Aug. 22, 1961 T. J. ELLIOTT ET AL 2,997,298

PILE HANDLING MECHANISM

Filed July 1, 1959 2 Sheets-Sheet 1

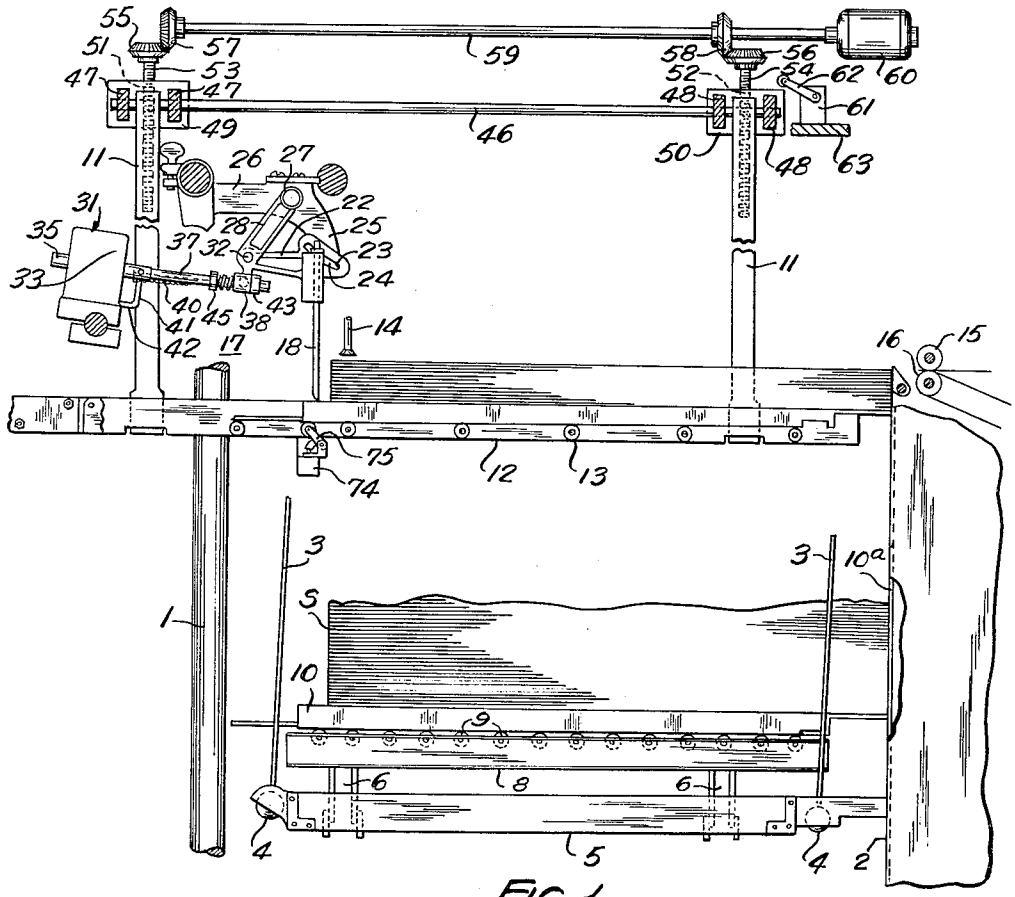


FIG. 1

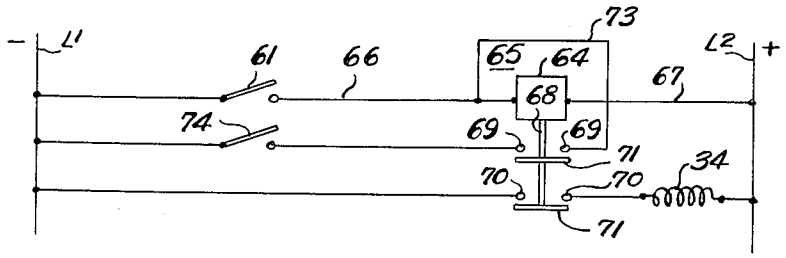


FIG. 3

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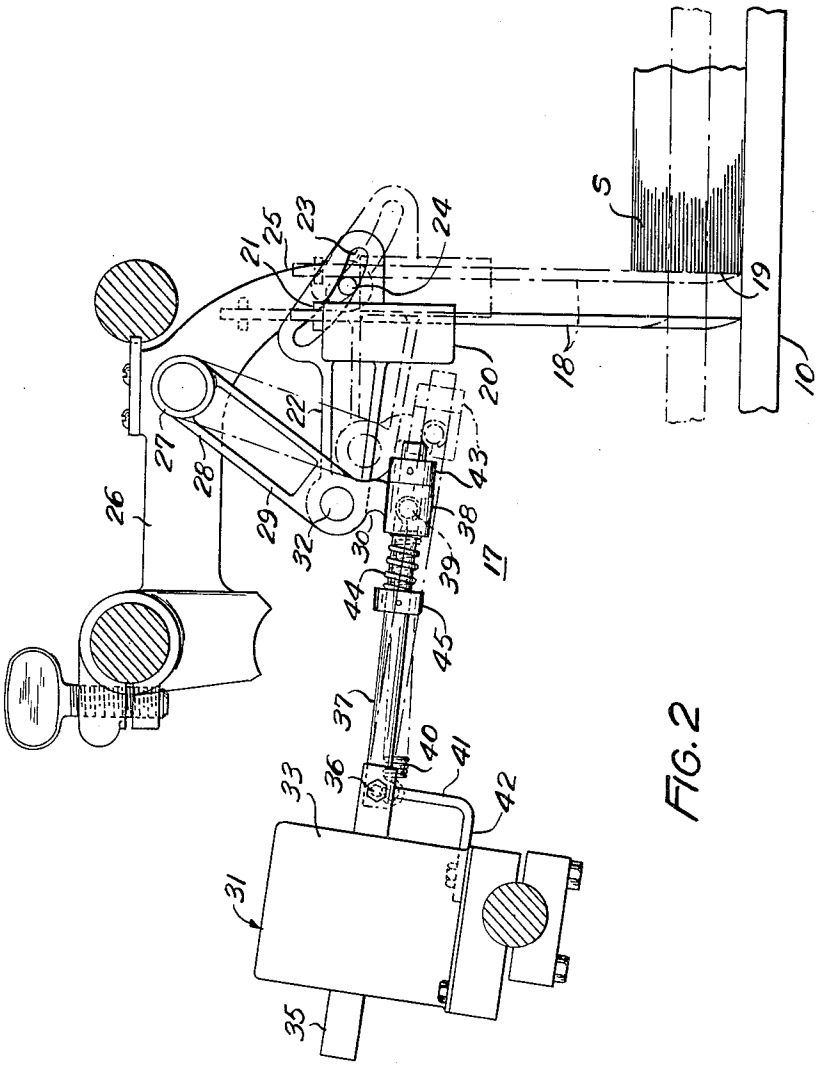


FIG. 2

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PILE HANDLING MECHANISM

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12 Claims. (Cl. 271—62)

This invention relates to pile handling mechanisms and has particular relation to pile changing mechanisms wherein means are provided for depositing a first pile of sheets upon a second pile of sheets positioned beneath the first pile.

The present invention is particularly applicable to a pile changing mechanism of the type disclosed in United States Patent No. 2,701,136. Such a mechanism includes a vertically movable auxiliary support having a pallet for supporting a remnant or depleting pile from the top of which sheets are to be removed. A main support is located beneath the pallet for movement in a vertical direction and supports a new or main pile. When the remnant pile on the pallet is nearing depletion the pallet is withdrawn laterally relative to the remnant pile whereby the remnant pile is deposited on the main pile. Such mechanisms are utilized in the printing field wherein it is desired to maintain an uninterrupted feeding of sheets to a printing machine.

In the present invention a pile handling mechanism is provided including improved means for preventing relative displacement of sheets of a remnant pile during withdrawal of a pile-supporting pallet relative to the remnant pile. For this purpose backing means is provided which is movable preferably automatically from an inoperative position wherein the backing means is spaced from the pile to an operative position wherein the backing means is engageable with a side of the pile toward which the pallet is withdrawn. The invention also provides that the backing means is automatically moved to its operative position only when the pallet is ready for withdrawal.

