No. 742,483. PATENTED OCT. 27, 1903.

P. PATTERSON.

APPARATUS FOR MAKING LAPWELD TUBING.

APPLICATION FILED FEB. 25, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

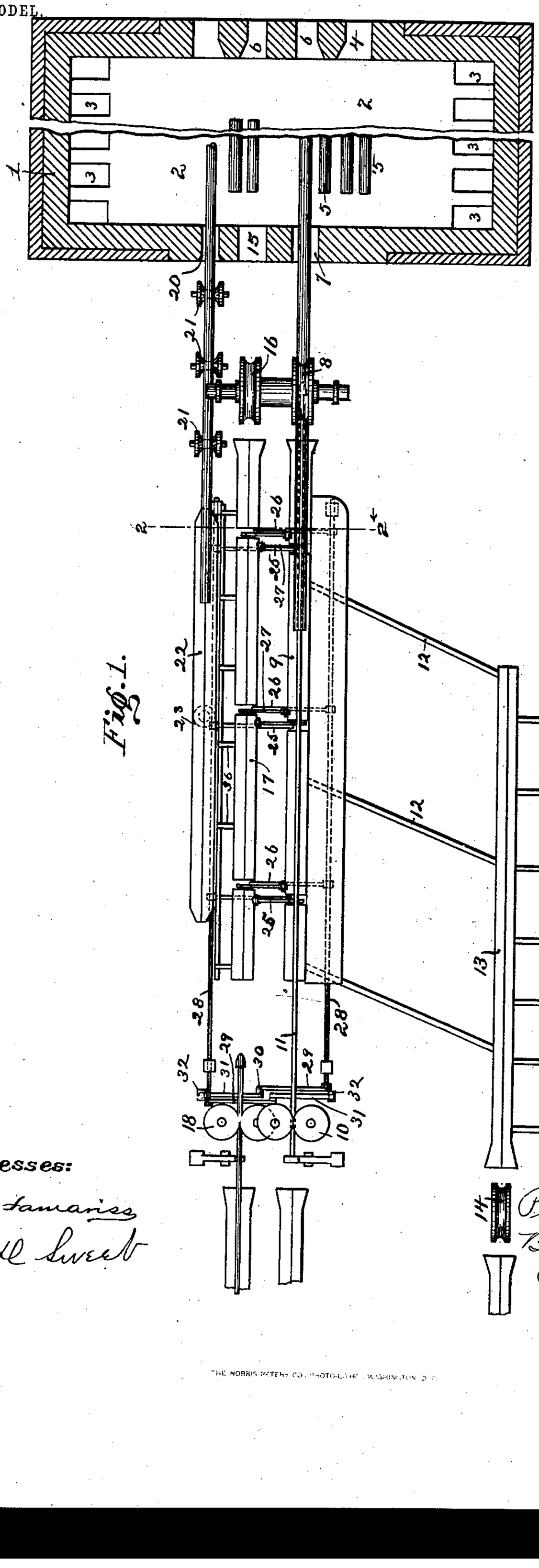

Fig. 1.

