G. D'W. MARCY.

MACHINE FOR CUTTING LEATHER.

APPLICATION FILED MAR. 29, 1909. RENEWED JULY 31, 1911.

1,007,126.

Patented Oct. 31, 1911.

2 SHEETS—SHEET 1.

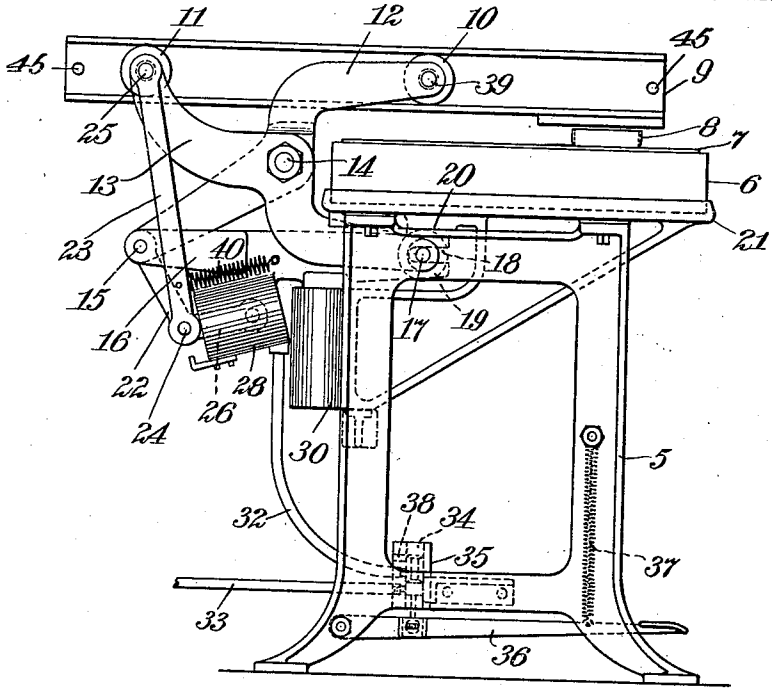

Fig. 1.

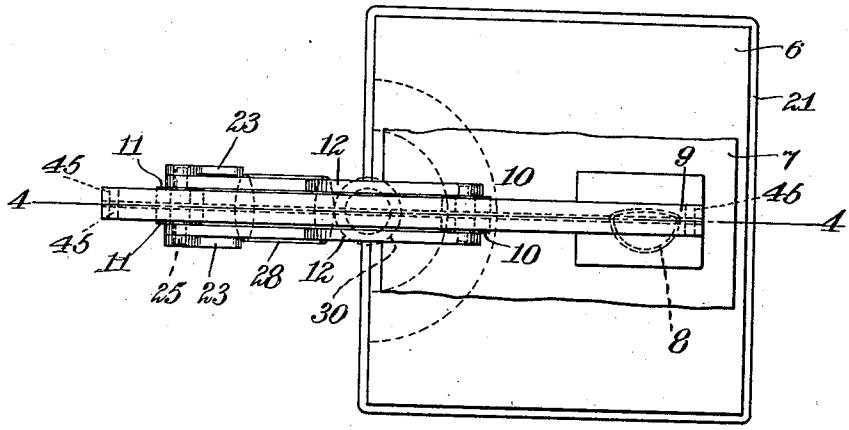

Fig. 2.

Witnesses:

Sydney E. Taft.

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Inventor:

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By his attorney

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2 SHEETS—SHEET 2.