In accordance with one feature of the present invention means are provided to automatically effect movement of the backing means to its operative position prior to withdrawal of the pallet and to automatically return the backing means to its inoperative position subsequent to withdrawal of the pallet. The backing means is supported for movement by a suitable linkage which is arranged so that the backing means is moved from its inoperative position to its operative position in a direction which is substantially opposite to the direction of withdrawal of the pallet. The linkage is further arranged such that the backing means is locked in its operative position against movement in the direction of withdrawal of the pallet by a force applied against the part of the backing means engaging the pile.

The backing means is supported so that it is in continuous engagement with the supporting surface of the vertically-movable pallet after the pallet is elevated sufficiently to engage the backing means. To this end the support for the backing means is designed to allow free vertical movement of the backing means whereby the backing means is vertically movable with the pallet. The backing means is provided with a pile-engaging surface which has a straight-line configuration throughout the length thereof which engages a supported pile.

A solenoid arrangement is preferably provided to effect movement of the backing means. The solenoid is preferably electrically energizable and is connected for energization under the control of suitable switch devices which may be actuated in response to predetermined movement of the pallet. In a preferred embodiment of the invention a switch is positioned for actuation in response to elevation of the pallet to a preselected height

for effecting energization of the solenoid to move the backing means to its operative position.

It is therefore an object of the invention to provide a pile handling mechanism including improved means for preventing relative displacement of sheets of the pile during a transfer movement of the pile.

It is another object of the invention to provide a pile handling mechanism including a pile-supporting pallet arranged for withdrawal horizontally relative to a supported pile to transfer the pile to a main pile located beneath the pallet with backing means movable preferably automatically prior to withdrawal of the pallet to an operative position wherein the backing means engages at least the lowermost portion of a side of the pile toward which the pallet is withdrawn.

It is a further object of the invention to provide a mechanism as defined in the preceding object wherein the backing means is supported so as to be locked in its operative position against movement by a force applied to the part thereof engaging the pile in the direction of withdrawal of the pallet.

It is another object of the invention to provide a mechanism as defined in the next preceding object wherein the backing means is movable to its operative position in a direction which is opposite to the direction of withdrawal of the pallet, and is preferably maintained parallel to the side of the pile with which it engages during movement to and from its operative position.

It is still another object of the invention to provide a pile handling mechanism including a vertically movable pile-supporting pallet arranged for withdrawal horizontally relative to a supported pile to transfer the pile to a main pile located beneath the pallet with backing means movable automatically to engage a side of the pile toward which the pallet is to be withdrawn only when the pallet is ready to be withdrawn.

It is a still further object of the invention to provide a mechanism as defined in the preceding object wherein the backing means is in continuous engagement with the supporting surface of the pallet after the pallet is elevated sufficiently to engage the backing means.

It is still another object of the invention to provide a mechanism as defined in the preceding object wherein the backing means has a pile-engaging surface which is of straight line configuration.

Other objects of the invention will become apparent from the following description taken in conjunction with the accompanying drawings, in which

FIG. 1 is a view in side elevation with parts removed, with parts broken away and with parts shown in section of a pile handling mechanism constructed in accordance with the teachings of the invention,

FIG. 2 is an enlarged view of a portion of the mechanism of FIG. 1, and

FIG. 3 is a circuit diagram illustrating in diagrammatic form circuits employed in the mechanism of FIG. 1.

Referring to the drawings, there is illustrated in FIG. 1 a pile handling mechanism which may be of a construction similar to that illustrated in the aforementioned United States Patent No. 2,701,136. The mechanism includes a plurality of supporting uprights 1 and 2 which may be provided to support certain parts of the pile handling mechanism. The mechanism also includes a main pile supporting structure or hoist including a plurality of spaced cables 3 having stirrups 4 secured thereto for engagement with a suitable bar 5. Four cables and two bars may conveniently be provided, with two cables and a bar located on each side of the mechanism. The bars 5 support a plurality of spaced cross members 6.

