May 29, 1951 A. J. GOGEL 2,554,858

SPARK PLUG CLEANER

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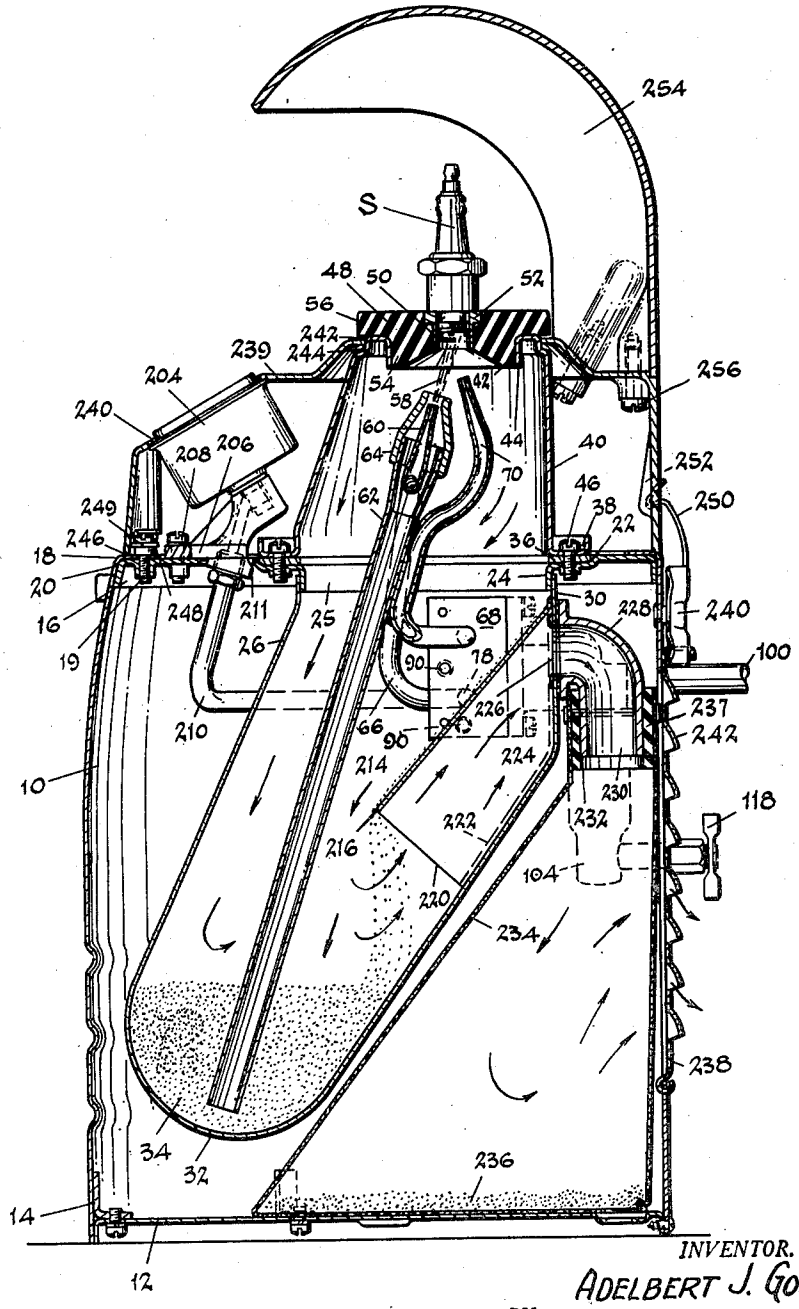


Fig. 1

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SPARK PLUG CLEANER

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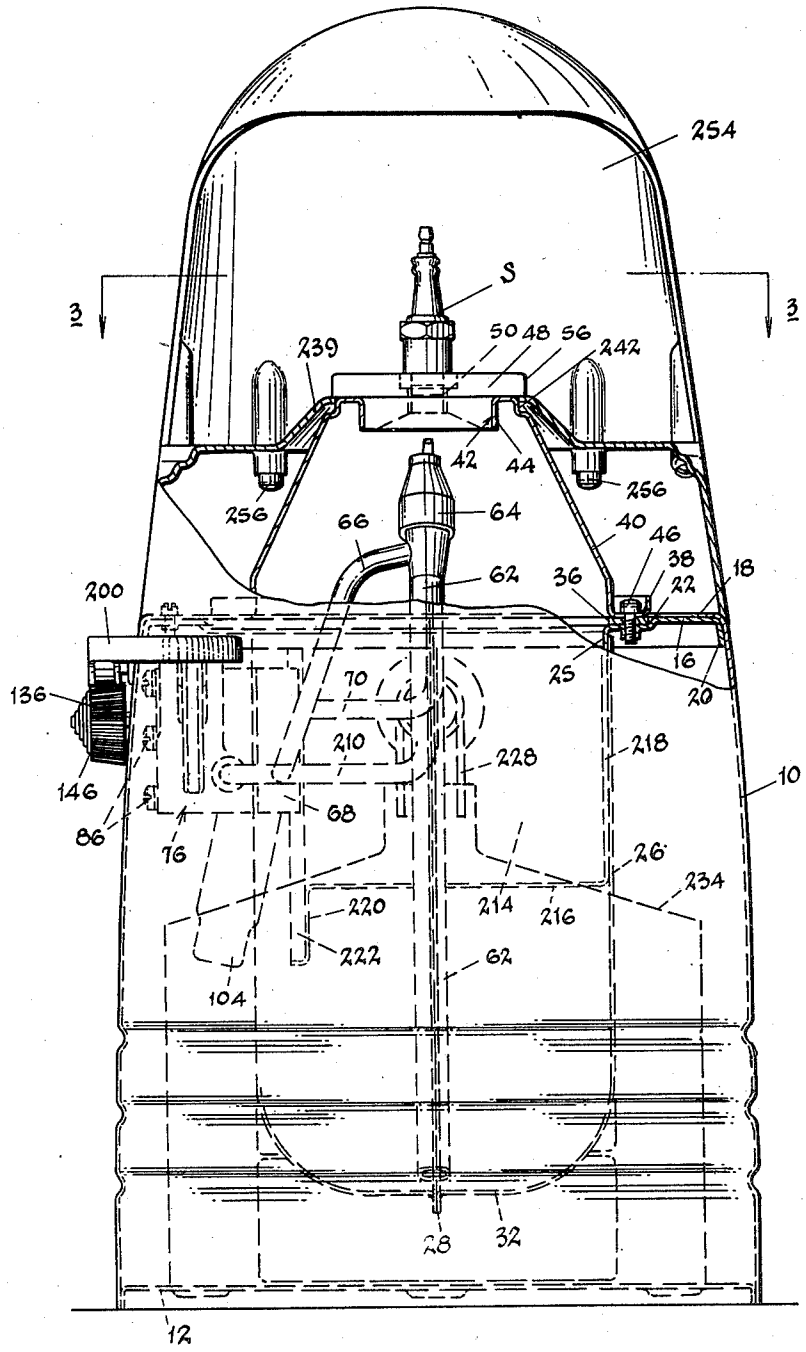


