

Dec. 3, 1957

K. H. GULICK

2,815,209

SHEET FEEDER PILE SUPPORT

Filed March 30, 1955

6 Sheets-Sheet 1

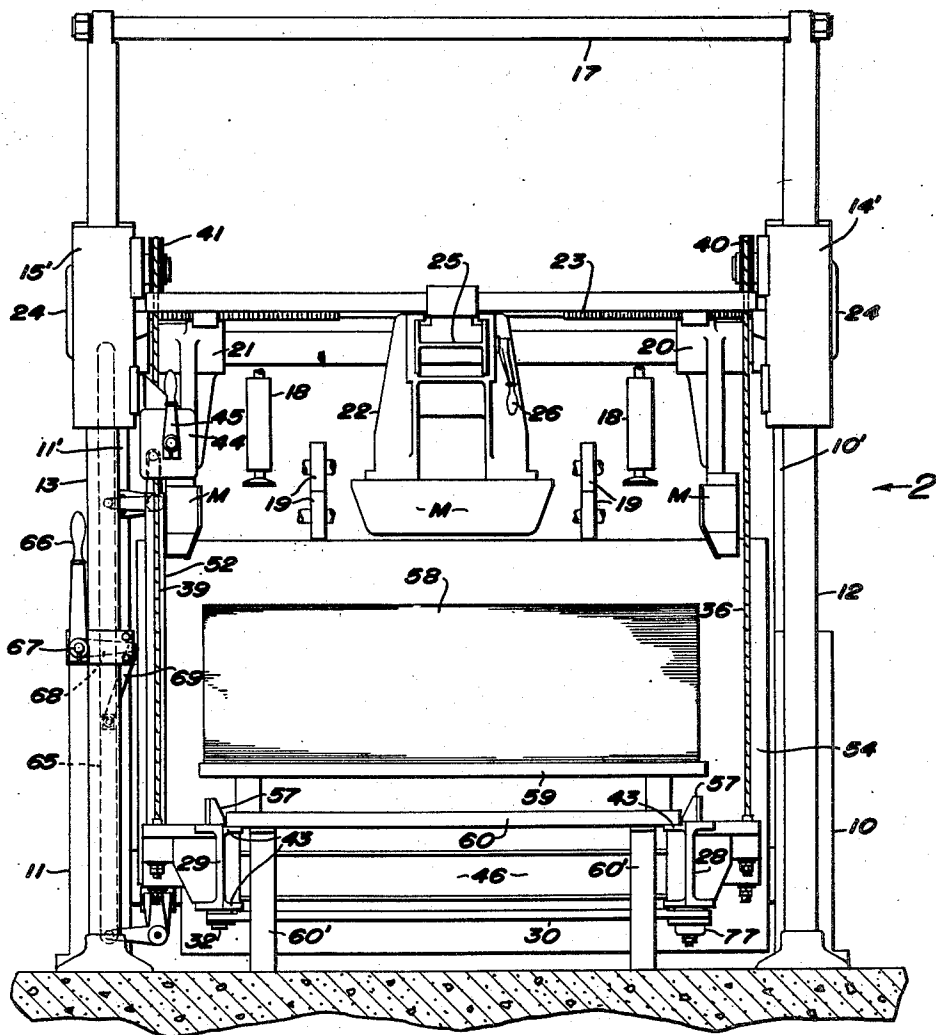


FIG. 1

INVENTOR.

