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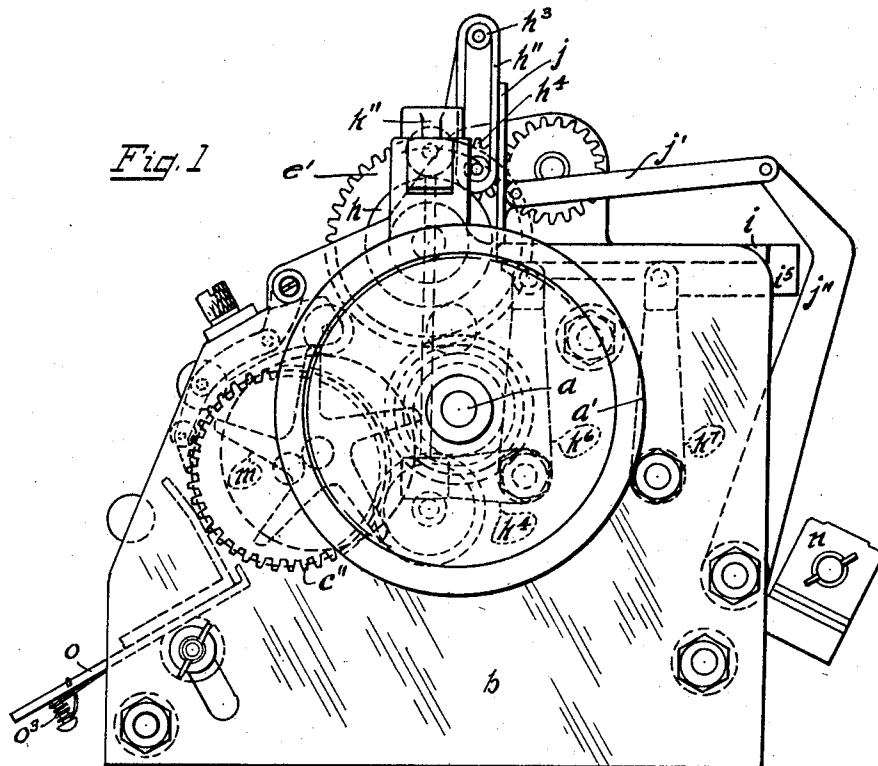
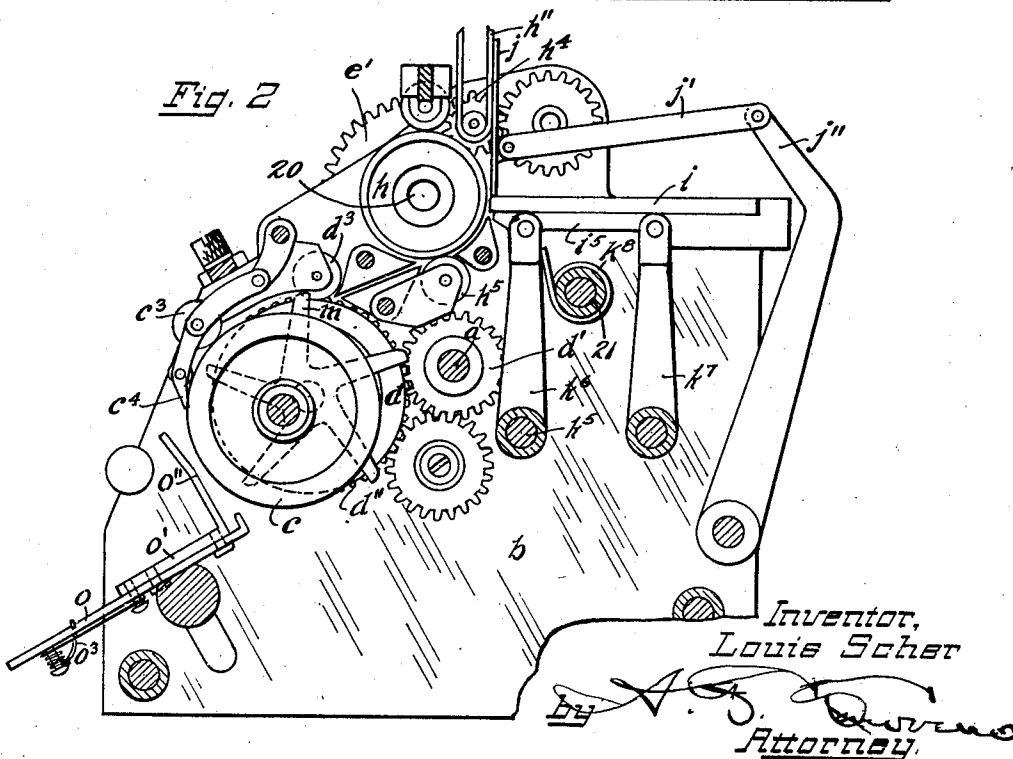
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1,820,680

