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E. HAAS ET AL

3,468,204

PRESS WITH RETRACTABLE PLATEN

Filed April 6, 1967

3 Sheets-Sheet 1

FIG.3

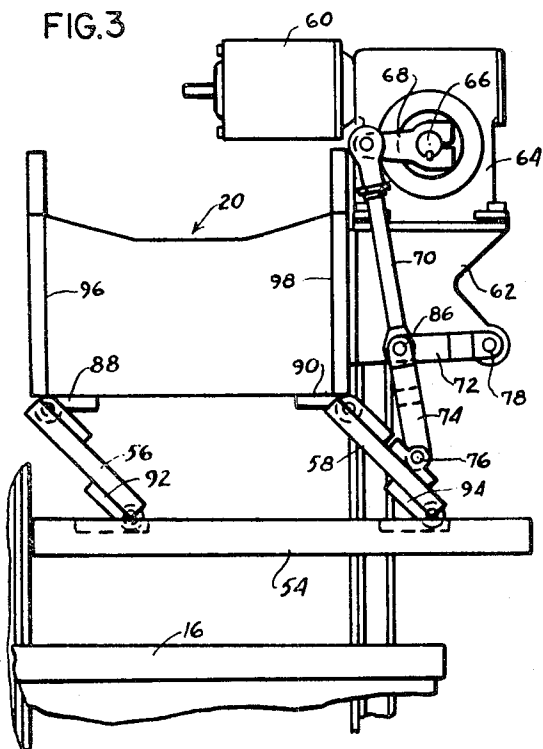


FIG.1

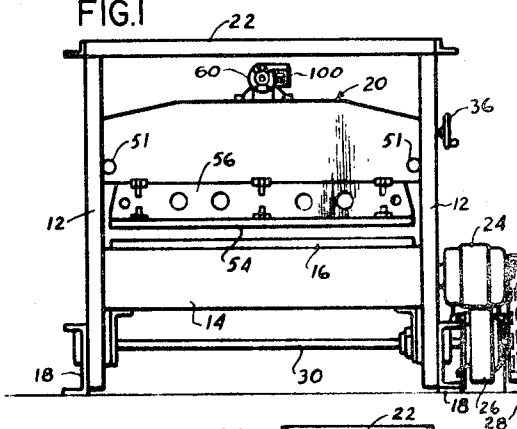


FIG.2

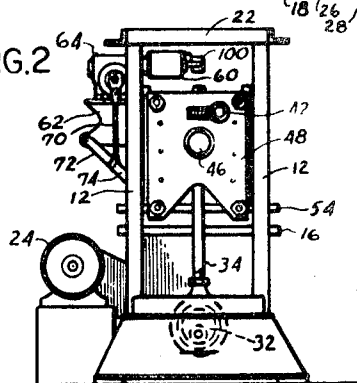


FIG.4

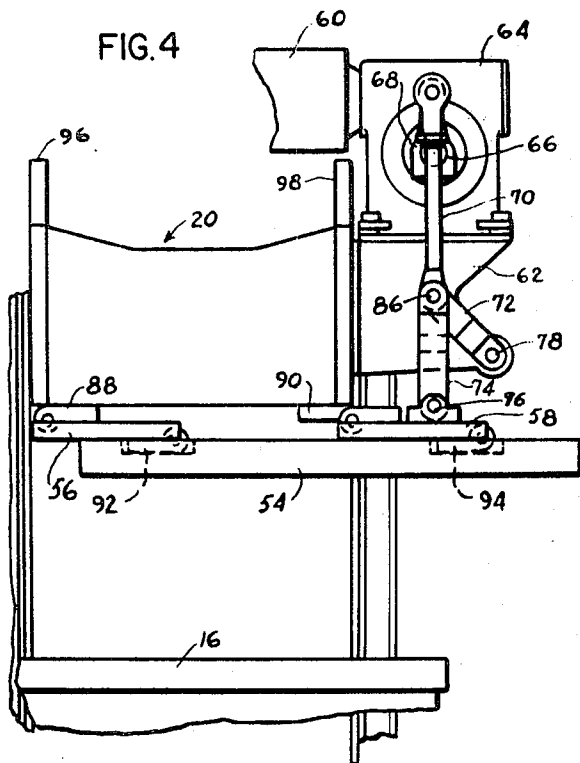
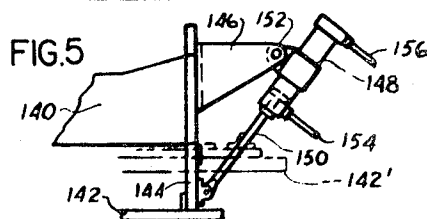
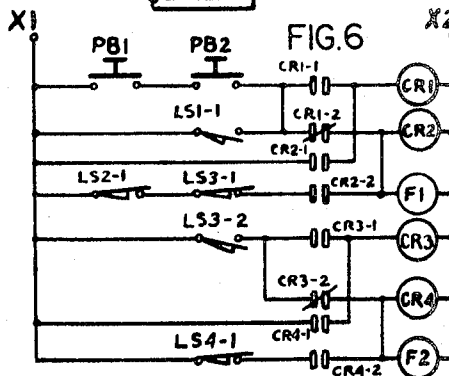


