Aug. 22, 1933. E. C. REILLY ET AL 1,923,458

SHEET PILER

Filed Dec. 9, 1931 2 Sheets-Sheet 1

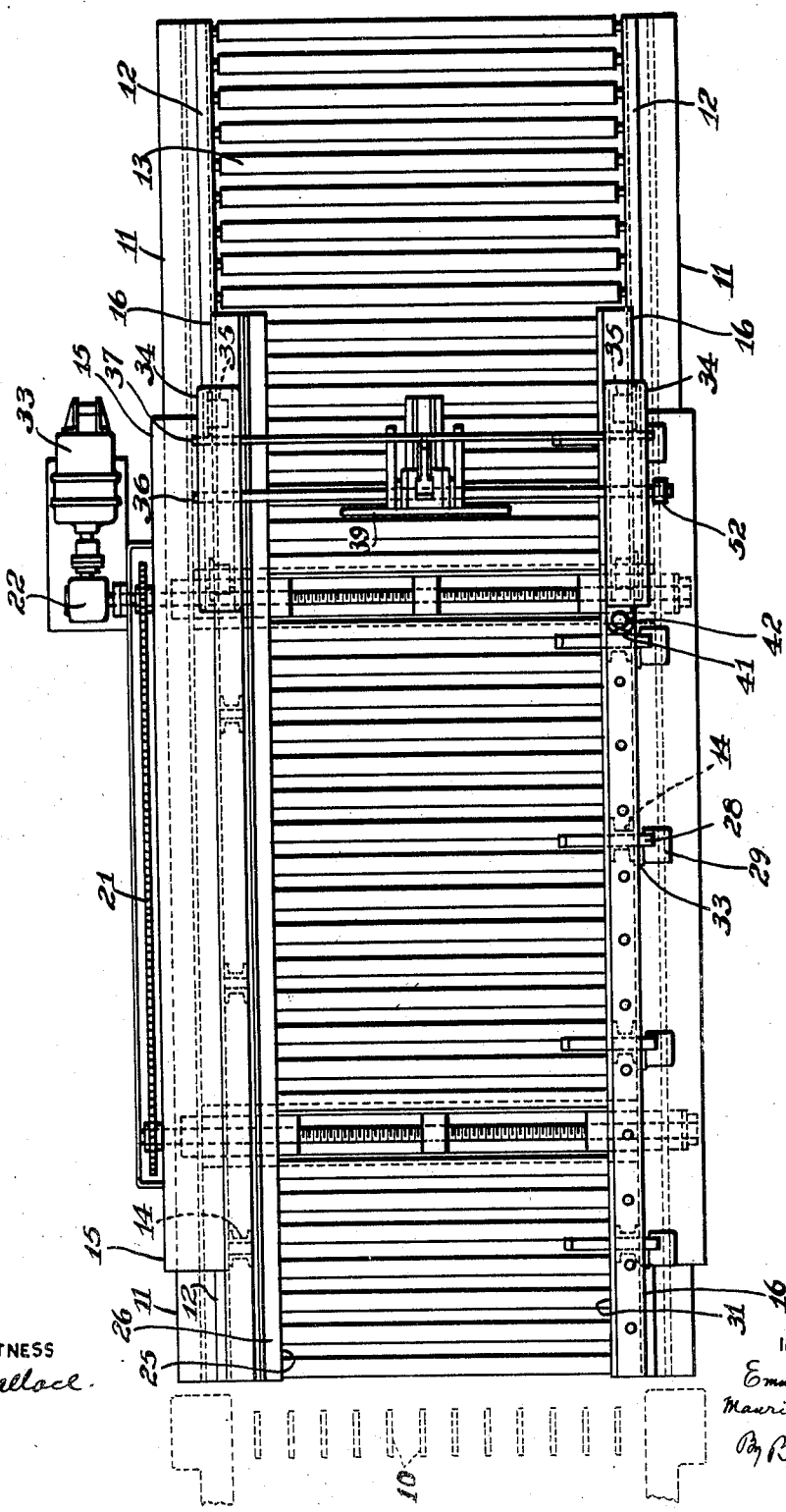


Fig. 1.

