L. A. CASGRAIN.

CUTTING MACHINE.

APPLICATION FILED OCT. 12, 1911.

1,106,363.

Patented Aug. 11, 1914.

3 SHEETS—SHEET 1.

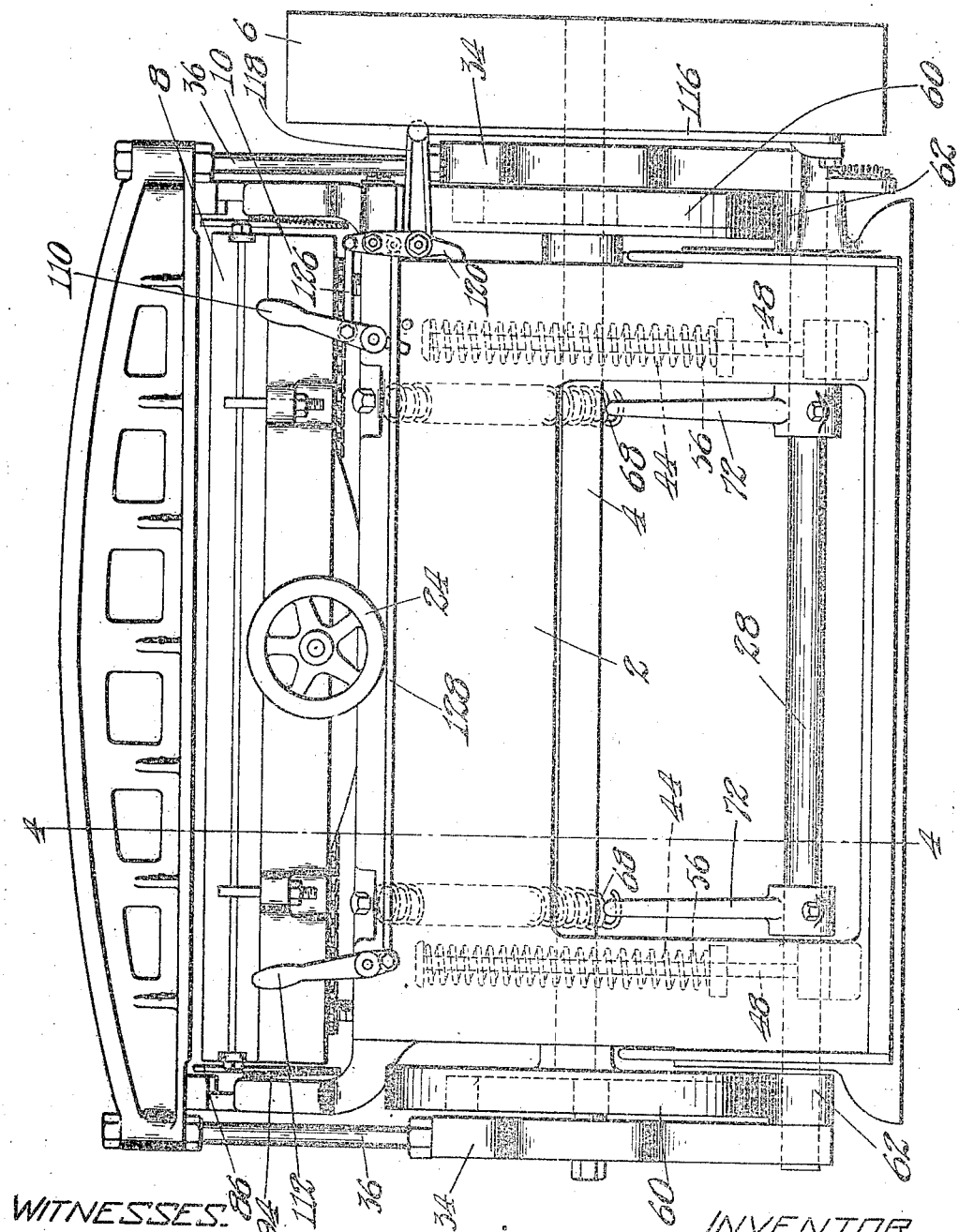


Fig. 1.

