R. E. BROCK.

METHOD OF ROLLING TUBING.

APPLICATION FILED APR. 26, 1911.

1,040,134.

Patented Oct. 1, 1912.

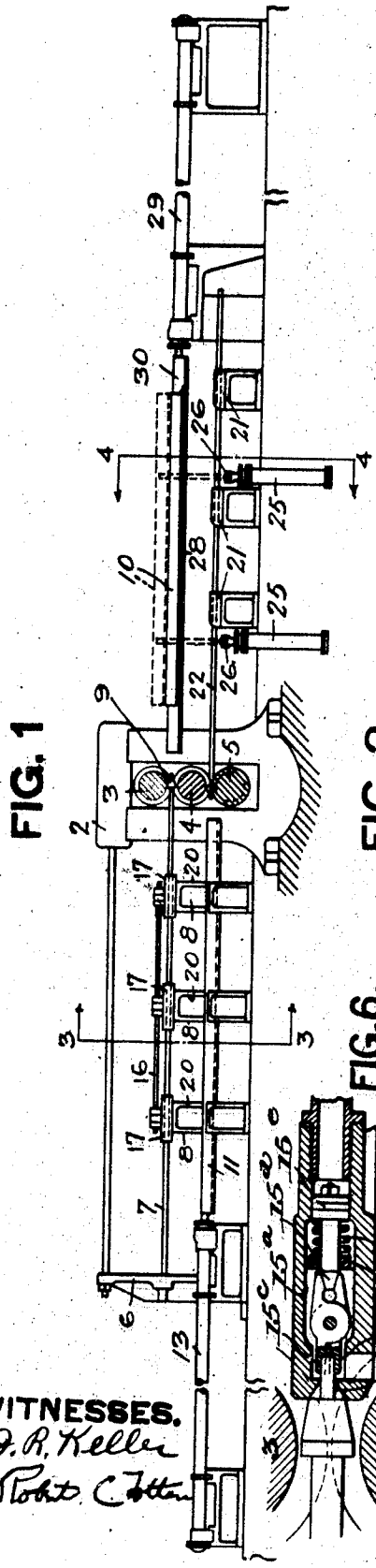

FIG. 1

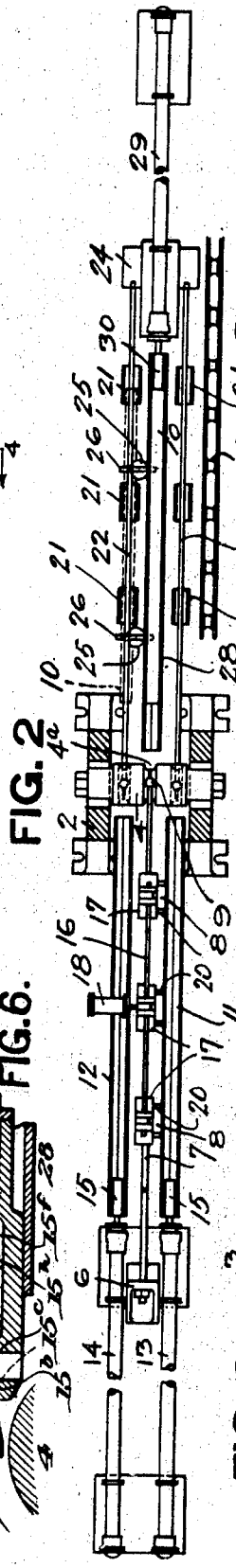

FIG. 2

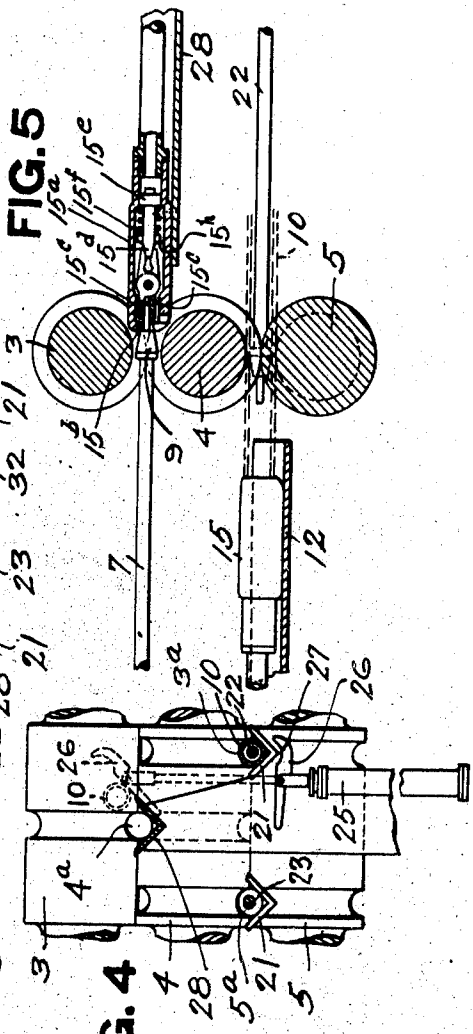

FIG. 5

FIG. 4

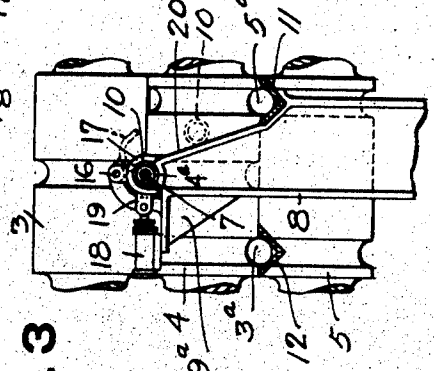

FIG. 3

FIG. 6.

