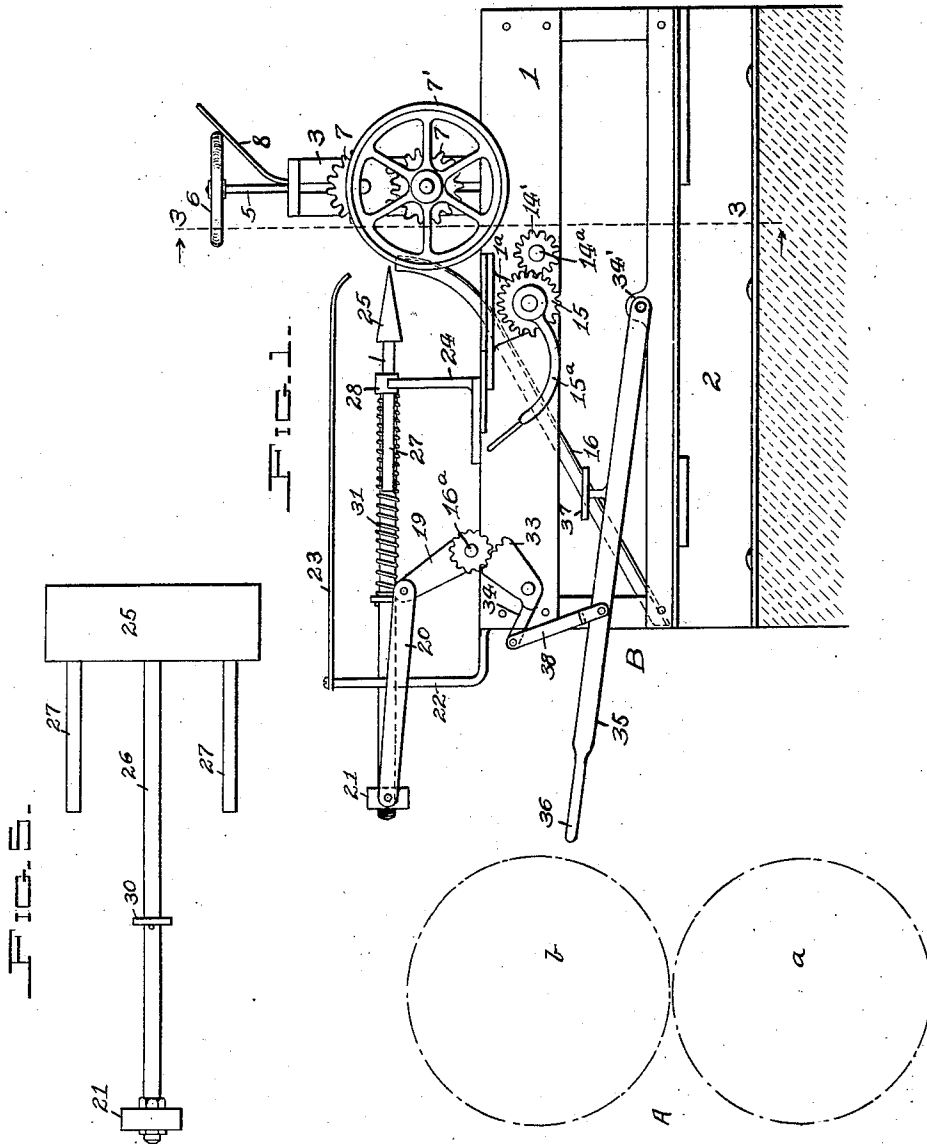


P. J. LYNCH.
DOUBLING MACHINE FOR ROLLING MILLS.
APPLICATION FILED MAR. 6, 1912.

1,047,425.

Patented Dec. 17, 1912.

2 SHEETS-SHEET 1.



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Inventor:
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2 SHEETS—SHEET 2.

FIG. 2.