AUTOMATIC FEEDING MECHANISM FOR COUNTERS AND THE LIKE

Filed April 11, 1927

5 Sheets-Sheet 1



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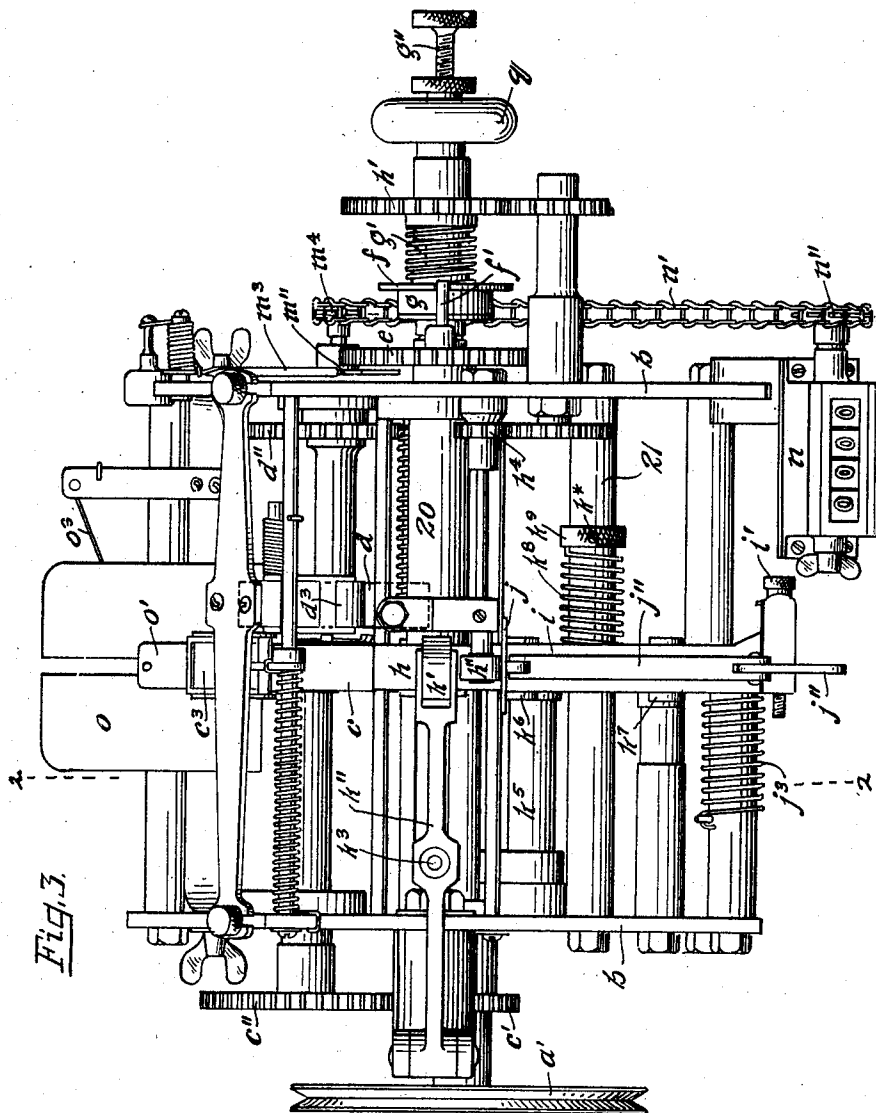
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AUTOMATIC FEEDING MECHANISM FOR COUNTERS AND THE LIKE

