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PATENTED FEB. 10, 1903.

P. PATTERSON.  
APPARATUS FOR MAKING BUTT WELD PIPE.

APPLICATION FILED FEB. 14, 1902.

NO MODEL.

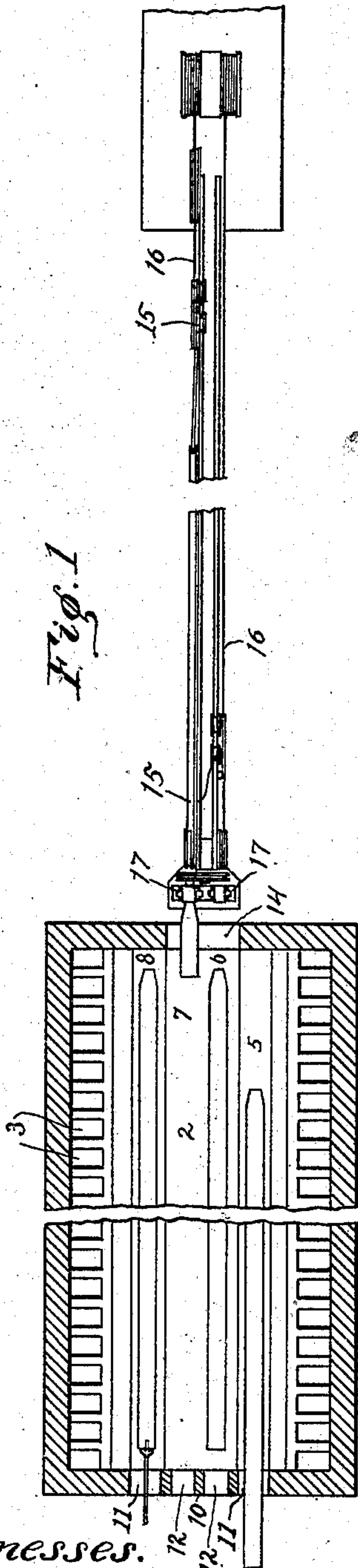


Fig. 1

Fig. 2

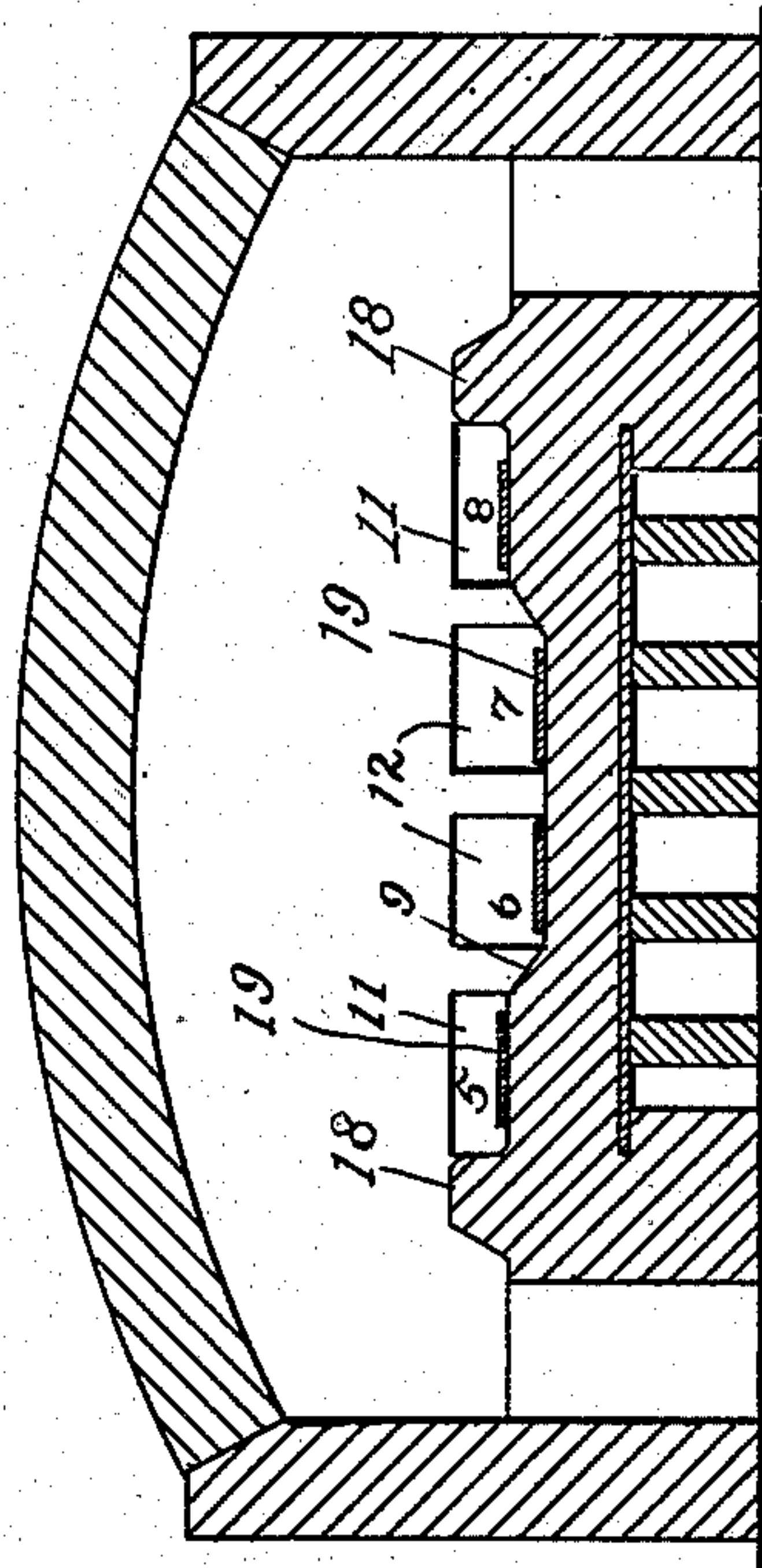
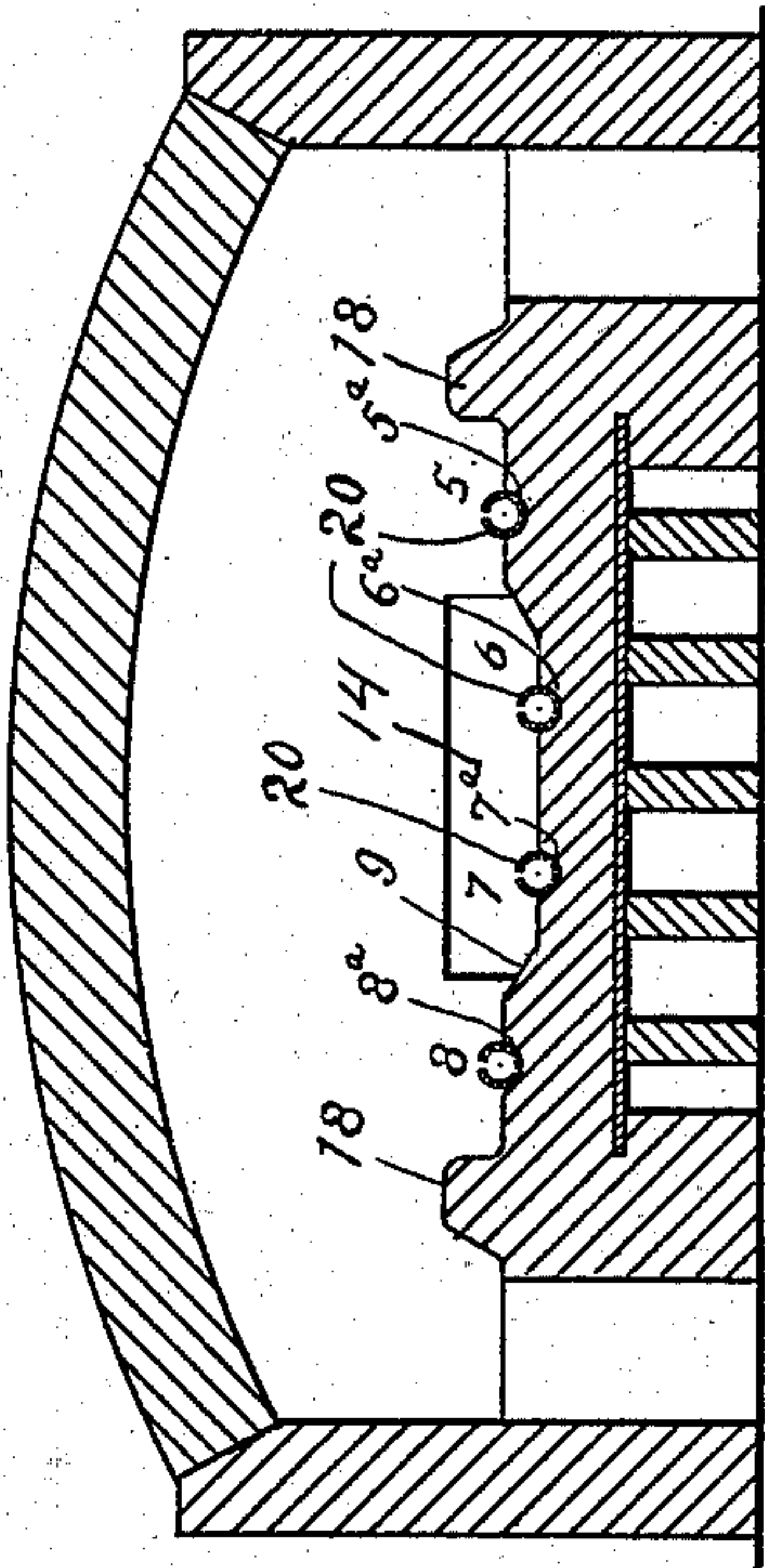


