A. LATHAM.

CUTTING MACHINE.

APPLICATION FILED APR. 2, 1913.

1,129,876.

Patented Mar. 2, 1915.

4 SHEETS—SHEET 1.

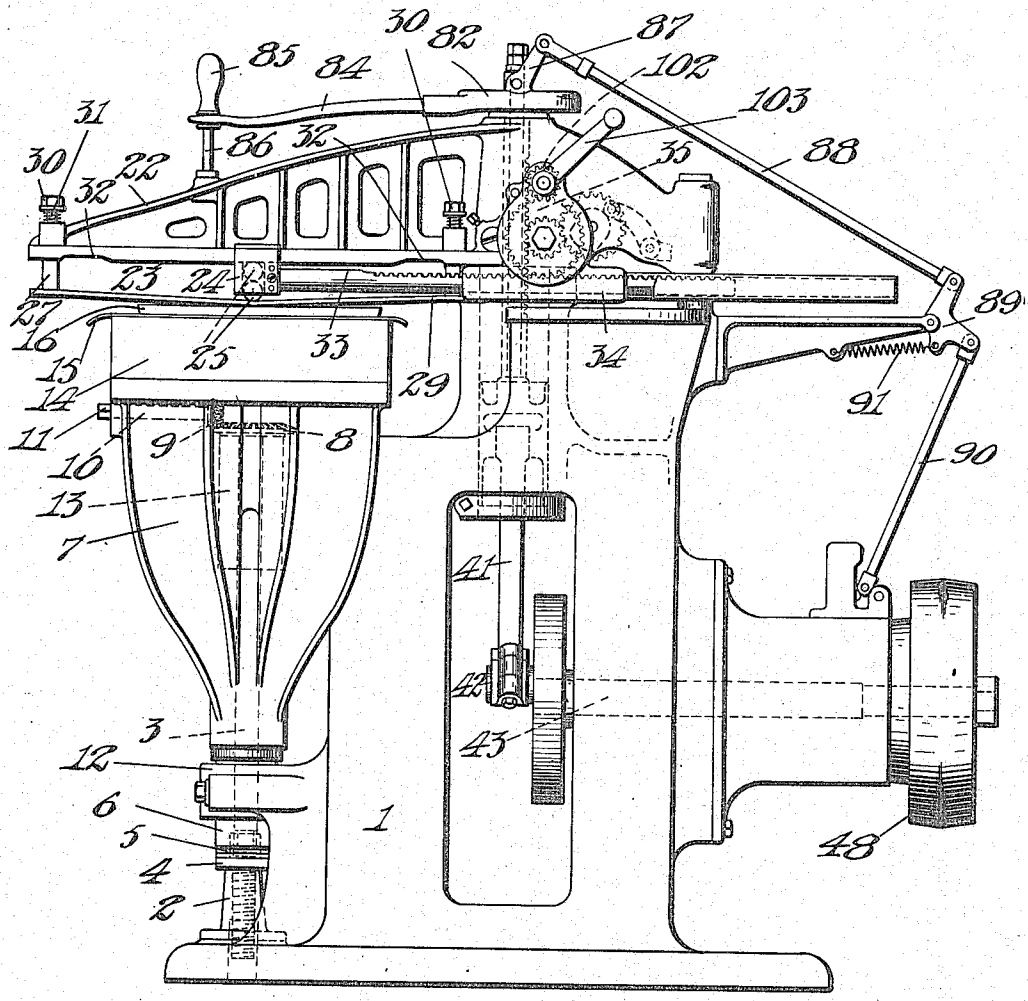


Fig. 1.

WITNESSES.

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4 SHEETS—SHEET 2.

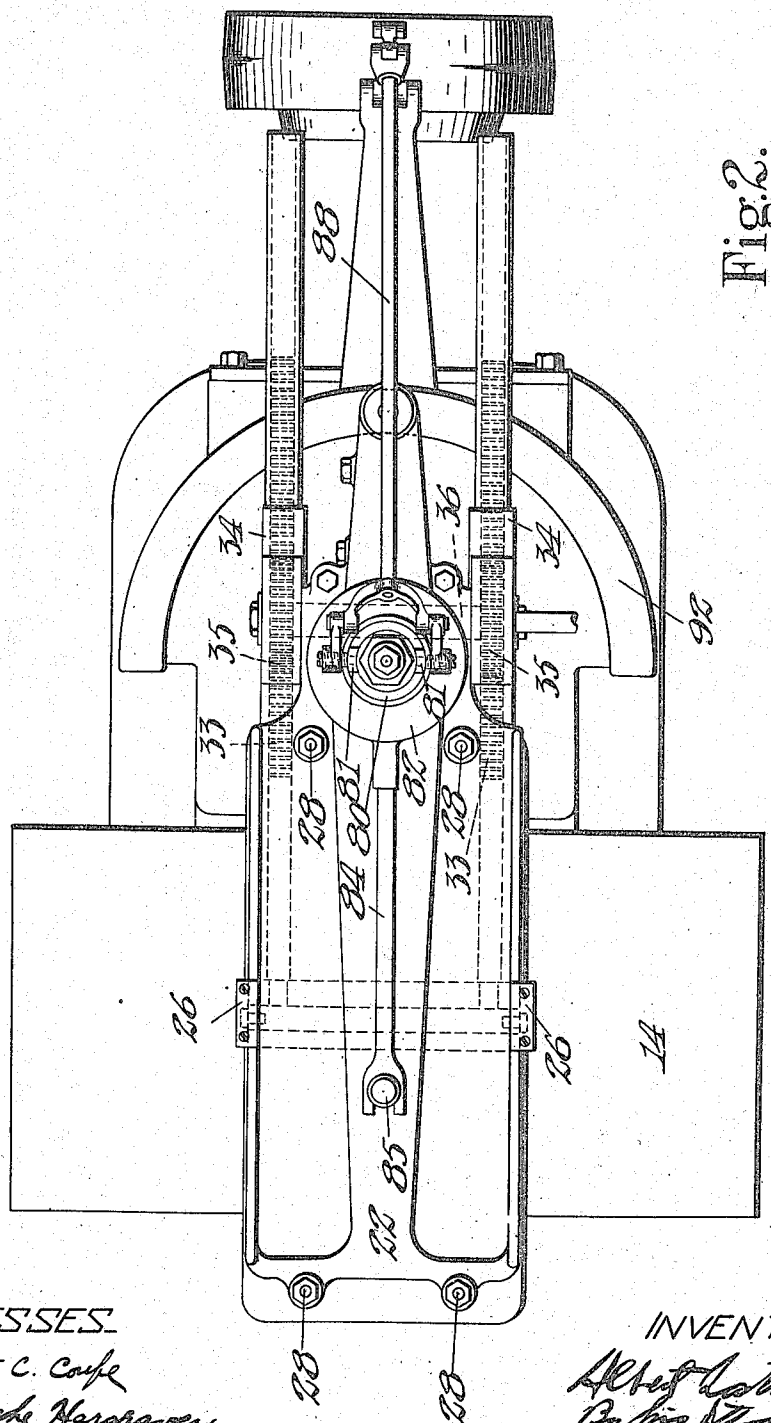


Fig. 2.

WITNESSES.

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4 SHEETS—SHEET 3.