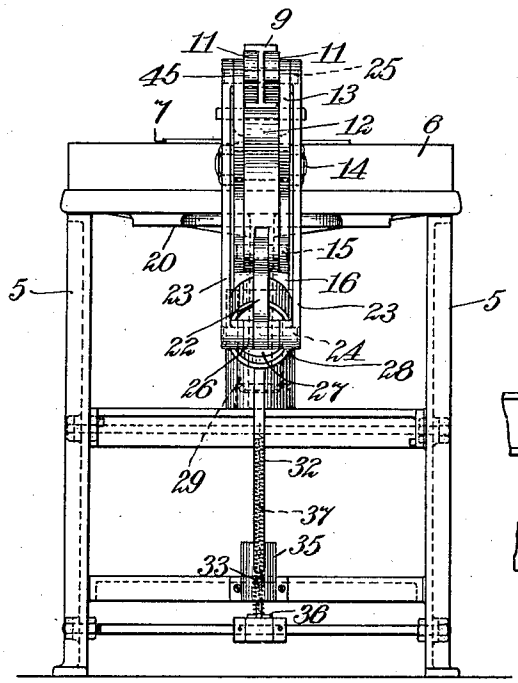

Fig. 3.

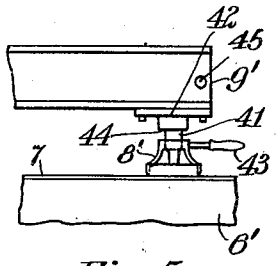

Fig. 5.

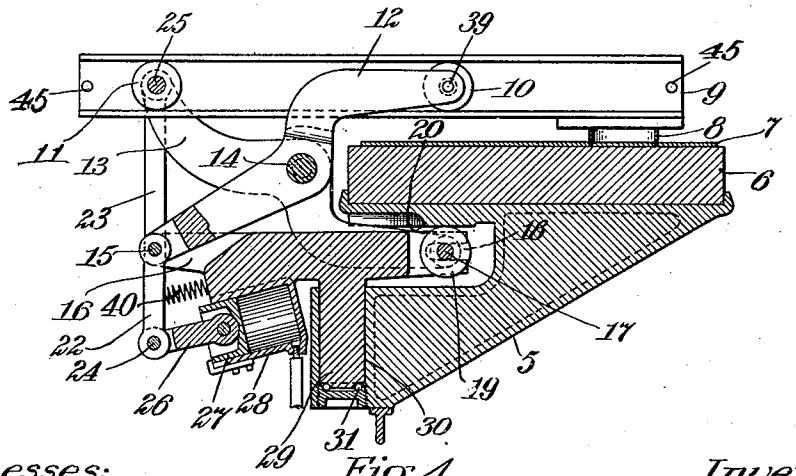

Fig. 4.

Witnesses:

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UNITED STATES PATENT OFFICE.

GROSVENOR D'W. MARCY, OF DORCHESTER MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MACHINE FOR CUTTING LEATHER.

1,007,126. Specification of Letters Patent. Patented Oct. 31, 1911.

Application filed March 29, 1909, Serial No. 486,313. Renewed July 31, 1911. Serial No. 641,658.

To all whom it may concern:

Be it known that I, GROSVENOR D'W. MARCY, a citizen of the United States, residing at Dorchester, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Machines for Cutting Leather, of which the following is a specification.

This invention relates to machines for cutting out articles from sheet material by means of suitably shaped dies, and particularly to machines for this purpose which are so organized that a considerable area of the material may be freely inspected between the successive cutting operations and that the coöperating pressure applying parts may be relatively moved into such operative relations to each other that pressure may be applied at any selected point within this area. Machines of this general type have come to be known as "clicking" machines.

An object of the invention is to provide a machine of this general type which is compact and simple in construction and which will operate to apply substantially uniform pressure at every point within its field of operation.

An important object of the invention is the provision of means for operating the presser beam in such manner that during the pressure applying operation it will move in a straight line to press the die through the material which is supported upon the cutter block whereby the parallelism of the cooperating pressure applying surfaces will not be disturbed.

