H. W. JACKSON & J. O. HORTON.

SAFETY STOP FOR BOX STAYING MACHINES.

APPLICATION FILED OCT. 22, 1915.

1,192,201.

Patented July 25, 1916.

2 SHEETS—SHEET 1.

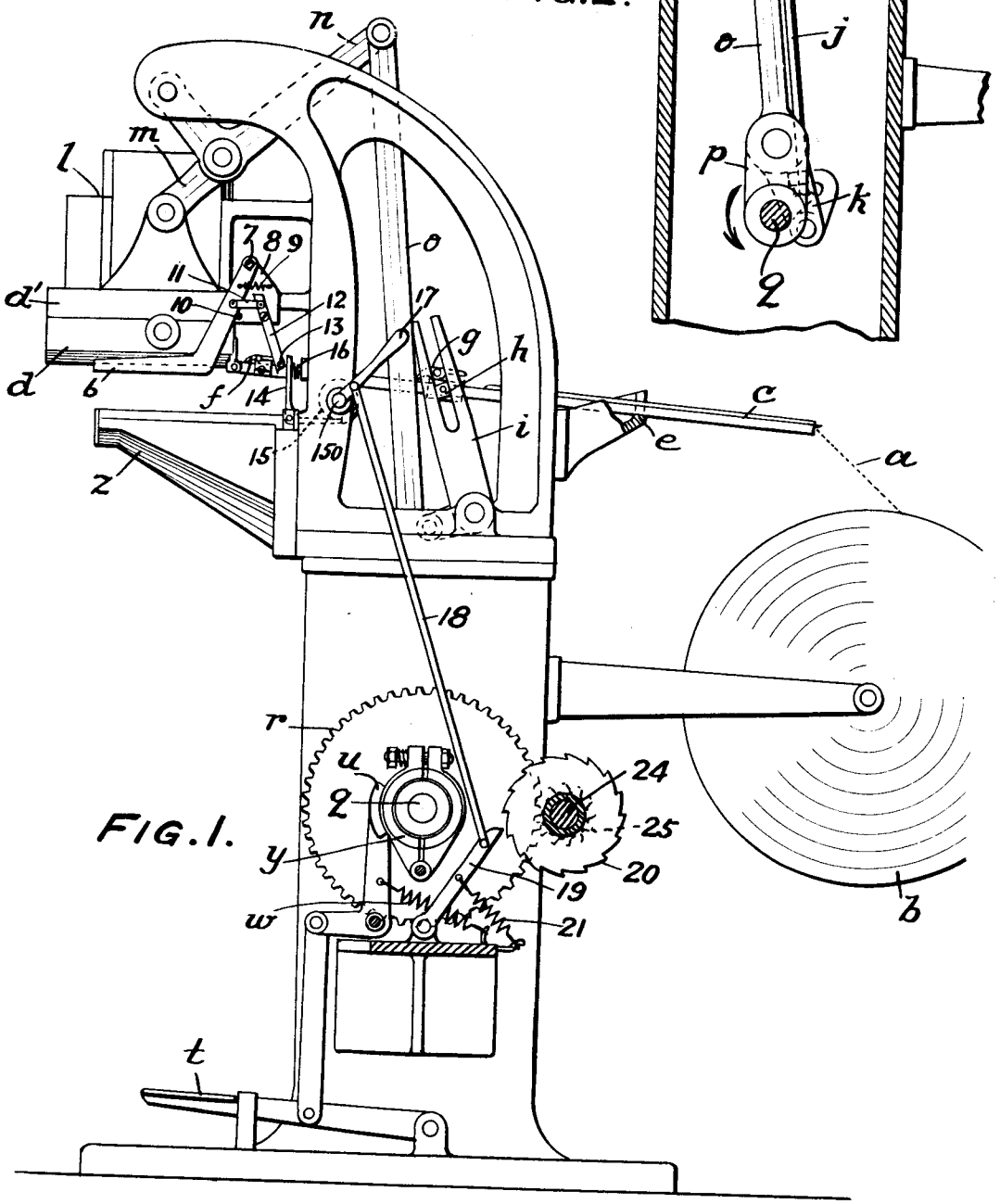


FIG. 1.

FIG. 2.

