Feb. 29, 1944. L. T. MART 2,342,952

INTERLOCKING SPLASH DECK FOR COOLING TOWERS

Filed Nov. 14, 1942 2 Sheets-Sheet 1

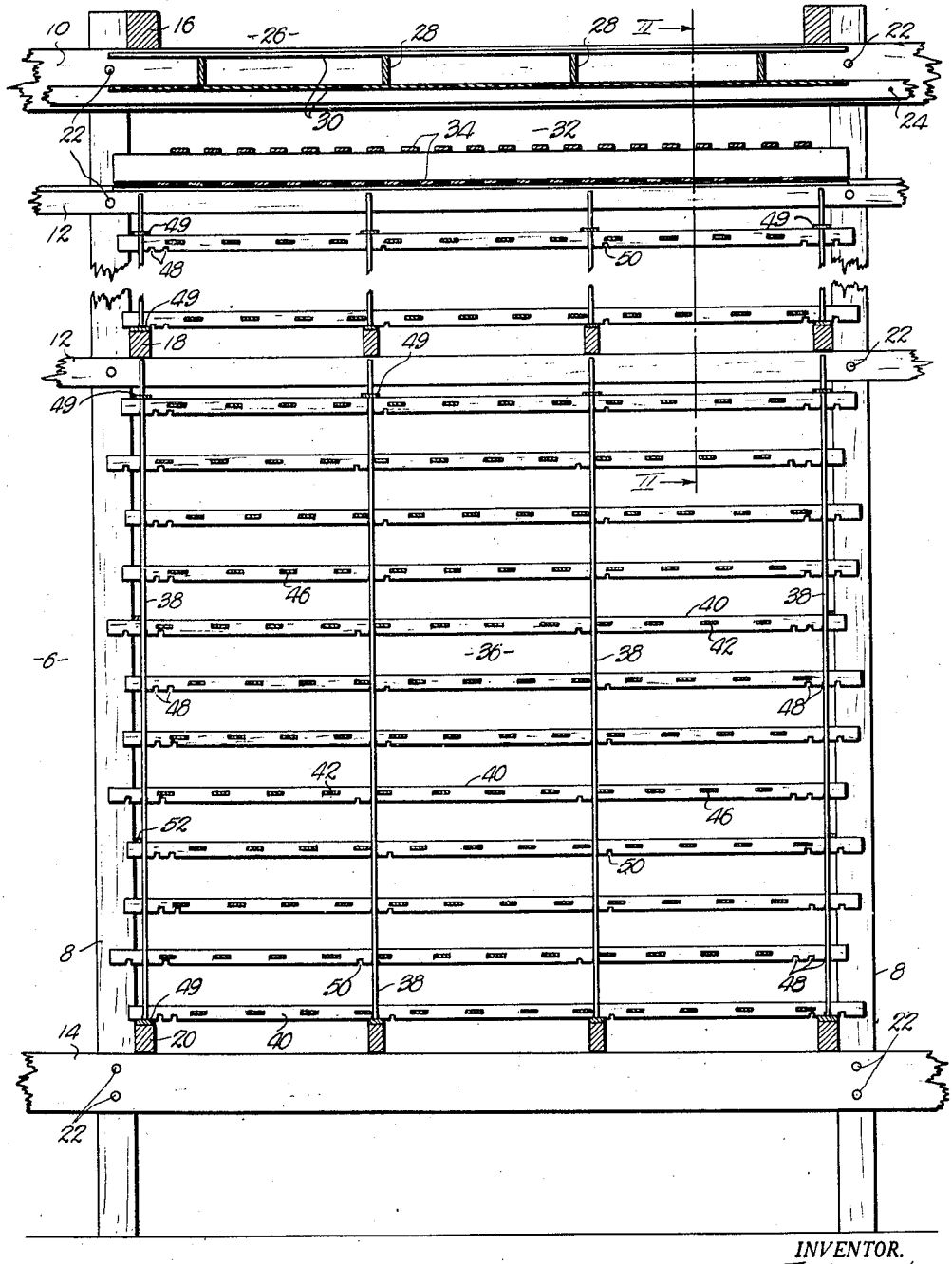


Fig. 1.