A suitable pallet support or frame 8 is mounted upon the cross-members 6 and comprises a plurality of spaced rollers 9 upon which a pallet 10 may be supported. The

pallet 10 may be of any suitable construction adapted to support a pile of sheets designated by the letter S. For example, the pallet 10 may be constructed in accordance with the disclosures in application Serial No. 698,430, filed November 25, 1957, by Arthur G. Royer and assigned to the assignee of the present invention, now U.S. Patent No. 2,950,107. As disclosed in the aforementioned United States patent, the bar 5, support 8 and pallet 10 are adapted to be raised and lowered by a suitable elevating mechanism (not shown) which operates through the cables 3 and are elevatable under the control of a pile height detecting mechanism to maintain the top of a pile thereon at a proper height for removing the top sheet by conventional sheet removing mechanism including a pair of suckers 14 and take off rolls 15, 16. The pile S is positioned so that its front side bears against a plurality of vertically extending horizontally spaced guide strips 10a whereby the front edges of the sheets of the pile are maintained in vertical alignment during the raising of the pile S.

An auxiliary pile supporting structure is also provided and is adapted to take a partially depleted pile from the main pile hoist and continue its elevation to maintain the top of the pile at proper feed level while a new pile is brought into position on the main hoist. This auxiliary structure includes a plurality of hangers 11 which are arranged so that a pair of hangers on each side of the mechanism is secured to a separate track structure 12 each mounting a plurality of spaced rollers 13. The pairs of hangers and their associated tracks are supported for movement toward and away from each other so that the pallet 10 may be taken from the main pile hoist and supported on the rollers 13 when the pile S is nearing depletion. The hangers 11 and tracks 12 are movable in vertical directions by suitable means described hereinafter to raise a pile of sheets positioned on the pallet which is supported by the tracks 12 to maintain the top of the pile at the proper level for sheet removal and the arrangement is such that the tracks 12 and the pallet are raised incrementally in any suitable manner so that the upper surface of the remnant pile is maintained at a substantially constant level.

In operation a suitable pile S on the pallet 10 may be placed upon the rollers 9 by rolling it from a conveyor (not shown) having rollers at the same level as the rollers 9. The cables 3 are then taken in to position the pile S at the proper height so that sheets may be removed therefrom. As the sheets are removed from the pile S the support 8 is raised incrementally to maintain the top of the pile at a constant level. During the removal of sheets from the pile S the hangers 11 and the tracks 12 are maintained in a retracted outward position. When the pile S nears depletion the hangers 11 and tracks 12 may be initially moved inwardly into a position beneath the pallet 10 and then elevated so that the rollers 13 engageably support the pallet 10 whereupon the frame 8 may be lowered to the floor position for receiving a new pile of sheets. During this time sheets are being removed from the top of the pile which is supported by the pallet on the tracks 12. When the new pile has been placed upon a new pallet carried by the frame 8, the frame 8 may then be raised to a position wherein the top of the new pile is just below the lower surface of the pallet supporting the depleting pile. At this time the pallet may be withdrawn from beneath the depleted pile toward the left as viewed in FIG. 1 such that this pile is dropped upon the new pile. The operation then continues in the manner described.

According to the present invention, improved backing means are provided for preventing relative displacement of sheets of a depleting pile during withdrawal of the supporting pallet. Such means are arranged to engage a side of the depleting pile toward which the pallet is withdrawn so that displacement of the sheets in the direction of withdrawal of the pallet is prevented. The pile-engaging backing means is arranged for movement from an inoperative position wherein it is spaced laterally from the pile side to an operative position wherein it engages the pile side throughout the height of the pile. This movement is in a direction which is opposite to the direction of withdrawal of the pallet and is preferably effected automatically at a time prior to the withdrawal of the pallet.

