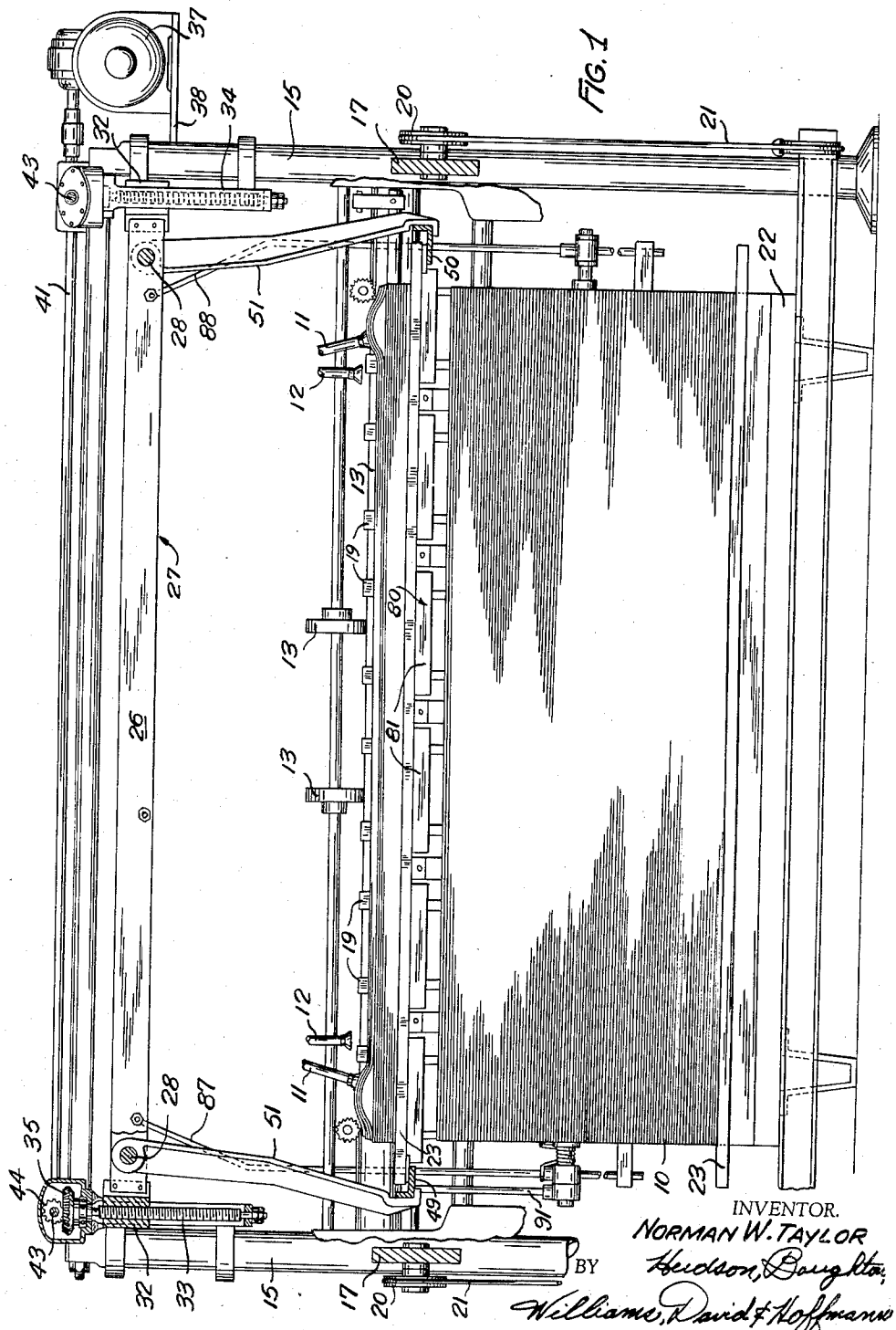
Jan. 17, 1961 N. W. TAYLOR 2,968,481

APPARATUS FOR FEEDING SHEETS FROM A PILE

Filed May 15, 1958 4 Sheets-Sheet 1

FIG. 1



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APPARATUS FOR FEEDING SHEETS FROM A PILE

