July 4, 1933. C. C. ARMSTRONG 1,916,912

SPRAY NOZZLE

Filed July 30, 1932

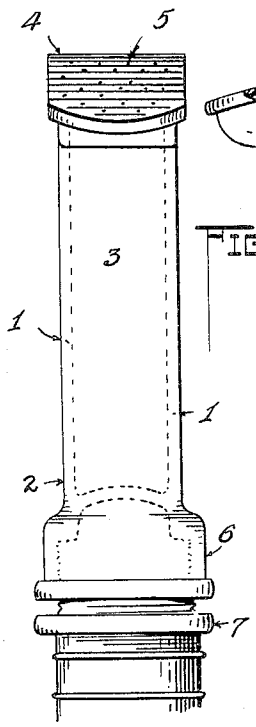


FIG. 1.

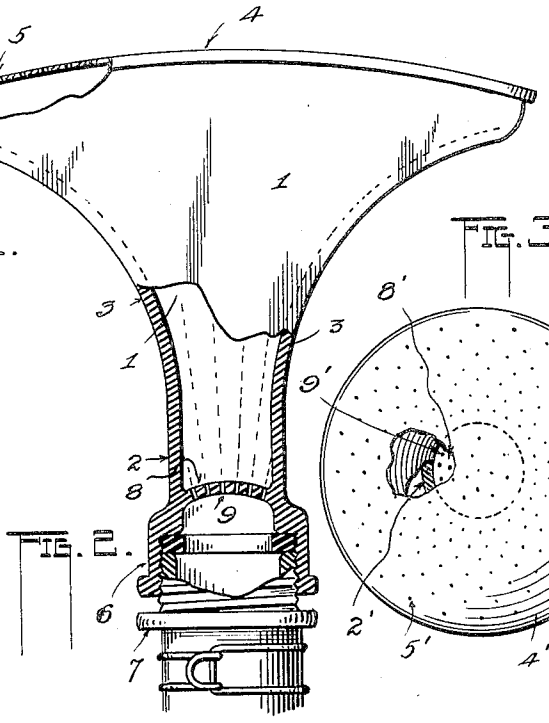


FIG. 2.

FIG. 3.

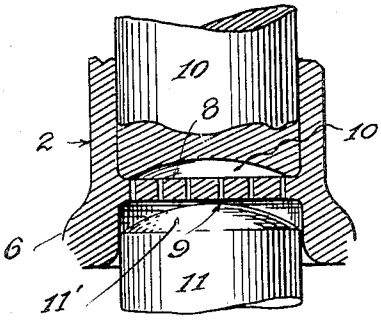


FIG. 4.

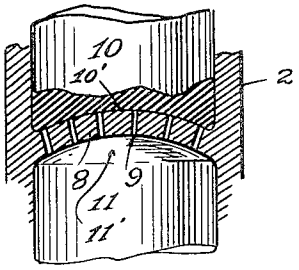


FIG. 5.

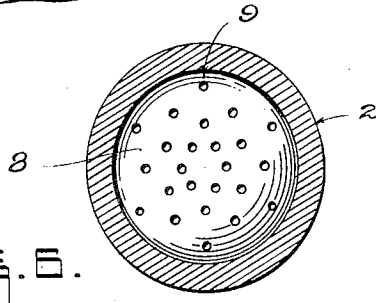


FIG. 6.

Inventor

C. C. Armstrong,

By L. M. Thurlow

Attorney

Patented July 4, 1933 1,916,912

UNITED STATES PATENT OFFICE

CHARLES C. ARMSTRONG, OF PEORIA, ILLINOIS, ASSIGNOR TO L. R. NELSON MANUFACTURING CO., INC., OF PEORIA, ILLINOIS, A CORPORATION OF ILLINOIS

SPRAY NOZZLE

Application filed July 30, 1932. Serial No. 626,944.

This invention has reference to sprinkler nozzles and particularly that type of nozzle having a terminal wall provided with many perforations, and used for spraying purposes.