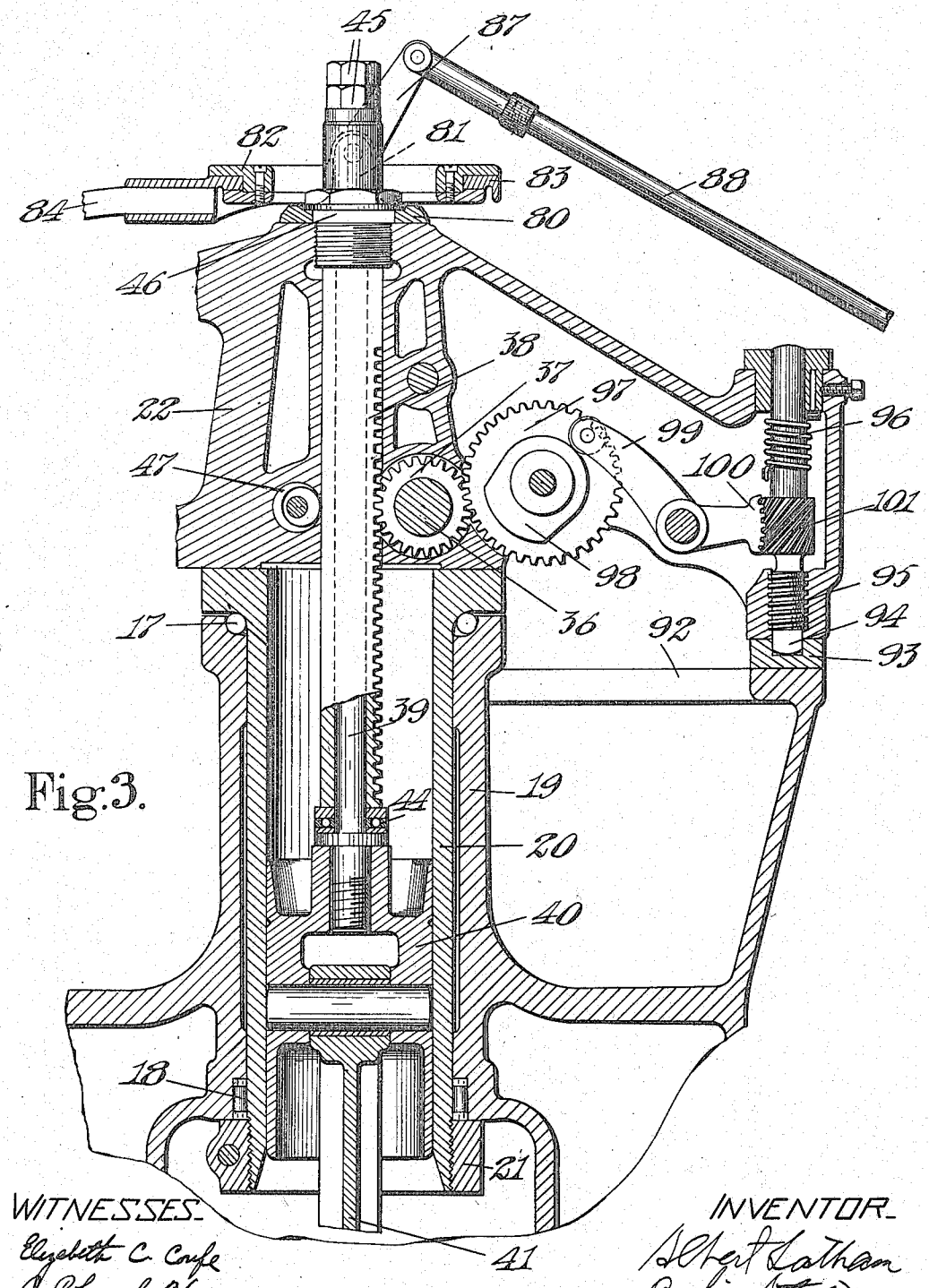


Fig. 3.

WITNESSES.

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4 SHEETS—SHEET 4.

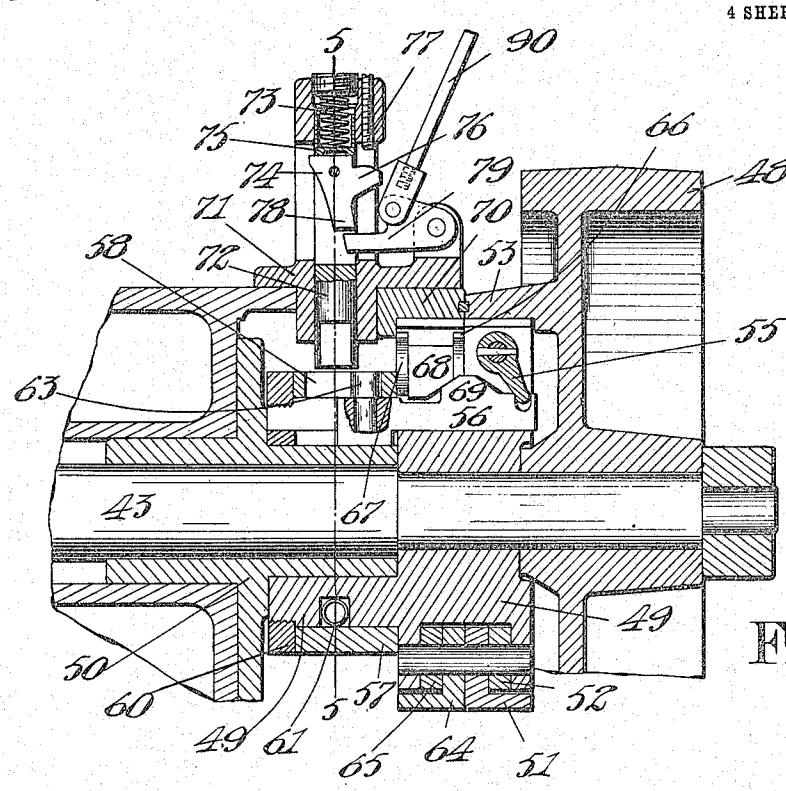


Fig.4.

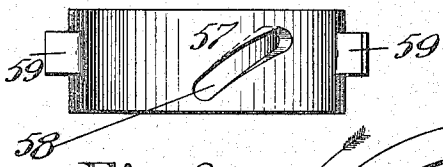


Fig.6.

Fig.5.

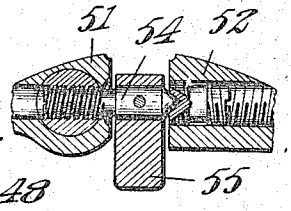


Fig.7.

WITNESSES.

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UNITED STATES PATENT OFFICE.

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CUTTING-MACHINE.

1,129,876. Specification of Letters Patent. Patented Mar. 2, 1915.

Application filed April 2, 1913. Serial No. 758,362.

To all whom it may concern:

Be it known that I, ALBERT LATHAM, 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.

The object of this invention is to provide a machine for cutting sheet material, and especially for dieing out blanks from thin material such as upper leather for use in the manufacture of boots and shoes. It is not restricted, however, to operation upon any particular material, nor to cutting blanks of any particular character, but is applicable broadly to all uses for which machines of similar type have been employed.

The machine embodying the preferred form of the invention includes a bed for supporting a die and the material upon which the die is to operate, and pressure applying means movable laterally over the bed, that is, in a direction from one side to the other of the die, and formed and arranged to bring pressure to bear successively during such movement upon different portions of the die so as to cut the material progressively.

Important features of the invention are to be recognized in the novel construction and arrangement of pressure applying means whereby the cutting operation is effected with the expenditure of but little power and in a positive and effective manner.

