No. 715,446. Patented Dec. 9, 1902.

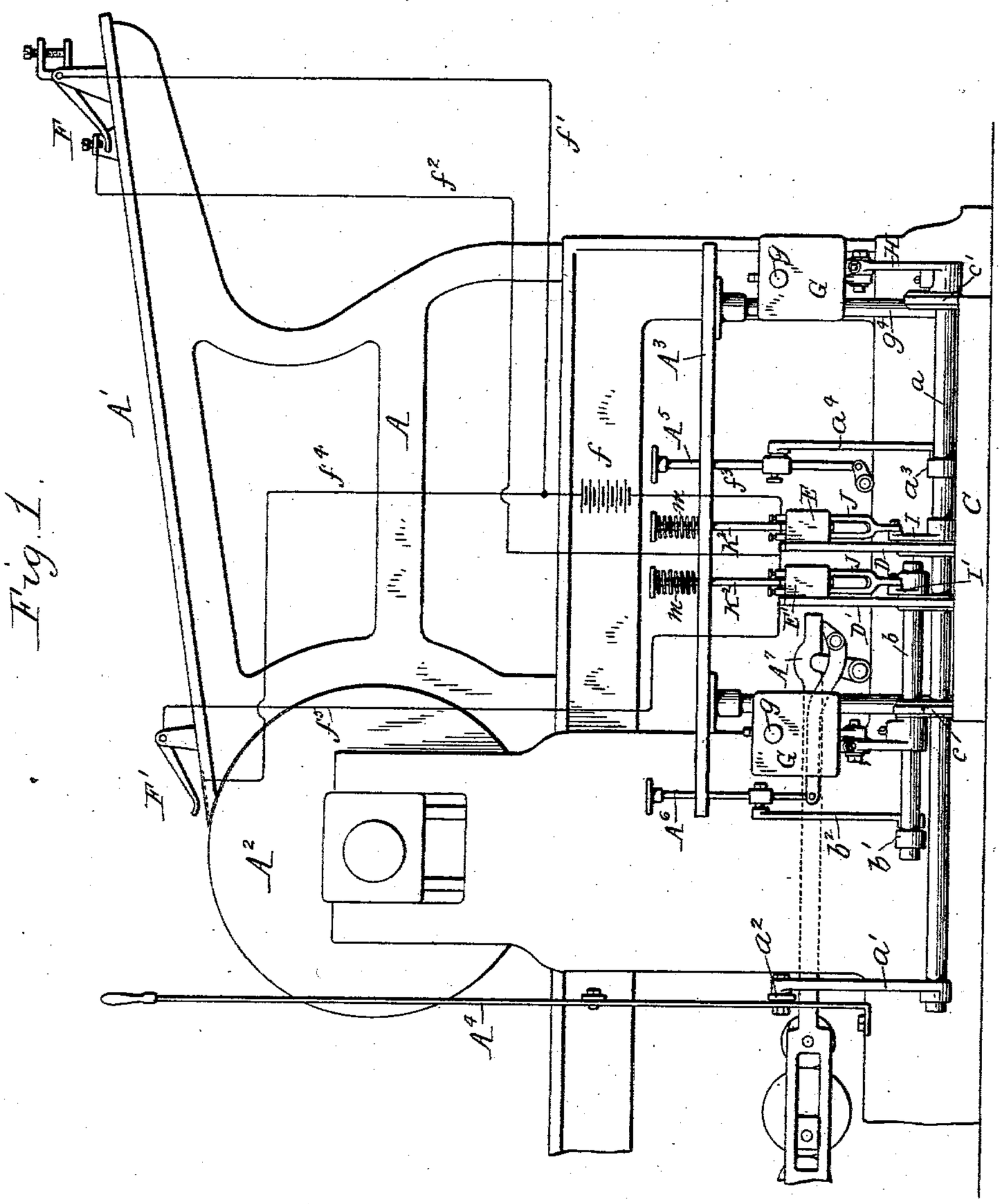
# G. R. WILLIAMS.

## STOP MOTION FOR PRINTING PRESSES, &c.

(Application filed Mar. 18, 1902.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

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(No Model.) 3 Sheets—Sheet 2.

Fig. 2.

