G. M. KLEUCKER.

DISTRIBUTING TROUGH FOR CONDENSERS.

APPLICATION FILED MAY 20, 1916.

1,291,926.

Patented Jan. 21, 1919.

2 SHEETS—SHEET 1.

Fig. 2.

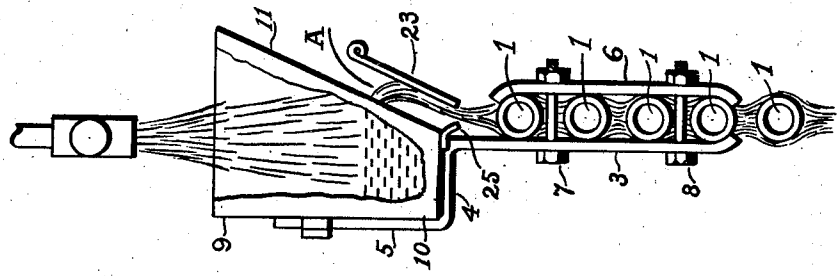
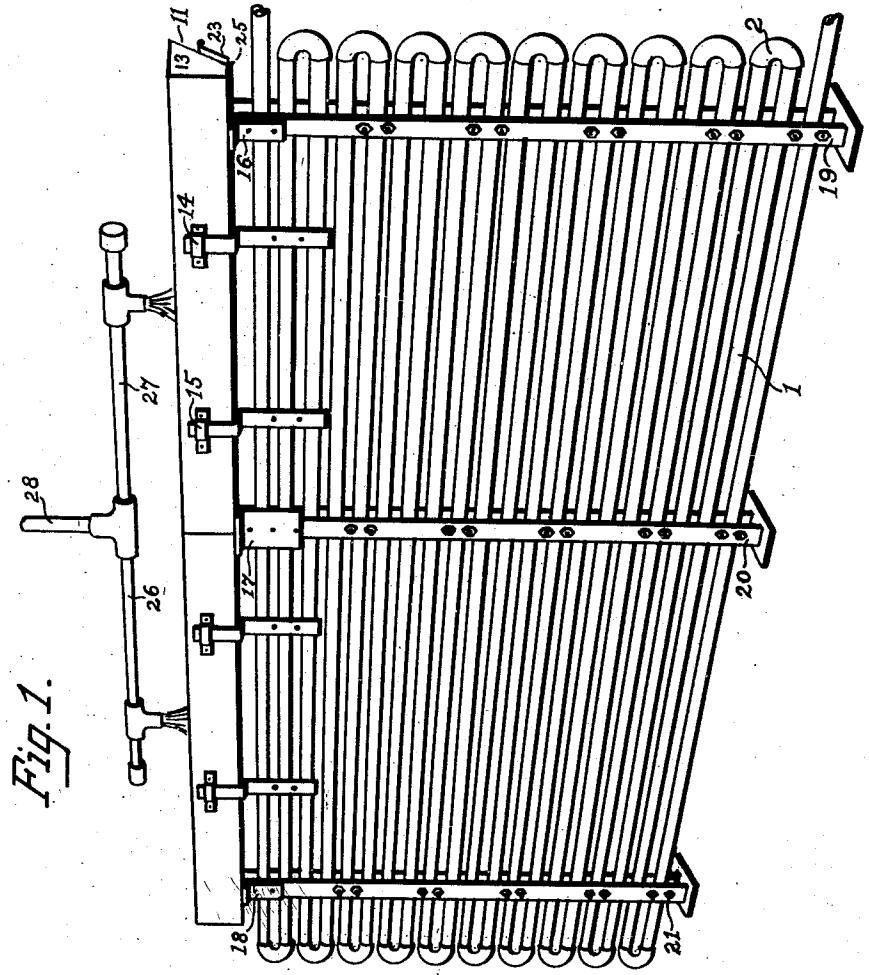


Fig. 1.



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Fig. 3.

