J. H. REED.

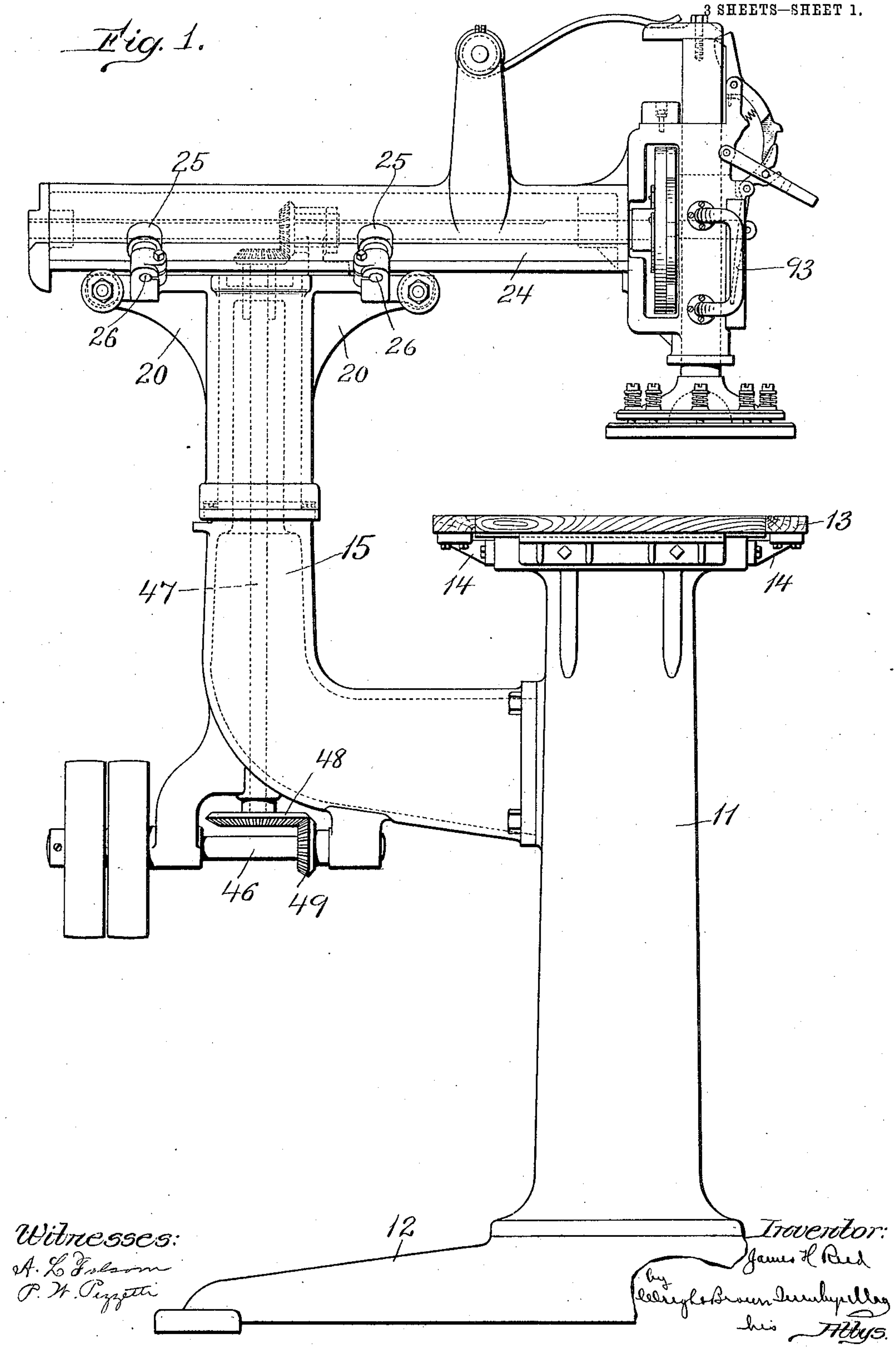
DIEING MACHINE.