WITNESS
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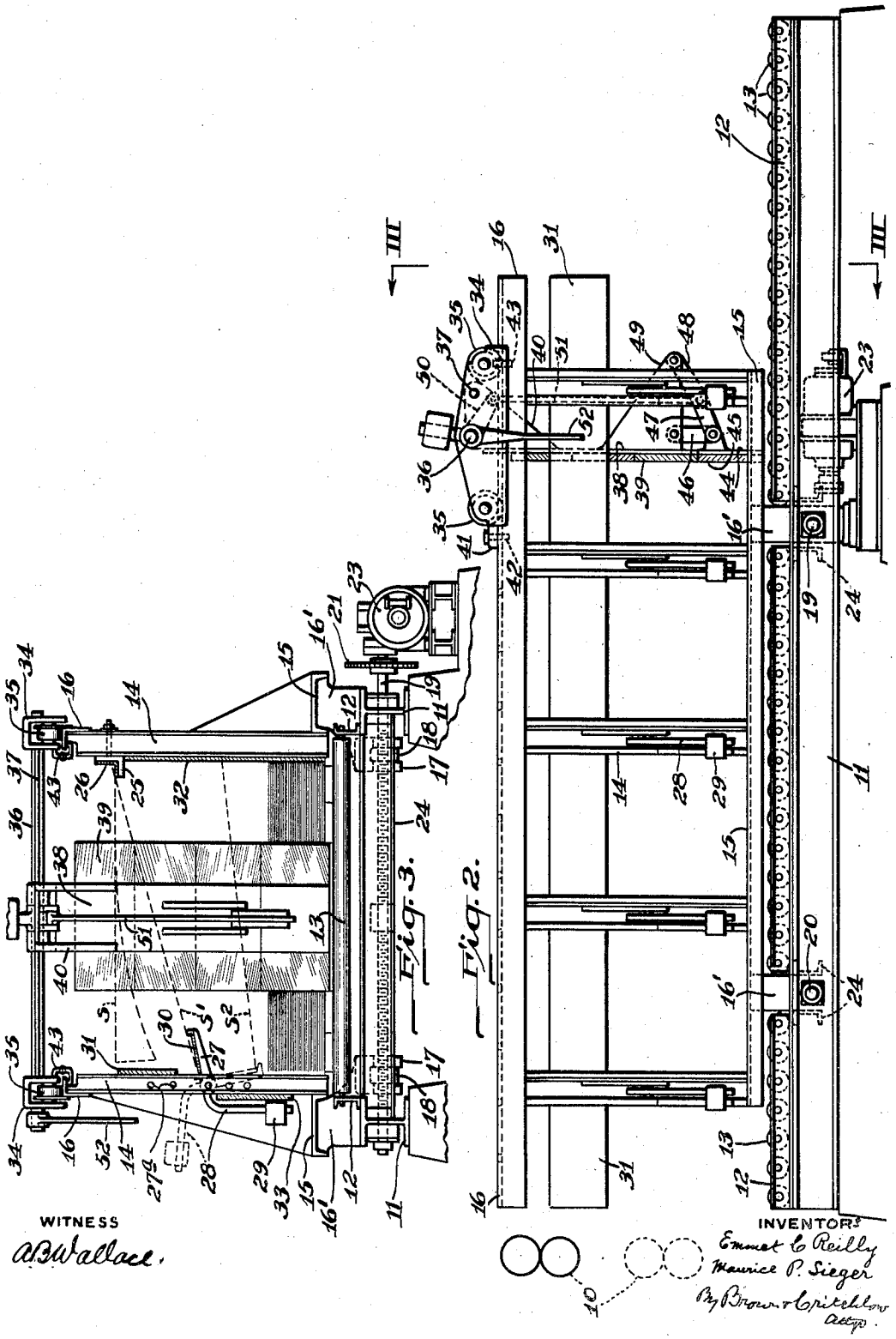


Fig. 3.

Fig. 2.

WITNESS

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UNITED STATES PATENT OFFICE

1,923,458

SHEET PILER

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11 Claims. (Cl. 271—86)

Our invention pertains to apparatus for piling sheets, and relates especially to such apparatus for use in the piling of metallic sheets of relatively high finish.

Metal sheets coming from a rolling mill frequently have highly finished surfaces which must be protected as much as possible from damage. However for reasonable convenience of storage and transportation it is usually desirable that the sheets be piled one on the other into stacks, and it has been found difficult to perform the piling operation without scratching or marring of the sheets, chiefly due to the longitudinal or lateral sliding of the latter one on the other in the course of being piled. Furthermore, the stacks of sheets, as heretofore piled, have usually been irregular, requiring an additional operation to produce a neat stack. Such additional operation involved the sliding of the sheets upon and between each other, with a consequent further tendency towards scratching and other marring.

