Nov. 20, 1923 1,474,655

G. A. URBACH

LIQUID SPRAYER

Filed July 18, 1919 2 Sheets-Sheet 1

Fig. 1.

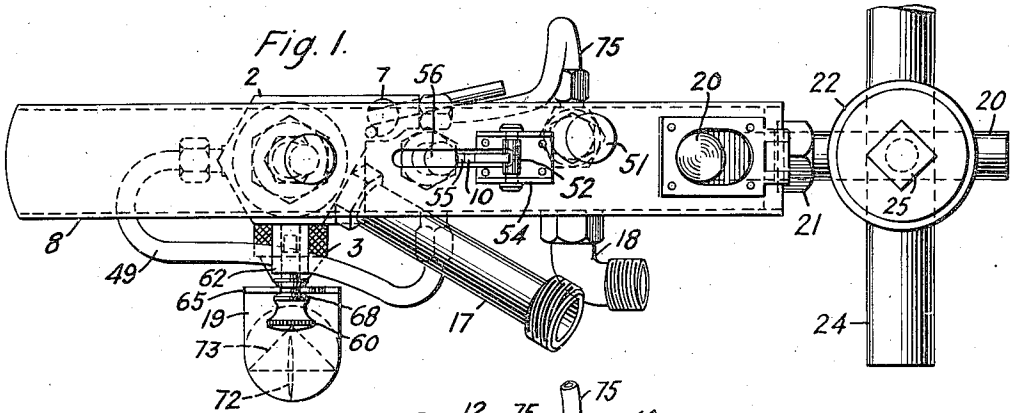


Fig. 2.

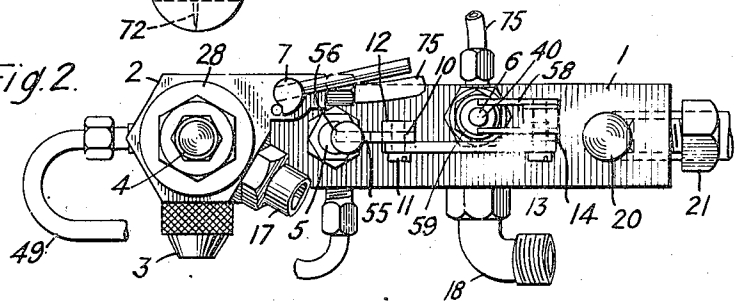
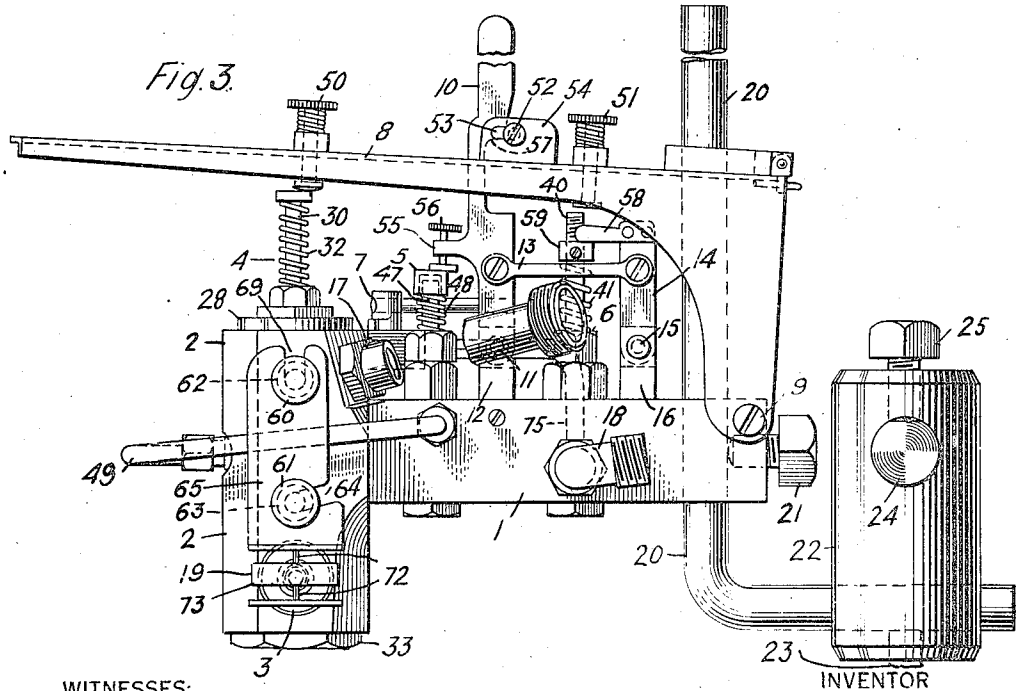


Fig. 3.