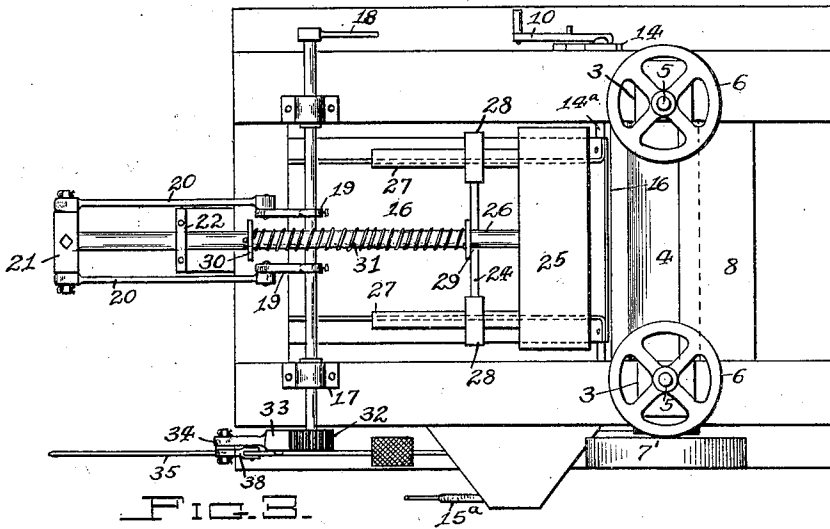


FIG. 3.

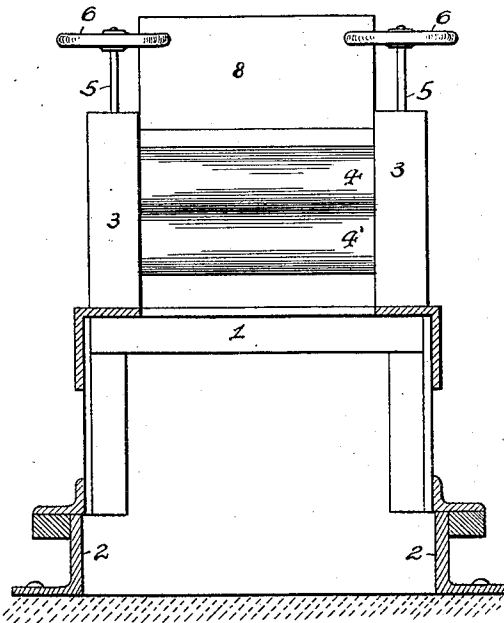
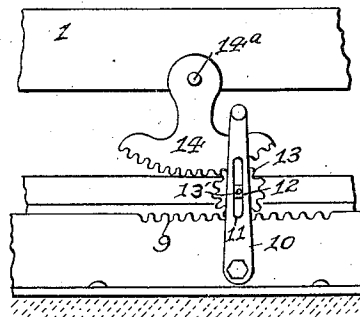


FIG. 4.



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UNITED STATES PATENT OFFICE.

PHILIP J. LYNCH, OF SHOUSETOWN, PENNSYLVANIA, ASSIGNOR OF ONE-THIRD TO EDWARD M. COX, OF MUNHALL, PENNSYLVANIA, AND ONE-THIRD TO ANDREW F. McCLURE, OF MIFFLIN TOWNSHIP, ALLEGHENY COUNTY, PENNSYLVANIA.

DOUBLING-MACHINE FOR ROLLING-MILLS.

1,047,425.

Specification of Letters Patent.

Patented Dec. 17, 1912.

Application filed March 6, 1912. Serial No. 681,957.

To all whom it may concern:

