May 8, 1951 G. PERSAK, JR 2,552,344

SPARK PLUG CLEANING AND TESTING UNIT

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Fig. 1.

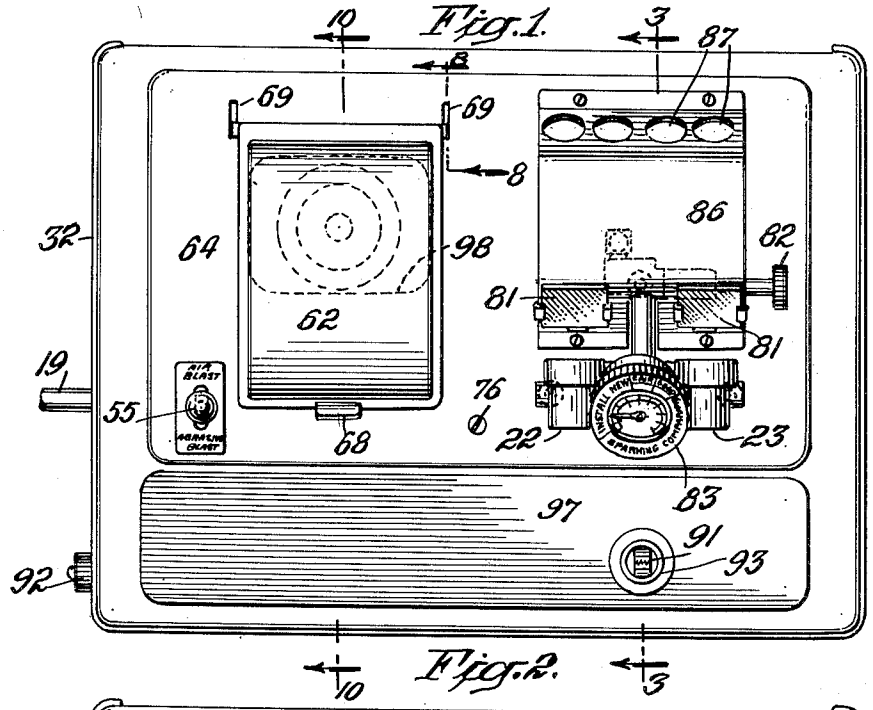
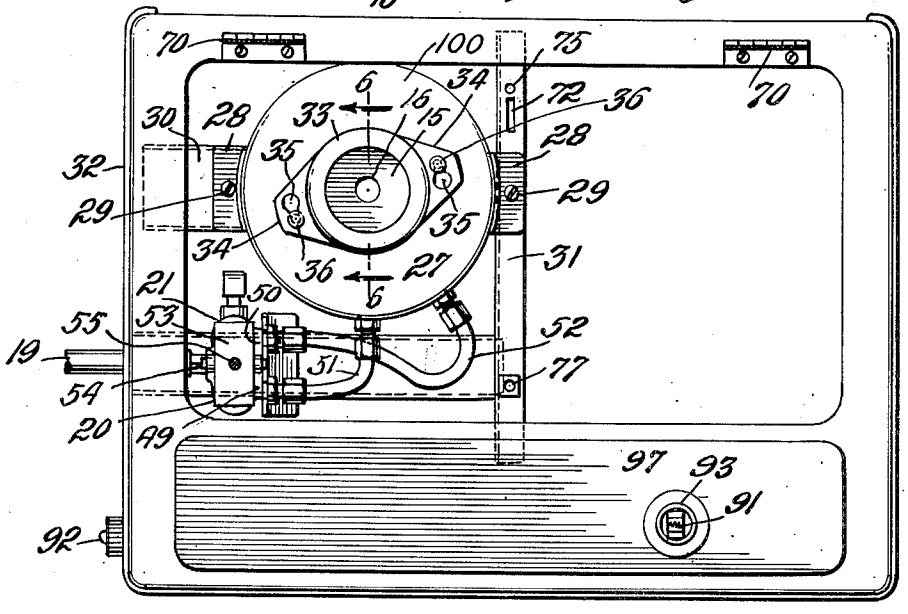


Fig. 2.