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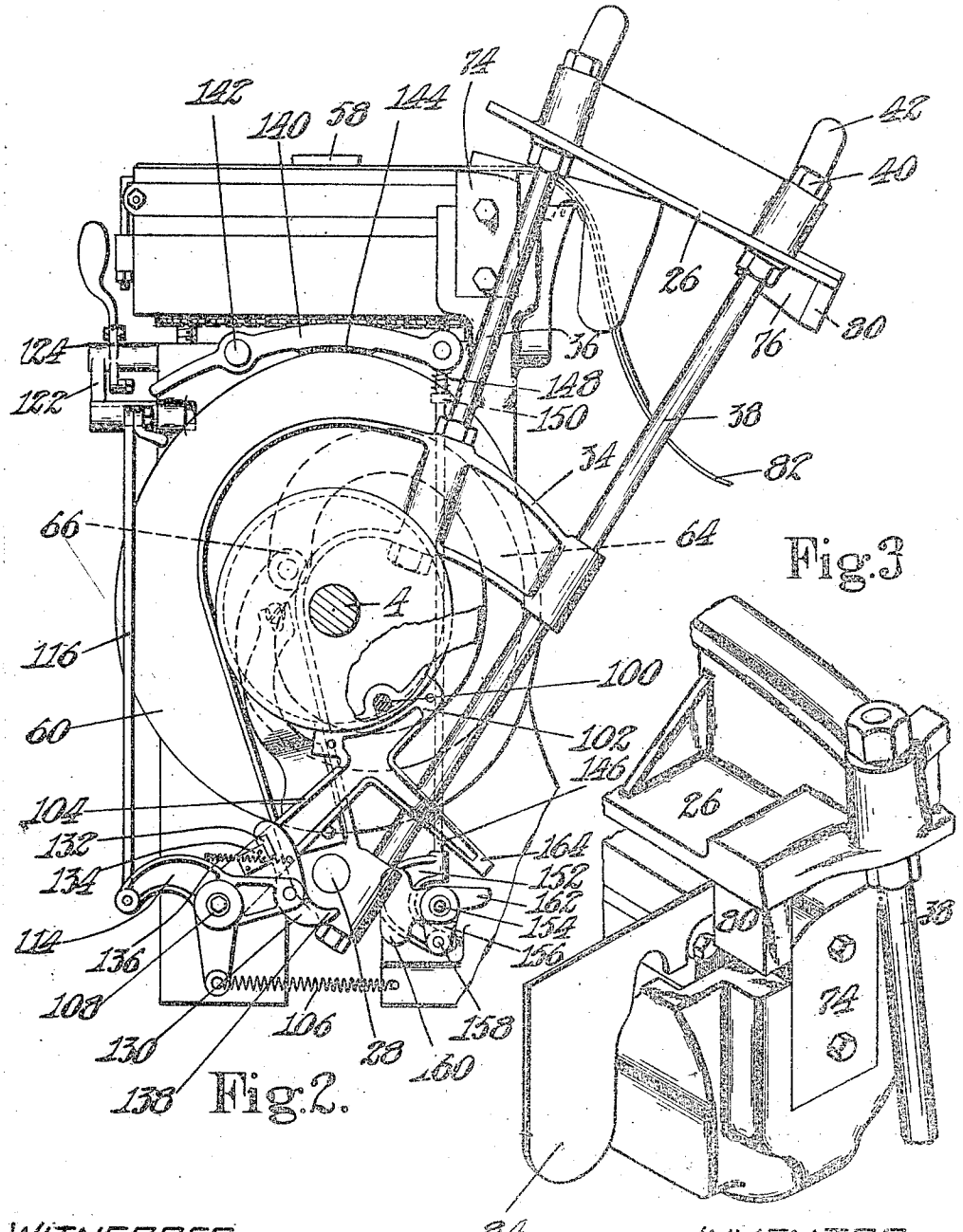


Fig. 3

Fig. 2.

