H. C. LA BATT.

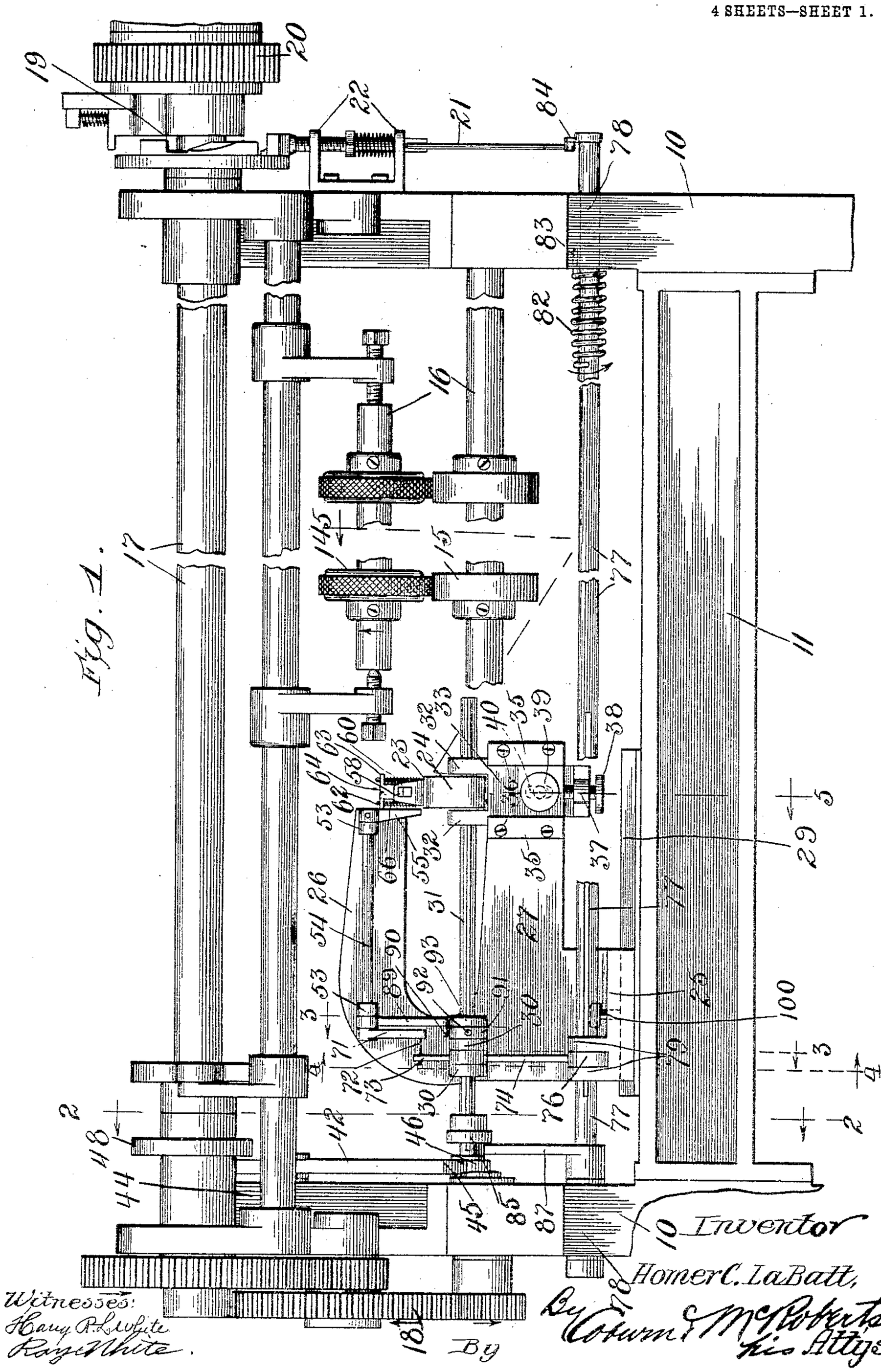
CONTROLLER FOR PAPER HANDLING MACHINES.

APPLICATION FILED AUG. 15, 1904. RENEWED NOV. 12, 1909.

962,440. Patented June 28, 1910.

4 SHEETS—SHEET 1.

Fig. 1.



