No. 618,412. Patented Jan. 31, 1899.

P. J. HAAS & C. D. HUBER.

SPRAY NOZZLE.

(Application filed Jan. 21, 1898.)

(No Model.)

Fig. 1.

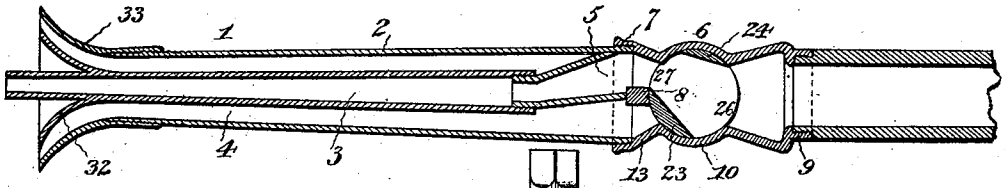


Fig. 2.

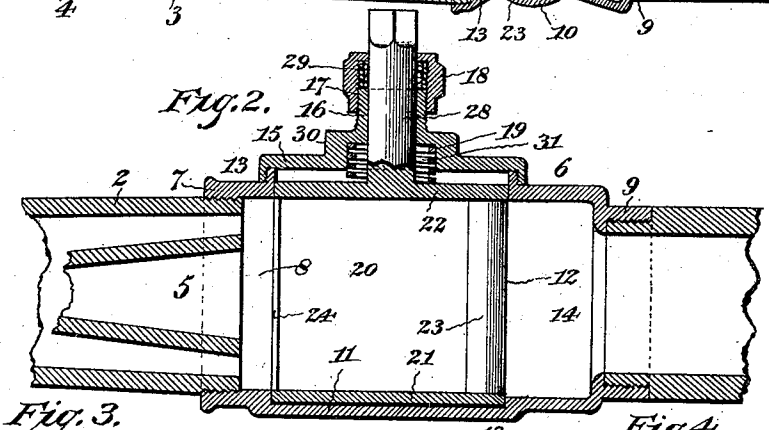


Fig. 3.

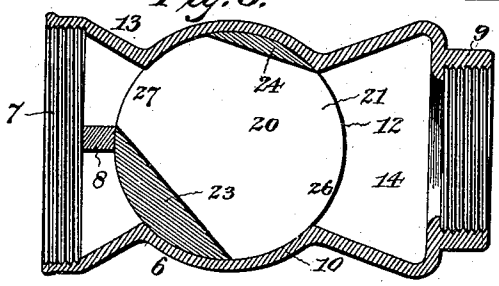


Fig. 4.

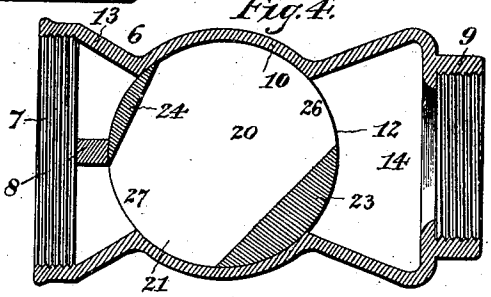


Fig. 5.

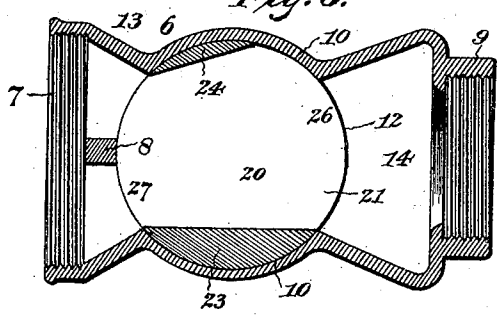
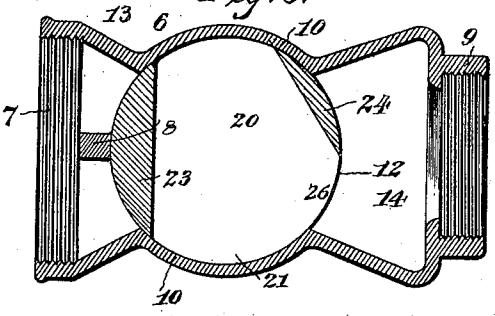


Fig. 6.



