July 7, 1964 P. M. REIF ETAL 3,140,091

PRINTING PRESS DELIVERY

Filed June 21, 1961 5 Sheets-Sheet 1

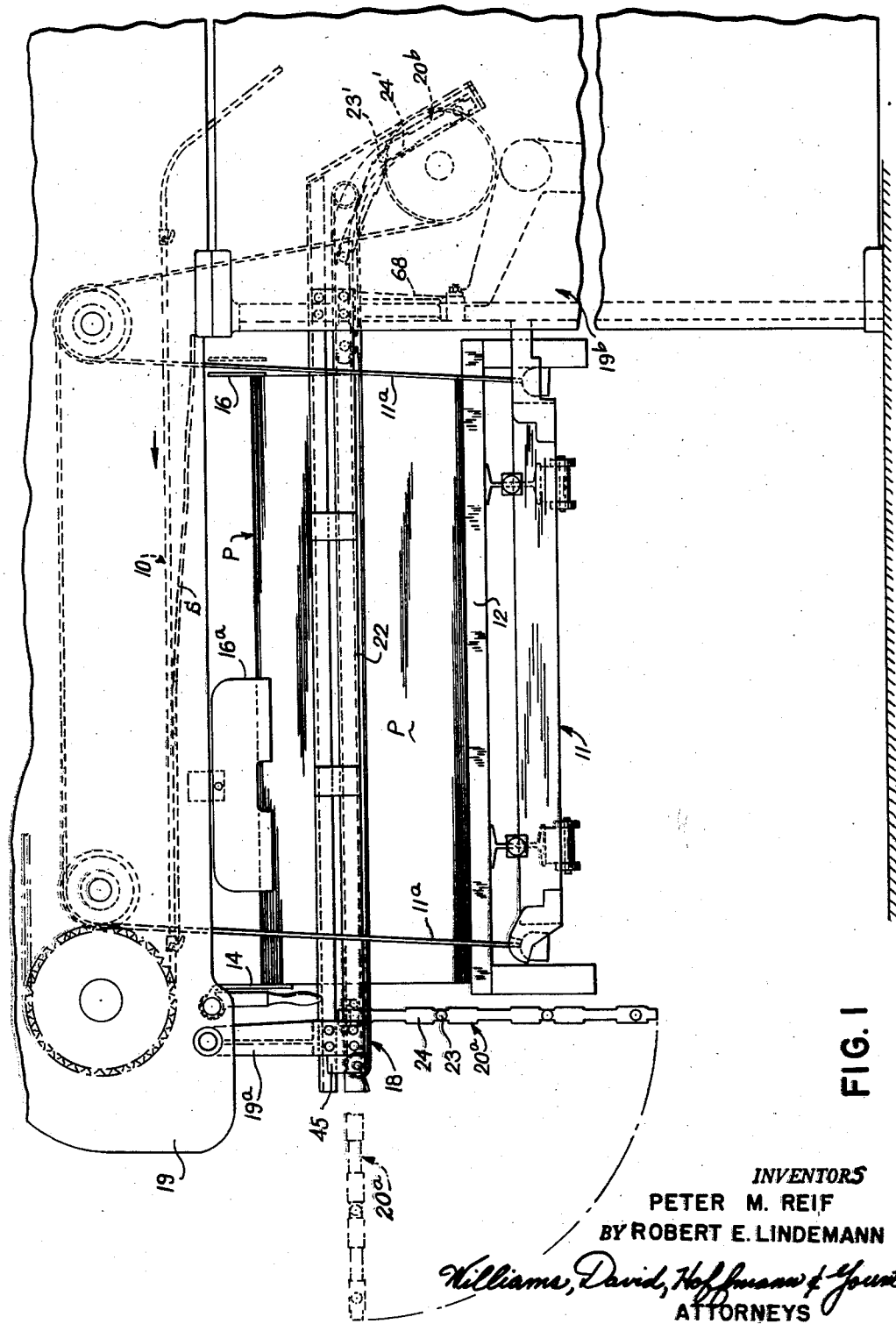


FIG. 1

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PRINTING PRESS DELIVERY

Filed June 21, 1961 5 Sheets-Sheet 2

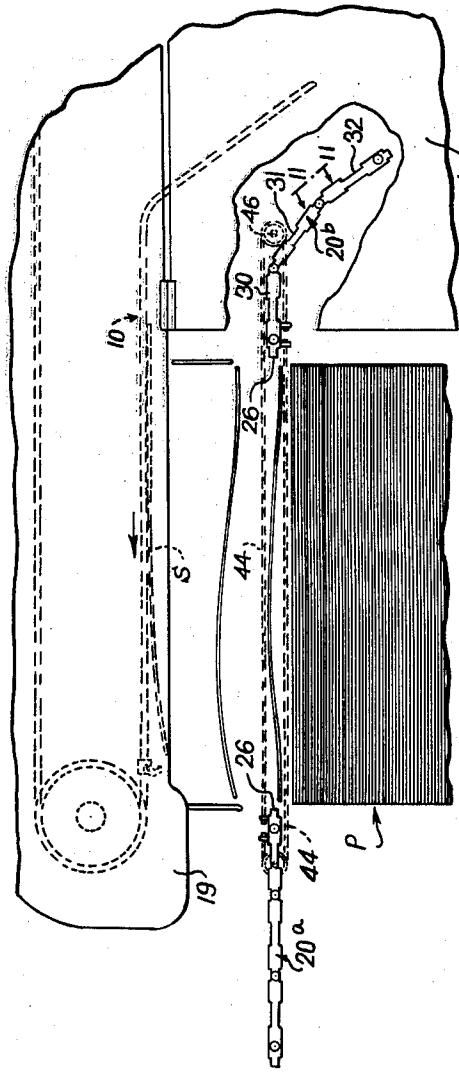


FIG. 2

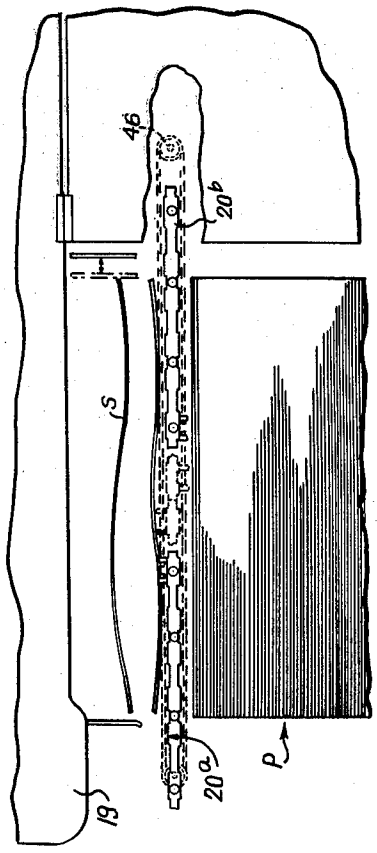


FIG. 3

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Filed June 21, 1961 5 Sheets-Sheet 3

