July 21, 1942. F. F. AKE ET AL 2,290,629

SPARK PLUG CLEANER

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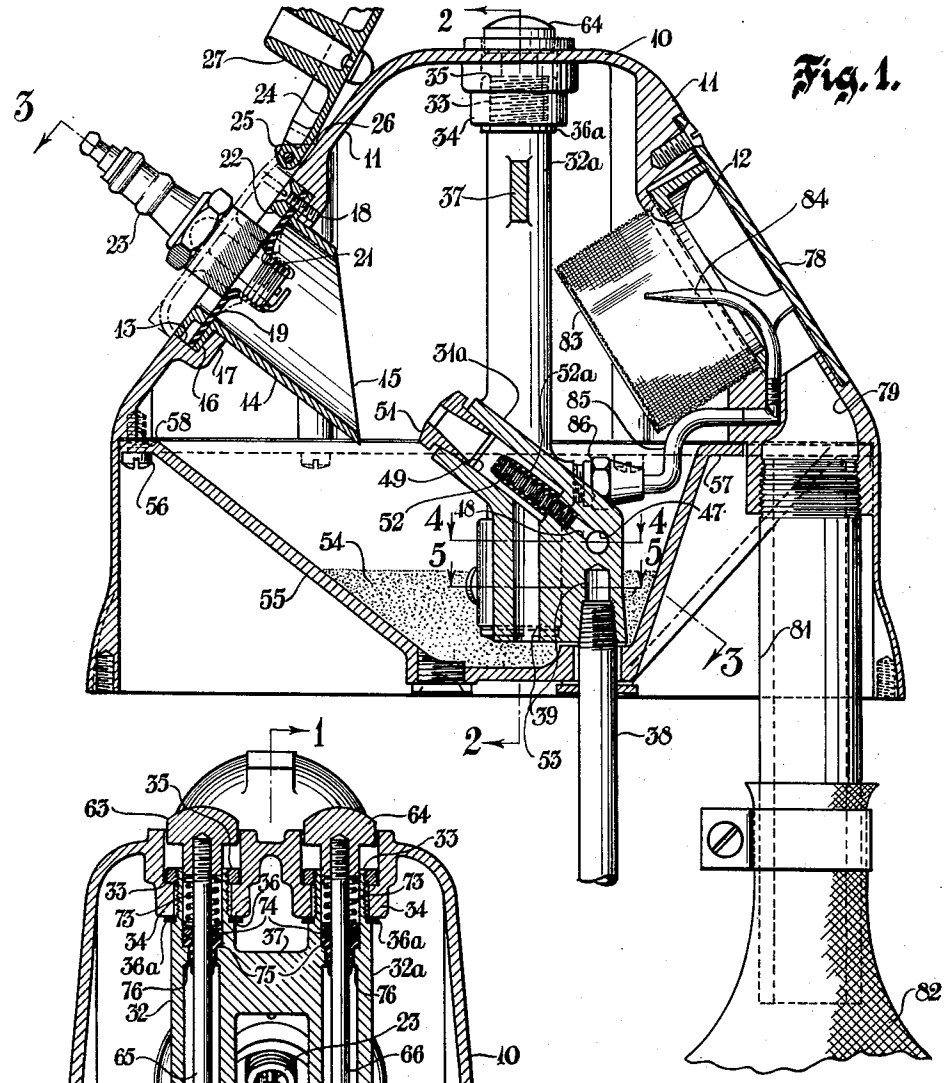


Fig. 1.

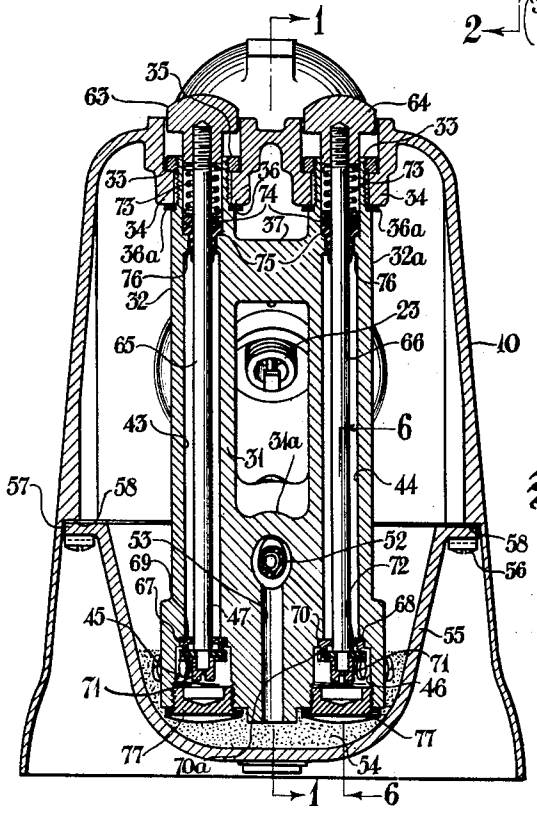


Fig. 2.