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5 Sheets-Sheet 2



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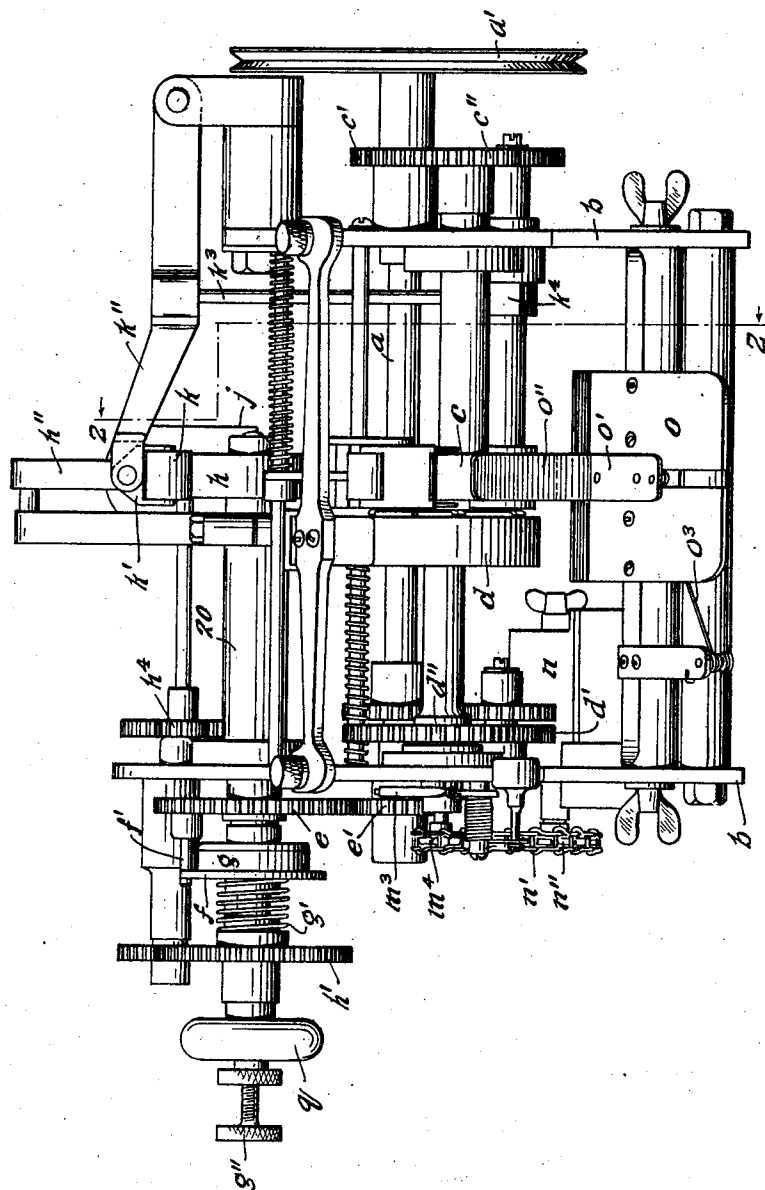
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AUTOMATIC FEEDING MECHANISM FOR COUNTERS AND THE LIKE

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5 Sheets-Sheet 3

Fig. 4.



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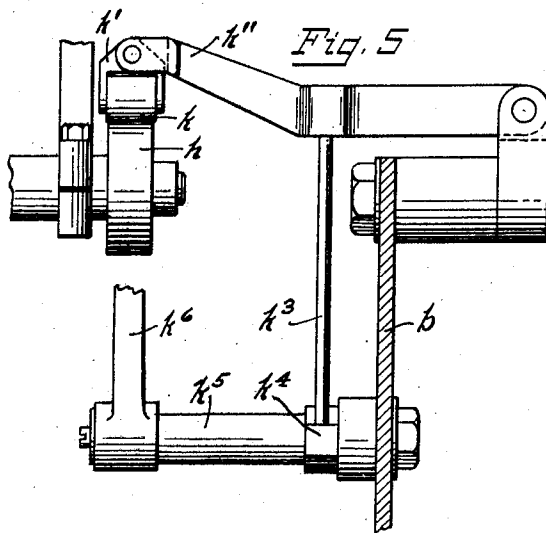
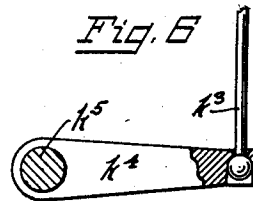
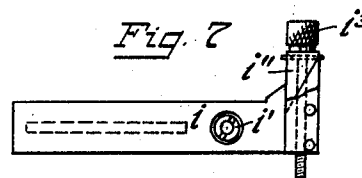
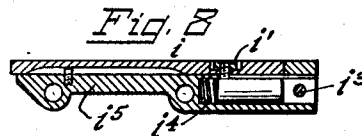
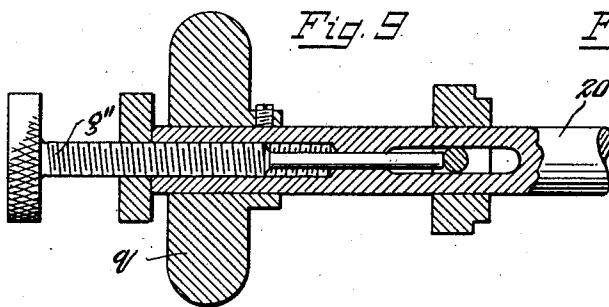
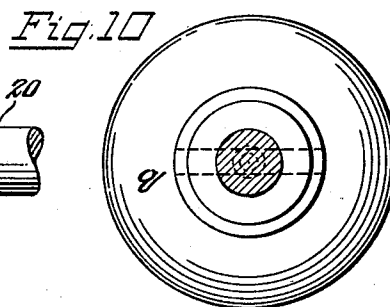
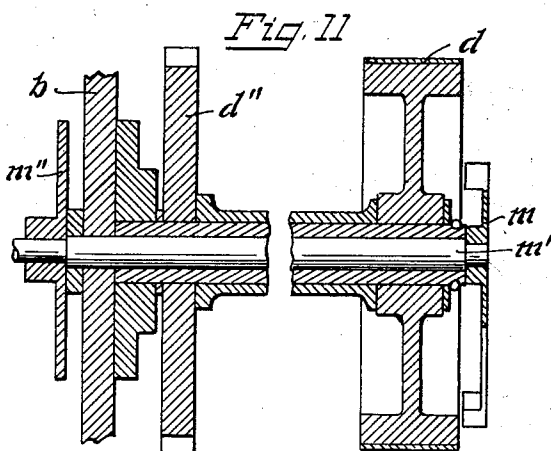
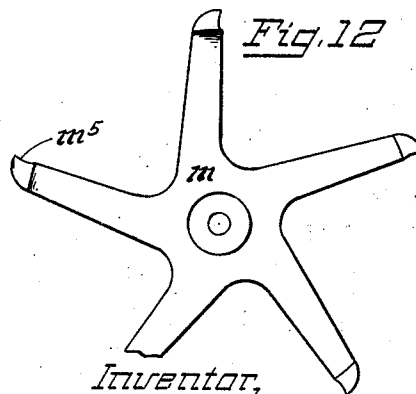
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5 Sheets-Sheet 4