APPLICATION FILED MAY 27, 1908.

1,091,707.

Patented Mar. 31, 1914.

3 SHEETS—SHEET 1.



COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

J. H. REED.

DIEING MACHINE.

APPLICATION FILED MAY 27, 1908.

1,091,707.

Patented Mar. 31, 1914.

3 SHEETS—SHEET 2.

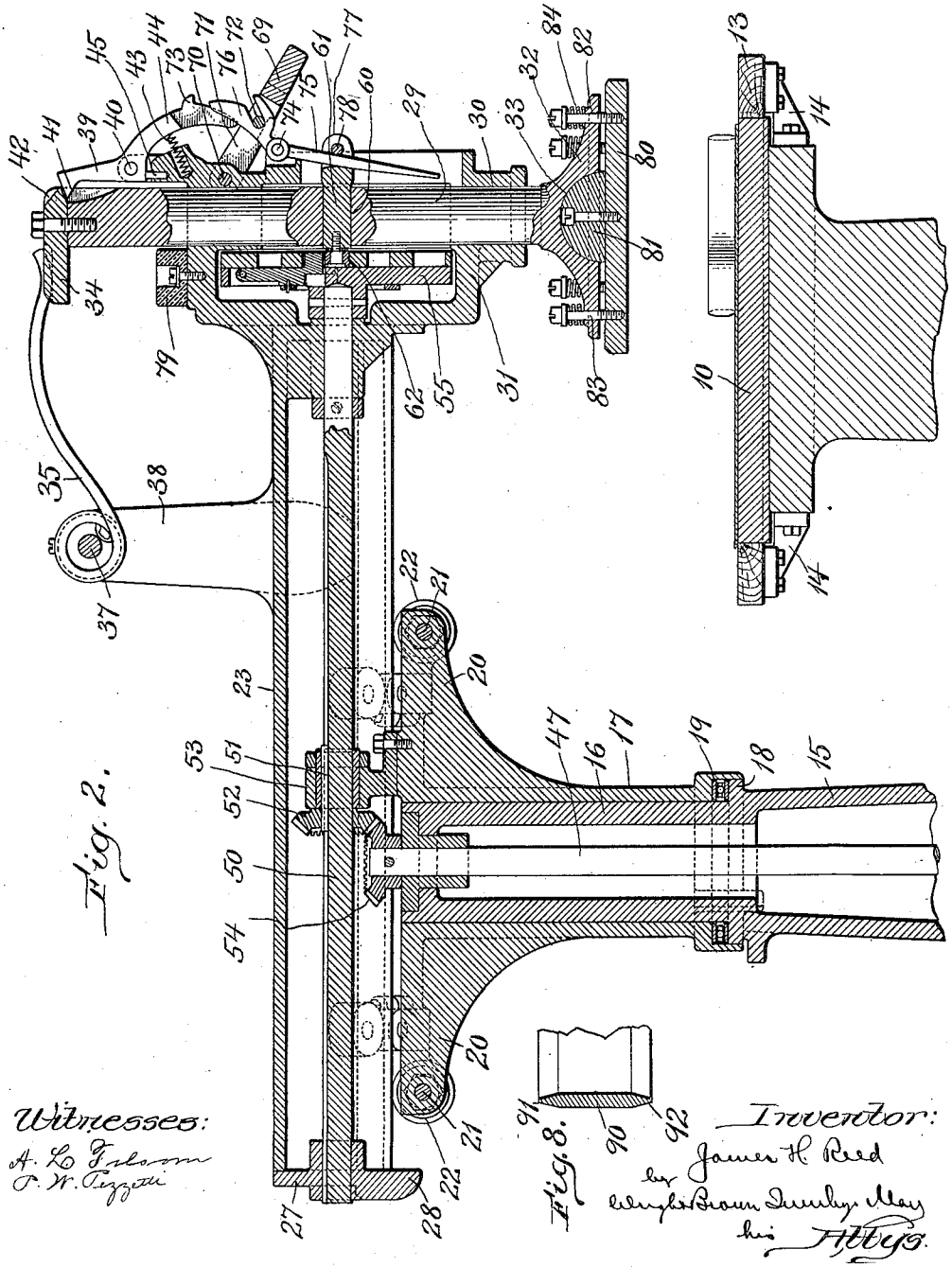


Fig. 2.

