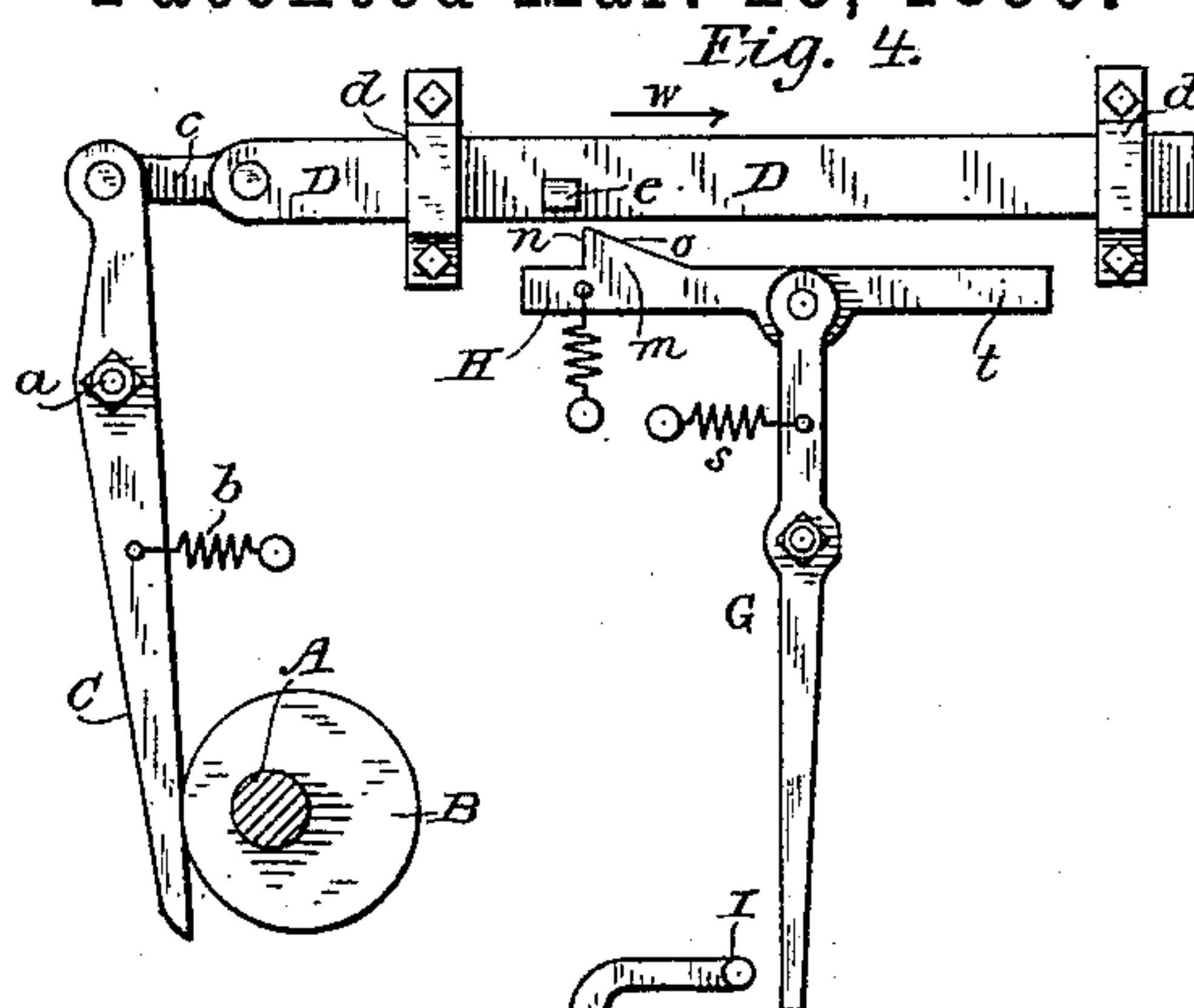