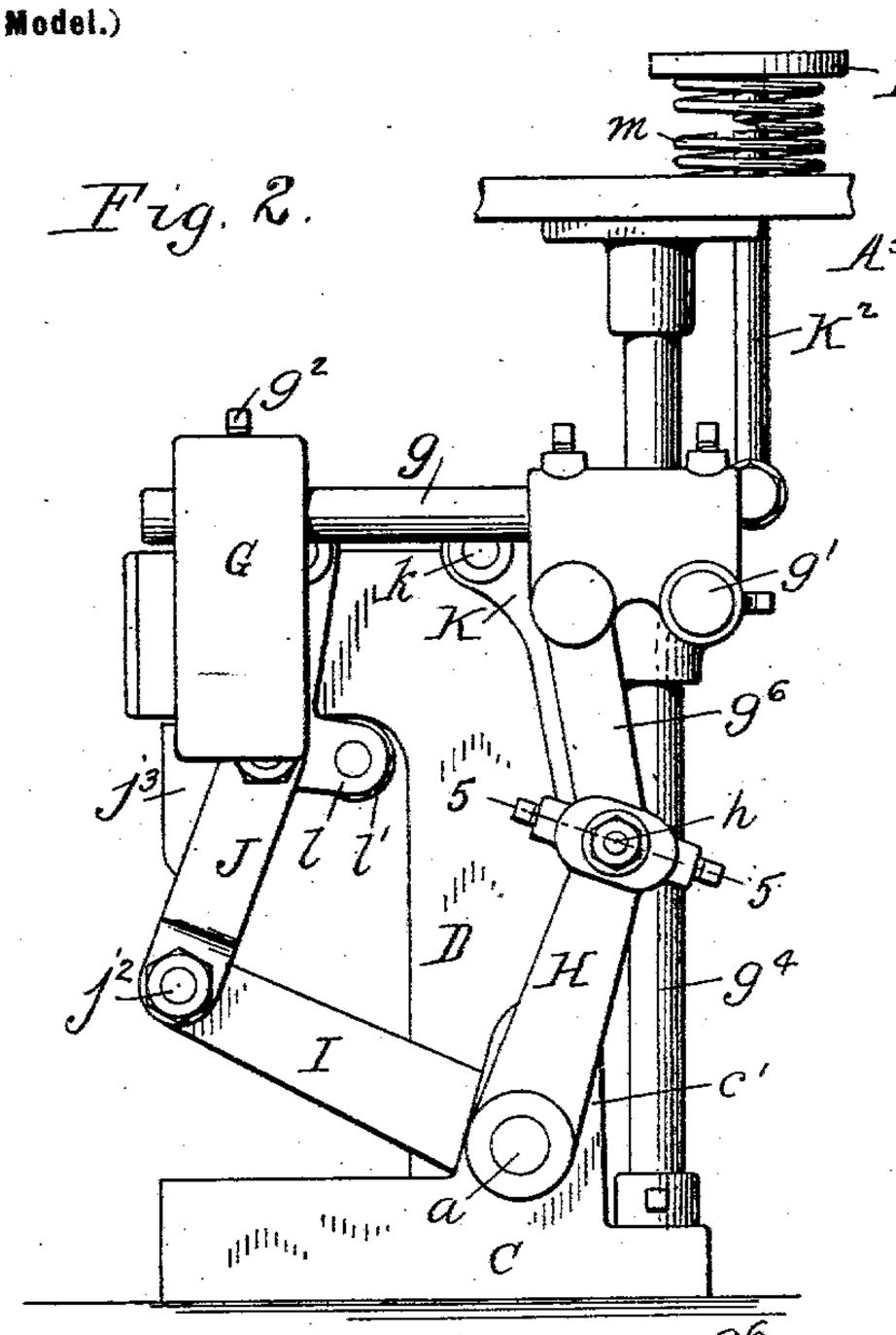



Fig. 3.

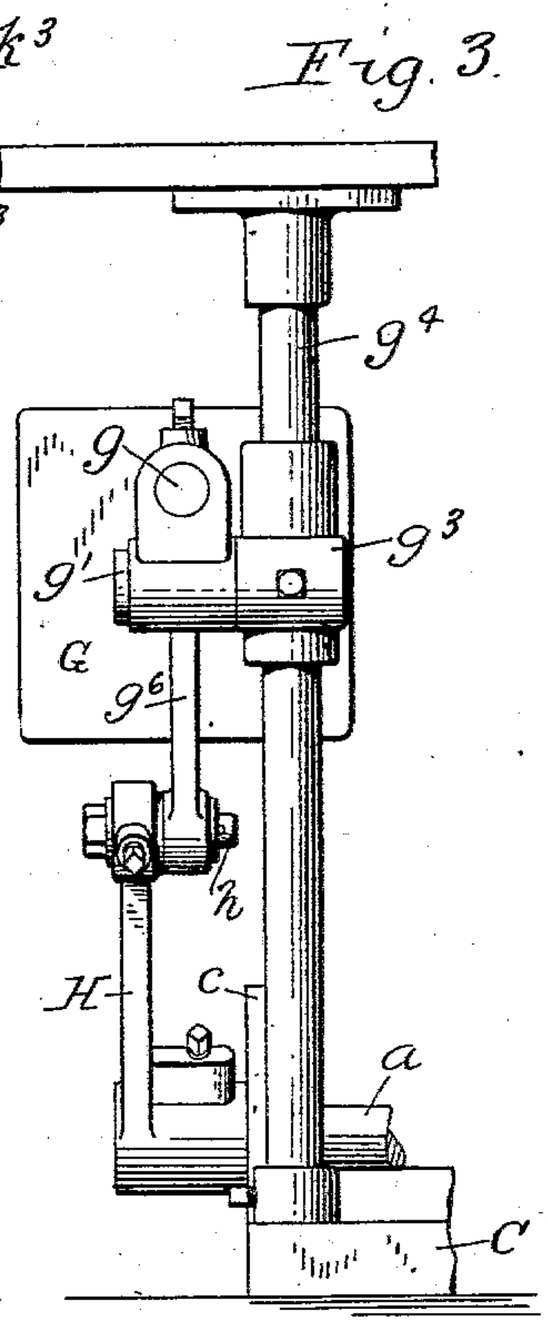



Fig. 5.

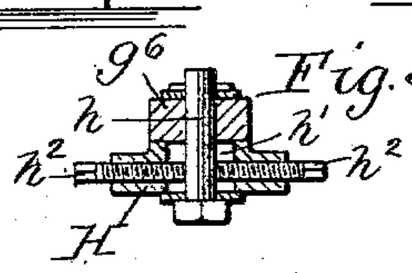



Fig. 4.