KENNETH H. GULICK

BY *Hudson, Coughlin,*

Williams, David & Hoffmann
ATTORNEYS

Dec. 3, 1957

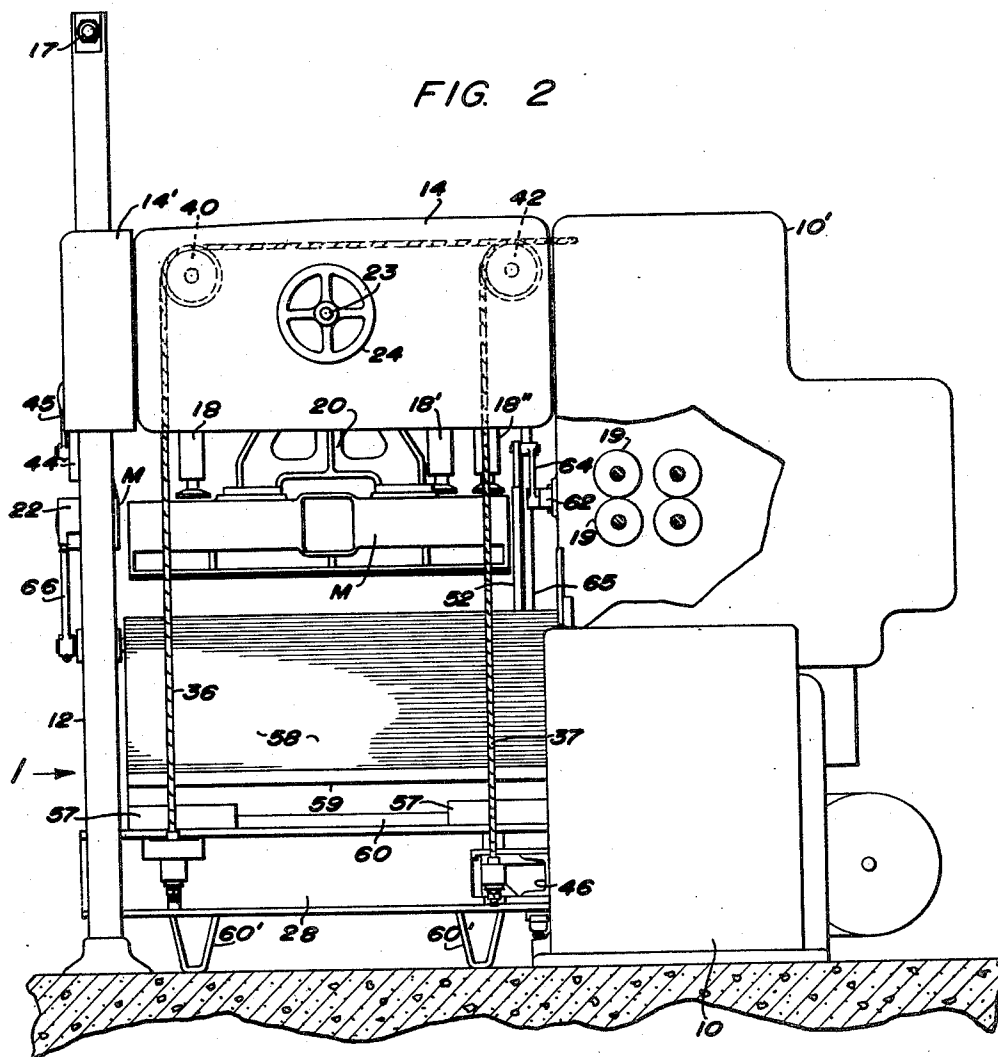
K. H. GULICK

2,815,209

SHEET FEEDER PILE SUPPORT

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6 Sheets-Sheet 2



INVENTOR.

