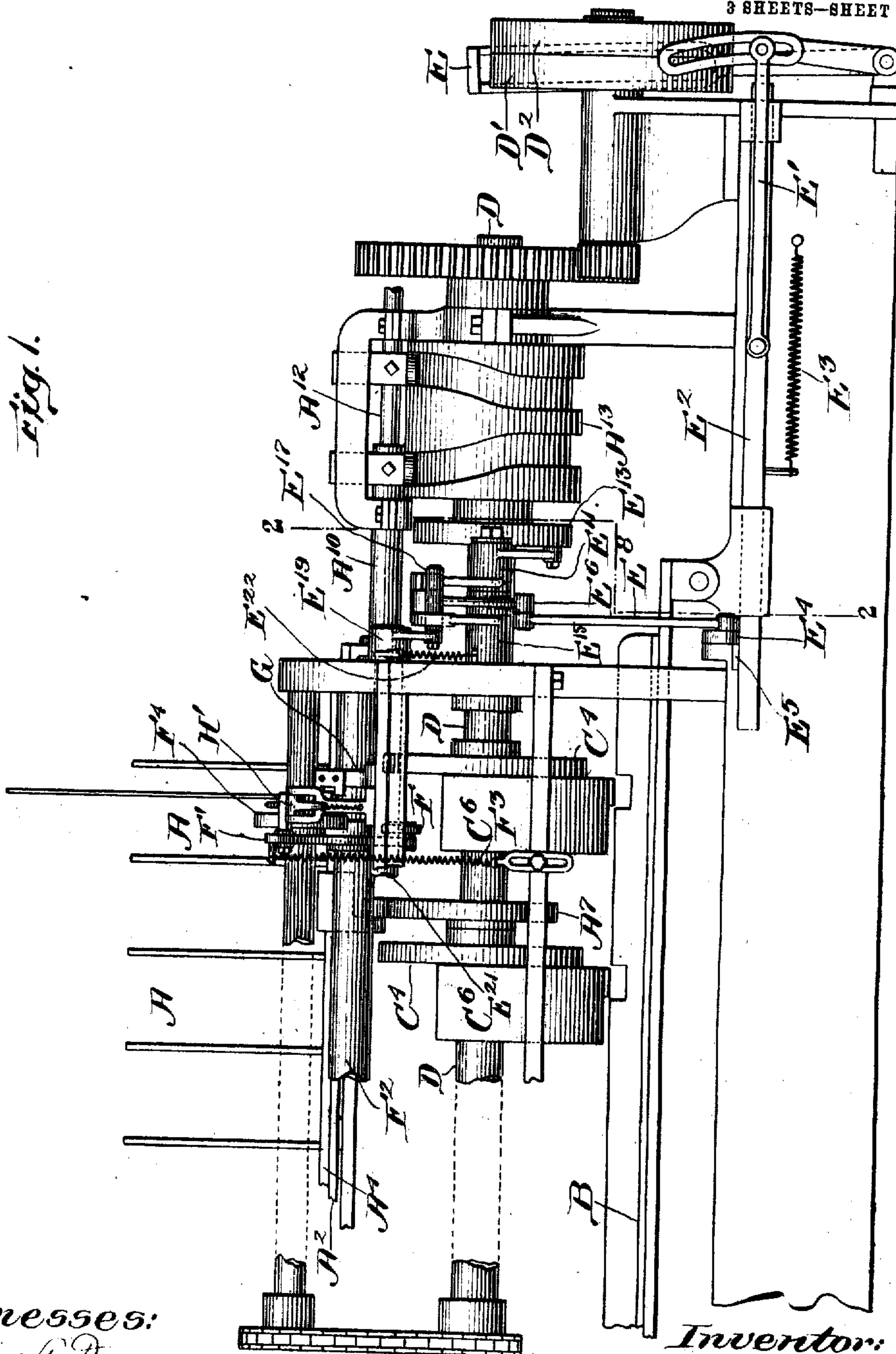


H. P. KENDALL.
 CONTROLLING MECHANISM FOR MACHINES ACTING ON SHEETS OR SIGNATURES.
 APPLICATION FILED JAN. 22, 1906.

912,965.

Patented Feb. 16, 1909.

