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Compendium of Module 3

**Interpretation of Patent Documents from
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- The office of CGPDTM and WIPO in co-operation with FICCI organise roving seminars for creating public awareness about the Madrid Protocol... | Public Notice (14 August, 2013)
- Draft guideline for Computer Related Inventions (CRIs) | Feedbacks (08 August, 2013)
- Appointment Order for the post of Examiner in TMR (17 July, 2013)
- The provisions relating to the international registration of trademarks under the Madrid Protocol have come into force in India... (Notification) | (Public Notice) (08 July, 2013)
- CGPDTM publishes information received from Patentees regarding working of Patented inventions in accordance with section 146(3) of the Patents Act, 1970 read with rule 131(3) of the Patents Rules, 2003 for the year 2012 (24 June, 2013)
- Draft Patent (Amendment) Rules, 2013 have been notified. Comments are invited (12 June, 2013)

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1859	THE ACT MODIFIED AS ACT XV, PATENT MONOPOLIES CALLED EXCLUSIVE PRIVILEGES (MAKING, SELLING AND USING INVENTIONS IN INDIA AND AUTHORIZING OTHERS TO DO SO FOR 14 YEARS FROM DATE OF FILING SPECIFICATION).
1872	THE PATENTS & DESIGNS PROTECTION ACT.
1883	THE PROTECTION OF INVENTIONS ACT.
1888	CONSOLIDATED AS THE INVENTIONS & DESIGNS ACT.
1911	THE INDIAN PATENTS & DESIGNS ACT.
1972	THE PATENTS ACT (ACT 39 OF 1970) CAME INTO FORCE ON 20 TH APRIL 1972.
1999	ON MARCH 28, 1999 PATENTS (AMENDMENT) ACT, (1999) CAME INTO FORCE FROM 01-01-1999.
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1	81780	81780	A theft preventing device for automobiles or like vehicles.	16/04/1962
2	76446	76446	Device for changing the direction of the spot lamps of the automobiles with the movement of steering wheels.	28/04/1961
3	70969	70969	Improvements in or relating to automobiles or like vehicles fitted with theft prevention devices.	04/03/1960
4	62094	62094	Improvements in or relating to automobiles or like vehicles fitted with theft prevention devices.	13/02/1958
5	47938	47938	A device for using mineral fuel oils other than petrol in internal combustion engines for automobiles or the like.	30/08/1952
6	47799	47799	A device for the delivery of fuel into internal combustion engines particular automobile engines.	01/08/1952
7	405	405	Device for automobile fore-carriage.	29/07/1912
8	39787	39787	Improvements in a governor controlled valve device for application to an automobile vehicle pneumatic brake system.	05/06/1948
9	37711	37711	Anti-squeak and vibration dampening device for automobile bodies.	03/07/1947
10	3692	3692	Improvements in devices for controlling the speed of automobile vehicles.	27/05/1918
11	2521/DEL/2006	239413	"light filtering and strong light-preventing device for the front seat of an automobile."	23/11/2006
12	1000/CHE/2003	228600	Accelerator control kit as an alternate device for carburetor in an automobile	09/12/2003
13	2031/MUM/2006	227873	A device for controlling overspeeding of automobiles	12/12/2006
14	383/CHE/2003	221862	An automatic device for switching off the ignition system of an automobile whenever it comes to a halt over a continuous predetermined period of time	06/05/2003
15	3499/DEL/1998	217651	"a device for controlling the flow of gas and air mixture in the carburetor of an automobile"	23/11/1998



Details

Application Number 2031/MUM/2006

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PC Journal Number	Publication Date	Patent Number	Grant Date	Title Of Invention	Date Of Filing
10/2009	06/03/2009	227873	23/01/2009	A DEVICE FOR CONTROLLING OVERSPEEDING OF AUTOMOBILES	12/12/2006

Int Patent Classific Number	Pet Int Appl Number	Pet Int Filing Date
B60K31/00	N/A	N/A

Application Number	Dof Convention Country	Priority Country
		NA

Applicant Details

Name Of Patentee	Applicant Address
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Inventor Details

Inventor Name	Inventor Address
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Srinivasan Govindarajan	Bombay House, 24 Homi Mody Street, Hutatma Chowk, Mumbai 400 001, Maharashtra, India.
Deepak Suryakant Kulkarni	Bombay House, 24 Homi Mody Street, Hutatma Chowk, Mumbai 400 001, Maharashtra, India.
Sadagopan Krishnan	Bombay House, 24 Homi Mody Street, Hutatma Chowk, Mumbai 400 001, Maharashtra, India.

Abstract Text

Abstract Text
This invention relates to a device to control over speeding of vehicles. It consists of a unit having an input and an output means, a programmed speed limit valve, the output connected to electronic switches capable of causing misfire in the cylinders and thereafter deactivating the fuel supply to the engine to reduce the speed. When the speed limit goes below the predetermined limit the fuel supply switch is activated to restart the engine.

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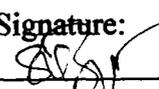
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FORM 1 THE PATENTS ACT 1970 (39 of 1970) & THE PATENTS RULES, 2003 APPLICATION FOR GRANT OF PATENT [See section 7, 54 & 135 and rule 20(1)]	(FOR OFFICE USE ONLY)
	Application No: 2031/MUM/1/2006 Filing Date: 12/12/06 Amount of Fee Paid: 4000/- CBR No: Signature: 27406 

1. APPLICANT(S)

Name	Nationality	Address
Tata Motors Limited	Indian	Bombay House, 24 Homi Mody Street, Hutatma Chowk, Mumbai 400 001, Maharashtra, India.

2. INVENTOR(S)

Name	Nationality	Address
Shankar Kamanna Kengar	Indian	Bombay House, 24 Homi Mody Street, Hutatma Chowk, Mumbai 400 001, Maharashtra, India
Srinivasan Govindarajan	Indian	
Deepak Suryakant Kulkarni	Indian	
Sadagopan Krishnan	Indian	

3. TITLE OF THE INVENTION

A Device for Controlling Overspeeding of Automobiles

4. ADDRESS FOR CORRESPONDENCE OF APPLICANT / AUTHORISED PATENT AGENT IN INDIA

DePENNING & DePENNING
 Alaknanda Building
 16 Nepean Sea Road
 Mumbai 400 036, INDIA

Telephone No.23678394
 Fax No.23644389
 Mobile No.
 E-mail:dandi@vsnl.net

5. PRIORITY PARTICULARS OF THE APPLICATION (S) FILED IN CONVENTION COUNTRY

Country	Application Number	Filing Date	Name of the Applicant	Title of the Invention
NA	-	-	-	-





**6. PARTICULARS FOR FILING PATENT COOPERATION TREATY (PCT)
NATIONAL PHASE APPLICATION**

International application number	International filing date as allotted by the receiving office
NA	-

7. PARTICULARS FOR FILING DIVISIONAL APPLICATION

Original (first) application number	Date of filing of Original (first) application
NA	-

8. PARTICULARS FOR FILING PATENT OF ADDITION

Main application / patent Number	Date of filing of main application
NA	-

9. DECLARATIONS:

(i) Declaration by the inventor(s)

I/We the above named inventor(s) is/are the true & first inventor(s) for this invention and declare that the applicant(s) herein is/are my/our assignee or legal representative.

Names

Signature

- Shankar Kamanna Kengar
- Srinivasan Govindarajan
- Deepak Suryakant Kulkarni
- Sadagopan Krishnan

(iii) Declaration by the applicants:

We, the applicants hereby declare that:-

- We are in possession of the above-mentioned invention.
- The complete specification relating to the invention is filed with this application.
- There is no lawful ground of objection to the grant of the Patent to us.
- We are the assignee or legal representative of true & first inventors.

10. FOLLOWING ARE THE ATTACHMENTS WITH THE APPLICATION:

- Complete specification (2) copies, No. of pages No. of Claims
- Drawings No. of sheets -

We hereby declare that to the best of our knowledge, information and belief the fact and matters stated herein are correct and We request that a patent may be granted to us for the said invention.

Dated this 12th day of December 2006

TATA MOTORS LIMITED

By their Agent & Attorney

K Karuna Gleria

(Karuna Gleria)

of DePENNING & DePENNING

To
The Controller of Patent
The Patent Office, at Mumbai

FORM 2

**THE PATENTS ACT 1970
(39 of 1970)
&
THE PATENTS RULES, 2003**

COMPLETE SPECIFICATION

(See Section 10; rule 13)

TITLE OF THE INVENTION

A device for controlling overspeeding of automobiles

APPLICANTS

TATA MOTORS LIMITED, an Indian company
having its registered office at Bombay House,
24 Homi Mody Street, Hutatma Chowk,
Mumbai 400 001 Maharashtra, India

INVENTORS

Mr. Shankar Kamanna Kengar, Mr. Srinivasan Govindarajan, Mr. Deepak Suryakant
Kulkarni, Mr. Sadagopan Krishnan all Indian nationals of TATA MOTORS
LIMITED, an Indian company, having its registered office
at Bombay House, 24 Homi Mody Street, Hutatma Chowk,
Mumbai 400 001 Maharashtra, India

PREAMBLE TO THE DESCRIPTION

The following Complete specification particularly describes the invention and the manner in
which it is to be performed.

FIELD OF INVENTION



This invention relates to a device for controlling overspeeding of automobiles. This device may be connected to carbureted engines, which do not include any other means for limiting speed. This device may also be attached to carbureted engines running on mono and bifuels like gasoline and CNG and gasoline and LPG.

BACKGROUND OF INVENTION



Unlike multipoint fuel injection engines and diesel engines, carbureted engines do not have speed control unit as an integral part of their design. Carbureted engines now find applications with alternate fuels such as CNG and LPG. The present trend is for high speed engines and highly offensive driving practice practiced by many city drivers, maximum speed limit and speed control of vehicles become an essential and life saving feature.

OBJECTS OF INVENTION



The main object of this invention is to limit engine speed at the desired and preset maximum, which is achieved by both operating and fuel controls governed by an electronic speed control means. This not only avoids overspeeding and resultant problems but also increases the engine life and fuel efficiency.

BRIEF DESCRIPTION OF INVENTION



This invention relates to a device for controlling overspeeding of automobiles which comprises an electronic over speed control unit connected to the engine of the automobile said unit having a signal receiving input means, an output means, said input means connected to a predetermined set of speed limits, a set of first electronic switches capable of triggering misfire in the first, second and third cylinders of the combustion engine sequentially to momentarily reduce the engine speed, means to monitor the misfire in the cylinder and atleast one switch to stop fuel supply to the engine when the predetermined speed limit exceeds said speed control unit being capable of deactuating the first series of electronic switches to restart the engine.

DESCRIPTION OF INVENTION



Detailed description of the device for controlling overspeed is given below in comparison with the existing systems.

Fig I of the accompanying drawings shows a schematic block diagram of the existing carbureted engine. Wherein reference letters D, E and C represent the distributor, engine and the coil respectively. Numerals 1, 2, 3, 4 and 5 represent the throttle, carburetor, fuel feed pump relay, fuel feed pump and high tension cables respectively.

The air and fuel quantity supplied to the engine governs the speed of the engine and that of the vehicle. The butterfly valve operated by the throttle thro' control linkage of the accelator pedal. Air and fuel supply to the engine is controlled by the opening of the butterfly valve. However in a carburetor engine fuel flow is governed by the

carburetor which is proportionate to the air flow power produced by the ignition of air and fuel provides speed. It is understood that when the throttle is opened more, increased quantity fuel and air is supplied to the engine resulting in high speed.

The block diagram shown in Fig 2 represents the carbureted engine with the device according to this invention connected thereto. Wherein D stands for the distributor and E for the engine. Reference letter EOSC shows the engine over speed controller i.e. speed control unit. Reference numerals 1, 2, 3, 4 and 5 stand for throttle, carburetor, fuel feed pump relay, fuel feed pump and high tension cable respectively. ES1 and ES2 stand for the first and second electronic switches. The engine over speed controller (EOSC) receives the speed signals from the engine as input and compares it with the predetermined maximum speed set point contained in the EOSC unit when the engine speed is less than the set value of maximum speed the unit remains inactive and no output signal is given. However, when the engine speed is equal or more than the set point, the electronic switch ES1 is activated such that the ignition system generates misfire in one cylinder to reduce the power generated by the engine momentarily by tending to reduce the engine speed. This control unit is pre-programmed, that the engine speed still is more than the maximum pre set value, yet another cylinder is triggered to misfire to impart better control over the engine speed. If the engine speed is still more than the maximum preset value, the third cylinder is also triggered to misfire in all the three cylinders for better speed control. This misfire is monitored for a pre determined time which is settable in the unit and if this time exceeds, the engine overspeed control unit deactivates an electronic switch ES2 to stop the fuel supply to the engine. This is in addition to the misfire in the cylinders and is aimed at positive reduction in engine speed. Once the speed limit is below the pre-

set value, ES2 is actuated to restart fuel supply. Simultaneously the misfire switches ES1 is deactuated to stop misfire and the engine restores its normal speed.

The block diagram shown in Fig 3 is applicable to conventional engines run on compressed natural gas fuels wherein D, C and E represent the distributor, coil and the engine respectively. Reference numbers 1, 2, 3, 4, 5 and 6 show the throttle, carburetor, gas shut off solenoid, gas air mixer, high tension cables and pressure regulator respectively.

Fig 4 is a block diagram incorporating the speed control unit of this invention. In addition to the parts described under Fig 3, this diagram shows ES1, ES2 and EOSC, which are as described under block diagram 2.

Fig 5 shows the diagram for Spark Ignition engine with bifuel operation with the engine over speed control device of this invention. Reference letters C D and E stand for coil, distributor and engine respectively while reference numbers 1, 2, 3, 4, 5 and 6 stand for throttle, carburetor, gas shut off solenoid, fuel shut of solenoid, gas air mixer, fuel feed pump, high tension cables and pressure regulator respectively, ES1 ES2 and ES21 are the electronic switches and EOSC is the speed control unit.

Dotted lines in all the figures 1 to 5 represent engine speed signal. Distributor of the engine may be an electronic or mechanical distributor.

Both mono fuel and bifuel operations can be controlled by this device and the fuels are gasoline, CNG and LPG either alone or in combination.

WE CLAIM



1. A device for controlling over speeding of automobiles comprising an electronic control unit (EOSC) having input interface to receive speed signal from a engine and output interfaces, said output interfaces connected to a first (ES1) and a second (ES2 or ES2') electronic switch for controlling ignition and fuel injection system of said engine respectively; said first electronic switch capable of triggering said ignition system to progressively misfire in consecutive cylinders of the combustion engine to momentarily reduce the engine speed when the engine speed is above pre-determined value, and said second electronic switch de-actuatable to stop fuel supply to the engine when the engine speed is above pre-determined value for a pre-determined time.
2. The device for controlling over speeding of automobiles as claimed in claim 1, wherein said electronic control actuate said second electronic switch to supply fuel to the engine when the speed limit is below the pre-determined value to restart the engine.
3. The device for controlling over speeding of automobiles as claimed in claim 1, wherein said ignition system consist of ignition coil, a distributor for controlling the ignition spark in the cylinders and spark plugs.
4. The device for controlling over speeding of automobiles as claimed in claim 5, wherein said distributor is an electronic or mechanical distributor.

Dated this 12th day of December 2006

TATA MOTORS LIMITED
By their Agent and Attorney

K Karuna Goleria

Karuna Goleria
of DePENNING & DePENNING

ABSTRACT



A Device For Controlling Over Speeding Of Automobiles

This invention relates to a device to control over speeding of vehicles. It consists of a unit having an input and an output means, a programmed speed limit valve, the output connected to electronic switches capable of causing misfire in the cylinders and thereafter deactuating the fuel supply to the engine to reduce the speed. When the speed limit goes below the predetermined limit the fuel supply switch is activated to restart the engine.

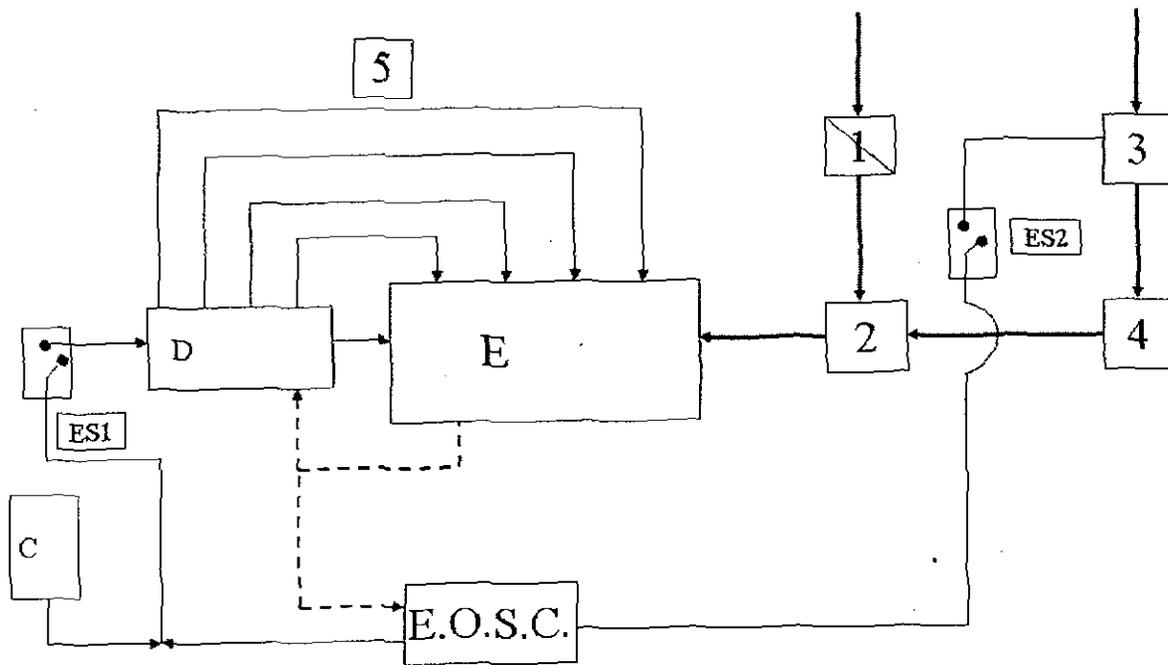


Fig. 2

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Figures 

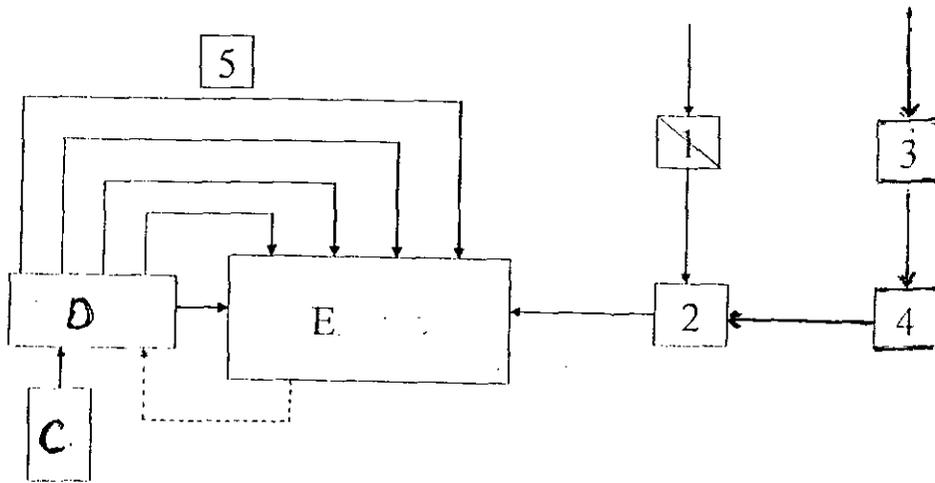


Fig. 1

K K Galaria

Karuna Galaria
of DePENNING & DePENNING
Agent for Applicants

22 JUL 2008

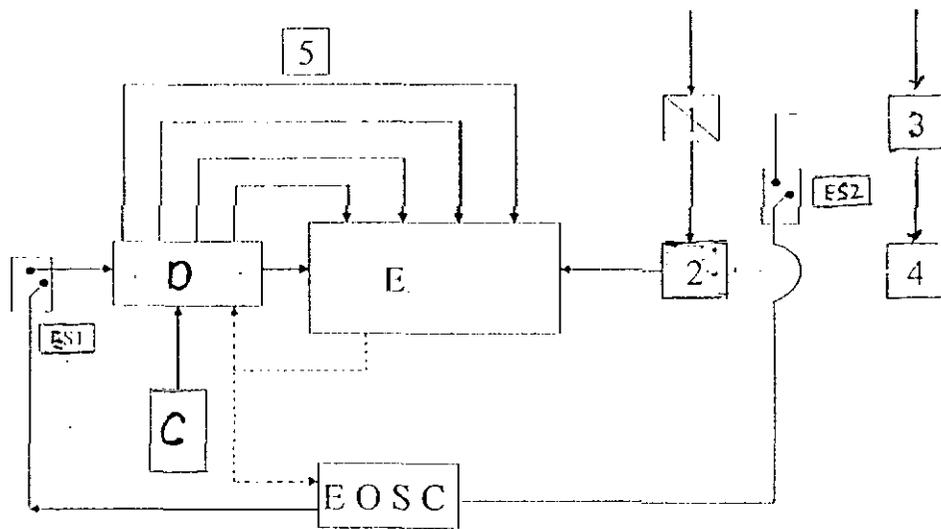


Fig. 2

22 JUL 2008

u u Goleria
Karuna Goleria
of DePENNING & DePENNING
Agent for Applicants

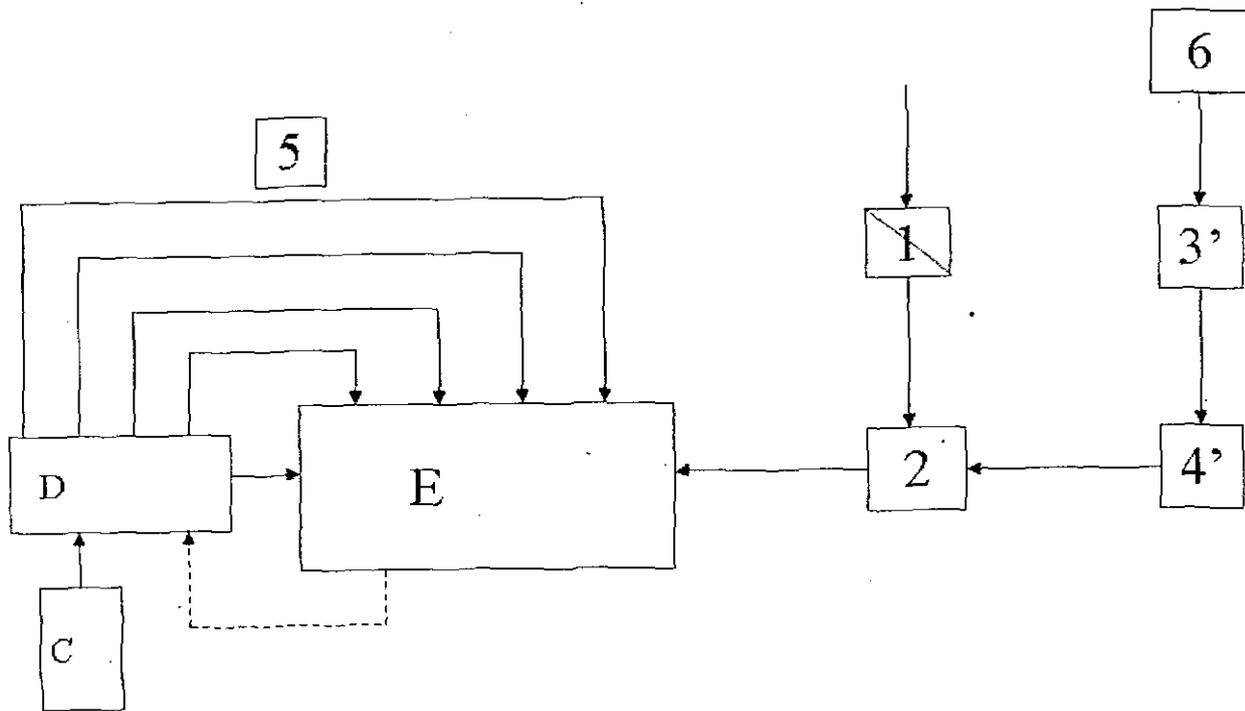


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K. G. Galaria

Karuna Galaria
of De PENNING & De PENNING
Agent for Applicants

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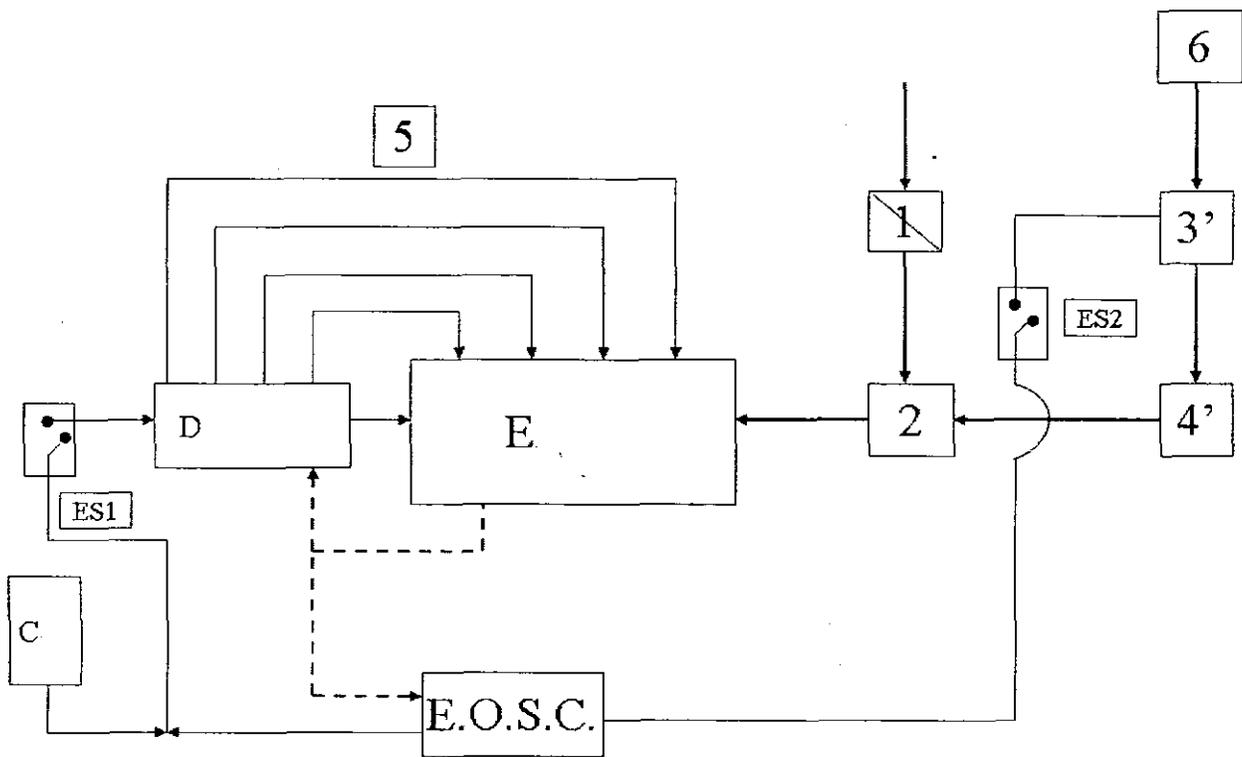