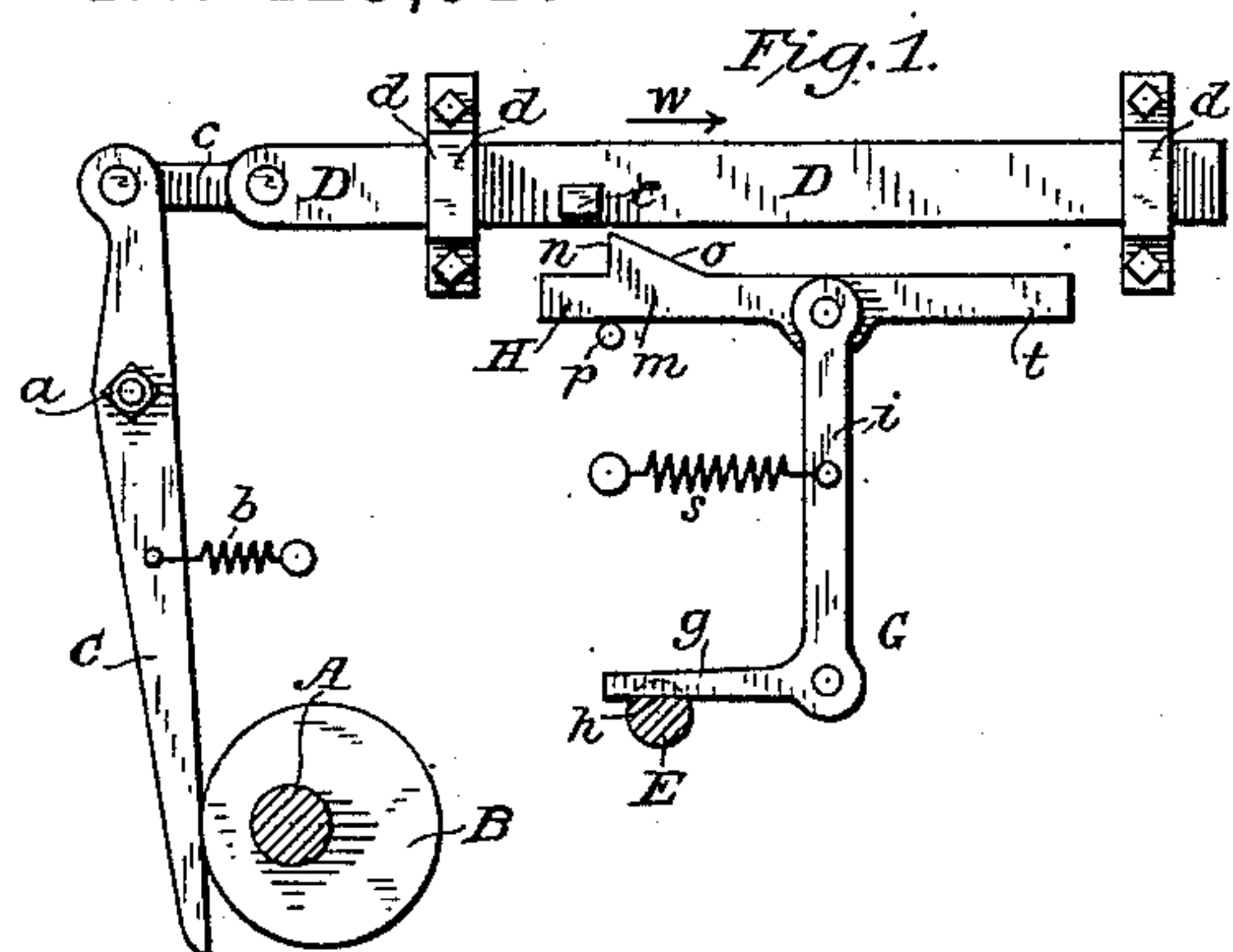


