Aug. 18, 1953 J. ADRIAN 2,649,154

HYDRAULICALLY OPERATED PAPER CUTTER

Filed Aug. 26, 1950 5 Sheets-Sheet 1

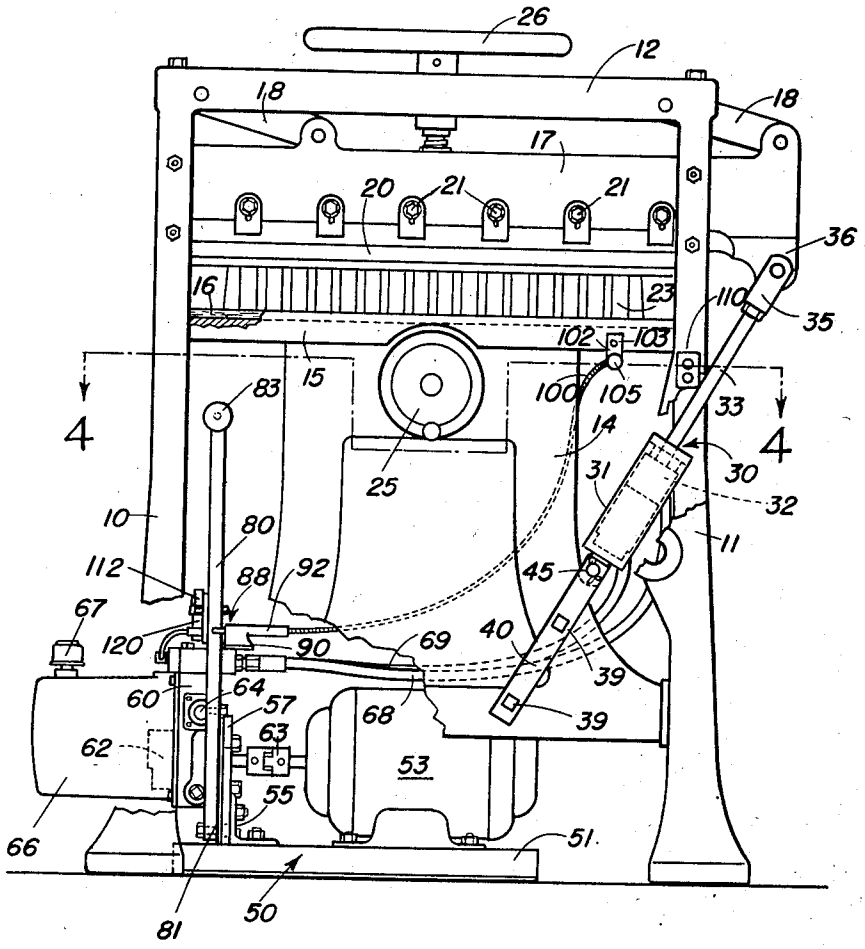


Fig. 1

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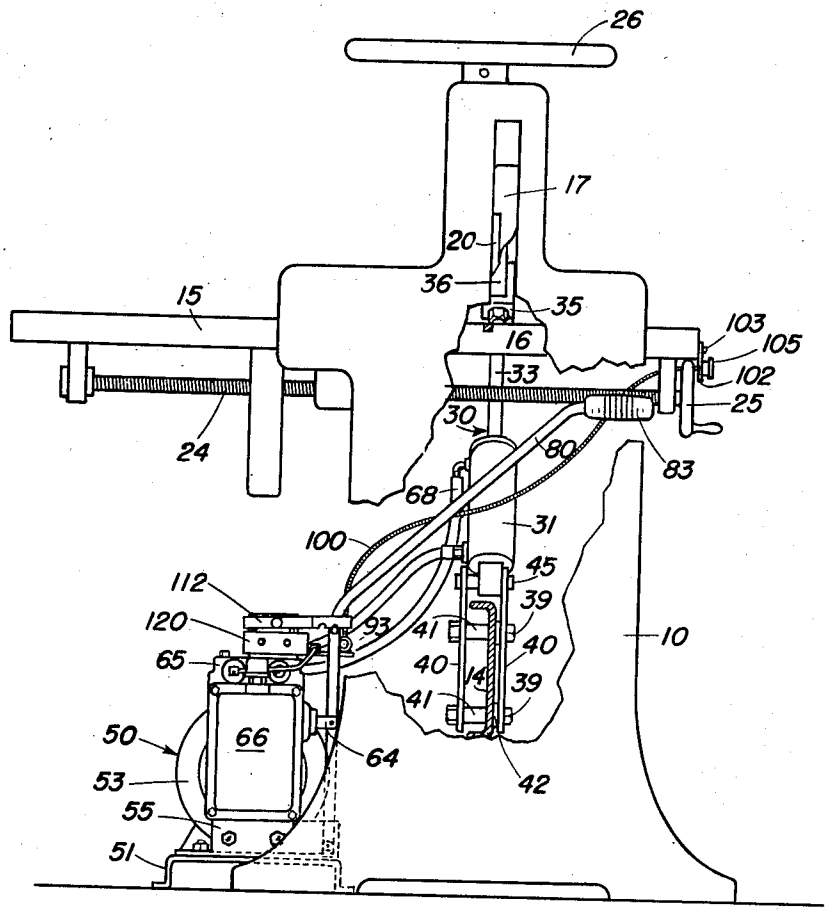


