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P. E. BAGGE,
PUNCH PRESS.
APPLICATION FILED MAY 21, 1910.

Patented Apr. 11, 1911.

2 SHEETS—SHEET 1.

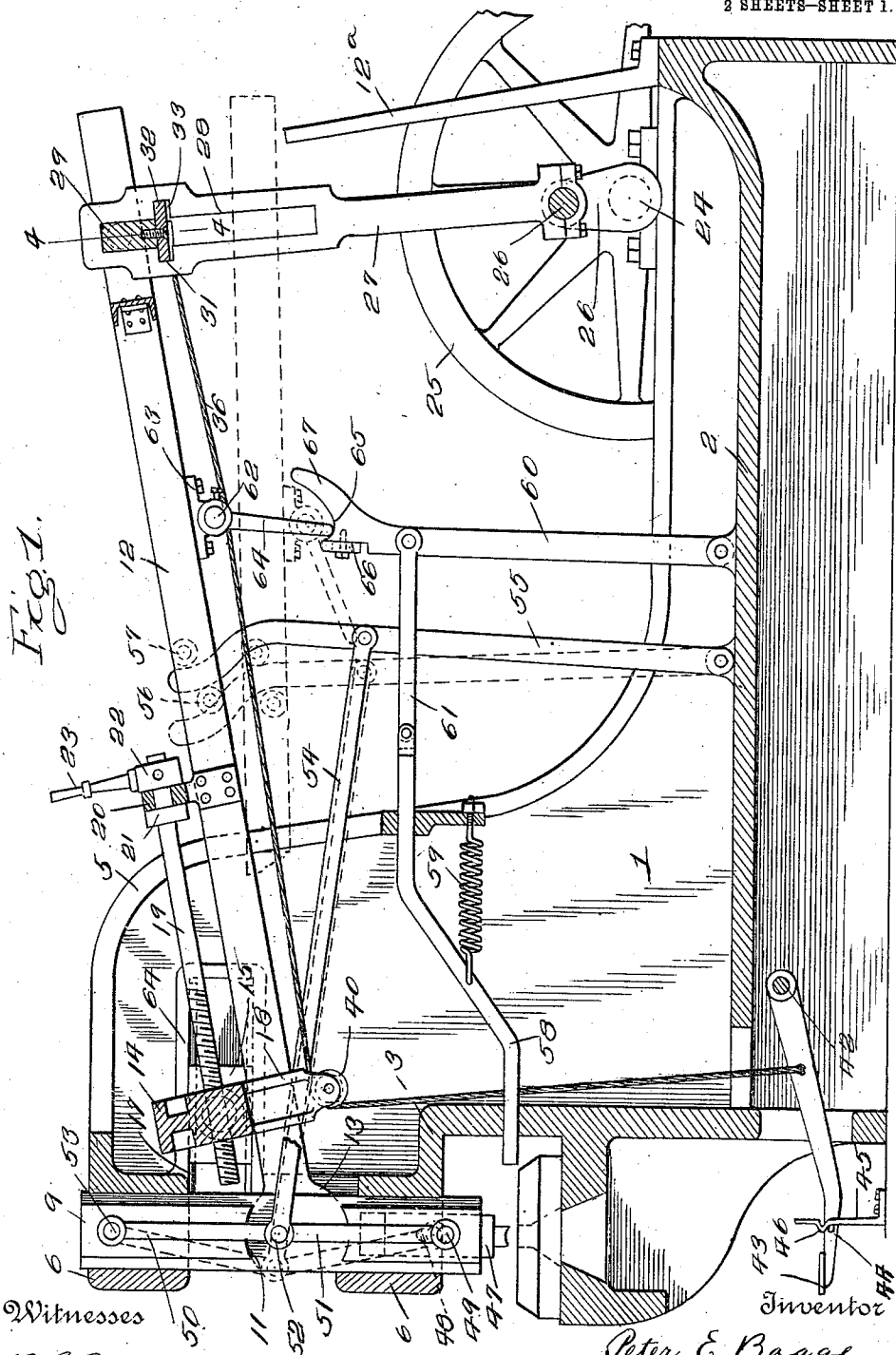


Fig. 1.