3 SHEETS—SHEET 1.



Witnesses:
 Nathaniel W. Dugan
 Geo. N. Goddard

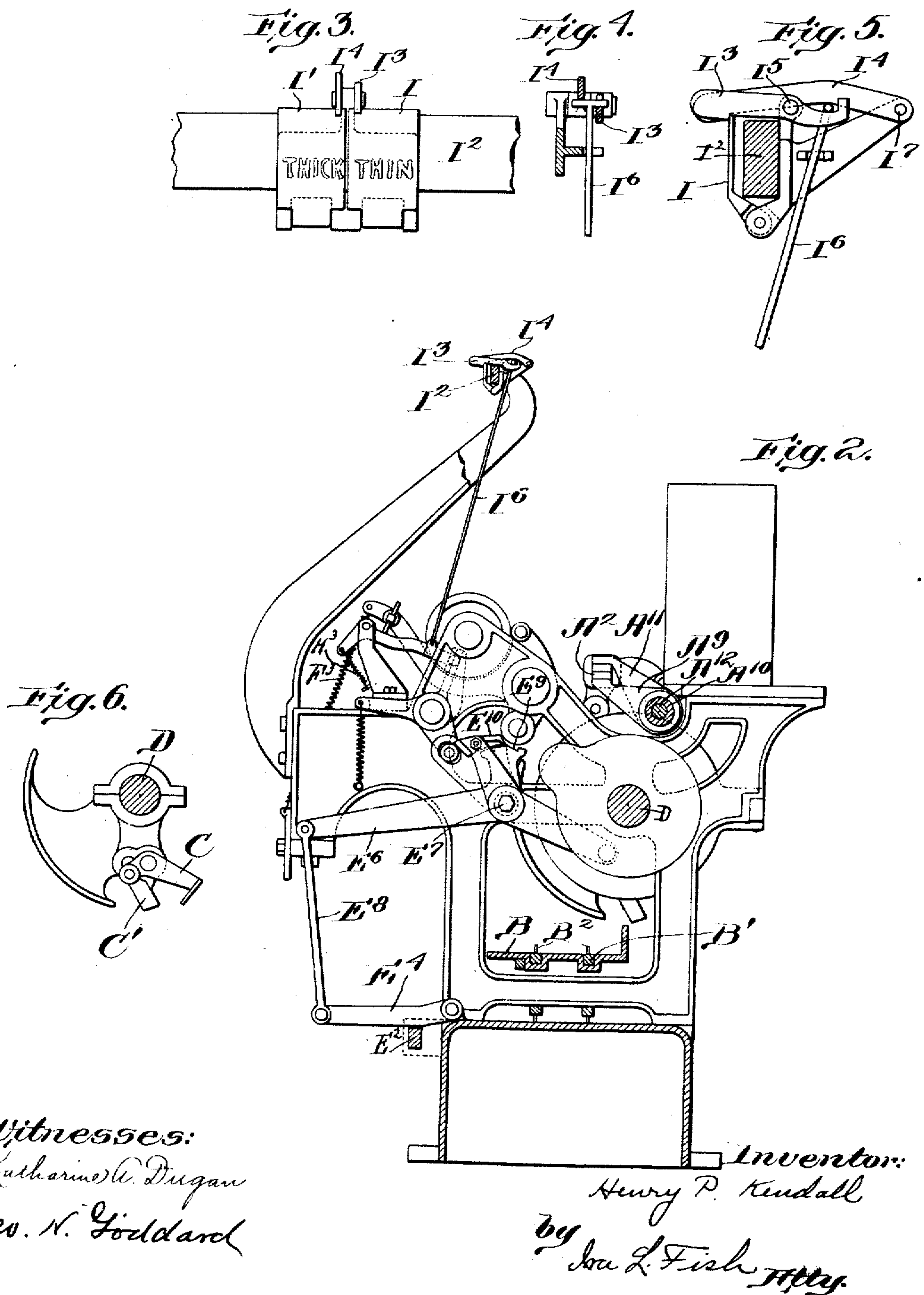
Inventor:
 Henry P. Kendall
 by
 Isaac L. Fish Attorney.