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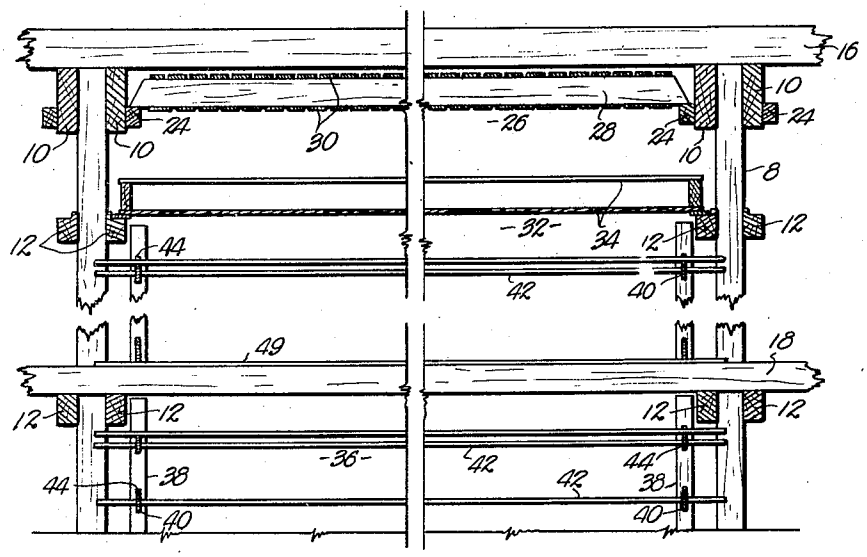


Fig. 2.

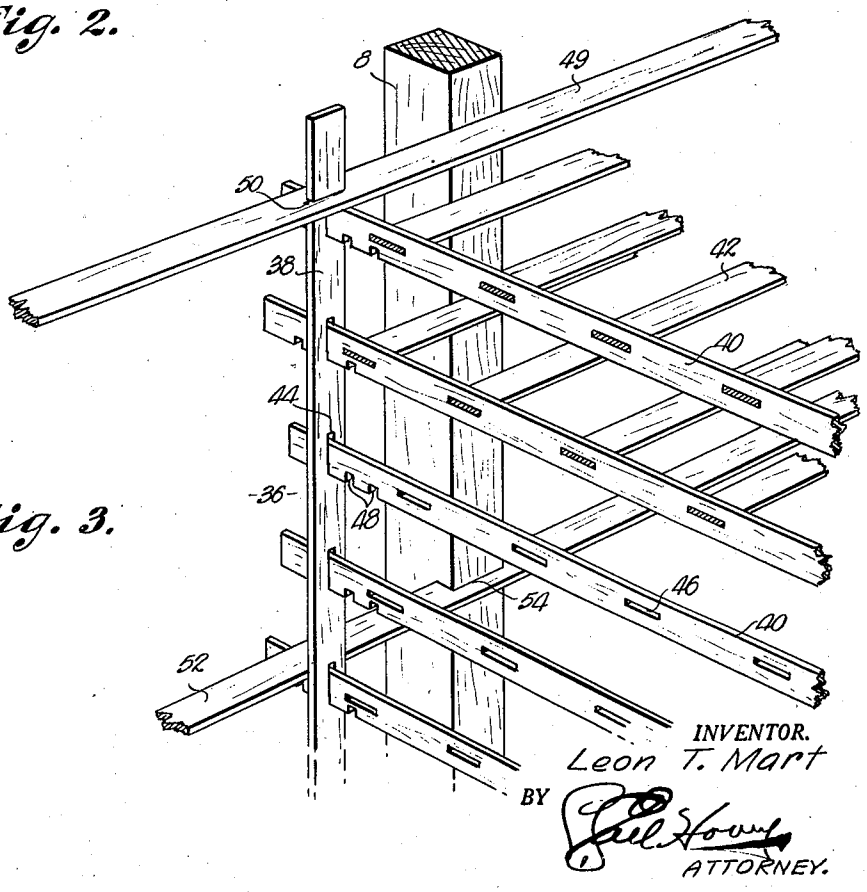


Fig. 3.