Fig. 2

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SPARK PLUG CLEANER

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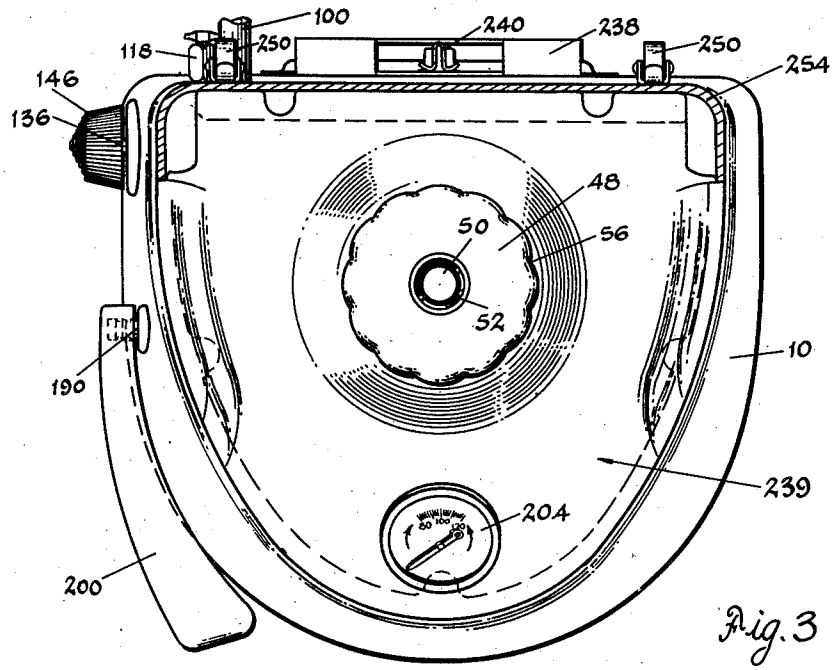


