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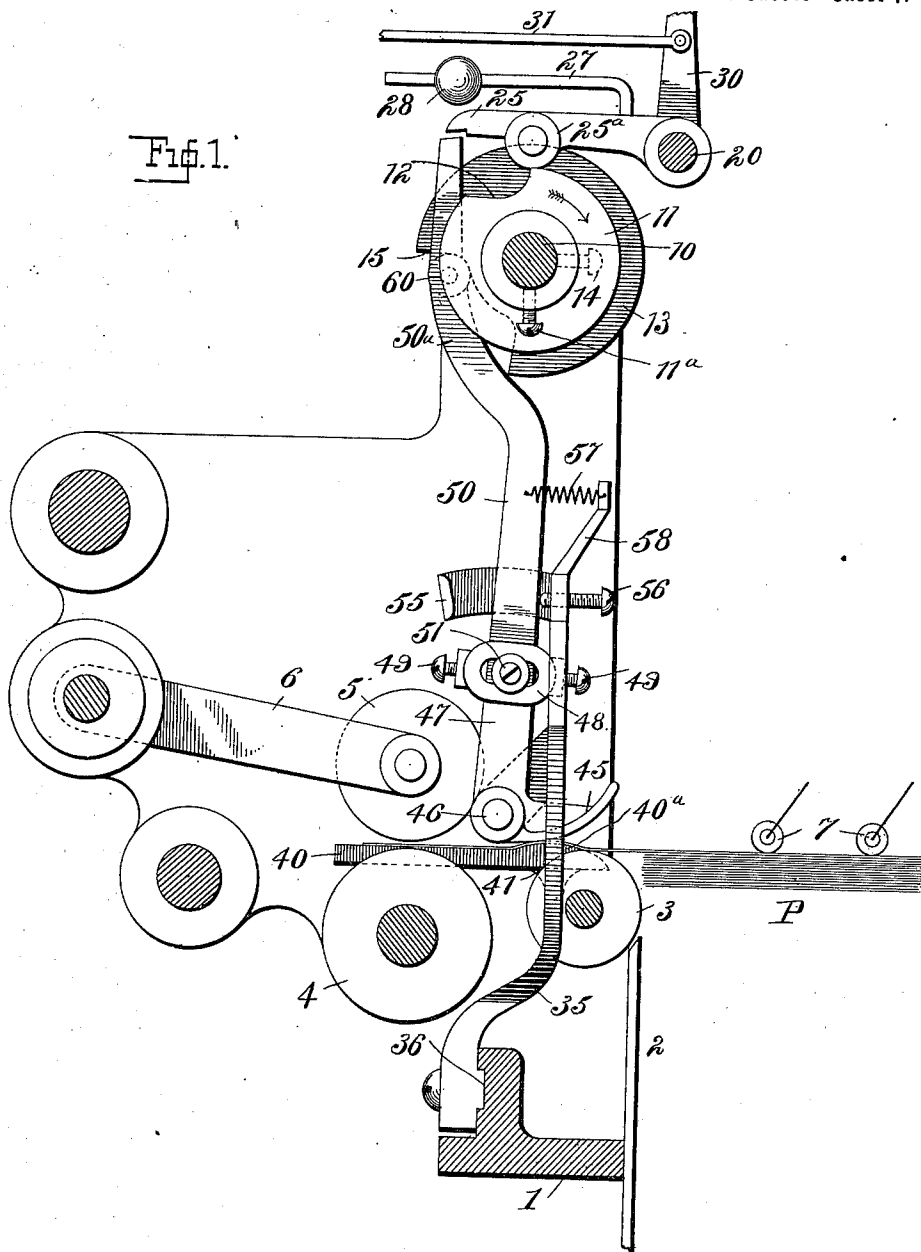
T. C. DEXTER.

SHEET CALIPERING DEVICE FOR PAPER FEEDING MACHINES.

(Application filed May 14, 1900.)

(No Model.)

