Jan. 31, 1956 G. A. MARTIN 2,733,064

SHEET DELIVERING APPARATUS

Original Filed July 20, 1948 3 Sheets-Sheet 1

Fig. 1

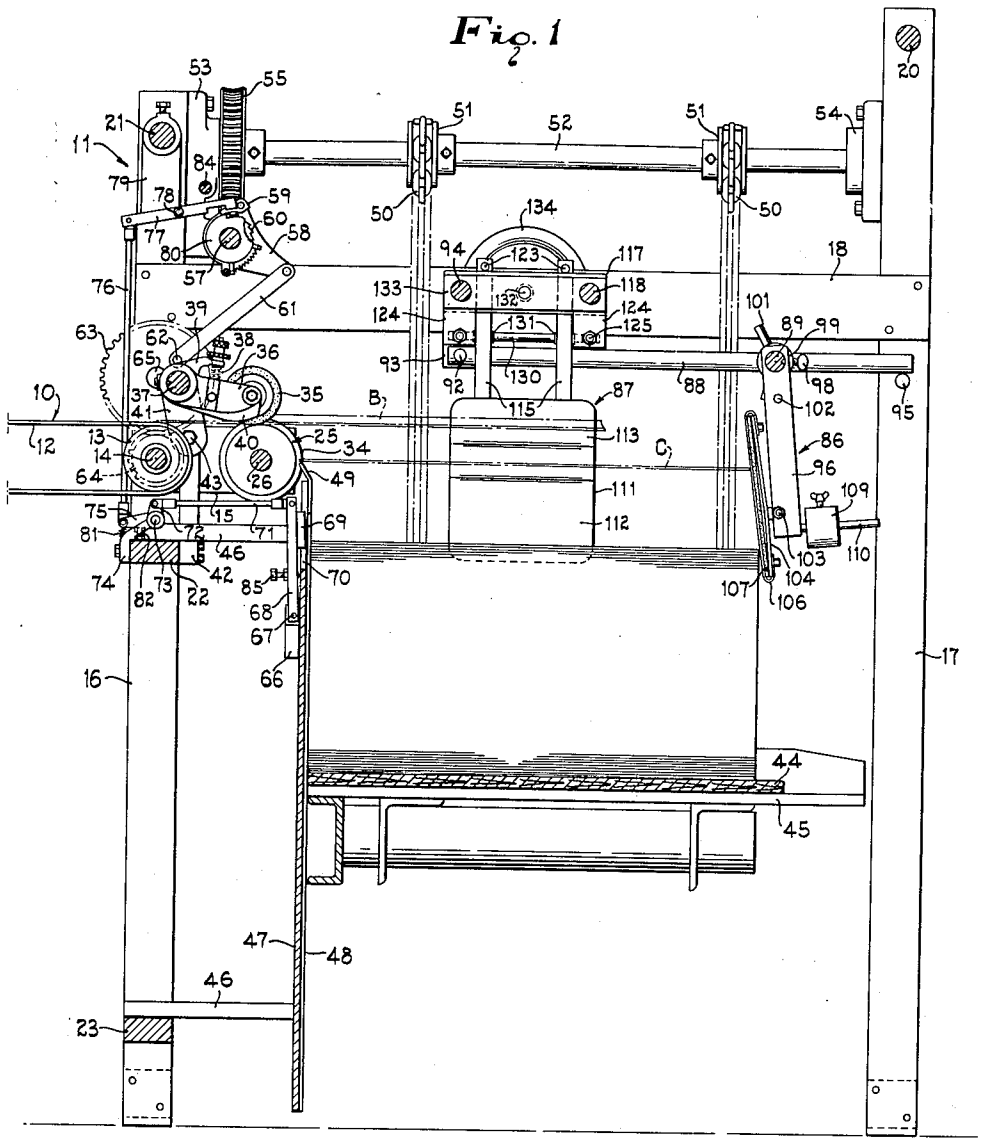

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