Oct. 24, 1950 N. C. STEARNS 2,526,778

SPRAY HEAD

Filed April 28, 1947

Fig. 1

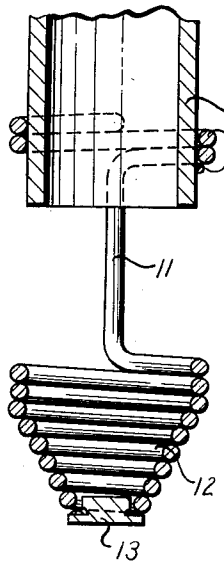


Fig. 2

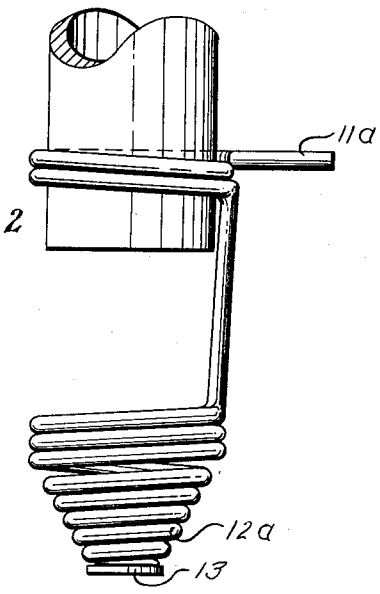
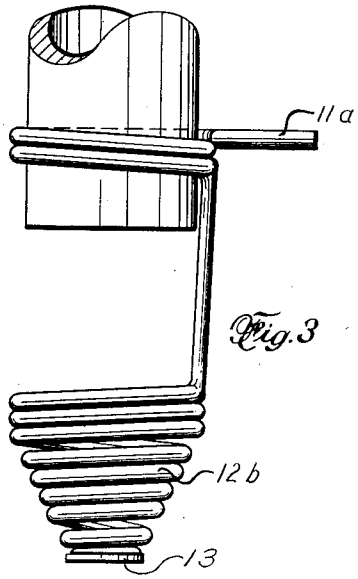


Fig. 3



Ned C. Stearns
INVENTOR.

BY J. Vincent Martin
Ralph R. Browning
James B. Kimmel
ATTORNEYS

Patented Oct. 24, 1950

2,526,778

UNITED STATES PATENT OFFICE

2,526,778

SPRAY HEAD

Ned C. Stearns, Houston, Tex.

Application April 28, 1947, Serial No. 744,290

4 Claims. (Cl. 299—121)

1

This invention relates to improvements in spray heads usable in conjunction with cooling towers and the like and refers more particularly to an improved spray head that may be economically fabricated from a continuous wire and which may have a plurality of separate substantially annular spray openings.

This invention constitutes an improvement upon the invention illustrated in my patent application, Serial No. 591,204, filed April 30, 1945, now abandoned. Spray heads manufactured according to my earlier invention have proven entirely satisfactory as to the character or pattern of the spray, but are relatively expensive as compared with spray heads in accordance with this invention. Also, in the spray heads illustrated in my earlier application, the liquid to be cooled may be sprayed in only one pattern.

An object of this invention is to provide an inexpensive spray head that lends itself to ease of fabrication.

Another object is to provide a spray head having a cup-shaped helical coil which may be resiliently fastened to a liquid discharge pipe.

A further object is to provide a spray head unit that may be made up from a continuous wire.

Still another object is to provide a spray head having a cup-shaped spray member with a plurality of lateral spray openings to spray liquid therefrom in separate concentric patterns.

Other and further objects of this invention will appear from the following description.

In the accompanying drawings which form a part of the instant specification and are to be read in conjunction therewith and wherein like reference numerals are used to designate like parts in the various views:

Fig. 1 is a sectional view taken through a spray head and discharge pipe embodying this invention;

Fig. 2 is a side-elevational view showing a modified spray head attached to a discharge pipe; and

Fig. 3 is a side-elevational view illustrating yet another spray head modification embodying this invention.

Referring to the drawings, the discharge end of a discharge pipe 10 is shown having attached thereto a spray head. The spray head is made up of a continuous wire 11. At one end of the wire is formed a cup-shaped coil 12, which is disposed in axial alignment beneath the discharge opening of discharge pipe 10. The coil shown is helical and has a plug 13 disposed in the opening at

2

the apex end of the coil, the plug substantially filling this opening.

The coil is wound in such fashion that the adjacent loops in the coil tightly engage each other and thus form, for practical purposes, a watertight cup. The coil is preferably wound in such fashion that the force of the liquid jetting into the open end of the coil will not force the adjacent loops of the coil apart.

In order to obtain the best results, it is preferred that the inside diameter of the cup-shaped coil be carefully regulated with respect to the diameter of the stream of discharge fluid entering the cup. This provides a means for controlling the characteristics or pattern of the spray as is more fully set out in my earlier application, referred to above. In the interest of simplicity, this matter will not be discussed further in this application.