3 Sheets—Sheet 1.



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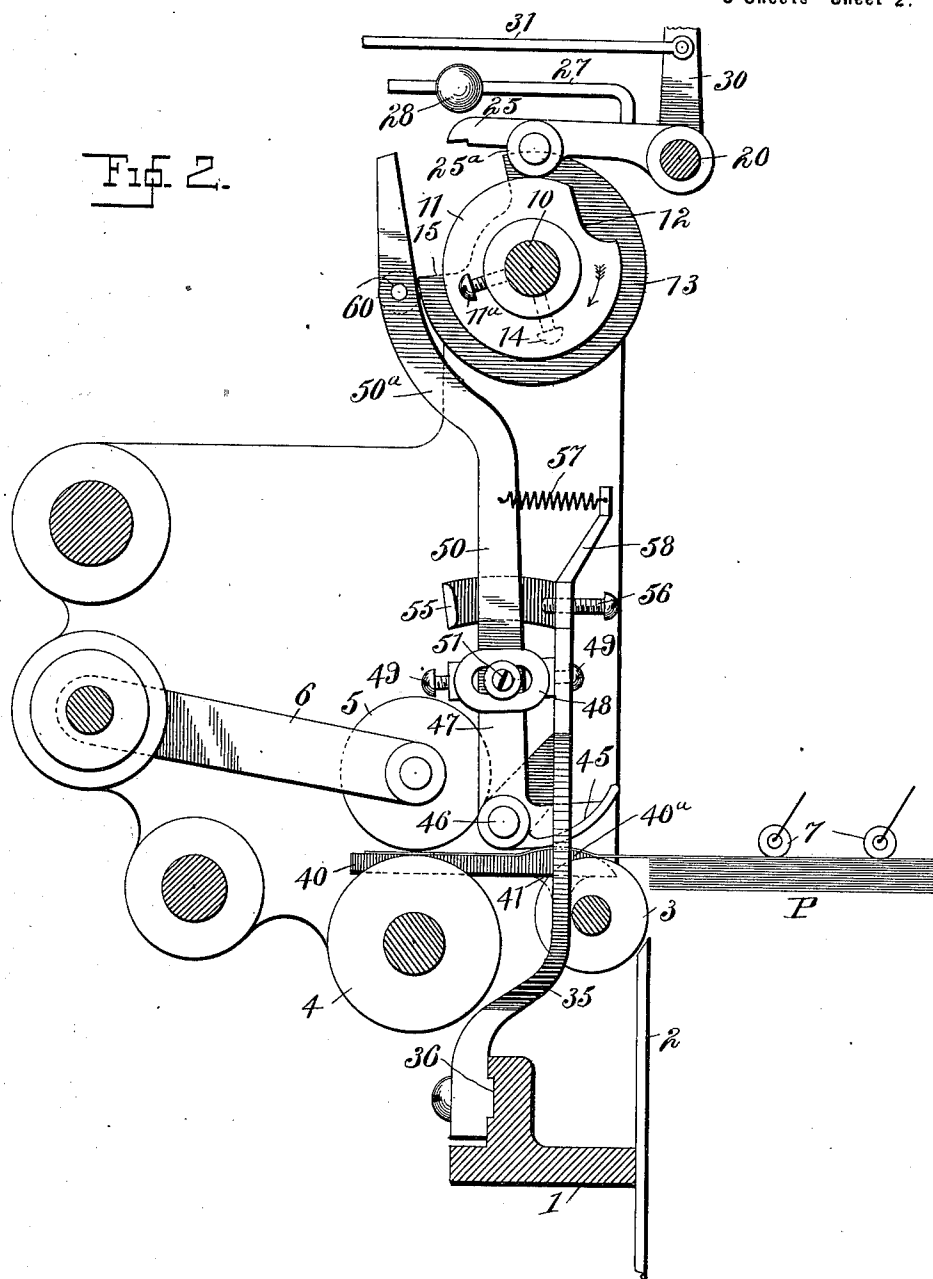
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(Application filed May 14, 1900.)

(No Model.)