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INTERLOCKING SPLASH DECK FOR COOLING TOWERS

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9 Claims. (Cl. 261—111)

This invention relates to heat exchanging apparatus and particularly to cooling towers wherein the temperature of water is lowered by continuously interrupting and breaking up the fine streams thereof during their downward travel in paths transverse to the flow of air through the tower.

In the manufacture of cooling towers, and more particularly in the construction of portable apparatus of this character, it is desirable that the "core," or splash deck assembly thereof, be formed of parts capable of being readily assembled or dismantled at the point of use without the aid of tools or fastening members.

The primary object of this invention is therefore, the provision of a portable cooling tower wherein the splash deck assembly is constructed of interlocking members that may be quickly assembled at the point of use without the aid of tools and firmly held in fixed condition without the employment of screws, nails or other fastening elements.

It is further desirable both from the standpoint of manufacture and in the erection and dismantling of a tower, that a minimum number of individually different parts be used. This invention has for an additional aim, therefore, the provision of a splash deck assembly comprising support strips of but a single pattern capable of arrangement to carry a series of splash slats in staggered relation one below the other, whereby water dropping downwardly through the tower will be repeatedly broken up into fine streams or drops as air passes through the splash deck assembly.

A yet further aim of the invention is to construct a cooling tower wherein uniformly slotted slats may be employed both as horizontal support strips, and as vertical spacers or locking members.

Other objects of the invention will appear during the course of the following specification, referring to the accompanying drawings wherein:

Fig. 1 is a vertical transverse sectional view through a cooling tower unit constructed in accordance with this invention.

Fig. 2 is a fragmentary longitudinal sectional view taken on line II—II of Fig. 1; and

Fig. 3 is an enlarged fragmentary perspective view of a portion of the splash deck assembly illustrating the manner of interlocking the members thereof.

In the drawings the numeral 6 designates generally a frame comprising standards 8 and upper, intermediate and lower transverse tie members 10, 12 and 14 respectively, and upper, intermediate and lower longitudinal stringers or tie members 16, 18 and 20 respectively. This open framework is rigidly secured together by bolts or analogous means 22.

Rails 24 fastened to the outer side faces of tie members 10 provide shelves for supporting an upper splash deck 26 comprising transverse stringers 28 and a series of longitudinal slats 30 fastened to both upper and lower edges of the stringers. Slats 30, as will be observed, are spaced slightly from each other, the spacing between the upper series of slats being staggered with relation to the spacing between the lower series. Tie members 12 immediately below members 10, similarly support a lower splash deck 32 which is substantially a duplicate of the upper deck excepting that its slats 34 are in transverse relation to the upper slats 30.

The remainder of the tower comprises an uniquely constructed core, filler or splash deck unit generally designated by the numeral 36. This unit includes vertical supports or locking members 38, transversely arranged support strips 40 and longitudinally extending splash slats 42. These supports 38, strips 40 and splash slats 42 are preferably all formed of wood uniform in width and thickness, the supports 38 and strips 40 being provided with regularly spaced slots 44 and 46 respectively, formed therein by punching and dimensioned to snugly receive a strip or slat passed transversely therethrough.

In the embodiment of the invention illustrated, four vertical supports or locking members 38 are shown for each vertical tier of horizontal, spaced apart support strips 40. Adjacent the ends of the latter and in the normally lower edges thereof, is formed a series of three notches 48. Each strip 40 has a pair of notches 50 cut into its normally lower edge at points where they may be selectively engaged with intermediate supports 38.

The positioning of these notches with relation to the slots 46 of the strip, is important and as illustrated. The lowermost strip 40 in Fig. 1 is locked in place as far to the right as its notches will permit. The strip next above is identical to the one below but has its ends reversed and is shifted to its extreme left position. The third support strip 40 is positioned to its extreme right, the ends remaining in the same relation as in the second strip. In the fourth strip from the bottom the arrangement of the lowermost strip is again duplicated and this practice of positioning is repeated throughout the remaining

portion of the tower. Accordingly, a staggered positioning of the splash slat receiving slots 46 is obtained with a single pattern of slotted support strip 40 and when the notches 48 and 50 of the strips 40 engage, slots 44 in the vertical strips 38, lateral displacement of the strip 40 becomes impossible. The arrangement of the slots 46 in strips 40 is such that the intermediate supports 38 extend between vertical rows of splash slats 42 and serve not only to maintain a proper spacing of the support strips 40, but also further assist in preventing lateral movement of the said strips.

