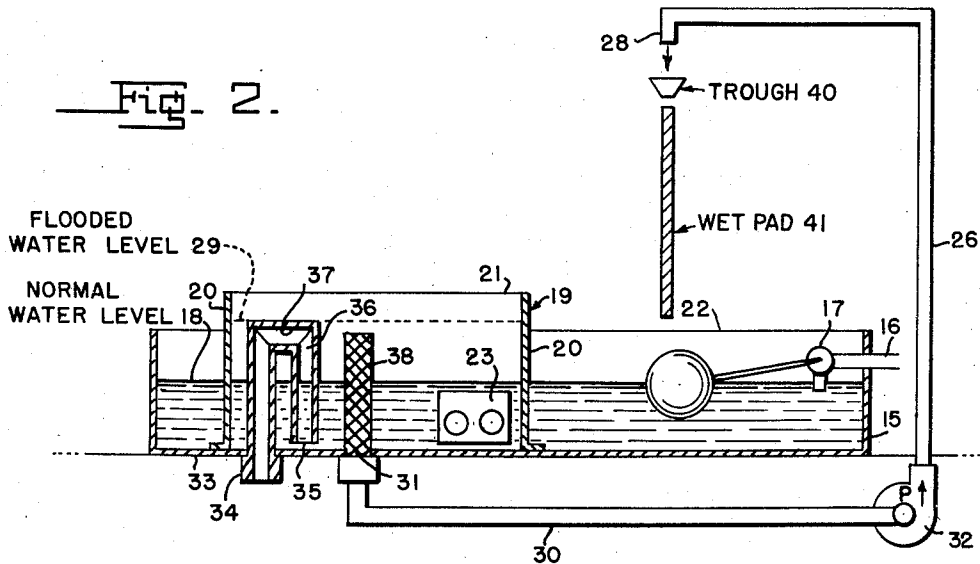
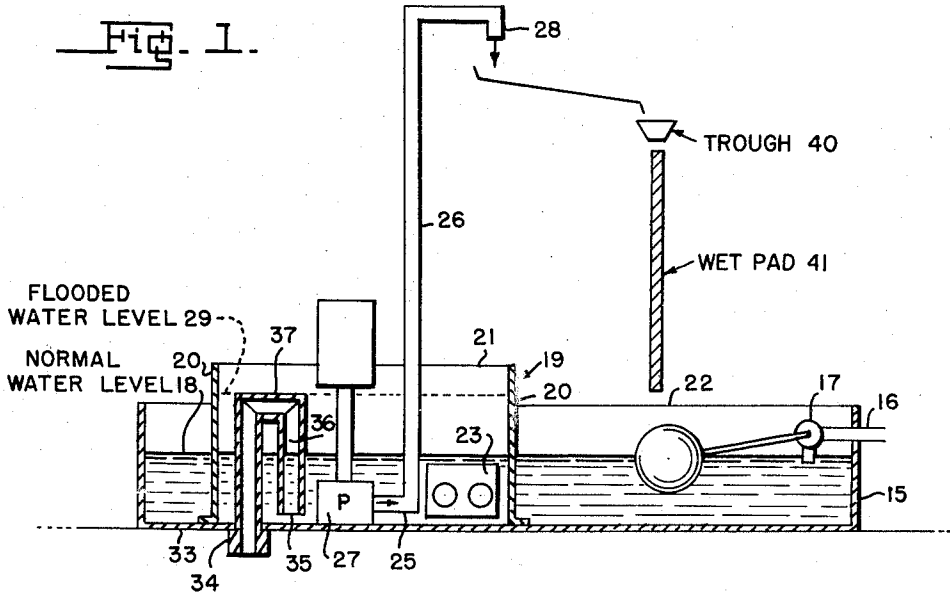


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B. E. WEIBERT, JR.
SELF FLUSHING DEVICE FOR EVAPORATIVE COOLER
AND COOLING TOWER SUMP
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INVENTOR.
Bayard E. Weibert, Jr.
BY
Franklin W. Durgin
AGENT.