3 Sheets—Sheet 2.



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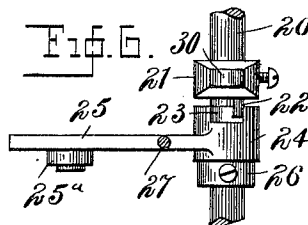
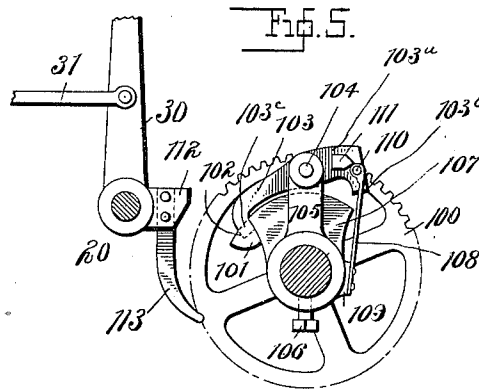
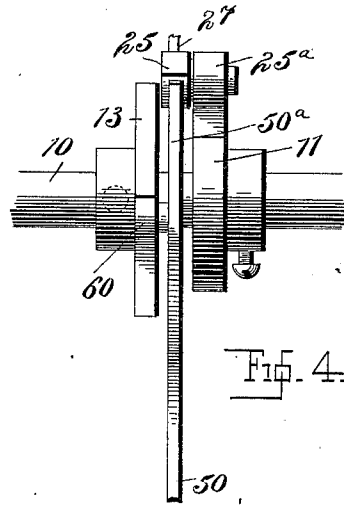
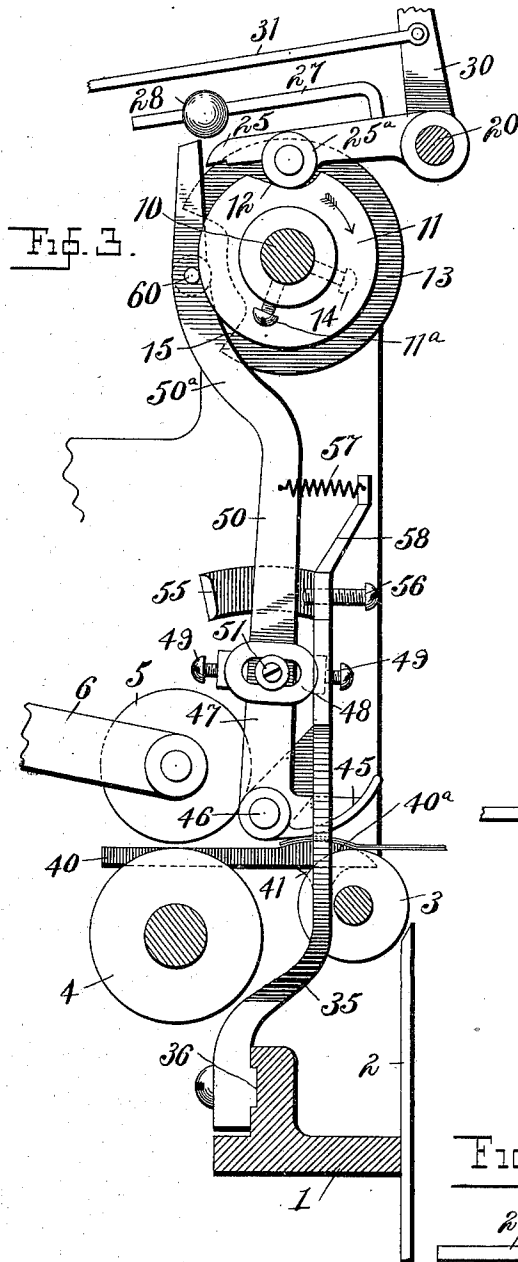
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(Application filed May 14, 1900.)

(No Model.)

3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

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SHEET-CALIPERING DEVICE FOR PAPER-FEEDING MACHINES.

SPECIFICATION forming part of Letters Patent No. 672,702, dated April 23, 1901.

Application filed May 14, 1900. Serial No. 16,636. (No model.)

To all whom it may concern:

Be it known that I, TALBOT C. DEXTER, a citizen of the United States, residing at Pearl River, county of Rockland, and State of New York, have invented certain new and useful Improvements in Sheet-Calipering Devices for Paper-Feeding Machines, of which the following is a specification.

