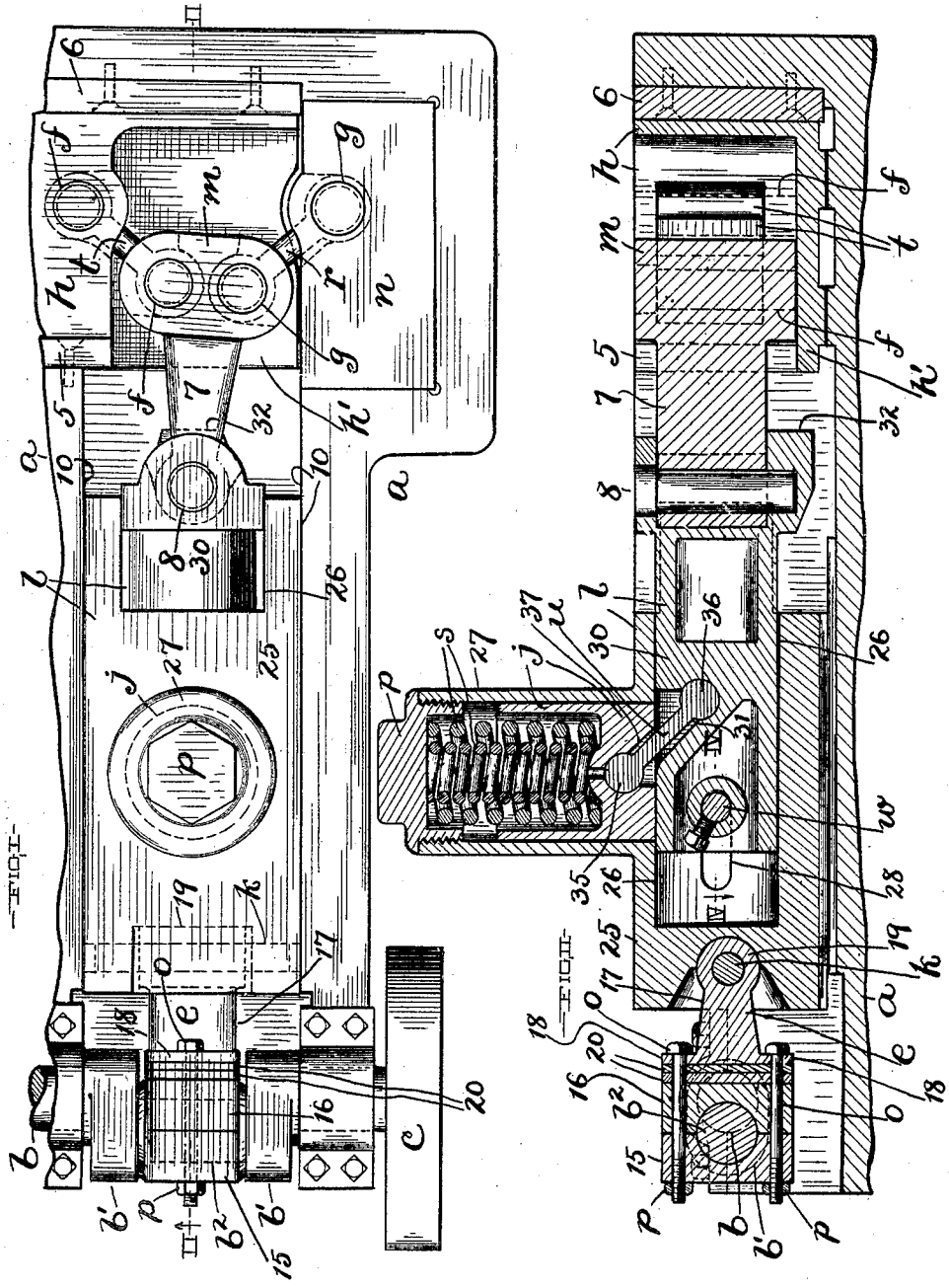
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PRESSURE EXERTING MACHINE.

(Application filed July 29, 1901.)

(No Model.) 2 Sheets—Sheet 1.