Overlying the uppermost rows of strips 40 are a plurality of horizontal locking bars 49, each provided with a slot 50 for every vertical support 38 engaged thereby. The locking bars 49 are formed from the same dimensioned stock as the remainder of the splash deck assembly and when in place over the supports 38, lock together the parts as a single unit. An additional locking bar 49 resting upon each stringer 18 and 20 receives the ends of vertical supports 38 and serves as tie bars to prevent displacement of supports 38. Lateral movement of the intermediate portion of the unit is further precluded by side bars 52 lying between frame member 8 and the outer supports 38 and notched as at 54 to engage frame members 8. Thus, the filler or splash deck assembly comprises a sturdy unit with the cooperating parts thereof rigidly interlocked against movement.

Obviously, a tower constructed as described may be built up to several tiers in height, it being desirable to have intervening tie members 12 for each tier and also locking bars 49 over the uppermost support strips 40 of each tier. Likewise, the length and width of the tower may be readily increased to obtain the cooling capacity required.

The manner of assembling or dismantling a tower provided with the uniquely designed core 36 above described, will be clear from the foregoing specification. Since support strips of only one pattern are required, much confusion in the erection of the tower is eliminated. With the horizontal support strips 49 and vertical supports 38 having identically shaped slots uniformly spaced, the manufacture of these members is also greatly simplified.

Red-wood is the preferred kind of material from which to make the parts of this interlocking splash deck for cooling towers. The cross sectional dimensions of slats 42, strips 40, supports 38 and locking bars 49 is about that of an ordinary lath and all are substantially the same in that respect.

Support strips 40 are spaced one above the other in the same plane because slots 44 in supports 38 are in alignment and parallel with the longitudinal edges of the supports.

A minimum amount of space is occupied by the load-bearing part of the structure and a sufficient number of splash slats 42 are mounted in the filler immediately below the upper splash deck to completely break the falling water into streams and drops as air is passing through core 36 in horizontal paths, transversely across splash slats 42.

The flow of air is not retarded by wide surfaces on supporting structure and air may be forced through the tower in any direction. Boxing, not here shown, may be applied to frame 6 for the purpose of confining the applied air to a stream moving in the selected direction.

When manufacturing the parts of the deck, all material or stock of desired dimensions is fed into a punch press or the like, to be perforated and notched. Equal spacing of slots 44 and 46 and the positioning of notches 48 at each end of strips 40 where they will be closer to a slot 46 at one end than at the other, is an important feature.

While only one form of splash deck assembly for cooling towers has been illustrated and described, other forms might be made without departing from the spirit of this invention, and it is desired therefore, to be limited only by the scope of the appended claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A splash deck assembly for cooling towers comprising a plurality of splash slats; a plurality of support strips having equally spaced slots for receiving said slats and having a series of notches adjacent their ends with the notches on one end closer to a slot than the notches at the other end; and a plurality of vertical supports provided with slots for receiving the strips, said strips being interchangeable, end for end and adapted to be postioned with selected notches thereof in locking engagement with the slots of the vertical supports whereby a staggered condition of the spill slats is obtained.

2. A splash deck assembly for cooling towers comprising a plurality of splash slats; a plurality of support strips having slots extending transversely therethrough for receiving said splash slats, said strips having notches in their normally lower edges; a plurality of vertical supports provided with slots for receiving said strips, certain of said notches of the strips having interlocking engagement with the slots of the supports; and locking bars, having slots for receiving the vertical supports extending between the same.

3. A splash deck assembly for cooling towers comprising a plurality of splash slats; a plurality of support strips having regularly spaced slots for receiving said slats, each strip having a series of notches in its lower edge adjacent each end with the series on one end closer to a slot than the series on the opposite end; and a plurality of vertical supports provided with slots for receiving the strips, said strips being interchangeable end for end and adapted to be positioned with certain of said notches in locking engagement with the slots of the vertical supports whereby a series of tiers of spill slats in staggered relation to each other are obtained.