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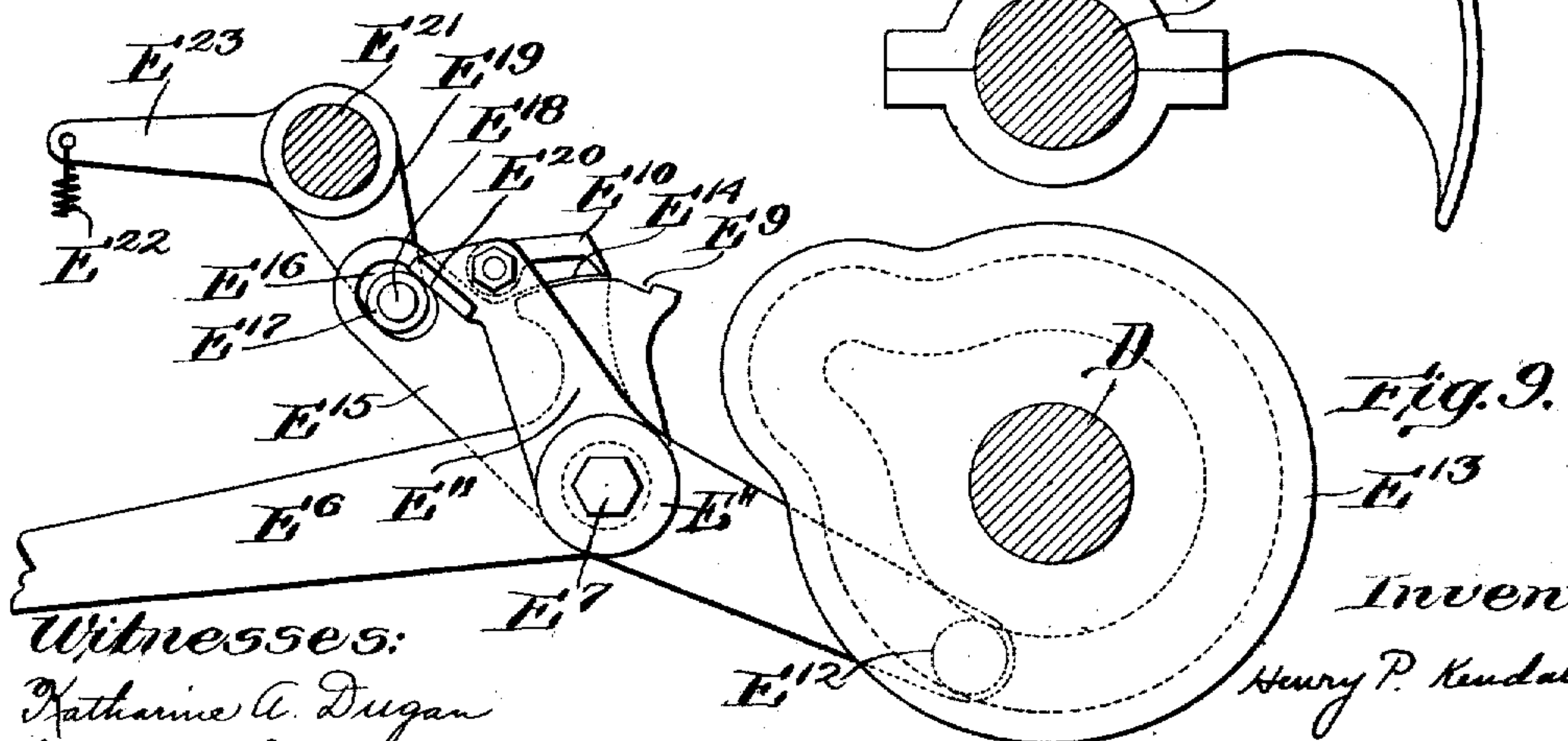
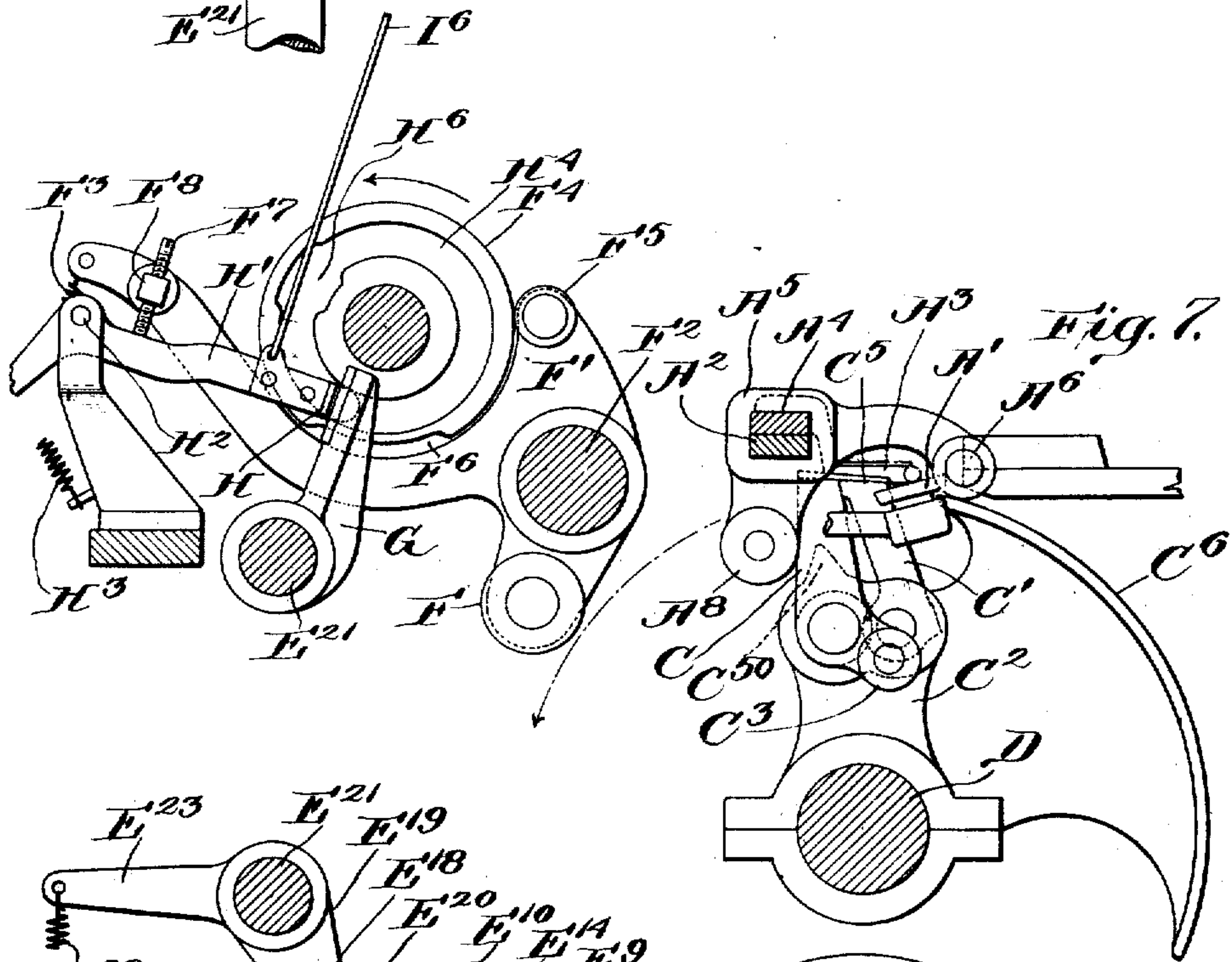
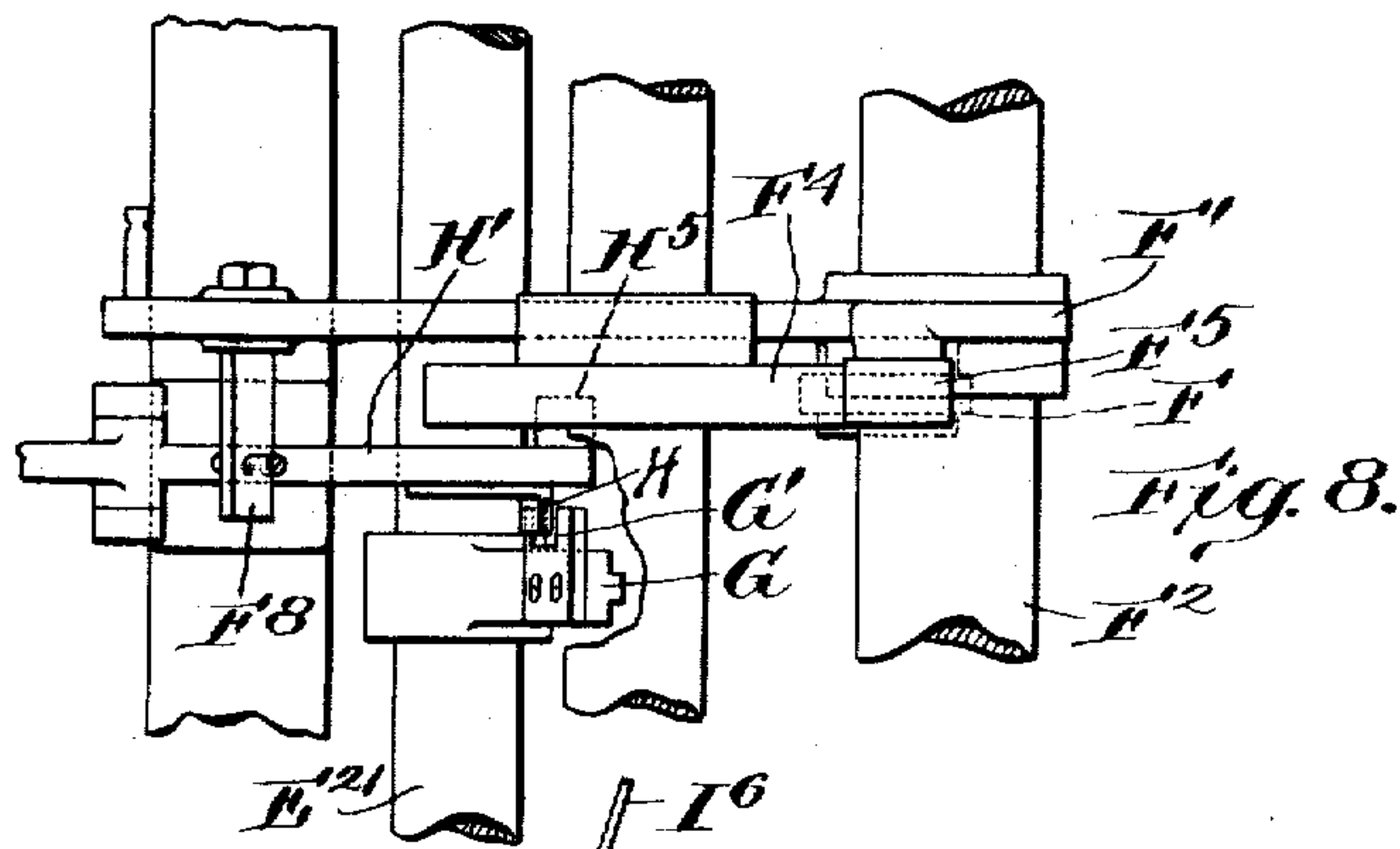
Witnesses:
 Katherine A. Dugan
 Geo. N. Goddard