FIG.5



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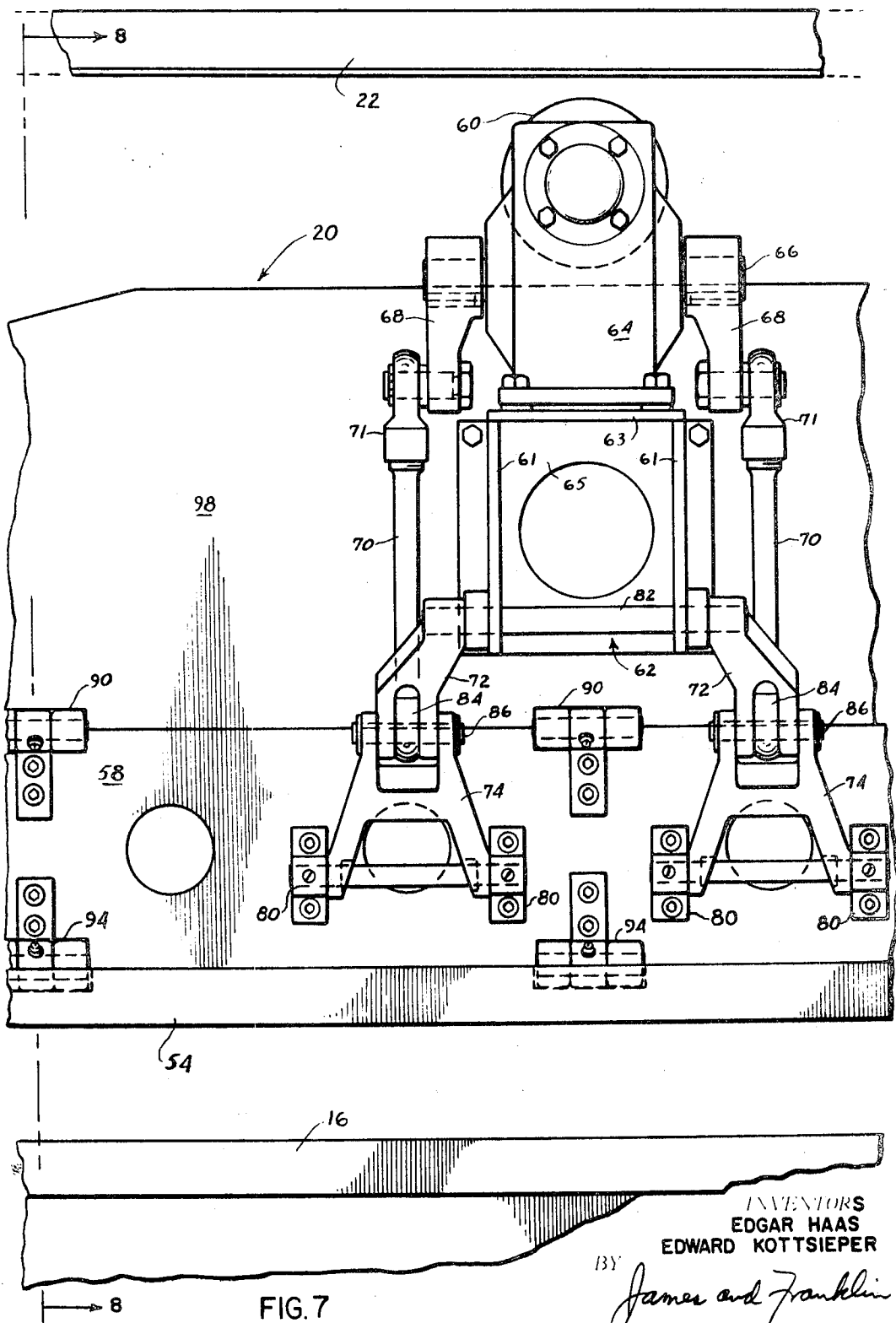