4. A splash deck assembly for cooling towers comprising a plurality of splash slats; a plurality of support strips having regularly spaced slots for receiving said slats, each strip having a plurality of notches intermediate its ends and a series of notches adjacent each end with the series on one end closer to a slot than the series on the other end; a plurality of vertical supports provided with slots for receiving the strips, said strips being interchangeable end for end and adapted to be positioned with certain of said notches in locking engagement with the vertical supports to produce staggered vertical tiers of splash slats; and an intermediate vertical support, having locking engagement with the intermediate notches of the strips positioned between the spill slats.

5. In a splash deck for cooling towers, a pair of vertical supports, each having a plurality of equally spaced apart slots formed therethrough,

said slots being arranged in opposed relation; a support strip having a plurality of equally spaced apart slots formed therethrough extending through the opposed slots of the supports, the slots in the strips and the supports being similarly spaced; and a splash slat in each slot of the support strip, said support strips each having a series of notches formed therein in the lower edges thereof and adjacent the said supports to engage the latter and maintain the strips in position with the splash slats in predetermined offset relation the shape of all of said slots being identical.

6. A splash deck assembly for cooling towers comprising a plurality of splash slats arranged in horizontal groups of several spaced apart splash slats each; support strips for each group respectively, each strip having slots formed therethrough for receiving said splash slats, the splash slats of one group being offset with respect to the splash slats of certain of the remaining groups thereof; and a plurality of vertical supports each having a plurality of equally spaced apart slots formed therethrough for receiving said support strips to hold the support strips in vertically spaced apart relation, said supports being spaced apart and each engaging an edge of a splash slat in a number of the groups thereof to maintain the groups of splash slats against relative shifting.

7. In a splash deck assembly for cooling towers, a pair of vertical supports, each having a plurality of equally spaced apart slots formed therethrough, said slots being arranged in opposed relation; a support strip having a plurality of equally spaced apart slots formed therethrough extending through the opposed slots of the supports, the slots in the strips and the supports being similarly spaced; a splash slat in each slot of said support strip, said support strips each having a series of notches formed therein in the lower edges thereof and adjacent the supports to engage the latter and maintain the strips in position with the splash slats in predetermined offset relation, the shape of all of said slots being identical; and perforated locking bars having the vertical supports threaded therethrough for preventing movement of the support strips and vertical supports toward or from each other longitudinally of the splash slats.

8. In a splash deck for cooling towers, a frame having at least two spaced apart vertical standards of rigid construction, a pair of vertical supports, each having a plurality of equally spaced apart slots formed therethrough, said slots being arranged in opposed relation; a support strip having a plurality of equally spaced apart slots formed therethrough extending through the opposed slots of the supports, the slots in the strips and the supports being similarly spaced; a splash slat in each slot of the support strips, said support strips each having a series of notches formed therein in the lower edges thereof and adjacent the said supports to engage the latter and maintain the strips in position with the splash slats in predetermined offset relation; and perforated locking bars having the vertical supports threaded therethrough for preventing movement of the support strips and vertical supports toward and from each other longitudinally of the splash slats, said locking bars each having an edge against at least one of the said standards to prevent movement of the vertical supports and parts carried thereby toward said one standard.

9. In a splash deck for cooling towers, a frame having at least two vertical standards of rigid construction, a pair of vertical supports, each having a plurality of equally spaced apart slots formed therethrough, said slots being arranged in opposed relation; a support strip having a plurality of equally spaced apart slots formed therethrough extending through the opposed slots of the supports, the slots in the strips and the supports being similarly spaced; a splash slat in each slot of the support strip, said splash slats of the deck being arranged in groups of several splash slats disposed in offset relation, said support strips being spaced apart, certain of said supports engaging an edge of at least one splash slat of each group thereof to maintain the groups of splash slats against relative shifting; and a side bar fitted between two of the vertical supports and one of the standards for tight engagement therewith, whereby the splash deck assembly is secured between the cooling tower frame standards.

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