Particular novel features of the invention reside in the form and construction of the presser member which is movable laterally over the bed in the manner above described to operate the die, in the arrangement of operating means for the presser member, and in means for transmitting the pressure of the member to the die in such manner that in the use of a free movable die the die will not be displaced with reference to the material to be cut.

The invention includes also guiding means for confining the operative movement of the presser member to a plane substantially parallel to the plane of the bed, such means comprising preferably a beam or arm constructed and arranged to extend over the die during the cutting operation and between which and the die the presser member is movable in a direction lengthwise of the beam. The beam thus provides an effective abutment for the presser member in the action of the latter upon the die.

An important advantage of the construction above described is that the presser member is effective in all positions to force the die the same distance through the stock, and with the same die in use this effect is invariable, whatever the character or thickness of the stock may be.

The invention includes also provision for varying at will the distance between the guide member and the bed, and with the use of such means the parts may be accurately adjusted, whatever the size of the die, to effect a clean cut through the stock without forcing the die unnecessarily into the bed. As a result frequent vexation and loss of time occasioned in removing dies that have been driven too far into the bed and in planing the surface of the bed where the latter has become scarred and worn, are avoided, and it is feasible also to use if desired a metallic cutting block, which is less cumbersome and less easily scarred than blocks made of wood or similar material.

A further feature of the invention resides in provision for movement of the presser member initially to different positions with respect to the bed so that its path of movement during the cutting operation may bring it directly over the die wherever the latter may be placed upon the bed. In the preferred construction shown the guide beam likewise is movable, so as to afford the operator an unobstructed view of the bed while placing the die. It is important, however, that the presser member, while in process of effecting the cutting operation, shall move in a definite predetermined path over the die, and be prevented from any other movement, in order to avoid cutting irregularly or displacing the die upon the stock. Means for constraining the presser member to move in a definite path from any starting position constitutes a further important feature of my invention.

Another feature of the invention resides in means for effecting with little effort on the part of the operator a quick, positive and limited movement of the presser mem-

ber. It comprises broadly automatic mechanism for imparting to the presser member a definite and limited movement, and a light, quick acting starting device within convenient reach of the operator for rendering this mechanism operative each time that a cutting operation is to be effected. This starting device preferably includes a handle mounted upon the guide beam, whereby the operator is enabled to move the beam to any position above the bed and then by a different movement of the same handle to trip the actuating mechanism for the presser member.

Other objects and features of the invention will appear from the following detailed description.

In the drawings, Figure 1 represents a side elevation of the machine; Fig. 2 is a plan view; Fig. 3 is a vertical section through the head portion of the machine; Fig. 4 is a vertical longitudinal section through the driving pulley and clutch, a portion of the structure at the bottom of the figure being broken away; Fig. 5 is a cross section on the line 5—5 of Fig. 4; Fig. 6 shows a detail of the clutch mechanism; Fig. 7 is a section through a portion of the means for operating the clutch shoes.

Threaded into the standard 2 on the front of the frame 1 of the machine is a vertical shaft 3 carrying a collar 4 that supports through an anti-friction bearing 5 a reduced portion 6 on the lower end of the block support 7. Fast on the shaft 3 at its upper end is a bevel gear 8 in mesh with a gear 9 on an arbor 10, the end of the arbor being squared at 11 for the reception of a crank or similar tool by which the gears may be operated. The reduced portion 6 of the support is arranged to slide in a bearing 12 of the frame, and the shaft 3 is journaled to rotate in a portion of the frame represented by dotted lines at 13 and is also arranged to slide vertically therein for adjusting the support.

Mounted upon the support 7 is the cutting block or bed 14, upon which in the operation of the machine is placed material 15, such as a strip of upper leather, from which blanks are to be cut. A free movable die 16 is placed upon the bed in desired position with its cutting edge in contact with the stock and pressure is applied to the die from above to cut the blank by means hereinafter described. When the shaft 3 is operated by the mechanism set forth, it serves to adjust the support 7 vertically and thereby present the die in predetermined relation to the pressure applying means.

Mounted to turn upon antifriction bearings 17 and 18 in an upright sleeve portion 19 of the frame is a cylinder 20 that has threaded upon its lower end a split clamping collar 21 to prevent vertical displacement. The cylinder is flanged at its upper end and carries thereon a beam or arm 22 a portion of which extends forwardly over the cutting block and by reason of the mounting described may be swung in a plane substantially parallel to the face of the bed.

The lower surface of the forwardly extending portion of the beam forms a guideway 23 substantially parallel to the face of the block or bed, which serves to direct the movements of a presser member, and acts as an abutment therefor. This member comprises, in the illustrated embodiment of the invention, a pair of rollers 25 mounted loosely in contact and one above the other in a slot in a yoke or carrying member 24, the upper roller contacting also with the guideway 23 and the lower roller with a flexible member 29 to be described. The yoke 24 has at each end an upward projection at the side of the beam carrying a plate 26 that extends inwardly over the edge of the beam for supporting the yoke in its movements so as to permit the lower roller to project to some extent below the lower face of the yoke. The rollers 25 I have termed inclusively a "presser member," since they constitute together that member which is directly instrumental in applying pressure to the die. It should be understood, however, that my invention is not limited to the use of rollers for this purpose, since devices of different character may be arranged to move laterally over the bed and perform the function of a presser member in the manner contemplated by my invention. The use of rollers, however, I have found especially advantageous as tending to eliminate friction and avoid displacement of the die.

Depending rigidly from the beam are a plurality of collars 27, the openings in which aline with openings that extend upwardly through the beam. Fitting loosely in these openings are bolts 28 that have attached to their lower ends a member 29 consisting of a thin strip of some flexible material, preferably spring metal. Threaded upon the upper ends of the bolts are nuts 30, and between the nuts and the beam are springs 31 that tend to elevate the bolts and the flexible strip, and maintain the latter in its highest position. The width of the combined rollers, it will be noted, is greater than the normal distance between the guideway 23 and the flexible strip. The strip 29 thus bears upwardly against the lower roller of the presser member and constitutes a contact member for transmitting pressure from said member to the die. At each end of the guideway 23 is formed a depression 32, which permits the rollers 25 to be forced upwardly in the yoke by means of the springs 31 and the flexible strip at the end of movement of the

presser member in either direction, whereby the flexible member 29 may be retracted sufficiently to clear the die and permit the beam to be swung to either side.

The provision of the member 29 as a means for transmitting pressure to the die serves the purpose of avoiding displacement of the die by the presser member, especially at the time when the latter first becomes effective upon the edge of the die. My invention, however, in its broader aspects, is not necessarily limited to the use of a contact member performing the function described, since obviously by suitably proportioning and arranging the parts of the presser member, the latter may be made to perform its function by direct contact with the die without the interposition of a passive member.

Connected with the yoke 24 are a pair of rack members 33 that slide in guideways 34 on the beam. These rack members are formed upon their upper sides with teeth that are in mesh with teeth on pinions 35 fast on a shaft 36 which is journaled in the beam. Midway between the pinions 35 the shaft 36 has fast thereon a pinion 37, the teeth of which are in mesh with teeth on a vertically reciprocating rack member 38. This rack member is mounted to turn upon a rod 39 carried by a cylindrical cross head 40 that is arranged for reciprocatory movement only within the rotating cylinder 20 and is operated by a pitman 41 and a crank 42 on the driving shaft 43. The rack member 38, it will be noted, is mounted at the pivotal point of the beam and turns with the beam about the rod 39 and upon a ball bearing 44 upon the cross-head. The member 38 is kept from endwise movement with respect to the rod 39 by nuts 45 on the end of the rod, and reciprocates with the rod through a bearing 46 and in contact with an adjustable anti-friction roller 47 on the beam.

