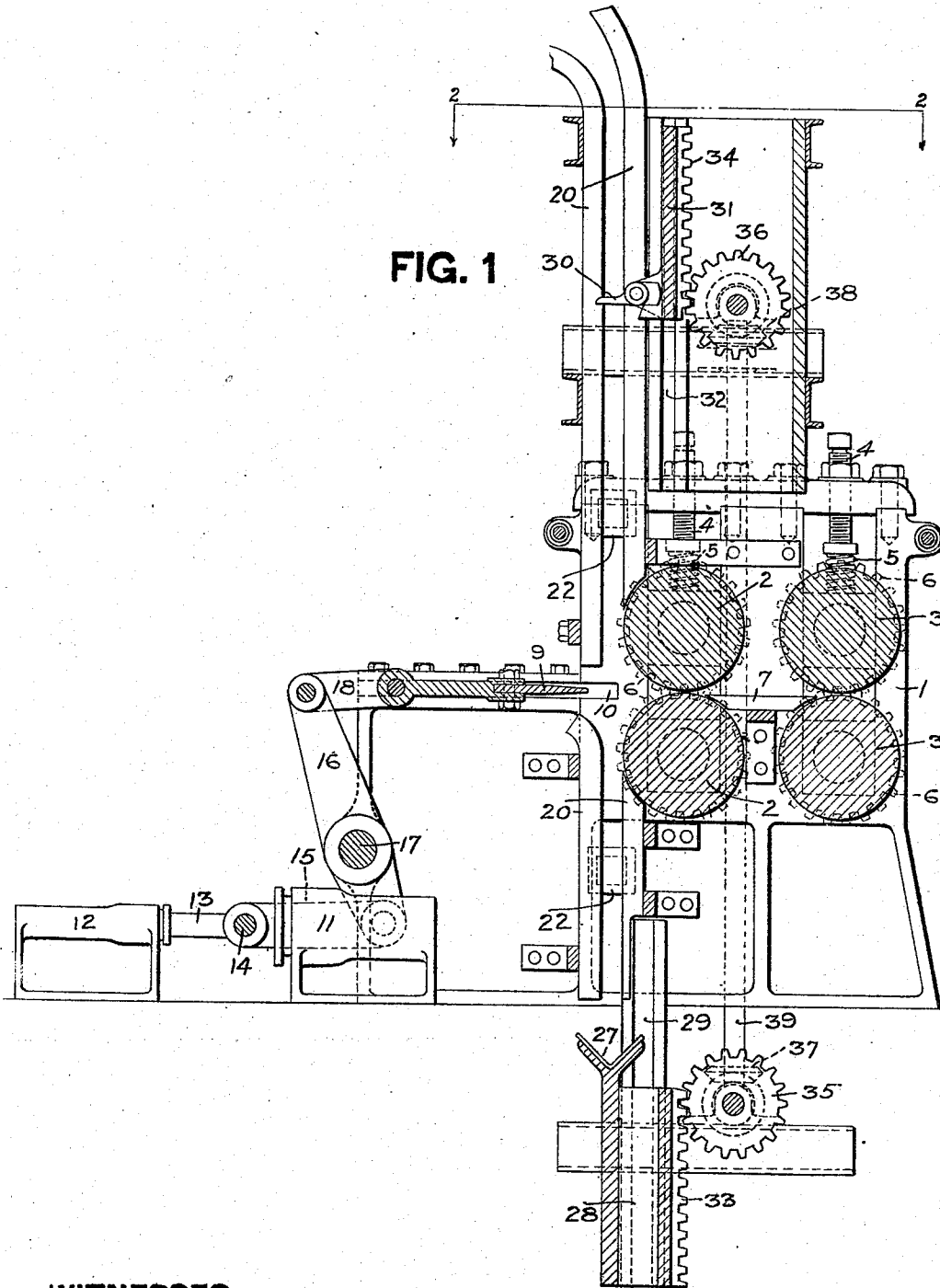


P. E. DONNER.
DOUBLING APPARATUS.
APPLICATION FILED FEB. 21, 1906.

941,700.

