United States Patent [19]

Romanowicz, Jr.

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[45] **Oct. 21, 1975**

[54] **SPARK PLUG CENTER**

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[52] **U.S. Cl.** ..... **51/8 SP**

[51] **Int. Cl.²** **B24C 3/34**

[58] **Field of Search** ..... 51/8 R, 11, 12, 8 SP

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Primary Examiner—Donald G. Kelly

Attorney, Agent, or Firm—Andrus, Sceales, Starke & Sawall

[57] **ABSTRACT**

A cylindrical adapter fits on a freon canister and has an inverted frust-conical top with a central upstanding tubular member. An upper housing is supported upon the adapter for limited rotational movement relative thereto and carries a control tube extending downwardly through the tubular member of the adapter with a valve actuating member at its lower end to puncture the valve of the canister and provide a gas jet upwardly through the control tube. The housing has a central top opening to receive and seal with a spark plug which upon insertion presses the control tube downwardly to open the canister valve. Registering openings through the sides of the two tubes admit sand to the gas stream from the recess in the top of the adapter, and provision is made for closing the openings by turning of the housing and its control tube relative to the adapter and its tubular member. A shield returns the spent sand to the recess for re-use, and openings in the housing provide an escape for the spent freon.

10 Claims, 4 Drawing Figures

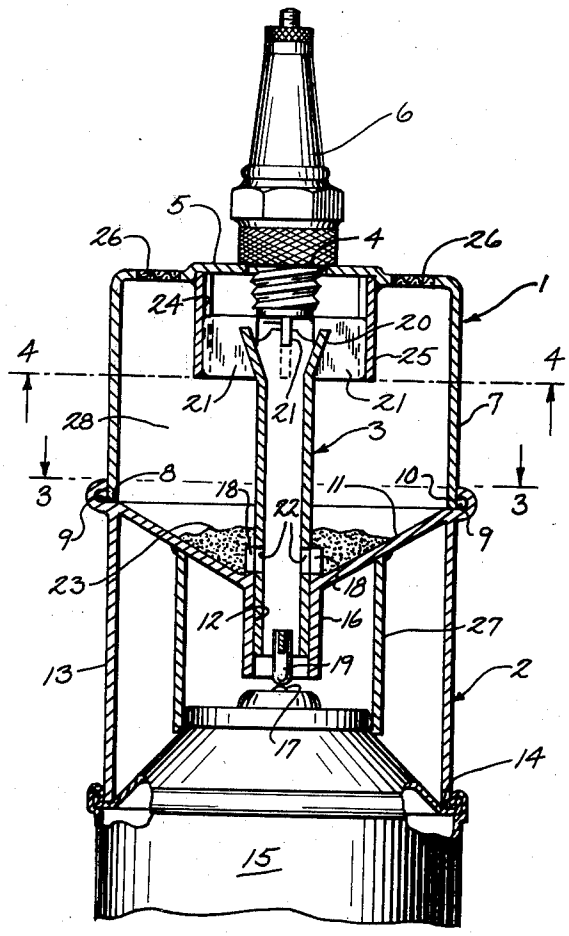


Fig. 1

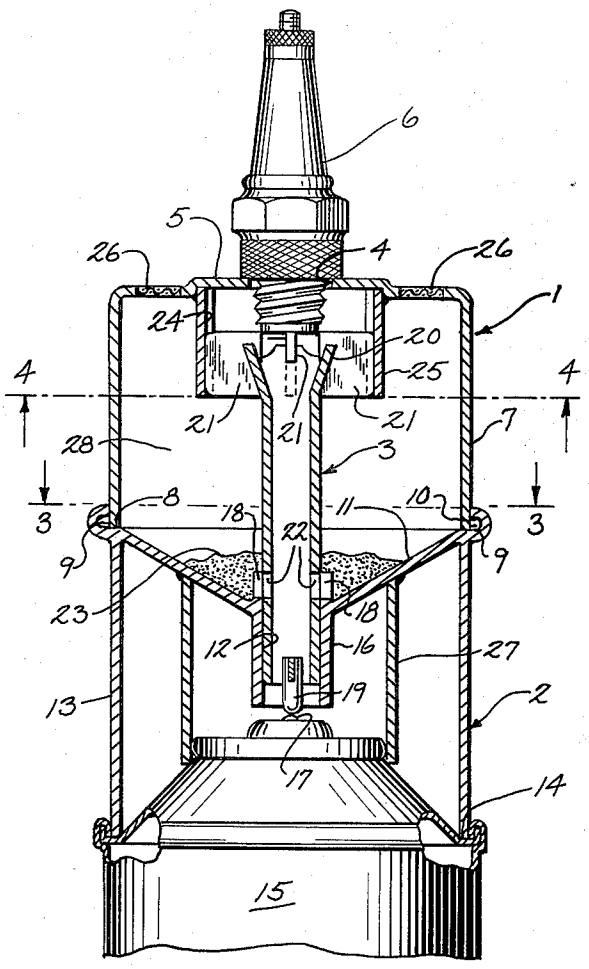


Fig. 2

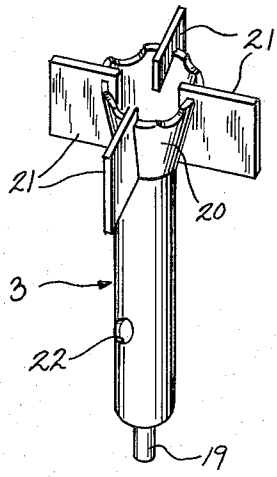


Fig. 3

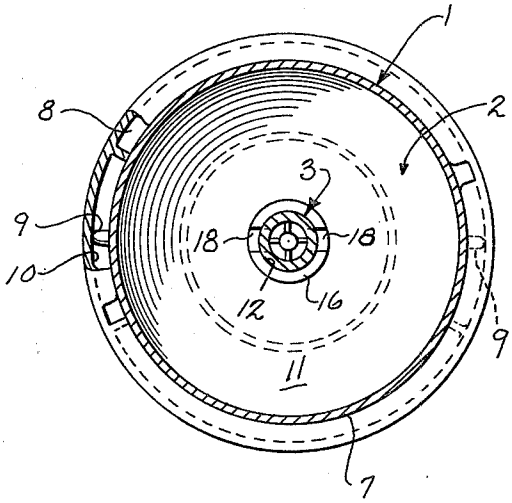
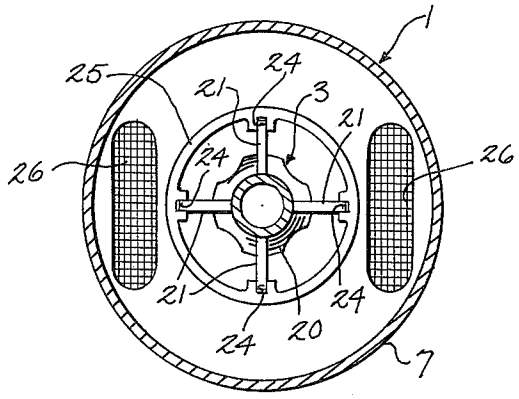