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By

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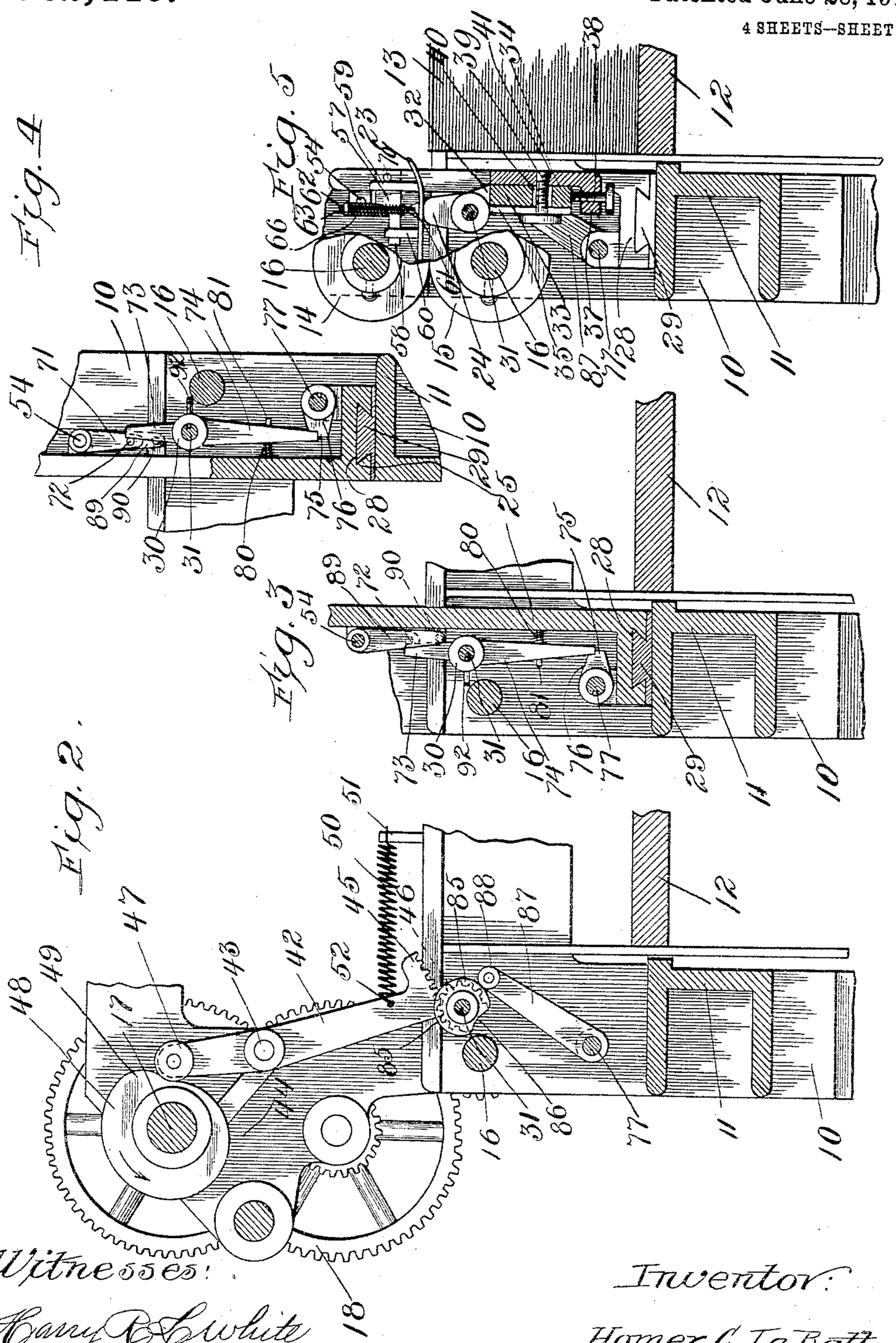
4 SHEETS—SHEET 2.

Fig. 4



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4 SHEETS—SHEET 3.