Philip J. Haas,
Clarence D. Huber.
Inventors.

Witnesses
Harold H. Simms.

By their Attorneys.

H. J. Beuhler

C. A. Snow & Co.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

PHILIP J. HAAS AND CLARENCE D. HUBER, OF MARENGO, IOWA.

SPRAY-NOZZLE.

SPECIFICATION forming part of Letters Patent No. 618,412, dated January 31, 1899.

Application filed January 21, 1898. Serial No. 667,479. (No model.)

To all whom it may concern:

Be it known that we, PHILIP J. HAAS and CLARENCE D. HUBER, citizens of the United States, residing at Marengo, in the county of Iowa and State of Iowa, have invented a new and useful Spray-Nozzle, of which the following is a specification.

Our invention relates to improvements in nozzles of that class adapted for use to deliver a solid stream or a diverged spray or both the solid stream or spray conjointly, and it is designed more particularly as an improvement upon the device disclosed in Letters Patent No. 355,573, dated March 3, 1896, to Philip J. Haas.

One of the objects of the present invention is to provide a simple construction of the nozzle in which a rotatable valve is used in conjunction with a peculiar form of the tubes constituting the nozzle proper, said valve being constructed to coact with the duplex-tubed nozzle to deliver the water separately or jointly to the tubes or to shut off the flow of water entirely through the nozzle.

A further object is to provide an improved construction of the valve which is seated in the valve-casing to be held securely in position therein against the pressure of the water flowing from the valve to the nozzle, said valve being adapted to be operated by the application of force externally applied thereto.

A further object is to provide an improved construction of the nozzle by which the spray may be regulated without shutting off the flow of water through the nozzle.

To enable others to understand our invention, we have illustrated the preferred embodiment therein in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a longitudinal section through a spray-nozzle embodying our improvements. Fig. 2 is an enlarged longitudinal section through the valve, the valve-case, and a part of the nozzle. Fig. 3 is a similar sectional view showing the valve arranged to direct the water into the central or inner tube of the nozzle to secure a solid stream. Fig. 4 is a section similar to Fig. 3, but showing the valve arranged to direct the water in the annular space between the inner and outer tubes and between the deflecters to produce a spray. Fig. 5 is a similar view showing the valve adjusted to direct the water into both the inner and outer tubes for the purpose of securing the spray and solid stream from a single nozzle. Fig. 6 is a view with the valve adjusted to entirely cut off the water from the nozzle.

Like numerals of reference denote like and corresponding parts in each of the several figures of the drawings.

The nozzle 1, forming the subject-matter of our present improvement, is substantially similar to the nozzle disclosed in the patent hereinbefore referred to; but the delivery end of the nozzle is modified somewhat in its construction with a view to promoting greater convenience in regulating the spray delivered by the outer tube of the nozzle, as will presently appear more fully. The outer tube 2 is preferably of tapered form, and within it is arranged the inner tube 3, which is also tapered and is arranged concentric within the outer tube to provide between the two tubes the annular space 4. There is no direct communication between the inner and outer tubes, and the receiving end of the inner tube 3 is provided with a flared mouth 5, which occupies an inclined relation to the longitudinal axis of the major length of said tube 3 to enable said flared inclined mouth 5 to operate in conjunction with a dividing-plate 8, presently referred to.

To the inner end of the duplex-tubed nozzle is attached an annular valve-casing 6, which is provided at its front end with a flared nipple 7 for the attachment of the outer tube 2 of the nozzle. This flared nipple 7 of the valve-casing is provided interiorly with the dividing-plate 8, which may be made as an integral part of the valve-casing and is positioned therein and shaped to conform to one side of the inclined receiving-mouth 5 on the inner tube 3 of the nozzle. This inclined receiving-mouth of the inner tube is arranged to abut solidly or firmly against the dividing-plate 8 of the valve-casing to provide therein a port situated at one side of the axial line of said valve-casing, and which port communicates directly with the flared mouth 5 of the inner tube. At its opposite end the valve-casing is constructed with an attaching-nipple 9, to which may be screwed a hose-coupling of any suitable construction. Between