Fig. 4

U U Galaria

Karuna Galaria
of De PENNING & De PENNING
Agent for Applicants

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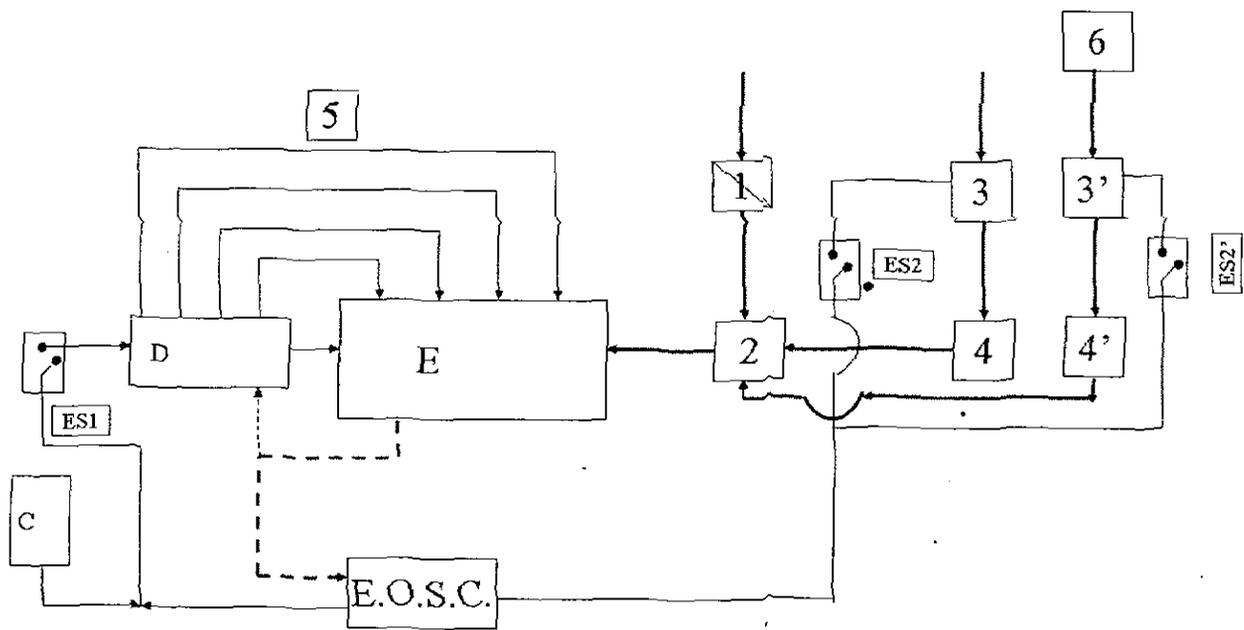


Fig. 5

U U Goleria

Karuna Goleria
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1. **Automobile** checking method and device by GPS technology

★ Inventor:	Applicant:	CPC:	IPC:	Publication info:	Priority date:
YANJUN LEI [CN]	XIAMEN YAXON NETWORKS CO		G01C21/26	CN101398973 (A)	2007-09-30
JIN LAN [CN] (+3)	LTD [CN]		G08Q10/00	2009-04-01	
			G08G1/00	CN101398973 (B)	
			(+2)	2012-05-09	

2. HYBRID **AUTOMOBILE** AND METHOD FOR CONTROLLING THE SAME

★ Inventor:	Applicant:	CPC:	IPC:	Publication info:	Priority date:
ITO TAKAO	TOYOTA MOTOR CORP	Y02T10/6265	B80K8/445	JP2008265652 (A)	2007-04-24
		Y02T10/6286	B80K8/52	2008-11-06	
		Y02T10/7077	B60L11/14		
			(+4)		

3. **Automobile** over-speed governor

★ Inventor:	Applicant:	CPC:	IPC:	Publication info:	Priority date:
JINHUI ZHONG [CN]	JINHUI ZHONG [CN]		G01P3/42	CN201016988 (Y)	2007-03-15
			G05B19/042	2008-02-06	
			G05B19/048		

4. POWER OUTPUT DEVICE AND **AUTOMOBILE** EQUIPPED WITH IT, AND CONTROL METHOD OF POWER OUTPUT DEVICE

★ Inventor:	Applicant:	CPC:	IPC:	Publication info:	Priority date:
MATSUMOTO KATSUNARI	TOYOTA MOTOR CORP	Y02T10/6286	B80K8/445	JP2005307874 (A)	2004-04-22
		Y02T10/7077	B80K8/448	2005-11-04	
			B60L11/14		
			(+9)		

5. Speed control device used for electric **automobiles** and method therefor

★ Inventor:	Applicant:	CPC:	IPC:	Publication info:	Priority date:
KIM CHANG-SOO [KR]	SAMSUNG HEAVY IND [KR]	B80L15/2009	B80L15/00	US5498941 (A)	1993-12-22
		B80L3/00	B80L15/20	1996-03-12	
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Automobile checking method and device by GPS technology

Page bookmark CN101398973 (A) - Automobile checking method and device by GPS technology

Inventor(s): YANJUN LEI [CN]; JIN LAN [CN]; TI XU [CN]; YU ZHANG [CN]; JIANCHENG YU [CN]

Applicant(s): XIAMEN YAXON NETWORKS CO LTD [CN]

Classification: - international: G01C21/26; G06Q10/00; G08G1/00; G08G1/01; G08G1/123
- cooperative:

Application number: CN2007109632.20070930

Priority number(s): CN2007109632 20070930

Also published as: CN101398973 (B)

Abstract of CN101398973 (A)

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The invention discloses a method used for checking motor vehicles by the Global Positioning System (GPS) technology and a device thereof. The method comprises that lane crossing and speed exceeding of a motor vehicle is judged and counted; the GPS data uploaded by a car sill, and the data of the practical number of runs, the pre-set route and the route nodes are used for comparing the running position with the pre-set route of the vehicle so as to judge the lane crossing situation, comparing the running speed of the vehicle and the speed limit of each highway section so as to judge the **overspeeding** situation of the vehicle, and then the lane crossing beginning time and ending time and the lane crossing duration of the vehicle are counted, and the **overspeeding** beginning and ending time and the **overspeeding** duration of the vehicle are counted,; so as to achieve the aim of checking vehicle operation.

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Description: CN101398973 (A) — 2009-04-01

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Automobile checking method and device by GPS technology

Description of CN101398973 (A)

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- [0001] 技术领域
- [0002] 本发明涉及一种汽车检查的方法及装置，特别是涉及使用GPS技术进行汽车检查的方法及装置。
- [0003] 背景技术
- [0004] 现有的汽车检查通常都需要统计、检查车辆行驶情况以及超速情况，以用于监测车辆是否在预定路线上行驶、是否在各路段进行行驶，这有助于车辆的规范行驶与安全驾驶。现有采用的统计、检查方法只能依靠路旁车辆或派工人工地上监督记录，该方法都存在其他不方便、检测费用高、检测不准、统计、检查麻烦、费时、成本高的不足。
- [0005] 发明内容
- [0006] 本发明提供一种使用GPS技术进行汽车检查的方法及装置，其克服了背景技术所存在的汽车检查麻烦、费时、成本高的不足。
- [0007] 本发明解决其技术问题所采用的技术方案是：一种使用GPS技术进行汽车检查的方法，该方法应用的装置包括中心系统和车载设备，车载设备设于汽车且与中心系统之间可实现数据传输，该方法包括：
- [0008] 路线设置步骤，在中心系统上设置并保存汽车信息、预定行驶路线；
- [0009] 行驶数据的接收与处理步骤，中心系统依次接收由车载设备依次上传的数据，每次接收的数据设置为一条行驶数据，每条行驶数据中都至少包括有GPS数据；中心系统逐条判断GPS数据是否位于预定行驶路线的预定范围内，如是则说明该条行驶数据为未审线，否则在该条行驶数据内设置审线标志以表示该条行驶数据为审线；保存上述各条行驶数据为各条行驶记录；以及
- [0010] 统计步骤，依据统计汽车信息和时间段查找出该汽车在该时间段内的多条行驶记录，逐条判断行驶记录中是否有审线标志，根据判断统计出该汽车在该时间段内的审线行驶时长。
- [0011] 本技术方案的一优选实施例中，该行驶数据的接收与处理步骤中，判断GPS数据是否位于预定行驶路线的预定范围内所采用的方法是：计算GPS数据到该预定路线的最短距离，再判断该最短距离是否在预定范围内，如是则说明该条行驶数据为未审线，否则在该条行驶数据内设置审线标志以表示该条行驶数据为审线。
- [0012] 本技术方案的一优选实施例中，该路线设置步骤，在中心系统上设置并保存汽车信息、预定行驶路线和行驶路线的各分段的限速；
- [0013] 该行驶数据的接收与处理步骤，它包括：
- [0014] 步骤P10，中心系统依次接收由车载设备依次上传的数据，每次接收的数据设置为一条行驶数据，每条行驶数据中都至少包括有GPS数据；
- [0015] 步骤P20，中心系统逐条判断GPS数据是否位于预定行驶路线的预定范围内，如是则说明该条行驶数据为未审线，然后执行P30，否则在该条行驶数据内设置审线标志以表示该条行驶数据为审线，然后执行P40；
- [0016] 步骤P30，查找出该GPS数据所处分段的限速，判断汽车的行驶速度是否大于该分段的限速，如是则在该条行驶数据内设置超速标志以表示该条行驶数据为超速，否则说明该条行驶数据为未超速；
- [0017] 步骤P40，保存上述各条行驶数据为各条行驶记录。
- [0018] 本技术方案的一优选实施例中，该统计步骤，它包括：
- [0019] 依据统计汽车信息和时间段查找出该汽车在该时间段内的多条行驶记录，逐条判断行驶记录中是否有审线标志，根据判断统计出该汽车在该时间段内的审线行驶时长；

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DESCRIPTION CN101398973

Technology

The present invention relates to an automobile inspection method and apparatus, in particular involving the use of GPS technology for automobile inspection method and apparatus.

BACKGROUND

Existing car carriers usually need to statistics, as well as inspection vehicles speeding string line to be used to monitor whether the vehicle is traveling on a specified route, whether speeding in various sections, which helps to regulate the vehicle driving and safety management.

Using existing statistics, inspection methods can only be sent a car to track vehicles or send employees on board oversight record, the detection of the presence of these methods are inconvenient, costly testing, testing allowed, statistics, audit troublesome and time-consuming, costly deficiencies.

SUMMARY OF THE INVENTION

The invention provides a technique for using a GPS car inspection method and apparatus which overcomes the background technology for automobile inspection cumbersome, time consuming, high cost less.

The present invention solves the technical problem of the technical solution adopted is: one uses GPS technology for automobile inspection methods, the method comprises the application of the system and the vehicle center piece of equipment, vehicles and automotive devices located in the center between the systems can be data transmission, the method comprising:

Route setup steps, set up in the center of the system and save the automotive information and reserve running route;

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Item	Inventor	Applicant	EC	IPC	Publication info	Priority date
1. Writing instrument for water-metachromatic members	KANITAKAO NAKASHIMA AKIO	PILOT INK CO LTD []		A63H33/00 A63H33/22 B41M3/00 (+8)	EP1867492 (A1) 2007-12-19	2000-10-04
2. Business management system	YOSHINO EIKO	TOHO BUSINESS MAN CT []		G06K9/20 G06K9/22 G06K9/62 (+1)	EP1793338 (A2) 2007-06-06 EP1793338 (A3) 2007-12-19	1997-11-13
3. Ball point pen	ANDO MASASHI	PILOT INK CO LTD []		B43K7/00 B43K7/01 C09D11/18	EP1621363 (A1) 2006-02-01	2003-10-22
4. Removing of Sleeves for Writing Devices	GANTZERT ERICH LANG WERNER (+1)	MERZ & KRELL GMBH & CO []		B29C33/44 B29C37/00 B29C45/26 (+6)	EP1151838 (A2) 2001-11-07 EP1151838 (A3) 2002-07-17	1996-05-23



The screenshot shows the detailed patent document page for EP1621363 (A1). The document title is 'Ball point pen'. The inventor is ANDO MASASHI and the applicant is PILOT INK CO LTD. The classification is B43K7/00; B43K7/01; C09D11/18. The application number is EP20050023973 20031022 and the priority number is JP20020307180 20021023. The document is also published as EP1413457 (A1). The abstract describes an ink tube with an ink follower and an elastic member. A technical drawing, FIG. 1, shows a cross-section of the ink tube with various components labeled.

Bibliographic data: EP1621363 (A1) — 2006-02-01

Ball point pen

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Inventor(s): ANDO MASASHI ±

Applicant(s): PILOT INK CO LTD [] ±

Classification: - international: B43K7/00; B43K7/01; C09D11/18
- European:

Application number: EP20050023973 20031022

Priority number(s): JP20020307180 20021023 30023995 20031022

Also published as: → EP1413457 (A1)

Abstract of EP1621363 (A1)

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Ink (7,107) and an ink follower (8,108) are reserved in an ink tube (8,106). An elastic member (4,104) urges a ball (3,103) forward. When an outflow of ink (7,107) is measured at intervals of a writing distance of 100 m, the value of outflow of ink (7,107) per writing distance of 100 m until a measurement time just before outflow of 80% of the amount of charged ink (7,107) from the start of writing is selected to be in a range between a value smaller by 20 mg than the outflow of ink (7,107) in the writing distance range of from 0 m to 100 m and a value larger by 20 mg than the outflow of ink (7,107) in the writing distance range of from 0 m to 100 m.

FIG. 1

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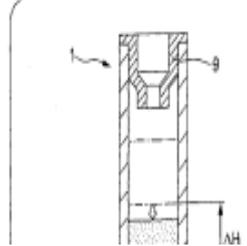
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(43) Date of publication: 01.02.2006 Bulletin 2006/05	(51) Int Cl.: B43K 7/01 (2006.01) C09D 11/18 (2006.01)	
(21) Application number: 05023973.0		
(22) Date of filing: 22.10.2003		
(84) Designated Contracting States: DE FR GB IT	(72) Inventor: Ando, Masashi Showa-ku Nagaya-shi Aichi (JP)	
(30) Priority: 22.10.2002 JP 2002307180	(74) Representative: HOFFMANN EITLE Patent- und Rechtsanwälte Arabellastrasse 4 81925 München (DE)	
(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC: 03023995.8 / 1 413 457	<u>Remarks:</u> This application was filed on 03 - 11 - 2005 as a divisional application to the application mentioned under INID code 62.	
(71) Applicant: THE PILOT INK CO., LTD. Nagoya-shi, Aichi-ken (JP)		
(54) Ball point pen		
(57) Ink (7,107) and an ink follower (8,108) are reserved in an ink tube (6,106). An elastic member (4,104) urges a ball (3,103) forward. When an outflow of ink (7,107) is measured at intervals of a writing distance of 100 m, the value of outflow of ink (7,107) per writing distance of 100 m until a measurement time just before outflow of 80% of the amount of charged ink (7,107) from the start of writing is selected to be in a range between a value smaller by 20 mg than the outflow of ink (7,107) in the writing distance range of from 0 m to 100 m and a value larger by 20 mg than the outflow of ink (7,107) in		



(11) **EP 1 621 363 A1**

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(43) Date of publication: **01.02.2006** Bulletin 2006/05

(51) Int Cl.: **B43K 7/01 (2006.01)** **C09D 11/18 (2006.01)**

(21) Application number: **05023973.0**

(22) Date of filing: **22.10.2003**

(84) Designated Contracting States:
DE FR GB IT

(72) Inventor: **Ando, Masashi**
Showa-ku
Nagaya-shi
Aichi (JP)

(30) Priority: **22.10.2002 JP 2002307180**

(74) Representative: **HOFFMANN EITLE**
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81925 München (DE)

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:
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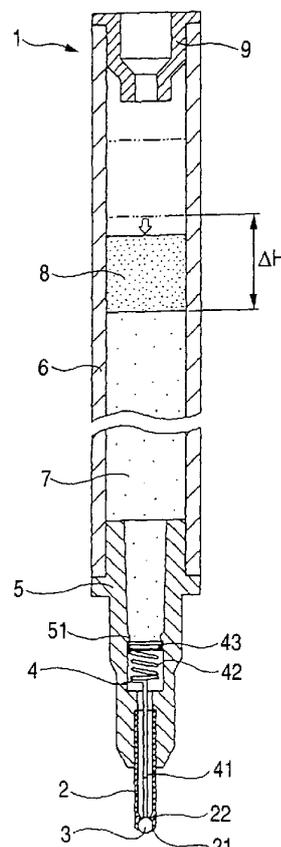
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(54) **Ball point pen** ← Title of Patent

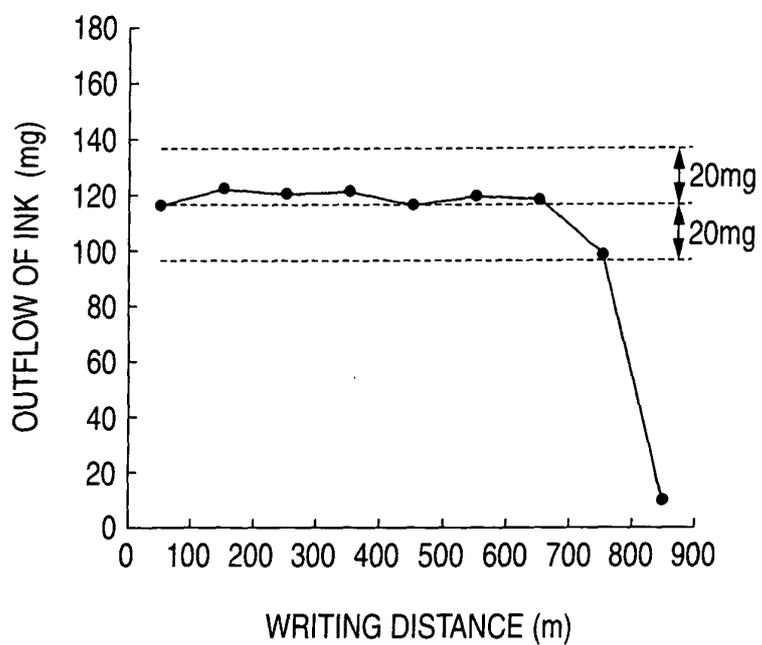
(57) Ink (7,107) and an ink follower (8,108) are reserved in an ink tube (6,106). An elastic member (4,104) urges a ball (3,103) forward. When an outflow of ink (7,107) is measured at intervals of a writing distance of 100 m, the value of outflow of ink (7,107) per writing distance of 100 m until a measurement time just before outflow of 80% of the amount of charged ink (7,107) from the start of writing is selected to be in a range between a value smaller by 20 mg than the outflow of ink (7,107) in the writing distance range of from 0 m to 100 m and a value larger by 20 mg than the outflow of ink (7,107) in the writing distance range of from 0 m to 100 m.

FIG. 1



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FIG. 4



Description

BACKGROUND OF THE INVENTION



5 [0001] The present invention relates to a ball point pen having low-viscosity ink directly reserved in an ink tube, and an ink follower disposed at a rear end of the ink.

[0002] In the conventional art, as disclosed in JP-Y2-2555677 (Japanese Registered Utility Model Publication Number:2555677), a ball point pen has a paste-like backflow preventing agent disposed in an ink tube charged with ink in front of the backflow preventing agent, a tip fixed to a front end of the ink tube while rotatably holding a ball partially protruding from a front end of the tip, and a spring for urging the ball to come into contact with an inward front end edge of the tip when the ball point pen is not used. Further, low-viscosity aqueous ink is charged in the ink tube.

10 [0003] In the conventional-art ball point pen, low-viscosity aqueous ink is charged. Accordingly, abundant ink outflow characteristic can be satisfied when writing starts. There is however the possibility that scratchiness may occur in writing at an early stage after the start of writing because ink outflow characteristic has a tendency to decrease gradually as the head of ink (i.e., water head pressure of ink applied on the pen point) decreases gradually after the start of writing.

15 [0004] To eliminate the scratchiness in writing, it may be conceived that the gap between the inner surface of the front end edge portion and the ball is formed largely in advance. In this case, there is however the possibility that blur may occur in writing because the outflow of ink is too much after the start of writing.

SUMMARY OF THE INVENTION



20 [0005] The present invention is developed to solve the problem in the conventional art and an object of the invention is to provide a ball point pen in which there is no possibility of occurrence of scratchiness and blur in writing until almost consumption of charged ink after the start of writing, even though low-viscosity ink is charged in the ball point pen.

25 [0006] The inventor has made eager examination to solve the problem. As a result, it has been found that occurrence of scratchiness and blur in writing can be suppressed when an outflow of ink (i.e., the amount of consumed ink) until almost consumption of charged ink after the start of writing is specified. The inventor has further paid attention to the fact that the decrement of the head of ink and the increase of the gap between the inner surface of the front end edge portion and the ball (i.e., abrasion of the ball seat) are intimately related to the outflow of ink. As a result, it has been found that the outflow of ink until almost consumption of charged ink after the start of writing can be kept in a proper range to suppress occurrence of scratchiness and blur in writing when the decrement of the head of ink and the increase of the gap between the inner surface of the front end edge portion and the ball are specified.

30 (1) That is, according to a first aspect, the invention provides a ball point pen 1 including: a tip body 2 including a front end edge portion 21 and a ball seat 22 provided inward at a front end, and a ball 3 rotatably held in the front end edge portion 21 and the ball seat 22; an ink tube 6 formed so that the tip body 2 is provided at a front end of the ink tube 6; ink 7 reserved in the ink tube 6; an ink follower 8 disposed at a rear end of the ink 7 and advancing with consumption of the ink 7; and an elastic member 4 for urging the ball 3 forward to bring the ball 3 into close contact with an inner surface of the front end edge portion 21 of the tip body 2, wherein the value of outflow of ink per writing distance of 100 m until a measurement time just before outflow of 80 % of the amount of charged ink from the start of writing in the case where an outflow of ink is measured at intervals of a writing distance of 100 m is selected to be in a range between a value smaller by 20 mg than the outflow of ink in the writing distance range of from 0 m to 100 m and a value larger by 20 mg than the outflow of ink in the writing distance range of from 0 m to 100 m.

35 According to the first aspect, the outflow of ink until almost consumption of charged ink after the start of writing can be kept in a proper range to thereby suppress occurrence of scratchiness and blur in writing.

If the outflow of ink per writing distance of 100 m is smaller than a value smaller by 20 mg than the outflow of ink in the writing distance range of from 0 m to 100 m, there is the possibility that scratchiness may occur in writing because the outflow of ink decreases remarkably compared with that at the time of the start of writing. On the contrary, if the outflow of ink per writing distance of 100 m is larger than a value larger by 20 mg than the outflow of ink in the writing distance range of from 0 m to 100 m, there is the possibility that blur may occur in writing because the outflow of ink increases remarkably compared with that at the time of the start of writing.

40 The phrase "a measurement time just before outflow of 80 % of the amount of charged ink from the start of writing in the case where an outflow of ink is measured at intervals of a writing distance of 100 m" is used for specifying the writing distance in the case where almost of charged ink is consumed.

45 The writing distance range in the case where almost of charged ink is consumed may be more preferably set "a measurement time just after outflow of 80 % of the amount of charged ink from the start of writing in the case where an outflow of ink is measured at intervals of a writing distance of 100 m" in order to elongate the writing-enabled

distance in which the outflow of ink can be kept in a proper range.

(2) Preferably, in a second aspect, in addition to the first aspect, in the ball point pen according to the invention, the decrement ΔH of the head of ink per writing distance of 100 m until a measurement time just before outflow of 80 % of the amount of charged ink from the start of writing in the case where an outflow of ink is measured at intervals of a writing distance of 100 m is selected to be in a range of from 3 mm to 12 mm.

According to the second aspect, occurrence of scratchiness and blur in writing can be surely prevented until almost of charged ink is consumed after the start of writing.

If the decrement ΔH of the ink head per writing distance of 100 m is smaller than 3 mm, there is the possibility that scratchiness may occur in writing easily because the outflow of ink from the front end of the tip body 2 is too little.

On the contrary, if the decrement ΔH of the ink head per writing distance of 100 m is larger than 12 mm, there is the possibility that blur may occur in writing easily because the outflow of ink from the front end of the tip body 2 is too much.

The phrase "the decrement ΔH of the ink head per writing distance of 100 m" means an average of descending speed of the ink head due to writing in a time range of from the start of writing to a measurement time just before consumption of 80 % of the amount of charged ink in the case where an outflow of ink is measured at intervals of a writing distance of 100 m. The term "ink head" used herein means a height (mm) of the rear end of ink from the pen point when the ball point pen is placed with the pen point down.