Witnesses
J. B. Brown
J. Jay Teller

Peter E. Bagge
By H. H. Blier Attorney

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2 SHEETS-SHEET 2.

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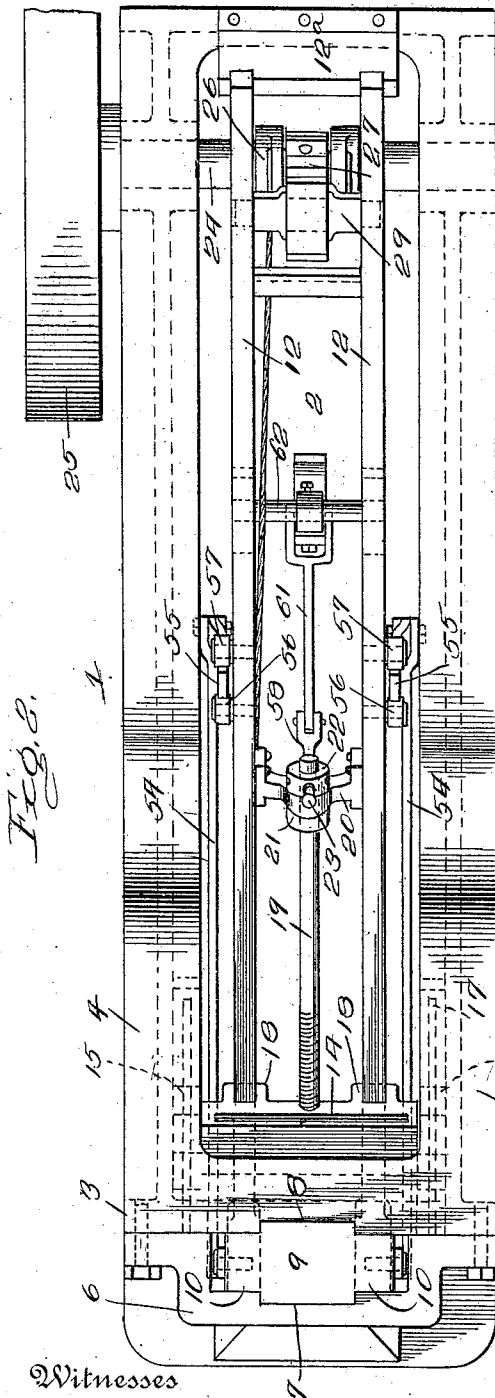


Fig. 8.

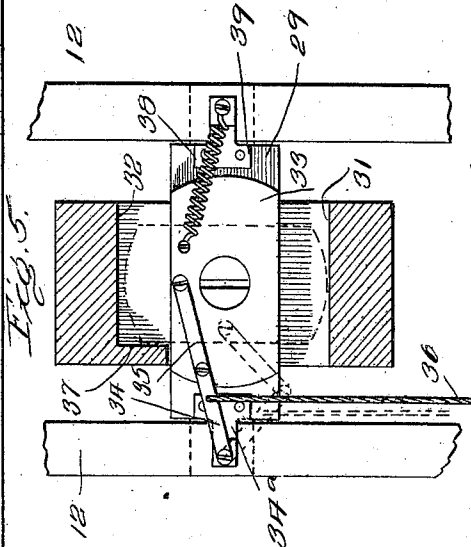


Fig. 5.