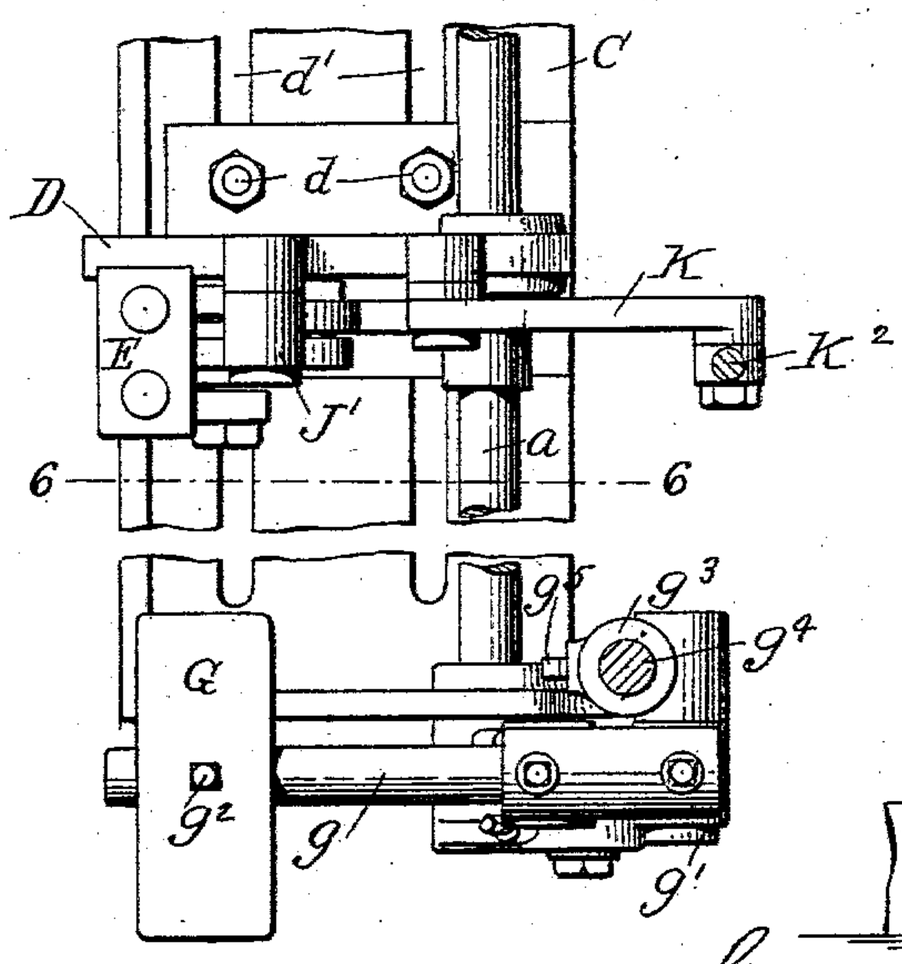
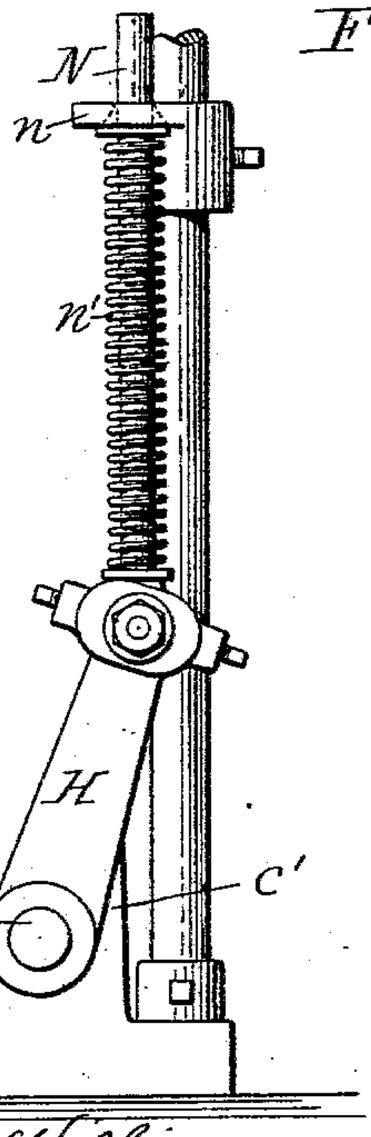



Fig. 9.

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(No Model.) 3 Sheets—Sheet 3.

Fig. 6.

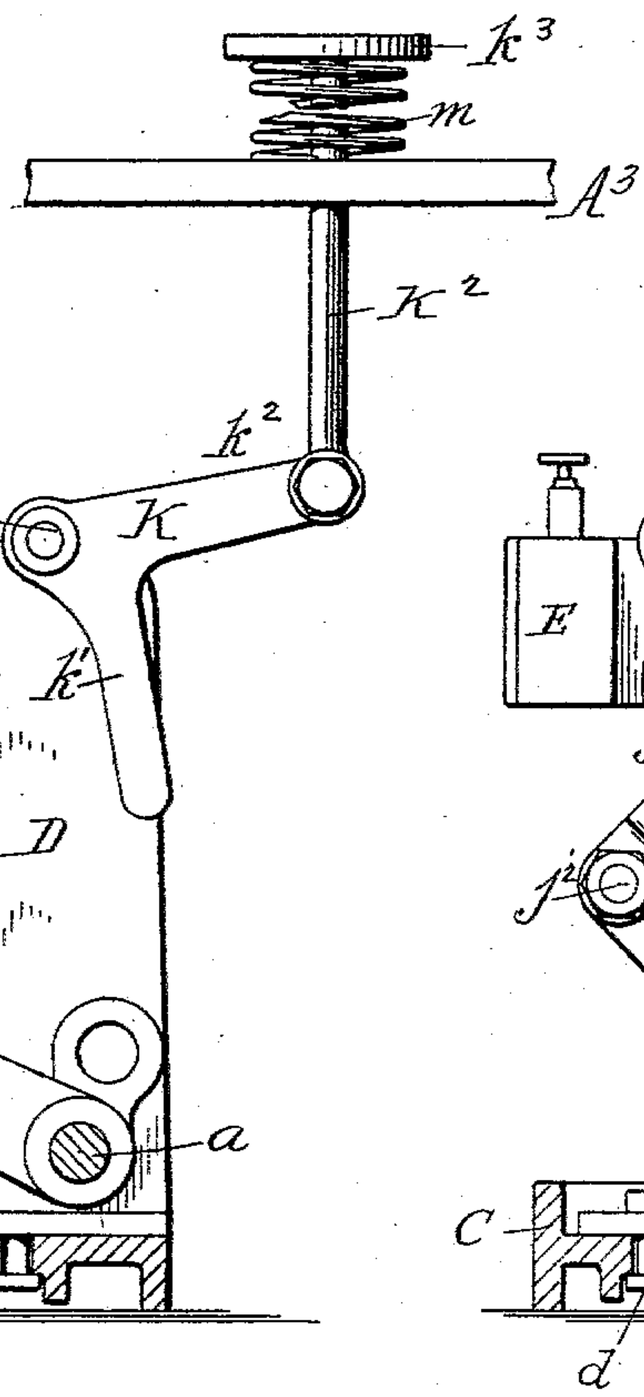



Fig. 7.