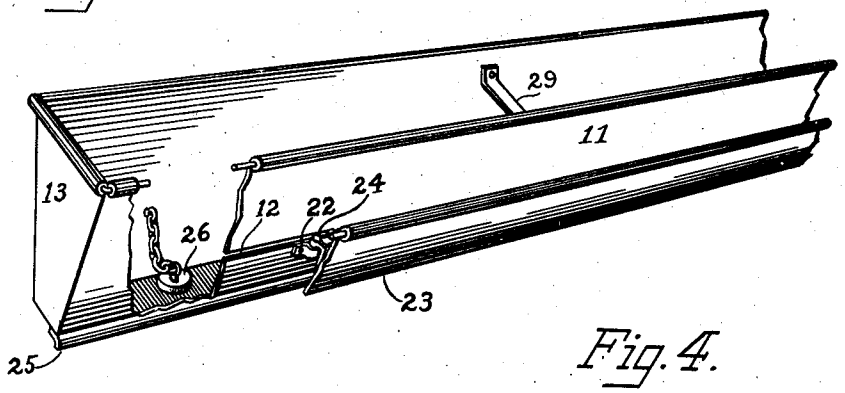
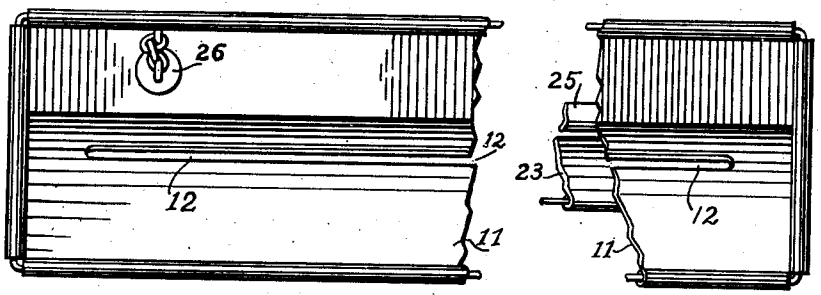


Fig. 4.



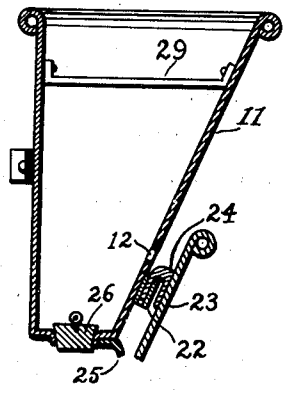


Fig. 5.

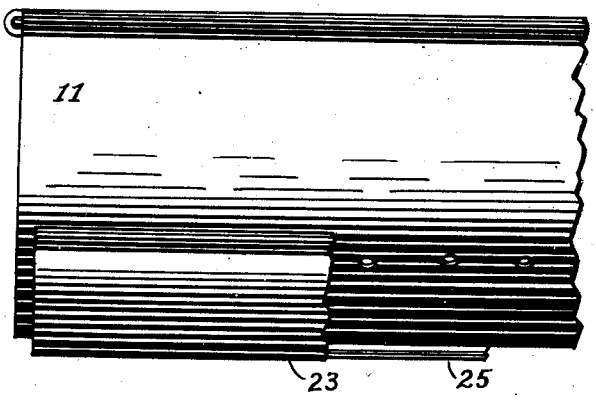


Fig. 6.

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UNITED STATES PATENT OFFICE.

GEORGE M. KLEUCKER, OF ST. LOUIS, MISSOURI.

DISTRIBUTING-TROUGH FOR CONDENSERS.

1,291,926. Specification of Letters Patent. Patented Jan. 21, 1919.

Application filed May 20, 1916. Serial No. 98,924.

To all whom it may concern:

Be it known that I, GEORGE M. KLEUCKER, a citizen of the United States, and resident of the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Distributing-Troughs for Condensers, of which the following is a specification.

The device, the subject of this invention is a means for distributing water over the pipes of a condenser, and it is so constructed that even though the trough be not arranged in a level position, a continued and even distribution will nevertheless result from its operation.

So that the advantages of my improvement may be more readily understood, I will briefly outline a few of the means formerly employed for accomplishing the useful purpose for which my trough was constructed, and I will endeavor to show by comparison the advantages to be found in my device as compared to the earlier devices employed for a similar purpose.

