July 30, 1935. T. W. PEDERSEN 2,009,589

SPARK PLUG SERVICING STAND

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Fig. 1.

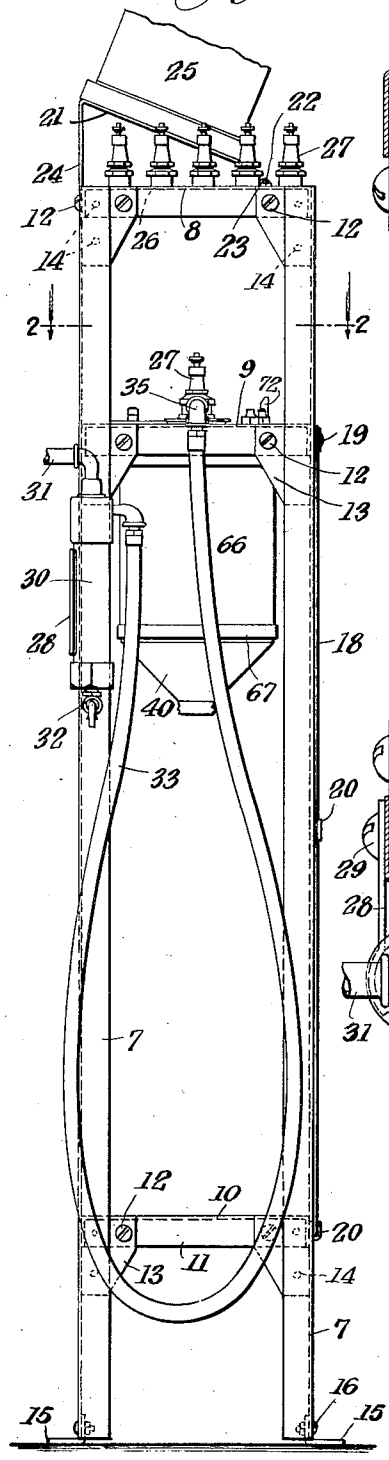


Fig. 2.

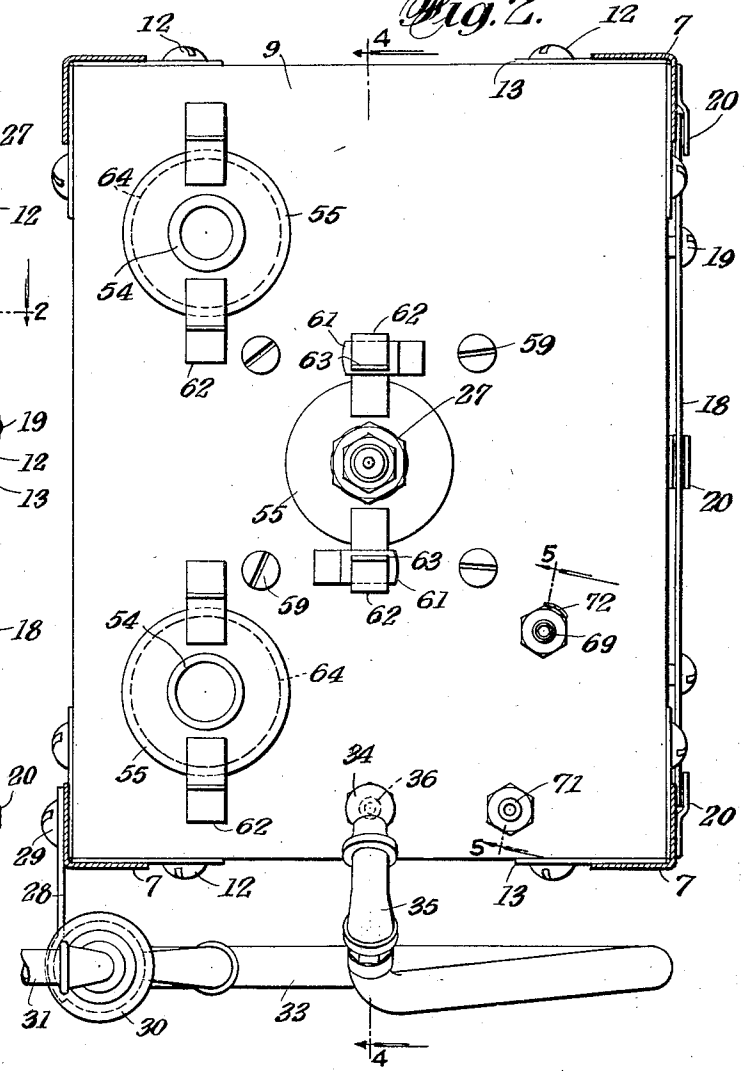
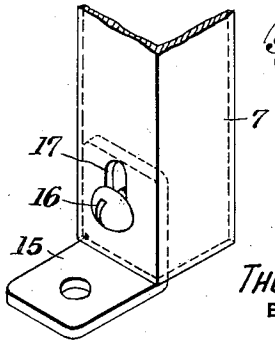


Fig. 3.