Filed May 15, 1958 4 Sheets-Sheet 2

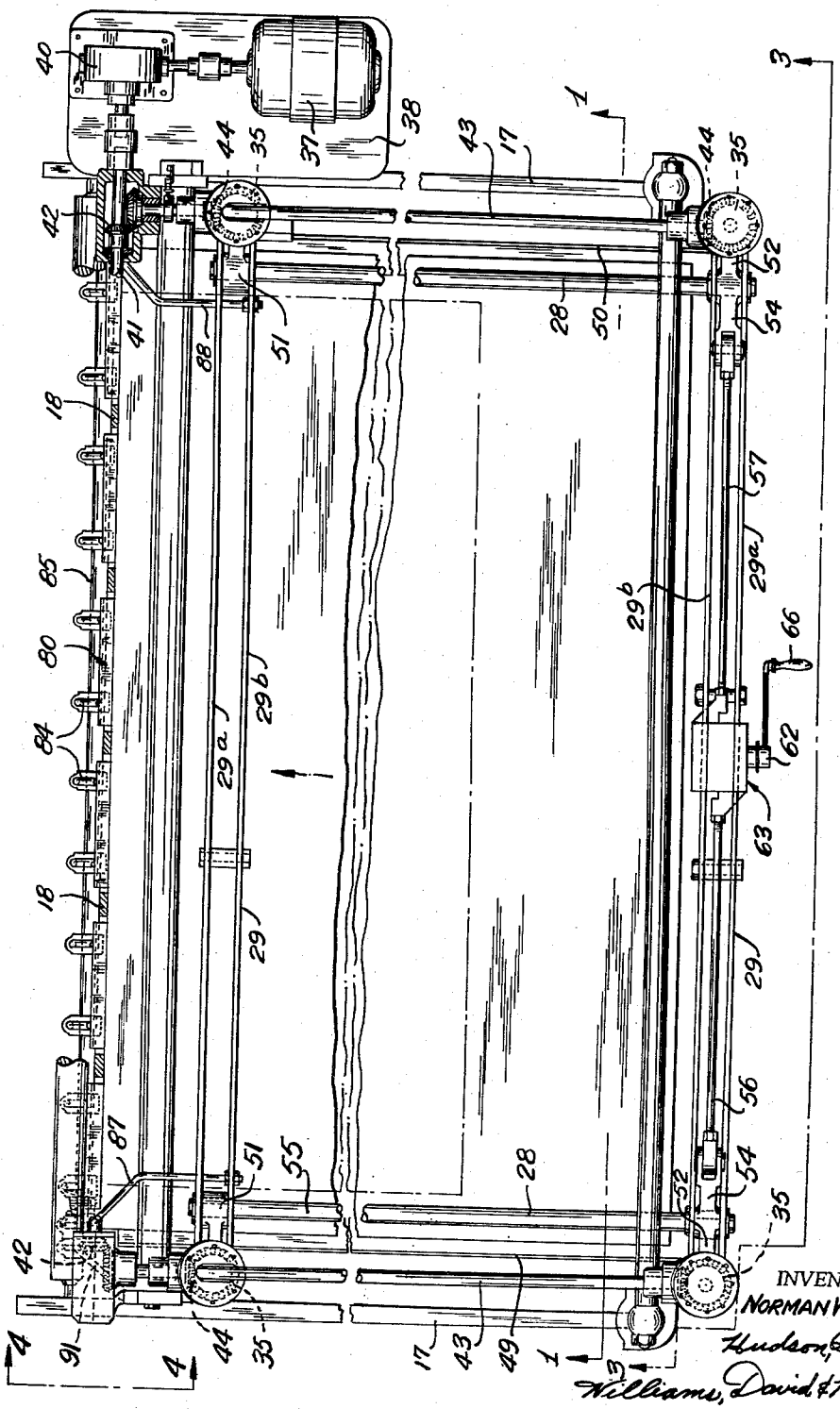

FIG. 2

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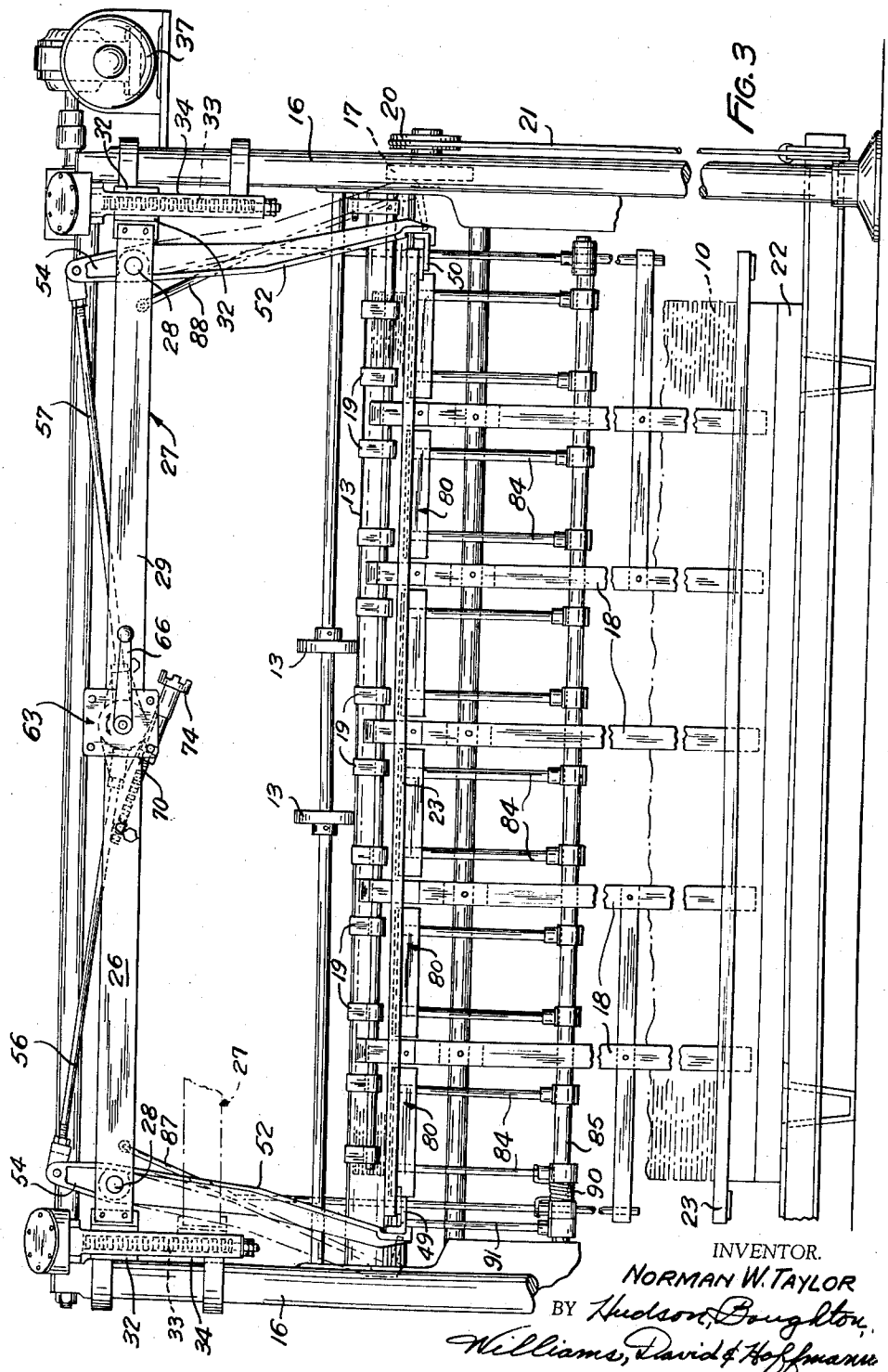
APPARATUS FOR FEEDING SHEETS FROM A PILE

Filed May 15, 1958

4 Sheets-Sheet 3

FIG. 3



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APPARATUS FOR FEEDING SHEETS FROM A PILE

