April 1, 1969 RYOICHI MORI 3,435,561

DEVICE FOR CLEANING THE ELECTRODE SECTION OF AN IGNITION PLUG

Filed Dec. 21, 1966 Sheet 1 of 3

FIG. 1

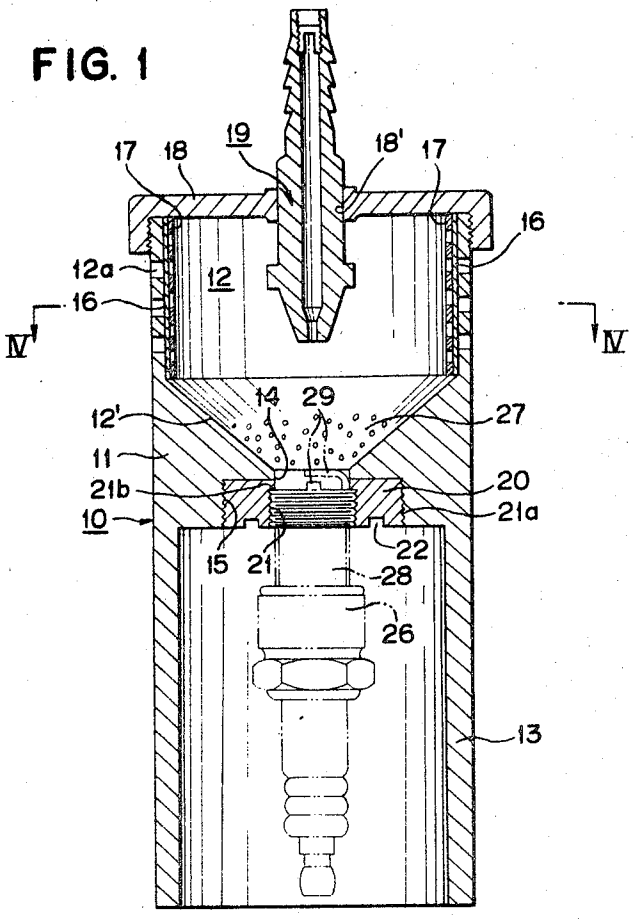
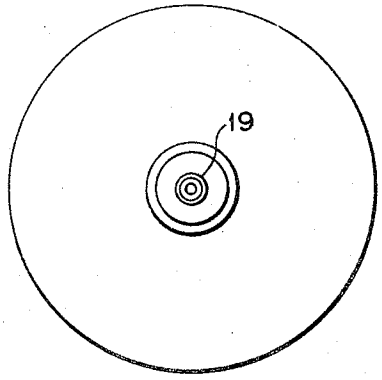