Fig. 8.

Witnesses:
A. L. Folsom
F. W. Tizzetti

Inventor:
James H. Reed
by Wright Brown Quinby & May
his Attys.

J. H. REED.

DIEING MACHINE.

APPLICATION FILED MAY 27, 1908.

1,091,707.

Patented Mar. 31, 1914.

3 SHEETS—SHEET 3.

Fig. 3.

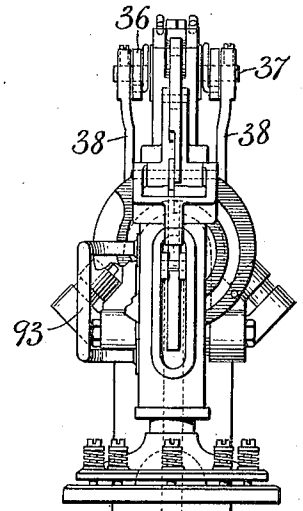


Fig. 6. Fig. 7.

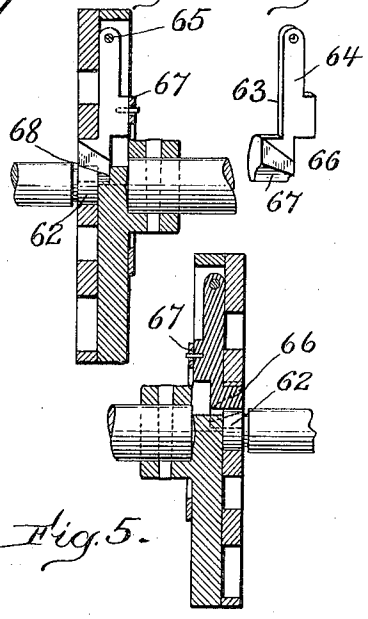


Fig. 4.

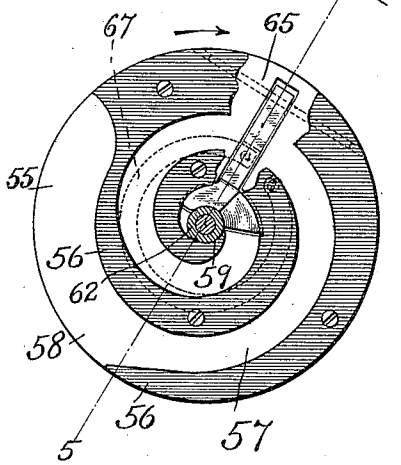


Fig. 5.

Witnesses:

A. L. Folsom

P. W. Pezzetti

Inventor:

James H. Reed

by Church & Brown

Thurlow & Allen

his Attys.

UNITED STATES PATENT OFFICE.

JAMES H. REED, OF SWAMPSCOTT, MASSACHUSETTS, ASSIGNOR TO ESSEX MACHINE COMPANY, OF LYNN, MASSACHUSETTS, A CORPORATION OF MAINE.

DIEING-MACHINE.

1,091,707. Specification of Letters Patent. **Patented Mar. 31, 1914.**

Application filed May 27, 1908. Serial No. 435,260.

To all whom it may concern:

Be it known that I, JAMES H. REED, of Swampscott, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Dieing-Machines, of which the following is a specification.

This invention has for its object to provide a machine which is capable of cheaply, efficiently and expeditiously dieing out shoe uppers and parts thereof.