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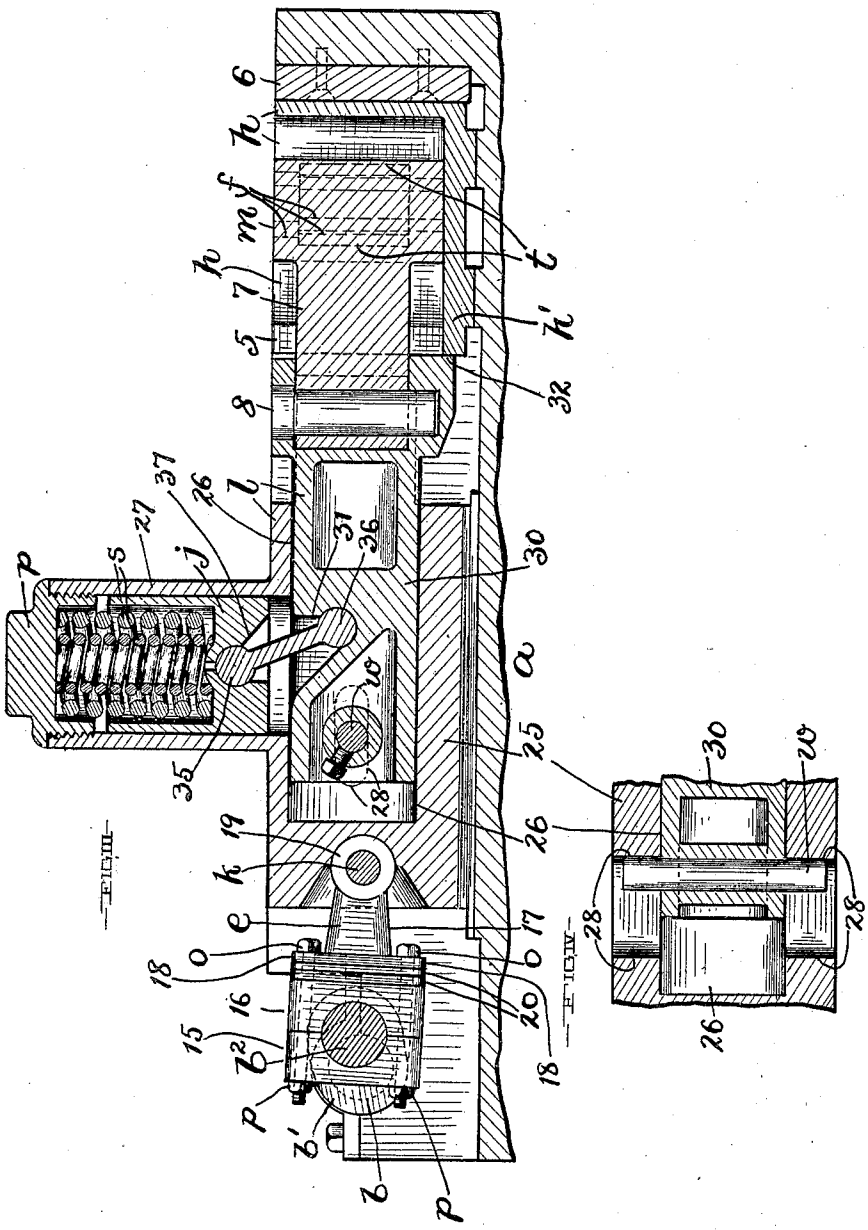
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UNITED STATES PATENT OFFICE.

GEORGE W. GREENWOOD, OF CLEVELAND, OHIO.

PRESSURE-EXERTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 689,961, dated December 31, 1901.

Application filed July 29, 1901. Serial No. 70,048. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. GREENWOOD, a resident of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Pressure-Exerting Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in pressure-exerting machines suitable for use in gripping, pressing, and forging operations—as, for instance, in gripping or exerting pressure against a blank or stock which is to be converted or formed into a predetermined article of manufacture; and the invention pertains more especially to a machine of the character indicated which comprises a suitably-guided pressure-exerting block capable of reciprocation and actuated by a suitably-operated toggle-joint and has means for avoiding breakage of or injury to any portion of the mechanism of the machine by an excess of material to be operated upon by the pressure-exerting block or by any obstructing matter obtaining ingress to the space entered by the blank, stock, or material which is to be pressed against or operated upon by the pressure-exerting block.

The object of this invention is to construct a machine of the character indicated with improved means for causing the pressure-exerting block to dwell longer than ordinarily in engagement with the object operated upon.