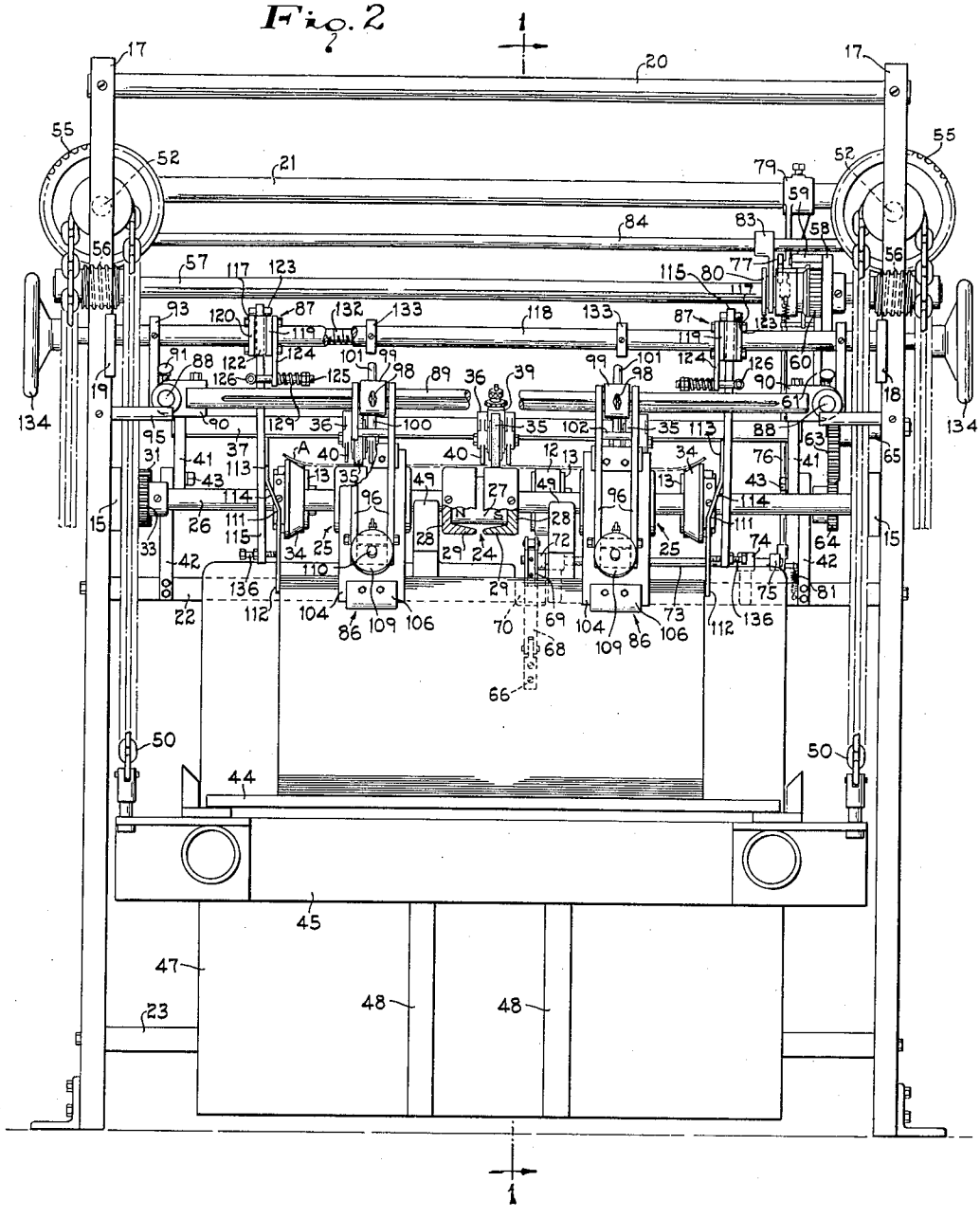
Fig. 2



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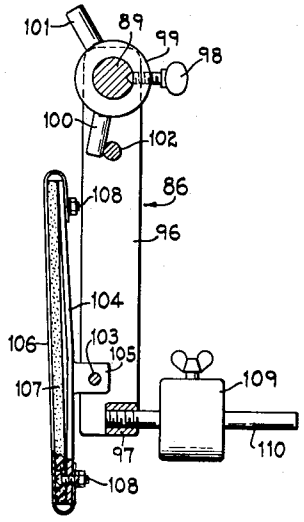

Fig. 3.

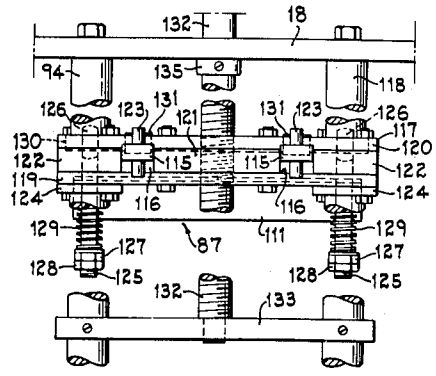

Fig. 4.