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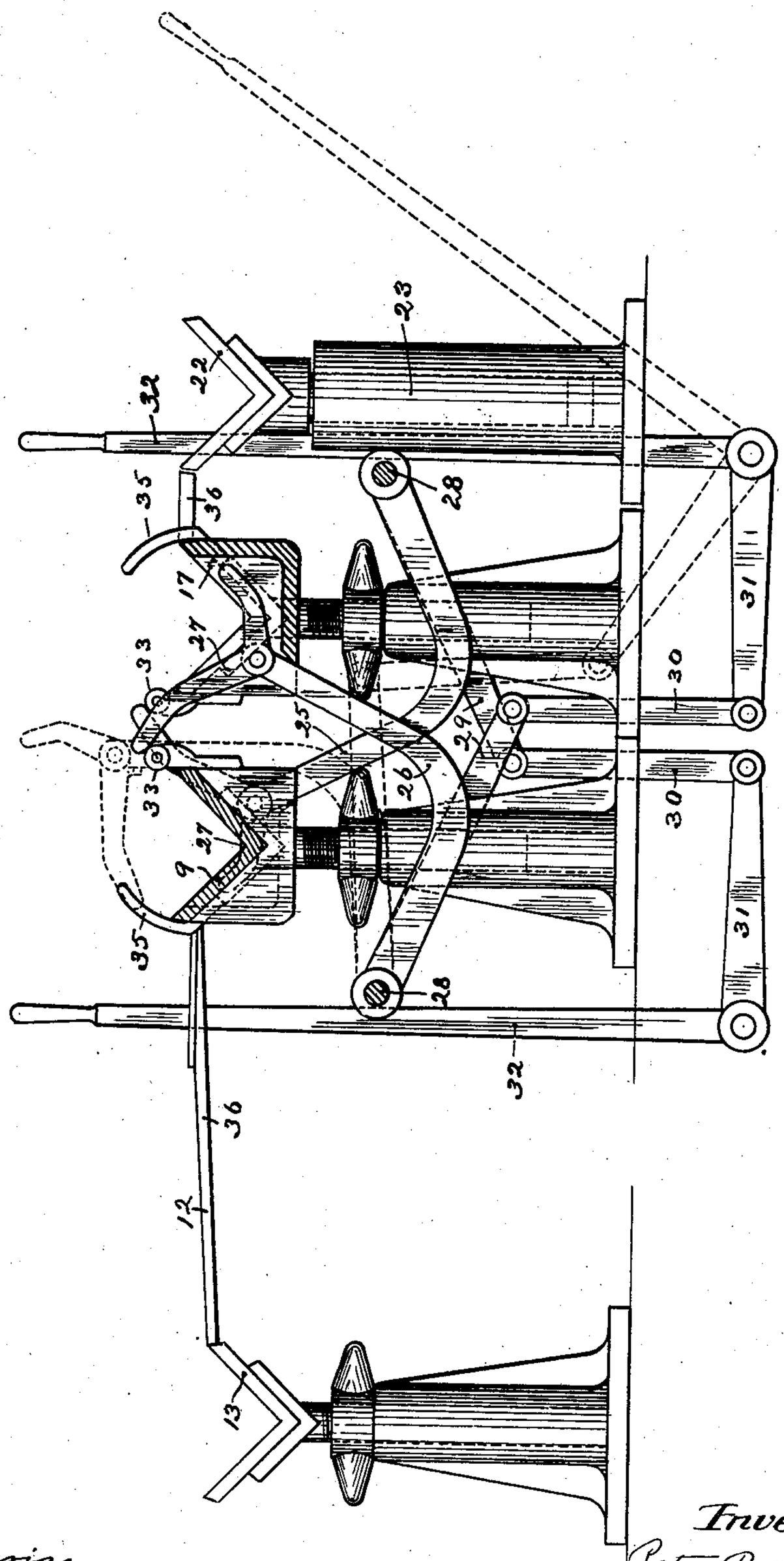
NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

PETER PATTERSON, OF McKEESPORT, PENNSYLVANIA, ASSIGNOR TO NATIONAL TUBE COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF NEW JERSEY.

APPARATUS FOR MAKING LAPWELD TUBING.

SPECIFICATION forming part of Letters Patent No. 742,483, dated October 27, 1903.

Application filed February 25, 1902. Serial No. 95,502. (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 Lapweld Tubing; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to apparatus for manufacturing lapweld tubing, and more especially for manufacturing boiler-tubes and other lapweld tubing which are given a second run through the furnace and welding apparatus.

The object of my invention is to provide apparatus for manufacturing such tubing whereby the output of the furnace is increased and the cost of operating the same reduced.

In the manufacture of boiler and similar tubes the practice heretofore has been to form the same in the ordinary way of making lapweld tubing—that is, from the bent-up skelp which was charged into a heating-furnace and raised to a welding heat and then pushed out of the furnace through welding-rolls and over a ball. This operation completes the usual lapweld tubing; but for use as boiler-tubes and elsewhere where greater strength is required it is necessary to give such tubes a second run through the furnace and welding apparatus. The usual practice is to operate the furnace for half a day on the first run, the tubes as they are welded being laid aside and permitted to cool, and then for the other half of the day the furnace is operated on the second run—that is, the welding-rolls are readjusted to the necessary size and the previously-welded tubes are charged into the furnace, again raised to a welding heat, and pushed out of the same and passed through the welding-rolls and over the ball. According to this practice the output of the furnace is limited to half a day's run and is about six hundred (600) tubes per day, this being the number which can be given the first run in the forenoon and the second run in the afternoon. The only way of increasing this output under the old method would be by having two furnaces, one for giving the first run and another for giving the second run, the tubes being transferred from the first furnace to the second. This, however, would necessitate the building of two furnaces and providing independent charging and welding apparatus for each of said furnaces, besides requiring two complete crews of eleven men each, so that while by means of such furnaces the output of the present single furnace would be practically doubled the expense would also be practically doubled and no saving would result.

The object of my invention is to provide apparatus for forming lapweld tubing which must be given two runs whereby the output can be increased without a corresponding increase in cost.

To this end it consists in adding to a furnace in which lapweld tubing is formed in the ordinary way means whereby the welded tube, preferably before the same has cooled, is recharged into the same furnace and preferably into the front end thereof, and also providing an additional set of welding-rolls, through which the tube after being reheated is given a second run.

My invention also comprises means for reversing the tube end for end before recharging it into the furnace, so as to present the perfect end to the second pair of welding-rolls.

