Nov. 14, 1944. L. J. CLARK ET AL 2,362,885

ATOMIZING APPARATUS

Filed Sept. 14, 1942 3 Sheets-Sheet 1

Fig. 1

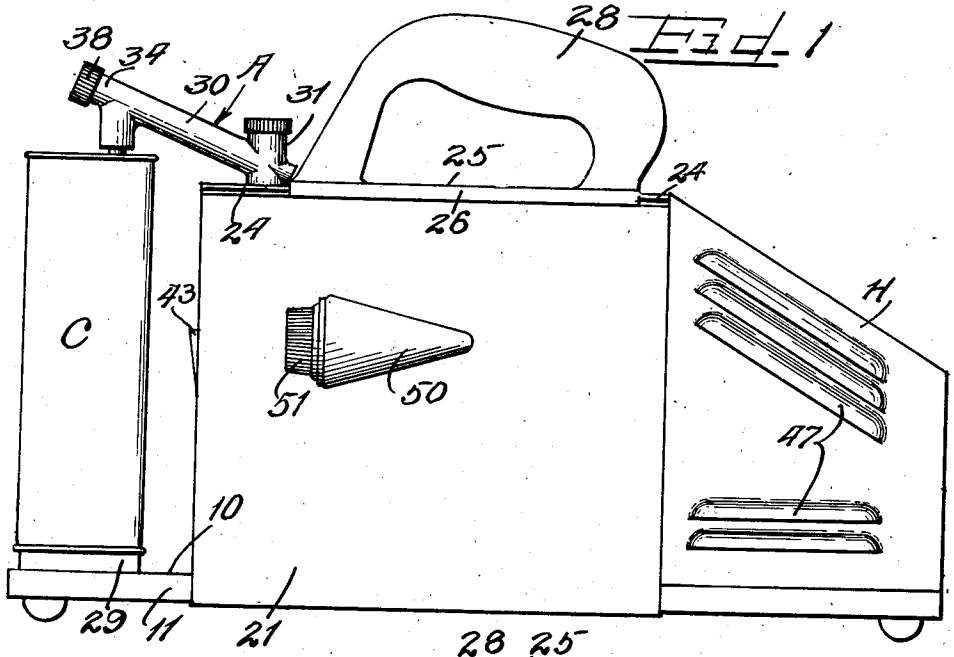
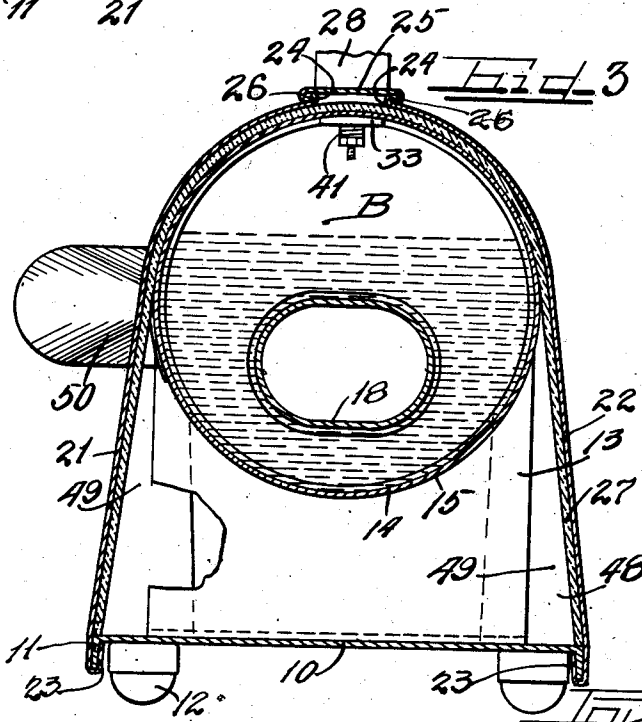