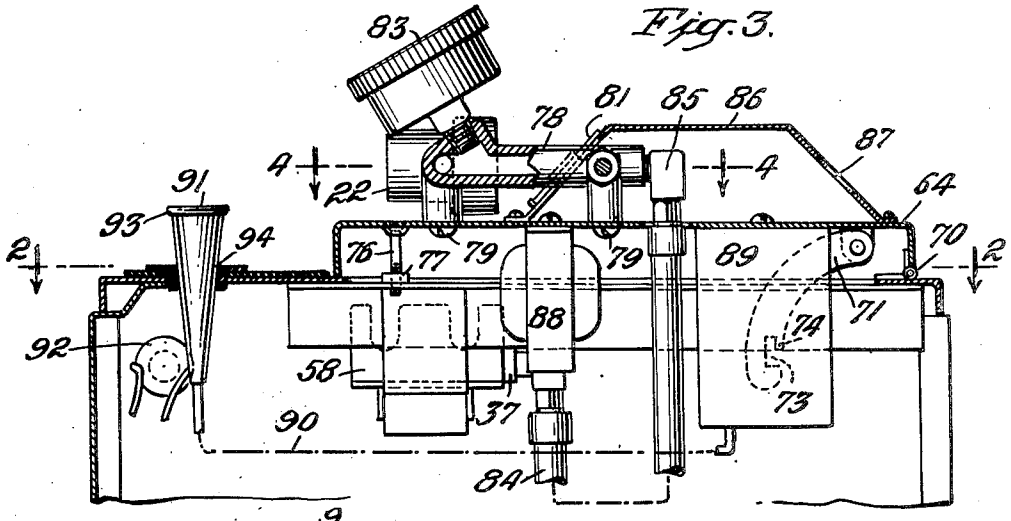
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Fig. 3.



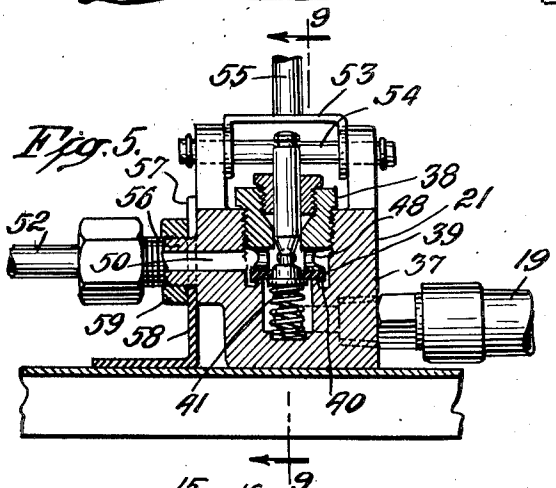
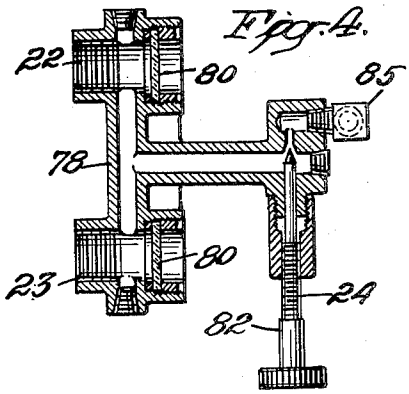


Fig. 5.

Fig. 4.



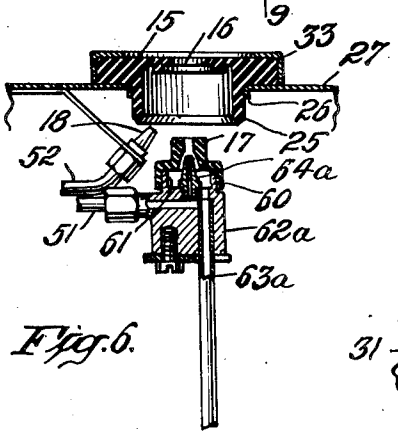


Fig. 6.