The racks and pinions and other parts of the mechanism above described for operating the presser member are so proportioned and arranged that when the crank 42 is in its lowest position the presser member will be at the inner end of the guideway 23 on the beam with the upper roller 25 retracted within the depression 32. Starting from this position a half revolution of the crank will raise the rack member 38 to its highest position, imparting a corresponding outward movement to the rack members 33 and thereby moving the presser member along the beam to the outer end of the guideway until the upper roller enters the depression 32 at that end of the guideway. These are the movements that correspond to a single operation of the machine. The succeeding half revolution of the crank in the same direction causes a reversal of the movements described and brings the parts back to their first position, these movements corresponding to a second operation of the machine. Between successive operations of the machine the beam 22 may be swung to one side so as to afford an unobstructed view of the stock and permit the die to be placed in the most advantageous position, after which the beam may be swung to position directly above the die wherever the latter may be located upon the bed. The swinging of the beam serves to adjust the presser member laterally with respect to the direction of its pressure applying movement, so that during such movement it may act uniformly and effectively upon the die wherever the die may be placed upon the bed. It will be seen that the swiveled relation of the rack member 38 to the rod 39 permits the beam to be moved as described without disturbing the operative arrangement of the parts that serve to effect the movements of the presser member, and that the latter may be operated in the same manner whatever the position of the beam may be.

For effecting the above described operations I have provided mechanism under the control of the workman for causing the shaft 43 to turn a half revolution only each time said mechanism is actuated and for bringing the shaft to a full stop automatically at the end of such movement with the crank 42 in one or the other of the two extreme positions specified. Broadly considered, this mechanism comprises a driving pulley 48 loosely mounted on the shaft, with means arranged to be actuated by the workman for causing the pulley to clutch the shaft and turn it a half revolution, at the end of which movement the pulley is automatically disengaged from the shaft and a brake applied to stop the shaft in the desired position. In the preferred embodiment shown this means comprises a particular form of clutch, the specific features of which are not claimed herein as novel; and it will be understood, furthermore, that the invention is not dependent upon the use of this particular device, but that equivalent devices may be substituted for effecting the desired movements of the presser member. Nor is a single complete operation of the machine necessarily restricted to a single movement of the presser member in one direction only along the beam, since obviously, if desired, a single cutting operation may involve a complete reciprocation of the presser member.

The embodiment shown includes a sleeve 49 fast on a reduced portion of the shaft 43 between the loose pulley 48 and a flanged journal bearing 50, one end of the latter being encompassed by a portion of the sleeve. Pivoted on the sleeve are two semicircular friction shoes 51 and 52 arranged

to engage, when expanded, a flange 53 on the pulley 48 and clutch the pulley to the shaft. For expanding the clutch shoes I employ a spindle 54 threaded into a ball in a socket of one of the shoes, as 51, and engaging an adjustable bearing in the other shoe. Fast upon the spindle is an arm 55 that is engaged and operated by a slide 56 in the sleeve 49. When the slide is in its extreme outward position as shown in Fig. 4, the clutch shoes are expanded so as to clutch the pulley to the shaft. When moved inwardly from this position the slide operates the arm and the spindle so as to release the pressure of the clutch members upon the flange 53 and disengage the pulley from the shaft.

Loosely encompassing a portion of the sleeve 49 is a ring 57 which has diagonally formed therein a slot 58 and carries at diametrically opposite points on its periphery abutments 59. The ring is held on the sleeve by means of a collar 60. Lying within a slot in the sleeve 49 is a coiled expansion spring 61 which engages the sleeve at one end and at the other end is connected to a pin 62 in the ring 57. Engaging within the slot 58 is one end of a pin 63 which is carried by the slide 56. The spring 61, as will be seen, tends to expand and rotate the ring 57 with respect to the sleeve 49 so as to force the pin 63 and the slide 56 to the extreme position shown in Fig. 4 and set the clutch. This is the position of the parts when the pulley is acting to turn the shaft. In order to disengage the clutch it is necessary to move the slide 56 toward the left from the position shown in Fig. 4. This is effected automatically by mechanism presently to be described. It should be noted at this point that such movement of the slide serves to operate simultaneously a brake that assists in stopping the rotation of the shaft. The brake mechanism comprises two shoes 64 and 65 pivoted on the sleeve 49 in the same manner as the clutch shoes 51 and 52. Pivoted to the respective brake shoes at their upper ends are links 66 and 67, these links being pivoted at their opposite ends to a block 68 the lower face of which is inclined so as to ride upon an inclined portion of a saddle 69 on the slide 56. The block 68 and the links 66 and 67 thus constitute a toggle device that acts simultaneously with the release of the clutch to force the brake shoes into contact with a fixed flange 70 on the frame when the slide 56 is moved toward the left from the position indicated in Fig. 4. Movement of the slide in the opposite direction serves to release the brake and set the clutch, as will be readily understood.

Upon the frame above the clutch and brake mechanism described is a casing 71 carrying a sliding finger 72 which is depressed normally by an adjustable spring 73 so as to project directly into the path of the abutments 59. Pivoted within a slot in the finger is a cam plate 74 which has a straight upper edge that lies, when the parts are in the position shown, in the same plane as the upper end of the finger. The spring 73 is seated within a plunger 75, which is thereby depressed and tends to hold the cam plate in the position shown. Upon the rear edge of the plate 74 is formed a projection 76 which extends through a slot in the casing and at a predetermined point in the upward movement of the finger engages an adjustable stop 77 shown as a screw. The lower portion of the cam plate forms a projection 78 arranged for engagement by a pivoted tripping member 79.

When the tripping member 79 is swung upwardly, by means presently to be described, it engages the projection 78 of the cam plate and begins to raise the finger 72, at the same time turning the plate slightly, against the action of the spring 73 and the plunger, so as to swing the projections 76 toward the stop 77. A continuation of the movement described brings the projection 76 into contact with the stop, after which in the continued upward movement of the finger the plate 74 is forced to turn in the reverse direction with respect to the finger until the projection 78 clears the end of the trip 79, when the finger and plate spring back into the position shown in Fig. 4, leaving the end of the trip 79 in the angle between the projections 76 and 78 of the plate. The trip may then be swung downward past the projection 78 when desired, to set the parts in position for another operation. The position of the stop 77, it will be noted, determines the point in the upward movement of the finger when the cam plate is disengaged from the tripping member, and therefore the range of movement of the latter necessary for effecting an operation of the machine.

As previously noted, the lower end of the finger 72, when the latter is depressed, lies directly in the path of movement of the abutments 59 on the rotation of the ring 57. When the machine is idle one of the abutments 59 rests in contact with the finger 72, the movement of the parts in a previous operation having caused the sleeve 49 to turn with reference to the ring 57 sufficiently to compress the spring 61 and force the pin 63 along the slot 58 so as to operate the slide 56 and disengage the clutch and set the brake. It will be understood that the spring 61 is not of sufficient strength to cause a reverse movement of the sleeve and connected parts of the machine. When the machine is to be operated the finger 72 is lifted by the tripping member and its operating mechanism so as to clear the contacting abutment

59. The ring 57 then turns quickly forward under the influence of the spring 61, thereby forcing the pin 63 to the opposite end of the slot 58, operating the slide 56 and releasing the brake and setting the clutch as described, so that the driving shaft begins to turn with the pulley. This is the position of the parts shown in Figs. 4 and 5. The finger 72, it will be understood, is tripped immediately so as to spring back in time to catch that abutment 59 which is located diametrically opposite to the first. When this action takes place, movement of the ring 57 is stopped, but the other parts of the mechanism continue to move until the pin 63 has shifted its position in the slot sufficiently to disengage the clutch and set the brake. When this occurs the pin is approximately at the opposite end of the slot and the spring 61 is compressed ready for a subsequent operation. It will thus be seen that at each actuation of the clutch the shaft is caused to turn a half revolution and no farther, and that it is always stopped in a predetermined position and the parts set automatically in readiness for a subsequent operation.