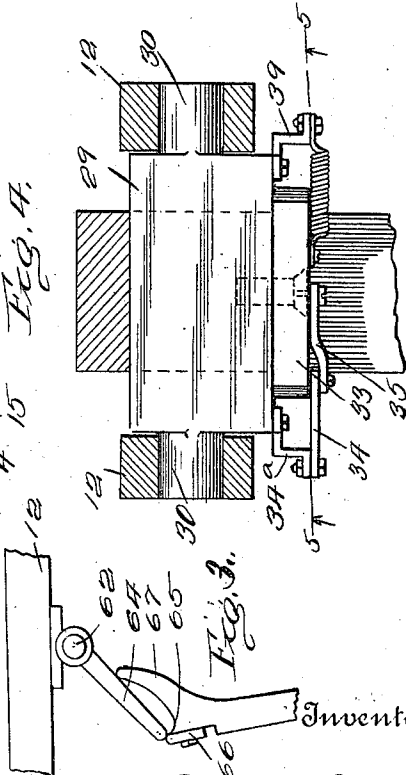


Fig. 4.

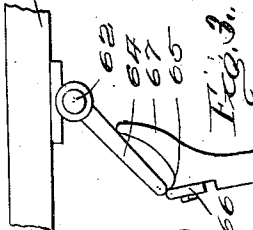


Fig. 3.

Witnesses
B. H. Mann
S. Jay Teller

Inventor
Peter E. Bagge
By H. H. Bliss Attorney

UNITED STATES PATENT OFFICE.

PETER E. BAGGE, OF MOLINE, ILLINOIS.

PUNCH-PRESS.

989,476.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, PETER E. BAGGE, a citizen of the United States, residing at Moline, in the county of Rock Island and State of Illinois, have invented certain new and useful Improvements in Punch-Presses, of which the following is a specification, reference being had therein to the accompanying drawing.

The present invention relates more particularly to presses for punching, but is by no means limited to presses of this type, as various features may be employed on or in connection with apparatus of the same general class, but for different purposes.

One object is to provide comparatively simple mechanism of a novel character, which may be adjusted so as to vary the amount of movement of the plunger or ram member, without in any manner changing the initial driving member.

A further object is to provide simple and effective means for operating an auxiliary plunger with respect to the main plunger so that compounding dies may be employed.

A still further object is to provide novel and simple means for actuating the ejecting mechanism, and another and important object is to provide means, whereby the ram or plunger can be readily thrown into or out of operation, without stopping the main or initial driving member of the machine.

Other objects will appear from the following specification.

An embodiment of the invention that is at present considered the preferable one, is illustrated in the accompanying drawings, wherein:—

Figure 1 is a side cross sectional elevation of the machine. Fig. 2 is a plan view. Fig. 3 is a detail view of a part of the ejector operating mechanism, in tripping position. Fig. 4 is an enlarged detail view along the line 4—4 of Fig. 1, and showing the clutch mechanism. Fig. 5 is an enlarged detail view taken along the line 5—5, of Fig. 4, looking upward.

Referring to the drawings, 1, represents the main frame of the machine to which the other parts are attached. The frame is provided with a horizontally extending bed, a forward upright 3, and spaced upstanding side walls 4, which connect the base 2, and

the upright 3. The side walls 4 are preferably provided with laterally extending reinforcing flanges 5.

6, 6, represent cap plates bolted to the forward side of the upright 3. The two parts 3 and 6 are provided with oppositely disposed parallel grooves 7 and 8 which are adapted to serve as guides and bearings for a vertically reciprocal plunger 9. The plunger 9 is provided with lateral tongues or extensions 10, 10, which are of the same length as the plunger itself. Each of the tongues 10 is cut away near its center, the upper and lower edges of the opening 11 thus formed, being cylindrical surfaces having a common center.

12, 12, are two plunger operating levers each of which is provided at its forward end with a partly cylindrical enlargement or pivot 13, which is adapted to fit into and turn in the opening 11 in one of the plunger tongues 10, the upper and lower curved sides of which serve as bearings for the pivot.