With this object in view and to the end of realizing other advantages hereinafter appearing the invention consists in certain features of construction and combinations of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure I is a top plan of a portion of a pressure-exerting machine embodying my invention. Fig. II is a vertical section on line II II, Fig. I, looking in the direction indicated by the arrow. Fig. III is an elevation, mostly in vertical section, corresponding with Fig. II, except in the position of the moving parts. Fig. IV is a horizontal section in detail on line IV IV, Fig. II, looking downwardly.

Referring to the drawings, *a* designates the stationary horizontally-arranged bed of the machine, and *b* a crank-shaft, which is arranged horizontally at one end of and supported from the bed *a*. The shaft *b* is provided at one end with a driving-pulley *c*. A pressure-exerting block *h* is arranged at and supported from the opposite end of the bed *a*. The block *h* is capable of reciprocation and has its line of travel arranged parallel with the shaft *c*. The shaft *b* and the block *h* are arranged, therefore, parallel and a suitable distance apart longitudinally of the bed *a*. The block *h* is arranged to operate between two guide-forming walls 5 and 6, provided upon the bed *a* and arranged at the inner side and outer side, respectively, of the path of the said block. The walls 5 and 6 are formed, preferably, by bars rigidly secured to the body portion of the bed *a* in any approved manner. The block *h* is operated by a toggle-joint arranged at one end of the said block *h* between the said block *h* and a thrust-block *n*. The said toggle-joint has its knuckle *m* provided with a shank or arm 7, which extends toward the slide *l* and is pivoted vertically, as at 8, to the said slide. The slide *l* is capable of reciprocation and arranged to operate between the shaft *b* and the travel of the block *h*. The toggle-joint is therefore operatively connected at its knuckle *m* with the slide *l*, which is operatively connected by a pitman *e* with the crank 9 of the shaft *b*, and the bed *a* is provided with walls 10, arranged to form guides for the said slide. The two links *r* and *t* of the toggle-joint connect the toggle-knuckle *m* with the blocks *n* and *h*, respectively. The toggle-joint is supplied in the usual manner, having opposite ends of its link *t* pivoted vertically, as at *f*, to the toggle-knuckle and to the block *h*, respectively, and having opposite ends of its other link *r* pivoted vertically, as at *g*, to the toggle-knuckle *m* and to the thrust-block *n*, respectively.

The slide *l* comprises an outer block 25 and an inner block 30. The block 25 rests upon the bottom of the recess or slideway formed between the walls 10. The block 30 is arranged within and movable endwise of a correspondingly-shaped chamber 26, which is formed in and extends longitudinally of the block 25 and is open at the outer end of the said block 25. The arm 7 of the toggle-knuckle

m is attached directly to the outer end of the block 30—that is, the pivot 8, which operatively connects the toggle-knuckle arm 7 with the slide l, (blocks 25 and 30,) extends through the said arm into the block 30 and not into the block 25; but the pitman e, instrumental, as already indicated, in establishing operative connection between the slide l and the shaft b, is attached directly to the block 25 and not to the block 30. During the operation of the pitman e the block 30 moves with the block 25, so as to result in the actuation of the toggle-joint; but the block 30 is yieldingly held in position within the block 25, as will hereinafter clearly appear.

The block h should adequately engage and operate upon the stock, blank, or material (not shown) to be engaged or pressed against, and the arrangement of the parts is such, therefore, that the block h shall have commenced to operate before the outer block 25 of the slide l has completed its stroke in the direction of the path of the said block h and that the block 30, with which the toggle-joint is directly connected, as already indicated, shall be capable of yielding, if necessary, during the said stroke after the said block h has commenced to engage the work, as aforesaid, so that the liability of any excess of material or obstructing matter against which the block h is actuated, resulting in breakage of or injury to the toggle-joint and connected parts, is reduced to a minimum. It will be observed, therefore, that the block 30 is movable endwise and independently of the block 25, and the yieldable means acting to retain the block 30 in its normal position within the block 25 comprises, preferably, a vertically movable or yieldable block j, arranged over the block 30 within a case 27, which is formed upon the top of the block 25. The case 27 has its outer end internally screw-threaded and engaged by a correspondingly externally-threaded plug p, and one or more spiral springs s are confined within the chamber of the case 27 between the opposing surfaces of the plug p and the block j. A short bar u extends from within the block j downwardly and in the direction of the outer end of and into the block 30. The bar u is provided with two journals 35 and 36, formed upon the outer end and inner end, respectively, of the bar and arranged at right angles to or transversely of the path of the slide l. The block j is suitably chambered, as at 37, to provide a bearing for the journal 35, and the chamber 37 extends to and is open at the inner end of the block j and has the dimensions required to accommodate the location and operation of the bar u. The block 30 is suitably chambered, as at 31, to provide a bearing for the journal 36, and the chamber 31 extends to and is open adjacent the block j and has the dimensions required to accommodate the location and operation of the bar u. The spring or springs s are normally compressed or under tension and through the medium of the block j and the bar u retain the block 30 in its outer and normal position within the block 25. The springs s are sufficiently powerful to retain the block 30 in its normal position in the absence of an abnormal excess in the work provided for the pressure-exerting block h until the movement of the block 30 during the travel of the slide l in the direction of the travel of the block h has been arrested before the block 25 has completed its movement in the said direction, as will hereinafter more clearly appear.