Fig. 2

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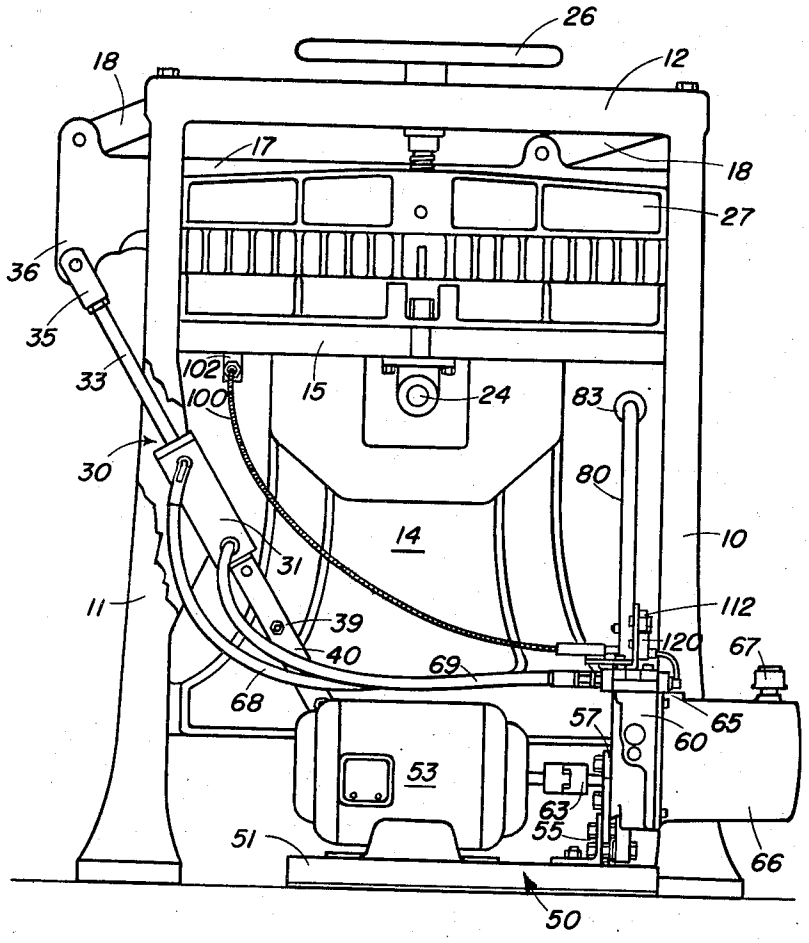


Fig. 3

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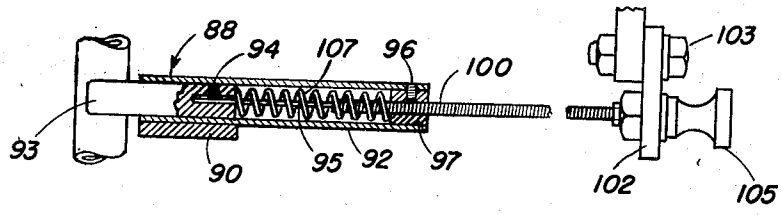
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Fig. 5



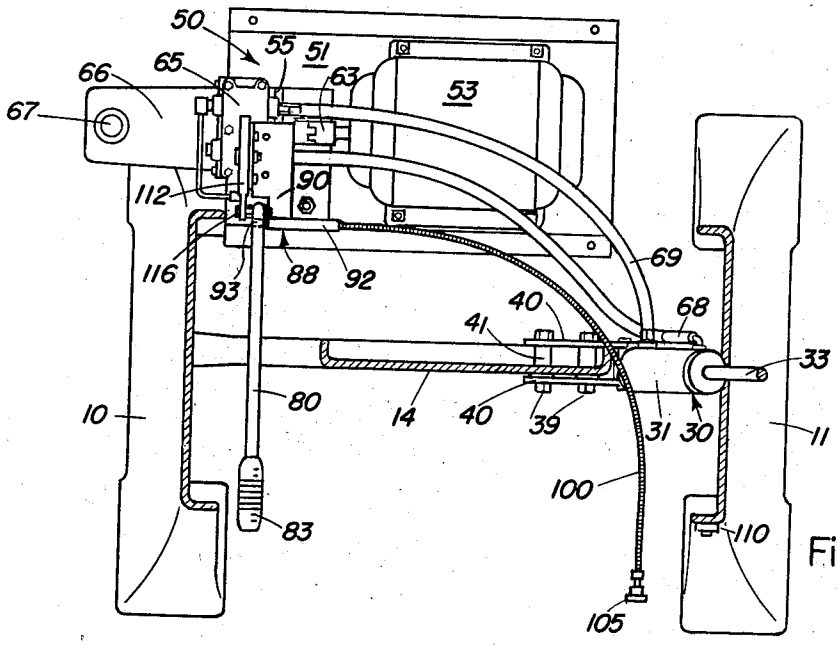
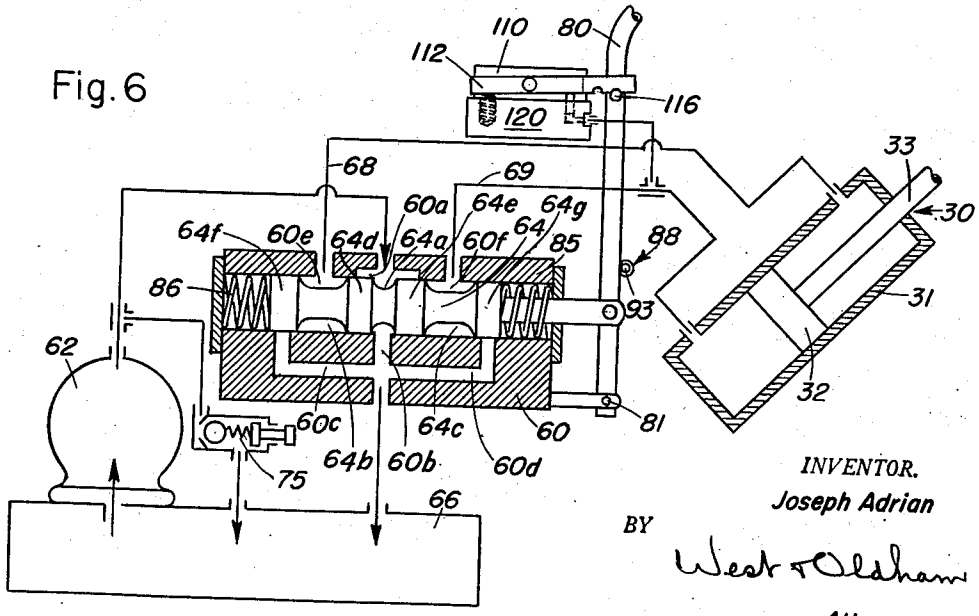