KENNETH H. GULICK

BY *Hudson, Daughton,*

Williams, David & Hoffmann
ATTORNEYS

ATTORNEYS

Dec. 3, 1957

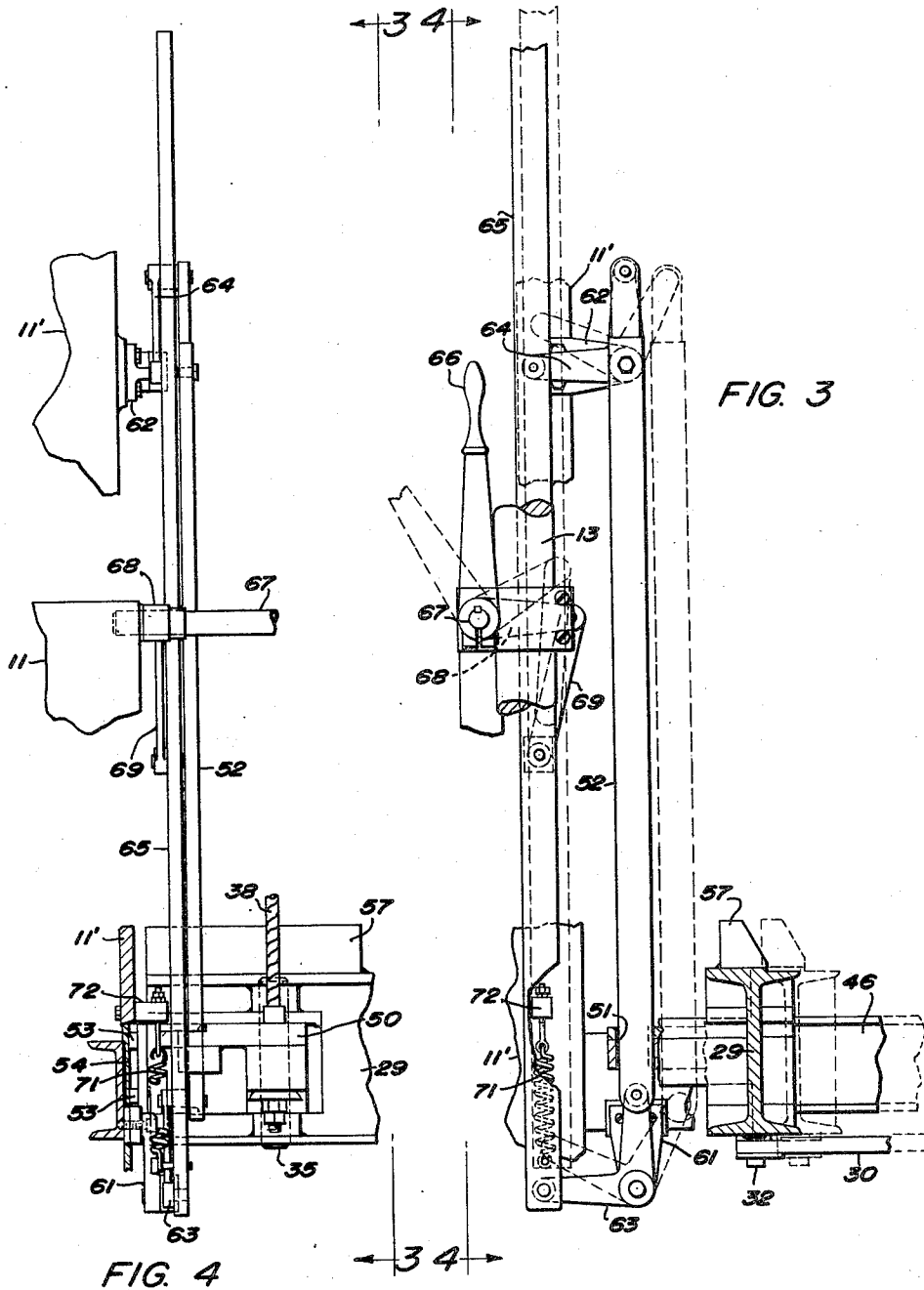
K. H. GULICK

2,815,209

SHEET FEEDER PILE SUPPORT

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6 Sheets-Sheet 3



INVENTOR.
KENNETH H. GULICK
BY *Hudson, Daugherty,*
Williams, David & Hoffmann
ATTORNEYS

Dec. 3, 1957

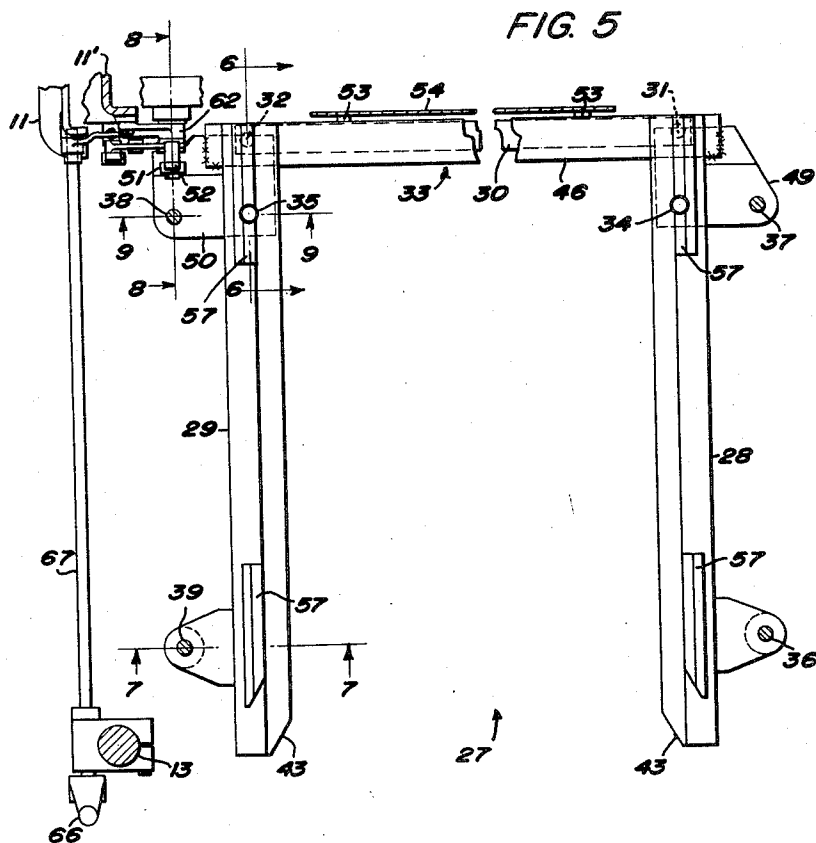
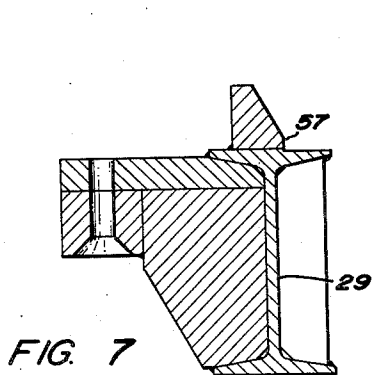
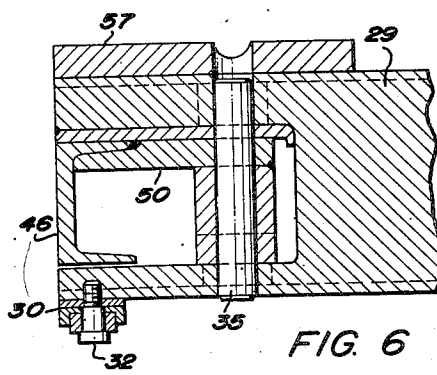
K. H. GULICK

2,815,209

SHEET FEEDER PILE SUPPORT

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6 Sheets-Sheet 4



INVENTOR.
KENNETH H. GULICK
BY *Hudson, Daughton,*
Williams, David & Hoffmann
ATTORNEYS

