Oct. 3, 1944. W. WILLIAMSON 2,359,455

FIRE EXTINGUISHING NOZZLE

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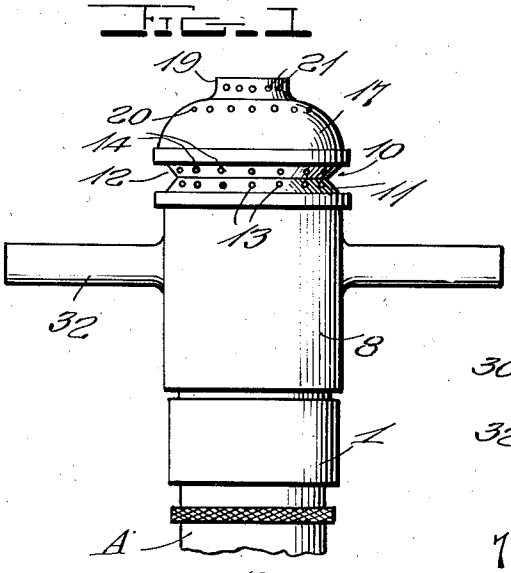
FIG. 1



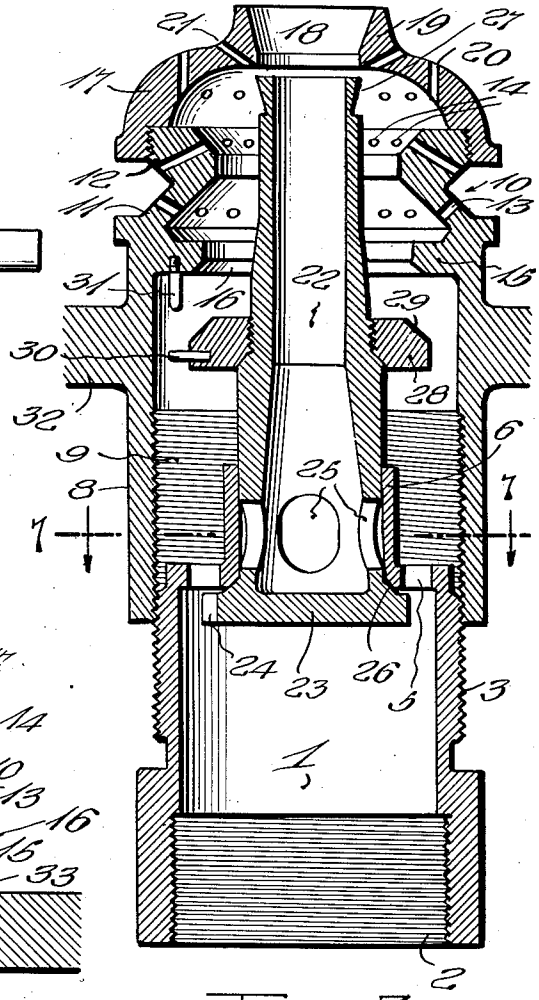


FIG. 3

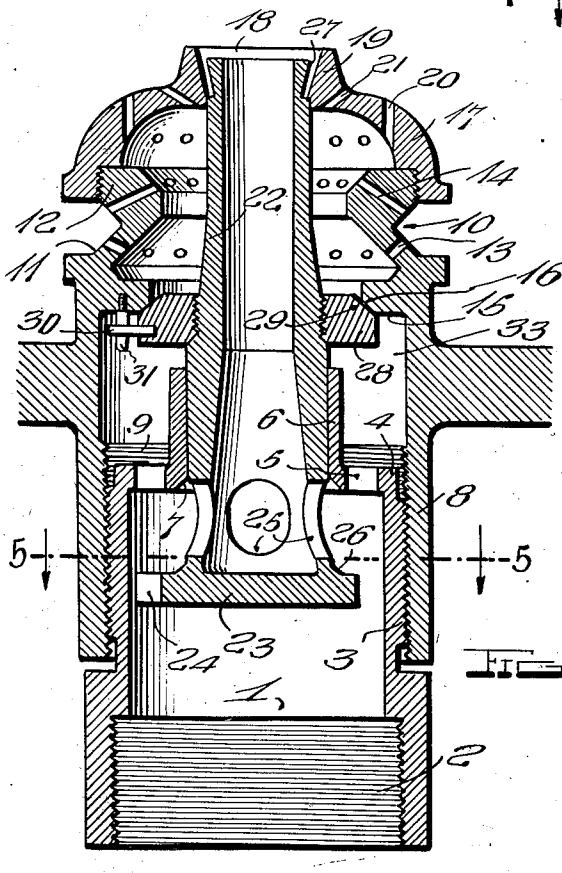


FIG. 2