Fig. 4

Fig. 6



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Fig. 7

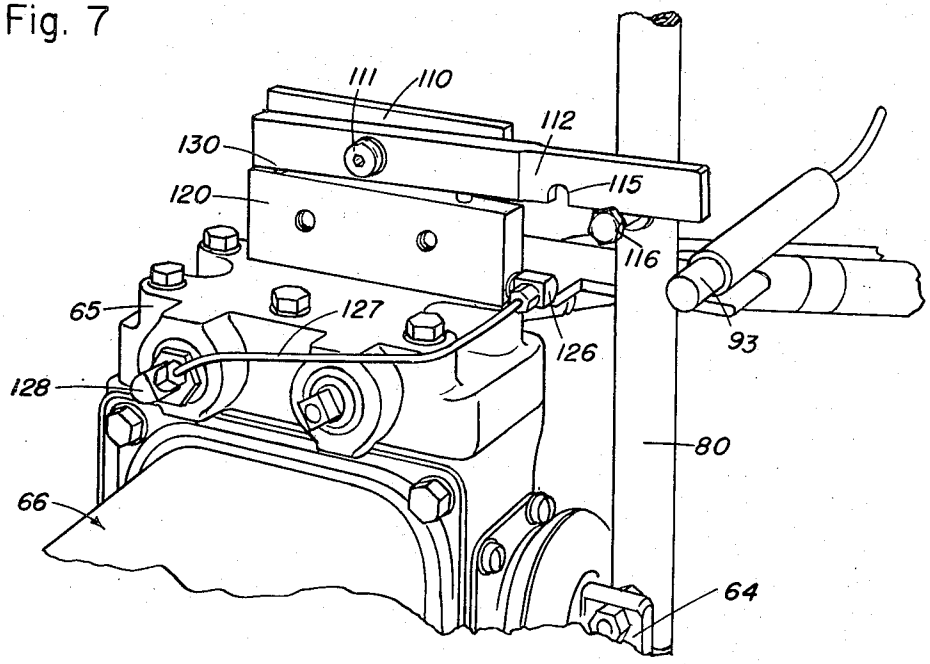
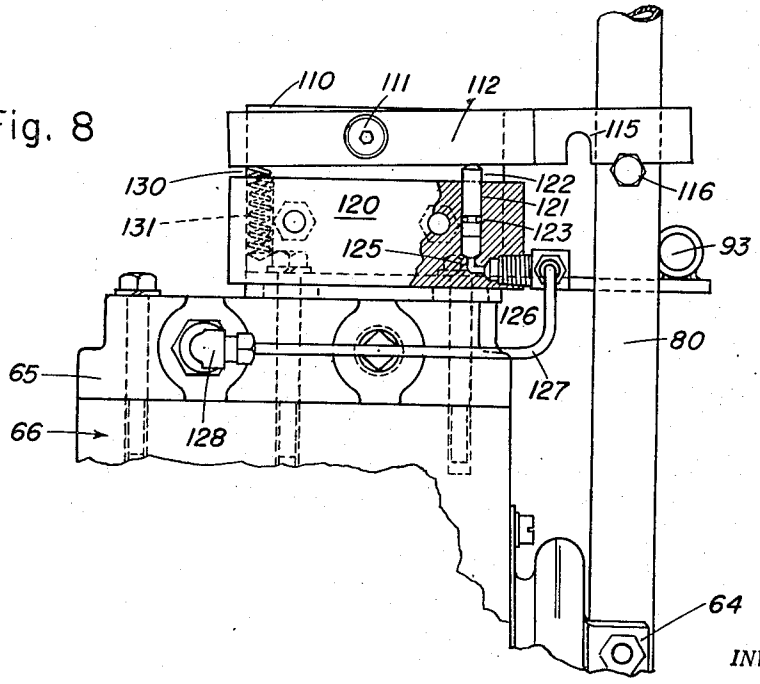


Fig. 8



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Patented Aug. 18, 1953

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UNITED STATES PATENT OFFICE

2,649,154

HYDRAULICALLY OPERATED PAPER CUTTER

Joseph Adrian, Cleveland, Ohio, assignor to Super Speed Printing Machinery, Inc., Cleveland, Ohio, a corporation of Ohio

Application August 26, 1950, Serial No. 181,631

8 Claims. (Cl. 164—56)

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This application is a continuation in part of my abandoned application Serial No. 161,775, filed May 13, 1950, and entitled "Hydraulic Equipment for Paper Cutters."