Fig. 3

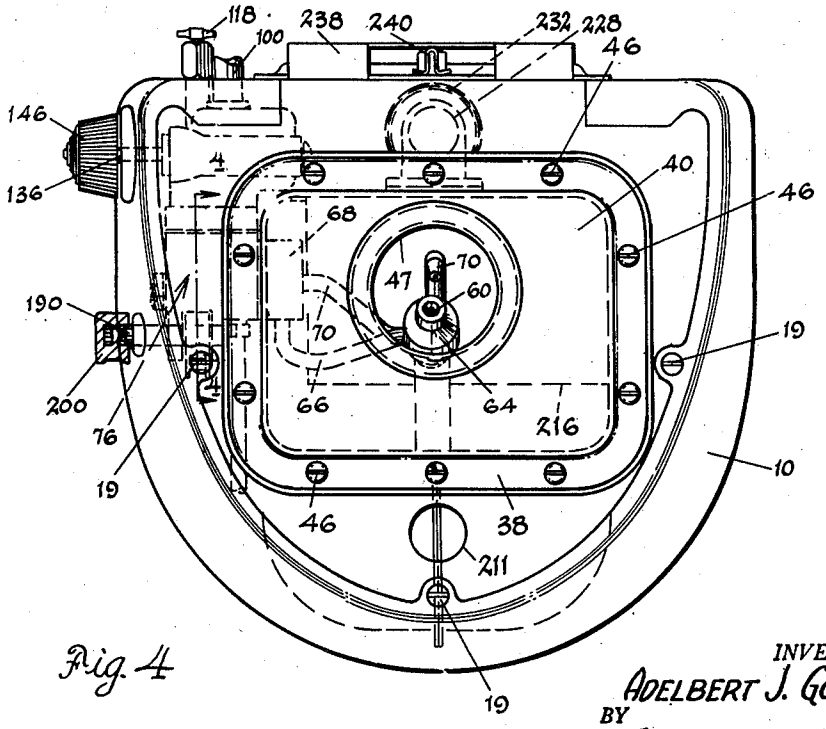


Fig. 4

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SPARK PLUG CLEANER

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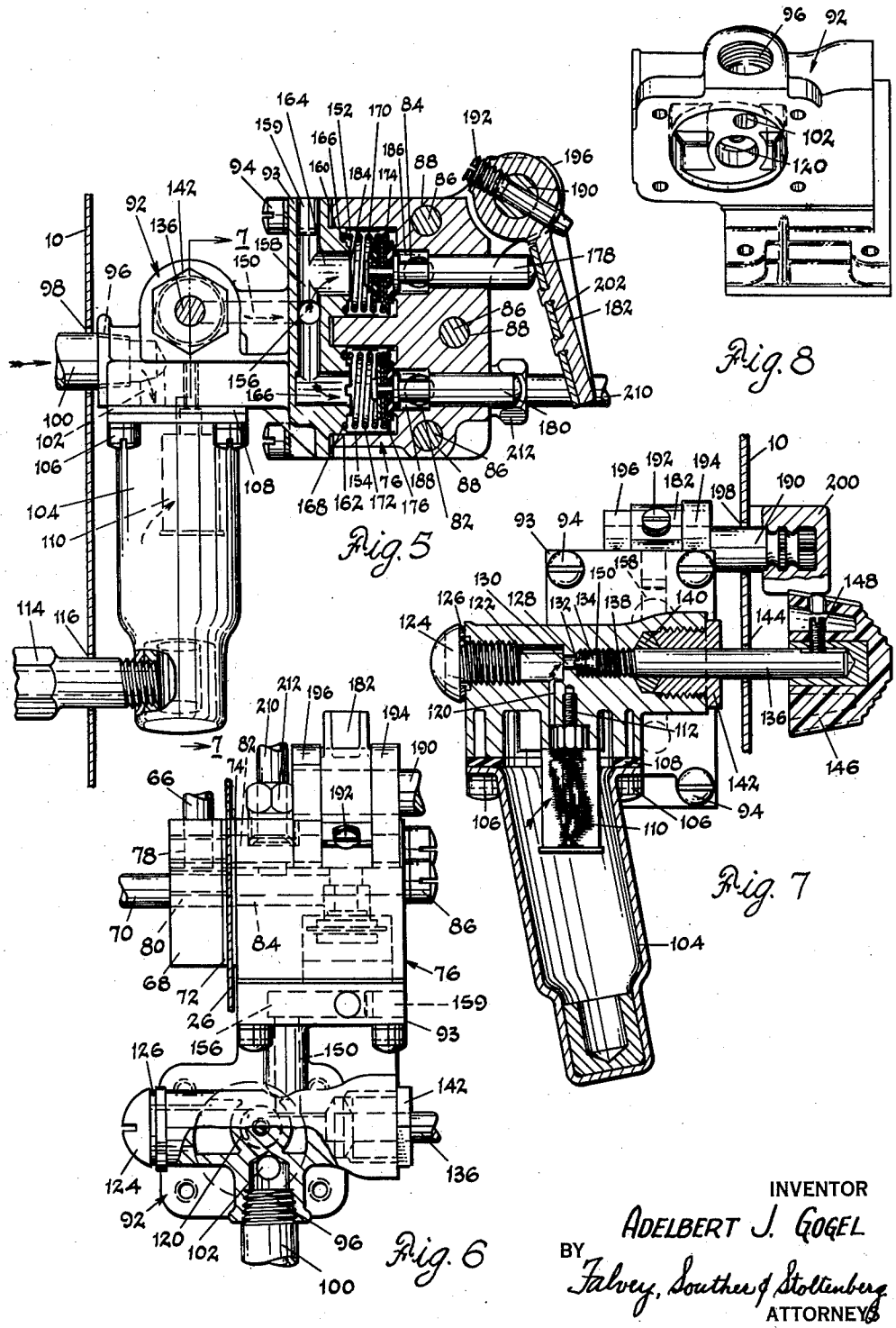


Fig. 8

Fig. 5

Fig. 7

Fig. 6

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SPARK PLUG CLEANER

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Application October 3, 1947, Serial No. 777,741

3 Claims. (Cl. 51—8)

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This invention relates to spark plug cleaners, particularly to sand-blast cleaners for spark plugs.

Sand-blast cleaners for spark plugs have been found inefficient in the past due to the fact that no efficient means has been provided for separating, from the sand, dust arising either from broken particles of sand or from foreign materials which have been added to the sand through repeated cleaning operations. The present invention contemplates the provision of a spark plug cleaner which has an integral separating means which will efficiently separate dust and other impurities of a predetermined size from the sand so as to maintain the percentage of impurities combined with the sand at a minimum. The invention further contemplates the provision of an efficient filter means which will separate the fines and maintain them within a convenient container to be readily removed from the spark plug cleaner and thrown away by an operator.

The invention further contemplates providing a structure wherein a baffle plate is positioned at an angular relation in the sand-blast chamber in such a manner that the sand particles issuing from the sand jet will impinge upon the spark plug to be cleaned and thereafter a large percentage of the sand particles will fall upon the baffle plate whose angular relation is such as to be steeper than the angle of repose of the sand itself, so that the sand will tend to flow down the baffle plate and fall from the bottom edge thereof into the sand-containing receptacle. The elements of the cleaning device are arranged in such a manner that the air flowing from the sand-blast receptacle will sweep through a screen of falling sand particles from the edge of the baffle plate at a velocity to pick up from the sand all particles which are sufficiently light to be entrained and carried out into the filter means. This, in effect, is an air-wash for a large percentage of the sand in the cleaner and thereby maintains the particle size of the sand in the receptacle of sufficient size to substantially enhance the cleaning efficiency of the sand jet with the removal of all fines from the sand. If the fines are not removed, they would tend to destroy the efficiency of the cleaner by clogging in the sand-containing receptacle so as not to feed properly into the sand-blast suction tube. This condition may be aggravated until the cleaner is inoperative and must be emptied of the contaminated sand and clean new sand added.