WITNESSES:

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Fig. 4.

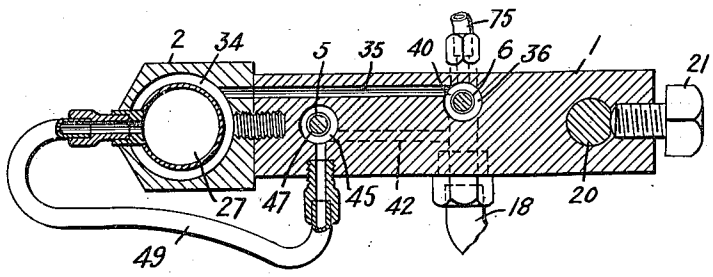


Fig. 5.

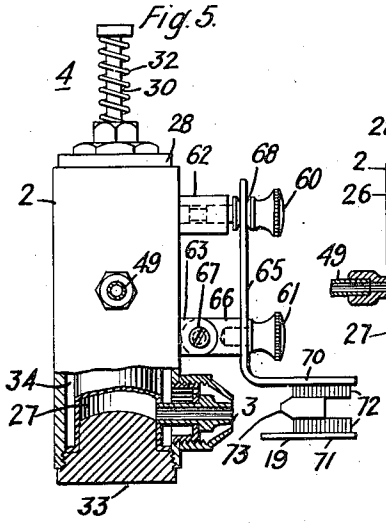


Fig. 6.

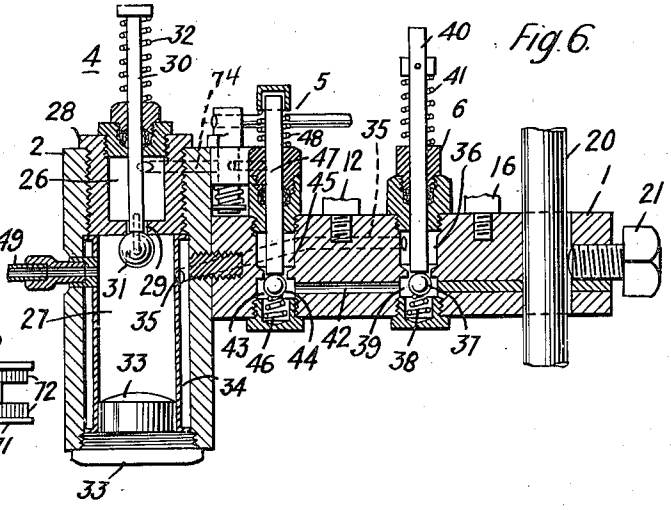


Fig. 8.

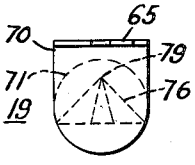


Fig. 7.

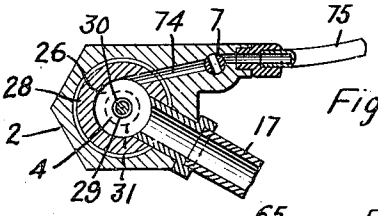


Fig. 10.

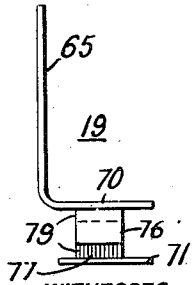


Fig. 9.

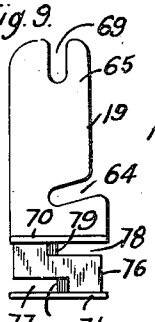


Fig. 11.

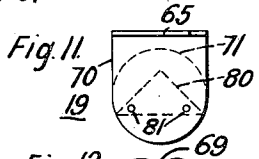


Fig. 13.

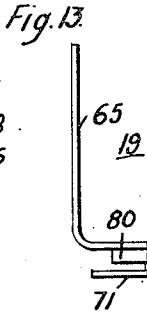


Fig. 12.