14, is a yoke or cross bar which extends transversely between the two side walls 4, and which is pivotally mounted at its ends in bearing blocks 15. The blocks 15 are slidably mounted in suitable horizontal guide ways 16 which are formed on the side walls 4. Preferably the guide ways 16 are provided with guide tongues 17 which engage with similarly formed grooves in the upper and lower surfaces of the bearing blocks. The yoke 14 is provided with two depending eyes or lugs 18 through each of which extends one of the operating levers 12. The levers are adapted to slide relatively to the yoke through the eyes 18. A screw 19 is mounted above and between the levers 12. At its forward end it extends through a threaded aperture in the yoke 14 and at its rear end it is mounted in a bearing bracket 20 which extends transversely of the levers. Collars 21 and 22 connected with the shaft, engage the bearing bracket and prevent relative longitudinal movement of the shaft. One of the collars, as for instance 22, is provided with sockets for the engagement of a hand lever 23 by means of which the same may be turned. It will be evident from the drawings that the pivoted ends of the yoke 14 serve as a center of oscillation for the levers 12. By turning

the screw 19, the yoke 14 may be moved relatively to the levers and in this way their center of oscillation may be changed.

At the rear end of the machine there is provided a main operating shaft 24, which may be provided with a belt wheel or fly wheel 25. The shaft 24 may be provided with a crank or an eccentric, as preferred. For purposes of illustration I have shown the shaft provided with a crank 26 to which is connected the lower end of a connecting rod 27. The upper end of the connecting rod 27 is provided with a rectangular longitudinally extending slot 28.

29 is a rectangular block slidable in the slot 28 and provided at its ends with pivots 30, which are mounted in suitable bearing apertures formed in the levers 12. The slot 28 is provided with two smaller oppositely disposed transverse slots 31 and 32.

33 is a turn button or latch pivotally mounted on the underside of the block 29. The latch 33 is so formed that when in one position it will be freely movable in the slot 28. When the block 29 is in its uppermost position in the block 28, the button or latch 33 may be turned through 90 degrees and its ends moved into the slots 31 and 32, thereby locking the slot 29 and the levers 12 to the connecting rod. Any desired means may be used for operating the latch 33. That which I prefer however, comprises two connected links 34 and 35, one of which is connected to a bracket 34^a on the block 29, and the other of which is connected to the latch 33. In Figs. 4 and 5, the full lines show the latch in position to permit movement of the connecting rod relative to the levers. By means of a wire cable 36, or other suitable device, connected to one of the levers, as for instance 34, the parts may be moved to the dotted positions shown in Fig. 5. A stop 37 is provided at one side of the slot 32 to limit the movement of the latch. A coil spring 38 is connected at one end to the latch and at the other end to a bracket 39, on the opposite side of the block 29 from the bracket 34^a. This spring tends at all times to move the latch into its inoperative position, the movement of the latch being again limited by the stop 37.

The wire cord 36 is preferably extended over a suitable guide pulley such as 40 to a foot lever 43 which is mounted upon a rock shaft 42. The pulley 40 is preferably mounted on the yoke 14. A depression of the foot lever serves by means of the connecting cord 36 to flex the toggle joint formed by the links 34 and 35 and to thereby throw the latch 33 into operative position.

In order to prevent the spring 38 from immediately returning the latch to its inoperative position, a suitable catch for the foot lever may be provided although if pre-

ferred the foot lever may be held down by the operator's foot. The catch which I have shown in the drawings for purposes of illustration, comprises a pin 44 on the foot lever and a spring latch 45, formed with a rounded projection 46 adapted to engage the pin to hold the lever depressed.

When it is desired to throw the machine out of operation, a simple pressure on the upper end of the latch 45 will move it into position to permit the latch 33 being moved by the spring 38. When the latch 33 is in inoperative position the connecting rod 27 may move up and down without moving the levers 12. A stop 12^a is provided for supporting the rear ends of the levers when they are not connected with the connecting rod.

47 represents a secondary or auxiliary plunger which is slidably mounted in a suitable socket formed in the lower end of the main plunger 9. The plunger 9 is provided with two opposite vertical slots 48 through which extend pins or trunnions 49 secured to the secondary plunger 47. At each side of the plunger 9 is a pair of links 50 and 51 connected together at 52. The upper end of each of the links 50 is pivotally connected to the plunger 9 as indicated at 53. The lower end of each of the links 51 is pivotally connected with one of the pins or trunnions 49 which are secured to the auxiliary plunger 47.