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FIRE EXTINGUISHING NOZZLE

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FIG. 4

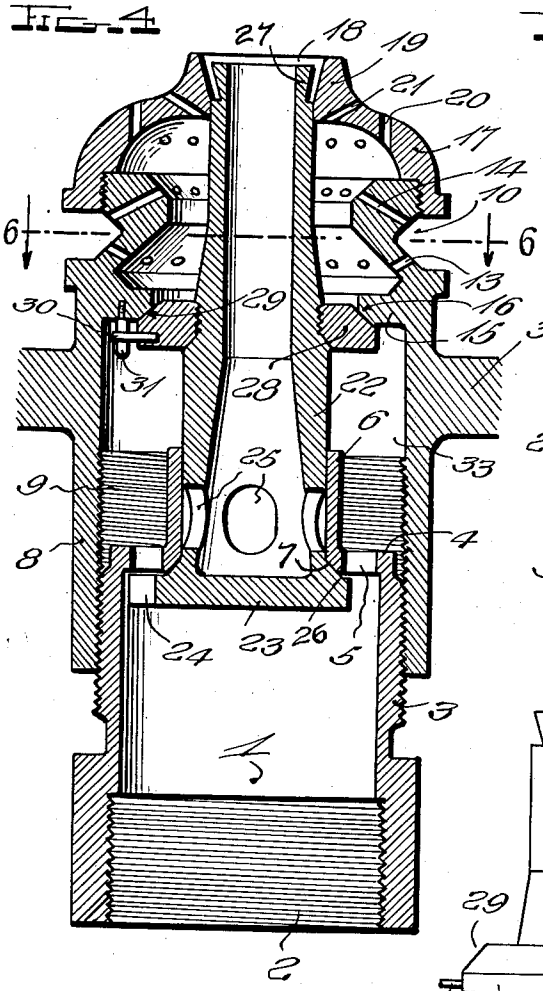


FIG. 6

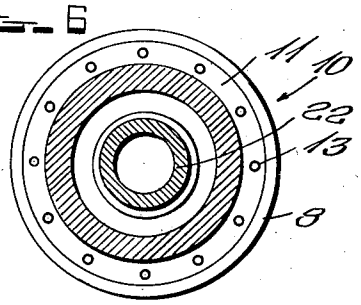
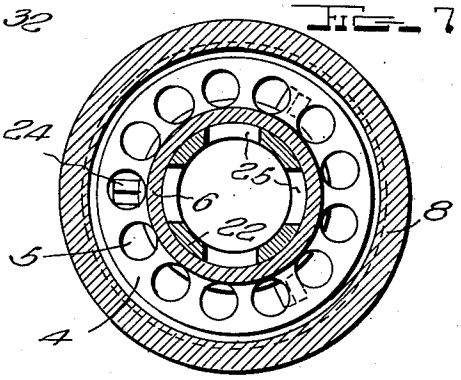