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Fig. 4.

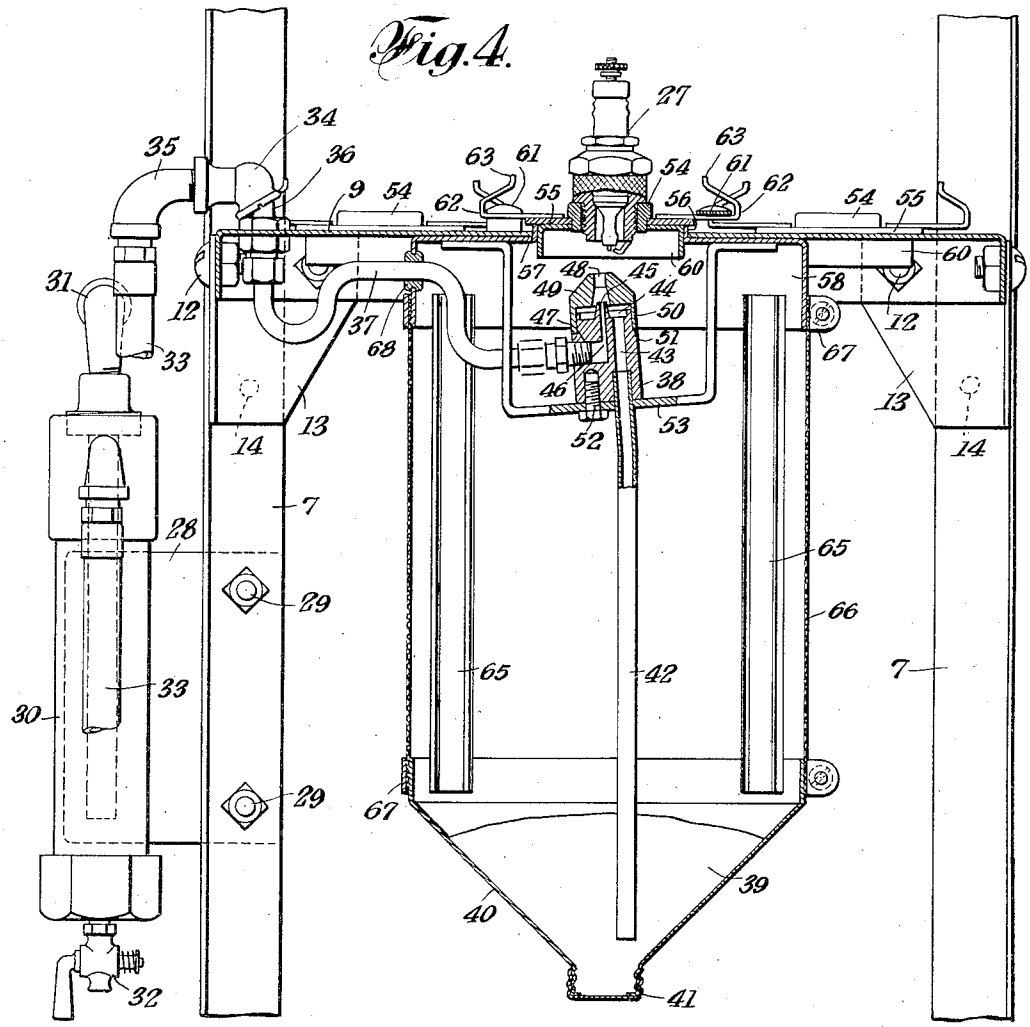


Fig. 5.