54, 54, are two links, each pivotally connected at its forward end to one of the connections 52 between the links 50 and 51 and each connected at its rear end to one of the upright cam levers 55. The cam levers 55 are pivotally connected at their lower ends to the bed 2 of the machine, and their curved upper ends extend between pairs of rollers 56 and 57 mounted on the levers 12. The upper ends of the levers 55 are so shaped that they will be moved forward by the rollers 57 as the rear ends of the levers 12 are depressed. This movement of the levers 55 is transmitted through the links 54 and the toggle links 50 and 51 to the auxiliary plunger 47, the result being that the plunger 47 is raised relatively to the plunger 9. When the levers are raised the rollers 56 move the levers 55 back to their first positions and the plunger 47 is lowered relatively to the plunger 9. It will be noted that this movement of the auxiliary plunger relative to the main plunger adapts my punch for use with compounding dies. It will furthermore be noted that by properly shaping the upper ends of the levers 55 any desired motion of the auxiliary plunger relative to the main plunger may be obtained.

58 is an ejecting bar slidably mounted in suitable bearings on the main frame of the machine. A spring 59 tends to normally hold the bar in retracted position.

60 is an ejector operating lever pivotally mounted on the bed 2 of the machine at its lower end and connected near its upper end with the bar 58 by means of the link 61. A shaft 62 extends transversely between the levers 12 and is mounted in suitable bearings 63. At the center of the shaft 62 is a depending dog 64 which is adapted to enter and engage with a pocket 65 formed in the upper end of the lever 60.

66 is an adjustable block secured to the lever 60 and forming the forward edge of the pocket 65. As the levers 12 descend, the dog 64 engages the upper end of the lever 60 and forces it forward. After a certain amount of movement the arm 67 at the rear side of the pocket 65 engages the dog 64 as shown in Fig. 3, and forces it out of engagement with the block 66, the spring 59 then immediately returns the parts to normal position.

It will be noted that the extent of the movement of the ejector is entirely independent of the amount of movement of the levers 12 and it will furthermore be noted that the movement of the ejector may be adjusted by changing the position of the block 66 relative to the lever 60.

The operation of my press will be evident from the foregoing specification without further exact description. Attention is directed however to the means of changing the stroke of the plunger 9 by adjusting the pivotal mounting of the levers 12; to the improved clutch mechanism for connecting the main operating levers with the connecting rod; to the improved means for obtaining movement of the secondary plunger relative to the main plunger; and to the improved ejector operating mechanism.

What I claim is:—

1. In apparatus of the character set forth, the combination with a plunger member, of moving means therefor including a lever, a shiftable fulcrum for the lever, and means for shifting the fulcrum and holding it in different positions, substantially as set forth.

2. In apparatus of the character set forth, the combination with a plunger member, of moving means therefor, including a lever, a fulcrum for the lever shiftable longitudinally of the same, and means connecting the fulcrum and lever for shifting the former, substantially as described.

3. In apparatus of the character set forth, the combination with a plunger member, of moving means therefor, including a lever, a fulcrum for the lever shiftable longitudinally of the same, and a screw connecting the fulcrum and lever for shifting said fulcrum, said screw being journaled in one and having a threaded engagement with the other, substantially as described.

4. In apparatus of the character set forth, the combination with a support, of a plun-

ger member, an actuating lever for the plunger member, a bearing box slidable on the support, and a fulcrum device for the lever journaled in the bearing box, substantially as described.

5. In apparatus of the character set forth, the combination with a support, of a plunger member, an actuating lever for the plunger member, spaced bearing boxes slidable on the support, and a fulcrum device for the lever slidably engaged therewith and journaled in the bearing boxes, substantially as described.