FIG. 7

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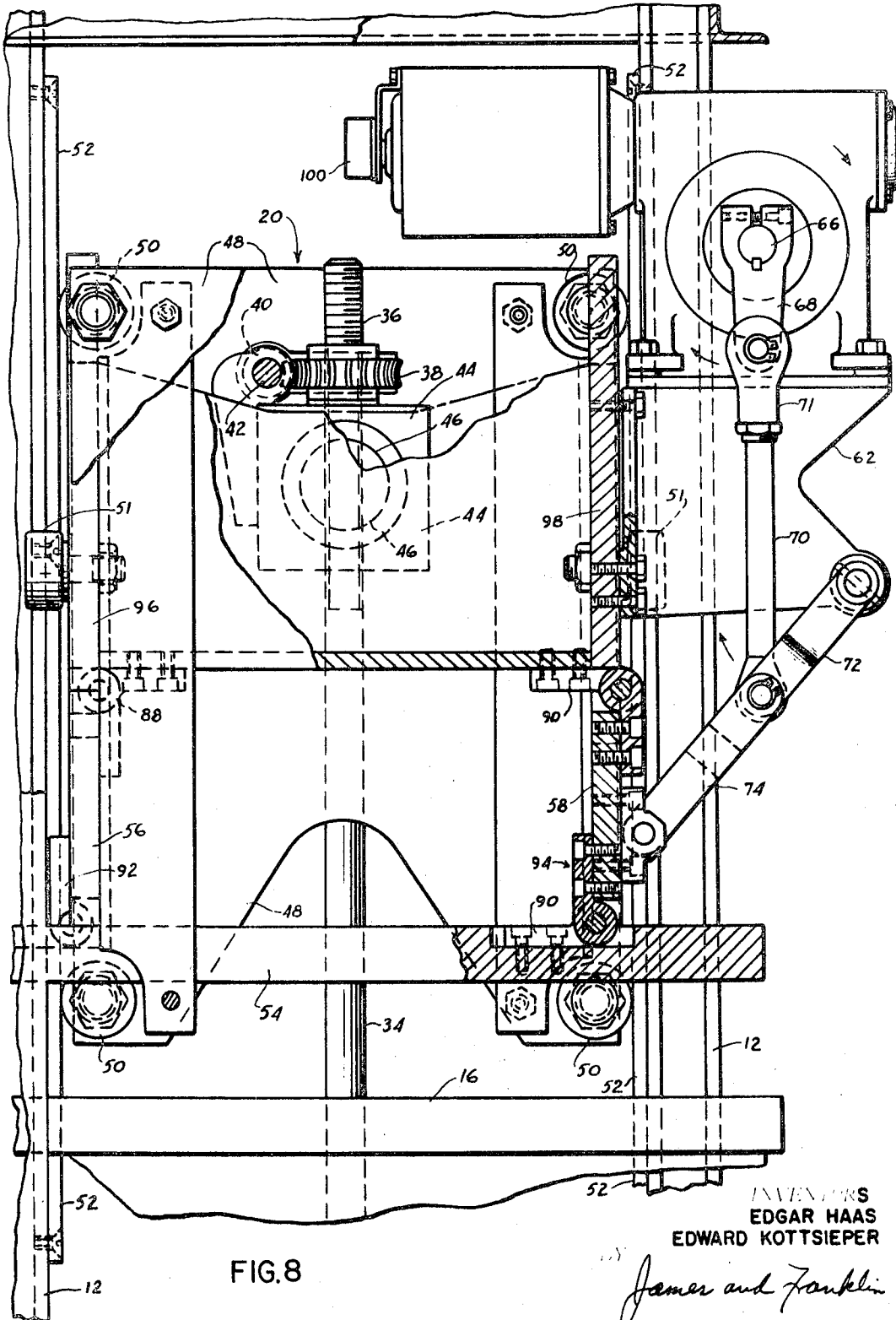
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3,468,204