My present invention is applicable to either a nozzle of the wide, flat, flared form for producing a wide and flat or fan-like spray, or one of the "rose" type of ordinary round form.

An object of my invention is to provide a new and novel arrangement for breaking up and delivering water into the pressure chamber of the nozzle through the use of separate streams or jets whereby water streams leaving the perforations of the nozzle will all have equal force, producing an even spray.

Also, an object lies in providing a perforated wall or diaphragm within the water-receiving neck of the nozzle so constructed and arranged that water passing therethrough will be evenly distributed within the nozzle-head resulting in a better and more even spread of streams at the nozzle's perforations.

Another object is to locate a wall or diaphragm within the neck of the nozzle, providing passages therein in such relation as to produce divergent streams or jets of water for delivery into the nozzle's pressure chamber.

In the drawing, Figure 1 is an elevation of one force of nozzle as seen edgewise, my invention being shown incorporated therewith. Figure 2 is a side elevation of the same type of nozzle, parts being shown in section to better illustrate the invention. Figure 3 shows the top or end of a round or "rose" type of sprinkler, with my invention incorporated therewith. Figures 4 and 5 are enlarged longitudinal sections of part of a nozzle's neck showing a diaphragm of a flat form, in one instance, and a curved diaphragm in the other instance both showing passages extending therethrough according to my invention, and Figure 6 is a transverse section of the neck showing the diaphragm and its passages.

When a solid uninterrupted bulk of water flows directly through the neck of a nozzle toward the perforations of the head a peculiar result is set up. It would naturally be supposed that all of the perforations of the head would discharge streams of like volume and pressure. Again, it might be supposed that if any difference existed in the streams those immediately in line with the bore of the neck would seem to be those that would discharge the strongest streams. As a matter of fact, neither of these supposed actions is true. The streams found to have the greatest pressure are those that lie along the marginal portions of the head, weak streams resulting at the middle or central portion thereof.

While various ways of remedying this have been tried none of them has produced the desired even flow of water from all of the perforations. However, I have found that by introducing a diaphragm in the neck of the nozzle in which passages are provided for initially breaking up the bulk of water into jets or streams to be projected into the pressure chamber the desired result is realized, all of the streams leaving the nozzle having the same volume and velocity.

The types of nozzle to which the invention is applicable may be such as are shown in the drawing. In Figures 1 and 2 the body, which may be a casting, has opposite flat walls 1 flared in fan-like form, a neck portion being denoted at 2. These walls may lie substantially parallel to each other and may be connected by narrow walls 3. Thus constructed the nozzle has a rectangular pressure chamber closed by a perforated wall 4, the perforations being identified at 5. The other form, Figure 3, may be of a round type, its discharge end including a wall 4′ having perforations 5′, while a neck is shown in part section at 2′. The walls in either form are gradually brought down to create the narrow neck which terminates in an internally threaded enlargement 6, Figure 2, adapted to receive a hose connection 7. And in this connection it may be said that all structures herein described are taken to be identical in Figures 2 and 3 as to all portions having to do with the said neck.

The invention herein is directed to a wall or diaphragm designated at 8, in Figures 2, 4, 5, and 6, and at 8′ in Figure 3. This member lies within the neck and may be cast with the

body of the nozzle, or it may be separate therefrom secured in the position desired in any suitable manner. It may be of any thickness, also, but as shown herein it may be about the thickness of the walls of said neck and may be located anywhere within the straight bore of the same. It is provided with a series of passages 9, 9′, Figures 2 and 3 respectively, and while it is unnecessary to describe the manner of creating said passages, it may be said that a method is employed by which they can be produced readily in a very simple manner, and at one operation. When cast in position the diaphragm is produced in flat form as best shown in Figure 4, together with said passages, the axes of which are parallel. By placing the diaphragm between a pair of dies 10, 11 its flat form may be changed to a spherically curved or domed one. While the projected streams may be parallel to each other by using a flat diaphragm, it is preferable, for the best results, to have them divergent by spherically curving said diaphragm to thus change the positions of the passages with respect to each other or so that their axes are divergently arranged. And while all of the streams may not be directed toward the perforated wall 4, 4′ of the sprinkler, the combined streams will act to cause the desired uniform discharge of water at the perforations 5, 5′.