the nipples 7 9 the valve-casing is provided with the walls 10, of segmental form, and a side wall 11. This side wall is in the form of a disk, and it is offset from the line of the valve-casing for the purpose of producing in said valve-casing and at one side thereof an annular seat 12 for one head of the rotatable valve. The opposite side of the valve-casing is formed with the annular flange 13, which is concentric with the seat 12, formed by the offset wall 11 of said valve-casing, and this annular flange is quite broad and is bored internally to provide the valve-seat 14, that is in alinement with the valve-seat 12 on the opposite side of the valve-casing. This annular flange 13 protrudes a considerable distance from the valve-casing and is externally threaded to enable a flanged threaded face-plate 15 to be screwed removably on said valve 13 of the valve-casing. This removable face-plate or disk 15 has an axial tubular hub 16, which projects outwardly from said face-plate, and this hub 16 is externally threaded at its remote end, as at 17, to receive the gland 18 of a stuffing-box. The removable face-plate 15 is also provided with an internal annular recess 19, which opens into the space formed by the annular seat 14 within the valve-casing, and said recess 19 is designed to receive a coiled spring, which acts against the valve to normally force it longitudinally within the valve-casing for the head of one end of said valve to press against the wall 11 of the valve-casing.

20 designates the axial-turning plug-valve, which consists of the concentric heads 21 22 and the peripheral webs 23 24, all of which are made or cast in a single piece of metal to provide a hollow valve with ingress and egress ports 26 27. The heads 21 22 of the valve are parallel to each other and joined by the webs 23 24 to maintain their concentric parallel relation, and said webs 23 24 are of different widths in order that the ingress and egress ports may be of different area. These webs are of segmental form, concentric with the heads of the valve, and the width of the web 23 is equal to the width of the chamber in the nipple 9 of the valve-casing, so that when the valve is adjusted to bring the web 23 to face toward the nipple 9 the passage of water through the valve-casing is entirely shut off. The valve is fitted in the case to have its head 21 occupy the annular seat 12, at one side of the case 6, while the other head 22 fits in the seat 14, provided by the flange 13 of said case. A spindle 28 is rigid or integral with the head 22 of the valve, and said spindle passes through the tubular hub 16 of the removable face-plate 15 and through the gland 18 of the stuffing-box, the protruding end of said spindle being squared or formed with an angular or polygonal tenon to receive a wrench or other implement by which the valve may be conveniently turned.

The gland 18 of the stuffing-box is chambered interiorly to receive a packing 29, which may be compressed against the end of the hub 16 and around the valve-spindle by the adjustment of the gland 18, and thus a tight joint is preserved between the valve-spindle and the hub 16 of its face-plate to prevent the leakage of water through the valve-casing.

The gland 18 of the stuffing-box is of hexagonal form externally for the application of a spanner to adjust said gland and secure the necessary tight joint with the hub and spindle, and the face-plate 15 is also provided with a hexagonal collar 30, to which the spanner may also be applied for adjusting the face-plate when it is desired to remove the latter to permit access to the valve.

Within the recess 19 of the removable face-plate is arranged a coiled spring 31, one end of which is seated against the face-plate and the opposite end against the head 22 of the valve. This spring tends to normally force the valve longitudinally within its casing to press the head 21 against the wall 10, and the valve is thus seated within its casing to rotate therein.

The front end of the inner tube 3 is designed to project beyond the outer tube of the nozzle, and to said end of the inner tube is rigidly secured a conical deflector 32. The outer tube 2 of the nozzle is provided with an adjustable conical deflector 33, which has a screw-threaded boss or hub screwed on the threaded end of the outer tube 2. This conical deflector 33 surrounds the conical deflector 32, and as it is adjustably attached to the nozzle-tube 2 the said deflector 33 may be adjusted toward or from the fixed conical deflector 32 to vary the width of the annular space between said deflectors 32 33, whereby the fineness of the spray may be regulated.