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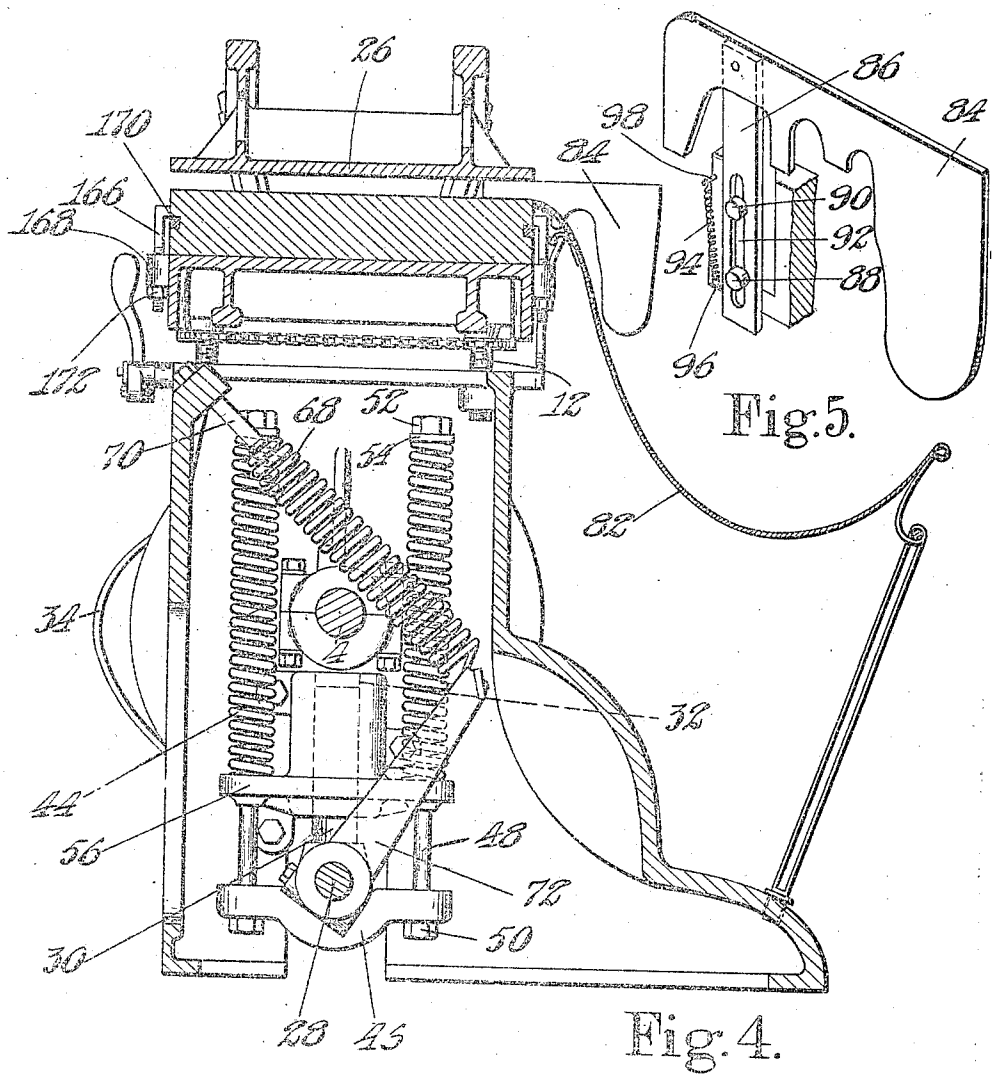
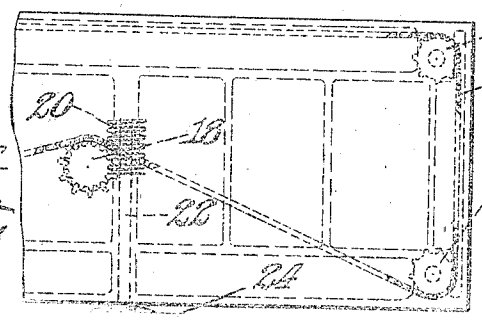


Fig. 4.

Fig. 5.

Fig. 6.



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UNITED STATES PATENT OFFICE.

LOUIS A. CASGRAIN, OF BEVERLY, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

CUTTING-MACHINE.

1,106,363. Specification of Letters Patent. Patented Aug. 11, 1914.

Application filed October 12, 1911. Serial No. 654,258.

To all whom it may concern:

Be it known that I, LOUIS A. CASGRAIN, a citizen of the United States, residing at Beverly, in the county of Essex and State of Massachusetts, have invented certain Improvements in Cutting-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to cutting machines and is herein shown as embodied in a cutting machine designed especially for use with freely movable dies to cut blanks from sheet material such as upper leather for boots and shoes. It will be understood, however, that many features of the invention are of general applicability in the art to which the invention particularly relates.

Only recently have cutting machines come to be used in the upper cutting rooms of shoe factories. Although the cutting machines now in general use are for the most part very satisfactory and have substantially revolutionized upper cutting, there are certain conditions both of work and of factory construction which are not met so satisfactorily when it is attempted to use the machines in the manufacture of certain types of shoes.

