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PATENTED FEB. 10, 1903.

J. H. MATHESON.

APPARATUS FOR THE MANUFACTURE OF BUTT WELD PIPE.

APPLICATION FILED JAN. 23, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

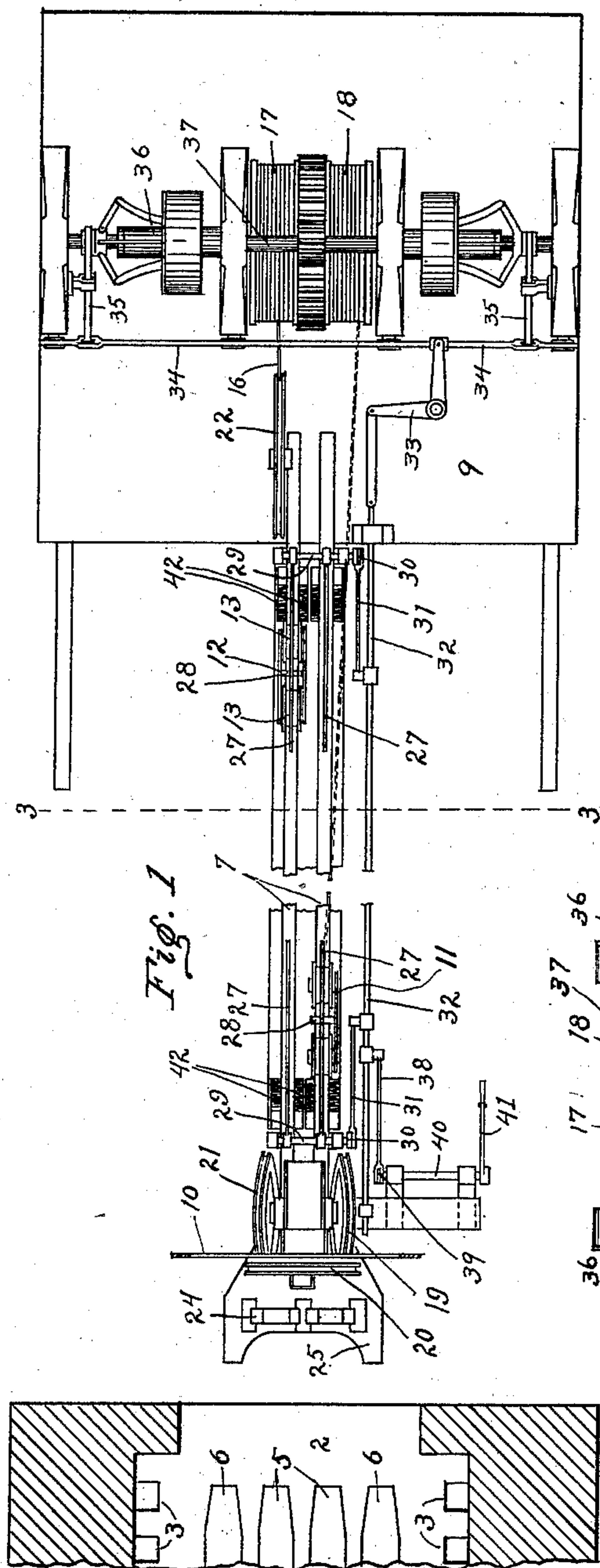


Fig. 1

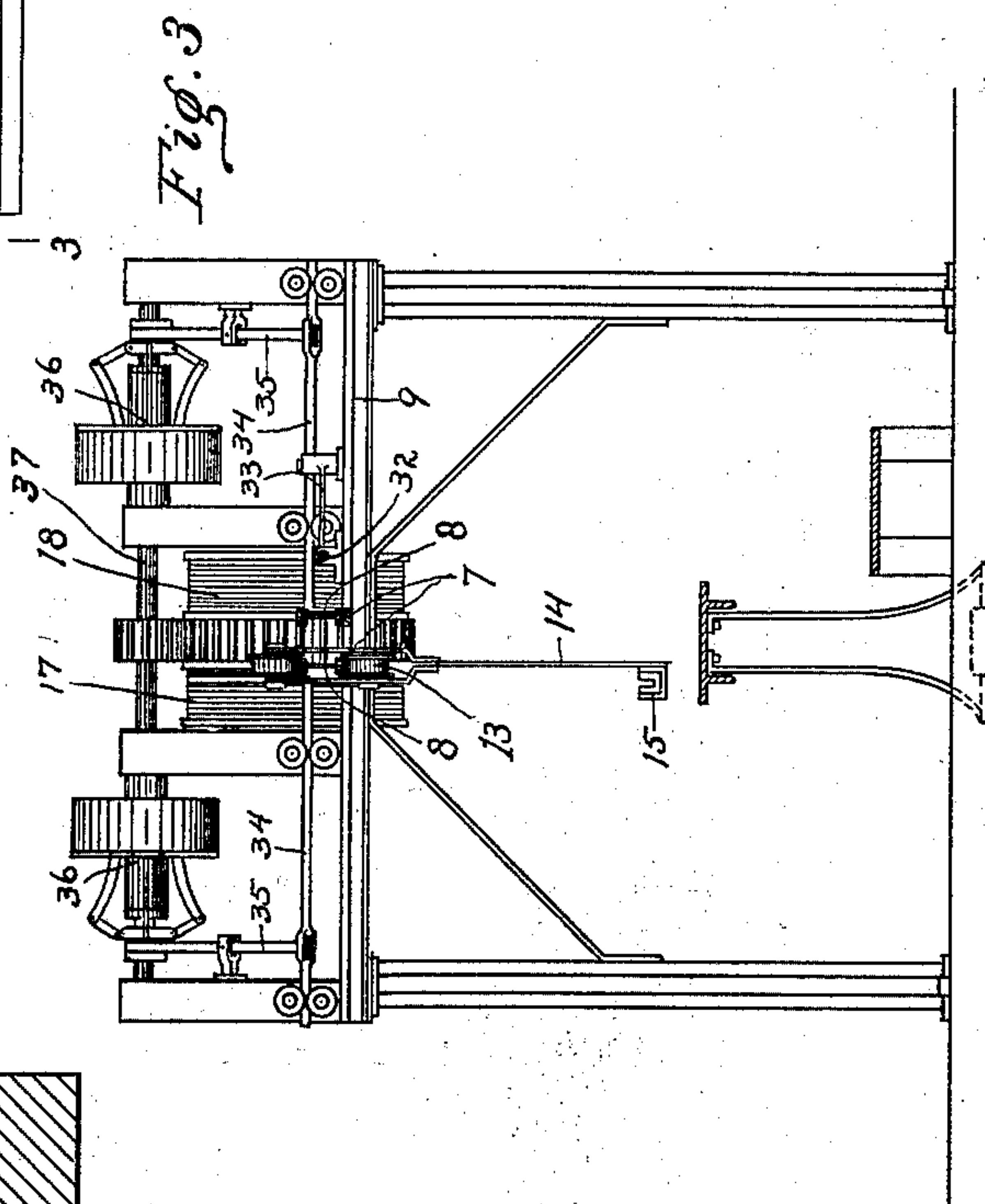