In some of the clicking machines hitherto employed, difficulty has been experienced in maintaining the coöperating pressure surfaces in parallelism throughout the pressure applying movement of these surfaces, particularly when the power has been applied at one end of a relatively long member. This difficulty has been due largely to the fact that the inertia of that end of the presser beam which is remote from the point at which the power is applied tends to retard the movement of the said remote end and thus to cause it to engage the die after the part of the beam which is nearest the point of application of the power has engaged the die. To overcome this difficulty, I propose to apply the power at different points upon a relatively long beam in such manner that one of the points of application shall be relatively near the point at which the work is being performed, while the other point of application is relatively remote, the beam being thus to a certain extent counterbalanced so that the effect of the inertia of the free end of the beam or the part of the beam which is movable over the cutter block is not so marked as in other constructions.

In the illustrated preferred embodiment of the invention, I attain the above defined object by mounting the presser beam upon the upper ends of two levers which are pivoted to each other and cross each other, thus forming a parallel linkage, and which have their lower ends pivotally mounted upon a rotary support. When rocking motion is imparted to the levers a parallel link-motion is obtained, so that the presser beam is moved downwardly or upwardly toward or away from the cutter block, and at the same time is maintained parallel to the cutter block. In the illustrated embodiment of the invention the rocking motion is produced by means of an inverted toggle, to the knee joint of which is connected a fluid operated piston working in a cylinder connected to a suitable source of power, such as compressed air. It will be understood, however, that the invention is not restricted to use with fluid operated means for applying power.

Having thus, in general, indicated the object and the construction of my invention, I will now proceed to describe the same specifically as embodied in a machine for cutting articles from hides.

The invention consists in the combination and arrangement of parts set forth in the following specification and particularly pointed out in the claims thereof.

Referring to the drawings: Figure 1 is a side elevation of my improved cutting machine. Fig. 2 is a plan view of the same. Fig. 3 is a rear elevation, as viewed from the left of Fig. 1. Fig. 4 is a sectional elevation, broken away and shown in section, substantially on line 4—4 of Fig. 2. Fig. 5 is a side elevation illustrating a portion of the presser and cutter block with a die rotatably mounted thereon.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, 5 is the main frame upon

which is supported a cutter block 6 and upon this cutter block the hide from which the articles are to be cut is placed. The die 8 is placed in the desired position upon the upper surface of the hide 7 by the operator and is pressed through the hide and against the block 6 to cut the article which is desired therefrom by the presser beam 9, preferably formed of a section of I-beam and supported so as to slide upon rolls 10, 10 and 11, 11. The rolls 10, 10 are journaled upon the upper end of the bifurcated lever 12 and the rolls 11, 11 are journaled upon the upper end of the bifurcated lever 13. The levers 12 and 13 cross each other and are pivoted to each other by means of a pivotal bolt 14 thus forming a parallel linkage system. The lower end of the lever 12 is pivoted at 15 to a rotatable support 16. The lower end of the lever 13 is connected by a pivotal pin 17 to the rotary support 16, said pin being fast to the lower end of said lever 13 and projecting into a horizontal slot 18 provided in said support 16. Rolls 19, 19 are journaled upon the pivotal pin 17 and bear against the finished surface 20 provided upon the under side of the table 21 which forms a portion of the frame 5 and provides a support for the cutter block 6. It will be understood that the two rolls 11, 11 are journaled upon the studs 25, 25 at the upper ends of the two-armed or bifurcated lever 13, said rolls projecting into the space between the upper and lower flanges of the I-beam 9, as shown in Figs. 2 and 3, and on opposite sides of the vertical web thereof, respectively, and that the two rolls 10, 10 are journaled on the pins 39, 39 at the upper ends of the two-armed or bifurcated lever 12, said rolls projecting into the space between the upper and lower flanges of the I-beam 9 on opposite sides of the vertical web thereof, respectively. It will thus be seen that the rolls 10, 10 and 11, 11 of the levers upon which they are journaled will allow the presser beam 9 to be moved longitudinally thereof by the operator, but will act to prevent the said beam from moving laterally thereof. It will be noted that the pairs of rolls 10, 10 and 11, 11 respectively engage the beam at points which are separated by a considerable distance. In the illustrated construction the pairs of rolls in the normal position of the beam are separated by a distance approximately equal to one-half the length of the beam. It will be seen that this arrangement of the pairs of rolls causes the beam to be substantially counterbalanced when it is in its extreme forward position and causes in all positions a counterbalancing of the beam such that the beam has little tendency to travel faster in one part than in another during the pressure applying operation.