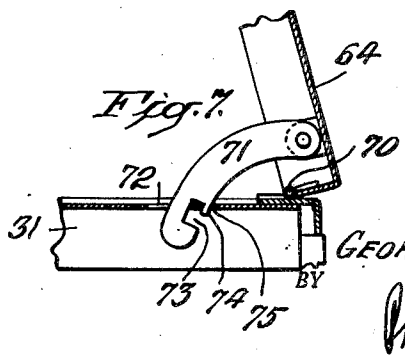


Fig. 7.

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SPARK PLUG CLEANING AND TESTING UNIT

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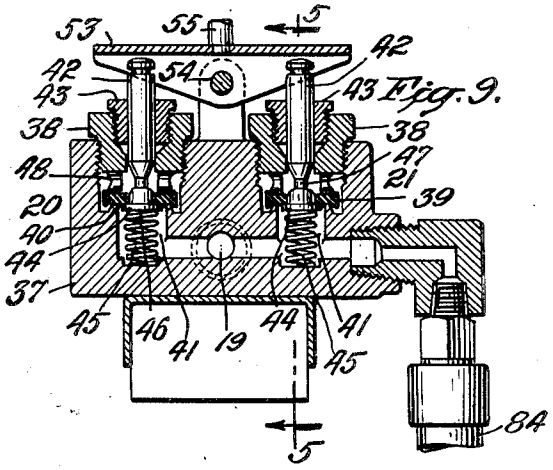


Fig. 9.

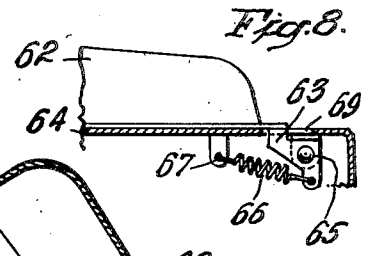


Fig. 8.