PRESS WITH RETRACTABLE PLATEN

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19 Claims

ABSTRACT OF THE DISCLOSURE

This press, typically a die cutting press of the four poster type, has a long bed to support wide continuous material, and a long head thereover. Dies are moved manually over the material. For hand safety and for better visibility, the platen is carried beneath the head by front and back upright hinge plates which are so hinged at their top and bottom that they can fold rearward and upward to retract the platen out of the way. An auxiliary motor means and linkage are connected to the hinged assembly to pull the platen to its retracted position when the head is raised.

BACKGROUND OF THE INVENTION

Material is frequently cut by loose dies which are manually placed on the material. The press platen may be a swinging arm, but when using wide material coming from rolls or a long layup, it is preferred to use a four poster press having a relatively long bed for material which is say sixty inches wide. If the dies are small, as for shoes, the press may be a "travel head" press, in which the platen travels sideward beneath a top beam between cuts. However, if the dies are of large area, as when cutting patterned pieces for clothing or luggage, it is preferred to have the entire width of the press available, and in a typical case the bed and the platen both may be say sixty inches by thirty inches. For improved visibility and to safeguard the hands of the operator, it has been proposed to slide the entire head rearward out of the way between cutting strokes, but this has created structural and inertia problems. Somewhat similar difficulty arises if one attempts to provide a very long stroke upward.

SUMMARY OF THE INVENTION

The present improved press comprises a four poster frame carrying a bed and a head with a main drive means to move the bed and the head vertically toward and away from one another, with a short stroke, all in accordance with known practice. However, the platen is carried beneath the head by front and back hinge plates which are upright during the cutting stroke, and which are so hinged at their top and bottom that they can fold rearward and upward to retract the platen out of the way. Appropriate linkage is connected to the hinged assembly to pull the platen to its retracted position, and auxiliary motor means is provided for this purpose.

The hinges at the top and bottom edges of the hinge plates are so positioned and arranged that the plates come to a stop in vertical position with their top edges bearing against the bottom of the head, and with their bottom edges bearing against the top of the platen, so that the full force of the head is transmitted directly to the platen without reliance or stress on the hinges. The hinge plates are nearly as long as the head and platen so that the cutting force is distributed along the length of the platen.

The auxiliary motor means preferably is mounted on and moves up and down with the head. It may be an electric motor of the gear motor type, in which the slow

speed shaft carries cranks at both ends, which operate rods connected to toggles. The toggle at one end are connected to the rear hinge plates, and at the other end are connected to the motor bracket projecting rearward from the head. This linkage is so arranged that the cranks and rods come into dead center alignment, and the toggles also come into dead center alignment, when the hinge plates are in vertical working position, thereby locking them in that position.

The foregoing and additional features are described in the following detailed specification, which is accompanied by drawings in which:

FIG. 1 is a front elevation of a die cutting press embodying the invention, the dies being omitted;

FIG. 2 is an end view looking toward the left end of FIG. 1, with a cover plate removed;

FIG. 3 is a fragmentary simplified view, to larger scale, looking toward the left of FIG. 1, but with the end plate of the head omitted, and showing the platen partially retracted;

FIG. 4 is a similar view showing the platen fully retracted;

FIG. 5 is a fragmentary view explanatory of a modification;

FIG. 6 is an electrical diagram;

FIG. 7 is a rear view drawn to larger scale, and showing the linkage of FIGS. 3 and 4; and

FIG. 8 is a section the right hand portion of which is taken approximately on the line 8—8 of FIG. 7.

Referring to the drawing, and more particularly to FIGS. 1 and 2, the press shown is a four poster press, the posts in this case being U channels 12 which carry bed beams 14 supporting a table with a cutting block 16. The posts are supported by base channels 18. The head 20 is vertically movable, and is guided by appropriate ways described later. The frame is completed by cross rails 22 at the top of the posts 12.