Fig. 6

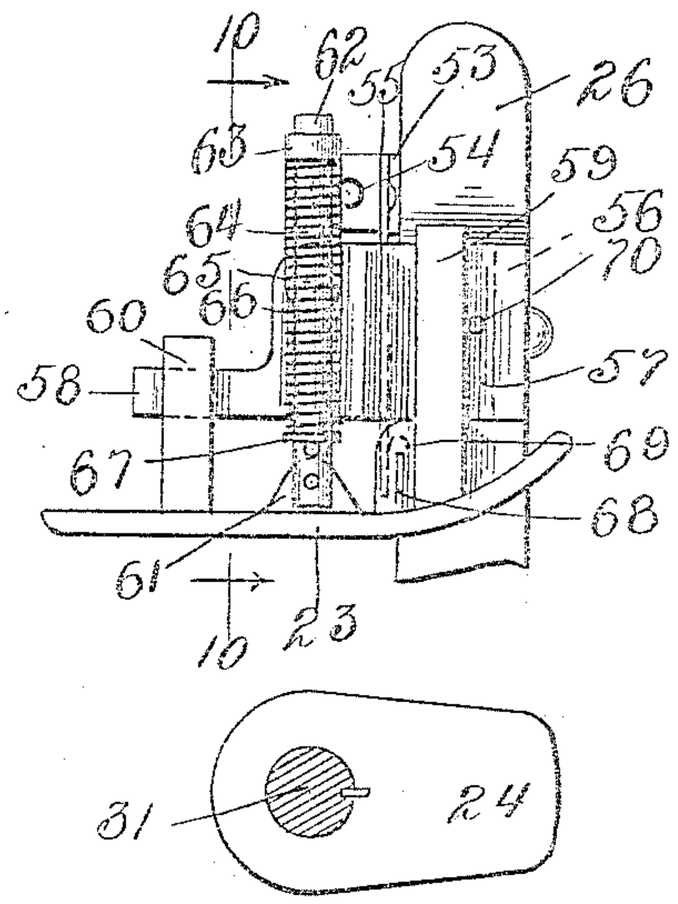


Fig. 7

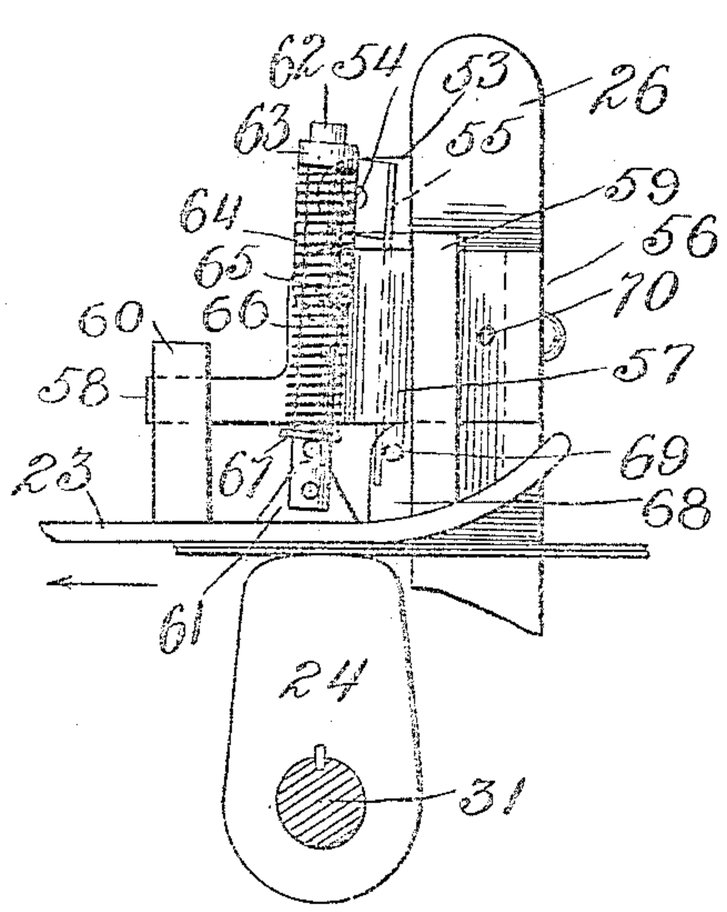


Fig. 8.

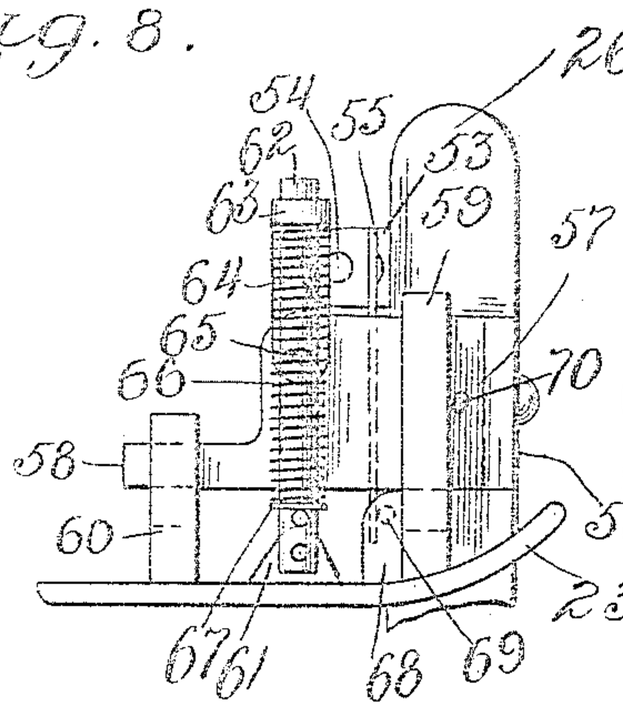


Fig. 10.

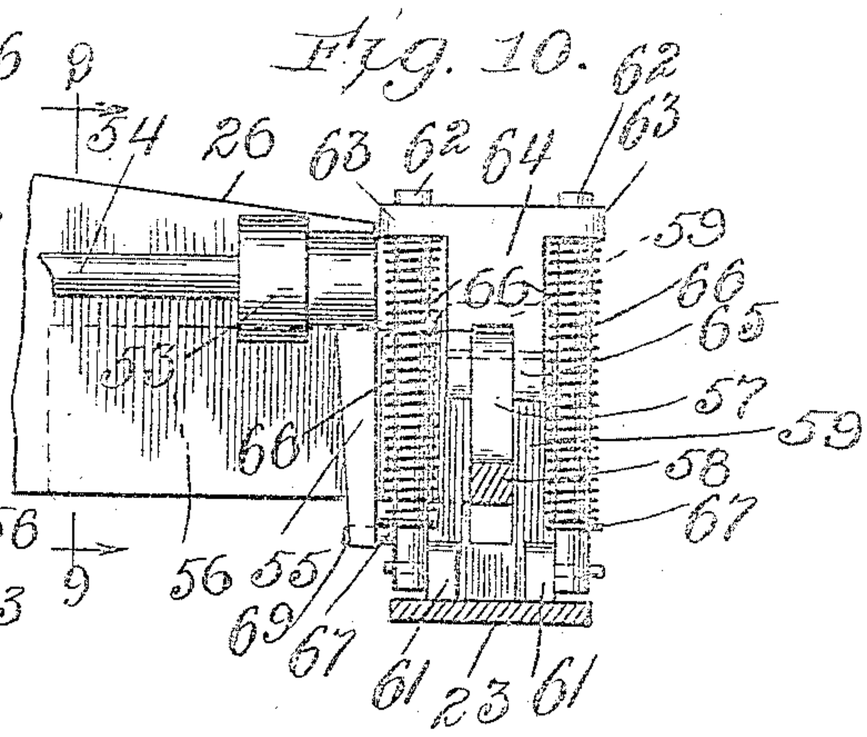
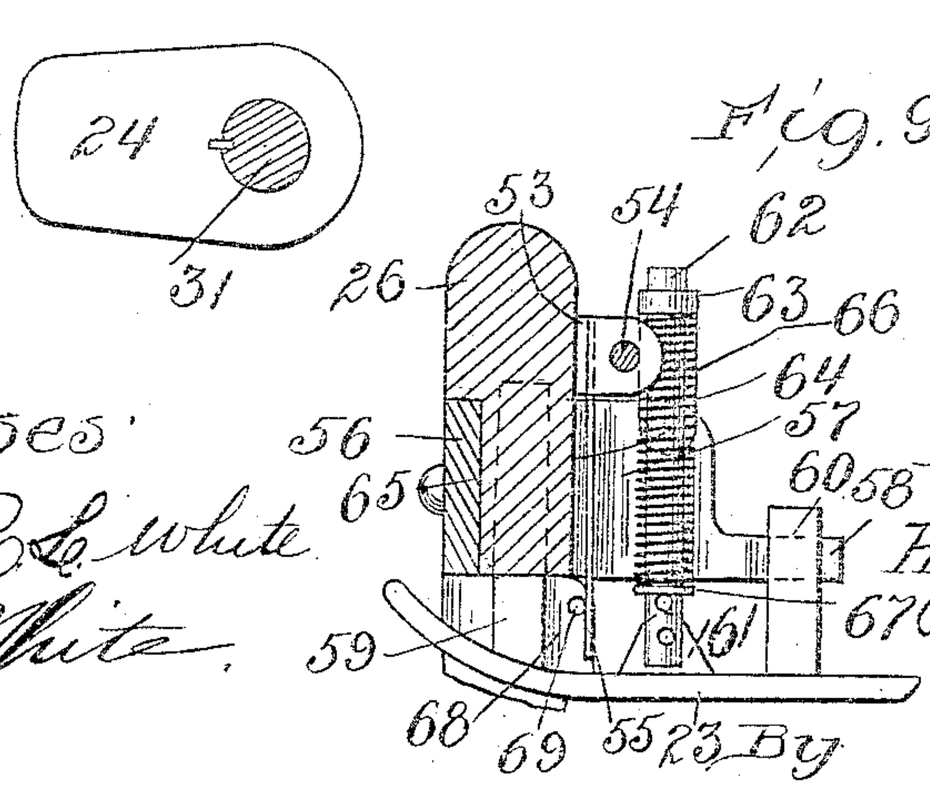