Fig. 3



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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR MAKING BUTT-WELD PIPE.

SPECIFICATION forming part of Letters Patent No. 720,061, dated February 10, 1903.

Application filed February 14, 1902. Serial No. 94,118. (No model.)

*To all whom it may concern:*

Be it known that I, PETER PATTERSON, a resident of McKeesport, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Making Butt-Weld Pipe; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to apparatus for the manufacture of tubing, and more especially to apparatus for heating tube-plates or skelps and then butt-welding the edges thereof together.

The invention relates to that class of apparatus wherein the tube-plates or skelps are charged into a furnace in one position, moved laterally therein, and then withdrawn, the object being to provide a construction of furnace whereby the handling of the plates or skelps in the furnace is facilitated, so that they can be moved transversely therein with greater ease and with less danger of bending or warping the same.

It has been proposed to form butt-weld tubing by charging flat plates into a furnace and into suitable charging territories therein and before the same became too flexible for easy handling to move them transversely in the furnace to their final-heating positions when still cool enough to chill the portions of the furnace-bed on which they rest, thus enabling such chilled portions of the bed to act upon and aid in holding the bodies of the plates at a lower temperature than the edges, so that when the edges of the plates are brought to a welding heat the bodies will still be stiff enough to take proper form in the bell and force the edges together and so produce a more perfect weld.

My invention relates to apparatus adapted for carrying out this method of forming butt-weld tubing from flat plates, but is also adapted to the manufacture of butt-weld tubing from bent-up or U-shaped skelp; and its object is to so construct the furnace as to facilitate the movement of the plates or skelps transversely therein.

To this end it consists in so forming the furnace bed or hearth that the charging territories will be above or at a greater elevation

than the withdrawing or final-heating territories, so that the transverse movement of the plate or skelp will be assisted by gravity. Preferably the final-heating territories will be two in number and located near the longitudinal center of the furnace, and the charging territories will be located at the sides of the furnace.