Fig. 3

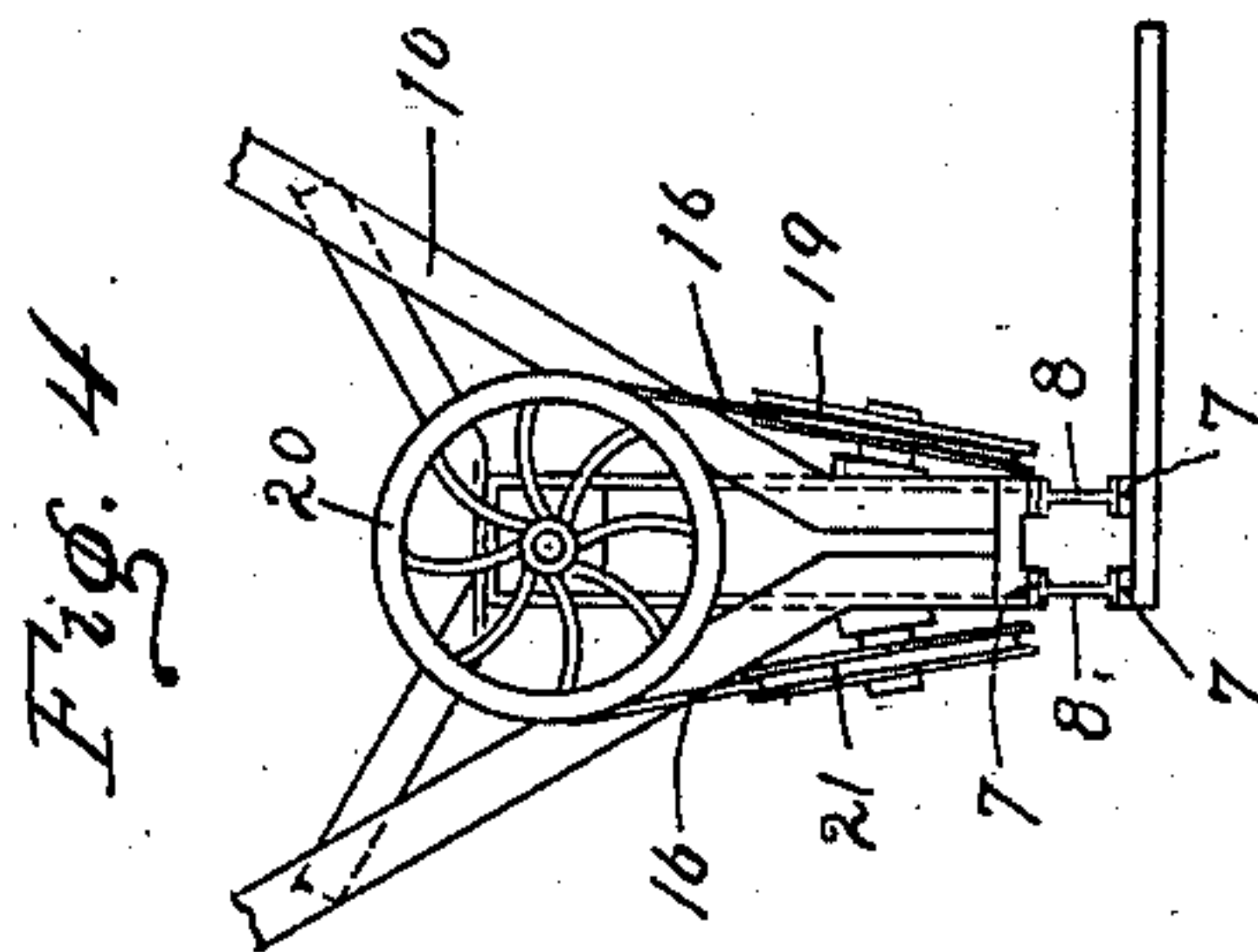


Fig. 4

Witnesses.

Fred R Sweet
Walter Tamaris

Inventor.
James H. Matheson
By Kay & Totten
Attorneys.