The cup-shaped coil is secured to the discharge end of pipe 10 by means of a tightly wound coil 14 which is spaced from the cup-shaped coil by an intermediate section of the wire 11. The exact number of convolutions or loops in the coil 14 has not been found critical but inasmuch as the friction between the coil and the end of the pipes is relied upon to hold the spray head to the discharge pipe, it is desirable to provide at least, substantially, two full convolutions or loops. The inside diameter of these loops, when unstressed, should be somewhat less than the outside diameter of the smallest discharge pipe to which the spray head is likely to be attached. To facilitate placement and removal of the spray heads upon a discharge pipe, the end portion 11*a* of the wire is preferably extended outwardly from the coil 14, as shown in Figs. 2 and 3. This extended portion of the wire along with the intermediate connection portion provides a means for readily stressing the wire of coil 14 to enlarge the diameter of the coil whereby it may be easily inserted over the end of the discharge pipe.

It is contemplated that the discharge pipe may be formed with a suitable bead, rib, or other projection 15 on its external periphery, to positively secure the spray head to the discharge pipe, although this usually is not required. In the event the end of discharge pipe 10 is externally threaded, the loop 14 will more securely engage the discharge pipe due to the added friction therebetween caused by the threaded or roughened periphery of the pipe.

The intermediate section of the wire 11, which serves as a connector between the cup-shaped coil and the coil 14, is resilient and provides a

suitable resilient connection between the fastening means and the spray cup. A proper resilient connection is advantageous in order to properly distribute the spray from the cup-shaped member or coil. These advantages are more fully set forth in the earlier application, above mentioned.

It is thought that the assembly and operation of the spray heads of this invention are apparent from the foregoing description. The spray head is first formed from a continuous length of wire and plug 13 is inserted in the apex end of the helical coil 12, substantially filling the opening at the end of the wire. The device is attached to a discharge pipe of a cooling tower or the like by first spreading the coil 14 so as to increase its diameter by manipulation of the intermediate connector section of the wire 11 and the extension 11*a* which is more clearly shown in Figs. 2 and 3. With the diameter of coil 14 thus increased, the coil may be readily passed over the end of the discharge pipe and the stress of the coil is such that the coil engages the periphery of the discharge pipe to hold the spray head in position thereon.

With the spray heads installed, liquid discharged from the end of pipe 10 enters the open end of the cup 12 filling the cup and sprays outwardly in all directions from the top edge of the coil 12. The pattern of the spray may be controlled by selecting a spray head the inner diameter of the cup of which bears a predetermined relation to the diameter of the stream of water entering the cup. Preferably, the diameter of the cup should range from 106 per cent to 180 per cent of the diameter of the stream entering the cup.

In the embodiment shown in Fig. 1, the cup 12 is made up of tightly wound coiled loops and provides a substantially closed cup-like member.

In the modification shown in Fig. 2, the helical cup-shaped coil 12*a* is formed with two intermediate adjacent loops of the coil spaced apart somewhat to provide an annular opening along the side of the cup. This opening, in operation, provides an additional outlet for the liquid to be sprayed. Liquid is sprayed outwardly from this opening in a sheet which is pulled downwardly by the force of gravity. The pattern of fluid sprayed from this opening is substantially cone-shaped and is within and concentric with the pattern of sprayed liquid which passes over the upper edge of the cup-like member.

In the modification of Fig. 3, the helical cup-shaped coil 12*b* has an opening along its side similar to the cup-shaped member 12*a*, shown in Fig. 2, and has an additional opening between adjacent loops near the apex end of the coil. Thus, in this modification, in operation, liquid is sprayed outwardly from the top edge of the cup-shaped coil as well as from the two side openings in the coil.

It is contemplated that various adjacent loops of the cup-shaped coil member may be spaced somewhat apart to provide substantially annular spray openings in the wall of the cup, and the modifications of the drawings are shown by way of example and not by way of limitation.

While the cup-shaped members have been shown as helically wound coils, this is by way of illustration and not by way of limitation and it is contemplated that these cup-shaped members may be formed in different configurations. This is contemplated by and is within the scope of the appended claims.

From the foregoing, it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth, together with other advantages which are obvious and which are inherent to the structure.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having described the invention, what is claimed is:

1. A spray head comprising a wire having a cup-shaped helical coil formed at one end with adjacent loops of the coil in snug contact with each other, fastening means at the other end of the wire, and a portion of the wire extending between the coil and fastening means substantially parallel to the axis of the cup-shaped portion to provide a substantially non-obstructed opening at the upper loop of the coil, the portion of the wire from which the cup-shaped coil is formed being so rigid that in operation for which it is intended, adjacent loops of the coil are not separated due to the force of liquid played into the coil.

2. The spray head of claim 1 wherein a plug is disposed within the loop of the coil at its apex and providing an end enclosure for the coil.

3. A spray head comprising a wire having a cup-shaped helical coil formed at one end with adjacent loops of the coil in snug contact with each other, a cylindrically shaped coil at the other end of the wire substantially coaxial with the helical coil and spaced therefrom, and a portion of the wire extending between the helical coil and the cylindrical coil and substantially parallel to the common axis of the two coils providing a substantially non-obstructed opening between the two coils, the portion of the wire from which the cup-shaped coil is formed being so rigid that in operation for which it is intended, adjacent loops of the cup-shaped coil are not separated due to the force of liquid played therein.

4. A spray head as in claim 3 wherein the end portion of the wire, at the cylindrically-shaped coil, extends laterally outwardly to facilitate securing and releasing operations.

NED C. STEARNS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
244,740	Brown	July 26, 1881
1,144,719	Melas	June 29, 1915
1,745,297	Harry	Jan. 28, 1930

FOREIGN PATENTS

Number	Country	Date
54,778	Denmark	Mar. 23, 1938
631,950	Germany	June 30, 1936