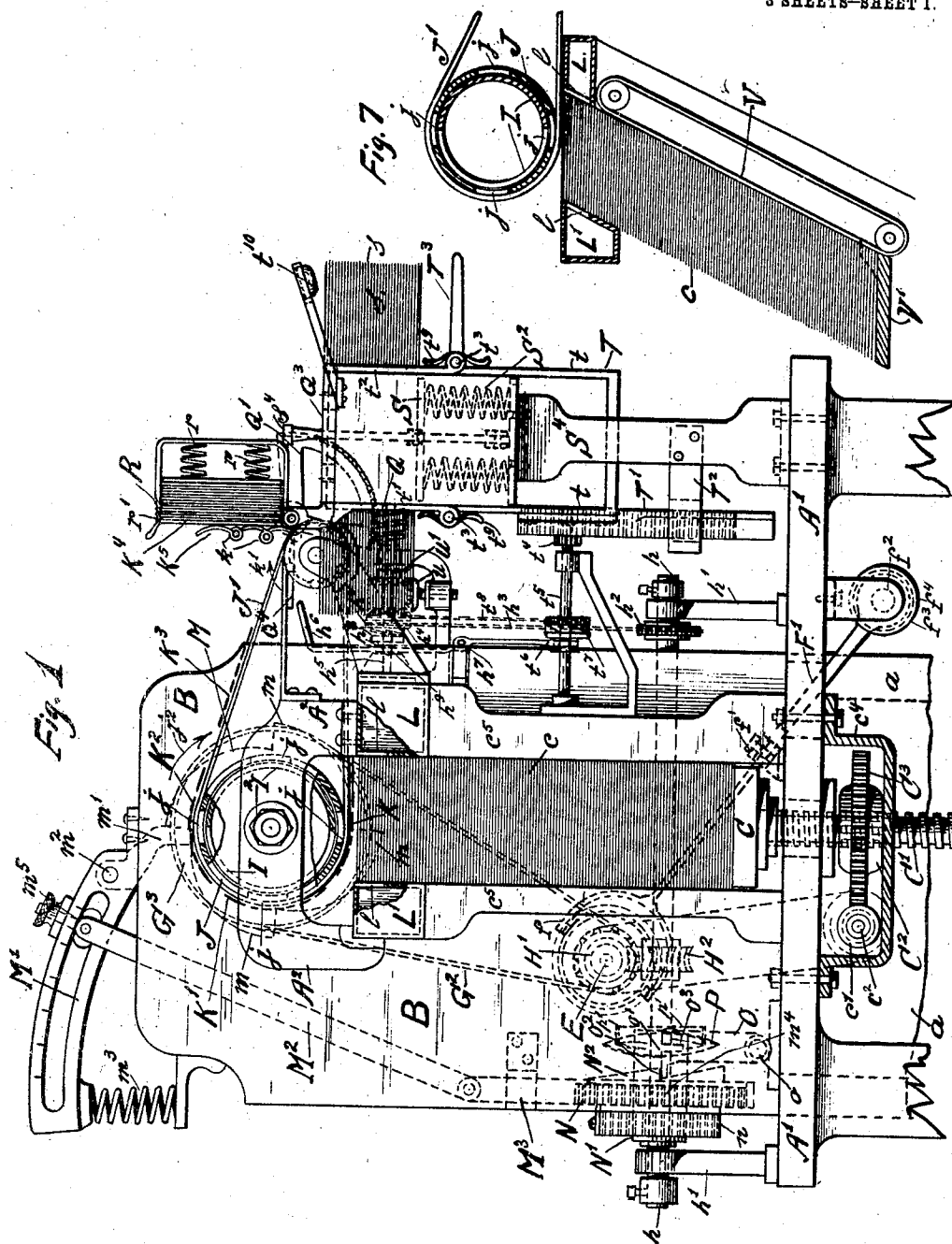


1,060,884.

A. VON BARTH.
COUNTING MACHINE.
APPLICATION FILED OCT. 6, 1908.

Patented May 6, 1913.

3 SHEETS-SHEET 1.



Attest:
Elizabeth B. King -
Geo. S. Wheelock.

Arthur von Barth Inventor:
by Donald Campbell
Atty

1,060,884.

A. VON BARTH.
COUNTING MACHINE.
APPLICATION FILED OCT. 6, 1908.

Patented May 6, 1913.