Be it known that I, PHILIP J. LYNCH, resident of Shousetown, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Doubling-Machines for Rolling-Mills; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to doubling machines for rolling mills and has special reference to a machine for such class of rolling mills as are used for rolling sheets, plates, etc. In such a mill the rolls are located near a heating furnace in order that the material may be passed quickly from the furnace to said rolls and first the hot bars are passed through the rolls in order to flatten the same into sheets, and this process or step is called the "breaking down" of such bars. In the first step two of the bars are laid together and flattened out into sheets so that when taken from the rolls there will be two distinct sheets of metal, several times the required thickness, and such sheets will then be taken and placed in the furnace to be heated to a cherry red. The plates after being reheated are again passed through the rolls and the sheets are still lying one upon the other so that the lower sheet is in contact with the lower roll and the upper sheet is in contact with the upper roll. After being rolled the sheets are bent double and this is accomplished by passing the same to a man called the "doubler" whose duty is to bend the sheets by holding an end of the same with a pair of tongs and throwing such end in line with the other end and then placing his foot upon the center of the same to press the sheets together at this point. The "doubler" wears a shoe specially adapted for this class of work and necessity for rapidity of movement makes the work extremely hazardous. This rolling and doubling process is then continued until the pack is eight sheets in thickness after which the sheets are separated and ready for commercial use.

The object of my invention is to provide a cheap, simple and efficient apparatus which will entirely eliminate the necessity of doubling the sheets by hand and will be simple in construction and composed of few and durable parts, unlikely to get out of order or become inoperative.

My invention consists, generally stated, in the novel arrangement, construction, and combination of parts as hereinafter more specifically set forth and described and particularly pointed out in the claims.

To enable others skilled in the art to which my invention appertains to construct and use my improved doubling machine I will describe the same more fully referring to the accompanying drawings, in which—

Figure 1 is a side elevation of the doubling machine. Fig. 2 is a top plan view of the same with the upper shield removed. Fig. 3 is a cross sectional view of the machine on the line 3—3 of Fig. 1 looking in the direction of the arrows. Fig. 4 is a partial view of the adjusting mechanism. Fig. 5 is a detail plan view of the blade for bending the sheet material.

Like symbols of reference herein indicate like parts in each of the figures of the drawing.

As illustrated in the drawing A represents the rolling mill, the rolls of which are shown in dot and dash lines in Fig. 1 and such machine consists of the lower roll *a* and the upper roll *b* which rolls are journaled and rotated in the usual manner.

The doubling machine B consists of the frame 1 which is formed of metal such as steel and is mounted on a pair of slide bars or rails 2, such slides being of any desired form and if necessary small rollers may be placed thereon to insure easy and convenient movement of the frame thereon.

The frame 1 is provided at a point near the rear of the same with housings 3 which extend upward from the top of said frame and have a pair of rolls 4 and 4' journaled within the same, said rolls being adjusted by means of the screws 5 having thereon the hand wheels 6. The rolls 4 and 4' are provided with gears 7 meshing together while the lower roll 4' is provided with a pulley 7' without said housing and gears, for the purpose of driving said rolls from any suitable source of power. The housings 3 are provided between the same and above the upper roll 4 with a deflector plate 8 which is upwardly inclined, the purpose of which is hereinafter explained.

On one of the rails 2 is a toothed portion which is at a position substantially in the

center of said rail and below said toothed portion is a lever 10 which is journaled in the same and such lever has a slot 11 in the same into which is fitted a sliding bearing 12 and such bearing operates on a small shaft 13' which is fastened in the lower part of the sliding frame 1. Between the frame 1 and sliding bearing 12 and rotatable on the shaft 13' is a pinion 13, which engages with the toothed portion 9 at all times. This pinion 13 is adapted to engage with a segmental gear 14 which is pivoted on a shaft 14^a which shaft is journaled in the sides of the frame 1 so that as the lever 10 is operated the frame will be moved backward and forward on the rails 2 in order to regulate the distance of the same from the mill rolls *a* and *b*. On the other end of the shaft 14^a and on the outer side of the frame 1 is a small pinion 14' which engages with a larger pinion 15, said last-named pinion being rotatably mounted on an extension 1^a of the frame 1 and securely fastened to an operating handle 15^a in order to operate the said frame on the rails 2.

At the front of the frame 1 is a chute 16 which is located at a point near the bottom of the same and such chute extends upward in a curved direction to a point near the front of the rolls 4 and 4' and at such point is almost vertically inclined.

