C. H. TRUE.

RADIATOR AND SIMILAR STRUCTURE.

APPLICATION FILED APR. 14, 1920.

1,368,770. Patented Feb. 15, 1921.

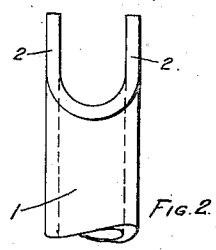

FIG. 2.

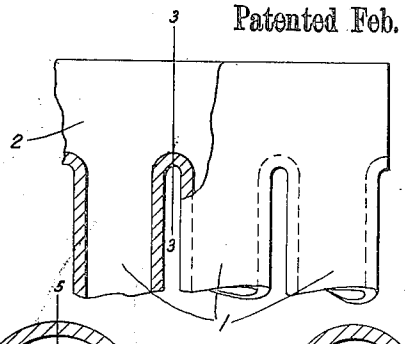

FIG. 1.

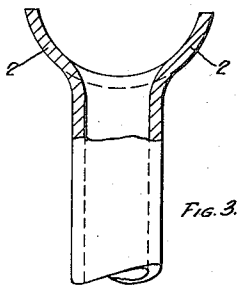

FIG. 3.

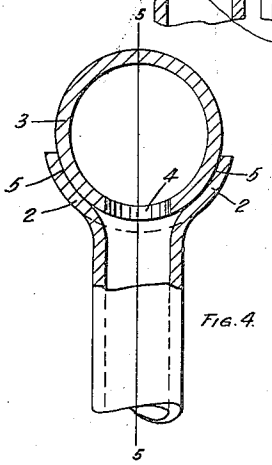

FIG. 4.

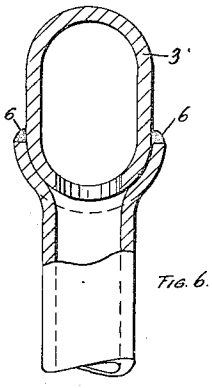

FIG. 6.

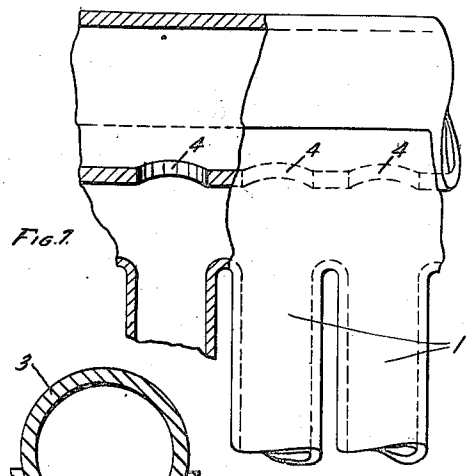

FIG. 7.

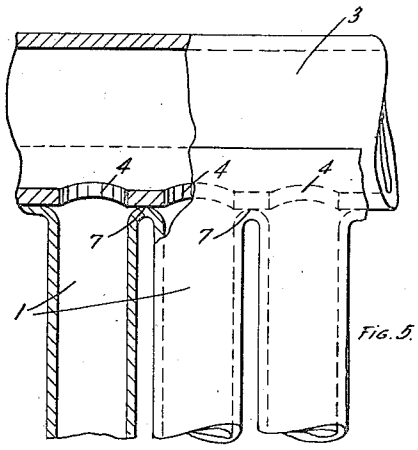

FIG. 5.

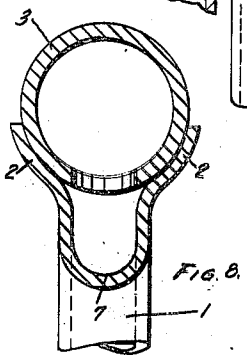

FIG. 8.

Clarke H. True Inventor

By his Attorney O. V. Thiele

UNITED STATES PATENT OFFICE.

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RADIATOR AND SIMILAR STRUCTURE.

1,368,770. Specification of Letters Patent. Patented Feb. 15, 1921.

Application filed April 14, 1920. Serial No. 373,904.

To all whom it may concern:

Be it known that I, CHARLES H. TRUE, a citizen of the United States, residing at Hammond, in the county of Lake and State of Indiana, have invented certain new and useful Improvements in Radiators and Similar Structures, of which the following is a specification.

This invention relates to radiators and related structures and particularly to a radiator whose form and method of making are described in United States Patents 1,264,455 and 1,315,614 granted to myself on April 30th, 1918, and September 9th, 1919, respectively.

The present improvement has for its purpose the provision of an improved form of header in these structures.

The invention is illustrated in the single sheet of drawing herewith, in which Figure 1 illustrates a fragmentary side view partly in section of a radiator according to my invention partly completed; Fig. 2 is an end view of the same; Fig. 3 is a fragmentary view partly in section on line 3—3 of Fig. 1 at a subsequent state of manufacture; Fig. 4 is a similar view of the completed radiator; Fig. 5 is a sectional view on line 5—5 of Fig. 4; Fig. 6 is a view similar to Fig. 4 showing a modification; and Figs. 7 and 8 show in views similar to 5 and 4 respectively a further modification.