Fig. 9.



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4 SHEETS—SHEET 4.

Fig. 11.

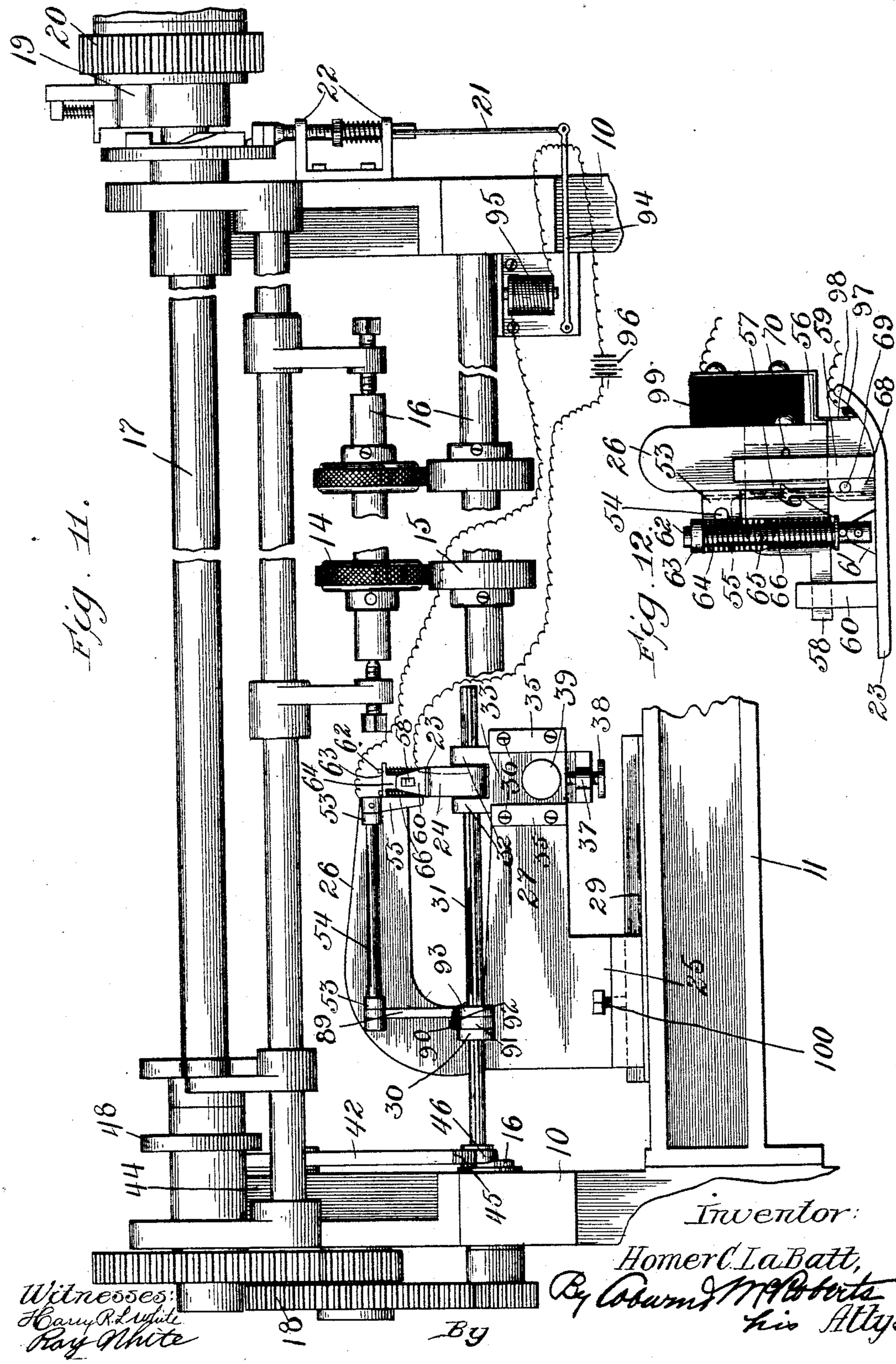

Fig. 12.

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UNITED STATES PATENT OFFICE.

HOMER C. LA BATT, OF CHICAGO, ILLINOIS, ASSIGNOR TO WILLIAM J. HERRICK, OF CHICAGO, ILLINOIS.

CONTROLLER FOR PAPER-HANDLING MACHINES.

962,440. Specification of Letters Patent. **Patented June 28, 1910.**

Application filed August 15, 1904, Serial No. 220,762. Renewed November 12, 1909. Serial No. 527,660.