In most shoe factories the upper cutting room is located in the upper part of the factory, and in view of the fact that no heavy machinery has been utilized until recently, little provision has been made in the factory construction for the use of heavy machinery on the upper floors. It will be seen, therefore, that it is important in installing upper cutting machines in old factories that provision be made against excessive jar in the cutting operation, and against too great momentum of heavy parts. In cutting ordinary uppers from light upper material little difficulty has been experienced with the upper cutting machines in common use. When, however, dies of large dimensions are used in cutting heavier stock and the length of the stroke of the machine is increased to facilitate its use with the heavier dies, the jar upon the floors of some of the older factories is quite objectionable, particularly when a large number of machines are operating in the same room. Moreover the increased momentum required for the heavier work results in more rapid wear of the cutting block and necessitates therefore more frequent resurfacing of the blocks.

One of the objects of the present invention is to provide a machine which will be of general utility in upper cutting, but which is especially adapted for use with the larger and heavier skins and with the larger dies.

Another object of the invention is to provide a machine which is so automatic and so positive in its operation that it may be run at a much slower speed than the present commercial machines, thereby reducing the momentum and the jar of the impact of the operative parts, and yet produce a quantity of work equal to, if not exceeding, that produced with the said commercial machines.

In the commercial machine most extensively used for upper cutting the cutting operation is performed during a single rotation of the driving shaft and the driving pulley, which is constantly driven from a source of power, is then unclutched from the driving shaft and a brake is simultaneously applied to the driving shaft to bring it to rest. The most convenient way to apply this brake is obviously to utilize the momentum of the moving parts. This is done in the commercial machine above mentioned, but the very simple mechanism employed to utilize this principle of operation is so arranged that when the driving pulley is again clutched to the driving shaft the shaft must be turned a short distance with the brake applied before the connection between the brake and the parts whose momentum it utilizes operate to release the brake.

According to the present invention the objectionable feature of the brake construction just described is eliminated by providing for the release of the brake at the time when, or just before, the clutching of the driving and the driven parts is effected.

Important features of the invention are not only the novel means for effecting the release of the brake before the driven parts begin to move with the driving member, but also the novel means for applying the brake. In the illustrated construction the brake is normally held stationary in the path of movement of an eccentric by means of an inverted toggle which is broken to release the brake before the eccentric begins to turn for the next operation of the machine.

Other important features of the invention are the novel means for effecting the lateral and vertical movements of the presser member and the novel means for preventing the stock from slipping over the sides of the cutting block.

Other features and objects of the invention will be apparent when the following description and claims are read in connection with the accompanying drawings, in which—

Figure 1 is a front elevation of a cutting machine embodying the present invention in its preferred form; Fig. 2 is a side elevation of the machine; Fig. 3 is a detail perspective showing the means for insuring parallelism of the presser member and the stock supporting bed throughout the cutting operation; Fig. 4 is a transverse vertical section of the machine showing the springs for supporting the presser member and the springs for counterbalancing it during its movement into and out of operative position. Fig. 5 is a detail perspective of the lateral guards for preventing the stock from running over the side of the block, and Fig. 6 is a plan view showing the arrangement of the means for effecting vertical adjustments of the cutting block.

The machine comprises a frame 2 provided with bearings for a driving shaft 4 upon which is loosely mounted a combined fly wheel and driving pulley 6 which may be connected to any suitable source of power and which may be clutched at the will of the operator to the shaft 4. The material to be cut is spread out upon a cutting block 8, of wood or other suitable material, which is carried upon a table or bed 10 adjustably supported upon the frame 2 by means of screws 12 threaded into the frame 2, there being a screw for each corner of the table 10. To facilitate adjustment of the table and block, each of the screws 12 is provided with a sprocket wheel 14 over which travels a chain 16, driven from a driving sprocket 18. The driving sprocket 18 is itself driven from a worm 20 upon a shaft 22 provided at the front of the machine with a hand wheel 24.