My invention also comprises certain details in construction which will hereinafter be described.

In the accompanying drawings, Figure 1 is a plan view of the apparatus, the top of the furnace being removed. Fig. 2 is a transverse section through the furnace, and Fig. 3 is a similar view of a modification.

The furnace may be of any suitable type, but preferably being heated by gas and being of the regenerative type. This furnace has the hearth 2 and the regenerator-ports 3. The hearth will be formed of sand, gravel, or other suitable material, and, as shown in the drawings, it has four heating sections or territories for the plates, such heating territories being substantially parallel with each other and being marked 5, 6, 7, and 8. The outer sections 5 and 8 are the feeding territories, into which the plates or skelps are charged, and the central sections 3 and 4 are the final-heating territories, in which the blanks lie until the edges are converted to a welding heat. The charging territories 5 and 8 are above or at a greater height than the final-heating territories 6 and 7, and the bottom of the furnace being inclined, as at 9, from the charging territories down to the final-heating territories. The rear end 10 of the furnace is provided with charging-openings 11 in line with the charging territories 5 and 8 and may also be provided with openings 12 in line with the heating territories 6 and 7, through which a bar can be entered to push the plates out of the furnace and into the welding apparatus. The front wall of the furnace is provided with withdrawing openings or openings 14 in line with the final-heating territories 6 and 7, through which openings the plates are drawn out of the furnace and through the welding-bell.

In front of the furnace, in line with the



final-heating territories 6 and 7, is the welding apparatus, which may be of any approved form, either a swinging draw-bench, having a continuously-running draw-chain, or any other approved form. I have shown a stationary double draw-bench having two buggies 15 thereon, an endless cable 16 for actuating the same, and a bell-holder 17 at its forward end, such as shown in the application of James H. Matheson, filed January 15, 1902, Serial No. 89,841.

At the sides of the hearth and between the same and the regenerator-parts 3 are the bridge-walls 18, over which the flame and heat must pass before striking the plates. These bridge-walls protect the blanks somewhat while in the charging territories, so that they will not become too flexible for handling before being moved down into the final-heating territories.

The furnace shown in Fig. 2 is adapted for flat plates 19, and therefore the charging territories 5 and 8 and final-heating territories 6 and 7 are substantially flat. When U-shaped or bent-up skelp 20 are to be worked, the charging territories will be slight depressions or gutters 5<sup>a</sup> and 8<sup>a</sup>, as shown in Fig. 3, to prevent the skelp rolling down the incline 9, and the final-heating territories 6<sup>a</sup> and 7<sup>a</sup> will be similarly formed, so as to somewhat protect the bodies of the skelp from the heat and flame.

In the use of the apparatus the blanks will lie in the depressed portion of the furnace-bottom until their edges are raised to a welding heat and will be successively drawn out of the furnace and through the welding-bell. As soon as the blank from one of the final-heating territories 6 or 7 is withdrawn the blank on the adjacent charging territory will be engaged by a picker or similar tool introduced through the openings in the rear wall of the furnace and moved transversely and down into the vacant final-heating territory, and a fresh blank will be charged into the charging territory thus made vacant. The transverse movement of the blanks in the furnace is facilitated by having the charging territories elevated above the final-heating territories, as the blanks need then only be properly started and will move down into position by gravity, so that there is less liability of bending or warping the blanks in transversely moving them, and especially so if they are of considerable length. The bridge-walls 18 also somewhat protect the blanks while in the charged position from the flame and heat, so that there is little liability of their becoming too flexible for proper handling, and at the same time the blanks will be in the furnace in position to be quickly moved into the final-heating positions as soon as a previously-heated blank is withdrawn. In this way the time of longitudinal charging is saved and it will not be necessary for the chargers to so closely time the charging as