To prevent the block 30 from being pushed or actuated outwardly beyond its normal position, a stop is provided, and comprises, preferably, a pin w, which extends horizontally and transversely through the block 30, at right angles to the line of travel of the slide l, into engagement with slots 28, formed in and extending longitudinally of the side walls of the chamber 26 of the block 25. In the normal position of the parts the pin w engages the forward end walls of the slots 28, as shown in Figs. II and IV. The pin w and the forward end walls of the slots 28 form a stop for limiting the outward movement of the block 30 by the action of the spring or springs s.

The pitman e consists of several separable sections assembled longitudinally of the pitman, comprising, preferably, two box-forming sections 15 and 16, which easily embrace the outer side and inner side, respectively, of the wrist b^2 of the crank b' of the shaft b, and another section 17, arranged a suitable distance from the inner box-forming section 16 and attached to the block 25 of the slide l. The section 17 has its outer end provided with ears or flanges 18 and has its inner end terminating in an eye 19, which loosely embraces a horizontally-arranged pin k, extending transversely of and supported from the block 25. The pitman illustrated has also plates or sections 20 interposed between the inner box-forming section 16 and the ears or flanges 18 of the section 17. The ears or flanges 18 and the remaining pitman-sections 15, 16, and 20 have registering bolt-receiving holes, as shown in Fig. II, and the bolts o, engaging the said holes, extend through the said pitman-sections and have their shanks provided with nuts p. The bolts o and nuts p are arranged and applied as required to hold the sections of the pitman properly assembled. By the construction just described it is obvious that either or both of the plates or sections 20 of the pitman can be removed upon the disconnection of the pitman-sections by withdrawing the nuts p and bolts o, and obviously the pitman is shortened or lengthened according as a plate or section 20 is added to or removed from the pitman, and obviously the stroke of the block 25 of the slide l is lengthened or shortened according as the pitman is lengthened or shortened.

The block 30 is provided upon its outer end

and at the bottom with a shoulder 32, which faces in the direction of a flange or extension h', which is formed upon and at the bottom of the block h and projects in under the toggle-knuckle m in the direction of the thrust-block n, and the arrangement of parts is such that the inner side edge of the said extension h' of the block h, as shown in Fig. III, shall be engaged by the shoulder 32 of the block 30 before the pitman e has completed its stroke during the movement of the slide l (blocks 25 and 30) toward the travel of the block h. The member h' of the block h and the shoulder or member 32 of the block 30 constitute a stop, therefore, for limiting the movement of the said block 30 toward the travel of the block h. The movement of the block 30 as soon as its shoulder 32 comes into engagement with the member h' of the block h during the travel of the slide l in the direction of the travel of the block h is arrested; but the block 25 continues to move in the said direction independently of the block 30, and obviously the block j is lifted during the said movement of the block 25 independently of the block 30, and the springs s within the case 27 are still further compressed, and the block h will, during the movement of the block 25 independently of the block 30, dwell against the object operated upon thereby, and obviously the said dwell is lengthened or shortened according as the pitman e is increased or decreased in length.

The formation of the stop employed to arrest the movement of the block 30 in the direction of the travel of the pressure-exerting block h by the said block 30, in conjunction with the extension h' of the block h, is important and valuable, in that the engagement of the block extension h by the block 30 holds the said member h tightly against the wall 6, along which the said member h' extends, and thereby steadies the block h at the desired time—viz., when the said block h dwells in the performance of its function.