Coöperating with the cutting block 8 in the cutting operation is a presser member or platen 26 arranged to swing bodily into and out of operative position over the block 8 about an axis below said block, the illustrated presser member being connected to a rock-shaft 28 mounted in bearings in vertical plungers 30 guided in guideways 32 in the machine frame. The connections between the presser member or platen 26 and the rock-shaft 28 comprise at each end of said member a yoke-like casting 34 connected to the rock-shaft 28 and provided with openings through which pass a short rod 36, extending through the presser member 26 and through the upper arm of said casting 34, and a long rod 38 extending through the presser member 26 and through both the upper and lower arms of the casting 34. The rods 36 and 38 are suitably confined at their respective ends in the presser member 26 and in the casting 34 by means of nuts 40 threaded thereon. The presser member 26 is provided with stiffening ribs 42.

The rock-shaft 28 is yieldingly pressed toward its uppermost position by springs 44, there being two springs near each end of the rock-shaft which support a yoke 46 which carries a bearing for said shaft. The connections between the yoke 46 and the springs 44 comprise rods 48 extending through the yoke and provided with nuts 50 at their lower ends, the rods 48 extending up through the springs 44 and being provided with nuts 52 at their upper ends which rest upon washers 54 on the upper ends of the springs 44. The springs 44 rest upon a support 56 which forms a part of the casting in which the guideway 32 is formed, this casting being bolted to and forming a part of the frame 2.

When the presser member 26 is in operative position over the block 8, as shown in Fig. 4, it is depressed against the tension of the springs 44 into engagement with the die 58 to effect the cutting operation by means of an eccentric or cam 60, rigidly connected to the driving shaft 4 and turning therewith, there being one of these eccentrics 60 at each end of the shaft 4. The eccentric or cam 60 engages an anti-friction roll 62 upon the rock-shaft 28, the roll 62 and eccentric 60 being maintained constantly in engagement with each other by the action of the springs 44. The presser member is moved into and out of operative position over the bed automatically, and the illustrated means for effecting this movement comprises a cam groove 64 in the eccentric disk 60 which operates upon a cam roll 66 carried by the yoke 34. The cam groove 64 forms a closed cam so that the movement of the presser member both into and out of operative position is positive.

In order to relieve the strain upon the machine during the movement of the presser member into and out of operative position, the weight of the presser member and its connected parts, when its center of gravity is out of vertical alinement with the axis of the rock-shaft 28, is either partly or wholly counterbalanced by a spring 68 connected at one end to a bolt 70, fastened to the frame 2, and at its other end to an arm 72, fastened to the rock-shaft 28. The amount of counterbalancing of the presser member and its connected parts may be varied by varying the tension of the spring 68 and by changing the angular position of the arm 72 upon the rock-shaft 28.

To insure parallelism of the presser mem-

ber and the bed during the cutting operation, that is to insure a movement of the presser member in a right line during the pressing movement, means is provided for preventing lateral movement of the presser member during its vertical movement. The illustrated means comprises a guide 74 bolted upon each end of the frame 2 and arranged to enter a guideway 76 in a part 80 carried upon each end of the presser member.

The machine herein shown is especially adapted for use in cutting the larger sizes of skins, the cutting block being preferably of considerable length, a suitable length for general use being about 48 inches. To support the part of the skin which projects over the rear edge of the block an inclined table and trough 82 is provided. The machine is also provided with means for preventing injury to the stock in the event that it accidentally projects beyond the ends of the block and comes into the path of relative movement of the guide 74 and the part 80 provided with the guideway 76, it will be seen that if a portion of the stock should come between these parts it might be sheared off during the pressing operation. To prevent this a guard plate 84 is provided which is carried upon a slide 86 arranged to slide upon the guide 74, the slide 86 being confined upon said guide by screws 88 and 90 which pass through a slot 92 in said slide and guide it in a vertical direction. The slide is normally maintained at the upper limit of its movement, with as much of the guard 84 exposed above the surface of the bed as possible, by means of a spring 94 connected at one end to a pin 96 upon the slide and at its other end to a pin 98 upon the guide 74. During the pressing operation the guide 84 will be engaged by the presser member and moved down against the tension of the spring 94. As the presser member again moves up, the guard will follow it and will thus prevent the stock from slipping over the upper end of the guide 74.

The machine is arranged to perform a single operation and then automatically come to rest. To this end it is provided with a non-repeating clutch. The clutch itself is of the general type shown in United States Letters Patent to Arthur Bates, No. 1,011,903, granted Dec. 19, 1911, and comprises an expanding ring, not herein shown, controlled by a spring-pressed bolt or plunger 100 in substantially the same manner as the clutch of the application above referred to, this bolt being held out of its clutch operating position by means of a wedge 102 carried upon a clutch controlling lever 104 pressed normally toward clutch releasing position by a spring 106 connected to the lower arm of said lever. The lever 104 is pivoted at 108 upon the machine frame and is moved into clutch actuating position by connections with two hand levers 110 and 112 pivoted upon the front of the machine frame, the connections being such that it is necessary for the operator to use both hands to start the machine.