FIG. 2



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DEVICE FOR CLEANING THE ELECTRODE SECTION OF AN IGNITION PLUG

FIG. 3

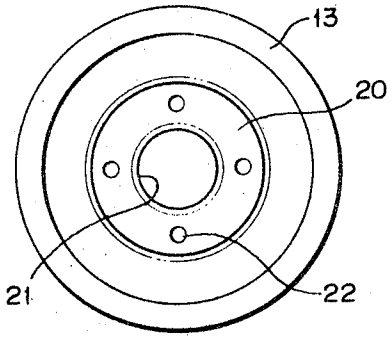


FIG. 4

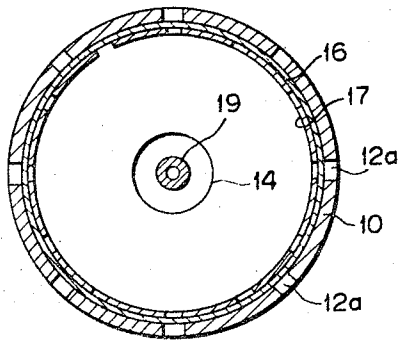


FIG. 5

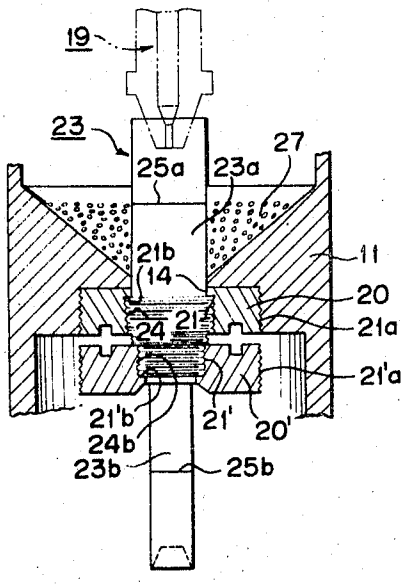


FIG. 7

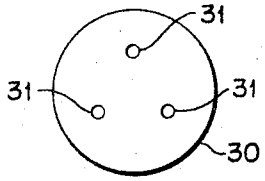
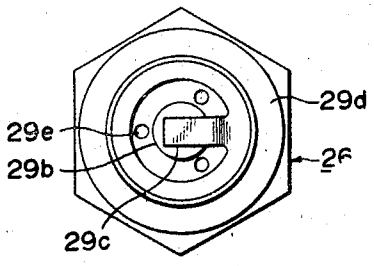


FIG. 9



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DEVICE FOR CLEANING THE ELECTRODE SECTION OF AN IGNITION PLUG

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FIG. 6

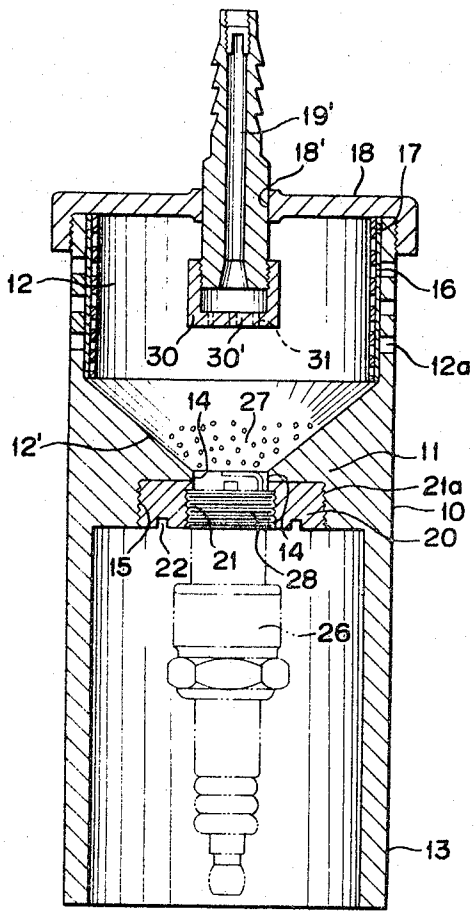
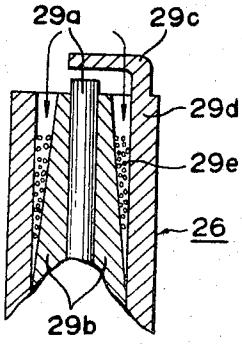


FIG. 8



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United States Patent Office 3,435,561 Patented Apr. 1, 1969

3,435,561

DEVICE FOR CLEANING THE ELECTRODE SECTION OF AN IGNITION PLUG

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Filed Dec. 21, 1966, Ser. No. 603,661
Int. Cl. B24c 3/00
U.S. Cl. 51—8 4 Claims

ABSTRACT OF THE DISCLOSURE

A device for cleaning the electrode section of an ignition plug. The device has upper and lower cavity sections with an annular partition separating them. A spark plug is adapted to be placed in the partition wall with a portion of the electrode section exposed in the upper cavity section, with the remainder of the spark plug in the lower section. A measured amount of abrasive material is placed in the upper cavity section and a compressed air nozzle extends through the cover of the upper section for injecting air into the upper section for agitating the abrasive material for cleaning the electrode section.

The present invention relates to an improved cleaning device, and more particularly to a novel and improved device suitably employed for cleaning the electrode section of an ignition plug to be mounted in an internal combustion engine or the like.