In operation the valve 20 may be turned within its casing to bring the port 27 in line with the inclined mouth 5 of the inner tube and with the annular space 4 between the inner and outer tubes, thus permitting water to flow through said valve into both tubes 2 3 and securing the solid stream through the inner tube and a spray between the deflectors 32 33. By giving a partial rotation to the valve the web 24 thereof may be brought to a position between one side of the valve-casing and the fixed abutment or dividing plate 8 therein, thus allowing water to pass through the valve to the outer tube 2 only and delivering the spray from the nozzle, the water being prevented from passing to the inner tube by the web 24. The valve may also be given a partial turn in the reverse direction to bring the web 23 thereof across the space between the dividing plate or abutment 8 and the annular chamber 4 of the nozzle, thus directing the water from the valve into the mouth 5 of the inner tube and permitting a solid stream to pass from the inner tube of the nozzle. To entirely shut off the passage of water through the valve-casing, the valve is turned to bring the broad web 23 across the nipple 9 of said casing. The described

adjustment of the valve may be easily and readily effected by a wrench or other tool fitted to the angular end of the valve-stem, and the spring, acting against the valve and the face-plate, serves to hold said valve in position against being deflected or pressed out of position by the pressure or action of the water against the webs forming a part of the valve.

We attach importance to the employment of a fixed conical deflector on the inner nozzle-tube and an adjustable conical deflector on the outer nozzle-tube, because the outer conical deflector is always accessible to the operator for the purpose of adjustment to vary the spray without shutting off the passage of water through the nozzle.

From the foregoing description, taken in connection with the drawings, it will be observed that we have provided a simple and durable construction of valve for use in connection with a duplex nozzle adapted to deliver a solid stream and a spray jointly or separately and that the valve is readily adjusted by the operator. The valve is securely held in its adjusted position against deflection by the action of water thereon, and as the face-plate is removable ready access can at any time be obtained to the valve for inspection and repairs.

Although we have shown the inner tube 3 as coupled by a threaded connection with the inclined mouth 5 in the drawings, we would have it understood that the tube 3 and its mouth 5 may be made of a single continuous piece.

In adjusting the valve to form a complete cut-off to the nozzle the web 23 of the valve may be brought opposite to the tubes 2 3 and the abutment 8, thus exposing the wide web to the pressure of water and utilizing the water-pressure to keep the valve to its seat.

It is evident that changes in the form and proportion of parts may be made by a skilled mechanic without departing from the spirit or sacrificing the advantages of the invention.

Having thus described the invention, what we claim is—

1. In a spray-nozzle, the valve-casing provided in advance of the valve-seat therein with a fixed dividing-plate, 8, which forms ports on opposite sides of the axial line of the casing at the delivery portion thereof, and an inner tube provided with a deflected flaring mouth, 5, that abuts against the dividing-plate and establishes communication through one port between said inner tube and the valve-casing, combined with an outer tube surrounding the inner tube and its deflected mouth and communicating directly with the valve-casing through the other port formed by said dividing-plate, and a turning plug seated within the valve-casing and having ports of different cross-sectional area, substantially as described, for the purpose set forth.

2. The combination with a valve-casing having annular seats therein, of a removable face-plate attached to one side of the valve-casing and having an annular recess and an extended hub, a rotatable valve fitted in said casing to have its heads occupy the annular seats therein and provided with an axial spindle which passes through the hub of said face-plate, and a spring arranged in the recess of the face-plate and seated against one head of the valve, substantially as and for the purposes described.

3. In a spray-nozzle, a valve-casing provided on one side thereof with an offset wall forming an interior annular valve-seat and having on its opposite open side an offstanding annular flange, a face-plate fastened to the flanged open side of said casing and formed with a chambered extended hub, and a gland attached to the hub, combined with a valve fitted to the seats formed by the offset wall and flange of the casing and having a spindle which passes through the hub and gland, a spring seated in the chamber of the hub and bearing against the valve, and the tubes attached to said valve-casing to have communication separately with the chamber of the casing, substantially as described.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

PHILIP J. HAAS.
CLARENCE D. HUBER.

Witnesses:
R. F. FISER,
W. H. MISBACH.