(3) Preferably, in a third aspect, in addition to the second aspect, in the ball point pen 1 according to the invention, the increment ΔC of longitudinal movable length C of the ball 3 at a front end of the tip body 2 per writing distance of 100 m until a measurement time just before outflow of 80 % of the amount of charged ink from the start of writing in the case where an outflow of ink is measured at intervals of a writing distance of 100 m is selected to be in a range of from 0.1 μm (0.0001mm) to 1.5 μm (0.0015mm) (more preferably in a range of from 0.1 μm to 1.0 μm , further preferably in a range of from 0.1 μm to 0.5 μm).

According to (3), the outflow of ink can be more surely set in a proper range until almost of charged ink is consumed after the start of writing, so that occurrence of scratchiness and blur in writing can be prevented.

If the increment ΔC of longitudinal movable length C of the ball 3 at the front end of the tip body 2 per writing distance of 100 m is smaller than 0.1 μm , the outflow of ink cannot be kept constant because the increment of the gap between the ball 3 and the inner surface of the front end edge portion 21 due to writing is excessively small so that the outflow of ink decreases gradually according to writing with the decrement of the ink head due to writing.

On the contrary, if the increment ΔC of longitudinal movable length C of the ball 3 at the front end of the tip body 2 per writing distance of 100 m is larger than 1.5 μm , the outflow of ink cannot be kept constant because the increment of the gap between the ball 3 and the inner surface of the front end edge portion 21 due to writing is excessively large so that the outflow of ink increases gradually according to writing to overcome the function of decreasing the ink head due to writing.

That is, in the ball point pen 1 as in (3), the function of gradually decreasing the outflow of ink due to the descending of the ink head and the function of gradually increasing the outflow of ink due to the abrasion of the ball seat 22 are balanced with each other so that the outflow of ink can be kept approximately constant.

The phrase "the increment ΔC of longitudinal movable length C of the ball 3 at the front end of the tip body 2 per writing distance of 100 m" means an average of increasing speed of the gap between the ball 3 and the inner surface of the front end edge portion 21 (i.e., abrading speed of the ball seat 22 due to writing).

(4) Preferably, in a fourth aspect, in addition to the afore mentioned aspects, in the ball point pen 1 according to the invention, the viscosity of the ink 7 at 20°C is selected to be in a range of from 1 mPa·s to 50 mPa·s.

According to (4), because the viscosity of the ink 7 is low, ink follow-up characteristic is improved so that smooth writing can be made without scratchiness in writing even in the case where writing is made at a high speed.

(5) Preferably, in a fifth aspect, in addition to one of first to third aspects, in the ball point pen 1 according to the invention, the viscosity of the ink 7 measured at 20°C at a rotational speed of 100 rpm by an E-type rotational viscometer is selected to be in a range of from 3 mPa·s to 160 mPa·s, and the shear-thinning index of the ink 7 is selected to be in a range of from 0.80 to 0.99.

[0007] According to (5), because the viscosity of the ink 7 is low, ink follow-up characteristic is improved so that smooth writing can be made without scratchiness in writing even in the case where writing is made at a high speed.

[0008] Incidentally, the shear-thinning index n is a value calculated according to an experimental equation $T = K\dot{\gamma}^n$ (in which K is a constant calculated) derived by rheological measurement of shear stress (T) and shear rate ($\dot{\gamma}$) with a viscometer. Incidentally, specific examples of the E-type rotational viscometer include an EM-type rotational viscometer, an EL-type rotational viscometer, and an EH-type rotational viscometer.

BRIEF DESCRIPTION OF THE DRAWING



[0009]

- 5 Fig. 1 is a vertical sectional view showing a ball point pen according to a first embodiment of the invention.
 Fig. 2 is an enlarged vertical sectional view showing a front end of a tip body in the ball point pen depicted in Fig. 1.
 Fig. 3 is an enlarged sectional view taken along the line A-A in Fig. 2.
 Fig. 4 is a graph showing the relation between writing distance and outflow of ink in the case where a ball having an outer diameter of 0.5 mm is used in the ball point pen depicted in Fig. 1.
 10 Fig. 5 is a graph showing the relation between writing distance and outflow of ink in the case where a ball having an outer diameter of 0.7 mm is used in the ball point pen depicted in Fig. 1.
 Fig. 6 is a vertical sectional view showing a ball point pen according to a second embodiment of the invention.
 Fig. 7 is an enlarged vertical sectional view showing a front end of a tip body in the ball point pen depicted in Fig. 6.
 Fig. 8 is an enlarged sectional view taken along the line B-B in Fig. 7.
 15 Fig. 9 is a graph showing the relation between writing distance and outflow of ink in the case where a ball having an outer diameter of 0.5 mm is used in the ball point pen depicted in Fig. 6.
 Fig. 10 is a graph showing the relation between writing distance and outflow of ink in the case where a ball having an outer diameter of 0.7 mm is used in the ball point pen depicted in Fig. 6.

- 20 **[0010]** Note that in the drawings, reference numeral 1 denotes a ball point pen, 2 a tip body, 21 a front end edge portion, 22 a inward protrusion (ball seat), 23 an ink flow gap, 24 a center hole, 3 a ball, 4 an elastic member, 41 a rear portion, 42 a coil portion, 43 a swollen portion, 5 a holder, 51 a lock protrusion, 6 an ink tube, 7 an ink, 8 an ink follower and 9 a tail plug.



DESCRIPTION OF THE PREFERRED EMBODIMENT

- [0011]** A mode for carrying out the invention will be described with reference to the drawings.
[0012] Fig. 1 to Fig.5 show a first embodiment of the invention.
[0013] In this embodiment, a ball point pen 1 includes a tip body 2 formed so that a ball 3 is rotatably held in a front end portion of the tip body 2, a holder 5 formed so that a rear portion of the tip body 2 is forced and fixed into a front opening portion of the ink tube 6, ink 7 reserved in the ink tube 6, an ink follower 8 disposed so as to be received in the ink tube 6, an elastic member 4 (spring) disposed in the inside of the tip body 2 and the inside of the holder 5, and a tail plug 9 forced and fixed into a rear end opening portion of the ink tube 6.
 30 **[0014]** The ink tube 6 is shaped like a right circular cylinder having opposite ends opened and is formed by extrusion molding of a synthetic resin. The rear portion of the holder 5 having the tip body 2 is forced and fixed into the front end opening portion of the ink tube 6. On the other hand, the tail plug 9 having an air hole formed to pierce the tail plug 9 is forced and fixed into the rear end opening portion of the ink tube 6. In the invention, the inner diameter of the ink tube 6 is effectively selected to be in a range of from 4 mm to 6 mm. In this embodiment, a tube having an inner diameter of
 40 4.4 mm is used as the ink tube 6.
[0015] The inside of the ink tube 6 is charged with the ink 7 and the ink follower 8. The ink 7 is aqueous ink having a viscosity of 3.5mPa·s at 20°C in a B type rotational viscometer or aqueous ink having a viscosity of 9 mPa·s at 20°C at a rotational speed of 100 rpm in an EL type rotational viscometer and a shear-thinning index of 0.97. The ink follower 8 is made of a high-viscosity fluid disposed at the rear end of the ink 7 and advancing with consumption of the ink 7.
 45 Alternatively, the ink follower 8 maybe made of a combination of a high-viscosity fluid and a solidmatter stored in the inside of the high-viscosity fluid or may be made of a solid matter that can slide on the inner wall of the ink tube 6. Dye type ink is preferred to pigment type ink as the ink 7 from the point of view of obtaining moderate abrasion of a ball seat 22. In this embodiment, aqueous dye ink is used as the ink 7.
[0016] The tip body 2 is made of a right circular cylindrical small tube of a metal (e.g., austenitic stainless steel such as SUS304 or SUS321). Four inward protrusions 22 (i.e., ball seat) are formed at regular circumferential intervals on an inner surface near a front end of the tip body 2 by deformation due to inward pressing. An annular inward front end edge portion 21 is formed at a front end portion of the tip body 2 by deformation due to inward pressing. The ball 3 is held in a portion (i.e., ball holding portion) between the inner surface of the front end edge portion 21 and the front surface of the inwardprotrusions 22 so that the ball 3 can rotate and move back and forth.
 50 **[0017]** In the invention, the outer diameter of the ball 3 is preferably selected to be in a range of from 0.5 mm to 0.7 mm. In this embodiment, a ball having an outer diameter of 0.5 mm and a ball having an outer diameter of 0.7 mm are used. The movable length C by which the ball 3 having an outer diameter of from 0.5 mm to 0.7 mm can move back and forth is preferably selected to be in a range of from 10 μm to 20 μm. In the ball 3 having an outer diameter of 0.5

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mm, an outflow of ink per 100 m is preferably selected to be in a range of from 95 mg to 135 mg from the point of view of preventing scratchiness and blur in writing. In the ball 3 having an outer diameter of 0.7 mm, an outflow of ink per 100 m is preferably selected to be in a range of from 135 mg to 175 mg from the point of view of preventing scratchiness and blur in writing.

5 **[0018]** Ink flow gaps 23 are formed between the inward protrusions 22 so as to extend from the center portion outward radially in four directions. A rod portion 41 of the elastic member 4 is inserted into the center side of the ink flow gaps 23. A front end of the rod portion 41 abuts on the rear surface of the ball 3 to thereby urge the ball 3 forward.

[0019] The holder 5 is a cylinder obtained by injection molding of a synthetic resin. The holder 5 has a tapered front portion to which the tip body 2 is attached, a collar portion abutting on a front end surface of the ink tube 6, and a rear portion forced into the front end opening portion of the ink tube 6. A tip mount hole having a front end opened to the outside and an ink flow hole having a front end communicating with the tip mount hole and a rear end opened to the outside are provided in the inside of the holder 5. A plurality of lock protrusions 51 (e.g., four lock protrusions 51) disposed so as to be distributed circumferentially are integrally formed on an inner surface of an intermediate portion of the ink flow hole.

15 **[0020]** The elastic member 4 is made of a stainless steel wire material having a wire diameter of 0.14 mm. The elastic member 4 has a rod portion 41 as a front portion, and a coil portion 42 as a rear portion integrated with the rod portion 41. A swollen portion 43 is formed at a rear end portion of the coil portion 42 so that the outer diameter of the swollen portion 43 is set to be larger than that of the coil portion 42 in front of the swollen portion 43. The swollen portion 43 is formed by such end turning that pieces of the wire material adhere closely to each other. The swollen portion 43 climbs over the lock protrusions 51 on the inner surface of the holder 5 from the rear portion of the holder 5 and is locked by the lock protrusions 51. Although this embodiment has been described on the case where the elastic member 4 has a rod portion 41 and a coil portion 42, the invention may be also applied to the case where the elastic member 4 has only a rod portion 41, that is, the elastic member 41 has no coil portion 42. Although this embodiment has been described on the case where the elastic member 4 is made of a metal, the invention may be also applied to the case where the elastic member 4 is made of another material such as synthetic resin, synthetic rubber or elastomer.

20 **[0021]** In the ball point pen 1 according to this embodiment, when writing is not made, the ball 3 pressed forward by the rod portion 41 of the elastic member 4 comes into close contact with the inner surface of the front end edge portion 21 to thereby seal the pen point. Accordingly, even in the case where the ball point pen 1 is kept with the pen point down, ink can be prevented from leaking from the pen point. In addition, even in the case where the ball point pen 1 is kept with the pen point up, air can be prevented from entering through the pen point.

25 **[0022]** The elastic force of the elastic member 4 is preferably selected to be in a range of from 15 g to 45 g (more preferably, in a range of from 25 g to 40 g). In this embodiment, the elastic force of the elastic member 4 is set at 35 g which is a relatively high value. As a result, sealing characteristic between the ball 3 and the inner surface of the front end edge portion 21 is improved. In addition, the force (writing pressure) for pressing the ball 3 backward is weakened by the elastic member 4 to relax the contact force of the ball 3 with the ball seat 22 to thereby suppress the abrasion of the ball seat 22.

(Measurement of Outflow of Ink)

40 **[0023]** An outflow of ink was measured at intervals of a writing distance of 100 m by a writing tester (writing speed: 4 m/min, writing load: 100 g, writing angle: 70°) in the condition that writing was performed spirally with the ball point pen 1 according to this embodiment. A ball having an outer diameter of 0.5 mm and a ball having an outer diameter of 0.7 mm were used as two kinds of balls 3. In each of the two kinds of balls 3, the amount of ink charged was set at 950 mg. Tables 1 and 2 and Figs. 4 and 5 show results of the measurement.

45 (1) Ball with Outer Diameter of 0.5 mm (see Table 1 and Fig. 4)

[0024]

50 [Table 1]

Writing Distance (m)	Outflow of Ink (mg)	Accumulated Outflow of Ink (mg)
0-100	117	117
100 - 200	123	240
200 - 300	121	361
300 - 400	122	483

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Table continued

Writing Distance (m)	Outflow of Ink (mg)	Accumulated Outflow of Ink (mg)
400 - 500	117	600
500 - 600	120	720
600 - 700	119	839
700 - 800	99	938
800 - 900	10	948

· Writing Distance at 80 % of the Amount of Charged Ink

[0025] Because 80 % of the amount (950 mg) of charged ink is 760 mg, it is obvious from the accumulated outflow of ink shown in Table 1 that the range of writing distance at a measurement time just before outflow of 80 % of the amount of charged ink after the start of writing is from 500 m to 600 m. Accordingly, when an outflow of ink is measured at intervals of a writing distance of 100 m, the range of writing distance until the measurement time just before outflow of 80 % of the amount of charged ink from the start of writing is from 0 m to 600 m.

[0026] Because 80 % of the amount (950 mg) of charged ink is 760 mg, it is obvious from the accumulated outflow of ink shown in Table 1 that the range of writing distance at a measurement time just after outflow of 80 % of the amount of charged ink after the start of writing is from 600 m to 700 m. Accordingly, when an outflow of ink is measured at intervals of a writing distance of 100 m, the range of writing distance until the measurement time just after outflow of 80 % of the amount of charged ink from the start of writing is from 0 m to 700 m.

· Outflow of Ink

[0027] A measured value of outflow of ink per writing distance of 100 m in the writing distance range of from 0 m to 600 m is from 117 mg to 123 mg. This value is in a range between a value (97 mg) smaller by 20 mg than the outflow (117 mg) of ink in the writing distance range of from 0 m to 100 m and a value (137 mg) larger by 20 mg than the outflow (117 mg) of ink in the writing distance range of from 0 m to 100 m (see Fig. 4).

[0028] A measured value of outflow of ink per writing distance of 100 m in the writing distance range of from 0 m to 700 m is from 117 mg to 123 mg. This value is in a range between a value (97 mg) smaller by 20 mg than the outflow (117 mg) of ink in the writing distance range of from 0 m to 100 m and a value (137 mg) larger by 20 mg than the outflow (117 mg) of ink in the writing distance range of from 0 m to 100 m (see Fig. 4).

· Decrement ΔH of Ink Head

[0029] The decrement of the head of ink in the writing distance range of from 0 m to 600 m is 45.6 mm so that the decrement ΔH of the ink head per 100 m is 7.6 mm.

[0030] The decrement of the ink head in the writing distance range of from 0 m to 700 m is 53.2 mm so that the decrement ΔH of the ink head per 100 m is 7.6 mm.

· Increment ΔC of Longitudinal Movable Length C of Ball

[0031] The longitudinal movable length C of the ball 3 is 14.5 μm before the start of writing and 15.6 μm just after the writing distance of 600 m. Accordingly, the increment ΔC of the longitudinal movable length C of the ball 3 is 1.1 μm in the writing distance range of from 0 m to 600 m so that the increment ΔC of the longitudinal movable length C of the ball 3 per 100 m is 0.18 μm .

[0032] The longitudinal movable length C of the ball 3 is 14.5 μm before the start of writing and 15.8 μm just after the writing distance of 700 m. Accordingly, the increment ΔC of the longitudinal movable length C of the ball 3 is 1.3 μm in the writing distance range of from 0 m to 700 m so that the increment ΔC of the longitudinal movable length C of the ball 3 per 100 m is 0.19 μm .

(2) Ball with Outer Diameter of 0.7 mm (see Table 2 and Fig. 5)

[0033]

[Table 2]

Writing Distance (m)	Outflow of Ink (mg)	Accumulated Outflow of Ink (mg)
0 - 100	163	163
100 - 200	161	324
200 - 300	159	483
300 - 400	157	640
400 - 500	151	791
500 - 600	120	911

· Writing Distance at 80 % of the Amount of Charged Ink

[0034] Because 80 % of the amount (950 mg) of charged ink is 760 mg, it is obvious from the accumulated outflow of ink shown in Table 2 that the range of writing distance at a measurement time just before outflow of 80 % of the amount of charged ink after the start of writing is from 300 m to 400 m. Accordingly, when an outflow of ink is measured at intervals of a writing distance of 100 m, the range of writing distance until the measurement time just before outflow of 80 % of the amount of charged ink from the start of writing is from 0 m to 400 m.

[0035] Because 80 % of the amount (950 mg) of charged ink is 760 mg, it is obvious from the accumulated outflow of ink shown in Table 2 that the range of writing distance at a measurement time just after outflow of 80 % of the amount of charged ink after the start of writing is from 400 m to 500 m. Accordingly, when an outflow of ink is measured at intervals of a writing distance of 100 m, the range of writing distance until the measurement time just after outflow of 80 % of the amount of charged ink from the start of writing is from 0 m to 500 m.

· Outflow of Ink

[0036] A measured value of outflow of ink per writing distance of 100 m in the writing distance range of from 0 m to 400 m is from 157 mg to 163 mg. This value is in a range between a value (143 mg) smaller by 20 mg than the outflow (163 mg) of ink in the writing distance range of from 0 m to 100 m and a value (183 mg) larger by 20 mg than the outflow (163 mg) of ink in the writing distance range of from 0 m to 100 m (see Fig. 5).

[0037] A measured value of outflow of ink per writing distance of 100 m in the writing distance range of from 0 m to 500 m is from 151 mg to 163 mg. This value is in a range between a value (143 mg) smaller by 20 mg than the outflow (163 mg) of ink in the writing distance range of from 0 m to 100 m and a value (183 mg) larger by 20 mg than the outflow (163 mg) of ink in the writing distance range of from 0 m to 100 m (see Fig. 5).

· Decrement ΔH of Ink Head

[0038] The decrement ΔH of the ink head in the writing distance range of from 0 m to 400 m is 40.8 mm so that the decrement ΔH of the ink head per 100 m is 10.2 mm.

[0039] The decrement ΔH of the ink head in the writing distance range of from 0 m to 500 m is 51.0 mm so that the decrement ΔH of the ink head per 100 m is 10.2 mm.

· Increment ΔC of Longitudinal Movable Length C of Ball

[0040] The longitudinal movable length C of the ball 3 is 16.9 μm before the start of writing and 18.1 μm just after the writing distance of 400 m. Accordingly, the increment ΔC of the longitudinal movable length C of the ball 3 is 1.2 μm in the writing distance range of from 0 m to 400 m so that the increment ΔC of the longitudinal movable length C of the ball 3 per 100 m is 0.3 μm .

[0041] The longitudinal movable length C of the ball 3 is 16.9 μm before the start of writing and 18.4 μm just after the writing distance of 500 m. Accordingly, the increment ΔC of the longitudinal movable length C of the ball 3 is 1.5 μm in the writing distance range of from 0 m to 500 m so that the increment ΔC of the longitudinal movable length C of the ball 3 per 100 m is 0.3 μm .

[0042] Fig. 6 to Fig. 10 show a second embodiment of the invention.

[0043] In this embodiment, a ball point pen 1 includes a tip body 102 formed so that a ball 103 is rotatably held in a front end portion of the tip body 102, a holder 105 formed so that a rear portion of the tip body 102 is forced and fixed

into a front portion of the holder 105, an ink tube 106 formed so that a rear portion of the holder 105 is forced and fixed into a front end opening portion of the ink tube 106, ink 107 reserved in the ink tube 106, an ink follower 108 disposed in the ink tube 106, an elastic member 104 (spring) disposed to be received in the inside of the tip body 102 and the inside of the holder 105, and a tail plug 109 forced and fixed into a rear end opening portion of the ink tube 106.

5 **[0044]** The ink tube 106 is shaped like a right circular cylinder having opposite ends opened and is formed by extrusion molding of a synthetic resin. The rear portion of the holder 105 having the tip body 102 is forced and fixed into the front end opening portion of the ink tube 106. On the other hand, the tail plug 109 having an air hole formed to pierce the tail plug 109 is forced and fixed into the rear end opening portion of the ink tube 106. In the invention, the inner diameter of the ink tube 106 is effectively selected to be in a range of from 4 mm to 6 mm. In this embodiment, a tube having an inner diameter of 4.4 mm is used as the ink tube 106.

10 **[0045]** The inside of the ink tube 106 is charged with the ink 107 and the ink follower 108. The ink 107 is aqueous ink having a viscosity of 9 mPa·s at 20°C in a B type rotational viscometer or aqueous ink having a viscosity of 5 mPa·s at 20°C at a rotational speed of 100 rpm in an EL type rotational viscometer and a shear-thinning index of 0.97. The ink follower 108 is made of a high-viscosity fluid disposed at the rear end of the ink 107 and advancing with consumption of the ink 107. Alternatively, the ink follower 108 may be made of a combination of a high-viscosity fluid and a solid matter stored in the inside of the high-viscosity fluid or may be made of a solid matter that can slide on the inner wall of the ink tube 106. Dye type ink is preferred to pigment type ink as the ink 107 from the point of view of obtaining moderate abrasion of a ball seat 122. In this embodiment, aqueous dye ink is used as the ink 107.

15 **[0046]** The tip body 102 has a ball holding hole and a ball seat 122 formed at a front end portion by cutting a metal material (e.g., stainless steel). A center hole 124 is formed in the ball seat 122 so as to pierce the ball seat 122. Ink flow gaps 123 are radially formed in the ball seat 122 so as to communicate with the center hole 124. An annular inward front end edge portion 121 is formed at a front end portion of the tip body 102 by deformation due to inward pressing. The ball 103 is held in a portion (i.e., ball holding portion) between the inner surface of the front end edge portion 21 and the front surface of the ball seat 122 so that the ball 103 can rotate and move back and forth.

20 **[0047]** In the invention, the outer diameter of the ball 103 is preferably selected to be in a range of from 0.5 mm to 0.7 mm. In this embodiment, a ball having an outer diameter of 0.5 mm and a ball having an outer diameter of 0.7 mm are used. The movable length C by which the ball 103 having an outer diameter of from 0.5 mm to 0.7 mm can move back and forth is preferably selected to be in a range of from 10 μm to 30 μm. In the ball 103 having an outer diameter of 0.5 mm, an outflow of ink per 100 m is preferably selected to be in a range of from 95 mg to 135 mg from the point of view of preventing scratchiness and blur in writing. In the ball 103 having an outer diameter of 0.7 mm, an outflow of ink per 100 m is preferably selected to be in a range of from 135 mg to 175 mg from the point of view of preventing scratchiness and blur in writing.

25 **[0048]** A rod portion 141 of the elastic member 104 is inserted into the center hole 124. A front end of the rod portion 141 abuts on the rear surface of the ball 103 to thereby urge the ball 103 forward.

30 **[0049]** The holder 105 is a cylinder obtained by injection molding of a synthetic resin. The holder 105 has a tapered front portion to which the tip body 102 is attached, a collar portion abutting on a front end surface of the ink tube 106, and a rear portion forced into the front end opening portion of the ink tube 106. A tip mount hole having a front end opened to the outside and an ink flowhole having a front end communicating with the tip mount hole and a rear end opened to the outside are provided in the inside of the holder 105. A lock wall portion 152 is integrally formed between the tip mount hole and the ink flow hole so that the rear end of the elastic member 104 abuts on the lock wall portion 152.

35 **[0050]** The elastic member 104 is made of a stainless steel wire material having a diameter of 0.14 mm. The elastic member 104 has a rod portion 141 as a front portion, and a coil portion 142 as a rear portion integrated with the rod portion 141. A swollen portion 143 is formed at a rear end portion of the coil portion 142 so that the outer diameter of the swollen portion 143 is set to be larger than that of the coil portion 142 in front of the swollen portion 143. The swollen portion 143 is formed by such end turning that pieces of the wire material adhere closely to each other. The swollen portion 143 is locked by the lock wall portion 152. Although this embodiment has been described on the case where the elastic member 104 has a rod portion 141 and a coil portion 142, the invention may be also applied to the case where the elastic member 104 has only a rod portion 141, that is, the elastic member 141 has no coil portion 142. Although this embodiment has been described on the case where the elastic member 104 is made of a metal, the invention may be also applied to the case where the elastic member 104 is made of another material such as synthetic resin, synthetic rubber or elastomer.

40 **[0051]** In the ball point pen 101 according to this embodiment, when writing is not made, the ball 103 pressed forward by the rod portion 141 of the elastic member 104 comes into close contact with the inner surface of the front end edge portion 121 to thereby seal the pen point. Accordingly, even in the case where the ball point pen 101 is kept with the pen point down, ink can be prevented from leaking from the pen point. In addition, even in the case where the ball point pen 101 is kept with the pen point up, air can be prevented from entering through the pen point.

45 **[0052]** The elastic force of the elastic member 104 is preferably selected to be in a range of from 15 g to 45 g (more preferably in a range of from 25 g to 40 g). In this embodiment, the elastic force of the elastic member 104 is set at 35

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g which is a relatively high value. As a result, sealing characteristic between the ball 103 and the inner surface of the front end edge portion 121 is improved. In addition, the force (writing pressure) for pressing the ball 103 backward is weakened by the elastic member 104 to relax the contact force of the ball 103 with the ball seat 122 to thereby suppress the abrasion of the ball seat 122.