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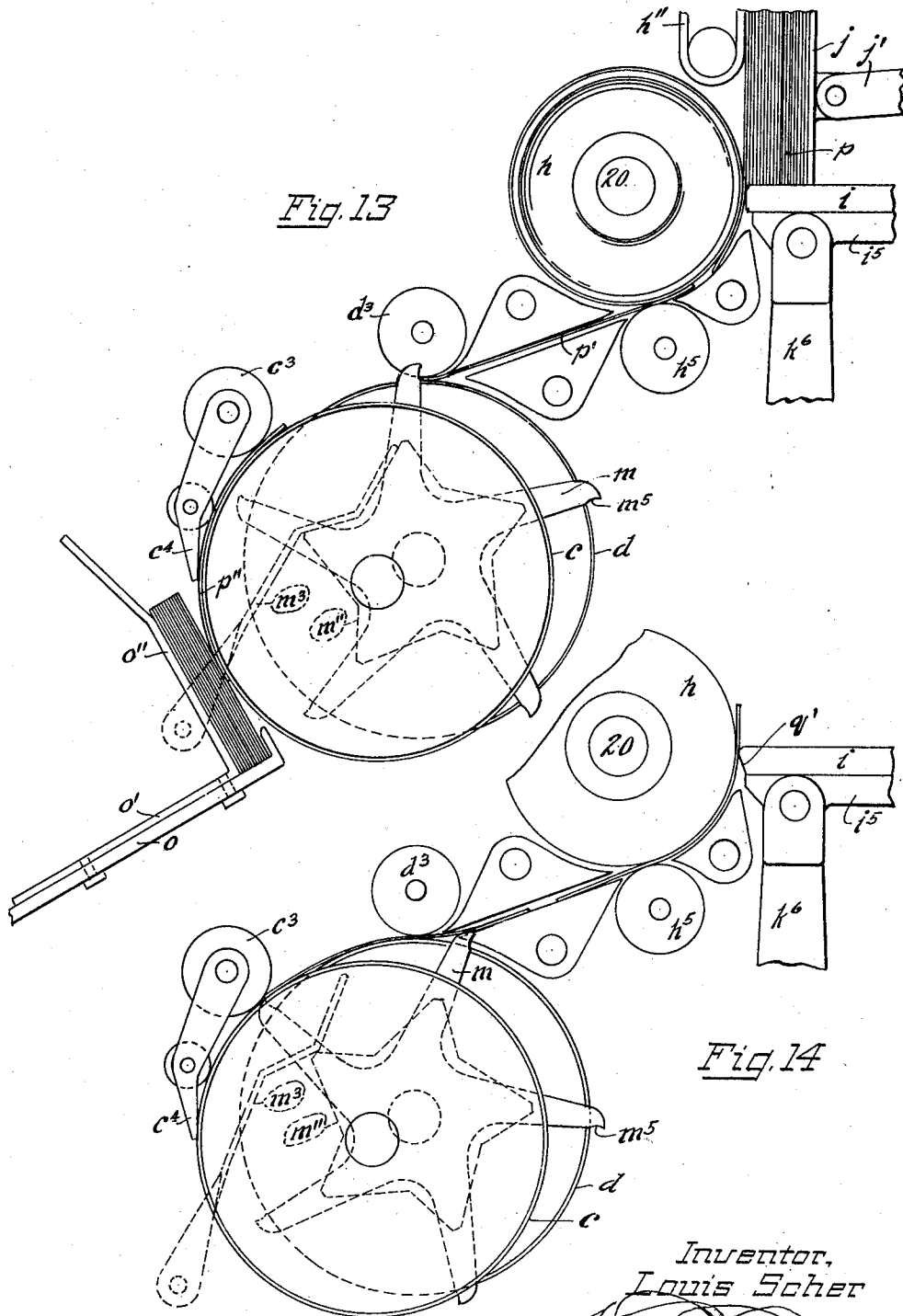
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AUTOMATIC FEEDING MECHANISM FOR COUNTERS AND THE LIKE

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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

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AUTOMATIC FEEDING MECHANISM FOR COUNTERS AND THE LIKE

Application filed April 11, 1927. Serial No. 182,781.