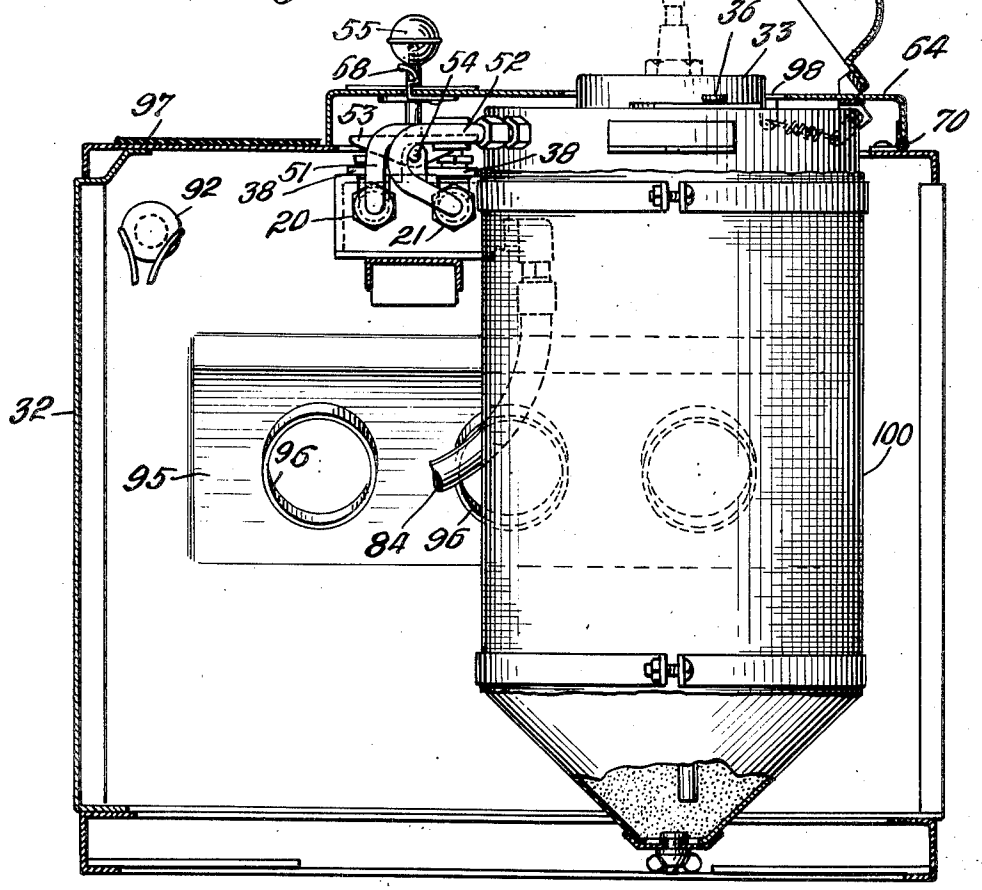


Fig. 10.

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SPARK PLUG CLEANING AND TESTING UNIT

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Application March 30, 1950, Serial No. 152,927

12 Claims. (Cl. 51—8)

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The invention disclosed in this patent application relates to the servicing of spark plugs, particularly cleaning and testing operations.

Objects of the invention are to provide a small, compact form of unit adapted for performing these operations, which will be practical and efficient in its operation, will consist of but relatively few, simple parts and which will be so arranged that these various parts may be quickly and easily inspected, replaced, repaired or otherwise serviced, as required.

Particularly it is a purpose of the invention to arrange the various elements of the device so that the cleaning and testing of spark plugs may be quickly, easily and safely performed.

Other desirable objects and the novel features of construction, combination and relation of parts through which the purposes of the invention are attained, are set forth or will appear in the course of the following specification.

The drawings accompanying and forming part of the specification illustrate a present commercial embodiment of the invention. Structure, however, may be modified and changed as regards the immediate illustration, all within the true intent and broad scope of the invention as hereinafter defined and claimed.

Fig. 1 in the drawings is a top plan view of the cleaning and testing unit, the line for supplying compressed air shown at the left being broken away;

Fig. 2 is a top plan and part sectional view on substantially the plane of line 2—2 of Fig. 3;

Fig. 3 is a broken cross sectional view of the testing part of the apparatus on substantially the plane of line 3—3 of Fig. 1, on somewhat larger scale;

Fig. 4 is a horizontal sectional view of the comparative spark plug testing sockets and pressure connections on substantially the plane of line 4—4 of Fig. 3;

Fig. 5 is a broken part sectional detail of the air-blast valve, on substantially the plane of line 5—5 of Fig. 9;

Fig. 6 is a broken vertical sectional detail of the abrasive and air-blast nozzles in association with the spark plug holding adapter;

Fig. 7 is a broken part sectional detail of the hinged top and supporting link;

Fig. 8 is a similar detail of the guard or cover and the spring hinged construction of the same, taken on line 8—8 of Fig. 1;

Fig. 9 is a broken cross sectional detail of the abrasive and air-blast valves as taken on substantially the plane of line 9—9 of Fig. 5;

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Fig. 10 is a broken enlarged cross sectional view of the complete unit on substantially the plane of line 10—10 of Fig. 1, showing the guard hinged up to admit a spark plug to the supporting adapter

The spark plug cleaner and tester illustrated consists, in general, of an adapter 15 having an opening 16 to receive and support a spark plug in line with abrasive and air-blast nozzles 17, 18, supplied from an air line 19 through valves 20, 21, and spark plug comparison sockets 22, 23, supplied through pressure control valve 24 from the same air line.

