April 19, 1932. O. M. SUMMERS 1,854,567

APPARATUS FOR MAKING PIPE LOOPS

Original Filed Jan. 31, 1927 2 Sheets-Sheet 1

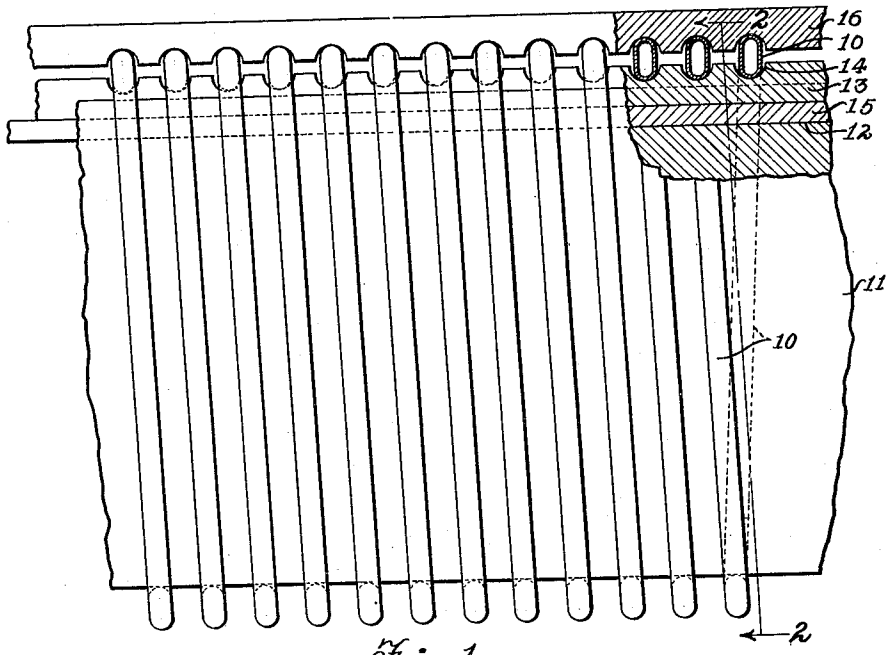

Fig. 1

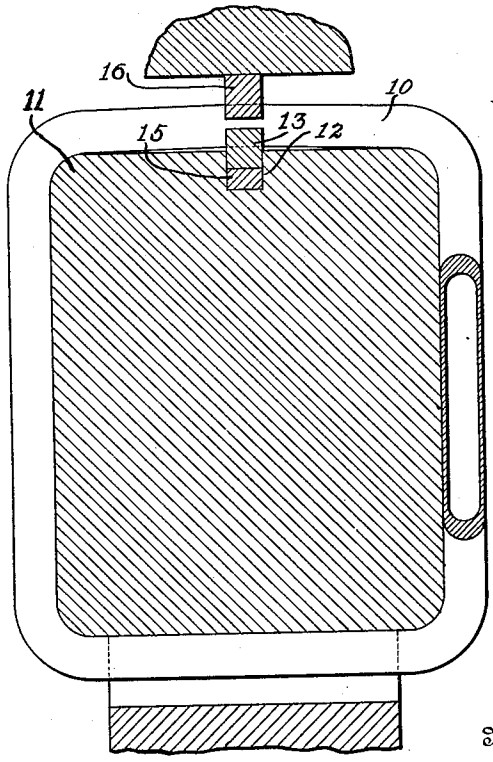

Fig. 2

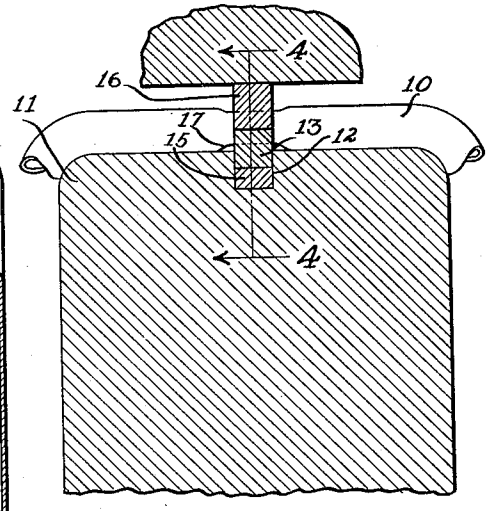

Fig. 3

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APPARATUS FOR MAKING PIPE LOOPS