To all whom it may concern:

Be it known that I, HOMER C. LA BATT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Controllers for Paper-Handling Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention has reference to a controlling device adapted to be associated with machines for handling paper, such as feeders, folders, printing presses, calendering and similar machines, and it has for its object generally to provide a simple and improved device of this character for automatically stopping the machine with which it is employed in the event of an abnormal thickness of paper, such as a plurality of sheets, being handled by such machine.

The invention consists of the arrangements and combinations of parts hereinafter particularly described and then pointed out in the appended claims.

In the drawings, Figure 1 is a front elevation of a sheet feeding machine showing my invention adapted thereto, parts of the machine being broken away to facilitate illustration; Fig. 2 is a section on the line 2—2 of Fig. 1, particularly illustrating the mechanism for moving the oscillating toe of the controller; Fig. 3 is a section on the line 3—3 of Fig. 1, looking in the direction of the arrow showing the means for restoring the slidable shoe of the controller and also the dog for holding against movement the shaft for operating the clutch controlling rod; Fig. 4 is a section on the line 4—4 of Fig. 1 looking in the direction of the arrow and illustrating the devices shown in Fig. 3 from the opposite side; Fig. 5 is a section on the line 5—5 of Fig. 1 showing the controller in side elevation and the paper ejecting rolls partially broken away for clearness of illustration; Fig. 6 is a side elevation on an enlarged scale of the controller showing the parts in their initial position; Fig. 7 is a similar view showing the oscillating toe in a second position and the sliding shoe moved by the action of the oscillating toe owing to the presence of a plurality of sheets; Fig. 8 is a view similar to Fig. 6 with the oscillating toe at the other end of its movement; Fig. 9 is a side elevation of the slidable shoe of the controller looking at the same from the opposite side to that shown in Figs. 6, 7, and 8; Fig. 10 is a section on the line 10—10 of Fig. 6; Fig. 11 is a front elevation of a sheet feeding machine showing a modification of the invention adapted thereto and provided with electrical means for operating the clutch controlling rod; and Fig. 12 is a side elevation of the slidable shoe of the controller illustrated in Fig. 11.

In the drawing 10 indicates the frame of a sheet separating machine with which the invention is shown associated, although while in the present instance I have described my invention in connection with a sheet separating machine, it is to be understood that it is applicable to any of the various types of machines designed to handle or employ paper in the operation of the same. In the machine illustrated the side members of the frame are tied together by a cross beam 11. The vertically movable table 12 of any preferred construction is designed to support and carry a stack of sheets 13 which are fed one at a time by any suitable mechanism (not shown) and ejected from the machine by suitable devices such as the front feed rolls 14, 15 secured to suitable shafts 16 and adapted to coöperate in the usual or any suitable manner. The shafts 16 in the present instance are driven from a suitable through shaft 17 by means of the intermediate gearing 18 shown. The shaft 17 receives motion from any suitable source through the medium of a suitable driving connection such as the clutch 19 which may be of any suitable or desired character and is mounted on an extension of the shaft 17. The driving member of the clutch may have motion transmitted thereto through the medium of the gear 20. The clutch is controlled in the present instance by a rod 21 which slides in suitable guides 22 fixed to one side of the main frame. The rod 21 normally stands in such position that it does not affect the clutch but when it is raised as hereinafter explained it operates to uncouple the clutch to arrest the motion of the machine.

In carrying out my invention I provide a suitable controller comprising a slidable shoe and an oscillating toe. The sliding shoe 23 is normally stationary, while the oscillating toe 24, is adapted to rock back and forth or oscillate, its movements being timed with the delivery of the sheets in succession, and

the arrangement is such that while the normally stationary slidable shoe is unaffected by the toe under normal conditions when only a predetermined thickness of material is delivered, yet when an abnormal thickness of paper enters the controller the normally stationary slidable shoe is moved by the toe. This movement of the shoe through the medium of suitable agencies, which may be either mechanical or electrical, results in the raising of the controlling rod 21 and the uncoupling of the driving connection or clutch 19, thereby arresting the motion of the machine.

The slidable shoe 23 and the oscillating toe 24 are disposed at any suitable point in the path of the paper, and in the embodiment of the invention illustrated they are mounted adjacent one side of the machine and immediately in front of the ejecting rolls 14, 15 in such position that the paper passes between them as it is fed out of the machine. The slidable shoe 23 as clearly shown in Fig. 6 is in the form of a horizontally disposed plate located just above the line of movement of the sheets and has its rear edge turned upwardly, as shown, to facilitate the entrance of the sheets. The oscillating toe 24 may be of any suitable form and preferably has its surface which coöperates with or moves across the under face of the slidable shoe 23 curved concentrically with its axis of oscillation.

The general arrangement of the parts and the manner of mounting the slidable shoe and the oscillating toe as now to be described, are clearly shown in Figs. 1 to 5 inclusive. Mounted upon the frame of the machine adjacent one side as upon the cross beam 11, is a bracket 25 provided, in the construction illustrated, with a pair of arms 26 and 27 extending inwardly toward the center of the machine. This bracket 25 is preferably adjustable transversely of the machine in order to adapt the controller to stock of different widths and to this end it is provided with a dove-tailed groove 28 in its under surface which receives a complementary shaped track 29 on the cross beam 11. Journaled in bearing-lugs 30 on the bracket 25 is a horizontal transverse shaft 31 whose other end is suitably journaled in the frame of the machine. The oscillating toe 24 is splined on the shaft 31 so as to oscillate therewith but be capable of longitudinal movement thereon when the bracket 25 is adjusted transversely of the machine. The shaft 31 passes freely through ears 32 located at opposite sides of the oscillating toe 24 and formed on a block 33 which is slidably seated in a vertical groove 34 in the rear face of the arm 27 and retained therein by overhanging lips 35 secured by means of screws 36. The arm 27 is provided at its lower edge with a rearward projection 37 having a screw threaded aperture through which passes a screw 38 engaging the lower edge of the block 33. This arrangement provides for suitable adjustment of the oscillating toe relatively to the slidable shoe. As only a slight adjustment is ever required and as the shaft 31 is of relatively small diameter and is sufficiently flexible to permit a lateral movement thereof to provide for the necessary adjustment, it is obvious that when the screw 38 is turned in one direction, the block 33 will be raised to move the oscillating toe 24 upwardly and that when the screw 38 is turned in the opposite direction the block 33 will be lowered to the extent defined by the position of the screw 38. A screw 39 passing freely through an elongated aperture 40 in the block 33 and engaging a threaded aperture 41 in the arm 27, as shown in Fig. 5, provides means to secure the block 33 in its adjusted position.