5

(Measurement of Outflow of Ink)

[0053] An outflow of ink was measured at intervals of a writing distance of 100 m by a writing tester (writing speed: 4 m/min, writing load: 100 g, writing angle: 70°) in the condition that writing was performed spirally with the ball point pen 101 according to this embodiment. A ball having an outer diameter of 0.5 mm and a ball having an outer diameter of 0.7 mm were used as two kinds of balls 103. In each of the two kinds of balls 103, the amount of ink charged was set at 950 mg. Tables 3 and 4 and Fig. 9 and Fig.10 show results of the measurement.

10

(3) Ball with Outer Diameter of 0.5 mm (see Table 3 and Fig. 9)

15

[0054]

[Table 3]

Writing Distance (m)	Outflow of Outflow of Ink (mg)	Accumulated Accumulated Outflow of Ink (mg)
0 - 100	118	118
100 - 200	123	241
200 - 300	128	369
300 - 400	128	497
400 - 500	128	625
500 - 600	132	757
600 - 700	122	879
700 - 800	50	929

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. Writing Distance at 80 % of the Amount of Charged Ink

[0055] Because 80 % of the amount (950 mg) of charged ink is 760 mg, it is obvious from the accumulated outflow of ink shown in Table 3 that the range of writing distance at a measurement time just before outflow of 80 % of the amount of charged ink after the start of writing is from 500 m to 600 m. Accordingly, when an outflow of ink is measured at intervals of a writing distance of 100 m, the range of writing distance until the measurement time just before outflow of 80 % of the amount of charged ink from the start of writing is from 0 m to 600 m.

35

[0056] Because 80 % of the amount (950 mg) of charged ink is 760 mg, it is obvious from the accumulated outflow of ink shown in Table 3 that the range of writing distance at a measurement time just after outflow of 80 % of the amount of charged ink after the start of writing is from 600 m to 700 m. Accordingly, when an outflow of ink is measured at intervals of a writing distance of 100 m, the range of writing distance until the measurement time just after outflow of 80 % of the amount of charged ink from the start of writing is from 0 m to 700 m.

40

45

. Outflow of Ink

[0057] A measured value of outflow of ink per writing distance of 100 m in the writing distance range of from 0 m to 600 m is from 118 mg to 132 mg. This value is in a range between a value (98 mg) smaller by 20 mg than the outflow (118 mg) of ink in the writing distance range of from 0 m to 100 m and a value (138 mg) larger by 20 mg than the outflow (118 mg) of ink in the writing distance range of from 0 m to 100 m (see Fig. 9).

50

[0058] A measured value of outflow of ink per writing distance of 100 m in the writing distance range of from 0 m to 700 m is from 118 mg to 132 mg. This value is in a range between a value (98 mg) smaller by 20 mg than the outflow (118 mg) of ink in the writing distance range of from 0 m to 100 m and a value (138 mg) larger by 20 mg than the outflow (118 mg) of ink in the writing distance range of from 0 m to 100 m (see Fig. 9).

55

· Decrement ΔH of Ink Head

[0059] The decrement of the head of ink in the writing distance range of from 0 m to 600 m is 47.0 mm so that the decrement ΔH of the ink head per 100 m is 7.8 mm.

5 **[0060]** The decrement of the ink head in the writing distance range of from 0 m to 700 m is 54.5 mm so that the decrement ΔH of the ink head per 100 m is 7.8 mm.

· Increment ΔC of Longitudinal Movable Length C of Ball

10 **[0061]** The longitudinal movable length C of the ball 103 is 20.0 μm before the start of writing and 23.0 μm just after the writing distance of 600 m. Accordingly, the increment ΔC of the longitudinal movable length C of the ball 103 is 3.0 μm in the writing distance range of from 0 m to 600 m so that the increment ΔC of the longitudinal movable length C of the ball 103 per 100 m is 0.5 μm .

15 **[0062]** The longitudinal movable length C of the ball 103 is 20.0 μm before the start of writing and 24.0 μm just after the writing distance of 700 m. Accordingly, the increment ΔC of the longitudinal movable length C of the ball 103 is 4.0 μm in the writing distance range of from 0 m to 700 m so that the increment ΔC of the longitudinal movable length C of the ball 103 per 100 m is 0.57 μm .

(4) Ball with Outer Diameter of 0.7 mm (see Table 4 and Fig. 10)

20

[0063]

[Table 4]

25

Writing Distance (m)	Outflow of Ink (mg)	Accumulated putflow of Outflow of Ink (mg)
0 - 100	159	159
100 - 200	157	316
200 - 300	153	469
300 - 400	151	620
400 - 500	151	771
500 - 600	140	911
600 - 700	32	943

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· Writing Distance at 80 % of the Amount of Charged Ink

40 **[0064]** Because 80 % of the amount (950 mg) of charged ink is 760 mg, it is obvious from the accumulated outflow of ink shown in Table 4 that the range of writing distance at a measurement time just before outflow of 80 % of the amount of charged ink after the start of writing is from 300 m to 400 m. Accordingly, when an outflow of ink is measured at intervals of a writing distance of 100 m, the range of writing distance until the measurement time just before outflow of 80 % of the amount of charged ink from the start of writing is from 0 m to 400 m.

45 **[0065]** Because 80 % of the amount (950 mg) of charged ink is 760 mg, it is obvious from the accumulated outflow of ink shown in Table 4 that the range of writing distance at a measurement time just after outflow of 80 % of the amount of charged ink after the start of writing is from 400 m to 500 m. Accordingly, when an outflow of ink is measured at intervals of a writing distance of 100 m, the range of writing distance until the measurement time just after outflow of 80 % of the amount of charged ink from the start of writing is from 0 m to 500 m.

50 · Outflow of Ink

[0066] A measured value of outflow of ink per writing distance of 100 m in the writing distance range of from 0 m to 400 m is from 151 mg to 159 mg. This value is in a range between a value (139 mg) smaller by 20 mg than the outflow (159 mg) of ink in the writing distance range of from 0 m to 100 m and a value (179 mg) larger by 20 mg than the outflow (159 mg) of ink in the writing distance range of from 0 m to 100 m (see Fig. 10).

55 **[0067]** A measured value of outflow of ink per writing distance of 100 m in the writing distance range of from 0 m to 500 m is from 151 mg to 159 mg. This value is in a range between a value (139 mg) smaller by 20 mg than the outflow (159 mg) of ink in the writing distance range of from 0 m to 100 m and a value (179 mg) larger by 20 mg than the outflow

(159 mg) of ink in the writing distance range of from 0 m to 100 m (see Fig. 10).

Decrement ΔH of Ink Head

- 5 **[0068]** The decrement ΔH of the ink head in the writing distance range of from 0 m to 400 m is 38.5 mm so that the decrement ΔH of the ink head per 100 m is 9.6 mm.
[0069] The decrement ΔH of the ink head in the writing distance range of from 0 m to 500 m is 47.8 mm so that the decrement ΔH of the ink head per 100 m is 9.6 mm.

10 Increment ΔC of Longitudinal Movable Length C of Ball

- [0070]** The longitudinal movable length C of the ball 103 is 25.0 μm before the start of writing and 26.0 μm just after the writing distance of 400 m. Accordingly, the increment ΔC of the longitudinal movable length C of the ball 103 is 1.0 μm in the writing distance range of from 0 m to 400 m so that the increment ΔC of the longitudinal movable length C of the ball 103 per 100 m is 0.25 μm .
[0071] The longitudinal movable length C of the ball 103 is 25.0 μm before the start of writing and 26.5 μm just after the writing distance of 500 m. Accordingly, the increment ΔC of the longitudinal movable length C of the ball 103 is 1.5 μm in the writing distance range of from 0 m to 500 m so that the increment ΔC of the longitudinal movable length C of the ball 103 per 100 m is 0.3 μm .
[0072] According to the invention, the outflow of ink until almost consumption of charged ink after the start of writing can be kept in a proper range to thereby suppress occurrence of scratchiness and blur in writing.
[0073] Moreover, occurrence of scratchiness and blur in writing can be surely prevented until almost of charged ink is consumed after the start of writing.
[0074] Moreover, the outflow of ink can be more surely kept in a proper range until almost of charged ink is consumed after the start of writing, so that occurrence of scratchiness and blur in writing can be prevented.
[0075] Moreover, ink follow-up characteristic is improved so that smooth writing can be made without scratchiness in writing even in the case where writing is made at a high speed.
[0076] Moreover, ink follow-up characteristic is improved so that smooth writing can be made without scratchiness in writing even in the case where writing is made at a high speed.

30 1. A ball point pen comprising:

- a tip body including a front end edge portion, a ball seat provided inward at a front end, and a ball rotatably held in said front end edge portion and said ball seat;
 35 an ink tube formed to provide said tip body at a front end thereof;
 ink reserved in said ink tube;
 an ink follower disposed at a rear end of said ink and advancing with consumption of said ink, and
 an elastic member urging said ball forward to bring said ball into contact with an inner surface of said front end edge portion of said tip body,

40 wherein the value of outflow of ink per writing distance of 100 m, until a measurement time just before outflow of 80 % of the amount of charged ink from the start of writing in the case where an outflow of ink is measured at intervals of a writing distance of 100 m, is in a range between a value smaller by 20 mg than the outflow of ink in the writing distance range of from 0 m to 100 m and a value larger by 20 mg than the outflow of ink in the writing distance range of from 0 m to 100 m.

50 2. A ball point pen according to 1, wherein the decrement of the head of ink per writing distance of 100 m, until a measurement time just before outflow of 80 % of the amount of charged ink from the start of writing in the case where an outflow of ink is measured at intervals of a writing distance of 100 m, is in a range of from 3 mm to 12 mm.

55 3. A ball point pen according to 2, wherein the increment of longitudinal movable length of said ball at a front end of said tip body per writing distance of 100 m, until a measurement time just before outflow of 80 % of the amount of charged ink from the start of writing in the case where an outflow of ink is measured at intervals of a writing distance of 100 m, is in a range of from 0.1 μm to 1.5 μm .

4. A ball point pen according to 1, wherein the viscosity of said ink at 20°C is in a range of from 1 mPa·s to 50 mPa·s.

5. A ball point pen according to 1,

wherein the viscosity of said ink measured at 20°C at a rotational speed of 100 rpm by an E-type rotational viscometer is in a range of from 3 mPa·s to 160 mPa·s, and the shear-thinning index of said ink is in a range of from 0.80 to 0.99.

5 6. A ball point pen according to 1, wherein the tip body is made of a right circular cylindrical small tube of a metal, and plural inward protrusions are formed at regular circumferential intervals on an inner surface near a front end of the tip body by deformation due to inward pressing.

10 7. A ball point pen according to 1, wherein the tip body has a ball holding hole and a ball seat formed at a front end portion by cutting a metal material.

15 **Claims**



1. A ball point pen comprising:

20 a tip body including a front end edge portion, a ball seat provided inward at a front end, and a ball rotatably held in said front end edge portion and said ball seat;
 an ink tube formed to provide said tip body at a front end thereof;
 ink reserved in said ink tube;
 an ink follower disposed at a rear end of said ink and advancing with consumption of said ink, and
 25 an elastic member urging said ball forward to bring said ball into contact with an inner surface of said front end edge portion of said tip body,

wherein the viscosity of said ink, at 20°C, is in a range of from 1 mPa·s to 50 mPa·s, and wherein the ball has an outer diameter of 0.5 mm or more and 0.7 mm or less and the movable length in which the ball can move back and forth is in a range of from 10 μm to 30 μm such that the value of outflow of ink per writing distance of 100 m, until a measurement time just before outflow of 80 % of the amount of charged ink from the start of writing in the case where an outflow of ink is measured at intervals of a writing distance of 100 m, is in a range between a value smaller by 20 mg than the outflow of ink in the writing distance range of from 0 m to 100 m and a value larger by 20 mg than the outflow of ink in the writing distance range of from 0 m to 100 m.

35 2. A ball point pen according to Claim 1, wherein the inner cross-sectional area of the ink reservoir is in a range from 4n mm² to 9n mm² and the decrement of the head of ink per writing distance of 100 m, until a measurement time just before outflow of 80 % of the amount of charged ink from the start of writing in the case where an outflow of ink is measured at intervals of a writing distance of 100 m, is in a range of from 3 mm to 12 mm.

40 3. A ball point pen according to Claim 2, wherein the increment of longitudinal movable length of said ball at a front end of said tip body per writing distance of 100 m, until a measurement time just before outflow of 80 % of the amount of charged ink from the start of writing in the case where an outflow of ink is measured at intervals of a writing distance of 100 m, is in a range of from 0.1 μm to 1.5 μm.

45 4. A ball point pen according to Claim 1, wherein the tip body is made of a right circular cylindrical small tube of a metal, and plural inward protrusions are formed at regular circumferential intervals on an inner surface near a front end of the tip body by deformation due to inward pressing.

50 5. A ball point pen according to Claim 1, wherein the tip body has a ball holding hole and a ball seat formed at a front end portion by cutting a metal material.

6. A ball point pen according to Claim 1, wherein a movable length in which the ball can move back and forth is in a range of from 10 μm to 20 μm.

55 7. A ball point pen according to any preceding claim, wherein an elastic force of the elastic member is in a range of from 15 g to 45 g.

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8. A ball point pen according to any preceding Claim, wherein the ink is an aqueous ink.

9. A ball point pen according to any preceding Claim, wherein the ink is an aqueous dye ink.

5 10. A ball point pen according to any preceding Claim, wherein the ink tube is shaped substantially a right circular cylinder having opposite ends opened and is formed by extrusion molding of a synthetic resin.

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Figures are displayed at the end of European Patent Documents.

FIG. 1

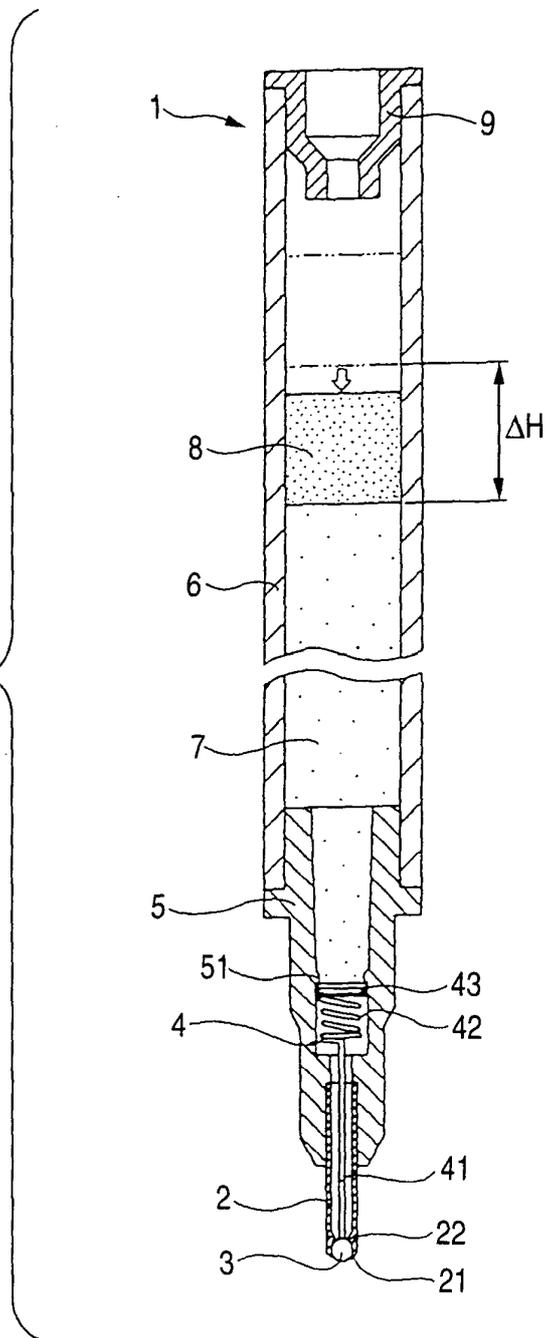


FIG. 2

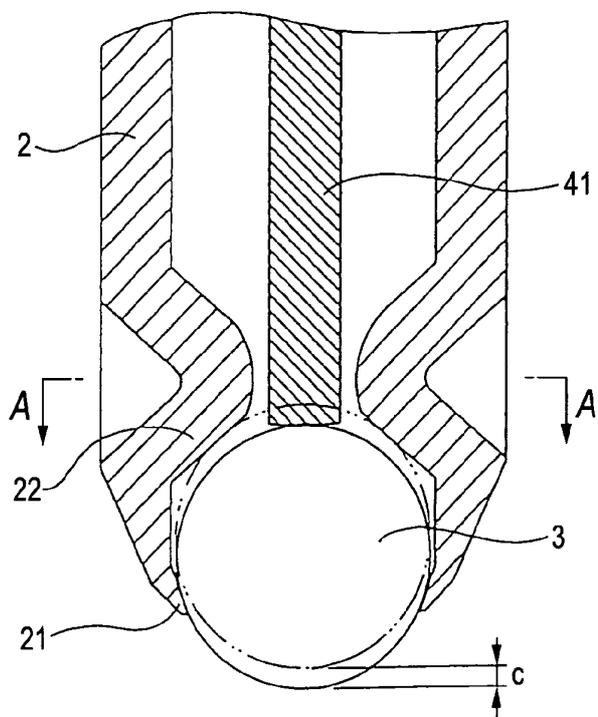


FIG. 3

A-A

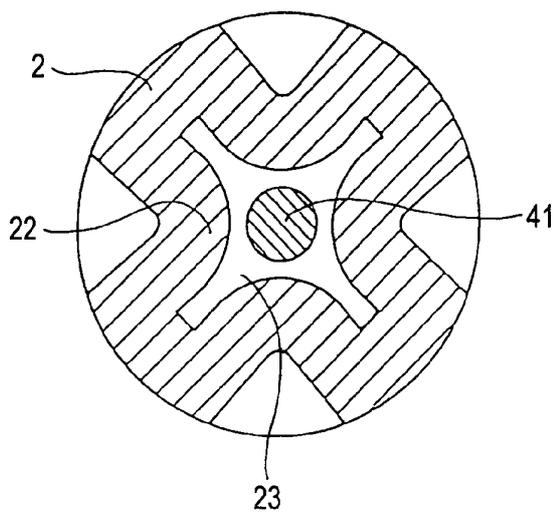


FIG. 4

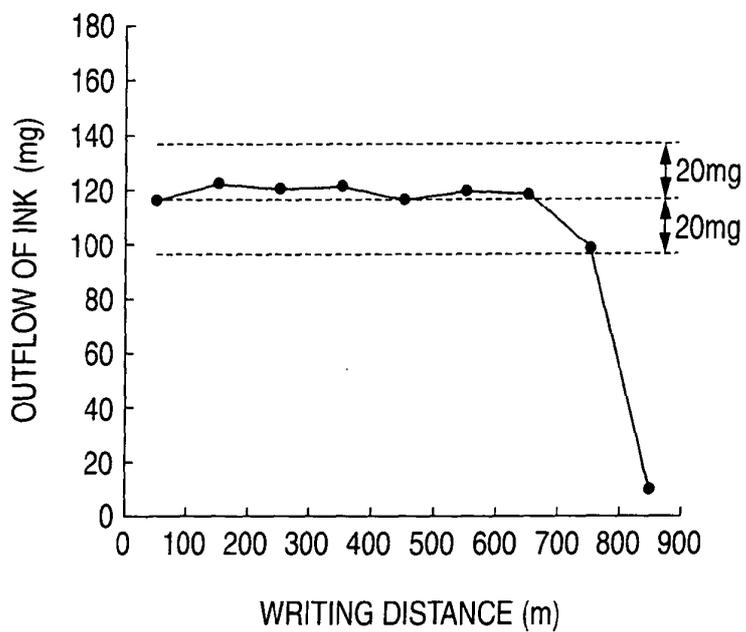
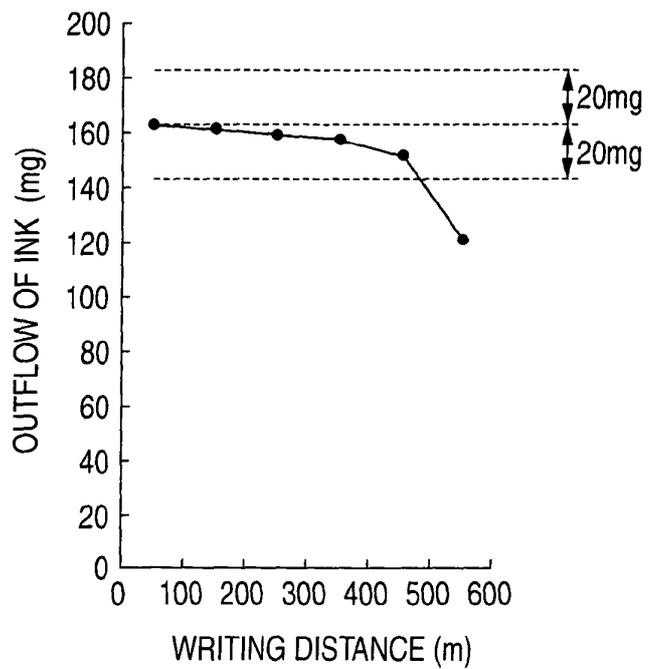


FIG. 5



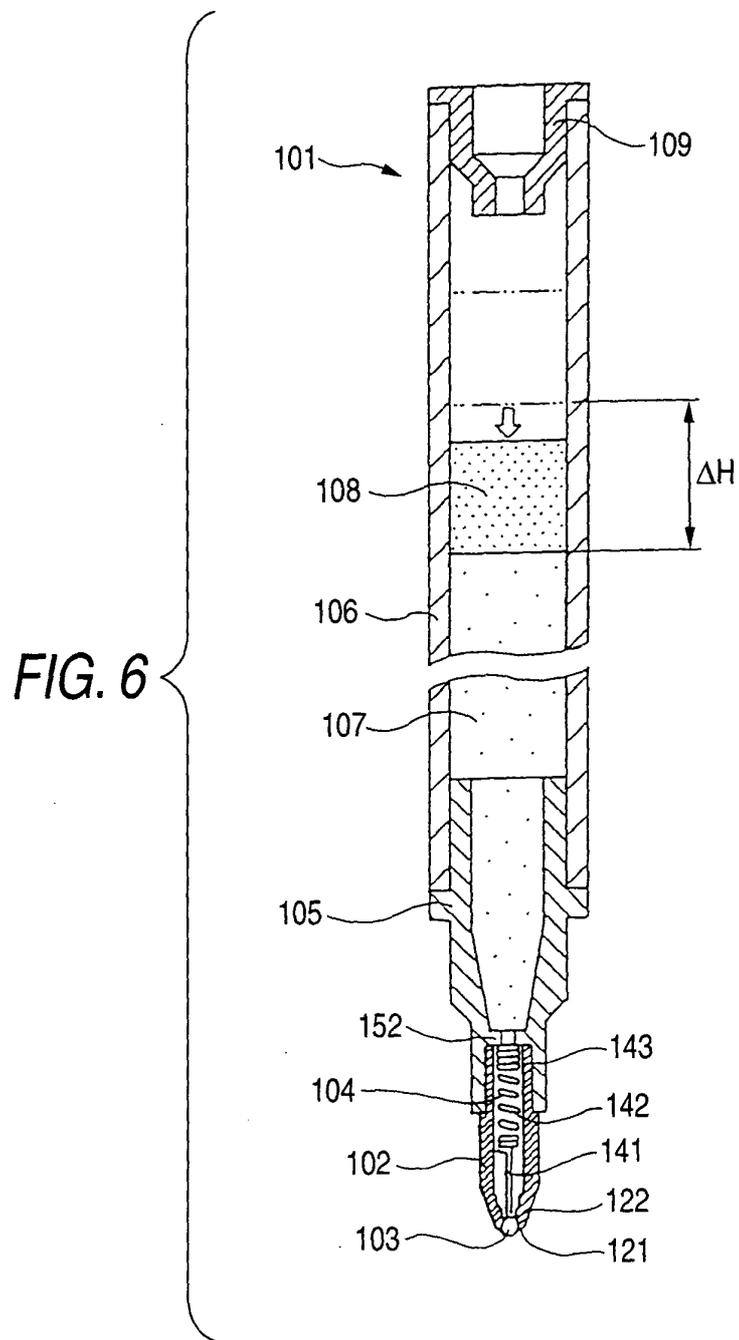


FIG. 7

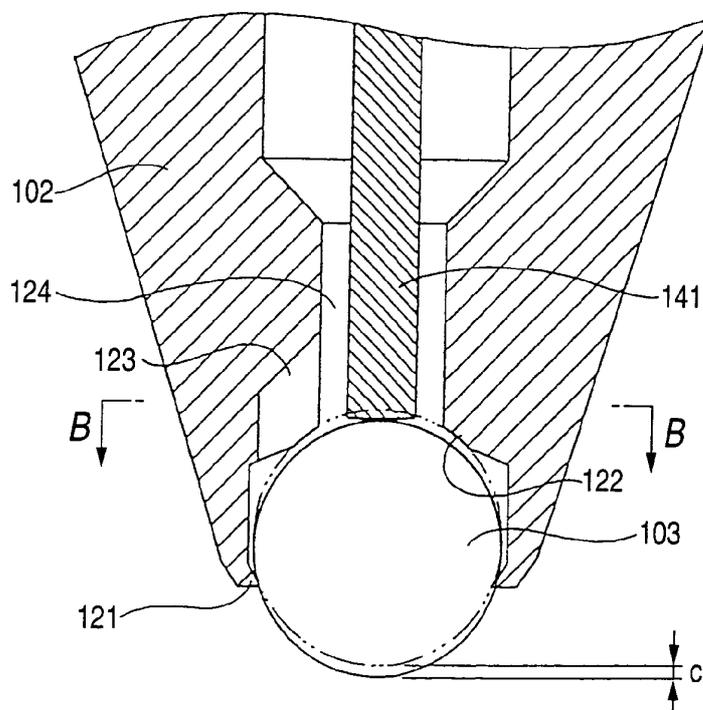


FIG. 8

B-B

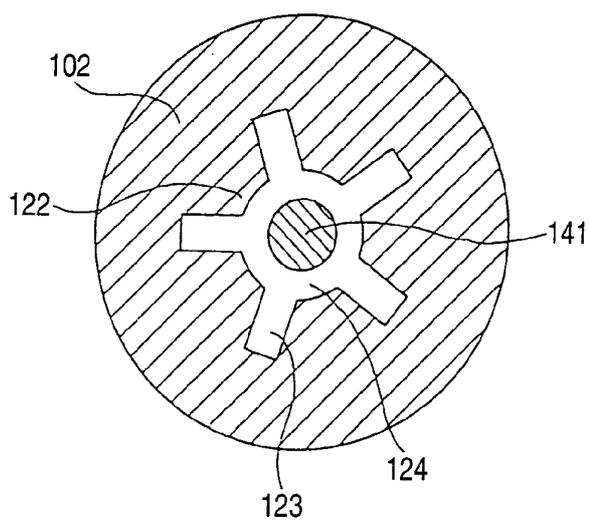


FIG. 9

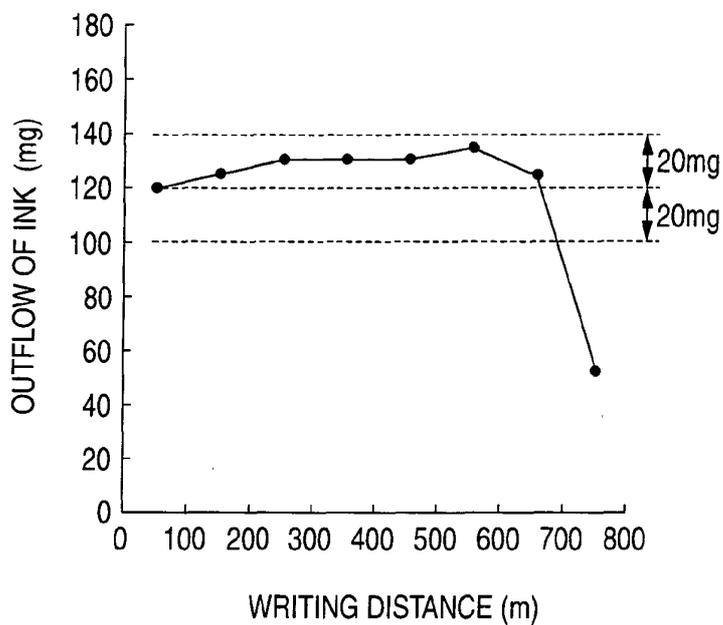
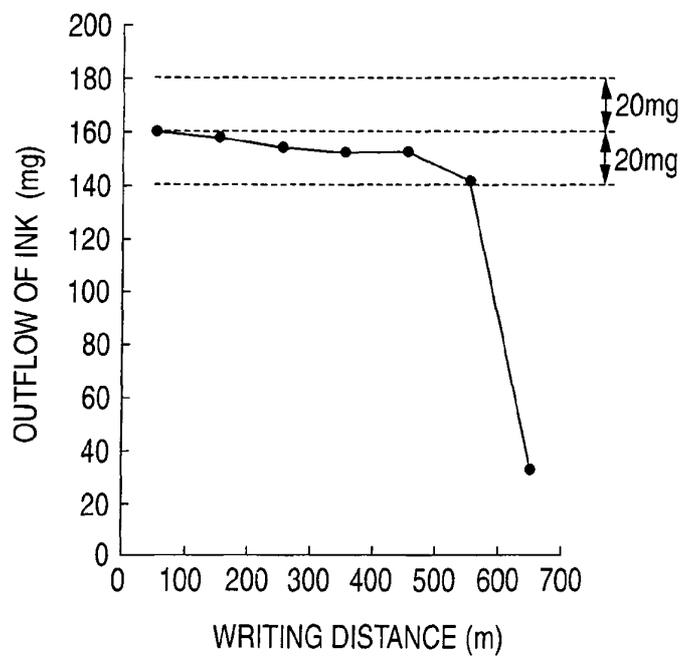