My invention relates to improvements in automatic feeding mechanism for counters and the like, and more particularly to counters for such articles as cards, tickets, transfers, coupons, and the like, being articles manufactured from paper and hereinafter generically termed "paper" to designate the various articles desired to be counted.

The object of my invention is the provision of a counter for "paper" of varying lengths and thicknesses, which is extremely simple and largely automatic in operation and construction, while insuring both rapid and accurate counting of the paper. More in detail, my object further contemplates the automatic adjustment of the caliper mechanism to compensate for wear, the individual feeding of paper of varying thicknesses, the starting and checking of the counter-member by the paper itself, the initial feeding of the paper by an endless band, the provision of a simple clutch adjustment, the return of an imperfect paper or one incapable of freely passing through the mechanism, the employment of staggered advancing rolls in conjunction with the counter-cam, as well as other features of less importance that are pointed out in the accompanying specification and claims.

Automatic counting mechanisms of this general class, to which my improvements are applied, preferably are power-driven at high speed, but those which have gone into use are found to be so complicated, and so subject to wear in counting large numbers of tickets, and the like, that expert supervision and adjustment must be provided for the upkeep and proper operation of such machines. It is with the idea of obviating such constant supervision and adjustment that I have simplified and provided automatic adjusting or compensating mechanism in my machine.

Before explaining the structure and operation of my improved automatic counting mechanism in detail, I may make brief reference thereto preliminary to setting forth the particular features of my improvement in connection with the accompanying drawings. It is important to note that my auto-

matic counting mechanism is so constructed and designed as to operate either with an adjustable, but automatically maintained caliper or clearance for a single paper to pass at a time, or it may be adjusted, alternatively, so that papers of variable thicknesses, within working limits, may be individually passed and counted. This is an adaptability of marked importance in mechanisms of the type set forth, giving a wide range of use unattained in any prior structure with which I am acquainted.

The papers passing through an adjusted caliper are individually fed against one arm of a counter-cam connected with the registering device. Said cam is so constructed and proportioned that a member thereof is brought into engagement with the paper and its movement is not completed until said paper has passed beyond toward the stacker.

The feed of the paper is accomplished by an endless rubber band substantially coinciding with the operative face of the initial feeding roll, or a tangent thereof, while a conveniently positioned member, in association with an adjustable clutch, permits the operator to check the feed or return a paper when desired. All these features, together with other details, may best be explained in connection with the accompanying drawings illustrating an embodiment of my invention, wherein:

Figure 1 is an end view of the automatic counting mechanism of my invention,

Fig. 2 is an intermediate vertical section on line 2-2, Fig. 3,

Fig. 3 is a plan view of said mechanism,

Fig. 4 is a front view of the counting mechanism,

Fig. 5 is a detached schematic view in elevation, but partially broken away and sectioned, illustrating the automatic adjusting mechanism,

Fig. 6 is a detail thereof, partly in section,

Fig. 7 is a plan view of the caliper support for the paper,

Fig. 8 is a longitudinal section thereof,

Fig. 9 is a detail, partly broken away

and in section, showing the clutch adjustment and paper-return knob,

Fig. 10 is a section on 10—10, Fig. 9,

Fig. 11 is a section intermediately broken away to show the mounting of the counter-cam, rear advancing disk and drive,

Fig. 12 is a side view of the counter-cam,

Fig. 13 is an enlarged view, principally diagrammatic, for showing the operation of my automatic counting mechanism with the paper about to engage the counter-cam,

Fig. 14 is a similar view containing less detail, but showing the counter-cam checked in rotation by the paper.

Throughout the several figures of the drawings, which are partially diagrammatic in character and do not purport accurately to represent the sizes and proportions, particularly of the papers being counted, the same character of reference is employed to indicate similar parts.

Power may be applied to my improved mechanism, which necessarily is capable of operating at high speed, in any suitable manner, as by the pulley-wheel a' mounted upon shaft a , journaled between the frame plates b, b , from which shaft there are provided, respectively, exterior gear drives c', c'' , for the advancing roll c ; interior gear drives d', d'' , for the staggered advancing roll d ; and a distant exterior gear drive e, e' for the clutch device hereinafter explained, together with its connections; all as best shown in assembled relation, Fig. 3. Thus the rotating members disassociated from the clutch normally are constantly driven, while those members beyond the clutch may be withheld or momentarily reversed in rotation, when required.