(No Model.)

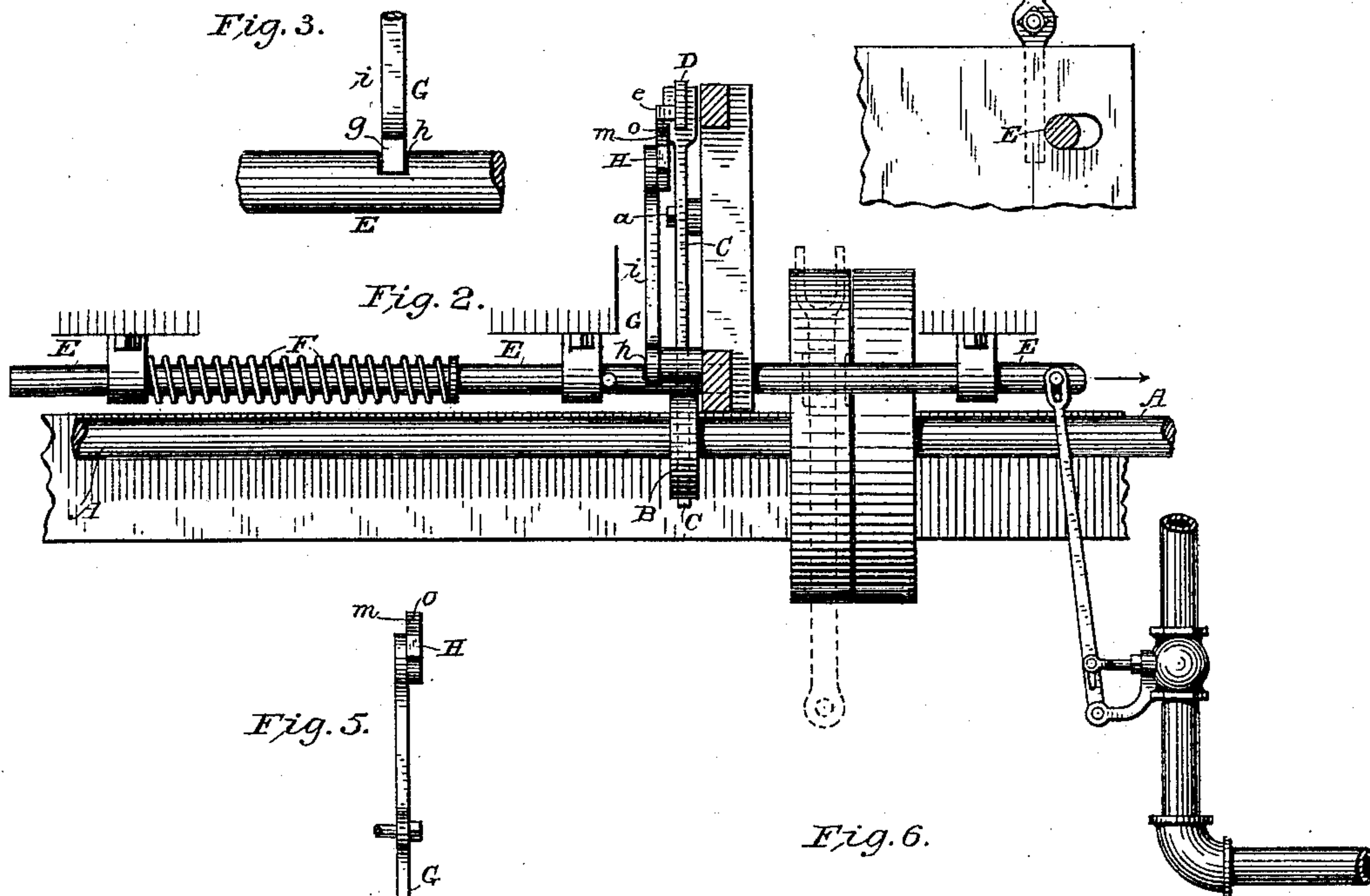
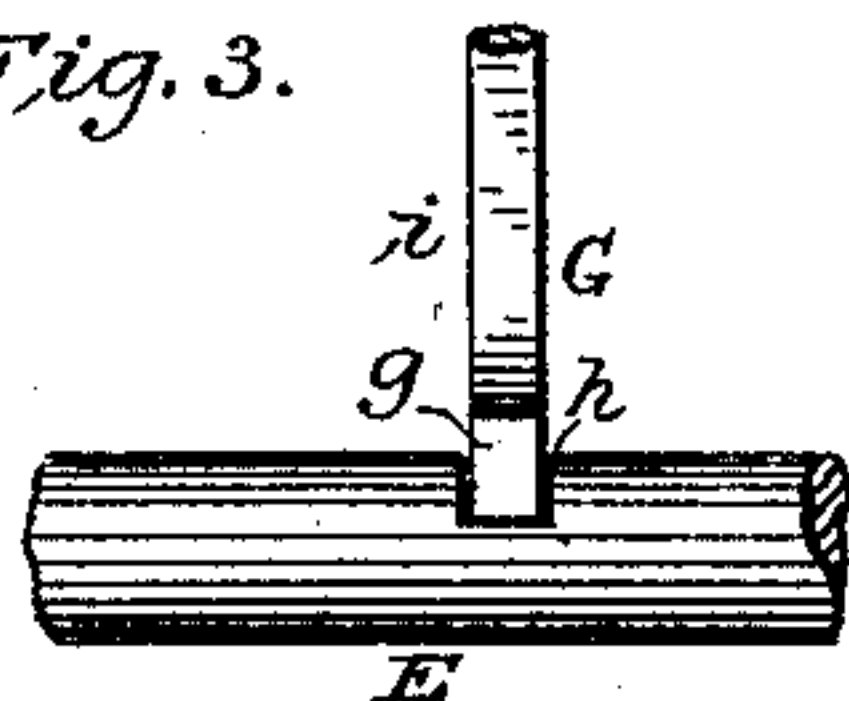
S. L. FOSTER.  
STOP MOTION.