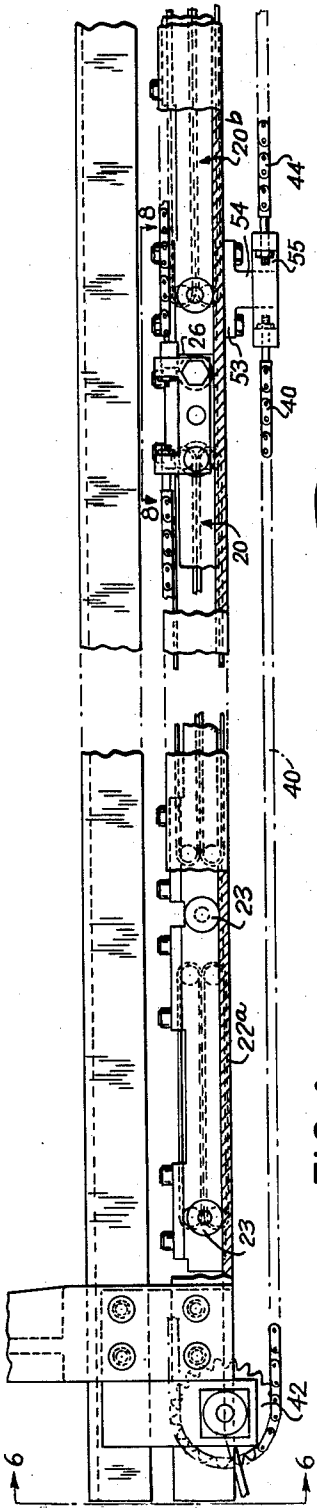


FIG. 4

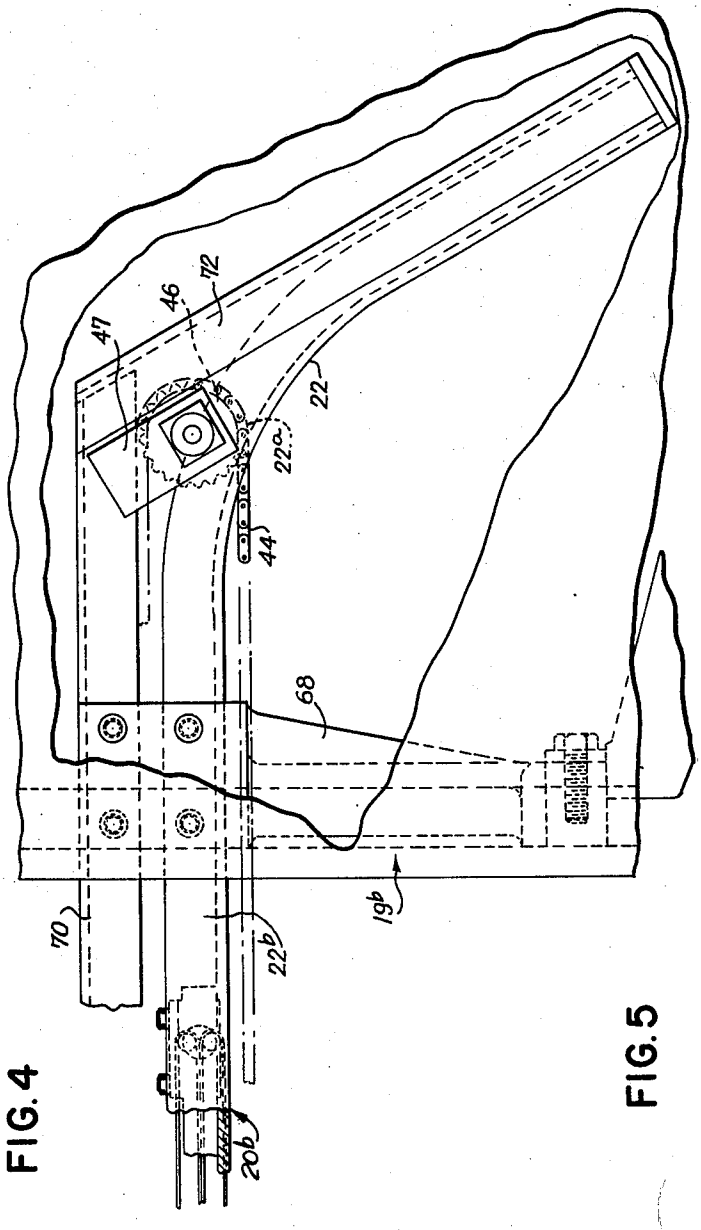


FIG. 5

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Filed June 21, 1961 5 Sheets-Sheet 4

