

Z. S. DURFEE.

Manufacture of Piles for Beams.

No. 158,578.

Patented Jan. 12, 1875.

Fig. 1.

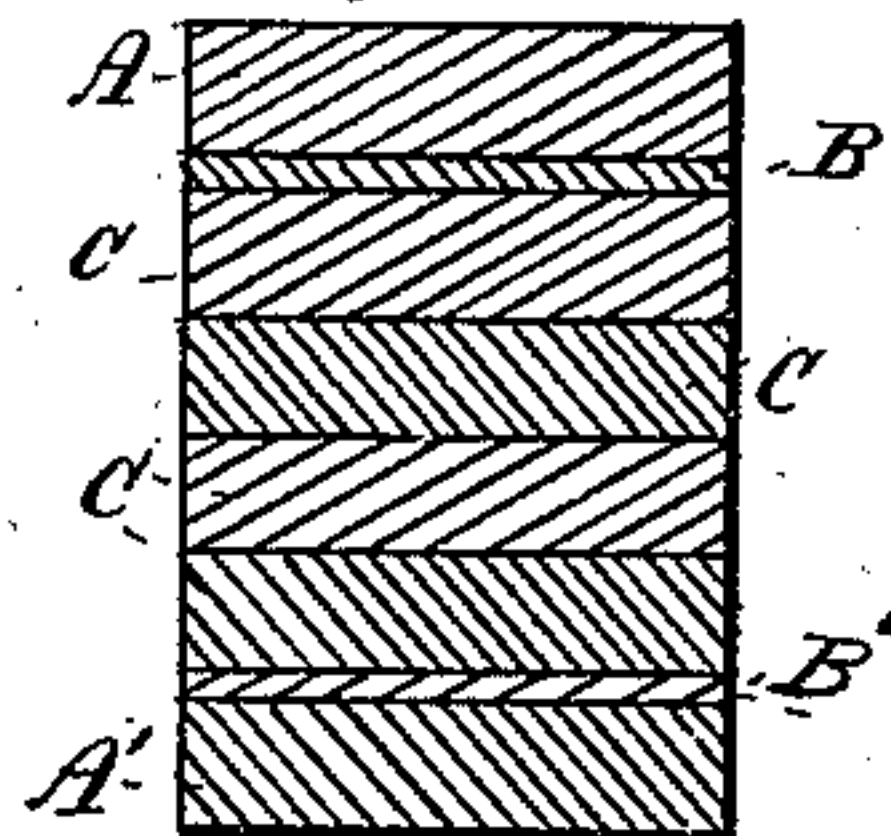


Fig. 2.

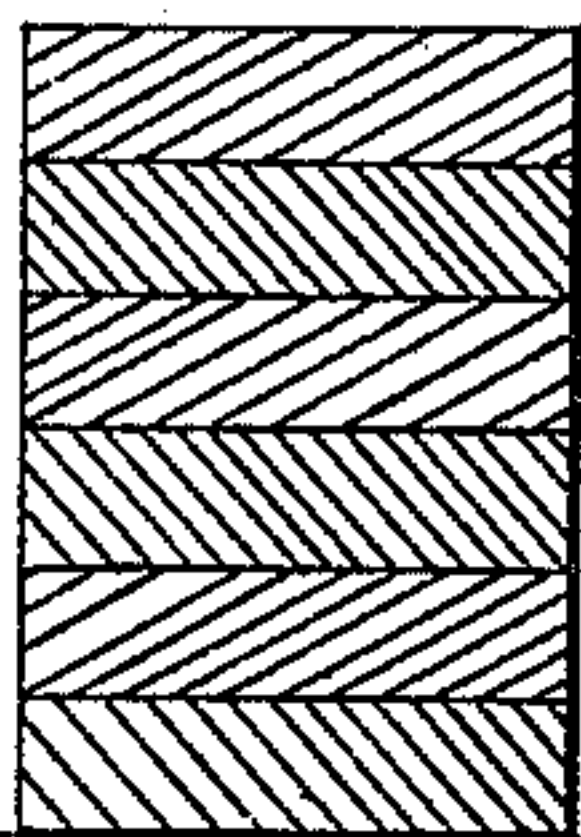


Fig. 3.