The invention, in its more comprehensive aspect, resides in improvements in paper cutters of the kind that are used, for example, in printing establishments; while, in a more limited phase, it has to do with an adjunct or attachment for such machines.

In paper cutters of the kind with which my invention is concerned, the knife travels between a top position, wherein its cutting edge is above the clamp, common in such machine for holding the work in place upon the table, and a bottom position wherein said edge is embedded more or less in the cutting stick. While it is desirable to be able to stop the knife bar in an intermediate position during the downstroke to facilitate replacing or adjustment of the knife, a danger results from the ability to stop the knife on its upstroke before its cutting edge is above the bottom plane of the clamp, said clamp serving, when the knife edge is above said plane, to guard the operator's hands from contact with the cutting edge. For instance, if an operator were cutting a shallow stack of sheet material, such as paper or cardboard, and in his haste to lift the stack from the machine or rearrange it for further cutting, and after retracting the clamp, he raised the knife only enough to clear the stack, he would expose himself to the danger of cutting his hands on the knife.

It is a purpose of my invention, therefore, to provide a contrivance that functions automatically to prevent the knife from being stopped in its upward travel before it reaches the top limit of its stroke.

Another object of the invention is to provide hydraulic means or equipment for operating the knife bar of a paper cutter, characterized by an hydraulically operated contrivance for preventing stoppage of the knife bar during its upward stroke.

Another object is to provide a contrivance of the character described that is thoroughly reliable; that is simple and substantial of construction; that is very durable in service, and that is not liable to get out of order.

A further object of the invention is to provide hydraulic equipment, in the nature of an adjunct or attachment, by means of which manually operated paper cutters may be easily, quickly and relatively inexpensively converted into power

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machines. Accordingly, by virtue of the invention, power operated paper cutters are made available to the smaller printing concerns which, heretofore, have found an investment in such machines impractical from an economic standpoint, or the cost actually prohibitive. Prevailing machines of this class—that is, hydraulically operated paper cutters—are usually large and expensive and, furthermore, are of a capacity far exceeding the requirements of the smaller printing concerns. A printer who possesses a manually operated paper cutter of the character with which the equipment of my invention is designed for use may procure said equipment and install it in his machine at relatively low cost.

Another object of the invention is to provide hydraulic equipment of the nature aforesaid that requires only a few simple changes in the paper cutter, and a minimum number of connections between the equipment and the machine.

Another object of the invention is to provide equipment of the above mentioned character that is safe in this respect, that it protects the hands of the operator from injury by the knife during a cutting operation because it requires the simultaneous occupation of both hands in effecting such operation, this being the case whether the knife is advanced from starting position, or a position intermediate the ends of its downstroke where it has been stopped for some reason.

It is a further object of the invention to provide hydraulic equipment for operating the knives of paper cutters and by means of which the knife bar may be stopped in any position during its downward stroke thereby to facilitate removal and replacement of the knife, as well as accurate adjustment of the latter with respect to the knife bar.

Also, it is an object of the invention to so design the equipment that, upon its being properly installed, it will prevent the knife from penetrating the cutting stick to an appreciable depth, making the use of a special stop for this purpose unnecessary.

A still further and more detailed object of the invention is to provide hydraulic equipment for converting manually operated paper cutters into power machines, comprising a cylinder and piston assembly that may be readily substituted for the manually operated mechanism (including hand lever, shaft, pull arm and connecting link), and a separate and distinct power unit assembly (incorporating an electric motor, pump, tank, valve,

operating handle for the latter, automatic means for retaining said handle in knife retracting position until the knife reaches the top limit of its movement, and a latch for controlling the movement of the said handle in a direction to effect a downstroke of the knife) which power unit assembly may be placed, desirably upon the floor, in such relation to the paper cutter that the valve operating handle of said equipment is located in convenient reach of the operator as, for example, immediately below the front of the table, and with the actuator of the aforesaid latch attached to an appropriate part of the machine, as the front of said table in laterally spaced relation to the valve operating handle. The connection between the actuator and latch, and the conduits or hoses through which communicative connections are made between the power unit assembly and the cylinder, are flexible and of maximum required length, thereby affording considerable latitude in the relation of the power unit assembly to the paper cutter.

The foregoing objects, with others hereinafter appearing, are attained in the embodiment of the invention illustrated in the accompanying drawings, wherein like reference characters designate like parts throughout the several views.