If desired, a stop pin 45 may be inserted in each of the opposite ends of the beam 9 to prevent the same from being drawn longitudinally off of the rollers 10, 10 and 11, 11, this stop-pin extending transversely through the web of the I-beam 9, so that it would abut against the rollers 10, 10 when the presser beam is pushed backwardly and would abut against the rollers 11, 11 when the presser beam is pulled forwardly, but as the I-beam is entirely within the control of the operator, when the form is out of contact with the stock and work-support and as said I-beam cannot be moved longitudinally thereof when it is lowered and the die 8 is in contact with the holder or with the work-support, it is not considered necessary that such stop-pin should be provided.

A rocking motion is imparted to the levers 12 and 13 by means of a short toggle link 22 and a pair of long toggle links 23. These links are pivotally connected together by means of a pin 24 the whole constituting what is sometimes called an "inverted" toggle. The short toggle link 22 is pivoted by the pin 15, to which the lower end of the lever 12 is connected, to the rotary support 16. The upper ends of the toggle links 23 are connected by studs 25 to the bifurcated ends of the lever 13, these studs 25 also forming journal bearings for the rolls 11, 11. The pin 24 is connected by a link 26 to a piston 27 adapted to reciprocate in the cylinder 28 fast to the rotary support 16. The rotary support 16 has a vertical shank or stem 29 which is journaled to rotate in a bearing 30 provided in the frame 5 of the machine, the lower end of said vertical stem resting upon a ball bearing 31. The cylinder 28 is connected to a suitable source of fluid pressure, preferably containing compressed air, by pipes 32 and 33, and interposed between these two pipes is a valve 34 and valve casing 35. The pipe 33 is the supply pipe leading from the valve casing to the source of supply. The pipe 32 leads from the valve casing to the cylinder. The valve 34 is a well known form of cylindrical valve and is connected to a treadle 36 which is operated by the foot of the operator and is held upwardly normally in the position illustrated in Fig. 1 by a spring 37. When the parts are in the position illustrated in Fig. 1 the valve 34 closes the port leading to the pipe 33 and opens communication between the pipe 32 and the exhaust port 38. When the treadle 36 is depressed, the exhaust port 38 is closed by the valve 34 and communication is opened between the inlet pipe 33 and the pipe 32, thus allowing pressure to be applied to the piston 27 to operate the machine in the manner which I will now describe.

Assuming the parts to be in the position illustrated in Fig. 1, with the presser beam 9 in its raised position, the operator places