Usually, when a conventional ignition plug is mounted in an internal combustion engine and the engine is continuously operated for a long period of time, a portion of the fuel very often remains in an incompletely burned state and carbon is freed from the incompletely burned fuel portion which will eventually deposit on and adhere to the elements in the electrode section of the ignition plug. And the elements in the electrode section of the conventional ignition plug are often caused to oxidize due to high temperature heat generated at the time of the ignition of an internal combustion engine in which the ignition plug is mounted and accordingly, the value of discharge resistance between the electrodes in the electrode section will become high resulting in lowering the efficiency of the ignition plug to a considerable degree.

Therefore, one object of the present invention is to provide a novel and improved cleaning device for the electrode section of an ignition plug which can easily and positively remove the free carbon, oxide and the like which have deposited on and adhered to the elements in the ignition plug electrode section.

Another object of the present invention is to provide a novel and improved cleaning device for the electrode section of an ignition plug which is compact in construction, convenient for carrying about and easy to handle.

Another object of the present invention is to provide a novel and improved cleaning device for the electrode section of an ignition plug which can perform the cleaning operation hygienically.

A further object of the present invention is to provide a novel and improved cleaning device for the electrode section of an ignition plug which is inexpensive to manufacture and substantially free from trouble.

When one cycle of a cleaning operation is carried out on the electrode section of an ignition plug by the use of the cleaning device constructed in accordance with the present invention for the purpose of removing the free carbon, oxide and the like which have deposited on and adhered to the elements in the electrode section of the ignition plug, prior to the initiation of the operation proper, a predetermined amount of abrasive material is first charged into the cleaning operation or upper cavity

section of the main body of the cleaning device and the upper cavity section is sealed off, and then an ignition plug whose electrode section is to be cleaned is inserted into the lower cavity section of the main body at the open lower end thereof until the upper portion of the plug electrode section is positioned in a predetermined position at the bottom of the upper cavity section. Thereafter, the first stage in the cleaning operation is initiated by supplying compressed air from any conventional compressed air supply means through an air injection nozzle extending down into the upper cavity from above so as to cause the compressed air to swirl within the upper cavity section. Thereby the abrasive material which has deposited at the bottom of the upper cavity is stirred and also caused to swirl during the swirling movement of the compressed air which entrains the abrasive material therein and the stirred and swirling abrasive material can strike against and abrade the elements in the electrode section to efficiently remove a substantial portion of the deposited and adhered free carbon, oxide and the like from the elements in the electrode section of the ignition plug in a brief period of time. After having stirred and swirled the abrasive material, the compressed air injected through the nozzle is filtered by means of a filtering medium mounted on the inner wall of the upper cavity section before the air is discharged out of the cavity section to the atmosphere whereby the possibility of pollution of the atmospheric air with dust and other fine particles which would otherwise be dispersed into the atmosphere by the discharged carrier gas. Therefore, the novel cleaning device is satisfactory from a hygienic point of view.

After the deposited and adhered substance removing first stage operation by the abrasion action in the manner as mentioned above, when the cleaning device is turned upside-down with the ignition plug electrode section still being positioned in the above-mentioned predetermined position at the bottom of the upper cavity section, the abrasive material which now is at the bottom of the upper cavity section is caused to fall down and be deposited on the inner side of the top cover of the upper cavity section of the cleaning device in its upside-down position and the leading end of the injection nozzle which extends through the top cover is caused to project above the level of the abrasive material which is now on the inner side of the cover. Therefore, when compressed air is injected from the compressed air supply means through the injection nozzle in this position of the cleaning device, only the compressed air is blown against the elements in the plug electrode section so as to remove the remainder of the deposited and adhered carbon, oxide and the like which have been left unremoved during the initial abrasive operation stage whereby the plug electrode can be easily and positively cleaned. The thus cleaned plug electrode section can again perform its function satisfactorily after removing the plug from the mounting position in the cleaning device and replacing it with a dirty plug.

The novel cleaning device for the electrode section of an ignition plug includes no expensive moving parts, is inexpensive to manufacture, substantially free from trouble, compact in construction and convenient for carrying about. Furthermore, since the change-over from the compressed air and abrasive material blowing operation to the compressed air blowing operation only and vice versa can be performed by simply turning the clean-device upside-down, the handling of the cleaning device is quite simple.