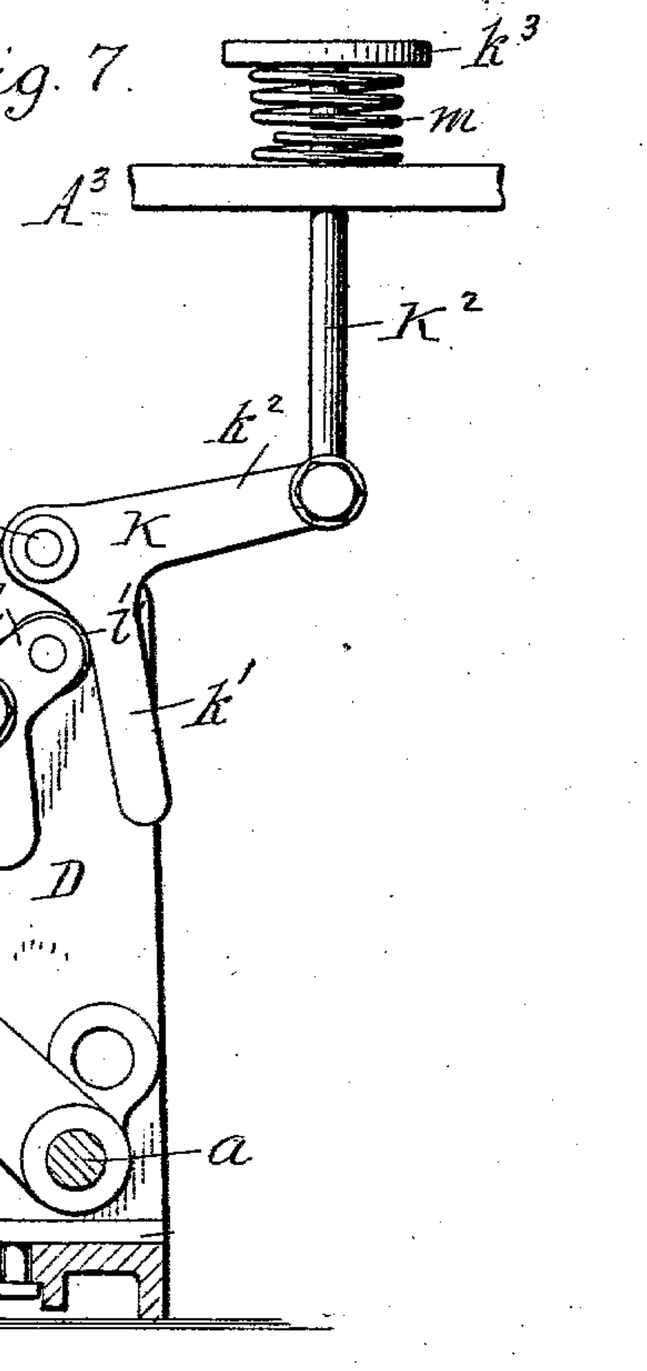



Fig. 8.

