A wet type spark plug cleaner having a slurry tank and a rinsing tank. The spark plug is cleaned over the slurry tank by a blast of abrasive slurry. A blast of air then removes most of the slurry. Any remaining slurry is removed in the rinsing tank by a blast of water. The spark plug is dried by a blast of air. The cleaner is operated from an external source of compressed air.

This invention relates to spark plug cleaners of the wet type, operating with a slurry instead of the dry types that are now presently used in service stations and the like.

The primary object of the invention is to provide a simple and practical machine that requires only connection of a source of compressed air and is otherwise self-contained.

Another object of the invention is to provide a simple and practical machine of low cost, having few parts and requiring only a small space in a service station or the like, thus adapting it for general use.

Another object of the invention is to provide a spark plug cleaning machine which will effect a thorough cleaning, rinsing and drying of a spark plug in a simple series of closely connected steps requiring but a short time to accomplish a complete cleaning cycle, and that requires no technical knowledge or even unusual manual dexterity.

Other objects and advantages of the invention will become apparent from the following description of a preferred embodiment thereof, reference being had to the accompanying drawings in which:

FIG. 1 is a front elevational view of a machine embodying the present invention, with parts broken away and thus appearing in section;

FIG. 2 is a top plan view of a cleaning tank assembly;

FIG. 3 is a horizontal sectional view taken on line 3–3 of FIG. 1;

FIG. 4 is a detail elevational view of an agitator control valve taken from line 4–4 of FIG. 2; and

FIG. 5 is a diagrammatic sectional view showing a cleaner embodying certain modifications of the present invention.

In the presently illustrated embodiment of the invention illustrated in FIGS. 1 to 4, there is provided a first tank 10 in which a slurry of abrasive is formed and in which a spark plug is subjected first to a blast of the abrasive slurry and subsequently to a blast of air, and there is provided a second tank 12 wherein any vestiges of abrasive are removed by a rinsing blast of wash water and the spark plug then dried by a blast of air alone.

The tanks 10 and 12 may be substantial duplicates of each other and each is shown as having a removable adapter 14 in the upper end thereof for receiving a spark plug, the adapter being set into the top of the tank and held in place by an appropriate cap or cover 16.

Each tank is shown as having a substantially conical bottom 18 with a central drain plug 20.

A slurry of fine grain abrasive in water is formed in the first cleaning tank by one or more agitator tubes 22 extending from a block 24, set in the upper wall of the tank and extending downwardly and terminating in a nozzle portion 23 overlying the conical bottom wall of the tank. While any suitable abrasive may be used, it has been found that fine glass beads are eminently suited for spark plug cleaning. Such beads are extensively used for imparting a reflective surface to highway markings and the like.

An appropriate check valve 25, such as a ball valve, is provided, if desired, at the lower end of the agitating tubes 22.

While the drawing indicates opposed agitating tubes and nozzles, in some instances a single nozzle may be used and the abrasive still maintains a desired state of suspension.

At the center of the tank 10 there is provided a suction tube 30 extending from the bottom of the tank to a head 32 supported on a cross bracket 34 and carrying a nozzle 36 lined with an abrasive resisting material 38 of tungsten carbide or the like, the nozzle 36 being directed at a spark plug seated in the adapter 14.

The cleaning air blast is supplied by a nozzle 40 inclined upwards towards the interior of a supported spark plug and intersecting the same in the region of the gap area thereof.

A supply of compressed air is furnished to the cleaning tank through piping having a control valve 52, which valve is provided with an operating knob or handle 54 which is shown in FIG. 4.

The control valve 52 is a three-way valve having two operating positions and an "off" position. In one operating position air is supplied through pipe 50 and tubes 22 to the agitating nozzles 23. In another operating position air is supplied to a pipe 55 and a pair of operating valves 56 and 58 in series, there being one associated with each of the two tanks 10 and 12. Thus valve 52 has a position marked "agitator" in which air is supplied only to the bottom of the tank 10 through the nozzle or nozzles 23 for the purpose of agitating the slurry therein and ensuring that the abrasive material will be properly suspended in the liquid prior to a cleaning operation. The other operating position of the valve 52 is marked "clean" and in this position air is supplied to the control valve 56.

Control valve 56 can be moved forward or back, and in the forward position causes air to pass through a pipe 60 to the suction nozzle of the head 32. This induces a flow of abrasive containing water upwardly through the pipe 30 and out of the nozzle 36 to impinge against a spark plug seated in the adapter 14. When the valve 56 is swung to its rear or air blast position as indicated in FIG. 2, air passes from a pipe, through the control valve 52, through the control valve 56 and into the nozzle 40 where the air impinges against the spark plug after the flow of abrasive containing slurry has been cut off.