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2,733,064

SHEET DELIVERING APPARATUS

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Original application July 20, 1948, Serial No. 39,764, now Patent No. 2,626,800, dated January 27, 1953. Divided and this application March 25, 1952, Serial No. 278,445

10 Claims. (Cl. 271—89)

This invention relates to sheet handling apparatus, and more particularly to sheet delivering apparatus for delivering and piling sheets of tin plate and other metallic or relatively heavy sheets as the same are discharged from a printing press, coating machine, buffing and cleaning machine, drying or baking oven, rolling mill, inspecting machine, trimming machine, and various other processing machines.

This application is a division of my co-pending application Serial No. 39,764, filed July 20, 1948, for "Sheet Delivering Apparatus," which issued as U. S. Letters Patent No. 2,626,800, January 27, 1953.

One object of the present invention is to provide in a pile delivery for metal or other relatively heavy sheets novel self-acting sheet jogging means for accurately aligning the successive sheets as they are piled so as to form an even pile thereof.

Another object is to provide in a pile delivery for metal or other relatively heavy sheets a novel sheet actuated sheet jogging device which is actuated by each succeeding sheet in process of delivery to effectively jog or align each preceding sheet delivered to and resting on the pile.

The above and further objects and novel features of the present invention will more fully appear from the following detail description when the same is read in connection with the accompanying drawings. It is to be expressly understood, however, that the drawings are for the purpose of illustration only, and are not intended as a definition of the limits of the invention.

In the drawings, wherein like reference characters refer to like parts throughout the several views,

Fig. 1 is a vertical longitudinal sectional view of a sheet delivery embodying the present invention and including a pile elevator, said view being taken on the line 1—1 of Fig. 2;

Fig. 2 is an end elevation of the sheet delivery shown in Fig. 1 looking from the right thereof, certain of the parts having portions broken away for purposes of clearer illustration;

Fig. 3 is an enlarged vertical longitudinal section of one of the front sheet jogging devices shown in Figs. 1 and 2, certain of the parts having portions broken away for purposes of clearer illustration; and

Fig. 4 is an enlarged top plan view of one of the side sheet jogging devices shown in Figs. 1 and 2.

Referring to the drawings, there is shown one form of sheet delivery embodying sheet jogging devices constructed in accordance with the present invention, said delivery being particularly adapted for delivering and piling sheets of tin plate as the same are received from a combined drying or baking oven and sheet turnover unit employed in the processing or making of metal articles or containers. It will be understood, however, that the novel sheet jogging devices disclosed herein may be advantageously and effectively employed in connection with the delivering and piling of cardboard or other relatively heavy non-metallic sheets.

In the illustrated embodiment, the sheets of tin plate pass in succession from the baking oven and turnover unit with their treated surfaces uppermost onto a horizontally disposed endless conveyor 10 which advances said sheets away from said unit to a pile delivery 11 wherein the sheets are piled one on top of the other in an orderly pile for further handling thereof. From the conveyor 10, the sheets of tin plate pass in succession between driven magnet rollers 24, 25 and cooperating rubber pressure rollers 35 which function to further advance said sheets and progressively bow and stiffen each advancing sheet in a longitudinal direction so that the latter is caused to move straight forward in a substantially horizontal plane into space until approximately the entire sheet is disposed over piling position.

When the trailing portion of each sheet advanced by the magnet rollers 24, 25 moves out of engagement with the pressure rollers 35, said sheet begins to swing downwardly, said trailing portion of the sheet, however, still being under the magnetic influence of the magnet rollers will continue to adhere to said rollers and, hence, the sheet will simultaneously be moved forwardly and downwardly at the trailing edge thereof around a portion of the periphery of the magnet rollers, thus maintaining the sheet substantially horizontal, as shown in broken lines at C in Fig. 1, and removing the trailing portion thereof from the path of the next or oncoming sheet to prevent interference therewith. When the delivered downwardly moving sheet reaches a position substantially coplanar with the axis of rotation of the magnet rollers 24, 25, said sheet is stripped from said rollers by non-magnetic strippers 49, whereupon it falls flatwise by gravity a relatively short distance onto a piling platform or skid 44 upon which the successive sheets are piled one upon the other in an orderly pile.