Patented Nov. 30, 1909.
3 SHEETS—SHEET 1.



WITNESSES.

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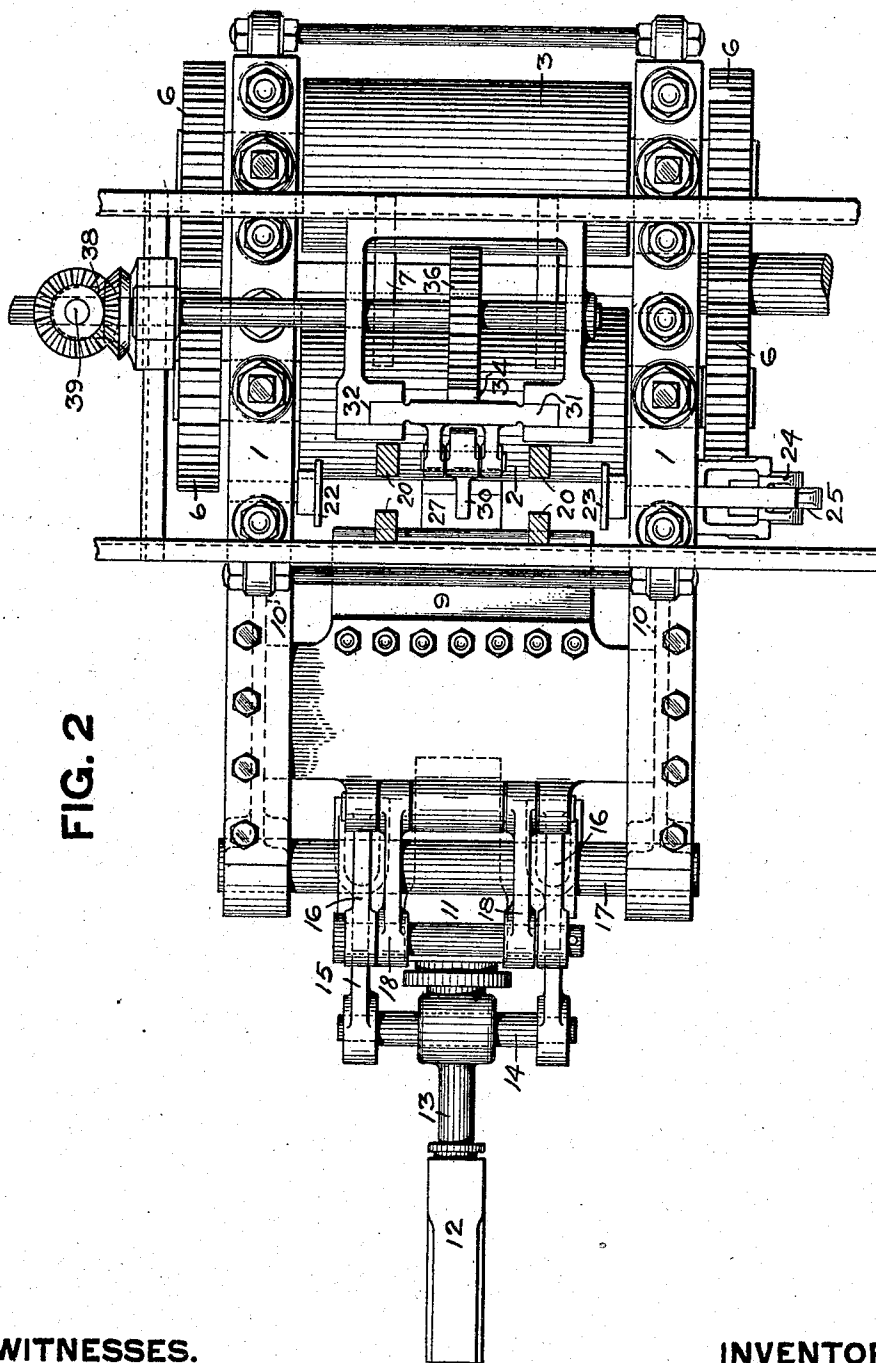


FIG. 2

WITNESSES.