In the embodiment illustrated in FIGS. 1 and 2 the backing means is represented generally by the numeral 17 and includes one or more plates 18 formed of any suitable material and of generally flat configuration. A pair of backing devices are preferably employed which are spaced a suitable distance in a direction transverse to the plane of the paper. Each backing device includes a plate 18 which is supported by suitable support means described hereinafter for movement from an inoperative position, shown in full lines in FIG. 2, to an operative position, shown in broken lines in FIG. 2, wherein the plate 18 is in flush engagement with a side 19 of the remnant pile S throughout the height of the pile. The plate 18 is supported so as to be in continuous engagement with the supporting surface of the pallet after the pallet is elevated sufficiently to engage the plate. The dimensions of each plate in the direction transverse to the plane of the paper and also the spacing of the pair of plates are selected so as to provide an effective backing action, and are determined by the corresponding dimension of the particular pile.

In order to support each of the plates 18 the invention provides separate support means each including linkage arranged to guide the associated plate for movement along preselected paths. Inasmuch as each of the plates and support means may be identical, only one of the plates and support means will be described. In the embodiment illustrated, the plate 18 is mounted in suitable guides within a channel of a U-shaped bracket 20 with the guides permitting free vertical movement of the plate 18 relative to the bracket 20 and preventing horizontal movement of the plate relative to the bracket. The plate 18 may be provided with an upper enlarged portion 21 serving as a stop which prevents the plate from dropping out of the bracket 20 when the plate is spaced from the supporting surface of the pallet.

As best shown in FIG. 2, the bracket 20 is secured in any suitable manner to a link 22 having an arcuate slot 23 in which is positioned a pin 24 which is attached to a depending arm 25 of a stationary support 26 which is adjustable front to rear of the hoist to accommodate different size sheets. The support 26 also mounts a pivot pin 27 which pivotally supports an end 28 of a link 29 having its other end 30 pivotally attached to a plunger assembly of a solenoid 31. The link 29 has rigidly secured between its ends a pin 32 to which an end of the link 22 remote from the slot 23 is pivotally attached. The slot 23 is shaped as shown in the drawing to cooperate with the pivoted link 29 to produce substantially parallel motion of the bracket 20 and, in turn, plate 18 so that the plate 18 remains vertical as it is moved to and from its backing position.

The solenoid 31 may be of any suitable construction and includes a housing 33 which contains a cylindrical electroconductive winding 34 shown diagrammatically in FIG. 3. The winding 34 surrounds a suitable magnetic plunger 35 which carries a pin 36 at one end thereof to which is pivotally secured an extending arm 37. The arm 37 mounts a sleeve 38 loosely thereon with the sleeve carrying a pin 39 to which is pivotally secured the end 30 of the link 29. Also attached to the pin 39 is one end of a helical tension spring 40 having its other end attached to an upstanding arm 41 of an L-shaped bracket 42 which is secured to the housing 33 of the solenoid 31. The sleeve 38 is biased against a collar 43 pinned to the arm 37 by means of a helical spring 44 surrounding the arm 37 in compression between the sleeve 38 and a collar 45 which is pinned to the arm 37.

As previously stated, the plate 18 is moved into its operative position prior to withdrawal of the pallet. To this end the solenoid is energized by the closure of a suitable switch which is actuated in response to depletion of the remnant pile to a height sufficiently small to necessitate withdrawal of the pallet. Inasmuch as the height of the pallet is indicative of the height of the remnant pile, the elevating mechanism for the auxiliary support is employed to actuate the switch.

An arrangement suitable for elevating the auxiliary support is illustrated in FIG. 1. As there shown, the pair of hangers 11 on one side of the pile changing mechanism is secured in any suitable manner to a horizontally extending shaft 46 which is supported at each of its ends by a separate pair of spaced supports 47 and 48. These supports also support a shaft (not shown) similar to the shaft 46 to which the other pair of hangers is secured.

Attached to the supports 47 and 48 in a suitable manner are lifting nuts 49 and 50 having respectively threaded bores 51 and 52 which threadably receive threaded ends of lifting screws 53 and 54 having headed ends in the form of bevel gears 55 and 56. The gears 55 and 56 are in meshing engagement with bevel gears 57 and 58 secured to a common shaft 59 which is rotated by suitable means such as an electric motor 60. Rotation of the shaft 59 and the gears 57 and 58 is imparted to the screws 53 and 54 through the gears 55 and 56 whereby the nuts 49 and 50 are raised together with the supports 47 and 48 and the hangers 11. A similar screw and nut arrangement may be utilized to raise the pair of hangers on the other side of the pile changing mechanism.