WITNESS:

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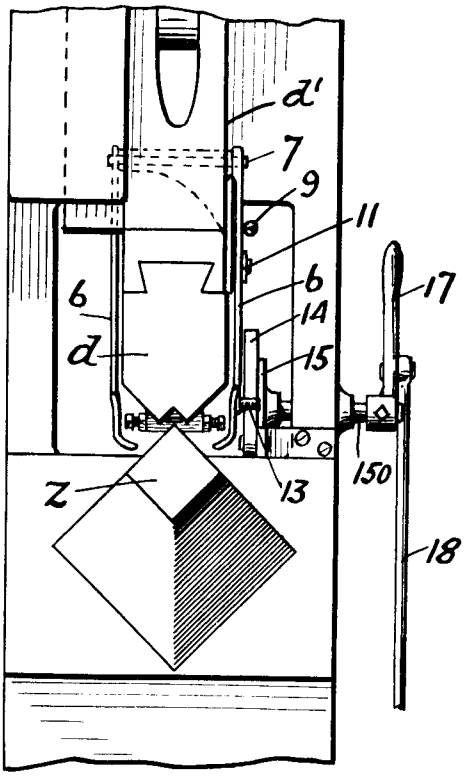
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2 SHEETS—SHEET 2.

FIG. 3.



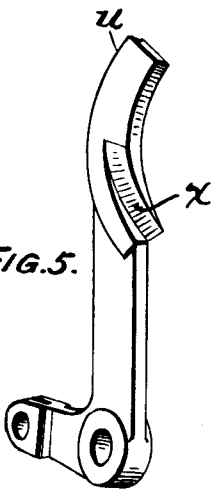


FIG. 5.

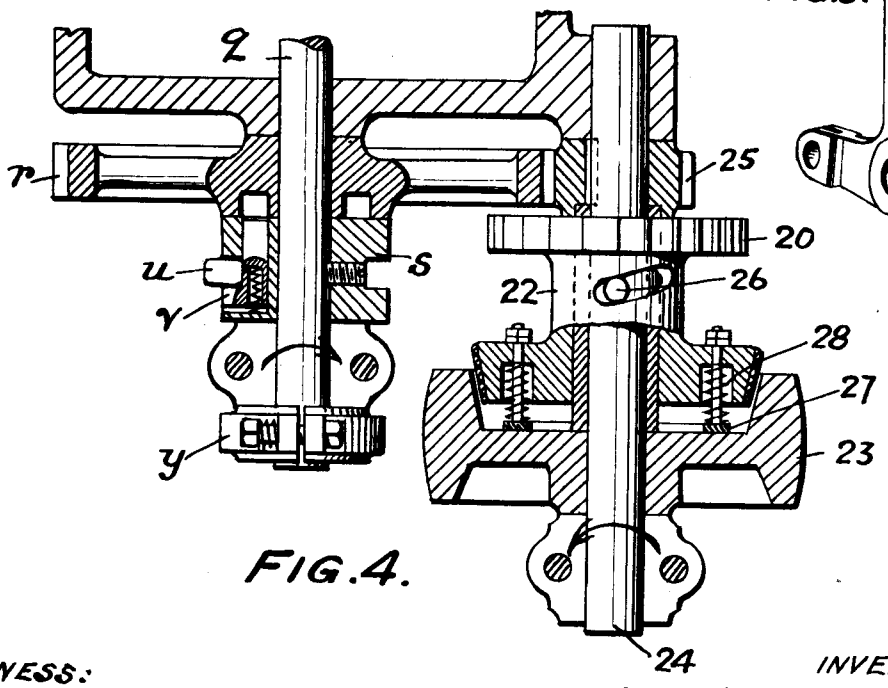


FIG. 4.

WITNESS:

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UNITED STATES PATENT OFFICE.

HENRY W. JACKSON, OF CYNWYD, AND JOHN O. HORTON, OF MONTROSE, PENNSYLVANIA, ASSIGNORS TO NATIONAL METAL EDGE BOX COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

SAFETY-STOP FOR BOX-STAYING MACHINES.

1,192,201. Specification of Letters Patent. Patented July 25, 1916.

Application filed October 22, 1915. Serial No. 57,386.