6. In apparatus of the character set forth, the combination with a base having spaced upstanding walls, of a reciprocatory plunger member, a lever engaged with the plunger member and extending between the walls, bearing boxes slidably mounted in the walls on opposite sides of the lever, a fulcrum for the lever slidably thereon and journaled in the bearing boxes, and means connecting the lever and fulcrum for sliding the same and the boxes, substantially as described.

7. In apparatus of the character set forth, the combination with a plunger member, of a lever for actuating the same, and a fulcrum for the lever comprising a rock shaft extending transversely of the lever on one side of the same, and a yoke carried by the rock shaft and embracing the lever, substantially as described.

8. In apparatus of the character set forth, the combination with a base having upstanding spaced walls, of a plunger member, a lever engaged with the plunger member and extending between the walls, said walls having guide ways, boxes slidable in the guide ways, a rock shaft journaled in the boxes and extending transversely of the lever on one side of the same, a yoke carried by the rock shaft and embracing the lever, and a screw journaled on the lever and having a threaded engagement with the rock shaft for moving the same longitudinally of the lever, substantially as described.

9. In apparatus of the character set forth, the combination with a main plunger member, of an auxiliary plunger member movable with and with respect thereto, means for moving the main plunger member, and means operated by the moving means for the main plunger member to effect a movement of the auxiliary plunger member with respect to the main plunger member when the latter is operated, substantially as described.

10. In apparatus of the character set forth, the combination with a main plunger member, and an auxiliary plunger member, movably mounted thereon, of connections between the two plunger members, operating mechanisms for the main plunger member, and means engaged with the connections between the plunger members and with the op-

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erating mechanism for effecting the movement of the said auxiliary plunger member on a predetermined movement of the main plunger member, substantially as described.

5 11. In apparatus of the character set forth, the combination with a main plunger member, of an auxiliary plunger member movable thereon, toggle links connecting the plunger members, a lever for operating the
10 main plunger member, and a mechanism operated by the lever for swinging the toggle links, substantially as described.

12. In apparatus of the character set forth, the combination with a main plunger
15 member, of a lever for operating the same, an auxiliary plunger member slidably mounted on the main plunger member, toggle links connecting the main and auxiliary plunger members, a swinging arm having an offset
20 portion, a link connection between the swinging arm and the toggle links, and devices mounted on the lever and riding on the offset portion of the swinging arm to operate the same on the movement of the lever, sub-
25 stantially as described.

13. In apparatus of the character set forth, the combination with die mechanism, of operating means therefor, including a lever, an ejector for the die mechanism, and
30 operating means for the ejector including a swinging arm operated by the lever, substantially as described.

14. In apparatus of the character set forth, the combination with die mechanism, of operating means therefor, including a lever, an ejector for the die mechanism, a swinging actuating arm having a link con-
35 nected with the ejector, and a finger carried by the lever and having a bearing on the swinging arm, substantially as described.

15. In a machine of the type set forth, the combination of a vertically movable plunger mechanism, a horizontally movable ejector device, a lever movable in a vertical plane
45 for operating the plunger mechanism, a substantially vertical pivoted lever connected with the ejector device, a dog pivoted to the plunger lever and adapted to engage the vertical lever, and means for automatically
50 disengaging the dog from the lever after a predetermined movement, substantially as described.

16. In a machine of the class described, the combination of a plunger mechanism, an
55 ejector device, adjustable means for operating the plunger mechanism, whereby its stroke may be varied and means for operating the ejector device from the plunger operating means whereby the ejector device
60 may be given a uniform movement, regardless of the adjustment of the plunger operating means, substantially as described.

17. In a machine of the type specified, the combination of a plunger, an ejector, a plun-
65 ger operating means, and operating connec-

tions between the plunger operating means and the ejector whereby the movement of the ejector may be regulated, substantially as described.

18. In a machine of the class described, 70 the combination with a plunger and a vertically movable operating lever, of an ejector, a vertically extending lever connected with the ejector, a pivoted dog on the plunger lever, a block on the ejector lever
75 adapted to be engaged by the dog, an arm on the ejector lever adapted to engage the dog to disengage it from the block after a definite amount of movement, and means for adjusting the position of the block to change
80 the time of disengagement of the dog, substantially as described.