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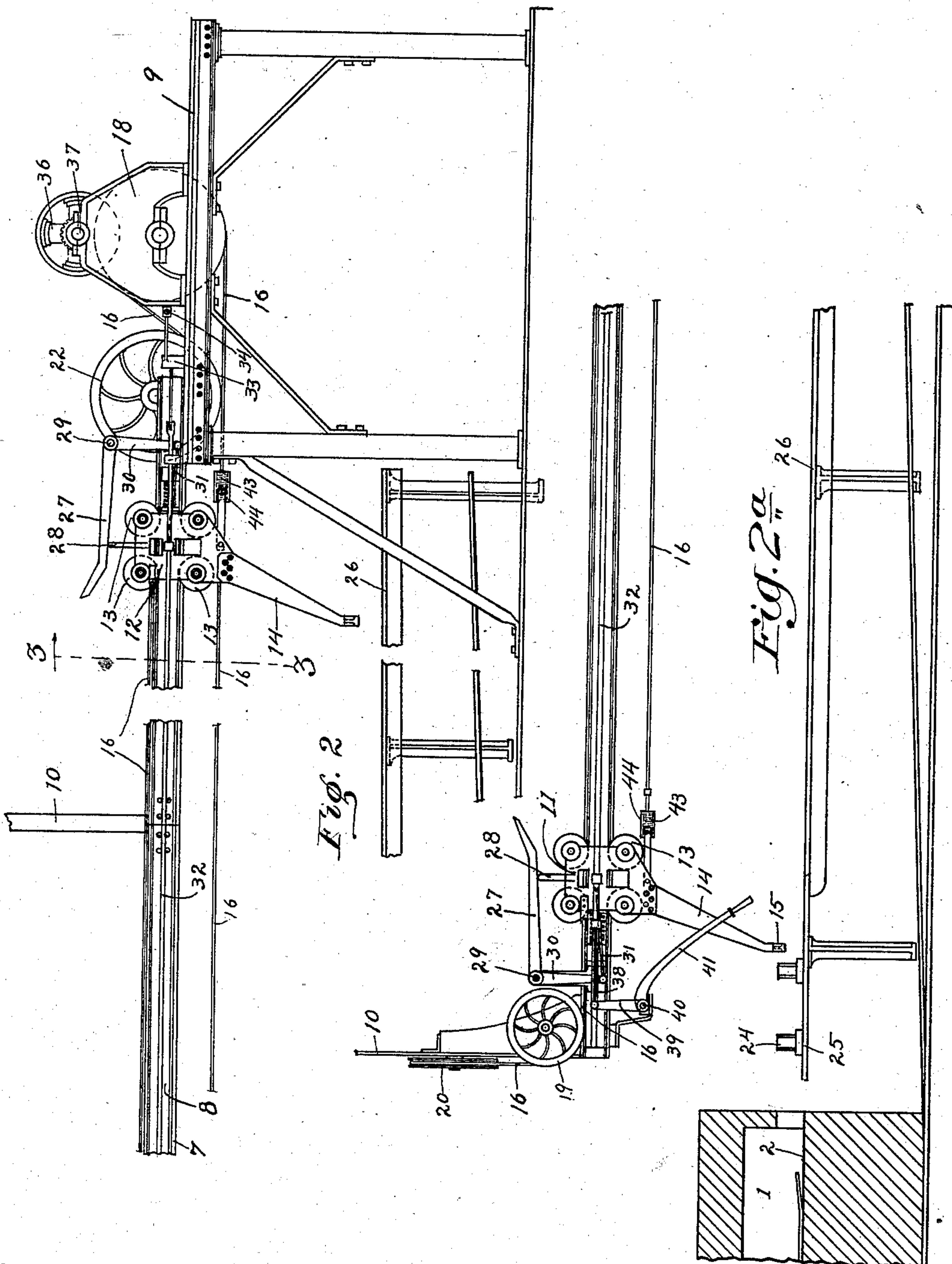
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2 SHEETS—SHEET 2.



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Fred H. Sweet.
Watt & Tammars

Inventor.

James H. Matheson
By Kay & Totten
Attorneys.

UNITED STATES PATENT OFFICE.

JAMES H. MATHESON, OF MIDDLETOWN, PENNSYLVANIA, ASSIGNOR TO
NATIONAL TUBE COMPANY, OF PITTSBURG, PENNSYLVANIA, A COR-
PORATION OF PENNSYLVANIA.

APPARATUS FOR THE MANUFACTURE OF BUTT-WELD PIPE.

SPECIFICATION forming part of Letters Patent No. 720,046, dated February 10, 1903.

Application filed January 23, 1902. Serial No. 90,972. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. MATHESON, a resident of Middletown, in the county of Dauphin and State of Pennsylvania, have invented
5 a new and useful Improvement in Apparatus for the Manufacture of 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
10 manufacture of butt-weld tubing, and more especially to apparatus for drawing flat plates out of a furnace and through welding-bells, its object being to provide drawing apparatus for this purpose in which the device or appli-
15 ance to which the tube-blank is to be connected for drawing through the bell will be in position in front of the furnace for attachment of the blank thereto as soon as a previous blank has been completely drawn
20 through the welding-bell.

