

ROLLING MILL SHEARING AND PILING APPARATUS,
APPLICATION FILED AUG. 26, 1918. RENEWED MAR. 11, 1920.

Patented Apr. 20, 1920.

3 SHEETS—SHEET 1.



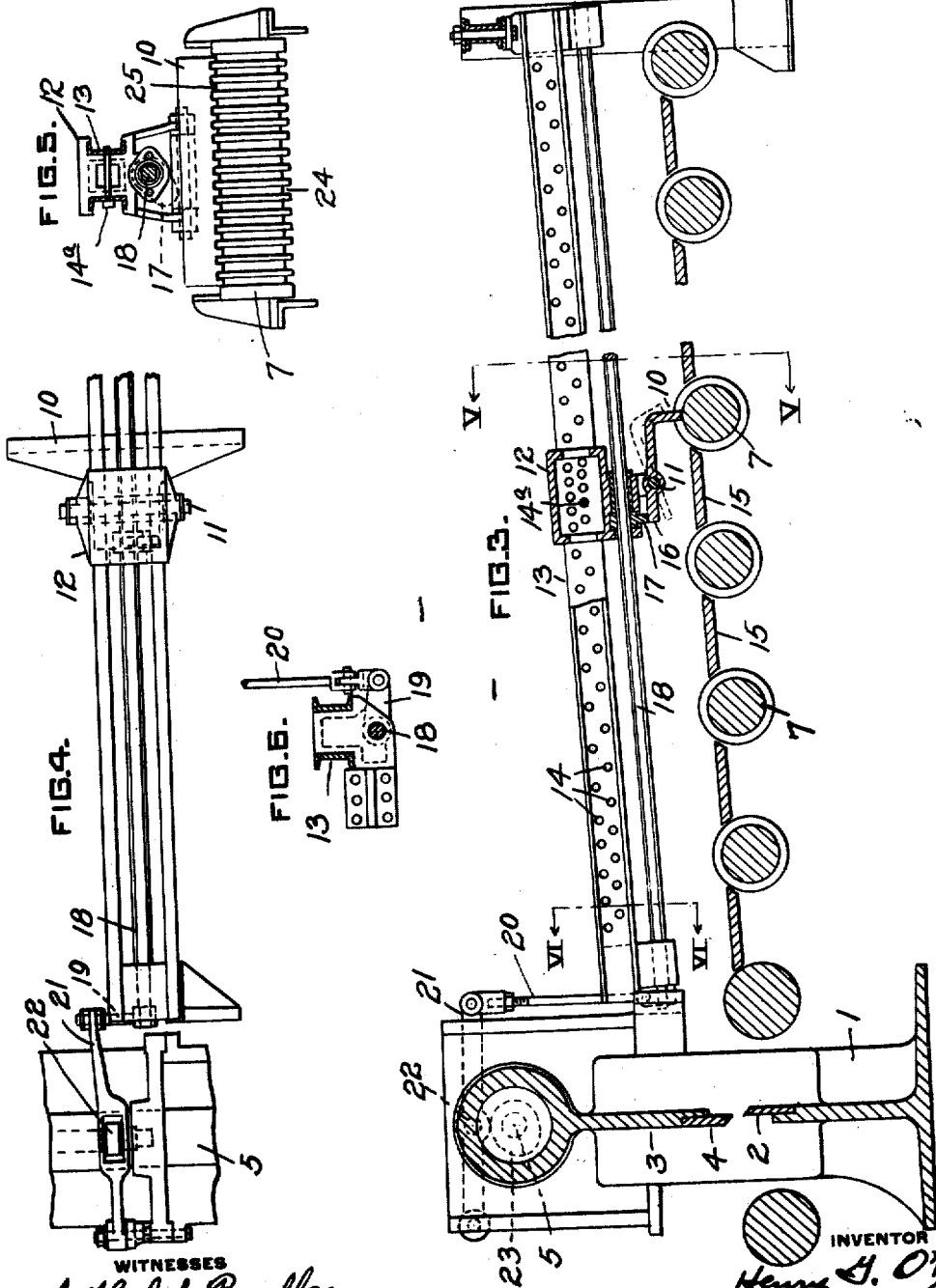
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

FIG. 8.