FIG. 7



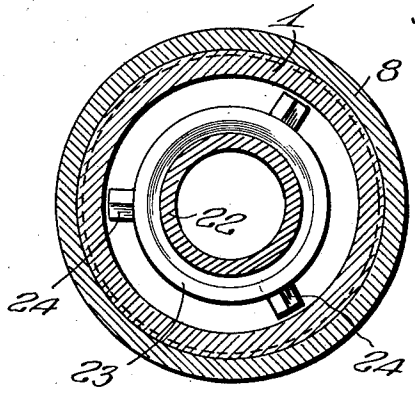


FIG. 5

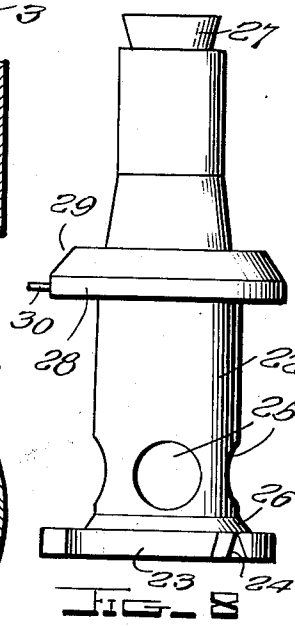


FIG. 8

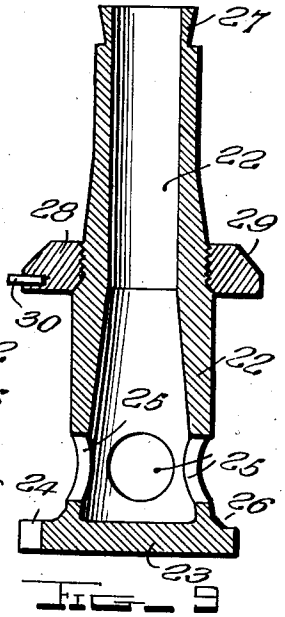


FIG. 9

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2,359,455

FIRE EXTINGUISHING NOZZLE

William Williamson, San Francisco, Calif., assignor to Marine Specialty Company, Incorporated, Long Beach, Calif., a corporation of California

Application June 2, 1943, Serial No. 489,406

8 Claims. (Cl. 299—148)

The present invention relates to improvements in nozzles and has reference more particularly to a nozzle for use in extinguishing fires.

One of the important objects of the present invention is to provide a fire extinguishing nozzle capable of projecting a solid or a full stream as well as producing a spray for protecting the fireman from the heat while holding the hose to which the nozzle is attached, in extinguishing the fire.

A further object is to provide a nozzle which is capable of also emitting a fog stream or sheet spray of water.

Still further, my improved nozzle is of such construction as to permit the several parts thereof to be readily and easily adjusted for effecting the above mentioned various methods of discharging the water from the nozzle, so that either a solid stream alone, a circular spray alone or both a full stream and spray may be emitted simultaneously, as the occasion may demand, and this without reducing the pressure of the water.

Another important object is to provide a nozzle that includes means for rendering the same self-cleaning, thus preventing the accumulation of any foreign matter in the body of the nozzle which would otherwise tend to clog up the nozzle an interfere with the proper emission of the water therefrom.

A still further object is to provide a fire extinguishing nozzle that can be readily and easily assembled and disassembled and adjusted to the various types of water emitting positions, the nozzle being simple in construction, strong and durable.

Other objects and advantages will become apparent from the following description when taken in connection with the accompanying drawings.

In the drawings, wherein like reference characters designate corresponding parts throughout the several views:

Figure 1 is a side elevation of the nozzle;

Figure 2 is an enlarged longitudinal section through the nozzle, showing the arrangement of the parts when a solid stream alone is emitted;

Figure 3 is a view similar to Figure 2 showing the arrangement of the parts when both, a full stream and a protective spray, are emitted;

Figure 4 is an enlarged longitudinal sectional view through the nozzle, showing the arrangement of the parts when the nozzle is in its fully closed position, so that no water can be emitted therefrom;

Figure 5 is a transverse section, taken approximately on the line 5—5 of Figure 2, looking in the direction of the arrows;

Figure 6 is a similar section, taken on the line 6—6 of Figure 4, looking in the direction of the arrows;

Figure 7 is a transverse section taken approximately on the line 7—7 of Figure 3, looking in the direction of the arrows;

Figure 8 is a side elevation of the tube or nozzle forming a salient part of the present invention, and

Figure 9 is a longitudinal sectional view through said tube or nozzle.