The particular press here shown, without the new retractable platen, is an electromechanical press substantially the same as the "Hercules" press made by Herman Schwabe, Inc. of Brooklyn, N.Y. There is a main drive motor 24, which drives a gear reducer 26, through multiple V belts 28. The output is applied to a main shaft 30 extending beneath the bed 14. This shaft carries eccentrics 32 (FIG. 2) near each end, driving generally upright connecting rods 34, which are connected at their upper ends to the head 20. A hand wheel 36 (FIG. 1) may be used to adjust the height of the head relative to the bed.

Referring to FIG. 8, for this purpose the main connecting rods 34 are threaded at 36, and are received in threaded sleeves which may be rotated by worm gears 38, driven by worms 40, on a shaft 42 which extends from one end of the head 20 to the other, and which is turned by the hand wheel 36 (FIG. 1). The threaded sleeves are rotatable in blocks 44 having trunnions 46 received in plates forming a part of the head 20. Thus the swing of the connecting rods 34 as they follow the motion of the eccentrics 32 is accommodated by oscillation of the blocks 44.

FIG. 8 also shows how the end plate 48 at each end of the head carries four rollers 50 which ride on ways 52 secured to the frame posts 12. There are also front and back rollers shown at 51 in FIGS. 1 and 8.

As so far described the press is conventional, but referring now to FIGS. 1 through 4, the platen 54, instead of being secured directly to the bottom of the head 20, is carried by front and back plates 56, 58. These are hinged at their top and bottom so that they can fold rearward and upward, as shown in FIGS. 3 and 4, to retract the platen 54 out of the way. The press has ap-

appropriate linkage for this purpose, and in the present case the linkage is operated by an auxiliary motor 60 which is preferably mounted on and moves up and down with the head 20. A bracket 62 is fixedly mounted on the rear of the head, and motor 60 is of the speed reducing or gear motor type, the base of gear housing 64 being mounted on bracket 62.

The slow speed shaft 66 of the gear motor turns a crank 68 carrying a connecting rod 70 the lower end of which is connected to the common pin of toggle levers 72 and 74. The lower end of lever 74 is connected at 76 to the hinged assembly, and more specifically to the hinge plate 58. The rear end of toggle lever 72 is connected at 78 to the bracket 62 previously referred to. The connecting rod 70 is adjustable in length, as by being threaded into a mating socket in its upper end connection 71 (FIGS. 7 and 8).

The toggle linkage is spread along the length of the the press, as is best shown in FIG. 7, referring to which, the slow speed shaft 66 projects at both ends from the gear housing 64, the latter in this case housing a worm and gear reduction. Shaft 66 carries two cranks 68, which in turn are connected to two connecting rods 70. The rear hinge plate 58 is shown in upright position between the head 20 and the platen 54.

The toggle levers 74 have a broad A shape, the wide lower ends being pivotally connected to the hinge plate 58 with the aid of bearing blocks 80. The toggle levers 72 are connected to the bracket 62 by means of a shaft 82. The other ends of toggle levers 72 are offset outwardly, and are bifurcated to receive the lower ends 84 of rods 70. The upper ends of the lower toggle levers 74 are wide enough to receive the bifurcated lower ends of levers 72. All three parts are pivotally connected by appropriate pins 86. On comparison it will be seen that this linkage is identical with that described in FIGS. 3 and 4, but FIG. 7 shows that it is used in duplicate, and spreads outward from the auxiliary motor at the center of the head.

FIGS. 3 and 4 respectively show the platen 54 partially and fully retracted. The forward or working position of the platen is shown in FIG. 2 but is better shown in FIG. 8, referring to which it will be seen that crank 68 and rod 70 are in alignment or dead center, and similarly that toggle lever 72 and toggle lever 74 are in alignment or dead center, when the platen 54 is in working or cutting position. At this time the front and back hinge plates 56 and 58 are in vertical position, and the linkage design helps lock them in that position. With hinge plates nine inches wide an extra lift of about eight inches is obtained, and there is also a rearward displacement.