Filed May 15, 1958

4 Sheets-Sheet 4

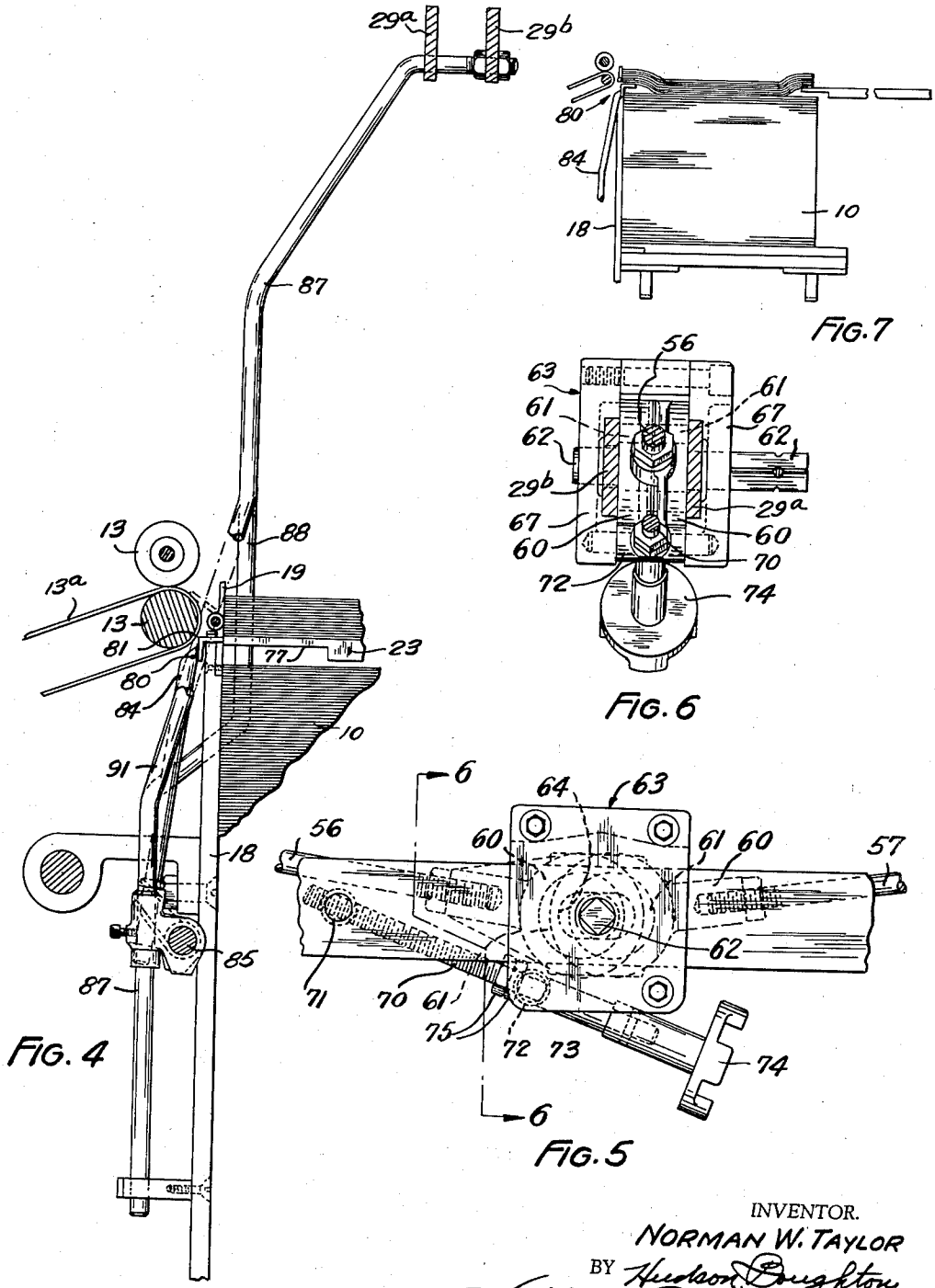

FIG. 4

FIG. 7

FIG. 6

FIG. 5

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2,968,481

APPARATUS FOR FEEDING SHEETS FROM A PILE

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Filed May 15, 1958, Ser. No. 735,446

21 Claims. (Cl. 271—62)

The present invention relates to an apparatus for feeding sheets from a pile to a sheet-handling mechanism and, more particularly, relates to such an apparatus having pile-hoisting means for maintaining the top of a pile at approximately a predetermined feeding level as the sheets are fed therefrom.

In the type of apparatus to which the present invention relates, a pile of sheets is supported on a pallet, the pallet, in turn, being supported on a hoist which is operable to move the pile vertically as sheets are fed from the top thereof to maintain the top of the pile at the level required by a sheet separating and forwarding mechanism associated with the apparatus.

It is conventional in an apparatus for feeding sheets from a pile to a sheet-handling mechanism to provide a new pile hoist and a remnant pile hoist so that a new pile may be brought into feeding position as the remnant part of the pile being fed is exhausted, enabling the feeding operation to be continuous without interruption to replenish the sheets. In this type of apparatus the new pile hoist is operated to elevate a pallet supporting a pile of sheets as the top sheets of the pile are fed and until the major portion of the pile is exhausted and a remnant pile remains. At this time the pallet with the remnant pile thereon is transferred from the new pile hoist to the remnant pile hoist, the latter then being operated to raise the pallet as the remnant pile is fed. While the remnant pile is being fed, a new pile of sheets is placed on the new pile hoist and elevated to a position where the top of the new pile is disposed in juxtaposition to the underside of the pallet supporting the remnant pile. The pallet supporting the remnant pile is then withdrawn from between the piles to deposit the remnant pile onto the top of the new pile while the hoists are operated to maintain the top of the remnant pile at the necessary feed level.

Conventionally the height of the top of the pile is gauged by pile-height gauging means which effects operation of the remnant pile hoist to maintain, during normal feeding, the pile at a height which enables the sheet separating and forwarding suckers associated with the apparatus above the rear edge of the pile to function properly. The pallets used with the apparatus described have heretofore been constructed to have a reduced thickness at the edge which is drawn last from the pile so that the rear edges of the new and remnant piles may be brought closer together than the thickness of the pallet before the pallet is completely withdrawn and the rear edge of the remnant pile permitted to drop onto the new pile. This prevents the rear edge of the remnant pile from dropping, at one time, the full thickness of the pallet as the latter is withdrawn. If the rear edge dropped the full thickness of the pallet in one step, the drop would lower the top of the rear edge to a point where it would be difficult or impossible for the sheet separating suckers to reach the top of the pile.

The remnant pile hoist, in the type of apparatus for feeding sheets described, generally comprises arms which are movable toward or away from each other to engage

the pallet carried by the new pile hoist and to support the pallet and remnant pile thereon on the remnant pile hoist. Furthermore, as the piles on either hoist are elevated, they are guided in their vertical movement by spaced front guides or stakes engaging the front side of the piles and extending upwardly to a point just below the feeding level of the sheets.

An important object of the present invention is to provide in an apparatus for feeding sheets from a pile, particularly an apparatus having new pile and remnant pile hoists, a vertically movable frame which is elevatable to maintain the top of a pile of sheets supported thereon at a predetermined feed level as sheets are fed from the top thereof and which has a member disposable under the front edge of the pile to support the same and which is so constructed and arranged that the movable frame can be elevated to a point for feeding all but a thin pack of sheets at the bottom of the pile without the pile-supporting member interfering with the operation of pull-in rolls supported adjacent the front edge of the pile at approximately feed level.

Another object is to provide an apparatus for feeding sheets as described in the preceding object in which the pile-supporting member adapted to be disposed under the front edge of the pile is positioned between the front guides for the pile and in which the elevating means is so constructed and arranged that the members for supporting the pile of sheets can be shifted laterally with respect to the front guides without causing relative movement between the front guides and the pile-supporting member.

Yet another object of the present invention is to provide a new and improved apparatus for feeding sheets from a pile, the apparatus including new and remnant pile hoists, the apparatus being so constructed and arranged that as the pallet is withdrawn, a pile-supporting member mounted on the secondary elevating means moves into a pile-supporting position under the front edge thereof to prevent the dropping of the front edge of the remnant pile onto the new pile, thereby maintaining the front edge of the remnant pile at a height which permits feeding the top sheets therefrom.

