

Nov. 14, 1944.

W. R. SPILLER ET AL

2,362,853

LIFT DEVICE

Filed April 6, 1942

2 Sheets-Sheet 1

Fig. 1.

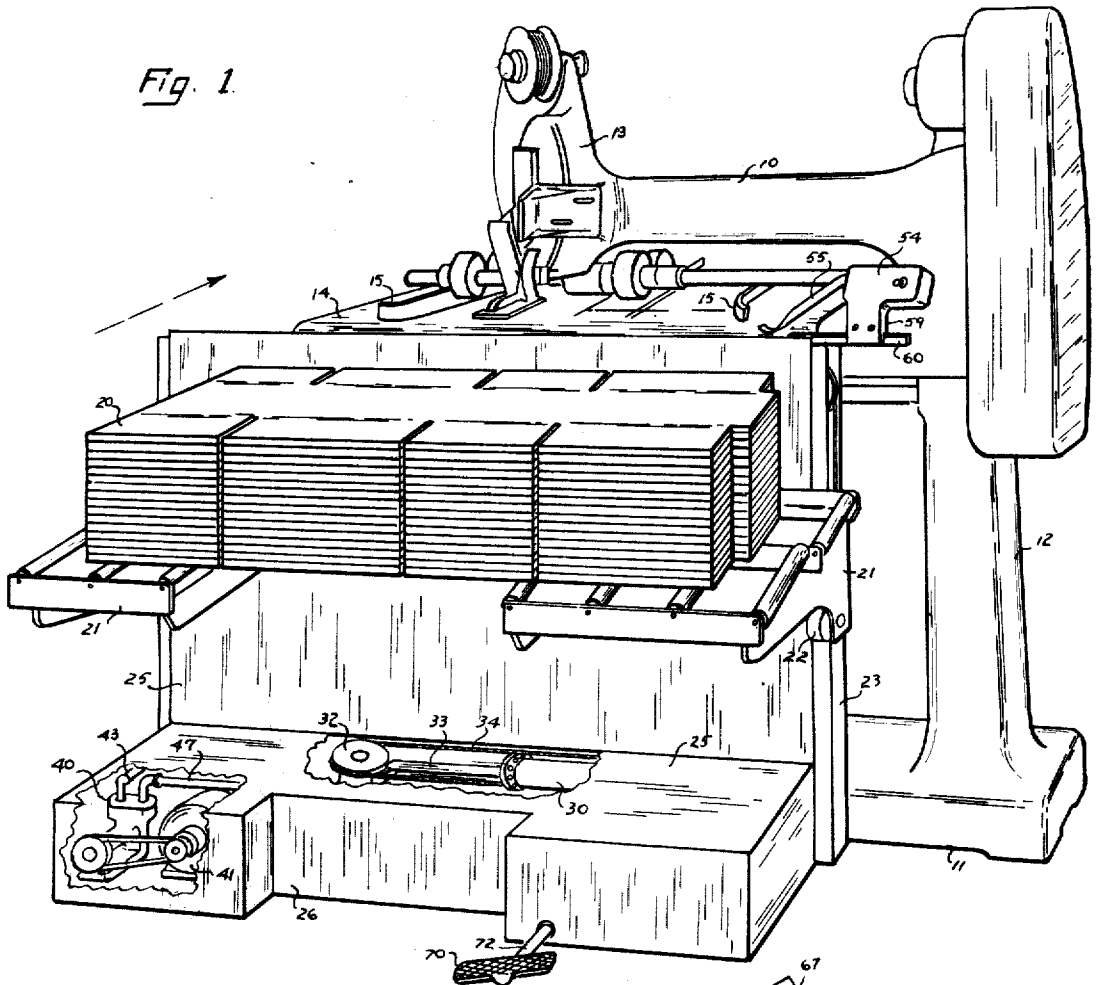
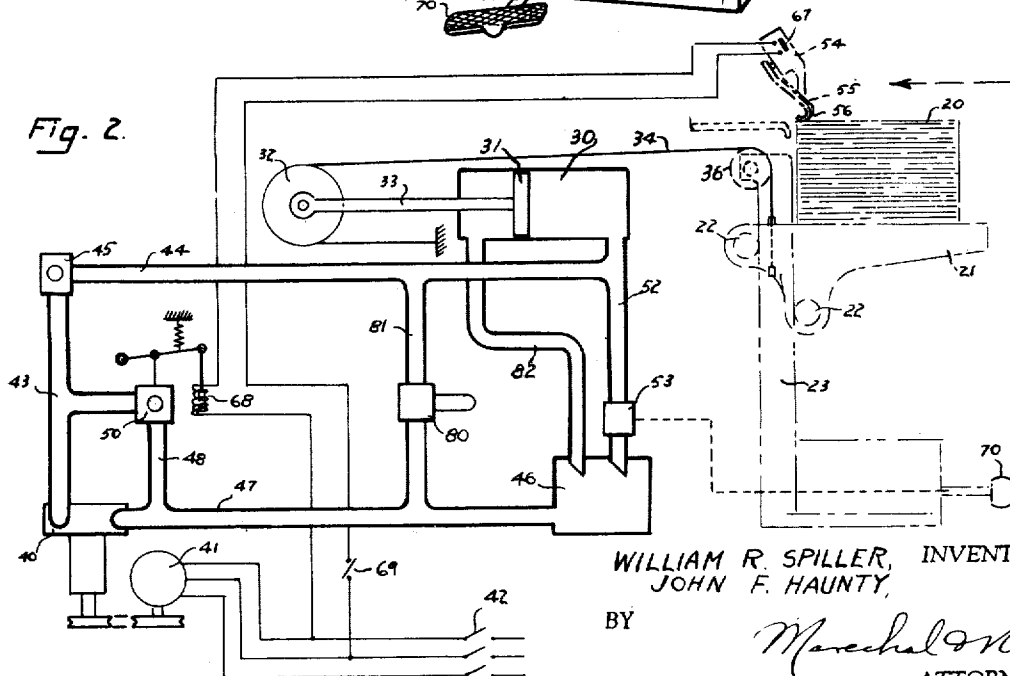