It is an object of our invention to provide a simple and effective piling apparatus by the use of which likelihood of the sheets being scratched or otherwise marred in the operation of being piled is reduced to a minimum. Another object is to provide a piling apparatus which will perform its functions in such manner as to produce a neatly stacked pile of sheets, requiring no subsequent operation. And other objects of our invention, and advantages secured, will appear from the following specification and claims.

One form of sheet piling apparatus embodying our invention is shown, by way of example, in the accompanying drawings and described in the following specification. We wish it understood, however, that the invention can be embodied in other forms, and that changes can be made in the particular form described and shown, without exceeding the scope thereof as defined in the appended claims.

In the drawings,—Fig. 1 shows the sheet piling apparatus in plan, Fig. 2 is a side elevation, and Fig. 3 is an end elevation as viewed from the line III—III of Fig. 2, a partially formed pile of sheets being, in this figure only, shown in place in the apparatus.

The sheets to be piled are delivered to the apparatus by means of pinch rolls 10 which, as indicated by the dotted position in Fig. 2, are adjustable vertically. Such pinch rolls, and the manner of their vertical adjustment is common in this art, and requires no further description. From the pinch rolls the sheets issue one by one into the piling apparatus, falling one upon the other so as to constitute a stack which rests upon the rolls of a roll table at the bottom of the apparatus. This roll table, as shown, comprises longitudinal beams 11 to which are secured channel irons 12 in which the rolls 13 are journaled.

Right and left-hand vertical side guides, of substantially the same construction, are movably mounted with respect to the roll table so as to be adjustable towards and away from each other for the purpose of accommodating sheets of varying width. Each side guide comprises a plurality of uprights, each constituted by a pair of spaced posts 14. The uprights are secured at their lower ends to a base plate 15 and are connected together at their upper ends by a longitudinally extending angle iron 16, the angle irons of the two guides constituting tracks for an end guide carriage, as will hereinafter appear. The base plate 15 of each guide is supported upon two blocks 16' each of which is disposed in a gap left between the ends of the several channel irons 12 which carry the table rolls. Likewise a gap is left between the table rolls themselves at this position. The blocks 16' of the two side guides face each other, and each block is formed with a depending bifurcated lug 17 which embraces a nut 18. Shafts 19 and 20, formed with right and left-hand screw threads, pass through the nuts 18 and are rotated in suitable bearings in the beams 11. Driving connection is established between the shafts 19 and 20 by means of sprockets and a chain 21, and the shaft 19 can be rotated, through a reduction gear 22, by means of an electric motor 23. It will thus be seen that upon putting the motor 23 in operation to rotate the shafts 19 and 20 in one direction or the other, the side guides will be caused to approach or recede from each other. The blocks 16 of the side guides move in the space left between the table rolls 13 and are supported during such movement by channel irons 24 which are secured to the beams 11 so as to extend transversely of the roll table.

Upon the left-hand (as viewed in the direction of movement of the issuing sheets) side guide is mounted an edge-support constituted by a long bar of L shape in cross section, one flange 25 of which extends a slight distance horizontally towards the center of the apparatus. The flange 25, as well as the vertical flange of the edge-support, has applied thereto a facing 26 of fiber board or other material incapable of scratching or marring the surface of the metal sheet. The edge support is held in place in such manner that it can be adjusted to various vertical positions,

by means of bolts which extend outwardly between the posts 14 of the uprights. The horizontal adjustment of the side guide and the vertical adjustment of the edge-support is such that the left-hand edge of the sheet issuing from the pinch rolls will slide along and be supported by the flange 25 of the edge-support.

Upon the right-hand side guide are mounted a plurality of retarders, preferably one at the end of each of the uprights. Each retarder is constituted by a lever, pivoted between the posts 14 of the upright, and having an inwardly extending arm 27 and an outwardly extending arm 28 upon which a counterweight 29 is mounted so that it can be adjusted in position to vary the retarding effect. The inwardly extending arm, which is provided with a facing 30 of fiber board or the like, is normally disposed substantially horizontally, being held in that position by the counterweight. However, when an edge of a sheet falls upon such arm, the latter descends, permitting the edge of the sheet to descend likewise, the counterweight being adjusted so that the downward movement of the arm and sheet is properly retarded.