No. 423,917.

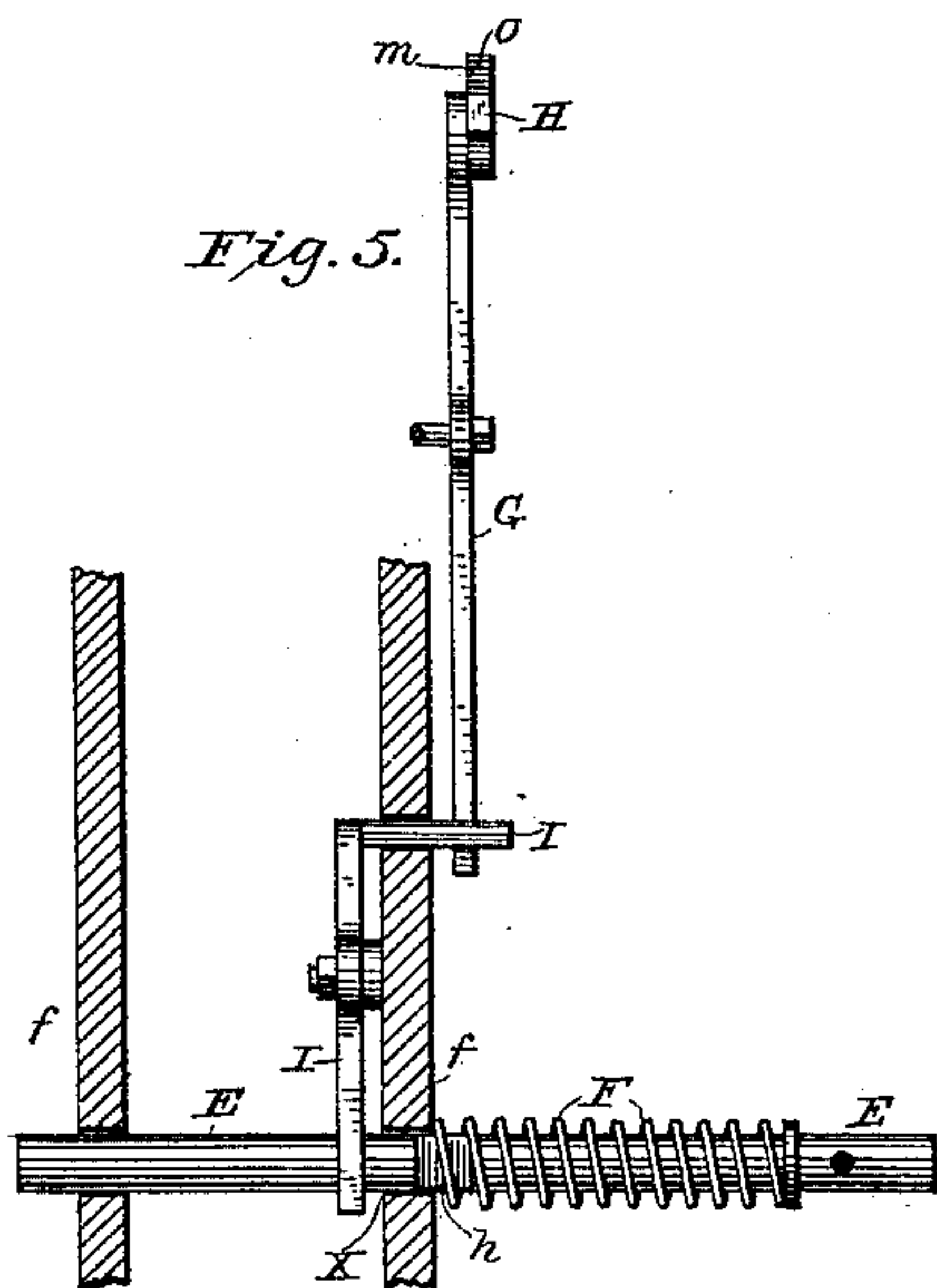
Patented Mar. 25, 1890.