The clutch essentially comprises the disk f , driven by the stud f' rotated upon the gear e rotatably mounted on the shaft 20, which disk is adjustably forced into yielding engagement with the side of leather-faced drum g by means of a coiled spring g' ; the frictional engagement of these members of the clutch being regulated by means of the thumb screw g'' , details of the same being shown in Fig. 9.

Rubber faced feeding roll h , which is accurately ground to true cylindrical form is keyed to the shaft 20 and, is driven by the gear h' also keyed on the shaft 20, while the cooperating endless rubber band h'' in tangent relation thereto (Fig. 1) runs over idler h^3 and is driven by the small gear h^4 at slower peripheral speed than roll h .

A caliper bar and support i is mounted adjacent to the roll h , adapted to support the papers in edgewise relation for feeding by the band h'' and roll h , individually to the counting mechanism. These papers are pressed by the traveler j (Fig. 13) its link j' and pivoted arm j'' tensioned by spring j^3 (Fig. 3) so that they may be rapidly fed,

one by one, through the machine. The caliper bar i is terminally spaced away from roll h sufficiently to permit the passage of only one paper at a time. For this purpose nut i' is loosened and the adjusting wedge i'' , controlled by the screw i^3 serves as a fine adjustment against the tension of spring i^4 , as shown in Figs. 7 and 8, to obtain micrometric adjustment of the caliper bar with respect to its support i^5 which is pivotally mounted to the upper ends of the links k^6 and k^7 , as well as to afford the requisite clearance between its forward end and the face of roll h .

It has been ascertained by careful test that the operative rubber face of roll h wears away about ten times as fast as does the presented end of the caliper bar, so I have provided automatic compensating means, best shown in Fig. 5, whereby the accurate spacing of these members may be indefinitely maintained for feeding papers of predetermined thickness. Thus the roll k , provided in the pivoted yoke k' at the end of lever k'' rides freely at the top of accurately ground roll h . A link k^3 having terminal ball and socket connections (Fig. 6) unites lever k'' with the lever arm k^4 secured upon the rocking shaft k^5 . An upright k^6 is terminally secured upon said shaft, and this, with the pivoted link k^7 , serves to position the caliper bar i , locked in its adjusted position by nut i' upon its supporting member i^5 , accurately in compensated relation with respect to the operating face of roll h , so that only one paper is permitted passage at a time.

The spring k^8 mounted on the shaft 21 (Figs. 2 and 3) normally urges the upper end of the link k^6 , and the caliper bar i carried by the link k^6 toward the roll h , and at the same time urges, through the link k^6 , the shaft k^5 , and link k^4 (Figs. 5 and 6), the links k^3 and k'' downward, thus pressing the roll k against the feed roll h .

Accordingly, as the rubber faced feed roll h wears away, the downward movement of the follower roll k , actuated by the spring k^8 , causes a readjustment of the lever system $k'', k^3, k^4, k^5, k^6, k^7$ and caliper bar i so as to move the end of the caliper bar i toward the roll h in order to automatically maintain the distance between the end of the caliper bar i and the roll h the same for any given adjustment of the caliper bar i on its support i^5 .

The end of the caliper bar, as previously stated, has been found in actual practice to wear away approximately one-tenth as fast as the roll h wears away, so that the lever system $k'', k^3, k^4, k^5, k^6, k^7$ and bar i is mathematically proportioned so that the end of the caliper bar i moves one and one-tenth times the distance of downward movement of the end of the arm k'' during readjustment of the lever system to compensate for

the wear of the roll h and caliper bar i . Thus the interconnection of the various parts and the actuation of the compensating mechanism by the roll h compensates for the ratio of wear, approximately one to ten, found to exist in practice between the bar and roll.

Disposed beyond the initial feeding band and roll in the path which the paper takes through the mechanism are two staggered advancing rolls c and d , previously mentioned, with their resilient pressure rolls c^3 and d^3 respectively bearing upon their upper peripheries to cause the paper to follow their joint rotative movement, while a corresponding pressure roll h^5 serves the same purpose with respect to the lower face of roll h . As best indicated in Figs. 2, 11, 12 and 13, a counter-cam m (the particular form shown having five arms) is rotatably positioned upon the inner shaft m' intermediately of the advancing rolls c and d . A corresponding star-shaped detent cam m'' is mounted at the opposite end of shaft m' , against which a light spring m^3 bears, while beyond the cam and spring there is positioned a gear m^4 connected by a drive chain n' and sprocket n'' with the registering or counting device n of well known type, as best shown in Fig. 3.

Beyond the advancing roll c and beneath the directing prongs c^4 and roll c^3 , there is provided a stacker o equipped with the slide o' and bent upright o'' resiliently held by the spring o^3 to receive the papers as they are transmitted by the advancing rolls.