My invention also comprises means for transferring the tubing from the first welding-trough to the recharging-trough and from the second welding-trough to the sizing-trough.

My invention also comprises details in construction, as will hereinafter appear.

In the accompanying drawings, Figure 1 is a plan view of my apparatus; and Fig. 2 is a transverse section on the line 2 2, Fig. 1.

The furnace employed may be of any approved type, but preferably being heated by gas and of the regenerative type. Such a furnace is shown at 1, and it has the usual side, end, and top walls and is provided with a hearth 2 and regenerator-ports 3. The hearth 2 will be made somewhat wider than in the ordinary lapweld furnace, so as to con-

tain in addition to the necessary number of skelp also a number of tubes for reheating preparatory to being given the second run. This furnace is provided at its rear end with openings 4, through which the skelp 5 are charged into the furnace, said skelp preferably being charged in one side of the hearth and as they heat are rolled over toward the center of the furnace and a fresh skelp charged into the vacant space, as is now the custom. The rear of the furnace is also provided with openings 6 for insertion of a suitable bar or fork for pushing the skelp out of the front end of the furnace and into the welding-rolls. The front end of the furnace is provided with a withdrawing-opening 7, through which the heated skelp are pushed on their way to the welding-rolls 8. These rolls are or may be of any desired construction and driven in any suitable way, and in line therewith is the usual trough 9 for receiving the tube and the rolls 10 for projecting and withdrawing the mandrel-bar 11, which supports the ball over which the skelp is welded. At one side of the welding-trough 9 are the inclined ways 12, leading to the sizing-trough 13, which is in line with the sizing-rolls 14. All of these parts are or may be of the usual construction and form no part of my invention, and the precise arrangement shown is illustrative merely.

In my invention the front end of the furnace will be provided with a second withdrawing-opening 15, and in line therewith will be another pair of welding-rolls 16, trough 17, mandrel-bar-operating rolls 18, and mandrel bar and ball, all of which are or may be precisely the same as the welding-rolls, trough, and mandrel first described. I prefer, however, to form the rolls 16 integral with or on the same shaft with the rolls 8, so as to necessitate only a single pair of bearings and housings for both sets of rolls. In the front end of the furnace at the side of the withdrawing-opening 15 is the recharging-opening 20, and in front thereof are a series of rollers 21, which may be power-driven by any suitable mechanism, and in line with these is a trough 22, which is mounted in any suitable way whereby it can be reversed end for end—as, for instance, by being connected at its middle to the upper end of the piston-rod of a hydraulic cylinder 23, whereby the trough can be raised up and then swung around end for end, as is now well understood.

Mechanism will preferably be provided for transferring the tubes from the welding-trough 9 to the charging-trough 22 and from the welding-trough 17 to the sizing-trough 13. Various arrangements of mechanisms for this purpose may be employed, and I have shown two sets of rocker-arms 25 and 26, respectively, each of which is provided at its upper end with the pivoted curved finger-pieces 27, which normally are adapted to lie in gaps formed in the welding-troughs 9 and 17. The arms 25 are arranged to transfer the tubes from the trough 9, and the arms 26 transfer them from the trough 17, and these arms and their operating mechanism are exact duplicates except that they are reversely arranged, as shown. Each set of arms is secured to a rock-shaft 28, which rock-shafts extend longitudinally of the troughs and have secured to their rear ends the arms 29, which are connected by links 30 to arms 31 on levers 32. By operating either of these levers 32 the respective shaft 28 for that lever will be rocked, thus throwing the arms 25 or 26, as the case may be, to the dotted-line position shown in Fig. 2, thus lifting the tube out of its trough and carrying the same over the adjacent trough. In this movement the long members of the pivoted finger-pieces 27 bear on the guides or antifriction-rollers 33, secured to the adjacent trough, and said finger-pieces rock to the position shown in dotted line, so that the tube will roll off the same, down the curved guard-pieces 35, secured to the troughs, and onto the bars or skids 36, leading either to the sizing-trough 13 or charging-trough 22. It will thus be seen that by means of these two reversely-arranged sets of rocking arms the tubes can be transferred from the welding-trough 9 over the welding-trough 17 to the charging-trough 22 and from the welding-trough 17 over the welding-trough 9 and to the sizing-trough 13.