According to the most approved practice of making butt-weld tubing flat plates are charged into a furnace through an opening in the rear thereof and after having been raised
25 to a welding temperature are seized by means of tongs inserted through an opening in the front wall of the furnace, a welding-bell is slipped over the reins of the tongs, and the tongs then connected to some suitable drawing device, preferably to a continuously-trav-
30 eling draw-chain, by means of which the plate is drawn out of the furnace and through the welding-bell, being bent thereby into tubular form and the edges butt-welded. Usually
35 the tongs are attached to a buggy having a hook which takes into the links of the chain, and when the tube has been drawn the buggy and hook are brought back by the buggy-boy to the front end of the bench, in position to
40 have connected thereto tongs attached to the next plate to be drawn. This consumes time, and it may happen that the welder will have to wait for the buggy-boy to return the buggy before the plate can be drawn, thereby re-
45 ducing the output and running some risk of overheating the plate.

The object of my invention is to avoid any difficulty on this score and to provide drawing apparatus wherein an appliance or device to

which the tube-blank is to be connected for
50 drawing out of the furnace and through the bell will always be in position to have the tube-blank connected thereto as soon as the previously-drawn blank has passed entirely
55 through the bell.

To this end it comprises, generally stated,
two tube-drawing devices or appliances in front of the furnace, together with mechanism for actuating said devices, which mech-
60 anism is so arranged that as one of said de-
vices is moved away from the furnace in drawing a tube the other will be moved toward the furnace and into position to have a
tube-blank connected thereto.

More specifically stated, my invention com-
65 prises a drawing apparatus having a double track or way and two buggies or trolleys moving thereon, together with mechanism, preferably an endless chain or cable, for simul-
70 taneously moving said buggies in opposite di-
rections.

In the accompanying drawings, Figure 1 is a plan view of the front end of the furnace, showing my improved drawing mechanism in front of the same. Fig. 2 is a side elevation
75 of the rear portion of the drawing mechanism. Fig. 2^a is a similar view of the front portion thereof. Fig. 3 is a transverse section on the line 3 3, Fig. 2, looking toward the driving-
80 drum; and Fig. 4 is a front end view of the mechanism.

With my improved drawing mechanism I may use any suitable welding-furnace in which the blanks are raised to the proper
welding-heat, the furnace being preferably
85 heated by gas and of the regenerative type. This furnace is shown at 1, having the hearth 2 and the regenerator-ports 3. In the particular furnace illustrated this hearth is of
sufficient width to contain four plates or
90 blanks 5 5 and 6 6, the two middle plates 5 5 being in position for drawing, while the plates 6 6 are in the charging positions and will be moved over into the positions of the plates 5 5 after the latter have been drawn out of
95 the furnace according to a method of operation which is described and claimed in my application filed January 15, 1902, Serial No.

89,841. When the drawing apparatus is stationary, as shown, this arrangement of plates will preferably be followed; but if the drawing apparatus is movable laterally in front of the furnace the plates may remain in the same position as charged until drawn from the furnace, and the hearth will then preferably be sufficiently wide to contain the necessary number of plates to insure practically a continuous operation of the drawing mechanism.

My drawing mechanism is shown as of the overhead type and as stationary, but is not limited in these particulars, as it may be laterally movable in front of the furnace to bring it into line with the plates in the furnace and need not be overhead. It will, however, comprise two devices adapted to have the tube-blanks connected thereto, which devices move side by side in substantially a parallel course and simultaneously in opposite directions. I have shown an overhead double track 7, the same comprising two I-rails 8, supported or suspended in any suitable way—as, for instance, by having their rear ends supported on the elevated platform 9 and their forward ends and intermediate points supported by suitable hangers 10. Mounted on these rails or tracks are two buggies or trolleys 11 and 12, which may be of any desired construction, preferably provided with wheels 13, embracing both the upper and lower faces of the rails, so as to insure an even and steady movement. Each of these buggies or trolleys is provided with a depending arm 14, having at its lower end the hook 15 or other convenient means for the attachment of the reins of the tongs thereto. These buggies or trolleys will be propelled along the track 7 by any suitable mechanism, whereby they will be simultaneously moved in opposite directions. Various mechanism for this purpose may be employed; but I prefer to use a cable or other flexible connection 16, which will have one end wound on the drum 18 or other driving means and pass therefrom to the trolley 11, to which it is secured, thence under the guide-pulley 19 at the front end of the track 7, over a vertical transversely-arranged guide-pulley 20, under the guide sheaves or pulley 21, opposite the pulley 19, and thence to the trolley 12, to which it is secured, and thence under the guide-pulley 22 at the rear end of the drawing apparatus to the drum 17, on which it is wound the opposite direction to that in which its beginning end is wound. As a consequence when the drum is rotated the rope or cable winds off one portion of the same and onto the other portion thereof. The two trolleys, with their depending drawing-arms, are mounted in proper position, so that one will be at the rear end of the drawing apparatus while the other is at the forward end thereof, ready to have the welding-tongs connected thereto. The drum will be driven by any suitable reversing power mechanism, and

