Sept. 2, 1958 H. R. BOHANON 2,850,269

COOLING PAD HANGER SYSTEMS

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FIG. 1

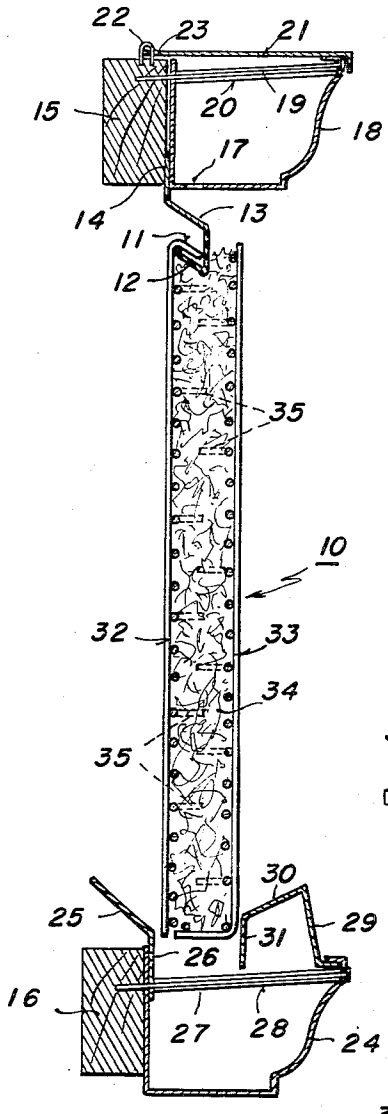


FIG. 2

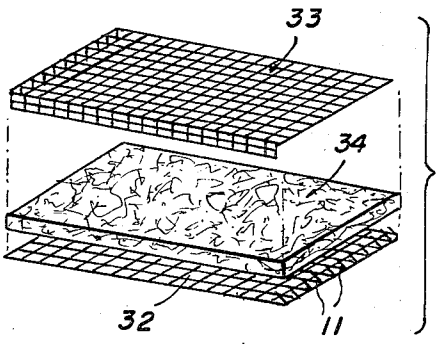


FIG. 4

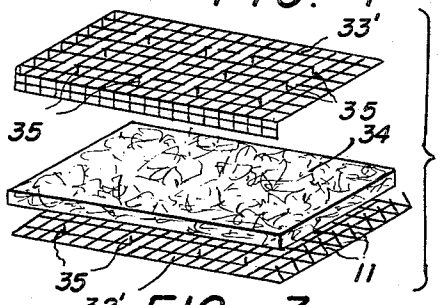
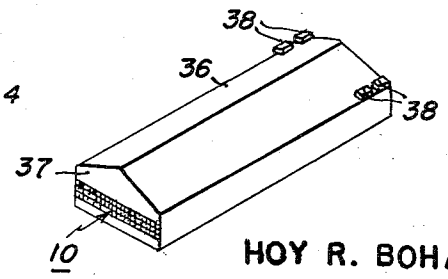


FIG. 3



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COOLING PAD HANGER SYSTEMS

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5 Claims. (Cl. 261—97)

The present invention relates to cooling pad hanger systems and pads therefor, which are adaptable for installation in the vertical wall of any water evaporative type of cooling systems, large or small, for maintaining an efficiently water-soaked wall of padding through which a flow of air is cooled by the resulting induced vaporization of the water.

The object of the invention is to provide an inexpensive universally adaptable and efficient cooling pad wall construction made simply of standard materials for any size wall.

Another object is to make the drip conductor, water spreader, drip collector, return gutter and covers for the above construction of uniform cross-sections respectively, whereby proper lengths of each, in accordance with the length of the particular wall to be built, may be readily cut to size from standard stock material.

A further object is to provide the water spreader material with an offset lower portion to form a hook ledge on which to hang the pad frames.

A further object is to make all the above parts of galvanized or other rust-proof and corrosion resistant materials.

A further object is to use standard coarse wire screen material for making pad frames of a length substantially equal to the height of the wall to be built, having an upper edge of the screen material bent to form a hook portion for hanging over the hook ledge of the water spreader.

A further object is to provide anti-sag means for the pad material by cutting some of the screen wires at suitably spaced points adjacent one of their cross-wires respectively, and bending the cut points inwardly of the pad before assembling the pad frame, to form spacedly distributed prongs for piercing into the pad from both sides when the pad, which is cut slightly oversize, is sandwiched in between two screens forming a box frame therefor.

A further object is to use a screen material which has a spread between wires substantially equal to the thickness of the pad material, whereby the prongs will be of sufficient length to substantially pass through the entire thickness of the pad material.

A further object is to form the box frame for the pad by cutting two lengths of the standard screen material substantially longer than the height of the wall to be built by the thickness of the box frame, one piece of padding of similar standard width and substantially the same length, bending the bottom and one side edge of one screen to form two of the box frame edges, bending the other side and top of the other screen to form the other two edges of the box frame, sandwiching in the slightly oversize padding into said box frame, and fastening the adjacent edges of the two screens around the sides and bottom leaving the bent top edge to serve as a hook to hang over the water spreader hook ledge.