To all whom it may concern:

Be it known that we, HENRY W. JACKSON and JOHN O. HORTON, citizens of the United States, residing, respectively, at Cynwyd, State of Pennsylvania, and Montrose, Pennsylvania, have invented a new and useful Improvement in Safety-Stops for Box-Staying Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to that class of staying machines in which the metal stay is applied to the box edge or any other article by the action of a die being caused to descend upon a rigid anvil, compressing the box and stay therebetween. Said anvil, upon which the box is placed for the application of the stays, is usually of substantially rectangular cross section and positioned diamond-wise, with its horizontal active edge uppermost. Against this edge the die descends and does its work.

In the operation of staying (for example) a box, the operator places the two box sides forming said angle upon the two faces of the anvil contiguous to its active edge, and holds the same close with his fingers during the application of the stay. This operation requires that the operator shall keep his fingers close to the joint and yet not too close. To decrease danger of accident and protect the operators, it is desirable to provide some safety device.

The object of this invention is to provide a safety stop for machines of this and similar character wherein appropriate parts are supplied, attached on either side of the die holder, and projecting downwardly in advance of the die, and so positioned as to contact with the operator's fingers if he has inadvertently placed them within the danger zone, and thereby set in action mechanism which will instantly stop the descent of the die.

The device may be separate and distinct from the usual operating clutch of the staying machine, which remains operable as usual.

In the drawings: Figure 1 is a side elevation of a box staying machine embodying the invention. Fig. 2 is a partial sectional view of same. Fig. 3 is a partial front view of same. Fig. 4 is an enlarged sectional view through the driving and clutch mechanism. Fig. 5 is an enlarged detail view of one of the clutch levers.

The metal strip *a* is carried in the shape of a strip on a drum *b* at the rear of the machine. Thence the strip is led to the throat *c*, which is a long guideway pivotally attached to the rear of die *d* and otherwise supported by the frame of the machine at *e*. The throat carries a holding pawl *f*.

g is the feed pawl carried by block *h* which slides along the throat and is actuated by a slotted connection with arm *i* of a bell crank lever which, by rod *j* and crank *k*, is driven from the main crank pin.

The action of pawls *f* and *g* in gripping the strip and moving it along the throat is not further developed herein, as the same is well understood in the art and forms no part of the present invention.

Die *d* is actuated in slideway *l* by knuckle levers *m* and *n*, and connecting rod *o*, from main crank *p* on shaft *q*. This shaft receives its motion, through the fixed clutch member *s* and the loose gear *r* (see Fig. 4), in such manner that when the foot is placed upon foot lever *t*, the end *u* of the clutch lever is withdrawn from the slot in member *s*, whereupon the L-shaped key *v* is pressed by its spring into one of the alining holes in gear *r*, and motion is transmitted to the shaft.

Upon releasing the foot lever, spring *w* returns the end *u* of the clutch lever within the groove in member *s*, cam surface *x* (see Fig. 5) coacting with the L-shaped key *v* to withdraw it from connection with gear *r*, and the machine is stopped. That said stoppage of the machine may be made to take place instantaneously with the withdrawal of power from gear *r*, the end of shaft *q* is engaged by a brake clamp *y*. The anvil *z* is rigidly mounted on the front of the machine directly below the die.

6 are finger guards supported at either side of the die, and actuated in unison, by being connected with the square ends of pin 7 carried by a bracket 8 mounted upon the die head *d'*. As seen in Fig. 3, the lower edges of guards 6 are turned inwardly toward each other, so that as the die is depressed toward the anvil if the operator's fingers are

in a dangerous position on either face of the anvil, said turned-in portions will contact with the operator's fingers and be raised before the die can strike them. The finger guards are held in operative position by spring 9 holding one of them against a stop pin 10 on bracket 8. This finger guard is connected by a link 11 with one end of a lever 12 near its intermediate pivot on bracket 8. The long arm of lever 12 projects downwardly and carries a pin 13, so that a very slight movement of the finger guards is multiplied to give a more appreciable movement to pin 13.

14 is a bell crank pivoted to a bracket on the frame of the machine.