Inventor:
 Henry P. Kendall
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Witnesses:
 Nathaniel A. Dugan
 Geo. N. Goddard

Inventor:
 Henry P. Kendall
 by Mrs L. Fish, Atty.

UNITED STATES PATENT OFFICE.

HENRY P. KENDALL, OF WALPOLE, MASSACHUSETTS, ASSIGNOR TO HERBERT M. PLIMPTON, OF NORWOOD, MASSACHUSETTS.

CONTROLLING MECHANISM FOR MACHINES ACTING ON SHEETS OR SIGNATURES.

No. 912,965.

Specification of Letters Patent.

Patented Feb. 16, 1909.

Application filed January 22, 1906. Serial No. 297,149.

To all whom it may concern:

Be it known that I, HENRY P. KENDALL, citizen of the United States, and resident of Walpole, county of Norfolk, Massachusetts, have invented certain new and useful Improvements in Controlling Mechanism for Machines Acting on Sheets or Signatures, of which the following is a specification.

The invention relates to mechanism for controlling the operation of machines for acting on sheets or signatures and its object is to provide a simple and efficient mechanism for automatically throwing the machine out of operation upon the failure to properly feed or present sheets or signatures of a predetermined thickness.

In practicing my invention I control the mechanism for throwing the machine out of operation through the movement of a caliper member which is so arranged that it presses against the surface of the signatures or sheets as they travel past it, the position or movement of the caliper member thus depending upon the thickness of the signatures or sheets which travel past it. The devices intermediate the caliper member and the mechanism for throwing the machine out of operation are so constructed and arranged that this mechanism is inactive so long as sheets or signatures of the proper predetermined thickness are fed past the caliper member at the proper intervals. If however, the thickness of the sheets or signatures carried past the caliper member is greater than the normal, the abnormal movement of the caliper member incident to its engaging the increased thickness of sheets or signatures, renders the mechanism for throwing the machine out of operation active so that the machine is either stopped or put into such condition that no injury or imperfect product results from the failure to feed sheets or signatures of the proper thickness. Likewise in case the signatures or sheets are of less than normal thickness or in case no sheet or signature is fed past the caliper member at the proper time, the abnormal movement of the caliper member incident to the decrease in the proper predetermined thickness of sheets or signatures which should be presented to the caliper member renders the mechanism for throwing the machine out of operation active to stop the machine or prevent injury or imperfect product.