The frame 1 is provided at a point near the front of the same with a shaft 16^a which extends completely across the top of said frame and is journaled in the bearings 17 thereon. At one end of the shaft 16^a is a lever 18 which is for the purpose of turning said shaft by hand as hereinafter explained. The shaft 16^a is provided at the center of the same with a pair of short arms 19 and these arms are rigidly fastened to said shaft and pivotally mounted by their free ends in bars 20 which in turn are connected to a block 21 on the sides of the same.

Extending up from the top of the frame 1 is a bearing plate 22 while a shield 23 is connected to the same to protect the parts beneath. At a position on the top of the frame 1 and between the shaft 16^a and the housings 3 is an upright portion 24 and such portion extends between the outsides of said frame and is connected thereto in any suitable manner. A blade 25 is connected to one end of a shaft 26 for such blade has a rod 27 extending out from the rear of and on each side of the same and fitting into bearings 28 on the upright portion 24, while the shaft 26 is also adapted to be carried by the upright portion 24 and such portion has a bearing 29 on the same for such purpose which is located between the bearings 28. The other end of the shaft 26 is connected to the block 21 and such shaft has a collar 30 located on the same and a spiral spring 31 is located around said shaft and between said collar

and the bearing 29 on the upright portion 24. The blade 25 is tapered down toward the front of the same to a dull edge and such edge will be directly in line with the pinch of the rolls 4 and 4', as hereinafter described.

At the outer end of the shaft 16^a is a small pinion 32 which meshes with a segmental gear 33 pivotally mounted in the side of the frame 1 and such gear is provided with an extension 34, as hereinafter described.

The frame 1 has a lug 34' at the bottom of the same and extending up from the bottom of said frame, and such extending lug has an operating bar or rod 35 pivotally mounted therein while the other end of the same is upwardly inclined and terminates in a handle 36 at the rear of which is a foot plate 37. The operating bar 35 is connected to the extension 34 by means of a connecting arm 38 so as to cause the segmental gear 33 to be operated when said operating bar is lowered.

The operation of my improved doubling machine for sheet mills is as follows:—After the "breaking down" process has been completed and the plate has been reheated such plate is again passed between the rolls *a* and *b* in order to thin the same, and such operation of passing the same between the rolls is repeated two or three times. As the "catcher" (the man in the rear of the rolls) passes the sheets over the upper roll to the "roller" (the man at the front of such rolls), said "catcher" grasps and turns the handle 15^a, which is connected to the large pinion 15 which by its engagement with the pinion 14' on the shaft 14^a causes said shaft to rotate, while the segmental gear 14 on the other end of said shaft is also turned. On account of the engagement of the segmental gear 14 with the small pinion 13, which in turn engages with the rack or toothed portion 9 on the rail 2 the frame 1 will be moved forward thereby. The bottom of the chute 16 is in a line with the pinch of the rolls *a* and *b* so that as the sheets emerge from said rolls they will extend into said chute and will pass upward therein and the front edges of the same will extend past the rolls 4 and 4' and the distance of the frame 1 from said mill rolls will be so regulated by the "catcher" that the center of the sheets will be exactly between the pinch of the rolls 4 and 4' and the blade 25 when the rear edges of such sheets are just emerging from the mill rolls *a* and *b*. The "catcher" then operates the operating rod 35 by either pressing the same down by stepping on the foot plate 37 which lowers said operating rod and then revolves the segmental gear 33 which is connected to said operating rod by the connecting arm 38 being attached to the extension 34 on said segmental gear. As the segmental gear 33 is thus revolved the shaft 16^a is also rotated on account of the pinion

32 which is located on the end of said shaft meshing with said segmental gear. As the shaft 16^a is thus rotated the short arms 19 will be turned and the shaft 26 carrying the blade 25 will thus be moved forward on account of the bars 20 being pivotally connected to said arms and to the block 21 which is on the opposite end of the shaft 26. As the shaft 26 is thus moved forward the blade 25 will strike against the sheets of tin or other material and press the same forward toward the rolls 4 and 4', which are constantly revolving and such sheets will be bent by such pressure and will be caught in the pinch of said rolls and rolled through the same thus completely doubling said sheets. The sheets are now taken by a boy or helper and placed in the furnace by the "heater" after which the same operation is repeated until there are eight sheets in each pack in the case of tin mill rolling at which time such sheets may be trimmed and separated for commercial use. By this method of doubling the sheets the work of the ordinary "doubler" is eliminated and the expense of producing the sheets necessarily reduced, as a boy can carry the doubled sheets from the rear of the doubler to the heater or a traveling table or belt may be placed at the rear of the machine so that the sheets will fall thereon after leaving the rolls 4 and 4'.