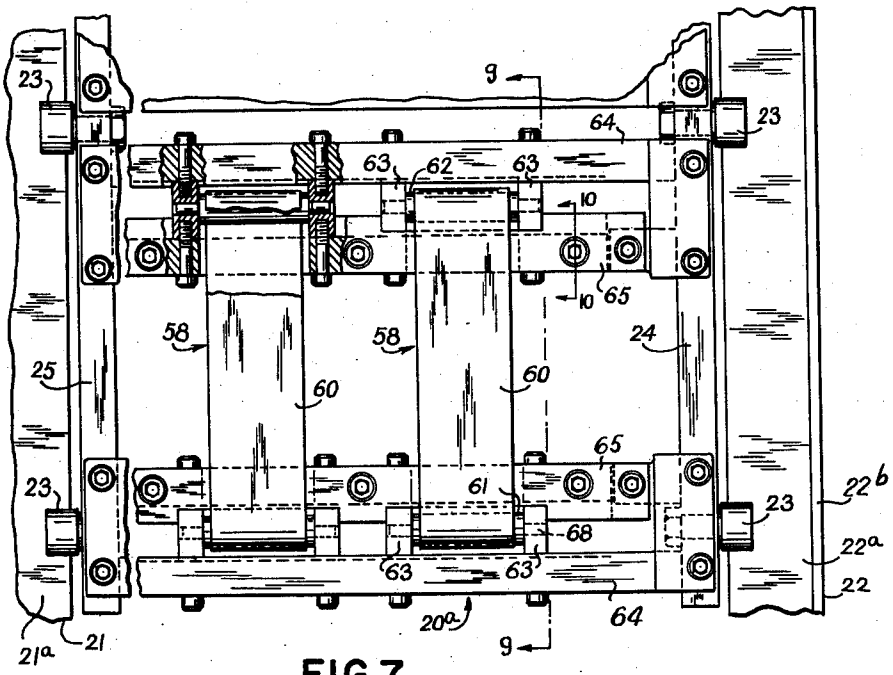


FIG.7

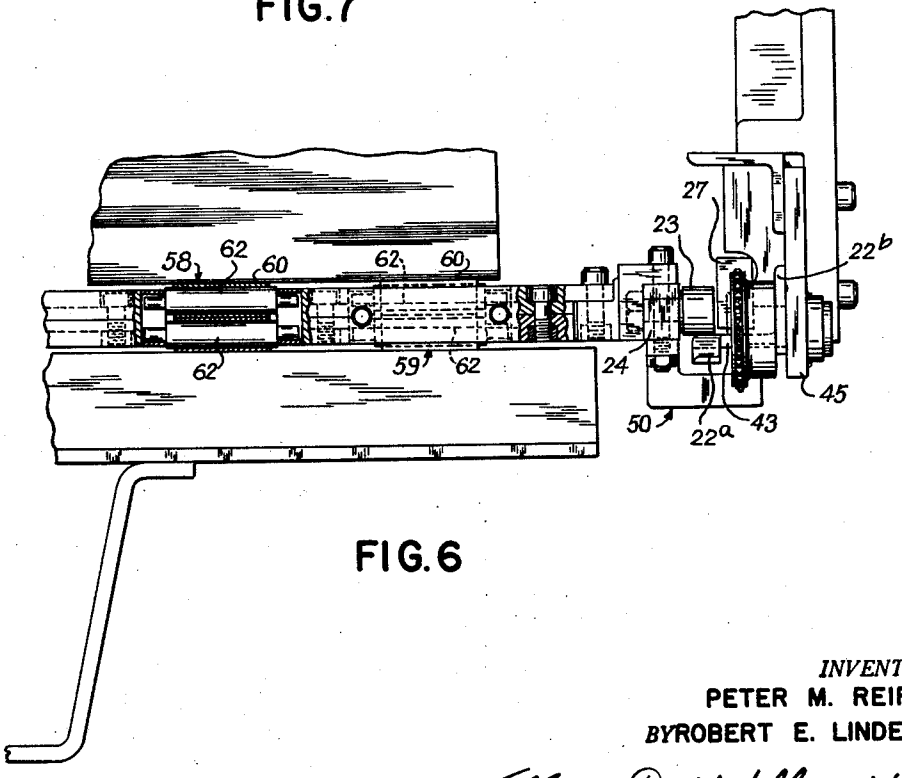


FIG.6

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Filed June 21, 1961 5 Sheets-Sheet 5

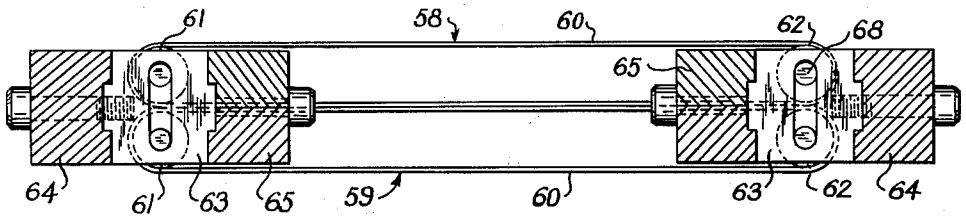


FIG. 9

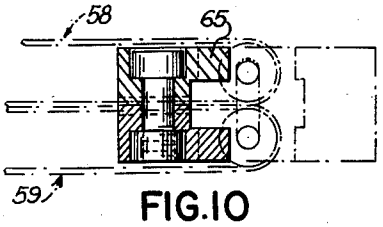


FIG. 10

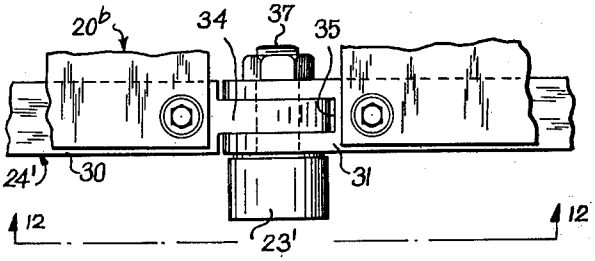


FIG. 11

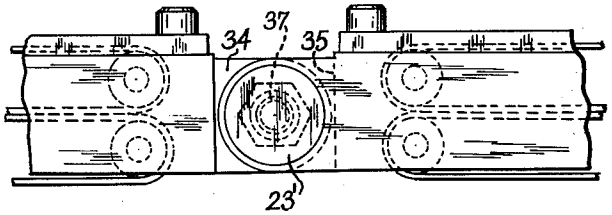


FIG. 12

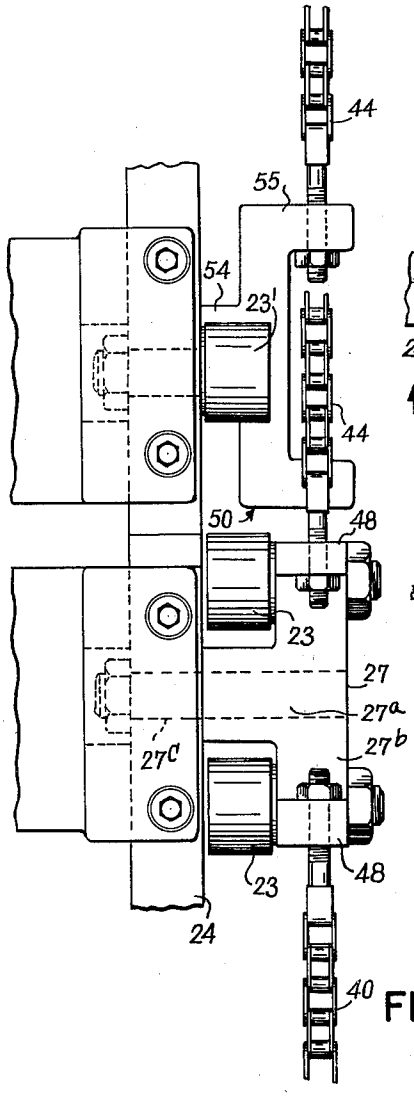


FIG. 8

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United States Patent Office 3,140,091 Patented July 7, 1964

3,140,091

PRINTING PRESS DELIVERY

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Filed June 21, 1961, Ser. No. 118,666
10 Claims. (Cl. 271—38)

The present invention relates to deliveries or similar sheet-handling mechanisms in which sheets being delivered in sequence are dropped from a position over a delivery hoist onto a pile-supporting platform on the hoist to form a sheet pile and wherein a temporary pile support is moved into position above the pile on the delivery hoist to catch sheets when the pile on the hoist is to be removed therefrom.

In the type of delivery to which the present invention relates, the temporary pile support is moved into a sheet-receiving position above the pile of sheets on the delivery hoist when the pile of sheets is to be removed from the hoist without interrupting the delivery of sheets. When the delivery is a printing press delivery, the sheets are delivered at high rates of speed, for example, between 5,000 and 7,000 sheets per hour for multicolor lithographic presses, and it is difficult to move the temporary pile support into sheet-receiving position over the pile on the delivery hoist without losing one or more sheets being delivered to the hoist. In some commercially known deliveries, the temporary pile support is normally disposed in an inactive or storage position adjacent one end of the delivery and is moved horizontally from that end of the delivery into sheet-receiving position when it is to be used. The inactive position of the temporary pile support is generally adjacent the end of the delivery remote from the feeder end of the press and when the support is moved into sheet-receiving position, the support is moved in a direction toward the press, i.e., opposite to the direction of sheet movement to the delivery. Commonly, when the temporary pile support is moved into position, the leading side or edge of the support will catch a sheet or sheets being dropped and push them toward the printing press. This not only causes the loss of sheets but also, in many deliveries, causes the sheets to be displaced toward the feeder end of the press. This results in a pile with the bottom few sheets crumpled or at least disarranged, thus causing problems in re-running the sheets through the press or through other sheet-handling machines, e.g., a cutter-and-creaser. This is particularly true if these machines are provided with non-stop feeders. The problem of inserting the temporary pile support without losing or disarranging sheets becomes more serious as the speed of the press increases, since the rate of delivery will be faster and less time and spacing for inserting the temporary pile support will be available between successively delivery sheets. If a sheet is pushed toward the press as described above, the pressman must immediately reach beneath the hoist and try to slip the disturbed sheet from beneath the others which are piling atop it. In attempting this, he often disturbs other sheets, but not to as great an extent as the first few.