The spark plug supporting adapters 15 are shown in Fig. 6 in the form of rubber or other resilient discs having dependent annular neck portions 25 to interchangeably engage in an opening 26 in the top plate 27 of the filter 100, this plate having outstanding brackets 28 by which the filter is supported and secured as a unit by screws 29 on the spaced supports 30, 31, of the cabinet frame structure 32.

The adapters are removably secured in position directly on top of the filter by an overstanding annular ring or flange 33 having laterally projecting lugs 34 with keyhole slots 35 therein rotatably engageable beneath the headed studs 36 on the filter top plate.

This construction holds the spark plug supporting adapters securely in place over the abrasive and air-blast nozzles but permits one form or size of adapter to be quickly substituted for another upon slightly rotating the securing flange 33 to disconnect it from the studs 36.

As shown in Fig. 6, the securing flange is short enough to clear the top plate 27 so that compressive force is required to connect the flange with the anchor studs 36, making the resilient adapter then serve in the capacity of a gasket compressibly clamped to the top of the filter. This prevents leakage of air or abrasive about the edges of the adapter.

The abrasive and air valves are combined in a single body casting shown at 37 in Figs. 5 and 9.

The valves themselves are of duplicate, interchangeable and readily removable construction consisting, in each instance, of a plug 38 removably screwed in the top of the valve body 37, into engagement with a gasket forming valve seat washer 39 resting on an annular lip 40 surrounding an inlet passage 41, Fig. 9, open to the supply line 19.

Valve plungers 42 operating in plugs 38 through packing glands 43, carry valve heads 44 at their

lower ends cooperable with the valve seat washers 39.

These valve stems, as shown in Fig. 9, are held in their upper closed position by springs 45, which may be caught over the shouldered lower end portions 46 of the valve stems so that when the plugs 38 are unscrewed from the valve body they will take with them the complete valve assembly, including valve element, valve seat and valve closing spring.

This permits thick and easy removal and replacement and interchangeability of both air and abrasive valves.

To afford free, unrestricted flow of air, the valve stems 42 are shown reduced at 47 above the valve seat washers 39 and in line with ports 48 in the reduced lower ends of the valve plugs 38, these ported portions of the plugs being open in the case of the respective abrasive and air valves, to passages 49 and 50, connected by tubing 51, 52, with the abrasive and air blast nozzles 17, 18, Fig. 6.

A rocker 53 is shown pivoted at 54 on top of the valve body overstanding the two valve stems and operable by a handle 55 to actuate either the abrasive or the air valve, as selected.

To enable quick, easy removal of the entire valve assembly, the valve body is shown as having tubular extensions 56 for the pipe connections, Figs. 2 and 5, entering in notches 57 in a supporting bracket 58 and held therein by jamb nuts 59. On releasing these nuts the complete valve assembly may be removed from its seated position in the cabinet. This thus permits of quick substitution of an entire valve assembly if that be desirable.

The abrasive nozzle indicated generally at 17 is of novel construction in that, as shown in Fig. 6, it consists of a single cap of rubber or like elastic material having a flange 60 removably engaged over the upstanding flange 61 of the block 62*a*, carrying the eduction tube 63*a* which dips down into the abrasive in the filter, and the inspirator nozzle 64*a* which projects up into the abrasive nozzle 17.

Upon removal of the adapter 15 this rubber abrasive nozzle 17 is exposed and may be removed by simply slipping it up off the supporting flange 61.

A safety guard is provided to protect an operator against the possibility of the abrasive blast being turned on without an adapter in place or without a spark plug seated in the adapter. This guard is shown as a cover 62, Figs. 1, 8 and 10, carried by dependent brackets 63 hinged beneath the top plate 64 of the cabinet at 65 and arranged to be thrown upward into an inclined protective position as in Fig. 10, by tension springs 66 connected between the lower ends of hinge leverage lugs 63 and stationary lugs 67 on the underside of the top plate.