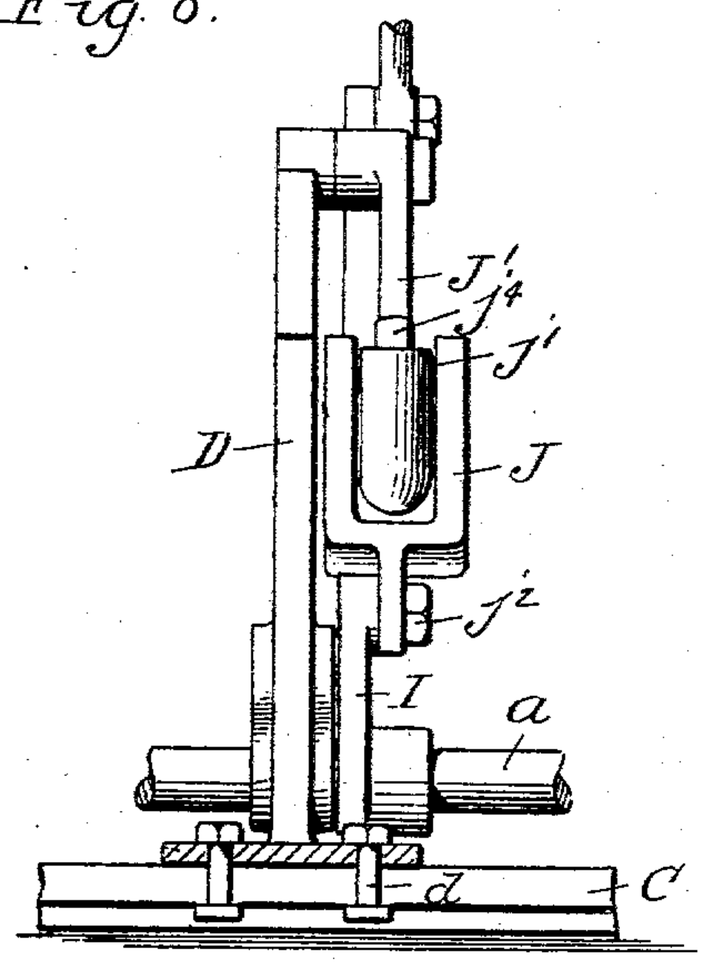
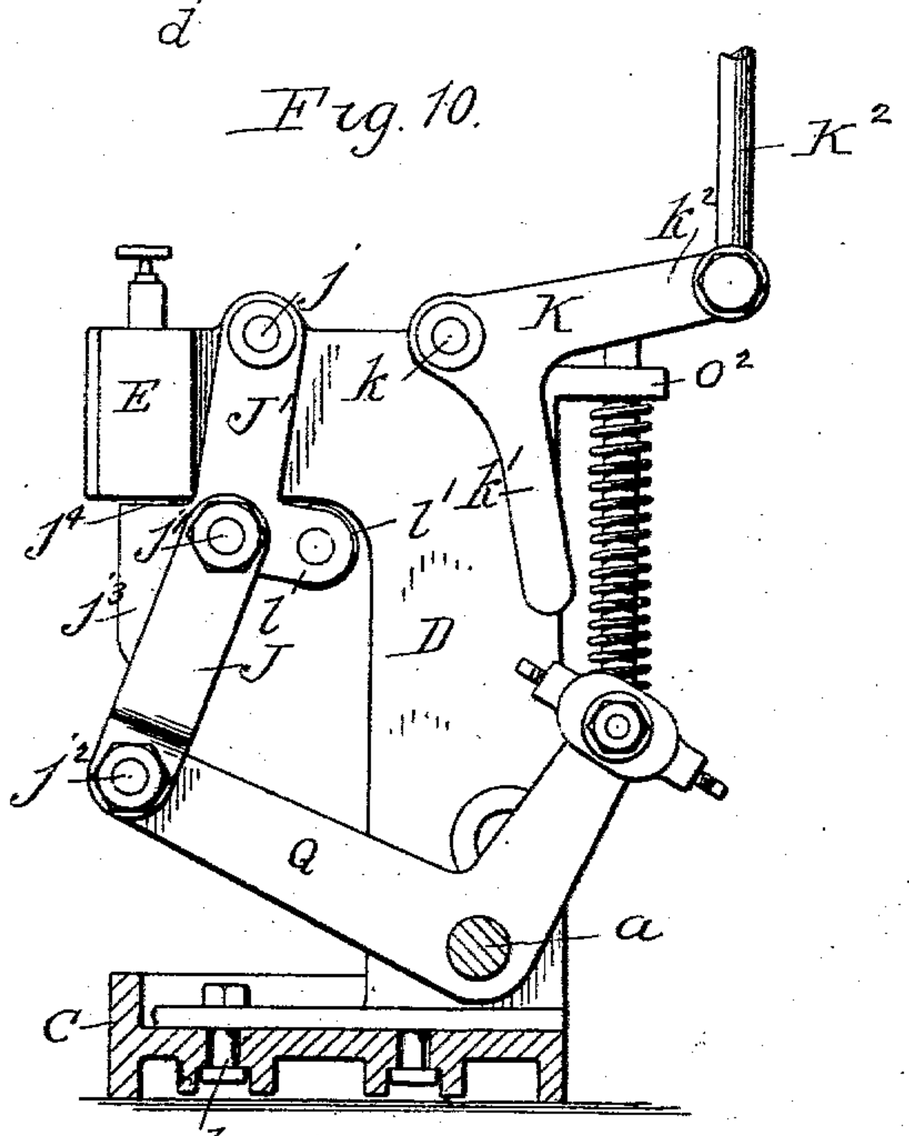



Fig. 10.




Witnesses:
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# UNITED STATES PATENT OFFICE.

GEORGE R. WILLIAMS, OF BROOKLYN, NEW YORK, ASSIGNOR TO ECONOMIC MACHINE COMPANY, OF NEW YORK, N. Y.

## STOP-MOTION FOR PRINTING-PRESSES, &c.

SPECIFICATION forming part of Letters Patent No. 715,446, dated December 9, 1902.

Application filed March 18, 1902. Serial No. 98,738. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE R. WILLIAMS, a citizen of the United States, and a resident of New York, in the borough of Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Stop-Motions for Printing-Presses and other Machines, of which the following is a specification.

My invention relates to that class of stop-motions for printing-presses and other machines in which the part which shifts the belt, trips the press-cylinder, or applies the brake is held out of action by an electrically-released latch. As such stop-motions are used mainly in connection with automatic printing-presses, I will confine the description to that use for the sake of brevity, although the invention is capable of use in connection with other machines to which sheets of paper are fed. In these stop-motions one difficulty has been that the comparatively heavy pressure necessary for shifting the belt, tripping the cylinder, or applying the brake, either or all, had to be sustained by the latch, in consequence whereof it was often impossible to overcome the friction caused by this pressure against the latch and to release the latter by electromagnetic action.

One object of my invention is to relieve the latch from the greater part of this pressure, thereby rendering the mechanism more sensitive and enabling it to be more easily operated. Another difficulty has been that where a weight has been employed for exerting the pressure necessary for shifting the stop mechanism the arrangement was such that the weight was slow in action and that where a spring capable of exerting the necessary heavy pressure has been employed its action has been so sudden and severe that breakages were likely to occur.

Another object of the invention is to contrive the mechanism in such manner that a weight or spring can be used without the unsatisfactory sluggish motion of the weight or the severe sudden action of the spring. A further difficulty has been that these stop-motion devices had to be applied to presses of widely-different constructions and as heretofore constructed were not capable of being adjusted to the varying location of the parts of presses with which connection had to be made, but had to be fitted to and attached to each press individually.