A still further object of the present invention is to provide a new and improved apparatus for feeding sheets from the top of a pile in which a pallet having the pile mounted thereon is supported by arms of a hoist, the arms being movable toward or away from each other to selectively engage or disengage the pallet and in the same direction in order to side-shift the pallet and pile of sheets supported thereon.

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 this specification and in which:

Fig. 1 is a vertical sectional view, somewhat diagrammatic, of an apparatus embodying the present invention, but with certain details of the new pile hoist thereof omitted, and taken approximately along line 1—1 of Fig. 2;

Fig. 2 is a plan view, principally of the remnant pile hoist of Fig. 1;

Fig. 3 is an elevational view of the apparatus of Fig. 2 looking in the direction of sheet feed and from approximately line 3—3 of Fig. 2;

Fig. 4 is a fragmentary elevational view looking from line 4—4 of Fig. 2, with parts omitted;

Fig. 5 is a fragmentary elevational view of the operating means for the remnant pile hoist arms of the apparatus;

Fig. 6 is a sectional view taken approximately along line 6—6 of Fig. 5; and

Fig. 7 is a diagrammatic view showing the relative position of the pile on the remnant hoist and the new pile hoist when the pallet supporting the remnant pile is partially withdrawn.

The apparatus for feeding sheets shown in the drawings comprises new and remnant pile hoists for elevating a pile of sheets **10**, as sheets are fed from the top thereof, to maintain the top of the pile at the level required for proper operation of the sheet separating and forwarding means associated with the apparatus. The sheet separating and forwarding means comprises separating suckers **11** adapted to pick up the top sheet of the pile and sheet forwarding suckers **12** for forwarding the separated sheet to pull-in rolls **13** disposed adjacent the front of the pile at approximately the level of the suckers **12**. The pull-in rolls **13** take the sheet and feed it to the sheet-handling mechanism by means of tapes **13***a* passing around the lower one of the rolls **13**.

The apparatus shown includes front and rear stationary uprights **15**, **16** and overhead side members **17** extending along the opposite sides of the apparatus and connecting the upper ends of the front and rear uprights **15**, **16** on that side of the apparatus. Transversely spaced, stationary guides **18** are provided and are adapted to engage the front of the piled sheets to guide the sheets in their vertical movement. A rockable shaft having spaced vertical guide members or flaps **19** thereon extends along the top of guides **18**. When the top sheet has been separated from the pile, the members **19** are rocked outwardly by their supporting shaft to their dotted-line position in Fig. 4 so as to permit the movement of the top sheet to the pull-in rolls **13**.

The new pile hoist includes pulleys **20** mounted on the overhead side members **17** and over which cables **21** are trained. The cables **21** have stirrups at their lower ends adapted to be attached to the ends of rails which extend under a skid or pallet platform **22** upon which a pallet **23** is supported, the pallet **23** having the pile of sheets **10** thereon to be fed by the sheet separating and forwarding means associated with the apparatus. Only one rail and two cables **21** trained over opposed pulleys **20** on opposite side members appear in the drawing. It is to be understood, however, that a pair of rails and two pairs of cables **21** are utilized, one rail extending transversely of the side members and under the pallet skid **22** adjacent each of the opposite sides thereof. The cables are wound on drums, not shown, and adapted to be taken in by mechanism, not shown, since the drums and mechanisms do not, per se, form a part of this invention and may be the same as that shown in Schmidt et al. Patent No. 2,701,136. Suffice it to say that the cables are taken in an increment at a time to raise the pile supported thereon as sheets are fed from its top. After a predetermined portion of the pile on the new pile hoist has been fed, the pallet supporting the partially depleted pile on the new pile hoist is transferred to a remnant pile hoist **26**. The remnant pile hoist is then elevated under the control of conventional pile-height gauging mechanism, not shown, to maintain the top of the remnant pile supported thereon at the proper feeding level as the sheet separating and forwarding suckers transfer the sheets therefrom to the pull-in rolls.

The remnant pile hoist includes a rectangular frame **27** supported between the stanchions or uprights **15**, **16** and comprised of side bars **28** and front and rear frame members **29** supporting and connecting the side bars **28**. The front and rear frame members **29** are each formed by spaced parallel plate members **29***a*, **29***b*. The frame **27** has nuts **32** at each of the corners thereof which are threaded onto vertical jack screws **33** rotatably supported in brackets **34** fixed to the adjacent upright **15** or **16**. The upper ends of the screws **33** carry bevel gears **35** which are driven to rotate the screws **33**. It can be seen that as the screws **33** are rotated, the frame **27** is raised

or lowered depending upon the direction of rotation of the screws.

The screws **33** are rotated from a motor **37** mounted on a platform **38** supported by the uprights **15**, **16**, adjacent the front right-hand side of the apparatus as viewed in Fig. 2. The motor **37** is connected to the input shaft of a gear box **40** which has an output shaft connected to drive a shaft **41** extending across the front of the apparatus adjacent the front uprights **15**. The shaft **41** has bevel gears **42** thereon which drive respective shafts **43** extending from the front to the rear of the apparatus along respective sides of the apparatus. The shafts **43** have bevel gears **44** thereon which mesh with and drive the gears **35** of the screws **33**.

The operation of the motor **37** and the mechanism for raising and lowering the remnant pile hoist do not, per se, form a part of the present invention. Suffice it to say that the motor **37** is intermittently operated as required in response to pile-height gauging means to raise the pile to maintain the top of the remnant pile supported thereon at a feeding level, that when the remnant pile hoist is to be disabled, the raising operation of the motor **37** is discontinued, and that the motor may be operated independently of the pile-height gauging means to lower the frame **27** and get it into position for the next partially depleted pile. The details of structure and manner of operation of the new pile hoist and remnant pile hoist may be the same or similar to that shown in the aforesaid Schmidt et al. patent except for those differences hereinafter pointed out.