According to the present invention, there is provided a device for cleaning the electrode section of an ignition plug, which comprises in combination a hollow cylindrical main body having an upper cavity section and a

lower cavity section separated by an annular partition wall, said upper cavity section having a bored bottom for exposing said electrode section of the ignition plug to be subject to cleaning operation and said lower cavity section being adapted to receive the remainder of said ignition plug during said cleaning operation; a measured amount of abrasive material partially filling said upper cavity section and normally deposited at the bottom of said upper cavity section; an annular holding member removably received in said annular partition wall below said upper cavity section for removably holding said electrode section of the ignition plug therein; a bored closure cover removably mounted on the top of said upper cavity section; a compressed air injection nozzle extending down through said bore in the closure cover from above and fixedly secured to the cover, the lower or leading end of said nozzle opposing said annular holding member at a predetermined distance from the top end of the holding member; and an annular filtering medium extending along the inner wall of said upper cavity section for filtering the compressed air injected through said injection nozzle, and in which when said cleaning device is turned upside-down, said abrasive material which is now at the bottom of said upper cavity section is caused to fall onto the inner side of said closure cover and said leading end of the injection nozzle is caused to project above the upper surface of the abrasive material which has been deposited on the inside of the cover.

The above and other objects and advantages of the present invention will be more readily apparent from the following description when read in conjunction with the accompanying drawings in which:

FIG. 1 is a vertical sectional view of a preferred form of cleaning device for the electrode section of an ignition plug constructed in accordance with the present invention;

FIG. 2 is a top plan view of said cleaning device for the electrode section of the ignition plug of FIG. 1;

FIG. 3 is a bottom plan view of said cleaning device for the electrode section of the ignition plug of FIG. 1;

FIG. 4 is a cross-sectional view taken substantially along the line IV—IV of FIG. 1;

FIG. 5 is a fragmentary vertical sectional view on an enlarged scale which shows the manner in which the abrasive material measuring member is mounted in said cleaning device;

FIG. 6 is a vertical sectional view of a modified form of cleaning device for the electrode section of an ignition plug constructed in accordance with the present invention;

FIG. 7 is a bottom plan view of the air distributor member provided at leading end of the nozzle of said modified form of cleaning device of FIG. 6;

FIG. 8 is a fragmentary vertical sectional view of the upper end portion of an ignition plug which is to be cleaned by any of said different forms of cleaning devices as shown in the preceding FIGS.; and

FIG. 9 is a top plan view of said ignition plug of FIG. 8.

Referring now to the accompanying drawings, and more particularly to FIG. 1 thereof in which a preferred form of cleaning device for the electrode section of an ignition plug according to the present invention is shown with an ignition plug which is to be cleaned by the cleaning device in position therein, the ignition plug being shown in chain lines. As shown in FIG. 1, the cleaning device generally comprises a main body **10** in the form of a hollow cylinder and the interior of the main body is divided into the upper cavity section **12** and lower cavity section **13** by means of an annular partition wall **11** which extends along the inner periphery of the main body and projects inwardly from the inner periphery toward the longitudinal axis of the main body. The upper surface of the partition wall **11** is tapered toward the vertical axis of the main body **10** in such a manner that the upper surface thereof defines a funnel shape **12'** which serves as the bottom wall of the upper cavity section **12**. The bottom wall **12'** of the upper cavity section **12** has a center bore **14** formed therein and a large diameter female-threaded bore **15** is formed in the bottom surface of the partition wall **11** which is in communication with the center bore **14** of the bottom wall **12'** of the upper cavity section **12**. The peripheral wall of the upper cavity section **12** is provided with a plurality of small bores **12***a* arranged in an equally spaced relation to each other along both the periphery and height of the upper cavity section **12**. An annular filter element or medium **16** is provided along the inner peripheral surface of the upper cavity section **12** and is held against the inner peripheral surface by means of a plurality of sector rings **17** each having a plurality of small holes therein (FIG. 4).