In the drawings, Fig. 1 represents a front elevation, Fig. 2 a side elevation, and Fig. 3 a rear elevation, of a paper cutter in which the hydraulic equipment of my invention is installed; Fig. 4 is a sectional plan, taken substantially on the line 4—4 of Fig. 1; Fig. 5 is a sectional detail of the latch, including its actuator, that controls the operation of the valve operating handle for effecting a downstroke of the knife; Fig. 6 is a schematic representation of the hydraulic equipment; Fig. 7 is a fragmentary perspective view of the hydraulic equipment, and Fig. 8 is a side elevational view of the parts shown in Fig. 7 with a portion of one of said parts broken away.

The paper cutter shown in the drawings is of a well known type, and the frame thereof comprises side members 10 and 11, a top cross member 12 and a center frame member 14 that is disposed between and is connected to the lower portions of the side members 10 and 11 and supports the central portion of the table 15 that is connected at its opposite sides to the frame members 10 and 11. The usual cutting stick 16, of wood or other impressionable material, which receives the cutting edge of the knife, reposes within a cross groove of the table 15.

Guided for vertical movement, in the top portion of the machine frame, is a knife bar 17 that is supported in the usual way through parallel links 18 from the top cross member 12. 20 denotes the knife that is adjustably connected, by bolts 21, to the knife bar 17 in accordance with common practice. The conventional back gauge 23 is adjustable along the table 15 by a screw shaft 24, that is adapted to be turned by a hand wheel 25, and the usual clamp by which the material to be cut is secured in position on the table 15, is operated by the hand wheel 26. The clamp, shown in Fig. 3, is designated 27.

As is well known by those acquainted with the art, manually operated paper cutters are provided with a shaft, a hand lever for operating the shaft, a so-called pull arm or crank on the shaft, a connecting link between said arm or crank and the knife bar, and a weight connect in such a manner as to counterbalance the knife bar. To condition the paper cutter for the application of my hydraulic equipment, the foregoing parts are removed.

Installed in the machine, as a substitute for the manual knife operating mechanism above referred to, is a piston and cylinder assembly, designated generally by the reference numeral 30. This assembly includes a cylinder 31, within which a piston 32 reciprocates. Rigidly connected to the piston is the rod 33 that operates, through the usual stuffing box (not shown) in the upper end or head of the cylinder, and the distal end of said rod is pivotally connected, through a clevis 35, to a part 36 of the knife bar 17. Fastened to the front and rear sides of the center frame 14 of the machine, as by bolts 39, are mounting plates 40 (Fig. 2), tubular spacers 41, and washers 42 being applied to said bolts to properly locate the mounting plates in a fore-and-aft direction. Connected, by a pivot pin 45, to the upper ends of the mounting plates 40, is the lower end of the cylinder 31. It may be mentioned in passing that the piston and cylinder assembly 30 extends through the opening in the side member 11 of the machine frame that formerly accommodated the connecting link of the hand operated mechanism. Before drilling the holes in the center frame 14 for the bolts 39, the knife bar 17 is lowered until the knife 20 rests upon the cutting stick 16. The cylinder 31 is then pushed up until stopped by the piston 32, and, with the parts of the assembly 30 in substantial alignment and disposed in approximately the direction of movement of the knife bar, the frame member 14 is spotted for the drilling of the bolt holes. With the parts properly installed, the limits of movement of the knife bar are permanently established, and no further stop means or adjustments are necessary.

The power unit assembly, designated generally by the reference numeral 50, comprises a base 51 that mounts, adjacent one of its ends, an electric motor 53. Fastened to the base adjacent its other end is an angle member 55 to which is attached a plate 57. Secured to and supported by this plate is a self-contained hydraulic power unit, the one shown in Figs. 1 to 4 of the drawings being of a well known type, having a variety of applications. The unit includes a body member 60 that is fastened to the plate 57. This body member carries a rotary pump 62, the shaft of which is connected to that of the motor by a coupling 63; and a slide valve 64 is incorporated in said body member.

A cover 65 is applied to the top of the body member 60, and to the side of the latter remote from the motor 53 is attached a tank 66, having a filling opening closed by a cap 67 that serves as a "breather" and contains a filter. The pump 62 is enclosed by the tank 66 and its inlet is in constant communication with a supply of hydraulic fluid or oil of suitable grade contained in the tank. The body member 60 and cover 65 are ported to establish communication between the pump and conduits or hoses 68 and 69 that are attached by suitable fittings to the open ends of ports in the cover 65. Distribution of the hydraulic fluid or oil among the ports of the member 60 is controlled by the valve 64. This is diagrammatically illustrated in Fig. 6 where representations of the above mentioned parts are designated by their distinguishing reference characters. As will appear from said

diagram, the slide valve 64 is of the multiple spool type, having at about its longitudinal center a relatively narrow circumferential groove 64^a and, spaced in opposite directions therefrom, relatively wide circumferential grooves 64^b and 64^c, the wide grooves being separated from the former narrow groove by the respective lands 64^d and 64^e. Toward its ends, beyond the wide grooves, the valve is provided with lands 64^f and 64^g.