A further object of my invention is to construct the mechanism in such a way that it can be readily adjusted to and connected with the parts of any ordinary printing-press or other machine to which sheets of paper are fed. In printing-presses provided with such stop-motions two separate detector mechanisms for discovering faults of feeding are usually employed. One detector acts when a sheet is improperly fed or when no sheet is fed. This is usually called the "no-sheet" detector. The other acts when two or more superposed sheets are fed simultaneously. This is usually called the "two-sheet" detector. Two stop-motions are employed—one which shifts the belt for stopping and applies the brake and the other for tripping the cylinder. The two-sheet detector is connected only with the stop-motion which shifts the belt and applies the brake, but does not trip the cylinder, because when two sheets are fed it is only necessary to stop, but unnecessary to trip. The no-sheet detector is connected with the same stop-motion, and in addition thereto it is also connected to the stop-motion which trips the cylinder, because when no sheet is fed it is necessary to trip the cylinder as well as to stop. My invention is applicable to both of these stop-motions and is so described and shown herein.

In the accompanying drawings, consisting of three sheets, Figure 1 is a side elevation of the feed end of a cylinder-press, showing a stop-motion attachment embodying my invention applied to the press. Fig. 2 is an end elevation of one of the stop-motion attachments in the locked position, on an enlarged scale. Fig. 3 is a rear elevation of the same. Fig. 4 is a plan view of the same, partly broken away. Fig. 5 is a section of the adjustable connection between the rock-arm and the link in line 5 5, Fig. 2. Fig. 6 is a sectional elevation of the locking mechanism in the locked position in line 6 6, Fig. 4. Fig. 7 is a similar view showing the parts in released position. Fig. 8 is a front elevation showing the parts in the locked position, as

in Fig. 6, but with the latch-box removed. Fig. 9 is an end elevation showing an actuating-spring instead of a weight. Fig. 10 is an end elevation, partly in section, showing a modified arrangement of the spring-actuated mechanism.

Like letters of reference refer to like parts in the several figures.

The accompanying drawings show my stop-motion attachment applied to a well-known type of cylinder-press having a stationary frame A, feed-board A′, cylinder $A^2$, footboard $A^3$, hand-lever $A^4$ for shifting the belt in stopping and starting, foot-spindle $A^5$ for applying the brake, and foot-spindle $A^6$ for tripping the cylinder through the trip-bar $A^7$, all of ordinary construction.

My stop-motion attachment is arranged lengthwise on the side of the press-frame below the footboard and is provided with two longitudinal shafts—a long lower shaft *a*, which is connected with the hand-lever $A^4$ and the brake-spindle $A^5$, so that by rocking this shaft the belt is thrown off and the brake applied, and a short upper shaft *b*, which is connected with the trip-spindle $A^6$, so that by rocking this shaft the cylinder is tripped. The connection between the lower shaft *a* and the hand-lever is made by an arm $a'$ and rod $a^2$ at one end of the shaft and with the brake-spindle by an arm $a^3$ and rod $a^4$ at the opposite end of the shaft. The connection between the upper shaft *b* and the trip-spindle is made by an arm $b'$ and rod $b^2$. Other connecting means may, however, be employed, if preferred.

C represents the base-plate of the stop-motion attachment, upon which the working parts are mounted. This plate is provided at its ends with upwardly-projecting bearings *c c′* for the shafts. In the construction shown in the drawings the upper short shaft *b* is journaled at one end in the bearing *c* and does not extend to the bearing *c′*, and the lower shaft *a* is journaled in both bearings.

D D′ represent two standards mounted side by side upon the plate C and secured thereto by bolts *d*, passing through parallel longitudinal slots *d′* in the plate, so that the standards can be adjusted on the plate toward and from the ends thereof. Each standard is preferably provided with two bearings, one for each of the two shafts, so that either standard can support both shafts, if necessary. As shown in the drawings, the upper short shaft *b* extends only into the standard D′, while the lower long shaft extends through both standards. Each standard is provided at the top with a forward extension, to which the usual box or casing is secured which contains the latch *e*, electromagnet *e′*, and armature $e^2$ of usual construction. (Shown in dotted lines in Fig. 6.)

E represents the latch-box secured to the standard D, and E′ the latch-box secured to the standard D′. The mechanism attached to the standard D controls the lower long shaft *a* for throwing off the belt and applying the brake and is controlled by the two-sheet detector F, and the mechanism attached to the standard D′ controls the upper short shaft *b* for tripping the cylinder and is controlled by the no-sheet detector F′. These detectors are of any well-known construction and are connected by electrical conductors with the latch-boxes E E′ in the usual way. The two-sheet detector F and the no-sheet detector F′ operate in a well-known manner. The two-sheet detector closes the circuit only when this detector is moved out of its normal position by an abnormal thickness of material—for instance, two superposed sheets fed simultaneously. The no-sheet detector is reciprocated or oscillated up and down by the usual mechanism and is so timed that this detector is moved down upon its lower contact, over which the sheets pass once for each sheet and at the time when a sheet should cover the lower contact. If at that time no sheet is present between the contacts of this detector, the latter closes the circuit, while if a sheet is present the circuit remains open. These connections are represented in Fig. 1 in a conventional way and are briefly stated, as follows: *f* represents the battery; *f′*, the wire extending from the same to the two-sheet detector F; $f^2$, the wire leading from the latter to the latch-box E, and $f^3$ the return-wire leading from the latter to the battery. $f^4$ represents the wire leading from the battery to the no-sheet detector F′, and $f^5$ the wire leading from the latter through both latch-boxes E E′ in series to the battery.