In the preferred and illustrated embodiment, the pallet **23** supporting the remnant pile is supported on the remnant pile hoist by angles **49**, **50** disposed on opposite sides of the pallet and extending from the front to the rear of the apparatus parallel to the direction of sheet movement. Each angle **50** is fixed to the lower end of front and rear arms **51**, **52**, respectively, the front and rear arms supporting each angle being opposed to the front and rear arms supporting the other angle. The arms **51**, **52** supporting each angle are fixed at their upper ends to the adjacent side bar **28** extending between the front and rear frame members **29**, the bars **28** being supported for rocking movement in the frame members **29**. The arms **51**, **52** are disposed between the plate members **29***a*, **29***b* forming the adjacent one of the front and rear frame members **29** and the rear arms **52** each has a portion **54** which extends upwardly above the rear frame member **29**. The opposed arms **51** and the opposed arms **52** positioned on the opposite sides of the frame **27** may be rocked toward and away from each other to move the angles **49**, **50** toward and away from engagement with a pallet **23** positioned therebetween. The arms are rocked about the axes of their respective rockshafts by operating means including links **56**, **57** each pivotally connected to the portion **54** of a respective one of the rear arms **52**. The links **56**, **57** extend from their respective rear arms **52** toward the front-to-rear center line of the frame **27** and each has a strap **60** journaled to an eccentric **61** fixed to a crankshaft **62** rotatably supported in a carriage **63** mounted on the plate members **29***a*, **29***b* forming the rear frame member **29**. The shaft **62** is a horizontal shaft and passes through aligned elongated slots **64** in the plate members **29***a* and **29***b*. The high points of both eccentrics **61** are at their maximum throw position for the same angular position of the shaft **62**. If the shaft is rotated in one direction the links **56**, **57** will be moved toward each other for 180° of revolution and away from each other for the remaining 180°. It can be seen that when the eccentric members have their maximum throw for the same shaft position, the arms supporting the angles **49**, **50** will be moving simultaneously either toward or away from the pile upon rotation of shaft **62**. A handle **66** is provided for rotating the shaft **62**. While the links **56**, **57** are connected directly to the rear arms **52**, it will be noted that the

front arms 51 will also move toward and away from each other with the arms 52 since both the arms 52 and the arms 51 are also connected to the bars 28.

While the shaft 62 may be rotated to move the arms in opposite directions about their axes, the carriage 63 may be moved along the rear frame member 29 to cause the arms to move in the same direction about their axes. The carriage 63 is formed by two slide blocks 67, one disposed on each of the outer sides of the plate members 29*a*, 29*b* forming the rear frame member 29 and each has a recess therein for slidingly receiving the adjacent plate member. The slide blocks 67 rotatably support the shaft 62 and are connected together at their corners.

The carriage is moved along the rear frame member 29 by rotation of a screw member 70 having one end threaded into a bore in a pin 71 extending between the plate members 29*a*, 29*b* and forming the rear frame member 29 at a point adjacent the carriage 63. The screw member 70 is received in an opening in a spacer member 72 spacing the slide blocks 67 at their lower left-hand corners and has a shoulder portion 73 which engages the spacer member 72 and a hand knob 74 on the side thereof remote from the threaded pin 71. A pair of nuts 75 are threaded onto the screw portion of the member 70 and abut the spacer 72 on the side thereof opposite to the shoulder portion 73. When the screw member 70 is rotated, the threaded portions of the member are threaded into and out of the pin 71 to move the carriage 67 along the rear frame member. Movement of the carriage 67 along the rear frame member 29 will cause the arms 51, 52 to move in the same direction about their axes and will effect a lateral or side-shifting movement of the load supported thereby in a direction dependent upon the direction of movement of the carriage. The side-shifting or lateral movement also facilitates the positioning of the arms 51, 52 to pick up a pallet on the new pile hoist.

In the apparatus as thus far described, the new pile hoist is operated under control of the pile-height gauging means to elevate a new pile of sheets as the sheets are fed from the top thereof to maintain the top of the pile at the level necessary for proper operation of the sheet separating and feeding suckers. After the new pile has been partially depleted the pallet supporting the pile of sheets on the new pile hoist is transferred to the remnant pile hoist by lowering the frame 27 of the remnant pile hoist to its lowermost position and operating the shaft 62 to effect engagement of the angles 49, 50 with the sides of the pallet. The remnant pile hoist is then placed under the control of the pile-height gauging means, and is operated to maintain the top of the remnant pile at the proper feed level as the sheets are fed from the top thereof. Before the remnant pile on the remnant pile hoist is exhausted a new pile is brought into position on the new pile hoist and the latter is operated to raise the new pile so that the top thereof is positioned immediately below the underside of the pallet supporting the remnant pile. When the new pile is so positioned the pallet supporting the remnant pile is withdrawn by sliding the pallet out from the rear side of the remnant pile. Heretofore, each portion of the remnant pile has, in the type of apparatus shown in the drawings, fallen onto the new pile as soon as the pallet is withdrawn from underneath that portion of the remnant pile. The pile supporting pallet has been formed with a rectangular type cutout 77 in the underside thereof at the forward edge of the pallet so that the forward edge of the pallet; i.e., the last edge of the pallet to be withdrawn from the pile, is of a reduced thickness as compared to the rest of the pallet. As the pallet is withdrawn, the withdrawal movement is stopped when the rear edge of the remnant pile is supported by the portion of reduced thickness. At this time the new pile hoist is operated independently of the remnant pile hoist to raise the new pile until the top thereof is immediately adjacent the underside of the portion of the pallet having a reduced thickness and the pallet is then completely withdrawn and the remnant pile including the rear edge thereof allowed to drop onto the top of the new pile. By operating the apparatus in the manner described, the rear edge of the remnant pile is always maintained at proper feeding level since the pile-height gauging mechanism can compensate for a drop equal to the reduced thickness of the pallet although it could not readily compensate for a drop corresponding to the full thickness of the pallet.

In accordance with one feature of the present invention, means is provided for supporting the front edge of the pile as the pallet is withdrawn. To this end, a plurality of pile supporting members 80 are disposed between each of the stationary front guides 18 as well as outwardly of each of the outer front guides. The pile supporting members 80 comprise inverted angles 81 having a generally horizontal, pile-carrying portion and a vertical portion which depends from the outer edge of the horizontal portion. The angles 81 are each supported by a pair of rods 84 fixedly mounted on a common pivotal support bar 85 extending transversely of the front guides 18 adjacent the front sides thereof. The support bar 85 extends outwardly of both sides of the pile of sheets being fed. The rods 84 are connected to the outer sides of the vertical portion of the corresponding angle and the support bar 85 is supported by hangers 87, 88 depending from the front frame member 29 of the remnant pile hoist 26. The hangers 87, 88 respectively support the opposite ends of the support bar 85 and for the major portion of their length are disposed outwardly of the pile being fed by the apparatus, the upper ends of the hangers 87, 88 above the suckers 11, 12 being bent inwardly to permit the upper ends of the hangers to be conveniently secured to the front frame member 29, as shown in Fig. 4.

The support rods 84 are secured to the support bar 85 for rotational and translatory movement therewith and the support bar 85 is rockably supported by the hangers 87, 88. A coil spring 90 is disposed about the support bar 85 adjacent the left-hand end thereof as viewed in Fig. 1 and has one end secured to the hanger 87 and its other end to the adjacent support rod 84 of the adjacent pile supporting member 80. The coil spring 90 operates to urge the support bar 85 to rotate in a direction to move the pile supporting members 80 inwardly of the adjacent guides 18. The inward movement of the pile supporting members 80 may be limited by the engagement of the upper portion of a lever 91 with the front end of the angle 49, the lever 91 being carried by the support bar 85.