As shown in Figs. 1 and 2, the platform or skid 44 is removably supported on a pile elevator which includes a U-shaped frame or support 45 which carries the platform 44 and which is open at the front thereof to receive a portable truck for unloading of said platform and the pile of sheets thereon from said elevator through the front of the delivery. The support 45 is lowered step-by-step to maintain the top of the pile of delivered sheets at a selected minimum distance below the magnet rollers 24, 25, and this is accomplished by a ratchet 60 drivably connected with the elevator and an oscillating pawl 59 engaged with said ratchet. The operation of the pawl and ratchet drive 59, 60 is controlled by a magnetic feeler 69 disposed in operative relation to the top of the pile of sheets on the elevator and operatively associated with a pawl controlling mask 80. When the top of the pile of sheets on the elevator is at a normal level below the magnet rollers 24, 25 determined by the feeler 69, the oscillating pawl 59 is held out of engagement with the ratchet 60 by the mask 80 and no downward movement will be imparted to said elevator and said pile. As the delivered sheets drop one after another on the pile and the latter thereby progressively increases, the feeler 69 is magnetically attracted toward said pile by said sheets, whereupon the mask 80 enables engagement of the pawl 59 with the ratchet 60 to rotate the latter and thereby effect downward movement of the elevator and pile of sheets thereon until the top of said pile again reaches the normal level thereof.

Disposed slightly forward of the rollers 24, 25 and supported on the cross members 22, 23 of the delivery frame by means of forwardly extending bars 46 is a metal plate or apron 47 provided on the front surface thereof with two transversely spaced, vertically extending pile guides 48 against which the successively delivered sheets are jogged as hereinafter described, and against which the rear side of the pile of delivered sheets bears during

lowering of said pile and the elevator as hereinbefore described.

In accordance with the present invention, sheet jogging devices of novel construction and operation are provided to cause the successive sheets upon delivery thereof to the support 45 to pile evenly thereon and without relative sliding movement. In the illustrated embodiment two sheet jogging devices indicated generally at 86, 86 are employed at the front of the delivery, and a single sheet jogging device indicated generally at 87 is employed at each side of said delivery. The front sheet jogging devices 86, 86 are identical in construction, mounting and operation, and the side sheet jogging devices 87, 87 are identical in construction, mounting and operation, therefore, a description of one of said front jogging devices and of one of said side jogging devices will suffice for both of the same.

As herein shown, the front sheet jogging devices 86, 86 are supported on an auxiliary frame comprising side members 88 and a front cross member 89. This cross member 89 is secured to brackets 90 slidably mounted on the side members 88. The cross member 89 and sheet jogging devices 86, 86 carried thereby and hereinafter described in detail are therefore adjustable rearwardly and forwardly along the side members 88 and may be secured in any desired position of adjustment thereon by thumb screws 91 or the like. The auxiliary frame is pivotally mounted at the rear thereof, as indicated at 92, on hangars 93 secured to and depending from a shaft 94 which extends transversely of the delivery frame and is secured at its opposite ends to the side members 18, 19 of said delivery frame. The auxiliary frame is supported at the front thereof by laterally projecting pins 95 secured in the front uprights 17. It will be noted that the pivotal mounting of the auxiliary frame enables said frame and the sheet jogging devices 86, 86 carried thereby to yield upwardly in the event the elevator is accidentally raised too high, thus preventing damage to said sheet jogging devices through engagement of the pile supporting platform 44 therewith.

As shown in Figs. 1, 2, and 3 of the drawings, each front sheet jogging device 86 comprises a pair of spaced vertically extending arms 96 which are loosely mounted for pivotal movement on the cross member 89 of the auxiliary frame and connected together at their lower extremities by a block 97 welded or otherwise suitably secured thereto. Arms 96 are adjustable along cross member 89 and may be secured in any desired position of adjustment thereon by a thumb screw 98 which is threaded into a collar 99 engaged over said cross member and disposed between said arms. Collar 99 is provided with two angularly related pins 100 and 101 which are adapted to be engaged by a cross pin 102 secured in and extending between the arms 96. Pin 100 is utilized to limit the swinging movement of the sheet jogging device in a rearward or clockwise direction, as viewed in Fig. 1, and pin 101 is utilized to support said sheet jogging device when the latter is swung forwardly and upwardly out of operative position to permit unloading of the pile of delivered sheets from the elevator through the front of the delivery.