Dec. 3, 1957

K. H. GULICK

2,815,209

SHEET FEEDER PILE SUPPORT

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6 Sheets-Sheet 5

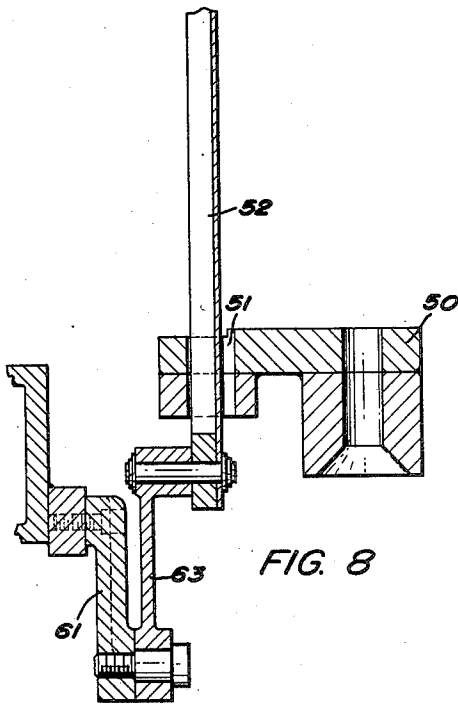


FIG. 8

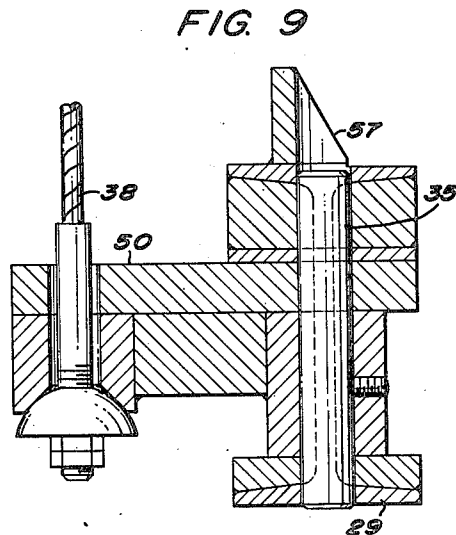


FIG. 9

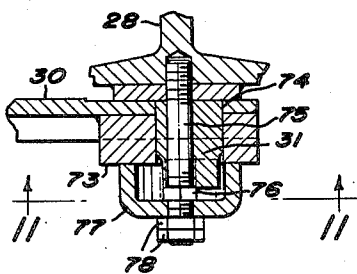


FIG. 10

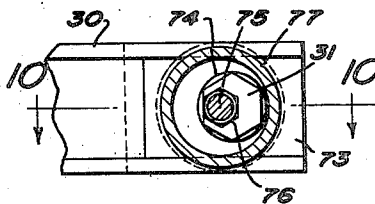


FIG. 11

INVENTOR.
KENNETH H. GULICK
BY *Hudson, Boughton,
Williams, David & Hoffmann*
ATTORNEYS

Dec. 3, 1957

K. H. GULICK

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SHEET FEEDER PILE SUPPORT

Filed March 30, 1955

6 Sheets-Sheet 6

FIG. 13

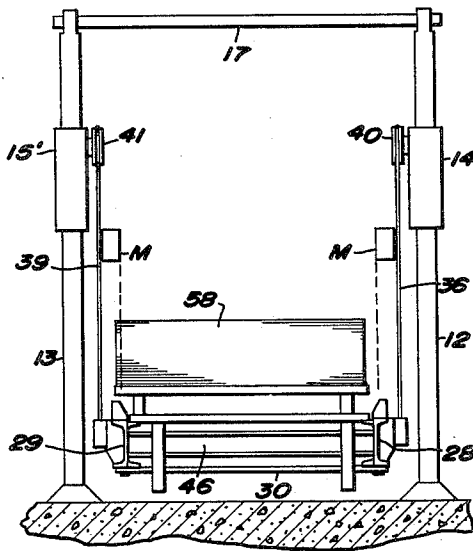


FIG. 14

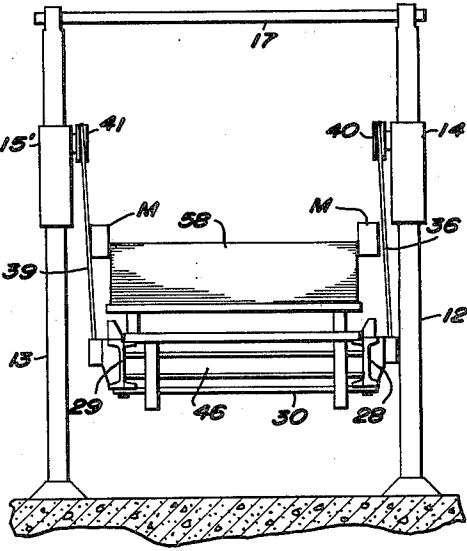
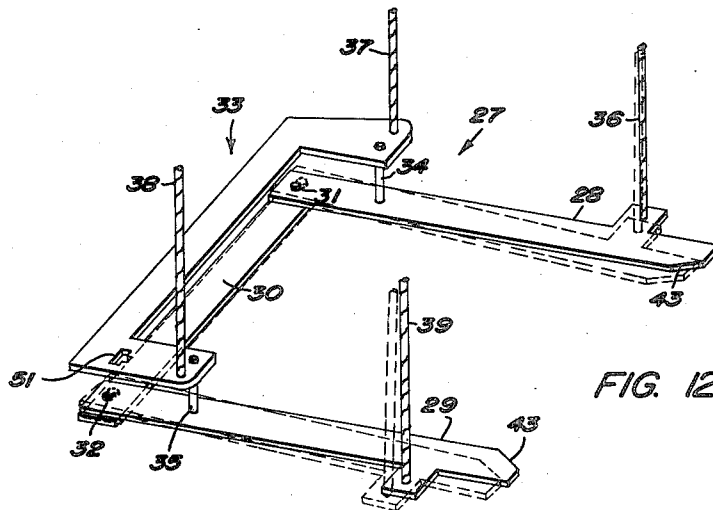