For actuating the clutch it is important to provide mechanism that shall be light, quickly responsive and easy to operate. I have mounted above the beam a stationary collar 80 having ears 81 on which is pivoted a yoke or rocking member 82. The yoke comprises two clamping members between which is swiveled a collar 83. Projecting forwardly from the collar is a rod 84, forked at its end and engaged by a handle 85 that is mounted to slide vertically on a rod 86 on the forward part of the beam. Projecting upwardly from the yoke 82 are arms 87 connected by a rod 88 with the bell crank 89, the latter being connected by a rod 90 with the tripping member 79. A spring 91 acts to hold the device in starting position.

The handle 85, it will be understood, serves as a means for swinging the beam as well as a part of the means for actuating the clutch. It is located in such a position that it may be conveniently grasped by the hand of the operator, who is thereby enabled to swing the beam to the desired position over the die and without releasing his hand to effect, by a downward movement of the handle, the actuation of the clutch and the movement of the presser member.

In order to avoid any action of the presser member that would tend to displace the die upon the stock or cause it to cut unevenly it is important that the movement of the beam in swinging into position over the die shall have entirely ceased before the presser member becomes effective in its operation upon the die. To insure this action I have provided a locking device which acts automatically to lock the beam against movement practically simultaneously with the beginning of the movement of the presser member along the beam. This device is located on the rear portion of the machine, and includes a track 92 on the frame, shown as semi-circular, and a friction block 93 that is carried along the track by the projecting end of a spindle 94 which is threaded into the rearward portion of the beam at 95. A spring 96 tends to rotate the spindle so as to cause the block 93 to bear forcibly upon the track. Driven by the pinion 37 is a gear 97 carrying a cam 98 arranged to engage a roller on one end of a bell crank 99. On the other end of the bell crank is a gear segment 100 that engages a spiral gear 101 on the spindle. These parts are so arranged that when the presser member is at either end of its path of movement the cam 98 rests beneath the roller on the bell crank, and the latter by means of the gears 100 and 101 serves to hold the spindle 94 retracted in opposition to the force of the spring 96 so as to release the pressure on the block 93 and permit the beam to be swung to any position desired. On the initial movement of the presser member along the beam, however, the cam moves from beneath the roller, permitting the adjacent end of the bell crank to be lowered by the action of the spring 96 upon the spindle, and the latter to be turned downwardly against the block 93 with sufficient force to cause the block to bind against the track and hold the beam in position until the cutting operation has been completed and the presser member has reached the opposite end of its path of movement, when the parts are returned to the position that they previously occupied and the beam is released.

It may be desirable at times to move the presser member and the operating mechanism therefor by hand. For this purpose I have provided a pinion 102 in mesh with one of the pinions 35, and a crank 103 connected therewith. During the normal operation of the machine the crank may be detached.

The operation of the machine in detail will now be clear from the preceding description. The support 7, it will be understood, is first adjusted accurately in accordance with the depth of the die to be used, so that the die may make a clean cut through the stock without being forced unduly into the surface of the block. After the die has been placed in the desired position upon the stock, the beam is swung by means of the handle 85 to a position directly over the die. The handle is then depressed, and acts through the mechanism described to trip the clutch, whereby the pressed member is caused to start on its movement along the beam while at the same time the beam is locked securely in the selected position. The first effect of the presser member is to de-

press the flexible member 29 through the action of the rollers 25 in riding out of the depression 32. As the rollers advance they force the member 29 downwardly upon the upper or inactive face of the die, first at one side and then progressively along the die, thereby effecting the cutting operation positively and accurately and in a progressive manner. When the presser member reaches the end of its path of movement the rollers are retracted within the yoke and the member 29 elevated clear of the die as previously described. At this point the clutch is disconnected and the brake applied and movement of the presser member ceases, and at the same time the locking device is released so as to permit the beam to be swung again to any position desired.

It will be noted that the cylinder 20 which carries the beam is so mounted that the beam is constrained in all positions from vertical movement and that the bearings for the cylinder are of such character that they are capable of precise adjustment and subject to but little wear. It will be noted also that during each cutting operation the track 92 constitutes a rigid support for the rearward extension of the beam. In view of the fact that in this machine there is comparatively small resistance to the cutting operation, because of the progressive and limited character of the latter, this construction assures that the beam shall serve as a perfectly rigid abutment for the presser member, with its guideway maintained parallel to the surface of the bed against whatever tendency there may be to distort the beam from its true position near the outer end. As a result the effect of the presser member will be uniform upon all portions of the die and the tendency to force the die irregularly and unevenly through the stock often encountered in previous machines is avoided.

I have thus provided a machine that requires the expenditure of but little power to operate, that is easily controlled and quickly responsive to the actuating mechanism, that is readily adjusted, and is positive and accurate in its operation and simple in construction.

Although the illustrated preferred embodiment of the invention involves the use of a free movable die and the arrangement of the material between the die and the bed so that the bed receives the thrust of the cutting edge of the die, it will be understood that the invention in its broader aspects is not definitely limited in these particulars but comprehends other arrangements of the die and the material with reference to the supporting bed and the presser member. It should be understood also that in many other respects the invention is not limited to the precise details of construction shown and described but comprehends other embodiments within the spirit and scope of the claims.

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

1. A machine for cutting material by means of a die having, in combination, a die supporting bed, and pressure applying means adjustable to move in different paths substantially parallel to the bed, said means being constructed and arranged to coöperate successively during such movement with different portions of the die so as to cut the material progressively.

2. A machine of the class described having, in combination, a bed upon different portions of which may be located a free movable die with its cutting edge opposed to the material to be cut, and pressure applying means movable in a plane substantially parallel to the plane of the bed to cause the die to cut the material, said means being adjustable laterally with respect to the direction of its pressure applying movement to cause it to move in different paths corresponding to different positions of the die upon the bed.

3. A machine of the class described having, in combination, a bed upon which may be located a free movable die, a presser member movable over the bed in a plane substantially parallel to the face of the bed to cause the die to cut the stock, and means for operating said presser member constructed and arranged to move said member over the bed in different paths corresponding to different positions of lateral displacement of said member with respect to its direction of operative movement.

4. A machine of the class described having, in combination, a die supporting bed, a presser member for operating upon the die, said presser member and the bed being relatively movable to cause said member to traverse the die from one side to the other of the die during its operation thereon, and means for effecting said relative movement in different paths corresponding to different positions of relative lateral displacement of said member and bed with respect to the direction of said traversing movement.

5. A machine for cutting material by means of a die having, in combination, a die supporting bed, an abutment constructed and arranged to extend over the die in spaced relation thereto and in a stationary relation to the bed during the cutting operation, and pressure applying means movable over the bed between the abutment and the die to cause the die to cut the material.