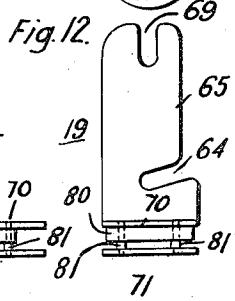


Fig. 14.

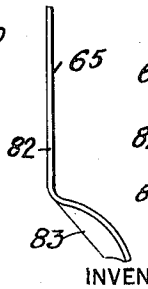
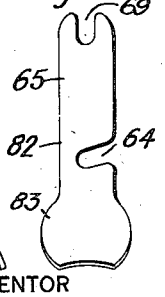


Fig. 15.



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Patented Nov. 20, 1923. 1,474,655

UNITED STATES PATENT OFFICE.

GUSTAVE A. URBACH, OF PITTSBURGH, PENNSYLVANIA

LIQUID SPRAYER.

Application filed July 18, 1919. Serial No. 311,875.

To all whom it may concern:

Be it known that I, GUSTAVE A. URBACH, a citizen of the United States, and a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Liquid Sprayers, of which the following is a specification.

My invention relates to fluid-distributing devices and particularly to fluid atomizers or sprayers.

One object of my invention is to provide a device of the above indicated character that shall comprise means whereby the spraying operation may be started and stopped quickly and the fluid prevented from dripping or spreading to parts other than those to which it is to be applied.

Another object of my invention is to provide means for so cleaning the various passages of a sprayer as to prevent a spraying fluid such as a liquid from accumulating and drying therein when the sprayer is inactive.

Another object of my invention is to provide distributing means, for a sprayer, that shall so control the spraying fluid or liquid as to permit it to be directed, and placed uniformly, over an area of selectively predetermined shape without causing the rebounding mist, splashing or other disturbances usually attending the placing of an object in the path of a rapidly flowing fluid spray stream.

Another object of my invention is to provide mechanical means for attachment adjacent a circular fluid orifice for uniformly directing the fluid stream without splitting the same.

Another object of my invention is to provide a sprayer, having correlated fluid or liquid and compressed air passages, in which the liquid is prevented from flowing into the air passages by the movement or certain positioning of, the sprayer when the air is shut off.

In Patent No. 1,231,222 issued to me June 26, 1917 a spraying machine is disclosed embodying a sprayer, somewhat similar to the sprayer hereinafter described, for distributing a relatively-heavy liquid mixture. While my invention comprehends a broad field of use, reference to the above patent may be had for a clear understanding of a specific use for which it is particularly adapted.

Figure 1 of the accompanying drawings is a top plan view of a sprayer embodying my invention and a portion of a relatively-movable carriage or support therefor; Fig. 2 is a top plan view of the sprayer with certain upper portions thereof removed; Fig. 3 is a side elevation view of the device shown in Fig. 1; Fig. 4 is a horizontal sectional view through the sprayer; Fig. 5 is an end view, partially in elevation and partially in section, of the sprayer; Fig. 6 is a vertical sectional view through the sprayer; Fig. 7 is a horizontal sectional view through an upper portion of the sprayer; Figs. 8, 9 and 10 are top, front and side elevational views, respectively, of a modified form of distributing member for the sprayer; Figs. 11, 12 and 13 are top, front and side elevational views, respectively, of another modified form of distributing member for the sprayer; and Figs. 14 and 15 are side and front elevational views, respectively, of another modified form of distributing member for the sprayer.

The sprayer comprises, in general, a body member 1 having a portion 2 disposed in right-angular relation thereto, a nozzle 3 adjacent one end of the portion 2, a liquid-control valve 4 in the portion 2, air-pressure valves 5 and 6 in the member 1, an auxiliary air-pressure valve 7 adjoining the portion 2, an operating handle 8, pivoted to the member 1 by a pin 9, for controlling the valves 4 and 6, a latch member 10, pivoted by a pin 11 to a standard 12 on the member 1, for holding the handle 8 and connected by a link 13 to a member 14 that is pivoted by a pin 15 to a standard 16 on the member 1, for controlling the valve 5, a liquid inlet pipe 17 communicating with the portion 2, an air pressure pipe 18 attached to the member 1 and communicating with the valves 5, 6 and 7, an adjustable spray-distributing member 19 of particularly novel design attached to the portion 2, a rod 20, of substantially L-shape, extending through one end of the member 1 and to which it is adjustably secured by a screw 21, a member 22 through which one end of the rod 20 extends and is adjustably secured thereto by a screw 23 and a rod

24, for mounting the sprayer on any suitable supporting device (not shown), that extends through the member 22 and is adjustably secured thereto by a screw 25.