As a sheet issues from the pinch rolls, it is at first, of course, supported at the rear across its entire width by the pinch rolls, the left-hand edge of the sheet sliding along and being supported by the flange 25 of the edge support. The sheet will, at this stage, have some such appearance as is indicated by the dotted position *s* of Fig. 3. When the tail end of the sheet emerges from the pinch rolls, the right-hand edge is free to fall and in doing so strikes the arms 27 of the retarders, assuming a position such as is indicated at *s'*. The right-hand side of the sheet continues to drop being, however, retarded by the counterweights 29. When the right-hand side has descended far enough the left-hand edge will slip off the edge support and fall freely, as is indicated by the position s^2.

Sheets of different widths, thickness, etc., will fall differently. As has been stated, the pinch rolls and edge-support are adjustable as to height, and the counter-weights are adjustable on the arms 28 of the retarders to vary the retarding effect of the latter. In addition, the vertical position of the retarders can be varied by pivoting them in various ones of a series of holes 27*a* formed in the uprights of the right-hand side guide. By making use of these adjustments any character of sheet can be made to finish its downward movement substantially flatwise, without appreciable sliding movement either longitudinally or laterally upon the sheet beneath it.

In order to prevent possible marring of the right-hand edge of the sheet by its striking against the uprights of the right-hand side guide, the latter is provided with an inwardly facing bumper strip 31. Likewise the left-hand guide is provided with an inner bumper wall 32. The bumper strip and bumper wall may, like the faces above referred to, be of fiber board or the like. Pads 33 are mounted upon the uprights of the right-hand side guides to take the impact of the counterweights 29 when the latter fall after the release of a sheet.

From the foregoing, it will be apparent that the sheets are delivered without any longitudinal sliding movement of one upon the other, and are made to fall into a piled formation without any possibility of lateral sliding of one upon the other. In this way, a fruitful source of scratching the surfaces of the sheets is obviated.

An end guide 38 is provided for engagement by the issuing sheets so that they will all drop at the same position, considered longitudinally of the apparatus, and form a neat pile ready for shipment or storage. The end guide is borne by a carriage which comprises a pair of trucks 34 each having wheels 35 adapted to run upon the tracks constituted by the angle irons 16, above referred to, which connect the tops of the uprights of the side guides. The trucks are connected by a shaft 36 and spacing rod 37, which shaft and spacing rod are slidably mounted in the trucks to allow for the movement of the side guides when the latter are adjusted.

The end guide 38 is provided with a facing 39, of wood or the like, and is hung upon the shaft 36, being maintained rigid in a vertical position by means of brackets 40 secured to the end guide and through which the spacing rod 37 passes. Each or one of the trucks is formed with a lug 41 through which passes a pin 42 to enter one or another of a series of holes formed in the channel iron 16 constituting the guide upon which the truck runs. By this means the end guide can be adjusted to any desired position longitudinally of the apparatus, so that the sheets on emerging from the pinch rolls will engage against the end guide and will thereby be caused to fall always in the same position considered longitudinally of the apparatus. To prevent tilting of the end guide under the impact of a sheet striking the same, the trucks are provided with hooks 43 which engage beneath the channels 16. In this way the piled stack is squared at the ends, as well as being squared at the sides because of the engagement of the left-hand edges of the sheets against the bumper wall 32 of the left-hand side guide. The resulting stack of sheets requires no subsequent squaring which, if it had to be done, would involve sliding of the sheets upon each other with a consequent tendency to scratching, etc.

To facilitate removal of the stack of sheets when the latter has reached a sufficient height, the end guide 38 terminates at a material distance above the roll table and is provided with an extension 44, having a facing 45 of wood or the like, which extension constitutes a door that may be opened when it is desired to remove the stack. The extension is hung from the main end guide by means of a link 46 pivoted to both members, and is adapted to be raised and lowered by means of a toggle comprising a pair of links 47 and 48, of which the link 46 is pivoted to the extension 44 and the link 48 is pivoted to a bracket 49 extending rearwardly from the main end guide. Upon the shaft 36 is mounted a lever 50 which is connected by a link 51 with the central pivot of the toggle, so that when the shaft is rocked, by means of a hand lever 52 provided for the purpose, the toggle is either broken upwardly and the extension raised to the right (Fig. 2), thereby opening a space for the removal of the stack of sheets, or else is straightened to move the extension 44 into vertical position and hold it firmly therein.