It is, therefore, an object of this invention to

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provide a spark plug cleaner using a sand-blast jet which has improved cleaning characteristics and which will remove from the sand by a special air-wash all fines which are the result of the cleaning operation of a spark plug.

It is a further object of this invention to provide a spark plug cleaning apparatus which is capable of sustained efficient operation with an efficient filtering means which will prevent the precipitation of dust in the vicinity.

Other objects and advantages of this invention relating to the arrangement, operation and function of the related elements of the structure, to various details of construction, to combinations of parts and to economies of manufacture, will be apparent to those skilled in the art upon consideration of the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

Referring to the drawings:

Fig. 1 is a sectional elevation of the spark plug cleaner;

Fig. 2 is an elevational view, partly in section, taken from the left of Fig. 1;

Fig. 3 is a plan view, partly in section, taken along the line III—III of Fig. 2;

Fig. 4 is a plan view, partly in section, taken in a direction similar to Fig. 3 with the cover plate, spark plug holding device and nozzle removed from the cleaner;

Fig. 5 is an elevational view, partly in section, of the manual control mechanism for the device;

Fig. 6 is a plan view, partly in section, of the control apparatus;

Fig. 7 is an elevational view, partly in section, taken along the lines VII—VII of Fig. 5;

Fig. 8 is an isometric view of one portion of the control mechanism;

Referring now to Fig. 1, an outer casing member 10 is provided which has a floor member 12 conveniently positioned therein by means of angle irons 14 to which the floor 12 may be screwed. Adjacent the upper end of the casing 10, a partition 16 is provided which is inserted in the casing 10 before the floor 12 is inserted and fits against an inwardly-turned flange 18 on the outer casing and is permanently held in position thereagainst by means of screws 19 or the like. The partition 16 is provided with a depending flange 20 for the purpose of strengthening the same and increasing its rigidity and

cooperates with the outer wall of the casing 10 as shown.

Adjacent a central location, the partition 16 is provided with a rectangular depression 22 which terminates in a depending flange 24 which defines a rectangular aperture 25. Positioned externally of the flange 24 and depending therefrom is a sand receptacle 26 which is conveniently welded to the flange and may be further soldered thereto in order to provide a permanent seal therebetween.

The sand receptacle 26 is preferably made of a pair of sheet metal stampings provided with outwardly-extending flanges 28 which are fitted together and welded and thereafter soldered for sealing. The receptacle is provided at its rear side with a flattened portion 30 for purposes which will be described hereinafter, and extends to substantially the bottom of the outer casing 10 being displaced obliquely forward of the central axis of the casing as is best shown in Fig. 1. The bottom 32 is given a rounded conformation to form a hopper, so that sand 34, which is positioned in the bottom thereof, tends to flow toward a central location to be available for the operation of a sand jet as will be described in more detail hereafter. The oblique relation of the sand receptacle 26 with reference to the outer casing 10 provides at its rear a large space which is utilized to position filtering elements which will also be described hereinafter.

The rectangular depression 22 in the partition plate 16 is provided with a gasket 36 which is positioned in the depression 22 and cooperates with an outwardly-extending flange 38 positioned on the lip of an inverted cup-shaped element 40 whose bottom is somewhat smaller than the aperture 25 and is provided with an opening 42 defined by a downwardly-extending flange 44. The cup-shaped receptacle 40 is sealed to the partition by means of the gasket 36 and is held thereagainst by screws 46 which engage apertures in the flange 38 and are screwed into threaded apertures formed in the depression 22 of the partition 16. This construction provides a sealed receptacle which extends from the rounded bottom 32 of the sand receptacle 26 up to the inverted bottom of the cup-shaped receptacle 40 which is pierced by the aperture 42 for the purpose of housing a spark plug positioning member 48 which is preferably made of rubber having a central aperture 50 defined by a bushing 52 which cooperates with the threaded portion of the spark plugs to be cleaned.

The spark plug positioning member 48 is provided with a downwardly-extending integral boss 54 which fits snugly into the aperture 42 defined by the flange 44 of the cup-shaped receptacle 40. The upper portion of the spark plug positioning member 48 overhangs the receptacle 40 and is provided with a roughened peripheral edge 56 which is adapted to be grasped by the hand of an operator and the whole rotated within the aperture 42 so as to rotate the spark plug to be cleaned positioned therein to effectuate the cleaning effect of a sand-blast jet 58 which is adapted to impinge against the bottom of the spark plug to remove therefrom foreign matter to recondition the spark plug for use in an automotive engine.

The sand-blast jet 58 is created within the receptacle formed by the sand-containing-receptacle and the inverted cup-shaped receptacle 40 by an air jet 60 mounted concentrically in a sand tube 62 which is preferably rigidly welded or otherwise fixedly attached to the jet 60 which terminates in a ceramic nozzle 64. The jet 60 issues through a side of the sand tube 62, which extends from the jet 60 to approximately the bottom of the sand-containing receptacle 26 as is most clearly shown in Fig. 2, its lower end being covered by the sand 34 positioned at the bottom of the receptacle. The jet 60 is surrounded by the ceramic nozzle 64 which is fitted on the upper end of the sand tube 62 which is preferably enlarged adjacent the point where the jet 60 enters therein. The ceramic nozzle 64 is generally in the form of a hollow truncated cone, the larger end of which fits on the upper end of the sand tube 62 and thereafter converges to form a concentric aperture aligned with the jet 60 to form the sand-blast jet 58 which projects sand drawn from the sand supply 34 at the bottom of the sand receptacle 32 through the sand tube 62 by the suction created by compressed air flowing through the air jet 60 adjacent the upper end of the sand tube 62 and the ceramic nozzle 64 to project the sand against the bottom end of the spark plugs positioned in the positioning member 48 for the purpose of cleaning the same.