The upper cavity section **12** also has a removable cover **18** having a reversed cup-shape screwed over the top thereof and the cover has a center opening **18'** through which a compressed air injection nozzle **19** extends and is fixedly held in position therein. Thus, when the cover **18** is screwed onto the top of the upper cavity section **12** and the section is sealed at the top end, the leading or lower end of the nozzle **19** is disposed above the center bore **14** in the bottom wall **12'** of the upper cavity section **12** in an opposed and spaced relation with respect to the bore **14** while the opposite or upper end of the nozzle which projects upwardly of the top of the upper cavity section **12** is adapted to be connected to an air hose (not shown) of any conventional air compressor (not shown) which is conventionally used to supply compressed air to a pneumatic tire.

An ignition plug holding member **20** having a female-threaded bore **21** in the center and a male thread **21***a* on the outer periphery is removably received in the female-threaded bore **15** in the partition wall **11** for holding the electrode section of an ignition plug to be cleaned by the cleaning device during the cleaning operation. Thus, when the holding member **20** is disposed in the position within the female-threaded bore **15** as shown in FIG. 1 by threaded engagement with the partition wall **11**, the center bore **21** of the holding member **20** is axially aligned with the center bore **14** of the bottom wall **12'** of the upper cavity section **12**. The partition wall center bore **21** is provided on the inner peripheral surface in the upper portion of the bore with an annular projection or shoulder **21***b* which serves as a stop means against which the fore or upper end of the electrode section of the ignition plug will abut when the plug is screwed into the partition wall bore **21** whereby the ignition plug can be easily and positively positioned in the cleaning device when the plug is being subject to the cleaning operation by the cleaning device. The ignition plug holding member **20** is further provided on the bottom surface with an annular recess **22** into which a spanner (not shown) is adapted to be inserted for screwing the holding member **20** into and out of the bore **21**. It is to be understood that by providing several ignition plug holding members having center threaded bores **21** of different diameters, the novel cleaning device can be suitably employed for cleaning ignition plugs having different diameters.

In FIG. 5, reference numeral **23** generally designates a removable material measuring member which also serves as a sealing means for the center bore **14** in the bottom wall **12'** of the upper cavity section **12**. The abrasive material measuring member **23** generally comprises a larger diameter or upper rod section **23***a* and an integral smaller diameter or lower rod section **23***b* which is axially aligned with the larger diameter section. It should be understood that when the smaller diameter rod section **23***b* is employed, that is, when the second holding member **20'** is employed for holding a smaller diameter ignition plug which is to be cleaned, the abrasive material member **23** should be turned upside-down so as to dispose the smaller diameter rod section on the top. It should be also understood that before the cleaning operation proper is initiated,

the abrasive material measuring member is removed from the main body **10** of the cleaning device. The outer periphery of the larger diameter rod section **23***a* is provided on the lower end portion with a male thread **24***a* which is adapted to engage the center threaded bore **21** of the holding member **20** while the smaller diameter rod section **23***b* is provided in the outer periphery of the upper end portion with a male thread **24***b* which is adapted to engage the female-threaded center bore **21'** having a diameter smaller than that of the bore **21** of the member **20** and formed in a different type of holding member **20'** which is to be employed for cleaning a smaller diameter ignition plug as will be explained hereinafter. Each of the larger and smaller diameter rod section **23***a* and **23***b* is provided on its outer periphery with a graduation **25***a* and **25***b*, respectively. The inner female threaded bore **21'** of the second holding member **20'** having an outer thread **21'***a* extends from the upper end and terminates short of the lower end of the associated holding member whereby an inner annular projection or shoulder **21'***b* is formed in the upper end portion of the holding member against which the adjacent end of the male thread portion **24***b* can abut. The adjacent end of the male thread portion **24***a* of the larger diameter rod section **23***a* can also abut against the inner annular projection or shoulder **21***b* of the first or larger diameter holding member **20**. Thus, when the abrasive material measuring member **23** is screwed into the larger or smaller diameter holding member **20** or **20'** which is selected depending upon the diameter of the ignition plug to be cleaned by the novel cleaning device until the leading end of either the male thread portion **24***a* or **24***b* of the larger or smaller diameter rod section **23***a* or **23***b* abuts against the annular shoulder **21***b* or **21'***b*, the larger or smaller diameter rod section **23***a* or **23***b* extends into the upper cavity section **12** of the main body **10** of the cleaning device to a predetermined distance. In this case, the leading end of the nozzle **19** is received within the recess formed at the adjacent end face of either the larger diameter or smaller diameter rod section **23***a* or **23***b* whereby the projection of either the larger or smaller diameter rod section into the upper cavity section **12** will not be obstructed.

