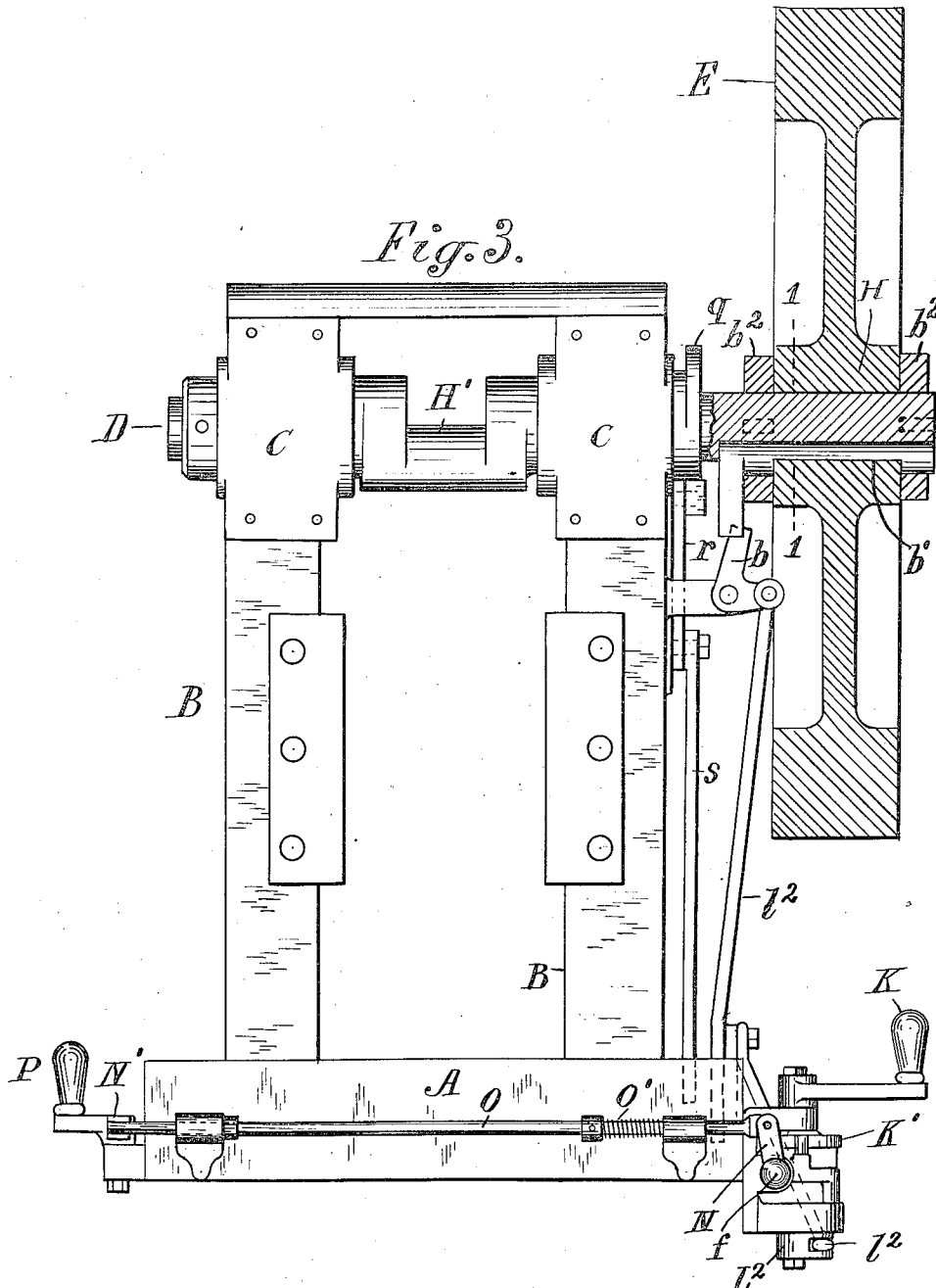


C. KNOTH.
SAFETY DEVICE FOR POWER PRESSES.
APPLICATION FILED APR. 1, 1912.

1,065,051.