In addition to the foregoing, the operator has heretofore had to move the whole temporary pile support from a storage position on one side of the delivery inwardly into sheet-receiving position. Commonly, the whole temporary pile support is disposed in a vertical position adjacent the side of the delivery remote from the press and is supported so that it can be swung to a horizontal position and then moved into sheet-receiving position by pushing on the horizontally disposed support. While the temporary pile support is being swung to a vertical position and started into the delivery, the weight of the support is supported by a pivot at one end and by the operator lifting the end of the temporary pile support remote from its pivot. If certain types of temporary pile supports are used in conjunction with presses printing large size sheets, the weight of the support may be greater than that which can be conveniently and efficiently handled by the operator. This can be particularly true if the temporary pile support is a platen which has upper revolvable elements which define the load-supporting surface of the platen, and lower revolvable elements that are adapted to engage a supporting surface for the platen to support the platen and load on the supporting surface and to effect a rotation of the upper revolvable elements when the platen is moved across the supporting surface for the platen. It is desirable to use this type of platen in a delivery, since it minimizes or eliminates the disarrangement of sheets on the withdrawal of the platen and the platen can be easily withdrawn from supporting position. Moreover, when this type of platen is used, the delivery hoist can be moved vertically to lift the platen from the support for the platen so that the hoist carries the platen and the pile thereon. The platen can then be removed from between the pile and hoist by moving the platen laterally. It is usually desirable to be able to lift the platen with a skid on the main hoist prior to platen withdrawal in order to minimize the drop between the pile on the platen and the skid or other pile-supporting surface on the main hoist to eliminate or minimize any possible disarrangement of the pile due to the drop between the top of the platen and the pile-supporting surface on the main hoist.

In view of the foregoing, an important object of the present invention is to provide a new and improved delivery mechanism having a temporary pile support that can be moved by the operator into and from sheet-receiving position above a pile on the delivery hoist of the mechanism in less time than heretofore required.

Another object of the present invention is to provide a new and improved delivery in which the temporary pile support is sectionalized to minimize the weight of the support that has to be handled by the operator and to decrease the time necessary to insert or withdraw the support.

Another object of the present invention is to provide a new and improved delivery mechanism having a temporary pile support which can be moved into sheet-receiving position to receive the sheets being delivered while a pile is being removed from the delivery hoist of the mechanism and wherein the pile support is comprised of platen sections disposed on opposite sides of the delivery.

Still another object of the invention is to provide a temporary pile support which is insertable between successive downwardly floating sheets from opposite sides thereof to both minimize sheet intercepting time and prevent incorrect catching and the disarranging of sheets from their proper position.

A further object of the present invention is to provide a new and improved delivery having a temporary pile support which is moved toward operating mechanism for delivering sheets to position the support to receive sheets being delivered and which is such that movement of the pile support to sheet receiving position can be accomplished with a minimum of danger of losing or disarranging sheets.

A still further object of the present invention is to provide a new and improved delivery mechanism wherein the withdrawal of a temporary pile support to deposit a pile formed thereon onto the delivery hoist is done in such a manner that the forces applied to the bottom of the pile by the withdrawal tend to move the pile in oppo-

site directions to minimize the effect of forces tending to translate the pile or to disarrange the lower sheets of the pile.

Still another object of the present invention is to provide a new and improved delivery mechanism in which a temporary pile support for receiving sheets being delivered is supported in sheet-receiving position by support means which accommodates limited vertical movement of the temporary pile support to enable the temporary pile support to be lifted therefrom and wherein the pile support is comprised of two sections which have inactive positions adjacent opposite sides of the delivery and which are interconnected by mechanism so that movement of one effects movement of the other to or from sheet-receiving position with the interconnecting mechanism accommodating the lifting of the temporary pile support.

Further objects and advantages of the present invention will be apparent from the following detailed description of the preferred embodiment thereof made with reference to the accompanying drawings forming a part of the present specification, and in which:

FIG. 1 is a fragmentary elevational view of one side of a sheet delivery embodying the present invention;

FIGS. 2 and 3 are fragmentary elevational views corresponding to FIG. 1 but in diagrammatic form and illustrating different positions of the parts during the operation of the delivery to move a temporary pile support into position;

FIG. 4 is an enlarged fragmentary view of a part of FIG. 1 with parts of the mechanism cut away;

FIG. 5 is an enlarged detailed view of a portion of FIG. 1 with parts cut away;

FIG. 6 is a fragmentary elevational view, looking from the left-hand side of FIG. 1, with parts cut away and with the temporary support shown supporting the pile;

FIG. 7 is a fragmentary plan view of the temporary support;

FIG. 8 is a sectional view taken approximately along line 8—8 of FIG. 4;

FIG. 9 is a sectional view taken approximately along line 9—9 of FIG. 7;

FIG. 10 is a sectional view taken approximately along line 10—10 of FIG. 7;

FIG. 11 is a fragmentary view looking in the direction of the arrows from line 11—11 of FIG. 2; and

FIG. 12 is an elevational view looking along line 12—12 of FIG. 11.

The present invention is shown embodied in a delivery of a type commonly used with printing presses and includes a chain conveyor **10** which receives sheets S from the printing press, not shown in the drawings but disposed to the right of the delivery shown in FIG. 1, and carries the sheets in succession to a position over the load support of a delivery hoist **11** where the sheets are released to fall onto and form a pile P on a skid or pile board **12** supported on the delivery hoist **11**. The delivery hoist **11** comprises a plurality of cables **11***a* which are operable to move the pile board **12** vertically and when there is no pile on the delivery hoist **11** prior to the beginning of sheet delivery operations, the hoist **11** is moved vertically to position the skid **12** immediately adjacent and end gate **14** disposed below the chain conveyor **10**. It will be understood that pairs of cables **11***a* are disposed on both the near and far sides of the hoist, as viewed in FIG. 1. The sheets being delivered by the conveyor **10** have forward momentum at the time they are dropped and this will carry them to the end gate **14** and the end gate will serve as a stop for the sheets and a vertical guide for the leading edge of the sheet. As noted above, the delivery hoist **11** is raised at the beginning of sheet delivery operations to position the skid **12** immediately adjacent the end gate **14** so that the drop from the chain conveyor **10** to the skid **12** is minimized. Conventional reciprocating joggers, which are shown rather schematically in FIG. 1 and designated by the reference numerals **16**, **16***a* may be

provided to jog the sheets into an even pile and against the end gate **14**. As the pile of sheets builds up on the skid **12**, the delivery hoist **11** is gradually lowered to prevent the pile from building up into the delivery mechanism **10**, but the top of the pile is maintained above the lower end of end gate **14**. After the pile has been built to a predetermined height, it is desirable to remove the pile and skid **12** from the delivery hoist **11** and to start a new pile. To accomplish this, the delivery hoist **11** is lowered to drop the top of the pile thereon below a support means **18** for supporting, in sheet-receiving position, a temporary pile support provided by two platens **20***a* and **20***b*. The platens **20***a*, **20***b* are normally stored or disposed outwardly of the right- and left-hand sides of the delivery, as the latter is viewed in FIG. 1, and are movable into an edge-abutting relationship in a sheet-receiving position above the top of the pile P on the skid **12** to intercept sheets being dropped onto the pile by the delivery. The use of a temporary pile support enables the delivery of the sheets to be continued while the pile on the delivery hoist **11** is being removed.