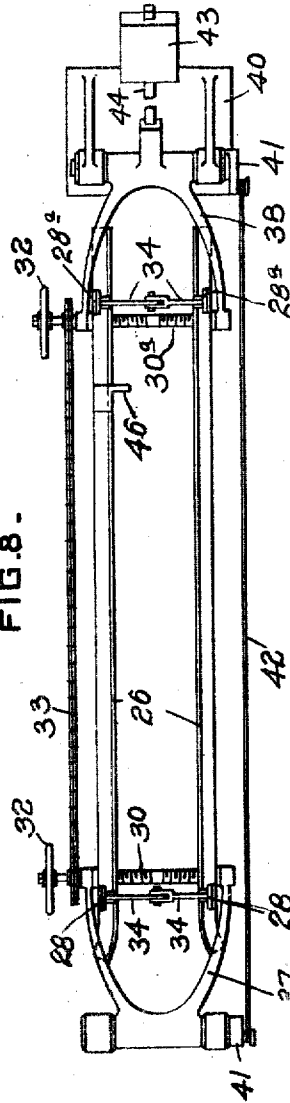


FIG. 7.

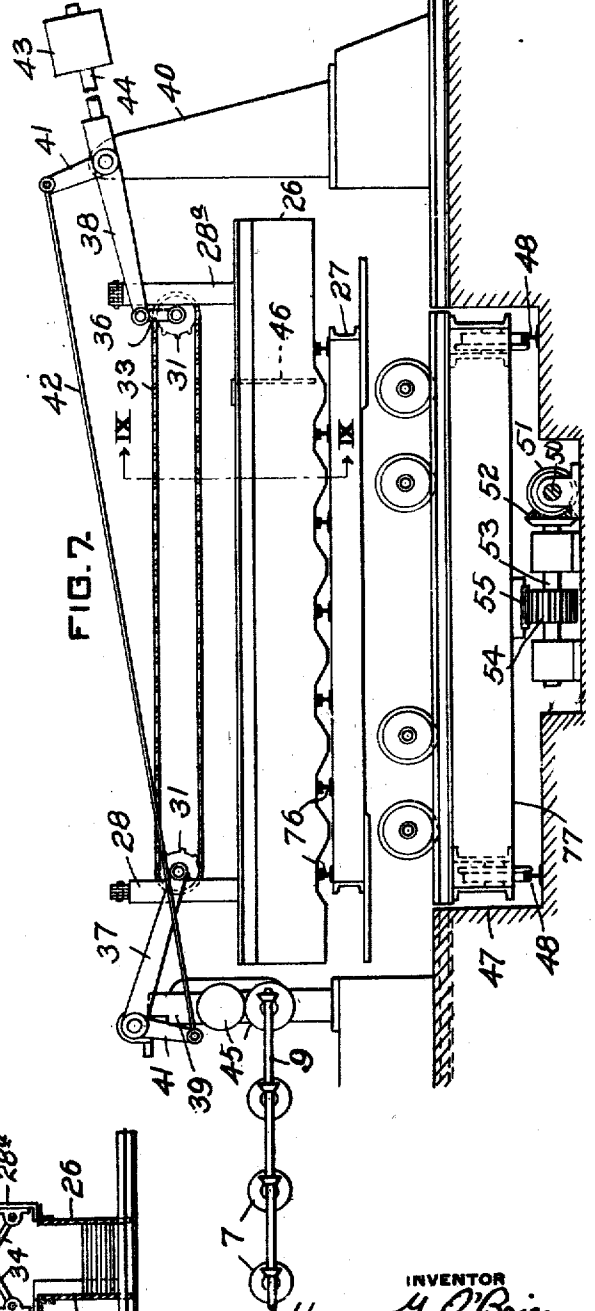
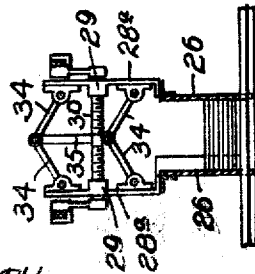


FIG. 9.



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UNITED STATES PATENT OFFICE.

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ROLLING-MILL SHEARING AND PILING APPARATUS.

1,337,464.

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To all whom it may concern:

Be it known that I, HENRY G. O'BRIEN, residing at Warren, in the county of Trumbull and State of Ohio, a citizen of the United States, have invented or discovered certain new and useful Improvements in Rolling-Mill Shearing and Piling Apparatus, of which improvements the following is a specification.