In the use of my apparatus the skelp 5 are charged through the opening 4, and as they heat are progressively rolled over toward the center of the furnace until in line with the withdrawing-opening 7. When the edges of the skelp are raised to a good welding heat, it is pushed out through said opening 7 and into the welding-rolls 8, through which it is passed over the ball in the usual way, passing over the mandrel-bar 11 in the trough 9. As soon as the tube has cleared the welding-rolls, the mandrel-bar will be withdrawn in the usual way, and then said tube is transferred by means of the rocker-arms 25 or other suitable transferring devices or mechanisms over the trough 17 and deposited in the charging-trough 22. As the front end of the tube is usually somewhat deformed or mutilated, it is desirable to reverse the tube end for end before recharging into the furnace. The trough 22 will therefore be reversed end for end, as above described, and the tube will then be pushed into the furnace through the charging-opening 20, and as it heats it will be moved over toward the center of the furnace until in line with the withdrawing-opening 15. As soon as again raised to a good welding heat it is pushed out of the furnace through the opening 15 and through the rolls 16 and over the ball in the usual way. It is then transferred by the rocker-arms 26 to the sizing-trough 13, and goes to the sizing-rolls and thence to the straightening-rolls, according to the usual practice.

By my apparatus the tube is recharged into the furnace before it has lost an appreciable

amount of heat, so that very little heat is necessary to again bring it to proper welding temperature. As a consequence the furnace can be operated at but a slight cost over the cost of operating the present furnaces for giving a single run. Furthermore, only three workmen will be required in addition to the eleven usually employed for a single crew and the output of the furnace will be nearly doubled. The product is therefore greatly cheapened.

What I claim is—

1. In apparatus for forming lapweld tubing, the combination with a furnace provided with two withdrawing-openings and a charging-opening in its front end, and welding-rolls in line with each of the withdrawing-openings.

2. In apparatus for forming lapweld tubing, the combination with a furnace provided with two withdrawing-openings and a charging-opening in its front end, of welding-rolls in line with each of the withdrawing-openings, and a charging-trough in line with the charging-opening.

3. In apparatus for forming lapweld tubing, the combination with a furnace having a withdrawing-opening and a charging-opening in its front end, of welding-rolls in line with the withdrawing-opening, and an endwise reversible charging-trough in line with the charging-opening.

4. In apparatus for forming lapweld tubing, the combination with a furnace provided with two withdrawing-openings and one charging-opening in its front end, of welding-rolls in line with each of the withdrawing-openings, a charging-trough at one side thereof and in line with the charging-opening, and a sizing-trough on the opposite side of the welding-rolls.

5. In apparatus for forming lapweld tubing, the combination with a furnace having a withdrawing-opening and a charging-opening in its front end, welding rolls and trough in line with the withdrawing-opening, a charging-trough in line with the charging-opening, and mechanism for transferring the tube from the welding-trough to the charging-trough.

6. In apparatus for forming lapweld tubing, the combination with a furnace having two withdrawing-openings and one charging-opening in its front end, welding rolls and troughs in line with each of the withdrawing-openings, a charging-trough at one side of the same and in line with the charging-opening, and mechanism for transferring the tube from one welding-trough over the other welding-trough to the charging-trough.

7. In apparatus for forming lapweld tubing, the combination with a furnace having two withdrawing-openings and a charging-opening in its front end, welding rolls and troughs in line with each of the withdrawing-openings, a charging-trough at one side of the same and in line with the charging-opening, a sizing-trough on the opposite side of the welding-trough, and mechanism for transferring the tube from one welding-trough to the charging-trough, and mechanism for transferring the tube from the other welding-trough to the sizing-trough.

8. In apparatus for forming lapweld tubing, the combination with a furnace having two withdrawing-openings and a charging-opening in its front end, welding rolls and troughs in line with each of the withdrawing-openings, a charging-trough in line with the charging-opening, a sizing-trough, and two sets of rocker-arms, one set for each welding-trough, one set thereof being arranged to transfer the tubes from one welding-trough to the charging-trough and the other set thereof being arranged to transfer the tubes from the other welding-trough to the sizing-trough.

9. In apparatus for forming lapweld tubing, the combination with a furnace having two withdrawing-openings and a charging-opening in its front end, of double welding-rolls in line with the withdrawing-openings, two welding-troughs, and a charging-trough at one side thereof and in line with the charging-opening.

10. In apparatusfor forming lapweld tubing, the combination with a furnace having a charging-port in its rear end, two withdrawing-ports and a charging-port in its front end, two welding-rolls in line with each of the withdrawing-ports, and a charging-trough in line with the charging-port.

11. In welding apparatus, a plurality of sets of welding-rolls, a plurality of receiving-troughs arranged side by side, and transfer mechanism arranged to lift the tubes from one of the troughs and transfer them sidewise and over the other trough to its opposite side.

12. In welding apparatus, a plurality of sets of receiving-troughs arranged side by side, transfer mechanism arranged to lift the tubes from one of the troughs, and transfer them sidewise and over the other trough to its opposite side, and transfer mechanism for the latter trough arranged to lift and transfer the tubes therefrom.

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

PETER PATTERSON.

Witnesses:
F. W. WINTER,
ROBERT C. TOTTEN.