The sand-blast jet 58 is directed against the bottom end of the spark plug at an angle of approximately 15 degrees with the axis of the spark plug and in the transverse axis is slightly displaced to one side in order that the sand particles may impinge upon the surfaces of the spark plug to be cleaned at a slight angle to give a whirling motion thereto which will cause rotation of the particles within the shell of the spark plug being cleaned. This construction is most clearly shown in Figs. 1 and 4.

The sand tube 62 with the air jet 60 are conveniently held in position in part by a connecting air tube 66 which is in communication with the air jet 60 and preferably integral therewith by issuing through a side of the sand tube 62 and welded thereto as has been already described. The tube 66 communicates with a connection block 68 which is positioned against the left-hand inner side of the sand receptacle 32 as is most clearly shown in Fig. 2, and is held in position by means to be described in further detail hereinafter. A blow-off jet 70 is also provided to cooperate with the bottom end of the spark plug to be cleaned and is primarily used for the purpose of removing loose foreign matter from the spark plug prior to and immediately after the time the sand blast jet 58 is directed thereagainst for the cleaning operation. The blow-off jet 70 comprises a tube having a tapered end which is bent to direct the air jet at a slight angle to the axis of the spark plug to be cleaned in order to create rotation of the air within the narrow annular space between the insulator of a spark plug and its shell. The tube of the blow-off jet 70 is welded to the side of the sand tube 62 and thereafter is continued downwardly and laterally toward the left, as shown in Fig. 2, to cooperate with passageways in the connection block 68 which is attached to the side of the sand receptacle as has already been described. Air pressure is introduced into the pipes 66 and 70 through the agency of the connection block by passageways therein and other means which will be described in further detail hereinafter.

Referring now to Fig. 6 where the connection block 68 is shown in plan view with the pipes 66 and 70 issuing therefrom, the connecting block is shown as being positioned against the inner side of one wall of the sand-containing-receptacle 26, shown in section, with a gasket 72 positioned

therebetween for sealing purposes. On the opposite side, i. e., the outside of the sand-containing-receptacle, a second gasket 74 is provided, against which is fitted one wall of a valve control means 76. Communication is obtained between the pipes 66 and 70 by passage-ways 78 and 80 formed in the connecting block 68 and aligning apertures in the gasket 72, the wall of the sand-containing-receptacle 26, and the gasket 74 to coincide with similar passages 82 and 84 formed in the block of the valve control means 76. Screws 86 positioned in apertures 88 are provided to extend through apertures formed in the block of the valve control means 76 and through aligning apertures in the gasket 72 and 74 and the side wall of the sand-containing-receptacle 26 and are thereafter fitted into threaded apertures 90 formed in the connecting block 68. When the screws 86 are drawn up, the block of the valve control means is drawn toward the connecting block 68 to compress gaskets 72 and 74 on opposite sides of the wall of the sand-containing receptacle 26 so as to provide communication for flow of gas or air pressure from the block of the valve control means 76 into the pipes 66 and 70 connected to the blow-off jet and the sand blast jet 58.

The valve control means 76, which is held in position by means of the screws 86, in turn, supports an air pressure control means 92 which is attached to the valve control means by means of an integral plate 93 cooperating with screws 94 and whose interaction with the valve control means will be described hereinafter. The air pressure control means 92 is provided with a threaded bore 96 juxtaposed in opposed relation with an aperture 98 in the rear side of the casing 10 to allow a pipe 100 to enter the casing and be threaded into the aperture 96. The pipe 100 is supplied with compressed air from a source (not shown) such as is usually found in tire-inflating systems in a garage or a gas station where the spark plug cleaning device may conveniently be used. The air from the source enters the control means 92 by pipe 100 and then flows through a transverse bore 102 which leads it to a depending enclosure 104 which is attached to the air pressure control means 92 by means of screws 106, being provided with a gasket 108 to provide a seal when the screws 106 draw the flange of the enclosure 104 against the bottom side of the casting forming the air pressure control means 92.

Extending internally of the depending enclosure 104, a filter means 110 is provided (Fig. 7) which comprises a series of compressed sheets to remove from the compressed air, moisture and other impurities by edge filtration, being attached to the casting of the air pressure control means by means of a central screw 112 threaded into the casting. The moisture and other foreign matter which collects on the exterior of the filter means 110 is collected within the enclosure 104 and may be drained therefrom by a hand petcock 114 which communicates with the bottom end of the receptacle 104 and extends externally of the casing 10 through an aperture 116 therein. A hand-controlled valve member 118 allows draining of the receptacle 104 when desired by an operator, being, during normal operation of the spark plug cleaning device, in closed relation, so that the receptacle 104 will contain the full air pressure from the source and the air will flow through the container 104 via the filter means 110, thence through passageway 120 formed in the casting of the air pressure control means into a secondary passage 122 which is closed by means of a screw 124 provided with a sealing gasket 126. The passage 122 is provided with an end wall 128 pierced by a counter-bore 130 which allows the air to flow through a pressure-regulating-valve 132 formed between the counter-bore 130 and a tapered valve member 134 which is a part of a threaded stem 136 threaded into a second counter-bore 138. The stem 136 is sealed by a packing 140 and a gland nut 142 which compresses the packing by being screwed into an enlargement of the threaded aperture 138 in the casting. The stem 136 extends to the exterior of the casing 10 through an aligning aperture 144, being provided with a thumb knob 146 which is conveniently attached to the stem by means of locking screw 148. The air flowing through the counter-bore 130 has its pressure controlled by the position of the tapered valve member 134 in its relation with the counter-bore to provide a constriction to the air flow which will reduce the pressure during flow to a desired degree in a transverse bore 150 communicating with the threaded counter-bore 138 as is best shown in Figs. 6 and 7.