From the back of the valve 56 air passes to the similar valve 58 mounted on the rinse and drying tank 12. In this tank there is an upwardly inclined air blast nozzle 62 and an upwardly directed rinse blast nozzle 64 communicating with a downwardly extending rinse water tube 66 extending from the bottom of the rinse tank up to the head 32 in a manner similar to the suction tube 30 and head 32 in tank 10.

The duplication of similarly functioning parts in both of the first and second tanks is of advantage as to cost and assemblage.

The operating handle for the second control valve 58 may operate in a similar fashion to the valve 56, that is, moving the lever in one direction will actuate the rinse water connections and induce a flow of water upwardly from the tube 66 and movement of the valve in the second direction will open the connection to the air blast nozzle 62, thus drying a spark plug seated in the adapter 14 associated with tank 12.
In the operation of this form of the invention, the first or cleaning tank 10 is charged with a suitable amount of water and fine abrasive and the second or rinsing and drying tank 12 is charged with a suitable quantity of clear rinse water. The connection of the air line is connected to a source of compressed air usually available in most service stations and carrying air at approximately 120-160 p.s.i.

Water and abrasive in the cleaning tank are usually added in the order of approximately 10 to 12 ounces of abrasive to one quart of water, while the rinse tank 12 contains wash water only, there being about 1/2 quarts of water in the form shown in the drawings.

The plug to be cleaned is inserted in the opening of the adapter 14 of the tank 10 and the agitator control knob 54 is turned to the "agitator" position. This will pass air through the agitator tubes 32 causing a turbulence in the tank and raising the abrasive into suspension in the water.

The operator next shifts the control valve 54 to the "clean" position and thus causes air to flow from the source to the main control valve 56. He then moves valve 56 to the "abrasive blast" position and air flows through pipe 60 inducing a flow of suspended abrasive particles through the nozzle 36 against the spark plug. The tungsten carbide insert in the nozzle 36 prevents excessive wear on the nozzle orifice. After this cleaning and scouring step the operating lever of valve 56 is pushed to the "air blast" position and clean air is injected through the blast nozzle 40 onto the bottom of the plug, blowing out most of the retained abrasive and drying the plug at this step.

The plug is then removed from the adapter 14 of tank 10, placed in the adapter 14 of tank 12 and the control lever of valve 58 associated with that tank is pulled to the forward position causing an initial flow of air upwardly through tube 66 to rinse off all traces of the slurry that might remain on the spark plug. Finally, the lever of valve 58 may be pushed to the rear or "air blast" position, thus drying the plug and making it ready for use.

As shown in the plan view of Fig. 2 the cleaning tank 10 is equipped with an exhaust outlet 71 to relieve pressure due to filter 52 which prevents the escape of abrasive into the surrounding air. Similarly, tank 12 is equipped with an exhaust outlet 71 to relieve pressure therein.

In the modification shown in Fig. 5 the two tanks are diagrammatically indicated at 110 and 112 and are made as similar containers depending from a common casting 114. A passage 116 connects the two tanks and a filter 118 is placed in this passage.

In this form of the invention air from the shop source enters through a pipe 120 which is connected by a T 121 to the control valve system for the abrasive tank 110 and a similar X 122 to the control valve system for the rinse and dry tank 112.

The control valve structure at each tank in this form comprises a series of push-button valves opening from a common source and assembled in a group as indicated at 124 and 125. One of the push-button valves at tank 110 feeds air to an abrasive agitating line 126 connected to an abrasive agitating nozzle 127 within the tank 110. Another of the valves associated with tank 110 is diagrammatically indicated as being connected to cause a flow of air in a pipe 128 leading to a suction head 129 from which an abrasive feed pipe 130 extends and also from which a nozzle 131 directs the abrasive bearing liquid against a spark plug seated in an adapter 136 on the top of the tank. The other valve directs air into a line 137 which terminates in an air blast nozzle 138 directed against the now-rinsed spark plug. Line 137 is also provided with a blast head 140 directed against filter 118.

In the normal sequence of operation of this form of the invention, a spark plug to be cleaned is first given an abrasive blast when seated in the adapter 136 associated with tank 110, followed by an air blast from pipe 132 to remove most of the slurry. The air introduced into the tank 110 passes out through filter 118 into the top of tank 112 and out of the second adapter 136. The filter 118 serves to remove the abrasive particles from this air stream.