With the foregoing structural details in mind, the explanation of the operation of my improved counting mechanism may be readily followed, having particular reference to the more or less diagrammatic Figs. 13 and 14; the papers p to be counted being shown in the upper right hand portion of Fig. 13 positioned between the follower or traveler j and rotating band and roll h'' , h . One of these papers p' is shown at the moment of its engagement with one arm of the counter-cam m , while a second paper p'' is partially delivered to the stacker o .

Immediately, however, the paper p' is advanced by roll d , carrying with it the counter-cam m ; the forward edge of the paper being carried by the roll c to the point at which the edge is disengaged from the counter-cam, as shown in Fig. 14. At the same time the succeeding arm of the counter-cam is brought into engagement with the underside of said paper, whereby the movement of said counter-cam is checked until this arm, in turn, is cleared by the complete passage of the paper. It will be observed that the spring m^3 upon the detent cam m'' , as shown by dotted lines, is brought to bear upon the incline of said cam m'' , so that immediately the paper has passed to the position of p'' ,

thus freeing the counter-cam m , said spring will advance both the detent cam and the connected counter-cam to the positions of Fig. 13. Meantime, the paper, of course, has been registered on counting device n .

It will be understood that the counter-cam and its connected members are of extremely light construction and perfectly free to rotate under the impact of the paper. The arms of said cam are spaced so that their terminals are measured by a shorter arc than will be spanned by the papers being counted. This is necessary for the reason that upon release of one arm by the forward edge of the paper, the next succeeding arm is engaged by the rear portion of the paper momentarily to check the movement of the counter-cam, as illustrated in Fig. 14. The terminals m^5 of said counter-cam preferably are slightly dished and expanded, as indicated in Figs. 3 and 11, better to engage and be actuated by the rapidly moving papers, which are individually fed and counted with great rapidity, in practice.

In case an imperfect, torn, or otherwise irregular paper, catches or is checked in entering the counting mechanism, it is necessary merely for the operator to reverse the movement of the feeding means by reversely turning the knob q against the torque of the clutch device, or the feeding means may be temporarily checked from rotation in the same manner. This reversal of movement by the operator will cause the return of the imperfect paper or papers in the course of being fed to the advancing rolls, while interfering in no way with the accuracy of the count.

For some classes of work, a counting mechanism affording only an invariable spacing for the passage of the papers, is totally unavailable. Thus, a stack of papers of varying thicknesses will not be handled and accurately counted by a machine having this limitation, hence a quantity of mixed old and new paper money, for example, may clog such machine and will not be individually fed for accurate counting. Accordingly, I have provided in my improved spring-pressed caliper support an adjustment present in the variable tensioning of the spring, whereby, within workable range, papers of different thicknesses may be individually fed, and accurately counted. For this purpose the free end of spring k^s is anchored in a rotatably adjustable collar k^9 , which is adapted to be held in its adjusted position, together with the tensioned end of said spring, by a set screw k^* . Thus, spring k^s is capable of being so lightly tensioned, as opposed to the manner of feeding previously described, that the caliper bar and its supporting means will be pressed backward from the normal spacing by the entry and passage of a thicker paper, so that

thin and relatively thicker papers will be fed in spaced relation, and counted, as above described. However, such slack adjustment of the spring partially nullifies the compensating action of the preferred operation previously described for papers of substantially uniform thickness. Furthermore, if papers of marked variation in thickness are to be handled, it is desirable to provide a caliper-member or support terminally cut away at an angle, as indicated at q' , Fig. 14, in order that the thicker papers may not maintain the spacing between said bar and roll h sufficiently to permit two succeeding thinner papers to be successively fed together.

Since the feeding and advancing rolls are provided with suitably frictioned rubber faces, they are necessarily subject to wear and require replacement. However, such replacement does not cause my improved counting mechanism to require readjustment, inasmuch as the position of the caliper bar, once accurately adjusted with respect to the working face of roll h , is made automatically to conform to the working face of a new and somewhat larger roll, by reason of the compensating or floating mounting of the caliper-member with respect to the working face of the roll. Thus, it is entirely practicable to adjust one of my improved counting mechanisms for a given thickness of papers, and it will operate satisfactorily over a long period without manual readjustment, with numerous replacements of the feeding rolls, and until a new caliper member is required. These members, however, are constructed of extremely hard steel and are capable of extremely long periods of use.

It is practically necessary, in order to insure extremely rapid operation, that a rotatable counter-member shall be used in machines of this class; preferably one with numerous paper-engaging parts, in order to be more effective. Thus one provided with ten such paper-engaging parts may be directly connected to the registering mechanism. As indicated above, however, the spacing of these parts must be less than the length of the papers being counted, but longer papers, as compared with such spacing, may be as accurately counted, although at a little slower speed. The counter-cam, however, preferably is positioned and designed so that one of the peripheral paper-engaging parts causes the next succeeding part to engage the traversing paper as the first part is disengaged by the staggered advancing roll. This momentarily checks the rotation of the counter-cam until the paper is advanced to permit the slight additional advance of said cam by the spring. Thus, no positive drive is required for the counter-cam, other than the actuation thereof by the individual papers.