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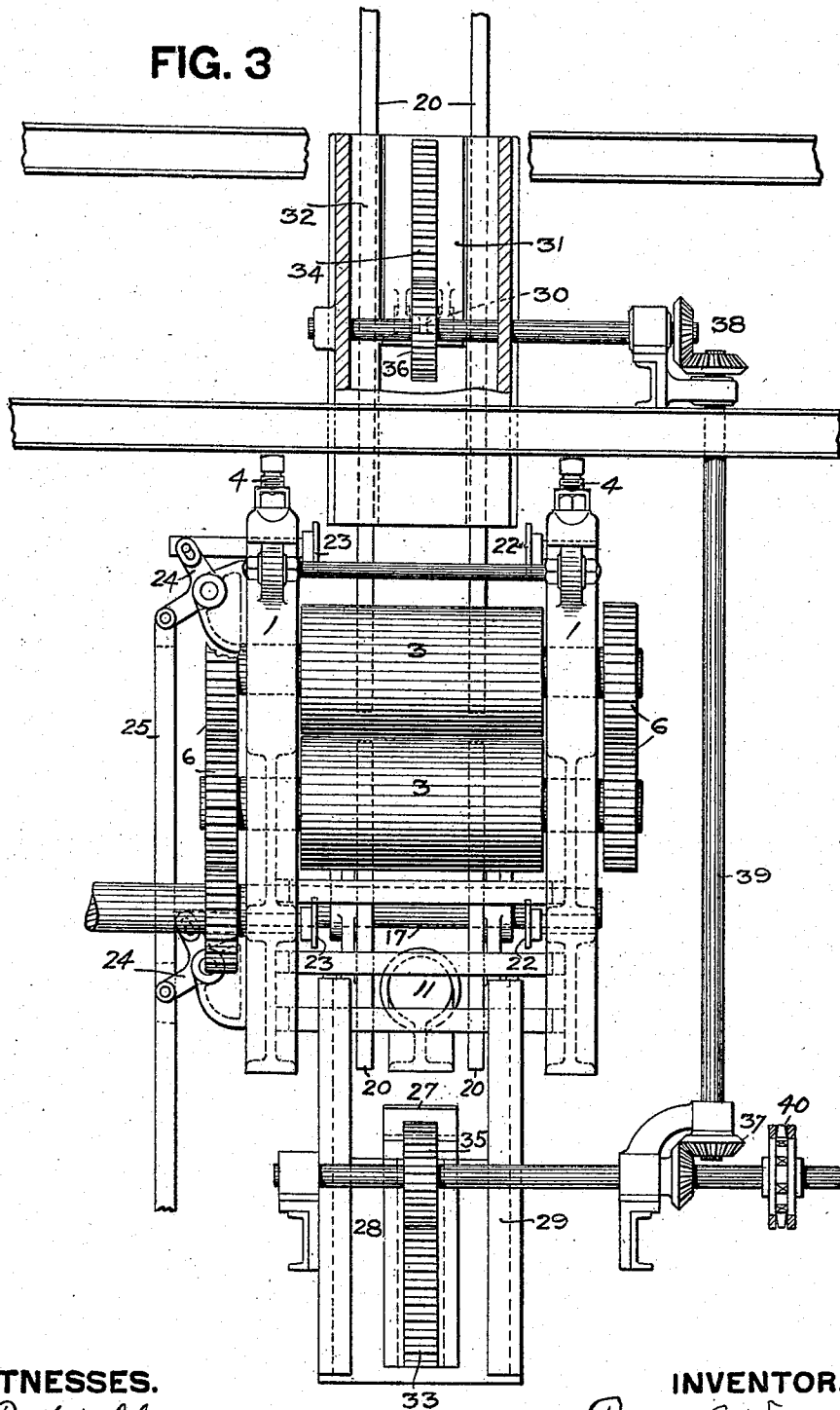
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UNITED STATES PATENT OFFICE.