15 is a disk formed with a stop against which one end of bell crank 14 is held, when in operative position, by spring 16. The bell crank, moreover, is so positioned that one arm is exactly vertical, and in line with and very close to pin 13 on lever 12. In this way, during the normal action of the machine, the die with the finger guards is lowered and raised without actuating the bell crank lever 14, pin 13 moving down and up very close to the vertical arm of said bell crank but not touching it. Disk 15 is carried on one end of a shaft 150, the other end of which carries a hand lever 17, and this hand lever is connected by a rod 18 with a pawl 19 in line with, but just out of mesh with, a ratchet wheel 20. Spring 21 tends to bring the pawl into mesh with the ratchet, and would do so but for the stop on the disk 15, which, by connections 150, 17, 18, is pressed against the horizontal end of bell crank 14.

Ratchet wheel 20 is connected with a clutch 22 (see Fig. 4) operating on the driving pulley 23 as follows: The driving pulley is mounted to turn freely on the driving shaft 24, to which is keyed pinion 25 in mesh with gear *r*. Shaft 24 carries a pin 26 which passes through an oblique slot in the hub of the clutch.

27 is an annular friction ring carried by the clutch and pressed against the bored out face of the driving pulley by springs 28.

As shown in Fig. 4 the clutch is disconnected. Now suppose power to be applied to driving pulley 23, in the direction shown by the arrow. The pressure of the friction ring 27 is sufficient to make the clutch member 22 turn with the driving pulley, freely on the shaft. In this movement the clutch member slides on pin 26, and by reason of its oblique slot is forced toward the driving pulley until by the time pin 26 reaches the end of its slot, the clutch is in driving engagement with the pulley and they act together to drive shaft 24 through pin 26, thereby driving the machine. Now should an operator inadvertently protrude his fingers too near the working edge of the anvil *z*, in the lowering of the die the finger guards 6 will contact with his fingers first and will be deflected upward. Instantly pin 13 on lever 12 will be kicked back, tripping bell crank lever 14 off of stop on disk 15, and spring 21 will then be released to throw pawl 19 into mesh with ratchet wheel 20. The stopping of ratchet wheel 20 at once forces pin 26 to move in its slot thereby drawing clutch 22 out of the driving pulley 23, which continues to turn freely on shaft 24, against only the comparatively slight friction of ring 27, until such time as the power is shut off or the tripping mechanism is reset. This latter is accomplished by turning hand lever 17 until pawl 19 is cleared of the ratchet wheel and the horizontal arm of bell-crank 14 is again caught by the stop on disk 15.

Ratchet wheel 20 is made with a wide enough face to preclude its overriding pawl 19 in its lateral movement. As is readily seen this pawl and ratchet might be supplanted by another equivalent form of stop for clutch member 22, and this without departing in any way from the spirit of the invention.

Other possible changes in detail will occur to the skilled mechanic and the invention is therefore not limited to the precise construction shown herein, but is the best embodiment of the invention for realizing the results contemplated.

Having now fully described our invention, what we claim and desire to protect by Letters Patent is:

1. In a staying machine, the combination with the anvil, the movable die, the driving wheel, driven mechanism for reciprocating the movable die, and a driving connection between the driving wheel and driven mechanism, of tripping mechanism located alongside said anvil and die, and normally stationary means adapted to be actuated by said tripping mechanism to disrupt the driving connection between the driving wheel and driven mechanism.

2. In a staying machine, the combination with the anvil, the reciprocating die coöperating with the anvil, the driving wheel, driven mechanism for reciprocating the die and a driving connection between the driving wheel and the driven mechanism, of tripping mechanism located alongside the coöperating parts of the anvil and die when the die is approximated toward the anvil and normally stationary means adapted to be actuated by the tripping mechanism when displaced by an obstruction adjacent to the face of the anvil, to disrupt the driving connection between the driving wheel and driven mechanism.

3. In a staying machine, the combination with the anvil, the reciprocating die coöperating with the anvil, the driving wheel, driven mechanism for reciprocating the die

and a driving connection between the driving wheel and the driven mechanism, of a tripping lever movable with the die and also displaceable from its normal position relative thereto by an obstruction adjacent to the face of the anvil, and means operable by the tripping lever, when so displaced, to disrupt the driving connection between the driving wheel and driven mechanism.