Fig. 4



SPARK PLUG CENTER

BACKGROUND OF THE INVENTION

This invention relates to a spark plug cleaner adapted to sand blast the operative face of a spark plug to clean the same, and which finds use by mechanics in garages, service stations or at home.

Heretofore, sand blast spark plug cleaners have generally utilized compressed air from the usual compressor available in garages and service stations. These have not been adapted for home use and are in fact useless away from available compressed air.

SUMMARY OF THE INVENTION

According to the present invention the spark plug cleaner utilizes a freon canister as a pressurized source of gas and generally comprises a housing containing a quantity of sand and having an adapter for mounting the housing upon a canister.

A central vertical tubular member extends downwardly through the bottom of the housing into contact with the central valve of the canister whereby a limited downward movement of the member will open the canister valve and thereby discharge pressurized gas from the canister. The canister valve remains closed when the tubular member is free of downward bias.

The top of the housing has a central opening adapted to receive and seal with a spark plug which is inserted face down into engagement with the tubular member to effect its actuation and to receive the impact of the discharged pressurized gas as the latter travels up the tubular member.

The housing contains a quantity of sand and has means to feed the same into the tubular member through one or more radial openings in the latter so that sand becomes entrained in the rapidly moving stream of pressurized gas flowing upwardly in the tubular member and impacts the face of the spark plug.