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SELF FLUSHING DEVICE FOR EVAPORATIVE COOLER AND COOLING TOWER SUMP

Bayard E. Weibert, Jr., Roswell, N. Mex.

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The present invention relates to improvements in evaporative coolers and more specifically to a self-flushing device for the sump of an evaporative cooler.

During the operation of an evaporative cooler with water containing dissolved impurities, such as lime, the strength of the water solution becomes more concentrated as the evaporation proceeds. In order to reduce scaling and the calcification of the absorbent material used in evaporative coolers, it is necessary to periodically drain the lime-concentrated liquid from the cooler sumps and refill with fresh water.

An important object of this invention is to provide means for automatically draining and refilling the sump of an evaporative cooler responsive to shutting off of the cooler.

Another object of the invention is to provide equipment of the character described which may be used with an evaporative cooler having a water-circulating pump located either inside or outside the sump.

A further object is the provision of a self-flushing arrangement for the sump of an evaporative cooler which is operable responsive to the return flow of water from an elevated portion of the cooler by gravity, and wherein the flushing action may be initiated by the return flow of a minimum volume of water.

A still further object of the invention is to provide equipment of the character described including a syphon drain which serves not only as a part of the self-flushing arrangement but also as an emergency overflow drain.

The invention also aims to provide equipment of the character described which may be manufactured from readily obtainable parts, is not liable to become clogged or otherwise inoperative, and wherein the parts are readily accessible for servicing, if such should become necessary.

Other objects and advantages of the invention will be apparent during the course of the following detailed description, taken in connection with the accompanying drawing forming part of this specification, and in which drawing,

Fig. 1 is a partly diagrammatic fragmentary view in vertical section showing the self-flushing equipment mounted in the sump pan of an evaporative cooler and with the water-circulating pump located inside the pan.

Fig. 2 is a partly diagrammatic fragmentary view in vertical section of equipment differing from that shown in Fig. 1 in that the water-circulating pump is located outside the sump pan.

In the drawing, which for the purpose of illustration shows two forms of the invention, and wherein similar reference characters denote corresponding parts throughout the views, the numeral 15 designates a conventional sump pan provided with a water supplying and replenishing pipe 16 delivering water to the pan under the control of a suitable float valve 17 so as to normally maintain water in the pan up to the normal water level shown at 18.

Mounted within the sump pan 15 is a dam or reservoir

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19 including sheet-metal walls 20 which terminate in an upper edge 21 somewhat above the upper edge 22 of the sump pan. The area of the reservoir 19 is considerably less than that of the sump pan 15 and consequently the addition of a given volume of water will make a considerably greater change in the water level of the reservoir than it would in the water level of the sump. Fitted in the reservoir wall 20 near its lower edge is a flapper check valve 23 permitting sump water to enter the reservoir and establish the normal water level 18 therein, as shown in the drawing.

The form of invention illustrated in Fig. 1 provides a circulating water line 25 including a riser portion 26 which extends between a pump 27 located within the reservoir and an elevated portion 28 of the evaporative cooler, such as the cooling tower conventionally represented in Fig. 1 by trough 40 and wet pad 41. Upon stopping the pump 27, the volume of water that drains from the riser portion 26, when added to the normal quantity of water in the reservoir, raises the water level to the broken line 29 shown in Fig. 1 and labeled "Flooded Water Level."

In the form of invention illustrated in Fig. 2 a circulating water line 30 is shown extending from a reservoir drain 31 to the elevated portion 28 of the evaporative cooler represented by trough 40 and wet pad 41. This water line 30 is equipped with a pump 32 located outside the sump pan 15 at the lower end of the riser portion 26. Upon stopping the pump 32, the water in the riser portion 26 that returns by gravity to the reservoir raises the level to the broken line 29 shown in Fig. 2 and labeled "Flooded Water Level."

