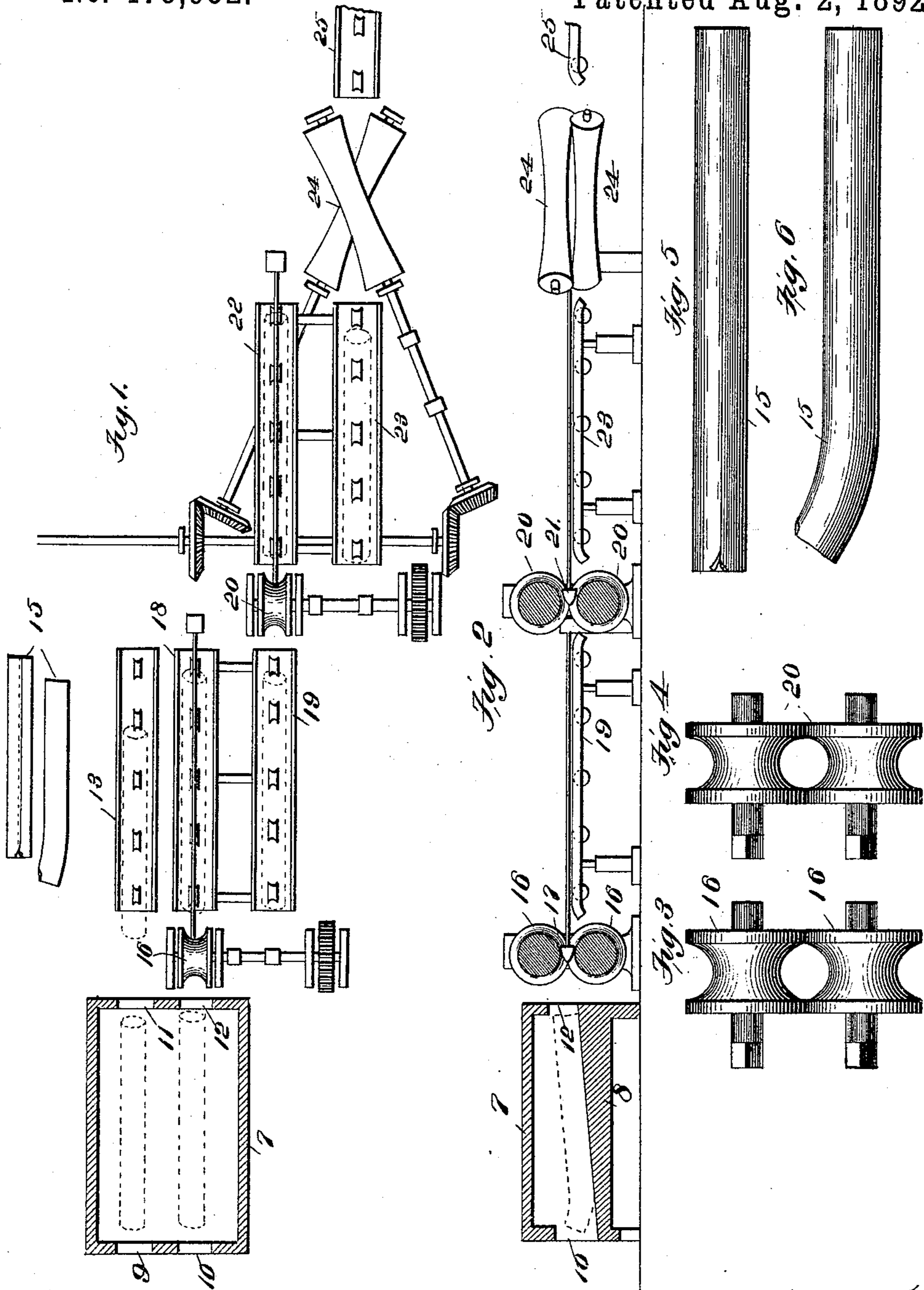


(No Model.)

W. S. McMANUS.  
PROCESS OF MAKING METAL PIPES OR TUBES.

No. 479,952.

Patented Aug. 2, 1892.



Witnesses:

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# UNITED STATES PATENT OFFICE.

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## PROCESS OF MAKING METAL PIPES OR TUBES.

SPECIFICATION forming part of Letters Patent No. 479,952, dated August 2, 1892.

Application filed February 5, 1891. Serial No. 380,374. (No specimens.)

*To all whom it may concern:*

Be it known that I, WILLIAM S. McMANUS, of South Chester, in the county of Delaware and State of Pennsylvania, have invented a new and useful Improvement in the Process of Making Metal Tubes or Pipes, which improvement is fully set forth in the following specification.