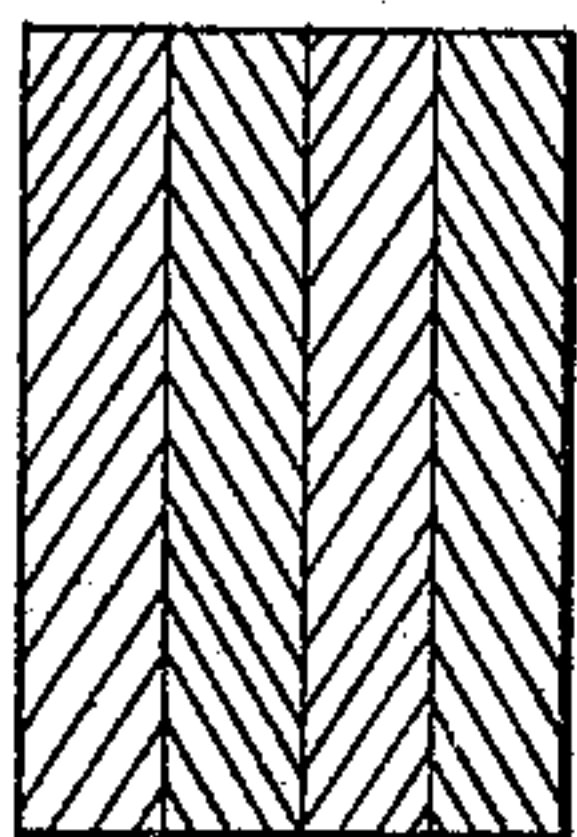


Fig. 4.

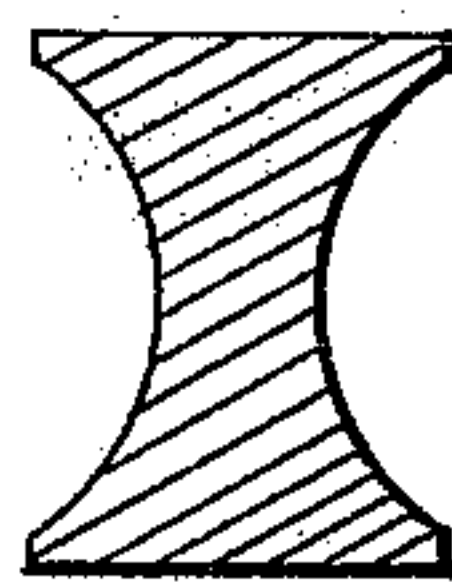


Fig. 5.

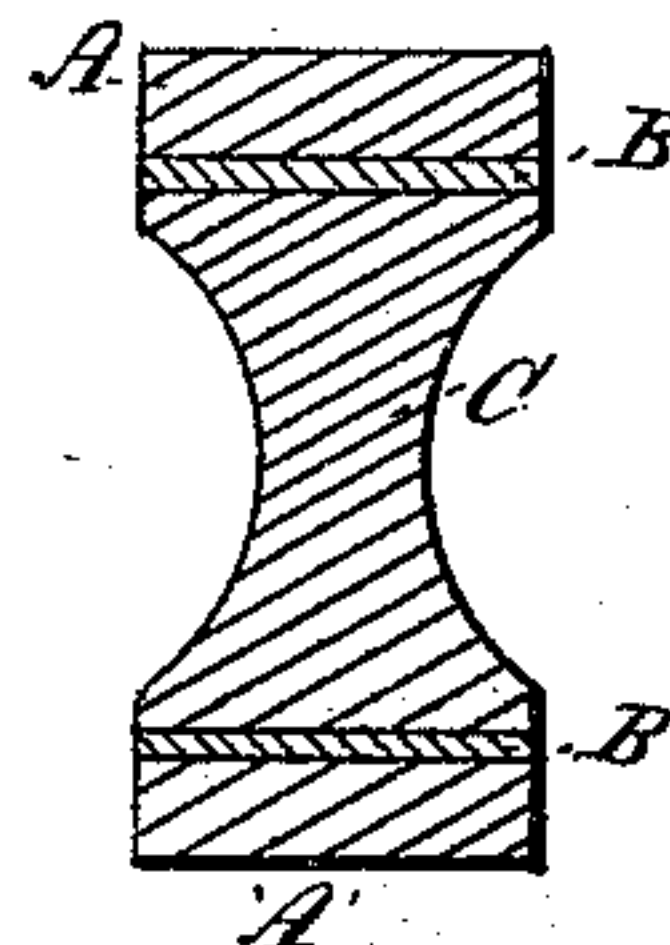
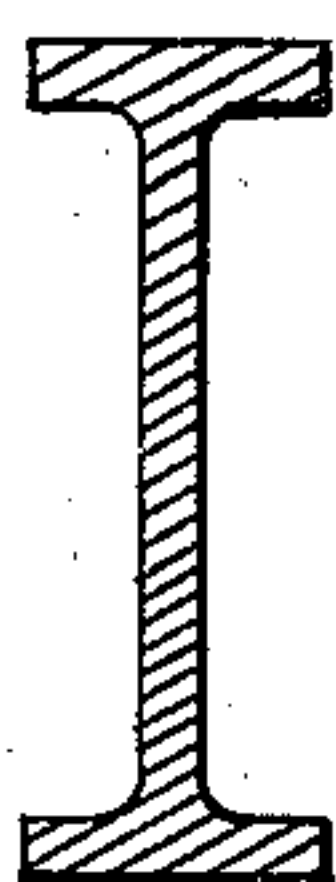