My invention relates to machinery or apparatus used in rolling mills for cutting or shearing roller blanks into desired lengths. The object thereof is to provide blank shearing apparatus whereby elongate strips of metal may be quickly sheared to accurate dimensions with a minimum amount of labor.

A further object of my invention is to provide an apparatus whereby elongate blanks may, in a continuous operation, be successively sheared and the sheared lengths properly and evenly piled.

In the accompanying sheets of drawings, which form part of my specifications, I have illustrated one embodiment of my invention. Figure 1 is a plan view of the general arrangement of the apparatus; Fig. 2 a vertical sectional view to enlarged scale taken on the line II—II, Fig. 1; Fig. 3 a vertical sectional view to enlarged scale of the left end of the apparatus of Fig. 1, the plane of view being indicated by the line III—III, Fig. 1; Fig. 4 a plan view of the left end of the apparatus shown in Fig. 3; Figs. 5 and 6 sectional views taken, respectively, on the lines V—V and VI—VI, Fig. 3; Fig. 7 a side view of the piler shown at the right end of Fig. 1, the plane of view being indicated by the line VII—VII, Fig. 1; Fig. 8 a plan view of the piler; and Fig. 9 a detail sectional view taken on the line IX—IX, Fig. 7.

In the practice of my invention, I provide a blank-cutting shear having a movable shear blade, and at the sides of such shear I arrange roll tables or other conveyers for feeding an uncut or unsheared blank to the shear and for removing the sheared lengths therefrom. Lying in the path of the blank being sheared, means are provided for arresting the movement of the blank after a predetermined length of it has passed between the shear blades; and, coordinated with the operation of the shears, means are provided for releasing the blank arresting

means so that the cut length may be passed along and that the remaining uncut blank may be advanced until the desired length has again passed between the shear blades. At the end of the roll table a piler is provided for receiving and piling the sections of the blanks as they are successively sheared.

Any suitable form of shear may be employed, its size and character depending somewhat upon the particular blanks it is intended to cut. The shear illustrated herein is for cutting thin sheet metal, and, as shown particularly in Fig. 3, comprises a housing 1 provided with a stationary blade 2 and with a reciprocating head 3, to which there is attached a blade 4 adapted to cooperate with the blade 2. The reciprocation of the head 3 for moving the blade 4 may be effected by the rotation of a shaft 5 in the manner well understood. Normally the reciprocating head 3 is inactive, and, to cause it to reciprocate, any desired mechanism, operated as by a treadle 6 (Fig. 1), may be provided.

At each side of the shear, conveyers are provided for moving a blank to and between the shear blades, and for further passing to the piler cut lengths of the blank. The conveyer is preferably a live roll table consisting of a series of rolls 7 adapted to be driven by a suitable motor 8 which is connected, through the illustrated train of gears and rotatable shaft 9, to each of the rolls.

Various means may be provided for arresting the advance of a blank after the desired length thereof has passed between the shear blades, such means depending somewhat upon the particular type of shear used for cutting the blanks. In the illustrative embodiment of my invention the movement of the blank is arrested by a gage 10, pivotally mounted, as at 11, to a carrier 12; which carrier is adjustably mounted upon a support 13 extending above and in alignment with the roll table. For securing the carrier 12 to the support 13 at any desired distance from the shear blades, the support may be provided with a plurality of suitably spaced holes 14 adapted to receive a pin 14^a extending through a hole in the gage carrier 12. Due to its own weight, the gage 10 normally rests either upon one of the rolls 7 or upon one of the short platform plates 15 arranged between adjacent rolls.

Hence, when the end of the blank being conveyed by the roll table strikes the gage, the further movement of the blank will be prevented. When the blank has thus been stopped, the operator presses the treadle 6 to cause the shear to make a cut.

That the gage may be then raised to permit the cut section of the blank to be passed beyond the gage, means, coordinated with the operation of the movable shear blade, are provided for moving the gage. As shown herein, an arm 16 is secured to the gage 10 and projects rearwardly from the pivot point 11 thereof. This arm is adapted to be pressed downwardly, and the gage 10 accordingly raised to the dotted line position in which it is shown in Fig. 3 by means of a finger 17, longitudinally slidable upon, but secured for rotation with, a rock shaft 18. As seen in Figs. 3 and 4, an arm 19 projects laterally from the shaft 18 and is connected at its outer end by means of a link 20 to a pivoted arm 21 provided with a roller 22 adapted to rest upon a cam 23 secured to the rotatable shaft 5. The configuration of the cam 23 and its location upon the shaft 5 are such that, as the reciprocating head 3 rises, the pivoted arm 21 will be lifted, and, through link 20 and arm 19, the shaft 18 will be rocked to depress the finger 17 and hence lift the gage 10.