Pivotally mounted on a pin 103 secured in and extending between the arms 96 adjacent the lower ends thereof is a vertically extending plate 104 provided on the front side thereof with a bearing block 105 to receive the pivot pin 103, said block being located below the center of said plate so that the latter is overbalanced and will tend to swing downwardly by gravity relative to the arms 96. The vertical dimension of the plate 104 is such that it extends a short distance below the normal level of the top of the pile of sheets on support 45 and above the horizontal plane of the magnet rollers 24, 25. Extending along the rear side of plate 104 and around the upper and lower ends of said plate is a thin metallic band 106 formed of a suitable wear resisting

resilient material such as, spring steel, and disposed between said band and said plate is a cushion pad 107 of a suitable material, such as, for example, sponge rubber. Pad 107 extends the full length of plate 104 and said pad and band 106 are secured to said plate by machine screws 108. The portion of plate 104 disposed above bearing block 105 is slightly offset rearwardly, as clearly shown in Fig. 3, so that pad 107 is spaced from said plate for a major portion of the length thereof, thus enabling said pad to also yield bodily relative to plate 104 and thereby increase the effective cushioning action thereof. Arms 96 are further weighted by a weight 109 which is adjustably secured to a forwardly projecting pin 110 that is, in turn, secured in the tie block 97.

In the initial operation of the pile delivery, the described sheet jogging devices, 86, 86 are moved along the side members 88 and cross member 89 to positions approximate the length and width of the sheet when the same is resting on the platform 44 and engaged with the rear pile guides 48. A few sheets are then delivered to the platform 44 and evenly piled thereon by manually moving the same rearwardly into engagement with the pile guides 48 and laterally to bring the front, rear, and side edges thereof into vertical alignment. Thereupon, the sheet jogging devices 86, 86 are reset, if necessary, on cross member 89 to desired lateral positions with respect to the pile, and moved farther rearwardly on side members 88 until the bands 106 contact the top front edge of the pile, the plate, cushion pad and band units 104, 107, 106 are inclined rearwardly toward the magnet rollers 24, 25, and the arms 96 are swung forwardly beyond their natural vertical positions, as shown in Fig. 1

Under these conditions, the upper end portions of the inclined plate, cushion pad and band units 104, 107, 106 will be spaced from the magnet rollers a distance equal to the length of the sheet, the lower end portions of said units at the point of contact with the pile will be spaced from the rear pile guides 48 a distance equal to the length of the sheet, and the arms 96 in tending to return to their natural vertical positions by gravity and the action of the weights 109 will press said units against the pile and hold the same in their intended inclined positions. The pressure of the plate, cushion pad and band units 104, 107, 106 may be increased as desired by moving the weights 109 forwardly along pins 110.

Accordingly, as each sheet is moved forwardly and downwardly by magnet rollers 24, 25 as hereinafter described, the front edge of said sheet contacts the bands 106, thus checking the sheet against any further forward movement, said bands yielding under this impact and thereby preventing damage to said edge. As the sheet is stripped from the magnet rollers 24, 25 and drops flatwise toward the pile, it moves in a forwardly and downwardly inclined direction along the inclined strippers 49 and band 106 and along the pile guides 48 onto the pile and to a final position thereon with the rear edge thereof engaged with the pile guides 48 and the front edge in line with the front edges of the previously delivered and piled sheets. Thus each sheet is deposited on the pile without sliding forwardly or rearwardly relative to the previously delivered underlying sheet, and an even piling of the sheets is automatically obtained. It will be noted that each forwardly and downwardly moving sheet, upon initial contact thereof with the bands 106, tends to swing the plate, cushion pad and band units 104, 107, 106 in a clockwise direction, as viewed in Fig. 1, thus causing the lower end portions of said units to tap or impart a rearward thrust to the preceding delivered topmost sheet or sheets on the pile, whereby engagement of the same with the pile guides 48 and even piling thereof is further assured.

Referring now to Figs. 1, 2 and 4, each of the side sheet jogging devices 87 comprises a thin metallic plate 111 formed to provide a vertically extending pile engag-

ing portion 112, an outwardly offset vertically extending attaching portion 113, and a downwardly and inwardly inclined portion 114 connecting the portions 112 and 113. Plate 111 is suitably secured by the attaching portion 113 thereof to two longitudinally spaced vertically extending bars 115 which are supported and guided at their upper ends for floating movement in vertical and horizontal directions in suitable enlarged openings 116 formed in a bracket 117. This bracket 117 is slidably mounted on shaft 94 and on a similar shaft 118 which extends transversely of the delivery in spaced parallel relation with shaft 94 and is secured at its opposite ends to the side members 18, 19 of the delivery frame.