One of the best known of all of the earlier inventions is a trough, the sides of which are usually arranged at an angle to each other and into which water is allowed to flow. This trough may have a series of perforations or a slit in the bottom. In another the upper edge is serrated to produce a plurality of saw-teeth, extending the full length of one side. In another a plurality of holes are arranged a short distance from the top and in still other constructions pipes are used having slits along the top or bottom, through which the water is allowed to pass. The construction of each of these devices requires that they be arranged upon a straight horizontal line, that they should be level over their entire length, otherwise an uneven distribution of water would result, as no water would flow from the highest point and a super-abundance of water would flow from the lowest point.

In construction it is sometimes difficult and almost impossible to arrange a distributing trough upon a perfectly horizontal plane, and it will be noted in considering my invention that it will not be necessary to take such great care in leveling. Other advantages, and the construction and method of operation will be fully set forth as the specification progresses.

The following is what I consider a good means of carrying out this invention and the accompanying drawings will form a part of the complete description of my construction.

In the drawings:

Figure 1 is a perspective view of a single condenser coil with my trough in position.

Fig. 2 is an enlarged side elevation of my device and a portion of a condenser with return bends removed.

Fig. 3 is a perspective view showing the construction of the trough.

Fig. 4 a fractional plan view.

Fig. 5 a sectional view.

Fig. 6 a fractional side elevation.

Similar reference numerals indicate like parts in all of the figures where they appear.

In Fig. 1, I have shown a condenser of ordinary construction and composed of a plurality of horizontally arranged tubes 1, connected in series by return bends 2. The tubes, 1 are arranged in a vertical stack, and it is over this stack or vertical condenser, that I desire to shower a quantity of water that shall be determined by the conditions under which the condenser will be called upon to operate.

For obvious reasons it is very desirable that the entire outer surface of each tube shall receive a quantity of water equal to every other part. This even distribution of the cooling medium, which in this instance I prefer to consider as water is important as it operates for the highest possible efficiency of the condenser.

Secured to the upper tubes of the condenser I arrange a plurality of clamps, one of which consists of a side member 3, having an outward extension or shelf 4, and an upward extension 5, for a purpose that shall appear later. The other clamping member is a strap 6, and I secure these members together and to the tubes of a condenser by means of bolts 7 and 8.

I provide a trough having one vertical straight side 9, a narrow bottom 10, which is adapted to be received upon the shelf 4, and an angularly disposed side 11, which is provided with a plurality of perforations 12, Fig. 3. Each end of the trough is closed as indicated at 13, and the top of the trough is open. The sides may be braced or securely held in equal distant position by braces 29, Fig. 5.

Upon the straight vertical side 9, of the trough, I arrange straps 14 and 15, by means of which I engage the trough upon suitably

disposed extensions 5, of the clamping member previously described, and to further secure and support the trough, I may arrange L shaped members 16, 17 and 18, upon the uprights 19, 20 and 21, which support the tubes 1, of the condenser.

Upon the obliquely or angularly arranged side 11, of the trough I secure a plurality of lugs 22, and these lugs may be arranged adjacent to the perforations 12.

I provide a member which I may term a deflecting shield. This shield is shown at 23, and upon it I secure brackets or hooks 24, adapted to engage into the lugs 23, to retain the shield in position adjacent and parallel to the side 11, of the trough.

It will be observed that the shield 23, is arranged over the perforations 12, but that it does not close these perforations.

Upon the bottom or adjacent to the lower edge of the side 11, of the trough I may arrange a short downwardly turned lip 25, the functions of which will be described later.

In Fig. 1, it will be noted that on an ordinary 20 foot condenser, I arrange 2 troughs in line with each other, and together extending the entire length of the condenser. Over these troughs I extend a delivery pipe 26, 27 connected to a suitable pipe 28, and delivering its water into the troughs through suitable fittings.

In operation water is supplied through the pipe 28, to the troughs and when the troughs are filled to the height of the perforations 22, the water will commence to flow over the condenser tubes. The supply may be so regulated that the water in the troughs will be kept at any desirable level and when a low level of water is retained in the trough, a level as indicated in Fig. 2, the water will flow out through the perforations against the deflecting shield 23, which shield will direct the water over the tubes 1, of the condenser. Under this condition a nominal flow of water will pass through each perforation and will, in turning downward, impinge upon the shield much in the manner indicated at A. When, however, the level of water in the trough is raised the water will pass through the perforations with greater velocity, a greater quantity flowing through each perforation, due to the hydrostatic head of the water in the trough, and when the water level in the trough is kept at a high point, the water will quite violently impinge upon the deflecting shield 23. This however, will not change the mode or operation of my device. Changing the water level furnishes the means for readily regulating and pre-determining the quantity of water that will flow over the condenser.