FIG. 8 shows how the hinges 88 and 90 at the top edges of the hinge plates 56 and 58, and the hinges 92 and 94 at the bottom edges of the hinge plates, are so positioned and arranged that the plates have their top edges bearing against the bottom of the head 20, and they have their bottom edges bearing against the top of the platen, so that the full cutting force of the head 20 is press, as is best shown in FIG. 7, referring to which, transmitted directly to the platen 54 without reliance or stress on the hinges. For this purpose, as will be seen in FIGS. 3, 4, 7 and 8, the hinge axes at the top are coincident with the top rear corners of the plates 56 and 58, and the hinge axes at the bottom are coincident with the bottom forward corners of plates 56 and 58.

The top of platen 54 is recessed to receive the leaves of hinges 92 and 94, and in FIG. 7 it will be seen that the upright hinge leaves are disposed between the horizontal hinge leaves, so that the center leaves can nest between the spaced leaves when the platen is in the raised position shown in FIG. 4. The top edges of the hinge plates are notched downward (See FIG. 7) to clear the top hinges, and the bottom edges are notched upward to clear the bottom hinges. When the platen is in its working position

as shown in FIG. 8, the hinge plate 56 is vertically aligned with and abuts in edge-to-edge relation with the main forward beam plate 96 of head 20, and the rear hinge plate 58 is vertically aligned with and abuts in edge-to-edge relation with the main rear beam plate 98 of the head 20.

Referring to FIG. 7, the bracket 62 has upright plates 61 welded to a top plate 63, and these are all welded to an upright mounting plate 65, to form a rigid box frame which is bolted to the rear beam plate 98 of the head 20.

The auxiliary motor is preferably provided with means to automatically stop it when the platen is in its working position, and again when it is fully retracted. This may be done in several ways. Referring to FIG. 8 there is a counter 100 which operates a switch after a predetermined count. Thus the gear reduction may be say 80 to 1, in which case the motor switch is opened at a count of 40, and again at a count of 80, and is appropriately synchronized with the up position of the crank 68 shown in FIG. 4, and the down position of the crank 68 shown in FIG. 8. Such revolution counters controlling switches are made, for example by the Allen Bradley Company at Milwaukee, Wis., or Eagle Signal Company of Moline, Ill.

Alternatively the slow speed or output shaft 66 of the gear motor may turn a unit with cam operated switches. Such switches are made by the aforesaid Allen Bradley Company and others. Still another arrangement may employ limit switches appropriately positioned to respond to the up and down position of the platen, or of the hinge plates. All of these devices are here considered to be limit switches.

A simplified electrical diagram is shown in FIG. 6, and is preferably so designed that the operation of the press is controlled by a pair of spaced push buttons PB1 and PB2 to ensure that the hands of the operator have been removed from the press. Moreover, the control circuitry of the main motor 24 and the auxiliary motor 60 is so interrelated that the main motor can be operated only after the auxiliary motor has moved the platen to working position.

In FIG. 6 the limit switch LS1 responds to upward movement of the head; limit switch LS2 is for the retracted position of the platen; limit switch LS3 is for the forward position of the platen; and limit switch LS4 is for the down position of the head.

To start the press the operator presses the spaced push buttons PB1 and PB2. Relay coil CR2 then is energized and closes contacts CR2-1 and CR2-2, thereby activating starter F1 for motor 60, which swings the platen forward. On reaching the forward position limit switch LS3-1 opens to halt the forward movement of the platen, and limit switch LS3-2 closes to activate relay coil CR4 which starts the cutting motion by activating the starter F2 of main motor 24 through relay contacts CR4-2. Relay contacts CR4-1 activate relay coil CR3 which closes contacts CR3-1 to act as a self contained hold, and also opens contacts CR3-2 so that relay coil CR4 is deenergized when limit switch LS4-1 opens at the end of the cutting stroke.

On its way up the head closes limit switch LS1-1 temporarily to energize starter F1 of auxiliary motor 60, which folds the platen backward until it opens limit switch LS2-1 thus deenergizing strater F1 of motor 60 and halting the folding motion. The retraction need not be delayed until the head has risen all the way. Relay coil CR1 which is energized through relay contacts CR2-1 will remain energized over relay contacts CR1-1 if the operator holds push buttons PB1 and PB2 closed. Relay contacts CR1-2 (which are normally closed) will open so that relay coil CR2 will be deenergized upon the opening of limit switch LS1-1 or LS3-1.