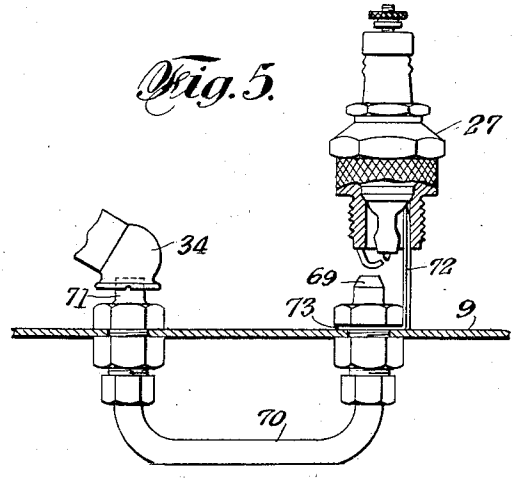
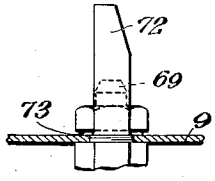


Fig. 6.



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UNITED STATES PATENT OFFICE

2,009,589

SPARK PLUG SERVICING STAND

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Application May 13, 1933, Serial No. 670,859

5 Claims. (Cl. 51—8)

The objects of this invention are to provide a work stand for cleaning spark plugs, which will combine in a single unitary structure all the necessary means for properly cleaning spark plugs; which will be in an attractive self-supporting form, suitable for locating wherever it may be convenient in a garage, store, sales room or other place; which stand will be of light but sturdy construction and in which the spark plug cleaning mechanism will be incorporated in a convenient safe form for use and will furthermore be entirely efficient and practical.

Other objects of the invention and the novel features of construction, combinations and relations of parts by which the objects are attained will appear as the specification proceeds.

The drawings accompanying and forming part of the specification illustrate one practical commercial embodiment of the invention, but as such illustration is primarily for purposes of disclosure, it is to be understood the structure may be modified and changed in various ways all within the true intent and broad scope of the invention.

Fig. 1 is a broken side elevation of the complete device.

Fig. 2 is a horizontal sectional view above the intermediate work shelf of the stand, as on line 2—2 of Fig. 1.

Fig. 3 is an enlarged broken detail of one of the leveling feet for the stand.

Fig. 4 is a broken vertical sectional view as on substantially the plane of line 4—4 of Fig. 2.

Fig. 5 is a fragmentary sectional detail of the air jet structure, substantially as on line 5—5 of Fig. 2.

Fig. 6 is a broken part sectional side view of the air jet nozzle and associated plug positioning and scraper blade.

The apparatus is made up for the most part of light sheet metal parts, which can be readily formed to shape and assembled in a rigid durable structure.

Thus the body of the stand is made up of four corner angles 7 and top intermediate and bottom sheet metal shelves 8, 9 and 10, set into and secured in the corners of these angle pieces.

The shelves are each alike in having downturned stiffening flanges 11, about the edges of the same and they are each secured in the same way by the screws 12, passed through these flanges and through the sides of bent angle brackets 13, secured as by spot welding 14, in the corners of the angle iron legs 7.

For securing the stand in properly leveled condition on a floor or other support, adjustable leg pads are provided, shown in the form of angularly bent lugs 15, secured by bolts 16, to the lower ends of the legs, there being slots or enlarged openings 17, either in the legs or the leg pads, enabling sufficient adjustment for ordinary leveling purposes. These leg pads may be detached and secured in inwardly turned relation for packing purposes and then be replaced in the outturned relation shown, at the place of mounting the stand.

In the form illustrated, the stand is further braced by a front plate 18, extending from the intermediate shelf to the lower shelf and shown as secured by screws 19, to the flange of the intermediate shelf, the overstanding clips 20, welded or otherwise secured to the front legs and lower shelf flange overlapping the side and bottom edges of the cover plate for retaining it in place and also serving when desired, to hold display cards or the like, which may be slipped over the cover plate beneath these overstanding clips.

At the top, the stand is further braced by an inclined angle bracket 21, having a front flange portion 22, secured on the shelf by screws 23 and having a back wall 24, caught beneath the back screws 12 of the top shelf. Upon removal of these screws and the front flange screws 23, this angle bracket may be removed and secured in directly reversed relation beneath the top shelf for shipment purposes. In addition to the bracing effect, this angle bracket serves in the position shown in Fig. 1 as a mounting for a spark plug testing outfit, such as indicated generally at 25. About the base of this testing set mounting bracket, the top shelf is indicated as provided with a series of holes 26, to serve as holders for spark plugs 27, which may be awaiting cleaning or test, or be placed there for display or advertising purposes.