it will be rotated in the proper direction, so that the trolley at the forward end of the drawing apparatus after having the tube-blank connected thereto will be propelled toward the rear, thereby drawing the tube-blank out of the furnace and through the welding-bell. Simultaneously the other trolley will be propelled toward the front end of the drawing apparatus, so that by the time the first tube has been drawn through the bell it will be in proper position to have the next tube-blank connected thereto. The drum will then be reversed and the opposite movement will result.

The welding-bells will be held in any suitable support—such, for instance, as the bell-holders 24, two in number, and arranged upon a suitable table or standard 25 in front of the furnace. This table is preferably extended toward the rear underneath the overhead track, as shown at 26, so as to provide a support for the tube after it is drawn.

The drum 18 can be driven by any suitable mechanism, either by an electric motor mounted on the platform 9, or it may be belted to any suitable source of power. Means, however, will be provided whereby the driving mechanism can be disconnected from the drum or rendered inoperative should either of the buggies suddenly run too far in either direction. Various devices for this purpose can be arranged; but preferably there will be located at each end of the overhead track, in the path of movement of each of the buggies, a suitable stop, abutment, or the like, against which the carriage will run at the end of its travel, and these stops or abutments will have suitable connection with the driving mechanism, so as to disconnect it from the drum or render it inoperative. I have shown in the drawings latches 27, pivotally mounted at each end of the track. These latches are adapted to be actuated by the buggies or part attached thereto, and, as shown, the buggies are provided with the brackets or stirrups 28 for contacting with the latches. A single latch at each end of the apparatus will be sufficient; but, if desired, two latches may be placed at each end, one in the path of each buggy. When two latches are used at each end of the apparatus, they are secured to a single rock-shaft 29. The rock-shafts at both ends of the bench are provided with arms 30, which are connected by links 31 to a rod 32, suitably mounted longitudinally in the tracks. This rod at its rear end is connected to one arm of a bell-crank lever 33, the other arm of which is connected to the transversely-reciprocating rod 34. This latter rod 34 is shown connected by suitable levers 35 to the friction-clutches 36 on the power-shaft 37, so that when the rod 32 is reciprocated longitudinally it will throw out these clutches, and thus disconnect the power mechanism from the drum. The rod 32 might break the circuit to an electric motor

or control the power mechanism in a variety of ways. To this reciprocating rod is also connected a link 38, connected to an arm 39 on the rock-shaft 40, to which is attached a lever 41, projecting into position, whereby it can be conveniently reached by the welder, so that thereby he can control the driving mechanism. Should the operator fail to stop the buggies in time, the stirrups 28 thereon will contact with the latches 27, and through the reciprocating rod 32 the power mechanism will be rendered inoperative and damage to the apparatus avoided. In addition to this I provide at each end of the draw-bench suitable buffers, such as springs 42, against which the buggies will run, and thus prevent undue shock. Also to prevent shock when starting the plate I preferably put a flexible connection in the driving-cable at the drawing side of each of the buggies, this flexible connection being preferably a strong spiral spring 43, inclosed in a casing 44 and attached at one end to the buggy and at its opposite end to the cable.