with the old types of furnace. By the arrangement shown a very rapid working of the furnace is insured, thus obtaining large output and providing for the lateral movement of the blanks before they are overheated and while they are stiff enough to be easily handled by the workmen. It is also further advisable when working with plates to put them into their final positions for heating while they are sufficiently cool to chill the bottom of the furnace under them, and thus to provide portions or streaks on the furnace-bed, which will absorb heat from the bodies of the plates as the edges approach the welding-temperature, and thus hold the main portion of the bodies of the plates stiff enough to properly form up within the welding-bell. For certain sizes of tubing the four territories or sections on the hearth will be sufficient; but for other sizes of tubing this hearth may have to be enlarged and two such groups of feeding and heating territories may be employed. It is therefore obvious that any desired number of final-heating territories may be used to accommodate the necessary number of plates to keep the drawing apparatus in continuous operation. In all cases a number of feeding territories will be provided which is equal to the number of final-heating territories, one at the side of each of the latter.

While I have particularly described the invention as adapted for heating blanks for forming butt-weld tubing, it will be understood that it is also, although in a lesser degree, adapted for heating bent-up skelps for forming lap-weld tubing or even for heating other blanks.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In apparatus for forming welded tubing, the combination of a furnace for heating the tube-blanks having a bed or hearth with substantially horizontal longitudinal portions thereof at different heights, and welding apparatus in line with the depressed portion.

2. In apparatus for forming welded tubing, the combination of a furnace for heating the tube-blanks having a bed or hearth provided with a longitudinal depressed portion, one or more longitudinal elevated portions at the sides of said depressed portion, charging-openings at the ends of said elevated portions, and welding apparatus in line with the depressed portion.

3. In apparatus for forming welded tubing, the combination of a furnace for heating the tube-blanks provided with a bed or hearth having a substantially horizontal final-heating territory extending longitudinally thereof at or near the middle and substantially horizontal charging territories at a higher level and at the sides of said central territory, and welding apparatus in line with the final-heating territories.

4. In apparatus for forming welded tubing, the combination of a furnace for heating the



tube-blanks provided with a bed or hearth having final-heating territories extending longitudinally thereof and charging territories at a higher level than said heating territories and at the sides thereof, charging-openings at the ends of said charging territories, air and gas ports at the sides of said hearth, and welding apparatus in line with the final-heating territories.

5 5. In apparatus for forming welded tubing, the combination of a furnace for heating the tube-blanks provided with a bed or hearth having a final-heating territory extending longitudinally thereof at or near the transverse middle, charging territories at the sides of said heating territory and at a higher level, charging-openings at the ends of said charging territories, air and gas ports arranged at the sides of the hearth, bridge-walls at the sides of the charging territories and between the same and the air and gas ports, and welding apparatus in line with the final-heating territories.

15 6. In apparatus for forming welded tubing, the combination of a furnace for heating the tube-blanks provided with a bed or hearth having a final-heating territory extending longitudinally thereof at or near its transverse center, substantially horizontal charging territories at the sides of said heating territory and at a higher level, said bottom sloping from the charging territories down to the

heating territories, and welding apparatus in line with the final-heating territories.

7. In apparatus for forming welded tubing, 35 the combination of a furnace for heating the tube-blanks provided with final-heating territories extending longitudinally thereof at or near its transverse center, charging territories at the sides of said heating territories 40 and at a higher level, said furnace having charging-openings in its rear wall at the ends of said charging territories and a withdrawing opening or openings in its front wall in line with its final-heating territories, and 45 welding apparatus in line with the final-heating territories.

8. In apparatus for forming welded tubing, the combination of a furnace for heating the tube-blanks provided with a bed or hearth 50 having a final-heating territory extending longitudinally thereof and charging territories at a higher level and at the sides of said final-heating territory, said territories being provided with longitudinal depressions or 55 gutters, and welding apparatus in line with the final-heating territory.

In testimony whereof I, the said PETER PATTERSON, have hereunto set my hand.

PETER PATTERSON.

Witnesses:

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ROBERT C. TOTTEN.