Fig. 2.



WILLIAM R. SPILLER, INVENTORS
JOHN F. HAUNTY,

BY

Marchal & Roe
ATTORNEY.

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2 Sheets-Sheet 2

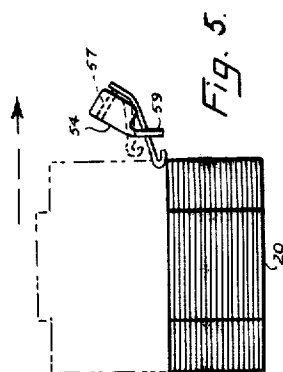
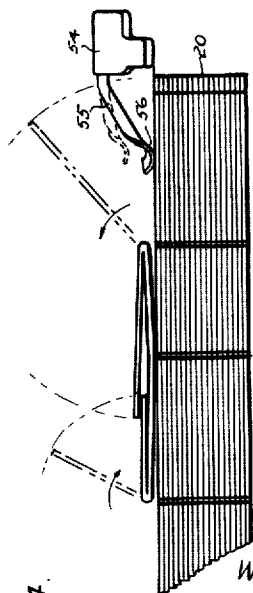
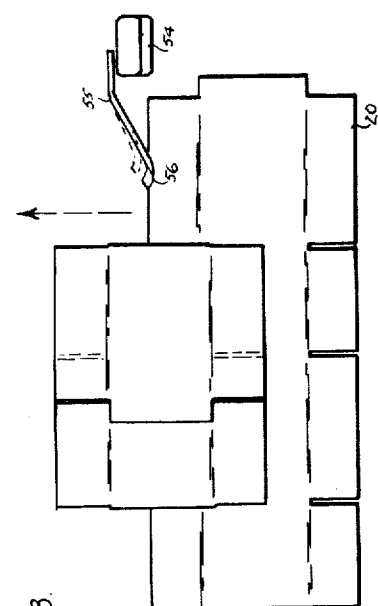
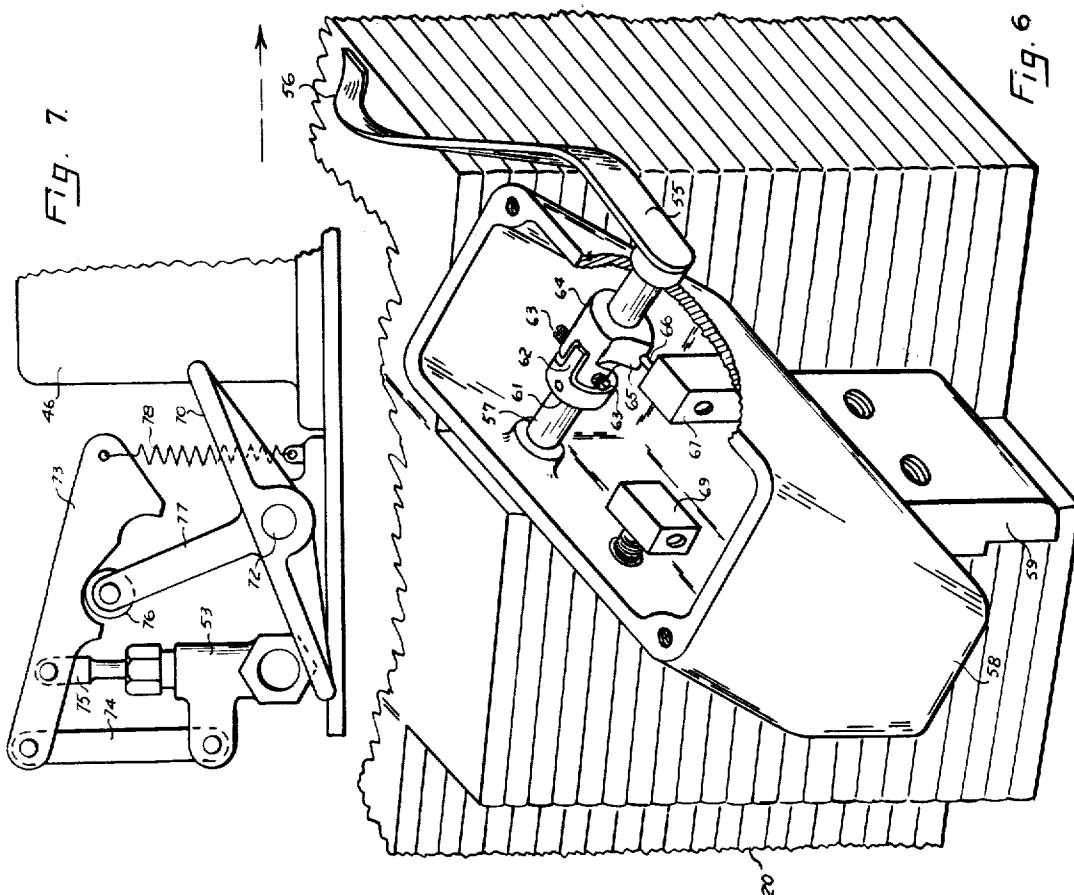