PERCY E. DONNER, OF PITTSBURG, PENNSYLVANIA.

DOUBLING APPARATUS.

941,700.

Specification of Letters Patent. Patented Nov. 30, 1909.

Application filed February 21, 1906. Serial No. 302,273.

To all whom it may concern:

Be it known that I, PERCY E. DONNER, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Doubling Apparatus; and I do hereby declare the following to be a full, clear, and exact description thereof.

This invention relates to apparatus for doubling metal plates and especially black plates used for tinning.

The object of the invention is to provide simple and effective apparatus of this character in which the doubling is carried out practically automatically but is nevertheless under the control of the operator, and provided with suitable movable stops which center the plate with reference to the doubling blade.

In the accompanying drawings Figure 1 is a vertical section through the doubling apparatus; Fig. 2 is a horizontal section on the line 2—2, Fig. 1, the major portion of the apparatus being shown in plan; and Fig. 3 is a rear elevation of the machine, the upper portion being in vertical transverse section.

My doubler is so arranged that the sheets or plates are held practically in a vertical position at the time of doubling, and have their intermediate portions forced sidewise by means of a horizontally movable blade into the bite of the doubling rollers. It also comprises certain stop mechanism for holding the sheet in proper position and centering it with reference to the doubler blade.

The apparatus comprises suitable frames or housings 1 in which are mounted preferably two pairs of doubling rollers 2 2 and 3 3, these rollers being arranged in tandem, and preferably with their axes horizontal, as shown. These rollers are provided with suitable journal boxes and suitable yielding adjusting means, such as the screws 4 contacting through the springs 5 on the boxes of the top rollers. The rollers preferably are positively driven by any suitable mechanism, being shown as provided with intermeshing spur gears 6 which will be driven from any suitable source of power, (not shown). Between the two pairs of rolls is provided a guide 7 for preventing the front end of the double sheets from falling between the rollers.

Mounted in front of the foremost pair of rollers 2 2 is a horizontally movable doubling

blade 9 whose ends are movable in horizontal guides or ways 10. This blade may be reciprocated by any suitable mechanism. It is shown as moved by means of differential power cylinders 11 and 12 whose pistons are united by the connecting member 13 which carries a pin 14 connected by means of a pair of links 15 with the lower ends of rocking levers 16 mounted on a pivot 17, and whose ends are connected by means of links 18 to the pusher blade. The larger cylinder 11 acts to move the blade forward to push the sheets between the doubling rollers, while the smaller cylinder 12 serves to retract said blade.

In front of the rollers 2 are suitable vertical guide bars 20 spaced apart and serving to guide and hold the sheets or plates in a vertical position. The upper ends of these guide bars will be in proximity to suitable feeding mechanism coming from the hot roll or feed table of the mill. Suitable side guides or stops for contacting with the edges of the sheets are provided, those on one side being stationary, and shown at 22, while those on the opposite side are movable, and shown at 23. These movable stops are suitably mounted in the housings and have connected to their outer ends bell crank levers 24 which have connected thereto the operating rod or link 25. The latter will be moved by any suitable mechanism such as a hydraulic or electric motor (not shown). I also provide a suitable bottom stop or support, and preferably also a top centering stop. These two stops are arranged to engage the ends of the sheet or plate and are connected by mechanism so that they can be moved simultaneously in order to center the sheet opposite the pushing blade. The bottom stop is shown at 27 and is V-shaped so as to form a secure support for the lower end of the sheet. It is secured to or formed integral with a slide 28, vertically movable in ways or guides 29 on the housings. The upper stop is formed as a counter-weighted finger pivotally secured to a slide 31 which is vertically movable in guides or ways formed on the housings. The finger 30 is so pivoted that it swings to permit the sheet to pass downwardly past the same and then swings by gravity to a horizontal position behind the sheet.