In order to energize the solenoid 31 a normally open switch 61 of any suitable construction is positioned with its actuating arm 62 in the path of movement of one of the lifting nuts 49 and 50. The switch 61 is shown with the arm 62 in the path of the nut 50 for engagement by the leading edge of the nut so that the switch is closed when the nut is raised slightly above the level at which is engages a roller on the arm 62. The switch 61 is mounted on a support 63 which may be adjusted in vertical directions to allow variations of the time at which the plates 18 are moved to their operative positions. For example, the switch 61 may be adjusted so that the plates 18 are moved to their operative positions at a time when the height of the remnant pile is two inches.

In operation, when the pallet which supports the depleting pile is moved upwardly as viewed in FIG. 1 the actuating arm 62 of the normally open switch 61 is displaced by the nut 50 to close the switch 61. As illustrated in FIG. 3, when the switch 61 is closed, a winding 64 of a suitable electromagnetic relay 65 is connected for energization through conductors 66 and 67 and the switch 61 from a suitable source of electrical voltage represented by the conductors L^1 and L^2. When the winding 64 is so energized, an armature 68 of the relay 65 is moved upwardly as viewed in FIG. 3 to effect the bridging of spaced contacts 69 and spaced contacts 70 by electroconductive bridges 71 and 72 respectively which are carried by the armature 68. When the contacts 70 are bridged the winding 34 of the solenoid is energized to move the backing plates 18 to their operative positions.

When the contacts 69 are bridged a holding circuit for the winding 64 is established from the conductor L^2 through the conductor 67, the winding 64, conductor 73, the bridge 71, and a closed switch 74, to the conductor L^1. This holding circuit may be provided if the arrangement is such that the nut 50 will effect only a temporary closure of the switch 61 prior to withdrawal of the pallet. If the nut 50 maintains closure of the switch 61 during the interval that the pallet is being withdrawn, then the holding circuit may be omitted.

The switch 74 is a normally open switch which is carried by one of the tracks 12 for movement therewith. When the tracks 12 are moved toward each other to a position beneath the pallet, and then raised so that the rollers 13 support the pallet, a roller on an actuating arm 75 of the switch 74 is depressed by the pallet to close the switch 74 and condition the holding circuit for energization. The holding circuit is energized when the switch 61 is closed by the nut 50 so that if for any reason the switch 61 is opened prior to pallet withdrawal, the winding 64 is maintained in an energized condition by the holding circuit whereby the winding 34 of the solenoid 31 is continuously energized through the bridge 72 from the conductors L^1, L^2.

Such energization of the winding 34 effects movement of the plunger 35 and the arm 37 to the right and slightly downwardly, as viewed in FIG. 2, whereupon the various elements of the backing means assume the positions shown in broken lines in FIG. 2. It is observed that movement of the arm 37 resulting from energization of the solenoid effects movement of the link 29 and the pin 32 in a counterclockwise direction about the pivot 27, as viewed in FIG. 2, to displace the link 22 and bracket 20 toward the right and downwardly. The pin 24 guides the bracket 20 and the plate 18 to its pile-engaging position.

It is observed that the plate 18 is in continuous engagement with the upper supporting surface of the pallet 10 after the pallet has attained a height wherein it engages the plate, and that the plate is moved vertically in response to vertical movements of the pallet 10 as shown in broken lines. An effective backing action is provided by forming the pile-engaging surface of the plate 18 with a straight-line configuration. The supporting linkage is so configured and arranged that the plate 18 is locked in its operative position against movement toward the left, as viewed in FIG. 2. It is observed that a force acting on the lower portion of the plate 18 toward the left as viewed in FIG. 2 tends to rotate the link 22 in a clockwise direction about the axis of the pin 24. However, this rotation is substantially prevented by the link 29. This arrangement assures that the sheets of the pile S will not be displaced relative to one another as the pallet 10 is withdrawn.