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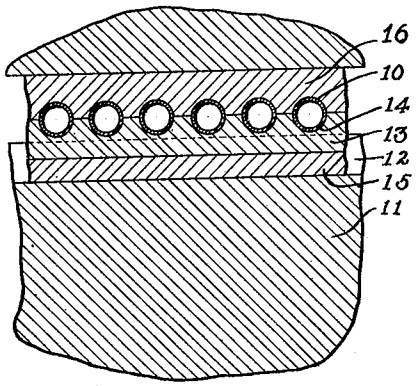

Fig. 4

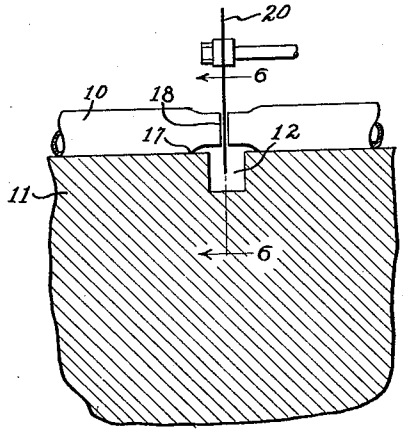

Fig. 5

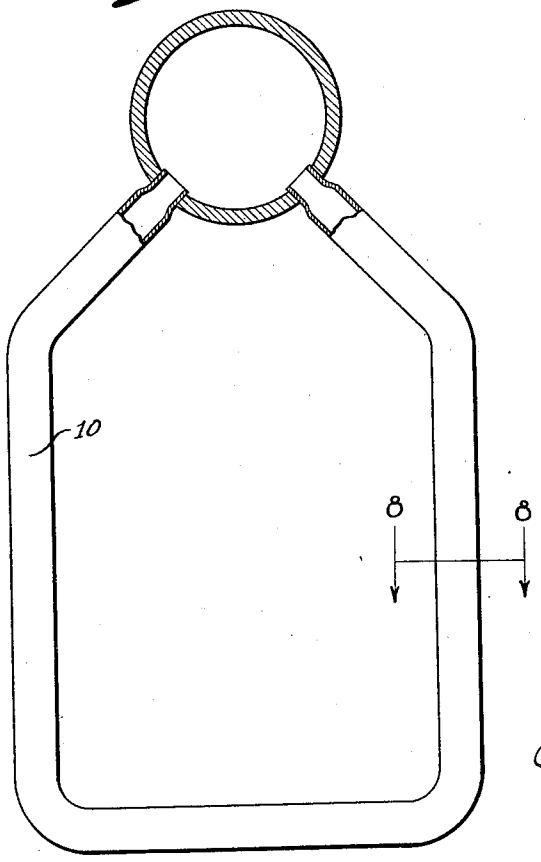

Fig. 7

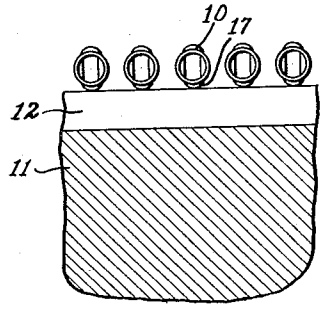

Fig. 6

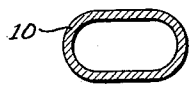

Fig. 8

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Patented Apr. 19, 1932 1,854,567

UNITED STATES PATENT OFFICE

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APPARATUS FOR MAKING PIPE LOOPS

Original application filed January 31, 1927, Serial No. 164,880. Patent No. 1,732,343. Divided and this application filed December 31, 1928. Serial No. 329,368.

This invention relates to refrigerating apparatus, and particularly to the cooling units thereof and the method of manufacturing same, this application being a division of my application Serial No. 164,880, for Method of forming pipe loops, filed January 31, 1927, Patent 1,732,343.

In the flooded system of refrigeration, it is customary to use a tank or header which has a plurality of loops adapted to contain liquid refrigerant connected therewith. The greater the number of loops that can be used, the greater is the cooling surface presented. Loops are used, as they present their entire surface to the atmosphere and, at the same time, provide a free passage for the circulating air within the cooling compartment.

If a sufficient number of round loops were used, it would be necessary to place them so close together that the circulation of air through cooling unit would be materially obstructed. For this reason it is preferable to use loops which are flattened throughout most of their length. However, it is desirable that the loops have cylindrical ends so that they may be more readily attached to header, because it is easier to make a good joint between cylindrical parts than between parts which are oblong or elliptical in cross-section.

In prior methods of manufacturing these flat loops with cylindrical ends it has been the practice to make each loop separately, which practice is both slow and costly.

It is an object of this invention to provide a method of manufacturing a plurality of individual loops from a single coil pipe, in which a portion of these loops has one cross-sectional contour and another portion another cross-sectional contour.