FIG. 12

INVENTOR.

KENNETH H. GULICK

BY *Hudson, Boughton,*

Williams, David & Hoffmann
ATTORNEYS

1

2,815,209

SHEET FEEDER PILE SUPPORT

Kenneth H. Gulick, Northfield, Ohio, assignor to Harris-Seybold Company, Cleveland, Ohio, a corporation of Delaware

Application March 30, 1955, Serial No. 498,068

16 Claims. (Cl. 271—62)

This invention relates to improvements in sheet feeder pile supports, more particularly pile supports of a character such that they shall embody means for readily shifting the pile sidewise as it is raised to feeding position preliminarily to guide it into proper alignment with the path of sheets through the printing or other machine in connection with which the feeder is used.

One of the objects of the invention is the provision of means in connection with a support which is hung on flexible swingable cables for deflecting the support slightly as a truck carrying a pile of sheets enters the space between the side bars of the support.

Another object is the provision of a parallelogram connection for the front ends of the side bars whereby, when the rear end of one of these bars is deflected, the other side bar will be deflected a like amount, and whereby as the truck continues forwardly in the same direction the two side bars will be swung back on certain of their parallelogram pivots toward their natural front and back direction, and whereby when the support is elevated on its flexible cables or chains the side bars will assume positions approximately parallel to the path of sheets in the printing or other machine being fed.

Another object is the provision of a parallelogram connection between the side bars which is so modified that it requires a minimum of space in the forward and rearward directions.

A further object of the invention is the provision of manual controls for the rapid raising of the pile and for the shifting of the pile crosswise, which controls are located close together and at the rear of the machine in such manner that a single operator standing near them may actuate one control with one hand and the other with the other hand, whereby he may cause the pile to be raised and may guide it readily into alignment with the path of sheets through the machine to be fed.

Another object is the provision of sidewise shifting means which will require little physical effort for operation even though the sheets of the pile are metal and proportionately heavy.

Other objects and features of novelty will appear as I proceed with the description of that embodiment of the invention which, for the purposes of the present application, I have illustrated in the accompanying drawings, in which

Fig. 1 is a rear elevation of a feeder embodying the invention;

Fig. 2 is a side elevational view looking in the direction of arrow 2 in Fig. 1;

Fig. 3 is a fragmental rear elevational view partially in section on line 3—3 of Fig. 4 and illustrating mechanism located principally at the forward end of the machine;

Fig. 4 is a fragmental side elevational view, partially in section on the line 4—4 of Fig. 3, the view being primarily at the forward end of the machine;

Fig. 5 is a plan view of the pile supporting frame and

2

the mechanism for adjusting the pile laterally and guiding it vertically;

Fig. 6 is a detail sectional view on a larger scale taken substantially on the line 6—6 of Fig. 5;

Fig. 7 is a detail sectional view taken substantially on the line 7—7 of Fig. 5, and also on a larger scale;

Fig. 8 is a fragmental enlarged detail view taken substantially along the line 8—8 of Fig. 5;

Fig. 9 is a fragmental enlarged sectional view taken substantially along the line 9—9 of Fig. 5;

Fig. 10 is an enlarged fragmental sectional view of means for adjusting the length of one of the members of the parallelogram linkage of the pile support, and is taken substantially along the line 10—10 of Fig. 11;

Fig. 11 is a view taken substantially along the line 11—11 of Fig. 10;

Fig. 12 is a schematic perspective view of the pile supporting frame illustrating the parallelogram connections which maintain the side bars in parallel relation;

Fig. 13 is a simplified rear elevational view illustrating the position the pile supporting frame takes when a pile is misaligned in the feeder and hung from the swingable cables but before the pile is brought into position in alignment with the path of sheets through the printing press or other machine in connection with which the invention is employed; and

Fig. 14 is a view similar to Fig. 13 showing the position of the frame and the cables supporting it after the frame has been positioned laterally to properly align the pile in the feeder.

Referring to Figs. 1 and 2, upright side frame members are illustrated at 10, 10', 11 and 11' at the forward end of the machine and posts 12 and 13 at the rear end. There are also upper side frame members 14, 14' and 15, 15', the latter members connecting frame members 10' and 11' to posts 12 and 13 respectively. The posts 12 and 13 and the frame members 10 and 11 are bolted to the floor, and thus are rigidly connected at their lower ends. The posts 12 and 13 are connected together at their upper ends by a cross bar 17.