Referring now to Figs. 1 and 2, in the bottom wall 33 of the reservoir and sump pan is fitted an inverted U-shaped syphon tube 34 serving as a drain when syphoning action is started. The inlet end 35 of the syphon tube terminates only a short distance above the bottom wall 33 of the reservoir and the syphon passageway 36 extends upwardly beyond the normal water level 18 to a zone 37 in the vicinity of, or just below, the flooded water level 29.

The reservoir drain 31 leading to the circulating water line 30 shown in Fig. 2 is covered with a large basket screen 38.

The operation of the equipment illustrated in Figs. 1 and 2 will now be described, assuming that the sump pan 15 and the reservoir 19 have been supplied with water up to the normal water level 18 shown in the drawing. Upon starting the pump 27 or 32, water is removed from the reservoir 19 and circulated through the line 25 or 30 including the riser portion 26 to the elevated portion 28 of the evaporative cooler. Water in the elevated portion 28 is discharged into trough 40 and then is absorbed by the vertical pad 41 from which it evaporates to produce a cooling effect, the residual water draining from the pad 41 into the sump pan 15. The removal of water from the reservoir is accompanied by an inflow of water from the sump pan 15 through the flapper valve 23 in the reservoir wall 20, and the transfer of water from the sump pan 15 is accompanied by an inflow of water through the supply pipe 16 under the control of the float valve 17, thus tending to maintain the normal water level. Inasmuch as the water being supplied to the sump pan 15 generally contains impurities, such as lime, the residual water that drains from the evaporative cooler back to the sump pan eventually becomes a lime-concentrated water solution due to the evaporation of water during the operation of the cooler. When the pump 27 or 32 is shut off the water in the riser 26 that flows back through the pump and into the reservoir 19 raises the water level in the dammed area to the height indicated by the

broken line 29 labeled "Flooded Water Level" in the drawing. This flooding of the reservoir primes the syphon 34 which thereupon operates to drain the reservoir. When the syphon 34 lowers the water in the reservoir the flapper check valve 23 opens and permits an inflow of water from the sump pan 15. When the reservoir 19 and the sump pan 15 are substantially empty, the syphon becomes inoperative and permits refilling of the reservoir and sump pan through the water supply pipe 16 under the control of the float valve 17. This valve 17 is throttled so that the flow of water to the sump pan 15 is less than the outflow through the syphon drain 34.

Various changes may be made in the forms of invention herein shown and described without departing from the spirit of the invention or the scope of the following claims:

I claim:

1. In an evaporative cooler of the type which includes a sump, means supplying water to and maintaining a normal water level in the sump, and means including a pump drawing water from a zone in the sump below said normal water level and transferring said water to an elevated portion of the cooler, at least a portion of said elevated water returning to said sump zone by gravity upon discontinuing operation of said pump; the improvements which comprise a dam enclosing said sump zone, a check valve associated with the dam permitting the flow of sump water from outside the dam into said sump zone, and a syphon drain having its inlet near the bottom of the sump within said dam and its passageway extending above said normal water level so that its syphoning action is initiated upon flooding of said dam by water returning from the elevated portion of the cooler.

2. In an evaporative cooler of the type which includes a sump, means supplying water to and maintaining a normal water level in the sump, and means including a pump drawing water from a zone in the sump below said normal water level and transferring said water to an elevated portion of the cooler, at least a portion of said elevated water returning to said sump zone by gravity upon discontinuing operation of said pump; the improvements which comprise a dam enclosing said sump zone, the area enclosed by said dam being small relative to the area of the sump whereby a relatively small quantity of return water from said elevated portion will flood said dam, a check valve associated with the dam permitting the flow of sump water from outside the dam into said sump zone, and a syphon drain having its inlet near the bottom of the sump within said dam and its passageway extending above said normal water level so that its syphoning action is initiated upon flooding of said dam, as by water returning from the elevated portion of the cooler.