A further object of this invention is to provide a method for making a plurality of pipe loops which can be practiced by means of single and easily constructed apparatus.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is an elevation of a pipe coiled about a mandrel in the first step of the operation;

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary view showing a forming operation;

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 3;

Fig. 5 is a fragmentary view with the forming dies removed from mandrel showing saw cut through pipe;

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 5;

Fig. 7 shows one of the completed loops attached to a header; and

Fig. 8 is a sectional view taken on the line 8—8 of Fig. 7.

Referring to the drawings, a length of flat pipe 10 is coiled about a mandrel 11. The mandrel may be of any suitable shape to conform with the configuration of the finished product. The top side of the mandrel is provided with a groove 12 which extends the entire length of the mandrel intermediate the edges thereof. The groove 12 is adapted to receive a die or swaging member 13. The die or swaging member is provided, transversely thereof, with spaced, semi-circular grooves 14, each of which receives a turn of the coiled pipe. The die or swaging member 13 is then elevated above the plane of the mandrel 11, by means of a removable bar or wedge 15, thereby providing a space between the top of the mandrel and the pipe 10. This space is provided in order to permit shaping a portion of each turn of pipe into a cylindrical form without deforming other portions thereof.

In practice, it is preferable first to assemble the die or swaging member 13 and wedge 15 in the mandrel 11, and then wrap the pipe 10 about the assembly. This permits the turns of the pipe to be uniformly spaced by the semi-circular grooves 14. A second die or swaging member 16, which is similar to the member 13, is then placed in an inverted position upon the turns of the coiled pipe 10, so that the grooves of each of the die or swaging members are opposite, with each pair of

grooves having a portion of a turn of the coil between them.

By means of a press (not shown), the die or swaging member 16 is forced downwardly into contact with the die or swaging member 13, so that their opposing grooves unite to form a cylindrical recess, thereby forcing that portion of the pipe which is between these members into a cylindrical shape. The space which is provided between the mandrel 11 and the pipe 10, permits the formation of a shoulder on the underside of the pipe turn, as is clearly shown at 17 in Fig. 3.

The die or swaging members 16, 13, and the wedge 15 are then removed and the rounded portions of the pipe which have been formed are severed, as shown at 18, by any suitable means, such as a saw 20. The natural spring of the loops thus formed, permits them to be easily removed from the mandrel; and, as they are usually constructed of copper, each loop may be readily bent by hand into the desired shape to fit into the opening in header shown in Fig. 7. It is readily apparent that the process described may be employed in any case where it is desirable to provide end portions of one cross-section on pipe loops of another cross-section by the use of suitable die or swaging members.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adapted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. Apparatus for making pipe loops having portions of different cross-sectional contour comprising, a two-part swedging die providing a plurality of die recesses each for receiving a portion of a turn of a pipe coil, a mandrel having provisions for receiving one of the die members so that each turn of the pipe which is wrapped around the mandrel will be received by a die recess in said die member, and means carried by the mandrel for supporting said die member and movable relative to the mandrel to permit retracting said die member from the pipe coil.

2. Apparatus according to claim 1 in which the mandrel is provided with a longitudinally extending groove for receiving one of the die members, and a removable bar for spacing said die member with its die recess beyond the surface of the mandrel.

3. Apparatus for making pipe loops having portions of different cross-sectional contour comprising, a two-part swedging die providing a plurality of die recesses each for receiving a portion of a turn of a pipe coil, a mandrel having provisions for receiving one of the die members so that each turn of the pipe which is wrapped around the mandrel will be received by a die recess in said die member, and means carried by the mandrel for supporting said die member, said means being adapted to permit retracting said die member within the surface of the mandrel.

4. Apparatus for making pipe loops having portions of different cross-sectional contour comprising a mandrel for coiling pipe, the mandrel including swedging means adapted to engage only a portion of each convolution of the coil, and means for positioning the swedging means either to engage or disengage the coil.

5. Apparatus for making pipe loops having portions of different cross-sectional contour comprising a mandrel for coiling pipe, the mandrel including swedging means adapted to engage only a portion of each convolution of the coil, and means for moving the swedging means transversely to the surface of the mandrel.

6. Apparatus for making pipe loops having portions of different cross-sectional contour comprising a mandrel for coiling pipe, the mandrel including movable swedging means, and means for holding the swedging means in engagement with the coil.

7. Apparatus for making pipe loops having portions of different cross-sectional contour comprising a mandrel for coiling pipe and means removably positioned within a longitudinal recess of the mandrel for swedging a portion of each convolution of the coil.

In testimony whereof I hereto affix my signature.

OTTO M. SUMMERS.