19. In apparatus of the character set forth, the combination with a plunger member, of actuating means therefor, including
85 transversely associated relatively movable elements, and means for detachably connecting the elements to cause their simultaneous movements, substantially as described.

20. In apparatus of the character set forth, the combination with a plunger member, of actuating means therefor, including
90 a lever connected with the plunger member, a pitman having a transverse sliding engagement with the lever, and means for connecting the pitman and lever to cause the
95 former to actuate the latter, substantially as described.

21. In apparatus of the character set forth, the combination with a plunger member, of actuating means therefor, including
100 transversely associated, relatively movable elements, and a connecting device pivotally connected on one element and movable into and out of detachable interlocking engagement with the other element, substantially
105 as described.

22. In apparatus of the character set forth, the combination with a plunger member, of actuating means therefor, including
110 a lever connected with the plunger member, a pitman having a transverse sliding engagement with the lever and provided with notches, a pivot rod journaled in the lever and having a depending head, and a latch
115 rotatably mounted on the head and movable into and out of engagement with the notches of the pitman, substantially as described.

23. In a machine of the class described, the combination of a plunger mechanism, a
120 horizontally pivoted lever for operating the plunger mechanism, a rotatable crank device, a connecting rod between the crank device and the end of the lever, the said rod being provided with a longitudinal slot and
125 with transverse slots extending from the said longitudinal slot, a block pivotally connected with the lever and slidable in the slot, a turn button on the block adapted to be turned into engagement with the trans-
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verse slots, and operating means for the turn button comprising two toggle links, one connected to the turn button and the other to the block, a connection to one of the links for moving the button into operative position, and a spring between the button and the block for moving the button into operative position, substantially as described.

24. The combination in a machine of the class described, of a plunger reciprocable in a straight line, an operating lever for the plunger pivoted at one end to the plunger, a fulcrum device for the lever intermediate its ends, and means connected with the other end of the lever for oscillating it about the fulcrum, substantially as set forth.

25. The combination in a machine of the class set forth, of a rectilinearly reciprocable plunger, a plunger operating lever pivotally connected to it, a fulcrum for the lever intermediate its ends, means connected to the other end of the plunger for oscillating it about its fulcrum, and a supporting device for the fulcrum in which the fulcrum is slidably mounted, substantially as set forth.

26. The combination in a machine of the class described, of a rectilinearly reciprocable plunger mechanism, provided at opposite sides with aligned cylindrical recesses, two levers each having a part adapted to fit into and engage with one of the said recesses, a machine frame having separated guide ways at an angle to the plunger mechanism, a fulcrum for the levers having elements connected therewith adapted to slide in the said guide ways, and means for oscillating the levers to reciprocate the plunger, substantially as set forth.

27. The combination in a machine of the

class described, of a rectilinearly reciprocable plunger mechanism, an operating lever therefor pivotally connected thereto, a fulcrum for the lever, a device for slidably supporting the fulcrum, means for adjusting the position of the fulcrum longitudinally relative to the lever, and means for oscillating the lever to reciprocate the plunger, substantially as set forth.

28. The combination in a machine of the class described, of a plunger mechanism, an operating lever therefor, a transverse rock shaft to the under side of which the lever is connected and which serves as a fulcrum for the lever, and means for oscillating the lever to reciprocate the plunger mechanism, substantially as set forth.

29. In apparatus of the character set forth, the combination with a main plunger member, of a lever for operating the same, an auxiliary plunger member slidably mounted relative to the main plunger member, toggle links connecting the two plunger members, an operating element movable longitudinally of the operating lever, engaging parts on the lever and the element whereby the latter is moved by the former, and a connection between the said element and the said toggle links whereby the auxiliary plunger member is moved relatively to the main plunger member when the said operating element is moved, substantially as set forth.

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

PETER E. BAGGE.

Witnesses:

ALBERT E. BAGGE,
S. H. KOHLER.