6. A machine of the class described having, in combination, a bed, a free die movable to different positions with respect to

the bed, and a presser member arranged to move over the bed in a plane substantially parallel to the face of the bed while bringing pressure to bear upon the die to effect the cutting operation, said presser member being adjustable about an axis substantially perpendicular to the plane of the bed to move in different angular directions in said plane corresponding to different positions of the die.

7. In a machine of the class described, the combination with a bed, of a presser member, and operating means for said presser member constructed and arranged to move said member in different paths in a plane substantially parallel to the plane of the bed, said member being adjustable to change its path of movement from a position over the bed to a position at one side of the bed.

8. In a machine of the class described, the combination with a bed, of a presser member adjustable initially with respect to the bed to different starting positions, and means constructed and arranged to move said presser member laterally over the bed from any selected starting position in a direction at an angle to the direction of said adjusting movement to effect the cutting operation.

9. A machine of the class described having, in combination, a cutting bed, a die having its cutting edge opposed to the bed, means arranged to bring pressure to bear successively upon different portions of the die so as to cut progressively material placed between the die and the bed, and a flexible contact member interposed between said means and the die.

10. A machine of the class described having, in combination, a bed for supporting material to be cut, a die freely movable to different positions above the bed, means cooperating successively with different portions of the die so as to cut progressively material placed beneath the die, and a flexible contact member interposed between said means and the die.

11. A machine of the class described having, in combination, a bed for supporting material to be cut, a die freely movable over the bed, operating means for the die arranged to move laterally over the bed, and means to prevent displacement of the die by said operating means.

12. A machine of the class described having, in combination, a bed for supporting material to be cut, a die freely movable over the bed, means arranged to move laterally over the bed while bringing pressure to bear upon the die so as to cut progressively material placed beneath the die, and a flexible contact member interposed between said means and the die.

13. A machine of the class described having, in combination, a bed for supporting material to be cut, a die freely movable over the bed, operating means for the die arranged to move laterally over the bed to effect the cutting operation, and a flexible member interposed between said operating means and the die, said means having rolling contact with the flexible member.

14. In a machine of the class described, the combination with a die supporting bed, of a beam constructed and arranged to project over the die on the bed in a stationary position during the operation of the die, and a die-operating presser member guided by the beam and movable laterally over the bed to effect the cutting operation.

15. In a machine of the class described, the combination with a die supporting bed, of a beam constructed and arranged to project over the same portion of the die upon the bed during the operation of the die, and a die-operating presser member guided by the beam and movable laterally over the bed to effect the cutting operation, the beam constituting a rigid abutment for the presser member during such lateral movement.

16. In a machine of the class described, the combination with a die supporting bed, of a beam constructed and arranged to project over the die on the bed and having a guideway substantially parallel to the face of the bed, and a die-operating presser member movable along the guideway and laterally over the bed to effect the cutting operation.

17. In a machine of the class described, the combination with a cutting bed, of a beam extending over the bed, a die-operating presser member guided by the beam and movable laterally over the bed to effect the cutting operation, and a flexible member interposed between the presser member and the bed, said presser member comprising a roller in contact with the flexible member.

18. In a machine of the class described, the combination with a die-supporting bed, of a beam extending over the bed, a presser member guided by the beam and movable laterally over the bed to effect the cutting operation, and a flexible member carried by the beam and located between the presser member and the bed.

19. In a machine of the class described, the combination with a die-supporting bed, of a beam extending over the bed and having a guideway substantially parallel to the face of the bed, a flexible member carried by the beam below the guideway, and a presser member movable along the guideway in contact with the flexible member.

20. In a machine of the class described, the combination with a die-supporting bed of a beam extending over the bed and having a guideway on its lower face substantially parallel to the face of the bed, a flexi-

ble member carried by the beam and spaced below the guideway, and a presser member of greater vertical extent than the normal distance between the flexible member and the guideway and movable along the beam between said member and guideway so as to depress said member and operate the die.

21. In a machine of the class described, the combination with a die-supporting bed, of a beam extending over the bed, a flexible member carried by the beam and spaced below the lower face of the beam, and a presser member movable laterally over the bed between the beam and the flexible member and having rolling contact with both the beam and the flexible member.

22. In a machine of the class described, the combination with a die-supporting bed, of a beam extending over the bed, said beam having a guideway, a flexible member carried by the beam below the guideway, and a presser member movable laterally over the bed between the flexible member and the guideway, said presser member comprising rollers, one in contact with the flexible member and another in contact with the guideway.

23. In a machine of the class described, the combination with a die-supporting bed, of a beam extending over the bed, said beam having a guideway, a flexible contact member below the guideway and yieldably attached to the beam, and a presser member movable laterally over the bed between the flexible member and the guideway.

24. In a machine of the class described, the combination with a die-supporting bed, of a beam extending over the bed, said beam having on its lower face a guideway with a depression at each end, a contact member mounted below the guideway and yieldably attached to the beam, and a presser member movable along the guideway between the beam and the contact member and in and out of said depressions, whereby the presser member in moving out of the depressions in the guideway moves the contact member toward the bed.

25. In a machine of the class described, the combination with a die-supporting bed, of a beam extending over the bed and having a guideway on its lower face, a flexible member below the guideway and yieldably attached to the beam, and a presser member movable laterally over the bed between the flexible member and the guideway, said presser member having a greater vertical extent than the normal distance between the flexible member and the guideway.

26. In a machine of the class described, the combination with a die-supporting bed, of a beam extending over the bed, said beam having on its lower face a guideway with a depression at each end, a flexible member mounted below the guideway and attached to the beam, and a presser member movable along the guideway between the beam and the flexible member and in and out of said depression.

27. In a machine of the class described, the combination with a die-supporting bed, of a beam extending over the bed, said beam having on its lower face a guideway with a depression at each end, a flexible member mounted below the guideway and yieldably attached to the beam, and a presser member movable along the guideway between the beam and the flexible member and in and out of said depressions, said presser member comprising rollers, one in contact with the guideway and another in contact with the flexible member.

28. In a machine of the class described, the combination with a die-supporting bed, of a beam extending over the bed, said beam having a guideway on its lower face, a flexible member carried by the beam below the guideway, and a presser member movable along the guideway between the beam and the flexible member, said presser member comprising rollers that contact respectively with the guideway and with the flexible member and are also in rolling contact with each other.

29. In a machine of the class described, the combination with a die-supporting bed, of a beam constructed and arranged to extend over the die on the bed, a presser member movable along the beam and laterally over the bed to effect the cutting operation, and means to effect vertical adjustment of the bed.

30. In a machine of the class described, the combination with a die-supporting bed, of a beam constructed and arranged to extend over the die on the bed and constrained rigidly from vertical movement, a presser member guided by the beam and movable lengthwise thereof and laterally over the bed to effect the cutting operation, and means to effect vertical adjustment of the bed.

31. In a machine of the class described, the combination with a cutting bed, of a beam movable to different positions above the bed, and a presser member movable along the beam in the direction of the length of the beam and laterally over the bed to effect the cutting operation.

32. In a machine of the class described, the combination with a bed, of a free die movable to different positions above the bed, a beam movable into and out of operative position over the die wheresoever located on the bed, and a presser member movable along the beam and over the die to effect the cutting operation.

33. In a machine of the class described, the combination with a bed, of a beam extending over the bed and pivoted at one side

of the bed so as to swing in a plane substantially parallel to the face of the bed, and a presser member movable along the beam and laterally over the bed in any position of the beam.