WITNESSES.

J. R. Keller

Robt. C. Totten

INVENTOR.

Richard E. Brock

By Kay & Totten

Attorneys

UNITED STATES PATENT OFFICE.

RICHARD E. BROCK, OF MONESSEN, PENNSYLVANIA, ASSIGNOR TO PITTSBURGH STEEL PRODUCTS CO., OF PITTSBURGH, PENNSYLVANIA, A CORPORATION.

METHOD OF ROLLING TUBING.

1,040,134. Specification of Letters Patent. Patented Oct. 1, 1912.

Application filed April 26, 1911. Serial No. 623,498.

To all whom it may concern:

Be it known that I, RICHARD E. BROCK, a citizen of the United States, resident of Monessen, in the county of Westmoreland and State of Pennsylvania, have invented a new and useful Improvement in Methods of Rolling Tubing; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to a method of rolling seamless tubing.

The object of my invention is to provide a rapid and efficient method of rolling seamless tubing in which a mill with upper and lower passes may be employed, the steps of the process being such as to make it possible to dispense with the cumbersome tables for the supporting mandrels heretofore employed in rolling tubing in a mill with upper and lower passes, as well as the mechanism and the power necessary to raise and lower such tables.

To these ends my invention consists, generally stated, in the method of rolling seamless tubing in a mill having upper and lower passes consisting in feeding the tubular blank through the first pass of the mill onto a mandrel, withdrawing the mandrel leaving the blank in the position in which it was delivered from the rolls, moving the blank to a different level into line with the second pass of the mill, passing the blank back through said second pass onto a mandrel, and withdrawing the mandrel.

In the accompanying drawing Figure 1 is a side elevation partly in section of a suitable mill for carrying out my invention; Fig. 2 is a plan view; Fig. 3 is a view looking in one direction toward the rolls; Fig. 4 is a view from the opposite side, the views being taken on the lines 3—3 and 4—4 of Fig. 1 respectively; and Figs. 5 and 6 show details of the pusher.

I will first describe suitable apparatus by which my improved method is carried out, and accordingly in the drawings the numeral 2 designates suitable housings of a three-high mill with the rolls 3, 4 and 5. These rolls are formed with grooves to form the passes which are designated by the numerals 3^a, 4^a and 5^a. It is, of course, understood that a mill with a greater number of passes or different arrangement thereof may be employed to carry out my invention. At one side of the rolls is the standard or frame 6 which forms a backstop for the mandrel 7 at that side of the mill. This mandrel 7 rests on the supports 8 arranged at suitable intervals. The outer end of the mandrel 7 carries the mandrel-plug 9 which is adapted to enter the pass of the rolls. The tubular blank 10 is adapted to rest in the troughs 11 and 12 which are in line with the passes 3^a and 5^a of the rolls. In line with the troughs 11 and 12 are the cylinders 13 and 14 respectively, and the piston rods are provided with the pushers 15. These pushers have combined with them a gripping device which is adapted to seize the mandrel when the pusher has been advanced until the tubular blank has been forced through the rolls, and this combined pusher forms the subject of a separate application for Letters Patent of the United States filed by W. M. Selkirk and myself on the 19th day of December, 1910, Serial No. 598,146. The pusher 15 is composed of the hollow body 15^a with the opening 15^b at the front end. The jaws 15^c are engaged by the conical head 15^d on the piston 15^e. A spring 15^f engages the piston 15^e and the abutment 15^h. In Fig. 5 the jaws are gripping the mandrel. Air has been admitted to withdraw the pusher and this air acting on the piston 15^e closes the jaws of the gripper around the mandrel. When the mandrel has been drawn through the rolls the air is exhausted and the spring 15^f will move the piston 15^e to release the jaws and release the mandrel.

Supported by the supports 8 is the rod 16, said rod carrying the hinged or swinging hoods 17 suspended above the supports 8. A cylinder 18 is carried on the shelf 19^a extending out from one of the supports 8 and the piston of said cylinder is connected to a lug 19 on one of the hoods 17. As the hoods are all rigidly secured to the rocking bar 16 the movement of one of said hoods by the cylinder 18 will act to move all of said hoods for the purpose fully hereinafter set forth. Skids 20 extend from the top of the supports 8 down at an angle so as to deliver the tube sliding on said skid to the trough 11 when the tube is to be brought into line with the third pass.

