Jan. 17, 1956 G. GOETTL 2,731,252

FLOW DISTRIBUTION VALVES FOR EVAPORATIVE COOLERS

Filed Dec. 23, 1953 2 Sheets-Sheet 1

Fig. 1.

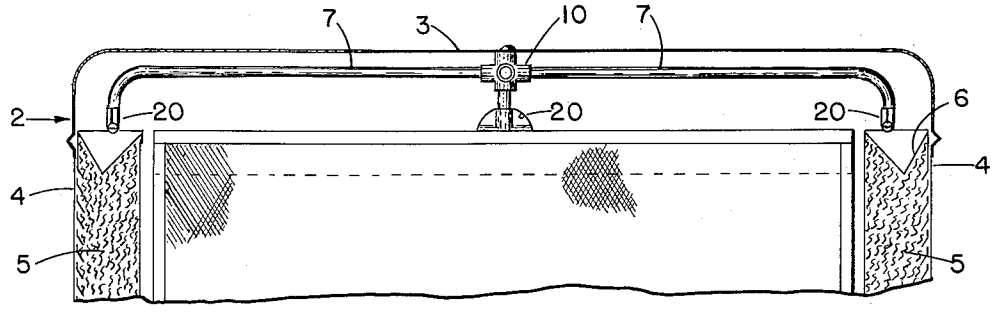
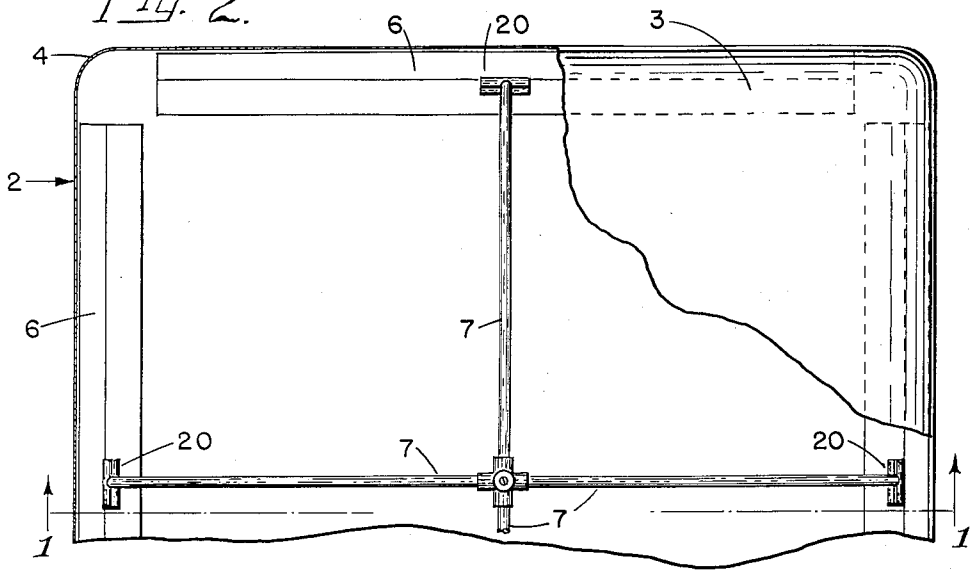


Fig. 2.



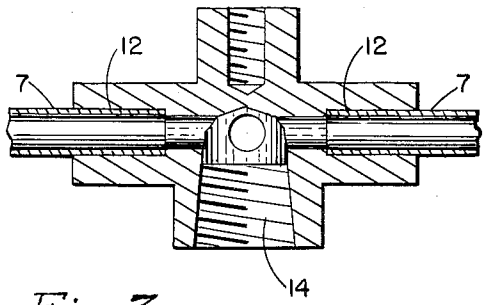


Fig. 3.

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Jan. 17, 1956 G. GOETTL 2,731,252

FLOW DISTRIBUTION VALVES FOR EVAPORATIVE COOLERS

Filed Dec. 23, 1953 2 Sheets-Sheet 2

Fig. 4.

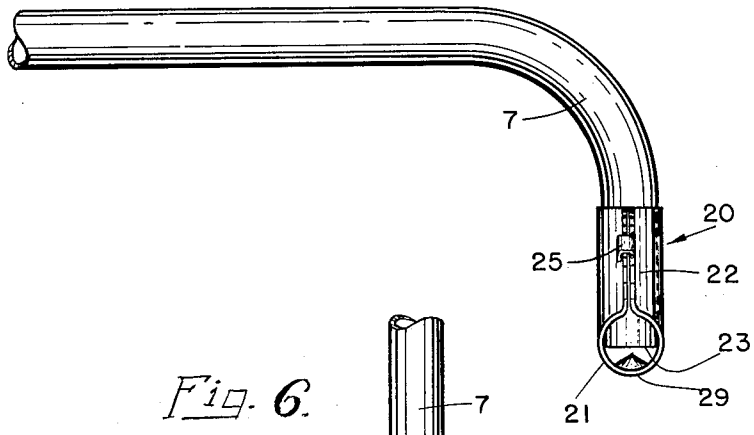
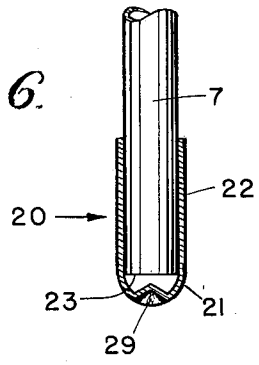


Fig. 6.