The controlling mechanism embodying the various features of my invention may be embodied in various machines where it is desirable to stop the machine or modify its action upon failure to properly feed or present material or pieces of a predetermined thickness. Controlling mechanisms of this character may be embodied with especial advantage in machines for gathering in proper succession the several signatures composing a book or magazine and the specific form of mechanism in which I have embodied the various features of my invention is especially designed and adapted for such machines. This mechanism is shown in the accompanying drawings embodied in a signature-gathering machine having substantially the construction of the machine shown in the patent to S. H. Pray No. 767,081 August 9, 1904.

In these drawings Figure 1 is a side elevation of so much of the signature gathering machine as is necessary for an understanding of the features of the present invention. Fig. 2 is a sectional view on line 2—2 Fig. 1 looking toward the left. Figs. 3, 4 and 5 are details of the indicating device. Fig. 6 is a detail of the carrying grippers and supporting segment which travels therewith. Fig. 7 is a detail sectional elevation showing the signature separating and carrying devices and the caliper member and parts of the controlling mechanism. Fig. 8 is a plan view of parts shown in Fig. 7; and Fig. 9 is an enlarged sectional elevation of parts of the mechanism for throwing the machine out of operation.

In the signature-gathering machine indicated in the drawings the signatures are contained within a series of magazines arranged in succession lengthwise of the machine and individual signatures are separated from the stacks of signatures in the magazines and delivered upon a support along which they are carried by the carrying chains in the manner fully described in the patent to Pray above referred to.

The devices for separating individual signatures from the stacks of signatures in the magazines A comprise a series of pneumatic pickers A' carried upon a bar A² and a series of separator plates A³ carried upon a bar A⁴. (Fig. 7.) The carrying bars A² A⁴ for the pneumatic pickers and separator plates are mounted to reciprocate longitudinally in bearing arms A⁵ which are

pivoted at A⁶ so that they may have a rocking movement about the pivot A⁶. The rocking movement is imparted to the arms A⁵ by means of a cam A⁷ which engages and supports a roll A⁸ on the arm A⁵. The bar A² is connected by means of an arm A⁹ with a sleeve A¹⁰ and the bar A⁴ is connected by an arm A¹¹ with a shaft A¹² which extends through the sleeve A¹⁰, the sleeve and shaft being reciprocated by means of cam grooves formed on a cam drum A¹³ in the manner described in the patent referred to.

In separating a signature from the stack of signatures in a magazine, the pneumatic picker A¹ moves toward the left in Fig. 1 into position beneath the corner of the lower signature in the magazine, then rises into engagement with the signature, then is depressed to bend the corner of the signature down away from the signatures in the magazine, the separator plate A³ moving forward between the lower signature and the stack. The picker is then released from the signature and moves toward the right to one side of the signatures, the plate A³ rising to support the stack while the lower signature is withdrawn. These movements are imparted to the picker and separating plate by the rocking of the supporting arms A⁵ and the reciprocation of the carrying bars A² A⁴ as is more fully described in the patent referred to. The lower signature is withdrawn from beneath the stack of signatures by means of carrying grippers C C' pivoted at different points upon a head C² which is secured to the main cam shaft D of the machine. The upper gripper C is provided with a roll C³ which travels in a cam groove in a stationary cam plate C⁴ the cam groove being shaped to open and close the grippers at proper intervals. The lower gripper C' is forced toward the left in Fig. 7 by a spring (not shown) and when the grippers are open this gripper rests against a stop C³⁰. As the lower gripper comes into position beneath the front edge of the signature which has been separated by the picker and separating plate, the upper gripper is swung toward the right in Fig. 7 bringing the gripper jaw C⁵ above the front edge of the signature and then during continued movement of the gripper C the grippers move in unison toward the right, thus bringing the gripping jaws together upon the front edge of the signature. When the edge of the signature has been thus gripped the rotation of the gripper carrying head C² carries the grippers toward the left in Fig. 7 thus withdrawing the lower signature from the stack. As the signature is carried forward by the grippers it is supported by a segmental supporting plate C⁶ secured to the head C² and extending back from the grippers. The signature is carried forward by the grippers and is deposited upon the support B in front

of pins B² which project from the carrying chains B'. As the chains B' move longitudinally of the machine a signature from each magazine is deposited in succession in front of the pins B² and thus a series of signatures comprising a signature from each of the magazines is collected in front of each set of pins upon the carrier chain as the chain travels through the machine.

As thus far described the machine corresponds in construction and mode of operation to the machine shown and described in the Pray patent above referred to.

In the machine being described the mechanism for throwing the machine out of operation is so constructed that when it is rendered active the machine is stopped and remains at rest until again started by the operator. The mechanism for thus throwing the machine out of operation comprises a belt shifter E arranged to shift the belt from the driving pulley D' to the loose pulley D² and thus stop the machine. The belt shifter is connected by means of a link E' with a shipping bar E² which is forced in a direction to shift the belt on to the loose pulley by the action of a spring E³. During the operation of the machine the shipping bar E² is held in position to maintain the belt upon the driving pulley by means of a locking lever E⁴ which is arranged to engage a lug E⁵ on the shipping bar and hold the bar against the tension of the spring E³. When the locking lever E⁴ is moved to disengage it from the lug E⁵ the spring E³ immediately operates the belt shifter to shift the belt onto the loose pulley and thus stop the machine.