Patented June 17, 1913.

4 SHEETS—SHEET 2.



Witnesses
L. Lee.
Walter Greenbaum

Inventor
Conrad Knott, per
Thomas S. Coane Atty.

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4 SHEETS—SHEET 3.

Fig. 4.

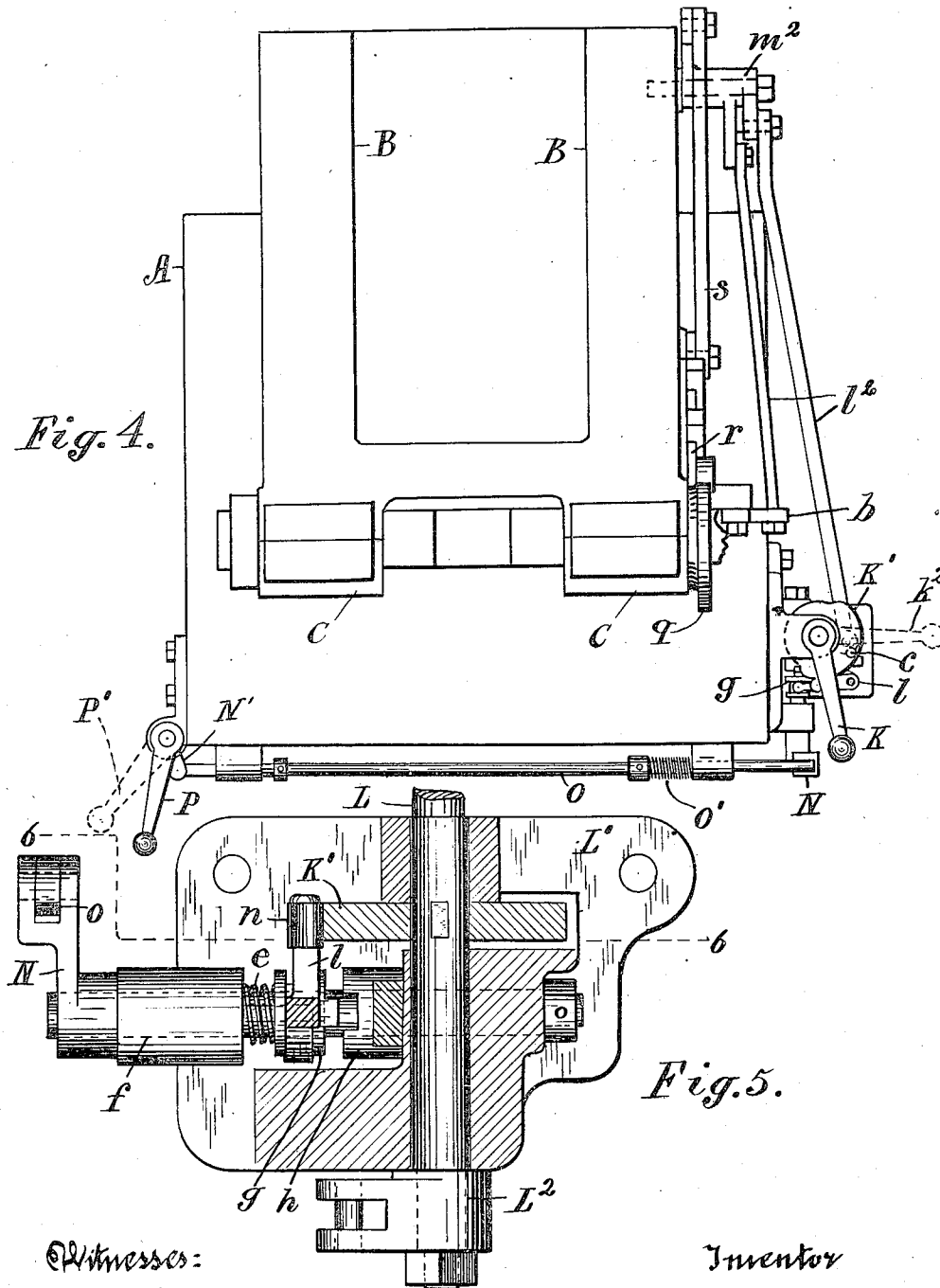


Fig. 5.