As disclosed in the diagram, the outlet of the pump communicates with a port 60^a in the body member 60 that is elongated and overlies to some extent the lands 64^d and 64^e of the valve, when the latter is in neutral position. Under these conditions, this port 60^a also communicates, through the groove 64^a of the valve, with a port 60^b through which liquid is returned to the tank 66; and branches 60^c and 60^d lead off from the port 64^b and have their ends remote therefrom closed by the lands 64^f and 64^g. As shown only in the diagram, a relief valve 75 is included in a return connection between the outlet of the pump and the tank. The previously mentioned conduits or hoses 68 and 69 communicate, through ports 60^e and 60^f, with the wide circumferential grooves 64^b and 64^c, respectively, of the valve. The conduit or hose 68 leads to the upper end of the cylinder 31, while the other conduit or hose 69 leads to the lower end of said cylinder.

The slide valve 64 extends forwardly of the body member 60 and is pivotally connected to a valve operating lever or handle 80. The lower end of this handle is mounted for oscillation on a pivot member or bolt 81 that is carried by the plate 57, and applied to the opposite end of the handle is a hand grip 83. The valve 64, shown in Fig. 6 in neutral or central position, is adapted to be moved by the handle 80, in a forward direction in opposition to a compression spring 85, or in a rearward direction in opposition to a similar spring 86, said springs tending to hold the valve, as well as the handle 80, in neutral or what may be regarded normal position. The handle 80 is ordinarily restrained against movement in a forward direction by a latch designated generally by the numeral 88. This latch includes a mounting bracket 90 that is fastened to the top of the cover 65 and includes a barrel 92 within the end of which, adjacent the handle 80, a plunger 93 is guided. As appears in Fig. 5, the inner end of the plunger 93 has an axial recess within which is secured, by a set screw 94, the end of a relatively stiff wire 95. Locked by a set screw 96 within the opposite end of the barrel is a bushing 97. Projected inwardly through the bore of this bushing, and fastened therein as by the previously mentioned set screw 96, is the end portion of a flexible sheath 100, the same being in the nature of a tightly wound helical spring. The end of the sheath distant from the latch is secured to a hanger 102, shown as fastened, by a bolt 103, to the front of the machine table 15. The previously mentioned wire 95 extends through the sheath 100 and projects beyond the hanger 102 where it has fastened to it a knob-like actuator 105. A coiled spring 107, enclosed by the barrel 92, is compressed between the plunger 93 and the bushing 97 and normally projects the plunger in front of the handle 80 so as to prevent the latter from being swung forwardly. It is obvious from the construction described that the plunger is retracted against the action of the spring 95 by pulling the actuator 105 forwardly.

Mounted in a convenient place on the frame of the paper cutter, as upon the side member 11 adjacent the table 15, is an electric switch 110 that is in circuit with the motor 53 by electrical conductors (not shown). When the switch is operated to close the circuit, the motor will be energized and drive the pump 62 to draw liquid or oil from the tank 66 and deliver it to the port 60^a (Fig. 6) of the body member 60. Assuming the valve to be in neutral position, this port communicates, through the groove 64^a and port 60^b, with the tank 66. Thus, with the pump idling, so to speak, the liquid or oil is circulated through the path described without effect.

In considering an operation of the paper cutter, it will be assumed that a stack of paper sheets has been placed upon the table 15 against the back gauge 23; that said gauge has been moved forwardly the desired distance by manipulation of the hand wheel 25 to position the sheets for cutting, and that the stack has been clamped in such position by the turning of the wheel 26. The machine may now be operated to cut the material by pulling forwardly on the actuator 105 by means of the right hand, and depressing the handle 80 with the left hand. This will result in shifting the valve 64 forwardly (to the right, as viewed in Fig. 6) so as to shut off the port 62^b, through which the liquid or oil is returned to the tank, and establish communication between the port 60^a and the port 60^e through the wide groove 64^b of the valve. At the same time the port 60^f, through the other wide groove 64^c, is placed in communication with the branch 60^d of the port 60^b. Therefore, with the valve in forward position, pressure fluid is delivered from the pump through the conduit or hose 68 to the upper end of the cylinder 31, while the liquid or oil in the lower end of the cylinder is permitted to escape through the conduit or hose 69 to the tank. The handle 80 is held forward until the piston 32 is stopped at the lower end of the stroke, which means that the knife 20 has passed through the material on the table 15 and engaged the cutting stick 16. If, for any reason, it should be desired to stop the knife before it reaches the bottom of its stroke, this may be accomplished by returning the handle 80 to normal position wherein it may be held by the latch 88 upon release of the actuator 105. Under these conditions the pump idles and circulates the oil or liquid as previously described, while the liquid or oil contained in the opposite ends of the cylinder 31 is locked therein. Obviously, the stroke of the knife may be completed by releasing the latch 88 and swinging the handle 80 forwardly. One reason for stopping the knife before it reaches the bottom of its stroke, as I have hereinbefore mentioned, is to facilitate the removal and replacement of the knife, or its adjustment with respect to the knife bar. In a normal cutting operation, however, there is no incentive for stopping the knife on its downward stroke before the cut is completed.

When the knife is to be lifted, the handle 80 is swung rearwardly so as to shut off the port 60^b and establish communication between the ports 60^a and 60^f, on the one hand (thereby to deliver pressure fluid to the lower end of the cylinder 31), and, on the other hand, between the ports 60^e and the branch port 60^c (to permit return of

the liquid from the upper end of the cylinder to the tank).