The mechanism for automatically operating the locking lever E⁴ comprises a bell-crank lever E⁶ loosely mounted upon a stud E⁷ and connected with the locking lever by a link E⁸. The short arm of the bell-crank lever E⁶ is provided with a recess or tooth E⁹ so arranged that it may be engaged by a reciprocating operating pawl E¹⁰. The operating pawl E¹⁰ is pivoted upon the upper end of a pawl carrying lever E¹¹ which is loosely mounted upon the stud E⁷. The pawl carrying lever E¹¹ is provided at its lower end with a roll E¹² which fits within a cam groove in the cam E¹³ which is so shaped that the pawl carrying arm is reciprocated once during each rotation of the cam shaft D during the operation of the machine. During the normal operation of the machine the pawl E¹⁰ is prevented from engaging the tooth E⁹ as the pawl reciprocates by means of a guard E¹⁴ which underlies the pawl and reciprocates therewith. The guard E¹⁴ is formed on a guard arm E¹⁵ which is loosely mounted upon the stud E⁷. The guard arm is provided with a radial slot E¹⁶ which is engaged by a roller E¹⁷ mounted upon a pin E¹⁸ which projects laterally

from a rock arm E^{19} . The pin E^{18} and roll E^{17} are extended beyond the guard arm E^{15} and the roll is engaged by a bearing surface E^{20} formed on the rear side of the pawl carrying arm E^{11} . The rock arm E^{19} is secured to a rock shaft E^{21} and is forced yieldingly toward the right in Fig. 9, or in a direction to keep the roll E^{17} against the pawl carrying arm by means of a spring E^{22} which is connected to a fixed part of the frame and to an arm E^{23} projecting from the rock shaft E^{21} . With this construction the guard arm E^{15} will be moved toward the left by action of the pawl carrying lever and will be moved yieldingly toward the right by the action of the spring E^{22} acting through the connections between the spring and the guard arm. So long as the rock shaft E^{21} is free to rock therefore the guard arm and guard carried thereby will reciprocate with the pawl carrying lever and the pawl will be prevented from engaging the tooth E^9 . If the movement of the rock shaft E^{21} under the influence of the spring E^{22} is arrested however, the guard arm and guard will not advance with the pawl carrying lever and in such case therefore the pawl E^{10} will ride off of the guard E^{14} and will engage the tooth E^9 on the bell-crank lever E^8 and will operate this bell-crank lever to withdraw the locking lever E^4 from engagement with the lug on the shipper bar and thus cause the stopping of the machine.

The mechanism shown for arresting the movement of the rock shaft E^{21} and thus rendering the mechanism for throwing the machine out of operation active comprises a moving member in the form of an arm G secured to the rock shaft E^{21} and a controller H which is normally out of the path of the moving member G and which is so connected with a calipering device that it is moved into the path of the moving member G to arrest its movement upon a movement of the calipering device greater or less than normal. In the construction shown the controller H is in the form of an abutment lug projecting laterally from a lever H' which is pivoted at H^2 and is forced yieldingly upward by a light spring H^3 secured to a fixed part of the frame and to the outer end of the lever. The abutment H is held normally in position to register with a recess G' formed in a plate which projects laterally from the arm G so that the arm G passes idly by the abutment as the rock shaft E^{21} oscillates. Whenever the abutment H is moved in either direction it is carried out of register with the recess G' and is brought into the path of the plate on the arm G , thus preventing the rocking of the shaft E^{21} and rendering the mechanism for throwing the machine out of operation active. The position of the controlling abutment H is determined by the movement of a calipering

device in the form of a roll F with which the controller abutment is connected.

The calipering roll F is so arranged that it may bear upon the signatures as they are carried past it by carrying grippers C C' and supporting segment C^6 . The calipering roll F is mounted in the short arm of a lever F' which is loosely mounted upon a shaft F^2 and the calipering roll is forced yieldingly toward the path of travel of the signature by means of a spring F^3 secured to the outer end of the long arm of the lever F' . During the time or a portion of the time that the supporting segment C^6 is passing the calipering roll F the roll is free to move toward the support under the influence of the spring F^3 and during this time the roll is pressed against the signature carried upon the support, the position of the roll being governed by the thickness of the signature traveling past it. During the remainder of the operation of the machine the roll carrying lever F' is supported against the tension of the spring F^3 by means of a cam F^4 arranged to engage a roll F^5 mounted upon the lever F' . The cam F^4 is provided with a low part F^6 which registers with the roll F^5 during the time that the calipering roll F is in engagement with the signature upon the support C^6 . The controller abutment H is so connected with the calipering roll that the abutment will be held in register with the recess G' on the arm G in case the signature against which the calipering roll is pressed is of a certain thickness. If the thickness of the signature is less or greater than this predetermined thickness the controller abutment will be moved by reason of its connection with the calipering roll in one direction or the other to bring it into the path of the arm and thus render the mechanism for throwing the machine out of operation active. In the construction shown in lever H' which carries the controlling abutment H is connected with the calipering roll by means of a screw F^7 which passes through a lateral projection F^8 of the roll carrying lever F' and engages the controller lever H' near its pivot. By adjusting the screw F^7 the connections between the calipering roll and controller may be adjusted so that the controller lug will be in register with the recess on the arm G when any predetermined thickness of signature is passing the caliper roll F .