My invention relates to improvements in the type of devices adapted to caliper the thickness of sheets passing from a feeding-machine and in cases where more than one sheet is fed forward to operate a suitable throw-out mechanism for arresting the operation of the machine. Such mechanisms are employed in connection with feeding-machines, folding-machines, ruling-machines, and other machines designed to operate upon sheets of paper, their object being to avoid wasting the paper and injuring the machinery by the passage of a greater thickness of paper than can be taken care of by the machines.

My present invention may be considered in the light of an improvement upon the sheet-calipering mechanism covered by my Patent No. 656,838, granted August 28, 1900, for improvements in paper-feeding machines. In the calipering mechanism of my said patent I employ suitable throw-out mechanism having an operating-arm connected with it, two relatively-movable sheet-calipering members arranged, respectively, above and below the plane of feed of the sheets, the member above the plane of feed having an arm or lever extending from it in position to normally sustain the throw-out-operating arm, while the member below the plane of feed is intermittently moved toward said first-named member for calipering the sheets between them, and when more than the normal thickness of sheets is presented between said members to move the arm or lever of said upper member away from the throw-out-operating arm to allow the latter to arrest the operation of the machine.

The object of my present invention is to simplify and improve the structure of the machine referred to, and to this end I employ a stationary bed or lower calipering member rigidly mounted upon the machine-frame and a movable upper calipering member adjust-

ably supported in relation to the lower stationary member and formed with an arm or lever which is adapted to intermittently move into and out of position to sustain the throw-out-operating arm. The throw-out-operating arm is provided with an antifriction-roller which runs upon the periphery of a cam and is normally sustained thereby in its inoperative position. The arm or lever of the movable calipering member is also provided with an antifriction-roller which runs upon the periphery of another cam, which normally sustains the caliper in inoperative position, but which intermittently allows it to move into operative position for calipering the sheet and for sustaining the throw-out-operating arm during the moment that the low portion of the throw-out-controlling cam is passing beneath said throw-out-operating arm.

In order that my invention may be fully understood, I will first describe the same with reference to the accompanying drawings and will afterward point out the novelty more particularly in the annexed claims.

In said drawings, Figure 1 is a detail sectional elevation of part of a paper-feeding machine having my improved sheet-calipering mechanism applied thereto and representing the parts of said mechanism in their normal position while the machine is operating and a single sheet is being calipered. Fig. 2 is a similar view representing the parts in the position they assume after a sheet has been calipered and while the sheet is passing off from the machine under the action of the sheet-delivery mechanism. Fig. 3 is a similar view representing the parts in the position they assume when the caliper has detected the presence of an abnormal thickness of sheets and has allowed the throw-out mechanism to operate. Fig. 4 is a detail front view illustrating the relative arrangement of the caliper-arm, the throw-out-operating arm, and their controlling-cams, the parts being in the position shown in Fig. 1. Fig. 5 is a detail view illustrating one form of clutch which may be employed to be operated by the throw-out-operating arm under the control of the caliper. Fig. 6 is a detail view illustrating the manner of mounting the throw-out-operating arm.

The framework of the machine upon which

my improvements are mounted may be of any suitable construction.

The reference-letter P indicates the pile of paper in the feeding-machine to be fed to the folder, printing-press, ruling-machine, or other machine which is to operate upon the paper.

1 is a part of the machine-frame.

2 indicates the vertical guide-rods for the front edge of the pile of sheets.

3 indicates one of a series of knurled wheels or rollers at the delivery end of the feeding-machine.

4 is one of a series of lower delivery feed-rollers, and 5 is one of a series of drop-rollers journaled in oscillating arms 6 and cooperating with feed-rollers 4 in a manner well understood.

7 may indicate any suitable form of feeding-off fingers adapted to feed sheets singly from the pile to the drop-roller delivery mechanism 4 5.

10 is the main operating-shaft of the machine, suitably journaled in the machine-frame and operated in any suitable manner. Keyed to the shaft 10 by a screw or other device 11^a is the throw-out-controlling cam 11, formed with a cut-out or low portion 12, for the purpose presently to be explained.