The two mechanisms by which the two rock-shafts are actuated for shifting the movable part to which each is connected are alike in their construction. As shown in Figs. 1 to 8, each rock-shaft is actuated by a weight G, which is operatively connected to the shaft, as follows: *g* represents a weight-lever which is fulcrumed at its rear end on a fixed fulcrum pin or stud $g'$ and carrying at its front end the weight, which is preferably adjustable on the lever and provided with a set-screw $g^2$ for holding it in adjusted positions. The fulcrum-pin is shown as projecting from a collar $g^3$, which is vertically adjustable on the standard $g^4$, supporting the adjacent end of the footboard and which is provided with a set-screw $g^5$ for fixing it in adjusted position. The lever is connected intermediate of its ends by a link $g^6$ with the upper end of a rock-arm H, which is fixed to the rock-shaft. The joint between the arm and link is preferably adjustable, so that the angle formed by the arm and link can be increased or decreased and may be constructed as shown in Figs. 2 and 5, in which *h* represents a pivot-pin fixed to the link and passing through a slot *h′* in the upper end of the arm, and $h^2$ oppositely-arranged set-screws which work in the arm and extend into the slot, so as to bear against opposite sides of the pivot-pin. When the pressure exerted by the weight is required

to be reduced, the pivot-pin is adjusted toward the weight, and when the pressure is required to be increased the pivot-pin is adjusted in the opposite direction. Thus a very fine and nice regulation of the pressure exerted by the weight can be obtained. Any other suitable adjustable joint may, however, be employed.

I I′ represent rock-arms fixed, respectively, to the rock-shafts *a b* and projecting forwardly adjacent to the standards D D′. The front end of each rock-arm is connected with the upper part of the adjacent standard by a toggle-joint consisting of a lower link J and an upper link J′. The latter is pivoted at its upper end to the standard by a bolt *j* and at its lower end to the lower link by a bolt *j*′. The lower link is pivoted to the rock-arm by a bolt $j^2$. The lower link is bifurcated and straddles the lower portion of the upper link, which latter is provided at its front, below the pivot-bolt *j*′, with an upright socket $j^3$, in which the catch-bolt $j^4$ is arranged which interlocks with the latch *e* in the latch-box. This socket also contains the spring by which the catch-bolt is projected. The latch-box is so arranged on the standard that the catch-bolt interlocks with the latch before the toggle-joint is entirely straightened out, so that the joint is slightly broken rearwardly and ready to open under the pressure of the weight as soon as the electrical mechanism withdraws the latch and releases the bolt. In the construction shown in Figs. 1 to 8 the operating-weight and connections for the upper rock-shaft *b* are shown at the left-hand end thereof and the weight and connections for the lower shaft at the right-hand end thereof. This location of these parts is selected simply for the room afforded, and they may be located at any other suitable point with reference to either shaft. The two rock-arms, one of which connects each shaft with the toggle and the other by the link with the operating weight-lever, constitute, in effect, the two arms of a lever.

The greater portion of the weight-pressure is sustained by the toggle-joint, as the latter is nearly closed when the parts are interlocked, and the latch is therefore required to resist but the small part of the pressure which is not carried by the joint. This relieves the pressure on the latch greatly and enables the latch to be readily moved by the electrical mechanism.

For the purpose of resetting the weight mechanism after it has been released the following parts are provided: K represents resetting-levers of elbow form, one of which is pivoted by a bolt *k* to the upper part of each standard in rear of the adjacent upper toggle-link in such a position that a projection *l*, formed on the upper toggle-link and provided, preferably, with a roller *l*′, will face the lower arm *k*′ of this lever when the toggle-joint has been fully opened. By swinging either resetting-lever, with its lower arm *k*′, forwardly the toggle-links for its shaft are moved forwardly until the catch-bolt has been interlocked with the latch. The forward movement of the links straightens the toggle-joint and depresses the rock-arm, which, through the rock-shaft and connections before described, lifts the weighted lever. This forward movement of each resetting-lever is conveniently effected by a spindle $K^2$, extending upwardly from the upper arm $k^2$ of the lever and provided with a foot-plate $k^3$. This spindle extends upwardly through the footboard $A^3$ and is provided above the same with a spring *m*, which holds the spindle in its elevated position and the resetting-lever in its retracted position. Upon depressing this lever by the foot until the catch-bolt has interlocked with the latch and then releasing the lever the latter is returned by the spring to its retracted position and is held out of the way of the toggle-joint, so that it is not struck by the joint when the latter opens. The point at which the resetting-lever takes hold of the toggle is nearest the fulcrum of the lever when the toggle is wide open and gradually recedes from the fulcrum as the lower arm of the lever swings forward.

In Fig. 9 is illustrated a spring mechanism which may be employed in place of the weight mechanism before described. A spring mechanism for each shaft is employed and is constructed as follows: N represents a rod, which is pivoted at its lower end to the upper end of the rock-arm H and extends up through and is guided in a lug *n*, secured to the adjacent supporting-standard for the footboard. A spring *n*′ is coiled around the rod and abuts at its upper end against the lug and at its lower end against a shoulder on the rod. The lower end of the rod is preferably adjustably connected with the rock-arm in such manner that the rod can be adjusted forwardly or backwardly in a slot in the arm for regulating the action of the spring. This adjustable connection is conveniently made like the before-described connection between the weighted lever and the rock-arm.

In Fig. 10 is illustrated a spring mechanism similar to that just described, with the exception that instead of the springs and arms H being located at the ends of the rock-shafts levers Q Q are secured to the shafts and arranged one adjacent to each standard D D′ and replace the rock-arms I I′. Each lever has a forwardly-projecting arm, which is connected to the lower toggle-link, and a rearwardly-projecting arm, which is connected to the spring-rod. The spring-rods extend up through lugs $O^2$ on the standards D D′.

When the press is running, both shifting mechanisms are set and held by their latch devices undisturbed, so long as the sheets are properly fed.

If two superposed sheets are fed simultaneously, the two-sheet detector closes the cir-

cuit through the latch-box E, releasing the mechanism applied to the lower shaft *a* and stopping the press.