When the above-mentioned novel cleaning device is operated for cleaning the electrode section **29** of an ignition plug **26**, either the first holding member **20** having the larger diameter female threaded center bore **21** or the second holding member **20'** having the smaller diameter female threaded center bore **21'** is first selected depending upon the diameter of the electrode section **29** of the ignition plug **26**. Although the operation of the novel cleaning device will be hereinbelow explained in connection with an instance in which the holding member **20** having the larger diameter threaded center bore **21** is employed, it is to be understood that the same will also apply to an instance in which the other type holding member **20'** having the smaller diameter threaded center bore **21'** is employed for the same purpose. Prior to the initiation of the cleaning operation proper the holding member **20** is first screwed into the female-threaded bore **15** in the partition wall **11** and then the abrasive material measuring member **23** is screwed into the holding member **20** by means of its outer peripheral male thread **24***a* on the larger diameter rod section **23***a* and the female-threaded center bore **21** of the holding member **20**. Thereafter, powdery abrasive material **27** such as Carborundum is charged into the upper cavity section **12** of the main body **10** through the open top thereof which is not yet closed by the cover **18** at this stage of the operation. After the abrasive material **27** has been charged into the upper cavity section **12** in a predetermined amount which is determined by a selected reading on the graduation **25***a*, the cover **18** is screwed onto the top of the main body **10**. The covered and sealed cleaning device is then turned upside-down and the measuring member **23** is screwed out of the holding member **20** by means of any suitable tool which can be inserted into the open lower end of the lower cavity section **13**. In place of the measuring member **23**, the ignition plug **26** is then screwed into the holding member **20** until the top end of the threaded upper portion **28** on the electrode section **29** of the plug abuts against the inner shoulder **21***b* of the holding member **20** whereby the upper portion of the electrode section **29** of the ignition plug **26** is positioned within the center bore **14** of the bottom wall **12'** of the upper cavity section **12** of the cleaning device main body **10** and the remaining portion of the electrode section **29** and the body of the ignition plug **26** is housed within the lower cavity section **13** of the cleaning device main body.

After the ignition plug **26** has been properly positioned within the main body **10** by means of the holding member **20**, the cleaning device is again turned upside-down to the original position. Then, the upper end of the nozzle **19** is connected to the air hose (not shown) of an air compressor (not shown) and compressed air is supplied from the compressor through the nozzle **19** into the upper cavity section **12** of the cleaning device main body **10**. The thus supplied air is injected against the abrasive material **27** which has been deposited at the lower portion of the funnel shape bottom wall **12'** of the upper cavity section **12** so as to cause the abrasive material to swirl within the upper cavity section **12**. The abrasive material **27** applies abrasive action to the electrode section **29** of the ignition plug **26** while the material is swirling whereby a substantial amount of carbon, oxide and the like which have deposited on and adhered to the elements of the electrode section **29** can be effectively removed from the electrode section elements.

As the cleaning operation is being carried out, the supplied compressed air itself is permitted to escape from the upper cavity section **12** through the small bores in the sector ring **17** and the pores of the filtering medium which removes the dirt and other fine particles contained in the air therefrom **16** into the atmosphere. However, the abrasive material **27** entrained in the swirling air is prevented from being discharged from the cleaning device.

After the abrasive applying stage in the cleaning operation by the novel cleaning device has been completed, the supply of the compressed air is temporarily interrupted and the cleaning device is turned upside-down so as to cause the abrasive material **27** to be deposited on the inside of the cover **18** with the leading end portion of the nozzle **19** projecting above the upper surface of the abrasive material deposit. With the abrasive material **27** and the leading end of the nozzle **19** positioned as mentioned just above, when the air compressor is again actuated so as to supply compressed air through the nozzle **19** into the upper cavity section **12** of the cleaning device main body **10**, only the compresed air is blown against the elements in the electrode section **29** of the ignition plug **26** and the remaining carbon, oxide and the like which have been left on the elements of the electrode section **29** during the initial abrasive applying stage in the cleaning operation can be effectively blown off the elements whereby the electrode can be completely cleaned.