As I have previously explained, a dangerous situation is created if the knife bar is stopped on its return stroke before it attains an elevation wherein the cutting edge of the knife is above the bottom plane of the clamp 27. Otherwise the operator might engage one or both of his hands with the edge of the knife in attempting to remove a shallow stack of material from beneath the knife or in rearranging the stack for further cutting. To avoid such an occurrence, I have included a contrivance that automatically functions to hold the valve operating handle 80 in its rearward position until the knife reaches the top limit of its stroke. In the present instance I have provided an hydraulically operated means for accomplishing this end, although I consider changes and modifications of said contrivance within the scope of my invention provided that they are embraced by the terms of the appended claims. The present preferred embodiment of this feature of the invention is illustrated in structural detail in Figs. 7 and 8, and diagrammatically in Fig. 6.

Mounted upon the cover 65 that is a part of the hydraulic unit is a support 110 to which is pivoted, at 111, a latch bar 112. The forward end of this bar is shown as reduced in thickness and is provided, on its under side, with a notch 115, for the reception of a projection 116 on the valve operating arm 80 when said arm is swung to its rearward position. Attached to the support 110 beneath the latch bar 112 is a rectangular body member 120 which has, adjacent its forward end, a vertical bore 121 that opens through the top of said body member and contains a piston-like plunger 122, shown as fitted with a conventional O-ring 123 to prevent leakage of pressure fluid about the plunger. The lower end of the bore 121 is placed in communication, through a port 125, with a fitting 126, and a pipe 127 communicatively connects this fitting with one designated 128. The latter fitting opens into the pressure fluid passage of the hydraulic unit wherewith the conduit or hose 69 constantly communicates, wherefore the bore 121 is in communication at all times with the lower end of the cylinder 31, as diagrammatically illustrated in Fig. 6. Excepting when the valve operating handle 80 is in its rearward position, the lower edge of the nose of the latch bar 112 rides on the projection 116 of said handle, and the bar is rocked in a direction to engage the notch 115 with said projection by a spring 130 that occupies a top-opening recess 131 of the body member 120 and bears, at its upper end, against the overlying portion of the latch bar.

It is evident from the foregoing that when the handle 80 is swung rearwardly to bring about the elevation of the knife bar in the manner above described, it will be held in such position by the latch bar 112 until the forward end of said bar is elevated against the action of the spring 130 by the plunger 122. This occurs after the piston 31 is stopped at the upper end of its stroke and pressure builds up within that portion of the system wherewith the bore 121 communicates sufficient to overcome the tension of said spring 130 and, through the plunger 122, lift the latch bar 112 thereby to liberate the projection 116 and allow the operating handle 80 to resume normal position.

Obviously, the tension of the spring 130 is somewhat less than that of the spring that is incorporated in the relief valve 75 and which tends to maintain the latter valve closed. This insures release of the handle 80 before the valve 75 opens to permit idle circulation of the fluid through the pump and tank.

Having thus described my invention, what I claim is:

1. In a paper cutter including a knife that is supported substantially horizontally for up-and-down movement, hydraulic equipment for raising and lowering the knife, a member movable from a neutral position to a first operative position for causing said equipment to lower the knife and to a second operative position for causing the equipment to raise the knife, means tending to retain said member in neutral position, a movable latch element for cooperation with said member and that is biased in a direction to engage and hold said member in second operative position, and means rendered effective when the knife reaches the top of its stroke to actuate the latch element and release said member.

2. In a paper cutter including a frame, and a knife supported substantially horizontally therein for up-and-down movement; a cylinder, and a piston reciprocable in the cylinder, the one being attached to the frame and the other having operative connection with the knife, a pressure fluid power unit, fluid conveying means including two branches leading from said unit to the respective ends of the cylinder, a distributor valve for controlling flow of pressure fluid through said branches, an operating member for said valve movable from a neutral position to a first operative position to effect, through the medium of said valve, delivery of pressure fluid through one branch to the appropriate end of the cylinder to cause the knife to be lowered and to a second operative position to similarly effect delivery of pressure fluid through the other branch to the opposite end of the cylinder to cause the knife to be raised, a latch biased to holding position for retaining the operating member in second position, and pressure operated means in communication with the last mentioned branch for releasing said latch when the pressure of the fluid in said last mentioned branch exceeds that required to raise the knife.

3. Hydraulic equipment for use with prevailing paper cutters, the same including a cylinder and piston assembly adapted for installation in a paper cutter in substitution for the manual knife operating mechanism thereof, and a power unit assembly providing a source of pressure fluid, a control handle incorporated in and supported solely by said power unit assembly, a latch carried by the power unit assembly for normally restraining said handle from assuming a given position wherein it causes the equipment to function to lower the knife, an actuator for said latch, said handle being shiftable to a second operative position in which it causes the equipment to operate in a manner to raise the knife, fluid conducting means establishing a communication between the power unit assembly and the cylinder of the first mentioned assembly, said power unit assembly being adapted to be arranged in such relation to the paper cutter that said handle is adjacent the table thereof, the aforesaid latch actuator being adapted to be supported in substantially spaced relation to said handle but so that both it and the handle may be reached simultaneously by the two hands of an operator, a second latch biased to holding position for retaining said handle in said second operative position, and pressure operated means

in communication with a part of the fluid conducting means wherein pressure prevails during the raising of the knife and which pressure operated means acts to release the second latch when the pressure exceeds that required to raise the knife.