In the drawings, wherein there is shown a preferred embodiment of my invention, the numeral 1 designates the tubular body of the nozzle, the same being internally threaded at its lower end as indicated at 2 for detachable connection with the water supply hose shown at A, in the usual manner.

The upper portion of the body is of slightly less diameter than the lower portion thereof and is externally threaded as indicated at 3. The upper end of the body 1 has an inturned flange 4 on the inner edge of which is a tubular extension 6 of the body 1. A series of spaced apertures 5 in the said flange surround the said tubular extension. A conical valve seat 7 is formed at the lower end of this tubular extension, for a purpose hereinafter to be more fully described.

An elongated sleeve 8 is internally threaded as at 9 for cooperation with the externally threaded portion 3 of the body 1. The upper end of the sleeve 8 is formed with a head portion designated generally by the numeral 10.

This head portion includes oppositely disposed angular walls 11 and 12 that converge toward each other, as clearly illustrated in the drawings. A series of water emitting orifices 13 are formed in the lower angular wall 11, while a similar series of water emitting orifices 14 are formed in the upper angular wall 12.

These water emitting orifices are so arranged that the water emitted outwardly through the lower series of orifices 13 in an upward direction will impinge upon and merge with the spray that is discharged through the upper series of orifices 14.

An annular flange 15 is formed on the inner wall of the sleeve 8 adjacent the head 10. A conical valve seat 16 is formed on the inner lower edge portion of this flange 15 for a purpose to be also hereinafter described.

A cap 17 is threaded on the upper end of the head 10, this cap being dome-shaped. An out-

wardly flaring enlarged water outlet opening 18 is formed in the tip 19 of this cap. A circumferential series of axially extending water discharge orifices 20 are formed in the cap 17. A series of angularly arranged water discharge orifices 21 are also formed in the cap 17, these last mentioned orifices being located around the base of the bored tip portion 19, as clearly illustrated in the drawings.

Forming a salient part of the present invention is the elongated tube or nozzle 22. The lower end of this tube is closed as indicated at 23. Scraper lugs 24, that are wedge shaped, extend outwardly from the closed lower end 23 of this tube for cooperation with the apertured upper end of the body 1.

The lower portion of this tube is adapted to slidably extend through the tubular extension 6 and the closed lower end portion of the tube is rotatable in the housing or body 1. A series of enlarged water admitting openings or ports 25 are formed in the lower portion of the tube or nozzle 22. A tapered valve forming shoulder 26 is formed on the exterior of the tube directly adjacent the closed lower end 23 for cooperation with the conical valve seat 7, formed on the lower end of the tubular extension 6.

The bore of the tube or nozzle 22 is tapered at its lower end portion, while the upper portion of the bore is of uniform diameter. This is clearly shown in the several figures of the drawings. The tube extends axially through the sleeve 8 and its head 10 and the upper end or tip 27 of the tube or nozzle is capable of sliding movement in the bore 18 of the tip 19 on the cap 17. The outer diameter of the upper portion of the tube is less than that of the lower portion of the tube.

Threaded on the intermediate portion of the tube or nozzle 22, for disposition within the sleeve 8 is the disc valve 28. This valve has a conical face 29 for cooperation with the conical valve seat 16 formed on the inwardly extending annular flange 15.

A laterally extending pin 30 is carried by the valve 28 for cooperation with the downwardly extending element 31 carried by the flange 15 for a purpose also to be presently described.