The die 10 has a cavity 10′ therein whose wall is spherically curved, and the die 11 has an outwardly rounded surface 11′ of substantially the same curvature. Pressure applied to the dies with the diaphragm between them results in the changed form in the latter.

The resultant divergent passages causes the water streams to be directed outwardly in all directions and therefore more evenly distributed through the pressure chamber with the result that full water streams, all of like pressure and volume, issue from the perforations 5, 5′. The water in the filled pressure chamber is placed under extreme agitation with even pressure throughout, due to the many needle streams.

Different ways of producing divergent passages in a diaphragm may be possible whether said diaphragm is flat or arched, I having described and shown, as an example only, one manner by which after the perforations are created they may be forced into divergent positions.

I claim:

1. The combination with a sprinkler nozzle comprising a sprinkler head forming a pressure chamber and having discharge perforations, said head including a restricted neck arranged for attachment to a hose, of a diaphragm fixed within the neck provided with passages for dividing into separate streams the water entering said neck and for projecting said streams into said pressure chamber.

2. A sprinkler nozzle comprising a sprinkler head forming a water pressure chamber, and having discharge perforations, said head having a reduced neck for attachment to a hose, and a diaphragm in said neck having passages extending through it for diverting water streams into said pressure chamber.

3. A sprinkler nozzle comprising a sprinkler head forming a water pressure chamber, and having discharge perforations, said head having a reduced neck for attachment to a hose, and a diaphragm in said neck having passages extending through it whose axes are divergent.

4. A sprinkled nozzle comprising a sprinkler head forming a water pressure chamber terminating in a wall provided with discharge perforations, said head having a neck for attachment to a hose, and a diaphragm closing the bore of said neck, the same having passages therein whose axes diverge therefrom in the direction of said wall for directing divergent water streams into said pressure chamber.

5. A sprinkler nozzle comprising a sprinkler head forming a water pressure chamber terminating in a wall having perforations, said head having a neck for attachment to a hose, and a diaphragm closing the bore of the neck between said wall and the place of connection of the hose, said diaphragm being spherically curved in the direction of said perforated wall and having passages for directing divergent water streams toward said wall.

6. A sprinkler nozzle comprising a cast sprinkler head forming a water pressure chamber including a neck for attachment to a hose, and provided with a wall having perforations, and a diaphragm integral with said neck closing the same, said diaphragm having a series of passages arranged for directing divergent water streams into said head.

7. A sprinkler nozzle comprising a cast sprinkler head forming a water pressure chamber provided with a wall having perforations, and including a neck for attachment to a hose, and a diaphragm integral with said neck closing the bore thereof between the place of hose connection and the perforated wall, said diaphragm being domed in the direction of the said perforated wall and having a series of divergent passages for directing divergent water streams toward said wall.

8. A sprinkler nozzle comprising a sprinkler head having a water inlet portion for attachment to a hose, and including a wall lying opposite the said water inlet portion, said wall being provided with discharge perforations, the whole constituting a pressure chamber, and a diaphragm disposed between the inlet portion and the said walls separating the cavity of the head into two compartments, said diaphragm having a series of passages extending therethrough radiating with re-

spect to the axis of the bore of the said inlet portion and directed toward said sprinkler-head for projecting divergent water streams toward said wall.

9. A sprinkler nozzle comprising a sprinkler head having a water inlet portion for attachment to a hose and including a neck, said head having a wall opposite the bore of said neck provided with discharge perforations, and a diaphragm within the bore having passages extending therethrough radially with respect to the axis of the bore and directed toward said sprinkler-head for projecting divergent water streams toward said wall.

In testimony whereof I affix my signature.

CHARLES C. ARMSTRONG.