Witnesses:

L. Lee.
Atty General.

Inventor

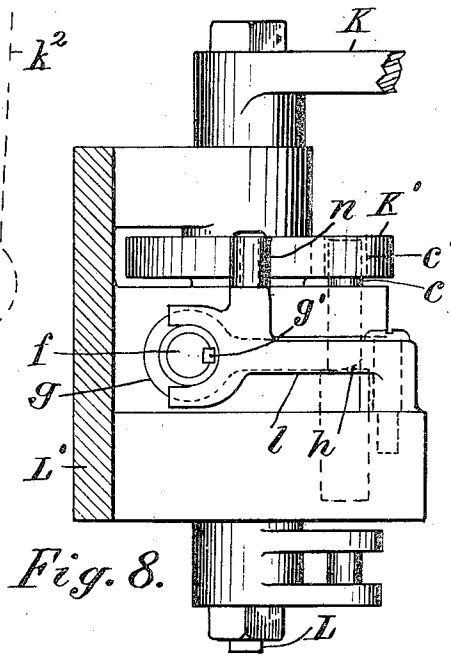
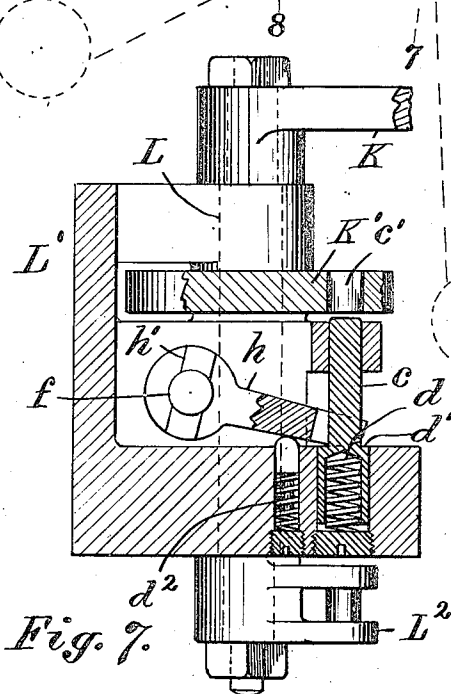
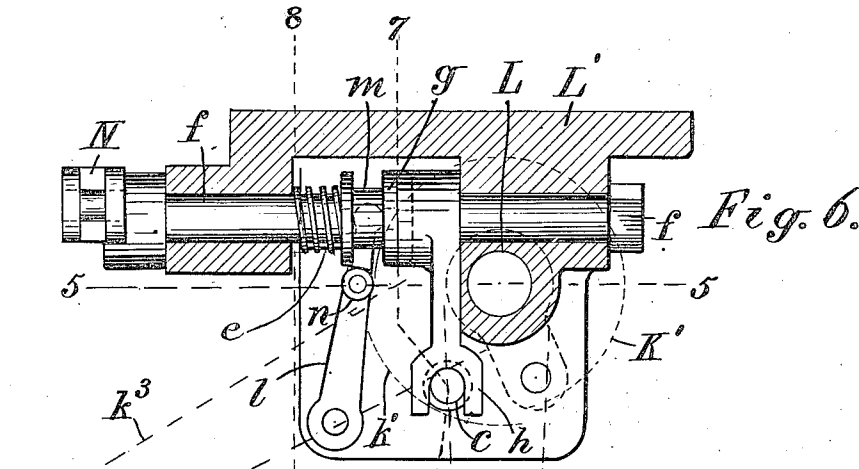
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L. Lee
Walter Steinbaum

Inventor

Conrad Knott, per
Thomas S. Crane, Atty.

UNITED STATES PATENT OFFICE.

CONRAD KNOTH, OF NEWARK, NEW JERSEY, ASSIGNOR TO HYATT ROLLER BEARING COMPANY, OF HARRISON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SAFETY DEVICE FOR POWER-PRESSES.

