Feb. 2, 1932. M. M. LAUTERBACH 1,843,395

ROLLING MILL

Filed Nov. 11, 1930

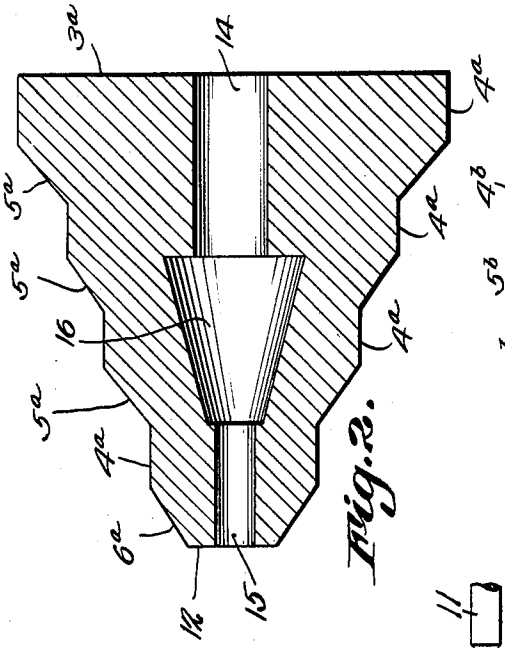


Fig. 2.

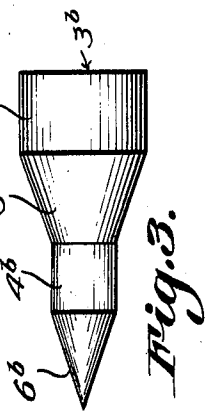


Fig. 3.

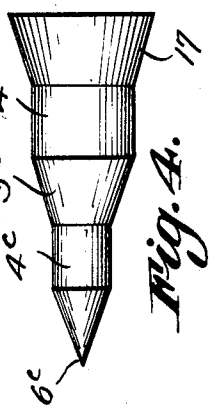


Fig. 4.

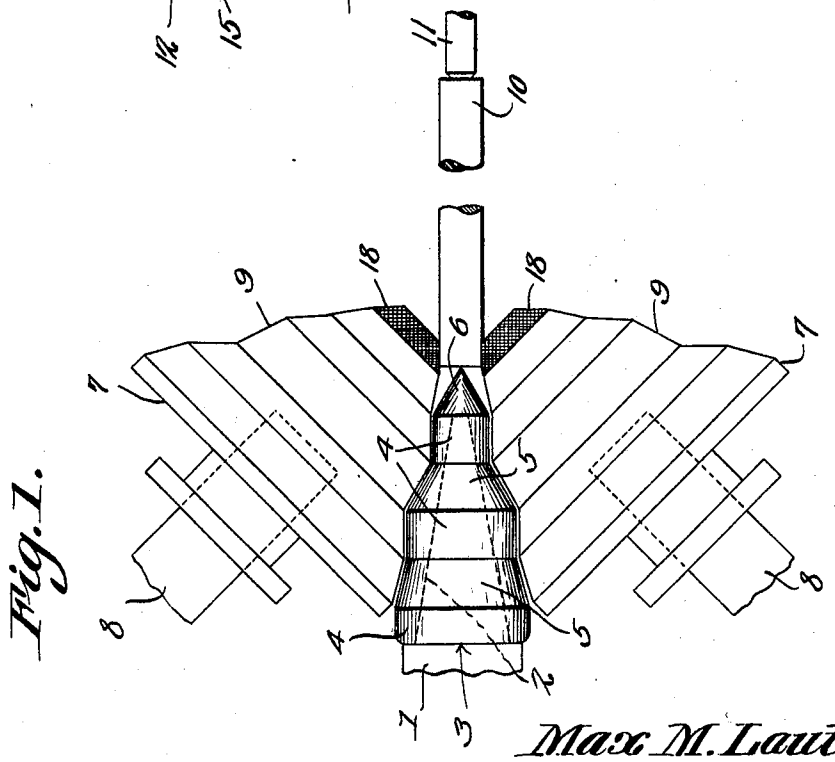


Fig. 1.

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UNITED STATES PATENT OFFICE

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ROLLING MILL

Application filed November 11, 1930. Serial No. 494,982.