Bracket 117 may be of any suitable construction and as herein shown is formed of two outer plates 119 and 120, a centrally disposed inner spacer block 121, and two end spacer blocks 122, said plates and blocks being bolted together as a unit, and said space blocks forming between them the openings 116. Plates 119, 120 and end blocks 122 are provided with suitable axially aligned openings to receive shafts 94 and 118. Downward movement of bars 115 relative to bracket 117 is limited by short pins 123 which are suitably secured in the upper ends of said bars and normally engage the upper side of said bracket to properly position the plate 111 vertically so that the portion 112 thereof extends a short distance below the normal level of the top of the pile of sheets on support 45. The portion 112 of plate 111 extends substantially to the same level as the axis of rotation of magnet rollers 24, 25, at which level is located the inclined connecting portion 114 of said plate.

Bolted or otherwise suitably secured to the plate 119 of bracket 117 at opposite ends thereof and depending from said plate are two narrow plates 124 which are provided adjacent their lower ends with suitable openings to slidably receive therein short rods 125. These rods 125 are formed at their outer ends with enlarged heads 126 and are externally threaded at their inner ends to receive adjusting and lock nuts 127 and 128, respectively. surrounding rods 125 between the plates 124 and adjusting nuts 127 are compression coil springs 129 for yieldingly urging said rods axially inwardly toward the center of the delivery.

Secured in the heads 126 of rods 125 and extending longitudinally across the outer sides of bars 115 is a rod 130 having journalled thereon two anti-friction needle bearings 131 which are held in engagement with said bars by the action of springs 129. It will thus appear that the floating mounting of bars 115 and the anti-friction bearings 131 enables said bars to freely yield upwardly in the event the elevator is accidentally raised too high, thus preventing damage to the sheet jogging device 87 through engagement of the pile suporting platform 44 with the plate 111 of said device. It will also appear that the floating mounting of bars 115 enables pivoting or canting of said bars relative to bracket 117 under the action of springs 129.

Journalled in suitable bearings in the side members 18, 19 of the delivery frame and extending inwardly and outwardly of said members are externally threaded shafts 132 which are threadedly engaged in suitable threaded openings provided in the plates 119, 120 and spacer blocks 121 of the brackets 117 of the sheet jogging devices 87, 87. Shafts 132 have their inner ends reduced and journalled in suitable bearings in plates 133 secured to the shafts 94, 118, and the outer ends of shafts 132 have fixed thereon handwheels 134. Axial movement of shafts 132 is prevented in one direction by plates 133 and in the opposite direction by collars 135 fixed on said shafts adjacent the inner sides of the side members 18, 19.

In operation, the side sheet jogging devices 87, 87 are adjusted inwardly toward each other by rotating the handwheels 134 and threaded shafts 132 in the proper direction until the portions 112 of plates 111 engage opposite sides of the pile of tin plate sheets on platform 44 and springs 129 are somewhat compressed. Under these conditions, the plate portions 112 will engage the uppermost sheets of the pile under a yielding pressure, and will be spaced apart a distance equal to the width of the sheets being handled. The pressure of the plate portions 112 on the pile may be varied, as desired, by adjusting the tension of springs 129 by means of the adjusting nuts 127. In order to hold the plates 111 against outward yielding movement relative to bars 115 adjustable stops 136 are provided in the lower ends of said bars, said stops being also utilized to adjust the portions 112 of said plates so that they are parallel with the vertical projection of the pile.

As each stiffened sheet of tin plate is advanced by magnet rollers 24, 25 in a horizontal plane over piling position, as hereinbefore described, said sheet passes between the attaching portions 113 of the plates 111. When the advanced sheet is moved downwardly by magnet rollers 24, 25 and is stripped from said rollers by strippers 49, said sheet falls flatwise toward the pile between the portions 112 of the plates 111 and, hence, drops onto the pile without sliding relative to the next preceding or underlying sheet on the pile and into position such that the side edges thereof are in accurate alignment with the side edges of the previously delivered and piled sheets.