Other and more specific objects will appear in the following detailed description of one specific form of the

invention, as illustrated in the accompanying drawings, wherein:

Fig. 1 is a cross-sectional view in elevation of a standard construction made in accordance with the present invention,

Fig. 2 is an exploded perspective view of a pad structure showing how it is put together,

Fig. 3 illustrates one application of the present invention to a storehouse requiring a cool humid atmosphere, and

Fig. 4 is an exploded perspective view similar to Fig. 2, but showing a modification in the structure to provide anti-sag means for the pad.

This invention is particularly adaptable to provide a simple economical way of building the evaporating pad walls for large installations such as greenhouses, storehouses, etc., where the required cooling pad area is seldom duplicated in different installations.

The present construction lends itself to the use of standard stock materials to easily and economically build a cooling pad wall of any height and any length that may be required for any specific design of cooling system.

Cooling systems of the evaporative wall type usually operate by providing an exhaust fan near the top of one end wall of a building to be cooled and a cooling pad wall near the base of the other end having water soaked absorbent pads through which air is sucked in from the outside atmosphere. The water for soaking the pad is generally circulated by a pump delivering the water to a drip conductor at the top of the pad, through which the water trinkles down into a gutter at the bottom for return to the pump sump.

Effective cooling without sacrificing simplicity in construction has been a major problem in many of these systems. The present invention has economically solved this problem.

The construction here illustrated may be readily built by inexperienced builders according to instructions from standard stock materials, or from prefabricated parts made to size as required for assembly in situ by the builder or supplier according to requirements.

The specific form of construction illustrated comprises a cooling pad or pads **10** having the upper edge **11** of the inner screen frame bent to hang over a hook ledge **12** at the bottom of the offset portion **13** of a water spreader strip. The strip is fixed at its upper edge **14** to the outside of the upper stringer **15** along the lower edge of the stringer. A similar stringer **16** is fixed to the bottom of the wall frame. These stringers are preferably of wood and run the full length of the cooling pad wall to form a continuous seal therefor. The water spreader strip is of a solid sheet material having a uniform cross-sectional form as shown. The surface of this material should have a capillary attraction for water to facilitate its spreading on the offset portion **13** as it drips down from the spaced comparatively large openings **17** in the bottom of the drip conductor **18**. This drip conductor is of a height substantially the same as the stringer **15**, to which it is fixed over the edge **14** of the spreader strip by means of spikes **19** and spacing ferrules **20** at suitable intervals along the length of the stringer. A cover strip **21** is hinged at its rear edge to the top of the stringer **15** by staples **22**, one leg of which is loosely passed through perforations **23** near the rear edge of the strip at suitably spaced intervals axially of said strip.

A water return drip collector **24** and a drip collector strip **25** having uniform cross-sections as shown in Figure 1, are fixed to the lower stringer **16** by spikes **27** and spacing ferrules **28**, spaced at suitable intervals along the stringer, the spikes passing through the vertically bent lower edge **26** of the collector strip **25**.

A return drip collector cover **29** having a drip col-

lector portion 30 and a vertical edge portion 31 is bendable at the folded corners, so that it may be spread to bring the edge portion 31 against the outer surface of the pad 10 to push it against the drip collector strip 25 at the inside surface and form a good air seal along the bottom of the pad wall. The lower edge of the vertical edge portion 31 may be notched at the spacing ferrules 28 to fit over them and prevent accidental endwise displacement of the cover 29.

The pads may be made from standard stock rolls of suitably heavy wire screen and padding of substantially the same width. Two pieces 32 and 33 of the wire screening and one piece 34 of the padding are cut to a length substantially the same as the distance between the upper and lower stringers 15 and 16 which are fixed to the building in a dead level position at the top and bottom of the wall opening left for the installation.

The wire screening pieces are flattened out and should be heavy enough to form flat sides of the box frame, stiff enough to compress the entire pad between them when held together only at the side edges.

The upper edge of the screen piece 32 is bent over, preliminary to the assembly, to an angle to form the hook portion 11 at an angle corresponding to that of the hook ledge 12 at the bottom of the spreader strip, and one side of this screen piece is bent at 90° to form one side edge of the box frame for the pad. The pad piece 34 is then placed on piece 32 with its top and corresponding side edge pressed up against the bent edges of piece 32. The other side and bottom edges of piece 33 are bent at 90° to form the other two edges of the box frame and piece 33 is placed over the pad with the bent bottom and side edges against the corresponding edges of the pad. Piece 33 is then worked into place, slightly compressing the pad in all directions into the box frame, which is then completed by fixing the adjacent edges at the bottom and sides of the pad with wire rings. The pad is then ready for hanging. The tops of the bent side edges of the screens may be notched or cut away if necessary to clear the lower edge of hook ledge 12 to facilitate hanging of the pad thereon.