4. In a staying machine, the combination with the anvil, the die, the driving wheel, driven mechanism for reciprocating the die, and a driving connection between the driving wheel and driven mechanism, of a tripping lever movable with the die and extending alongside the lower working edge thereof, a spring holding the tripping lever in normal position, and mechanism adapted, when the tripping lever is moved against the action of its spring, to be released to disrupt said driving connection.

5. In a staying machine, the combination with the anvil, the die, the driving wheel, driven mechanism for reciprocating the die, and a driving connection between the driving wheel and driven mechanism, of a tripping lever extending alongside the anvil and die, mechanism to disrupt said driving connection, a holding lever normally maintaining said mechanism out of operation, and means controlled by said tripping lever to operate the holding lever to release said mechanism.

6. In a staying machine, the combination with the anvil, the die, the driving wheel, driven mechanism for reciprocating the die, and a driving connection between the driving wheel and driven mechanism, of a tripping lever extending alongside the anvil and die, mechanism to disrupt said driving connection, a holding lever normally maintaining said mechanism out of operation, a spring tending to move said holding lever out of holding position, and means controlled by the tripping lever to allow said spring to operate when the tripping lever is moved from its normal position.

7. In a staying machine, the combination with the anvil, the die, the driving wheel, driven mechanism for reciprocating the die, and a driving connection between the driving wheel and driven mechanism, of a tripping lever extending alongside the anvil and die, mechanism to disrupt said driving connection, a holding lever normally maintaining said mechanism out of operation, a spring maintaining the tripping lever in normal position, and lever mechanism connected with the tripping lever and adapted, when the tripping lever is moved from its normal position against its spring, to release the holding lever.

8. In a staying machine, the combination with the anvil, the die, the driving wheel, driven mechanism for reciprocating the die, and a driving connection between the driving wheel and driven mechanism, of a tripping lever extending alongside the anvil and die, mechanism to disrupt said driving connection, a holding lever normally maintaining said mechanism out of operation, a spring tending to move the holding lever out of holding position, a spring maintaining the tripping lever in normal position, and lever mechanism connected with the tripping lever and normally maintaining the holding lever in holding position but adapted, when the tripping lever is moved against its spring, to release the holding lever.

9. In a staying machine, the combination with the anvil, the die, the driving wheel, driven mechanism for reciprocating the die, and a driving connection between the driving wheel and driven mechanism, of a tripping lever movable with the die and extending along the lower working edge thereof, a spring holding the tripping lever in normal position, mechanism to disrupt said driving connection, a holding lever normally maintaining said mechanism out of operation, an arm of said lever extending vertically, a spring tending to move the holding lever out of normal position, and lever mechanism connected with the tripping lever and reciprocating vertically therewith and a part whereof moves along the vertical arm of the holding lever and normally restrains it from actuation by its spring.

10. In a staying machine, the combination with the anvil, the die, the driving wheel, driven mechanism for reciprocating the die, and a driving connection between the driving wheel and driven mechanism, of a tripping lever extending alongside the anvil and die, a normally stationary control shaft, mechanism controlled therefrom to render said driving connection operative or inoperative, and means controlled by the tripping lever to control the turning of said shaft in direction to render said driving connection inoperative, and manually operable means to turn the shaft in direction to render said driving connection operative.

11. In a staying machine, the combination with the anvil, the die, the driving wheel, driven mechanism for reciprocating the die, and a normally operative driving connection between the driving wheel and the driven mechanism, of means to render said driving connection inoperative, a spring tending to so actuate said means, a control shaft, connected with said means and adapted to hold the same from operation by its spring, a holding lever adapted to so hold the shaft, a tripping lever in operative relation with the anvil and die, and devices controlled by the tripping lever to operate the holding lever to unlock said shaft.

12. In a staying machine, the combination with the anvil, the die, the driving wheel,

driven mechanism for reciprocating the die, and a normally operative driving connection between the driving wheel and the driven mechanism, of means to render said driving connection inoperative, a spring tending to so actuate said means, a tripping lever in operative relation with the anvil and die, and a chain of mechanism between said lever and said means normally holding the latter from operation by its spring but adapted, when the tripping lever is moved from its normal position, to be operated to allow said spring to actuate said means.