I have discovered that it is possible to cut blanks from a sheet of leather with a die having a dull edge when a hard supporting surface is employed for the reception of the work, and to leave a sharp clean cut edge on the blank, if such die be given a sharp or hammer-like blow; whereas if a slow pressure is exerted against the die, a ragged or imperfectly formed edge is left on the blank. According to my invention therefore, I employ a work support or table having a hard unyielding face, such for instance as a steel plate, a die having a dull edge, and means for imparting a sharp or hammer-like blow to the die. By forming the die with a dull edge, that is with an edge say 1/64 (more or less) of an inch in thickness, it is not injured when used in conjunction with a hard work support, and moreover the die may be formed with two such edges so that it is reversible for dieing out the corresponding blanks of right and left shoes, since the upper or unused edge will not suffer by reason of the contact or impingement therewith or thereupon of the hammer.

In the illustrated embodiment of the invention, I employ a hammer having a hard face for engagement with the upper edge of the die, and provide spring mechanism for actuating the hammer to cause it to impart a sharp blow to the die. The hammer is raised automatically so as to store up power in the spring, and it is locked in its raised position ready to be released by suitable releasing mechanism under the control of the operator. The work support has an exposed area sufficient to receive an entire skin, so that the die may be moved manually from place to place to cut out such parts of the skin as may be adapted for use in any particular portion of a shoe. The hammer is likewise manually movable laterally over the work support, so as to be caused to register with the die, and it may be mounted upon a head which is adapted to swing about an upright axis, and to be moved transversely thereof. In addition to these features, the illustrated embodiment of the invention is equipped with means by which the hammer automatically adjusts itself so as to distribute the blow equally to all parts of the die.

Referring to the drawings, Figure 1 represents a side elevation of the machine containing the invention. Fig. 2 represents a longitudinally vertical section through the upper portion of the machine. Fig. 3 represents a front elevation of the machine. Fig. 4 represents a front elevation of the cam for raising the hammer. Fig. 5 represents a section on the line 5—5 of Fig. 4, looking in the direction of the arrow *a*. Fig. 6 represents a similar section looking in the opposite direction. Fig. 7 shows in perspective view, the locking member which is carried by the cam. Fig. 8 represents a section through the die.

Referring to said drawings, 10 indicates the work support which consists of a hard steel plate having a smooth upper surface. This work support rests upon a standard 11 having a suitable base 12. Inclosing the work support 10 is a rectangular wooden frame 13 secured by brackets 14 to the standard 11. The work support has an exposed area sufficient to receive an entire skin or other material from which it is desirable to cut the blanks. Extending laterally and upwardly from the standard 11 is a bracket-like arm 15 which is hollow as shown. This arm supports the head which carries the hammer as will be explained. The upper portion of the arm 15 is cylindrical as indicated at 16 to form a bearing for a sleeve 17. Between the lower end of said sleeve and a shoulder or flange 18 on the arm, I interpose a suitable antifriction end thrust bearing as indicated at 19. The sleeve is provided with two alined lateral extensions 20 20 through which are passed pins or shafts 21 having secured thereto or journaled thereon, rollers 22. Resting upon said roll-

ers is a slide 23. This slide projects over the work support and may be moved longitudinally relatively to the sleeve 17. It is formed with side walls, the lower edges of which rest upon the rolls 22. The side walls are provided with exterior inclined guide surfaces 24 against which bear rolls 25 journaled on pins 26 secured to the extensions 20 20 of the sleeve as best shown in Figs. 1 and 3. The provision of the rollers 22 and 25 enables the slide to be moved longitudinally with comparative ease, and yet to be held firmly against lost motion.

The slide and the sleeve constitute a head for supporting the hammer and permitting its movement laterally to any desired place over the work support. At its rear end, the slide has an end wall 27 with a projection 28 which constitutes a stop to limit the forward movement of the slide. The end of the slide is enlarged to form a guideway for the hammer which is mounted to reciprocate therein. The hammer itself comprises a bar 29 arranged in a guideway 30 in the end 31 of the slide, said bar having at its lower end a flaring enlargement 32. The under face of the flaring end of the stem or bar 29 is flat except for a semispherical socket 33. On the upper end of the stem or bar 29 is a plate 34 against which bears a spring tension member which, in the present instance, consists of two springs 35 each having one end affixed to a disk 36 affixed upon a pin 37 mounted in arms 38 projecting upwardly from the slide as shown in Figs. 2 and 3. The spring member, when power is stored therein by raising the bar or stem 29, is sufficiently powerful to drive the hammer down, upon its being released, as will be explained, and imparts a sharp blow to a die located therebeneath. Any suitable mechanism may be utilized for raising the hammer and for latching and releasing it.