1,065,051.

Specification of Letters Patent.

Patented June 17, 1913.

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To all whom it may concern:

Be it known that I, CONRAD KNOTH, a citizen of the United States, residing at 173 Jelliff avenue, Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Safety Devices for Power-Presses, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to that class of power-presSES in which the driving-wheel is connected with the press-shaft by a clutch which is automatically disengaged to stop the movement of the pressing-dies after each stroke, to permit the removal and replacement of the objects which are operated upon by the dies. By such mechanism, the pressing-dies may remain stationary while the operator replaces the part which has been pressed in the dies; but in presses started by a foot-treadle the operator keeps his foot continuously upon the treadle and in his haste to accomplish a greater amount of work, sometimes inadvertently presses the treadle and starts the press in operation before he has removed his hands from the dies, with the result that his hands are caught between the dies and severely crushed or cut off.

The object of this invention is to avoid the use of a foot-treadle and to absolutely prevent the operator from reengaging the press-clutch until both his hands are removed from the dies in the press. This is effected by providing a clutch-handle and a releasing-handle at the opposite sides of the press, both of which must be simultaneously moved by the operator in order to reengage the press-clutch. These two handles are so connected that neither is capable alone of reengaging the clutch, and a locking device is applied to the clutch-handle, and a cam is rotated by the press-shaft to throw the clutch-handle back to its normal position after each actuation, in which position it is locked until the releasing-clutch is again moved.

The invention will be understood by reference to the annexed drawing, in which—

Figure 1 is a side elevation of a press containing the improvements, with the driving-wheel removed and the clutch-key shown in dotted lines, the parts being moved to permit the automatic engagement of the press-clutch. Fig. 2 shows the press-shaft and

the cam connections for restoring the clutch handle to its normal position; Fig. 3 is a front elevation of the press-frame and the safety appliances with the driving-wheel in section; Fig. 4 is a plan of the press; Fig. 5 is a section on line 5—5 in Fig. 6; Fig. 6 is a section on line 6—6 in Fig. 5, with the cam indicated by dotted lines; Fig. 7 is a section on line 7—7 in Fig. 6; and Fig. 8 is a section on line 8—8 in Fig. 6. Figs. 7 and 8 show the parts at the right of their respective section lines.

The press is shown with a bed A having stanchions B carrying bearings C for the press-shaft D. A driving-wheel E is shown fitted to turn loosely upon the shaft and its hub is provided with a clutch-bolt F adapted to engage a hole G. Its hub is provided with an interior groove to engage one corner of a rocking-bolt b' which is journaled in disks b^2 keyed upon the shaft D at opposite ends of the wheel-hub H. The rocking-bolt rocks in the disks and is flattened to clear the bore of the hub when turned in its inoperative position by the contact of the finger b^3 with a latch b .

The rocking-bolt is shown in its operative position in Fig. 1 engaging the left hand side of the groove in the hub, and pressed into such position by a spring b^4 on one of the disks, which holds the finger b^3 in the path of the hinge-latch b , as shown in Fig. 3. The latch is operated by a clutch-handle K through suitable connections, including a rock-shaft m^2 and link l^2 . A spring m^3 operating upon the bell-crank m^2 holds the latch b normally in the path of the finger b^3 , which rotates with the shaft d and the driving-wheel so long as the rocking-bolt is engaged with the hub, and is pressed backwardly by the latch b at each rotation so as to turn the rocking-bolt to clear the groove in the hub and disengage the driving-wheel from the press-shaft d . The finger b^3 after turning the rocking-bolt clear of the hub still rests upon the tip of the latch b and remains stationary with the shaft D until the latch is withdrawn. The driving-wheel may thus rotate continuously without moving the press-shaft as long as the latch is in the path of the finger b^3 . The spring m^3 performs the same function as the cam g , but as such springs are liable to break or lose their strength, the cam is provided as an additional safeguard to posi-

tively restore the clutch-handle K to its normal position where it is automatically locked by the bolt *c*.