The chain convepor mechanism for delivering the sheets over the skid **12**, the mechanism for raising and lowering the delivery hoist **11**, and the means for effecting an automatic lowering of the delivery hoist **11** as the sheet pile builds up thereon do not, per se, form a part of the present invention and the structure and operation thereof may be conventional. For example, the delivery may be constructed and operated in the same manner as the delivery shown and described in United States Patent No. 2,673,735, to I. F. Niles et al.

In the illustrated delivery, the support means **18** depends from overhead frame structure **19** and the support means comprises a pair of horizontal rails **21**, **22** supported at one end from the frame structure **19** by hanger means, including a hanger **19***a*, and at the other end from side frame structure **19***b*. The rails **21**, **22** extend parallel to the direction of sheet movement to the top of the pile and are adapted to support the platens **20***a*, **20***b* in a sheet-receiving position and for movement to and from a sheet-receiving position. The rails **21**, **22** are spaced from each other and disposed adjacent outer sides of the delivery so that a sheet may drop therebetween and so that a pile of sheets and the skid may be disposed or move therebetween. The rails have inwardly extending horizontal flange portions **21***a*, **22***a*, upon which rollers **23**, **23'** extending outwardly from the sides of the platens **20***a*, **20***b*, respectively, are adapted to roll, and also have outer, upwardly extending vertical flanges **22***b*.

The platen **20***a* has side plates **24**, **25** from which the rollers **23** are supported and the rollers extend outwardly to roll on the horizontal flanges **21***a*, **22***a* of the adjacent supporting rails. The platen **20***b* has side plates corresponding to side plates **24**, **25**, which carry the rollers **23'**, but which differ somewhat in construction from the side plates **24**, **25** of the platen **20***a* to provide a platen comprised of articulated sections. The structure of the side plates of platen **20***b* will be described in more detail hereinafter.

The platens **20***a*, **20***b* are movable to positions shown in dot-dash lines in FIG. 3 wherein they are in a sheet-receiving position and abut each other along adjacent sides **26** to form the temporary pile support for receiving sheets. The inner edges or sides **26** of the platens **20***a*, **20***b* are, when the platens are in this position, preferably at approximately the transverse center line of the maximum size pile to be formed. The platens **20***a*, **20***b* may be moved from the sheet-receiving position shown in FIG. 3 outwardly of the delivery, with the platen **20***a* moving outward of the left-hand side of the delivery, i.e., the side remote from the press from which the sheets are being delivered, and the platen **20***b* moving toward the press and outwardly of the righthand side of the delivery.

As the platen 20*a* is moved outwardly from its sheet-receiving position, the platen moves outwardly of the ends of the rail 21, 22 supporting the platen and, when all but a last pair of the rollers 23 on each side of the platen 20*a* adjacent the side 26 have cleared the left-hand end of the supporting rails, the platen may be swung about the axis of a support for the rollers still in contact with the supporting rails to move to the vertical position shown in solid lines in FIG. 1. The pair of rollers on each side of the platen 20*a* nearest the edge 26 are rotatably mounted on a T-shaped support bracket 27 which is pivoted to the adjacent one of the side plates 24, 25 for movement about a horizontal axis so that the platen 20*a* may be swung to a vertical position when all rollers 23, except those supported by the brackets 27, have cleared the rails 21, 22. A central leg 27*a* of each bracket 27 extends horizontally outwardly from and is pivoted in the adjacent side plate by means of a pin 27*c* and the rollers 23 supported thereby are disposed on opposite sides of the leg intermediate the adjacent side plate and the crosspiece 27*b* of the bracket and are journaled in the crosspiece.

When the platen 20*b* moves outwardly of its sheet-receiving position, i.e., to the right as viewed in FIGS. 1–3, the platen is moved toward an inclined portion of the chain conveyor which delivers the sheets from the printing press and, preferably, the rails 21, 22 which support and guide the platen, extend for the entire extent of movement necessary to withdraw the platen 20*b* from a sheet-supporting position. The rails 21, 22 are curved downwardly, as is shown in FIG. 1, at their end portions in the direction of withdrawal of platen 20*b*, thereby requiring less horizontal extent in which to store the platen. To enable the platen 20*b* to follow the curved track or rail therefor, the platen 20*b* is divided into three sections, along lines extending between the rails 21, 22, i.e., across the delivery, with the sections being pivotally connected to each other to provide an articulated, sectionalized platen. Preferably, the only parts of the platen 20*b* which interconnect the different sections of the platen are the side plates thereof. The side plates of the platen 20*b* are sectionalized and the adjacent sections of each side plate thereof have hinged interfitting parts, as is shown in FIG. 11. The side plate of platen 20*b* shown in the drawings is designated by the reference numeral 24'. The side plate 24' is comprised of three plate sections 30, 31, 32 (see FIGS. 2 and 3). The plate section 30 is of reduced thickness at its end adjacent the plate section 31 (see FIG. 11) to provide a projecting portion 34 which is received in a slot 35 in the adjacent end of the plate section 31. The portion 34 and slot 35 comprise a tongue-and-groove connection. The plate sections 30, 31 are interconnected by a stud 37 which supports one of the rollers 23' carried by the side plate 24'. The stud 37 allows a pivotal or hinged movement between the parts of the platen carried by the side plates 30, 31. The plate sections 31, 32 are similarly connected and the other side plate of section 20*b* is constructed similarly to the side plate 24' and the hinge axes of the sections of side plate 24' are aligned with the hinge axes of the sections of plate 24'. The side plates are the only members interconnecting the adjacent parts of the platen 20*b* and, therefore, when the platen 20*b* is moved outwardly of the pile, the articulated parts of the side plates of the platen section will pivot relative to each other and allow the platen to follow the curved track and to be stored in a position as shown in FIGS. 1 and 2. To enable the rollers 23' to ride their rails in all positions of the platen 20*b*, it is preferable that the articulated sections be hinged on the axes of the rollers 23' as shown.