Fig. 3



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ATOMIZING APPARATUS

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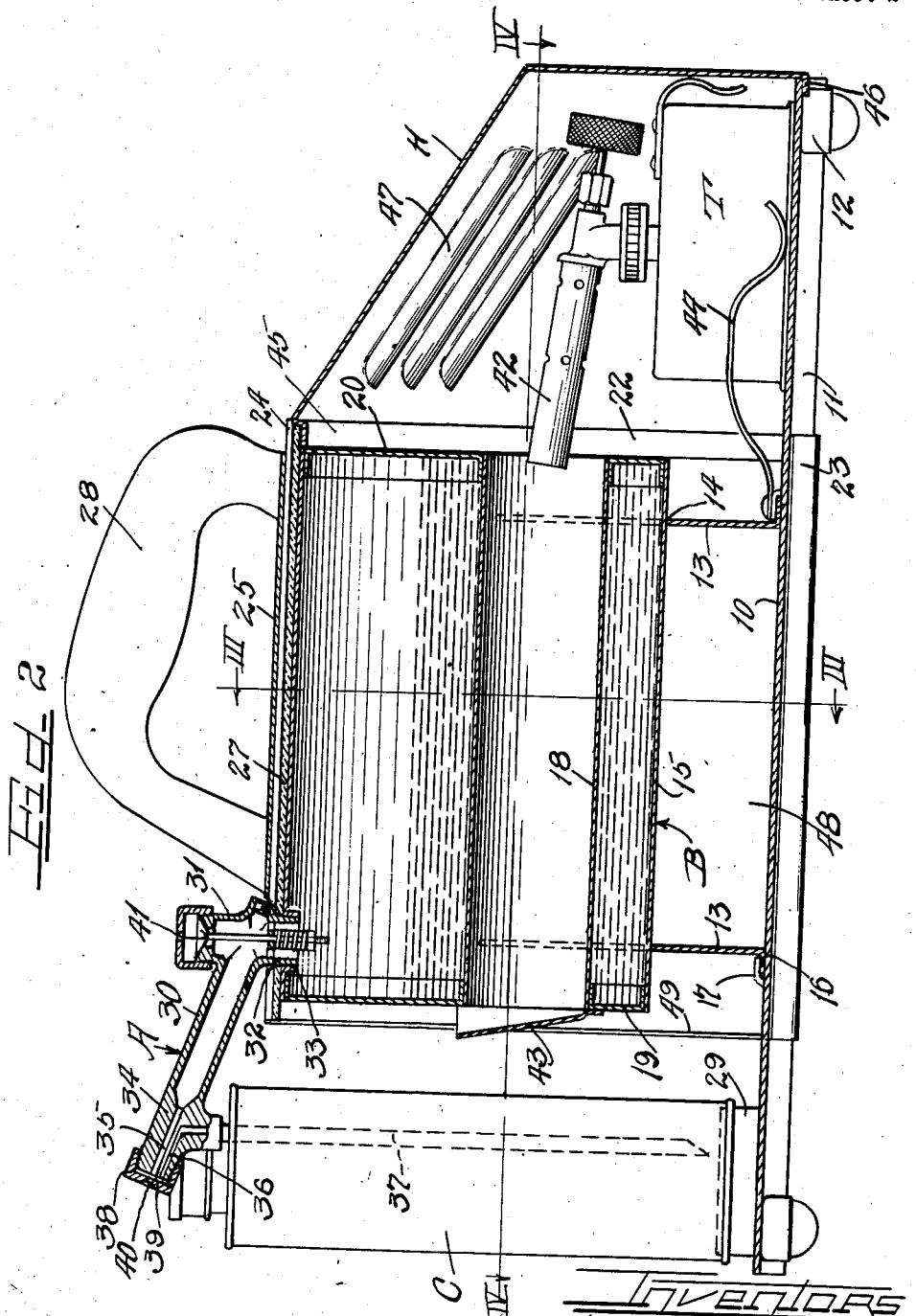