While the present invention is herein illustrated and described in connection with the delivering and piling of sheets of tin plate as the same are discharged from a combined drying oven and sheet turnover unit, it is equally adapted for the delivering and piling of cardboard and other relatively stiff metallic and non-metallic sheets as the same are discharged from various other instrumentalities acting on such sheets.

The rotary means disclosed herein for advancing and bowing the sheets and for preventing downward pivotal movement of the sheets during advance thereof is not claimed in the present application for the reason that it forms the subject matter of my original application serial No. 39,764, now patent No. 2,626,800, hereinbefore referred to.

Various changes may be made in the design and arrangement of the parts of the illustrated embodiment without departing from the spirit and scope of the invention as will now be clear to those skilled in the art. It is therefore to be expressly understood that the present invention is not limited to the particular embodiment thereof herein illustrated and described.

What is claimed is:

1. Sheet delivery apparatus comprising a support for a pile of metal, cardboard or similar stiff sheets, means disposed above said support at one side thereof for delivering such sheets one after another to said support, guide means at said side for locating one vertical edge of the pile, and means arranged at the side of the pile opposite said guide means and actuated toward said pile by each succeeding sheet in progress of delivery to the pile for jogging each preceding delivered sheet on said pile against said guide means, said last-named means comprising an upright member mounted for pivotal movement intermediate its ends about a horizontal axis and such that the portion thereof below said axis is engageable with the pile on said support and the portion thereof above said axis is engageable by the sheets in progress of delivery to said support, whereby movement of the upper portion of said member by said last-named sheets in a direction away from said guide means simultaneously causes movement of the lower portion of said member in a direction toward said guide means.

2. In a sheet delivery of the type having a vertically movable support for a pile of metal, cardboard or similar stiff sheets, means disposed above said support at one side thereof for conveying such sheets one after another for-

wardly into space over said support for flatwise piling thereon, and guide means at said side for locating one vertical edge of the accumulated pile, in combination with said support, said conveying means and said guide means of sheet jogging means arranged at the side of the pile opposite the guide means for intercepting each successive sheet and directing the same toward the support and into engagement with said guide means, said sheet jogging means comprising a planar abutment member inclined rearwardly from the vertical towards said guide means and pivotal about a horizontal axis located intermediate the ends thereof, said member being positioned so that the portion thereof below said axis extends below the level of the top of the pile of sheets on said support and the portion thereof above said axis extends into the path of forward movement of the sheets, and means for supporting said member at said inclination and for pivotal movement about said axis.

3. A sheet delivery as defined in claim 2, comprising a resilient shock absorbing cushion carried by said sheet jogging member and interposed between the latter and each sheet in progress of delivery to the pile support.

4. A sheet delivery as defined in claim 3, comprising a flexible metallic strip carried by the sheet jogging member and extending over said cushion.

5. In a sheet delivery of the type having a vertically movable support for a pile of metal, cardboard or similar stiff sheets, means disposed above said support at one side thereof for conveying such sheets one after another forwardly into space over said support for flatwise piling thereon, and guide means at said side for locating one vertical edge of the accumulated pile, in combination with said support, said conveying means and said guide means of sheet jogging means arranged at the side of said pile opposite the guide means for intercepting each successive sheet and directing the same toward the pile and into engagement with said guide means, said sheet jogging means comprising an abutment plate inclined rearwardly from the vertical towards said guide means and pivotal about a horizontal axis located intermediate the ends and below the center thereof, said member being positioned so that its portion below said axis extends below the level of the top of the pile of sheets on said support and its portion above said axis extends into the path of forward movement of the successive sheets, a vertically extending support-arm, means mounting said abutment plate on said arm for pivotal movement about said axis, and means mounting said arm at the upper end thereof for pivotal movement about a horizontal axis and providing for inclination of the same to bias said abutment member into operative position.

6. In a sheet delivery of the type having a vertically movable support for a pile of metal, cardboard or similar stiff sheets, means disposed above said support at one side thereof for conveying such sheets one after another forwardly into space over said support for flatwise piling thereon, and guide means at said side for locating one vertical edge of the accumulated pile, in combination with said support, said conveying means and said guide means of sheet jogging means arranged at the side of said pile opposite the guide means for intercepting each successive sheet and directing the same toward the pile and into engagement with said guide means, said sheet jogging means comprising an abutment plate inclined rearwardly from the vertical towards said guide means and pivotal about a horizontal axis located intermediate the ends and below the center thereof, said member being positioned so that its portion below said axis extends below the level of the top of the pile of sheets on said support and its portion above said axis extends into the path of forward movement of the successive sheets, a vertically extending support-arm, means mounting said abutment plate on and adjacent the lower end of said arm for pivotal movement about said axis, means pivotally mounting said arm at the upper end thereof for swinging movement about a horizontal axis, and adjustable weight means carried by said arm for biasing the latter and said abutment plate toward the pile of sheets on said support.