3 SHEETS—SHEET 2.

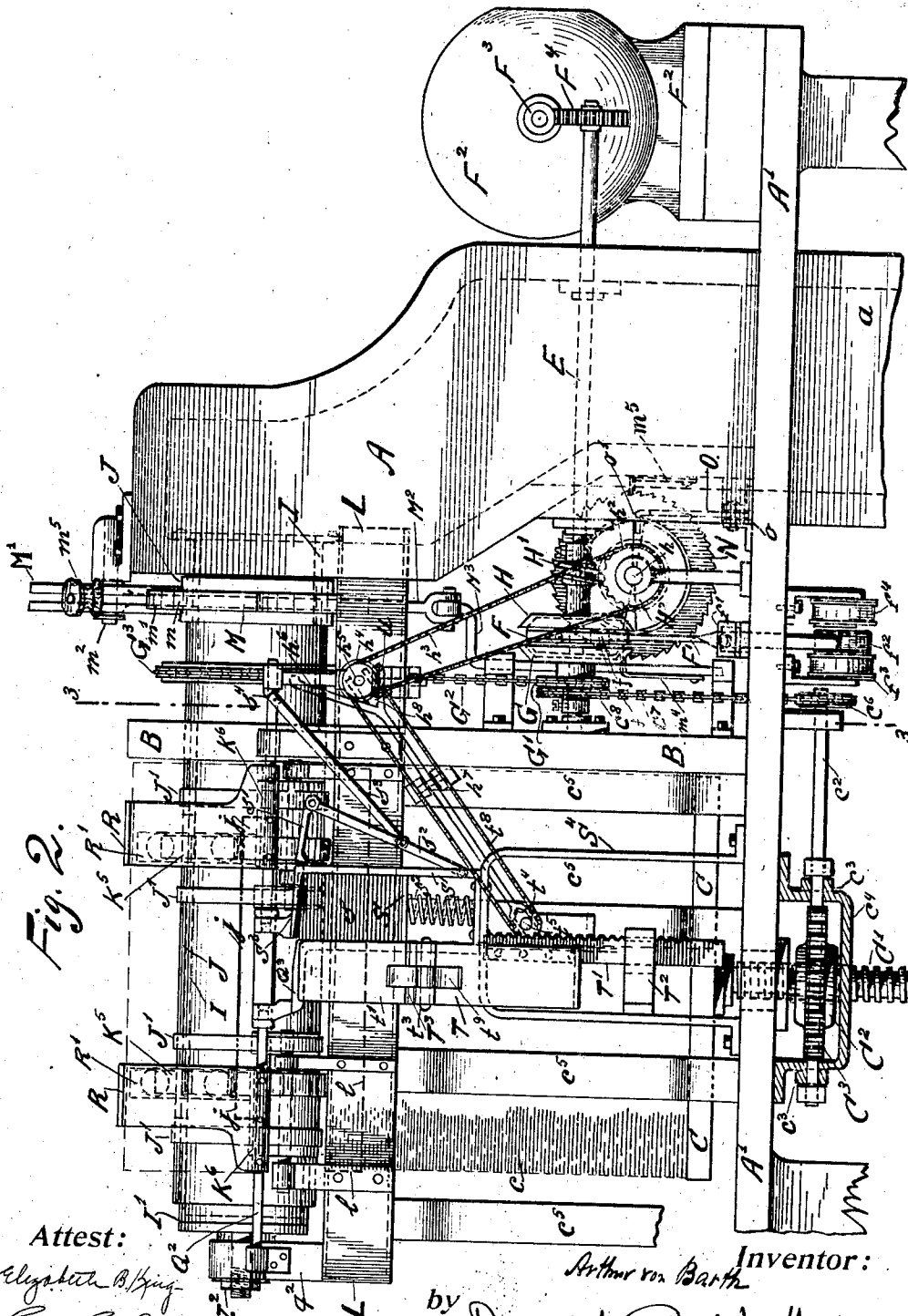


Fig. 2.

Attest:
Eugene B. King
Geo. L. Wheelock

by *Arthur von Barth*
Donald Campbell
Inventor:
Atty

1,060,884.

A. VON BARTH.
COUNTING MACHINE.
APPLICATION FILED OCT. 6, 1908.

Patented May 6, 1913.

3 SHEETS-SHEET 3.

Fig. 3.