The latching mechanism in the illustrated embodiment of the invention, consists of a latch 39 fulcrumed on a stud 40 arranged in ears on the front end of the slide, and in front of the bar or stem 29. The end of the latch is adapted to project under the beveled edge of the plate 34 as shown in Fig. 2, so as to hold the bar 29 against downward movement, and thereby resist the pressure of the spring-actuating-mechanism. The end of the latch is beveled as at 41, and the plate 34 is beveled as at 42, so that, when the hammer rises, the latch will be forced outward by the engagement of the two beveled surfaces 41, 42, after which it is caused to spring back under the plate 34 by a spring 43 which bears against an arm 44 on the latch. The movement of the latch under tension of the spring 43 is limited by a stop pin 45.

The mechanism for raising the hammer is power driven. To this end may be employed a prime power shaft 46 mounted in bearings on the arm 15. This power shaft has the usual fast and loose pulleys, and is adapted to be continuously driven.

Arranged in bearings in the arm 15, is an upright shaft 47 geared to the shaft 46 by bevel gears 48 49. Journaled in the end walls of the slide is a shaft 50, having a longitudinal groove to receive a key or feather 51 on a bevel gear 52 which is journaled in a bearing 53 placed on the top of the sleeve 20, so as to extend into the interior of the slide. The bevel gear 52 is driven by a bevel gear 54 on the upper end of the shaft 47. By reason of this construction, the shaft 50 will be driven from the prime power shaft 46 irrespective of the rotative or longitudinal movement of the slide 23, the shaft 47 being arranged with its axis coincident with the axis of rotation of the sleeve 17. On the front end of the shaft 50 there is a cam disk 55 on the inner face of which is a spiral cam 56 forming a spiral groove 57 with a large mouth 58 opening at the periphery of the disk, and an inner end 59 located in alinement with the axis of the shaft 50. The bar 29 has a transverse aperture 60 to receive a slide pin 61 having journaled on its inner end a roll 62 to move in the cam slot 57.

In Fig. 2, the hammer bar 29 is raised and the pin 61 is in the inner end of the cam groove. By withdrawing the pin 61 from the cam groove and releasing the latch 39, the hammer will be forced downwardly by the spring mechanism. If the pin 61 be then forced inwardly, rotation of the cam disk will cause the cam 56 to engage the pin and lift the hammer back to its initial position as shown in Fig. 2. In order that the roll 62 may be caused to remain at the end of the cam slot, I employ a spring lock as indicated at 63 in Fig. 7. The lock has a shank 64 which lies in a slot in the cam disk and is pivoted upon a pin 65. At the end of the shank there is an offset head 66 which projects into the cam groove as shown in Figs. 5 and 6. The end of the head is concave, as indicated at 67, so that it forms a movable wall of the socket at the end of the cam groove as illustrated in Fig. 4. The lock is pressed yieldingly in position by a curved leaf spring 67 and its head is beveled as at 68, so that, when the roll is engaged therewith as it moves toward its socket, the lock will be pressed outwardly until the roll reaches the socket, immediately upon which, the spring will return the lock to its locking position. The lock and the inner end of the helical cam thus form a substantially closed socket concentric with the axis of rotation of the disk and it will be apparent that, when the roll, which is carried

by the hammer bar, reaches this socket, the disk will continue to rotate freely without effecting further movement of the hammer bar.

