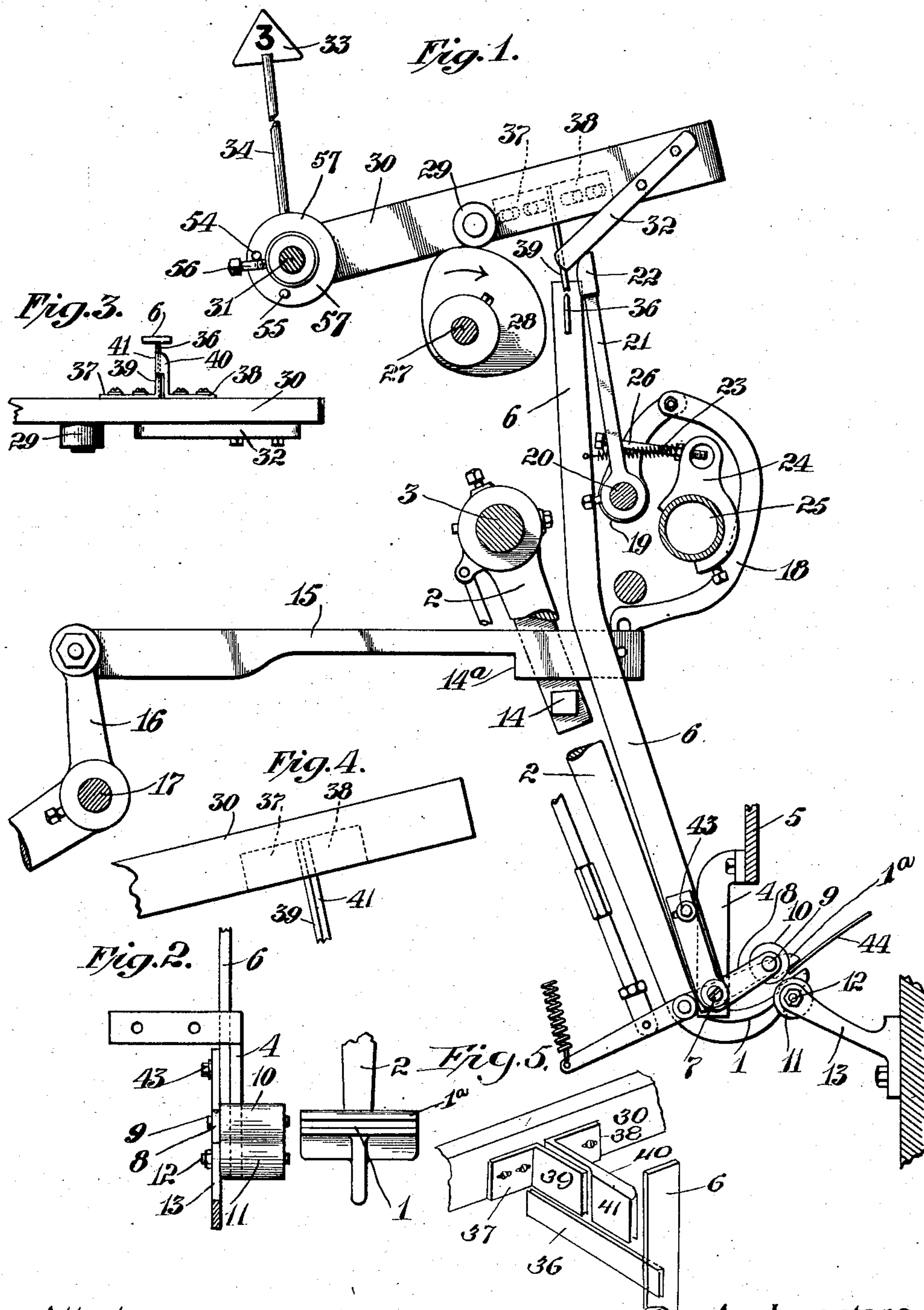


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 CALIPERING DEVICE FOR SHEET GATHERING MACHINES.
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UNITED STATES PATENT OFFICE.

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CALIPERING DEVICE FOR SHEET-GATHERING MACHINES.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, CHARLES L. SMITH and ALEX O. GULLBERG, citizens of the United States, and residents, respectively, of New York city, borough of Manhattan, county and State of New York, and Arlington, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Calipering Devices for Sheet-Gathering Machines, of which the following is a specification.

This invention relates to improvements in calipering devices for sheet gathering machines, such as are used for gathering the signatures for books, pamphlets, etc.

The object of our invention is to provide a new and improved machine of this kind which is simple in construction, quick and reliable in action and easily adjusted, and which is provided with means for automatically calipering the thickness of the sheet and thereby controlling the stop mechanism, which calipering means operates independently of the gripper.