In case the apparatus is used for cutting relatively thin sheet metal, such as is contemplated by the particular apparatus shown herein, the several rolls 7 may, as particularly indicated in Fig. 5, be provided with annular grooves 24 lying in planes perpendicular to the axes of the rolls, and the lower face of the gage 10 may be provided with projections 25 adapted to rest in the grooves 24. With such arrangement, a thin sheet of metal cannot, by slipping between the gage and a roll, advance beyond the gage before being cut.

The shear illustrated herein is of sufficient width to simultaneously cut several blanks fed side by side to the shear. To the end that the simultaneously sheared lengths may, while they are being conveyed from the shear by the roll table, be piled one on top of the other, the rolls 7^a beyond the end of the gage support 13 have their outer ends tapered as indicated in Fig. 1, and suitable lateral guide or deflecting plates 75 are arranged between the outer tapered ends of the rolls.

At the end of the roll table there is provided a piler and transfer table, so that the successively sheared lengths, as they are continuously passed along the roll table from the shear, may be properly piled and quickly removed from the vicinity of the shear. The piler comprises a pair of vertically disposed plates 26 having serrated lower edges adapted to rest upon the piling

rails 76 of a truck 27, movable, by means of the transfer table presently to be described, to and from a position at the end of the roll table. The piler plates are laterally adjustable to receive cut blanks of different widths, and vertically movable to permit a loaded truck to be moved laterally below their lower edges.

As shown herein, pairs of arms 28 and 28^a are attached to the upper edges of the ends of the plates 26. To such arms there are secured interiorly threaded sleeves or bushings 29, which receive the ends of oppositely threaded screws 30 and 30^a. For causing the two screws to turn simultaneously, they are provided with sprockets 31 connected by a chain 33, and to each screw a hand wheel 32 is attached. That the plates may be held in vertical alinement, they are connected to each other by two pairs of toggles comprising laterally projecting links 34 pivoted to the arms 28 and 28^a, and vertical links 35 pivoted to the outer ends of the links 34, as indicated in Figs. 8 and 9.

For moving the piler plates vertically, the outer ends of the screws 30 and 30^a are suspended from yokes 37 and 38 pivotally mounted on supports or standards 39 and 40, the yoke 38 being connected to the screw 30^a by means of a link 36, to permit a slight longitudinal movement of the plates 26 when the yokes swing to move such plates vertically. Each yoke is provided with a laterally projecting arm 41, which arms are connected to each other by a rod 42 so that the two yokes may swing in unison. The piler may be counterweighted by means of a weight 43 adjustably carried by an arm 44 secured to the yoke 38.

As will be seen in Figs. 2 and 7, the general arrangement of the piling apparatus is such that the bed or supporting rails 76 of the truck 27 is below the plane of the roll table. To feed the sheared blanks beyond the end of the roll table and upon the truck, there may be provided a pair of pinch rolls 45 adapted to be driven by the shaft 9 of the roll table. The pinch rolls will ordinarily be driven at a speed sufficient to cause a blank, after it passes beyond their engagement, to slide upon the plate beneath it a sufficient distance to clear the pinch rolls and their housing. That the ends of the plates forming a pile may be arranged evenly, a suitable adjustable stop 46 may be arranged between the piler plates 26, it being understood that the position of such stop with reference to the pinch rolls 45 or to the end of the piler plates 26 will be determined by the length of blanks being piled.

As already stated, the truck 27 rests upon and is movable by a transfer table. As seen in Figs. 2 and 3, the transfer table 77 rests within a shallow pit 47 upon a track 48 extending at right angles to the roll table.

The transfer table is adapted to be moved from one to the other end of the pit, and hence from one side to the other of the roll table, by means of a motor 49, the driving connections between such motor and transfer table including a shaft 50, bevel pinions 51 and 52, counter shaft 53, pinion 54 and a rack 55 secured to the bottom of the transfer table. On top of the transfer table there are two truck-supporting tracks 56 and 57, and leading from the opposite sides of both ends of the pit 47, and parallel with the general line of extent of the roll table, there are stub-end tracks 58, 59, 60 and 61. Thus, while one truck is being loaded, a previously loaded truck may be moved from the transfer table and an empty truck placed on such table in readiness to be moved to loading position. It will be seen that the arrangement of tracks lends itself to a rapid piling of the blanks and their quick removal from the vicinity of the shear.