FIG. 10





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Place of search The Hague		Date of completion of the search 6 December 2005	Examiner van Overbeek, K
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AND	▼	Applicant Name	▼	=		?
AND	▼	International Class	▼	=		?
AND	▼	Inventor Name	▼	=		?
AND	▼	Office Code	▼	=		?
AND	▼	English Description	▼	=		?
AND	▼	English Claims	▼	=		?
AND		Licensing availability		=	<input type="checkbox"/>	
AND		Inventor Name	▼	Is Empty:	<input checked="" type="radio"/> N/A <input type="radio"/> Yes <input type="radio"/> No	

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421 results

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Results 1-10 of 693 for Criteria:FP:METHOD AND FP:MANUFACTURING AND FP:ELECTRICAL AND FP:CONDUCTORS Office(s):all Language:EN Stemming: true

prev 1 2 3 4 5 6 7 8 9 10 next Page:1 / 70 Go >

Refine Search

Analysis

Sort by Pub Date Desc View All List Length 10

No	Ctrl	Title	PubDate	Int.Class	Appl.No	Applicant	Inventor
1.	WO	WO/2013/121668 - ROTATING ELECTRICAL MACHINE AND METHOD FOR MANUFACTURING ROTATING ELECTRICAL MACHINE	22.08.2013	H02K 3/04	PCT/JP2012/082407	HITACHI AUTOMOTIVE SYSTEMS, LTD.	ISHIGAMI, Takashi

A rotating electrical machine includes a stator where a stator winding is mounted on a stator core, and a rotor that is rotatably disposed inside the stator. The stator winding includes a plurality of approximately U-shaped segment conductors that are inserted into a slot from one end surface of the stator core, end portions thereof projecting from the other end surface of the stator core, and adjacent end portions of the plurality of segment conductors are welded to each other. The segment conductor includes a non-deformed portion, a plastically deformed portion that is formed at the end portion, and a tapered portion that is formed between the non-deformed portion and the plastically deformed portion. The plastically deformed portion is formed in such a manner that dimensions thereof in a circumferential direction of the stator are larger than dimensions in a circumferential direction of the stator in the non-deformed portion, and dimensions thereof in a radial direction of the stator are smaller than dimensions in a radial direction of the stator in the non-deformed portion. The segment conductors are welded to each other at an apex of the plastically deformed portion.

2.	WO	WO/2013/122724 - METHOD OF MANUFACTURING ELECTRICAL CONDUCTORS	22.08.2013	H01L 21/768	PCT/US2013/022885	TYCO ELECTRONICS CORPORATION	SULLIVAN MALERVY, Mary, Elizabeth
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A method of manufacturing an electrical conductor (100) includes providing a substrate layer (102), depositing a surface layer (104) on the substrate layer that has pores (120) at least partially exposing the substrate layer, and forming graphene deposits (140) in the pores. Optionally, the graphene deposits may be formed only in the pores. The graphene deposits may be formed along the exposed portions of the substrate layer. The graphene layers may be selectively deposited or may be deposited to cover an entire layer. Optionally, the forming of the graphene deposits may include processing the electrical conductor using a chemical vapor deposition process using an organic compound precursor and heat of sufficient temperature to facilitate graphene growth on the metal compound comprising the substrate layer.

3.	WO	WO/2013/117657 - CIRCUIT BOARD, METHOD FOR	15.08.2013	H05K 1/02	PCT/EP2013/052454	OSRAM GMBH	FENG,
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2. (WO/2013/120537) DISPLAY AND METHOD IN AN ELECTRIC DEVICE

PCT Biblio. Data Description Claims National Phase Notices Drawings Documents

Latest bibliographic data on file with the International Bureau [Submit observation](#) [PermaLink](#)

Pub. No.: WO/2013/120537 International Application No.: PCT/EP2012/052810
 Publication Date: 22.08.2013 International Filing Date: 17.02.2012
 IPC: G06F 3/048 (2013.01)
 Applicants: SONY ERICSSON MOBILE COMMUNICATIONS AB [SE/SE]; Nya Vattentornet S-221 88 Lund (SE) (For All Designated States Except US).
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 DE LEON, David [SE/SE]; (SE) (For US Only).
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 Inventors: ALEXANDERSSON, Petter; (SE).
 DE LEON, David; (SE).
 JOHANSSON, Fredrik; (SE)
 Agent: VALEA AB; Lindholmspiren 5 S-417 56 Göteborg (SE)
 Priority Data:
 Title: (EN) DISPLAY AND METHOD IN AN ELECTRIC DEVICE
 (FR) AFFICHAGE DANS UN DISPOSITIF ÉLECTRIQUE ET SON PROCÉDÉ
 Abstract: (EN)The present invention relates to display (100) in an electrical device and a method of enhancing interaction with user. The display comprises: a controller (140), a content displaying surface (106), a touch sensitive portion comprising one or several touch sensors (108), for providing the controller with information about presence of a pointing object close to the surface, a motion sensor (150) for providing motion of the display. The controller (140) is configured to control content output on the displaying surface and adjust the content output with respect to information from the touch sensor and the motion sensor (150).
 (FR)La présente invention concerne l'affichage (100) dans un dispositif électrique et un procédé permettant d'améliorer l'interaction avec l'utilisateur. Le dispositif d'affichage comprend : une unité de commande (140), une surface d'affichage de contenu, (106) une partie tactile comprenant un ou plusieurs capteurs tactiles (108), pour fournir à l'unité de commande des informations sur la présence d'un objet de pointage à proximité de la surface, et un capteur de mouvement (150) destiné à assurer le mouvement de l'affichage. L'unité de commande (140) est configurée pour commander la sortie de contenu sur la surface d'affichage et pour régler la sortie de contenu par rapport aux informations provenant du capteur tactile et du capteur de mouvement (150).
 Designated States: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
 African Regional Intellectual Property Org. (ARIPO) (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW)
 Eurasian Patent Organization (EAPO) (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM)
 European Patent Office (EPO) (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR)
 African Intellectual Property Organization (OAPI) (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
 Publication Language: English (EN)
 Filing Language: English (EN)

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    graph TD
      1[Detect pointing device] --> 2[Detect motion]
      2 --> 3[Adjust content output]
    
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Fig. 3

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6. (WO2012068821) MOBILE TERMINAL SYSTEM AND METHOD FOR REALIZING ACCESS POINT NAME SETTING

PCT Biblio. Data | Description | Claims | Final Phase | Notices | Drawings | Documents

Note: Text based on automatic Optical Character Recognition processes. Please use the PDF version for legal matters

Machine translation

Query mobile

一种移动终端及实现接入点名称设置的系统和方法

技术领域

本发明涉及移动通信系统中移动终端应用业务的扩展技术，尤其涉及移动终端及实现接入点名称（Access Point Name, APN）设置的系统和方法。

背景技术

目前，随着移动互联网的发展，移动终端用户通过移动终端（譬如手机终端和便携式电脑等）进行上网已成为一种普遍的需求。然而，在使用移动终端接入互联网之前，需要用户设置 APN。当移动终端用户设置 APN 时，需要知道本终端所用的 APN 信息，然后进行手工设置，这给用户带来很大的不便。

其次，当运营商需要进行业务扩展或者业务变更时，如果涉及到新添加 APN 或者变更 APN 时，如何有效地通知终端用户进行 APN 设置或变更，这同样会给运营商带来很大的不便。

再者，随着移动互联网的发展出现了虚拟运营商。虚拟运营商通常会使用本运营商自身的 APN 信息进行分组数据域呼叫，但由于虚拟运营商的网络是租用的，所以移动终端用户如果将 APN 设置为其它运营商的 APN，同样也可以使用分组数据域的服务，这会为该移动终端用户提供服务的虚拟运营商带来了一定的损失。

因此，需要针对上述问题提供一种方法，能够通过自动方式实现 APN 信息的设置或者变更，既便于运营商进行业务扩展，同时也能为终端用户带来很大的便利。

目前，已有如下专利文献披露的方法可以实现 APN 信息的自动设置：专利申请号为 CN200810089261.X 发明名称为“一种移动终端上自适应配置接入点名称的方法”的专利文献，描述了一种通过人机界面应用程序自动配置 APN 的方法。该方法存在如下缺点：

- 1) 存储于移动终端的闪存存储器中的 APN 信息，不便于在 APN 信息发生变更时及时进行更新；
- 2) 移动终端每次启动时需要查询 APN 信息，当移动终端中的 APN 信息随着业务的需要越来越多时会影响启动速度和效率；

专利申请号为 CN200610098446 发明名称为“一种获取用户归属地的

GGSN 地址的方法、系统及网元”的专利文献，描述了一种匹配 APN 的方法，通过在 GPRS 服务支持节点网元（Serving GPRS Support Node, SGSN）上添加数据匹配单元和 APN 定制单元，其中数据匹配单元会在用户发起激活分组数据协议（Packet Data Protocol, PDP）请求时，根据国际移动用户识别码（International Mobile Subscriber Identity, IMSI）信息和 PDP 请求中携带的 APN 信息进行 APN 匹配。该方法存在如下缺点：

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6. (WO2012068821) MOBILE TERMINAL, SYSTEM AND METHOD FOR REALIZING ACCESS POINT NAME SETTING

PCT Biblio. Data | Description | Claims | National Phase | Notices | Drawings | Documents

Note: Text based on Automatic Optical Character Recognition processes. Please Use the PDF Version for legal matters

Machine translation

Query
mobile

A mobile terminal and the access point name to implement a system and method

Technology

The present invention relates to a mobile terminal in a mobile communication system application service expansion technology, in particular to implement a mobile terminal and the access point name (Access Point Name, APN) to set the system and method.

BACKGROUND

Now, with the development of mobile Internet, mobile end-user through the mobile terminal to access the Internet has become a popular demand. However, access to the Internet using APN. When the mobile end-user set APN, you need to know the APN information used in a great deal of inconvenience.

Secondly, when operators need to conduct business expansion or business change, if it effectively inform end-users or change the APN settings, which also give the operators to

Moreover, with the development of mobile Internet, there has been a virtual operator. Virtual domain information for the packet data call, but because of virtual operators rented network operators APN, the same packet can be used data field services, which will provide services for the mobile end-user virtual operators to bring a certain amount of damage.

Therefore, the need to address the problem to provide a method that can be achieved by automatically setting APN information or change, both for



Original text

本发明涉及移动通信系统中移动终端应用业务的扩展技术，尤其涉及移动终端及实现接入点名称 (Access Point Name, APN) 设置的系统和方法。

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1. (WO2013122724) METHOD OF MANUFACTURING ELECTRICAL CONDUCTORS

PCT Biblio. Data	Description	Claims	National Phase	Notices	Drawings	Documents
International Application Status						
Date	Title	View		Download		
28.08.2013	International Application Status Report	HTML, PDF		PDF, XML		
Published International Application						
Date	Title	View		Download		
22.08.2013	Initial Publication with ISR (A1 34/2013)	PDF (20p.)		PDF (20p.), ZIP(XML + TIFFs)		
Related Documents on file at the International Bureau						
Date	Title	View		Download		
22.08.2013	Notification Concerning Availability of Publication of the International Application (IB/311)	PDF (1p.)		PDF (1p.), ZIP(XML + TIFFs)		
22.08.2013	Notification of the International Application Number and of the International Filing Date (RO/105)	PDF (1p.)		PDF (1p.), ZIP(XML + TIFFs)		
22.08.2013	Application Body as Filed	PDF (17p.)		PDF (17p.), ZIP(XML + TIFFs)		
22.08.2013	Notification of receipt of record copy (IB/301)	PDF (1p.)		PDF (1p.), ZIP(XML + TIFFs)		
22.08.2013	Notification Concerning Payment of Prescribed Fees (RO/102)	PDF (2p.)		PDF (2p.), ZIP(XML + TIFFs)		
22.08.2013	Power of Attorney	PDF (1p.)		PDF (1p.), ZIP(XML + TIFFs)		
22.08.2013	Request form (RO/101)	PDF (5p.)		PDF (5p.), ZIP(XML + TIFFs)		
22.08.2013	US 13/372,155 13.02.2012 (Pr. Doc.)	PDF (45p.)		PDF (45p.), ZIP(XML + TIFFs)		
22.08.2013	Notification Concerning Submission or Transmittal of Priority Document (IB/304)	PDF (1p.)		PDF (1p.), ZIP(XML + TIFFs)		
22.08.2013	International Search Report	PDF (4p.)		PDF (4p.), ZIP(XML + TIFFs)		

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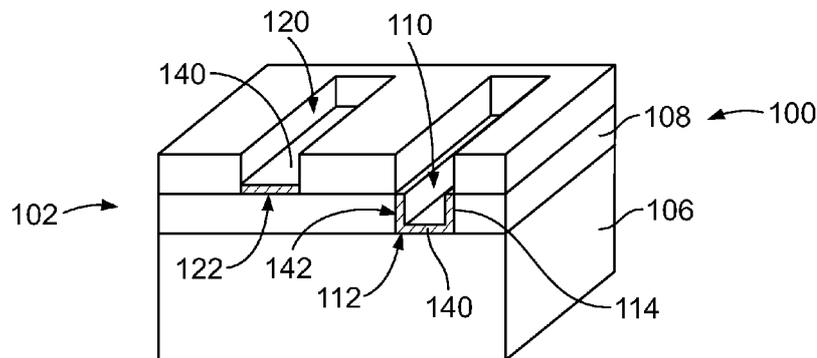
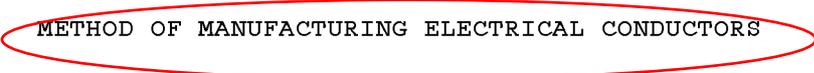


FIG. 3

(57) Abstract: A method of manufacturing an electrical conductor (100) includes providing a substrate layer (102), depositing a surface layer (104) on the substrate layer that has pores (120) at least partially exposing the substrate layer, and forming graphene deposits (140) in the pores. Optionally, the graphene deposits may be formed only in the pores. The graphene deposits may be formed along the exposed portions of the substrate layer. The graphene layers may be selectively deposited or may be deposited to cover an entire layer. Optionally, the forming of the graphene deposits may include processing the electrical conductor using a chemical vapor deposition process using an organic compound precursor and heat of sufficient temperature to facilitate graphene growth on the metal compound comprising the substrate layer.

WO 2013/122724 A1



METHOD OF MANUFACTURING ELECTRICAL CONDUCTORS



[0001] The subject matter herein relates generally to methods of manufacturing electrical conductors. 

[0002] Electrical conductors have many forms, such as a contact, a terminal, a pin, a socket, an eye-of-needle pin, a micro-action pin, a compliant pin, a wire, a cable braid, a trace, a pad and the like. Such electrical conductors are used in many different types of products or devices, including electrical connectors, cables, printed circuit boards, and the like. The metals used in the electrical conductors are susceptible to corrosion, diffusion or other reactions, limiting their use or requiring protective coatings. For example, when copper or copper alloy electrical conductors are used, such conductors are susceptible to corrosion. A gold surface layer is typically applied to the copper as a corrosion inhibitor. However, the gold and copper materials suffer from diffusion and typically a diffusion barrier, such as nickel is deposited between the copper and gold layers. 

[0003] Corrosion of base metals is detrimental to the conductor interface and signal integrity. Current plating methods used to mitigate corrosion often leave a porous surface, resulting in oxidation and corrosion of the underlying surface. Additionally, some surface layers suffer from problems associated with friction, stiction and other contact forces, limiting application of the conductors.

[0004] A need remains for an electrical conductor that addresses the aforementioned problems and other shortcomings associated with traditional electrical conductors.

[0005] According to the present invention, a method of manufacturing an electrical conductor is provided including providing a substrate layer, depositing a surface layer on the substrate layer that has pores at least partially exposing the substrate layer, and forming graphene deposits in the pores. Optionally, 

the graphene deposits may be formed only in the pores. The graphene deposits may also be formed along any exposed portions of the substrate layer.

[0006] Optionally, the formed graphene deposits may include processing the electrical conductor using a chemical vapor deposition (CVD) process using an organic compound precursor and heat of sufficient temperature to facilitate graphene growth on the metal compound comprising the substrate layer. The chemical vapor deposition process may use methane at a temperature that promotes graphene growth on the exposed substrate layer. The forming of the graphene deposits may include subjecting the electrical conductor to conditions having a preference for graphene growth on the substrate layer as compared to the surface layer. The forming of the graphene deposits may include depositing a graphene layer between the substrate layer and the surface layer that spans across the pores.

[0007] The invention will now be described by way of example with reference to the accompanying drawings wherein:



[0008] Figure 1 is a cross sectional view of a portion of an electrical conductor formed in accordance with an exemplary embodiment.

[0009] Figure 2 is a cross sectional view of a portion of the electrical conductor with graphene barriers.

[0010] Figure 3 is a cross sectional view of a portion of the electrical conductor with graphene barriers.

[0011] Figure 4 illustrates the electrical conductor having graphene barriers.

[0012] Figure 5 illustrates the electrical conductor having graphene barriers.

[0013] Figure 6 illustrates the electrical conductor having graphene barriers.

[0014] Figure 7 is a flow chart showing an exemplary method of manufacture of an electrical conductor.

[0015]  **Figure 1** is a cross sectional view of a portion of an electrical conductor 100 formed in accordance with an exemplary embodiment. The electrical conductor 100 may be any type of electrical conductor, such as a contact, a terminal, a pin, a socket, an eye-of-the-needle pin, a micro-action pin, a compliant pin, a wire, a cable braid, a trace, a pad and the like. The electrical conductor 100 may form part of an electrical connector, a cable, a printed circuit board and the like.

[0016] In an exemplary embodiment, the electrical conductor 100 is a multi-layered structure having a substrate layer 102 and a surface layer 104 that together define a workpiece 105. The workpiece 105 is processed to form graphene on select layers and/or at select locations of the workpiece 105 to enhance the performance of the electrical conductor. The surface layer 104 provides a corrosion-resistant electrically conductive layer on the substrate layer 102. For example, the surface layer 104 may include a metal compound such as gold, silver, tin, palladium, nickel, palladium-nickel, platinum and the like. The surface layer 104 is generally a thin layer. The surface layer 104 may be deposited on the substrate layer 102 by any known process, such as plating. Optionally, the surface layer 104 may be deposited directly on the underlying substrate layer 102. Alternatively, one or more other layers may be provided between the surface layer 104 and the substrate layer 102, such as a graphene layer.

[0017] The substrate layer 102 may be a multi-layered structure. In the illustrated embodiment, the substrate layer 102 includes a base substrate layer 106 and a barrier substrate layer 108 deposited on the base substrate layer 106. Optionally, the base substrate layer 106 and/or the barrier substrate layer 108 may be a multi-layered structure. The surface layer 104 and the substrate layers 102 together define a stackup of layers. The graphene may be provided at any or all interfaces between the layers and/or at select locations of the stackup to enhance the performance of the electrical conductor.

[0018] In an exemplary embodiment, the base substrate layer 106 is electrically conductive and includes a metal compound, such as a copper or a copper alloy. Other metal compounds for the base substrate layer 106 may include nickel, nickel alloy, steel, steel alloy, aluminum, aluminum alloy, palladium-nickel, tin, tin alloy, cobalt, carbon, graphite, graphene, carbon-based fabric, or any other conductive material. The barrier substrate layer 108 is electrically conductive and includes a metal compound, such as nickel or a nickel alloy. Other metal compounds for the barrier substrate layer 108 include other metal or conductive material such as copper, gold, silver, cobalt, tungsten, platinum, palladium, or alloys of such. The barrier substrate layer 108 provides a diffusion barrier between the base substrate layer 106 and the surface layer 104, such as when such layers are copper and gold or other metal compounds that have diffusion problems. The barrier substrate layer 108 provides mechanical backing for the surface layer 104, which may be relatively thin, improving its wear resistance. The barrier substrate layer 108 reduces the impact of pores present in the surface layer 104. The barrier substrate layer 108 may be deposited on the base substrate layer 106 by any known process, such as plating. Optionally, the barrier substrate layer 108 may be deposited directly on the underlying base substrate layer 106. Alternatively, one or more other layers may be provided between the barrier substrate layer 108 and the base substrate layer 106, such as a graphene layer.

[0019] The barrier substrate layer 108 may include pores 110 that expose the base substrate layer 106. The pores 110 are formed during the depositing process. For example, the pores 110 may form at triple points or grain boundaries of the base substrate layer 106. The pores 110 expose the base substrate layer 106, which may lead to corrosion of the base substrate layer 106 if left exposed. The pores 110 have a bottom 112, exposing the base substrate layer 106, and sides 114 extending from the bottom 112 to a top 116 of the barrier substrate layer 108 (the terms bottom and top are relative to a particular orientation of the electrical conductor and more generally constitute interior and exterior, respectively). The sides 114 are exposed within the pores 110. While the pores 110 are represented graphically in

Figure 1 as being rectangular, it is realized that the pores 110 may have any shape. For example, the sides 114 may be non-planar and may be irregular in shape.

[0020] The surface layer 104 may include pores 120 that expose the substrate layer 102. The pores 120 may be formed during the depositing process. For example, the pores 120 may form at the pores 110. The pores 120 expose the substrate layer 102, which may lead to corrosion if left exposed. The pores 120 have an open bottom 122 along the interface between the surface layer 104 and the substrate layer 102. The pores 120 have sides 124 extending from the bottom 122 to a top 126 of the surface layer 104. The sides 124 are exposed within the pores 120.

[0021] Figure 2 is a cross sectional view of a portion of the electrical conductor 100 with graphene barriers 130 to inhibit corrosion. The graphene barriers 130 may be electrically conductive. The graphene barriers 130 are deposited on the substrate layer 102. In the illustrated embodiment, the graphene barriers 130 are provided on the base substrate layer 106 to inhibit corrosion of the base substrate layer 106 (e.g. copper layer). In an exemplary embodiment, the graphene barriers 130 are grown on the exposed portion of the base substrate layer 106. For example, the electrical conductor 100 is processed to grow the graphene barriers 130 in select locations (e.g. on the exposed base substrate layer 106). The graphene barriers 130 constitute graphene deposits, generally indicated by reference numeral 132. The graphene deposits 132 plug the pores 110, 120. The graphene deposits 132 cover the bottoms 112 of the pores 110 below the pores 120. The graphene deposits 132 may constitute plugs for the pores and may be referred to hereinafter as plugs 132.