Fig. 3.

Fig. 4.

Fig. 5.

WILLIAM R. SPILLER, INVENTORS
JOHN F. HAUNTY,

BY

Marshall & Moore
ATTORNEY.

UNITED STATES PATENT OFFICE

2,362,853

LIFT DEVICE

William R. Spiller and John F. Haunty, Dayton, Ohio, assignors to Harris-Seybold-Potter Company, Cleveland, Ohio, a corporation of Delaware

Application April 6, 1942, Serial No. 437,754

17 Claims. (Cl. 271—62)

This invention relates to automatic lift devices and to controls therefor.

It is the principal object of the invention to provide a lift device for handling a pile of sheet material which is simple and highly effective in operation in providing for maintaining the top of the pile of sheets at a predetermined level as the individual sheets are fed from the top thereof.

It is a further object to provide a lift device of this character incorporating a continuously operating pump for supplying fluid under pressure to a hydraulic motor to actuate the lift device under control of a feeler which serves to close a by-pass passage around the continuously operated pump when the top of the pile is at a level below that at which it is desired to be maintained and to open such by-pass passage when the pile is at the proper level.

It is a further object to provide a lift device particularly adapted for handling sheet material which is folded as it is fed from the top of the pile, such as box blanks which are folded into overlapping form for delivery to a stitching machine, and in which a simple and effective feeler element is provided for sensing the level of the top of the pile and arranged to present substantially no interference with the free folding and feeding movement of the sheets.

It is a still further object to provide a feeler device constructed and arranged to provide for the withdrawal of the sensing element away from the vertical projection of the pile as the top sheet is lifted upwardly, to avoid interference of the feeler element during the folding of the sheets, the sensing element returning to a position in contact with the top of the pile before the feeding of the preceding sheet has been completed.

Other objects and advantages will be apparent from the following description, the accompanying drawings, and the appended claims.

In the drawings,

Fig. 1 is a vertical perspective showing of the lift device of the present invention associated with a typical stitch forming mechanism, the dotted arrows in this and the remaining views showing the direction of feed of the sheet material;

Fig. 2 is a diagrammatic view showing the operating parts of the lift device and the controls therefor;

Figs. 3, 4 and 5 are views in plan, side, and end elevations, respectively, showing the relationship existing between the feeler element and the sheet during its folding and feeding movement;

Fig. 6 is a view in perspective on an enlarged

scale with certain parts being broken away showing the construction of the feeler element itself; and

Fig. 7 is a view showing the arrangement for the foot operated control which provides for the lowering of the lift table to receive a fresh supply of sheets.

In the manufacture of containers of paper or paperboard material, it is desired to provide for the stitching of an overlapping seam along the side or end wall of the container, and to utilize for this purpose stitching machinery which provides for forming a series of stitches in the paper sheets or blanks as they are fed forwardly into stitching position. As representative of the type of stitch-forming machine to which reference is made, attention is directed to the patent to William R. Spiller No. 2,264,776 issued December 2, 1941, and assigned to the same assignee as this application. While the present invention is applicable for use with other sheet materials and in conjunction with other mechanisms for handling the sheets, the invention will be hereinafter described for illustrative purposes with reference to the handling and feeding of sheets of paper to such a stitch-forming mechanism.

In such operation flat blanks or sheets are individually fed from the top of a pile, it being desired to maintain the top of such pile at a substantially uniform level so that each succeeding blank will be conveniently fed to the stitching mechanism in the same manner. This requires that the lift table on which the pile is supported be progressively raised as sheets are withdrawn from the top, such raising movements being under the control of a feeler in sensing relation with the topmost sheet on the pile. Since the ends of the blank must be folded to form the overlapping seam to be stitched, it is desirable to so construct and arrange the feeler element that it presents substantially no interference with the free and direct folding and feeding movement of the sheet. Preferably the construction is such that as the folding operation begins, the feeler promptly withdraws from the path of the folded portion of the sheet, and is completely out of contact therewith before the folded end is raised upright, the feeler returning to sensing position with the next sheet even before the feeding of the folded sheet through the stitching mechanism has been completed. In this way not only is free and direct handling of the sheets into the stitcher provided for, but also the feeler device is capable of responding quickly and accurately to raise the level of the pile and to

continually maintain the level thereof at the desired point.