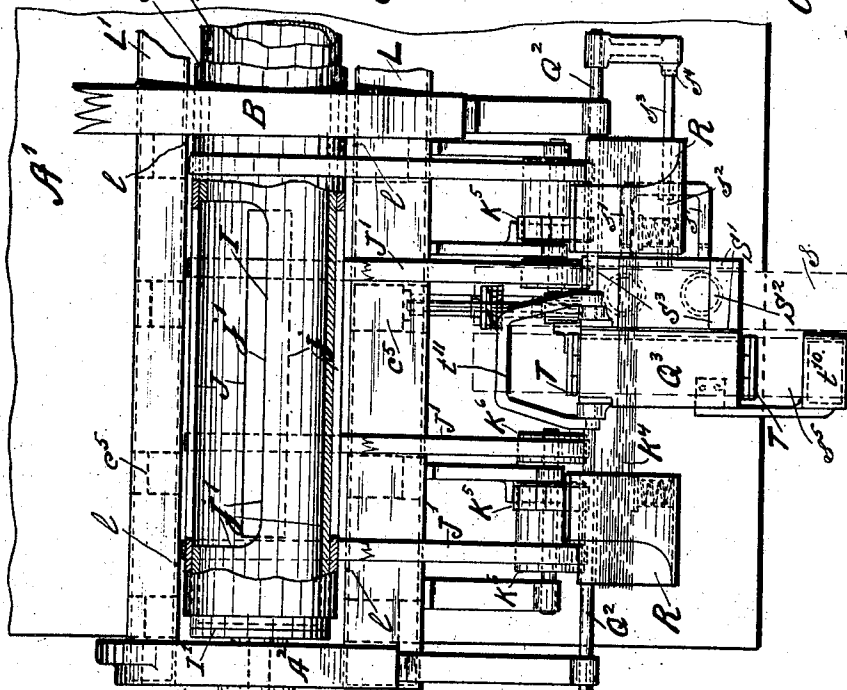


Fig. 4.

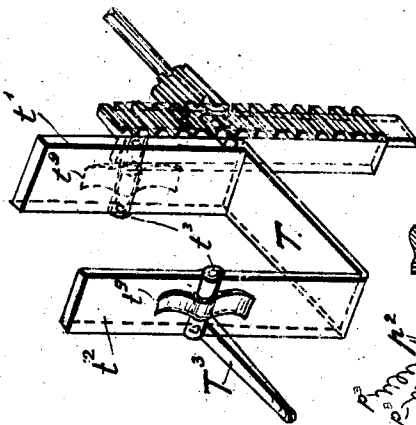


Fig. 5.

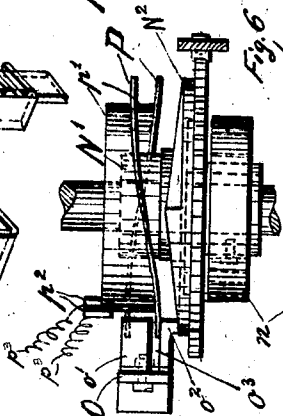
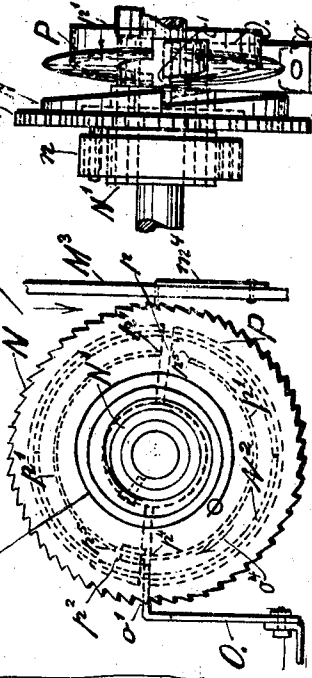


Fig. 6.

Fig. 6.



Attest:
Elizabeth B. King
Geo. L. Whellock

Arthur von Barth Inventor:
by Donald Campbell
Atty

UNITED STATES PATENT OFFICE.

ARTHUR VON BARTH, OF NEW YORK, N. Y.

COUNTING-MACHINE.

1,060,884.

Specification of Letters Patent.

Patented May 6, 1913.

Application filed October 6, 1908. Serial No. 456,503.

To all whom it may concern:

Be it known that I, ARTHUR VON BARTH, a citizen of the United States, residing in the city of New York and State of New York, (formerly in the city of Allegheny and State of Pennsylvania,) have invented certain new and useful Improvements in Counting-Machines, of which the following is a specification.