When the pallet is completely withdrawn relative to the remnant pile, the right-hand end of the pallet as viewed in FIG. 1 will clear the arm 75 of the switch 74 and the switch 74 will open. Assuming that the switch 61 is open, opening of the switch 74 will interrupt the holding circuit whereby the winding 64 is de-energized to drop the armature 66 which effects de-energization of the winding 34. The plunger 35 is then returned to its normal position under the action of spring 40, which causes retraction of the plate 18 to its inoperative position. If the arrangement is such that the switch 61 remains closed during pallet withdrawal and a holding circuit is not necessary, then the switch 61 may be opened subsequent to withdrawal of the pallet for returning the plate 18 to its inoperative position by merely lowering the auxiliary support which lowers the nut 50 away from the arm 62 of the switch 61, or the switch 74 may be located in series with the winding 34 to de-energize the winding when the switch opens even though switch 61 is closed.

While the solenoid 31 is preferably energized and de-energized automatically, it is understood that this might be done under the control of the operator and that a fluid motor or other actuating means may be provided for moving the plates to and from their backing positions.

Although the invention has been described with reference to certain specific embodiments thereof, numerous modifications are possible, and it is desired to cover all modifications falling within the spirit and scope of the appended claims.

Having thus described our invention, we claim:

1. In a pile handling mechanism, a support adapted to support a pile of sheets while the pile is depleted by the removal of sheets therefrom, said support being arranged for horizontal withdrawal relative to a supported pile toward a side of a supported pile from a pile-sup-

porting position, backing means for preventing relative displacement of sheets of a supported pile during withdrawal of the support, support means supporting said backing means for movement from a first position wherein the backing means is spaced from a supported pile to a second position wherein the backing means is engageable with at least the lowermost portion of a side of a supported pile toward which the pallet is withdrawn, and means operable automatically in response to predetermined depletion of a supported pile to effect movement of the backing means from the first position to the second position.

2. A mechanism as defined in claim 1 wherein the bottom of said backing means engages the supporting surface of said support during movement of the backing means from the first position to the second position, said support being mounted for movement in a vertical direction, said support means supporting said backing means for movement from the first position to the second position in a direction opposite to the direction of withdrawal of the support and free vertical movement such that the backing means is movable vertically with the support when in engagement with the support.

3. A mechanism as defined in claim 1 wherein said support means includes linkage arranged to lock the backing means in said second position against movement in the direction of withdrawal of the support.

4. A mechanism as defined in claim 1 wherein said last-named means includes an electrically energizable solenoid, and switch means actuatable by the support to control energization of the solenoid.

5. In a pile handling mechanism, a support adapted to support a pile of sheets, said support being arranged for horizontal withdrawal relative to a supported pile toward a side of a supported pile from a pile-supporting position, backing means for preventing relative displacement of sheets of a supported pile during withdrawal of the support, support means including a mechanical linkage supporting said backing means for movement in a generally horizontal direction from an inoperative position wherein the backing means is spaced from a supported pile to an operative position wherein the backing means is engageable with at least the lowermost portion of a side of a supported pile toward which the pallet is withdrawn, and means including electrically energizable solenoid means and a solenoid plunger operatively connected to the linkage operable to effect movement of the backing means between said positions, the bottom of said backing means being positioned to engage the supporting surface of said support, said support being mounted for movement in a vertical direction, said support means supporting said backing means for free vertical movement such that the backing means is movable vertically with the support when in engagement with the support.

6. In a pile handling mechanism, a support adapted to support a pile of sheets, said support being arranged for horizontal withdrawal relative to a supported pile toward a side of a supported pile from a pile-supporting position, backing means for preventing relative displacement of sheets of a supported pile during withdrawal of the support, support means including a mechanical linkage supporting said backing means for movement in a generally horizontal direction from an inoperative position wherein the backing means is spaced from a supported pile to an operative position wherein the backing means is engageable with a side of a supported pile toward which the pallet is withdrawn, and means including electrically energizable solenoid means and a solenoid plunger operatively connected to the linkage operable to effect movement of the backing means between said positions, the bottom of said backing means being positioned to engage the supporting surface of said support, said support being mounted for movement in a vertical direction, said support means supporting said backing means for free vertical movement such that the backing means is movable vertically with the support when in engagement with the support, the backing means having a pile-engaging surface of straight-line configuration throughout the length thereof which engages the pile, said linkage being arranged to lock the backing means in said operative position against movement in the direction of withdrawal of the support, said support means supporting the backing means for movement from the first position to the second position substantially in a direction opposite to the direction of withdrawal of the support.