Referring to the drawings, the stitch-forming mechanism is indicated generally at 10, having a base portion 11, an upstanding pedestal 12, and a stitcher head 13 cooperating with the work table 14 over which the folded sheets are fed, being guided into the proper position by means of lateral guides 15.

The pile of sheets to be handled is shown at 20 carried by a frame or lift table 21 having guide rollers 22 mounted on opposite sides of and at different elevations with respect to an upright frame 23 in such manner as to guide and support the frame 21 in a horizontal position while providing for raising and lowering thereof. The operating mechanism is preferably enclosed within a casing 25 which is arranged with a central recessed portion 26 providing a convenient location in which the operator can stand.

While the detailed construction of the hydraulic motor is not material insofar as the invention is concerned, it has been shown as comprising a hydraulic cylinder 30 in which there operates a piston 31 which carries one or preferably a pair of pulleys 32 on piston rod 33. Cables 34 having one end fixed to a part of the frame, pass over the pulleys and the other ends thereof are guided over one or more suitably located fixed pulleys 36 to train the cables into position where they connect with the lift table 21. From the above description it will be clear that upon supply of pressure fluid to the right-hand side of piston 31, the pulleys 32 will be moved to cause the lifting of cables 34 and the resultant raising of the lift table 21.

In order to provide a source of pressure operating fluid for actuating the hydraulic motor, a pump 40 is provided which is driven from a suitable source of power such as motor 41. The motor is controlled by switch 42 but is arranged to operate the pump continuously during the time that the device is in use. The pump is provided with a pressure discharge conduit 43 which leads through check valve 45, conduit 44 and into the right-hand end of cylinder 30, to supply pressure fluid into the motor.

A fluid reservoir is provided at 46 into which the fluid is discharged after use and from which supply conduit 47 returns the fluid into pump 40.

A by-pass passage 48 connects from conduit 43 directly to conduit 47 to provide for the circulation of the fluid from the discharge side of the pump to the inlet side thereof without passing to the motor cylinder. A feeler controlled valve 50 is positioned in passage 48 and arranged to permit of this by-pass action when opened while preventing by-passing when closed, thus forcing the fluid to be delivered through check valve 45 into conduit 44.

A second by-pass passage 52 communicates with conduit 44 at a point beyond check valve 45 and also communicates directly with the cylinder 30 to provide for discharge or dumping of the fluid therefrom to lower the lift table, the fluid being returned to reservoir 46. The passage 52 is controlled by a suitable dump valve 53, fluid being delivered into cylinder 30 to lift the pile, only when both valves 50 and 53 are closed.

In order to control the operation of valve 50, a feeler member shown generally at 54 is positioned adjacent the top of the pile, having an arm 55, the pile engaging end of which is formed with a rounded lower portion 56 to present a

smooth frictionless contact with the sheet at the top of the pile, as that sheet is folded and fed forwardly.

Arm 55 is mounted on the end of a shaft 57 suitably journaled in a housing 58. The housing is carried by a support 59 which is mounted for adjustment on bar 60 longitudinally of the sheets to suitably accommodate the pile engaging portion to blanks of different length.

By reference to Figs. 5 and 6 it will be seen that bracket 59 supports the housing 58 in a position inclined downwardly in the direction of forward feed of the sheets, the shaft 57 having a similar downward inclination. Satisfactory results have been secured where the shaft 57 is downwardly inclined at an angle of approximately 30°, as shown. At the same time the housing is located forwardly and preferably somewhat above the level of the pile. By reason of such arrangement, the pile engaging end 56 of the feeler arm will not only move freely upwardly as the end of the sheet is folded, but at the same time it will have a concurrent movement away from the vertical projection of the pile, so that it tends to quickly clear itself of the lifted or folded portion of the sheet shortly after such lifting movement begins and before the folded end has reached an upright position, avoiding any interference with the usual rapid folding and feeding of the sheets.

This is illustrated in Figs. 3, 4 and 5, Fig. 3 showing a sheet folded and advanced into position for feeding to the stitching mechanism, the full line position of the feeler arm showing that it has returned into the proper sensing relation with the top of the pile, the portion 56 being in engagement with that part of the subsequent sheet which is to be folded. The dotted line position of the arm shows that upon relatively small angular movement, it will withdraw to a clearance position free and clear of the upwardly folding end of the sheet.

In Fig. 4, the dotted line showing of the sheet indicates the manner in which the fold is made, and Fig. 5 also shows that as soon as the folded end of the sheet has been raised only a limited amount, the rotation of the feeler arm about its inclined pivot axis will cause it to move laterally to the side of the folded sheet, hence to be withdrawn from the path of the sheet so that the folding operation can be accomplished quickly and easily without interference from the feeler arm and as a single continuous movement. The arm is permitted to return to proper sensing position from only a slightly raised position, hence it is immediately in position to sense the level of the pile even before the folding and feeding operations on the preceding sheet have been completed. With a limited movement of the arm, it is not subject to severe shocks and may be made to accurately actuate delicate control mechanism.