It should be understood that a portion of the abrasive material **27** used during the abrasive applying stage may remain on the electrode elements even after the cleaning device has been turned upside-down as mentioned just above, but such portion of the abrasive material can be removed from the electrode elements during the last stage or exclusive air blowing stage.

When the electrode section of an ignition plug having the same diameter as the previously cleaned ignition plug is desired to be cleaned in succession to the cleaning operation on the previous ignition plug, the already cleaned ignition plug is screwed off the holding member **20** and the new ignition plug is screwed into the holding member **20** in place of the removed plug with the cleaning device maintained in its upside-down position in which the

abrasive material **27** is deposited on the inside of the cover **18** and the leading end portion of the nozzle **19** projects above the upper surface of the abrasive material deposit as mentioned above. Thereafter, the procedure mentioned in connection with the cleaning of the first ignition plug may be repeated for the new ignition plug.

When the novel cleaning device is not used and is desired to be stored ready for future use, the cleaning device may be stored with the holding member **20** or **20'**, in which the larger diameter rod section **23***a* or smaller diameter section **23***b* of the measuring member **23** is in threaded engagement, being in threaded engagement in the threaded bore **15** in the partition wall **11** whereby loss of these component elements can be prevented.

FIG. 6 illustrates a modified embodiment of cleaning device constructed in accordance with the present invention. This modified embodiment is substantially the same as the preceding embodiment except that in this modified embodiment, the nozzle **19'** has at its lower or leading end a reversed cup-shaped air distributing member **30** threaded thereon and the cup-shaped member has a circular bottom **30'** having a plurality of equal angularly spaced bores **31** (three bores in the illustrated embodiment) formed therein as shown in FIG. 7. The positions of these bores **31** correspond to those of bores **29***e* formed in the annular recess defined by the insulator **29***b* surrounding the center electrode **29***a* and the housing **29***d* of the electrode section **29** of the ignition plug **26** to be cleaned, (FIGS. 7, 8 and 9).

Although the construction of the electrode section **29** of the ignition plug **26** itself does not form part of the present invention, for the purpose of better understanding of the present invention the construction of the plug electrode section **29** will be briefly explained referring to FIGS. 8 and 9 of the accompanying drawing. As shown in these figures, the electrode section **29** generally comprises a center electrode **29***a*, a coaxial insulator **29***b* disposed around the center electrode, a ground electrode **29***c* extending transversely over the center electrode **29***a* and insulator **29***b* and integral with a hollow cylindrical housing **29***d* which houses the center electrode **29***a* and insulator **29***b* therein. The insulator **29***b* and housing **29***d* define an annular recess therebetween and the annular recess is formed with three equally angular spaced vertical bores **29***e* therein and as mentioned above, these vertical bores **29***e* communicate with the three bores **31** formed in the bottom **30'** of the cup-shaped air distributing member **30**, respectively. As seen in the vertical sectional view of FIG. 8, the annular recess and these vertical bores **29***e* taper toward their bottoms, respectively.

In the operation of the modified embodiment of cleaning device of the present invention, the preparatory procedure is substantially the same as that explained in connection with the first embodiment of FIGS. 1 through 5 except that the reversed cup-shaped air distributing member **30** is screwed onto the lower end of the nozzle **19** and then, the cover **18** is screwed onto the top of the main body **10** of the cleaning device. Following the preparatory procedure the cleaning operation proper is initiated by injecting compressed air from the air compressor through the nozzle **19** and the cup-shaped air distributing member **30** which divides the air flow into three equally spaced air streams by means of the three bores **31** formed in the bottom **30** thereof. The air streams can reach deep into the bottoms of the three tapered bores **29***e* in the annular recess defined by the insulator **29***b* and housing **29***d* whereby the bores **29***e* as well as the other elements of the electrode section **29** can be more effectively abraded and cleaned. This modified embodiment is more advantageous than the first embodiment because when the compressed air is injected through only the nozzle **19** toward the electrode section **29** or the air is injected in a single stream in the first embodiment, the single air stream may hit against only narrow localized areas on the ground electrode **29***c* and insulator **29***b* and there is the possibility of excessive abrasion of these localized areas on the elements while the use of the air flow distributing member **30** having the plurality of bores **31** of the second embodiment makes it possible to evenly distribute the compressed air over a wider area of the electrode elements by means of the plurality of bores **31** whereby the disadvantage inherent in the single air stream embodiment can be eliminated.