In the accompanying drawings in which like letters of reference indicate like parts in all the figures: Figure 1 is a vertical sectional view of part of a gathering machine, having one embodiment of our improvement. Fig. 2 is a detail view showing the sides of the calipering rollers and the gripper jaws in end view. Fig. 3 is an enlarged detail plan view of part of the cam lever showing the gage plates in line. Fig. 4 is a side view of the bar, showing the gage plates in end view and out of line. Fig. 5 is a perspective view of the gage plates and associated parts.

The gripper mechanism, which may be of any approved or conventional construction, has two gripper jaws 1 and 1^a, which are suitably mounted on a swinging gripper bar 2, secured on a driven rock shaft 3 and any suitable well known mechanism is provided to open or swing apart the jaws as they swing toward the stack or sheets, then to close them to grip a sheet, keep them closed while swinging from the stack and withdrawing the sheet, then to open them to release the sheet, all as is very well known in this art.

A bracket 4 is secured to the front 5 of the signature box and to the same an upwardly extending detector bar 6 is pivoted at 7 and

this bar is provided with a short arm 8 extending toward the stack of sheets and having at its free end a laterally extending pin 9 on which a calipering roller 10 is mounted, snugly but to turn freely. Below and adjacent to and parallel with the roller 10 a like roller 11 is mounted on a laterally projecting pin 12 on a fixed bracket 13. As shown in Fig. 2 the caliper rollers 10 and 11 are located adjacent to the gripper jaws 1 so that a sheet or signature gripped and held between the jaws must pass between the caliper rollers 10 and 11 when the jaws swing from the stack.

The gripper arm 2 carries a laterally extending stud 14 which can engage a shoulder 14^a on a substantially horizontal bar 15 pivoted at one end to an arm 16 on a rock shaft 17, from which the starting and stopping mechanism of the machine is operated in any well known manner forming no part of the present invention, and the opposite end of this bar 15 is pivoted to the lower end of a curved link 18 pivoted at its upper end to the end of the shorter arm of an angle lever 19 mounted to rock on a fixed shaft 20, the upper end of the longer arm 21 of this angle lever terminating in a head 22 beveled at its upper end.

A helical spring 23 has one end attached to the detector bar 6 and the other to a bracket 24 on a part 25 of the machine frame and this spring pulls the detector bar 6 to the right until it rests against the head of an adjustable stop-screw 26, in the bracket 24.

A rotary shaft 27 carries a cam 28 upon which rests the side roller 29 of a cam lever 30 mounted to swing up and down on a shaft 31. The cam lever 30 is provided with a downwardly and inwardly inclined arm 32 which rests upon the beveled end of the head 22 of the angle lever 19.

A target 33 is carried by a rod 34 on a loose collar 57 which has two pins 54 and 55 at opposite sides of a screw 56 on the hub of the cam lever.

The detector bar 6 carries at its upper end a laterally projecting detecting finger 36 having a knife edge at the top.

On one side of the cam lever 30 two plates 37 and 38 are held adjustable toward and from each other lengthwise by screws passing through slots in these plates into a cam

roller 30 and of these plates the plate 37 carries at one end a laterally extending plate having a V-shaped groove in its bottom edge and the plate 38 is provided at one end with
 5 a bracket arm 40 carrying a plate 41 provided in its bottom edge with a V-shaped groove. The detector finger 36 is substantially of a length equal to the combined
 10 length of the bottom edges of the plates 39 and 41, in the direction at right angles to the cam arm 30. These plates 39 and 41 are above the upper edge of the detector finger 36. When the two plates 39 and 40 are so
 15 adjusted as to be in line it stands to reason that as the cam lever 30 moves up and down the bottom edge of these plates will encounter the detector finger 36 as long as the variations in thickness of the signature are so
 20 slight as not to move the detector finger out of the path of the bottom edges of the plates 39 and 41. But when such fine adjustment is not required the plates 37 and 38 are moved from each other slightly, that is to
 25 say, to such an extent that the plates 39 and 41 are no longer in line. A wider contact area is now presented by the combined bottom edges of the two plates 39 and 41 for engagement with the finger 36. If the finger 36 moves a distance, which would have
 30 prevented it from arresting the cam lever 30, as long as the two plates 39 and 40 were in line, it will now be arrested by either one of the said plates 39 and 41.

To facilitate the adjustment of the upper
 35 roller 10 in relation to the lower roller 11 when mounting the machine, the arm of the detector bar in which the upper roller is mounted, is made adjustable as shown at 43.