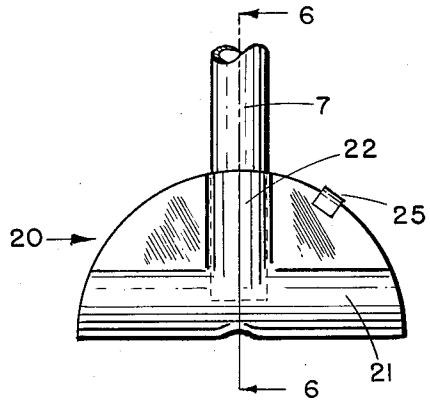


Fig. 5.

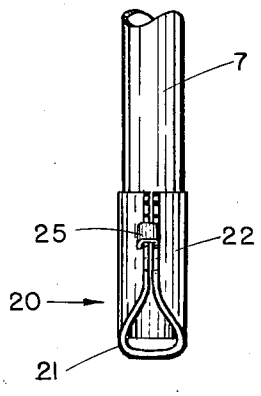


Fig. 7.

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FLOW DISTRIBUTION VALVES FOR EVAPORATIVE COOLERS

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Application December 23, 1953, Serial No. 399,880

3 Claims. (Cl. 261—71)

This invention concerns flow distribution valves for evaporative air coolers.

Heretofore, water distributing heads for evaporative air coolers have been made with fixed restricting orifices leading to the several water distributing arms and controlled the flow of water to the several arms by reason of the fact that there was a constant head pressure applied to the inlet of the distributing head. For this reason, even though distributing arms were slightly unlevel, there was always sufficient head to force water through into all arms comparatively evenly. So long as water was supplied from a water main that applied considerable head pressure, this type of distributing head could be used. However, it has been found that direct feed of water from a supply source is wasteful, and it has of late become increasingly necessary to recirculate water from a pump in the bottom of the cooler case. Recirculating pumps can be made to furnish water at a low head pressure only. In this case, the restricted distributing orifices would have to be redrilled and made larger in order to furnish sufficient water under the low head pressure provided by the pump. When the orifices were thus enlarged, then siphoning would take place in the distributing pipes whenever the cooler case was tilted and not level. In this event, the distributing arm on the lower side of an unlevel installation will siphon some or all of the water from the arm or arms on the high side of the installation. This condition robs the pads on the high side of the cooler of sufficient water to operate correctly and, on the other hand, floods the pads on the lower side. This condition is due to the fact that, with a recirculating pump, there is not sufficient head to supply a positive pressure to all of the distribution pipes, and the water in the distributing arms or pipes is affected by gravity.

Due to the construction of evaporative coolers it is very difficult to service the distribution head, which is placed just beneath the top plate of the case, and make any adjustments that might be necessary to either correct the leveling of the head and arms assembly or to change the diameter of the holes in the head.

In view of the foregoing, one of the objects of the present invention is to provide a flow regulator and distributor which can be applied to the outer ends of the water distributing arms and which will not only regulate the flow through each of the arms at its outer end but will also direct the flow transversely of the arm and along the length of the distributing trough which is just above the pads.

Another object is to provide a simple regulating valve which may be applied to the end of any cooler distributing pipe within easy reach, and which will effectively regulate and distribute the flow of water through said pipe.

I attain the foregoing objects by means of the devices, parts, and combinations of parts illustrated in the accompanying drawings in which—

Figure 1 is a view of the top portion of a cooler case having my improved flow distribution valves applied to the tubular water distributing arms with the case sectioned off substantially along line 1—1 of Figure 2;

Figure 2 is a partial plan view thereof, with the top cover broken away to show interior construction;

Figure 3 is a mid-sectional elevation of a distributing head drawn on an enlarged scale;

Figure 4 is a side elevational view of one of the tubular distributing arms also drawn on a somewhat enlarged scale, and with my valve applied to the outer end thereof;

Figure 5 is a front elevational view thereof;

Figure 6 is a sectional view thereof taken on line 6—6, Figure 5; and

Figure 7 is an end elevation of a modified form of valve.

Similar numerals refer to similar parts in the several views.

In Figures 1 and 2 the cooler case 2 has a top plate 3, side corner supports 4, and pads 5 which fit within the openings in the side of the case between the corner supports. Each pad has a V shaped distribution trough 6 at its top which has its bottom perforated to distribute water to the pad beneath it. Each trough receives water from one of the distribution tubes 7.

Distributing head 10 has a body portion secured to case top 3, and is formed with four horizontally opening distributing arm sockets 12, which open into a centrally positioned vertical inlet conduit 14. This vertical conduit is threaded to receive a pipe connection leading to a source of water under pressure.