13 is a larger cam, which may consist of a disk adjustably mounted upon the shaft 10 adjacent to the cam 11 and secured by set-screw 14. The disk cam 13 is formed with a cut-out or low portion 15.

20 is a rock-shaft carrying means for actuating any suitable form of clutch or other throw-out mechanism by which the feeding-machine or other machine to which the mechanism is applied may be thrown into or out of gear with its driving mechanism. For the purpose of illustration I have represented in the drawings and will hereinafter describe the form of clutch and operating means set forth in my above-named patent, No. 656,838; but I would have it understood that I do not limit myself to any particular form of throw-out clutch.

Keyed to the rock-shaft 20 is a collar 21, provided with a pin 22, which rests in a notch or recess 23 of the hub 24 of a rock-arm 25. The rock-arm 25 is loosely mounted upon the rock-shaft 20 and confined in position by any suitable means, such as a collar 26.

27 is an arm formed integrally with or rigidly attached to the rock-arm 25, and 28 is a weight adjustably mounted upon the arm 27 for insuring the downward movement of the rock-arm 25 when it is released by the mechanism hereinafter explained. The arm 25 is the throw-out-operating rock-arm, which is controlled by its cam and the sheet-calipering mechanism in the manner which I will presently explain.

The object of forming a loose-jointed connection between the rock-arm 25 and shaft 20, as I have just explained, is to allow the rock-shaft 20 to be operated by hand for throwing

out the feeding-machine independently of the caliper and throw-out-operating rock-arm 25. To throw out the machine by hand, I provide one or more operating rock-arms 30, keyed to the shaft 20 and provided with any suitable operative connection, such as a rod 31, extending forward or backward to a convenient point of operation. I have shown a rock-arm 30, formed integral with the collar 21.

35 is a yoke or auxiliary frame secured to the feeder-frame 1 at 36 and supporting the lower stationary member and the upper movable member of the calipering device, as I will now explain.

40 is the lower stationary member of my improved calipering device. It consists of a plate curved slightly at its rear end to facilitate the passage of the leading edges of the sheets thereover and formed with a depending bracket-arm 41, by means of which it is secured to the lower portion of the yoke or auxiliary frame 35. The upper surface of the lower stationary calipering member 40 is formed with a rounded prominence 40^a, which is located in the plane of feed of the sheets. This rounded prominence 40^a is the calipering part of the lower member.

45 is the rearwardly-projecting curved foot of the upper movable calipering member. This calipering-foot 45 is journaled at 46 to the upper portion of the yoke or auxiliary frame 35. Formed integral with the calipering-foot 45 is an upwardly-projecting arm 47, formed at its upper end with a yoke 48, through the ends of which are threaded adjusting-screws 49.

50 is a long arm or lever journaled upon the pin 46 alongside of the calipering-foot 45 and extending upwardly therefrom, its upper end being curved forwardly at 50^a. The arm or lever 50 carries a stud 51, which rests within the yoke 48 of the arm 47 and is engaged on opposite sides by the adjusting-screws 49, so that the relation of the arm or lever 50 to the calipering-foot 45 can be regulated to a nicety, and they can be clamped rigidly together to operate upon journal 46 as a single structure.

55 is a bracket-arm extending from the auxiliary frame 35, and 56 is a limiting-screw threaded into the bracket-arm 55 and adapted to limit the movement of the upper calipering member under the action of its spring 57, which is connected to the arm 50 and to a bracket-arm 58, extending from arm 55. In place of the spring 57 I may provide a torsional spring (not shown) upon the pivot-pin 46 to give the upper calipering member the required spring tendency.

Adjacent to the upper end of the long arm or lever 50 is journaled an antifriction-roller 60, which travels upon the periphery of the large cam 13, above referred to, and intermittently drops into the low portion or recess 15 of said cam, the spring 57 giving said arm 50 a tendency to move toward the cam.

It will be observed from Fig. 4 of the draw-

ings that rock-arm 25 and long arm 50 are in the same vertical plane and that cams 11 and 13 are in parallel vertical planes, the anti-friction-rollers 25^a and 60 projecting from opposite sides of the arms 25 and 50 into the planes of cams 11 and 13, respectively.