Pivoted upon the pivot 108 is a second lever 114 connected at one end by a link 116 to one arm 118 of a bell-crank lever fulcrumed upon a bracket 120 upon the side of the machine frame. The other arm 122 of the bell-crank lever carries an equal-armed lever 124 of the first-class, one arm of the equal-armed lever 124 being connected by a link 126 to the hand lever 110 and the other arm being connected by a link 128 to the hand lever 112. At its other end the lever 114 carries a latch 130 provided with a catch plate 132 which hooks over a second catch plate 134 upon the lever 104. The two catch plates are held normally in engagement with each other by means of a spring 136.

It will be noted that the hand lever 110 is a lever of the second-class and that the hand lever 112 is a lever of the first-class and that, therefore, when the handles of the two levers are grasped by the two hands of the operator and moved toward each other they will operate together to rock the bell-crank lever in a counter-clockwise direction about its fulcrum and thus lift up the outer end of the lever 114 and depress the inner end of said lever, thereby exerting a downward pull on the latch 130 and rocking the lever 104 about its fulcrum 108 against the tension of the spring 106. This operation serves to move the wedge 102 out of engagement with the bolt or plunger 100 and thus permits the said plunger to set the clutch to clutch the fly wheel 6 to the driving shaft 4.

When the machine has been started and the presser member has been brought into operative position over the bed and begins to move toward the bed to effect the cutting operation, the end of the rock-shaft 28 will engage the tail 138 of the latch 130 and will move the catch plate 132 out of engagement with the catch plate 134, thus permitting the spring 106 acting upon the wedge carrying lever 104 to move the wedge 102 back into clutch releasing position to stop the machine at the end of one rotation of the driving shaft 4. To prevent overthrow of the parts when the fly wheel 6 has been unclutched from the driving shaft 4, means is provided for bringing the driving shaft to rest. The illustrated means comprises a brake lever 140 fulcrumed at 142 upon the machine frame and provided with a friction shoe 144 which is arranged to engage the periphery of the eccentric 60 at substantially the point of its greatest eccentricity. The brake shoe 144 is normally held in such position that it will engage the eccentric disk 60 at its point

of greatest eccentricity when this disk has turned to bring the said point beneath the said shoe. The means for holding the shoe in this position comprises an inverted toggle which is arranged to be broken at the time when or just before the fly wheel 6 is clutched to the shaft 4. One member of the inverted toggle consists of a rod 146 slidably mounted in a pivoted block at the end of the lever 140 and pressed normally toward its lowermost position by a spring 148 confined between the said block and a collar 150 on the said rod. At its lower end the rod 146 carries a yoke-like casting 152 which normally embraces the pivot 154 of the other toggle member 156, which is pivotally connected with the said casting 152 and 158.

The toggle member 156 is provided with a weight 160 so arranged that it tends to move the toggle toward straightened position. The said member 156 is also provided with a projection 162 so arranged that it is struck by an arm 164 carried by the lever 104 when this lever is moved in the direction to carry the wedge 102 out of clutch releasing relation to the plunger 100. The toggle is thus broken as the clutch is permitted to act and the breaking of the toggle relieves the pressure of the brake shoe 144 upon the eccentric disk 60. When the fly wheel 6 is clutched to the shaft 4 there is, therefore, no resistance to the turning of the shaft.

The block 8 may be confined upon the table 10 in any suitable manner, as for example, by clamp hooks 166 having threaded ends which extend through openings in lugs 168 upon the table 10, these hooks engaging the binding irons 170 of the block and being drawn down to hold the block tightly upon the table by means of nuts 172 screwed upon their threaded ends.

Having described my invention what I claim as new and desire to secure by Letters Patent of the United States is:—

1. In a machine of the class described, a bed, a presser member arranged to swing into and out of parallelism to said bed about an axis below the bed, said presser member being movable toward and away from the bed, when in operative position, to effect a pressing operation, and counterbalancing means arranged to counterbalance said presser member both during its pressing movements and during its swinging movements.