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Fig. 3.

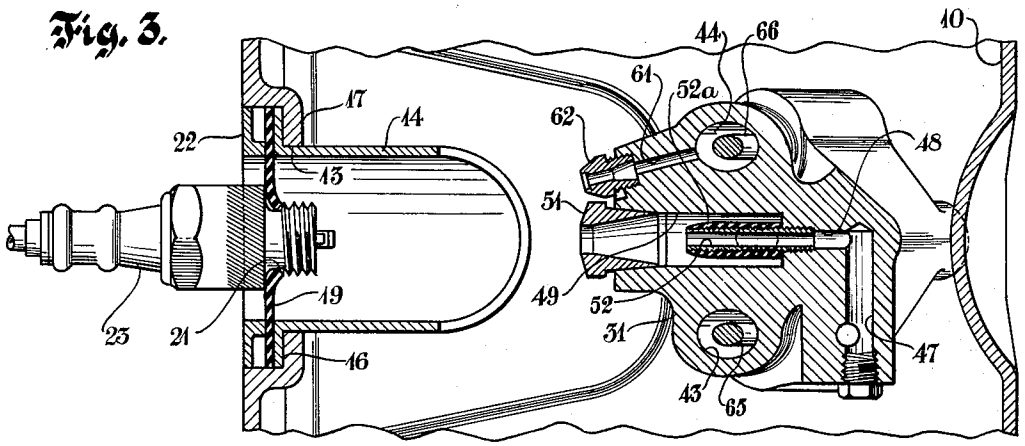


Fig. 4.

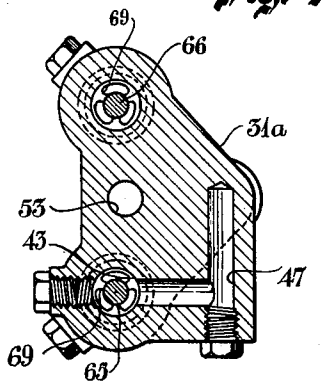
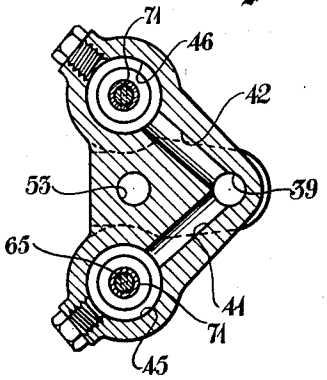


Fig. 5.



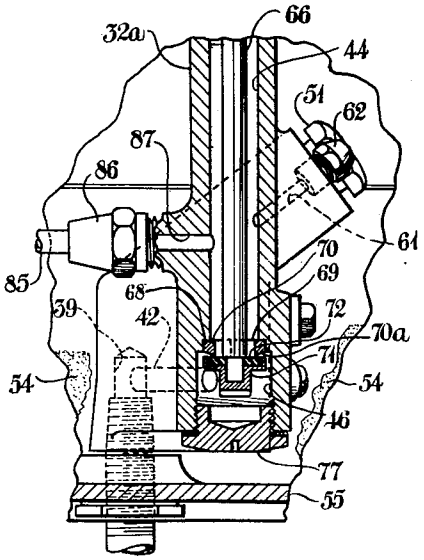


Fig. 6.

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SPARK PLUG CLEANER

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Application December 7, 1940, Serial No. 369,014

2 Claims. (Cl. 51—8)

This invention relates to spark plug cleaners, especially to an improved, easily operated spark plug cleaner which cleans spark plugs by blowing abrasive particles thereagainst.

The present invention is an improvement to the spark plug cleaner described and claimed in Thomas A. Worsham application Serial No. 310,056, which issued as Patent No. 2,257,144 on September 30, 1941.

The general object of the present invention is to provide a long-lived, sturdily built spark plug cleaner which is composed of a minimum of easily assembled parts.

Another object of the invention is to provide a sturdy valve for a spark plug cleaner, which valve functions efficiently and has a long life.

The foregoing and other objects will be manifest as the specification proceeds. Attention is directed the accompanying drawings, in which:

Figure 1 is a longitudinal vertical section through a spark plug cleaner embodying the invention, said section being taken on the line 1—1 of Figure 2;

Figure 2 is a transverse vertical section taken on line 2—2 of Figure 1;

Figure 3 is a section taken on line 3—3 of Figure 1;

Figures 4 and 5 are detail horizontal sectional elevations taken on lines 4—4 and 5—5 of Figure 1; and

Figure 6 is an enlarged detail vertical sectional elevation taken on line 6—6 of Figure 2.