The extreme upper end of the arm 50 is shaped to properly engage and support the rock-arm 25 at the proper moment, as I will now explain.

Any suitable form of clutch mechanism may be employed for arresting the operation of the machine under the control of the sheet-calipering mechanism or sheet-detecting device. I have illustrated in Fig. 5 and will now describe the clutch mechanism illustrated and described in my above-named patent, No. 656,838.

Upon the end of shaft 10, outside of the side frame of the machine, is freely journaled a main power-gear 100, having attached to or formed integral with it one member of the automatic clutch. This member of the clutch on gear 100 is shown in the form of a cam-shaped shoulder 101, having a notch 102 for the engagement of the clutch-dog 103. The dog 103 is journaled at 104 to an arm 105, which is adjustably secured to the shaft 10 outside of gear 100 by means of a tap-bolt 106. Formed integral with the arm 105 is a plate or flange 107, for the purpose presently to be explained.

108 is a spring-arm secured to shoulder 109 of arm 105 and having journaled to its free end a small anti-friction-roller 110, which is adapted to engage the angular faces of the lug 111, attached to or formed upon the face of the rear portion of dog 103 to hold the dog in engaged or disengaged position.

Keyed to the end of rock-shaft 20 is a clutch-operating arm 112, formed with a depending finger 113, which arm and finger are supported in the same longitudinal plane with the clutch-dog 103.

The operation of my improved sheet-calipering device is as follows: In the ordinary operation of the feeding-machine, in which single sheets are successively fed from the pile between the sheet-calipering members to the drop-roller delivery mechanism, the long arm 50 of the sheet-calipering device will intermittently move inwardly to come under the throw-out-operating arm 25 just prior to the moment when the low portion 12 of cam 11 reaches the anti-friction-roller 25^a, so that the arm 50 will sustain the arm 25 while said low portion 12 of the cam 11 is passing said anti-friction-roller. It will be observed that the cams 11 and 13 are arranged relatively upon the shaft 10, so that the low portion 15 of cam 13 will reach the anti-friction-roller 60 upon the arm 50 just prior to the moment when the low portion 12 of cam 11 reaches anti-friction-roller 25^a. This relation of the cams is necessary to enable the arm 50 to reach its position beneath arm 25 prior to the release of said arm by its cam. Assume now that

the feeding-machine has failed to separate the top sheet from its under sheet and the two sheets are passed forward to the delivery mechanism at the same time—an accident which very frequently happens in the operation of feeding-machines. A moment before the delivery drop-rollers 5 operate, the low portion of cam 13 reaches the anti-friction-roller 60, allowing spring 57 to pull arm 50 rearwardly and move the calipering-foot 45 downwardly into engagement with the two sheets of paper which are supported upon the rounded prominence 40^a of the rigid lower calipering member 40. The extra thickness of sheets between these members will prevent the arm 50 from moving rearwardly sufficiently far to reach its position under the nose of the throw-out-operating arm 25. Immediately after this has taken place and still before the delivery-drop-roller mechanism has operated, the low portion 12 of cam 11 has reached the anti-friction-roller 25^a, tending to drop the rock-arm 25, and as the arm 50 of the upper calipering member has failed to reach its position under the arm 25 there will be nothing to sustain said arm 25, and it will drop to the limit of the low portion of its controlling-cam 11, which movement is sufficient to actuate the throw-out mechanism, which arrests the operation of the machine and prevents the passage of the improper thickness of sheets from the machine. When the rock-arm 25 drops, the rock-shaft 20 will be rocked to throw arm 112 into engagement with the cam-surface 103^a of dog 103, thereby forcing the heel 103^b of said dog downwardly into engagement with the plate or flange 107, the nose 103^c of the dog being withdrawn from the notch 102 to release the main gear 100 and arrest the operation of shaft 10 and all the operating parts of the machine which are driven therefrom. When the dog is disengaged in this manner, the spring-arm 108 yields outwardly under the action of angular lug 111 upon anti-friction-roller 110, causing said roller to disengage the under angular face of said lug and engage its upper angular face for holding the dog in disengaged position. When it is desired to start the operation of the machine, the rock-shaft 20 is rocked rearwardly by one of the hand-levers, causing finger 113 to engage the forward end of the dog 103 and force it downwardly until the nose 103^c rests upon the plate or flange 107, the spring-arm 108 operating, as before, to give the dog a spring tendency to move into engagement with the other clutch member. The continuously-rotating gear 100 brings the cam-shoulder 101 around into engagement with the notch 102 to again lock the clutch members together, when the machine immediately starts off.