This invention aims to provide a novel form of piercing ball adapted to use in connection with rolls and a push bar, for piercing a red hot billet, to make pipes, the construction being such that the machine will operate with peculiar efficiency, requiring little force to drive it, an unusually satisfactory product resulting.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that type to which the invention appertains.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, may be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings:

Figure 1 shows in plan, a device constructed in accordance with the invention;

Figure 2 is a longitudinal section showing a modification;

Figure 3 is an elevation showing another modification;

Figure 4 is an elevation showing a still further modification.

Referring to Figure 1, the numeral 1 marks a shaft mounted to rotate upon a fixed axis. The shaft 1 may have a conical end 2 held in a correspondingly shaped recess in a piercing ball 3 made up of cylindrical body portions 4 of successively decreasing diameters, the body portions 4 being connected by frusto-conical parts 5, the piercing ball terminating in a point 6.

On each side of the piercing ball 3 are located rolls 7 carried by shafts 8 mounted to rotate on fixed axes disposed at an acute angle to the axis of rotation of the shaft 1. The rolls 7 are stepped as shown at 9 to correspond with the cylindrical body portions 4 and the frusto-conical parts of the piercing ball 3. The billet of red hot steel is marked by the numeral 10 and is advanced by a push bar 11 mounted for right line reciprocation and engaging the outer end of the billet.

In practical operation, the billet 10 is forced forwardly by the push bar 11 on the point 6 of the piercing ball 3. The rolls 7 may be milled or constructed otherwise at their smaller ends as shown at 18, to take hold of the forward end of the billet 10. The billet 10 is forced forwardly over the parts 4 and 5 of the piercing ball 3, and is shaped to the piercing ball, by the action of the rolls 7 and by the action of the piercing ball 3, as these parts are rotated, respectively, by the shafts 8 and by the shaft 1.

The billet 10 is transformed into a roughly finished piece of pipe. The construction of the device is such that not much power will be required to drive it, and the resulting product, although in a rough state, is singularly free from imperfections.

It will be understood that there may be as many or as few of the parts 4 and 5 as occasion may require. If a small pipe is turned out, there need not be so many steps in the piercing ball as is necessary when a larger pipe is made. Moreover, the slopes shown at 5 may be more or less acute as occasion may require. These modifications are shown in Figures 2, 3 and 4.

In Figure 2, parts hereinbefore described, have been designated by numerals previously used, with the suffix "*a*". In Figure 2, there are more of the cylindrical parts 4*a* than in Figure 1 and there is a corresponding increase in the number of the parts 5*a*. The point 6*a* of the expander shown may be blunted, if desired, as shown at 12.

The bore of the piercing ball 3*a* may consist of parts 14 and 15 of different diameters, connected by an enlarged recess 16 of any desired shape, which cuts down the amount of metal and decreases the weight of the piercing ball. The recess 16, as shown in Figure 2 is of frusto-conical form, but this shape is not insisted upon. The smaller portion 15 of the bore of the piercing ball 3*a* is located in the reduced end of the piercing ball, whereas the part 14 of the bore, which is of greatest diameter, is located in the wider end of the piercing ball.

In Figure 3, parts hereinbefore described have been designated by numerals previously used, with the suffix "*b*". In this form of the invention, the number of cylindrical parts 4*b* has been cut down as compared with Figure 1, there being a corresponding decrease in the number of the parts 5*b*. The part 5*b*, and the point 6*b* have a more gradual slope, than in Figure 1.

In Figure 4, parts hereinbefore described have been designated by numerals previously used with the suffix "*c*". In Figure 4, the cylindrical part 4 of Figure 1, which is of greatest diameter, is replaced by a conical portion 17.

In general, the several figures of the drawings, taken together, indicate that the number of steps in the piercing ball may be increased and decreased at will, and it is plain, also, that the slopes of the conical parts such as the parts 5, 5*a*, 5*b*, and 5*c*, may be regulated as occasion may require.

Having thus described the invention, what is claimed is:

In a mill of the class described, means for piercing and expanding a hot billet as succeeding steps in a continuous operation, comprising a piercing ball having a conical point which is sharp enough to effect the piercing step, a frusto-conical part, and a cylindrical part interposed between the frusto-conical part and the base of the point, the base of the point being connected immediately to one end of the cylindrical part and being of the same diameter as the cylindrical part, the smaller end of the frusto-conical part being connected immediately to the opposite end of the cylindrical part and being of the same diameter as the cylindrical part, and lateral rolls cooperating with the piercing ball and having rolling surfaces the ends of which meet, said rolling surfaces, respectively, being parallel to and coextensive with, the outer surfaces of the cylindrical and frusto-conical parts of the piercing ball.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature.

MAX MILLION LAUTERBACH.