H. A. LEWIS.

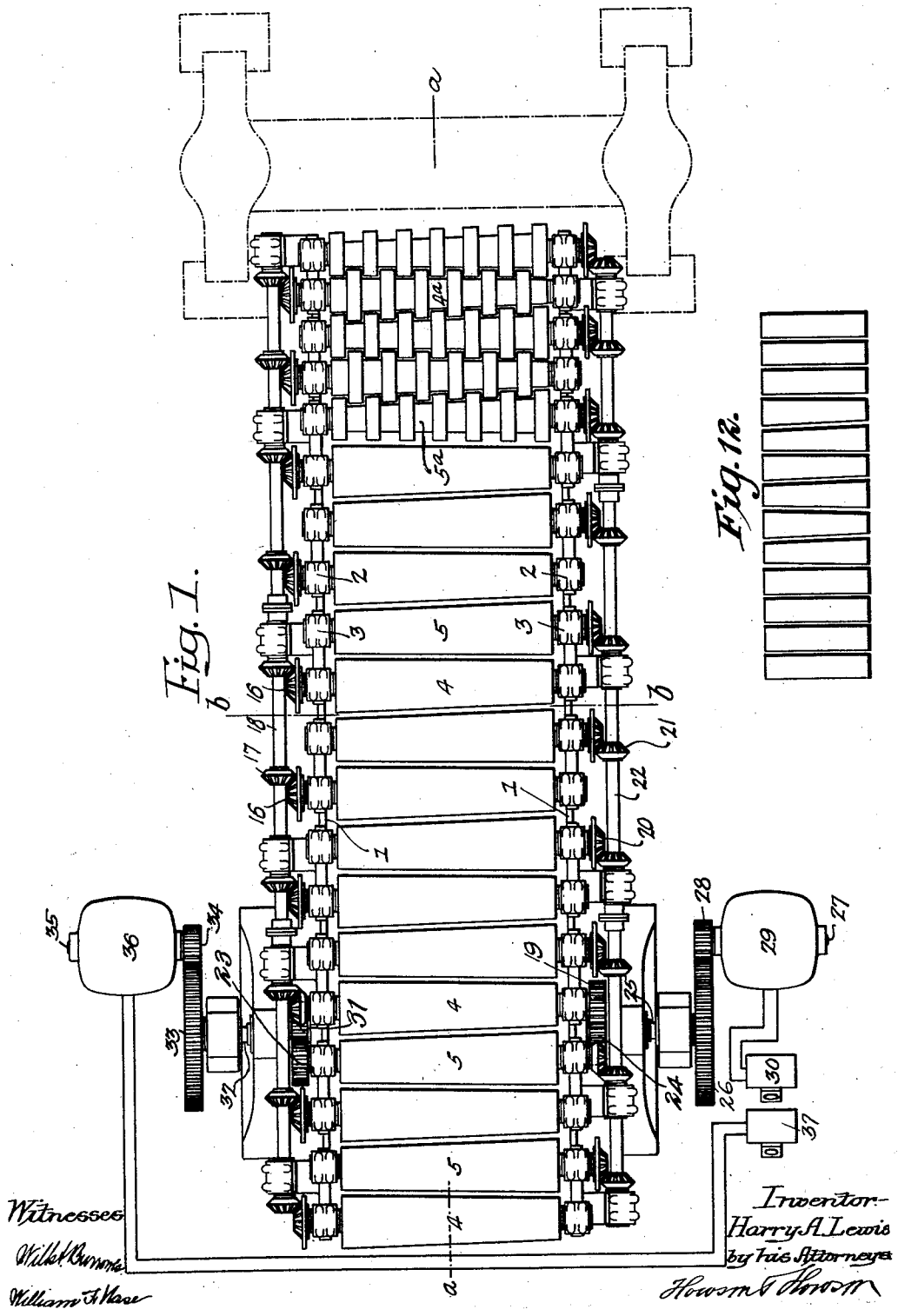
ROLLER TABLE FOR ROLLING MILLS.

APPLICATION FILED MAR. 25, 1914.

1,114,621.

Patented Oct. 20, 1914.