[0022] In an exemplary embodiment, the graphene barriers 130 may be formed during a chemical vapor deposition (CVD) process in the presence of an organic compound, such as gaseous methane, at a high temperature, such as approximately 800°C. Deposition mechanisms may also include electron beam, microwave or other process within the vaporous atmosphere. Other processes may be used to deposit the graphene barriers 130, such as laser deposition, plasma deposition or other techniques or processes. Optionally, the graphene barriers 130 may be 1

atomic layer thick on the base substrate layer 106. Alternatively, the graphene barriers 130 may be thicker. The graphene barriers 130 provide corrosion resistance.

[0023] The graphene barriers 130 may be deposited only on the exposed portions of the base substrate layer 106. For example, the metal compound of the base substrate layer 106 may be used as a catalyst during the CVD process (or other process) to promote graphene growth at the interface with the base substrate layer 106 as compared to other layers, such as the barrier substrate layer 108 or the surface layer 104. Optionally, the CVD process may be controlled to promote graphene growth at such interface as opposed to interfaces with other metal compounds. For example, the type of organic compound or gas precursor used, the pressure of the gas precursor used, the flow rate of the gas precursor, the temperature of the process, or other factors may promote graphene growth on one metal as compared to other metals. As such, the graphene barriers 130 may be selectively deposited on the electrical conductor 100 as opposed to a blanket covering of the entire electrical conductor 100, or particular layer of the electrical conductor 100.

[0024] In alternative embodiments, the CVD process may be controlled to promote graphene growth on more than one type of metal as compared to other types of metals. For example, the CVD process may be controlled to promote graphene growth on copper and nickel, but not gold, such that the exposed portions of the barrier substrate layer 108 and the base substrate layer 106 in the pores 110 are covered by graphene, but the surface layer 104 is not covered by graphene. Such embodiment is shown in more detail in Figure 3.

[0025] Figure 3 is a cross sectional view of a portion of the electrical conductor 100 with graphene barriers 140 to inhibit corrosion. The graphene barriers 140 may be electrically conductive. The graphene barriers 140 are deposited on the substrate layer 102. In the illustrated embodiment, the graphene barriers 140 are provided on the base substrate layer 106 and/or the barrier substrate layer 108 to inhibit corrosion. The graphene barriers 140 are grown on the exposed portion of the base substrate layer 106 and the barrier substrate layer 108. For example, the

graphene barriers 140 are grown on the sides 114 of the pores 110 and the bottom 122 of the pores 120 along the barrier substrate layer 108 to grow the graphene barriers 140 in select locations. The graphene barriers 140 constitute graphene deposits, generally indicated by reference numeral 142. The graphene deposits 142 plug the pores 110. The graphene deposits 142 cover the bottoms 112 of the pores 110. The graphene deposits 142 may be formed in a similar manner as the graphene deposits 132 (shown in Figure 2). Optionally, the graphene deposits 142 may entirely fill the pores 110 and/or 120. The graphene deposits 142 may constitute plugs for the pores and may be referred to hereinafter as plugs 142.

[0026] In alternative embodiments, the electrical conductor 100 may include graphene layers that cover the entire surfaces of one or more layers in addition to having the graphene deposits 132 or 142 or as an alternative to having the graphene deposits 132 or 142. Figure 4 illustrates the electrical conductor 100 having a graphene layer 150 deposited on the base substrate layer 106 between the base substrate layer 106 and the barrier substrate layer 108. Figure 5 illustrates the electrical conductor 100 having a graphene layer 152 deposited on the barrier substrate layer 108 between the barrier substrate layer 108 and the surface layer 104. Figure 6 illustrates the electrical conductor having a graphene layer 154 deposited on the surface layer 104. The graphene layers 150, 152, 154 define graphene barriers. Optionally, the electrical conductor 100 may include more than one graphene layer, such as the graphene layers 150 and 152, the graphene layers 150 and 154, the graphene layers 152 and 154 or the graphene layers 150, 152 and 154.

[0027] In an exemplary embodiment, the graphene layers 150, 152, 154 entirely cover the top surfaces of the base substrate layer 106, the barrier substrate layer 108 and the surface layer 104, respectively. The pores 110 in the barrier substrate layer 108 expose the graphene layer 150. The pores 120 in the surface layer 104 expose the graphene layers 150 and/or 152. The graphene layer 154 covers the pores 120 and/or 110. The exposed portions of the graphene layers operate as corrosion barriers for the electrical conductor 100 by providing a barrier between

the base substrate layer 106 and the environment to inhibit oxygen atoms from interacting with the metal compounds of the base substrate layer 106.

[0028] In an exemplary embodiment, the graphene layers 150, 152 operate as diffusion barriers to inhibit diffusion between the base substrate layer 106 and the surface layer 104. Optionally, the graphene layer 150 may replace the barrier substrate layer 108, acting as the diffusion barrier between the base substrate layer 106 and the surface layer 104.

[0029] In an exemplary embodiment, the graphene layer 154 is the outermost layer of the electrical conductor 100. The graphene layer 154 may reduce friction on the outermost surface of the electrical conductor 100, which may make mating of the electrical conductor 100 easier. The graphene layer 154 may reduce stiction of the surface layer 104. The reduction in stiction may allow use of the electrical conductor 100 in fields or devices that previously were unsuitable for electrical conductors 100 having problems with stiction and/or cold welds, such as electrical conductors having the outermost layer being a gold layer. For example, in microelectromechanical systems (MEMS) switches, stiction is a problem when a gold layer is the outermost layer of the electrical conductor. Coating the surface layer 104 with the graphene layer 154 reduces the stiction of the electrical conductor 100, making the electrical conductor suitable for use in MEMS switches.

[0030] The graphene layers 152, 154 cover the pores 110, 120, respectively. Optionally, the graphene layers 152, 154 may at least partially fill the pores 110 and/or 120. The graphene layers 152, 154 may define graphene deposits that at least partially plug the pores 110 and/or 120.

[0031] **Figure 7** is a flow chart showing an exemplary method of manufacture of an electrical conductor, such as the electrical conductor 100. The method includes providing 200 a base substrate layer, such as the base substrate layer 106. The base substrate layer may be a copper or copper alloy layer.

[0032] Optionally, the method may include forming 202 a graphene layer, such as the graphene layer 150, on the base substrate layer. The graphene layer may be formed by a CVD process or another process. The graphene layer may completely cover the base substrate layer or may selectively cover portions of the base substrate layer. The graphene layer may be formed by growing or depositing one or more graphene layers on the base substrate layer. The base substrate layer may act as a catalyst to promote selective growth of the graphene thereon.

[0033] The method includes depositing 204 a barrier substrate layer, such as the barrier substrate layer 108, on the base substrate layer. The barrier substrate layer may be directly deposited on the base substrate layer. Alternatively, one or more other layers, such as the graphene layer, may be layered between the barrier substrate layer and the base substrate layer. The barrier substrate layer may be deposited by plating or by other known processes that apply the barrier substrate layer on the base substrate layer.

[0034] Optionally, the method may include forming 206 a graphene layer, such as the graphene layer 152, on the barrier substrate layer. The graphene layer may be formed by a CVD process or another process. The graphene layer may completely cover the barrier substrate layer or may selectively cover portions of the barrier substrate layer. The graphene layer may cover any pores in the barrier substrate layer. The graphene layer may at least partially fill any pores in the barrier substrate layer. The graphene layer may be formed by growing or depositing one or more graphene layers on the barrier substrate layer. The barrier substrate layer may act as a catalyst to promote growth of the graphene thereon.

[0035] The method includes depositing 208 a surface layer, such as the surface layer 104, on the barrier substrate layer. The surface layer may be directly deposited on the surface layer. Alternatively, one or more other layers, such as the graphene layer 152, may be layered between the barrier substrate layer and the surface layer. The surface layer may be deposited by plating or by other known processes that apply the surface layer on the barrier substrate layer.

[0036] Optionally, the method may include forming 210 a graphene layer, such as the graphene layer 154, on the surface layer. The graphene layer may be formed by a CVD process or another process. The graphene layer may completely cover the surface layer or may selectively cover portions of the surface layer. The graphene layer may cover any pores in the surface layer. The graphene layer may at least partially fill any pores in the surface layer. The graphene layer may be formed by growing one or more graphene layers on the surface layer. The surface layer may act as a catalyst to promote growth of the graphene thereon.

[0037] The method includes forming 212 graphene deposits, such as the graphene deposits 132 and/or 142, in the pores in the barrier substrate layer and/or the pores in the surface layer. The graphene deposits may be formed by a CVD process or another process. For example, the workpiece defined by the various layers of the electrical conductor is processed to form the graphene in select areas. The graphene deposits may be formed on the exposed metal of the barrier substrate layer and/or the base substrate layer in the pores in the barrier substrate layer. The graphene deposits may completely cover the exposed portion of the base substrate layer and/or the sides of the pores in the barrier substrate layer. The graphene deposits may at least partially fill any pores in the barrier substrate layer. The graphene deposits may be formed by growing one or more graphene layers on the exposed metal of the substrate layer(s). The exposed metal may act as a catalyst to promote growth of the graphene thereon as compared to the exposed metal of the surface layer.

[0038] In an exemplary embodiment, the graphene of the layers or the deposits are formed during a CVD process in the presence of an organic compound, such as gaseous methane, at a high temperature, such as approximately 800°C. The location of the graphene growth may be controlled, such as by using certain metals as catalysts to promote growth where such metals are exposed. For example, the metal exposed in the pores may be used as the catalyst to promote graphene growth at such interfaces as compared to other layers that do not have such metals exposed. The type of organic compound or gas precursor used, the pressure of

the gas precursor used, the flow rate of the gas precursor, the temperature of the process, or other factors may promote graphene growth on one metal as compared to other metals.

CLAIMS:

1. A method of manufacturing an electrical conductor (106), the method comprising:

providing a substrate layer (102);

depositing a surface layer (104) on the substrate layer; and

depositing a graphene layer (130 or 150) on the substrate layer.

2. The method of claim 1, wherein the graphene layer (152) is deposited directly on the substrate layer (102) prior to the deposit of the surface layer (104).

3. The method of claim 1, wherein the graphene layer (154) is deposited directly on the surface layer (104).

4. The method of claim 1, wherein the graphene layer (130) is deposited directly on the substrate layer (102) after the surface layer (104) is deposited on the substrate layer.

5. The method of claim 1, wherein the surface layer (104) has pores (120) when deposited on the substrate layer (102), the graphene layer (132) being deposited in the pores on the substrate layer after the surface layer is deposited on the substrate layer.

6. The method of claim 1, wherein the substrate layer (102) includes a base substrate layer (106) and a barrier substrate layer (108) deposited on the base substrate layer, the surface layer (104) being deposited on the barrier substrate layer, the graphene layer (152) being deposited directly on the barrier substrate layer prior to the deposit of the surface layer on the barrier substrate layer.

7. The method of claim 1, wherein the substrate layer (102) includes a base substrate layer (106) and a barrier substrate layer (108) deposited on

the base substrate layer, the surface layer (104) being deposited on the barrier substrate layer, the graphene layer (150) being deposited directly on the base substrate layer prior to the deposit of the barrier substrate layer on the base substrate layer.

8. The method of claim 1, wherein the substrate layer (102) includes a base substrate layer (106) and a barrier substrate layer (108) deposited on the base substrate layer, the surface layer (104) being deposited on the barrier substrate layer, the graphene layer (142) being deposited directly on at least one of the barrier substrate layer and the base substrate layer after the surface layer is deposited on the barrier substrate layer.

9. The method of claim 1, wherein the substrate layer (102) includes a base substrate layer (106) and a barrier substrate layer (108) deposited on the base substrate layer, the surface layer (104) being deposited on the barrier substrate layer, the layers forming a stackup, the graphene layer (150, 152, 154) being deposited at any or all interfaces between the layers of the stackup.

10. The method of claim 1, wherein said depositing a graphene layer (140) comprises depositing graphene plugs (142) in pores (120) of the surface layer (104) by processing the electrical conductor (100) using a chemical vapor deposition process using an organic compound precursor and heat of sufficient temperature to facilitate graphene growth on the metal compound comprising the substrate layer (102).

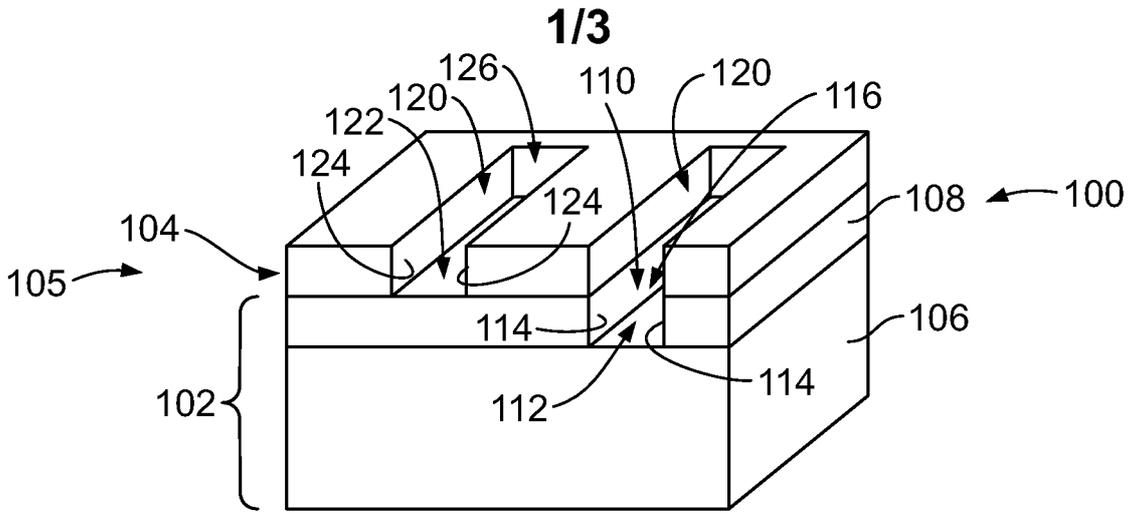


FIG. 1

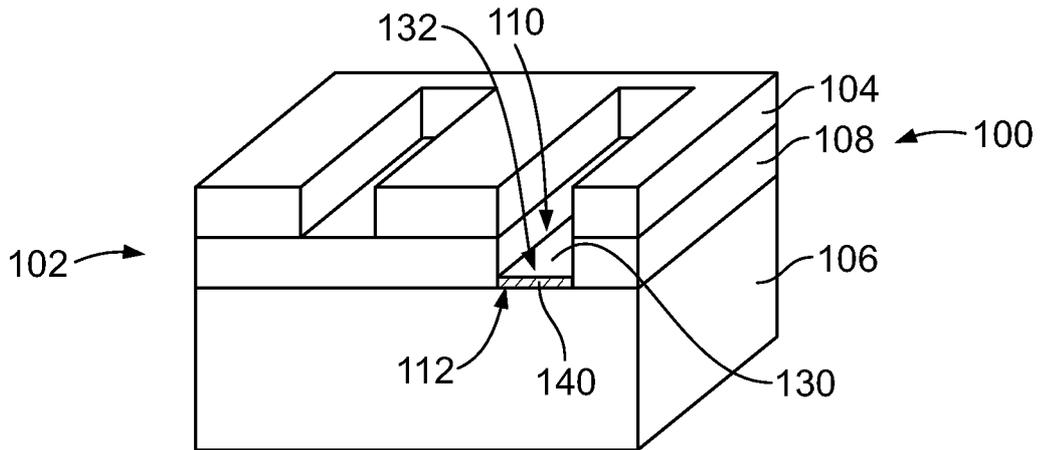


FIG. 2

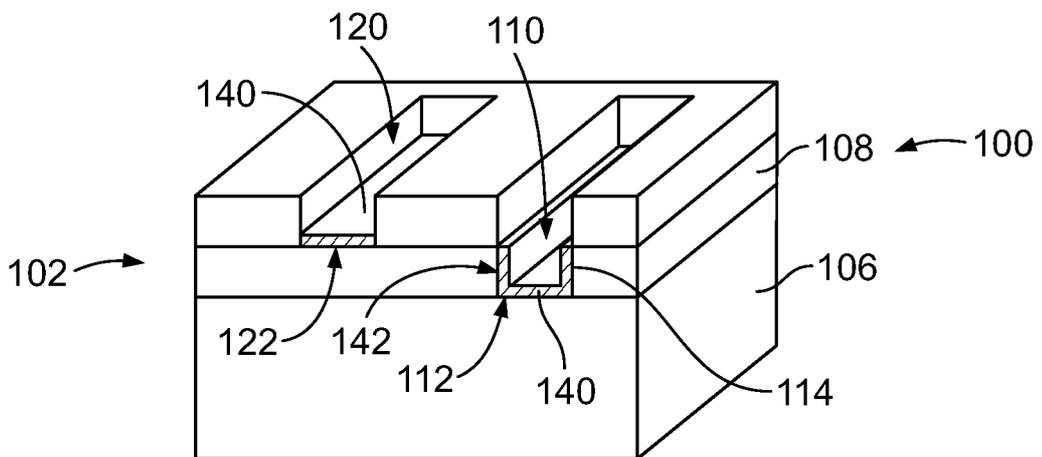


FIG. 3

2/3

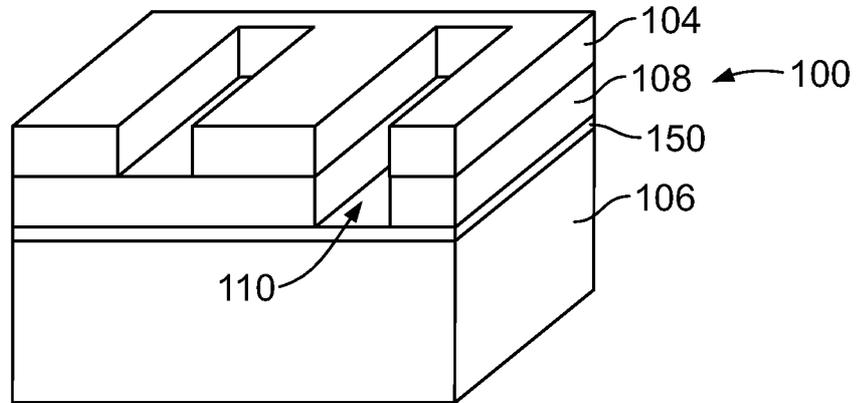


FIG. 4

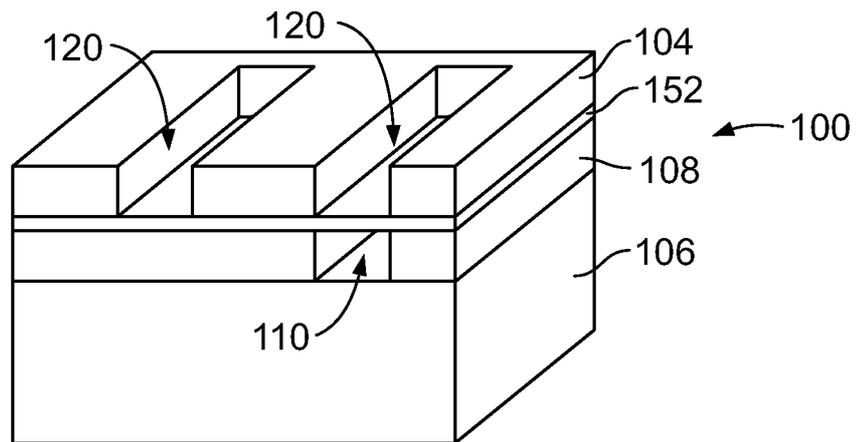


FIG. 5

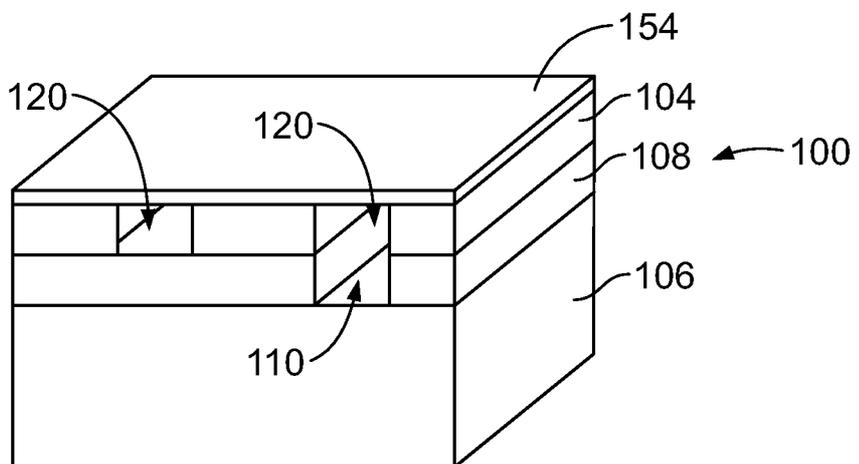


FIG. 6

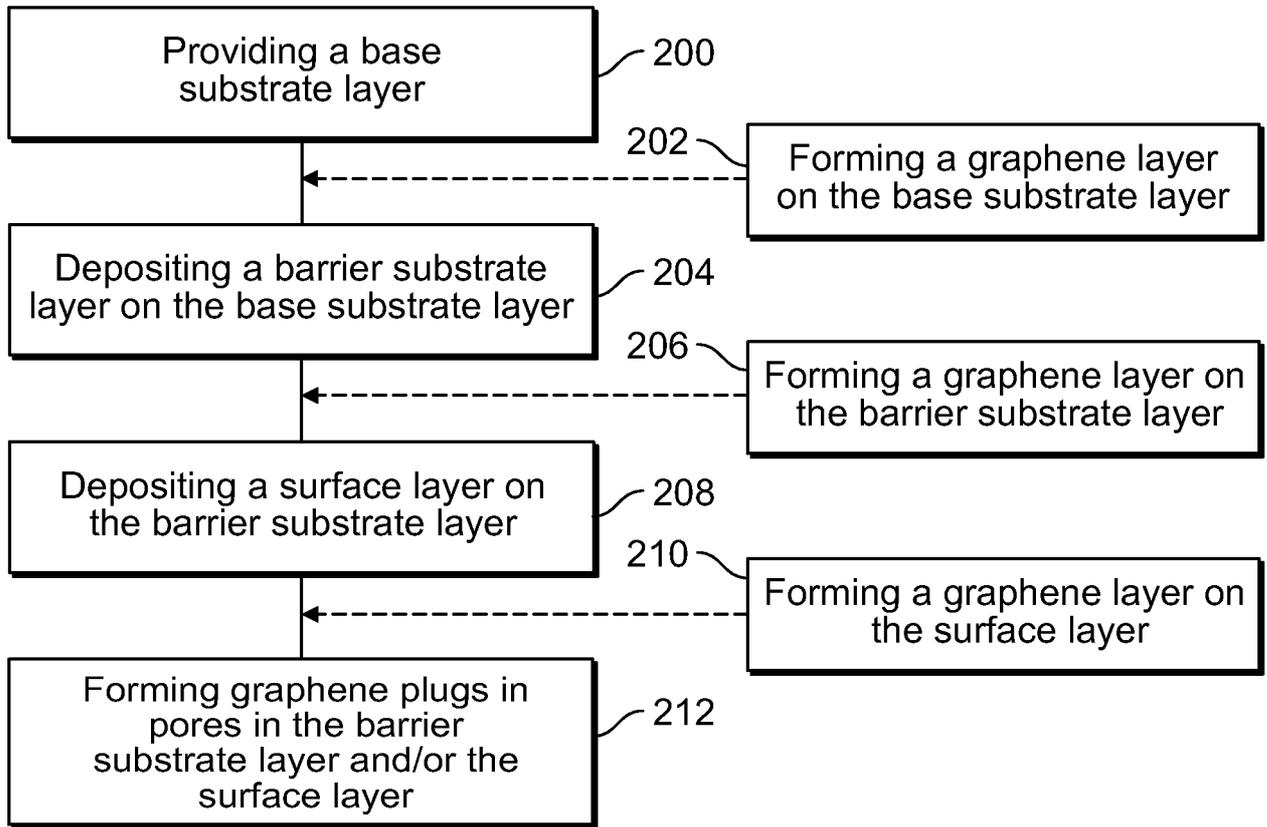


FIG. 7

Introduction to US Patent Document



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(54) **SYSTEM AND METHODS FOR ESTABLISHING A TELEPHONY SESSION FROM A REMOTE DIALING UNIT**

Publication Classification

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H04M 3/42 (2006.01)
- (52) **U.S. Cl.** 379/216.01
- (57) **ABSTRACT**

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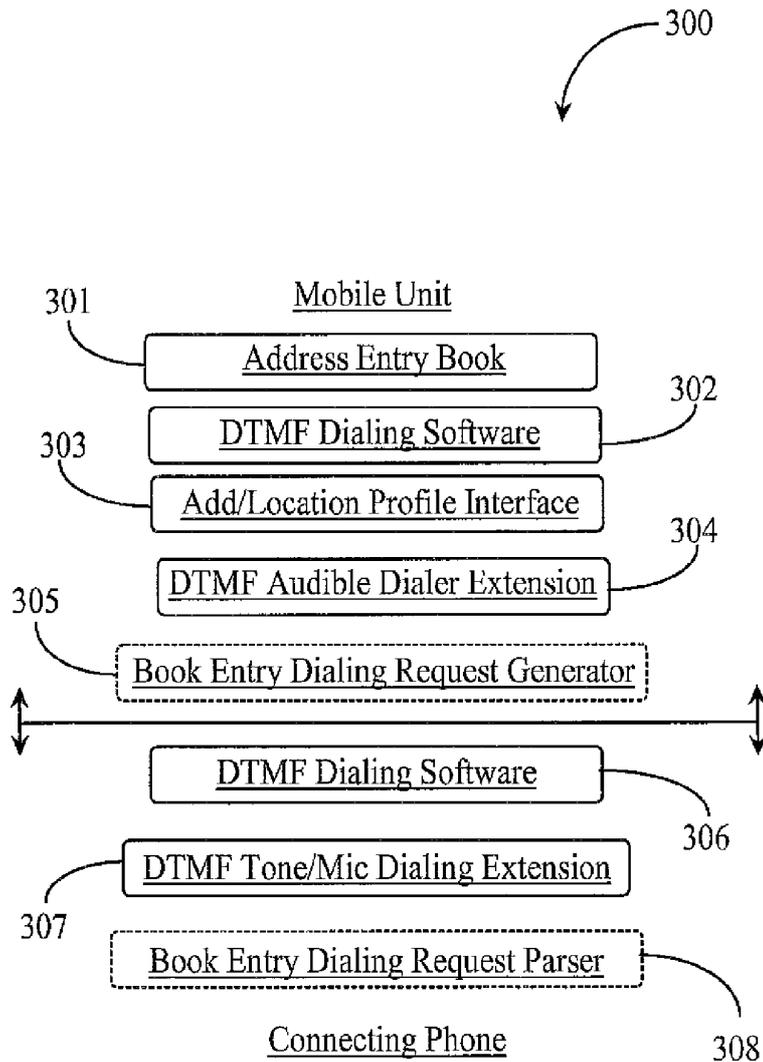
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Related U.S. Application Data

- (63) Continuation of application No. 12/105,532, filed on Apr. 18, 2008.
- (60) Provisional application No. 60/914,508, filed on Apr. 27, 2007.