It should be noted that the precise form and arrangement of parts herein set forth to exemplify my invention, are capable of wide variation and adaptation, without departing from my instant improvements.

Having now described the preferred embodiment of my invention and explained the operation thereof, I claim as new, together with such modifications, adaptations and changes as may be made by one skilled in the art, the following:

1. In mechanism of the class described the combination with means for feeding the papers, of an adjustably positioned caliper-member mounted closely adjacent to the initial feeding means, and associated mechanism actuated by the feeding means including means urging the feeding means and caliper-member toward each other for automatically maintaining the spaced relation of said parts in compensation for wear, substantially as set forth.

2. In mechanism of the class described the combination with means for feeding the papers, of an adjustable caliper-member positioned closely adjacent to the initial feeding means, a resilient mounting urging the feeding means and caliper-member toward each other and permitting selective movement of the caliper-member momentarily away from said feeding means, and means for adjusting the same, substantially as set forth.

3. In mechanism of the class described the combination with means for feeding the papers, of a resiliently mounted caliper-member positioned closely adjacent to and urged toward the initial feeding means, whereby a restricted wedging action is insured for the passage of relatively thicker papers, and means for adjusting the same, substantially as set forth.

4. In mechanism of the class described the combination with means for feeding the papers, the initial feeding means comprising an accurately surfaced cylindrical roll, of a caliper-member positioned closely adjacent to the face of said roll in spaced relation to permit the passage of a single paper, and compensating means interposed between the roll and the caliper-member actuated by the roll including means urging the roll and caliper-member toward each other for maintaining their relative spacing as said parts are worn away, substantially as set forth.

5. In mechanism of the class described the combination with means for feeding the papers, the initial feeding means comprising an accurately surfaced cylindrical roll, of a caliper member positioned closely adjacent to the face of said roll in spaced relation to permit the passage of a single paper, and compensating means including a lever system and roll bearing upon the sur-

face of said feed roll for regulating the position of said caliper-member, whereby their spacing is maintained as said parts are worn away, substantially as set forth.

5 6. In mechanism of the class described the combination with means for feeding the papers, the initial feeding means comprising an accurately surfaced cylindrical roll, of an associated caliper-member presented
10 closely adjacent to the working face of said roll in spaced relation to permit the passage of a single paper, a spring tensioned to force said member in engagement with the roll, and compensating means bearing upon the
15 surface of said roll connected with the caliper-member and holding it against the tension of its spring in spaced relation with respect to the working face of said roll, substantially as set forth.

20 7. In mechanism of the class described the combination with means for feeding the papers, of an adjustable caliper-member positioned closely adjacent to the initial feeding means, a resilient mounting for
25 said caliper-member urging the feeding means and caliper-member toward each other, and micrometric adjusting means for positioning said caliper-member, substantially as set forth.

30 8. In mechanism of the class described the combination with means for feeding the papers, of a caliper-member positioned closely adjacent to the initial feeding means, a resilient mounting for said caliper-member
35 urging the feeding means and caliper-member toward each other including a spring affording a wide range of tension, and means for adjustably tensioning said spring, substantially as set forth.

40 9. In mechanism of the class described the combination with means for individually feeding the papers, the initial feeding means comprising an accurately surfaced cylindrical roll, of an associated caliper-
45 member having a floating mounting actuated by and urged toward said roll adapted to maintain the parts in spaced relation permitting the passage of a single paper therebetween, substantially as set forth.

50 10. In mechanism of the class described the combination with means for individually feeding the papers, the initial feeding means comprising an accurately surfaced cylindrical roll, of an associated caliper-member, and
55 wear-compensating connections including a lever system and roll between the feed roll and said member, whereby their operative relation is automatically maintained to insure separate feeding of the papers, substantially
60 as set forth.

11. In an automatic paper-handling mechanism of the class described, the combination with the initial feeding mechanism, means for driving the same, an interposed
65 clutch affording slippage of the driving

torque, and means connected with said feeding mechanism for reversing its motion without disconnecting the clutch, substantially as set forth.

12. The herein described method of main- 70
taining accurate spaced relation between a feeding roll and its caliper-member, which consists in interposing a floating support for said member reacting against the work-
75 ing face of said roll.

13. The herein described method of effect-
ing automatic compensation for surface wear of a feeding roll and its coacting caliper-member which consists in causing the ap-
80 proximation of said parts in accordance with their ratio of wear.

In testimony whereof I do now affix my signature.

LOUIS SCHER.

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