Fastened to the shaft 57 of the arm is a collar 61 with tongue portion 62 which has a limited degree of travel before it engages one or the other of the adjustable screw threaded stops 63, which stops are threaded into a collar 64 rotatable on but in axially fixed relation to shaft 57. This collar has a cam portion 65 which engages a plunger 66 operating a micro-switch indicated at 67, this switch controlling the energizing circuit of solenoid 68 to in turn effect the closing of by-pass valve 50. A manual switch 69 may be provided in the circuit to disable the control mechanism.

As the sheets are removed from the top of the pile, the feeler arm 55 is permitted to drop lower and when the desired level is reached, tongue 62 engages one of the stops 63 to cause the rotation of collar 64 effecting the closing of the switch 67 which thereupon causes the closing of valve 50. As the pile rises, lifting the feeler arm, the tongue contacts the opposite stop and effects the opposite rotation of collar 64 to open switch 67, allowing valve 50 to move to open position. By changing the setting of the stops 63 and by changing the angular relation of the feeler arm to shaft 51, the actual level of the pile may be adjusted; also the amount of play permissible before engagement of the tongue with one or the other of the stops, may be varied, and in this way the sensitivity of the control may be adjusted. If desired the control may be made to function upon delivery of each sheet, but it is found preferable in most cases to provide sufficient spacing so that unnecessary operation of the mechanism is avoided, such as by arranging for the closing of the switch at intervals of about every third feeding operation, in the case of handling blanks for paper boxes.

Upon the closing of valve 50, the fluid can no longer circulate about by-pass passage 48, but is forced into conduit 44 through check valve 45, and into the motor to cause the travel of the piston in the direction to gradually raise the level of the pile. This need not be a rapid movement as the extent of lift in any cycle of movement is relatively small.

In order to provide for manual control of the lift table and to secure downward travel thereof, such as when it is desired to load a new quantity of sheets thereon, a foot operated treadle is arranged to control operation of valve 53. A foot lever 70 is mounted on shaft 72 in position where it is convenient to the foot of the operator, and is arranged to be actuated to either of two alternate positions to open or close valve 53. This mechanism includes a lever arm 73 connected at one end to link 74 and to the valve stem 75. Lever 73 is yieldably retained in either of two alternate positions by means of a roller 76 carried on arm 77 which is rotatable with shaft 72, the roller riding against spaced recesses in lever 73 which is spring urged into contact with roller 76 by means of spring 78. Thus the treadle valve is yieldably retained either in the position shown in Fig. 7 in which valve 53 is closed, or after the operator has stepped upon the opposite side of the treadle, in the opposite position in which the valve stem 75 is raised, to open the valve.

By reference to Fig. 2 it will be seen that with valve 53 closed, supply of pressure fluid into the cylinder is under the control of the feeler valve 50, the closing of valve 50 resulting in forcing fluid past the check valve and into the lift cylinder to cause the raising of the table. As the proper level is reached, and valve 50 is opened by the operation of the feeler, the fluid merely recirculates without any appreciable load, no more fluid being delivered into cylinder 30. Return flow of the pressure fluid from the cylinder is prevented by means of check valve 45, with the result that while the table no longer rises, it is held stationary at its then level. Thereafter as one or more sheets are withdrawn, the closing of valve 50 will result in a further flow of fluid into the cylinder 30 to raise the lift table to reestablish the desired level at the surface of the pile.

When it is desired to drop the table, such as for receiving a fresh supply of sheets, treadle 70 is actuated into the position to open dump valve 53, with the result that the fluid supplied through conduit 44 as well as that in the cylinder 30 is permitted to discharge directly back into reservoir 46. Thus with the dropping of the table, the feeler valve 50 will close, but because of the capacity of the dump valve 53 and passage 52, the fluid will be drained out of the cylinder more rapidly than it is introduced by the pump, with the result that the lift table will be quickly lowered to its lowest position, the dropping of the table being properly cushioned by limiting the maximum rate of fluid flow through the passage.

If desired a high pressure relief valve 80 may be arranged in a by-pass passage 81 to prevent damage from excessive pressures and a drain passage 82 may provide for return of any leakage fluid into reservoir 46.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. In a lift device of the character described, the combination of a lift table for receiving a pile of sheet material to be fed from the top thereof, a hydraulic motor for raising said table, a continuously operating pump for supplying fluid under pressure to said motor, a fluid reservoir, means connecting said fluid reservoir with the intake of said pump, a plurality of passages for by-passing the fluid around said motor, one of said passages communicating directly between the pump intake and discharge, a feeler controlled valve in said one of said passages, another of said passages communicating between the discharge of said pump and said reservoir, a manually controlled valve in said other of said passages, a conduit for supplying fluid from said pump to said motor when both said valves are closed to thereby actuate said motor to lift said table, a feeler for sensing the top of the pile of sheets, and means actuated by said feeler for controlling said feeler controlled valve when the top of the pile reaches a predetermined level.