The feeder includes the usual sheet separating and feeding mechanism, of which only suckers 18, 18' and 18'' and pull-in rollers 19 are illustrated. The feeder illustrated is one for feeding metal sheets. The customary manner in which metal sheets are separated is to provide permanent or electromagnets at the top of the pile at its sides at least, and in some cases at the front and back. Magnetic lines of force through the metal sheets cause the top sheets to spring away from each other and thereby separate to a considerable extent to permit the sheets to be picked up and fed to the printing machine one at a time.

In the present machine there are magnet supports 20 and 21 at the sides of the pile, and a magnet support 22 is provided at the rear of the pile. Each of the supports for the side magnets is movable toward and away from the pile, the supports 20 and 21 being movable in unison whereby they are always equidistant from the centerline of the feeder and the printing press. For this purpose the supports 20 and 21 are mounted on a screw shaft 23 having right and left hand threads. At each end of this shaft there is a hand wheel 24, by means of which the shaft may be turned and the supports 20 and 21 may be jointly moved in or out. The magnet support 22 is mounted on a horizontal guide 25 which is shown as an I-beam on its side. The support 22 is locked in adjusted position by means of a clamp having a handle 26. In the lower end of each of the magnet supports there are mounted a plurality of magnets, the general position of which is indicated at M.

The support for the pile of sheets comprises a frame 27

having side bars 28 and 29 which may swing sidewise horizontally to some extent, but which always remain parallel to each other. To effect this result the forward ends of the side bars have a parallelogram connecting means. This parallelogram means, shown diagrammatically in Fig. 12, comprises a cross bar 30 connected to the side bars 28 and 29 by pivots 31 and 32, and a cross member 33 to which the side bars are connected by means of pivots 34 and 35. The spacing of pivots 31 and 34 is equal to that of pivots 32 and 35, and pivots 31, 32 are spaced a distance equal to the spacing of pivots 34, 35. The shape of the cross member 33 is such that the transverse portion of the member 33 will overlie the cross bar 30 and thus will permit a sheet carrying truck to enter fully the space enclosed by frame 27. The side bars 28, 29 may swing horizontally, at times upon the pivots 31, 32 and at times upon the pivots 34, 35, or even upon both sets of pivots at the same time.

The frame 27 is hung upon flexible cables or chains 36, 37, 38 and 39, it being noted that cables 36 and 39 are attached to the side bars 28 and 29 while cables 37 and 38 are attached to the cross member 33. Cables 36 and 39 extend upwardly to and over pulleys 40 and 41 while cables 37 and 38 extend upwardly and over pulleys, one of which is shown at 42. All four of the cables extend forwardly to a reel, not shown, which may be revolved in either direction to wind up or unwind the cables for raising or lowering the pile support.

Power means for winding and unwinding cables to raise and lower the pile support rapidly under control of the operator and to raise it automatically an increment at a time for maintaining the top of the pile at the required height during operation of the machine are well-known, and are not disclosed herein in detail. However, a switch box for the controls is shown at 44 in Fig. 1 and an actuating handle 45 is fixed to a rock shaft extending into the box, this handle having three positions, one for up and one for down rapid action and one for automatic gradual upward action. Handle 45 is positioned at the rear of the machine where the operator can use it in moving the pile support upwardly while guiding the support to bring the pile into alignment between the side magnets M.

Referring to Fig. 5, the cross member 33 comprises a channel portion 46 to which are rigidly fastened by welding or otherwise, brackets 49 and 50. The cross member 33 may of course be made of one piece, but for ease of manufacturing is made up of channel 46 and brackets 49 and 50. Bracket 50 is provided with a guiding aperture 51 which receives a vertical guide bar 52 that may be moved sidewise of the machine while remaining vertical in order to guide the supporting frame 27 while it is moving vertically. The cross member 33 is provided with blocks 53 which bear slidably against a fixed vertical plate 54. The pulleys 40, 41 and 42 are so located as to provide a very slight forward inclination to the cables, thus urging the frame and pile against the plate 54 by gravity.

Beveled guide blocks 57 are provided on the upper surface of side bars 28 and 29 for the purpose of seating the pile skid properly on the side bars. As shown in Fig. 1 the pile of sheets 58 is supported on a skid 59 and the skid in turn is supported on a pile board 60 having legs 60'. It is to be understood that the pile board 60, skid 59 and pile 58 will be raised slightly from the position shown in Fig. 1 while they are on a hand truck and being wheeled into position between the side bars 28, 29. At such time the horizontal part of pile board 60 will overlap the side bars and the legs 60' will be between the side bars. As the pile with its supporting elements is lowered into position by manipulation of the truck members, the edges of the pile board, if the pile happens to be off to one side, will engage the beveled blocks 57 and cause the side bars which hang freely on the cables to swing crosswise correspondingly.