In accordance with one feature of the present invention, the platens 20*a*, 20*b* are interconnected for movement in unison and at the same rate of speed toward and away from a sheet-receiving position. Referring to FIG. 4, a flexible chain 40 or its equivalent has one end connected to the bracket 27 on side plate 24 of platen 20*a*. The chain 40 extends from the right-hand end of the platen 20*a* in the direction of movement of the platen 20*a* from sheet-receiving position, i.e., to the left as viewed in FIG. 4, and passes around a sprocket 42 rotatably secured to the left-hand end of the rail 22 and disposed in a cutout 43 in the flange 22*a* thereof. The sprocket is journaled in a plate 45 which is fixed to the outer side of vertical flange 22*b*. The sprocket 42 reverses the direction in which the chain extends and the chain extends from the sprocket 42 below the rail 22 toward the platen 20*b* and is connected to the platen 20*b* adjacent the side 26 thereof which is adapted to abut the platen 20*a*. A second chain 44 extends from the bracket 27 of the platen 20*a* toward the platen 20*b* and passes around a sprocket 46 rotatably supported by the vertical flange 22*b* of rail 22 just rearwardly of the point of connection of the chain 40 to the platen 20*b* when the latter is in its retracted position. The sprocket 46 is journaled in a plate 47 fixed to the outer side of flange 22*b* and the flange 22*a* has an opening therein for passing the chain 44 therethrough. The chain 44 and sprocket 46 do not obstruct the movement of platen 20*b* since the rollers 23' engage the flange 22*a* inwardly of the sprocket. The chain 44 passes around the sprocket 46 and is connected to the platen 20*b* adjacent the point of connection of the chain 40. The chains 40, 44, in effect, define an endless flexible member lying in a vertical plane having an elongated path disposed adjacent the rail 22 to provide upper and lower runs above and below the flange 22*a*, with the platen 20*a* being connected to the upper run of the endless flexible member and the platen 20*b* being connected to the lower run of the endless flexible member so that when the flexible member is moved through its endless path, the platens 20*a*, 20*b* move in opposite directions so that the sections will move in unison toward or away from a sheet-receiving position. It will be apparent that the rate of movement of the platens 20*a*, 20*b* will be the same.

The structure for connecting the chains 40, 44 to the platen 20*a* is shown in FIG. 6, and referring thereto, it will be noted that the bracket 27 on side plate 24 has upstanding lugs 48 (see FIG. 8) on the crosspiece 27*b* which are spaced lengthwise of rail 22 and to which the chains 40, 44 are respectively connected. In the case of platen 20*b*, the side plate 24' has a bracket 50 which depends therefrom and to which the chains 40, 44 are connected. The bracket 50 has a depending central portion 54 which extends downwardly and then outwardly of the side plate 24' beyond the rollers 23' to underlie rail 22 and includes a crosspiece 55 at the outer end of the portion 54 which extends parallel to the rail 22 and which has spaced lugs to which the chains 40, 44 are connected. In the described arrangement, the chains 40, 44 are disposed clear of the path of movement of a skid on the main hoist when moving vertically past the rails 22 and also clear of the path of movement of sheets being dropped from the chain conveyor 10 onto the main hoist when the latter is positioned below the rails 22. The chains 40, 44, sprockets 42, 46 for the brackets 27, 50 are duplicated on the remote side of the delivery from the rail 22.

In the preferred and illustrated embodiment, the temporary pile support 20 is comprised of a plurality of sets of revolvable elements 58, 59, the elements 58, 59 of which are respectively adapted to engage and support the load on the pallet and to support the platen on a surface, such as the skid 12.

A platen using revolvable elements as shown and described is the subject matter of a copending application assigned to the assignee of the present invention and the revolvable elements per se do not form part of the present invention.

The platen 20*a* is made up of three rows of the revolvable elements 58 and 59, the elements of each row having aligned axes and the rows extending right and left, as the platen is viewed in FIG. 6. The revolvable elements 58,

59 are each shown as comprising an endless belt 60 which passes around spaced rollers 61, 62, with each of the rollers being supported between two blocks 63. The blocks 63 which support the rollers 61, 62 of the elements 58 also support the rollers 61, 62 of the corresponding element 59. The rollers 61, 62 are provided with trunnions 68 which are received in vertically elongated slots in the blocks 63, the blocks 63 supporting the rollers so that the rollers are capable of vertical floating movement relative to the supporting blocks therefor. The rollers 61 of each row of elements have their axes aligned and are disposed between a pair of transverse frame members 64, 65 to which their supporting blocks 63 are bolted. The rollers 62 of each of the respective rows of elements 58, 59 have their axes similarly aligned and supported. The belt 60 of each element 58 passes over the transverse frame members 65 mounting the blocks 63 for the rollers 61, 62 of the element and around the rollers 61, 62, and the transverse frame members 65 are each split longitudinally to provide a two-piece frame member which is bolted together with the adjacent longitudinal sides of the abutting sections being cut out to provide an opening for passing the inner run of the belt 60.

The outer runs of the belts 60 of each element 59 pass under the frame members 65 mounting the supporting blocks 63 for the rollers 61, 62 of the element and the openings in the split frame members 65 permit passage of the inner runs of the belts therethrough.

The elements 58 are carried by their corresponding elements 59 and when the elements 59 support the platen 20 on a subjacent surface and the platen is moved across the subjacent surface, the bolts 60 of the elements 59 revolve and drive the belts 60 of the elements 58 to effect a revolution thereof to move the upper or outer runs of the latter in a direction opposite to the direction of movement of the platen and at the same rate of movement as the platen so that any point on the upper run in engagement with the pile is, in effect, stationary with respect to a load thereon. The described structure enables the platen 20*a* to be withdrawn from beneath a pile supported thereon with minimum effort and without tending to disarrange the pile. The slots of the supporting blocks 63 allow each pair of elements 58, 59 to move vertically as a unit to accommodate uneven skid surfaces.

The platen 20*b* is also preferably a roller platen of substantially the same construction as the platen section 20*a*, with each of the sections of the platen 20*b* having a row of revolvable elements corresponding to the elements 58 and their supporting elements 59.

The structure for supporting the right-hand end of the rails 21, 22, as the latter are viewed in FIG. 1, has not been described in detail since any suitable supporting structure can be provided; and suffice it to say that each of the rails 21, 22 may be supported by a post 68, the post 68 for supporting the rail 22 being best shown in FIG. 5. The post 68 may be fixed at its lower end to a bar 70 that extends transversely of the delivery mechanism and which is supported by the side frame structure 19*b*. The upper end of the post 68 for supporting the rail 22 may be bolted or otherwise secured to the flange 22*b* of the rail.

For structural purposes, a rail 70 may be provided, the rail 70 being disposed over the rail 22 and fixed to the hanger 19*a* and the post 68. An angle 72 is also preferably provided and is fixed to the right-hand end of the rail 70, as the latter is viewed in FIG. 5, and is nested over the downwardly extending portion of the rail 22 to form a generally U-shaped channel which will facilitate maintaining the rollers 23' in engagement with the rail 22 on the downwardly extending portion thereof. A rail and an angle corresponding to the rail 70 and angle 72 are also associated with the rail 21.