Referring in detail to the apparatus shown in the accompanying drawings, a casing 10 is shown for mounting component parts of the spark plug cleaner of the invention. The upper part of the casing 10 has a pair of oppositely inclined wall portions 11 having openings 12 and 13 therein. The opening 13 is provided to mount a spark plug to be cleaned and a substantially cylindrical baffle 14 having a beveled end 15 extending inside the casing 10 is mounted in the opening 13 through a flange 16 on the exterior end thereof. The flange 16 is seated on a complemental flange 17 formed in the casing 10 and screws 18 secure the baffle 14 to the casing 10. A flexible rubber washer 19 having a central aperture 21 therein, is positioned over the flange 16 and a washer, or ring, 22 is placed over the edge of the rubber washer 19. The screws 18 extend through the rubber washer 19 and washer 22 to secure them to the casing 10, whereby a spark plug 23 can be positioned in the apparatus by inserting its end through the hole 21 in the rubber washer 19, as shown. A closure disc 24 is hinged to the casing 10 by a pin 25 which is journalled in a bracket 26 formed on the casing adjacent the opening 12 therein. A feature of the invention is that the closure has a boss 27 formed on the surface thereof adjacent the rubber ring 19 when the closure is positioned thereover, which boss is adapted to extend into the hole 21 in the rubber and retain the closure over the opening 13.

An integrally cast valve unit 31 is positioned within the casing 10 to control the operation of the cleaner. The valve 31 includes a valve body 31*a* and parallel, integrally formed tubes 32 and 32*a* extending therethrough and upwardly therefrom. The tubes 32 and 32*a* terminate in reduced, externally threaded upper end portions 33 which extend into wells 34 formed integrally with the casing 10. Nuts 35 engage with the upper ends 33 of the valve tubes to suspend the valve 31 from the upper surface of the casing 10. The reduced ends 33 of the tubes provide shoulders 36 which are beneath the wells 34 and combine with the nuts 35 to aid in clamping the valve 31 in position. Washers 36*a* may be positioned between the shoulders 36 and the lower end of the wells 34 while a brace 37 extends between the tubes 32 to reinforce same.

An air supply line 38, furnishing compressed air for operating the cleaner, is engaged with the lower end of the valve 31 and this line connects to an upwardly extending cylindrical bore 39 formed in the valve body 31*a*, which in turn connects to two horizontal conduits 41 and 42 formed in the valve body. The conduits 41 and 42 connect to bores 43 and 44 of the tubes 32 and 32*a*, which have enlarged end portions 45 and 46, respectively, formed therein. The bore 43 has a horizontally disposed L shaped conduit 47 extending therefrom to the center of the rear edge of the body portion 31*a* and it connects to a feeder conduit 48 formed in the valve body at the base of an enlarged diagonally upwardly extending cylindrical recess 49 formed in the upper part of the valve body 31*a*. The recess 49 is aligned with the hole 21 in the rubber washer 19 and a nozzle 51 is engaged with the outer end of the recess 49 to direct air flowing therefrom against the spark plug 23 positioned in the cleaner. An aspirator tube 52 connects to the conduit 48 to increase the velocity of air flowing through the conduit 48 and to direct air into the nozzle 51. A vertically extending recess 53 is formed in the valve body to connect the recess 49 to the lower end of the valve. Abrasive particles 54 are received in a hopper 55 se-

cured to the lower portion of the casing 10 by screws 56 extending through a flange 57 formed on the upper edge of the hopper and abutted against a shoulder 58 formed on the casing. The flow of air through the aspirator tube 52 serves to draw abrasive particles through the conduit or recess 53 and blow such particles against the inner end of the spark plug 23 to clean same. A rubber sleeve 52a is positioned around, and may be secured integrally to, the aspirator tube to protect it from abrasive action thereon by the particles 54 as they are drawn up through the conduit 53 and forced out of the nozzle 51 whereby the aspirator tube has a longer life than regular metal tubes.

The air distributing conduit 42, connecting to air supply line 38, connects to the enlarged end 46 of the bore 44 to provide it with compressed air. A small upwardly extending conduit 61 is formed in the valve body 31a at the upper portion thereof, which conduit extends between the bore 44 and the edge of the valve body and connects to a nozzle 62 positioned in the valve body adjacent the nozzle 51. The nozzle 62 and conduit 61 are aligned with the inner end of the spark plug 23 and hence are adapted to direct air thereagainst, which air serves to clean any abrading particles, or other loose material, from the inner end of the spark plug.