The work of the "doubler", as before explained, is very hazardous and a false step might cause him to be very seriously cut or burned, so that as such accidents are not infrequent the elimination of such injury to the workman is apparent by doing away with his work.

Various modifications and changes in the design and construction of my improved machine for doubling sheets may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages.

What I claim as my invention and desire to secure by Letters-Patent is—

1. A movable doubling device adapted to receive the plate or sheet from the rolling mill rolls and having rolls therein, means on said device for engaging with said plate or sheet to direct the same into said last named rolls to double said plate or sheet, and means for regulating the position of said device with respect to the mill rolls.

2. A movable doubling device adapted to receive the plate or sheet from the rolling mill rolls and having rolls therein, movable means on said device for engaging with said plate or sheet to direct the same into said last named rolls to double said plate or sheet, and means for regulating the position of said device with respect to the mill rolls.

3. A movable doubling device adapted to receive the plate or sheet from the rolling mill rolls and having rolls therein, spring controlled movable means on said device for

engaging with said plate or sheet to direct the same into said last named rolls to double said plate or sheet, and means for regulating the position of said device with respect to the mill rolls.

4. A movable doubling device adapted to receive the plates or sheets from the rolling mill rolls and having rolls therein, means for directing the plate or sheet from said mill rolls to a position in front of said last named rolls, means on said device for engaging with said plate or sheet to direct the same into said last named rolls to double said plate or sheet, and means for regulating the position of said device with respect to the mill rolls.

5. A movable doubling device adapted to receive the plate or sheet from the rolling mill rolls and having rolls therein, means for directing the plate or sheet from said mill rolls to a position in front of said last named rolls, movable means on said device for engaging with said plate or sheet to direct the same into said last named rolls to double said plate or sheet, and means for regulating the position of said device with respect to the mill rolls.

6. A movable doubling device adapted to receive the plate or sheet from the rolling mill rolls and having rolls therein, means for directing the plate or sheet from said mill rolls to a position in front of said last named rolls, spring controlled movable means on said device for engaging with said plate or sheet to direct the same into said last named rolls to double said plate or sheet, and means for regulating the position of said device with respect to the mill rolls.

7. A movable doubling device adapted to receive the plate or sheet from the rolling mill rolls and having rolls therein, a chute in said device for directing the plate or sheet from said mill rolls to a position in front of said last named rolls, means on said device for engaging with said plate or sheet to direct the same into said last named rolls to double said plate or sheet, and means for regulating the position of said device with respect to the mill rolls.

8. A movable doubling device adapted to receive the plate or sheet from the rolling mill rolls and having mill rolls therein, a chute in said device for directing the plate or sheet from said rolls to a position in front of said last named rolls, movable means on said device for engaging with said plate or sheet to direct the same into said last named rolls to double said plate or sheet, and means for regulating the position of said device with respect to the mill rolls.

9. A movable doubling device adapted to receive the plate or sheet from the rolling mill rolls and having mill rolls therein, a chute in said device for directing the plate or sheet from said rolls to a position in front

of said last named rolls, spring controlled
movable means on said device for engaging
with said plate or sheet to direct the same
into said last named rolls to double said
5 plate or sheet, and means for regulating the
position of said device with respect to the
mill rolls.

In testimony whereof, I the said PHILIP J.
LYNCH, have hereunto set my hand.

PHILIP J. LYNCH.

Witnesses:

T. B. HUMPHRIES,
J. N. COOKE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