7. In a pile handling mechanism having vertical guide means against which a first side of a main pile is to be maintained while sheets are removed from the top of the main pile, a first support movable in a vertical direction, a pallet on said first support movable therewith for carrying a remnant pile of sheets, a second support for carrying a main pile beneath the pallet for movement in a vertical direction with the first side of the main pile against the guide means, said pallet being arranged for withdrawal relative to a remnant pile toward a side of a remnant pile opposite to the first side of the main pile from a pile-supporting position to combine the remnant and main piles, backing means for preventing relative displacement of sheets of a remnant pile during withdrawal of the pallet, support means supporting said backing means for movement from an inoperative position wherein the backing means is spaced from a remnant pile to an operative position wherein the backing means is engageable with the side of a remnant pile toward which the pallet is withdrawn, and means operable automatically in response to predetermined vertical movement of the pallet to effect movement of the backing means from the inoperative position to the operative position, and operable automatically in response to withdrawal of the pallet to effect movement of the backing means from the operative position to the inoperative position.

8. A mechanism as defined in claim 7 wherein the backing means is movable from the inoperative position to the operative position in a horizontal direction which is substantially parallel and opposite to the direction of withdrawal of the pallet.

9. A mechanism as defined in claim 7 wherein the support means includes linkage arranged to lock the backing means in said operative position.

10. A mechanism as defined in claim 7 wherein the support means includes a first link carrying the backing means, a first pin pivotally mounting one end of the first link, said first link having a slot at its other end, a fixed second pin within said slot, a second link secured to the first pin, and a third fixed pin pivotally mounting the second link at one of its ends, in combination with a solenoid having a plunger pivotally mounting the other end of said second link.

11. In a pile handling mechanism having vertical guide means against which a first side of a main pile is to be maintained while sheets are removed from the top of the main pile, a first support movable in a vertical direction, a pallet on said first support movable therewith for carrying a remnant pile of sheets, a second support for carrying a main pile beneath the pallet for movement in a vertical direction with the first side of the main pile against the guide means, said pallet being arranged for horizontal withdrawal relative to a remnant pile toward a side of a remnant pile from a pile-supporting position to combine the remnant and main piles, backing means for preventing relative displacement of sheets of a remnant pile during withdrawal of the pallet, and power means operable for moving the backing means along the supporting surface of the pallet in a generally horizontal direction opposite to the direction of withdrawal of the pallet from an inoperative position wherein the backing means is spaced from a remnant pile to an operative position wherein the backing means is engageable with a side of a remnant pile toward which the pallet is withdrawn.

12. In a pile handling mechanism having vertical guide

means against which a first side of a main pile is to be maintained while sheets are removed from the top of the main pile, a first support movable in a vertical direction, a pallet on said first support movable therewith for carrying a remnant pile of sheets, a second support for carrying a main pile beneath the pallet for movement in a vertical direction with the first side of the main pile against the guide means, said pallet being arranged for withdrawal relative to a remnant pile toward a side of a remnant pile opposite to the first side of the main pile from a pile-supporting position to combine the remnant and main piles, backing means for preventing relative displacement of sheets of a remnant pile during withdrawal of the pallet, support means supporting said backing means for movement from an inoperative position wherein the backing means is spaced from a remnant pile to an operative position wherein the backing means is engageable with the side of a remnant pile toward which the pallet is withdrawn, and means operable automatically in response to predetermined vertical movement of the

pallet to effect movement of the backing means from the inoperative position to the operative position, and operable automatically in response to withdrawal of the pallet to effect movement of the backing means from the operative position to the inoperative position, said last-named means including an electrically energizable solenoid and a solenoid plunger operatively connected to said backing means, and a pair of switches actuatable respectively in response to predetermined vertical and horizontal movement of the pallet for energizing and deenergizing said solenoid.

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