It will be noticed that the drawing-arms of the trolleys are located, respectively, opposite the two plates 5 5 and are therefore adapted to draw plates from these two positions in the furnace. With stationary apparatus, as shown, the plates 6 6 will have to be moved to the position of the plates 5 5 as soon as the latter are drawn from the furnace; but if the apparatus is made laterally movable this will not be necessary, as the same can be moved to bring the drawing-arms into line with the plates.

In the use of my apparatus the plates or other blanks for forming the tubing are charged into the furnace, preferably from the rear end thereof, and are therein brought to a proper welding temperature, either remaining in the position in which first charged if a movable apparatus is used or being moved laterally into one of the central positions in the furnace if stationary apparatus is used. As soon as one plate is withdrawn another will either be charged into its place or moved laterally into place and a fresh plate charged into the place of the latter. As soon as one of the plates is at a proper welding temperature it is seized by the tongs, the bell thrown over the reins of the tongs, and the reins connected to the depending arm of the buggy or trolley which is at the front of the drawing apparatus, and as one of the buggies will always be in this position no time will be lost. The drum 18 will then be rotated in the proper direction, thereby propelling that particular trolley toward the rear of the drawing apparatus and drawing the blank through the bell and butt-welding its edges together, the other trolley being simultaneously moved to the front end of the apparatus, so that as soon as the first-named blank is drawn entirely through the bell the said trolley will be in position to have the tongs of the next blank im-

mediately attached thereto. In this way no time is lost in the working of the furnace, the output increased, and the liability of overheating the plates decreased.

While I have shown in the drawings the apparatus used for butt-welding flat plates into tubes, it will be understood that any form of plates, such as U-shaped skelp, may be drawn by the apparatus.

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

1. In apparatus for making tubing, the combination with a furnace, of two tube-drawing devices in front of the same, and mechanism for actuating the said devices, so arranged that as one of said devices is moved away from the furnace in drawing a tube, the other is moved toward the furnace into position to have a tube-blank connected thereto.

2. In apparatus for making tubing, the combination with a furnace, of a double track or way in front of the same, two pipe-drawing buggies or trolleys running thereon, and mechanism for propelling said buggies along said track so arranged that said buggies are simultaneously propelled in opposite directions.

3. In apparatus for making tubing, the combination with a furnace, of an overhead double track or way in front of the same, two buggies or trolleys running thereon and having depending drawing-arms, and mechanism for propelling said buggies along said track so arranged that said buggies are simultaneously propelled in opposite directions.

4. In apparatus for making tubing, the combination with a furnace, of a double track or way in front of the same, two pipe-drawing buggies or trolleys running thereon, a power-driven drum or the like, and flexible connections between each buggy and the driving-drum, whereby said buggies are propelled simultaneously in opposite directions.

5. In apparatus for making tubing, the combination with a furnace, of a double track or way in front of the same, two pipe-drawing buggies or trolleys running thereon, a driving-drum or the like at the rear end of said drawing apparatus, suitable guide-pulleys at the front end thereof, and a cable or other flexible connecting means, connected to said drum and to each of said buggies and passing over the guide-pulleys, whereby said buggies are propelled simultaneously in opposite directions.

6. In apparatus for making tubing, the combination with a furnace, of a duplicate bell-holder in front of the same, two movable drawing devices in line with said bell-holders, and mechanism for moving said devices simultaneously in opposite directions.

7. In apparatus for making tubing, the combination with a furnace, of two tube-drawing devices in front of the same, mechanism for moving said devices simultaneously in opposite directions, and means at each end of the

track and actuated by said devices for rendering the actuating mechanism inoperative.

8. In apparatus for making tubing, the combination with a furnace, of a double track in front of the same, two tube-drawing buggies running on said track, mechanism for propelling said buggies simultaneously in opposite directions, a latch at each end of the track in the path of movement of a buggy, a recipro-

cating rod connected to said latches, and means operated by said rod for rendering the driving mechanism inoperative.

In testimony whereof I, the said JAMES H. MATHESON, have hereunto set my hand.

JAMES H. MATHESON.

Witnesses:

JOS. H. NISLEY,

HARRY H. JOHNSON.