While I prefer the form of connections between the calipering roll and controller shown, for the reason that with this construction the movement of the controller is comparatively large as compared with the movement of the calipering device and the mechanism will operate efficiently in throwing the machine out of operation upon slight variations in the thickness of the signatures, yet other forms of connections may be employed. For instance with the same form of

controller and mechanism for throwing the machine out of operation shown the controlling lug might be mounted directly upon the lever which carries the caliper roll instead of upon a separate lever.

During the time that the calipering roll F is supported by the cam F⁴ the controller lever H' may be supported by a cam groove H⁴ formed in the face of the cam disk F⁴ and engaged by a roll H⁵ on the end of the lever H', the cam groove being provided with an enlargement H⁶ which registers with the roll H⁵ during the time that the calipering roll is in engagement with the signature.

The mechanism for throwing the machine out of operation should be rendered active in a signature gathering machine upon the failure to deliver a signature of proper thickness from any one of the signature magazines and the machine is accordingly provided with calipering and controlling devices corresponding to each signature magazine and each set of separating and carrying devices. In order that the operator may quickly determine the point at which the failure to deliver a signature of proper thickness occurred and also to determine whether the machine was stopped by reason of the delivery of a signature thicker than normal or by reason of the delivery of a signature thinner than normal, I have provided devices which indicate the point at which the imperfect action took place and which also indicate whether the stopping of the machine occurred by reason of the feeding of a signature thicker than normal or by reason of the feeding of a signature thinner than normal. These indicating devices are shown in Figs. 2 to 5 inclusive. The indicating devices consist of two plates I I' pivotally supported upon an elevated bar I² and held in normal position by means of latches I³ I⁴. The latch I³ which holds the plate I in normal position is pivoted at I⁵ and is provided with a rearwardly extending part by the downward movement of which the latch may be disengaged from the plate I so that the plate will fall. The latch I³ is operated to release the indicator plate I by means of a rod I⁶ the lower end of which is connected to the controller lever H' and the upper end of which is extended laterally over the rear projection of the latch I³. The latch I⁴ which retains the indicator plate I' in position is pivoted at I⁷ and passes over a lateral projection of the rod I⁶. When a signature which is thinner than normal is fed past the caliper roll, the controller lever H' is moved downward into the path of the arm G in rendering the stopping mechanism active and this downward movement of the controller lever H' operates the latch I³ to release the plate I. On the other hand when a signature thicker than the normal is fed past the caliper roll F, the controller lever H' is

moved upward in bringing it into the path of the arm G to render the stopping mechanism active and this upward movement of the controller lever H operates the latch I⁴ to release the indicator plate I'. The plates I I' may be colored, shaped or marked so that the operator can readily determine whether the stopping mechanism was rendered active by reason of a thick or by reason of a thin signature. There is a pair of indicator plates for each calipering and controlling device and therefore the falling of a plate indicates the point at which the defective operation occurred as well as indicating the defect.

While I prefer to employ the mechanism for throwing the machine out of operation such as has been described in which the mechanism is rendered active by the arrest of a moving part, it will be understood that such form of mechanism is not essential to all the features of my invention. It will also be understood that the construction and arrangement of the controller and the connections between the controller and the calipering device may be changed and modified without departing from the broader features of my invention. It will also be understood that it is not essential in case an abutment and registering recess are employed in the connections between the calipering device and the mechanism for throwing the machine out of operation, that these parts be arranged in the relation shown, since this relation might be reversed for instance. It will also be understood that in constructions where a controller and moving part are employed it is not essential that the controller should arrest the movement of the moving part, since the moving part might act through the controller to impart movement to the mechanism for throwing the machine out of operation. Various changes and modifications in the construction and arrangement of the connections intermediate the calipering device and the throw-out mechanism may be made without departing from my invention.

Without attempting to point out all the various forms in which the features of invention may be embodied, what I claim and desire to secure by Letters Patent is:--

1. Mechanism for controlling machines acting upon sheets or signatures having in combination, devices for advancing sheets or signatures, a yielding calipering member past which the sheets travel, the extent of movement of which depends upon the thickness of the sheets or signatures, a moving part, a controller normally out of the path of the moving part, connections between the controller and calipering member for moving the controller into the path of the moving part upon a movement of the calipering member greater and upon a movement of the

calipering member less than normal, and mechanism for throwing the machine out of operation rendered active by the engagement of the controller and moving part.