The motor means to retract the platen need not be an electric motor. It is possible to use an actuator driven by compressed fluid, such as oil or air. Referring to FIG.

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5, as before the head 140 carries a platen 152 on front and rear hinge plates, only the rear hinge plate 144 being shown. The head 140 carries a bracket 146 supporting motor means in the form of a cylinder 148 and plunger or piston rod 150 connected to a piston inside the cylinder. The cylinder 158 is pivotally mounted at 152 on the bracket 146, and piston rod 150 is connected to the hinged assembly. It will be evident that when the actuator is extended the platen 142 is moved downward and forward to working position, and when the actuator is shortened, the platen is moved upward and rearward to its retracted position shown in broken lines at 142'. The pipes for the fluid driving the actuator are indicated at 154 and 156.

It is believed that the construction and operation of our improved press with retractable platen, as well as the advantages thereof, will be apparent from the foregoing detailed description. The advantages of a very long press stroke are obtained, while using a short press stroke. With a separate auxiliary motor the platen may be put safely into working position before the cutting stroke, yet may be retracted during the return stroke of the press.

It will be apparent that while we have shown and described the invention in a preferred form, changes may be made without departing from the scope of the invention.

We claim:

1. A press comprising a frame, a bed, a head, a main drive means to relatively move the head and bed toward or away from one another, a platen carried by the head beneath the head by front and back upright hinge plates which are so hinged at their top edges to the head and at their bottom edges to the platen that they can turn rearward and upward to retract the platen out of the way, and auxiliary means connected to the hinged assembly to pull the platen to its retracted position.

2. A press as defined in claim 1, in which the hinges at the top and bottom edges of the hinge plates are so positioned and arranged that the plates come to a stop in vertical position with their top edges bearing against the bottom of the head, and with their bottom edges bearing against the top of the platen, so that the force of the head is transmitted directly to the platen without reliance on the hinges.

3. A press as defined in claim 2 in which the auxiliary means comprises an extra motor and linkage connected to the hinged assembly and operated by the extra motor.

4. A press as defined in claim 3, in which the frame and bed are stationary, and in which the head moves up and down over the bed, and in which the auxiliary motor means for retracting the platen is mounted on and moves up and down with the head, and in which the platen is retracted when the head is raised.

5. A press as defined in claim 4, designed for die cutting wide material resting on the bed by means of dies moved manually over the material while the platen is retracted, said press being a four poster press having a relatively long bed, a commensurately long head and platen, and hinge plates nearly as long as the head and platen in order to apply a cutting force which is distributed along the length of the platen.

6. A press as defined in claim 5, in which the auxiliary motor means is an electric motor of the speed reducing or gear motor type, and in which the slow speed shaft is double-ended and carries cranks at both ends, connecting rods driven by said cranks, and toggles operated by said rods, and in which the toggles at one end are connected to the rear of the hinged assembly, and at the other end are connected to a bracket projecting rearward from the head.

7. A press as defined in claim 5, in which the auxiliary motor means is an electric motor of the speed reducing or gear motor type, and in which the slow speed shaft is

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double-ended and carries cranks at both ends, rods driven by said cranks, and toggles operated by said rods, and in which the toggles at one end are connected to the rear hinge plate, and at the other end are connected to a bracket projecting rearward from the head, and in which the cranks and rods come into dead center alignment and the toggles also come into dead center alignment when the hinge plates are in vertical working position, thereby locking the hinge plates in vertical position.

8. A press as defined in claim 7, in which the auxiliary motor means is provided with limit switches to stop the operation of the motor when the hinge plates are vertical, and again when the platen is fully retracted.

9. A press as defined in claim 8, in which the main drive means is electromechanical and is driven by an electric motor, and in which the operation of the press is controlled by a pair of spaced push buttons to ensure that the hands of the operator have been removed from the press, and in which the control circuitry of the main motor and the auxiliary motor are so interrelated that the main motor can be operated only after the auxiliary motor has moved the platen to working position.

10. A press as defined in claim 5, in which the auxiliary motor means comprises a cylinder and plunger, one of which is connected to the rear hinge plate, and the other of which is connected to a bracket projecting rearward from the head.