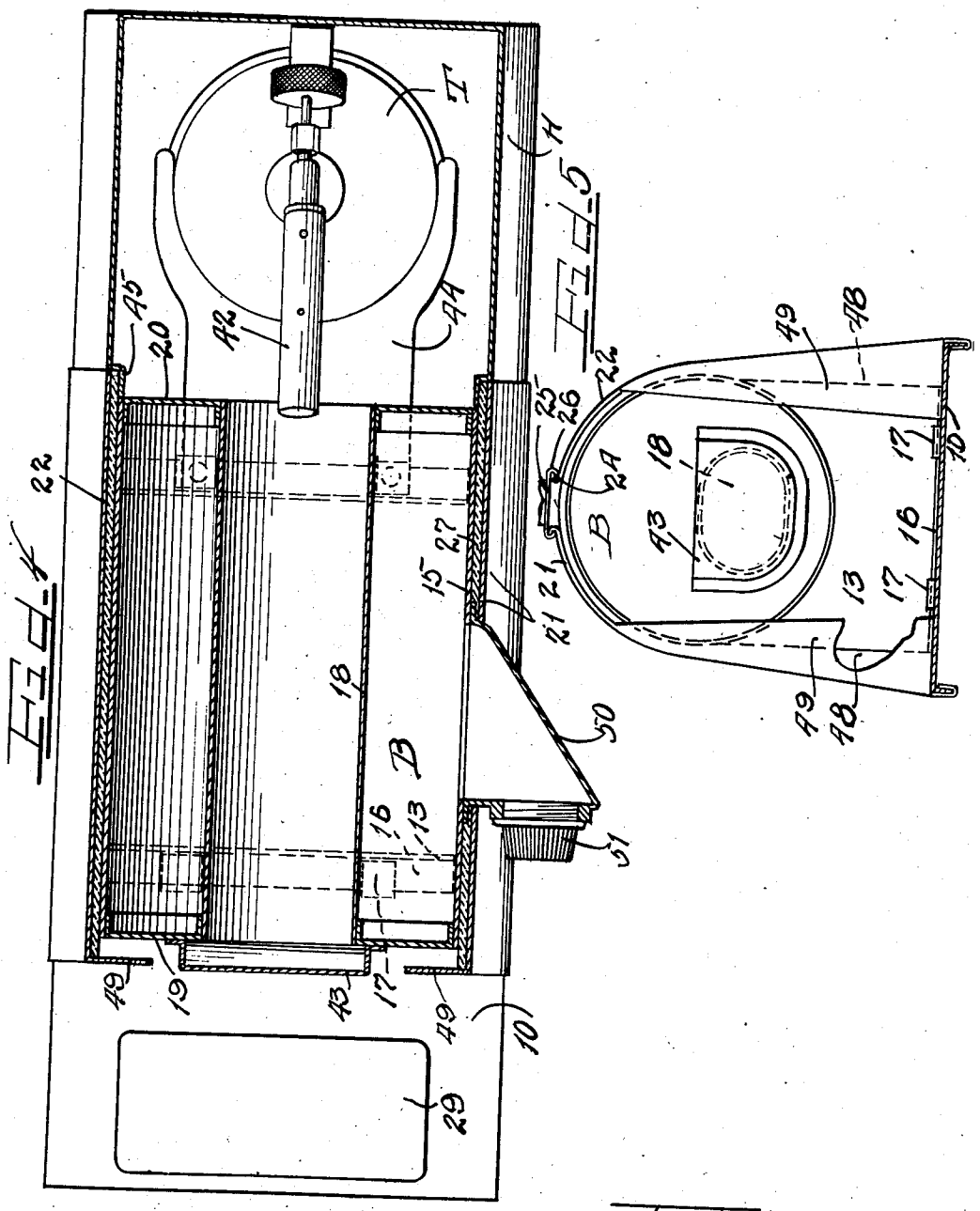
Fig. 2

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ATOMIZING APPARATUS

Filed Sept. 14, 1942 3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,362,885

ATOMIZING APPARATUS

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Application September 14, 1942, Serial No. 458,226

9 Claims. (Cl. 299—87)

Our invention relates to atomizing apparatus, and more particularly to improved steam spray atomizing apparatus especially useful in the diffusion and spraying of insecticides, disinfectants, and the like.

An important object of the invention is to produce apparatus of this type in which steam is generated in a boiler by means of a burner, such as a gasoline burner, from which the flame is forced through the boiler for quick and efficient steam generation.

A further important object is to provide a compact arrangement in which the burner and the boiler are enclosed but with provision for adequate supply of air to the burner and with means for preventing disturbance of the burner operation by air drafts or the weather.

Another important object is to provide a boiler element in the form of a shell through which extends a flue through which the flame from the burner is directed for rapid heating of the boiler water and generation of steam.

A further object is to provide a compact atomizing apparatus or outfit on which standard commercial insecticide containing cans may be mounted and readily connected by an atomizing nozzle structure with the boiler for flow of the steam to draw the liquid from the can for diffusion and spraying thereof.

A further object of the invention is to provide a blow torch whose burning capacity is sufficient to create a sufficient amount of steam for atomizing a given quantity of insecticide, say the contents of one or more insecticide containers, and still have ample supply of water in the boiler to prevent dry overheating, the operator then knowing, after atomization of a certain amount of insecticide, that the boiler must be replenished with water and the burner with fuel.