The inner ends of distributing tubes 7 are inserted in sockets 12 and extend horizontally from head 10 to the area above and adjacent the cooler pad. The outer ends of each of the distributing tubes is curved downward and directed toward the bottom of the V trough into which it distributes water. My improved water distributing and flow regulating valves are applied to the ends of each of these distributing tubes 7.

Each water distributing and flow regulating valve 20 has a body formed from the disc of semi-hard springlike sheet metal which is diametrically folded so that the material on each side of the fold is brought upward and joined together forming the two halves of the valve body. A horizontal distributing tubular channel 21 is formed at the bottom of the body thus formed and is substantially a tubular enlargement of the fold. Extending vertically from the center of this channel there is a tubular socket 22 which is formed by outward bulges in the two sides of the body and resiliently compresses on the downwardly directed end 23 of each distributing tube. This socket grips the tube end resiliently and with sufficient frictional contact to hold it in place.

To provide adequate friction and to hold the two halves of the valve body together, there is a tab 25 formed on the edge of the disc as it is blanked out in a blanking die. The discing is thereafter pressed to shape in a forming die to provide the bulges forming socket 22. The quarter-round portions on each side of the socket bulge are brought together, and the two quarter-round portions on the side, which includes the tab, are held firmly together. Those on the opposite side are resiliently held together by the elasticity of the material. When tab 25 is bent over to secure the two quarter-round portions of the body together, the entire body is complete, and the socket 22 has sufficient resilient gripping power to hold on to the end of tube 7. It will also assume any position on the end of the tube necessary for adjustment of flow of water from the end of the tube.

To facilitate a complete shut-off of the water flowing from tube 7, a conical dent 29 is made in the middle of

bottom channel 21 at a position so that it will extend upward into the open end 23 of tube 7. The open end of the tube acts as a valve seat, and the raised conical dent acts as a valve plug. Since the device is used principally where water under a low head pressure is furnished by circulating pump, this valve arrangement is sufficient to either regulate or entirely shut off the flow.

Water issuing from pipe 7, when the valve portion is open, strikes the surfaces of the cone 29 and is distributed toward the lateral ends of the valve body 20. Thus, water, instead of impinging on the center of V trough 6, is directed towards its ends and a better distribution results.

In use, in order to regulate the flow of any one of the distribution tubes 7, it is only necessary to lower the pad 5 in case 2 sufficient to expose the valve body 20. This may be grasped, pulled or pushed and twisted right and left slightly until the right distance is obtained between the top of cone 29 and the end 23 of the tube 7.

It is to be understood that in certain installations, the use of the cone 29 is unnecessary, and the bottom of horizontal channel 21 may be made flat as shown in Figure 7. In this case, the flat bottom contacts the squared end of tube 7, and regulation of the flow may be made by varying this distance. In this alternative structure, complete shut-off is not contemplated, but regulation may be nevertheless effected in the same manner as above described.

I claim:

1. A flow distribution valve for evaporative coolers, having pads with V shaped water distributing troughs at their tops and distributing heads with outwardly extending tubular arms having downwardly curved outer ends, consisting of a body formed of sheet metal having a resilient vertical socket fitting over the end of a tubular arm and opening into a transverse distributing channel along the bottom of said body, open at each end and distributing water toward each end of, and along said V trough, a conical plug formed in the bottom of said transverse channel disposed to seat on the open end of said distribution tube when said tubular arm is fully inserted into said valve body.

2. In an evaporative cooler having a case including a top, evaporative pads having V troughs at their tops, a distribution head secured to the central portion of the under side of said top, and distribution tubes extending outward from said head to said troughs with their outer

ends bent downward toward the center of said troughs, a flow regulating and distribution valve for the ends of each of said distribution tubes composed of a body consisting of a disk of resilient sheet metal upwardly folded diametrically and having a horizontal tubular distribution channel along said fold, directing the flow of water from said tube toward each of the end portions of said V trough, and a vertical centrally disposed tubular socket formed between the adjacent upwardly folded portions of said disk, resiliently and frictionally engaging the outer end portion of said distribution tube; the said horizontal distribution channel having a bottom portion adapted to contact and seat on the end of said distribution tube when said body is pushed upward onto said tube and regulate and close the flow of water from said tube.

3. In an evaporative cooler having a case including a top, evaporative pads having V troughs at their tops, a distribution head secured to the central portion of the under side of said top, and distribution tubes extending outward from said head to said troughs with their outer ends bent downward toward the center of said troughs, a flow regulating and distribution valve for the ends of each of said distribution tubes composed of a body consisting of a disk of resilient sheet metal upwardly folded diametrically and having a horizontal tubular distribution channel along said fold, directing the flow of water from said tube toward the end portions of said V trough, and a vertical centrally disposed tubular socket formed between the adjacent upwardly folded portions of said disk, resiliently and frictionally engaging the outer end portion of said distribution tube; the said horizontal distribution channel having a bottom portion provided with a conical plug adapted to seat in the open end of said distribution tube and decrease and shut off flow of water therethrough when said body is pushed up onto said tube.

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