As shown in Fig. 3, the sprayer is adapted to be moved in the clockwise direction, from its spraying position, about the axis of the rod 24 through an angular displacement of substantially 90°. This is to remove the sprayer from the path of passing objects to be sprayed, such as automobile tires as set forth in the above mentioned patent.

The portion 2 is divided internally, as shown in Fig. 6, into two chambers or reservoirs 26 and 27 by means of a hollow plug 28 that is inserted in its upper end. The upper reservoir 26 is connected, by means of a pipe or hose (not shown) that is adapted for attachment to the pipe 17, with a tank or other suitable spraying liquid source (not shown). An aperture 29, in the bottom of the plug 28, provides communication between the upper and lower reservoirs that is controlled by the valve 4 having a stem 30 that projects out of the top of the plug 28. The stem 30, having a ball or valve member 31 at its lower end that registers with the aperture 29, is held in its uppermost position by a spring 32. The bottom of the reservoir 27 is closed by means of a removable screw plug 33.

The nozzle 3 communicates with the reservoir 27 at a position adjacent the top of the plug 33, shown clearly in Fig. 5, and also communicates, by means of an annular passage 34, as shown in Figs. 4 and 6, with a passage 35 in the member 1 that leads to a relatively-small chamber 36 to the valve 6. An aperture, in the bottom of the chamber 36, is closed by a ball or valve member 37 that is normally held against its seat by a spring 38, the said valve controlling communication between the chamber 36 and a lower chamber 39 that is connected, by means of the pipe or conduit 18 and another pipe or hose (not shown) to a source of compressed air.

The ball 37 is operated by means of a stem or rod 40 that projects out of the top of the member 1, and is normally held in its uppermost position by a spring 41.

The chamber 39 is also connected, by means of a passage 42, with another chamber 43 containing a ball 44, of the valve 5, that controls communication between the chamber 39 and an upper chamber 45. The ball 44 is normally retained against its seat by a spring 46 and is actuated by a stem 47 that projects out of the top of the member 1 and is held in its uppermost position by a spring 48. The chamber 45 is connected, by a pipe 49, with the upper portion of the reservoir 27, the pipe 49 being so positioned with respect to the reservoir 27 as to be above the latter when the sprayer is moved about the rod 24 to its inactive position to, thereby, prevent any of the spraying liquid from flowing thereinto.

The valve stems 30 and 40 are actuated to open the valves 4 and 6 and to, thereby, admit both the liquid or mixture to be sprayed and air to the nozzle 3, by means of the handle 8 that carries screws 50 and 51 adapted to engage the tops of the valve stems. By adjustment of the screws 50 and 51, the valves may be caused to open to the proper degree, and in the proper relation to each other, which is preferably simultaneous.

The handle 8 is also provided with a pin 52 that is loosely mounted in slots 53 of a bracket 54 on the handle and is adapted to engage the member 10 that has a lateral projection 55 in which is threaded a screw 56 for engagment with the top of the valve stem 47. The member 10 has a shoulder 57 for the reception of the pin 52 when the handle 8 is depressed.

A yoke 58 at the top of the member 14 extends to a position over a collar 59 disposed adjacent the upper end of the stem 40.

The adjustable distributing member 19 is removably and adjustably mounted, by screws 60 and 61, to two standards 62 and 63, respectively, secured to the portion 2. The screw 61 extends through a side slot 64 in a vertical arm 65 of the member 19 and rigidly secures the latter to a portion 66 that is pivoted by a pin 67 to the standard 63. The screw 60 is provided with an annular groove 68 for the reception of the upper end of the arm 65 that has a vertical slot 69 therein. The member 19 may be, thereby, readily removed by releasing the screw 61 and adjusted, with respect to the nozzle 3, by the manipulation of the screw 60. That is, by turning the screw 60, the member 19 is turned about the pin 67 to any desired position.

Horizontal plates or portions 70 and 71, at the lower end of the arm 65, are connected by two relatively-thin stream-line portions 72 of knife edge extending in alignment with the axis of the nozzle and a triangular portion 73 disposed between, and connected to, the portions 72 and having one apex thereof on a median line extending in the direction of the axis of the nozzle 3.