A user-operated system for causing a land-line telephone to dial a destination includes a mobile telephony device having a speaker and an internal dual tone multiple frequency (DTMF) dialer, and a dialer extension integrated with a microphone on the land line telephone for capturing a DTMF telephone number sequence. A telephone number is selected on the mobile telephony device, which generates an audible DTMF for the telephone number over the speaker, and the DTMF is captured by the microphone, and the land-line telephone dials the destination.



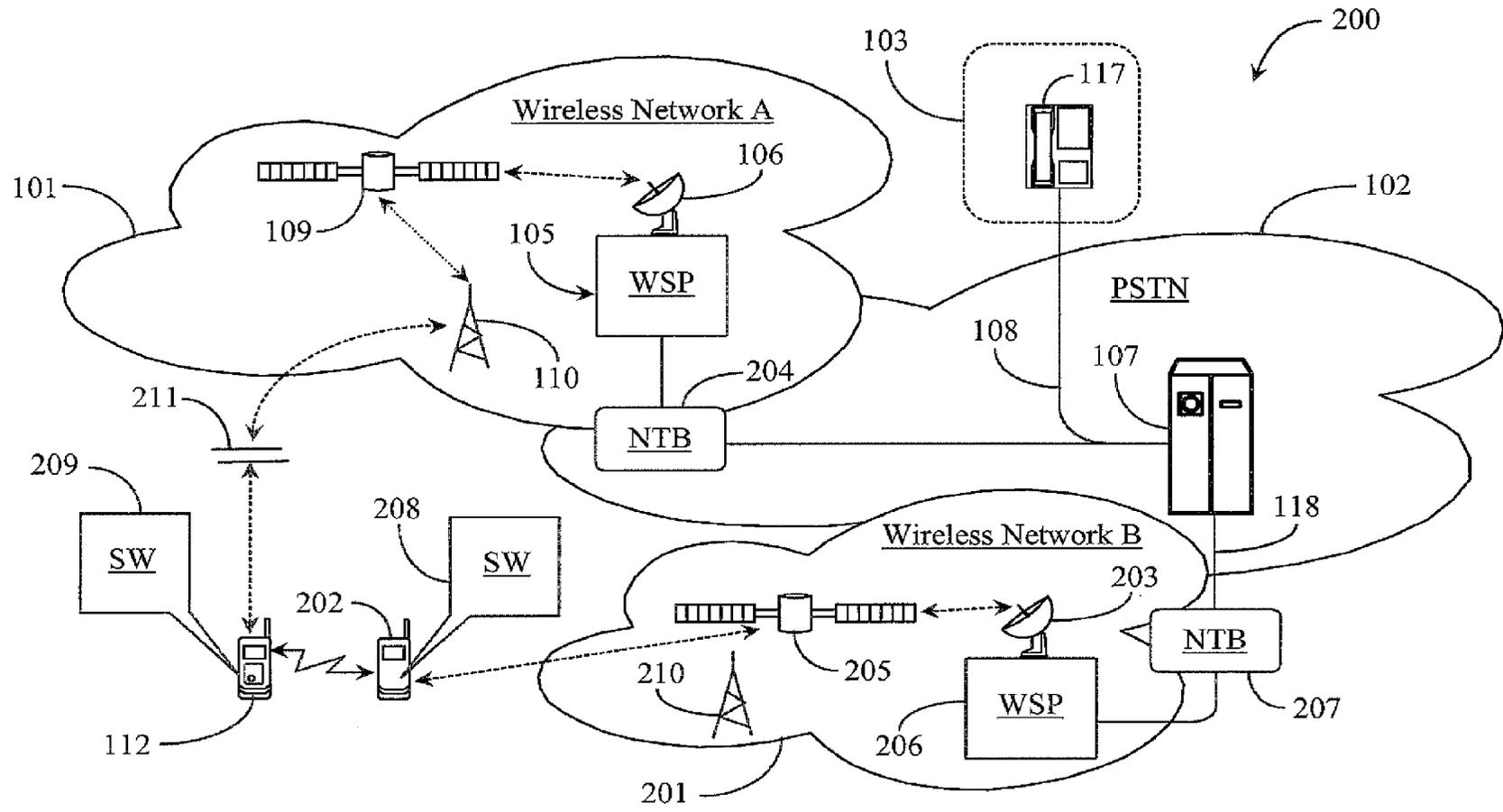


Fig. 2

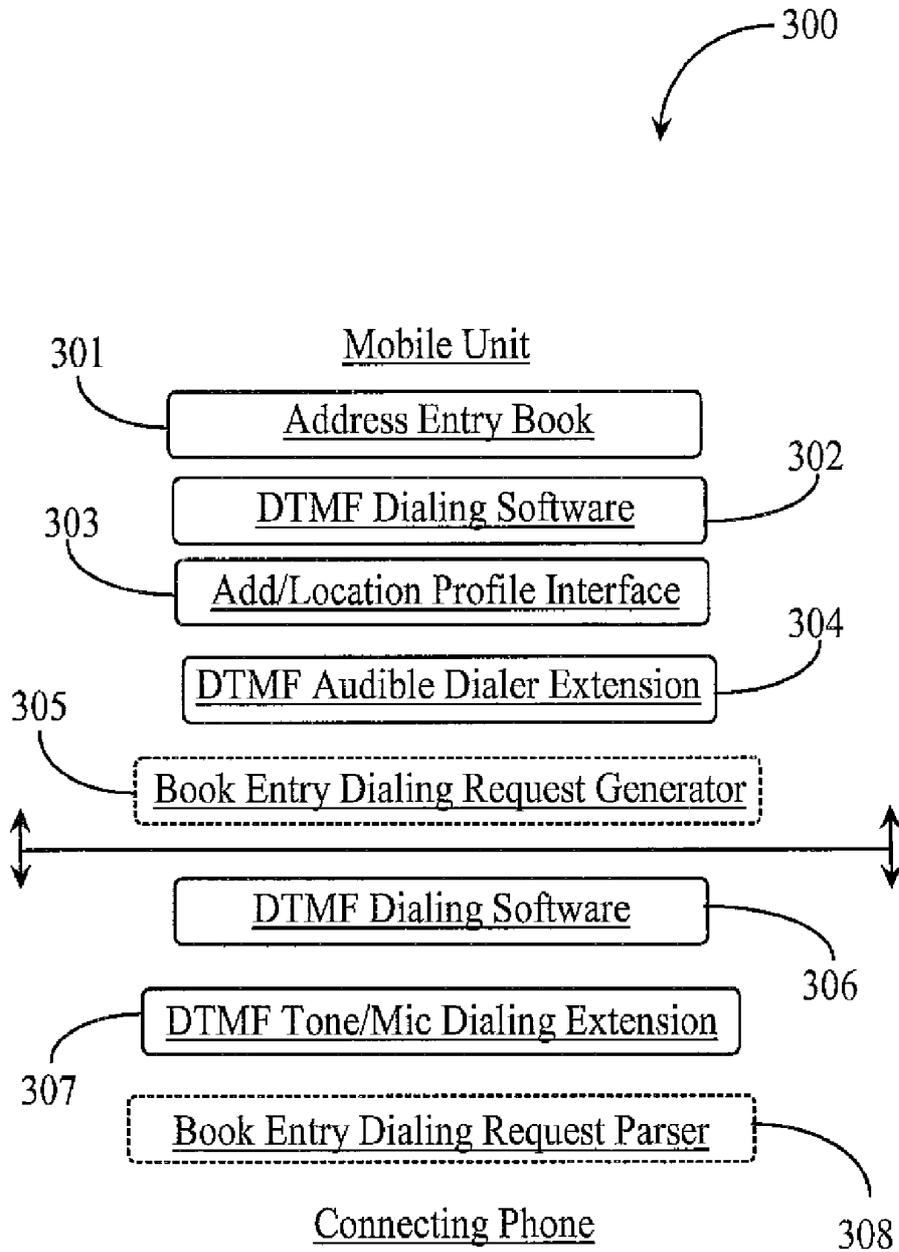


Fig. 3

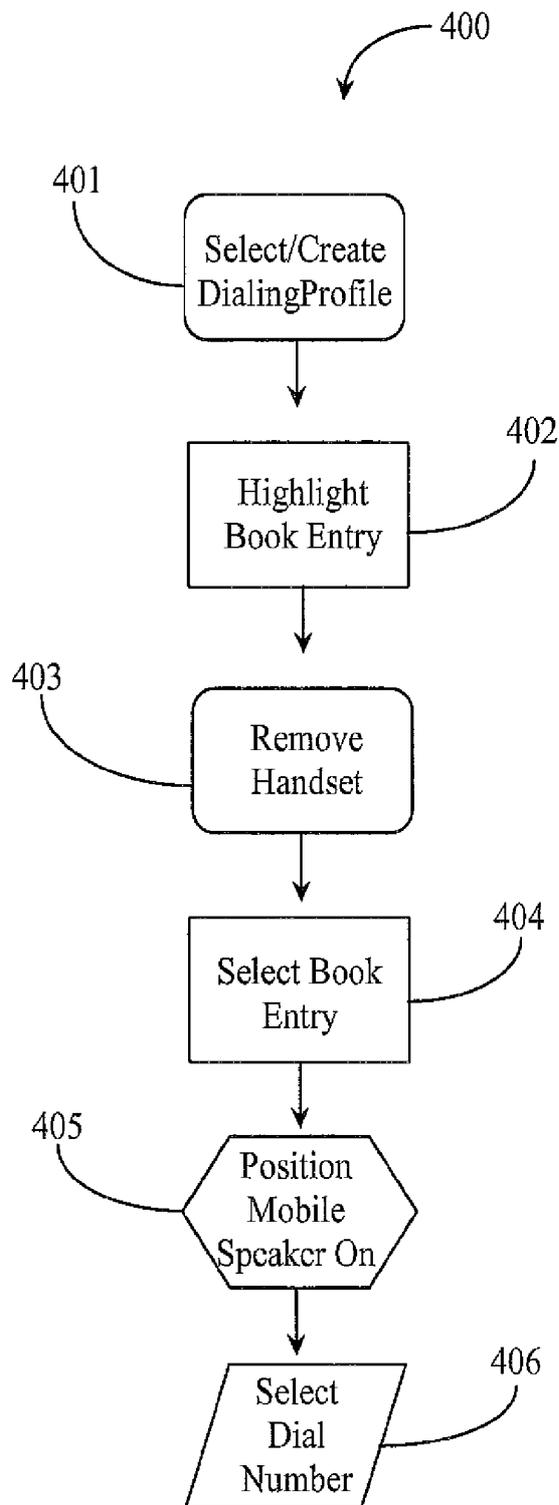


Fig. 4

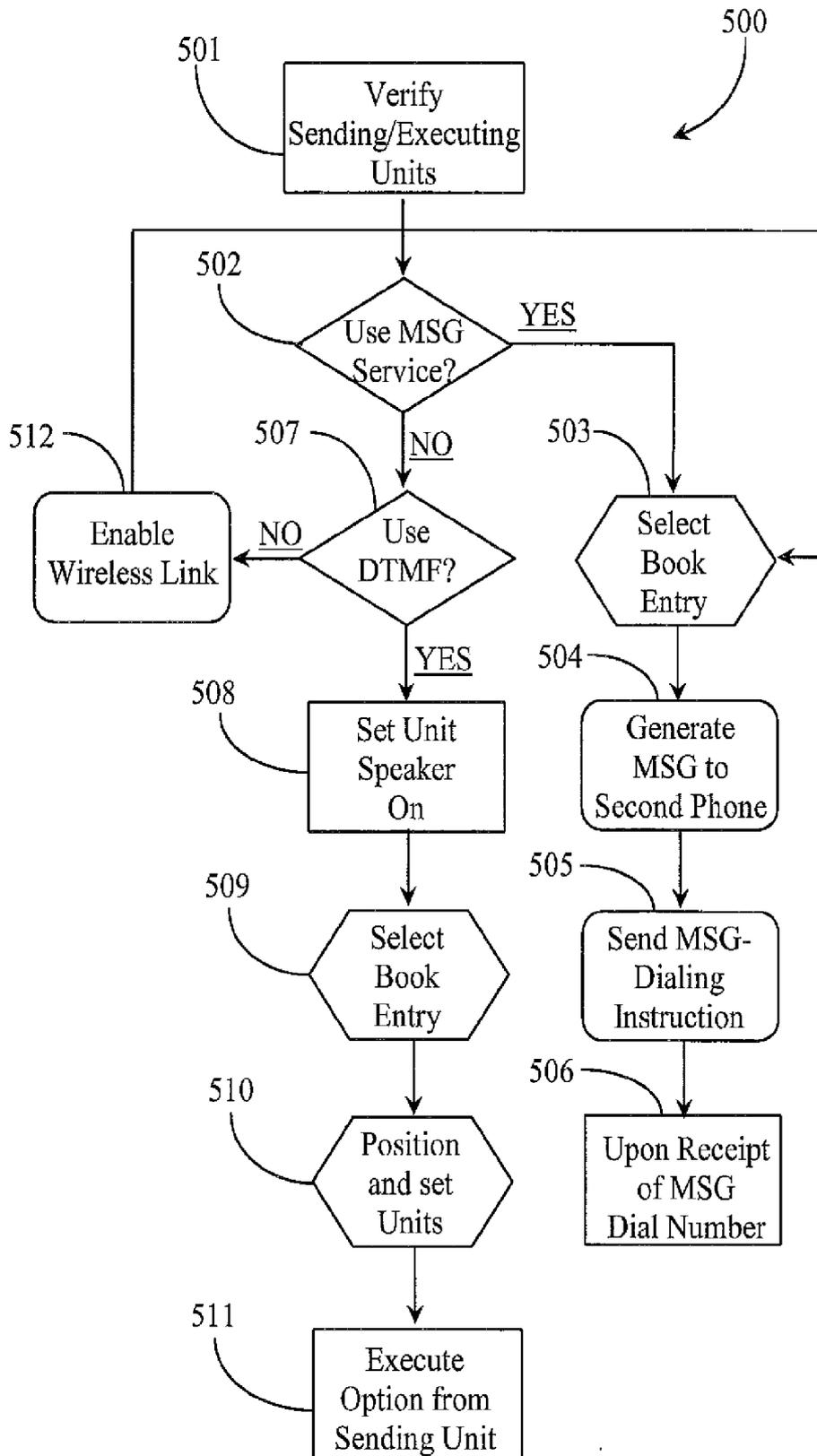


Fig. 5

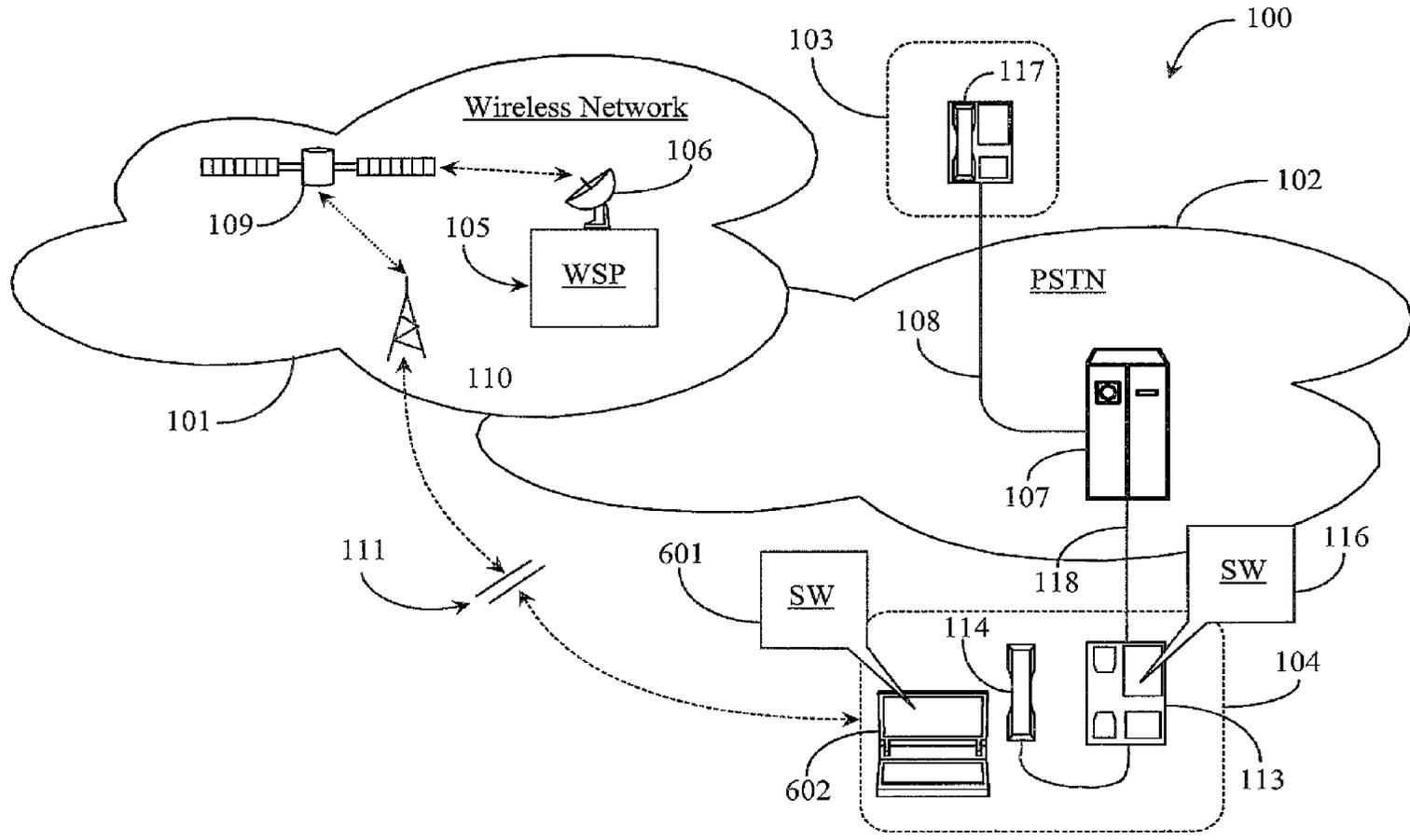


Fig. 6

**SYSTEM AND METHODS FOR
ESTABLISHING A TELEPHONY SESSION
FROM A REMOTE DIALING UNIT**

CROSS-REFERENCE TO RELATED
APPLICATIONS

[0001] The present invention is a continuation of pending case Ser. No. 12/105,532 filed Apr. 18, 2008, which claimed priority to a U.S. provisional patent application Ser. No. 60/914,508, filed Apr. 27, 2007, entitled "Method and Apparatus for Transferring a Number Dialing Operation to a Second Telephone Unit from a Mobile Dialer". Priority is claimed for provisional application 60/914,508, and all common disclosure is incorporated herein in its entirety at least by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention 

[0003] The present invention is in the field of telephony and pertains particularly to a system and methods for establishing a telephone session using remotely received commands from a dialing unit.

[0004] 2. Discussion of the State of the Art 

[0005] In the field of telephony, more particularly telephone equipment, the mobile or cellular telephone has gained wide acceptance in the market, mainly because of convenience. Most people now own a mobile telephone and subscribe to mobile telephone services in place of or in addition to a landline telephone service subscription. Demographics may vary somewhat regionally, however families often have several mobile units, subscribe to a mobile service while retaining their landline service as well.

[0006] The benefits of using a mobile telephone are well known. Some benefits of going mobile include security for family members including children, and having, hopefully, a reliable connection to friends, business associates, and family regardless of location. The mobile telephone is also convenient in that it generally includes an address book or phonebook where numbers can be pre-entered for easy dialing by highlighting an entry in the book and hitting the "dial", "call", or "talk" button on the phone, or, in some cases, by speaking a code name or alias.

[0007] One lingering problem with many wireless cellular and digital network services is that service is not always available in terms of suitable signal strength in some locations, such as at the edge of and between service cells or sectors. Due to the nature of wireless signal propagation between towers, satellites and relay points, some geographic features on the ground like mountains, tall buildings, tunnels, and low-lying depressions may serve as significant obstacles to obtaining a suitable signal for connecting to services, even when signal strength is generally good in the overall region. Low or no-service areas are often termed dead spots in the art. Moreover, in satellite-assisted digital networks, bad or stormy weather might also play a significant role in inhibiting signal strength in certain service areas, at least temporarily.

[0008] Landline services generally are more reliable than mobile services, because they use dedicated landlines to propagate the signal. It has occurred to the inventor that a mobile telephone having an address or phonebook may dial a number, producing thereby a clearly audible Dual Tone Multiple Frequency (DTMF) dial sequence regardless of the level of signal strength that might be available at the time of the

call. Also, the process of dialing an address book entry is more convenient than it is in most landline telephone handsets. Many landline telephone handsets have programmable speed dialing options, but the number of entries that can be pre-programmed is generally limited. Unless those speed-dial numbers are visibly associated with a name on a handset insert card, many times the number/name association is forgotten by the user. On the other hand an address book always has a readily visible association between the name and number of an entry.

[0009] What is clearly needed are a system and methods for establishing a telephony session by transferring dialing intelligence executed from a mobile dialing unit to a second dialing unit, which actually dials the number based on a received command. This capability would increase the reliability of existing mobile telephone services by virtue of leveraging more reliable units at the time of the call attempt to actually place calls.

SUMMARY OF THE INVENTION 

[0010] A problem stated above is that good signal strength and quality of connection is desirable for telephony communications but too often wireless telephony signals are not very reliable when compared to landline services. Drop-out and other quality of service and connection issues may cause problems for a mobile device attempting to establish a communication session with a destination or end device.

[0011] The inventor therefore considered functional elements of a telephony network and devices looking for elements that could be manipulated to provide a convenient way initiate communications from a device that is functioning poorly on the network because of one or more network-related issues.

[0012] Every telephone session established over a telephone network depends on the reliability of the carrier network to enable clear communication in a way that does not present problems. The inventor realized in an inventive moment that if, at the point of initiation of a communication, a telephony device experiencing connection or quality of service problems could transfer dialing responsibility and session establishment function to another telephony device not experiencing any service or network related issues, successful session establishment and clear communication would result.

[0013] Therefore the inventor constructed a unique telephony system that allowed successful communications sessions between parties to occur without the typical work of manually entering and dialing a telephone number from the unit that will dial the call. Significant workflow reduction is achieved relative to manual number entry and dialing tasks typically carried out on telephones to establish connectivity to a destination party.

[0014] Accordingly, in an embodiment of the invention, a user-operated system for causing a land-line telephone to dial a destination is provided, comprising a mobile telephony device having a speaker and an internal dual tone multiple frequency (DTMF) dialer, and a dialer extension integrated with a microphone on the land line telephone for capturing a DTMF telephone number sequence. A telephone number is selected on the mobile telephony device, which generates an audible DTMF for the telephone number over the speaker, and the DTMF is captured by the microphone, and the land-line telephone dials the destination.

[0015] In one embodiment the telephone number is selected from a contact list stored on the mobile device, and in another embodiment the telephone number is entered by a user on a keypad of the mobile device.

[0016] In another aspect of the invention a method for dialing a destination on a land-line telephone is provided, comprising the steps (a) selecting a telephone number to dial from a the mobile device; (b) generating a dual tone multi frequency (DTMF) dialing sequence for the telephone number; (c) playing the DTMF sequence over a speaker system of the mobile device; (d) receiving the DTMF sequence at a microphone of the telephone; and (e) dialing the destination by the land-line telephone.

[0017] In one embodiment of the method the telephone number is selected from a contact list stored on the mobile device, and in another embodiment the telephone number is entered by a user on a keypad of the mobile device.

BRIEF DESCRIPTION OF THE DRAWING FIGURES



[0018] FIG. 1 is an architectural overview of a telephony network according to an embodiment of the present invention.

[0019] FIG. 2 is an architectural overview of a telephone system according to another embodiment of the present invention.

[0020] FIG. 3 is a block diagram illustrating software for enabling intelligent dialing transfer between two telephone units according to an embodiment of the present invention.

[0021] FIG. 4 is a process flow chart illustrating steps for executing a book entry from a mobile unit causing landline dialing execution according to an embodiment of the present invention.

[0022] FIG. 5 is a process flow chart illustrating steps for requesting a dialing execution for a book entry of one mobile unit the number dialed by another mobile unit or capable landline unit.

[0023] FIG. 6 is an architectural overview of a telephone system accepting dialing intelligence from a mobile laptop computer according to an embodiment of the present invention.

DETAILED DESCRIPTION



[0024] The inventor provides a system and methods for transferring telephony dialing instruction from one telephony device to another so that the second or receiving telephony device can execute a call to a destination device based on the instruction and intelligence received from the first or initiating device. The system and methods are detailed below in various illustrated embodiments.