A finger releasable spring latch 68 engageable with the forward edge of the guard serves to hold it in the downward, fully closed position, and the length of the slots 69 in the top plate through which the hinge levers 63 project determines the extent of lift or opening movement of the guard.

The top or cover portion 64 of the cabinet is itself hingedly connected to the body or frame portion of the cabinet at the back, as indicated at 70, Figs. 2, 3, 7 and 10, so that it may be swung open to fully uncover the filter, valve mechanism and other portions housed in the cabinet.

This hinged top is shown as supported in its

raised position by a pivoted link 71, Fig. 7, located to drop down through a slot 72 in the frame bar 31 and notched in the back edge at 73 to form a lug 74 which will catch in a locking opening 75 to the rear of the slot 72 when the plate is raised to the full extent permitted by engagement of notch 73 with the back edge of slot 72, and then dropped back to permit lug 74 to enter hole 75.

This lifting top may be secured in a normally closed position by screw 76 engaging a screw seat 77 in the frame bar 31.

On removal of the securing screw 76 the entire top of the cabinet may be opened up to the extent permitted by the swinging link 71, and then on slightly lowering the top the locking lug 74 will enter opening 75, as in Fig. 7, to support the top in the raised relation and to secure it in that relation.

With the top raised and supported as in Fig. 7, all portions within the cabinet are fully exposed and the automatic locking of the supporting link 71 prevents the top from being accidentally dropped.

To lower the top or cover 64, it must first be lifted sufficiently to clear the locking lug 74 from opening 75, at which time the supporting and locking link 71 can be drawn forward fully into registry with the slot 72, thus to permit complete lowering movement of the top.

The sockets 22, 23, for the comparative testing of spark plugs are shown as carried by a manifold construction 78 secured on the top 64 at one side of the spark plug guard and cover, by screws 79, Fig. 3.

Various adapters for different size spark plugs may be used in the comparative sockets 22, 23, and these sockets have transparent windows 80 at the back, Fig. 4, opposite reflectors 81, Fig. 1, so that the action of different plugs may be observed and compared under different pressure conditions controlled by valve 82 and checked by a suitably calibrated pressure gage 83.

Pressure is supplied to the plug testing manifold by a hose connection 84, extending from the supply passage 41 in the valve body 37, Fig. 9, to the inlet fitting 85 on the back of the manifold, the flexibility of this hose permitting the lifting and lowering movements of the cabinet top without interrupting air connections.

The test mirrors 81 are shown as carried at the forward side of an arched bracket 86 secured on the hinged top over the supply connections to the manifold, and this bracket is shown as having in its rearward inclined side, openings 87, Figs. 1 and 3, for holding different size spark plug adapters which may be used in the spark plug testing sockets.

A transformer 88 and spark coil unit 89 are shown secured to the underside of the hinged top and a flexible high tension lead 90 is shown extended from the spark coil up through the front portion of the cabinet into position for convenient engagement of the pinch connector 91 on the end of the same, with the plugs which are being tested in the sockets 22, 23.

A low tension push-button switch is shown mounted at 92 on the end of the cabinet for completing the energizing circuit.

The spring jaw connector 91 on the end of the high tension cable is shown as heavily insulated by a conical sleeve 93 of rubber or the like which will drop down into firmly held engagement in the insulating socket 94 in the forward, fixed top wall of the cabinet.

The elastic insulating sleeve 93 provides a convenient grip for lifting and connecting the terminal clip with a spark plug in one of the testing sockets, and the push-button switch 92 enables the sparking circiut to be controlled at will.

All portions of the apparatus are readily accessible and may be quickly and easily serviced, replaced or repaired. The various elements also are of simple, durable form and construction, low in cost and small in size so that they can be compactly assembled into a relatively small size piece of apparatus, well adapted for mounting on a bench or stand in service stations and like places where space is at a premium.