3 SHEETS—SHEET 1.



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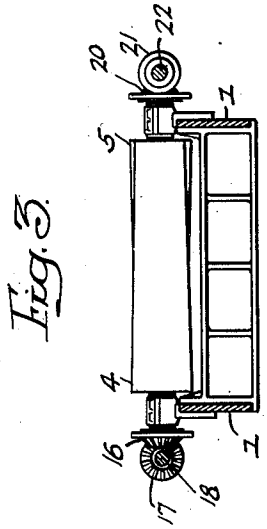

Fig. 3.

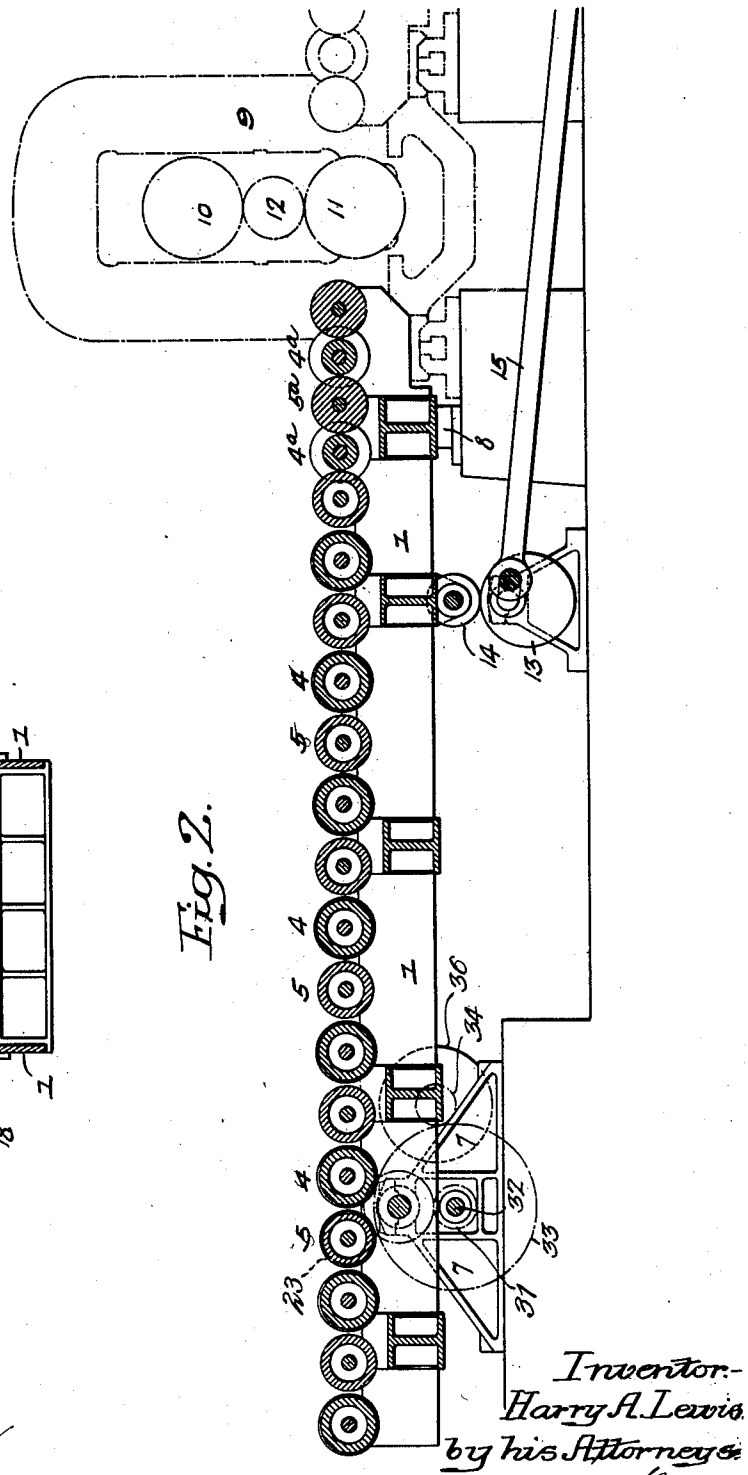

Fig. 2.

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William F. Masi

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3 SHEETS—SHEET 3.

Fig. 8.

Fig. 5.

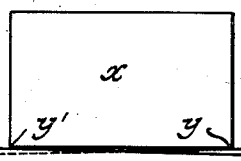
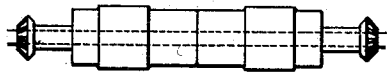


Fig. 9.