The air at the desired pressure in the transverse passage 150 flows to upper and lower valve chambers 152 and 154, by a pair of communicating passageways 156 and 158. These may be conveniently plugged back by inserts 159 as is most clearly shown in Figs. 5 and 6. The attaching plate 93 of the air pressure control means 92, in which the passageways 156 and 158 are located, is provided on its right face (Fig. 5) with a pair of circular bosses 160 and 162 which are pierced by bores 164 and 166 which are both in communication with the transverse bore 158. The forward faces of the bosses 160 and 162 are provided with depressions 168 which form seats for a pair of valve-actuating-springs 170 and 172, the opposite ends of which coact with movable valve members 174 and 176 positioned in the valve chambers 152 and 154 respectively. Each of the valve members is provided with a guide stem 178 and 180 respectively which are of such a length as to extend from the right side of the valve control means to cooperate with a manually-controlled actuating device 182 which will be described in further detail hereinafter. The upper valve member 174 is provided with two gaskets so as to cooperate with a valve seat at each of its extremes of movement, one valve seat 184 being positioned on the forward face of the boss 160, while the second seat is positioned at the terminating edge of the counter-bore 186 in the block of the valve control means. The lower valve member 176 is adapted to cooperate with only one valve seat formed at the terminus of a second counter-bore 188. The springs 170 and 172 urge the valve members 174 and 176 against the valve seats formed in the counter-bores 186 and 188, which are in communication with passageways 82 and 84 hereinbefore described. As has been already pointed out, the passageways 82 and 84 are in communication with the pipes 66 and 70 which lead to the sand-blast jet 58 and the blow-off jet respectively. The stems 178 and 180 fit in their cooperating bores with sufficient closeness to give a reasonably good seal when the pressure is active in the valve chambers 152 and 154.

The manually-controlled valve actuating means 182 is in the nature of an arm attached to shaft 190 by means of a set screw 192 and is rotatable by being journaled in a pair of up-

wardly-extending ears 194 and 196, preferably integral with the casting of the valve control means 76. The shaft 190, which preferably is in parallel relation with the spindle 136, extends outwardly through an aperture 198 in casing 10 and is provided at its outer terminus with a control handle 200 which is fixedly attached at the exterior of the casing 10 (Figs. 4 and 7). It will be noted that as the handle 200 is thrust downwardly by an operator, its initial movement will rotate the arm 182 in a clockwise direction (Fig. 5), so that a pad 202, positioned on the forward face of the arm 182, contacts the spindle 178 and thrusts it to the left so as to move the valve gasket from the valve seat formed in the counter-bore 186 against the bias of spring 170 to allow air to pass from the passageway 158 to the passageway 84, thence through the terminal block 68 by passage 78 through pipe 70 to the blow-off jet. This is the first step in the operating cycle of the cleaner. This directs a blast of air against the lower end of the spark plug to be cleaned and will remove loose foreign matter and oil therefrom before the cleaning operation by the sand-blast jet begins.

As the handle 200 is moved still further downwardly, the arm 182 advances the spindle 178 further to the left so as to bring the valve member 170 into contact with the valve seat 184 formed on the boss 160. This closes the communication between the passageway 158 and passageway 84 and shuts off the air from the blow-off nozzle formed on the end of the pipe 70. Substantially simultaneously with this closing action, the lower portion of the arm 182 comes into contact with the spindle 180 and pushes it also to the left against the bias of spring 172 (Fig. 5) so as to release the valve member 176 from the valve seat formed on the terminus of the counter-bore 188. This establishes communication between the passageway 158 and passageway 82 to allow air to flow therethrough, thence through passageway 78 in connection block 68, thence to pipe 66 and into the jet 60 which creates a suction in the sand pipe 62 and blows a mixture of air and sand against the lower end of the spark plug to be cleaned.

At this point, it is expedient for the operator to check the amount of air pressure which is being utilized to operate the sand-blast jet 58 and, for this purpose, a pressure gauge 204 is provided which is mounted in an oblique relation with reference to the partition 16 by means of a pedestal 206 which is preferably fastened by screws 208 to the partition immediately in front of the cup-like receptacle 40. The pressure gauge 204, which is preferably of the well-known Bourdon type, which need not be described in further detail, is connected in the pressure system by means of a pipe 210 which is connected to the gauge by the pedestal 206, which extends through aperture 211 in partition 16. The pipe runs externally of the sand-hopper 26, and is placed in communication with passageway 82 in the block of the valve control means as is best shown in Fig. 6. A nut 212 is provided to form a leak-proof joint.