My improved mechanism is effective in producing the desired result and is much simpler than devices of this character as heretofore constructed. The adjustment for the calipering device is above the plane of feed

of the sheets and is readily accessible at all times.

My improved calipering device differs, broadly, from the device of my patent above referred to in that only one of the calipering members is movable. This movable member has a normal stroke into and out of position to prevent the operation of the throw-out mechanism, and when an abnormal thickness of sheets is presented between the calipering members the movable member is not allowed to move far enough to prevent the operation of the throw-out mechanism.

In the machine of my patent the arm of the upper calipering member is normally in position to sustain the throw-out-operating arm and is only moved out of this position when an abnormal thickness of sheets is presented between the two members and enables the intermittently-movable lower member to actuate it through the intervening sheets.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In combination with a machine through which sheets of paper are passed, and suitable throw-out mechanism adapted to arrest the operation of said machine, of an intermittently-movable sheet-calipering device supported adjacent to the plane of feed of the sheets and adapted to intermittently move into position to prevent the operation of the throw-out mechanism during the normal operation of the machine, and to be held out of such position by the presence of an abnormal thickness of sheets to allow the operation of the throw-out mechanism, substantially as set forth.

2. In combination with a machine through which sheets of paper are passed, suitable throw-out mechanism for arresting the operation of said machine, and an arm connected with and adapted to operate said throw-out mechanism, of an intermittently-moving calipering device arranged adjacent to the path of the sheets and adapted to caliper the thickness of sheets passing it and so constructed and arranged that its movements will be controlled by the thickness of sheets passing it; whereby said calipering member will intermittently move into position to sustain the throw-out-operating arm in the ordinary operation of the machine, and will be prevented from moving into such sustaining position by the presence of an abnormal thickness of sheets, substantially as set forth.

3. In combination with a machine through which sheets of paper are passed, suitable throw-out mechanism for arresting the operation of said machine, an arm connected with and adapted to operate said throw-out mechanism, and a cam normally engaging and sustaining said throw-out-operating arm and intermittently releasing it, of a calipering device arranged adjacent to the path of the sheets and adapted to caliper the thickness of sheets passing through the machine and so

constructed that its movements will be limited by the thickness of sheets passing through it; whereby said calipering member will intermittently move into position to sustain the throw-out-operating arm in the ordinary operation of the machine, and will be prevented from moving into such sustaining position by the presence of an abnormal thickness of sheets, substantially as set forth.

4. In combination with a machine through which sheets of paper are passed, a sheet-calipering device comprising a rigid member and a movable member between which the successive sheets pass, means for intermittently moving said movable member toward and away from the rigid member, suitable throw-out mechanism for arresting the operation of the machine, and suitable intermediate mechanism between the movable calipering member and throw-out mechanism constructed and arranged to prevent the operation of the throw-out mechanism during the passage of the normal thickness of sheets through the machine, and allow the operation of the throw-out mechanism when an abnormal thickness of sheets passes, substantially as set forth.

5. In combination with a machine through which sheets of paper are passed, suitable throw-out mechanism adapted to arrest the operation of said machine, and an arm connected with and adapted to operate said throw-out mechanism, of a sheet-calipering device comprising a stationary member and an intermittently-movable member between which the sheets of paper pass, said intermittently-movable calipering member carrying a part which is intermittently moved into position to prevent the operation of the said throw-out-operating arm, substantially as set forth.

6. In combination with a machine through which sheets of paper are passed, suitable throw-out mechanism adapted to arrest the operation of said machine, and an arm connected with and adapted to operate said throw-out mechanism, of a sheet-calipering device comprising a rigid member and an intermittently-movable member between which the sheets of paper pass, an arm carried by said movable member, and means for intermittently moving said movable calipering member toward the rigid member to caliper the sheets between them and to bring the said arm of the movable member into position to prevent the operation of said throw-out-operating arm, substantially as set forth.