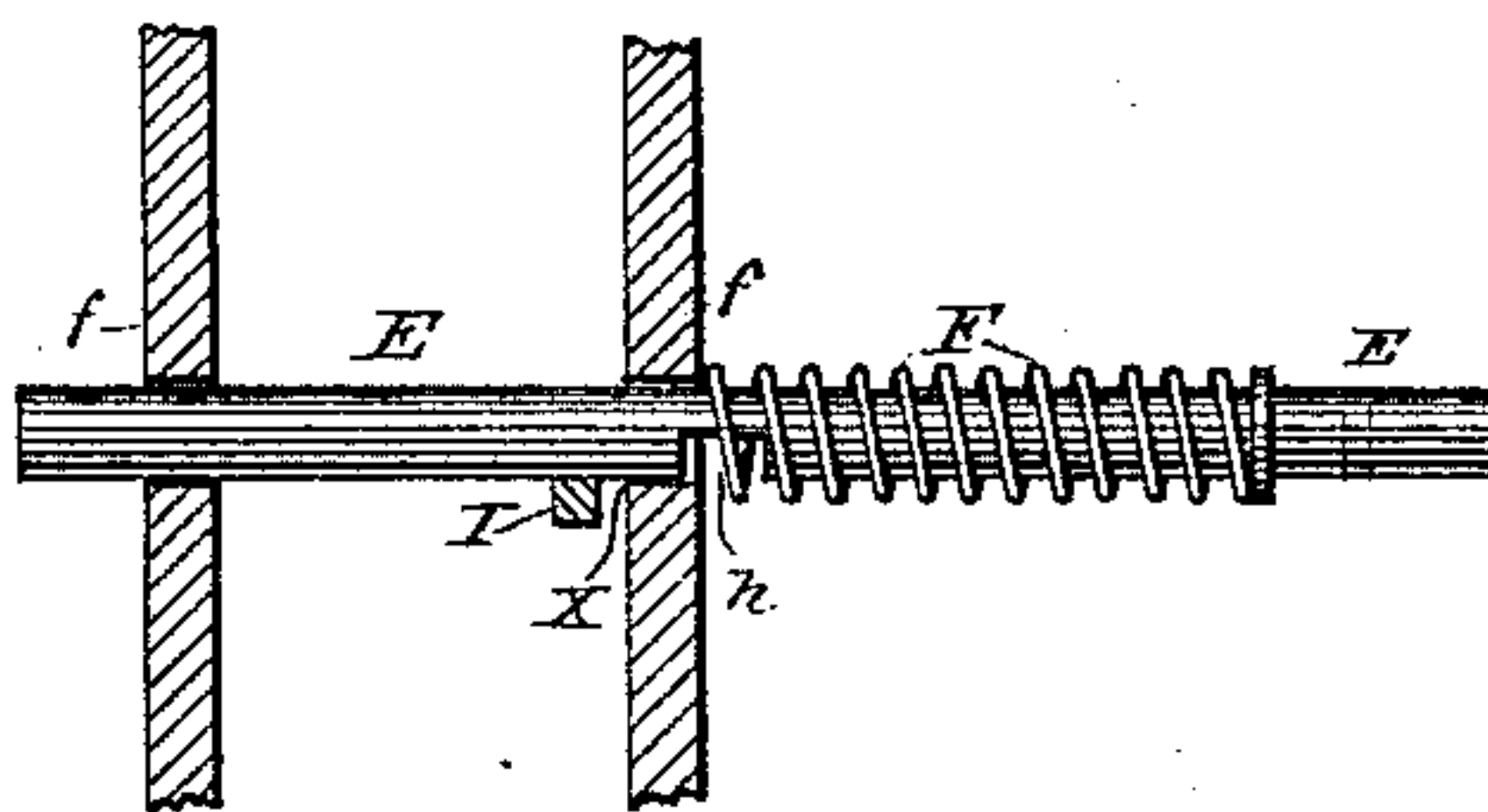
*Fig. 3.*



*Fig. 5.*



*Fig. 6.*



Witnesses

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# UNITED STATES PATENT OFFICE.

SAMUEL L. FOSTER, OF WILMINGTON, DELAWARE, ASSIGNOR OF THREE-FOURTHS TO FRANCIS E. GALLAGHER, JOHN P. HASLAM, AND JOHN T. AHRENS, ALL OF SAME PLACE.

## STOP-MOTION.

SPECIFICATION forming part of Letters Patent No. 423,917, dated March 25, 1890.

Application filed July 3, 1889. Serial No. 316,418. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL L. FOSTER, of Wilmington, in the county of Newcastle and State of Delaware, have invented certain new and useful Improvements in Stop-Motions for Machinery, of which the following is a specification.

In different and numerous kinds of machinery it is desirable or necessary that the operation of the machinery should be automatically stopped in case of various emergencies—such as the occurrence of defects in the work, the completion of the work, &c. As examples of such kinds of machinery, reference may be made to feed-pumps for supplying boilers or tanks, in which it is desirable to stop the pump when the boiler or tank is full, and the various classes of textile machines, wherein it is essential that the machine should be stopped on the occurrence of any defect in the thread. In the majority of such cases, especially in the case of textile machines, the emergency or defect is of such a character that it does not offer a source of power bearing any adequate proportion to the power required to effect the actual stoppage of the machine, which is usually effected by the movement of a lever, which either shifts a driving-belt from a fast to a loose pulley on the main drive-shaft of the machine or closes a valve or cock in a steam-pipe supplying steam to an engine operating the machine. It is hence essential, in order to stop the machine with certainty and celerity on the occurrence of an emergency of the character specified, that means for furnishing the requisite power should be set in operation by the initial or prime mover immediately controlled by the instrument in which the defect or emergency may occur. Numerous mechanisms have hitherto been designed for this purpose; but the majority have been lacking in some respect, either in not being sensitive enough to be controlled quickly and certainly on the occurrence of the defect or emergency, or in failing to at all times supply the necessary power for stopping the machine, or in being liable to operate accidentally when not required.

The object of the present invention is to pro-

vide a mechanism applicable to nearly all, if not all, characters of machinery wherein automaticity in stopping is desired, and controllable by the occurrence of any emergency, and which at the same time will act instantaneously and certainly, which will furnish ample power for stopping the machine, and which will not be liable to accidental operation.