7. In a sheet delivery of the type having a vertically movable support for a pile of metal, cardboard or similar stiff sheets, means disposed above said support at one side thereof for conveying such sheets one after another forwardly into space over said support for flatwise piling thereon, and guide means at said side for locating one vertical edge of the accumulated pile, in combination with said support, said conveying means and said guide means of sheet jogging means arranged at the side of said pile opposite the guide means for intercepting each successive sheet and directing the same toward the pile and into engagement with said guide means, said sheet jogging means comprising an elongated abutment member inclined rearwardly from the vertical towards said guide means and pivotal about a horizontal axis located intermediate the ends thereof, said member being positioned so that the portion thereof above said axis extends inwardly beyond the vertical projection of the adjacent side of said pile and into the path of forward movement of the successive sheets and the portion thereof below said axis projects below the level of the top of the pile of sheets on said support, a flexible metallic strip carried by said member and extending along the inner surface thereof, a pad formed of resilient material disposed between said member and said strip, a vertically extending support-arm, means mounting said member on and adjacent the lower end of said arm for pivotal movement about said axis, and means pivotally mounting said arm at the upper end thereof for free swinging movement about a horizontal axis.

8. In a sheet delivery of the type having a support for a pile of sheets and means disposed above said support at one side thereof for conveying successive sheets forwardly into space over said support for delivery thereto and flatwise piling thereon, in combination with said support and said conveying means of sheet jogging means arranged in said space and at each side of the sheet path for directing the delivered sheets toward the support and into position thereon with their side edges in vertical alignment, said sheet jogging means each comprising a vertically disposed plate-like member having a pile engaging lower portion projecting above and below the top of the pile, an outwardly offset portion above said pile engaging portion, and an intermediate connecting portion inclined downwardly from said offset portion to said pile engaging portion, means for supporting and guiding said plate-like member for free floating movements in vertical and horizontal directions, and resilient means for yieldingly pressing said plate-like member against the adjacent side of the pile.

9. In a sheet delivery of the type having a support for a pile of sheets and means disposed above said support at one side thereof for conveying successive sheets forwardly into space over said support for delivery thereto and flatwise piling thereon, in combination with said support and said conveying means of sheet jogging means arranged in said space and at each side of the sheet path for directing the delivered sheets toward the support and into position thereon with their side edges in vertical alignment, said sheet jogging means each comprising a vertically disposed plate-like member having a pile engaging lower portion projecting above and below the top of the pile, an outwardly offset portion above said pile engaging portion, and an intermediate connecting portion inclined downwardly from said offset portion to said pile engaging portion, means for supporting and guiding said plate-like member for free floating movements in vertical and horizontal directions, and resilient means for yieldingly pressing said plate-like member against the adjacent side of the pile, and means for connecting said resilient means with said plate-like member and providing for relative vertical movement of said plate-like member.

10. In a sheet delivery of the type having a support

for a pile of sheets and means disposed above said support at one side thereof for conveying successive sheets forwardly into space over said support for delivery thereto and flatwise piling thereon, in combination with said support and said conveying means of sheet jogging means arranged in said space and at each side of the sheet path for directing the delivered sheets toward the support and into position thereon with their side edges in vertical alignment, said sheet jogging means each comprising a vertically disposed plate-like member having a pile engaging lower portion projecting above and below the top of the pile, an outwardly offset portion above said pile engaging portion, and an intermediate connecting portion inclined downwardly from said offset portion to said pile engaging portion, bar means connected to said offset portion and extending upwardly therefrom, a bracket for

supporting and guiding said bar means for free floating movements in vertical and horizontal directions, spring-pressed means carried by said bracket for yieldingly urging said member against the adjacent side of the pile, and means connected to said spring-pressed means and including anti-friction bearing means engaged with said bar means for transmitting the action of said spring-pressed means to said bar means and said member.

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