the die 8 at any desired point upon the hide 7 and moves the presser beam until the outer end thereof is over said die. This he can do by a combined swinging of the presser beam, together with the levers 12 and 13 and the support 16, with their connecting links and the cylinder and its piston, and by sliding said presser beam longitudinally thereof upon the rolls 10 and 11. When the presser beam is thus brought, with its outer end above the die 8, the operator presses downwardly upon the treadle 36, thus moving the valve 34 downwardly, closing the exhaust port 38 and opening connection between the inlet pipe 33 and the pipe 32 leading from the valve casing to the cylinder 28. The pressure of the compressed air causes the piston 27 to move toward the left from the position illustrated in Fig. 1 to that illustrated in Fig. 4, thus rocking the toggle link 22 about the fixed pivot 15 as a center. The toggle link 22 being thus rocked will carry the lower ends of the toggle links 23 with it, and on account of the difference in the length of said links the toggle link 22 will cause the toggle links 23 to move at their lower ends in the path described by the center of the pivotal pin 24 and about the center of the pivotal pin 15, thus causing the upper ends of the toggle links 23 to be moved downwardly and rocking the lever 13 about the pivotal pin 14, the lower end of said lever at the same time rocking the pivotal pin 17 and moving said pivotal pin longitudinally of the slot 18 in the rotary support 16, which, it will be remembered, is stationary as to vertical movement. This rocking of the lever 13 will cause the lever 12 to be rocked about its pivotal center 15, thus lowering the upper outer end of the lever 12, together with the rolls 10 thereon, and as the distance from the center of the pin 14 to the center of the pins 15, 25 and 17 and 39 is the same, the rolls 10, 10 and 11, 11 will be lowered the same amount, thus lowering the presser beam 9 the same distance at its opposite ends and bringing a perfectly straight downward pressure upon the die 8 when said presser beam engages therewith. When the presser beam has descended sufficiently to press the die 8 through the hide 7 and against the upper surface of the cutter block 6, the operator allows the treadle 36 to be carried upwardly by the spring 37, thus cutting off the pressure and opening the exhaust, whereupon the springs 40, 40 pull the toggle links 23 and 22 from the position illustrated in Fig. 4 to that shown in Fig. 1, thus causing the movement of the levers 12 and 13, hereinbefore described, to be reversed, and the presser beam 9 to be carried away from the die 8. The operator then places the die in another position and the operation hereinbefore described is repeated.

It will be seen that the power obtained by the application of the direct pressure of the piston to the lower ends of the toggle link 22 and the two toggle links 23, 23 is very great and can be multiplied to any desired extent. All work is taken from the operator, except that of moving the treadle 36 downwardly and placing the die in position. The presser beam 9 can be carried to any desired position over the surface of a very large cutter block and the whole device is simple in its construction and very powerful.

While I have described my invention as applied to a machine for cutting pieces of leather from a hide, I do not wish to be understood as limiting myself to this particular embodiment of my invention, as the mechanism hereinbefore described may be equally well applied to any machine in which it is desired to obtain a heavy pressure by means of a presser beam through the operation of a pair of levers upon which said presser beam is supported, said levers being operated by suitable means, preferably toggle links to which motion is conveyed by means of a piston located within a cylinder and operated by means of a suitable fluid pressure. It is also evident that without departing from the spirit of my invention, the power may be applied to the toggle levers by any suitable means, such as a crank or eccentric driven by suitable power instead of by the piston and cylinder and link connection shown and described, or said toggle links might be operated by foot power.

In Fig. 5 I have illustrated a portion of a presser 9′, a portion of a cutter block 6′ and a die 8′, which, instead of being entirely disconnected from the presser is rotatably mounted upon a stud 41 fast to a bracket 42 which, in turn, is fastened to the under side of the presser 9′. In using this form of my invention, when the presser is raised, as shown in Fig. 5, the same can be moved around over the surface of the block until the die is brought to the required location. The die itself can also be turned upon the stud 41 to locate it properly with relation to the material to be cut, said die being provided for this purpose with a handle 43. When the presser beam is lowered by the mechanism hereinbefore described, a shoulder 44 comes into contact with the top of the die 8′ and forces the same through the leather 7 or other material which is to be cut.

Having thus described my invention, what I claim and desire by Letters Patent to secure is:

1. A machine of the character described having, in combination a presser, a support therefor and two levers pivoted together and crossing each other, the lower end of one of said levers pivoted to said support, the lower end of the other of said levers pivotally connected to said support and slid-

able thereon, said presser mounted upon the upper ends of said levers.

2. A machine of the character described having, in combination, a presser, a rotary support therefor, and two levers pivoted together and crossing each other, the lower end of one of said levers pivoted to said rotary support, the lower end of the other of said levers pivotally connected to said rotary support and slidable thereon, said presser mounted upon the upper ends of said levers and slidable thereon.