2. In a lift device of the character described, the combination of a lift table for receiving a pile of sheet material to be fed from the top thereof, a hydraulic motor for raising said table, a continuously operating pump for supplying fluid under pressure to said motor, a conduit for delivering pressure fluid from said pump to said motor, a plurality of passages communicating with said conduit in spaced relation to each other for by-passing the fluid around said motor, a feeler controlled valve in the one of said passages closer to said pump, a manually controlled valve in another of said passages, closer to said motor, said conduit supplying fluid from said pump to said motor when both said valves are closed to thereby actuate said motor to lift said table, a check valve in said conduit intermediate the communication of said feeler controlled valve and said manually controlled valve for preventing discharge of fluid during the opening of said feeler controlled valve, and a feeler for sensing the top of the pile of sheets and adapted to cause the opening of said feeler controlled valve when the top of the pile reaches a predetermined level.

3. In a lift device of the character described, the combination of a lift table for receiving a pile of sheet material to be fed from the top thereof, a hydraulic motor including a cylinder and a piston for raising said table, a continuously operating pump for supplying fluid under pressure to said motor, a conduit for delivering said pressure fluid to said motor, a passage connecting with said conduit for by-passing the pressure fluid back to said pump, a check valve in said conduit beyond said by-pass for preventing back flow of fluid from said motor, a second passage connecting with said conduit beyond said check valve providing for return flow of fluid from said motor back to said pump, a manually controlled valve in said second passage providing for discharge of fluid from said motor upon opening of said valve at a predetermined rate in excess of the rate of fluid supplied by said pump to thereby lower said lift table, a feeler controlled valve in said first mentioned passage adapted upon closing to force fluid to be delivered from said pump into said conduit past said check valve, a feeler located adjacent the top of said pile for sensing the level thereof, and means under control of said feeler for actuating said feeler controlled valve to open position when said pile rises to a predetermined level.

4. In a lift device of the character described, the combination of a lift table for receiving a pile of sheet material to be fed from the top thereof, a hydraulic motor for raising said table, a continuously operating pump for supplying fluid under pressure to said motor, a conduit for delivering said pressure fluid to said motor, a passage connecting with said conduit for by-passing the pressure fluid back to said pump, a check valve in said conduit beyond said by-pass for preventing back flow of fluid from said motor, a second passage connecting with said conduit beyond said check valve providing for return flow of fluid from said motor back to said pump, a manually controlled valve in said second passage providing for a flow therethrough of fluid supplied by said pump and discharge of fluid from said motor upon opening of said valve to thereby lower said lift table, a feeler controlled valve in said first mentioned passage adapted upon closing to force fluid to be delivered from said pump into said conduit past said check valve, a feeler located adjacent the top of said pile for sensing the level thereof, means under control of said feeler for actuating said feeler controlled valve to open position when said pile rises to a predetermined level, and means for adjusting said actuating means to cause closing of said feeler controlled valve in response to the feeding of a predetermined number of sheets.

5. In a lift device of the character described the combination of a lift table for receiving a pile of sheet material to be fed from the top thereof, a hydraulic motor including a cylinder and a piston for raising said table to maintain the top of said pile at a predetermined level, a reservoir for receiving a quantity of pressure operating fluid, a continuously operating pump receiving fluid from said reservoir, a conduit for supplying fluid under pressure from said pump to said hydraulic motor to lift said table, a by-pass passage for circulating said pressure fluid from the delivery side to the intake side of said pump, valve means in said by-pass passage adapted to close the same to force delivery of said fluid into said conduit, a check valve in said conduit beyond said by-pass passage for preventing return flow

of fluid delivered thereinto, a feeler for sensing the level of the top of the pile and adapted to control said valve means to supply fluid into said conduit to cause the actuation of said motor to raise said pile when below a predetermined level, and a dump passage communicating with said conduit beyond said check valve and with said motor for returning fluid as received from said pump and as discharged from said cylinder under the action of gravity directly to said reservoir to provide for the lowering of said table during the continuous supply of pressure fluid from said motor.

6. In a lift device of the character described the combination of a lift table for receiving a pile of sheet material to be fed from the top thereof, a hydraulic motor for raising said table to maintain the top of said pile at a predetermined level, a reservoir for receiving a quantity of pressure operating fluid, a continuously operating pump receiving fluid from said reservoir, a conduit for supplying fluid under pressure from said pump to said hydraulic motor to lift said table, a by-pass passage for circulating said pressure fluid from the delivery side to the intake side of said pump, valve means in said by-pass passage adapted to close the same to force delivery of said fluid into said conduit, a check valve in said conduit beyond said by-pass passage for preventing return flow of fluid delivered thereinto, a feeler for sensing the level of the top of the pile and adapted to control said valve means to supply fluid into said conduit to cause the actuation of said motor to raise said pile when below a predetermined level, a dump passage communicating with said conduit beyond said check valve and with said motor for returning fluid therefrom directly to said reservoir at a predetermined rate to provide for the regulated lowering of said table during the continuous supply of pressure fluid from said motor, and valve means for closing said dump passage to place the lifting of said table under control of said feeler.