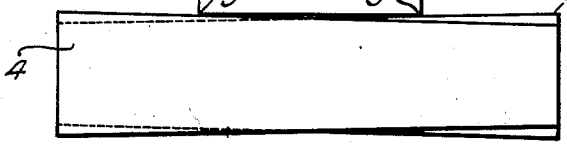


Fig. 10.

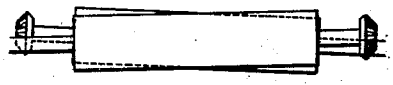


Fig. 11.

Fig. 4.

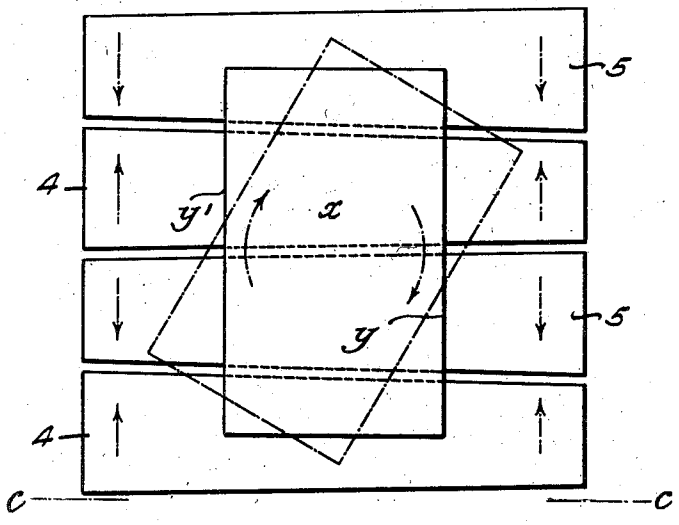


Fig. 6.

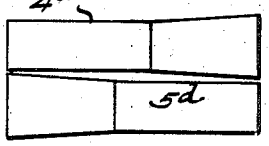
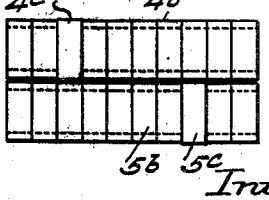


Fig. 7.



Witnesses.—

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William T. Mase.

Inventor—

Harry A. Lewis.

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Howard Howson

UNITED STATES PATENT OFFICE.

HARRY A. LEWIS, OF NORRISTOWN, PENNSYLVANIA.

ROLLER-TABLE FOR ROLLING-MILLS.

1,114,621. Specification of Letters Patent. Patented Oct. 20, 1914.

Application filed March 25, 1914. Serial No. 827,163.

To all whom it may concern:

Be it known that I, HARRY A. LEWIS, a citizen of the United States, residing in Norristown, county of Montgomery, State of Pennsylvania, have invented certain Improvements in Roller-Tables for Rolling-Mills, of which the following is a specification.

The object of my invention is to construct roller tables used for handling material, especially the tables of rolling mills, so that the blooms can be turned automatically and without being manually handled as is the usual practice at the present time.

The invention can be used for handling plates where it is desired to convey the material away from a rolling mill and it can also be used in connection with conveyers where it is desired to turn heavy objects mounted on the table so as to be presented at one end of the table in any position desired.

These objects and other advantageous ends I attain in the following manner, reference being had to the accompanying drawings, in which:

Figure 1 is a plan view of a rolling mill table illustrating the rolling mill in dotted lines; Fig. 2 is a longitudinal sectional view through the table of a three high mill, on the line *a*—*a*, Fig. 1, the mill being shown in dotted lines; Fig. 3 is a transverse sectional view on the line *b*—*b*, Fig. 1; Fig. 4 is a diagrammatic plan view exaggerated, showing the bloom on the table; Fig. 5 is a diagrammatic elevation on the line *c*—*c*, Fig. 4; Figs. 6 and 7 are views illustrating modifications of the invention; Figs. 8, 9, 10, and 11 are views illustrating other modifications; and Fig. 12 is a plan view in diagram of a modification of the roller table.