10 My invention relates to counting machines, and more particularly to machines for counting paper money such as currency bills, although it may be equally useful for other kinds of bills or for paper or similar articles which need to be counted.

15 It also relates to a portion or adjunct of such machines for bunching or packing the bills or objects in bundles of any desired number. For example, the machine may be used for counting dollar bills and the bunching device may serve to bundle them in packages of one hundred.

20 An object hereof is to so operate upon an indefinite column or supply of bills as to segregate and count a number of them; segregate in the sense of separating the counted from the rest or as it were make them into an isolated group, and in the same act count those bills so grouped or segregated.

30 In this way of course any quantity of bills can be counted.

Other objects will be stated hereinafter and still others will be understood.

35 I use a hollow suction member or cylinder, with a longitudinal slot, by which I include a row of openings, through which the suction acts. The details will be fully hereinafter explained.

40 I will first describe one form of machine in which my invention may be embodied and will then set forth the novel features thereof in the claims.

45 In the accompanying three sheets of drawings which form a part of this specification, Figure 1 is a front elevation of one form of counting machine embodying my improvements, the invention in this figure being shown as applied to a single machine, although its principles can be adapted to one for simultaneously counting two piles of objects. The figure is complete excepting that the table legs are broken off, as is also the exhaust chamber or tube; and the fan or other exhaust apparatus for producing an exhaust in said chamber is omitted as it

specifically forms no part of my invention. Fig. 2 is a right-hand side elevation of the machine shown in Fig. 1. Fig. 3 is a top view of the machine shown in Figs. 1 and 2, or rather so much thereof as is shown to the left of the line 3-3 in Fig. 2. Fig. 4 is a perspective view of the clamp which receives the desired number of counted bills, compresses and wraps the band around them; together with its operating rack and pinion. Fig. 5 represents an enlarged top view of the devices which at every half revolution effect the counting of the desired number of bills and the stopping of the counting portion of the machine, while the bunching device comes into play to secure the counted bills together into a bundle. Fig. 6 is a side or face elevation of the devices shown in Fig. 5, and Fig. 6^a is an end elevation thereof. Fig. 7 illustrates one of the many ways in which the details of my machine may be modified, the uncounted bills in this modification being elevated in an inclined direction by the action of an endless belt carrying a platform.

Similar letters of reference represent corresponding parts in the several figures of the drawings.

A represents the main suction chamber in which a suction or partial vacuum may be maintained in any suitable way. This chamber may be of any convenient form and I have shown the downward extension at *a*, which may be connected with a rotary fan or other suction apparatus which is not shown. A' represents any suitable base upon which the suction chamber is supported, and B represents a vertical wall arranged centrally with respect to the base, and the purpose of which is to form a support for various other elements of the machine hereinafter to be described.

C represents a table which is preferably horizontal and whose purpose is to support in bulk the bills or other objects to be counted, said uncounted bills being shown at *c* as piled up one upon the other forming a column. As the bills are removed one at a time from the top of the pile, the table C must be moved upwardly a corresponding amount, and for this purpose I have employed the following as a convenient form of mechanism. Beneath the table C is a vertical screw shaft C' which does not turn but which passes through a threaded member

C², which contains screw threads and which is adapted to be rotated through a gear C³ formed on or connected with it so that when the gear C³ is turned the screw shaft C¹ will gradually elevate and carry the table C with it. Looking particularly at Figs. 1 and 2, the gear C³ will be seen to be driven by a worm c¹, which worm is fast upon a shaft c², said shaft having bearings at c³, c⁴, in a box-like casting c⁴ secured to the under side of the base A'. The screw shaft C¹ passes up through an aperture in the base A' and is rigidly connected to the table C. Said table as it rises is prevented from rotating by the vertical guides c⁵, of which four are shown on each side, and which guides also serve to encompass or inclose the column of ascending bills.

The shaft c² contains at its extremity a sprocket wheel c⁶ secured thereto, about which operates a sprocket c⁷ which passes around a second sprocket wheel c⁸ secured to one of the clutch parts upon the main shaft hereafter to be described.

