

Z. S. DURFEE.

MANUFACTURE OF TUBES AND CYLINDERS.

No. 172,098.

Patented Jan. 11, 1876.

Fig. 6.

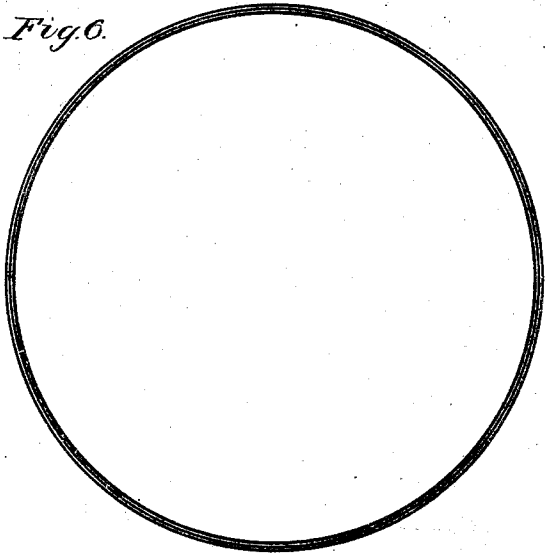


Fig. 4.

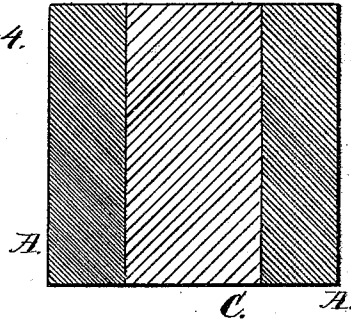


Fig. 5.

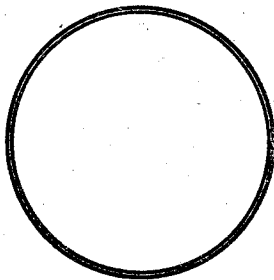


Fig. 2.

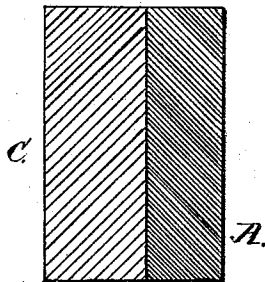


Fig. 1.

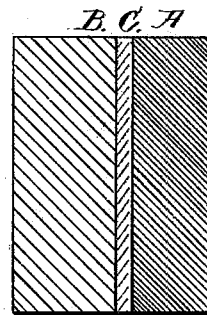


Fig. 7.

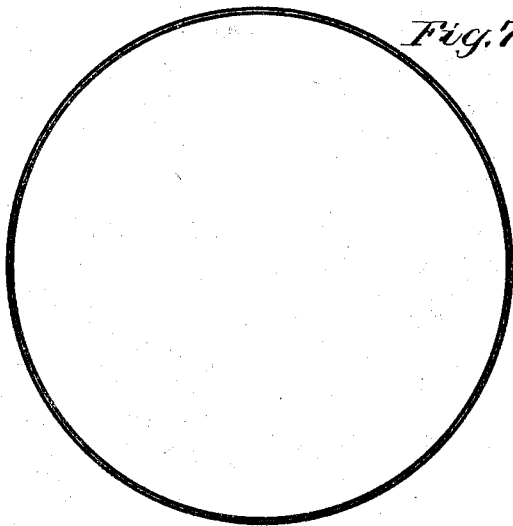
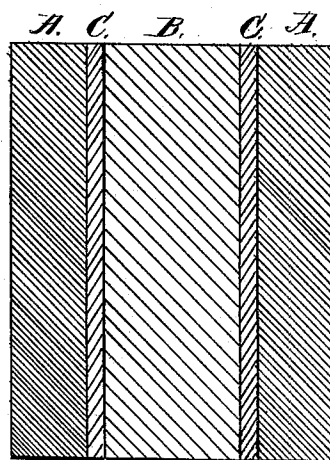


Fig. 3.



Witnesses.