Still another important object is to provide an enclosing housing for the boiler and burner of comparatively light sheet metal parts, held together without the use of screws, bolts, or the like.

A further object is to provide an enclosing housing for the boiler of sheet metal parts held securely together by clamping engagement therewith of a handle at the top thereof, by which handle the apparatus may be conveniently carried around and manipulated for directioning of the spray.

Still another object is to provide an assembly in which all of the various parts, particularly the burner, are rigidly held in operative position while the apparatus is being used in various positions for spraying.

The above enumerated and other features of our invention are embodied in the structure shown on the drawings, in which drawings:

Figure 1 is a side elevation of the apparatus;

Figure 2 is a vertical longitudinal section;

Figure 3 is a section on plane III—III of Figure 2;

Figure 4 is a section on plane IV—IV of Figure 2; and

Figure 5 is an end view to reduced scale.

The apparatus comprises the supporting base 10 in the form of a sheet metal plate having the downwardly extending flanges 11 along its longitudinal edge, the base being provided with suitable supporting feet 12. The sheet metal walls 13 extend upwardly from the base 10 and are cut out at their upper ends to provide semi-circular seats 14 for the cylindrical outer shell 15 of the boiler structure B. These walls 13 may be secured to the base by means of end flanges 16 engaging below tongues 17 deflected out of the base 10. A flue 18 extends through the boiler shell and is supported by the boiler end walls or heads 19 and 20. To provide for large heating area, the flue may be of oval cross section, as shown on Figure 3.

To surround and protect the boiler and to hold it to its supporting walls 13, side wall sections 21, 22 of sheet metal are provided which have inturned flanges 23 at their lower ends for hooking around and receiving the flanges 11 on the base 10, the walls at their upper ends extending across the top of the boiler where they terminate in hook flanges 24. A tie bar 25 of sheet metal has hook flanges 26 along its longitudinal edges for receiving the hook flanges 24, and when this tie bar is slid longitudinally for reception of the hook flanges in the tie bar flanges, the walls 21 and 22 will be securely clamped in position against the boiler to hold it to its supports 13. A layer or wall of asbestos 27 is preferably provided between the top of the boiler and the walls 21 and 22 and preferably extends down along the inside of these walls to the base wall 10, as shown on Figure 3.

A handle 28 may be secured to the tie bar 25, by means of which handle the entire apparatus may be carried or manipulated for spraying operations. By means of this handle, the securing bar 25 may be readily applied to the side walls 21 and 22 to clamp them in position.

At the left end of the base 10, a platform or block 29 is provided for receiving the lower end, usually recessed, of containers C of insecticides, the atomizer nozzle structure A extending between

the boiler and the top of the containers. The nozzle structure shown comprises the tubular part 30 extending from the body 31 having the plug flange 32 at its lower end for plugging into opening 33 in the top of the boiler. The head 34 at the outer end of the tubular part 30 has the jet bore 35 therethrough and the suction bore 36 alongside thereof, this suction bore communicating with the supply pipe 37 extending downwardly from the head into the container C. A cap 38 has threaded engagement with the outer end of the head 34, to provide a mixing chamber 39 at the ends of the bore 35 and 36, and having the spraying aperture 40. Steam blowing through the jet bore 35 and the spraying aperture 40 will create suction in the bore 36 for drawing insecticide from the container C into the mixing chamber 39 for mixture and diffusion with the steam and outflow therewith through the spray aperture 40.

As the nozzle element A has plug connection with the boiler, it can be readily detached from the boiler and from the container. The inlet end of the pipe 37 may be cut off on the bias (Figure 2) to form a sharp edge so that, when a fresh container is to be applied, the top of the container may be readily pierced for insertion of the pipe 37, the container being then seated on the block 29 and the nozzle element A plugged into the boiler outlet. In the body 31 of the nozzle element A there is preferably inserted a check valve 41 for relief of the boiler pressure when the pressure reaches a predetermined maximum.

At the rear end of the base 10 is located the burner T, shown in the form of a gasoline blow torch well known in the art. The burner tube 42 of this torch directs the flame into the flue 18 of the boiler, the forward end of the flue being covered by a baffle wall 43 which keeps the flame from contacting the container C and which directs the outflowing heat upwardly toward the atomizing nozzle element A for heating thereof.