3. A machine of the character described, having, in combination, a presser, a support therefor and two levers pivoted together and crossing each other, the lower end of one of said levers pivoted to said support, the lower end of the other of said levers pivotally connected to said support and slidable thereon, said presser mounted upon the upper ends of said levers and slidable thereon, and means adapted to rock one of said levers upon the other, whereby said presser may be moved toward and away from said support.

4. A machine of the character described, having, in combination, a presser, a support therefor and two levers pivoted together and crossing each other, the lower end of one of said levers pivoted to said support, the lower end of the other of said levers pivotally connected to said support and slidable thereon, said presser mounted upon the upper ends of said levers and slidable thereon, and two links of unequal length pivoted together at one end thereof, the shorter link pivoted at its other end to said support, the longer link pivoted at its other end to said second named lever.

5. A machine of the character described having, in combination, a presser, a support therefor and two levers pivoted together and crossing each other, the lower end of one of said levers pivoted to said support, the lower end of the other of said levers pivotally connected to said support and slidable thereon, said presser mounted upon the upper ends of said levers and slidable thereon, two links of unequal length pivoted together at one end thereof, the shorter link pivoted at its other end to said support, the longer link pivoted at its other end to said second named lever, a cylinder, a piston and a link connecting said piston to said shorter link.

6. A machine for cutting articles from sheet material having, in combination, a stationary cutter block, a die, a presser beam, a rotary support therefor and two levers pivoted together and crossing each other, the lower end of one of said levers pivoted to said support, the lower end of the other of said levers pivotally connected to said support and slidable thereon, said presser beam mounted upon the upper ends of said levers and slidable relatively thereto.

7. A machine of the character described having, in combination, a presser beam, a support therefor, two levers pivoted together and crossing each other, the lower end of one of said levers pivoted to said support, the lower end of the other of said levers pivotally connected to said support and slidable thereon, and rolls mounted upon the upper ends of said levers upon which said presser beam is mounted to slide.

8. A machine of the character described having, in combination, a stationary frame, a support rotatably mounted thereon, two levers pivoted together and crossing each other, the lower end of one of said levers pivoted to said support, the lower end of the other of said levers pivotally connected to said support and slidable thereon, and a roll mounted on said second named lower end and adapted to bear against said frame, rolls journaled upon the upper ends of said levers, and a presser beam slidably mounted on said rolls.

9. A machine of the character described having, in combination, a stationary frame, a cutter block thereon, a support rotatably mounted on said frame, two levers pivoted together and crossing each other, the lower end of one of said levers pivoted to said support, the lower end of the other of said levers pivotally connected to said support and slidable thereon, a roll mounted on said second named lower end and adapted to bear against said frame, rolls journaled upon the upper ends of said levers, a presser beam slidably mounted on said rolls, and means adapted to rock one of said levers upon the other, whereby said presser beam may be moved toward and away from said cutter block.

10. A machine of the character described having, in combination, a stationary frame, a support rotatably mounted thereon, a cylinder and piston mounted on said rotary support, a pair of levers crossing each other and pivoted at their lower ends, respectively, to said rotary support, a presser beam slidably mounted on the upper ends of said levers and means operatively connecting said piston to said levers, whereby the same may be rocked and said presser beam moved toward and away from said stationary frame.

11. A machine of the character described having, in combination, a stationary frame, a cutter block thereon, a support rotatably mounted upon said frame, a cylinder and piston mounted on said rotary support, a pair of levers crossing each other and pivoted at their lower ends, respectively, to said rotary support, a presser beam slidably mounted on the upper ends of said levers, and means operatively connecting said piston to said levers, whereby the same may be rocked and said presser beam moved toward and away from said cutter block.

12. A machine of the character described

having, in combination, a stationary frame, a support rotatably mounted thereon, a cylinder and piston mounted on said rotary support, a pair of levers crossing each other and pivoted at their lower ends, respectively, to said rotary support, a presser beam slidably mounted on the upper ends of said levers, and a pair of toggle links operatively connected to said levers and piston and pivotally supported upon said rotary support, whereby said levers may be rocked and said presser beam moved toward and away from said cutter block.