The distribution of the air fed to the spark plug cleaner is controlled by push buttons 63 and 64 positioned on the outside of the casing 10 and connected to valve stems 65 and 66, respectively, which are mounted in bores 43 and 44, respectively. The specific construction of the control means is best shown in Figure 2, and such construction is a feature of the present invention. Shoulders 67 and 68 are provided at the enlarged lower ends of the bores 43 and 44 and annular valve seats 70 having lower surfaces 70a that taper downwardly from their outer to their inner edges are received on the shoulders. The valve seats 70 have radially spaced, inwardly extending positioning lugs 69 formed thereon, which engage with the valve stems 65 and 66 to maintain the valve stem aligned with the tubular arms 32 and 32a. Valves 71 are secured to the ends of both valve stems 65 and 66 and engage with the valve seats 70 through annular rubber members 72 which are carried on the upper surfaces of the valves 71. The valves 71 are normally retained in closed position, i. e. seated on the valve seats 70, by means of springs 73 which are compressed between the lower ends of the buttons 63 and 64, and metallic washers 74 carried on the valve stems 65 and 66 and seated on rubber grommets 75 which in turn seat upon flanges 76 formed in the bores 43 and 44 at the upper ends thereof. Hence the valves 71 can be moved to open position by pressing the buttons downwardly and compressing the springs 73 which permits passage of air from the chambers 45 and 46 through their associated bores 43 and 44 to either the nozzle 51 or the nozzle 62, depending upon which valve is depressed. Caps 77 may be threaded into the lower ends of the valve 31 to close the lower ends of the tubes 32.

Air is exhausted from the casing head through the opening 12 therein, which may be provided with a removable closure plate 78 that is flush with the exterior surface of the casing 10. However, the opening 12 is positioned inwardly of the outer surface of the casing and connects to an outlet passage 79 that in turn connects to an exhaust pipe 81 exhausting to the atmosphere through a porous fabric bag 82. Before air can be exhausted from the casing 10, any abrasives carried thereby should be removed. To this end, a cylindrical screen 83 is provided for the opening 12, which screen is held in place by the closure 78. Obviously appreciable pressure is built up in the casing 10 when air is forced therein, whereby the screen 83 must be adapted to stand such pressure without collapse. A cylindrical member has been proven satisfactory, whereas other types or shapes of screen do not function properly. Sand stuck to the outer surface of the screen 83 is removed therefrom by blowing air against the inner surface of the screen by means of a fishtail air jet pipe 84. This pipe 84 connects to a conduit 85 which in turn engages with a fitting 86 carried by the valve body 31a. The fitting 86 connects to the bore 44 through a substantially horizontally disposed conduit 87 formed in the valve body, so that when the valve button 64 is depressed air is blown against the inner end of the spark plug 23 through nozzle 62 and onto the screen 83 through the pipe 84. Sand laden air obviously will be blown against any object such as a spark plug 23 positioned in the hole 21 in the rubber washer 19 only when the valve button 63 is depressed. Hence in operation, the button 64 may be depressed first to remove loose particles from a spark plug positioned in the rubber washer after which the button 63 is pushed to cause a stream of abrasive to be blown against the exposed end of the spark plug which is then cleaned off by pushing the button 64 again. The rubber washer 19 should be adapted to retain a spark plug in the hole 21 while it is being cleaned.

An additional function of the boss 27, when engaged with the rubber washer 19, is to prevent any abrasive material from being expelled from the casing 10 since abrasive blown towards the rubber washer strikes either the boss 27 or the rubber washer and falls back to the hopper 55.

While an embodiment of the invention has been completely illustrated and described herein, it will be appreciated that modifications thereof may be made without departing from the scope of the invention, as defined in the appended claims.

What is claimed is:

1. In a spark plug cleaner, a casing having a hole therein, an apertured rubber washer secured to said casing to cover the hole therein and to support a spark plug to be cleaned, cover means hinged on said casing and adapted to expose and cover said rubber washer, said cover means having a boss extending inwardly therefrom with relation to said casing, said boss engaging with the aperture in said rubber washer to secure said cover means in closed position upon said casing, abrasive particles loosely received within said casing, air supply means for feeding compressed air to said casing, a rubber coated aspirator tube connected to said air supply means for picking up said abrasive particles and directing them against said spark plug supporting washer, valve means for controlling the operation of said aspirator tube, a cylindrical exhaust screen for removing abrasive particles from air exhausted from said casing, and a fish tail air jet on the exhaust side of said screen for blowing abrasive particles stuck to said screen from said screen and back into loose position in said casing.

2. In a spark plug cleaner, a casing having a

hole therein, an apertured rubber washer secured to said casing to cover the hole therein, cover means hinged on said casing and adapted to expose and cover said rubber washer, said cover means having a boss extending inwardly therefrom with relation to said casing, said boss engaging with the aperture in said rubber washer to secure said cover means in closed position upon said casing, abrasive particles received within said casing, air supply means for feeding compressed air to said casing, and a metallic aspirator tube connected to said air supply means for suctionally picking up said abrasive particles and directing them against said rubber washer, said aspirator tube being provided with a rubber coating to prevent said abrasive particles from wearing away said aspirator tube.

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