Referring to the drawings, 1, 1 are the side frames of the table having bearings 2 and 3 for the rollers 4 and 5 respectively. The table is pivotally mounted on a bearing 7 and is supported in its lowest position by an abutment 8 directly in front of the housings 9 of the rolling mill. This mill is shown in dotted lines in the figures and is, in the present instance, a three high mill having rolls 10, 11 and 12. The table is raised and lowered by a cam 13 bearing upon a roller 14 secured to the table, as shown in Fig. 2, and connected by a rod 15 to operative mechanism so that, as the cam is turned, the table will either be raised in line with the space between the upper roll 10 and the intermediate roll 12, or will be lowered so as to be in line with the space between the intermediate roll 12 and the lower roll 11.

All of the above described mechanism is common in this type of rolling mill table.

In reducing a bloom to the proper shape for rolling plates, or for other purposes, the bloom must be turned so that it can be passed through the rolls sidewise, as well as lengthwise, and it is often desirable to pass it through at an angle to secure certain results in order to reduce the bloom to the proper size. Heretofore, it has been the common practice to use bars hung from the overhead structure of the mill. The bars are located, one at each side of the mill, so as to allow an operator to work the bars manually under the bloom and to turn it by main force. This is a tedious operation and is not accurate as there is but a short interval between the time the bloom passes from between the rollers and the time it is again caused to move forward for another pass.

By my invention, which I will now proceed to describe, all manual labor is dispensed with in handling the bloom as it is done automatically by manipulating the rollers from a given point.

It will be noticed, upon referring to the drawings, that the rollers 4 alternate with the rollers 5 and that the rollers 4 are tapered in one direction and the rollers 5 are tapered in the opposite direction. Each of the rollers is independently driven. In the present instance, on each roller 4 are bevel wheels 16 which mesh with bevel wheels 17 on a longitudinal driving shaft 18 so that all of the rollers 4 are driven in unison. In the present instance, one of the rollers has a gear wheel 19 through which power is applied to all of said rollers. On one end of each roller 5 is a bevel gear wheel 20 meshing with a bevel gear wheel 21 on the shaft 22 and on one of the rollers 5 is a gear wheel 23 through which all of the rollers 5 are driven. The wheels 19 and 23 may be geared to driving mechanism, which can be independently reversed, either by electrical means or by mechanical means, as desired, so as to reverse both sets of rollers 4 and 5 in unison, or to reverse the rollers 5 while the rollers 4 are moving in the opposite direction, or to allow one set of rollers to remain stationary while the other set of rollers is moving in either direction.

It is the usual practice to make the rollers near the rolling mill in the form of ribbed rollers so as to more accurately carry the bloom and to allow for the free discharge of any scale and such rollers 4^a and 5^a are preferably tapered similarly to the rollers 4 and 5, although they may be plain and not tapered where the turning can be accomplished on the rollers 4 and 5. In some instances, the table may have only a portion of the rollers tapered where the turning can be accomplished in a limited space, as shown in Fig. 12.

Referring to Figs. 4 and 5, x is the bloom and 4 and 5 are the rollers. The rollers 4 are tapered in one direction and the rollers 5 are tapered in the opposite direction. It will be noticed that the edges y, y' only rest upon the rollers. It will also be noticed that the edge y rests on the high portion of the rollers 5 and the edge y' rests upon the high portion of the rollers 4. Consequently, when the two sets of rollers are driven at the same speed and in the same direction, then the bloom will be fed longitudinally in a straight line according to the direction of movement of the rollers, but should the direction of movement of the rollers 5 be reversed, then the bloom is turned, as the portions y of the bloom rest between the rollers 5, which are moving in one direction, while the portions y' of the bloom rest upon the rollers 4, which are traveling in the reverse direction, and, if this movement is continued, the bloom is turned continuously on the table. Therefore, if the driving mechanism of the two sets of rollers be under the control of an operator so that he can reverse either set of rollers at will, it is obvious that when the bloom passes from between the rolls of the mill and onto the table the operator can immediately turn the bloom to any position desired by manipulating the driving mechanism of the rollers so that it can be presented to make the next pass in the proper position to be reduced to the shape desired.

It will be seen that while the invention is particularly adapted for handling blooms, which are being reduced in a rolling mill, it can be used for other purposes where it is desired to turn articles which cannot be readily turned by hand and which are conveyed or supported by roller beds or tables.

In the drawings, I have shown one method of driving the mechanism, but this arrangement may be modified without departing from the essential features of the invention.