Operation.—In operation, the sheets are delivered by the lower run of the chain conveyor 10 to a position over the delivery hoist 11 and, when the sheets are so positioned, the sheets are released to fall onto the skid 12 on the delivery hoist 11. The top of the skid 12 at the beginning of a new pile is positioned immediately adjacent the end gate 14 so as to minimize the drop between the chain conveyor 10 and the skid 12, and as the pile builds up on the skid 12, the hoist 11 is lowered to maintain the top of the pile thereon at approximately the level shown in FIG. 1. When a pile has been built on the skid 12 to the desired height, the delivery hoist 11 is lowered to position the top of the pile thereon just below the rails 21, 22. During this time, the delivery of the sheets is continued. When the top of the pile is below the rails 21, 22 and as a sheet is falling onto the pile, the operator lifts the lower end of the platen 20*a* and swings the platen to the position shown in dot-dash lines in FIG. 1, and as soon as a sheet falls below the rails 21, 22, he pushes on the platen 20*a* to move it to its sheet-receiving position shown in FIG. 3. The movement of the platen 20*a* to its sheet-receiving position also effects movement of the platen 20*b* to sheet-receiving position because of the chains 40, 44 interconnecting the platens. Because of variations in type and size of stock fed from one printing job to the next and because of different speeds at which the press may be run, the time and rate of insertion of the platens 20*a*, 20*b* will vary from job to job. However, since the platens move into supporting position from opposite directions, it is relatively simple to properly catch a sheet. Furthermore, since each platen 20*a*, 20*b* is only half the length of a one-piece platen, the time for inserting is also cut in half or less. It will be apparent that the operator need only lift a portion of the weight of the platens which form the temporary pile support for receiving sheets while the formed pile is being moved from the delivery hoist 11. Conventional wedges (not shown) may be temporarily used in selected positions on the platens 20*a*, 20*b* to cause portions of the edges of the sheets to be within the reach of end gate 14, rear joggers 16 and side joggers 16*a* for proper formation of the new pile. After the platens 20*a*, 20*b* have been moved into position, the skid 12 is removed from the hoist 11, a new skid put into its place and the delivery hoist 11 raised to cause the top of the new skid 12 to engage the underside of the platens 20*a*, 20*b*, to lift the platens slightly from the supporting flanges of the rails 21, 22 so as to support the weight of the platens and the pile thereon on the new skid 12. It will be noted that the support means 18 and the chains 40, 44 accommodate the lifting of the platen. After the platens 20*a*, 20*b* have been lifted, the pile on the temporary pile support is transferred to the skid 12 by withdrawing the platens 20*a*, 20*b*. The operator withdraws the platens by pulling on the platen 20*a* to withdraw it from its sheet-receiving position and to move it outwardly until all but the last pair of rollers have cleared the rails 21, 22, at which time, the platen 20*a* is allowed to swing to its vertical position shown in FIG. 1. The withdrawal of the platen 20*a* also effects a withdrawal of the platen 20*b* by reason of the chains 40, 44. The withdrawal of the platens 20*a*, 20*b* will deposit the pile which had been formed thereon onto the new skid 12 and the delivery hoist 11 is then elevated to position the top of the new pile above the lower end of the end gate 14, as is shown in FIG. 1.

During the withdrawal of the platens, movement of the platens relative to the pile and to the skid 12 is greatly facilitated by the elements 58, 59. The lower elements 59 which support the platens on the skid 12 are rotated by the withdrawal to drive the upper elements supported thereon and the peripheral speed of the upper element will correspond to the peripheral speed of the lower elements which, in turn, corresponds to the speed of withdrawal of the platens. The upper surfaces of the revolvable elements 58 will, therefore, be moving in a direction opposite to the direction of withdrawal of the platen at a rate corresponding to the rate of withdrawal and, in effect, will be stationary with respect to the sup-

porting structure. Consequently, the forces tending to disarrange the pile supported thereon are kept at a minimum and the pile has little or no tendency to be moved with the platen. The action of the revolving elements with respect to the pile supported thereon and with respect to the skid supporting the elements, as well as with respect to each other, may be best described as a rolling action.

The possibility of losing a sheet because of the sheet's falling to the level of the temporary support prior to the support being fully inserted is minimized with the described structure. The splitting of the temporary pile support into two platens which are disposed at opposite sides of the delivery and moved simultaneously to and from sheet-receiving position enables the temporary pile support to be inserted at a much more rapid rate than heretofore possible and, therefore, minimizes the time required for the insertion and enables the operator to normally insert the temporary pile support in the time available between successive sheets. Furthermore, if the platens are still somewhat spaced when the next sheet reaches the level of the platens, the platens will support the sheet adjacent opposite side portions so that, if the sheet is relatively stiff, it will not fold down into the space between the platens and the sheet will not be lost even though it does drop onto the platens before the platens are in edge-abutting relationship. The use of two platens also has advantages on the withdrawal, since each platen will tend to move the plie in a direction opposite to the direction which the other platen tends to move the pile and any forces which might be developed upon withdrawal will oppose each other, thereby minimizing the possibility of pile translation with the platens or disarrangement of the lower sheets of the pile. Even if the size of the sheet being delivered is such that the edges **26** of the platens **20***a*, **20***b* are not at the center of the pile when the platens are in pile-receiving position and one platen will, therefore, necessarily lose engagement with the pile on withdrawal before the other platen, the tendency to translate the pile or disarrange the sheets is minimized, since the forces tending to disarrange the pile or translate it are greatest at the beginning of the withdrawal movement of the platens.

In view of the foregoing, it is respectfully submitted that the objects heretofore enumerated and others have been accomplished and that a new and improved delivery has been provided wherein a temporary pile support may be moved to and from pile-support position in less time and with more ease than heretofore required and with less danger of losing a sheet or disarranging or effecting translation of the pile while being transferred from the platen to a skid supporting the platen.

While the preferred embodiment of the present invention has been described in considerable detail, it is hereby my intention to cover all constructions, modifications and embodiments which fall within the ability of those skilled in the art and within the scope and spirit of the present invention.

Having described our invention, what we claim is:

1. In a sheet handling mechanism comprising a vertically movable delivery hoist having a platform for receiving sheets which are moved in sequence to a position over the hoist and dropped onto the platform, said hoist being lowered from a raised position as the pile builds up thereon to maintain the top of the pile at about a predetermined level, a temporary pile support adapted to be moved to a pile-supporting position over the pile on said platform to intercept falling sheets, said pile support comprising two sections disposable in side-by-side relationship in said pile-supporting position and each having withdrawn positions on opposite sides of said hoist respectively which are clear of falling sheets, support means supporting said sections for horizontal movement over said platform between said withdrawn positions and said side-by-side positions, interconnecting means connecting said sections to effect movement thereof toward and away from each other in unison, said support means and said interconnecting means providing for limited vertical movement of said temporary pile support relative to said support means whereby the pile support may be lifted relative to said support means and moved laterally while elevated, and said hoist being operable to effect a lifting of said pile support with said platform.

2. A sheet-handling mechanism as defined in claim 1 wherein said interconnecting means comprises a flexible member connected to said sections and defining an endless member having upper and lower runs, one of said sections being connected to said upper run and the other of said sections being connected to said lower run.

3. In a sheet-handling mechanism having a vertically movable delivery hoist including a pile-support platform for receiving sheets which are moved in sequence to a position over the platform and dropped onto the platform from the said position, said hoist being lowered as a pile of sheets builds up thereon to maintain the top of the pile at about a predetermined level, and a temporary pile support adapted to be disposed over a pile on said pile-supporting platform to receive the sheets being dropped, the combination of spaced rails adjacent opposite sides of said hoist and outwardly of the path of falling sheets for supporting said temporary pile support for generally horizontal movement from a position clear of the falling sheets to a position intercepting the falling sheets, said temporary pile support comprising two sections disposable in side-by-side relationship over said platform to form the temporary sheet-receiving pile support for intercepting said sheets, support means on the sides of said sections adjacent said rails and adapted to support said sections on said rails and said dsections having withdrawn positions on opposite sides of said hoist clear of the falling sheets and supported on said rails by said support means for movement laterally into side-by-side relationship over said platform, one of said sections moving outwardly of the ends of said rails, the support means supporting one of said sections including support members extending from the sides of the section adjacent said rails at points adjacent the inner end of the section and connected to the section to support the latter for swinging movement about a horizontal axis, and interconnecting means connected to said support members and to the other of said sections to interconnect said sections for movement to and from sheet-receiving position in unison.