13. A machine of the character described having, in combination, a presser, a support therefor and two levers pivoted together and crossing each other, the lower end of one of said levers pivoted to said support, the lower end of the other of said levers pivotally connected to said support and slidable thereon, said presser mounted upon the upper ends of said levers and slidable thereon.

14. A machine of the character described having, in combination, a presser, a support therefor and two levers pivoted together and crossing each other, the lower end of one of said levers pivoted to said support, the lower end of the other of said levers pivotally connected to said support and slidable thereon, said presser mounted upon the upper ends of said levers and slidable thereon, and two power multiplying links pivoted together and adapted to rock one of said levers upon the other, whereby said presser may be moved toward and away from said support.

15. A machine of the character described having, in combination, a presser, a support therefor and two levers pivoted together and crossing each other, the lower end of one of said levers pivoted to said support, the lower end of the other of said levers pivotally connected to said support and slidable thereon, said presser mounted upon the upper ends of said levers, and two power multiplying links pivoted together and pivotally connected with said levers.

16. A machine of the character described having, in combination, a presser, a die rotatably mounted thereon, a support for said presser and two levers pivoted together and crossing each other, the lower end of one of said levers pivoted to said support, the lower end of the other of said levers pivotally connected to said support and slidable thereon, said presser mounted upon the upper ends of said levers.

17. A machine of the character described having, in combination, a presser, a die rotatably mounted thereon, a support for said presser and two levers pivoted together and crossing each other, the lower end of one of said levers pivoted to said support, the lower end of the other of said levers pivotally connected to said support and slidable thereon, said presser mounted upon the upper ends of said levers, and two power multiplying links pivoted together and pivotally connected with said levers.

18. A machine of the character described, having in combination, a cutter block, a presser beam supported outside said block and movable over said block into different operative relations thereto, and means for effecting a pressure applying movement of said beam comprising means for applying power to said beam at a point relatively near to the point at which pressure is to be applied, and means for applying power to said beam at a second point relatively remote.

19. A machine of the character described, having in combination, a cutter block, a presser beam, a support for said beam arranged outside said block, and means for applying power to said beam to cause it to move toward and away from said block to effect a pressure applying operation constructed to apply said power to said beam at points separated a distance at least one-half the length of said beam.

20. A machine of the character described, having in combination, a cutter block, a presser beam, a support for said beam arranged outside said block and having sliding connections with said beam at two points separated by a distance equal to at least one-half the length of said beam, said support and said beam being arranged also for lateral movement with respect to said block, and means for applying power to said beam to effect a pressure applying operation arranged to operate through said support.

21. A machine of the character described, having in combination, a cutter block, a presser beam, a support for said beam through which it may slide across the block and with which it may move in a direction transverse to its sliding movement, and means operating through said support for applying power to said beam at separated points to effect a pressure applying operation, said points being separated a distance equal to at least one-half the length of said beam.

22. A machine of the character described, having in combination, a cutter block, a presser beam supported outside said block and movable over said block into different operative relations thereto, a source of power, and parallel linkage connections between said source of power and said presser beam.

23. A machine of the character described, having in combination, a cutter block, a presser beam, a source of power, parallel linkage connections between said source of power and said presser beam, and a support for said beam and said connections upon which said beam and connections may be turned to bring said beam into different operative relations to said block.

24. A machine of the character described,

having in combination, a cutter block, a presser beam, means for moving said beam toward and away from said block to effect a pressure applying operation and a pivoted support upon which said beam and said means are carried.

25. A machine of the character described, having in combination, a cutter block, a presser beam, a support for said beam through which it may slide across the block and with which it may move in a direction transverse to its sliding movement, means operating through said support to effect the pressure applying movement of said beam, and a carrier for said beam support and said aforementioned means pivotally mounted outside said block.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

GROSVENOR D'W. MARCY.

Witnesses:

CHARLES S. GOODING,

LOUIS A. JONES.