A bracket 28 attached by screws 29 to one of the rear corner posts carries a water trap 30, which has at the top a suitable connection 31, for a compressed air line and at the bottom a drain valve 32, by which water or moisture in the air system may be drained out at the stand, immediately before reaching the cleaning portion of the apparatus.

Connected with the upper, outer shell portion of the trap, above the water well in the bottom of the same is a flexible air hose 33, provided at its free end with a tire inflating chuck 34, the latter being connected with the hose by an angled neck 35, Fig. 4, so that the hose may be hung up on the stand by hooking the chuck over a stud or support, such as that indicated at 36, Fig. 4.

The stud 36 last mentioned may be, and is in fact, in the present disclosure, the air inlet stem

of the cleaner system, it being secured in upstanding relation on the intermediate shelf and having connected with it below the shelf, a short length of pipe 37, extending to the spark plug scouring nozzle 38.

The scouring of the plugs is effected by the use of a suitable powdered abrasive indicated at 39, within a conical bottom or hopper 40, which for ready discharge purposes is provided at the center with a removable emptying screw cap 41.

An abrasive conducting tube 42, extends from the abrasive hopper up into the bottom of the nozzle body, where it communicates with a passage 43, opening to an annular way 44, in the top of the plug body, about the upstanding air nozzle 45. The latter is in communication by central passage 46, with the entrance 47, for the air tubing in the side of the nozzle body.

The throat of the nozzle is in the form of a Venturi passage 48, in a cap or nozzle tip 49, flanged at 50, to fit rotatably down onto a shoulder 51, on the nozzle body. This nozzle tip can thus be readily rotated to seat it properly down over the nozzle body and can be lifted off any time the nozzle passage is worn, to be replaced by a new tip.

The entire nozzle is shown as bolted at 52, on top of a bracket or bridge 53, angled to direct the jet at an incline up into the shell of the spark plug being cleaned, that is between the shell and the center electrode, substantially as indicated.

The plug being cleaned is rotatably supported in a socket 54, carried by a plate 55, seating on a flange 56, projecting up through an opening 57 in the shelf. This flange is shown as an integral hub part of a supporting ring member 58, secured to the underside of the shelf by screws 59.

To further seal the seating member for the spark plug, the cover plate 55 is shown as having a downwardly flanged member 60, attached thereto, adapted to slide down through the upstanding flange 56, defining the opening through the shelf. The combined closure and spark plug support is shown as removably secured in position by clips or brackets 61, on top of the shelf designed to catch and hold radially projecting arms 62, on the cover plate, these arms or the holding clips, or both, preferably being somewhat resilient, so that as the cover is turned to lock it in place, it will then be held seated under spring tension. The ends of the outstanding arms are shown as turned back to serve as handles 63, for rotating the cover plate either in a locking or unlocking direction.

A number of cover plates may be provided with appropriate sockets for different sizes and styles of spark plugs, thus serving as "adapters" for properly locating different kind of plugs over the abrasive nozzle. Two other such adapters are indicated at the back in Figs. 2 and 4, seated in appropriate sockets or openings 64, provided in the shelf to the rear of the nozzle structure, in position to be conveniently reached by one working at the stand.

The mounting bracket or bridge for the abrasive nozzle is indicated as welded or otherwise suitably attached to the ring or flange member 58, and the latter serves also as a head for supporting the conical hopper 40, which is indicated as rigidly suspended therefrom by channel strips 65. Surrounding the flange of the head piece 58, and the flange of the hopper 40 is the fabric or other screening material 66, shown as removably secured on such parts by split clamping bands 67. This construction permits ready replacement of the air filtering fabric or other material and the relatively wide separation of the hopper from the supporting head allows free escape of the air without unnecessary agitation of powder falling back into the hopper. The supporting strips 65 also act as stays for the air filter fabric.

The shelf which supports the abrasive nozzle serves also as a dust guard, overstanding the air filter hung beneath the same and the top shelf overstanding as it does the entire nozzle structure, serves as a shield for the operator and as a protection from the blast in case the air be accidentally started when no plug is in position closing the plug socket.

To seal the abrasive enclosure where the air pipe enters the same, a rubber gasket such as indicated at 68, may be provided where such tubing is led through the flange of the head piece 58, Fig. 4.