For the purpose of actuating the sleeve 8 to move the same either upwardly or downwardly on the threaded upper portion 3 of the body 1, I provide the handles 32 that extend outwardly from the sleeve at opposite sides thereof.

When the parts are arranged in the position shown in Figure 4, the valve 26 will be seated against its seat 7 and the valve 28 will be seated against its valve seat 16. In this position the nozzle is in its fully closed position and no water will be admitted to the bore of the tube 22 or will any water entering the chamber 33 in the sleeve 8 be admitted to the orifices in the head 10 and cap 17. The pressure of the water acting against the closed end 23 of the tube 22 will maintain the latter in its uppermost position.

When a solid stream of water is to be projected from the nozzle, the sleeve 8 is moved downwardly on the externally threaded portion 3 of the body 1 and this will result in the flange 15 coacting with the disc valve 28 to move the lower portion of the tube 22 downwardly through the tubular extension 6, unseating the valve 26 from its seat 7 and at the same time moving the ports or openings 25 to a position below the lower end of the tubular extension, as clearly shown in Figure 2, whereby the water from the hose A entering the body 1 will be admitted to the bore of the tube 22 through the openings or ports 25 and the water will be discharged from the tip 27 and through the opening 18 in the tip of the cap 17 with full force. With the parts arranged as shown in Figure 2, no water will be discharged from the nozzle through any other of the orifices.

By moving the sleeve from the closed position shown in Figure 4, outwardly or upwardly upon the threaded portion 3 of the body, the seat 16 will be moved away from the valve 28 and simultaneously, the tip 19 will move upwardly from the tip 27 of the tube 22. The pressure of the water will move the tube to its uppermost position whereupon, the ports 25 will be confined within the tubular extension and the valve 26 seated against its seat 7.

With the parts arranged as shown in Figure 3, the water from the hose A cannot enter the bore of the tube 22 through the ports 25 and will enter the chamber 33 through the opening 5. From this chamber, the water enters the head 10 and the cap 17 on the upper end of the sleeve 8, through the enlarged central opening defined by the annular flange 15.

Not only will the water be discharged through the outwardly flaring opening 18 in the tip of the cap in a full stream, but some of the water will also be discharged through the orifices 13, 14, 20 and 21, respectively, in spray formation.

The circular or conical sprays will serve to shield and protect the fireman from the intense heat and flames while handling the fire hose and nozzle attached thereto, when fighting a fire at close range. Also, the spray can be used for covering large areas.

The scraper lugs 24 coact with the underside of the apertured upper end 4 of the body 1 to prevent the accumulation of any foreign matter in said openings. When the parts are arranged as shown in Figure 4, a slight rotation of the sleeve 8 in one direction will cause the element 31 which is in engagement with the pin 30 to turn the valve and tube as a unit. The turning movement of the tube will cause the upper sharpened edges of the lugs 24 to scrape against the bottom face of the apertures 5 and break up any particles that may accidentally become lodged therein.

It will thus be seen from the foregoing description that I have provided an improved fire extinguishing nozzle that can be readily and easily adjusted to produce various types of sprays and which will at all times be positive and efficient in carrying out the purposes for which it has been designed.

While I have shown the preferred embodiment of my invention, it is to be understood that various changes in the size, shape and arrangement of parts may be resorted to without departing from the spirit of the invention and the scope of the appended claims.

Having thus described the invention, what I claim is:

1. A nozzle comprising a body for connection at its inner end to a source of water supply, a tubular nozzle slidably mounted in the outer end of said body, the inner end of the tubular nozzle being closed, said tubular nozzle being formed with water admitting ports in its sides, means for preventing water from entering said ports, additional means for moving the tubular nozzle to a position where water will be admitted to the bore of said nozzle through said ports and discharged from the outer end of the tubular nozzle in a solid stream, said last means including a sleeve mounted for longitudinal movement

on said body and enclosing the tubular nozzle, and a member carried by the intermediate portion of the tubular nozzle to be engaged by said sleeve.