7. In a lift device of the character described, the combination of a lift table for receiving a pile of sheet material to be fed from the top thereof, a hydraulic motor for raising said table, a continuously operating pump for supplying fluid under pressure to said motor, a passage for by-passing the fluid around said motor directly from the discharge to the intake side of said pump, a feeler controlled valve in said passage adapted upon closing to force delivery of fluid under pressure to said hydraulic motor, a feeler arm for engaging the top of said pile and sensing the level thereof, means for mounting said arm for pivotal movement about an axis inclined downwardly in the direction of feed of said sheets, and means for controlling said feeler controlled valve in response to the sensing of said pile by said feeler arm.

8. In a lift device of the character described, the combination of a lift table for receiving a pile of sheet material to be fed from the top thereof, said sheets being folded upon themselves as they are fed from the top of the pile, a hydraulic motor for raising said table to maintain the top of said pile at a predetermined level, a continuously operating pump for supplying fluid under pressure to said motor, a passage for by-passing the fluid around said motor, a feeler controlled valve in said by-pass passage adapted upon closing to force delivery of fluid under pressure to said hydraulic motor, a feeler arm for engaging the pile at the portion of the sheet

to be folded, means for mounting said arm providing for the withdrawal thereof from the vertical projection of the pile in response to preliminary folding movement of the portion of the sheet being folded, and means for controlling said feeler controlled valve in response to engagement of said feeler with the top of the pile.

9. In a lift device of the character described which comprises a lift table for receiving a pile of sheets, a hydraulic motor for raising said lift table as the sheets are fed from the top of the pile, said sheets being folded upon themselves as they are fed from the top of the pile, a feeler arm for engaging the top of said pile, means for mounting said arm above said pile for pivotal movement about an axis extending in the direction of feed of the sheets and inclined downwardly with respect to said direction of feed to cause said arm to engage the top of said pile and to move out of the path of the folded portion of said sheet as it is being folded, and means for controlling the operation of said motor in response to said feeler arm to maintain a substantially constant level of the top of said pile.

10. In a lift device of the character described which comprises a lift table for receiving a pile of sheets, a hydraulic motor for raising said lift table as the sheets are fed from the top of the pile, said sheets being folded upon themselves as they are fed from the top of the pile, a feeler arm for engaging the top of said pile at the portion of the sheet to be folded and sensing the level thereof, means for mounting said feeler arm providing for withdrawal thereof from the vertical projection of the pile in response to preliminary folding movement of the portion of the sheet being folded, a feeler controlled valve, and means for actuating said feeler controlled valve in response to the sensing movement of said feeler arm only after the feeding of a predetermined number of sheets.

11. In a lift device of the character described which comprises a lift table for receiving a pile of sheets, a hydraulic motor for raising said lift table as the sheets are fed from the top of said pile, an end portion of said sheets being folded upon the central portion thereof as they are fed from the top of the pile, a feeler arm for engaging the top of said pile at the end portion to be folded, a shaft for pivotally mounting said arm, said shaft having a downward inclination in the direction of the feed of said sheets and being displaced laterally from the vertical projection of the pile to cause said arm to move out of the path of the folded portion of the sheet as it is being folded upwardly, and means for controlling the operation of said motor under control of said feeler device to maintain a substantially constant level of the top of said pile.

12. In a lift device of the character described which comprises a lift table for receiving a pile of sheets, a hydraulic motor for raising said lift table as the sheets are fed from the top of said pile, an end portion of said sheets being folded upon the central portion thereof as they are fed from the top of the pile, a feeler arm for engaging the top of said pile at the end portion to be folded, a shaft for pivotally mounting said arm, said shaft being above said pile and inclined downwardly in the direction of the feed of said sheets and being displaced laterally from the vertical projection of the pile to cause said arm to move out of the path of the folded portion of the sheet as it is being folded upwardly, means for controlling the operation of said motor under con-

trol of said feeler device to maintain a substantially constant level of the top of said pile, and means providing for delayed response of said motor to the movement of said feeler arm to provide for actuation thereof only after the feeding of a predetermined number of sheets.

13. In a lift device of the character described which comprises a lift table for receiving a pile of sheets, a hydraulic motor for raising said lift table as the sheets are fed from the top of said pile, an end portion of said sheets being folded upon the central portion thereof as they are fed from the top of the pile, a feeler arm for engaging the top of said pile at the end portion to be folded, a shaft for pivotally mounting said arm, said shaft being located above the pile and inclined downwardly in the direction of the feed of said sheets and being located in advance of the pile in the direction of feed to cause said arm to move out of the path of the folded portion of the sheet as it is being folded upwardly, and means for controlling the operation of said motor under control of said feeler device to maintain a substantially constant level of the top of said pile.