2. In a machine of the class described, a bed, a presser member arranged to swing into and out of operative position over the bed about an axis below the bed, automatic means for moving said presser member positively in both directions, and means for imparting to said presser member a normal tendency to move into operative position over the bed.

3. In a machine of the class described, a bed, a presser member, lateral supports for said presser member pivoted below the bed, spring supported bearings for said pivots, means for automatically and positively swinging said presser member about its pivots into and out of operative position over the bed, and means for automatically depressing said pivotal bearings against the tension of the supporting springs when the presser member is in operative position over the bed.

4. In a machine of the class described, a bed, a presser member arranged to swing into and out of operative position over said bed about an axis below the bed, means for effecting positively the said swinging movements of the presser member, means for effecting a relative pressing movement of the presser member and bed when the presser member is in operative position, yielding means arranged to resist the operation of said last-mentioned means, and other yielding means arranged to resist the movement of the presser member out of operative position.

5. In a machine of the class described, a bed, a platen, lateral supports for said platen, a rock-shaft arranged below the bed and connecting said lateral supports, bearings in which said rock-shaft is journaled, means for yieldingly supporting said bearings arranged to permit vertical movement thereof, means for guiding said bearings to insure a right line movement, means for automatically and positively swinging said platen and its supports about the axis of said shaft to bring said platen into and out of parallelism to the bed, and means for yieldingly resisting turning movement of said rock-shaft when the platen is moved out of parallelism to the bed.

6. In a machine of the class described, a bed, a presser member arranged to swing into and out of parallelism to said bed about an axis below the bed, a driving shaft, an eccentric upon said driving shaft for depressing said presser member to effect the pressing operation when said member is in operative position over the bed, means for yieldingly supporting said presser member arranged to operate against said eccentric, a cam for positively effecting the swinging movements of said presser member, a driving pulley, a clutch between said driving pulley and said shaft, and means for automatically disconnecting said driving pulley and said shaft after said shaft has made a single rotation.

7. In a machine of the class described, a bed, a presser member arranged to be swung into and out of parallelism to said bed about an axis below the bed, means for yieldingly supporting said presser member, an eccentric for depressing said presser member against its yielding support when said mem-

ber is in operative relation to the bed, and a brake cooperating with said eccentric to check the movement thereof when the presser member is out of operative relation to the bed.

8. In a machine of the class described, a bed, a presser member movable into and out of operative position over said bed, means for yieldingly supporting said presser member, an eccentric for depressing said presser member against its yielding support to effect a pressing operation when said member is in operative position over the bed and a brake cooperating with said eccentric to check the movement thereof when the pressing operation is completed.

9. In a machine of the class described, a bed, a presser member movable into and out of operative position over a die placed upon said bed, means for yieldingly supporting said presser member, an eccentric for depressing said presser member against its yielding support when said member is in operative position over the die, a brake cooperating with said eccentric to check the movement thereof after the die engaging operation of the presser member, and a toggle for holding said brake in the path of said eccentric arranged to be broken before said eccentric begins to turn to effect the movements of said presser member.

10. In a machine of the class described, a bed, a presser member arranged to be swung into and out of parallelism to said bed about an axis below the bed, means for yieldingly supporting said presser member, an eccentric for depressing said presser member against its yielding support when said member is in operative relation to the bed, a brake cooperating with said eccentric to check the movement thereof when the presser member is out of operative relation to the bed, a toggle arranged when in straightened position to hold said brake in the path of said eccentric and to be broken before said eccentric turns to effect the movements of the presser member, automatic means for effecting the straightening of said toggle and manually controlled means for effecting the breaking of said toggle.

11. In a machine of the class described, a bed, a presser member arranged to be swung into and out of parallelism to said bed about an axis below the bed, means for automatically effecting the swinging movements of said presser member, means for yieldingly supporting said presser member, an eccentric for depressing said presser member against its yielding support when said member is in operative relation to the bed, a brake cooperating with said eccentric to check the movement thereof when the presser member is out of operative relation to the bed, a toggle operating when straightened to hold said brake in the path of movement of said eccentric and manually controlled means for actuating said swinging means and said eccentric constructed to break said toggle before said eccentric begins to turn.

12. In a machine of the class described, a bed, a presser member arranged to swing into and out of operative position over the bed about an axis below the bed and lateral guards for the bed located beneath the presser member and arranged to yield when engaged thereby.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LOUIS A. CASGRAIN.

Witnesses:
CHESTER E. ROGERS,
RUTH E. WARD.