The mechanism constituting the invention is not limited to any particular initiating instrumentality, nor is it limited to any particular finally-acting stopping device.

The newly-invented mechanism is illustrated in the accompanying drawings, in which—

Figure 1 is a view through the main drive-shaft of a machine, showing the improved mechanism. Fig. 2 is a view of the same at right angles to the position shown in Fig. 1. Fig. 3 is a detail view. Fig. 4 is a view similar to Fig. 1, showing a modification. Figs. 5 and 6 are details of the modification.

A is a rotating shaft, which may be any shaft on the machine to which the improvements are to be applied, which rotates constantly during the operation of the machine. This constantly-rotating shaft carries with it a cam or eccentric B, against the surface of which rests one end of a rocking lever C, which is pivoted to any convenient stationary support, as at *a*. The end of the lever abutting against the cam or eccentric is held at all times in contact therewith by any suitable means, such as by a spring *b*. As long, therefore, as the machine is in operation this rocking lever will be constantly swung or rocked, the rapidity of its movement depending upon the speed of the rotation of the shaft. Connected with this rocking lever is a sliding bar D. As shown in the drawings, this sliding bar is a straight bar connected to the rocking lever by an intervening connected rod *c*, pivoted at opposite ends to the bar and lever, respectively, said sliding bar reciprocating in fixed guides *d d* or any convenient stationary support. This sliding bar D carries a projecting stud *e*.

E is a sliding shifting-rod, which is movably held in fixed guides *f f* on any conven-



ient stationary support, so that it is movable longitudinally. This shifting-rod is actuated in one direction by a spring F. The shifting-rod effects the movement of the final stopping mechanism, which may be actuated thereby by any convenient connection. For example, in case an ordinary shipper-lever is employed for shipping a driving-belt from a fast to a loose pulley the shifting-rod may abut directly against said lever, or may be pivotally or otherwise connected thereto, or the shifting-rod may be connected with a lever controlling the valve or stop-cock in a steam-supply pipe. The shifting-rod is actuated by the spring F in order to effect the stopping of the machine, and by giving the proper tension to the spring a uniform force is always at hand of the proper power to stop the machine. Where the machine is running in proper order, this spring-actuated shifting-rod is held retracted, such being its normal position.

The spring-actuated shifting-rod is held and locked in the normal retracted position by means of a pivoted swinging lever G, one arm *g* of which rests in a notch *h* in the shifting-rod. The other arm *i* of this pivoted swinging lever carries an oscillating catch-lever H, pivoted thereto. This catch-lever carries on one end a catch *m*, having its front face *n* abrupt and its upper rear edge *o* beveled. This catch is normally held just out of the path of the projecting stud *e* on the sliding bar D, the catch-lever itself being substantially parallel with the sliding bar. The proper normal position of the catch can be secured by any suitable means. Preferably the catch-lever is nearly balanced on the pivot connecting it with the swinging lever G, the catch end of the catch-lever being slightly heavier, however, so that the weight of the catch end is sufficient to hold it out of the path of the stud *e*. Any fixed stop, as *p*, can be employed to limit the movement of the catch below the path of the stud. Since, however, the relative positions of the several parts may be changed, as far as the planes occupied by them are concerned, modifications in the weighting of the catch-lever may be introduced without departing from the essential mode of operation of the several parts. It is only essential that the catch-lever should be a nearly balanced lever, and that its catch end should be normally out of the path of the stud *e*. The lever G is held in proper position and returned thereto, so as to cause the locking-arm *g* to coact with the notch *h* in the shifting-rod by means of a spring *s*.