One end wall of the cabinet is shown as struck inward on an incline at 95 and as having flanged openings 96 therein, providing sockets to support different spark plug adapters in readily accessible position.

The stationary portion 97 of the cabinet top provides a relatively narrow shelf or ledge at the front of and below the hinged top portion 64, as shown in Fig. 10, this ledge affording a convenient support for any tools or parts which may be used in connection with the cleaning and testing operations.

The opening 98 in the hinged top portion through which the spark plug adapter and its securing flange are exposed, preferably is large enough, as indicated in Figs. 1 and 10, to permit removal of the flange and substitution of different adapters without having to lift the hinged top of the cabinet, and the guard 62 is preferably large enough to completely cover the opening 98.

What is claimed is:

1. A spark plug cleaning and testing unit comprising a cabinet having a hinged top panel, a filter within the cabinet having a top plate immediately below said panel and said panel having an opening therein to expose said top plate, said top plate having a smaller sized opening, a spark plug adapter removably seated in said opening in the top plate and exposed through said opening in the top panel, and a guard cover hingedly mounted on the top panel over said adapter and over said opening in the top panel.

2. A spark plug cleaning and testing unit comprising a cabinet having a hinged top panel, a filter within the cabinet having a top plate immediately below said panel and said panel having an opening therein to expose said top plate, said top plate having a smaller sized opening, a spark plug adapter removably seated in said opening in the top plate and exposed through said opening in the top panel, and a guard cover hingedly mounted on the top panel over said adapter and over said opening in the top panel, said adapter being of compressible material, and a removable clamp exposed through said opening in the top panel and compressibly securing said adapter on said top plate of the filter.

3. A spark plug cleaning and testing unit comprising a cabinet having a hinged top panel, a filter within the cabinet having a top plate immediately below said panel and said panel having an opening therein to expose said top plate, said top plate having a smaller sized opening, a spark plug adapter removably seated in said opening in the top plate and exposed through said opening in the top panel, and a guard cover hingedly mounted on the top panel over said adapter and over said opening in the top panel, said cabinet having a stationary table portion at the front of the same and said top panel being located to the rear of said table portion and hingedly connected at the back with the cabinet and said guard cover being hingedly mounted at the back of said top panel.

4. A spark plug cleaning and testing unit comprising a cabinet having a hinged top panel, a filter within the cabinet having a top plate immediately below said panel and said panel having an opening therein to expose said top plate, said top plate having a smaller sized opening, a spark plug adapter removably seated in said opening in the top plate and exposed through said opening in the top panel, and a guard cover hingedly mounted on the top panel over said adapter and over said opening in the top panel, said guard cover having a hinge lever extension beneath the top panel and a spring connected therewith for automatically lifting the guard cover, and a releasable latch on the top panel for securing said guard cover closed against the action of said spring.

5. A spark plug cleaning and testing unit comprising a cabinet having a hinged top panel, a filter within the cabinet having a top plate immediately below said panel and said panel having an opening therein to expose said top plate, said top plate having a smaller sized opening, a spark plug adapter removably seated in said opening in the top plate and exposed through said opening in the top panel, a guard cover hingedly mounted on the top panel over said adapter and over said opening in the top panel, a panel supporting link pivotally connected with said top panel and means on the cabinet engageable with said link for limiting lifting movement of the top panel and for releasably locking said link in panel supporting position.

6. A spark plug cleaning and testing unit comprising a cabinet having a hinged top panel, a filter within the cabinet having a top plate immediately below said panel and said panel having an opening therein to expose said top plate, said top plate having a smaller sized opening, a spark plug adapter removably seated in said opening in the top plate and exposed through said opening in the top panel, a guard cover hingedly mounted on the top panel over said adapter and over said opening in the top panel, spark plug testing means on said top panel at one side of said guard cover and pressure supply connections to said filter and testing means, including a valve body mounted in fixed relation in the cabinet and a flexible hose extending from said valve body to the testing means mounted on the hinged top panel.