It is desirable to carry the water level some distance above the perforations for then, no adjusting of the trough in level position will be necessary and still the water distribution over the condenser coil will be as uniform for the entire length of the coil as need be.

Should the force of the water striking the shield be too great, it may spatter back against the angular side 11, of the trough and tend to follow downward upon that side. In this instance the lip 25, would again deflect the course of the water and assure that it will fall upon the approximate center of the uppermost tube of the coil.

In cold weather or when a very small amount of water is required to be showered over the tubes, the limited flow through the perforations 12, may not reach the deflecting shield 23, but may follow down the side 11, of the trough. In this instance the lip 25, will also deflect the water over the tubes in a desirable manner.

I call particular attention to the fact that the shield 23, may be readily removed for any purpose and that the entire trough may be removed from the condenser without difficulty. This is particularly advantageous for cleaning purposes or if repairs are to be made.

It is obvious that the perforations may be moved or elongated or I may provide one continuous slot as shown in Fig. 4. I may increase or decrease the size of the perforations 12, or I may increase or decrease the number of perforations used. I may also change the dimensions of the trough or the angularity of the sides in any manner that I may find desirable for differing conditions.

As certain water level will be kept in the trough at all times I have found it expedient to provide a plug 26, arranged in a perforation in the bottom of the trough and by means of which the trough may be drained and cleaned. This may be dispensed with, with the accompanying loss of function, and the means for supporting the trough or the shield 23, may be changed at will, and I believe that the member 25, may in some instances be found unnecessary and although I prefer the whole as shown and described other modifications may be made within the scope of the appended claims without departing from the principle or sacrificing the advantages of the invention.

Having carefully and fully described my invention what I claim and desire to secure by Letters Patent is:

1. A trough, the top of which is open and having one side arranged at an obtuse angle to the bottom of the trough, said side being provided with a plurality of perforations and a deflecting shield secured to said side and adjacent to and in front of said perforations and practically parallel in a vertical direction to the perforated side of

the trough, but spaced therefrom as and for the purpose set forth.

2. An open trough, the bottom of which is perforated and provided with a removable plug, and one side of which is perforated, and a flat deflecting shield removably secured to said perforated side and coöperating therewith.

3. An open topped trough, one side of which is perforated and a detachable deflecting shield exterior to said trough and in front of said perforations to direct the flow therefrom, and means for receiving and directing the drip from said trough.

4. A trough, the top of which is open and having one perforated side arranged at an obtuse angle to the bottom of the trough and a deflecting shield supported upon and parallel to said angularly disposed side and adjacent to said perforations.

5. A trough, a plurality of lugs upon each of the longest sides thereof, angular brackets engaging certain of said lugs and extending under said trough for supporting said trough and means supported in others of said lugs for deflecting the discharge from said trough.

6. The combination with a condenser of a trough supported thereby and having one side arranged at an obtuse angle to the bottom of the trough, and perforated and a deflecting shield and a projection at the base of said trough attached to said trough, coöperating with said shield, and adapted to direct the flow from said trough over the tubes of said condenser.

7. The combination with a condenser of a trough for distributing water thereover, said trough having a flat bottom provided with a drain plug, a perforated side arranged at an obtuse angle to the bottom of the trough, a deflecting shield removably attached to and parallel with said angularly arranged side and adapted to change the direction of flow of liquid passing through said perforations as and for the purpose set forth.

8. An open distributing trough, one side of which is vertical and the other side of which is arranged at an obtuse angle to the bottom of the trough and perforated, a plurality of deflecting surfaces, one secured to the bottom of said trough and the other secured to the perforated side thereof, said deflecting surfaces coöperating to direct the flow from said trough in a line parallel to the vertical side of said trough.

GEO. M. KLEUCKER.