What I claim is—

1. In a machine of the character indicated, a pressure-exerting block h capable of reciprocation; a slide l comprising an inner block 30 and an outer block 25 carrying the block 30 and movable endwise independently of the block 30; a shaft having a crank; a pitman connecting the said crank directly with the outer block 25 and comprising a separable or removable section arranged to lengthen the pitman; means adapted to actuate the pressure-exerting block and attached directly to the inner block 30; a block j arranged adjacent to and movable from and toward the block 30; yieldable means acting to retain the said block j in its inner and normal position; a short bar u extending from within the block j in the direction of the outer end of and into the block 30, which bar u is provided with two journals 35 and 36 formed upon the outer end and inner end, respectively, of the said bar and arranged transversely of the path of the slide l and having bearing in the blocks j and 30, respectively, and a stop arranged to arrest the outward movement of the block 30 preparatory to the completion of the crank's throw instrumental in effecting the said movement.

2. In a machine of the character indicated, a pressure-exerting block h capable of reciprocation; a slide l comprising an inner block 30 and an outer block 25 carrying the block 30 and movable endwise independently of the block 30; means for actuating the said outer block 25; means adapted to actuate the pressure-exerting block and attached directly to the inner block 30; a block j arranged adjacent to and movable from and toward the block 30; yieldable means acting to retain the block j in its inner and normal position; a short bar u extending from within the block j in the direction of the outer end of and into the block 30 and journaled in the said blocks j and 30, and a stop arranged to arrest the outward movement of the block 30 preparatory to the completion of the crank's throw instrumental in effecting the said movement.

3. In a machine of the character indicated, a thrust-block n, a pressure-exerting block h movable from and toward the thrust-block and provided, at the bottom, with an extension h' projecting toward the thrust-block; a slide l comprising an inner block 30 having its outer end provided with a shoulder 32 arranged to engage the aforesaid extension of the block h during the operation of the machine, and an outer block 25 carrying the block 30 and movable endwise independently of the block 30; a shaft having a crank; a pitman having one end thereof attached to the wrist of the said crank and having its other end attached to the outer block 25, which pitman comprises a removable section lengthening the pitman; a toggle-joint having its knuckle attached directly to the inner block 30 and having its two links attached at their adjacent ends to the said knuckle and attached at their other end to the blocks h and n, respectively, and yieldable means acting to retain the block 30 in its outer and normal position, all arranged and operating substantially as shown, for the purpose specified.

4. In a machine of the character indicated, a thrust-block n, a pressure-exerting block h movable from and toward the thrust-block and provided, at the bottom, with an extension h projecting toward the thrust-block; a slide l comprising an inner block 30 having its outer end provided with a shoulder 32 arranged to engage the aforesaid block extension h' during the operation of the machine, and an outer block 25 carrying the block 30 and movable endwise independently of the block 30; means for actuating the said block 25; a toggle-joint having its knuckle attached directly to the inner block 30 and having its two links attached at their adjacent ends to the said knuckle and attached at their other end to the blocks h and n, respectively, and

yieldable means acting to retain the block 30 in its outer and normal position, all arranged and operating substantially as shown, for the purpose specified.

5. In a machine of the character indicated, a thrust-block *n*; a pressure-exerting block *h* movable from and toward the thrust-block; guide-forming walls 5 and 6 extending along the inner side and outer side respectively, of the travel of the said last-mentioned block; an extension *h'* formed upon the pressure-exerting block and extending along the outer guide-wall 6 toward the thrust-block; a slide *l* comprising an inner block 30 having its outer end arranged to engage the aforesaid block extension *h'* during the operation of the machine, and an outer block 25 carrying the block 30 and movable endwise independently of the block 30; means for actuating the said outer block 25; a toggle-joint having its knuckle attached to the inner block 30 and having its two links attached at their adjacent ends to the said knuckle and attached at their other end to the blocks *h* and *n*, respectively, and yieldable means acting to retain the block 30 in its normal and outer position, all arranged and operating substantially as shown, for the purpose specified.

Signed by me at Cleveland, Ohio, this 10th day of July, 1901.

GEORGE W. GREENWOOD.

Witnesses:
C. H. DORER,
A. H. PARRATT.