14. In a lift device of the character described which comprises a lift table for receiving a pile of sheets, a hydraulic motor for raising said lift table as the sheets are fed from the top of said pile, a portion of said sheets being folded upon the central portion thereof as they are fed from the top of the pile, a feeler arm for engaging the top of said pile, a shaft for pivotally mounting said arm, said feeler shaft being inclined downwardly in the direction of feed of said sheets and being located above and in advance of the pile in the direction of feed to cause said arm to move out of the path of the folded portion of the sheet as it is being folded, and means for controlling the operation of said motor under control of said feeler device to maintain a substantially constant level of the top of said pile.

15. A hydraulic lift device of the character described comprising a lift table adapted to be lowered to a position for receiving a pile of sheet material and to be elevated to provide for feeding said sheet material from the top of said pile, a cylinder, a piston, means for operatively connecting said piston to said lift table for actuation thereby, a continuously running pump, a conduit for supplying pressure fluid from said pump to said cylinder to raise said lift table, a by-pass passage communicating with said conduit for bypassing the fluid delivered by said pump, means for receiving the fluid by-passed through said passage and returning the same to said pump, a feeler controlled valve in said passage, a feeler for sensing the level of the top of the pile and adapted to close said valve when the top of said pile is below a predetermined level to effect delivery of fluid through said conduit and into said cylinder for lifting said table against the action of gravity, a second by-pass passage communicating with said conduit and being capable of by-passing the fluid supplied by said pump and concurrently discharging the fluid in said cylinder to provide for the return of said piston and the lowering of said table under the action of gravity, and valve means in said second by-pass passage for controlling the flow therethrough to provide for the lowering of said table to receive a load thereon.

16. In a lift device of the character described for supplying sheet material toward a work table, the combination of a unitary lift table for receiving a pile of sheet material to be fed from the top thereof, an upright frame separate from said work

table and adapted to be positioned immediately adjacent and below the level of the work table, means on said frame below the level of said work table for adjustably supporting said lift table leaving the work position of said work table entirely free and clear in the direction of feed of the sheet material, a hydraulic motor for raising said lift table as the sheets are fed from the top of the pile, feeler means for sensing the level of the top of the pile, means for mounting said feeler means at one side and out of the direct path of feed of the sheet material, and means for controlling the operation of said motor in response to said feeler means to maintain the top of the pile substantially at the level of said work table and in position for free forward feeding of the sheet material toward said work table.

17. In a lift device of the character described

which comprises a lift table for receiving a pile of sheets, a hydraulic motor for raising said lift table as the sheets are fed from the top of the pile, said sheets being folded upon themselves as they are fed from the top of the pile, a feeler arm for engaging the top of said pile at the portion of the sheet to be folded and sensing the level thereof, means for mounting said feeler arm providing for withdrawal thereof from the vertical projection of the pile in response to preliminary folding movement of the portion of the sheet being folded, and means for controlling the operation of said motor in response to said feeler arm to maintain a substantially constant level of the top of said pile.

WILLIAM R. SPILLER.
JOHN F. HAUNTY.

DISCLAIMER

2,362,853.—*William R. Spiller and John F. Haunty*, Dayton, Ohio. LIFT DEVICE. Patent dated Nov. 14, 1944. Disclaimer filed May 6, 1946, by the assignee, *Harris-Seybold-Potter Company*.

Hereby enters this disclaimer to claims 10 and 17 in said specification.

[*Official Gazette June 11, 1946.*]

table and adapted to be positioned immediately adjacent and below the level of the work table, means on said frame below the level of said work table for adjustably supporting said lift table leaving the work position of said work table entirely free and clear in the direction of feed of the sheet material, a hydraulic motor for raising said lift table as the sheets are fed from the top of the pile, feeler means for sensing the level of the top of the pile, means for mounting said feeler means at one side and out of the direct path of feed of the sheet material, and means for controlling the operation of said motor in response to said feeler means to maintain the top of the pile substantially at the level of said work table and in position for free forward feeding of the sheet material toward said work table.

17. In a lift device of the character described

which comprises a lift table for receiving a pile of sheets, a hydraulic motor for raising said lift table as the sheets are fed from the top of the pile, said sheets being folded upon themselves as they are fed from the top of the pile, a feeler arm for engaging the top of said pile at the portion of the sheet to be folded and sensing the level thereof, means for mounting said feeler arm providing for withdrawal thereof from the vertical projection of the pile in response to preliminary folding movement of the portion of the sheet being folded, and means for controlling the operation of said motor in response to said feeler arm to maintain a substantially constant level of the top of said pile.

WILLIAM R. SPILLER.
JOHN F. HAUNTY.

DISCLAIMER

2,362,853.—*William R. Spiller and John F. Haunty*, Dayton, Ohio. LIFT DEVICE. Patent dated Nov. 14, 1944. Disclaimer filed May 6, 1946, by the assignee, *Harris-Seybold-Potter Company*.

Hereby enters this disclaimer to claims 10 and 17 in said specification.

[*Official Gazette June 11, 1946.*]