2. In a nozzle, a body adapted for connection at its inner end to a source of water supply, a tubular nozzle slidably mounted in the outer end of the body, the inner end of the tubular nozzle being closed, said tubular nozzle being provided with water admitting ports in its sides, means for normally preventing water from entering said ports, a sleeve mounted for longitudinal movement on said body and surrounding said tubular nozzle, a head carried by the outer end of the sleeve, said head having a central water discharge opening in its outer end, said head having spray emitting orifices formed therein around the central discharge opening, valve means on said nozzle for preventing the delivery of water to said spray emitting orifices, said valve means and said sleeve serving to move the tubular nozzle to a position where water will be admitted to the bore of said tubular nozzle through said ports and discharged from the outer end thereof and through the central discharge opening in the head in a solid stream.

3. A nozzle comprising a body adapted for connection at its inner end to a source of water supply, an inturned flange on the outer end of the said body, the said flange terminating in a tubular extension of the body which surrounds a central opening, said flange being provided with water discharge openings arranged around the tubular extension, a tubular nozzle mounted for axial slidable movement through the tubular extension and central opening, the inner end of the nozzle being closed, said tubular nozzle being provided with water admitting ports in its sides adjacent the closed inner end thereof, means for normally preventing water from entering the tubular nozzle through said ports, a sleeve mounted on the body for longitudinal movement thereon and surrounding the tubular nozzle, a head carried by the outer end of the sleeve, said head being formed with spray emitting orifices in its sides, a cap carried by the outer end of the head and formed with a central water discharge opening, said cap being formed with a series of spray emitting orifices arranged around the central discharge opening therein, the outer end of the tubular nozzle being capable of movement into the central discharge opening in said cap, valve means for preventing water entering the sleeve through the water discharge openings in the outer end of the body from being delivered to said spray emitting orifices in the head and cap, said valve means serving to move the tubular nozzle to a position where water will be admitted to the ports and discharged from the outer end of the tubular nozzle and through the central discharge opening in the cap in a solid stream.

4. A nozzle comprising a body adapted for connection at its inner end to a source of water supply, an inturned flange on the outer end of the said body, the said flange terminating in a tubular extension of the body which surrounds a central opening, said flange being provided with water discharge openings arranged around the tubular extension, a tubular nozzle mounted for axial slidable movement through the tubular extension and central opening, the inner end of the nozzle being closed, said tubular nozzle being provided with water admitting ports in its sides adjacent the closed inner end thereof, means for normally preventing water from entering the tubular nozzle through said ports, a sleeve mounted on the body for longitudinal movement thereon and surrounding the tubular nozzle, a head carried by the outer end of the sleeve, said head being formed with spray emitting orifices in its sides, a cap carried by the outer end of the head and formed with a central water discharge opening, said cap being formed with a series of spray emitting orifices arranged around the central discharge opening therein, the outer end of the tubular nozzle being capable of movement into the central discharge opening in said cap, valve means for preventing water entering the sleeve through the water discharge openings in the outer end of the body from being delivered to said spray emitting orifices in the head and cap, said valve means including a disc valve carried by the intermediate portion of the tubular nozzle, an annular valve seat formed on the interior of the sleeve adjacent the head portion, said valve seat coacting with the disc valve to move the tubular nozzle inwardly to a position where water will be admitted to the ports of the nozzle and discharged from the outer end thereof and through the central discharge opening in the cap when the sleeve is moved longitudinally on the body in an inward direction, the annular valve seat on the interior of the sleeve being moved away from the disc valve when the sleeve is moved outwardly on the body, to admit water to the interior of the head and cap and be discharged therefrom through said orifices in spray formation.