The operation is as follows: Normally the
 40 parts are in the positions shown in Fig. 1 and every time the gripper-arm swings to and fro to withdraw a sheet or signature 44 of a predetermined thickness, the cam shaft 27 makes one turn and when the gripper
 45 is withdrawing the signature the roller 29 runs upon the shallow part of the cam 27 permitting the lever 30 to descend until it is arrested by one or both plates 39 and 41 contacting with the knife edge of the detector
 50 finger 36 on the detector bar 6. In fact, when the machine is running normal the cam lever 30 moves up and down only about an eighth of an inch, more or less, and all this takes place as long as the signatures 44 do not vary from the predetermined
 55 thickness. As soon, however, as the gripper misses a signature or a signature is too thin, the spring 23 pulls the detector bar 6 against the stop screw 26 as there is nothing
 60 or not enough thickness of paper between the rollers 10 and 11 to prevent this and thus the detector finger 36 is moved to the right, (Fig. 1) and out of the path of the plates 39 and 41, and thus the cam lever 30 is not
 65 checked in its descent and its inclined arm

32 swings the arm 21 of the angle lever 19 outward, causing the curved link 18 to descend, whereby the bar 15 is lowered so that when the gripper bar 6 swings to the right to grasp the next signature 44 its stud 14
 70 strikes the shoulder 14^a thereby moving the bar 15 to the right causing it by means of the arm 16 and shaft 17 to operate the stopping device of the machine. By this time, the cam lever has again been raised, as shown
 75 and all the operator need do is to swing up the arm 21 and target 33 and then start the machine by hand. When the cam lever 30 drops it swings down the target, but when raised, does not lift the target, which re-
 80 mains lowered thus showing in which box the miss was made and after the attendant has corrected the error and before starting the machine he swings up the target. If, on the other hand, a signature 44 is too thick
 85 or more than one has been taken by the gripper jaws the detector bar is moved to the left (Fig. 1) and the plates 39—41 again miss the detector finger 36 and the above described occurrence takes place.
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It is frequently desirable to make the device less sensitive as to the increased thickness of the signatures on account of paste or inserts and in such cases the plates 39 and 41 are placed slightly out of alignment
 95 as shown in Fig. 4, so as to increase the effective width of the bottom edges of these plates, so that even if the rollers 10 and 11 are spread slightly beyond the normal, the combined bottom edges of these plates
 100 can still encounter and engage the upper edge of the detector finger 36.

The above described appliances are provided for each sheet box or signature box of the collating or gathering machine.
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The detecting or calipering mechanism operates entirely independent of the gripper jaws and the positions of the latter cannot, in any way, have any effect on the detecting
 110 mechanism.

Having described our invention what we claim as new and desire to secure by Letters Patent is:—

1. In a signature gathering machine, the combination with stopping mechanism and signature gripping jaws, of a signature thickness detector mechanism, controlled by the thickness of the signature and having a portion thereof mounted in a fixed and permanent position, and a portion mounted
 115 movably in relation to said fixed part and means operated by the detector mechanism for controlling the position of the stopping mechanism, substantially as set forth.
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2. In a signature gathering machine, the combination with a stopping mechanism and swinging gripper jaws, of a detector mechanism controlled by the signatures, and comprising a calipering device, having a fixed and a relatively movable member, a
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detector finger on the latter, a lever having a to and fro motion and carrying a mechanism for engagement with said finger and means for inaugurating the actuating of the stopping mechanism through said lever, and means for adjusting the mechanism on the lever, substantially as set forth.

3. In a signature gathering machine, the combination with a stopping mechanism and swinging gripper jaws, of a detector mechanism controlled by the signatures comprising a calipering device, having a fixed and a relatively movable member, a detector finger on the latter, a lever having a to and fro motion and carrying a mechanism for engagement with said finger and means for inaugurating the actuating of the stopping mechanism from said lever, and means for increasing the effective width of the acting edges of said mechanism on the lever, substantially as set forth.

4. In a signature gathering machine, the combination with a stopping mechanism and swinging gripper jaws, of a detector mechanism controlled by the signatures, comprising a calipering device, having a fixed and a relatively movable member, a detector finger on the latter, a lever having a to and fro motion and carrying a mechanism for engagement with said finger, said mechanism being composed of two plates adjustable into and out of alinement end to end and means for inaugurating the ac-

tuating of the stopping mechanism through said lever, substantially as set forth. 35

5. In a signature gathering machine, the combination with a stopping mechanism and swinging gripper jaws, of a detector mechanism controlled by the signatures, comprising a movable detector bar supported by the frame of the machine, a cam lever, a cam, and coacting devices on the cam lever and detector bar and means on the cam lever for acting upon the stopping mechanism, substantially as set forth. 40 45

6. In a signature gathering machine, the combination with a stopping mechanism and swinging gripper jaws, of a detector mechanism controlled by the signatures, comprising a movable detector bar, supported by the frame of the machine, a cam lever, a cam, a spring acting on the detector bar, a stop for the detector bar, coacting devices on the cam lever and detector bar and means on the cam lever for acting upon the stopping mechanism, substantially as set forth. 50 55

Signed at New York city in the county of New York and State of New York this 26th day of May A. D. 1910.

CHARLES L. SMITH.
ALEX O. GULLBERG.

Witnesses:

OSCAR F. GUNZ,
JOSEPH H. BAKER.