The pipes 1—1 are joined to each other by a process which is well understood by those familiar with this art and which is completely described in Patent 1,264,455 referred to above. The following brief description will therefore suffice.

Two pipes having had their ends heated to a welding heat, are each slit along a line parallel to its axis for a suitable distance, the portions adjacent to the sides and bottom of the slit of each are bent outward and the edges of one welded to those of the other. These steps may be performed without any special apparatus but are preferably performed in suitably shaped dies, the slitting, bending, and welding all being done in one operation. A third pipe is joined to one of the two by a second similar operation, and as many more pipes as desired are added by successive operations. The process is described in the patent also in a modified form, which has proved very good in practice, whereby the whole number of pipes which it is desired to join are in a suitably formed set of dies joined simultaneously.

In either case the resulting structure is an incomplete header or manifold connecting a set of parallel pipes, the header being trough-shaped, its side opposite the pipes still being open. To complete the header this open side has next to be closed. The patent describes one way of effecting this. The ends of the trough are split, the adjacent portions bent outward to lie in a plane with the sides of the trough; the sides of the trough are then bent toward each other until the edges meet, the edges then being welded together.

The present invention contemplates an improved way of finishing the header after the pipes have been joined and the ends of the trough-like incomplete header have been split and the adjacent portions bent outward. Instead of bending the sides of the trough toward each other, these portions (designated by reference numerals 2—2) are bent outward, as illustrated in Fig. 3, so that they assume the shape of partial cylinders whose radius conforms to the pipe 3. This pipe 3 occupies a position clearly illustrated in Figs. 4 and 5. It has a series of openings 4—4 in it, each opening being opposite one of the pipes 1—1. The portions 2—2 are welded to pipe 4 along their common surfaces 5—5 by means of pressure, hammering, electric welding or any other preferred means. In this way a very convenient and strong header is provided for the set of pipes. This header may evidently be threaded or prepared in some other way in its ends for connections. It will be clear that a similar header may be and usually will be provided for the other ends of the pipes 1—1. The variation in Fig. 6 will be understood without any particular description. The header 3 may evidently be flattened to any extent thought desirable by the designer. This figure illustrates one additional feature, *i. e.*, the material 6 which may be filled in at the points indicated by means of acetylene or other autogenous welding. This material when used furnishes an additional guarantee against leakage. It also adds to the strength of the connection between the header 3 and the pipes and in fact if desired it may be relied on

entirely for this strength, in which case there would be no welding between the portions 2 and the header 3 at all. The variation shown in Figs. 7 and 8 may prove desirable in some cases. It will be seen in Fig. 5 that the header 3 comes in contact with the metal joining the adjacent pipes 1—1 at the points 7—7. If desired the portions 2—2 need not be bent out all the way down to these points 7, but only part way, so that the pipe 1 remains considerably above 7. This will be entirely clear, particularly from Fig. 8. In that case the openings 4—4 need not be exactly opposite the pipes 1—1 and in fact need not correspond in number, size or location to these points at all.

Obviously it is quite possible to vary to some degree the forms of my invention shown in the drawing. These forms are meant for illustration only and are not to be considered in any way as limitations.

What I claim is:—

1. The process of making structures of the kind described, which comprises joining the ends of two of the pipes by the steps of heating them; slitting them for a suitable distance from their ends; pressing the portions adjacent to each side and to the bottom of the slits outward; welding the edges of said portions of one to the corresponding edges of the other; joining in a similar manner a third pipe to one of the first two, and similarly adding as many more pipes as desired; whereby the pipes are joined by an open-topped trough-like incomplete header; slitting the two ends of the trough and bending the portions adjacent to the slits outward; placing a pipe into the trough and securing it to the walls of the trough.

2. The process of making structures of the kind described, which comprises joining the ends of two of the pipes by the steps of heating them; slitting them for a suitable distance from their ends; pressing the portions adjacent to each side and to the bottom of the slits outward; welding the edges of said portions of one to the corresponding edges of the other; joining in a similar manner a third pipe to one of the first two, and similarly adding as many more pipes as desired; whereby the pipes are joined by an open-topped troughlike incomplete header; slitting the two ends of the trough and bending the portions adjacent to the slits outward; perforating a header pipe with holes spaced to correspond to the ends of the assembled pipes; placing this pipe into place in the open-ended trough and welding the trough walls to it.

3. The process of making structures of the kind described, which comprises joining the ends of two of the pipes by the steps of heating them, slitting them for a suitable distance from their ends; pressing the portions adjacent to each side and to the bottom of the slits outward; welding the edges of said portions of one to the corresponding edges of the other; joining in a similar manner a third pipe to one of the first two, and similarly adding as many more pipes as desired; whereby the pipes are joined by an open-topped trough-like incomplete header; slitting the two ends of the trough and bending the portions adjacent to the slits outward; perforating a header pipe with holes spaced to correspond to the ends of the assembled pipes; curving the sides of the trough to the radius of the header pipe; placing the pipe into the trough and welding it to the walls of the trough.

4. A structure of the class described comprising a set of pipes integrally connected at their ends to a trough-shaped channel, and a header pipe lying in and welded to the walls of the trough, the header pipe being provided with perforations opposite the pipe ends.

CHARLES HENDERSON TRUE.