In the operation of my invention, the gage carrier 12 is adjusted to such position upon the support 13 that the stopping face of the gage 10 is at the exact required distance from the plane of operation of the shear blades 2, 4 to effect the cutting of a blank into the desired lengths. The gage carrier is held in its adjusted position by means of a pin 14 extending through such carrier and through one of the holes 11 in the support 13. The motor 8 is preferably driven continuously to drive the rolls 7 of the roll table. Accordingly the blanks are fed by the roll table between the shear blades 2 and 4 until the end of the blanks strike the gage 10, at which time the operator presses the treadle 6 which controls the instrumentalities for causing the reciprocating head 3 of the shear to descend and cut the blank. As the reciprocating head rises, the cam 23, secured to the shaft 5, lifts the arm 21, and, through link 20, arm 19, rock shaft 18 and finger 17, causes the gage 10 to be lifted so that the continuously rotating rolls 7 may convey the sheared blank to the piler. As the sheared blank passes beneath the gage, the gage is released so that it again falls to a position for arresting the end of the uncut blank. Thus one blank after another may be continuously cut.

At the end of the roll table the pinch rolls 45 engage the sheared blanks and cause them to move beyond the end of the table upon the truck 27 between the piler plates 26. When the top of a pile is about even with the meeting plane of the pinch rolls 45, the piling plates 26 are raised by rocking the pivoted yokes 37 and 38, and the motor 49 is then driven to cause the transfer table 77 to move laterally until the truck 27 supporting the pile of plates is in alinement with either the tracks 58 and

60 or the tracks 59 and 61. In such position an unloaded truck will be beneath the piler plates 26 and the loaded truck may be removed along one of the tracks. If the loaded truck is removed along the track 58, an unloaded truck may be placed on the transfer table 77 from the track 60, so that, when a second pile has been completed, the transfer table may be moved to the opposite end of the pit 47 for repeating the operation of removing a loaded truck along the track 59 and receiving an unloaded truck from the track 61.

As already explained, the plates 26 may be adjusted laterally to receive blanks of any desired width, such adjustment being effected by the rotation of the plate-supporting screws 30 and 30^a. Also, the adjustable stop 46 may be placed at the required distance from the pinch rolls 45 to cause the ends of the blanks to be arranged evenly in the truck.

According to the provisions of the patent statutes, I have described the principle and operation of my invention together with the apparatus which I now consider to represent the best embodiment thereof. However, I desire to have it understood that, within the scope of the appended claims, my invention may be practised with other forms of apparatus than that particularly shown and described herein.

I claim as my invention:

1. The combination of a shear, a roll table at one side thereof the rolls of which are grooved in planes perpendicular to the roll axes, a gage adjacent to said table and movable to and from a position of obstructing the advance of a blank being conveyed by said table, the face of said gage being provided with projections adapted to fit into the grooves of said rolls when the gage is in the position of obstructing the advance of a blank, and means for moving said gage to said alternate positions.

2. The combination of a shear provided with a movable blade, a roll table at one side of said shear the rolls of which are grooved in planes perpendicular to the axes thereof, a gage adjacent to said table and movable to and from a position of obstructing the advance of a blank being conveyed by said table, the face of said gage being provided with projections adapted to fit into the grooves of said rolls when the gage is in the position of obstructing the advance of a blank, and means coordinated with the movement of said shear blade for moving said gage to said alternate positions.

3. The combination of a roll table, a shear extending transversely thereof and adapted to simultaneously cut a plurality of flat strips arranged side by side on said table, and a gage extending transversely of said table for arresting said strips while so ar-

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ranged, said table being provided with means for piling the cut strips while conveying them from the shear.

4. The combination of a roll table, a shear
5 extending transversely thereof and adapted to simultaneously cut a plurality of flat strips arranged side by side on said table, and a gage extending transversely of said
10 table for arresting said strips when so arranged, the rolls at the outer end of said

table having their ends tapered whereby the cut strips may be piled while being conveyed from the shear by the table.

In testimony whereof I have hereunto set my hand.

HENRY G. O'BRIEN.

Witnesses:

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HELEN C. BRAINARD.