11. A press as defined in claim 3, in which the frame and bed are stationary, and in which the head moves up and down over the bed, and in which the auxiliary motor means for retracting the platen is mounted on and moves up and down with the head, and in which the platen is retracted when the head is raised.

12. A press as defined in claim 1, designed for die cutting wide material resting on the bed by means of dies moved manually over the material while the platen is retracted, said press being a four poster press having a relatively long bed, a commensurately long head and platen, and hinge plates nearly as long as the head and platen in order to apply a cutting force which is distributed along the length of the platen.

13. A press as defined in claim 3, in which the auxiliary motor means is an electric motor of the speed reducing or gear motor type, and in which the slow speed shaft is double-ended and carries cranks at both ends, connecting rods driven by said cranks, and toggles operated by said rods and in which the toggles at one end are connected to the rear of the hinge assembly, and at the other end are connected to a bracket projecting rearward from the head.

14. A press as defined in claim 3, in which the auxiliary motor means is an electric motor of the speed reducing or gear motor type, and in which the slow speed shaft is double-ended and carries cranks at both ends, rods driven by said cranks, and toggles operated by said rods, and in which the toggles at one end are connected to the rear hinge plate, and at the other end are connected to a bracket projecting rearward from the head, and in which the cranks and rods come into dead center alignment and the toggles also come into dead center alignment when the hinge plates are in vertical working position, thereby locking the hinge plates in vertical position.

15. A press as defined in claim 3, in which the auxiliary motor means is provided with limit switches to stop the operation of the motor when the hinge plates are vertical, and again when the platen is fully retracted, and in which the main driven means is electromechanical and is driven by an electric motor, and in which the operation of the press is controlled by a pair of spaced push buttons to ensure that the hands of the operator have been removed from the press, and in which the control circuitry of the main motor and the auxiliary motor are so interrelated that the main motor can be operated only after the auxiliary motor has moved the platen to working position.

16. A press as defined in claim 3, in which the auxiliary motor means comprises a cylinder and plunger, one of

which is connected to the rear of the hinged assembly, and the other of which is connected to a bracket projecting rearward from the head.

17. A press as defined in claim 1, in which the auxiliary means comprises an extra motor, and linkage connected to the hinged assembly and operated by the extra motor, and in which the said extra motor is an electric motor of the speed reducing or gear motor type, and in which the slow speed shaft is double-ended and carries cranks at both ends, connecting rods driven by said cranks, and toggles operated by said rods, and in which the toggles at one end are connected to the rear of the hinge assembly, and at the other end are connected to a bracket projecting rearward from the head.

18. A press as defined in claim 1, in which the auxiliary means comprises an extra motor, and linkage connected to the hinged assembly and operated by the extra motor, and in which the said extra motor is an electric motor of the speed reducing or gear motor type, and in which the slow speed shaft is double-ended and carries cranks at both ends, rods driven by said cranks, and toggles operated by said rods, and in which the toggles at one end are connected to the rear hinge plate, and at the other end are connected to a bracket projecting rearward from the head, and in which the cranks and rods come into dead center alignment and the toggles also come into dead center alignment when the hinge plates are in vertical working position, thereby locking the hinge plates in vertical position.

19. A press as defined in claim 1, in which the auxiliary means comprises an extra motor, and linkage connected to the hinged assembly and operated by the extra motor, and in which the said extra motor is provided with limit switches to stop the operation of the motor when the hinged plates are vertical, and again when the platen is fully retracted, and in which the main driven means is electromechanical and is driven by an electric motor, and in which the operation of the press is controlled by a pair of spaced push buttons to ensure that the hands of the operator have been removed from the press, and in which the control circuitry of the main motor and the auxiliary motor are so interrelated that the main motor can be operated only after the auxiliary motor has moved the platen to working position.

References Cited

UNITED STATES PATENTS

101,931	4/1870	Simonds	83—563 X
1,153,287	9/1915	Candee	83—563
1,560,117	11/1925	Stevenson et al.	
1,990,599	2/1935	Freeman	83—563 X
2,812,543	11/1957	Stacy.	

FRANK T. YOST, Primary Examiner

U.S. Cl. X.R.

83—563, 699; 100—53, 226, 295