I provide a handle for operating both the pin 61 and the latch 39, and preferably their actuation is sequential, as I find it desirable to disengage the pin and its roll from the cam before the hammer bar is released by the latch 39. The handle is indicated at 69, and it consists of a lever which is pivoted upon a pin 70 inserted in the front end of the slide 23. The lever is slotted as at 71 through which is passed a pin 72. When the lever 69 is moved upwardly far enough, this pin engages the curved end of the arm 44 and forces the latch rearwardly from the plate 34 so as to release the hammer. The upward movement of the lever is limited by a lug or ear 73 on the arm 44. The connection between the handle or lever 69 and the pin 61 comprises a lever fulcrumed on a pin 74 and having two arms 75 76. The arm 75 projects downwardly between two ears 77 on the front end of the pin 61, and between the end of the pin and a cross pin 78 passed through said ears as illustrated in Fig. 2. The arm 76 has in one edge an open cam slot which receives the pin 72, on the handle or lever 69. The parts are so arranged that, when the handle is moved upwardly from the position shown in Fig. 2, it will first move the two armed lever 75 76 to withdraw the roll 62 and the pin 61 out of its socket at the end of the cam groove 57. The continued movement of said lever 69 effects the withdrawal of the latch 37 in engagement with the hammer so that the hammer is immediately driven downward with considerable force by its spring-actuating mechanism. If the lever 69 be permitted to remain in this position by the operator, the hammer will remain down, but upon his moving the handle down again, the latch will be first released so that it may be sprung into engagement with the hammer at the proper time, and the pin 61 will be moved inwardly so that the roll thereon will be caused to enter the cam slot in the cam disk with the result stated to be consequent thereupon.

In order to cushion the hammer in case it should be forced downwardly and the die should not be in position to receive the blow, I employ a block of rubber or other suitable material, as indicated at 79, this being placed immediately beneath the plate 34 on the upper end of the hammer bar. This cushion 79 also has the effect of raising the hammer out of contact with the die after the blow has been struck, and prevents the hammer rebounding and striking a second blow, which is undesirable because, as is found in practice, if this occurs the stock will be marred owing to the fact that the die rebounds slightly after the first blow, and the second blow causes the die to mark the stock without cutting it.

I have stated that the lower end of the hammer bar is provided with a semispherical socket as indicated at 33. This is in order that the hammer head may be universally adjustable. The hammer head is indicated at 80, and it is provided with a semispherical member 81 complemental to the socket 33 to form a ball and socket joint. At the edges of the flaring end of the hammer bar, are numerous apertures 82 through which loosely pass bolts 83 which are screwed into the head 80. Springs 84 encircle the upstanding ends of the bolts and bear against the heads of the bolts and against the upper surface of the flaring end of the hammer bar. These springs maintain the engagement of the members of the ball and socket joint, and at the same time permit the head to adjust itself so as to equalize the blow imparted to the die. The under surface of the hammer head is flat and the head itself is preferably formed of hard steel.

In Figs. 2 and 8 I have shown a die having what I term a "dull edge" although the showing is naturally more or less conventional. The die is shaped to die out from the leather, a blank of the proper conformation, and it is made of steel with its upper and lower ends beveled so as to produce an edge which is not a sharp cutting edge but one which is say, for example, 1/64 (more or less) of an inch in thickness. With such a die it is, as I previously stated, possible by striking the upper edge with a hammer blow, to cause the lower edge to cut out of the piece of leather or a sheet of any suitable fabric such as paper, cloth or the like, a blank having a sharp and clean cut edge. Since the edges of the die are dull there is no injury by the repeated blows of the hammer.

In operation, a skin or sheet of fabric is placed upon the work support 10 and the die 90 is manually placed upon such part thereof as may be desired to remove the blank. The hammer is then manually, by means of a handle 93 which is attached to the front end of the slide, brought directly over the die. The handle or lever 69 is then raised to release the hammer whereupon it is forced downwardly with considerable force, and as the head of the hammer engages the die, it immediately adjusts itself so as to equalize or distribute the blow over the entire die. The handle lever is then moved downwardly whereupon the hammer is raised and latched in its raised position. The operator may then, if he desires to die out a blank to fit the corresponding shoe of

a pair, turn the die over and locate it on another part of the fabric. The hammer is again adjusted by hand over the die and the previous operation as described is repeated.