The shaft 31 may be oscillated through the medium of a lever 42, pivoted near its upper end, as at 43, to an arm 44 of the frame of the machine. This lever 42 is provided at its lower end with a segmental rack 45 which meshes with a pinion 46 fixed on the shaft 31 and at its upper end with an abutment which may take the form of an anti-friction roller 47 engaging a cam disk 48 having an abrupt cam shoulder 49. As shown in Fig. 2 the perimeter of the disk 48 increases gradually in diameter from the shoulder 49 for about one-half its periphery, and then continues from that point at uniform diameter to the cam shoulder. Suitable means such as a contractile spring 50, one end of which is attached to a lug 51 on the frame of the machine while its other end is anchored to the lever below the pivot 44, as at 52, serves to hold the lower end of the lever in its retracted position and its upper end in engagement with the disk 48.

Journaled in bearings 53 on the bracket arm 26 is a horizontal shaft 54 parallel with the shaft 31 and having at its inner end a depending finger 55 the purpose of which will be explained hereinafter. Attached to the end of the arm 26, as by means of an angular extension 56 secured to the rear face of the said arm, is a rearwardly extending plate 57 shown in the present instance as provided with a reduced extension 58. The plate 57 forms a support for the slidable shoe 23, the latter being provided on its upper face with loops 59 and 60, the former of which embraces the body-portion 57 of the plate while the latter embraces the extension 58. By this construction the slidable shoe 23 is supported and at the same time is permitted to slide longitudinally of the plate. Pivotally connected at their lower ends to lugs 61 on the slidable shoe 23 are stems 62, the upper ends of which pass through apertures in wings 63,

extending laterally from a depending block 64 which is pivoted, as at 65, to the support 57, the said block being bifurcated and straddling the plate 57 as shown in Fig. 10. Coiled about the stems 62 are expansion springs 66 which re-act between collars 67 on the stems and the wings 63, such springs holding the slidable shoe 23 in its normal depressed position, as defined by the length of the openings of the loops 59 and 60. The pivotal connections of the stems 62 permit the shoe to slide freely on the support 57 and avoid binding of the parts.

Fixed to a lug 68 on the slidable shoe 23 and in the front of the finger 55 is a pin 69 which engages the said finger when the slidable shoe 23 is moved forward and rocks the shaft 54. A stop 70 on the plate 57 and engaged by the loop 59 defines the normal position of the slidable shoe 23 and arrests the same when restored after actuation in the manner to be explained. Fixed to the end of the shaft 54 opposite the finger 55 is a depending arm 71 which is designed when the shaft 54 is rocked to trip or release the mechanism for operating the clutch controlling rod 21. To this end the arm 71 is provided with a pin 72 which is adapted to engage an upwardly extending finger 73 of a dog 74 pivotally mounted between the lugs 30, on the shaft 31. This dog normally engages a shoulder 75 of an arm 76 mounted on a shaft 77 journaled at its end, as at 78, in the side members of the frame of the machine; and this arm is splined to the shaft so as to oscillate therewith but be movable longitudinally thereon, such longitudinal movement being compelled by ears 79 located at opposite sides of the arm and formed on the bracket 25, and shown in Figs. 1 and 3. A coiled expansion spring 80 on a pin 81 projecting rearwardly of the bracket 25 and passing through an aperture (not shown) in the dog 74, reacts between the said dog and the bracket to hold the dog in engagement with the shoulder 75.

Coiled about the shaft 77 is a spiral spring 82 one end of which is anchored to the frame of the machine as at 83, while the other end is attached to the shaft. The end of the shaft 77 at that side of the machine adjacent the clutch 19 is extended outwardly and is provided with an arm 84 to which the lower end of the rod 21 is pivoted. The tendency of the spring 82 is to turn the shaft 77 in the direction of the arrow, Fig. 1, and move the rod 21 upwardly to uncouple the clutch, but this is prevented by the engagement of the dog 74 with the shoulder of the arm 76. When, however, the dog is disengaged from the arm 76 the shaft is turned far enough to throw the rod 21 so as to uncouple the clutch.

Fixed to the shaft 31 is a disk 85 having a short cam depression 86, and coöperating with such disk is a lever 87 fixed on the shaft 77 and the free end of which is provided with an anti-friction roller 88 which engages the periphery of the disk 85. In the normal operation of the machine and while the shaft 77 is held against movement by the dog 74, during the oscillations of the disk 85, the roller 88 is engaged by the uniform periphery of the disk and is held out of engagement with the depression 86. The parts are so related, however, that the dog 74 is tripped just before the roller 88 reaches the depression 86, and the roller then enters such depression so as to permit the shaft 77 to be turned by its spring 82.