At the opposite side of the rolls are the sectional troughs 21 to receive the mandrels 22, 23, which bear at their outer ends against the backstop 24.

The cylinders 25 are arranged vertically to lift the tube to the upper or second pass 4a and the pistons of said cylinders carry the swinging supports 26, said supports having the concave seats 27 to receive the tubular blank. The swinging supports 26 are held in the position indicated in full lines Fig. 4 by the shoulder on said supports engaging the upper end of the piston-rod, which works in the cylinder 25. The trough 28 is arranged in line with the second pass and the outer ends of the swinging supports 26 are adapted to engage said trough to tilt said supports to deliver the tube to said trough as fully hereinafter set forth. In line with the trough 28 is the cylinder 29 which has the combined pusher and gripper 30 the same as before referred to.

In carrying out my improved method with the above form of apparatus, the tubular blank 10 is brought from the piercer and is deposited in the trough 12, the cylinder 14 is operated and the pusher 15 advances to force the blank into the first pass of the rolls and onto the mandrel 22. When the blank has passed the front end of the mandrel which projects beyond the plug, the pusher is withdrawn pulling the mandrel through the first pass to the opposite side of the rolls and leaving the tube in the position in which it was delivered by the rolls or resting on the supports 21. The cylinders 25 are now operated and the swinging supports 27 moving upward lift the tubular blank from the supports 21, and when the outer ends of the swinging supports 26 strike the trough 28 as shown in dotted lines Fig. 4, the said swinging supports will be inclined so as to cause the tubular blank to roll from the concave seats 27 into the trough 28. After the blank is raised the mandrel 22 is returned to the position indicated in Fig. 1 by the pusher in position to receive the next blank coming through that pass. In this manner the tubular blank is brought into line with the second pass and the cylinder 29 is then operated to force said tubular blank through the second pass onto the mandrel 7. The gripper on the pusher then seizes the front end of the mandrel 7 and pulls it through the pass to the opposite side of the rolls leaving the tubular blank 10 resting on the supports 8 with the hoods 17 inclosing said tube as shown in Fig. 3. Power is then applied to operate the cylinder 18 and the hoods 17 are swung to the position indicated in dotted lines Fig. 3, whereupon the tubular blank is forced from the supports 8 and falls down the skids 20 into the trough 11 which is in line with the third pass. The cylinder 13 is now operated and its pusher advances the tubular blank through the third pass onto the mandrel 23 when the gripper seizes said mandrel and draws its back to the opposite side of the roll leaving the tube in position to be delivered to the conveyer 32 to be carried to a suitable expanding mill for a further operation on the tube.

By the above method I am enabled to employ a three-high or other mill having upper and lower passes in connection with the rolling of seamless tubing in such a manner as to dispense with the cumbersome tables and the mandrels permanently carried thereby for lifting the tubes to the different passes, and I further avoid the feeding of the tubes off the mandrel bars onto the mandrel bars at the opposite side of the rolls. The mandrel bars are withdrawn each time leaving the tube in position to be delivered by itself to an upper or lower pass which requires no power except to lift the tube. In the methods heretofore practised in connection with the rolling of tubes in a three-high or other mill having upper and lower passes great difficulty was experienced in feeding the tube from the mandrels to which they had been delivered, and the operations were so slow that it was practically impossible to handle hot tubes on such mills. By withdrawing the mandrel each time the heat of the blank is maintained and the mandrel bars do not become as highly heated, and it is not found necessary to water-cool the mandrels which tends to reduce the heat of the blank. Furthermore, by passing the tube through a different pass each time, the first pass does practically all the roughing work while the second and third passes tend to give a better finish to the interior as well as to the exterior of the tube.

What I claim is:

1. The method of rolling seamless tubing consisting in feeding the tubular blank through a pass of a mill having upper and lower passes onto a mandrel, withdrawing the mandrel leaving the blank in the position in which it was delivered from the rolls, moving the blank to a different level into line with another pass of said mill, passing the blank back through said last named pass onto a mandrel, and withdrawing the mandrel.

2. The method of rolling seamless tubing consisting in feeding the tubular blank through the pass of a mill having upper and lower passes onto a mandrel, seizing the mandrel at its front end and drawing it to the opposite side of the rolls, lifting the blank from the position in which it was delivered from the rolls to a different level into line with another pass of said mill, and passing the blank through said last named pass onto a mandrel, and withdrawing the last named mandrel through the pass to the opposite side of the rolls.

3. The method of rolling seamless tubing consisting in feeding the tubular blank

through the pass of a mill having upper and lower passes onto a mandrel, withdrawing the mandrel through the rolls to the opposite side thereof, lifting the blank from the position in which it was delivered from the roll to a different level into line with another pass of said mill, returning said mandrel to its original position, passing said blank back through said last named pass onto another mandrel, and withdrawing said last named mandrel.

In testimony whereof, I the said RICHARD E. BROCK have hereunto set my hand.

RICHARD E. BROCK.

Witnesses:
ROBERT C. TOTTEN,
JOHN F. WILL.