- 5 2. Mechanism for controlling machines operating upon sheets or signatures having in combination, a support, a yielding calipering member cooperating therewith, a controller connected with the calipering device, 10 a moving part the movement of which is arrested by the controller upon a variation above and upon a variation below the normal in the thickness of sheets or signatures between the support and calipering member, 15 and mechanism for throwing the machine out of operation rendered active by the arrest of said part.
3. Mechanism for controlling machines operating upon sheets or signatures having 20 in combination a controller, a support, a yielding calipering member connected with the controller, a moving part the movement of which is arrested by the controller upon a variation above and upon a variation below 25 the normal in the thickness of sheets or signatures between the support and calipering member, and mechanism for throwing the machine out of operation rendered active by the arrest of said part.
- 30 4. Mechanism for controlling machines operating upon sheets or signatures having in combination, devices for advancing sheets or signatures, a yielding calipering member past which the sheets or signatures travel, a 35 mechanism for throwing the machine out of operation, a controller member connected to move with the calipering member, a cooperating member connected with said throw-out mechanism, means for reciprocating one 40 of said members, and means for connecting said members to render said throw-out mechanism active upon a movement of the calipering member greater and upon a 45 movement of the calipering member less than normal.
5. Mechanism for controlling machines operating upon sheets or signatures having in combination, devices for advancing sheets or signatures, a yielding calipering member 50 past which the sheets or signatures travel, a controller member, a moving member, an abutment on one member, a normally registering recess on the other member, connection between the controller and calipering 55 member for bringing the abutment and recess out of register upon a movement of the calipering member greater and upon a movement of the calipering member less than normal, and mechanism for throwing the machine out of operation rendered active by the 60 engagement of the controller and moving member.

6. Mechanism for controlling machines operating upon sheets or signatures having

in combination, mechanism for throwing 65 the machine out of operation, a reciprocating member the arrest of which renders said throw out mechanism active, a recess in said member, a controller normally registering with said recess, and a calipering device 70 connected with said controller.

7. Mechanism for controlling machines operating upon sheets or signatures having in combination, mechanism for throwing the machine out of operation, a controller for 75 controlling the operation of said throw-out mechanism, a yielding member connected with the controller, and an unyielding traveling support for sheets or signatures traveling past the yielding member. 80

8. A machine for handling sheets or signatures having in combination, carrying grippers, a support traveling therewith, a yielding member arranged to engage the sheets or signatures on the support, mechanism for throwing the machine out of operation, and means for controlling the said mechanism from the yielding member. 85

9. A machine for handling sheets or signatures having in combination carrying 90 grippers, a support traveling therewith, a yielding calipering member arranged to engage the sheets or signatures on the support, a controller operated by the calipering member, and mechanism for throwing the machine out of operation controlled by the controller. 95

10. A machine for handling sheets or signatures having in combination, carrying grippers, a segmental support traveling 100 therewith, a calipering member arranged to engage the sheets or signatures on the support, means for supporting and releasing the calipering member, and mechanism for throwing the machine out of operation controlled by the calipering member. 105

11. A machine for handling sheets or signatures having in combination, separating devices, carrying grippers, a calipering member yieldingly forced against the passing sheets or signatures, a cooperating support, and mechanism for throwing the machine out of operation rendered active by a movement of the calipering device greater and by a movement of the calipering device 115 less than normal.

12. A machine for handling sheets or signatures having in combination, carrying grippers, a calipering member yieldingly held against the passing sheets or signatures, 120 a connected controlling member, a cooperating member, an abutment on one of said latter two members, a registering recess on the other of said two members, and mechanism for throwing the machine out of operation rendered active when the abutment and recess are out of register. 125

13. A machine for handling sheets or sig-

natures having in combination, devices for advancing sheets or signatures, a calipering member, means for yieldingly pressing the calipering member against the passing sheets or signatures, a controller member connected with the calipering member, a movable member, an abutment on one of said latter two members, a registering recess on the other of said two members, and a mechanism for throwing the machine out of operation rendered active when the abutment and recess are out of register.

14. A machine for handling sheets or signatures having in combination devices for advancing sheets or signatures, a calipering member, means for yieldingly pressing the calipering device against the passing sheets or signatures, a controller adjustably connected with the calipering member, and mechanism for throwing the machine out of operation rendered active by the controller upon a movement of the calipering member greater and upon a movement of the calipering member less than normal.

15. A machine for handling sheets or signatures having in combination, devices for advancing sheets or signatures, a calipering member past which the sheets or signatures are advanced, a spring operated carrying lever therefor, a controller lever connected with the caliper carrying lever, and mechanism for throwing the machine out of operation rendered active by a movement of the controller lever greater and by a movement of the controlling lever less than normal.

16. Mechanism for controlling machines operating upon sheets or signatures having in combination, mechanism for throwing the machine out of operation, a support and a calipering member between which sheets or signatures are advanced, and devices controlled by the movement of the calipering member for rendering the throw out mechanism active upon a movement of the calipering member greater and upon a move-

ment of the calipering member less than normal.

17. Mechanism for controlling machines operating upon sheets or signatures having in combination, mechanism for throwing the machine out of operation, an unyielding support and a yielding calipering member, means for advancing sheets or signatures between the support and calipering member, and devices controlled by the movement of the calipering member for rendering the throw out mechanism active whenever the movement of the calipering member is greater and whenever the movement of the calipering member is less than normal.

18. Mechanism for controlling machines operating upon sheets or signatures having in combination, mechanism for throwing the machine out of operation, a yielding calipering member, a traveling support for sheets or signatures while they are traveling past the calipering member, a controller connected with the calipering member for rendering the throw-out mechanism active upon a movement of the calipering member greater and upon a movement of the calipering member less than normal.

19. A machine for handling sheets or signatures having in combination, mechanism for throwing the machine out of operation, carrying grippers, a support traveling therewith, a yielding calipering member arranged to engage the sheets or signatures on the support, a controller connected with the calipering member for rendering the throw-out mechanism active upon a movement of the calipering member greater and upon a movement of the calipering member less than normal.

In witness whereof, I have hereunto set my hand, this 18th day of January 1906.

HENRY P. KENDALL.

In the presence of—

IRA L. FISH,

GEO. N. GODDARD.