I consider it highly desirable to utilize a hammer which is bodily movable laterally in all directions, so that it may be brought into alinement with the die over any portion of the work support. There is practically no strain upon the slide since the spring-actuating mechanism for the hammer is mounted on the slide, and the hammer itself is movable relatively to the slide. The shock of the blow is absorbed by the die, the work, and the work support, and is not borne by the slide.

An examination of Fig. 2 of the drawings will show that the metal contained in the hammer is disposed substantially symmetrically about the vertical axis of the shaft 29 so that the weight of the said metal is disposed most effectively to enable a hard blow to be given by a relatively light hammer.

The machine possesses numerous advantages which will be apparent to those familiar with the art, and to which it is unnecessary to refer in detail. It may be used for dieing blanks out of textile fabrics, paper or other material, and so far as certain features of the invention are concerned, it will be understood that it is not necessary to use a double edged die in cutting such materials.

Having thus explained the nature of my said invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, I declare that what I claim is:—

1. In a machine of the character described, a die having a dull cutting edge, a work support having a hard unyielding surface, a hammer having an unyielding face and mechanism for causing said hammer to impart a hammer blow to the upper edge of the die.

2. In a machine of the character described, a work support having a hard unyielding surface, a hammer adapted to impart a hammer blow to the die, and having a hard unyielding face, mechanism for operating said hammer, and a die having at its ends dull cutting edges substantially as set forth.

3. In a machine of the character described, a work support, a hammer, and a head therefor constructed and arranged to permit said hammer to be moved in every direction in a plane parallel to the work support longitudinally and laterally of the surface of the work support.

4. In a machine of the character described, a work support, a hammer and a head therefor constructed and arranged to permit said hammer to be moved laterally in every direction over the surface of the work support, said head comprising a rotatable member and a hammer-carrying slide supported thereby.

5. In a machine of the character described, the combination with a flat work support, of a hammer adapted to reciprocate perpendicularly to the face of said support, means for raising the hammer, spring-actuating mechanism for depressing said hammer to impart a hammer blow to a die, and a head for supporting said hammer and adapted to permit said hammer to be moved laterally over said work support.

6. In a machine of the character described, the combination with a flat work support, of a hammer adapted to reciprocate perpendicularly to the face of said support, spring-actuating mechanism for depressing said hammer, power mechanism for raising said hammer, latching mechanism for holding the hammer raised, and a head supporting said hammer and adapted to permit said hammer to be moved laterally over said work support.

7. In a machine of the character described, a work support, a standard having an upright bearing, a head comprising a member rotatable on said bearing and a slide supported on said member, a die-operating device supported to move longitudinally on said slide, and manually-controlled mechanism on said slide for reciprocating said die-operating device.

8. In a machine of the character described, a work support, a hammer support movable laterally in every direction over said work support, a hammer, spring mechanism on said hammer support for depressing said hammer, and power-driven mechanism on said hammer support and movable laterally therewith for raising said head.

9. In a machine of the character described, a work support, a standard having an upright bearing, a head comprising a member rotatable on said bearing and a slide supported on said member, a driven shaft on said slide, a driving shaft in the bearing, gearing connecting said shafts, a die-operating device on said head, and means operated by said driven shaft for imparting movement to said die-operating device.

10. The combination with a bar, of a rotatable face cam for moving said bar in one direction and having a spiral cam groove terminating in a socket coincident with the axis of rotation of said cam, means for moving said bar in the other direction, and a member carried by said bar and adapted to be engaged with and disengaged from said groove, substantially as set forth.

11. The combination with a reciprocable member, of a rotatable cam having in its face a spiral open-mouth groove terminat-

ing in a socket in the axis of rotation of said cam, a spring-tensioned lock forming a movable retaining wall of said socket, and means on said member adapted to travel in said groove and rest in said socket substantially as set forth.