The catch-lever H being a nearly balanced one, it is obvious that it is or may be made quite sensitive, so that in case a slight power is applied to its free end *t* in the proper direction the catch *m* will be moved into the path of the stud *e* on the constantly-sliding bar D. In case the catch is so moved the stud

on the sliding bar, on its movement in one direction, (that indicated by the arrow *w*,) will strike against the abrupt face of the catch. The force thus applied to the catch, being that imparted by the cam B on the shaft A, which may be the main drive-shaft of the machine, is only limited in its intensity by the power of the machine. The force will hence be sufficient to carry with the sliding bar the catch-lever, moving the latter bodily in the path of the stud. The movement of the catch-lever H carries with it the arm *i* of the swinging lever G, which swings on its pivot. By this movement of the lever G its arm *g* is lifted out of the notch *h*, the force actuating the lever G being amply sufficient to overcome the pressure upon the arm *g* due to the tension of the spring F. The shifting-rod E being thus released, it is free to be moved by the spring F, and so operate the final stopping instrumentalities. In order, therefore, to stop the machine on the occurrence of a defect or other emergency, it is only necessary that the initiating instrumentality should furnish sufficient power to oscillate the nearly balanced catch-lever, which can be made so sensitive as to be responsive to any demands upon it.

The described locking mechanism for the spring-actuated shifting-rod E is not essential, and a modification thereof is illustrated in Figs. 4, 5, and 6. In these figures the shifting-rod is shown as capable of a lateral movement in its guides, so that it may be locked in its retracted position by a coacting locking-lip X and notch *h*, one of which is on the shifting-rod and the other on any convenient stationary part. A lateral bodily movement of the shifting-rod will then release it. To thus move the shifting-rod laterally, a presser-lever I is employed, which in turn is actuated by the swinging lever G. In this modification, as in the preferred construction, the lever G unlocks or releases the shifting-rod.

The spring-actuated shifting-rod is in itself no part of the present invention, except in so far as it enters into combination with the other features, and hence it is only essential that it be released or unlocked by means of the swinging lever G. Nor need the spring-actuated shifting-rod necessarily be a longitudinally-sliding rod, since it may, if convenient, be a spring-actuated rod swinging on a pivot. Both reciprocating and swinging spring-actuated shifting-rods are well-known mechanisms for shipping belts for stopping machinery.

Owing to the catch *m* being made with one face *n* abrupt and the other *o* beveled, the catch will be acted upon by the stud *e* only when the latter is moving in the proper direction to release the locking mechanism of the spring-actuated shifting-rod. If the stud is moving in the opposite direction at the moment when the catch *m* is elevated into its path, it will ride upon the rear beveled face



o of the catch, thus depressing the catch out of its path.

I claim as my invention—

5 1. In a stop-motion for machinery, a rotating shaft, a cam or eccentric on said shaft, a rocking lever abutting against said cam or eccentric, whereby it is swung or rocked, and a bar connected with said rocking lever, whereby said bar is moved in a predetermined  
10 path, said bar having a projecting stud, in combination with a swinging lever, a spring-actuated shifting-rod, a latch or lock holding said shifting-rod, said latch or lock being controlled by said swinging lever, and a catch-  
15 lever pivotally connected with said swinging lever, the catch on said lever being normally out of the path of said projecting stud, but adapted to co-operate therewith, substantially as set forth.

20 2. In a stop-motion for machinery, a rotating shaft, a cam or eccentric on said shaft, a rocking lever abutting against said cam or eccentric, whereby it is swung or rocked, and a bar connected with said rocking lever,  
25 whereby said bar is moved in a predetermined

path, in combination with a spring-actuated shifting-rod, a swinging lever controlling said shifting-rod, and a catch-lever pivoted to said swinging lever, the catch on said lever being normally out of the path of said bar, but  
30 adapted to co-operate therewith, substantially as set forth.

3. In a stop-motion for machinery, a rotating shaft, a cam or eccentric on said shaft, a rocking lever abutting against said cam or  
35 eccentric, whereby it is swung or rocked, in combination with a spring-actuated shifting-rod, a swinging lever controlling said shifting-rod, and a catch-lever pivoted to said swinging lever, said catch-lever being nor-  
40 mally inoperative, but adapted to be moved through the instrumentality of said rocking lever, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing  
45 witnesses.

SAMUEL I. FOSTER.

Witnesses:

JOSEPH L. CAVENDER,  
HENRY C. CONRAD.