The spring 90 urges the pile supporting members 80 into engagement with the front edge of the pallet supporting the remnant pile and as the pallet is withdrawn the pile supporting members will be moved inwardly to a pile-carrying position under the front edge of the remnant pile. Pile supporting members 80 will then support the front edge of the remnant pile and raise the same as the remnant pile hoist is operated under the pile-height gauging means to maintain the front edge of the remnant pile at the proper feed level. The use of the members 80 to support the front edge of the remnant pile eliminates or minimizes the problem of raising the front edge of the sheets high enough after the pallet is withdrawn to clear the flaps 19 as the sheets are fed forward to the pull-in rolls 13. Without such support, sheets could easily stumble on the flaps 19 on their way to the nip of the rolls. Reference is made to Fig. 7 which shows the position of the pile supporting members 80 immediately after the withdrawal of the pallet, supporting the remnant pile to its position where the reduced portion thereof is supporting the rear edge of the pile and immediately prior to the operation of the new pile hoist to raise the new pile to dispose the same immediately adjacent the underside of the reduced portion of the

pallet. It will be noted that in this position the sheets of the remnant pile dip at their central portion. The dip apparently aids the operation of the air which is conventionally used to help float the top sheet to the rolls 13, since improved feeding is noted when the members 80 are provided and used as described. Inasmuch as the pile supporting members 80 are adapted to support the front edge of a relatively thin remnant pile, it is necessary that the pile supporting members 80 be constructed so as to move into the space between the pull-in rolls without interfering with or striking the pull-in-rolls. As is best shown in Fig. 4 the upper ends of the support rods 84 are beveled or tapered to aid in eliminating interference with the pull-in rolls and the pile supporting members themselves are disposed inwardly of a vertical plane tangent to the inner side of the pull-in rolls. With the pile supporting members and the support rods therefor constructed in this manner, the pile supporting members will be partly received in the space between the pull-in rolls and the piles as the frame 26 is moved toward its upper limit.

After the pallet supporting the remnant pile has been withdrawn and the remaining sheets of the top pile are deposited on the new pile, the pile supporting members 80 are moved outwardly against the bias of spring 90. This is done by pulling on the upper end of the lever 91. The upper end of the lever 91 is bent to extend laterally so as to be in position to be grasped by the operator as well as to be properly disposed to engage the forward end of angle 49 when the members 80 move inwardly. If desired suitable latching or tying means may be provided for latching or holding the pile supporting members in their outermost position. After the pile supporting members 80 have been moved to their outer position the motor 37 is operated to lower the frame 27 to position the hoist to receive another pallet from the new pile hoist after the pallet has been raised by the new pile hoist above the lower level of the angles 49, 50. If latching means has not been provided the operator can either hold the members 80 in their outermost position as the frame 27 is lowered or the members may be allowed to ride down the front of the new pile.

While the pile supporting members 80 have been described as moving into position upon the withdrawal of the pallet supporting the remnant pile, it will be understood by those skilled in the art that in some types of apparatus for feeding sheets from the top of the pile, the pile supporting members 80 might be in pile-carrying position for the entire time that the pile supported by the remnant hoist is being fed. This is particularly true in the type of apparatus where the rear part of the pallet or pile is supported by a rail extending transversely of the direction of feed and which is withdrawn in a direction transversely to the direction of feed movement. It will also be understood by those skilled in the art that, in the illustrated embodiment, the reduced portion of the pallet supporting the remnant pile could be carried on the horizontal portion of the angles forming the pile supporting members 80 in which case the pile supporting members 80 would be disposed in their pile-carrying position for the entire feeding operation of the remnant pile. Furthermore, the pallet used with the disclosed embodiment could be provided with a tapered forward edge rather than a cutout as described. In this case the forward edge can be used to effect a gradual lowering of the rear edge of the remnant pile while the pile hoists are operated to maintain the pile top at feed level.

It can now be seen that the present invention has provided a new and improved apparatus for feeding sheets from the top of a pile and that the objects heretofore enumerated and others have been accomplished. The disclosed apparatus includes a pile hoist having arms which are movable toward or away from each other to selectively engage or disengage a pallet having a pile of sheets thereon which are to be fed and the hoist is so constructed and arranged that a remnant pile of sheets may be side-shifted, or the arms for supporting the pile may be side-shifted to pick up an off-center pallet and remnant pile. In addition, a pile hoist for lifting all but a small amount of a remnant pile is provided with a pile supporting member adapted to be positioned under the front edge of the pile and is so constructed and arranged that it does not interfere with pull-in roll or rolls adjacent the top of the pile as the hoist is operated to its upper limit of movement. Furthermore, the pile supporting members which are disposable under the front edge of the pile facilitate the withdrawal of the pallet to place the remaining sheets thereon onto a new pile disposed therebeneath without disturbing the continuous feeding operation and are preferably supported so that they do not side-shift with the arms for supporting the new pile.

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

Having thus described my invention, what I claim is:

1. An apparatus for forwarding sheets from the top of a pile including stationary upright frame members, a pile hoist for supporting a pallet having a pile of sheets thereon which are to be fed, said hoist being operable to maintain the top of the pile at a feeding level and comprising a movable frame supported by said stationary frame members for vertical movement and a pair of opposed arms supported on said movable frame and having pallet-engaging portions adapted to engage the opposite sides of said pallet to support the pallet and pile on said movable frame in a feeding position, means connecting each of said arms to said movable frame for selective movement with respect thereto to move said pallet-engaging portions laterally toward or away from engagement with said pallet, and operating means operatively connected to said arms for selectively moving said arms and said pallet-engaging portions thereof laterally in the same direction whereby said arms are selectively movable to laterally shift the position of a pile of sheets supported by said arms.

2. An apparatus for forwarding sheets from the top of a pile including stationary upright frame members, a new pile hoist adapted to support a pile of sheets on a pallet in position to be fed and operable to maintain the top of the pile at a feeding position, a remnant pile hoist for supporting and elevating said pallet when the pile thereon has been depleted to a predetermined height, said remnant pile hoist comprising a movable frame supported by said stationary frame members for vertical movement, a pair of opposed arms supported on said movable frame and having pallet-engaging portions adapted to engage the opposite sides of said pallet to support the pallet on said movable frame in a feeding position for the remnant pile thereon, means connecting each of said arms to said movable frame for selective movement with respect thereto to move said pallet-engaging portions laterally toward or away from engagement with said pallet, and operating means operatively connected to said arms for selectively moving said arms and said pallet-engaging portions thereof laterally in the same direction whereby said arms are selectively movable to laterally shift the pile supporting position of said arms relative to said new pile hoist and to said frame members.