12. In a machine of the character described, a rectilineally movable hammer, a guideway therefor, a continuously rotating cam member for moving said hammer in one direction, means for moving said hammer in the other direction, and means under control of the operator for engaging said hammer with and disengaging it from said cam member, substantially as set forth.

13. In a machine of the character described, a hammer, a face cam having an open-mouth spiral groove terminating in the axis of rotation of said cam, a member on said hammer adapted to travel said groove to cause said hammer to be raised, means for depressing said hammer, a latch for holding said hammer raised, and means for withdrawing said member from said cam groove and said latch from the hammer.

14. A machine of the class described, having, in combination, a cutting block, a knife or die freely movable over said block, an arm arranged to swing over said block but constrained from vertical movement relative to said block, a hammer or platen carried by said arm and means for effecting vertical reciprocation of said hammer to force said die through stock supported on said block.

15. A machine of the class described, having, in combination, a cutting block, a vertically movable hammer or platen, a laterally movable support by which said hammer or platen is carried into different operative relations to said block while maintaining the operative face of said hammer or platen in one plane, said support being constrained from vertical movement and means for operating said hammer.

16. A machine of the class described, having, in combination, a cutting block, a vertically movable hammer or platen, a support for said hammer or platen arranged to swing about an axis at one side of the block, said support being constrained from vertical movement relative to said block, and said hammer or platen being arranged for radial movement with respect to the axis about which said support turns.

17. A machine of the class described, having, in combination a cutting block, a knife or die freely movable over the block, a light vertically movable hammer or platen, a rigid support for said hammer or platen, arranged to swing about an axis at one side of the block, said support being constrained from vertical movement relative to said block and means for causing said hammer to deliver a quick, sharp blow to the knife or die, the counter-thrust from said means being received by said rigid support.

18. A machine of the class described, having, in combination, a cutting block, a knife or die freely movable over said block, a light vertically movable hammer or platen, a rigid support for said hammer or platen arranged to swing about an axis at one side of the block, said support being constrained from vertical movement relative to the block, means for maintaining said hammer or platen yieldingly in its uppermost position, and means for depressing said hammer or platen to force the knife or die through stock supported on the block, the reaction from said depressing operation being taken up by said rigid support.

19. A machine of the class described, having, in combination, a cutting block, a vertically movable hammer or platen, a support for said hammer or platen laterally movable over the block but constrained from vertical movement relative thereto, a carrier for said hammer movable over said support and means for controlling the operation of said hammer mounted upon said carrier.

20. A machine of the class described, having, in combination, a cutting block, a post arranged at one side of said block, an arm arranged to swing on said post over said block, said post and arm being constrained from vertical movement, a vertically reciprocating hammer, a carrier for said hammer mounted upon said arm for radial movement with respect to said post, means for operating said hammer and means for controlling the operation of said hammer mounted upon said carrier.

21. A machine of the class described, having, in combination, a cutting block, a hammer or platen having a striking surface the dimensions of which are less than the corresponding dimensions of said block movable over the block into operative position above a cutting knife or die wherever located on the block and movable toward and away from the block to force the knife or die through stock supported on the block, means for effecting the movement of the hammer or platen toward and away from the block and a support for the hammer or platen constrained from vertical movement therewith.

22. In a machine of the character described, a die having a dull cutting edge, a work-support having a hard unyielding surface, a hammer having an unyielding face, mechanism for causing the said hammer to impart a hammer blow to the upper edge of the die, and a cushion engaging a portion of the hammer and holding it out of contact with the die when the parts are at rest.

23. In a machine of the character described, a die having a dull cutting edge, a work-support having a hard unyielding sur-

face, a hammer having an unyielding face, and mechanism for causing said hammer to impart a hammer blow to the die, the metal of which said hammer is composed being disposed symmetrically about the central line of movement of the center of the hammer.

In testimony whereof I have affixed my signature, in presence of two witnesses.

JAMES H. REED.

Witnesses:
HENRY R. HURLEY,
HENRY W. ELDRIDGE.