13. In a staying machine, the combination with the anvil, the die, the driving wheel, driven mechanism for reciprocating the die, and a normally operative driving connection between the driving wheel and the driven mechanism, of means to render said driving connection inoperative, a spring tending to so actuate said means, a tripping lever in operative relation with the anvil and die, a chain of mechanism between said lever and said means normally holding the latter from operation by its spring but adapted, when the tripping lever is moved from its normal position, to be operated to allow said spring to actuate said means, and a shaft included in said chain of mechanism adapted to be manually reset to restore said chain of mechanism to operative position.

14. In a staying machine, the combination with the anvil, the die, the driving wheel, driven mechanism for reciprocating the die, and a normally operative driving connection between the driving wheel and the driven mechanism, of means to render said driving connection inoperative, a spring tending to so actuate said means, a control shaft connected with said means and adapted to hold the same from operation by its spring, a holding lever adapted to so hold the shaft, a spring tending to move the holding lever out of operative position, a tripping lever in operative relation with the anvil and die, and lever mechanism connected with the tripping lever and adapted to normally maintain the holding lever in operative position but adapted, when displaced from its normal position, to allow the holding lever to be actuated by its spring.

15. In a staying machine, the combination with the anvil and the die, a driven shaft, and mechanism actuated thereby for reciprocating the die, of a driven clutch member adapted to positively drive the shaft but having a limited movement relative thereto into non-driving position, a driving clutch member adapted to normally drive the driven clutch member, means to hold the driven clutch member from actuation by the driving clutch member, and a tripping lever in operative relation with the anvil and die and adapted when displaced from its normal position to render said means operative.

16. In a staying machine, the combination with the anvil and the die, a driven shaft, and mechanism actuated thereby for reciprocating the die, of a driven clutch member adapted to positively drive the shaft but movable relatively thereto into non-driving position, a driving clutch member adapted to yieldingly advance the driven clutch member from non-driving position to driving position and then drive the same positively, means to retract the clutch from driving to non-driving position, and a tripping lever in operative relation with the anvil and die and adapted when displaced from its normal position to render said means operative.

17. In a staying machine, the combination with the anvil and the die, a driven shaft, and mechanism actuated thereby for reciprocating the die, of a driven clutch member sleeved on the shaft and movable longitudinally thereon, when turned relatively thereto, into driving and non-driving position, a driving clutch member having a yielding engagement with the driven clutch member to turn the same into driving position and having a positive engagement with the driven clutch member when the latter is so turned into driving position, means to lock the driven clutch member from turning, and a tripping lever in operative relation with the anvil and die and adapted when displaced from its normal position to render said means operative.

18. In a staying machine, the combination with the anvil and the die, a driven shaft, and mechanism actuated thereby for reciprocating the die, of a driven clutch member sleeved on the shaft, a pin on the shaft engaging an inclined slot in the driven clutch member, a driving clutch member, yielding friction device between said clutch members whereby the clutch is turned upon the shaft into positive driving engagement therewith and also moved axially on the shaft, a relatively positive friction device between said clutch members adapted to be rendered operative by such axial movement of the driven clutch member, means to arrest the movement of the driven clutch member thereby causing the shaft, when in operation, to advance out of driven engagement with the driven clutch member and move the driven clutch member axially out of positive driven engagement with the driving clutch member, and a tripping lever in operative relation with the anvil and die adapted when displaced from its normal position to render said means operative.

19. In a staying machine, the combination with the anvil and the die, a driven shaft, and mechanism actuated thereby

reciprocating the die, of a driven clutch member sleeved on the shaft, a pin on the shaft engaging an inclined slot in the driven clutch member, a driving clutch member recessed to receive the driven clutch member, a spring pressed friction device carried by the driven clutch member and engaging the base of said recess, a friction device carried by the periphery of the driven clutch member and adapted to engage the wall of said recess, means to arrest the turning movement of the driven clutch member, and a tripping lever in operative relation with the anvil and die and adapted when displaced from its normal position to render said means operative.

In testimony of which invention, we have hereunto set our hands, at Philadelphia, on the second day of October, 1915.

HENRY W. JACKSON.
JOHN O. HORTON.

Witnesses:
HERMAN HARVEY,
G. E. THRASHER.