By suitably adjusting the member 19, the portions 72 and 73 may be placed in such relation with respect to the nozzle 3 as to distribute the spraying fluid over one of a plurality of selectively predetermined areas. The portions 72 being extremely thin and having sharp edges, offer substantially no opposition to the forward distribution of a portion of the fluid. The portion 73 is shaped to deflect a portion of the spray laterally at an angle with the axis of the nozzle, the arrangement of the portions 72 and 73 having been found to distribute the spray-

ing fluid uniformly over a relatively-wide area close to the nozzle and to substantially eliminate the rebound mist or dripping normally attending the placing of an object in the path of a rapidly flowing spray stream. The stream-line and knife-edge members 72 further do not split the spraying fluid as would be the case if the deflector 73 were supported by other means.

The valve 7, which is normally closed, controls communication between the reservoir 26 and the chamber 39 through a passage 74 and a pipe 75.

In operation, when the handle 8 is depressed, if the pin 52 is at the forward ends of the slots 53, it will engage the member 10 and be thus moved to the other end of the slots 53, this movement of the pin permitting it to move to its position under the shoulder 57 without moving the latch member 10 to actuate the stem 47. The depression of the handle 8, at the same time, actuates the stems 30 and 40 to thus open the valves 4 and 6 to admit both liquid and air to the nozzle 3. The air is admitted through the chambers 39 and 36, the passage 35 and the annular passage 34. The pin 52, cooperating with the shoulder 57 in the member 10, holds the handle 8 in depressed position, during which time the spraying operation occurs.

To stop the spraying operation, the latch member 10 is moved to the left, as shown in Fig. 3, thereby permitting the handle 8 to be raised by the spring 32 and the valve 4 to be closed, to cut off the flow of liquid to the chamber 27. Movement of the member 10, to release the handle 8, causes the valve 5 to be opened and, by reason of the connection of the member 10 through the link 13 to the member 14, permits the valve 6 to be retained momentarily in its open position, with the result that air is forced through the spraying fluid passage 27 and, consequently, through both the liquid and air passages of the nozzle 3. This is accomplished by reason of air being forced through the pipes 49. The valve 7 may also be opened to force air through the pipe 74 into the upper chamber 26.

The sprayer is thus effectively cleaned at the completion of the spraying operation and freedom from clogging and great reliability of operation are thereby insured.

The valve 7 is provided to periodically force air through the upper reservoir 26 and the pipe 17 to remove encrustation therefrom and insure a free flow of spraying fluid at all times.

In the modification of the spray-distributing member 19, shown in Figs. 8, 9 and 10, the parts are substantially the same as in the above described form with the exception of an intermediate triangular portion 76 which is cut away to provide recesses 77 and 78 at its upper and lower sides on opposite sides, respectively, of the axis of the spray stream. Vertically-aligned edges 79, Fig. 9, of the cut-away portions of the portion 76 serve substantially the same purpose as the knife-edged portions 72 of the above described form of distributor and cut the spray stream to distribute parts of it to one side and to permit parts of it to flow uninterrupted.

In the modification of the spray-distributing member 19, shown in Figs. 11, 12 and 13, an intermediate spray-distributing portion 80, between the plates 70 and 71, is secured in flat abutting engagement with the upper plate 70 and spaced from the lower plate 71 by pins 81.

The modification of the spray-distributing member 19, shown in Figs. 14 and 15, comprises a single integral member 82 having the vertical slotted arm 65, as in the other forms, and a lower portion 83 bent at an angle with the arm 65 and shaped to distribute the spray uniformly over a predetermined area.

Any of the forms of the member 19, when in position on the sprayer, may be adjusted by manipulation of the screw 60 to vary the direction and scope of the spray with respect to an object to be sprayed to thereby include areas of selectively-predetermined forms and dimensions. With the member 19 as shown in Figs. 1 and 5, an even and uniform stream of any type of spraying fluid may be obtained which, since it has no heart as in the ordinary type of spray, is particularly adaptable for spraying rubber, paint, varnish, etc.

While I have shown and described particular forms of my invention, changes may be effected therein without departing from the spirit and scope thereof, as set forth in the appended claims.

I claim is my invention:

1. A sprayer comprising a chamber, a nozzle in communication therewith, means including valves for supplying a plurality of fluids to the nozzle and to the chamber, and means, operable in two directions, for actuating said valves simultaneously when actuated in one direction and sequentially when actuated in the other direction.