Only a brief operation of the cam *q* is required to shift the clutch-handle K to the position in which it is locked by the lock-bolt *c*, and the cam is turned clear from the roll upon the slide *r* by the time that the rocking-bolt *b'* is disengaged from the hub H; so that the latch *b* which is coupled to the slide *r* by the bell-crank can be freely moved without obstruction from the cam.

The press-shaft is in practice formed with a crank or eccentric H' shown in Fig. 3, and with a crosshead carrying a punch I to operate upon an object J in the die J' upon the press-bed. The punch I is shown in connection with the other grooves in Fig. 1, but the parts for reciprocating the punch are omitted, as they are common in such presses and form no part of the present invention.

The latch is so arranged as to arrest the rotation of the shaft when the punch I is raised, thus leaving room above the die J' for the operator to manipulate the object J upon the die. A shaft L is journaled in bearings upon a housing L' at the right hand side of the bed and carries a clutch-handle K and a cam K'. The shaft L is provided with a crank L² connected to the latch *b* by rods *l*² and intermediate bell-crank *m*². The cam is provided with a hole *c'*, and a lock-bolt *c* is sustained movably beneath the hole and pressed normally upward into the hole by a spring *d*. A rock-shaft *f* is journaled upon the housing L' transverse to the cam-shaft L, and has a toothed coupler *g* fitted movably thereto upon a feather *g'*. The rock-shaft is connected by cranks N, N' and connecting-rod O with a releasing hand-crank P journaled upon the left hand side of the bed A, and each movement of the releasing-handle oscillates the rock-shaft. A spring O' operates to hold the releasing-handle in its normal position shown by dotted lines P' in Fig. 4. An arm *h* is fitted loosely upon the rock-shaft *f* adjacent to the toothed coupler *g*, and is provided with notches *h'* to engage the toothed coupler. A spring *d*² presses the arm normally upward, and the arm is forked at the end, as shown in Fig. 6, to embrace the locking bolt *c*, and is shaped to press upon a shoulder *d'* upon the lower part of the bolt, so as to depress the same in opposition to the spring *d* when the arm is engaged with the coupler and the rock-shaft is turned by the releasing-handle. A spring *e* (see Figs. 5 and 6) presses the coupler normally toward the arm *h* so as to engage the same at each oscillation of the rock-shaft; but means is provided to withdraw the coupler upon each actuation of the clutch-handle and cam-shaft, so that the

locking-bolt *c* may automatically engage the hole *c'* in the cam. This is effected by a tripper-arm *l* pivoted upon the casing L and having a forked end shown in Fig. 8, to embrace a groove *m* in the coupler, and a roller *n* projected past the edge of the cam K', as shown in Figs. 5 and 8. The cam has a raised face *k'* which is adapted to crowd the roller *n* outwardly when the clutch-handle K is moved from its normal position shown in Fig. 3 (indicated by dotted lines *k*² in Fig. 4), to the end of its actuating movement, where it is shown in full lines in Fig. 4.

The clutch-handle is indicated in its normal position by dotted lines *k*² in Fig. 6, and in a partially shifted position by dotted lines *k*³ in the same figure, where the raised face upon the cam engages the roller *n* before the clutch-handle completes its movement. The cam thus operates at each movement of the clutch-handle to disconnect the arm *h* from the coupler upon the rock-shaft, and this permits the locking-bolt *c* to automatically engage the cam when the clutch-handle is restored to its normal position, as shown in Fig. 8. The positive return of the clutch-handle to its normal position is not dependent upon the will of the operator, but is effected by a cam *q* upon the press-shaft D, operating upon a slide *r* which is connected by a link *s* with the bell-crank *m*². The bell-crank being connected to the cam-shaft L by the link *l*², the rotation of the cam *q*, at each reciprocating movement of the press-tools, pulls the clutch-handle positively back to its initial position. In this position it is automatically locked by the bolt *c* and cannot again be moved by hand to start the press without first moving the releasing-handle P. It will thus be seen that the latch *b* cannot be retracted from its operative position in which it stops the press-shaft at each rotation, without first operating the releasing-handle P to retract the locking-bolt and then turning the clutch-handle K to withdraw the latch. This compels the operator to grasp both the handles P and K simultaneously and prevents his starting the press while either hand is engaged with the press-tools. The spring *o'* restores the releasing-handle P to its initial position after each movement so as to relieve the arm *h* from the pressure exerted by this handle, thus removing any obstruction to the automatic rising of the bolt *c*.