Appropriate openings in the upper end of the tubular member provide for a return of sand to the housing and the release of spent gas into the housing and out through screened top openings therein.

Means are provided for relative rotation between the housing and the tubular member to selectively shut off or open the supply of sand to the member from the housing.

BRIEF DESCRIPTION OF THE DRAWING

The drawing furnished herewith illustrates the best mode presently contemplated by the inventor for carrying out the subject invention.

In the drawing:

FIG. 1 is a transverse vertical central section showing the cleaner mounted upon a canister of pressurized gas, and with a spark plug positioned ready for cleaning;

FIG. 2 is a perspective view of the tubular member employed to direct a blast of pressurized gas from the canister to the face of a spark plug;

FIG. 3 is a transverse horizontal section through the housing taken on line 3—3 of FIG. 1, looking downwardly; and

FIG. 4 is a similar section taken on the line 4—4 of FIG. 1 looking upwardly.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the drawing, the spark plug cleaner

illustrated comprises an upper housing 1, a lower housing or adapter 2 and a central vertical tubular member 3.

The upper housing 1 is of inverted cup shape with a central opening 4 in its substantially flat top 5 to receive a spark plug 6 to be cleaned.

The sides or skirt 7 of housing 1 extend down to rest upon the rim 8 of adapter 2 and the two are secured together by a pair of bayonet connections on opposite sides and providing for limited rotation of housing 1 relative to adapter 2.

For this purpose the side or skirt of housing 1 has opposite radial projections 9 which enter into inwardly facing circumferential grooves 10 in rim 8.

The adapter 2 is also of inverted cup shape with a recessed inverted frusto-conical top 11 having a central opening 12 therein in vertical alignment with opening 4.

The outer skirt 13 of adapter 2 extends downwardly to rest upon and interlock with the outer upper rim 14 of a canister 15 of pressurized gas such as freon.

The central opening 12 of the adapter 2 is defined by a tubular sleeve 16 secured therein and preferably adapted to extend down to near the valve cartridge 17 of canister 15.

The sleeve 16 extends upwardly from the conically recessed top 10 of the adapter with one or more vertical slots 18 in its upper edge.

The tubular member 3 is adapted to fit down through the sleeve 16 with a central projection 19 adapted to engage valve 17 and to penetrate the same upon downward movement for the purpose of releasing pressurized gas from the canister into tubular member 3.

The upper end of tubular member 3 is adapted to be engaged by the face of spark plug 6 for the purpose of pushing the member downwardly and thereby effecting opening of valve 17.

For this purpose the upper end of member 3 is preferably funnel-shaped at 20 with radial plates 21 extending upwardly and also outwardly on edge to be engaged by the spark plug 6 and space the upper funnel edge of member 3 from the spark plug so that spent gases and sand may escape from the region of the face of the spark plug over the edge of funnel 20.

Downward pressure by spark plug 6 upon member 3 effects opening of valve 17 and a consequent blast of gas against the face of the spark plug 6.

When downward pressure is no longer applied as when spark plug 6 is removed, the valve 17 generally forces member 3 upwardly to a position where pressurized gas is no longer discharged from the canister.

The tubular member 3 is provided with radial openings 22 therethrough disposed to register with corresponding slots 18 in sleeve 16.

A quantity of sand 23 is stored on the top 11 of adapter 2 and is directed downwardly and inwardly to feed by gravity through slots 18 and openings 22 into the stream of gas rising upwardly in the central passage in member 3.

The sand thus entering the upward gas stream is blasted against the face of spark plug 6 to dislodge carbon deposit therefrom and clean the plug.

Spent sand will tend to follow the gas stream over the edge of funnel 20 and then fall back onto the recessed inverted frusto-conical top 11 of adapter 2 to become a part of the stored sand 23.

Any sand residue that might stick to the face of the spark plug **6** after a sand blast operation may be removed by a clean air blast which can be effected by closing off the supply of sand to tubular member **3**.

For this purpose the plates **21** are disposed to interlock rotationally with housing **1** so that limited rotation of the housing relative to adapter **2** will effect turning of member **3** in sleeve **16** and a misalignment of holes **22** and slots **18**.