Fixed to the shaft 54, adjacent the arm 71, is a depending arm 89 provided in the present instance with an abutment 90 at its free end. Splined on the shaft 31 so as to oscillate therewith but be capable of longitudinal movement thereon, is a sleeve 91 having a shoulder 92 and which is maintained in proper position and compelled to move with the bracket 25 by the ears 30 and 93 located at its opposite sides and formed on the bracket 25. When the shaft 54 is rocked the arm 89 is moved forward and its abutment projected into the path of the shoulder 92 of the sleeve 91. As the lever 42 is returned by the spring 50, after the machine is started again, the shoulder 92 engages the abutment 90 rocking the shaft 54 in the opposite direction to that in which it moves when operated by the forward movement of the slidable shoe 23, thereby thrusting the finger 55 against the pin 69 and restoring the slidable shoe to its original position, the latter being arrested by the stop 70.

The initial position of the oscillating toe 24 and the normal position of the slidable shoe 23 are as shown in Fig. 6. At about the time the front edge of a sheet clears the front edge of the stack, as it is separated and fed forward by the usual mechanism, the lowest portion of the cam-disk 48 is engaged with the roller 47, and as the rising portion of the disk then travels past the said roller the movement of the oscillating toe 24 is gradually increased so that when it is in its upright position as shown in Fig. 7, it is traveling at the same speed as the sheet being delivered, thereby avoiding slippage. As the portion of the disk which is of uniform diameter comes into engagement with the roller 47, the oscillating toe 24 reaches its extreme forward position of Fig. 8 and is held there while the ejecting rolls are taking the sheet away and until the cam shoulder 49 moves past the roller to permit the spring 50 to return the toe to its original position in time to move forward with the next sheet. This is the normal operation of the device.

The oscillating toe 24 is designed to be so adjusted relatively to the slidable shoe 23

that when the radial portion or end of the toe is at the point of nearest approach to the slidable shoe 23, that is to say when the radial surface or outer end of the oscillating toe is moving past and directly under the slidable shoe 23 as shown in Fig. 7, there is sufficient clearance between the oscillating toe and the slidable shoe to permit a predetermined thickness of paper to pass freely between the same. When, however, an abnormal thickness of paper is fed forward by the associated machine and enters between the oscillating toe and the slidable shoe, sufficient friction is created between the sheets and the shoe and toe to cause the toe 24 by its movement to carry the shoe 23 forward, the latter being held firmly in contact with the paper by the springs 66. This movement of the slidable shoe 23, by reason of the engagement of the pin 69 with the finger 55, rocks the shaft 54, tripping the dog 74 and releasing the arm 76 so as to permit the spring 82 to turn the shaft 77 and raise the clutch-uncoupling rod 21 to arrest the motion of the machine, as heretofore described.

The clutch may be coupled to start the machine by any suitable means, as by employing the arm 84 on the shaft 77 as a handle. By moving the arm or handle 84 downwardly the shaft 77 is rocked in the direction opposite to that indicated by the arrow in Fig. 1, thereby moving the arm 76 in position to be engaged by the dog 74.

The machine being started again as soon as the cam shoulder 49 of the disk 48 passes the roller 47 and the latter rides onto the reduced portion of the said disk, the lever 42 is retracted by the spring to restore the slidable shoe in the manner heretofore explained. As the shaft 54 moves into its original position the pin 72 of the arm 71 is moved away from the finger 73, thus releasing the dog 74 which then is pressed outwardly by its spring and engages the shoulder of the arm 76 holding the shaft 77 against movement.

As has heretofore been stated the clutch may be controlled to arrest the motion of the machine by electrically operated means, and in Figs. 11 and 12 I have illustrated my invention in connection with such means. In this instance the rod 21 is actuated by the armature of an electro-magnet which is energized by the closing of a circuit through the medium of the slidable shoe 23 of the controller. To this end the clutch rod 21 is pivoted to an extension of the armature 94 of an electro-magnet 95, which may be suitably mounted on the frame of the machine. One terminal of the circuit in which the electro-magnet 95 is included, and which also includes a battery 96, is in the form of a contact 97 on the slidable shoe 23, while the other terminal leads to a contact 98 supported by the arm 26 of the bracket 25 but insulated therefrom by an insulating block 99. When the electro-magnet controlling means for uncoupling the clutch are employed, the shaft 77, shown in Fig. 1, as well as the devices for releasing and resetting the same, are dispensed with. Normally and when the machine is operating under proper conditions the circuit is open at the contacts 97 and 98. When, however, the slidable shoe is moved forward in the manner heretofore described in connection with the construction illustrated in Fig. 1, the contact 97 is moved into engagement with the contact 98 thereby closing the circuit and energizing the electro-magnet 95, and as the armature 94 is attracted the rod 24 is raised thereby uncoupling the clutch and arresting the motion of the machine. By using the extension of the armature as a handle the rod 21 may be lowered, thereby coupling the clutch to start the machine, and the slidable shoe is restored by the coöperation of the shoulder 92 with the abutment 90 as heretofore explained.

By means of the adjustable block 33 a fine and exact adjustment of the oscillating toe 24 with reference to the slidable shoe 23 may be readily secured to adapt the controller to stock of varying thickness, and variations in the width of the stock are provided for by the lateral adjustment of the bracket 25, the shafts 31 and 77 having the oscillating toe 24, dog 74, sleeve 91 and arm 76 splined thereon so as to readily move longitudinally thereof when the bracket is adjusted. If desired a set screw 100, passing through the bracket and engaging the track 29, may be provided for holding the bracket in its adjusted position.

Having described my invention what I claim is:—

1. The combination with a paper handling machine, of a driving connection therefor, a slidable shoe and an oscillating toe, the slidable shoe being normally stationary and adapted to be moved by the oscillating toe when an abnormal thickness of paper is interposed there between, and means actuated by the slidable shoe for arresting the motion of the machine.