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ZOHETH S. DURFEE, OF NEW YORK, N. Y.

IMPROVEMENT IN THE MANUFACTURE OF TUBES AND CYLINDERS.

Specification forming part of Letters Patent No. **172,098**, dated January 11, 1876; application filed May 20, 1873.

To all whom it may concern:

Be it known that I, Z. S. DURFEE, of New York, N. Y., have invented a new and Improved Construction of Tubes, Flues, and Boilers, of which the following is a specification:

Attempts have from time to time been made to manufacture tubes and flues for boilers and other uses from skelps or strips of cast-steel, of homogeneous metal, and Bessemer steel, all of which are welded with considerable difficulty, and these attempts have hitherto proved failures from the uncertain soundness of such pipes and flues by reason of imperfections in the welding.

Now, it has been found that by making a pile from which to roll tube strips or skelps and boiler-plates, by taking a bar of either of those aforementioned metals, which do not weld readily to themselves, and a bar of iron, and putting between them an intermediate layer of blistered steel or puddled steel, the blistered or puddled steel will act as a flux to weld the pile, and produce a bar, strip, or sheet one surface of which will be steel or homogeneous metal, the other iron, with a center of intermediate character. From these sheets, or strips, tubes and boilers can be made with one surface of steel and the other of iron; and the tubes so made can be welded more surely and soundly than tubes of steel or homogeneous metal, because the edges of the strips or sheets forming them will come together when lapped round to make the tubes, so as to bring the three different metals upon each other in succession, and thus insure a fluxing of their surfaces, the iron and blistered or puddled steel carrying in their composition a slag, which will melt out and protect the cast-steel or homogeneous metal.

In case it should be desired to have both surfaces of the sheets for making the tubes or boilers of steel or homogeneous metal, the pile for making them would be made up as follows: first, a bar of cast-steel; second, a bar of blistered steel; third, a bar of iron; fourth, a bar of blistered steel; and, fifth, a bar of cast-steel.

In either of the piles above described the iron may be dispensed with, because the blistered or puddled steel is the real or the best fluxing agent; but the compound of the three metals will be cheaper than that of the cast-steel and blistered steel alone. There is, how-

ever, an advantage in using the two steels, so far as rapidity of conducting heat is concerned, as steel is a better conductor than iron.

In making the tubes or flues from these strips the steel surface may be put outside or inside, as desired. If the tubes are to be used for water-tubes of boilers, the heat surrounding the outside surfaces, the outside should be, by preference, of steel. If the tubes should be used, as in ordinary tubular boilers, with the heated currents passing through them, the inside surface should preferably be of steel, because the heated currents ordinarily carry sharp particles of fuel, which cut the tubes.

It has been found quite difficult to make good steel boilers, because the absolute homogeneity of the cast-steel is liable to produce, in the manufacture of the boilers, straws in them, which assist in their rupture under pressure. The compound sheets I propose will be more elastic, and, I think, safer.

In the accompanying drawings, Figure 1 shows a pile composed of cast-steel A, iron B, blistered steel or puddled steel C; Fig. 2, a pile of cast-steel A, blistered steel C; Fig. 3, cast-steel A, iron B, blistered steel C; Fig. 4, cast-steel A A, blistered steel C; Fig. 5, tube made of iron, steel, and blistered steel, steel or iron outside, as may be preferred; Fig. 6, a flue or boiler, steel outside and inside, iron or blistered steel intermediate; Fig. 7, boiler or flue, iron and steel, welded by the blistered steel, or steel and blistered steel, at will.

I claim as an improvement in the art of making steel-surfaced tubes or cylinders the following method:

Making skelps and sheets from piles compounded as described and shown in the accompanying drawings and specification, and bending the same, so as to bring the different metals compounded to lap or abut together, and then welding the joints by any of the usual modes and machinery employed in this manufacture, substantially as and for the purposes set out in the accompanying specification, and to overcome the difficulties hitherto met in making good steel or steel-surfaced tubes.

ZOHETH S. DURFEE.

Witnesses:

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