A main driving shaft such as E, whose exact location is not material, is provided with connections for performing the several operations described in this specification. As shown in the drawings, said driving shaft for convenience passes through the chamber A having bearings in its walls. On the shaft is a clutch which may be of any desired species. As shown, said clutch has a middle part F, see Fig. 2, which rotates with the shaft but is capable of movement lengthwise of the shaft, preferably through a key and slot device of the well-known form. Said clutch part F has means for moving it lengthwise so that when moved in one direction it will cause the performance of one set of operations and when moved the reverse direction, it will cause the performance of other operations. In order to cause the movements of the clutch part F any convenient mechanical or electrical arrangement will suffice, such for example as the lever F', having a fork f at its extremity and pivoted at f', extending beyond the pivot to a point f². To move the end f² of said lever, electrical devices may be used, such for example as the electromagnets f³, f⁴, into which currents of electricity can be directed alternately to cause alternate or opposite movements of the lever, and thereby cause lengthwise movements in opposite direction to the clutch part F.

The clutch part F coöperates with the two clutch parts G and H between which it is located, and is adapted to actuate one or the other according to the relative position of the parts. The exterior form of the clutch part F is that of a truncated cone on each side, and each of the clutch parts G and H is made concave of the same form,

so as to afford the most advantageous surface to be driven by friction. The clutch part G connects with mechanism which operates the bill-transferring devices herein-after to be described, while the part H connects with devices for operating the bunching mechanism. These two parts of the machine will be described in the order mentioned.

The source of power for driving the above mentioned parts including the shaft E is shown for convenience as an electric motor F² and the connection between the motor and the shaft is shown as a worm F³ on the motor shaft engaged with a gear F⁴ on the driving shaft E.

Coming back to the clutch part G, it is formed on or connected rigidly with a sleeve that is loose on shaft E and adapted to turn with said shaft only when the clutch parts F and G are in frictional engagement; and said sleeve is provided with a pair of sprocket wheels, one being the sprocket wheel c⁸ already mentioned, which has connections with the table C. The other sprocket wheel G¹ is engaged by a sprocket chain G² which passes upwardly and around a second sprocket wheel G³ which is formed on or rigid with a rotating cylinder J. Said cylinder J extends forwardly and rearwardly near the upper part of the machine and is supported on or revolves in contact with a suction cylinder I, which is shown as contained within the rotating cylinder and also extending forwardly and backwardly, being closed at its forward end at I', the closed end of said suction cylinder being suitably supported as by a bolt I² to a frame part A², which is indirectly supported by the vertical guides c⁵ already mentioned.

The relation between the rotating cylinder J and the suction cylinder I is a peculiar one and will now be described. Said cylinders are located directly above the uppermost of the column of uncounted bills, as clearly seen in Fig. 1. Suction is maintained in the cylinder I by reason of said cylinder passing through the wall B and through the side-wall of the main suction chamber A as seen in dotted lines, Fig. 2, said cylinder at that end being open so as to afford communication between the interior of the cylinder and the source of suction.

The rotating cylinder which is shown as outside of the suction cylinder, is intended to engage through the operation of suction with the topmost bill and transfer it through the rotation of the cylinder to a place removed from the column of bills, wherefrom it may be conveyed to the place where the bills are to be bunched. To enable this operation, the rotating cylinder is formed with a longitudinal slot or a plurality of such slots, and for convenience four of them are

shown; each slot as the same passes the column of bills being designed to cause the adherence of the topmost bill, so that four bills will be raised and transferred successively for each rotation of said cylinder. The slots mentioned are shown at *j* and as shown the same are shorter than the bills, although I do not limit myself in regard to the dimensions of the slots.

Fig. 1 shows the relative relation of the slots *j*. They are equidistant from each other around the circumference of the rotating cylinder J. In said Fig. 1, the suction cylinder I is shown in cross-section as cut out or open for about half its circumference, the other half being closed, and in the top view of Fig. 3, the same is shown, *j'* representing the line whereat said suction cylinder is cut open. It should be explained that in said Fig. 3, the rotating cylinder is for convenience broken away near each end so as to better disclose the cut-away construction of the suction cylinder. The suction cylinder being hollow, the drawing shows the slot *j* on the opposite or farther side of the rotating cylinder.