7. A spark plug cleaning and testing unit comprising a cabinet having a hinged top panel, a filter within the cabinet having a top plate immediately below said panel and said panel having an opening therein to expose said top plate, said top plate having a smaller sized opening, a spark plug adapter removably seated in said opening in the top plate and exposed through said opening in the top panel, a guard cover hingedly mounted on the top panel over said adapter and over said opening in the top panel, spark plug testing means on said top panel at one side of said guard cover and pressure supply connections to said filter and testing means, including a valve body mounted in fixed relation in the cabinet and a flexible hose extending from said valve body to the testing means mounted on the hinged top panel and a supporting link pivoted to the underside of the top panel and engageable with the cabinet structure for limiting the upward lift of

the panel and for releasably retaining it in lifted position.

8. A spark plug cleaning and testing unit comprising a cabinet having a hinged top panel, a filter within the cabinet having a top plate immediately below said panel and said panel having an opening therein to expose said top plate, said top plate having a smaller sized opening, a spark plug adapter removably seated in said opening in the top plate and exposed through said opening in the top panel, a guard cover hingedly mounted on the top panel over said adapter and over said opening in the top panel, spark plug testing means on the top panel at one side of the guard cover, the cabinet having a fixed table portion at the front of the same, the hinged panel being located to the rear of said table portion, and electrical connections for association with said testing means extending from within the cabinet up through said fixed table portion of the cabinet in front of the testing means on said panel.

9. A spark plug cleaning and testing unit comprising a cabinet having a hinged top panel, a filter within the cabinet having a top plate immediately below said panel and said panel having an opening therein to expose said top plate, said top plate having a smaller sized opening, a spark plug adapter removably seated in said opening in the top plate and exposed through said opening in the top panel, a guard cover hingedly mounted on the top panel over said adapter and over said opening in the top panel, air supply connections to said filter including a valve body mounted in the cabinet in front of said filter and a valve operating handle extending from said valve body up through the top panel adjoining said guard cover.

10. A spark plug cleaning and testing unit comprising a cabinet having a hinged top panel, a filter within the cabinet having a top plate immediately below said panel and said panel having an opening therein to expose said top plate, said top plate having a smaller sized opening, a spark plug adapter removably seated in said opening in the top plate and exposed through said opening in the top panel, and a guard cover hingedly mounted on the top panel over said adapter and over said opening in the top panel, said adapter resting on said top plate and having a dependent annular flange extending down through the opening in said top plate, headed studs on said top plate and a retaining flange engaged over said adapter and having laterally projecting lugs perforated for interlocking engagement with said headed studs.

11. A spark plug cleaning and testing unit comprising a cabinet having a hinged top panel, a filter within the cabinet having a top plate immediately below said panel and said panel having an opening therein to expose said top plate, said top plate having a smaller sized opening, a spark plug adapter removably seated in said opening in the top plate and exposed through said opening in the top panel, a guard cover hingedly mounted on the top panel over said adapter and over said opening in the top panel, a blast nozzle in the filter below said opening in the top plate and including an upstanding annular supporting flange and a one-piece nozzle or resilient material removably engaged over said upstanding flange and removable up through said opening in the top plate.

12. A spark plug cleaning and testing unit comprising a cabinet having a hinged top panel, a filter within the cabinet having a top plate immediately below said panel and said panel having an opening therein to expose said top plate, said top plate having a smaller sized opening, a spark plug adapter removably seated in said opening in the top plate and exposed through said opening in the top panel, a guard cover hingedly mounted on the top panel over said adapter and over said opening in the top panel, a blast nozzle in the filter below said opening in the top plate and including an upstanding annular supporting flange and a one-piece nozzle of resilient material removably engaged over said upstanding flange and removable up through said opening in the top plate, and said adapter having a dependent annular flange extending down through said opening in the top plate into position about said nozzle.

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