The inside rear corners of side bars 28 and 29 are

provided with beveled or inclined edges 43. When the truck is pushed forward into the space within the frame 27, if the truck is not accurately aligned, the legs 60' on one side or the other of the pile board will strike one of the bevels 43, whereupon the side bars 28, 29 will swing horizontally to the dotted line position of Fig. 12 for example. Further movement of the truck in the same direction will cause it to bear strongly against the straight side edge of side bar 29 and thus will tend to swing both bars on their parallelogram connection pivots back to positions at right angles to cross bar 30, and also to swing the whole frame 27 sidewise on the supporting cables.

If the pile happens to be centered properly with the machine to which sheets are to be fed once the pile board 60 is raised off the floor, winding up the cables will raise the pile between the side magnets M. If however the pile 58 is off to one side as in Fig. 13, it is necessary to shift the pile and its supporting elements sidewise in order that the edges of the pile may rise vertically between the magnets M. This is accomplished in my construction by moving the frame 27 by shifting the cross member 33 to the right as viewed in Fig. 12.

The mechanism for shifting the frame 27 laterally to align an off-center pile of sheets is best illustrated in Figs. 3 and 4. On the framework of the feeder there are two brackets 61 and 62 which at their free ends carry pivots for bell crank levers 63 and 64 respectively. The arms of these bell cranks are of the same length and are similarly disposed at all times. The vertical guide bar 52 is pivotally connected to the upstanding arms of the bell crank levers 63 and 64. A vertical bar 65 is connected to the lateral arms of the levers 63 and 64. The bar 65 is adapted to be moved up and down in response to the operation of a handle 66 mounted on a lever which is keyed to a shaft 67 that extends from the front of the feeder to a point at the rear near the handle 45 previously mentioned. The two handles are close enough together so that an operator may grasp one in one hand and the other in the other hand and actuate them both simultaneously or consecutively in short steps one after the other.

At the forward end of the machine shaft 67 carries a crank 68 to the outer end of which is pivoted the upper end of a link 69 which is pivotally connected at its lower end to the vertical bar 65. The axis of shaft 67 is fixed and the bar 65 reciprocates in a mainly vertical path. The vertical bar 65 is pivotally connected with the lateral arms of the bell crank levers 63 and 64. When the bar 65 is raised by counterclockwise movement of handle 66, bell crank levers 63 and 64 are swung clockwise and guide bar 52 is shifted over to the dotted line position of Fig. 3. This guide bar 52 in all positions of adjustment remains vertical because of its bell crank mountings and serves to guide the frame 27 in its vertical movements. The operation of the bell cranks therefore moves the guide bar laterally and with it the whole frame 27.

A coil spring 71 has its upper end anchored in a bracket 72 attached to frame member 11', while its lower end is secured to the lower end of bar 65. The spring provides a counterbalance for the bar 65 to maintain the bar, frame 27, and other parts in substantial equilibrium when the frame 27 is unloaded.

In Figs. 10 and 11 of the drawings there is shown an adjustment means for controlling accurately the length of the cross bar 30 to make the distance between pivots 31 and 32 identical with that between pivots 34 and 35. To the bottom of bar 30 there is welded or otherwise secured a block 73. Through this block and bar 30 there is drilled a hole 74. The pivot 31 is rotatably mounted in this hole and has drilled therethrough an eccentric hole through which passes a stud 75. The stud is threaded into the bottom of side bar 28 and has a lock nut 76 which fastens the pivot 31 to the side bar. The end of the pivot 31 adjacent the nut 76 is adapted to receive a wrench whereby the pivot 31 may be adjusted to change the distance between the pivots 31 and 32 and therefore the length of

one side of the parallelogram. A cap 77 covers the nut 76 and the lower end of pivot 31 and is held in place by nuts 78.

Referring again to Figs. 13 and 14, the pile 58, which may be off center with respect to the center line of the feeder and also with respect to the side magnets M, the latter functioning as bearing plates, may be shifted to the right or left by the lateral adjusting mechanism operated by the handle 66 while being raised rapidly. The operator moves actuating handle 45 to rapidly raise the pile until the uppermost metal sheets are almost level with the bottom of the magnets. This is accomplished with the right hand. With his left hand the operator moves handle 66 while continuing to raise the pile with the control handle 45 at a slower rate. Once the pile is in the position shown in Fig. 14 where the top of the pile is slightly above the bottom of the magnets, the handle 66 may be released and the pile will stay in such vertical alignment. An exaggerated condition is illustrated in Fig. 14, where the cables are inclined to a considerable extent. The frame 27 is restrained against sidewise movement, since the pile is held against such movement by the magnet supports. It is therefore unnecessary to provide any means for locking the guide bar in position once the pile has been aligned with the magnets.

It can readily be seen that with the mechanism provided a pile of sheets need be only approximately aligned with the pile support when loading the feeder. The pile support aligns itself with the pile. It can also be observed that the entire raising and aligning operations can be accomplished from the rear of the feeder with the operator looking in the direction of sheet feed where he can best do this particular job.

Having thus described my invention, I claim:

1. In a pile support for sheet feeders, side bars for supporting the pile boards of a stack of sheets, means for connecting the forward ends of said side bars comprising two rigid transverse elements pivotally connected with said side bars in a parallelogram arrangement, and freely swingable front and rear supporting cables attached to each side of said support.