When the manual control lever 200 is moved to its lowest position with the valve 174 seated on the valve seat 184 to shut off air flowing through the blow-off jet, and with the valve 176 moved off the seat formed at the terminus of the counter-bore 188 to place the air pressure on the sand-blast jet 58 by connecting passageways,

the pressure gauge will also be in communication with the air pressure which is active in the system at that moment. If the air pressure is too high for the efficient operation of the sand-blast jet, as indicated by the limits on the gauge 204, the operator may control the pressure by manipulating the manual knob 146 to advance or withdraw the tapered valve member 134 with reference to the counter-bore 130 so as to control the restriction to the air flow formed by these two members and thereby control the air pressure at the sand-blast jet 58.

Assuming that the operator has placed a spark plug which he wishes to clean in the spark positioning member 48, where he will hold it in position in the aperture 50 while at the same time holding the positioning member in the aperture 42 of the receptacle 40, he first pushes down the manual operating handle 200, located on the left side of the casing, as indicated in Fig. 2, to a position where the air pressure is applied to the blow-off jet 70 which will be allowed to operate for a short period of time. Thereafter he will push the handle 200 down to the optimum position which will place the air pressure on the jet 60 of the sand-blast device to create the sand-blast jet 58 by drawing sand from the lower end of the sand receptacle 26 via the sand tube 62 by the suction created. This will project the sand particles against the lower end of the spark plug to be cleaned at a relatively high velocity and while the sand-blast jet 58 is working, the operator will turn the spark plug positioning member 48 through at least a complete revolution so as to expose all of the annular space within the spark plug to a direct action of the sand blast for the purpose of cleaning it thoroughly.

During the cleaning operation, a considerable volume of air blows through the jet 60 and a substantial quantity of sand is withdrawn from the lower end of the container 26 to be projected against the spark plug. During the cleaning operation, the sand projected from the sand-blast jet 58 in the upper end of the receptacle 40 will become contaminated by foreign material removed from the plug and will become, in part, broken up and finely divided due to the abrasive action of the particles moving at high velocity, so that if this foreign material and finely divided sand are allowed to remain in the receptacle and returned to the bottom portion thereof to be used again in a subsequent cleaning operation, the efficiency of the sand-blast jet is materially reduced due to the fact that the contaminants and also the finely divided sand no longer are efficient for cleaning purposes. It is, therefore, highly desirable that the contaminants be removed from the sand and the particle size of the sand retained to a large degree, so that the efficiency of the cleaning jet will remain of a high order.

Generally speaking, the contaminants or foreign materials are finely divided and relatively lighter in weight than the sand particles which have the best cutting action during the cleaning. For the purpose of removing these light-weight particles from the sand, a separating means is provided in the cleaner, which consists, in part, of a baffle 214, the upper end of which is attached to the flattened side portion 30 of the sand container 26 adjacent the point where the sand container is attached to the depending flange 24 of the partition 16. From this point, the baffle 214 extends steeply downward at an angle substan-

tially greater than the angle of repose of the sand which generally is in the neighborhood of approximately 30 degrees, so that any sand which is deposited on the baffle will immediately tend to flow down upon its surface to drop from an edge 216 of the baffle 214 into the bottom portion 32 of the sand receptacle. The right-hand side of the baffle 214 (Fig. 2) is attached to the inner side of the sand receptacle by means of a flange 218, being preferably brazed thereto in order to form a seal. The left-hand side of the baffle is provided with a downwardly-projecting web 220 to contact the inner side of the oblique portion immediately below the vertical flattened portion 30 thereof, against which contact is made by means of a flange 222. The flange 222 is also preferably brazed to the sand container 26 to seal the same so as to form a separation chamber 224 therebeneath open only at its lower end, the opening being defined by edge 216 and the forward end of web 220.

Adjacent the upper end of the chamber 224, the vertical flattened portion 30 of the sand-containing receptacle 26 is pierced by an aperture 226 to communicate with the chamber and having attached in aligned relation thereto an elbow 228 on the exterior of the sand-containing receptacle to provide an exit for the air confined in the closed receptacle arising from the operation of either of the jets. The elbow 228 has an open end 230 which projects vertically downward and has cooperating therewith a mouth 232 of a filtering means 234 in the nature of a cloth bag for the purpose of allowing the air to escape while retaining the dust and fines of contaminants within the bag at the bottom 236 thereof. The mouth of the filtering means 232 is provided with a rubber insert 237 which frictionally engages with the exterior of the elbow 228, so that an operator may remove the same for the purpose of emptying the dust and contaminants from the filtering means. For this purpose, a hinged door 238 is provided at the rear of the casing 10, being held in closed relation therewith by means of turn-buckle 240. To allow ready escape of filtered air from the interior of the casing 10, louvers 242 are provided in this door opening outwardly.

The air flowing from either of the jets creates an air pressure within the closed sand blasting receptacle, which causes the air to flow downwardly until it passes the edge 216 of the baffle 214. At this point, the cross-sectional area of the receptacle, through which the air flow occurs, is somewhat reduced by the projection of this edge into the receptacle, so that there is a tendency for the air to increase its velocity. Thereafter, the air must make an abrupt turn of approximately 180 degrees to flow into the separation chamber 224, thence through the aperture 226 into elbow 228 and finally into the filtering means 234 where the air escapes through the fabric and has separated from it the dust and other contaminants which it has carried with it from the interior of the main receptacle. A cleaning action of the sand occurs through the reversal of the air flow about the edge 216 of the baffle 214. The larger particles of sand, having relatively greater weight, have too much inertia to make the 180° turn about the edge 216, with the result that they will continue moving downwardly to augment the sand supply 34 at the bottom of the sand receptacle 26. However, a large proportion of the lighter particles, such as arise during the cleaning operation, either from foreign materials removed from the spark plug or from broken particles of sand, will not have sufficient inertia when considering the velocity of the flow of air to be carried downwardly and will make the 180° turn about the edge 216 and be carried by the air currents into the filtering means 234. A grading action of the sand will occur at the edge 216 and such particles as cannot be carried to the aperture 226 by the velocity of the air will fall to the oblique wall section of the sand receptacle 26 and will be returned to the sand supply 34 by gravity.