[0025] FIG. 1 is an architectural overview of a telephony network 100 according to an embodiment of the present invention. Network 100 represents a telephony communications network supporting practice of the present invention according to several different embodiments. In this example, communications network 100 includes a public switched telephone network (PSTN) telephone network 102, and a wireless telephone network 101. Communications network 100 may also be referred to herein as a telephony network 100 comprising one or more telephone networks.

[0026] PSTN network 102 may be a private telephone network rather than a public network without departing from the spirit and scope of the present invention. A reason for exem-

plifying the PSTN network is because of its high public access characteristics and the use of land lines and cables for carrying communications in a reliable manner. PSTN network 102 includes at least a local telephone switch 107 for purposes of discussion. Switch 107 may be an automated call distributor (ACD) switch or a private branch exchange (PBX) switch or some other type of telephone switch. The only requirement for switch 107 is that is capable of processing call requests and connecting parties to a telephone session.

[0027] A call destination premises 103 is illustrated in this example and includes a landline telephone 117 having connectivity and communications access to switch 107 in telephone network 102 by way of a telephone line 108. Premises 103 represents anyplace a call may be placed to where telephone 117 represents any destination telephone or telephony device. A call origination premise 104 is illustrated in this example and includes a landline telephone 113 having communications access to switch 107 in network 102 via a telephone line 118. Thus landline telephones 117 and 113 are wired to communicate with one another through PSTN 102.

[0028] Landline telephones 117 and 113 may be plain old telephony service (POTS) telephones with modern features or any variation of newer telephone models or appliances for voice communication like Internet Protocol (IP) telephones or base station handsets or head sets that communicate wirelessly with customer premises equipment (CPE), such as a base station for example. In this example telephones 117 and 113 are POTS telephones having at least limited programming capabilities such as a programmable dialer including normal telephone dialing and answering features.

[0029] Wireless network 101 may be a cellular telephone network including analog and digital capabilities that may include Internet access services over the digital wireless network. Wireless network includes a satellite transmitter/receiver 106 connected to a wireless service provider (WSP) premises 105. WSP 105 provides wireless telephone services and may be a known service company of which there are several. Network 101 includes a cellular relay tower 110 and relay satellite 109 representing typical equipment that might operate in a wireless network such as network 101.

[0030] A mobile telephone 112 is illustrated in this example in near proximity to landline telephone 113 in call origination premises 104. It is noted herein that designation of premises 104 as a calling premises is exemplary only. Any premises having a suitable telephone can be a call originating premises. Likewise, the designation of premises 103 as a destination premises is completely random. Any connected telephone may receive and send calls.

[0031] Wireless telephone 112 may be a cellular telephone, a personal digital assistant (PDA), or another network appliance capable of wireless telephony. In this example telephone 112 is enabled through a service subscription to a wireless telephone service such as one provided by WSP 105. In this example telephone 112 has communication access to network 101 but is not receiving a good wireless signal as is illustrated herein by a connectivity break 111 between cell tower 110 and telephone 112. Therefore, in this example it is possible that the caller receiving poor signal strength wants to use landline telephone 113 to place a call to an entity stored in the address book of mobile unit 112.

[0032] Typically speaking, there are no connection issues such as dropout, call fuzziness, or other such problems generally attributable to low signal strength in a landline telephone. Therefore a call placed to destination premises 103

such as to landline telephone **117** from landline telephone **113** would result in a more reliable communication session from the standpoint of quality of service (QoS) while a call placed to landline telephone **117** from mobile unit **112** might not even connect depending upon the current condition related to the wireless services.

[0033] Mobile telephone **112** has software (SW) or in some cases firmware **115** installed thereon and adapted to enable the telephone to play dual tone multi-frequency (DTMF) tones representing telephone number characters used to dial a telephone number. SW **115** enables the DTMF number string to be assembled and played through the speaker system of mobile **112** with speaker phone option set to on, among other capabilities. In a preferred embodiment the numbers to be dialed out are listed with other data as telephone address book entries in a displayable address book on phone **112**. The numbers to dial may be selected from the telephone address book.

[0034] Landline telephone **113** has software (SW) or in some cases firmware **116** installed thereto in one embodiment of the present invention. SW **116** may be adapted to listen for a DTMF number dialing sequence played by telephone **112** with the aid of SW **115** using the telephone microphone, among other capabilities. Telephone **113** is illustrated in this example with a telephone handset **114** lifted off of the telephone and positioned to receive a DTMF signal via the speaker output of mobile telephone **112**. The speaker mode of mobile telephone **112** may be adapted to turn on automatically when the DTMF dialing sequence initiates. Further, the volume of the DTMF signal generated is managed to be of sufficient magnitude to activate the dialing process in telephone **113**. In the case of analog telephones there need not be a program to receive the input and to recognize it as a dial-out because the signal path will be open to the exchange. In the case of the digital device telephone using software, the input need not be DTMF, but could be any code that both software/firmware **115** and **116** understand and agree upon. SW **116** interprets the audible DTMF dial tones (or other code) as dialing intelligence or instruction and a command to dial the sequence out over the landline and make a connection to the number. In this aspect SW **116** may include a small program that sets the dialer of the origination telephone (**113**) to accept the recorded sequence as it normally does for a push-button dialing sequence.

[0035] In a simple embodiment a user operating mobile unit **112** under low signal-strength conditions decides to transfer a dialing operation to a nearby landline telephone such as telephone **113** in this example. The user may select or highlight an address book entry such as one representing the destination number assigned to telephone **117**. The user may press "transfer dial" or "call" (in transfer mode) with the speaker of mobile **112** on and the handset **114** of telephone **113** lifted off of the receiver and positioned to pickup the sequence as it is played over the speaker system of the mobile. Landline telephone **113** automatically recognizes and executes dialing of the DTMF sequence representing the number selected and attempt to establish a call connection to telephone **117** over the PSTN network as would be the case if the telephone number was dialed manually from telephone **113**. The user of mobile **112** may then use landline **113** to engage the called party in a telephone conversation.

[0036] The practice of the present invention does not necessarily hinge on low signal strength for mobile **112** as a reason to transfer dialing execution to landline **113**. There

may be a host of other reasons to use landline telephone **113** to dial and to connect with the called party such as a lower cost for the call, or simply that the user does not wish to manually dial the address book entry that is programmed on the mobile but not already part of an address list or book programmed into the landline telephone.

[0037] In this embodiment mobile unit **112**, landline telephones **113** (execution) and **117** (destination), and telephone switch **107** for a routing system for routing a dialing instruction and establishing a telephone call based on the instruction.

[0038] FIG. 2 is an architectural overview of a telephony network **200** according to another embodiment of the present invention. Network **200** represents a telephony communications network similar to network **100** incorporating the PSTN network of FIG. 1 and the wireless telephone network of FIG. 1. Many of the same communications components illustrated in FIG. 1 are also present in FIG. 2. Elements common to both examples will not be reintroduced. An additional wireless telephone network **201** is illustrated as a part of communications network **200**. Wireless network **101** may be referred to herein as wireless network A and wireless network **201** may be referred to herein as wireless network B. Wireless networks A and B may refer to separate proprietary service networks A and B in this example, each network having its own WSP.

[0039] In this example WSP **105** administers network traffic through network A and WSP **206** administers traffic over network B. Wireless network B (**201**) includes typical wireless communications components analogous to those described in FIG. 1 such as a satellite **205**, WSP **206**, satellite transceiver **203**, and cell tower **210**.

[0040] In this embodiment, wireless networks A (**101**) and B (**201**) are bridged for communication to PSTN network **102** through a network bridge (NTB) facility **204** and a NTB facility **207**. NTB **204** and NTB **207** may be one of a number available bridging facilities adapted to extend wireless telephone calls into the PSTN network over the PSTN land lines. One with skill in the art of network bridging facilities will recognize that the appropriate telephone command protocol and call data conversion methods are well known and already in place for seamlessly transferring calls between networks in both directions.

[0041] WSP **105** has connection to NTB **204** and access to telephone switch **107** through the bridge. Likewise, WSP **206** has connection to NTB **207** and access to telephone switch **107** through the bridge. In this example mobile telephone **112** leverages wireless network **101** administered through WSP **105**. A mobile telephone **202** is illustrated in this example and has connection to wireless network **201** through subscription to WSP **206**. In this example mobile telephone **112** is not authorized to use network B and mobile **202** is not authorized to use network A. Logically speaking then the networks are separated according to proprietary services if not actual towers, satellites, and other equipment.

[0042] Mobile telephone **112** has software (SW) or firmware **209** installed thereon. SW **209** may be somewhat analogous to SW **115** of FIG. 1. Mobile telephone **202** has SW **208** or equivalent firmware installed thereon. SW **208** may also be somewhat analogous to SW **115** of FIG. 1. In this embodiment mobile **112** is receiving little or no signal strength from network A as illustrated logically herein by a service break or lull **211**. On the other hand, mobile telephone **202** is receiving adequate or strong signal strength. The operator of mobile telephone **112** has decided to transfer a destination number

dialing sequence and command to mobile telephone 202, which will actually dial the destination number and forge the connection.

[0043] In this example the transfer is made, not by playing a DTMF string, but by sending a number dialing sequence code and command instruction using a local wireless network capability like Bluetooth™ or an 802.xx wireless capability. In this case the motivation for transferring the dialing capability from phone 112 to phone 202 is low signal strength but that should not be construed as a limitation. If mobile 112 had good signal strength, there still may be motivating circumstances for transferring the dialing capabilities to mobile 202 such as lower connection and session costs in network B.

[0044] Mobile telephone 112 has an address book entry programmed therein that represents, for the purpose of discussion, the number and profile of the user operating telephone 117. It is noted herein that a destination address book entry may also be that of a mobile telephone or some other automated device capable of receiving a telephone session request without departing from the spirit and scope of the present invention.

[0045] A user operating mobile telephone 112 aided by SW 209 may first connect to mobile telephone 202 using Bluetooth™ or another available wireless protocol. The user may then select a phonebook entry and press dial while in a correct mode for transfer of the dialing instructions. Options such as “transfer dial” or “call transfer” may be provided so that the mobile telephone does not attempt to dial the selected entry. Mobile phone 112 aided by software 209 may produce the dialing code and embed the code in a message or command that is automatically sent as a dialing request including instruction to mobile phone 202 using the near proximity wireless protocol. Mobile phone 202 aided by SW 208 receives the message or command, parses it for the number dialing sequence, and automatically dials the telephone number. The call is placed through wireless network B, NTB 207, and switch 107 to the destination number such as to telephone 117.

[0046] Transferring the dialing intelligence and command from mobile 112 to mobile 202 is not limited to short-range wireless capability generic to those telephone sets. In one embodiment of the present invention a message like email or a short message service (SMS) message may be generated by mobile phone 112 for send to mobile phone 202. The message may contain the destination number dialing command instruction and code. In this aspect the signal strength to both mobile phones needs to be sufficient enough for SMS, instant messaging (IM), or email messaging. Motivation for transferring dialing execution from one mobile phone to another mobile phone may simply be the cost of the call.

[0047] In one embodiment motivation may simply consist of one person wanting to call a number that is not programmed in the phonebook on his or her mobile telephone so another person who has the contact listed in the phonebook on his or her mobile telephone simply selects the entry and presses a button to initiate the transfer of dialing intelligence so the second unit may dial the number. After the session, the user of the second mobile phone may save the number as a new contact in the phonebook on that phone, if desired.

[0048] FIG. 3 is a block diagram illustrating components 300 for enabling intelligent dialing transfer between two telephone units according to an embodiment of the present invention. Referring now to FIG. 3, basic software SW components 300 are illustrated in block form. Components 300 comprise

a program that may be installed partially on a mobile unit and partially on a landline telephone system including any connecting phone that actually dials the destination number. An address entry book 301 is generally required on the mobile phone that will transfer the dialing intelligence and command or request to dial to a connecting unit. The destination number at a minimum may be provided in a displayable list on the phone. DTMF dialing software 302 is provided at least in an embodiment wherein a DTMF dialing string is created and played over the phone speaker system as described further above with respect to FIG. 1.

[0049] In one embodiment where a DTMF dialer is used, an add location/profile interface 303 is provided. Interface 303 is used when a certain dialing profile is needed for the purpose of conforming to the dialing rules of the situation at hand. For example, to dial out from a hotel room in London for a tourist from the U.S., there may be several requirements to place the call. For example, the phonebook on the mobile phone may show a destination number for a call as 1+area code (309) followed by the telephone number 444 5555. The dialing instruction may be created as a profile for the hotel in London as follows. The profile name (location) may be “London” or the name of the hotel in London if it is a frequent location or one that the user often travels to when abroad. For the profile “Canterbury”, for example, “use the following dialing instructions”: Outside long distance line=72; Pause for line seizure=comma; Number of service provider=800 2345 678 Long pause for response=3 commas; Authorization code=123456; Pause for authorization=2 commas; International access code=00; Number=[1-309-444-5555].

[0050] Therefore, the number to dial according to the created location using the selected destination number is “72, 800 2345 678,, 123456,, 00 1 309 444 5555. Once the correct location profile is created, it may be used over and over with any destination number within the address book for the specified country. Other destination numbers of other countries can be automatically plugged into transferred dialing command intelligence and the connecting phone will automatically use the appropriate country access codes for those countries without having to create multiple dialing instructions for the one location.

[0051] If the user is at home in the U.S. then the profile can be “Home” and the connecting telephone will simply dial the number that is in the book or 444-5555 if the call is local and not a long distance destination number. If the service provider requires all of the digits to be dialed such as 1-309-444-5555, then the access and area code is automatically dialed. The entry should include the access code and area code if this is the case.

[0052] A DTMF audible dialer extension 304 is provided on the mobile phone in the DTMF embodiment and is adapted to enable the mobile telephone to dial the number using the DTMF dialing software without attempting to connect to the number. This feature may be likened to a “transfer dialing feature”. The option may be provided as a static option visible in the displayed phonebook on the mobile telephone so that a user may select a destination number and then select “normal dial” or “transfer dial”. Selecting the first option may simply dial the number and includes an attempt to connect to the destination party. The second option may cause the DTMF string to be played over the speaker system on the mobile phone so that the receiving phone responsible for dialing the

number can incorporate the signal and actually dial the destination number and establish the connection with the aid of a telephone switch.

[0053] In an alternate embodiment where close proximity wireless messaging or typical service sponsored network messaging might be used to “transfer dial”, then a book entry dialing request generator 305 may be provided as an extension to the mobile telephone phonebook or SW. The actual format and content of a generated request may vary somewhat with the type of technology used to convey the message whether close proximity messaging or network messaging. Close proximity messaging may include use of Bluetooth™ technology or some other available wireless tether like infrared, Wireless Fidelity (WiFi), or the like. Network messaging may include e-mail, IM, and SMS conventions or other like conventions that may be available to the inventor.

[0054] Components 300 may include a DTMF dialing software 306 installed on the connecting telephone that will record the DTMF string played over speaker system by the mobile unit and use it as dialing intelligence for a number dialing execution. A DTMF tone/microphone dialing extension 307 may be provided to set the phone to a mode for listening to the DTMF audible signals. Extension 307 is adapted to control the dialer whenever a correct DTMF sequence is recognized.

[0055] In an alternate embodiment wherein messaging is used to request a dialing sequence, a book entry dialing request parser 308 may be provided. Parser 308 may be adapted to recognize a message containing a dialing request and code for dialing the number. Once recognized, the parser interprets the intelligence and then initiates the dialing of the number.

[0056] Components 300 may include fewer or more components than were illustrated in this example without departing from the spirit and scope of the present invention. For example, Bluetooth™ or other close proximity wireless SW modules and extensions may be present. In some embodiments the connecting phone may be a mobile telephone and may therefore contain some or all of the mentioned components adapted for the mobile unit.

[0057] FIG. 4 is a process flow chart illustrating steps 400 for executing a book entry from a mobile unit causing landline dialing execution according to an embodiment of the present invention. Referring now to FIG. 4, steps 400 are for transferring a dialing operation from a mobile unit to a landline telephone. In step 401a user selects a dialing profile or creates one if an appropriate profile does not exist. The dialing profile may be created using an add location interface like interface 303 described above. The dialing profile is sensitive to the location of the actual call placed according to known dialing rules for that location.

[0058] In step 402 the user may highlight a phonebook entry containing minimally a dialable telephone number. In step 403 the user may remove the handset receiver of a landline telephone analogous to telephone 113 of FIG. 1 and position it to listening for a dialing sequence. In step 404 the user may select the appropriate telephone number to dial in a case where there is more than one telephone number such as by double clicking on the telephone number in the entry in some cases or by highlighting the exact telephone number. Many phonebook entries for one party contain multiple telephone numbers. In one embodiment where there is only one tele-

phone number associated with an entry or a priority number (first number dialed) is acceptable, then step 404 may not be required.

[0059] In step 405 the user positions the mobile telephone with the speaker on next to the handset of the landline telephone so that the pending DTMF string can be picked up using the handset microphone. In step 406 the user may press a dial button or a “transfer dial” button if one is available. It is important that a feature for determining when or not an actual connection attempt is made or a dial transfer operation is made can be executed. One way to ensure that the mobile telephone will not attempt to connect to the destination party during a dial transfer operation is to provide a special button or mode for the operation. Another way to accomplish the correct operation on a generic mobile phone is to select the correct operation from available static options displayed and visible in the phonebook entry highlighted such as by selecting an option “Normal Dial” or by selecting an option “Dial Transfer” before depressing a generic call button on the phone.

[0060] In this embodiment, software on the landline telephone or generic DTMF capabilities built into the telephone enable the phone to record the DTMF signaling played through the speaker system of the mobile unit and to use the intelligence as a command to dial the number according to the provided number sequence and any dialing rules associated with the profile.

[0061] One with skill in the art will agree that the exact number and order of steps illustrated in this example may be changed without departing from the spirit and scope of the present invention. For example, in one embodiment an error message may play on the landline telephone in an event where the dialing rules or selected location profile is incorrectly selected or configured. It may be that some dialing rules need to be updated or that a user has inadvertently selected the wrong profile for the location of the call causing the wrong numbers to be dialed along with the destination telephone number.

[0062] FIG. 5 is a process flow chart illustrating steps 500 for requesting a dialing execution for a book entry of one unit the number dialed by another unit. Steps 500 are provided to illustrate dial transfer options depending on included capabilities and scenarios including whether or not messaging or DTMF signaling is used in the transfer operation. At step 501a user may verify that a sending unit and an executing or dialing unit is available to practice a dial transfer operation. A sending unit is typically a mobile telephone but may be any other device capable of practicing telephony. An executing unit is typically a landline telephone but may be a mobile device with good wireless reception. The term unit will be used in this description to refer to a telephony device mobile or not that is adapted to practice the invention.

[0063] At step 502 the user may decide if a messaging service will be used to initiate the dial transfer operation. If in step 502 the user decides that a messaging service will be used, the user may select a phonebook entry containing minimally one telephone number to dial at step 503. In this example it is assumed that all of the proper dialing rules are made available through a location profile or otherwise known to the dialing unit. The user may be required to select a telephone number to dial from more than one available telephone number displayed in the phonebook entry on the sending unit. It is noted herein that both the sending and executing units must be capable of practicing the network-based mes-

saging determined for carrying the transfer of instructions. Both units must also be connected to the network hosting the messaging service to enable send and receipt of messages.

[0064] In step 504, the user may generate a message (MSG) addressed to the second telephone or dialing unit. The second telephone may also be a mobile telephone. The message type may be an email message, an instant message, or a short message service (SMS) message. The carrier network may be the Internet network including any connected sub-networks.

[0065] At step 505 the user may send the message generated at step 504. The message may contain the dialing instruction, number to be dialed, and code to the dialing unit. At step 506 the dialing unit may receive the message and may dial the number according to the message data, which includes any instruction in addition to the exact telephone number to dial. A feature may be available in the mobile phonebook that enables the user to select a "Normal Dial" or to select a "Dial Transfer" operation so that if the "Dial Transfer" option is selected, the message is automatically generated except for the addressing of the message to the receiving unit that will actually dial the number. The address of the receiving unit may be a telephone number, an IM handle or an email address.

[0066] In step 506, the receiving unit recognizes and accepts the message parses the instructions and dials the number according to the message parameters. The participating units may be mobile telephones using one or more than one wireless service. The executing unit might be a landline unit that is enabled for messaging.

[0067] Referring back to step 502 if the user decides not to use a messaging service, then the user may decide if DTMF signaling will be used at step 507. FIG. 4 illustrates steps used for dial transfer to a landline telephone. It may be assumed in this example that the sending unit is another mobile telephone or a landline unit capable of messaging and/or short-range wireless communication. A mobile dialing unit may be adapted to recognize DTMF tones and may serve as the executing unit. If at step 507 the user decides to use DTMF signaling, the user may set the speaker phone on the sending unit to on at step 508. At step 509 the user may select a phonebook entry that contains at least one telephone number to dial at minimum. In case of more than one listed telephone number, the user may select a correct or preferred number. Also in this step, the user may select an option "Dial Transfer" or an equivalent option so that the sending unit does not attempt to connect with the destination number.

[0068] The user may position the sending unit near the dialing unit once the sending unit is set to transfer a dialing operation. The user may set the dialing (executing) unit to receive the DTMF signaling by lifting the phone receiver or flip-top lid (if mobile) or otherwise activating the microphone on the unit as part of step 510. This step may be undertaken before the phonebook entry number is selected for dial transfer at step 509. At step 511 the user may depress a dial button or equivalent on the sending unit to initiate the transfer. The DTMF dialing string will be played over the speaker and will be picked up by the microphone of the dialing unit, which will automatically dial the number and attempt connection to the destination party.

[0069] The user may decide not to use DTMF referring back to step 507. A third option exists if the units can communicate with each other via Bluetooth™ or some other close proximity wireless protocol. If at step 507 the user has decided not to use DTMF after also deciding not to use a messaging service in step 502, the user may enable a wireless

link between the units involved at step 512 for the purpose of sending a message to initiate the dial transfer operation. In this case, the process resolves back to step 503 through step 506 using generally the same sequence used if a messaging service is selected. The only difference is that the message passes directly from mobile to mobile and the units do not have to be connected to a network supporting messaging.

[0070] One with skill in the art will agree that the exact number and order of steps required to practice the illustrated options may vary somewhat without departing from the spirit and scope of the present invention. For example, a user may decide whether to use DTMF before deciding whether to use a messaging service or whether to use a wireless link to initiate a dial transfer operation. The use of DTMF signaling in this example assumes that both units (sending and executing) are adapted for the purpose with the aid of the software of the present invention or its equivalent in firmware.

[0071] FIG. 6 is an architectural overview of telephone network 100 supporting receipt of dialing intelligence from a mobile laptop computer during a dialing transfer operation according to an embodiment of the present invention. Referring now to FIG. 6, network architecture identical to that of FIG. 1 is illustrated. Many of the same components illustrated and described in FIG. 1 are also illustrated in this example and therefore shall retain the same element numbers and shall not be reintroduced. In place of mobile unit 112 described with respect to FIG. 1 further above, a laptop computer 602 is illustrated. Laptop 602 has a wireless connection to wireless network 101. Laptop computer 602 has SW 601 installed thereon for practicing the present invention using an address book on the laptop and PC dialing software, typically dialing out through a software modem or wireless network card. SW 601 may be similar to SW 115 described in FIG. 1 except that it is adapted for a PC instead of a mobile telephone.

[0072] Laptop 602 may be wirelessly connected to any wired or wireless network including LAN, WAN, or WiFi networks without affecting DTMF dialing function. Laptop 602 may dial out a selected telephone book entry number without attempting to connect to the party of the number by properly setting previously mentioned features in the phonebook display such as "Normal Dial", or Transfer Dial" as is the case with a mobile telephone. Messaging services and close proximity messaging may also be used with the laptop if it is enabled for those technologies. However in this example, telephone 113 may be a POTS telephone and therefore may not be able to accept electronic messages. Therefore DTMF transfer may be an only option in this particular example. The process for initiating a dial transfer using DTMF signaling from laptop 602 to telephone 113 is the same as that process illustrated in FIG. 4. Telephone unit 113 may be a telephone that has messaging capabilities including wireless short range communication capabilities like Bluetooth™. In one embodiment unit 113 may be a desktop or laptop PC connected to the Internet and enabled for dial-out telephony. There are many unit configurations possible.

[0073] It will be apparent to one with skill in the art that the methods and apparatus of the invention for enabling a dial transfer operation from a mobile telephone to a telephone dialer (landline or mobile) may be provided using some or all of the mentioned features and components without departing from the spirit and scope of the present invention. It will also be apparent to the skilled artisan that the embodiments described above are exemplary of inventions that may have far greater scope than any of the singular descriptions. There

may be many alterations made in the descriptions without departing from the spirit and scope of the present invention.

What is claimed is:



1. A user-operated system for causing a land-line telephone to dial a destination, comprising:

a mobile telephony device having a speaker and an internal dual tone multiple frequency (DTMF) dialer; and
a dialer extension integrated with a microphone on the land line telephone for capturing a DTMF telephone number sequence;

wherein a telephone number is selected on the mobile telephony device, which generates an audible DTMF for the telephone number over the speaker, and the DTMF is captured by the microphone, and the land-line telephone dials the destination.

2. The system of claim 1 wherein the telephone number is selected from a contact list stored on the mobile device.

3. The system of claim 1 wherein the telephone number is entered by a user on a keypad of the mobile device.

4. A method for dialing a destination on a land-line telephone, comprising the steps:

(a) selecting a telephone number to dial from a the mobile device;

(b) generating a dual tone multi frequency (DTMF) dialing sequence for the telephone number;

(c) playing the DTMF sequence over a speaker system of the mobile device;

(d) receiving the DTMF sequence at a microphone of the telephone; and

(e) dialing the destination by the land-line telephone.

5. The method of claim 4 wherein the telephone number is selected from a contact list stored on the mobile device.

6. The method of claim 4 wherein the telephone number is entered by a user on a keypad of the mobile device.

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