5. A nozzle comprising a body adapted for connection at its inner end to a source of water supply, an inturned flange on the outer end of the said body, the said flange terminating in a tubular extension of the body which surrounds a central opening, said flange being provided with water discharge openings arranged around the tubular extension, a tubular nozzle mounted for axial slidable movement through the tubular extension and central opening, the inner end of the nozzle being closed, said tubular nozzle being provided with water admitting ports in its sides adjacent the closed inner end thereof, means for normally preventing water from entering the tubular nozzle through said ports, a sleeve mounted on the body for longitudinal movement thereon and surrounding the tubular nozzle, a head carried by the outer end of the sleeve, said head being formed with spray emitting orifices in its sides, a cap carried by the outer end of the head and formed with a central water discharge opening, said cap being formed with a series of spray emitting orifices arranged around the central discharge opening therein, the outer end of the tubular nozzle being capable of movement into the central discharge opening in said cap, valve means for preventing water entering the sleeve through the water discharge openings in the outer end of the body from being delivered to said spray emitting orifices in the head and cap, said valve means including a disc valve carried by the intermediate portion of the tubular nozzle, an annular valve seat formed on the interior of the sleeve adjacent the head portion, said valve seat coacting with the disc valve to move the tubular nozzle inwardly to a position where water will be admitted to the ports of the nozzle and discharged from the outer end thereof and through the central discharge opening in the cap when the sleeve is moved longitudinally on the body in an inward direction, the annular

valve seat on the interior of the sleeve being moved away from the disc valve when the sleeve is moved outwardly on the body, to admit water to the interior of the head and cap and be discharged therefrom through said orifices in spray formation, scraper lugs projecting from the closed inner end of the tubular nozzle for wiping engagement with the apertured outer end of the body when the tubular nozzle is in its outermost postion, a pin extending laterally from the disc valve, and an element carried by the sleeve for engagement with the pin to rotate the tubular nozzle and actuate the scraper lugs.

6. A nozzle comprising a body for connection at its inner end to a source of water supply, an inturned flange at the outer end of the said body and surrounding a central opening, a series of water discharge openings surrounding the central opening, a tubular nozzle slidably disposed through said central opening, the inner end of the tubular nozzle being closed and formed with water admitting ports in its sides, the water under pressure from said source of supply normally urging the tubular nozzle outwardly, means on said nozzle preventing the water from entering said ports, a member movably mounted on the outer end of the body and provided with a central water discharge opening in its outer end and with spray emitting orifices, and coacting means between the member and the tubular nozzle for selectively effecting a discharge of a solid stream, or a full stream and spray of water from the outer end of said member.

7. A nozzle comprising a body for connection at its inner end to a source of water supply, an inturned flange at the outer end of the said body and surrounding a central opening, a series of water discharge openings surrounding the central opening, a tubular nozzle slideably disposed through said central opening, the inner end of the tubular nozzle being closed and formed with water admitting ports in its sides, the water under pressure from said source of supply normally urging the tubular nozzle outwardly, means on said nozzle preventing the water from entering said ports, a member movably mounted on the outer end of the body and provided with a central water discharge opening in its outer end and with spray emitting orifices, coacting means between the member and the tubular nozzle for selectively effecting a discharge of a solid stream, or a full stream and spray of water from the outer end of the member, means for causing rotation of said tubular nozzle in the body, and scraper lugs carried by the inner end of the tubular nozzle and movable across the under face of the water discharge openings in the outer end of the body.

8. In a nozzle structure, a body for connection at its inner end to a source of water supply, a tubular nozzle mounted for axial movement in the body, said tubular nozzle being closed at its inner end and provided with water admitting ports at its sides, a member movably mounted on the outer end portion of the body, a cap secured on the outer end of said member and provided with a central water discharge opening and spray emitting orifices, and coacting means between the member and the tubular nozzle for selectively cutting off the entire discharge of water through the cap, or for effecting the discharge of a solid stream, or a full stream and spray of water through said cap.

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