2. A pile support substantially as defined in claim 1, wherein that one of said transverse elements the pivotal connections of which are rearmost, is offset forwardly to clear the space behind the other transverse element.

3. A pile support substantially as defined in claim 1, wherein one of said transverse elements is a straight bar pivotally connected to the forward ends of said side bars, and the other of said transverse elements is pivotally connected with said side bars rearwardly of said first named pivotal connection and is offset forwardly to overlie said straight bar and leave the space behind that bar free to accommodate a pile of sheets to be fed.

4. A pile support substantially as defined in claim 1, wherein the inside rear corners of said side bars are horizontally beveled, whereby a truck loaded with a stack of sheets, if pushed between the side bars off-center, will deflect the side bars on their parallelogram pivots, and whereby further forward movement of the truck in the same direction will shift the support sidewise and deflect said bars in the opposite direction upon their parallelogram pivots.

5. A pile support substantially as defined in claim 1, comprising means for winding said cables to lift said side arms and transverse elements, control means accessible to one hand of the operator at the rear of the pile for starting and stopping said cable winding means, and means accessible simultaneously to the other hand of the operator for moving said side bars and transverse elements laterally to guide the pile into properly centered position as it rises.

6. A pile support for sheet feeders comprising a pile supporting frame, freely swingable front and rear supporting cables attached to each side of said frame, a vertical guide bar, means on one side of said pile sup-

porting frame slidably engaging said guide bar, means supporting said guide bar for movement transversely of the pile supporting frame while maintaining its vertical posture, and lever controlled means for moving said last named means to shift said guide bar in either direction crosswise of the pile supporting frame.

7. A pile support substantially as defined in claim 6, wherein the means for supporting the vertical guide bar comprises a second vertical bar, a pair of vertical, spaced, like bell crank levers having fixed pivots, one arm of each bell crank being pivoted to said guide bar and the other to said second bar, and manual means for raising and lowering said second bar.

8. A pile support substantially as defined in claim 7, wherein the means for raising and lowering said second bar comprises a rock shaft extending rearwardly to a position opposite the rear end of one of said side bars, the forward end of said rock shaft being connected by a lever and link with said second bar, whereby oscillation of the rock shaft in one direction will raise said second bar and oscillation in the opposite direction will lower it.

9. A pile support substantially as defined in claim 8, comprising spring means tending to counterbalance the weight of said second bar.

10. In a pile support for a pack of metal sheets, a frame, bearing plates with vertical inner surfaces carried by said frame in fixed positions to closely receive between them the side edges of the metal sheets, a pile support comprising side bars for supporting said pile of sheets and transverse connecting means at the forward ends of the side bars, freely swingable front and rear supporting cables attached to each side of the support permitting slight movement of the support transversely, means for winding or unwinding the cables, means for swinging the support transversely on said cables, manual control means for said winding means disposed for actuation by one hand of the operator, and manual control means for the transverse swinging means disposed for actuation by the other hand of the operator, whereby the pile may be shifted sidewise as it rises to cause it to enter between said bearing plates, and whereby the bearing plates by their engagement with the side edges of the sheets serve thereafter to prevent shifting of the pile out of alignment.

11. In a pile support for sheet feeders, a horizontal cross member, a pair of horizontal side bars pivotally mounted near the ends of said cross member and extending generally at right angles perpendicular to said member, said bars being pivoted to said cross member intermediate their ends, a cross bar parallel to said cross member, said cross bar being pivotally connected to corresponding ends of said side bars, the pivotal connections of said side bars to said cross member and said cross bar defining four corners of a parallelogram, the ends of said side bars remote from said cross bar being adapted to receive supporting means for a stack of sheets to be fed, and freely swingable supporting means for said pile support.

12. A pile support substantially as defined in claim 11 wherein said freely swingable means comprises suspension cables attached to each end of said cross member and the end of each side bar remote from said cross bar.

13. A pile support substantially as defined in claim 12 in which said pile support is adapted for up and down movement and in which means engageable with said cross member is provided for guiding said support vertically during such up and down movement.

14. A pile support as defined in claim 13 including means for shifting said guiding means laterally and thereby shifting said cross member and pile support in the same direction.

15. A pile support substantially as defined in claim 11 in which said cross member is offset from its pivots in a direction opposite the free ends of said side bars, thereby providing maximum space within the area enclosed by

said side bars and said cross member for entrance and support of a stack of sheets.

16. A pile support as defined in claim 15 in which the cross bar and the offset portion of said cross member lie approximately in the same vertical plane.

5

912,563
1,617,374
1,953,049
2,474,141
2,643,784
2,650,092

References Cited in the file of this patent

UNITED STATES PATENTS

646,207 Fiske ----- Mar. 7, 1900

Gustafson ----- Feb. 16, 1909
Christophel ----- Feb. 15, 1927
Horton ----- Mar. 27, 1934
Chatterton ----- June 21, 1949
Turner ----- June 30, 1953
Wall ----- Aug. 25, 1953