2. The combination with a paper handling machine, of a driving connection therefor, a normally stationary slidable shoe and an oscillating toe, the slidable shoe being adapted to be moved by the oscillating toe when an abnormal thickness of paper is interposed between the slidable shoe and the oscillating toe, and a connection controlled by the normally stationary slidable shoe for throwing the driving connection out of operation.

3. The combination with a paper handling machine, of a driving connection therefor, a movable toe, a slidably mounted shoe adapted to be moved by the movable toe when an

abnormal thickness of paper is interposed between the shoe and the toe, and means controlled by the slidable shoe for throwing the driving connection out of operation.

4. The combination with a paper handling machine, of a driving connection therefor, a normally stationary slidable shoe, an oscillating toe coöperating with the normally stationary shoe and adapted to move the same when an abnormal thickness of paper is interposed between them, and means actuated by the normally stationary shoe for arresting the motion of the machine.

5. The combination with a paper handling machine, of a driving connection therefor, an oscillating toe, a normally stationary slidable shoe adapted to be moved by the oscillating toe when an abnormal thickness of paper is interposed between them, a clutch in the driving connection, and means controlled by the slidable shoe for uncoupling the clutch.

6. The combination with a paper handling machine, of a driving connection therefor, a clutch in the driving connection, two members between which the paper passes, one of said members oscillating in the direction of movement of the sheets and the other member being normally stationary but slidable and adapted to be moved by the oscillating member when an abnormal thickness of paper is interposed between the members, and mechanism controlled by the slidable member for uncoupling the clutch.

7. In combination with a paper handling machine having a driving shaft, a clutch therefor, a controller to uncouple the clutch, of a normally stationary slidable shoe and an oscillating toe for moving the slidable shoe when an abnormal thickness of paper is interposed between them, and means actuated by the slidable shoe when moved to operate the clutch controller.

8. In combination with a paper handling machine having a driving shaft, a clutch therefor, a controller to uncouple the clutch, a normally stationary slidable shoe, an oscillating toe between which and the slidable shoe the paper passes and which is adapted to move the slidable shoe when an abnormal thickness of paper is interposed between the shoe and the toe, a shaft for operating the clutch controller, a dog for holding the shaft against movement, and a connection actuated by the movement of the slidable shoe for releasing the dog.

9. In combination with a paper handling machine having a driving shaft, a clutch therefor, and means to uncouple the clutch, a normally stationary slidable shoe, an oscillating toe coöperating therewith and which is adapted to move the same when an abnormal thickness of paper is interposed between the shoe and the toe, a shaft on which the oscillating toe is mounted, means for oscillating the shaft, a shaft to which the means to uncouple the clutch is connected, a spring tending to turn the said shaft, a dog holding the said shaft against movement, and means actuated by the movement of the slidable shoe to release the said shaft.

10. The combination with a paper handling machine, of a clutch therefor, an oscillating shaft, a toe on said shaft, a slidable normally stationary shoe coöperating with the oscillating toe and moved by the latter when an abnormal thickness of paper is interposed between the toe and the shoe, an adjusting slide engaging and for moving the shaft to adjust the oscillating toe relatively to the slidable shoe, and means actuated by the movement of the slidable shoe for uncoupling the clutch.

11. The combination with a paper handling machine, of a driving connection therefor, a normally stationary slidable shoe and an oscillating toe coöperating therewith and adapted to move the slidable shoe when an abnormal thickness of paper is interposed between the toe and the shoe, a connection actuated by the movement of the slidable shoe for arresting the motion of the machine, an arm for restoring the slidable shoe, and means for moving the arm when the machine is started again.

12. The combination with a paper handling machine, of a clutch therefor, a normally stationary slidable shoe and an oscillating toe coöperating therewith and adapted to move the same when an abnormal thickness of paper is interposed between the shoe and the toe, a rock shaft having a finger engageable with the slidable shoe, means actuated by the rock shaft for uncoupling the clutch and means for moving the rock shaft to restore the slidable shoe.

13. The combination with a paper handling machine, of a clutch associated therewith, a rod for uncoupling the clutch, a normally stationary slidable shoe and an oscillating toe coöperating therewith and adapted to move the same when an abnormal thickness of paper is interposed between the shoe and the toe, an oscillating shaft on which the oscillating toe is mounted, a rock shaft having a finger adapted to be engaged by the slidable shoe when the latter is moved, an arm on the rock shaft, means actuated by the said arm to move the clutch rod, a second arm on the rock shaft, and a shoulder carried by the oscillating shaft and adapted to engage the said second arm to restore the slidable shoe.

14. The combination with a paper handling machine, of a driving connection therefor, an oscillating toe and a coöperating normally stationary slidable shoe adapted to be moved by the oscillating toe when an abnormal thickness of paper is interposed

between the shoe and the toe, the said shoe and toe being adjustable transversely of the machine, and means actuated by the slidable shoe for arresting the motion of the machine.

15. The combination with a paper handling machine, of a driving connection therefor, an oscillating toe and a coöperating normally stationary slidable shoe adapted to be moved by the oscillating toe when an abnormal thickness of paper is interposed between the shoe and the toe, said shoe and toe being adjustable simultaneously and transversely of the machine, and a connection controlled by the slidable shoe for arresting the motion of the machine.

16. The combination with a paper handling machine, of a clutch therefor, a bracket mounted on and slidable transversely of the machine, an oscillating toe movable with the bracket and a coöperating normally stationary slidable shoe mounted on the bracket and adapted to be moved by the oscillating toe when an abnormal thickness of paper is fed between the shoe and the toe, and means controlled by the slidable shoe for uncoupling the clutch.

In testimony whereof I affix my signature in presence of two witnesses.

HOMER C. LA BATT.

Witnesses:

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ARTHUR B. SEIBOLD.