Fig. 6.



Witnesses

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## IMPROVEMENT IN THE MANUFACTURE OF PILES FOR BEAMS.

Specification forming part of Letters Patent No. 158,578, dated January 12, 1875; application filed August 13, 1872.

*To all whom it may concern:*

Be it known that I, ZOHETH S. DURFEE, of the city, county, and State of New York, have invented certain improvements in the method of making beams and girders of a combination of bars of iron and steel, of which the following is a description:

The object to be accomplished by my invention is the production of a girder or beam, the top and bottom members or flanges of which, or either of them, shall be made in greater or less part of steel, the steel I prefer to use being that commonly known as Bessemer steel.

It has been proposed to assist the welding of iron and steel bars by the use of an intermediate layer or bar of blistered or puddled steel; and my invention relates to the method of applying this plan to the manufacture of beams and girders.

Figure 1 shows the application of the foregoing plan of welding iron and steel bars to the formation of a pile of the character most commonly used for beams and girders, in which—

A A' represent the bars of steel; B B', the bars of blistered or puddled steel, and C C C the bars of iron.

It may be possible to roll such a pile satisfactorily into a beam or girder of moderate size; but, if the pile be for a large girder, there will be great danger that the steel bars at the bottom and top will be injured before the iron bars will be sufficiently heated to be welded throughout; and, besides, by reason of the greater density of the steel than of the iron, there will be difficulty in changing the form of such a pile to that of the finished girder, because the greater portion of the work will have to be done on the iron, and the weld between the iron and the steel may be weakened or broken up in consequence of the greater readiness of the iron than of the steel to yield to the action of the rolls.

In order to avoid these difficulties, I proceed to roll from piles formed entirely of iron, or partly of iron and partly of steel, as shown in Figs. 2 and 3, made in any way in which piles for girders are now made, (except that, when steel is combined with the pile, it must always be put inside the pile,) an approximate section of the iron portion of the girder, such,

for instance as is shown in Fig. 4; and in making this approximate section I desire to have the bars composing it welded as thoroughly as possible, so that in the subsequent treatment it will not require to be raised to a very high heat. I then take this approximate section and make a pile for the finished girder by adding bars of steel and blistered or puddled steel, as shown in Fig. 5, from which pile I roll the finished girder required—as, for instance, that shown in Fig. 6.

Inasmuch as the approximate section has already been thoroughly welded, only sufficient heating of the pile including it will be necessary to insure the welding of the steel to the iron, and thus the danger of injuring the steel will be reduced to a minimum.

The pile for being rolled into the approximate section may be made large enough to furnish a sufficient length of the section to make two or more of the piles shown in Fig. 5; and, when small girders are to be rolled in this way, the original pile just described should be large enough for making several lengths of approximate section, in order that this section shall have work enough in the rolls to be soundly welded and condensed.

It will be obvious that the plan herein described is also applicable to the manufacture of rails for railways.

I am aware that various plans of making piles for beams and girders have been in use in which the shape of the pile has been approximated to the shape of the girder required; and I do not claim, broadly, making such an approximate pile. It will, however, be obvious that the advantages claimed for my plan of making approximate welded sections or girders, and then welding on the top and bottom flanges thereof, will be useful in the manufacture of iron girders, and I include this use under my claims. Nor do I claim the plan of facilitating the welding of iron and steel hereinbefore referred to; but

What I do claim is—

The process of making beams, girders, and rails, substantially as described and shown.

ZOHETH S. DURFEE.

Witnesses:

R. B. McMASTER,  
JOHN C. WYMAN.