3. In an evaporative cooler of the type which includes a sump, means supplying water to and maintaining a normal water level in the sump, and means including a pump mounted within the sump and drawing water from a zone therein below said normal water level and a riser transferring said water to an elevated portion of the cooler, at least a portion of said elevated water returning to said sump zone by gravity upon discontinuing operation of said pump; the improvements which comprise a dam enclosing said sump zone, a check valve associated with the dam permitting the flow of sump water from the outside of the dam into said sump zone, and a syphon drain having its inlet near the bottom of the sump within said dam and its upper portion above said normal water level so that its syphoning action is initiated upon flooding of said dam, as by water returning from said riser, said syphon having the capacity to drain water from said reservoir at a higher rate than the water supply means can replenish the supply of sump water.

4. In an evaporative cooler of the type which includes a sump, means supplying water to and maintaining a normal water level in the sump, and means including a circulating water line drawing water from a zone within the

sump below said water level, a pump and a riser transferring water to an elevated portion of the cooler, at least a portion of said elevated water returning to said sump zone by gravity upon discontinuing operation of said pump; the improvements which comprise a dam enclosing said sump zone, a check valve associated with the dam permitting the flow of sump water from the outside of the dam into said sump zone, and a syphon drain having its inlet near the bottom of the sump within said dam and its upper portion above said normal water level so that its syphoning action is initiated upon flooding of said dam, as by water returning from said riser, said syphon having the capacity to drain water from said reservoir at a higher rate than the water supply means can replenish the supply of sump water.

5. In an evaporative cooler provided with a sump for receiving residual water from an evaporative cooling tower or the like, water supply and flow control means normally maintaining a predetermined water level in the sump, said water containing dissolved impurities, such as lime, which eventually produce an objectionably strong lime-concentrated water solution through the continued evaporative action of the cooler; the improvements which comprise a dam within the sump forming a reservoir having an area considerably smaller than the area of the sump, means including a pump for elevating water from the reservoir to the cooling tower or the like, and permitting the return of a given quantity of water to the reservoir by gravity upon stopping of said pump, said given quantity of water being sufficient to flood said reservoir, and a check valve associated with the reservoir permitting inflow of water from the sump, and means draining the reservoir responsive to flooding thereof.

6. In an evaporative cooler provided with a sump for receiving residual water from an evaporative cooling tower or the like, water supply means normally maintaining a predetermined water level in the sump, said water containing dissolved impurities, such as lime, producing an objectionably strong solution by the evaporative action of the cooler; the improvements which comprise a reservoir within the sump capable of holding water at a flood level higher than said predetermined sump water level, the reservoir area being considerably smaller than the area of the sump, a check valve associated with the reservoir permitting sump water to enter, a water circulating line and a pump for supplying water from the reservoir to said cooling tower or the like, said line including a riser portion holding water sufficient to flood said reservoir, upon backflow of the water in said line, said reservoir being fitted with a syphon drain having an inlet near the lowest part of the reservoir and a syphoning passageway extending higher than said predetermined water level whereby operation of the syphon drain is initiated upon flooding of the reservoir to substantially completely drain the reservoir, the means supplying water to the sump being throttled so that the sump water inflow is less than the outflow through the syphon.

7. In an evaporative cooler provided with a sump for receiving residual water from an evaporative cooling tower or the like, a water supply normally maintaining a predetermined water level in the sump, said water containing dissolved impurities, such as lime, producing an objectionable concentrated solution by the evaporative action of the cooler; the improvements which comprise a reservoir capable of damming water at a flood level higher than said predetermined level, the area of said reservoir being considerably smaller than the area of the sump, said reservoir having an inlet from the sump provided with a check valve allowing sump water to flow into the reservoir and reach said predetermined level, a water circulating line for the cooling tower or the like, supplied from said reservoir including a riser portion extending above said flood level, the capacity of said

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riser portion being small relative to the area of said sump but large with respect to the area of said reservoir, and a pump circulating water in said line through said riser portion, said reservoir being fitted with a syphon drain operable upon flooding of said reservoir to substantially 5 drain the reservoir and consequently to temporarily lower

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the sump water level through the action of the check valve, the means supplying water to the sump being throttled so that the sump water inflow is less than the outflow through the syphon.

No references cited.