The sand which falls upon the upper surface of the baffle 214 will tend to flow downwardly on this surface by the action of gravity and also by the action of the air flow so as to fall downwardly across the flow of air entering the open end of the chamber 224 and will thereby be cleaned due to the fact that the velocity of the air movement will tend to pick up the fines and remove them from the receptacle via the aperture 226. In this respect, a large proportion of the sand will be continually air-washed, so that the particles of sand in the bottom of the receptacle will be sufficiently large to maintain the efficiency of the cleaner at a high level.

After the cleaning operation, the operator will partially release the manual handle 200, so that the springs 170 and 172 will return the valve members to the position where the air will cease flowing to the sand-blast jet 58, and flow to the blow-off jet 70 to remove loose particles of sand from the spark plugs just cleaned. Thereafter the handle 200 will be entirely released, so that the air will be shut off and the cleaner will be ready for a next cleaning operation.

To enhance the appearance of the cleaner, an escutcheon plate 239 is provided which has an aperture 240, through which pressure gauge 204 projects, as is most clearly shown in Fig. 3 and also a second aperture 242 to embrace an indentation 244 on the upper end of the receptacle 40. The escutcheon plate is generally in the form of a cup whose lip 246 fits against the inwardly-turned flange 18 of the outer casing member 10 with which it cooperates to form a casing covering substantially all of the working parts of the device with the exception of those which have a frictional aspect as has been already described. The escutcheon plate is held on the outer casing 10 by means of a bifurcated tongue 248 at its forward side (Fig. 1) which forms a partial hinge connection by cooperating with slotted screw-head 249, about which it pivots, to contact the container 10 on which it is held in closely cooperating relation by means of snap-spring members 250 on the casing which lock with indentations 252 in the escutcheon plate. A protective hood 254 is provided to cover the spark plug positioning means 48 to prevent an operator from having the sand blast or any leakage therefrom from being thrown into his eyes. The hood 254 is conveniently attached at its rear side to the escutcheon plate by means of screws 256 so as to hold the parts permanently in position.

It is to be understood that the above detailed description of the present invention is intended to disclose an embodiment thereof to those skilled in the art, but that the invention is not to be construed as limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of being practiced and carried out in various ways without departing from the spirit of the invention. The language used in

the specification relating to the operation and function of the elements of the invention is employed for purposes of description and not of limitation, and it is not intended to limit the scope of the following claims beyond the requirements of the prior art.

What is claimed:

1. In a device of the class described, an outer casing provided with a horizontal supporting plate having a centrally located aperture, a sand receptacle depending from said plate, a hood attached to the upper side of said plate and having an aperture substantially aligned with the aperture of said plate, a spark plug positioning member rotatably mounted in the aperture in said hood, an air-operated sand-blast jet cooperating with said positioning member to clean a spark plug positioned in said member having a tube extending to the bottom of said sand receptacle said sand-blast jet being supported by the sand receptacle, a baffle positioned obliquely on one side of the sand receptacle at an angle greater than the angle of repose of the sand to define a separating chamber and to increase by constriction the velocity of movement of air adjacent the lower edge of the baffle, an outlet means cooperating with said separating chamber adjacent the upper end thereof, and filter means cooperating with the outlet positioned between the sand receptacle and the outer chamber.

2. In a device of the class described, an outer casing provided with a horizontal supporting plate having a centrally located aperture, a sand receptacle depending from said plate, a hood attached to the upper side of said plate and having an aperture substantially aligned with the aperture of said plate, a spark plug positioning member rotatably mounted in the aptreure in said hood, an escutcheon plate cooperating with said hood and said outer casing including a shell extending forwardly over the spark plug positioning means, an air-operated sand-blast jet cooperating with said positioning member to clean a spark plug positioned in said member having a tube extending to the bottom of said sand receptacle, said sand-blast jet being supported by the sand receptacle, a baffle obliquely positioned on one side of the sand receptacle at an angle greater than the angle of repose of the sand to

define a separating chamber and to increase by constriction the velocity of movement of air adjacent the lower edge of the baffle, an outlet means cooperating with said separating chamber adjacent the upper end thereof, and filter means cooperating with the outlet positioned between the sand receptacle and the outer chamber.

3. In a device of the class described, an outer casing provided with a horizontal supporting plate having a centrally located aperture, a sand receptacle depending from said plate, a hood attached to the upper side of said plate and having an aperture substantially aligned with the aperture of said plate, a spark plug positioning member rotatably mounted in the aperture in said hood, an escutcheon plate cooperating with said hood and said outer casing including a protective shell extending forwardly over the spark plug positioning means, an air-operated sand-blast jet cooperating with said positioning member to clean a spark plug positioned in said member having a tube extending to the bottom of said sand receptacle said sand-blast jet being supported by the sand receptacle, means to control the pressure of air admitted to the sand-blast jet, gauge means positioned in the escutcheon plate adjacent the hood for indicating the air pressure on the sand-blast jet, a baffle obliquely positioned on one side of the sand receptacle at an angle greater than the angle of repose of the sand to define a separating chamber and to increase by constriction the velocity of movement of air adjacent the lower edge of the baffle, an outlet means cooperating with said separating chamber adjacent the upper end thereof, and filter means cooperating with the outlet positioned between the sand receptacle and the outer chamber.

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