4. Hydraulic equipment for incorporation in a paper cutter of the character described, said equipment including a cylinder and piston assembly adapted for pivotal connection at one end to the center frame of the paper cutter below the table thereof and at the other end to the knife bar operating part of the cutter with its axis disposed approximately in the direction of movement of said part, the piston being moved in a direction to lower the knife bar when pressure fluid is delivered to the so-called working end of the cylinder, and in a direction to lift said bar when pressure fluid is delivered to the opposite end of the cylinder, a power unit assembly adapted to be positioned in convenient relation to the paper cutter, the same comprising a tank for liquid, a pump, an electric motor, driving connections between the motor and pump, said pump having an inlet communicating with said tank and provided also with an outlet, liquid conducting means leading from said outlet and including two branches, the first branch being communicatively connected to the working end of the cylinder and the second branch to the opposite end thereof, a valve incorporated in said power unit assembly and located in said liquid conducting means, said valve having three positions in the first of which it cuts off flow to said branches, in the second of which it direct flow to the first branch and establishes communication between the second branch and the tank, and in the third of which it directs flow to the second branch and establishes communication between the first branch and the tank, means for operating the valve including a handle adapted to be located adjacent the table of the machine, latch mechanism cooperating with said valve operating means and biased to a position wherein it restarins said operating means from moving the valve to second position, an actuator for said latch means adapted to be supported in a position enabling an operator to simultaneously grasp it with one hand and the handle of the aforesaid valve operating means with the other hand, holding means biased toward effective position for retaining the valve in the third position, and pressure operated means in communication with said second branch for releasing said holding means when pressure in said second branch exceeds that required to lift the knife bar.

5. Hydraulic equipment for a paper cutter, said equipment including a cylinder and piston assembly adapted for operative connection with the knife of the cutter, a power unit assembly providing a source of pressure fluid, communicative connections between said assemblies, control means for the power unit assembly including a movable handle normally biased to a neutral position, a latch biased to holding position for restraining said handle from assuming a first operative position wherein it causes the equipment to function to lower the knife, manually operated means for releasing said latch, a second latch biased toward holding position for retaining the handle in a second operative position wherein it causes the equipment to function to raise the knife, and means automatically operated when the knife reaches the top of its stroke for releasing the second latch.

6. In a paper cutter including a frame, and a knife supported substantially horizontally therein for up-and-down movement; a cylinder, and a piston reciprocable in the cylinder, the one being attached to the frame and the other having operative connection with the knife, a pressure fluid power unit, fluid conveying means including two branches leading from said unit to the respective ends of the cylinder, a distributor valve for controlling flow of pressure fluid through said branches, an operating member for said valve movable from a neutral position to a first operative position to effect, through the medium of said valve, delivery of pressure fluid through one branch to the appropriate end of the cylinder to cause the knife to be lowered and to a second operative position to similarly effect delivery of pressure fluid through the other branch to the opposite end of the cylinder to cause the knife to be raised, a latch biased to holding position for retaining the operating member in second position, and means automatically operated when the knife reaches the top of its stroke for releasing the second latch.

7. Hydraulic equipment for incorporation in a paper cutter of the character described, said equipment including a cylinder and piston assembly adapted for pivotal connection at one end to the center frame of the paper cutter below the table thereof and at the other end to the knife bar operating part of the cutter with its axis disposed approximately in the direction of movement of said part, the piston being moved in a direction to lower the knife bar when pressure fluid is delivered to the so-called working end of the cylinder, and in a direction to lift said bar when pressure fluid is delivered to the opposite end of the cylinder, a power unit assembly comprising a tank for liquid, a pump, an electric motor, driving connections between the motor and pump, said pump having an inlet communicating with said tank and provided also with an outlet, liquid conducting means leading from said outlet and including two branches, the first branch being communicatively connected to the working end of the cylinder and the second branch to the opposite end thereof, a valve incorporated in said power unit assembly and located in said liquid conducting means, said valve having three positions in the first of which it cuts off flow to said branches, in the second of which it directs flow to the first branch and establishes communication between the second branch and the tank, and in the third of which it directs flow to the second branch and establishes communication between the first branch and the tank, means for operating the valve including a handle adapted to be located adjacent the table of the machine, latch mechanism cooperating with said valve operating means and biased to a position wherein it restrains said operating means from moving the valve to second position, an actuator for said latch means adapted to be supported in a position enabling an operator to simultaneously grasp it with one hand and the handle of the aforesaid valve operating means with the other hand, holding means biased toward effective position for retaining the valve in the third position, and means automatically operated when the knife reaches the top of its stroke for releasing said holding means.

8. The combination with a paper cutter having a movable knife and pressure means for moving the knife in cutting and return directions including a source of pressure for said pressure

means and a valve to control said pressure, of means for actuating said valve comprising, manual means for moving said valve from a neutral position to either knife cutting or return positions, separate manually releasable means for holding said valve against knife cutting movement, and automatic means for holding said valve in knife return position, said automatic holding means being released upon movement of the knife to the end of its return movement.

JOSEPH ADRIAN.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
893,166	Hand	July 14, 1908
918,120	Bradmiller	Apr. 13, 1909
1,200,802	Berry	Oct. 10, 1916
2,379,171	McLaughlin	June 26, 1945

FOREIGN PATENTS

Number	Country	Date
402,235	England	Nov. 30, 1933