The ordinary method of making metal tubes or pipes is as follows: The skelp as it comes from the turn-up box is allowed to cool and then taken to a furnace located back of the welding-rolls and having a door on the end opposite to that at which the welding-rolls are located. The skelp is put through this door into the furnace and while in the furnace is moved and controlled by helpers by means of long iron rods inserted through this door. The welder also watches it through this door. When the skelp has been heated to the proper degree of heat, it is pushed by means of the said rods through a door at the end of the furnace opposite the door above mentioned and directly back of the welding-rolls. As it emerges from this door it is passed over a ball through welding-rolls having elliptical surfaces. It is then allowed to cool and then again put into the furnace through the door at which it was first inserted, and, after again being heated, it is pushed through the opposite door and passed again over a ball through the welding-rolls. It is then passed through finishing-rolls having cylindrical surfaces of the form and size of the finished pipe, but not over a ball, and then in some instances it is also passed through cross-rolls, when it is supposed to be complete, with the exception of the finishing of the ends. Various attempts have been made to improve this process. In one or two instances, instead of allowing the skelp to keep cool after it comes from the turn-up box, it has been while still hot inserted in the furnace through the door opposite to the end where the welding-rolls are located. This, however, has necessitated the laying of the red-hot skelp adjacent to the end of the furnace where the helpers stand who move and control the skelp while in the furnace, and the intense heat radiated from the hot skelp renders it difficult for these helpers to work. It has been attempted, but

with imperfect success, to remedy this by a movable curtain in front of the hot skelp. In one or two instances, also, the pipe or tube after it comes from the welding-rolls has been reinserted in the furnace through a second door, on the end at which the welding-rolls are located. The reheating of the tube or pipe after it comes from the welding-rolls has also been in some cases avoided by using a second or intermediate set of rolls between the welding-rolls and finishing-rolls and passing the tube through them while still heated as it comes from the welding-rolls.

In the accompanying drawings, Figure 1 represents in plan a plant organized for the practice of my invention, the furnace being shown in section. Fig. 2 represents a view of the same, partly in side elevation and partly in section. Fig. 3 represents a front elevation of the rolls having elliptical passes. Fig. 4 represents, on a larger scale, a front elevation of the rolls having circular passes; and Figs. 5 and 6 represent, respectively, also on a larger scale, a plan and elevation of a skelp.

Similar numerals of reference indicate similar parts throughout the several views.

Referring to the drawings, 7 indicates a furnace having a sloping bottom 8 and provided at its front end with doors or openings 9 and at its rear end with doors or openings 11 12. In front of one of the rear doors, as 11, may be located a conveyer-trough 13, having feed-rollers, as shown, to enable the skelps as they come from the turn-up box to be readily inserted into the furnace through said door. The forward end of the skelp is usually somewhat bent as it comes from the turn-up box, said bent end forming a skate, facilitating the entrance of the skelp into the furnace and at the same time lessening the wear on the furnace-bed. In front of the other rear door 12 are located the rolls 16, having elliptical passes, as shown in Fig. 3, and having a ball 17, between which and the surfaces of the rolls 16 the first part of the welding operation is performed. A conveyer-trough 18 receives the partly-finished tube, and it is then passed by means of the conveyer-trough through the rolls 20, having circular passes and having a ball 21. From the rolls 20 it is

received by the conveyer-trough 22 and is then removed to the conveyer-trough 23 and passed through the cross-rolls 24, from which it may conveniently be carried off by the conveyer-trough 25.

It will thus be seen that in the process which I have invented the skelp as it comes from the turn-up box and while still in a heated condition is inserted into the furnace by a door at the end at which the welding-rolls are located. As the bottom of the furnace is necessarily made to slope downward toward the end opposite the rolls, the skelp is pushed easily and without friction into the furnace, and the end of the skelp which is to pass first through the welding-rolls and over the ball is the least subject to be battered or bent. After the skelp is in the furnace it is moved and controlled by the helpers through the door at the end opposite to that at which the skelp entered. These helpers, being at the opposite end of the furnace from the hot skelp as delivered from the turn-up furnace, are not incapacitated by the heat. After the skelp is heated to the proper degree it is pushed by the helpers through the door of the furnace at the end where the welding-rolls are located and is passed over a ball through welding-rolls having elliptical passes. It is then while still in a heated condition, but without reheating, passed over a ball through a second set of welding-rolls having, instead of elliptical passes, cylindrical passes of the form and size of the finished tube and then passed through cross-rolls, and is then complete with the exception of the finishing of the ends. It will be seen that in this process the operation is one continuous operation, avoiding the reheating of the skelp or tube and doing away with the one set of rolls technically known as the "finishing-rolls," while at the same time handling the metal with the greatest economy of space and the least loss and inconven-

ience to the employés. The result is also to produce a more perfect tube or pipe than by the old process and at a cheaper cost. By this operation the tube is welded, the blisters which form after the passage of the iron through the rolls at a welding heat are removed, and the shape of the pipe is formed by one continuous operation, involving only two rollings of the pipe before it reaches the cross-rolls—a result never before attained, so far as I am aware, with any degree of certainty or uniformity.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The hereinbefore-described method of welding metallic tubes and pipes, which consists in the following continuous operation, to wit: first, introducing the heated skelp into the end of the welding-furnace adjacent to the welding-rolls, whereby the end of the skelp which is to first enter the rolls is preserved in better condition to undergo the subsequent steps of the operation; second, passing it at a welding heat in a reverse direction from the furnace to and over a ball and through welding-rolls, and, third, passing it from these rolls having elliptical passes at a lower heat, but without reheating, to and over a ball and through rolls having cylindrical passes.

2. In the art of welding metallic tubes and pipes, the improvement which consists in passing a heated skelp at a welding heat over a ball and through rolls having elliptical passes and then passing it from these rolls at a lower heat, but without reheating, to and over a ball and through rolls having cylindrical passes.

W. S. McMANUS.

Witnesses:

SAML. F. GILLIER,  
ADOLPH S. HERMANN.