The blow torch T is held in position on the base 10 by suitable means such as a clamping spring 44, and a hood H is provided for the burner. The hood H is made detachable, and may be secured in service position in any suitable manner. As shown, the flange 45 at the inner end thereof is adapted to telescope into the end of the side walls 21 and 22, and a tongue or flange 46 at its front lower edge engages against the under side of the base 10, so that the hood may be readily slid off of the base 10.

The hood is provided with louvres 47 for supplying air to the burner. Further air supply for the burner is by way of the space 48 below the boiler and between the sidewalls 21 and 22. The boiler supporting walls 13 will function as baffles in this space against air flow from the forward end thereof toward the burner space within the hood. The sidewalls 21 and 22 at their forward ends may be deflected inwardly to form additional baffle walls 49 (Figure 5), air being required to flow first around the inner edges of the baffle walls and then around outer edges of the walls 13 so the air will enter the hood H in quiet condition for supplying the burner. When the burner is in operation, it will project the flame into the boiler flue 18, and air will be drawn through the space 48 and by its engagement with the boiler it will be preheated. The louvres 47 are located so the burner may be supplied with air flow therethrough during all positions of the vaporizing device when in service.

The boiler is provided with a filling spout 50 closable by a plug 51. This filler spout is so located, that when the device is set on its rear end for filling of the boiler, the amount of water the boiler will take before overflowing the inlet will determine the proper level of the water in the boiler for service operation. By using combustion fluid, such as gasoline, which is readily obtainable, our improved apparatus can be used where electrical current is not available, since the only requirements are easily transported supplies of gasoline, water and insecticide liquids. Thus the possible range of usefulness of the apparatus is widely extended.

By employing a burner, such as a blow torch, where the flame is projected, a horizontal type of boiler can be used, so that a lower and more compact structure assembly will result which can be readily carried and accurately manipulated for directioning of the spray, and as all the parts of the assembly are held in their operative position, they will not become displaced during operation of the apparatus in various postions.

The fuel capacity of the burner being proportional to the volume of water in the boiler, the burner and boiler will cooperate for the vaporization of a predetermined volume of insecticide, and after atomizing such predetermined volume of insecticide, water will still be left in the boiler so as to prevent dry overheating of the boiler. Then when the burner and the boiler are replenished, the apparatus is ready for another atomization of a predetermined volume of insecticide or other fluids, to be sprayed.

The various parts being enclosed and the boiler being surrounded by asbestos, loss of heat is minimized as well as the possibility of fire starting, and the user is protected against danger of injury from burns. The hot exhaust gases issuing from the boiler flue are baffled against striking insecticide container and are directed upwardly alongside of the container and toward the nozzle element for heating thereof to assist in vaporization and atomizing of the fluids.

We have shown a practical and efficient embodiment of our invention, but we do not desire to be limited to the exact construction, arrangement and aperation shown and described as changes and modifications may be made without departing from the scope of the invention.

We claim as follows:

1. A unitary atomizing structure comprising a horizontal boiler having flue passageway therethrough, a blow torch located to direct flame under pressure through said flue passageway for the generation of steam in said boiler, a support for a container of liquid to be atomized, a nozzle element having connection with the boiler outlet and connection with the interior of the container, through which nozzle element the steam flows under pressure to draw fluid out of said container for atomizing and spraying thereof, and means for directing the heat outflow from said flue passageway against said nozzle element for direct heating thereof.

2. A unitary atomizing apparatus comprising a horizontally extending boiler having flue passageway therethrough, a gasoline blow torch at one end of the boiler having its burner tube located to direct flame under pressure into said flue passageway, a support for a container adjacent the other end of said boiler, an atomizing nozzle structure detachably connected with the boiler outlet and with the container and operated by the steam flow therethrough to draw fluid out of said container for atomizing and spraying

thereof, and baffle means at the front end of said flue passageway for keeping the flame from impinging said container and for directing the heat from said flue upwardly along the container toward the nozzle element.

3. An atomizing apparatus comprising a supporting base, a horizontal boiler mounted on said base and having flue passageway longitudinally therethrough, a burner on said base at the rear end of said boiler effective to project flame under pressure into said flue passageway for generation of steam in said boiler, a support at the front end of said base for a container of fluid to be atomized, a nozzle element having a body at one end adapted for detachable connection with the boiler outlet and having an atomizing head and a pipe extending therefrom into said container whereby steam flow through said nozzle element will draw fluid out of said container for atomizing thereof, and means for deflecting the outflow heat from said flue passageway away from said container and upwardly against said nozzle element for direct heating thereof.