7. In combination with a machine through which sheets of paper are passed, suitable throw-out mechanism adapted to arrest the operation of said machine, and an arm connected with and adapted to operate said throw-out mechanism, of a sheet-calipering device comprising a rigid member and a relatively movable member between which the sheets of paper are passed, a throw-out-controlling arm connected with said movable calipering member and adapted to intermittently rest

beneath the throw-out-operating arm, and means for operating said movable calipering member and its connected arm, whereby, in the normal movement of said movable calipering member and its connected arm in calipering the normal thickness of sheets, said calipering-arm will prevent the operation of the throw-out mechanism, and in a shorter or more limited movement caused by the presence of an abnormal thickness of sheets between the calipering members, will allow the throw-out mechanism to operate, substantially as set forth.

8. In combination with a machine through which sheets of paper are passed, suitable throw-out mechanism adapted to arrest the operation of the said machine, and an arm connected with and adapted to operate said throw-out mechanism, of a sheet-calipering device comprising a rigid member and a relatively movable member between which the sheets of paper are passed, a throw-out-controlling arm connected with said movable calipering member and adapted to intermittently rest beneath the throw-out-operating arm, means for operating said movable calipering member and its connected arm, and means for relatively adjusting the two calipering members, whereby the throw-out mechanism will be allowed to operate only when an abnormal thickness of sheets passes between the calipering members, substantially as and for the purpose set forth.

9. In combination with a machine through which sheets of paper are passed, suitable throw-out mechanism adapted to arrest the operation of said machine, an arm connected with and adapted to operate said throw-out mechanism, and a cam normally engaging and sustaining said throw-out-operating arm and adapted to intermittently release said arm, of a sheet-calipering device comprising a rigid member and a relatively movable member between which the sheets of paper pass, a controlling-arm connected with said movable calipering member and adapted to intermittently move into position beneath said throw-out-operating arm, and means for intermittently operating said movable calipering member and its connected controlling-arm, substantially as set forth.

10. In combination with a machine through which sheets of paper are passed, suitable throw-out mechanism adapted to arrest the operation of said machine, an arm connected with and adapted to operate said throw-out mechanism, and a rotary cam normally sustaining said throw-out-operating arm and

adapted to intermittently release it, of a sheet-calipering device comprising a rigid member and a relatively movable member having a throw-out-controlling arm connected to it, and automatically-controlled spring mechanism adapted to intermittently move the movable calipering member toward the rigid calipering member and the connected controlling-arm into position beneath the throw-out-operating arm, substantially as set forth.

11. In combination with a machine through which sheets of paper are passed, suitable throw-out mechanism adapted to arrest the operation of said machine, an arm connected with and adapted to operate said throw-out mechanism, and a rotary cam normally sustaining said throw-out-operating arm and adapted to intermittently release it, of a sheet-calipering device comprising a rigid member and a relatively movable member having a throw-out-controlling arm connected to it, a spring device adapted to intermittently move the movable calipering member and its connected arm into operative position, and a cam engaging said controlling-arm and normally sustaining it against the action of said spring device, substantially as set forth.

12. In combination with a machine through which sheets of paper pass, suitable throw-out mechanism adapted to arrest the operation of said machine, an arm connected with and adapted to operate said throw-out mechanism, and a rotating cam normally sustaining said throw-out-operating arm and adapted to intermittently release said arm, of a sheet-calipering device comprising a rigid member and a relatively movable member between which the sheets of paper pass, a throw-out-controlling arm connected with said movable calipering member, a spring device engaging said controlling-arm and adapted to move said movable calipering member toward said rigid calipering member and said controlling-arm into position beneath the throw-out-operating arm to sustain it temporarily while it is released from the controlling-cam, and a second cam rotating with said throw-out-controlling cam and adapted to normally hold the movable calipering member and the connected controlling-arm in inoperative position and to intermittently release them to the action of the said spring device, substantially as and for the purpose set forth.

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