2. A sprayer comprising a chamber, a nozzle in communication therewith, means including valves for supplying a plurality of fluids to the nozzle and the chamber, means for actuating certain of said valves, and means for latching said actuating means in position, said latching means also constituting actuating means for a plurality of said valves.

3. A sprayer comprising a chamber, a nozzle in communication therewith, means including valves for supplying a plurality of fluids to the nozzle and the chamber, means

for actuating certain of said valves, and means for latching said actuating means in position, said latching means being related to said actuating means and valves to actuate, and to retain in previously actuated position, certain of said valves when releasing said actuating means.

4. A sprayer comprising a chamber, a nozzle in communication therewith, means including valves for supplying a plurality of fluids to the nozzle and the chamber, means for actuating certain of said valves, and means for latching said actuating means in position, said latching means being related to said actuating means and to said valves to prevent the actuation by said actuating means of one of said valves and to actuate and retain in previously actuated position certain of said valves when releasing said actuating means only.

5. A sprayer comprising a chamber, a valve for admitting a liquid thereto, a nozzle communicating therewith, a valve for admitting fluid pressure to the nozzle, a valve for admitting fluid pressure to the chamber, an operating handle for controlling said valves, a latch for holding said operating handle in the spraying position, and means permitting the handle to open the fluid-pressure valve to the nozzle and the liquid-controlling valve and the latch to open the fluid-pressure valve to the chamber and maintain open the fluid-pressure valve to the nozzle when the latch is actuated to release the handle.

6. A sprayer comprising a chamber, a valve for admitting a liquid thereto, a nozzle communicating therewith, a valve for controlling fluid pressure for the nozzle, an operating handle for controlling said valves, a valve for admitting fluid pressure to the chamber, an operating member for actuating said fluid-pressure valves independently of the handle, and a latch connected to the operating member and having an operative connection with the handle, the arrangement permitting the handle to open the fluid-pressure valve to the nozzle, and the liquid-controlling valve and to be held in position by the latch, and the latch to open the fluid-pressure valve to the chamber, and maintain open the fluid-pressure valve to the nozzle, when the latch is actuated to release the handle and close the liquid-controlling valve.

7. In a spraying apparatus, the combination with a sprayer having a nozzle for directing a stream of fluid, of means for distributing the fluid comprising a member spaced from the nozzle and formed to uniformly divide said stream and prevent the rebound of said fluid from said distributing means.

8. In a spraying apparatus, the combination with a sprayer having a nozzle for directing a stream of fluid, of means, spaced from the nozzle, for distributing the fluid, comprising a member having a portion for directing a portion of said fluid laterally and a portion for permitting the uninterrupted passage of a portion of said fluid.

9. In a spraying apparatus, the combination with a sprayer having a nozzle for directing a stream of fluid, of means, spaced from the nozzle for distributing the fluid, comprising a member having a portion for directing a portion of said fluid angularly with respect to the axis of the stream and a portion for permitting the forward distribution of a portion of said fluid.

10. In a spraying apparatus, the combination with a sprayer having a nozzle, of means for directing a fluid therefrom comprising a member having angularly-related surfaces spaced from the nozzle and meeting on a sharp line in the path of said fluid.

11. In a spraying apparatus, the combination with a sprayer having a nozzle, of means for directing a fluid therefrom comprising a member having converging relatively-flat angularly-related surfaces spaced from the nozzle and meeting on a straight line at substantially right angles to, and in, the path of said fluid.

12. In a spraying apparatus, the combination with a sprayer having a nozzle, of means for directing a fluid therefrom comprising a member having a surface angularly related with respect to the path of the fluid and a relatively-thin portion of knife-edge, the said surface being to deflect a portion of the fluid and the said portion of knife-edge being to permit the uninterrupted passage thereof of a portion of the fluid.

13. In a spraying apparatus, the combination with a spraying orifice, of a deflecting means therefor having such stream-line supporting means that the spray is precluded from splitting.

14. A deflecting device for spraying apparatus comprising two plates, a deflecting member of U-shape and knife-blade stream-line members disposed on each side of the member of U-shape for positioning the same between the two plates.

In testimony whereof, I have hereunto subscribed my name this 16th day of July, 1919.

GUSTAVE A. URBACH.