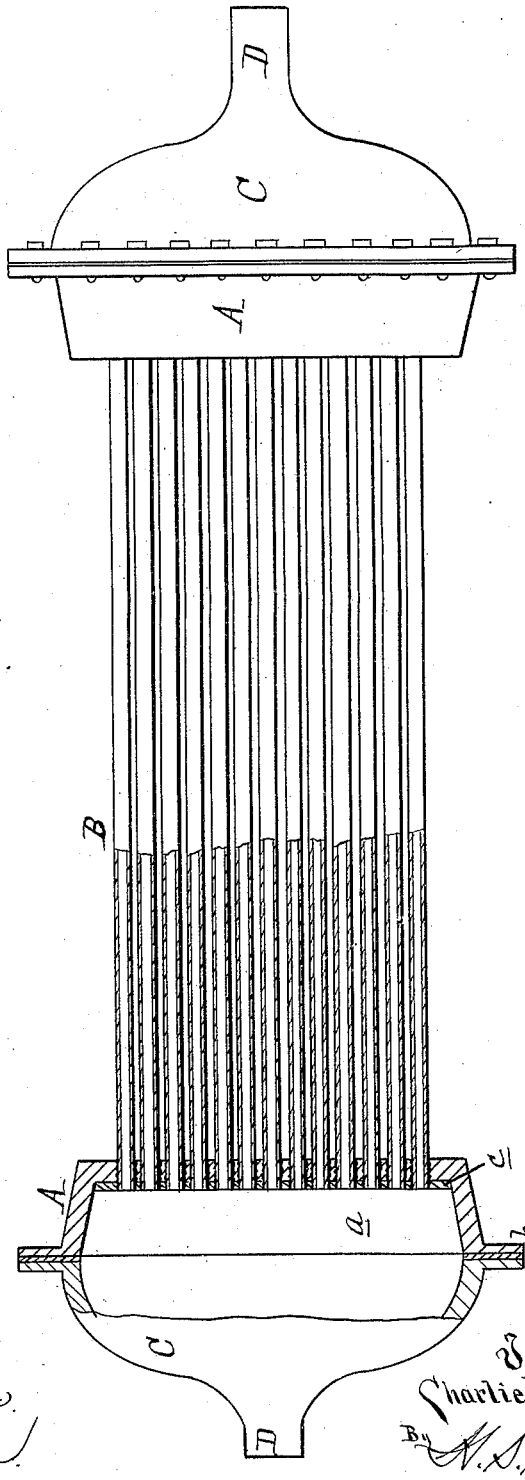
(No Model.)

C. E. MARK.

MANIFOLD.

No. 419,783. Patented Jan. 21, 1890.



Attest:
J. T. Stephan.
H. J. Lehman.

Inventor.
Charlie E. Mark.
By N. S. Sprague
Att'y.

UNITED STATES PATENT OFFICE.

CHARLIE E. MARK, OF CLEVELAND, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO RUSSELL BOTTSFORD, OF SAME PLACE.

MANIFOLD.

SPECIFICATION forming part of Letters Patent No. 419,783, dated January 21, 1890.

Application filed August 3, 1889. Serial No. 319,634. (No model.)

To all whom it may concern:

Be it known that I, CHARLIE E. MARK, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Heating Apparatus Manifolds, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to certain new and useful improvements in manifolds of that class designed for use in hot-water-heating apparatus.

The invention consists in the peculiar means employed for forming tight joints between the tubes and the heads of the manifold, all as more fully hereinafter set forth and claimed.

In the accompanying drawing, which forms a part of this specification, my improved manifold is shown in sectional elevation.

A represents the heads of the manifold, which I preferably cast rectangular in form from any suitable metal, though I prefer brass. Each of these heads is provided with a well *a*.

C represents caps, which are designed to be bolted to the flanges *b* of the heads A, suitable packing being used, so as to insure tight joints between the parts. Each cap is provided with a threaded neck D, by means of which it may readily be connected with any system of piping.

B represents a plurality of tubes, which communicate with the wells *a* of the heads A and should be sufficient in number to equal the bore of the neck D. To secure these tubes, which are preferably of copper, in place and to obtain tight joints, I tap through the bottom of the well a number of threaded holes equal to the number of tubes to be employed in the manifold. The interior of the well is then tinned. The ends of the tubes are tinned and inserted in the holes in the heads, their ends projecting somewhat within the well. I now, by the use of a proper tool, expand the ends of the tubes till they are firmly embedded in the threads of the holes. This being done, the ends of the tubes are temporarily plugged, and molten lead is poured into the well around the projecting ends of the tubes, thus forming a filling *c*, which firmly adheres to the tubes and the wall and bottom of the wells of the heads and producing a thoroughly water and steam tight joint between the tubes and the heads.

What I claim as my invention is—

In a manifold, the heads A, having the wells *a* tinned upon the inside and provided with threaded holes or openings in their bottom to receive the tinned ends of a plurality of tubes B, the ends of said tubes being tinned and expanded into the threads of said holes, and a filling of lead *c*, surrounding the projecting ends of said tubes within the wells, the parts being constructed and arranged substantially in the manner and for the purposes set forth.

In testimony whereof I affix my signature, in presence of two witnesses, this 13th day of June, 1888.

CHARLIE E. MARK.

Witnesses:
H. S. SPRAGUE,
H. L. VAIL.