This safety clutch device is adapted to power presses of all descriptions having a clutch with means for automatically throwing out the same at each stroke of the press, and the safety devices themselves may be varied in construction provided they include a clutch-handle for reengaging the press-clutch after it is automatically thrown

out, a lock for the clutch-handle and means for disengaging the lock before the clutch-handle can be shifted. For instance, the locking-bolt is shown applied to the cam K', but it could be applied to the shaft L or to the rod L² and produce the same effect.

The clutch-handle K and releasing-handle P are shown in the drawings arranged at the opposite sides of the bed to be within convenient reach of the right and left hands of the operator, but it is not essential that they should have this location, provided two handles are used which require manipulation simultaneously by the operator to re-engage the press-clutch.

Having thus set forth the nature of the invention what is claimed herein is:

1. In a power press, a safety device for actuating the press-clutch, comprising a clutch-handle with connections to operate the clutch, a locking-bolt to prevent the movement of the handle, an arm to disengage the bolt, a releasing-handle, and a coupler for connecting it detachably with the said arm.

2. In a power press, a safety device for actuating the press-clutch, comprising a cam-shaft, a clutch-handle and a cam thereon, a locking-bolt to prevent the movement of the handle, an arm to disengage the bolt, a releasing-handle, a coupler for connecting it detachably with the said arm, and a tripping-arm actuated by the cam for shifting the coupler and operating to disconnect the releasing-handle from the locking-bolt at each actuation of the clutch-handle.

3. In a power press, a safety device for actuating the press-clutch, comprising a cam-shaft at one side of the press, a clutch-handle and a cam on said shaft with a bolt-hole in the said cam, a locking-bolt for automatically engaging the said hole, a rock-shaft with arm fitted movably thereto to retract the locking-bolt, a releasing-handle at the opposite side of the press with connections to oscillate the rock-shaft, a coupler movable with the rock-shaft to engage the arm, and a tripping-arm connected with the coupler and actuated by the cam to disconnect the releasing-handle from the locking-bolt at each movement of the clutch-handle.

4. A safety clutch for a power press comprising a clutch and means for automati-

cally throwing out the same at each stroke of the press, a clutch-handle movable from its normal position for reengaging the clutch, a cam rotated once at each stroke of the press, the connections arranged and operated to throw the clutch-handle back to its normal position.

5. A safety clutch for a power press comprising a clutch and means for automatically throwing out the same at each stroke of the press, a clutch-handle movable from its normal position for reengaging the clutch, a cam rotated once at each stroke of the press, with connections arranged and operated to throw the clutch-handle back to its normal position, a locking-bolt operating automatically to secure the said handle in its normal position, and a releasing-handle for disengaging the locking-bolt.

6. A safety clutch for a power-press, comprising a clutch and means for automatically throwing out the same at each stroke of the press, a clutch-handle movable from its normal position for disengaging the clutch, means operating at each stroke of the press to throw the clutch-handle back to its normal position, a locking-bolt automatically operating to lock the clutch-handle when turned to its normal position, and a releasing handle at the opposite side of the press with detachable connections to withdraw such locking-bolt.

7. A safety clutch for a power press comprising a clutch and means for automatically throwing out the same at each stroke of the press, a clutch-handle movable from its normal position for reengaging the clutch, a cam rotated once at each stroke of the press, with connections arranged and operated to throw the clutch-handle back to its normal position, a locking-bolt operating automatically to secure the said handle in its normal position, a releasing-handle with a detachable coupler for connecting it to the locking-bolt, and means actuated by the clutch-handle in moving it from its normal position, to disconnect the releasing-handle from said locking-bolt.

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

CONRAD KNOTH.

Witnesses:

G. C. STULTS,
M. E. JAHN.