Suitable mechanism is provided for moving the slides 28 and 31 simultaneously toward or from each other. The mechanism

shown comprises racks 33 and 34 formed respectively on the slides 28 and 31, and which are engaged by spur gears 35 and 36 respectively. These spur gears are connected to rotate in unison by any suitable mechanism such as the bevel gearing 37 and 38 and connecting shaft 39. Driving means will be connected to this gearing at any suitable place and will be of any suitable character. It is indicated at 40.

The operation of my doubler will be readily understood from the foregoing description and the drawings. The sheets to be doubled are fed down between the guides 20, the lower ends of the sheets coming to rest in the bottom support 27. The slides 28 and 31 are then moved toward each other, the lower guide 27 lifting the sheet, and this movement continues until the top end of the sheet contacts with the finger 30, in which position the sheet is properly centered with reference to the pushing blade. As a consequence both legs or members of the doubled sheet will be of the same length. The side stops 23 are actuated by the mechanism shown in order to push the sheet sideways against the opposite side stops 22. The pusher blade 9 then moves forwardly pushing the intermediate portion of the sheet between the rollers 2 sufficiently far to be gripped by said rollers when the latter completes the doubling operation by drawing the remainder of the sheet through the rollers and feeding the same to the pair of rollers. The doubled sheet is fed away in a straight course.

The various mechanisms of the apparatus will preferably be controlled from a single point or pulpit, such as providing magnets for throwing said mechanisms into and out of operation, which magnets will be wired up to suitable controllers in the pulpit.

What I claim is:

1. In sheet metal doubling apparatus, the combination of a pair of doubling rollers arranged horizontally and one above the other, spaced sheet guides arranged vertically in front of said rollers, a support for the lower end of the sheet, a pusher blade mounted to move horizontally, and mechanism for moving said blade to force the intermediate part of the sheet between the doubling rollers.

2. In sheet metal doubling apparatus, the combination of two pairs of doubling rollers arranged in tandem with their axes horizontal and one roller of each pair above the other, spaced sheet guides arranged vertically in front of said rollers, a support for

the lower end of the sheet, a pusher blade mounted to move horizontally, and mechanism for moving said pusher blade to force the intermediate part of the sheet between the doubling rollers.

3. In sheet metal doubling apparatus, the combination of a pair of doubling rollers arranged horizontally and one above the other, spaced sheet guides arranged vertically in front of said rollers, a support for the lower ends of the sheets, means for matching the side edges of the sheets, a pusher blade mounted to move horizontally, and mechanism for moving said pusher blade to force the intermediate part of the sheets between the doubling rollers.

4. In sheet metal doubling apparatus, the combination of a pair of doubling rollers arranged horizontally and one above the other, spaced sheet guides arranged vertically in front of said rollers, stops for engaging the top and bottom ends of the sheet, mechanism for moving said top and bottom stops toward and from each other, a pusher blade mounted to move horizontally, and mechanism for moving said pusher blade to force the intermediate part of the sheet between the doubling rollers.

5. In doubling apparatus, the combination of a pair of doubling rollers arranged horizontally and one above the other, guides in front of said rollers for holding the sheet vertically, movable side stops for contacting with the side edges of the sheet, a vertically movable support for the lower end of the sheet, a pusher blade mounted to move horizontally, and mechanism for moving said pusher blade to force the intermediate part of the sheet between the doubling rollers.

6. In doubling apparatus, the combination of a pair of doubling rollers, guides in front of said rollers for holding the sheet vertically, movable side guides for contacting with the side edges of the sheet, movable top and bottom stops for contacting with the upper and lower ends of the sheet, mechanism for moving said top and bottom stops toward and from each other, a pusher blade mounted to move horizontally, and mechanism for moving said pusher blade to force the intermediate part of the sheet between the doubling rollers.

In testimony whereof, I the said PERCY E. DONNER have hereunto set my hand.

PERCY E. DONNER.

Witnesses:

ROBERT C. TOTTEN,
J. R. KELLER.