Oct. 23, 1928

1,688,335

L. IVERSEN

ROLLING MILL

Filed Aug. 5, 1926

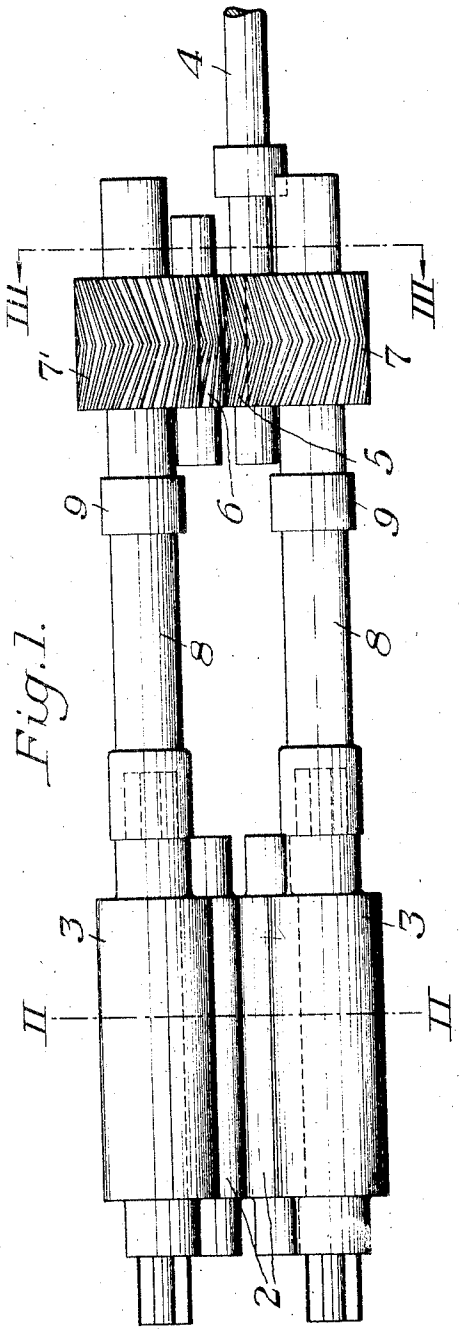


Fig. 1.

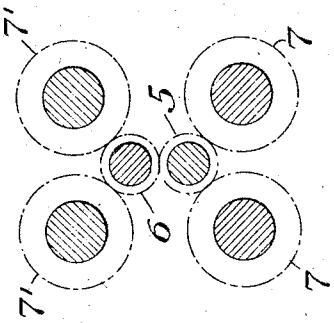


Fig. 3.

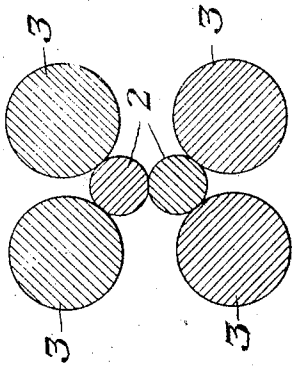


Fig. 2.

INVENTOR

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by his attorneys

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UNITED STATES PATENT OFFICE

LORENZ IVERSEN, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO MESTA MACHINE COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

ROLLING MILL.

Application filed August 5, 1926. Serial No. 127,296.

This invention relates to rolling mills, and particularly to those mills wherein the working rolls which actually engage the material being rolled are provided with backing-up rolls.

In certain kinds of rolling, particularly the rolling of sheets and strip material, it is found desirable to use working rolls of relatively small diameter and to supply the additional resistance to rolling forces required to prevent deflection of such rolls under load by utilizing backing-up rolls. In some cases a three-high mill is used, in which case only one of the working rolls is provided with a backing-up roll. In this case the unsupported working roll is generally of larger diameter than the supported roll. It is customary, however, in mills of this character, to provide a four-high mill in which the working rolls are of substantially the same diameter and are both provided with a backing-up roll.

It is customary in mills of this character to drive the backing-up rolls, and to depend upon friction for the transmission of power from a backing-up roll to its working roll. Ordinarily this practice is open to certain objections, among them being the fact that if slippage occurs between a work roll and its backing-up roll a flat spot will be worn on the work roll and this will result in an inferior product.

Various ways of overcoming the difficulty have been proposed. For example, in the patent to Chartener, No. 1,522,473, spring pressure is employed to supply a force between a work roll and its backing-up roll, in addition to the ordinary rolling force. In my copending application, Serial No. 120,308, filed July 3, 1924, I have described and claimed a rolling mill wherein one of the work rolls is positively driven and the other is frictionally driven through its backing-up roll.

By the present invention I provide a simple and effective way of driving the working rolls without any of the difficulties encountered in the various arrangements heretofore proposed. I provide a plurality of backing-up rolls for a working roll, and preferably drive all of the backing-up rolls. By this arrangement a much better drive from the backing-up rolls to the working roll is provided and slippage is eliminated or minimized. With this arrangement no particular relation of diameters need exist between the backing-up rolls and the working rolls, and therefore the working rolls may be dressed as many times as desired without interrupting the mill operation.

In the accompanying drawings, which illustrate more or less diagrammatically the present preferred embodiment of my invention,—

Figure 1 is a side elevation of a set of rolls in a mill stand, together with the drive shaft pinions and couplings;

Figure 2 is a section taken on the line II—II of Figure 1; and

Figure 3 is a section taken on the line III—III of Figure 1.

In the illustrated embodiment of the invention there is shown a pair of working rolls 2, each provided with two backing-up rolls 3. Power is supplied to each of the backing-up rolls from any desired source through a power shaft 4. The power shaft 4 is connected to a pinion 5 which meshes with a pinion 6. The pinions 5 and 6 are preferably of substantially the same diameter as the working rolls, although this is not essential.

The pinion 5 also meshes with two gears 7 which preferably correspond in diameter to the backing-up rolls 3. The pinion 6 meshes with two similar gears 7′.

It will be noted from Figures 2 and 3 that the gears 5, 6, 7 and 7′ occupy substantially the same relative position as the rolls 2 and 3.

The gears 7 and 7′ are each connected to their corresponding backing-up rolls 3 through spindles 8 and couplings 9. The usual provision for adjustment of the rolls in the mill stand is of course provided.

It will be seen that each of the working rolls instead of making one frictional contact with a backing-up roll, makes two such contacts at points spaced around the roll. Therefore, the possibility of slippage is very materially reduced. The arrangement thus eliminates the many troublesome features of earlier mills of this character.

I have illustrated and described a preferred embodiment of the invention. It will be understood, however, that it is not limited to such form since more than two backing-up rolls may be employed or other changes may be made within the scope of the following claims.

I claim:

1. A rolling mill, comprising a pair of working rolls each having a plurality of posi-

tively driven backing-up rolls, and a single drive means for the several backing-up rolls.

2. A rolling mill, comprising a pair of working rolls each having a plurality of driven backing-up rolls, a pinion set made of gears and pinions of the same general diameter as the rolls and arranged in the same manner as said rolls, and connections between the pinion set and the backing-up rolls.

In testimony whereof I have hereunto set my hand.

LORENZ IVERSEN.