Furthermore, by provision of different air distributing members **30** having air flow distribution bores **31** which are different in size, number and arrangement, respectively, these different air distributing members **30** can be selectively employed depending upon the type and diameter of the ignition plug to be cleaned.

While two preferred embodiments of the invention have been shown and described in detail it will be understood that they are for the purpose of illustration only and are not to be taken as a definition of the scope of the invention, reference being had for this purpose to the appended claims.

What is claimed is:

1. A device for cleaning the electrode section of an ignition plug which comprises a hollow cylindrical main body having an upper cavity section and a lower cavity section and an annular partition wall separating said cavity sections; said upper cavity section having a bore in the bottom thereof for receiving a portion of the electrode section of a plug and adapted to expose a portion of the electrode section to be subject to the cleaning operation and said lower cavity section being adapted to receive the remaining portion of said ignition plug; a measured amount of abrasive material partially filling said upper cavity section and normally deposited at said bottom of the upper cavity section; an annular holding member removably received in said annular partition wall below said upper cavity section bottom for removably holding the electrode section of a plug therein; a bored closure cover removably mounted on the top of said upper cavity section; a compressed air injection nozzle extending down through said bore in the closure cover and fixedly secured to the cover, the lower end of said nozzle being opposed to said holding member at a predetermined distance from the top of the holding member; and an annular filtering medium extending along the inner periphery of said upper cavity section, whereby when said cleaning device is turned upside-down, said abrasive material is deposited on the inner side of said closure cover and said leading end of the nozzle projects above the upper surface of the abrasive material deposit.

2. A device for cleaning the electrode section of an ignition plug as claimed in claim **1** in which said leading end of the compressed air injection nozzle has a reversed cup-shaped air distributing member screwed thereon and said air distributing member has a bottom having a plurality of air distributing through bores therein, the number and arrangement of said plural air distributing bores corresponding to bores formed in the insulator for the center electrode of the electrode section of the plug to be cleaned.

3. A device for cleaning the electrode section of an ignition plug as claimed in claim **1** further comprising an abrasive material measuring member having a pair of integral rod sections removably received in said electrode section holding member vertically extending through a substantial portion of said main body of the cleaning device for closing said bores formed in the upper cavity section bottom, and annular holding member respectively, said measuring member being provided on the outer peripheries of said rod sections with graduations for measuring the amount of said abrasive material to be charged into said upper cavity section.

4. A device for cleaning the electrode section of an ignition plug which comprises a hollow cylindrical main body having an upper cavity section, a lower cavity section and an annular partition wall between said upper

and lower cavity sections, and having a center bore therein for receiving a portion of said electrode section of an ignition plug and adapted to expose the electrode section to be subject to the cleaning operation and said lower cavity section being adapted to receive the remaining portion of said ignition plug; an annular holding member removably received in said bore in the partition wall below said upper cavity section for removably holding the electrode section and exposing the electrode section to be subject to the cleaning operation; a bored closure cover removably mounted on the top of said upper cavity section; a compressed air injection nozzle extending down through said bore in the closure cover, the lower end of said nozzle being opposed to said holding member and at a predetermined distance from the top of the holding member; and an annular filtering medium extending along the inner periphery of said upper cavity section; whereby

when a measured amount of abrasive material is placed in said upper cavity section partially filling it and then said cleaning device is turned upside down, said abrasive material is deposited on the inner side of said closure cover and said leading end of the injection nozzle projects above the upper surface of the abrasive material deposit.

References Cited

UNITED STATES PATENTS

1,292,004	1/1919	Miller	51—8
1,399,225	12/1921	Pellet	51—8
1,421,001	6/1922	Hagen	51—8
1,864,072	6/1932	Kleinfeld	51—8
1,867,324	7/1932	Mullan	51—8

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