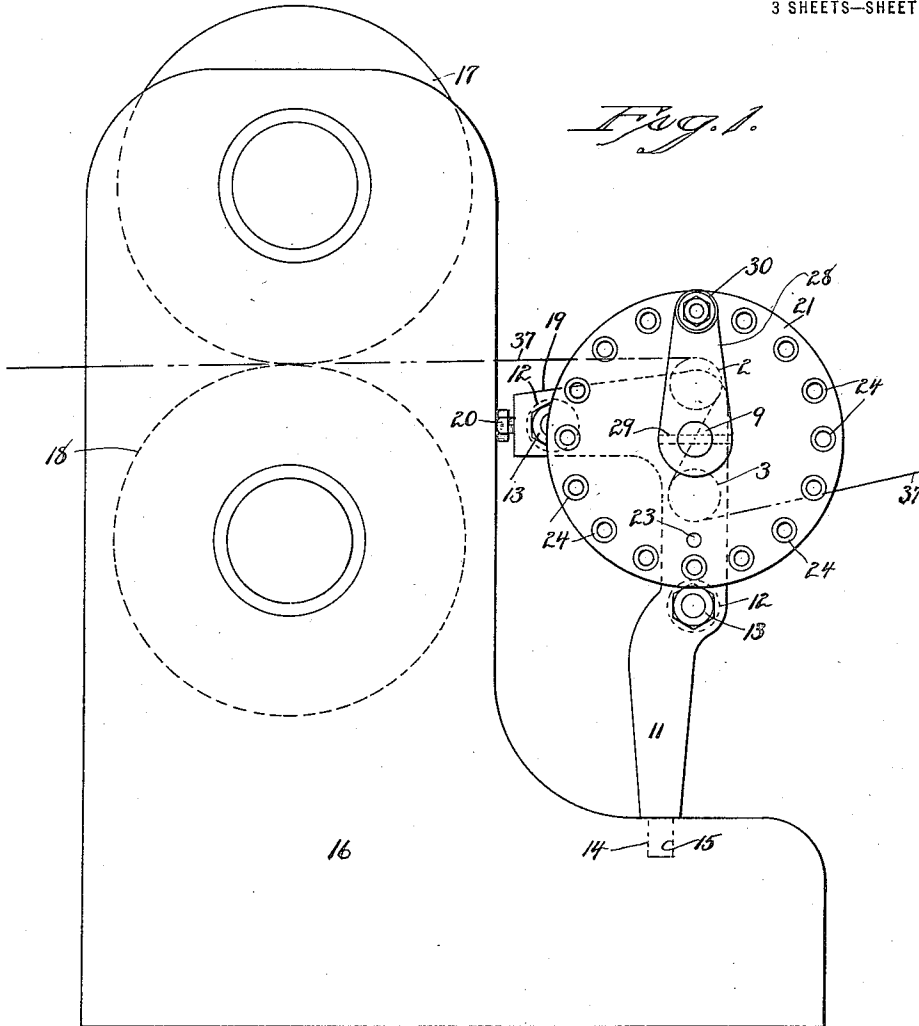


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APPLICATION FILED SEPT. 26, 1917.

1,305,069.

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3 SHEETS—SHEET 1.



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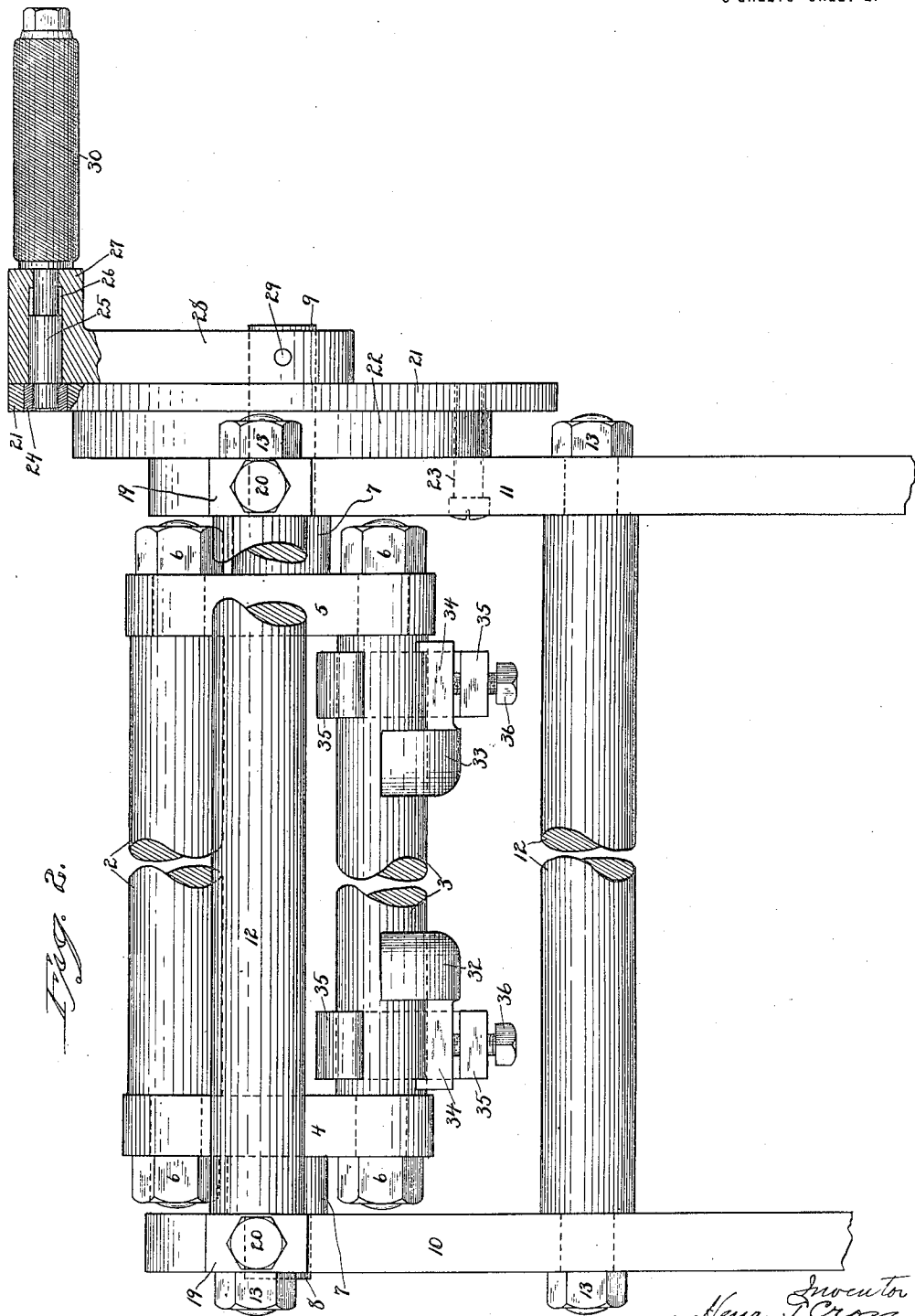


Fig. 2.

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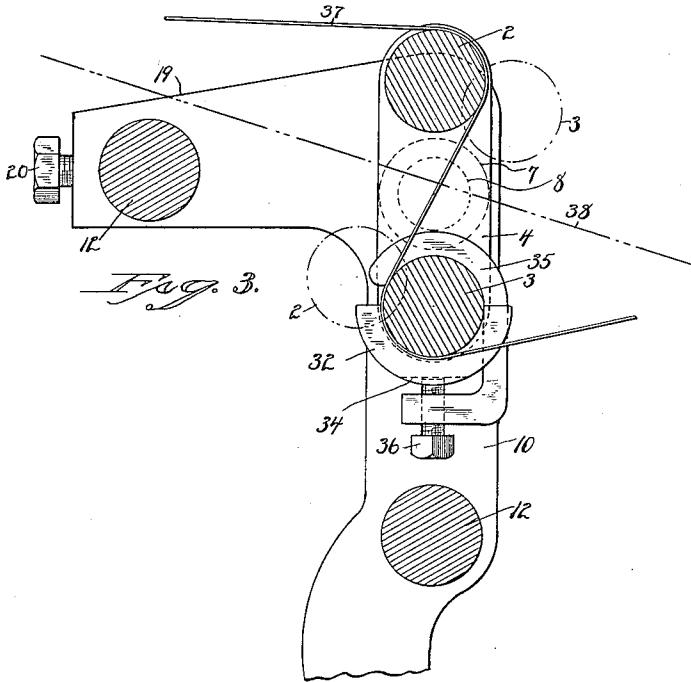


Fig. 6.

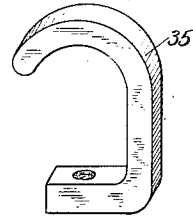


Fig. 5.

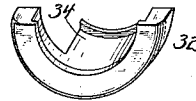


Fig. 4.

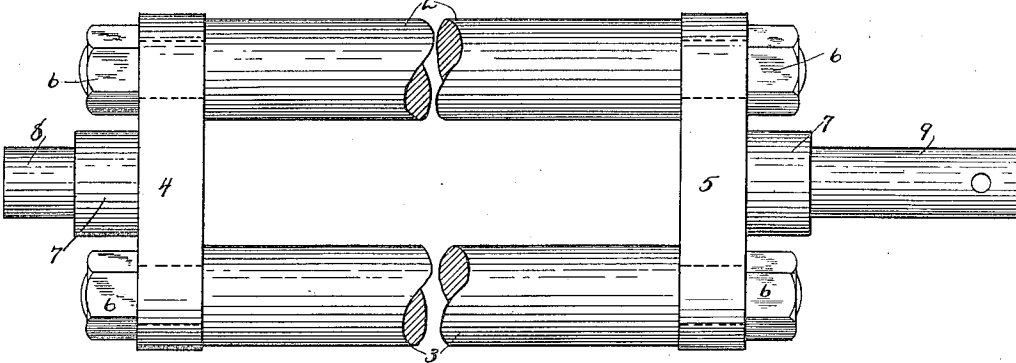
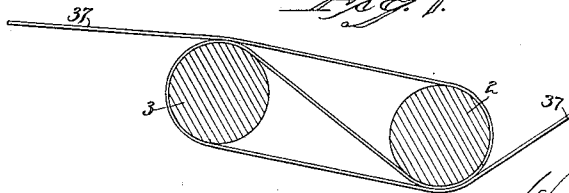


Fig. 7.



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# UNITED STATES PATENT OFFICE.

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## BRIDLING APPARATUS FOR ROLLING-MILLS.

1,305,069.

Specification of Letters Patent.

Patented May 27, 1919.

Application filed September 26, 1917. Serial No. 193,281.

*To all whom it may concern:*

Be it known that I, HENRY T. CROSS, a citizen of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Bridling Apparatus for Rolling-Mills; and I do hereby declare the following, when taken in connection with the accompanying drawings and the characters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this application and represent, in—

Figure 1 a view in side elevation of a rolling mill provided with my improved bridling apparatus.

Fig. 2 a detached broken view in inside elevation of my bridling apparatus.

Fig. 3 a broken view of the apparatus in vertical section.

Fig. 4 a detached broken view in elevation of the bridle.

Fig. 5 a detached perspective view of one of the two guide-blocks used on the bridle.

Fig. 6 a corresponding perspective view of one of the two guide-block hooks.

Fig. 7 a view showing the strip wrapped so as to return upon itself by a complete rotation of the bridle after the insertion of the fed-end of the strip between the rolls of the mill.

The object of my present invention is to reduce the time and labor required for "threading" a rolling mill; to the minimum, and also to provide convenient and speedy means for varying the tension or drag as required for different weights of metal and different grades of stock.

With these ends in view, my invention consists in a bridling apparatus having a movable bridle, and means for bodily moving the same into threading and bridling positions.

My invention further consists in a bridling apparatus comprising a rotary bridle and adapted to be turned to deflect the sheet-metal strip to a greater or less extent according to the amount of tension required, and means for turning it and holding it in place.

My invention further consists in a bridling apparatus having certain details of

construction and combinations of parts as will be hereinafter described, and pointed out in the claims.

In carrying out my invention as herein shown, I employ two parallel bridle-bars 2, 3, mounted at their ends in frame-pieces 4, 5, in which they are rigidly secured by nuts 6, the said frames being formed with spacing-shoulders 7, and the frame-piece 4 having a short trunnion 8, and the frame-piece 5 a long trunnion 9. The bridle as thus made, is mounted for rotary movement between the uprights 10 and 11 of a bridle-frame, the said uprights being rigidly connected to each other by stretchers 12 secured in place by nuts 13. The trunnion 8 of the frame-piece 4 turns in the upright 10, and the trunnion 9 of the frame-piece 5 turns in the upright 11. As thus constructed, the bridle rotates on an axis located in a plane passing through the axes of its bridle-bars.

The lower ends of the uprights 10 and 11 are reduced in size to form feet 14 which are loosely inserted into sockets 15 formed in the rolling-mill frame 16 carrying rolls 17 and 18 located one above the other in the usual manner. The upper ends of the uprights 10 and 11 are formed with inwardly extending horizontal arms 19 carrying adjusting screws 20 which bear upon the adjacent face of the frame 16 and provide for the adjustment of the bridle-frame, within narrow limits, toward and away from the rolling-mill frame 16, this adjustment being permitted by the loose fit of the feet 14 in the sockets 15 and in the give of the uprights 10 and 11.

The long trunnion 9 of the rotary bridle projects through its bearing in the upright 11 and mounts a locking-disk 21 formed upon the outer edge of a heavy hub 22 and secured against rotation by a bolt 23 passing through the said upright. The said disk is furnished with a circular series of hardened bushings 24 receiving the beveled inner end of a locking-pin 25 adapted to be slid back and forth in a chamber 26 formed in a head 27 at the outer end of a crank-arm 28 secured by a pin 29 to the projecting end of the trunnion 9, the said pin 25 being furnished with a knurled handle 30 by means of which it is slid back

and forth for locking and unlocking the crank-arm 28 with respect to the locking-disk 21.

As herein shown, I have mounted upon the bridle-bar 3, two substantially semi-circular guide-blocks 32 and 33 having outwardly projecting arms 34 by means of which they are secured in place by clamping hooks 35 furnished with set screws 36. I prefer to employ the guide-blocks 32 and 33 or guide-blocks answering the same purpose, though they are not essential to the operation of my improved movable bridle.

In the use of my improvement, the bridle is unlocked by pulling the handle 30 outward for the retraction of the locking-pin 23 from the particular bushing 24 in the locking-disk 21 in which it may be located at the time. The bridle is now turned by the handle 30 and crank-arm 28, in one direction or the other as may be required to bring the space between the two bridle-bars 2 and 3, into such position that the fed-end of the strip 37 may be readily passed between them on the broken line 38 of Fig. 3, without deflection or manipulation, and inserted between the rolls 17 and 18. The extent to which the bridle is initially turned preparatory to threading and then finally, for the purpose of bridling, will depend upon all the circumstances and conditions, it only being necessary to turn the bridle sufficiently to permit the fed-end of the strip to be passed between the bridle-bars, on its way to the rolls. Ordinarily, it will probably be more convenient, however, to turn the bridle so that the space between the bridle-bars will stand substantially at a right angle to the line 38 aforesaid. In Fig. 3 of the drawings, the bridle-bars 2 and 3, of the bridle are shown by broken lines in convenient threading positions, there being free clearance between them for the insertion of the fed-end of the strip 37. Immediately after the rolls have taken hold of the end of the strip and its feeding has been begun, the bridle is rotated so as to almost reverse the position of the bridle-bars 2 and 3, as shown in full lines in Fig. 3, which represents the strip 37 as partially wrapped around the two bridle-bars which thus impose tension or drag upon the strip as it is drawn over them by the rolls. After the strip has been run through the mill, another strip is threaded through the bridle, either without turning it preparatory to threading it, or by turning back to its previous threading position as shown by broken lines in Fig. 3, as may be desired. The bridle is locked in any position whether for threading or bridling, by means of the pin 25 operated by the handle 30.

It will be readily understood that the amount of tension or drag imposed upon the strip depends upon the extent to which the

strip is deflected by being wrapped around the bridle-bars, and that will depend upon the amount to which the bridle is rotated after threading. When a great amount of bridling is required, the bridle may be rotated so as to wrap the strip around the bridle-bars to the extent shown in Fig. 7.

It will be seen that under my invention, the bridling of the strip takes place after the insertion of the fed-end thereof between the rolls.

I claim:—

1. A bridling apparatus for rolling mills having a bridle comprising two bridle-bars and trunnions located midway between the said bars and having their axes located in a plane passing through the axes thereof, the metal strip being initially wrapped upon itself upon the said bars for the creation of frictional drag on the strip against the pull of the rolls, and means for locking the said bridle against rotation.

2. A bridling apparatus for rolling mills, comprising a rotary bridle adapted to be rotated for wrapping the metal strip upon itself for the creation of frictional drag on the strip against the pull of the rolls, and means for locking the bridle in a plurality of positions according to the amount of drag required.

3. In a bridling apparatus for rolling mills, the combination with a rotary bridle by means of which the metal strip is wrapped more or less upon itself for the creation of frictional drag on the strip against the pull of the rolls, the said bridle having trunnions, a handle applied to one of the trunnions of the bridle for rotating the same, and means for positively locking the bridle in a plurality of operating positions according to the amount of drag required.

4. In a bridling apparatus for rolling mills, the combination with a rotary bridle by means of which the metal strip is wrapped upon itself for the creation of frictional drag on the strip against the pull of the rolls, a locking-disk connected with the bridle, and means co-acting with the disk for locking the bridle in any one of a plurality of positions.

5. In a bridling apparatus for rolling mills, the combination with a rolling-mill frame mounting rolls, of a separately organized bridle-frame adapted to be mounted upon the said rolling-mill frame in adjustable spaced relation thereto, a two-bar rotary bridle mounted in the said bridle-frame and constructed to rotate upon an axis located in a plane passing through the axes of its two bridle-bars, for initially wrapping the metal strip upon itself for the creation of frictional drag on the strip against the pull of the rolls, and means for locking the bridle against rotation.

6. In a bridling apparatus for rolling

mills, the combination with a rotary bridle, of a bridle-frame in which the bridle is mounted, a locking-disk, a crank-arm for rotating the bridle, and a locking-pin mounted in the said crank-arm and adapted to be engaged with the said disk for locking the bridle against rotation in the said frame.

7. In a bridling apparatus for rolling mills, the combination with a self-contained removable bridle-frame, of a rotary bridle mounted therein and adapted to be rotated for wrapping the metal strip upon itself for the creation of frictional drag on the strip against the pull of the rolls, and means organized with the bridle for locking it in any one of several positions.

8. In a bridling apparatus for rolling mills, the combination with a bridle having bridle-bars, of guide-blocks mounted upon one of the said bars for steadying the strip at the time of its engagement with the bridle and before it is placed under tension thereby.

9. In a bridling apparatus for rolling mills, the combination with a rolling-mill frame mounting rolls, of a separately organized bridling apparatus comprising a bridle-frame adapted to be mounted upon the said rolling-mill frame, a removable self-con-

tained rotary bridle mounted in the bridle-frame and adapted to be rotated therein for wrapping the metal strip upon itself for the creation of frictional drag on the strip against the pull of the rolls, and means for locking the bridle in one of several positions according to the amount of drag required.

10. In a bridling apparatus for rolling mills, the combination with a rolling-mill frame mounting rolls, of a bridle-frame adapted to be adjusted toward and away from the said rolling-mill frame and comprising two uprights each having an inwardly extending horizontal arm, and means for uniting the said uprights, a self-contained bridle mounted in the bridle-frame for rotation therein on its axial center for wrapping the metal strip upon itself for the creation of frictional drag against the pull of the rolls, and means for locking the said bridle against rotation.

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

HENRY T. CROSS.

Witnesses:

JAS. H. PILLING,  
WM. J. FITZGERALD.