3. In an apparatus for feeding sheets from the top of a pile and including stationary upright frame members and a pile hoist for supporting a pallet having a pile of sheets thereon which are to be fed, said hoist comprising a movable frame supported by said upright frame members and elevatable to maintain the top of the pile at a feeding level and a pair of opposed arms supported on said movable frame and having pallet-engaging portions

adapted to engage the opposite sides of said pallet to support the pallet and pile thereon at a position for feeding sheets from the top of the pile, the improvement which comprises pivot means connecting each of said arms to said movable frame and supporting said arms for selective movement about parallel axes to move toward or away from said pallet to selectively engage and disengage the arms with said pallet and actuating means on said frame and connected to said arms for selectively and simultaneously operating said arms in the same direction about their axes whereby the pallet-supporting position of said arms may be shifted laterally.

4. In an apparatus for feeding sheets from the top of a pile of sheets and comprising a pile hoist for lifting a pallet having a pile of sheets thereon and for maintaining the top of the sheet pile at approximately a predetermined feed level, said hoist comprising a frame vertically movable to maintain the top of the pile at approximately said level and a pair of opposed arms supported by said frame and having first portions adapted to engage the opposite sides of said pallet to support the pallet and pile in a position for feeding sheets from the top of the pile, the improvement which comprises pivot means connecting each of said arms to said frame and supporting said arms for movement about parallel axes to selectively engage and disengage the arms with said pallet, and actuating means on said frame connected to said arms for selectively operating one of said arms in either direction about its axis and the other of said arms in the same direction about its axis, and further actuating means for selectively actuating one of said arms in either direction about its axis and the other of said arms in the opposite direction about its axis.

5. In an apparatus for feeding sheets from the top of a pile of sheets and comprising a pile hoist for lifting a pallet having a pile of sheets thereon and for maintaining the top of the sheet pile at approximately a predetermined feed level, said hoist comprising a frame vertically movable to maintain the top of the pile at approximately said level and a pair of opposed arms supported by said frame and having pallet-engaging portions adapted to engage the opposite sides of said pallet to support the pallet and pile in a position for feeding sheets from the top of the pile, the improvement which comprises pivot connections connecting said opposed arms to said frame for rocking movement about parallel axes to selectively move said arms either toward or away from said pallet, a member supported on said frame intermediate said arms, an individual link pivoted to each arm and connected to said member, and actuating means on said member and connected to said links for selectively moving said links endwise toward or away from said member, and means for moving said member toward one or the other of said arms selectively.

6. In an apparatus for feeding sheets from the top of a pile of sheets, the structure as defined in claim 5 wherein said actuating means comprises a rotatable shaft on said member, first and second eccentric members on said shaft and first and second cooperating elements on said first and second links respectively cooperating with said first and second eccentric members respectively to actuate said links endwise upon rotation of said shaft.

7. In an apparatus for feeding sheets from the top of a pile and including sheet separating and forwarding suckers for separating and forwarding the top sheet of the pile, pull-in rolls receiving the separated sheet from the forwarding suckers, a pile hoist for lifting a pallet having a pile of sheets thereon and for maintaining the top of the pile at approximately a predetermined feed level, the pile on the pallet supported by said elevating mechanism having a front side generally parallel to and facing said rolls and said hoist including a vertically movable frame and a pair of opposed arms depending from said frame and having first portions adapted to engage said pallet on opposite sides thereof to support the pallet and pile thereon in a position for feeding sheets from the pile while maintaining the top thereof at said predetermined feed level, a plurality of transversely spaced vertical guides engaging the front of said pile and extending upwardly to a point adjacent said pull-in rolls, means connecting each of said arms to said frame for movement in first and second directions to respectively move the first portion thereof toward and away from said pile, and operating means connected to said arms for moving said arms selectively in their first or second directions simultaneously, the improvement which comprises further operating means connected to said arms for selectively moving either one of said arms in its first direction and the other of said arms in its second direction, a pile supporting member adjacent said guides and disposed adjacent the front end of a pallet supported by said arms, a support member for said pile supporting member carried by said frame, means connecting said pile supporting member to said support member and mounting said pile supporting member for movement from a position outwardly of the front side of said pile to a second position inwardly of and under the front side of said pile for supporting the front edge of said pile, biasing means connected between said frame and said pile supporting member and urging said pile supporting member into engagement with the front end of said pallet and effecting movement of said pile supporting member to said second position upon withdrawal of said pallet.

8. In an apparatus for feeding sheets from the top of a pile as defined in claim 7 wherein said support member extends outwardly of the sides of the pile supported on said pallet, and said frame has means depending therefrom and disposed outwardly of the sides of the pile on said pallet for supporting said support member.

9. In an apparatus for feeding sheets from the top of a pile as defined in claim 8 wherein said pile supporting member is disposed between a pair of adjacent front guides and fits closely into the space therebetween, said arms being movable relative to said guides to any of their positions while said pile supporting member is constrained against transverse movement relative to said guides.

10. In an apparatus for feeding sheets from the top of a pile and including sheet separating and forwarding suckers for separating and forwarding the top sheet of the pile, a pull-in roll for receiving the separated sheet from the forwarding suckers, a new pile hoist for supporting and lifting a pallet having a pile of sheets thereon and to maintain the top of the pile at approximately a predetermined feed level, the pile on the pallet supported by said new pile hoist having a front side generally parallel to and facing said pull-in roll, a plurality of transversely spaced vertical guides engaging the front of the pile on said new pile hoist and extending upwardly to a point adjacent said pull-in roll, a remnant pile hoist for taking the pallet from said new pile hoist after said pallet has been elevated to a predetermined height by said new pile hoist and the pile thereon partially depleted, said remnant pile hoist being operable to elevate the pallet with the remnant pile thereon to maintain the top of the remnant pile at said predetermined feed level and including a vertically movable frame and a pair of opposed arms depending from said frame and having first portions adapted to engage said pallet on opposite sides thereof to support the pallet and pile thereon in a position for feeding sheets from the pile while maintaining the top thereof at said predetermined feed level, means connecting each of said arms to said frame for movement in first and second directions to respectively move the first portion thereof toward and away from said pile, and operating means connected to said arms for moving said arms selectively in their first or second directions simultaneously, the improvement which comprises further operating means connected to said arms for selectively moving either one of said arms in its first direction and the other of said arms in its second direction, a pile

supporting member adjacent said guides and disposed adjacent the front end of a pallet supported by said arms, a support member for said pile supporting member carried by said frame, means connecting said pile supporting member to said support member and mounting said pile supporting member for movement from a position outwardly of the front side of said pile to a second position inwardly of and under the front side of said pile for supporting the front edge of said pile, biasing means connected between said frame and said pile supporting member and urging said pile supporting member into engagement with the front end of said pallet and effecting movement of said pile supporting member to said second position upon withdrawal of said pallet.