Either before or after, or both before and after, the plugs to be cleaned may be submitted to a straight air blast, provided in the illustration, by an air nozzle 69, secured on the mounting shelf 9, and connected by piping 70, beneath the shelf with an upstanding air inlet stem 71, on top of the shelf in conveniently accessible relation alongside the first or abrasive nozzle air stem 36.

In usual practice, with the proper adapter in place, the plug is positioned in the socket of the adapter and rotated slowly with one hand, while the air chuck is pressed down by the other hand over the top of the air stem 36. With the proper abrasive, the central insulator and inside of the shell are thoroughly scoured and cleaned without injuring either. Then all traces of abrasive, loosened carbon, etc., can be quickly and thoroughly removed by holding the plug over the air jet nozzle 69 and pressing the air chuck down over the air jet stem 71. In both these operations, the top shelf serves as a guard, keeping dust and blast away from the operator, an important feature of protection in case the operator should inadvertently press the chuck down over the abrasive nozzle stem when no plug is in place closing the adapter socket.

Under some conditions, it may be advisable to loosen caked carbon in the plug, particularly if it be of a sticky or oily nature, before or after subjecting to the abrasive blast. Provision for such treatment is present in the disclosure, in the form of a transversely curved scraper blade 72, having a base portion 73, caught beneath the head of the air jet nozzle 69. This blade may be positioned as indicated, so as to serve as a guide for properly positioning the plug over the jet, as well as a merely mechanical means for loosening or scraping carbon in the plug. The placing of this blade off to one side of the jet as illustrated, also locates it out of the way, if it be desired to simply hold the plug centrally over the jet for blowing it clear of any scouring material, or for drying it, and the like. This blade therefore is such that it may or may not be used, is not in the way when not required and serves when desired, as a guide for positioning the plug to best advantage for the jet to fully penetrate between the porcelain and the shell.

The parts of the device are all of simple, inexpensive design, easy to manufacture and assemble and form when put together a rigid durable stand of light weight but firmly braced form. With the parts turned inward as described, that is with the leg pads and the angle bracket on the top shelf, reversed to the inside of the stand and with the water trap detached or secured in reversed relation, inside the outline of the stand, the

unit will then form a plain rectangular outline, which can be packed for shipping in a rectangular container of like internal dimensions, without waste of space. The device can be quickly set up, without requiring any special skill, by simply turning the parts described outward into the service positions, adjusting the leg pads, if need be, to properly level the stand in the position it is to occupy and connecting the water trap with a suitable source of air pressure. The device is of sufficiently attractive ornamental appearance and the operation of cleaning the plugs is a sufficiently interesting and clean process to permit of locating the apparatus in positions of display in stores and garages, where customers may inspect and watch the operations. The top guard shelf may then be well utilized for display of spark plugs or other merchandise.

There are no valves in the apparatus which might become clogged with abrasive and the only part likely to wear, that is the abrasive nozzle tip **49**, is loosely rotatably positioned on the nozzle body, so that it may be either turned to a different position, or be entirely removed for replacement of a new nozzle tip, the latter being practical because of the simple inexpensive form of the piece. The adapter opening over the nozzle is large enough to permit the fingers to readily grasp the nozzle tip for these or other purposes and also to receive the abrasive, which may simply be poured in through this opening. Abrasive powder entering the nozzle in such operation is not objectionable, because the nozzle is self-cleaning as soon as the air blast is turned on by forcing the air chuck down over the inlet stem. If the abrasive in the hopper bottom should cake more or less, or the abrasive feed tube become clogged, these conditions may be corrected by closing the nozzle jet as by holding a thumb over the same and then pressing the chuck down over the stem, the air then blowing down through the feed tube and up through the body of the abrasive. The nozzle is supported up close to the plug, away from the body of the abrasive, which for ordinary purposes, need only occupy a part or the whole of the funnel-shaped bottom. The wide separation of the latter from the nozzle structure provides a plentiful area of filtering material, so that the nozzle operates freely without back pressure and without forcing dust out through the filter cloth. Any dust that may escape however, is below the working shelf and in back of the front panel. Removal of the cleaning powder, when a change is desired, is easily effected by simply unscrewing the cap of the funnel bottom. The different adapters are conveniently located directly on the same working shelf, where they can be readily reached and one quickly substituted for another. The water trap may, if desired, incorporate the features of an air filter, but such usually is not necessary, it being sufficient ordinarily to make sure that the water is trapped out at this end of the air line, just before reaching the powdered abrasive. The water trap serves as a practical form of terminal mounting for the air hose, which latter may be considered in the possibly broader aspect of an air connection having sufficient flexibility to permit of its being readily coupled with either the inlet stem for the abrasive nozzle or the inlet stem for the air jet. Because of the need to press the air chuck firmly down over the inlet stems and the spark plug firmly to its seat in the positioning socket, the stand structure must be rigid and strong and this is accomplished with light weight material through the structural features disclosed, including the angle corner pieces, the angle brackets affixed to the corners of the same and the shelves flanged about their edges and set in the corners of the angle pieces and secured to the angle brackets. While compressed air has been found most suitable for cleaning purposes, it is possible that other fluid under pressure might be employed and that the principles underlying the invention might be utilized with other variations, within the true scope of the invention and the terms herein used have therefore been employed in a descriptive, rather than in a limiting sense, except possibly for limitations as may be required by state of prior art.