To avoid sagging of the pad during operation when it is saturated with water, some of the wires at spaced intervals in each of the screen pieces 32' and 33' may be cut adjacent one of their cross wires and the points bent inwardly of the pads as shown in the modification in Fig. 4, to form spikes 35 that will pass into the padding during assembly of the pad to form anti-sag means; thus providing a good air seal around the upper edge of the padding in the pad during operation. A very efficient yet simple construction is thus provided with padding material that would otherwise not be suitable although having other desirable qualities, such as aspen wood fiber padding. These spikes are shown in dotted lines in Fig. 1.

To accommodate any length of cooling pad wall, where more than one pad is required, the pads may be fastened at adjacent edges by wire rings. If the length requires a pad of less than full width a partial pad may be readily made by cutting down the width of the pieces 32, 33 and 34 correspondingly before making and assembling the pad of reduced width. Where the length of wall required is not critical, it may be designed to comprise an integral number of standard width pads which will provide an overall length nearest that required, or a different standard width may be selected for the pads made from available standard width materials which may be more suitable.

The gutters, covers, spreader, spikes and ferrules are preferably of galvanized material. The wire screen may be of heavy galvanized wire welded at the crossings and having squares about the size which will form spikes 35 long enough to substantially pass through the padding.

Figure 3 shows an application of the present invention to a storehouse 36 wherein the cooling pad wall is formed along the bottom of one end wall 37 and the exhaust fans 38 are mounted in pairs at the two upper corners of the other end of the building, to provide the required air flow capacity when needed. Individual covers are provided for these fans to seal off those that are not being operated when less than full capacity is required. A water circulation pump means (not shown) is provided in the building to supply water at controlled rates to the drip conductor at the top of the pads, from which the water drips over the offset portion of the spreader where it is evenly spread and flows in a continuous even sheet over the side of the offset portion into the top of the padding. The excess water drips from the bottom of the padding into the return drip conductor which is connected to the pump sump, into which a supplemental or make-up supply of water is supplied under control in accordance with the amount of water evaporated in the cooling process.

The drip openings 17 are large enough to prevent clogging by small particles of dirt, but the spreader enables an even distribution not previously obtainable except with very fine drip openings, which are obviously subject to easy clogging and are thus rendered inoperative, unless frequently cleaned. After the drip conductor and return drip collector are cut to the required length, the ends are of course soldered thereon and proper conduits are connected to and from the pump.

Many obvious modifications in the form and details of the several cooperating parts may be made without departing from the spirit and scope of the present invention, as defined in the appended claims.

What is claimed is:

1. In a cooling system for cooling air by passing it through water soaked pads, a cooling pad hanger system comprising a horizontal drip conductor having a large drip orifices of a suitable number distributed along its bottom, a water spreader and hanger strip of sheet metal extending downwardly from said drip conductor along its rear, said strip having a mid portion offset under said orifices and sloping gently forward then extending downwardly and having its bottom edge sharply bent back to form a hook ledge, a pad in a wire frame having hook means at its upper edge to hang over said hook ledge so as to direct the water flowing over said offset portion over the top edge of said paid, and a return drip collector means under said pad frame to recapture the excess water for recirculation to said drip conductor.

2. A cooling pad system as defined in claim 1, a stringer to which said drip conductor and hanger strip are fixed, a second stringer to which said return drip collector is fixed, a cover for said drip conductor having spaced perforations at the back, and staples in the top of said first stringer having one leg loosely passed through each of said perforations in said cover to provide a hinge therefor.

3. A cooling pad system such as defined in claim 2, wherein all said parts are of uniform cross-sectional form, whereby they can be cut from standard stock to any lengths in accordance with the size of the particular system.

4. A cooling pad hanger system as defined in claim 3, wherein more than one pad is hung, wire rings fixing adjacent edges of the frames of said pads.

5. A cooling pad system as defined in claim 2, and a cover for the portion of said return drip collector not covered by the lower end of said pad frame, said cover having a portion forming an outside drip collector and being expandable in cross-section to cover various exposed portions of said return drip collector in accordance with variations in thickness of pads used, whereby standard stock material of uniform cross section may be cut to length for any installation.

(References on following page)

References Cited in the file of this patent

UNITED STATES PATENTS

1,213,782	Thomas	Jan. 23, 1917
1,291,926	Kleucker	Jan. 21, 1919
2,233,976	Essick	Mar. 4, 1941
2,408,158	Belsher	Sept. 24, 1946
2,497,947	Lewis	Feb. 21, 1950
2,535,386	Brookins	Dec. 26, 1950
2,596,801	Wilhelmi	May 13, 1952
2,631,021	Arnold	Mar. 10, 1953
2,637,540	Rowe	May 5, 1953
2,670,941	Feinberg	Mar. 2, 1954
2,775,310	Shelton	Dec. 3, 1956

FOREIGN PATENTS

492,071	Germany	Feb. 15, 1930