34. In a machine of the class described, the combination with a cutting bed, of a presser member movable laterally over the bed to effect the cutting operation, and operating means for the presser member comprising a rack carried by said member, a pinion engaging the rack, a main driving shaft, and means connecting said shaft and pinion.

35. In a machine of the class described, the combination with a cutting bed, of a presser member movable laterally over the bed to effect the cutting operation, and operating means for the presser member comprising a rack carried by said member, a vertically movable rack, pinions respectively engaging said racks and connected to rotate in unison, a main driving shaft, and means connecting said shaft with the vertically movable rack.

36. In a machine of the class described, the combination with a die-supporting cutting bed, of a presser member movable laterally over the bed to operate the die, and means whereby the presser member is moved automatically over the bed in one direction only in effecting one complete operation on the die and alternately in opposite directions for successive operations, said member and bed being relatively movable between successive operations of the presser member to afford an unobstructed view of all portions of the bed.

37. In a machine of the class described, the combination with a cutting bed, of a presser member movable laterally over the bed to effect the cutting operation, and means to impart to the presser member bodily movement in one direction only at each complete cutting operation comprising a main driving shaft, a pitman connected therewith, connections between the pitman and the presser member whereby the rectilinear movements of the latter correspond to the forward and backward movements of the pitman, a driving member, and a clutch between said shaft and driving member constructed and arranged to cause the shaft to be turned a half revolution only at each actuation of said clutch and then stopped.

38. In a machine of the class described, the combination with a cutting bed, of a presser member movable laterally over the bed to effect the cutting operation, and means to impart to the presser member bodily movement over the bed in one direction only at each complete cutting operation comprising a main driving shaft, a pitman connected therewith, a rack connected with the pitman, a pinion engaging the rack, a shaft on which said pinion is mounted, a second pinion on said shaft, a rack carried by the presser member and engaging said second pinion, a driving member, and a clutch between said main shaft and driving member constructed and arranged to cause the main shaft to be turned a half revolution only at each actuation of said clutch.

39. In a machine of the class described, the combination with a cutting bed, of a presser member movable laterally over the bed to effect the cutting operation, and means for effecting alternate forward and backward movements of the presser member comprising a main driving shaft, a pitman driven thereby, and connections between the pitman and the presser member whereby the rectilinear movements of the latter correspond to the forward and backward movements of the pitman.

40. In a machine of the class described, the combination with a cutting bed, of a presser member movable laterally over the bed to effect the cutting operation, and means whereby the presser member is moved over the bed alternately in opposite directions and stopped at the end of each movement in a single direction comprising a main driving shaft, a pitman driven thereby, connections between the pitman and the presser member whereby the rectilinear movements of the latter correspond to the forward and backward movements of the pitman, and automatic means under the control of the operator to cause the shaft to turn a half revolution only at each actuation of said means.

41. In a machine of the class described, the combination with a cutting bed, of a beam extending over the bed, a presser member movable along the beam and laterally over the bed, and means to impart to the presser member movement in one direction only at each complete cutting operation comprising a main driving shaft, a pitman connected therewith, connections between the pitman and the presser member for causing the latter to move forward and backward in unison with similar movements of the pitman, a driving member, a starting device, and means to cause the driving member to turn the main shaft a half revolution only at each actuation of the starting device.

42. In a machine of the class described, the combination with a cutting bed, of a beam mounted to swing above the bed in a plane substantially parallel to the face of the bed, a presser member movable along the beam and laterally over the bed to effect the cutting operation, and means to move the presser member along the beam comprising a vertically reciprocating rack mounted to turn with the beam at the pivotal point of the latter, means connecting the rack with the presser member, and means to reciprocate the rack.

43. In a machine of the class described, the combination with a cutting bed, of a beam mounted to swing above the bed in a plane substantially parallel to the face of the bed, a presser member movable along the beam and laterally over the bed to effect the cutting operation, and means to move the presser member along the beam comprising a vertically reciprocating rack mounted to turn with the beam at the pivotal point of the latter, means connecting the rack with the presser member, a cross-head connected with the rack and upon which the rack is swiveled, and means to reciprocate the cross-head.

44. In a machine of the class described, the combination with a cutting bed, of a beam mounted to swing above the bed in a plane substantially parallel to the face of the bed, a presser member movable along the beam and laterally over the bed to effect the cutting operation, and means to move the presser member along the beam comprising a vertically reciprocating rack member mounted to turn with the beam at the pivotal point of the latter, means connecting the rack member with the presser member, a reciprocating cross-head, a rod carried thereby and extending through the rack member and having means to clamp the rack member against relative endwise movement, the rack member being free to turn about the rod, and means to reciprocate the cross-head.

45. In a machine of the class described, the combination of a cutting bed, a frame having an upright sleeve portion, a cylinder mounted to turn in said sleeve, a beam mounted upon the cylinder so as to swing above the cutting bed in a plane substantially parallel to the face of the bed, a presser member movable along the beam and laterally over the bed to effect the cutting operation, a cross-head mounted to reciprocate in the cylinder and about which the latter is free to turn, a rack member carried by the cross-head and free to turn with respect to said cross-head, said rack member turning with the beam at its pivotal point, and means connecting the rack member with the presser member.

46. In a machine of the class described, the combination with a cutting bed, of a presser member movable with respect to the bed to different starting positions from which it may be directed in different respective paths of movement laterally over the bed, means for moving the presser member laterally over the bed from any selected starting position, and means to confine the presser member to the path of movement corresponding to the selected starting position.

47. In a machine of the class described, the combination with a cutting bed, of a presser member movable with respect to the bed to different starting positions from which it may be directed in different respective paths of movement laterally over the bed, means for moving the presser member laterally over the bed from any selected starting position, and means operating automatically in unison with said means to confine the presser member to the path of movement corresponding to the selected starting position.

48. In a machine of the class described, the combination with a cutting bed, of a presser member pivoted to swing to different starting positions with respect to the bed from which it may be directed in different radial paths of movement laterally over the bed, means for moving the presser member over the bed from any selected starting position, and means to confine the presser member to the path of movement corresponding to the selected starting position.

49. In a machine of the class described, the combination with a cutting bed, of a beam movable to different positions above the bed, a presser member movable along the beam and laterally over the bed to effect the cutting operation, and means to prevent movement of the beam during such movement of the presser member.

50. In a machine of the class described, the combination with a cutting bed, of a beam movable to different positions above the bed, a presser member movable along the beam and laterally over the bed to effect the cutting operation, means to effect such movement of the presser member, and means operating automatically in unison with said first means to prevent movement of the beam during such movement of the presser member.

51. In a machine of the class described, the combination with a cutting bed, of a beam mounted to swing in a plane substantially parallel to the face of the bed to different positions above the bed, a presser member movable along the beam and laterally over the bed to effect the cutting operation, and means to lock the beam against movement during the movement of the presser member along the beam.

52. In a machine of the class described, the combination with a cutting bed, of a beam mounted to swing in a plane substantially parallel to the face of the bed to different positions above the bed, a presser member movable along the beam and laterally over the bed to effect the cutting operation, means to operate the presser member, and means acting automatically in unison with said operating means to lock the beam against movement during the movement of the presser member along the beam.

53. In a machine of the class described, the combination with a cutting bed, of a beam mounted to swing in a plane substantially parallel to the face of the bed to dif-

ferent positions above the bed, a presser member movable along the beam and laterally over the bed to effect the cutting operation, means to operate the presser member, and means acting automatically in unison with said operating means to lock the beam against movement during the movement of the presser member along the beam and to release the beam at the end of such movement of the presser member.