11. In an apparatus for feeding sheets from the top of a pile and including pull-in rolls for taking sheets and forwarding the same, a frame including means for supporting in a generally horizontal position a pallet having a pile of sheets thereon, the pile on the pallet supported by said frame having a front side generally parallel to and facing said pull-in rolls and said frame being moved vertically to maintain the top of the pile of sheets at approximately a predetermined level for feeding the top sheet edgewise from the top of the pile to said pull-in rolls, said pallet being removable from said frame by horizontal movement in the direction opposite to the direction of sheet movement to said pull-in rolls and said sheet feeder including transversely spaced guide bars engaging and guiding the front of said pile in its vertical movement, the improvement which comprises a support member carried by said frame, and a pile supporting member disposed adjacent said guides and reciprocably supported by said support member for movement toward and away from the front edge of a pallet supported by said frame and movable from a position outwardly of said pile to a second position inwardly of the front edge of said pile, said pile supporting member being adapted to engage the front edge of said pallet and being movable to said second position under the front edge of said pile as the pallet is withdrawn.

12. In a sheet feeder as defined in claim 11 wherein said support member is disposed below the pallet position on said frame and said pile supporting member extends upwardly from said support member and the upper end thereof is disposed inwardly of said guides when the pile supporting member is in said second position.

13. In a sheet feeder as defined in claim 11 wherein at least three guide bars are provided for guiding the front side of the pile and in which a pile supporting member is disposed between each pair of adjacent guides.

14. In an apparatus for feeding sheets from the top of a pile and including pull-in rolls for taking sheets and forwarding the same, a frame including means for supporting in a generally horizontal position a pallet having a pile of sheets thereon, the pile on the pallet supported by said frame having a front side generally parallel to and facing said pull-in rolls and said frame being moved vertically to maintain the top of the pile of sheets at approximately a predetermined level for feeding the top sheet edgewise from the top of the pile to said pull-in rolls, said pallet being removable from said frame by horizontal movement in the direction opposite to the direction of sheet movement to said pull-in rolls and said sheet feeder including transversely spaced guide bars engaging and guiding the front of said pile in its vertical movement, the improvement which comprises a support member carried by said frame, a pile supporting member disposed adjacent said guides and reciprocably supported by said support member for movement toward and away from the front edge of a pallet supported by said frame and movable from a position outwardly of said pile to a second position inwardly of the front edge of said pile, said pile supporting member being adapted to engage the front edge of said pallet while the latter is supporting a pile on said frame and being movable to said second position under the front edge of said pile as the pallet is withdrawn, and means connected between said frame and said pile supporting member for urging said pile supporting member toward said second position.

15. In a sheet feeder as defined in claim 14 wherein at least three guide bars are provided for guiding the front side of the pile and in which a pile supporting member is disposed between each pair of adjacent guides.

16. A machine for separating and forwarding sheets from the top of a pile wherein the separated sheets are fed by forwarding means to a pull-in roll adjacent the front of the pile and which includes a pile hoisting means for gradually raising the pile as the sheets are removed from the top, said pile hoisting means comprising a new pile hoist and a remnant pile hoist, said remnant pile hoist being adapted to take a partially exhausted pile from the new pile hoist and to continue the elevation thereof and including a pile carrying member adjacent the front of the pile and a support bar for mounting said pile carrying member, said support bar being moved upwardly when said remnant pile hoist is operated to raise said pile, and said pile carrying member extending upwardly from said support bar and having a pile supporting position under the front edge of said pile in which it is adapted to extend into the space between said pull-in roll and the plane of the front of said pile when said support bar is at the upper limit of its movement.

17. In a machine as defined in claim 16 wherein said pile carrying member is movably supported for movement from said pile supporting position to a position outwardly of said pile.

18. In a machine as defined in claim 16 wherein said pile carrying member is movably supported for movement from said pile supporting position to a position outwardly of said pile and wherein biasing means is connected to said pile supporting member and urges said member to said pile supporting position.

19. In a machine for separating the top sheet from a pile of sheets and delivering it to pull-in rolls adjacent the front side of pile and having a frame for supporting said pile of sheets and movable vertically to maintain the top of the pile at a predetermined level approximately at the height of said pull-in rolls and stationary transversely spaced vertical guides engaging the front side of the pile of sheets and terminating below the path of movement of the sheet from the top of the pile to the pull-in rolls, the improvement which comprises a pile supporting member mounted on said frame and having a pile carrying position in which an upper part thereof is disposed under the front edge of the pile and wherein the outer side of the upper part facing in the direction of sheet movement is disposed inwardly toward the pile from a vertical plane containing the axis of said pull-in roll, whereby said pile supporting member is movable upwardly to approximately said predetermined level without striking said pull-in roll, and a support member outwardly of said guides mounting said pile supporting member and carried by said frame and disposed below said part.

20. In the method of feeding sheets continuously wherein sheets are piled on a pallet, the sheets fed from the top of the pile while lifting the pile to maintain the top thereof at a feeding level as the pile is depleted and wherein a new pile is positioned beneath the partially depleted pile and raised until it approaches the partially depleted pile at which time the pallet is withdrawn to combine the pile thereon with the new pile and as the pallet is withdrawn the rear edge of the pile is supported by a member or part of the pallet of reduced thickness as compared to the thickness of the pallet proper while the piles are moved closer together to prevent the rear edge of the pile from dropping in one step the thickness of the pallet as the latter is withdrawn, the improvement which comprises supporting the front edge of the partially depleted pile independently of the new pile as

the pallet is withdrawn to prevent the front edge of the partially depleted pile from dropping the thickness of the pallet and onto the new pile and continuing the elevating of said front edge to maintain the front edge of the partially depleted pile at approximately feeding height.

21. An apparatus for forwarding sheets from the top of a pile including a stationary frame, a pile hoist for supporting a pallet having a pile of sheets thereon, said pile having a front side and rear side and said sheets being fed from the pile by moving the sheet away from the front side in a direction extending from the rear side of the pile toward the front side thereof, said hoist being operable to maintain the top of the pile at a feeding level while sheets are being removed therefrom and comprising a movable frame supported by said stationary frame for vertical movement and a pair of front hangers and a pair of rear hangers depending from said movable frame adjacent the front and rear sides of the pile, said hangers having means at the lower ends thereof for supporting said pallet on said movable frame and being movable relative to said movable frame to move to and from pallet-supporting positions, and means supporting said pair of front hangers and said pair of rear hangers respectively for adjusting movement in the same direction relative to said stationary frame and parallel to the front side of said pile, and said hoist including means for selectively effecting said adjusting movement.

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