When the no-sheet detector is called into action by the improper feeding of a sheet or the missing of a sheet or any other cause, the no-sheet detector closes the circuit through both latch-boxes, releasing both shifting mechanisms, thereby stopping the press and tripping the cylinder.

My improved attachment can be constructed in practically complete form at the shop and can be applied to the press in the most convenient position. Each standard, with the parts carried by the same, can be separately adjusted on the base-plate to the position at which connection can be made most conveniently with the shifting part to be operated by the shifting mechanism. In most cases it is most convenient to transmit the motion from the shifting-arm, which is actuated by the weight or spring by means of a rock-shaft to which the arm is secured, as described, as such a shaft can readily be extended to reach the part to be shifted; but other devices may be employed for transmitting the motion from the shifting-arm.

The weight mechanism is on the whole to be preferred, because the connection of the weight-lever with the arm on the rock-shaft by a link gives the weight a comparatively long drop and a gradually-increasing effect, as the pressure which the weight exerts is at first small, and therefore not liable to cause breakage of any part of the mechanism and increases during the fall of the weight to a powerful action, by which the shaft and the parts of the press or other machine connected therewith are easily shifted.

I claim as my invention—

1. In a stop mechanism, the combination with a shifting mechanism, and actuating means for the same, of a toggle-joint which controls said operating means, a releasable locking device for holding said toggle-joint from action, and means for releasing said locking device, substantially as set forth.

2. In a stop mechanism, the combination with a shifting device, and a weighted actuating-lever and connections for said shifting device, of a locking mechanism for said weighted lever comprising a toggle-joint connected to said weighted lever, and a releasable latch for holding said toggle-joint locked in inactive position, substantially as set forth.

3. In a stop mechanism, the combination with a shifting device, and actuating means for the same, of a locking mechanism for said actuating means comprising a toggle-joint having one end connected with said shifting device and the other with a stationary support, a catch carried by said toggle-joint, and a releasable latch with which said catch interlocks when the shifting device is in position ready for action, substantially as set forth.

4. In a stop mechanism, the combination of a standard, a rock-arm adjacent thereto, an actuating-weight and connections for said rock-arm, a toggle-joint connecting the free end of said arm with said standard, a catch mounted on said toggle-joint, and a releasable latch mounted on said standard, substantially as set forth.

5. In a stop mechanism, the combination of a standard, a rock-arm, a toggle-joint connecting the free end of the arm with the standard and having one of its links provided with a socket, a catch-bolt arranged in said socket, a releasable latch mounted on said standard and adapted to interlock with said catch-bolt, and actuating means for said rock-arm, substantially as set forth.

6. In a stop mechanism, the combination of a toggle-joint, a releasable locking device engaging the same when the toggle-joint is nearly closed, means for releasing said locking device, a shifting mechanism controlled by the toggle-joint, means for actuating the shifting mechanism when the toggle-joint is released, and a resetting-lever for engaging the toggle-joint with said locking device, substantially as set forth.

7. In a stop mechanism, the combination of a toggle-joint, a releasable locking device engaging the same when the toggle-joint is nearly closed, means for releasing said locking device, a shifting mechanism controlled by the toggle-joint, means for actuating the shifting mechanism when the toggle-joint is released, a resetting-lever for engaging the toggle-joint with said locking device, and a spring by which the resetting-lever is held in a retracted position, substantially as set forth.

8. In a stop mechanism, the combination with a shifting mechanism, of a locking mechanism for the same comprising a standard, a rock-arm, an actuating means for said rock-arm, a toggle-joint connecting said arm with said standard, a catch mounted on the toggle-joint, a latch device mounted on said standard and a resetting-lever pivoted to said standard in rear of said toggle-joint, substantially as set forth.

9. In a stop mechanism, the combination with a base-plate, a standard mounted on said plate and adjustable lengthwise of the same, a shifting rock-shaft arranged lengthwise of said base-plate, a shifting-arm mounted on said shaft and adjustable lengthwise of said shaft, and a locking mechanism for said arm mounted on said standard and adjustable therewith, substantially as set forth.

10. In a stop mechanism, the combination of a base-plate, a standard adjustably mounted on said base-plate, a shifting-arm adjustable with said standard, a locking mechanism for said arm carried by said standard and comprising a toggle-joint provided with a catch, a latch device, and means for actuating said arm, substantially as set forth.

11. In a stop mechanism, the combination

of a base-plate, a shaft, a standard mounted on the base-plate and adjustable lengthwise of said shaft, a shifting-arm secured to said shaft and adjustable with said standard, a locking mechanism for said arm carried by said standard, and means connected with said shaft for actuating said arm, substantially as set forth.

12. In a stop mechanism, the combination of a base-plate, a horizontal rock-shaft journaled on the same, a brake-actuating device and a belt-shipper-actuating device connected with said shaft, a standard mounted on said base-plate, a shifting-arm secured to said shaft, a locking device for said arm carried by said standard, and a connection between said locking device and said shifting-arm, substantially as set forth.

13. In a stop mechanism, the combination of a base-plate, a horizontal rock-shaft journaled on the same, a press-trip-actuating device connected with said shaft, a standard mounted on said base-plate, a shifting-arm secured to said shaft, a locking device for said arm carried by said standard, and a connection between said locking device and said shifting-arm, substantially as set forth.

14. In a stop mechanism, the combination of a base-plate, horizontal rock-shafts journaled on the same, a brake-actuating device and a belt-shipper-actuating device connected with one of said shafts, a press-trip-actuating device connected with the other shaft, shifting-arms secured to said shafts, locking devices for said arms carried by said standards, connections between said locking devices and said shifting-arms, and electrically-operated means for releasing said locking devices, substantially as set forth.

Witness my hand this 13th day of March, 1902.

GEORGE R. WILLIAMS.

Witnesses:
GEO. C. KIMBALL,
JAMES J. BOYAN.