The spark plug that has been blasted with abrasive is now moved over to adapter 136. The operator first rinses away any remaining abrasive by introducing air into line 134 and ejecting a blast of rinse liquid, usually water, from tank 112 against the plug. This is followed by a blast of air from line 137. At the time of the air blast from line 137, air also flows through the filter cleaning blast head 140, forcing the removal of any caked abrasive that might have accumulated on the filter. Air is flowing through the filter in the reverse direction as stated passes out through the opening of the empty adapter 136. Thus, the filter 118 is cleaned with each use of the apparatus of the present invention.

While the invention has been disclosed in conjunction with a specific form and disposition of the parts, changes and modifications may be made therein without departing from the scope of the appended claims.

What I claim is:

1. A spark plug cleaner comprising a tank for abrasive slurry, said tank having a conical bottom, an adapter for holding a spark plug to be cleaned in the top of said tank, means for introducing abrasive and air blast nozzle directed at a plug positioned by said adapter, a slurry supply tube extending from the abrasive nozzle down into contents of the tank, compressed air supply connection extending to the abrasive and air blast nozzles, including a reversible valve for selectively directing compressed air to the abrasive nozzle or to the air blast nozzle, and slurry forming means including agitating nozzle means entered in the lower portion of the tank, said nozzle means including downwardly and inwardly inclined nozzles in spaced, opposed relation, and valve means for controlling admission of compressed air to said nozzle means.

2. A spark plug cleaner comprising a tank for abrasive slurry, an adapter for holding a spark plug to be cleaned in the top of said tank, abrasive and air blast nozzles directed at a plug positioned by said adapter, a slurry supply tube extending from the abrasive nozzle down into contents of the tank, compressed air supply connections extending to the abrasive and air blast nozzles, including a reversible valve for selectively directing compressed air to the abrasive nozzle or to the air blast nozzle, slurry forming means including agitating nozzle means entered in the lower portion of the tank, said nozzle means including downwardly and inwardly inclined nozzles in spaced, opposed relation, control valve means for controlling admission of compressed air to said nozzle means.

3. The spark plug cleaner according to claim 2 in which said abrasive slurry tank and said second tank are substantial duplicates and in which said controlling valve means and said directing valve means are substantial duplicates.
4. Spark plug cleaner comprising the combination of a tank for abrasive slurry, a tank for rinsing liquid, spark plug holding adapters in the top of said tanks, abrasive blast and air blast nozzles in the abrasive slurry tank directed toward the adapter of said slurry tank, rinsing and air drying nozzles in the rinsing tank, said abrasive blast and rinsing nozzles having slurry and rinsing liquid suction tubes extending down into said slurry and rinsing liquid containing tanks, and compressed air supply connections extending to said nozzles including valve means at the abrasive slurry tank for directing compressed air to the abrasive slurry nozzle or to the air blast nozzle in said slurry tank and valve means at the rinse tank for directing compressed air to the rinsing and air drying nozzles in said rinsing tank, and slurries forming means at said slurry tank including agitating nozzles in the lower portion of said slurry tank and compressed air connections to said agitating nozzles including a control valve governing supply of compressed air to said agitating nozzles.

5. A spark plug cleaner comprising the combination of a tank for abrasive slurry, a tank for rinsing liquid, spark plug holding adapters in the top of each of said tanks, a vent connection between said tanks, a filter disposed in said vent connection, abrasive and air blast nozzles in the abrasive slurry tank directed toward the adapter of said slurry tank, rinsing and air blast nozzles in said rinsing tank directed toward the adapter of said rinsing tank, and means to supply appropriate material to each of said nozzles, said vent connection between said tanks acting to relieve air pressure in either of said tanks through the said spark plug holding adapter in the other of said tanks.

6. The combination of elements defined in claim 5, and a separate air blast nozzle in said rinsing tank directed at said filter and acting to dislodge abrasive material collected thereon by operation of said abrasive nozzle.

7. The spark plug cleaner according to claim 2, wherein said agitating nozzle means includes downwardly and inwardly inclined nozzles in spaced, opposed relation.

References Cited

UNITED STATES PATENTS

1,202,368 10/1916 Cutter ........................ 51—8 X
1,987,374 1/1935 Shelton .................... 51—8
2,253,225 8/1941 Bowes et al. .............. 51—8
2,554,858 5/1951 Gogel ...................... 51—8
2,797,530 7/1957 Garver ..................... 51—8
2,846,820 8/1958 Persak et al. .............. 51—8
1,438,834 12/1922 Keil ...................... 134—182

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