54. In a machine of the class described, the combination with a cutting bed, of a beam mounted to swing above the bed in a plane substantially parallel to the face of the bed, a presser member movable along the beam and laterally over the bed to effect the cutting operation, means to operate the presser member, and automatic means to lock the beam against movement simultaneously with the beginning of the movement of the presser member along the beam.

55. In a machine of the class described, the combination with a cutting bed, of a beam mounted to swing above the bed in a plane substantially parallel to the face of the bed, a presser member movable along the beam and laterally over the bed to effect the cutting operation, means to operate the presser member, and means effective in any position of the beam above the bed to lock the beam against movement simultaneously with the beginning of the movement of the presser member along the beam.

56. In a machine of the class described, the combination with a cutting bed, of a beam mounted to swing above the bed in a plane substantially parallel to the face of the bed, a presser member movable along the beam and laterally over the bed to effect the cutting operation, and means to lock the beam against movement during the movement of the presser member along the beam comprising a stationary track, and means carried by the beam for effecting frictional engagement with the track.

57. In a machine of the class described, the combination with a cutting bed, of a beam mounted to swing above the bed in a plane substantially parallel to the face of the bed, a presser member movable along the beam and laterally over the bed to effect the cutting operation, and means to lock the beam against movement during the movement of the presser member along the beam comprising a stationary track, a member movable with the beam along the track, and means for suddenly pressing said member forcibly upon the track.

58. In a machine of the class described, the combination with a cutting bed, of a beam mounted to swing above the bed in a plane substantially parallel to the face of the bed, a presser member movable along the beam and laterally over the bed to effect the cutting operation, means to operate the presser member, and means to lock the beam against movement during the movement of the presser member along the beam comprising a stationary track, a friction member movable with the beam along the track, and means operating simultaneously with the beginning of the movement of the presser member along the beam to cause said friction member to bear forcibly upon the track.

59. In a machine of the class described, the combination with a cutting bed, of a beam mounted to swing above the bed in a plane substantially parallel to the face of the bed, a presser member movable along the beam and laterally over the bed to effect the cutting operation, means to operate the presser member, and means to lock the beam against movement during the movement of the presser member along the beam comprising a stationary track, a friction member movable with the beam along the track, a spring tending to force said friction member against the track, and means for rendering said spring operative simultaneously with the beginning of the movement of the presser member along the beam.

60. In a machine of the class described, the combination with a cutting bed, of a beam mounted to swing above the bed in a plane substantially parallel to the face of the bed, a presser member movable along the beam and laterally over the bed to effect the cutting operation, means to operate the presser member, and means to lock the beam against movement during the movement of the presser member along the beam comprising a stationary track, a friction member movable with the beam along the track, a spring tending to force said friction member against the track, means operating to oppose the action of said spring and release the friction member when the presser member is at either extreme of its path of movement along the beam and to render said spring operative to lock the beam simultaneously with the beginning of the movement of the presser member along the beam.

61. In a machine of the class described, the combination with a cutting bed, of a beam mounted to swing above the bed in a plane substantially parallel to the face of the bed, a presser member movable along the beam and laterally over the bed to effect the cutting operation, and means to lock the beam against movement during the movement of the presser member along the beam comprising a stationary track, a friction member movable with the beam along the track, a spindle threaded in the beam and engaging the friction member, a spring acting to turn the spindle so as to force the friction member against the track, and means operative when the presser member is at either extreme of its path of movement to turn the spindle against the action of the

spring and release the pressure of the friction member upon the track.

62. In a machine of the class described, the combination with a cutting bed, of a beam mounted to swing above the bed in a plane substantially parallel to the face of the bed, a presser member movable along the beam and laterally over the bed to effect the cutting operation, and means to lock the beam against movement during the movement of the presser member along the beam comprising a stationary track, a friction member movable with the beam along the track, a spindle threaded in the beam and engaging the friction member, a spring acting to turn the spindle so as to force the friction member against the track, a spiral gear on the spindle, a lever having at one end means in engagement with said spiral gear, a cam engaging the other end of the lever so as to turn the spindle against the action of the spring when the presser member is at either extreme of its path of movement, and automatic means operative simultaneously with the movement of the presser member to withdraw the cam and cause the beam to be locked against movement.

63. In a machine of the class described, the combination with a bed, of a presser member movable initially in a plane substantially parallel to the face of the bed to starting position, automatic mechanism for moving the presser member laterally over the bed to effect the cutting operation, a single device constructed and arranged for movement to bring the presser member to starting position and for other movement to actuate the mechanism for moving the presser member laterally over the bed, and connections between said device and said mechanism.

64. In a machine of the class described, the combination with a cutting bed, of a beam movable to different positions above the bed, a presser member carried by the beam and movable laterally over the bed to effect the cutting operation, automatic mechanism for moving the presser member laterally over the bed, and a single means for moving the beam and for rendering said automatic mechanism operative.

65. In a machine of the class described, the combination with a cutting bed, of a beam movable to different positions above the bed, a presser member carried by the beam and movable laterally over the bed to effect the cutting operation, automatic mechanism for moving the presser member laterally over the bed, and means carried by the beam and convenient to the hand of the workman for moving the beam and for rendering said automatic mechanism operative.

66. In a machine of the class described, the combination with a cutting bed of a beam extending over the bed and pivoted at one side of the bed so as to swing in a plane substantially parallel to the face of the bed, a presser member movable lengthwise of the beam and laterally over the bed to effect the cutting operation, mechanism for moving the presser member comprising a shaft to receive and transmit power and connections between the shaft and the presser member, and means to render said mechanism operative at any point in the movement of the beam over the bed.

67. In a machine of the class described, the combination with a cutting bed, of a beam extending over the bed and pivoted to swing in a plane substantially parallel to the face of the bed, a presser member guided by the beam and movable laterally over the bed to effect the cutting operation, mechanism for operating the presser member, and a starting device for rendering said mechanism operative in any position of the beam comprising a rocking member mounted above the beam, means connecting the rocking member with the operating mechanism, and means carried by the beam and connected to operate the rocking member and movable relatively to the latter as the beam is moved to different positions.

68. A machine for cutting material by means of a die having, in combination, a die supporting bed, an abutment constructed and arranged to extend over the die in spaced relation thereto during the cutting operation, and pressure applying means movable laterally over the bed between the abutment and the die to cause the die to cut the material, said pressure applying means having a greater extent in perpendicular relation to the bed than the distance between the abutment and the die.

69. A machine for cutting material by means of a die having, in combination, a die supporting bed, an abutment constructed and arranged to extend over the die in spaced relation thereto and in stationary relation to the bed during the cutting operation, said abutment being movable to different positions corresponding to different positions of the die upon the bed, and pressure applying means movable over the bed between the abutment and the die for any position of the abutment to cause the die to cut the material.

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

ALBERT LATHAM.

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

Correction in Letters Patent No. 1,129,876.

It is hereby certified that in Letters Patent No. 1,129,876, granted March 2, 1915, upon the application of Albert Latham, of Beverly, Massachusetts, for an improvement in "Cutting-Machines," an error appears in the printed specification requiring correction as follows: Page 5, line 126, for the word "pressed" read *presser;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 7th day of September, A. D., 1915.

[SEAL.]

J. T. NEWTON,
Acting Commissioner of Patents.