This interlock is provided by disposing the outer edges of plates **21** in vertical grooves **24** in a divider shield **25** depending from housing top **5**.

The divider shield **25** is like a skirt and has approximately one-half the radius of skirt **7** and it extends downwardly beyond the upper edge of funnel **20** so as to direct gas and sand flowing outwardly over the edge of the funnel downwardly to drop the sand as previously described.

The gas then ducks under the lower edge of divider shield **25** and is finally discharged upwardly through screened openings **26** in top **5** of housing **1**.

Rotation of housing **1** and tubular member **3** relative to adapter **2** is limited by the length of the grooves **10** which receive projections **9** interlocking the housing to the adapter.

If desired an inner skirt **27** may depend from the inverted conical top **11** of the adapter to engage an intermediate raised portion of the canister top and increase the stability of the device in its mounting upon canister **15**.

The tubular member **3** constitutes a sand blast nozzle which receives its air stream from canister **15** at one end, receives a supply of sand centrally thereof and blasts the sand against the spark plug face at its other end.

The upper housing member **1** and lower adapter member **2** cooperate with each other to provide an enclosed sand blast chamber **28** containing sand **23** in the bottom thereof.

Various modes of carrying out the invention are contemplated as being within the scope of the following claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention.

I claim:

1. A spark plug cleaner comprising a sand blast nozzle, means to support a spark plug with its face aligned with the discharge from said nozzle, a canister of pressurized gas, and adapter means to mount said nozzle upon said canister of pressurized gas for operating the nozzle.

2. The construction of claim **1** comprising two inverted cup shaped members, the upper one supported upon the lower one and cooperating therewith as a housing to provide an enclosed sand blast chamber containing sand in the bottom thereof and the other being adapted to be supported upon said canister of pressurized gas, upwardly directed nozzle means in said chamber, means to position a spark plug facing said nozzle means in said chamber, and means to supply pressurized gas from said canister to said nozzle to actuate the same.

3. The construction of claim **2** in which said nozzle means comprises a vertical tube having openings therein for receiving sand from said chamber, said last named means comprises an extension of said vertical tube downwardly to the canister, and means are provided in said chamber to salvage sand spent in blasting the face of the spark plug.

4. The construction of claim **3** and means to close the openings in said vertical tube to prevent sand from entering the same, whereby pressurized gas free from sand impinges upon the face of the spark plug to clean excess sand and dirt therefrom.

5. The construction of claim **2** in which said nozzle means comprises a vertical tube in said chamber, said last named means comprises an extension of said vertical tube downwardly to the canister, and means mounting said tube for vertical movement to thereby actuate the discharge valve of the canister by a downward movement of said tube.

6. The construction of claim **5** in which the upper end of said tube constitutes means supporting the spark plug, and manual downward pressure upon the spark plug effects downward movement of said tube to actuate the discharge valve of the canister.

7. The construction of claim **4** in which said means to close the openings in said vertical tube comprise a ported sleeve fixed in the top of said lower cup shaped member, the ports of said sleeve registering with the openings in said tube to admit sand therethrough, and means to rotate said vertical tube relative to said sleeve to eliminate such registry.

8. The construction of claim **7** in which the top of said lower member constitutes the bottom of said sand blast chamber and is shaped in an inverted frustrum of a cone to direct sand into said ports.

9. The construction of claim **7** in which said vertical tube is interlocked rotationally with said upper member, and said upper member is rotationally supported by said lower member.

10. The construction of claim **3** in which said last named means comprises in part an inner skirt depending from the top of said upper member to below the level of theupper end of said tube, means spacing the upper end of said tube from the face of the spark plug to be sand blasted, and means in the top of said upper member outwardly of said inner skirt for the escape of gas, whereby the jet stream of gas blasting the face of the spark plug escapes over the top edge of said tube carrying with it the sand and dirt which then falls to the bottom of the chamber as the gases change course in ducking under the edge of said inner skirt.

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UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 3,913,273

DATED : October 21, 1975

INVENTOR(S) : Karl J. Romanowicz, Jr.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the Title: Cancel "Center" and substitute --Cleaner--

Column 1, line 1: Cancel "Center" and substitute --Cleaner--

Signed and Sealed this

sixth Day of *April 1976*

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks