E. W. DUSTON.

ROLLING MILL BRIDLE.

APPLICATION FILED JUNE 12, 1919.

1,352,587. Patented Sept. 14, 1920.

Fig. 1

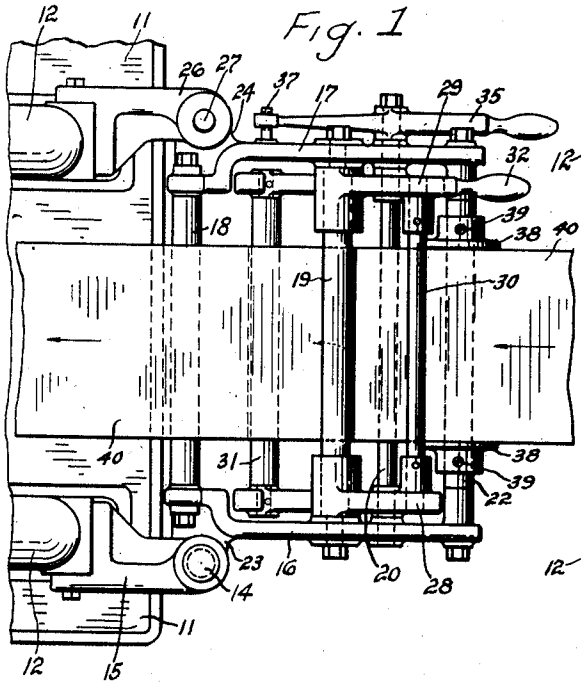


Fig. 3

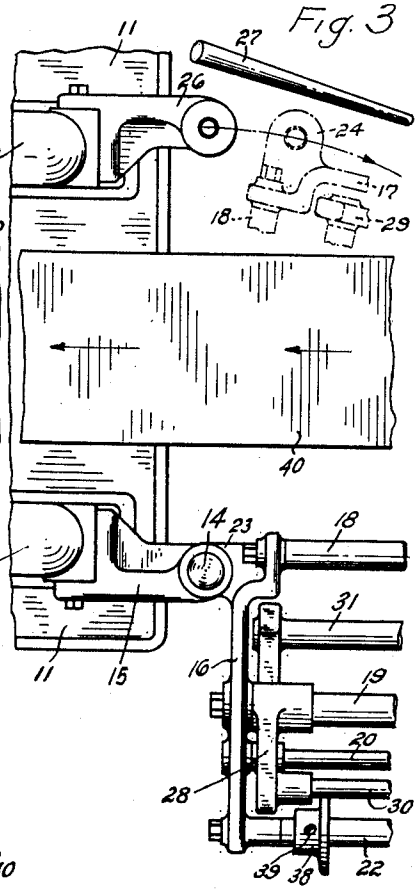


Fig. 2

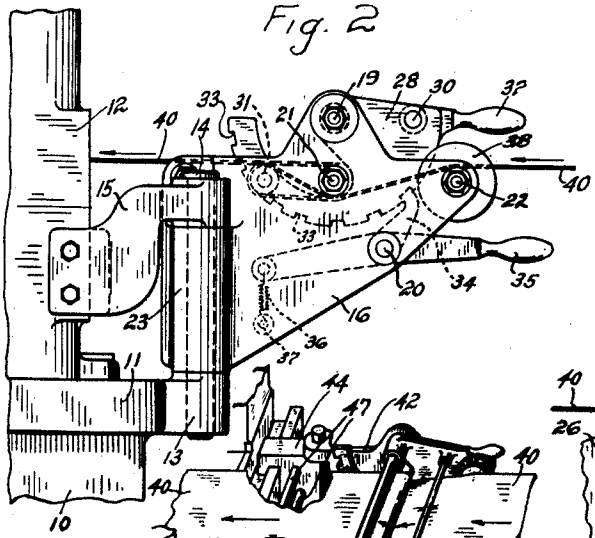


Fig. 4

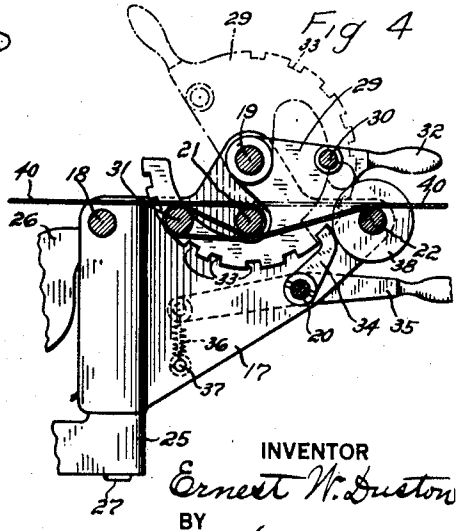
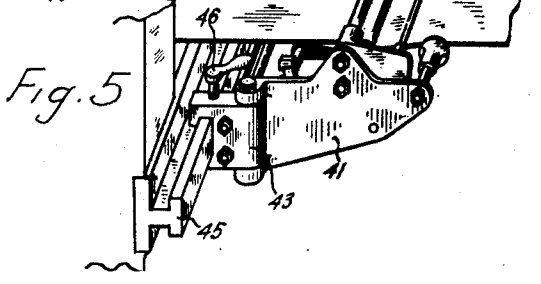


Fig. 5



INVENTOR

Ernest W. Duston

BY

A. M. Wooster

ATTORNEY

UNITED STATES PATENT OFFICE.

ERNEST W. DUSTON, OF WATERBURY, CONNECTICUT, ASSIGNOR TO THE BLAKE & JOHNSON COMPANY, OF WATERBURY, CONNECTICUT, A CORPORATION OF CONNECTICUT.

ROLLING-MILL BRIDLE.

1,352,587. Specification of Letters Patent. **Patented Sept. 14, 1920.**

Application filed June 12, 1919. Serial No. 303,588.

To all whom it may concern:

Be it known that I, ERNEST W. DUSTON, a citizen of the United States, residing at 15 Roseland Ave., Waterbury, county of New Haven, State of Connecticut, have invented an Improvement in Rolling-Mill Bridles, of which the following is a specification.

This invention relates to bridles or tension devices for use in connection with machines for operating upon sheet material, and especially, although not exclusively, to bridles for rolling mills which operate on very thin sheet metal, said bridles being employed for the purpose of maintaining the strip of sheet metal, as it is fed to the machine, under a suitable tension, and for causing said strip to enter the machine in proper flat position.

The invention has for its object to provide a device of the character referred to which will permit the ready insertion of the web or strip of sheet material into the machine without requiring the threading of said web or strip through the device in the tortuous path which it is subsequently caused to follow for the purpose of tensioning the same; which is readily adjustable to vary the tension applied to the strip in accordance with the requirements; and which may readily be moved into an inoperative position, without completely removing the same from the machine, when not required, or for the purpose of affording more ready access to other parts of the machine, as, in the case of a rolling mill, for the purpose of facilitating the grinding of the rollers.

The foregoing and other objects of the invention, together with means whereby the same may be carried into effect, will best be understood from the following description of certain forms or embodiments thereof illustrated in the accompanying drawings, in which:

Figure 1 is a plan view of a device constructed in accordance with the invention, showing the same in operative position with respect to the machine with which it is intended to coöperate.

Fig. 2 is a side elevation thereof.

Fig. 3 is a view similar to Fig. 1 showing the bridle moved into its inoperative position.

Fig. 4 is a substantially central vertical section.

Fig. 5 is a perspective view showing a slightly modified construction.

The invention is herein shown as applied to a rolling mill comprising a support 10 for the machine bed 11 from which rise uprights 12 in which the rollers (not shown) are journaled. The remaining parts of the rolling mill are not shown, as the particular construction of said mill forms no portion of the present invention.

Carried by and projecting forwardly from the bed 11 is a bracket 13 carrying a pivot pin 14 supported at its upper end in a bracket 15 bolted or otherwise secured to one of the uprights 12. Mounted to swing on the pin 14 is a bridle frame comprising side members 16 and 17 connected by a suitable number of transverse rods 18, 19, and 20 and by a pair of parallel tension bars 21 and 22. The side member 16 is formed with a cylindrical lug or integral sleeve portion 23 which rests on the bracket 13 and through which the pivot pin 14 passes, while the side member 17 is formed with a similar sleeve portion 24 (see dotted lines Fig. 3) adapted to be received between brackets 25 (see Fig. 4) and 26 similar to the brackets 13 and 15, and to be locked in position by a removable locking pin 27 inserted through said brackets and sleeve portion. The bridle frame, when in operation, is supported immediately in front of the frame bed 11 by the brackets 13, 15, 25, and 26, as shown in Fig. 1, but, by removing the pin 27, the entire frame and the mechanism carried thereby may be swung about the pivot pin 14 into the position shown in Fig. 3, thereby affording convenient access to the machine proper for purposes of repair or otherwise.

Mounted to swing on the rod 19 between the bridle frame side members 16 and 17 is a tensioning frame comprising side members 28 and 29 connected by a cross bar 30 and also by a third tension bar 31 parallel to the tension bars 21 and 22. The side member 29 of the tensioning frame is provided with a handle 32, whereby said frame may be swung about the axis of the rod 19,

both of the side members of said frame being cut away to receive the tension bar 21, thereby permitting the bar 31 to be swung downwardly, in a circular path, from the position shown in dotted lines in Fig. 4, between the bars 21 and 22 and across the plane of the axes thereof, into a position beyond the bar 21, as shown in full lines in said figure, while preserving the parallelism of all of said bars. For securing the tensioning frame in any position of angular adjustment, the arcuate edge of the side member 29 is formed with a series of notches 33 to receive a locking pawl 34 fast on the rod 20 which is rotatably mounted in the bridle frame members 16 and 17. Fast on the rod 20 at the outside of the frame member 17 is an operating lever 35 normally held in a position to engage the pawl 34 with the notches 33 by means of a spring 36 connected at one end to an extended end of the lever 35 and at its opposite end to a stud 37 projecting from the frame member 17. The tension bar 22 is preferably provided with a pair of guiding collars 38 secured thereto by set screws 39 and adjustable thereon in accordance with the width of the web or strip of sheet material 40.

The operation of the device is as follows: The bridle frame having been swung into operative position, as shown in Fig. 1, and locked therein by inserting the pin 27, the collars 38 are adjusted on the tension bar 22 in accordance with the width of the strip 40 to be inserted, the lever 35 depressed to cause the pawl 34 to unlock the tensioning frame, and said tensioning frame raised into the position shown in dotted lines on Fig. 4, the lever 35 being then released to permit the pawl 34 to retain said tensioning frame in this position. The strip 40 may then be readily inserted into the machine by passing the same in a rectilinear direction over the bars 21 and 22 and beneath the bar 31, as shown in dotted lines in Fig. 4, whereupon the tensioning frame is depressed, causing the bar 31 to engage the strip 40 between the bars 21 and 22 and force the same downwardly and rearwardly between said bars. The strip 40 will consequently be successively flexed in opposite directions in its passage around the bars 22, 31, and 21, thereby tensioning the same. The extent of depression of the tensioning frame will depend upon the relative stiffness of the material of the strip 40 and the amount of tension which it is desired to apply thereto. In the case of a thin and flexible strip, the tensioning frame may be depressed to a sufficient extent to cause the bar 31 to assume a position substantially in the plane of the bars 21 and 22, as shown in Fig. 4, causing the strip to pass alternately in opposite directions over the bars 21 and 31, the resulting frictional resistance serving to apply additional tension to the strip. If desired, the parts may be so proportioned as to permit the bar 31 to be moved still farther upwardly from the position shown, thereby increasing the pressure between the several convolutions of the strip and consequently increasing the friction.

The construction shown in Fig. 5 is substantially similar to that above described with the exception that the brackets 43 and 44 for supporting the bridle frame side members 41 and 42 are slidably mounted on a transverse guide 45 carried by the machine bed, said brackets being, if desired, locked to said guide by means of set screws 46, as shown in the case of the bracket 43. Said brackets 43 and 44 are connected by rods or bolts 47 and may, therefore, be removed from the machine as a unit by sliding the same laterally from the end of the guide 45, carrying with them the complete tension mechanism. It will also be seen that by setting the brackets 43 and 44 at different distances apart on the guide 45, and by providing connecting rods and tension bars of different length, the effective width of the complete device may be varied to accommodate work of different sizes.

Having thus described my invention, I claim:

1. A tension device of the character described comprising a pair of fixed parallel tension bars, a third tension bar parallel to said first named bars, and means for moving the said third bar between said first named bars and into a position beyond the same.

2. A tension device of the character described comprising a pair of fixed parallel bars, a third tension bar parallel to said first named bars, and means for moving said third bar between said first named bars across the plane of the axes thereof and into a position beyond said first named bars and substantially in said plane.

3. A tension device of the character described comprising a pair of fixed parallel tension bars, a third tension bar parallel to said first named bars, and means for moving said last named bar in a substantially circular path intersecting the plane of the axes of said first named bars at two points, one of which is between said first named bars.

4. A device of the character described comprising a bridle frame, a pair of parallel tension bars supported by said frame, a tensioning frame, a third tension bar carried by said tensioning frame and parallel to said first named tension bars, said tensioning frame being movable on said bridle frame to carry said last named tension bar between said first named tension bars across the plane of the axes thereof.

5. A device of the character described comprising a bridle frame, a tension bar carried by said frame, a tensioning frame

movably mounted on said bridle frame, a tension bar carried by said tensioning frame parallel to said first named tension bar, and means for locking said tensioning frame in adjusted position on said bridle frame.

6. A device of the character described comprising a bridle frame, a tension bar therein, a tensioning frame pivotally mounted on said bridle frame to turn about an axis parallel to the axis of said tension bar, a tension bar carried by said tensioning frame parallel to said first named tension bar, said tension frame having a notched arcuate edge, a holding pawl coöperating with said notched edge, and a releasing lever for operating said pawl.

7. A device of the character described comprising a bridle frame, a pair of parallel tension bars therein, a tensioning frame pivotally mounted on said bridle frame to turn about an axis parallel to said tension bars, and a tension bar carried by said tensioning frame parallel to said first named tension bars, said tensioning frame being movable on its axis to carry said last named tension bar between said first named tension bars and across the plane of the axes thereof.

8. In a device of the character described, a bridle frame comprising side members, rods connecting said side members, tension bars connecting said side members, a tensioning frame comprising a pair of side members pivoted on one of said rods, and a tension bar connecting said tensioning frame side members.

9. In a device of the character described, a bridle frame comprising a pair of side members, rods connecting said side members, a pair of parallel tension bars connecting said side members, a tensioning frame comprising a pair of side members pivoted on one of said rods, one of said last named side members having a notched arcuate edge, a third tension bar carried by said tensioning frame side members and movable therewith between said first named tension bars, and a pawl carried by another of said rods and coöperating with said notched edge to lock said tensioning frame in adjusted position.

10. A device of the character described comprising a bridle frame, a tension bar therein, a tensioning frame movably mounted in said bridle frame, a second tensioning bar carried by said tensioning frame, and a pair of spacing collars adjustably carried by said first named tension bar.

11. The combination with a machine frame, of a tension device for sheet material comprising a bridle frame hinged to said machine frame to swing into and out of operative position with respect to the sheet material, and means for locking said bridle frame in operative position.

12. The combination with a machine frame provided with a pair of brackets adjacent opposite sides thereof, of a tension device comprising a bridle frame having at one side a lug pivoted to one of said brackets and at the opposite side a second lug adapted to engage the other of said brackets, and a locking pin adapted to pass through said last named lug and bracket to lock said bridle frame in operative position with respect to said machine bracket.

13. The combination with a machine frame having a transverse guide, of a pair of brackets adjustably mounted on said guide, and a tension device comprising a pair of side members carried by said brackets respectively and parallel tension bars supported between said side members.

In testimony whereof I affix my signature.

ERNEST W. DUSTON.