The term "pinch rolls" as employed in the claims is intended to cover devices which operate like pinch rolls in that they support the sheet across its width until its end is reached.

We claim:

1. The combination with means for delivering sheets edgewise, of means for supporting one side of the sheet during delivery, and a yielding device, disposed at a level lower than that of said first-named means, for engagement by the other

side of the sheet upon such other edge being permitted to fall.

2. The combination with pinch rolls for delivering sheets edgewise in lengths, of means for supporting one side of the sheet during delivery and yielding means for catching the other side of the sheet when such other side falls upon emergence of the sheet from the pinch rolls.

3. The combination with pinch rolls for delivering sheets elgewise in lengths, of means for supporting one side of the sheet during delivery, and a device for catching the other side of the sheet when such other side falls upon emergence of the sheet from the pinch rolls, said device being constructed to yield under the weight of the side of the sheet, and being disposed so that, upon yielding, the opposite side of the sheet escapes from said supporting means.

4. The combination with pinch rolls for delivering sheets edgewise in lengths, of means for supporting one side of the sheet during delivery, a device for catching the other side of the sheet when such other side falls upon emergence of the sheet from the pinch rolls, said device being constructed to yield under the weight of the side of the sheet and being disposed so that, upon yielding, the opposite side of the sheet escapes from said supporting means, and means for retarding the yielding action of said device.

5. The combination with pinch rolls for delivering sheets edgewise in lengths, of an elongate support disposed to receive one side of a sheet as delivered by said rolls, a pivoted arm disposed at a level lower than that of said support, means normally holding said arm beneath the other side of the sheet in a position to catch such other side when it falls upon emergence of the sheet from the pinch roll, said means being constructed to yield under the weight of the sheet.

6. The combination with pinch rolls for delivering sheets edgewise in lengths, of an elongate support disposed to receive one side of a sheet as delivered by said rolls, a pivoted arm disposed at a level lower than that of said support, yieldable means normally holding said arm in a position to catch the other side of the sheet when it falls upon emergence of the sheet from the pinch rolls, and means for retarding the yielding action of said last-named means.

7. The combination with pinch rolls for delivering sheets edgewise in lengths, of means for supporting one side of the sheet during delivery, a device for catching the other side of the sheet when such other side falls upon emergence of the sheet from the pinch rolls, said device being constructed to yield under the weight of the side of the sheet, and being disposed so that, upon yielding, the opposite side of the sheet escapes from said supporting means, and means for retarding the yielding action of said device, said means being adjustable to vary the retarding action.

8. Apparatus for delivering sheets edgewise in lengths from pinch rolls adjustable in height, comprising means for supporting one side of the sheet during delivery, said support means being adjustable to accord with the height of the pinch rolls, a device for catching the other side of the sheet when such other side falls upon emergence of the sheet from the pinch rolls, said device being adjustable in height and said device being constructed to yield under the weight of the side of the sheet, and disposed so that, upon yielding, the opposite side of the sheet escapes from said supporting means, and means for retarding the yielding action of said device, said means being adjustable to vary the retarding action, whereby, by means of said adjustments, the sheet may complete its fall substantially flatwise.

9. The combination with means for delivering sheets edgewise, of means for supporting one side of the sheet during delivery, a yielding device disposed at a level lower than that of said first-named means, for engagement by the other side of the sheet upon such other edge being permitted to fall, a side guide for engagement by a side edge of the sheet and an end guide for engagement by an end edge of the sheet.

10. The combination with means for delivering sheets edgewise, of means for piling the delivered sheet upon a support, said means comprising a member for supporting one side of the sheet during delivery, a yielding device disposed at a level lower than that of said member, for engagement by the other side of the sheet upon such other edge being permitted to fall, a side guide for engagement by the side edges of the sheets, and an end guide for engagement by the end edges of the sheets, said end guide including a member terminating above said support and an extension of said member movable with respect thereto to permit withdrawal of the piled sheets.

11. The combination with pinch rolls for delivering sheets edgewise in lengths, of means for piling the delivered sheets, said means comprising a roll table disposed so that the sheets will fall one upon the other thereon on issuing from said pinch rolls, a side guide for engagement by the edges of the sheets at one side of the latter, an end guide for engagement by the edges of the sheets at one end of the latter, said end guide terminating above said roll table, and an extension of said end guide disposed between the latter and the roll table and movably mounted with respect to said end guide to permit removal of the pile of sheets.

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