4. In a sheet-handling mechanism as defined in claim 3 wherein said one of said sections is a rigid platen adapted to be manually grasped and manually moved between its said positions and the movement of said one of said sections effects the driving of the other of said sections through said interconnecting means.

5. A sheet-handling mechanism as defined in claim 3 wherein said means interconnecting said platen sections of said first section comprises pivotal connections between adjacent platen sections with said connections being rigid to forces transverse to the pivot axis, said pivotal connections connecting the adjacent platen sections for articulation about a predetermined axis.

6. In a sheet-handling mechanism having a vertically movable delivery hoist including a pile-supporting platform for receiving sheets which are moved in sequence to a position over the platform and dropped onto the platform from the said position, said hoist being lowered as a pile of sheets builds up thereon to maintain the top of the pile at about a predetermined level, and a temporary pile support adapted to be disposed over a pile on said pile-supporting platform to receive the sheets being dropped, in a combination of spaced rails adjacent opposite sides of said hoist and outwardly of the path of fall-

ing sheets for supporting said temporary pile support for generally horizontal movement from a position clear of the falling sheets to a position intercepting the falling sheets, said temporary pile support comprising two sections disposable in side-by-side relationship over said platform to form the temporary sheet-receiving pile support for intercepting said sheets, a plurality of roller means extending from the sides of said sections adjacent said rails and adapted to support said sections on said rails and said sections having withdrawn positions on opposite sides of said hoist clear of the falling sheets and supported on said rails by said roller means for movement laterally into side-by-side relationship over said platform, one of said sections moving outwardly of the ends of said rails, the roller means supporting said one of said sections including roller support members extending from the sides of the section adjacent said rails at points adjacent the inner end of the section and connected to the section to support the latter for swinging movement about a horizontal axis and rollers supported by said support members and adapted to roll on said rails, and interconnecting means connected to said roller support members and to the other of said sections to interconnect said sections for movement to and from sheet-receiving position in unison.

7. In a sheet-handling mechanism having a vertically movable delivery hoist including a pile-supporting platform for receiving sheets which are moved in sequence to a position over the platform and dropped onto the platform from the said position, said hoist being lowered as a pile of sheets builds up thereon to maintain the top of the pile at about a predetermined level, and a temporary pile support adapted to be disposed over a pile on said pile-supporting platform to receive the sheets being dropped, the combination of spaced rails disposed adjacent opposite sides of said hoist and outwardly of the path of falling sheets for supporting said temporary pile support for generally horizontal movement from a position clear of the falling sheets to a position intercepting the falling sheets, said temporary pile support comprising two sections disposable in side-by-side relationship over said platform to form the temporary sheet-receiving pile support for intercepting said sheets, a plurality of roller means extending from the sides of said sections adjacent said rails and adapted to support said sections on said rails and said sections having withdrawn positions on opposite sides of said hoist clear of the falling sheets and supported on said rails by said roller means for movement laterally into side-by-side relationship over said platform, one of said sections moving outwardly of the ends of said rails, the roller means supporting said one of said sections including roller support members extending from the opposite sides of the section at points adjacent the inner end of the section and connected to the section to support the latter for swinging movement about a horizontal axis and rollers supported by said support members and adapted to roll on said rails, and interconnecting means connected to said roller support members and to the other of said sections to interconnect said sections for movement to sheet-receiving position in unison, support means for supporting the other of said sections in its inactive position comprising curved rail portions forming extensions of said rails, said other of said sections beng articulated along at least one line extending transversely of said rails and having sectionalized side plates and studs joining the sections of said side plates for hinging movement, said roller means on said other section comprising rollers supported on said studs for rotation about the axis thereof.

8. In a sheet-handling mechanism having a generally horizontal pile support movable endwise from an inactive position to an active position for supporting a pile of sheets, and a pair of spaced rails disposed along adjacent sides of said pile support and supporting the pile support for endwise movement between said positions, the improvement comprising downwardly curved extensions on said rails for supporting the pile support in its inactive position, said pile support being articulated along at least one line extending transversely of said rails to provide a plurality of sections and having sectionalized side members hinged along each line of articulation, support means extending from said pile support outwardly of the sides thereof adjacent each end of the pile support to support said pile support on said rails, and additional support means at each line of articulation of said pile support, said additional support means including a stud pivotally received in the side members of the pile support and constituting a hinge pin about which the adjacent sections pivot, and roller means mounted on said stud.

9. In a sheet-handling mechanism comprising a vertically movable delivery hoist including a pile-supporting platform for receiving sheets which are moved in sequence to a position over the platform and dropped onto the platform from said position, said hoist being lowered as the pile of sheets builds up thereon to maintain the top of the pile at about a predetermined level, a temporary pile support adapted to be disposed over a pile on said pile-supporting platform to receive the sheets being dropped, said temporary pile support comprising first and second sections having withdrawn positions on the opposite sides of said hoist and clear of falling sheets and end-to-end pile-supporting positions over said platform for intercepting falling sheets and in which pile-supporting positions said sections are contained in a generally horizontal plane, said first section comprising a plurality of platen sections disposed in end-to-end relationship, and means for supporting said first and second sections in their said positions and for endwise movement between said positions comprising horizontal portions supported outwardly of the path of falling sheets for supporting said first and second sections in their pile-supporting positions and a second portion extending to one side of said pile position and downwardly therefrom for supporting said first section in its withdrawn position with the platen sections thereof in end-to-end relationship, said first section including means interconnecting the adjacent platen sections thereof for articulating movement along a line transverse to the endwise movement of the platen sections as the first section moves between its said positions, and operating means interconnecting said first and second sections for moving said first and second sections toward and away from each other in unison.

10. In a sheet-handling mechanism comprising a vertically movable delivery hoist including a pile-supporting platform for receiving sheets which are moved in sequence to a position over the platform and dropped onto the platform from said position, said hoist being lowered as the pile of sheets builds up thereon to maintain the top of the pile at about a predetermined level, a temporary pile support adapted to be disposed over a pile on said pile-supporting platform to receive the sheets being dropped, said temporary pile support comprising first and second sections having withdrawn positions on opposite sides of said hoist and clear of falling sheets and end-to-end pile-supporting positions over said platform for intercepting falling sheets and in which said sections lie in a generally horizontal plane, said first section being comprised of a plurality of platen sections disposed in end-to-end relationship, rails on opposite sides of said hoist and clear of falling sheets for supporting said sections for movement between their said positions including generally horizontal rail portions for supporting said sections over said platform and downwardly curved portions forming extensions of said horizontal portions and extending downwardly therefrom outwardly of said hoist for supporting

said first section in its said withdrawn position, said platen sections extending between said rail portions and being disposed in end-to-end relationship in said withdrawn position for said first section, said first section including means interconnecting the adjacent platen sections thereof for articulation as said first section moves between its said positions and means supporting said sections on said rails comprising rollers cooperating with said sections and said rails.

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