The gear wheel 19, through which the rollers 4 are driven, is driven from a gear wheel 24 on the shaft 25 on which is mounted a gear wheel 26 and this gear wheel is driven from a motor shaft 27 through a pinion 28. The gearing may have as many reductions as desired.

29 is an electric motor and 30 is a controller.

On the opposite side of the table is an arrangement similar to that described above. The wheel 23 on one of the rollers 5 is driven from a wheel on the shaft 32 through an intermediate wheel 31. On the shaft is a gear wheel 33 which meshes with a pinion 34 on the shaft 35 of an electric motor 36.

37 is a controller for the motor 36 which is located close to the controller 30 so that one man can manipulate both controllers.

While I have illustrated a certain specific mechanism for driving each series of rollers 4 and 5, other means will suggest themselves and can be employed without departing from the spirit of the invention.

In Fig. 6 I have illustrated a modification of the invention in which the rollers 4^d and 5^d are tapered a portion of their length and are straight for the balance thereof. This accomplishes the same purpose as though the rollers were tapered the full length where the width is limited and where the bloom, or other article, rests only on the tapered portion of the rollers.

In Fig. 7, I have illustrated another modification in which the rollers 4^b and 5^b have narrow raised portions 4^c and 5^c and the balance of each roller is reduced to accommodate a series of loose sleeves less in diameter than the raised portion of the rolls. By this means the bloom, or other element, will rest upon the raised portion and will be fed forward or turned according to the direction of movement of the rollers.

In Fig. 8, I have illustrated a form of my invention in which two tapered rollers are mounted on the same longitudinal center line. One of these rollers is at one side of the table and the other is at the opposite side. The rollers are driven independently and both rollers are tapered toward the center of the table.

In Fig. 9, I have illustrated another form in which the two rollers are mounted on the same shaft and each roller has an enlarged portion some distance from the center. This enlarged portion is preferably straight, as shown. These two rollers are independently driven so that they can be driven in unison or one roller can be reversed with respect to the other.

In Fig. 10, I have illustrated two sets of rollers alternating with each other. The rollers are of even diameter throughout but the bearings on which the rollers are mounted are slightly off center, so that the upper bearing surface of one set of rollers is at an angle in respect to the other set.

In Fig. 11, one set of rollers is on a horizontal axis, while the alternate rollers are at an angle, producing the same result.

I claim:

1. The combination of a table, two sets of

rollers thereon; means for independently driving each set, the upper surface of one set being out of line with the upper surface of the other set so that a bloom, or plate, resting on the rollers will have a bearing at one side on one set of rollers and on the opposite side on the other set of rollers and can be moved longitudinally in either direction or turned.

2. The combination of a table; two sets of rollers thereon, one set of rollers alternating with the other set and one set being higher at one side of the center line of the table than at the other and the alternate set being higher at the opposite side of the center line than the other so that when an article is supported on the table it will rest upon the high portions of the rollers; and means for independently driving the rollers so that when both sets of rollers are driven at the same speed and in the same direction, the article will travel in a straight line, but when the mechanism of one set of rollers is reversed, the article will be turned.

3. The combination in a roller table of a roller mill, of two series of rollers, the rollers of one series being increased in diameter at one side of the center of the table and the other series being increased in diameter at the opposite side of the table; and means for independently driving the rollers so that they can be driven in one direction in unison to feed a plate forward and can be reversed to turn a plate.

4. The combination in a roller table, of two sets of rollers; and means for independently driving each set, one set of rollers being tapered in one direction and the other set being tapered in the other direction so that an article supported by the rollers can be fed either straight ahead or turned, as desired.

5. The combination in a roller table of two sets of rollers, one set alternating with the other set; and means for independently driving each set, one set of rollers being tapered in one direction and the other being tapered in the opposite direction so that an article placed on the rollers can be moved in a straight line or can be turned, as desired.

6. The combination of a rolling mill; a table at one side of the mill; bearings on the table; a series of rollers mounted in the bearings, the alternate rollers being tapered in one direction and the other rollers being tapered in the other direction; with independent means for driving each set of rollers so that the said rollers can be driven in unison in either direction or one or the other set reversed.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

HARRY A. LEWIS.

Witnesses:
WALTER F. PULLENGER,
WM. A. BARR.