4. An atomizing apparatus comprising a supporting base, a horizontal boiler mounted on said base and having flue passageway therethrough, a blow torch mounted on said base at the rear of said boiler with its burner tube located to direct flame under pressure forwardly into and through said flue passageway for generation of steam in the boiler, a protecting covering extending from said supporting base around said boiler, a hood on said base for said blow torch forming a continuation of said boiler cover and having louvres therein for air supply to said blow torch, passageway between said boiler and said base within said boiler cover for the flow of air rearwardly into said hood for supplying the blow torch, baffle means in said passageway for quieting down the air flow before it reaches the blow torch, a container of fluid to be atomized supported on said base adjacent the outlet end of said flue passageway, an atomizing nozzle structure connecting the boiler outlet with said container for drawing of fluid from the container by the steam flow for atomizing thereof, and baffle means at said flue outlet end for diverting the outflow heat away from said container and toward said nozzle structure.

5. An atomizing apparatus comprising a supporting base, a horizontal boiler mounted on said base, a burner on said base for heating said boiler for generation of steam therein, a support at the front end of said base for a container for fluid to be atomized, a nozzle structure connecting the outlet of said boiler with said container and operable by the steam flow therethrough for drawing fluid out of the container for atomization thereof, a filler inlet for said boiler so located that, when the boiler is set on its rear end, filling thereof up to the filler opening will determine the proper volume of water in the boiler for sufficient steam generation for complete emptying of the container.

6. A portable atomizer unit comprising a closed container for a fluid to be atomized, a boiler, and a burner for heating said boiler, a base for supporting said container, boiler and burner in tandem relationship, means for removably holding said burner on said base, a nozzle member removably connected to said boiler and to said container, means extending transversely of said unit for spacing said boiler from said base, and hood means about said boiler, said spacing means and said burner attached to opposed sides of said base and operative to hold said boiler, spacing means and base together and defining along said boiler, in conjunction with said spacing means, baffled air passages for admitting still air to said burner.

7. Atomizing apparatus comprising a supporting base, a horizontal boiler on said base having a flue passageway therethrough, a container on said base for fluid to be atomized, a blow torch removably mounted on said base at the rear of said boiler with its burner tube located to direct flame under pressure forwardly into and through said flue passageway for the generation of steam in the boiler, side walls extending upwardly from said supporting base around said boiler and terminating at the boiler top in hook flanges, a flanged tie bar engaging said hook flanges to hold said plates clamped around the boiler to hold it on said supporting base and to form a protecting cover therefor, a hood on said base for enclosing said blow torch forming a continuation of said boiler cover and having louvers therein for air supply to said blow torch, and a nozzle element having one end detachably connected with a boiler outlet and having an atomizing head and a pipe extending therefrom into said container whereby steam will flow to said nozzle element and blow fluid out of said container for atomizing thereof.

8. An atomizing unit comprising a supporting base, a horizontal boiler on said base and having a flue passageway therethrough, a burner element removably mounted on the rear of said base operative to project flame under pressure into and through said flue passageway for generation of steam in the boiler, a protecting housing for said boiler comprising opposite side walls having engagement at their lower edges around the longitudinal edges of said base and extending upwardly alongside of and over the top of the boiler and there terminating in hook flanges, a tie bar having hooked flanges slidable into engagement with the hook flanges on said side walls for holding these walls clamped around the boiler, a support at the outer end of said base for a container of fluid to be atomized, a nozzle structure having detachable connection with one end of the boiler outlet and at the other end having a pipe extending therefrom for projecting into the container and operative by the steam flow therethrough for drawing fluid out of the container for atomizing thereof, a removable hood about said burner, and a handle secured to said tie bar whereby said apparatus may be carried and manipulated during spraying service.

9. An atomizer unit comprising a container for fluid to be atomized, a horizontal boiler, a burner for heating said boiler, a base for supporting said boiler and the container and burner in tandem relation, a nozzle member connected to the boiler and the container, and hood means about said boiler and burner including side plates attached at their lower ends to said base and extending upwardly around opposite sides of the boiler and terminating in hook flanges at the boiler top, and a tie bar having hook flanges slidable into engagement with said side wall hook flanges for holding said plates clamped around said boiler whereby to hold said boiler and hood means to the base.

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