Returning to Fig. 1, it will be seen that the relative arrangement of the two cylinders effects an action analogous to that of a valve. The cylinder J rotates in the direction of the arrow *j*². As the slot *j* approaches its lowest position, and its edge begins to pass the edge *j'* of the suction cylinder, there will appear an open space permitting a suction through the walls of both cylinders. In Fig. 1, this space is shown in the act of opening. A suction being maintained in the interior, air will rush into said opening and as the rotating cylinder advances, the air will enter in increasing quantities until, when the opening is at its largest, the maximum amount of air tends to pass inward. However, the topmost bill being in close proximity, although not quite in contact with the rotating cylinder, is affected by the rush of air and is drawn upward toward the rapidly opening slot, so that before the same has fully opened the uppermost bill has been drawn into contact with the rotating cylinder and is there held with a sufficiently powerful frictional engagement to prevent displacement and to permit the rotating cylinder to take and transfer the bill around in a forward and upward direction until it reaches a point where other operations will take place hereafter to be described. The opening in the suction cylinder, which is bounded by the line shown at *j'*, will preferably be of substantially the same length as the slots *j*, although as before stated, I do not limit myself to dimensions of openings.

When the rotation of cylinder I has brought the slot *j* to its topmost position, then the wall of the suction cylinder I acting again as a valve, automatically closes the

slot *j* and prevents further operation of suction through that slot.

From the above description, it will be seen that for every revolution of cylinder J, four bills will in succession be lifted from the top of the column *c* and carried by rotation from that point to the upperside of the cylinder. At this point it had best be explained that for the purpose of removing the bills at the last named point, I have provided one or more, preferably four, belts, made of fabric for example, which pass around and are driven by the rotating cylinder J. These belts are represented at *J'*, and after passing around the rotating cylinder, the same pass around a drum or drums which will be described later on in this specification. Two of these belts are shown as engaged with the rotating cylinder at such points as to extend directly over portions of the slots *j*. In this way the belts are useful in preventing a bill from being drawn into the interior of the cylinder through too strong a suction. The bills, it will be understood, when drawn successively from the top of the column *c*, are held in contact with the rotating cylinder but with the belts *J'* interposed between the cylinder and the bills. The result is that when each bill has reached the topmost position, the continued rotation of the cylinder and belt effects a lateral transposition of the bill, the same now being carried by the belts instead of by the cylinder; and the bills will be carried the entire length of the belt to a point at which the bunching operations are to be effected, as will hereinafter appear.

K represents the foremost or topmost bill which has just been drawn by the suction from the column *c* into contact with the belts and rotating cylinder.

K' represents the preceding bill which has advanced to a partially rotated position, and K² represents the bill preceding K'. Bill K² has reached the topmost position and has begun to separate from the cylinder and pass along with the belts. Bill K³ is shown as having been carried part way along the belts toward the bunching devices.

I have found that it is desirable to provide means tending to hold in proper horizontal position the uncounted bills, save the topmost which is to be lifted and transferred by the cylinder. For this purpose I have provided a pair of auxiliary suction chambers L L' which extend parallel to and alongside of the column of uncounted bills. The forward ends of the auxiliary suction chambers are suitably supported at the top of the foremost of the guides *c*³, and their rearmost ends pass through the wall B and backward to and through the wall of the main suction chamber A, so as to afford a connection between the interior of the auxiliary suction chambers and the source of suction. As seen

in Fig. 1, these auxiliary chambers are substantially square in cross-section. The innermost vertical sides of each of them is cut away at l , see Fig. 1, the same being shown also in dotted lines in Fig. 2, forming a sort of horizontal slot which extends preferably the entire length of the bills to be counted. These openings or slots l are permanently open so that a current of air is constantly passing inwardly through the same under the influence of the suction therein. It will be observed that the bills are all horizontal and the general motion of the air will also be an inward horizontal motion so that the effect is a sort of drag upon each of the bills, or a tendency to stretch or draw the same at each edge toward the auxiliary suction box. The usefulness of this action is to obviate any tendency which might otherwise exist, when the topmost bill is lifted into contact with cylinder J , of the second bill lifting with it either through adhesion, statical electricity or suction existing between the two bills; and if the second bill should slightly rise up under the influence just mentioned, the auxiliary suction boxes would operate to quickly restore it to normal, horizontal position and thus prevent two bills being counted at once.

I will now describe the means whereby the bills are counted as they are transferred from the column c to the bunching devices. A rotating cam M is fixed upon the rotating cylinder J . Said cam has a number of cam surfaces m preferably the same as the number of slots j . They are shown as being four in number. The action of the cam surfaces is peripheral and their tendency is to lift and drop the end m' of a lever M' , as best seen in Fig. 1 where the parts m and m' are in dotted lines. The lever M' is pivoted at m^2 and its farther end is preferably supported by a spring such as m^3 whose purpose is to restore the lever to normal position after each cam surface has operated. It will be obvious that for each quarter revolution of the rotating cylinder J one of the cam surfaces m will come into play and force upwardly the part m' , thereby throwing the lever M' . Said lever is connected by a link M^2 with a slide M^3 which slide operates upon a pawl m^4 to effect the progressive rotation of a ratchet wheel N , which forms part of the counting and regulating device. At m^5 I have shown a detent pawl acting upon the ratchet N , this pawl being disposed opposite to the pawl m^4 which guides this ratchet wheel.