What is claimed is:

1. In an apparatus of the character disclosed, a supporting plate having an opening therethrough, a supporting head secured beneath said plate and having an upwardly flanged neck projecting through said plate opening, a closure plate seated on said flange and having a dependent flange entered in said upstanding flange, a spark plug positioning socket carried by said closure plate, a bracket carried by said head piece beneath said opening, a blast nozzle mounted on said bracket and directed at the spark plug positioning socket, a hopper bottom with a central discharge outlet supported in spaced relation from said head piece, an abrasive conducting tube extending from the nozzle down into said hopper bottom, air filter material extending from said head piece to said hopper bottom and an air supply connection carried by the plate and in communication with the nozzle.

2. Spark plug servicing apparatus, comprising a supporting stand, a cleaning nozzle mounted thereon, a spark plug positioning member located closely at one side of and substantially parallel with the jet of said nozzle and positioned to locate a spark plug in proper relation to be acted on by said cleaning nozzle and fluid pressure connections for said cleaning nozzle, said plug positioning member being engagable inside a plug placed thereover for accurately locating and guiding the inside of the plug over the jet from the nozzle.

3. A spark plug cleaning unit, comprising a stand having a supporting shelf, a pair of air inlet stems projecting upwardly on said shelf adjoining one edge of the same, an abrasive nozzle supported by said shelf beneath the central portion of the same, an air connection from one of said pair of upstanding air inlet stems extending beneath the shelf to said abrasive nozzle, an abrasive container supported by said shelf beneath the same enclosing and in communication with said abrasive nozzle, means on top of the shelf for positioning a spark plug on the shelf in active relation to said abrasive nozzle an upwardly directed cleaning air nozzle on top of the shelf at one side of said spark plug positioning means, an air connection from the other of said pair of upstanding air inlet stems to said upwardly projecting air cleaning nozzle and an air chuck flexibly mounted on said stand adjacent said upstanding air inlet stems and interchangeably engageable with either of the same and whereby by the mere forcing of said flexibly mounted air chuck down over one or the other of said upstanding air inlet stems either the abrasive nozzle or the air cleaning nozzle may be used selectively at will.

4. A spark plug cleaning unit, comprising a stand having a supporting plate with an opening therethrough, a head beneath said plate and

about said opening, a removable closure for said opening and provided with a spark plug positioning socket, a bracket carried by said supporting head beneath said opening, a blast nozzle mounted on said bracket and directed toward said spark plug positioning socket, a hopper bottom with a central discharge outlet supported in spaced relation below said head, an abrasive conducting tube extending from the nozzle down into said hopper bottom, air filter material extending from said head to said hopper bottom, an air supply connection extending from said nozzle and terminating in an upwardly projecting air inlet stem on the supporting plate and an air chuck engageable over said air inlet stem.

5. A spark plug cleaning stand having a supporting shelf provided with an opening, a spark plug positioning socket engageable over said opening, a bracket beneath said shelf in line with said opening, a head piece at the underside of the shelf about said opening, a blast nozzle mounted on said bracket and directed toward said spark plug positioning socket a hopper bottom with a discharge outlet supported in spaced relation below said nozzle, an abrasive conducting tube extending from the nozzle down into said hopper bottom, air filter material extending from said head piece to said hopper bottom, upstanding air inlet stems mounted in spaced relation on said supporting shelf, an air chuck selectively engageable over either of said upwardly projecting air inlet stems, an air connection extending from one of said air inlet stems to the blast nozzle beneath the shelf and an air cleaning nozzle mounted on the shelf and connected with the other air inlet stem.

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