In order to adjust the machine for counting and bunching packages of bills of different sizes I have provided an adjusting means, such for example as an adjustable slide connection between the upper end of link M^2 and the lever M' . A set-screw m^5 serves to make the proper pivoted connection

between the link and the lever at any of the points desired along the length of the lever. When the connection between the two is at the extreme right-hand end, the pawl will pass over the minimum number of teeth and it will therefore require the maximum number of cylinder rotations before the ratchet wheel N gets to the point where it effects the stoppage of the cylinder and the operation of the bunching mechanism. On the other hand, when the link M^2 is adjusted to the extreme left-hand of the lever M' the minimum number of bills will be counted before the bunching operation takes place.

The ratchet wheel N is mounted loosely on a sleeve N' . Said sleeve is intended to rotate intermittently in a manner that will hereinafter appear. The ratchet wheel is provided with a coil spring n , one end of which is fixed to the sleeve N' , and the other end is fixed to the ratchet wheel. The sleeve N' , it should be mentioned, is mounted to revolve freely and merely as a matter of convenience I have shown it mounted on the same auxiliary shaft h which takes part in driving the bunching mechanism, as will hereafter appear.

Under the influence of the pawl m^4 the ratchet wheel N gradually rotates and this rotation will continue for a half revolution of the ratchet wheel, when it will be brought to a stop by the following means: The ratchet wheel N has a face cam N^2 with two inclined surfaces, so that a swinging stop O which has contact with said face cam, will be thrown toward the right to its farthestmost position at each half revolution of the ratchet wheel. Said swinging stop is shown as pivoted at o to a fixed part of the frame, from whence it extends upwardly and at its upward end it is bent forwardly at o' for a short distance, as seen in Fig. 2. As seen in Fig. 1, it also has a lug o^2 extending toward the left. See also Fig. 5. It is the last mentioned lug o^2 which contacts with the inclined surfaces of the face cam N^2 which rotates with the ratchet wheel. During the rotation of the ratchet wheel and of the cam N^2 , the swinging stop will swing from left to right, looking at Fig. 1, until the lug o^2 has reached the highest point of the face cam. Said swinging stop is provided with a vertical slot o^3 . When the swinging stop is in its right-hand position the slot o^3 is brought opposite to the outer portion of a plate cam P . This plate cam is best seen in Figs. 5 and 6. Fig. 6 shows a face view of it and shows that it consists of two semi-circular plate-like pieces. These are secured to the sleeve N' . It is as though a thin circular plate had been secured upon the sleeve and then slitted at diametrically opposite points with slits of substantial width as shown at p in dotted lines, Fig. 6. The two faces of the plate cam P , however, are not

in the same plane, for if they were there would be no cam action, but each of them is bent out of the plane in opposite directions near the two slits p , so as to produce a curvature somewhat analogous to that of a screw-propeller. Fig. 5 shows how the two portions of cam P are bent out of the flat. See also Fig. 6^a.

Now it is intended that the slot o^3 of the stop arm O shall engage with that portion of the plate cam which is bent farthest away from the ratchet wheel N. That is to say, such engagement will take place when the stop arm has been forced by the face cam N² to its outermost or right-hand position. In the last named position the slot o^3 will register with the plate cam P. The instant this state of affairs is reached, the spring n operates to cause a relative movement between the ratchet wheel and the plate cam. The plate cam will begin to revolve, entering into the slot o^3 . The instant it begins to revolve, the plate cam operates certain electrical connections which effect an immediate stoppage of the rotating cylinder J and the other bill-transferring mechanism. The manner in which it accomplishes this is by throwing the clutch part F away from the clutch part G and this throwing is effected as already explained through the magnets f^3 , f^4 .

Any convenient arrangement of electrical wiring may be employed, for example see Fig. 5. The two vanes or portions of plate cam P are each provided with a semi-cylindrical brush p' , the two brushes together forming a complete cylinder save for two opposite spaces between the brush-ends as seen in Fig. 6.

In connection with brushes p' p' I have shown a stationary pair of contacts p^2 p^2 which are insulated from each other as shown in Fig. 5, but which are capable of being electrically connected by one of the brushes p' coming in between the contacts p^2 p^2 . Thus electricity can flow from p^2 to p^2 whenever the brush p' is sliding between them, but no current can flow when the space between the brushes comes opposite the contacts p^2 p^2 . Two wires p^3 p^3 lead from the contacts p^2 p^2 , one of them passing to a battery and then to the magnet f^3 , while the other wire p^3 passes directly to magnet f^3 . The result is that as soon as the cam P begins to rotate in the direction of the arrow p^5 , Fig. 6, the magnet f^3 will be energized, and the armature f^2 attracted toward it so as to throw the lever F' and the clutch part F, thereby disengaging the clutch part G, and causing the bill-transferring and counting mechanism to stop. The length of the contact p' is such that the magnet f^3 will be energized for nearly half a revolution of the plate cam P and sleeve N'. At the same time that clutch part G is disengaged, part H will be engaged to operate the bunching

mechanism. At the end of the operation of the bunching mechanism, the magnet f^4 in an analogous way will be energized, drawing the armature f^2 toward the right and setting the bill-transferring and counting devices into operation again.

While I have herein described and shown in the drawings, a simple electrical arrangement for controlling the flow of current to the magnets f^3 and f^4 , it is not my intention to limit myself to this particular electrical arrangement, as any other desired manner of causing the alternate energizing of these magnets may be employed.

I will now describe the bunching mechanism which has been brought into play as above described by the engagement of clutch part F with clutch part H.

H' represents a worm which is mounted fast on the same sleeve which carries the clutch part H. When the worm is rotated it operates to rotate a worm wheel H² mounted on an auxiliary shaft h . This is the same shaft which was before referred to as carrying the sleeve N', which sleeve, however, is only loosely mounted on said shaft h . Said shaft is supported in bearings h' at either end, and has fixed to it a sprocket wheel h^2 engaging a sprocket chain h^3 that extends upwardly to another sprocket wheel h^4 mounted on a sleeve which turns loosely on a horizontal shaft h^5 . Said sleeve and shaft are adapted to be engaged with each other by a clutch of an ordinary kind, shown in Fig. 1, and which is controlled in its operation by a lever h^6 pivoted at h^7 , and having a fork h^8 engaging a groove in a second sleeve h^9 , which is keyed on the shaft h^5 . When the lever is thrown, the sleeve h^9 is thrown to the right or left, and when thrown to the right, Fig. 1, the two clutch parts are brought together so as to lock the two sleeves and cause a rotation of the shaft h^5 . When the shaft h^5 rotates, the following operations take place. At the end of shaft h^5 is a worm Q which engages with a toothed segment Q', so as to cause the latter to rotate from the position shown in Fig. 1, toward the left, when the shaft h^5 is rotated.

At this point it should be explained that the counted bills K³, which are passing from left to right in Fig. 1 resting on the belt J', are one at a time transferred from the belt to the upright position shown at K⁴. This is accomplished through the action of a folding spring K⁵, or rather two of them, which are mounted to rotate with two of the four drums K⁶. The said drums, it will be remembered, rotate with the rotating cylinder J through the belts J', and as the drums rotate the folding springs are caused to wrap themselves around the surface of the drums, the said springs having one or more hinges k to permit this. The drums rotate in the direction of the arrow k' , Fig. 1, and as

stated, the folding springs wrap around the drums as the latter rotate, until the rotation is nearly completed, when the nature of said springs causes them to spring upwardly to the position shown in Fig. 1, and this upward springing movement causes the bill K^3 , carried on the belts J' , to be carried upwardly with the spring to a vertical position and deposited at K^4 against the bills that have already been so acted upon.

R represents a swinging box or receptacle, or rather a pair of them, one near each end of the bills which are sprung upwardly as above explained, and these swinging boxes are provided with vertical platens R' , which are pressed outwardly by springs of very light tension r . A portion of the sides of the box R is corrugated as at r' so as to assist the vertically standing bills in maintaining their position. As the operation of the machine progresses, the quantity of counted bills in the box R keeps increasing, the springs r meanwhile compressing, and this continues until, for example, one hundred bills have been deposited in the box, at which stage the transferring and counting mechanism comes to a stop as previously explained. It is at this stage that the clutch F is thrown, bringing the shaft h^5 into operation and thereby causing the sectional rack Q' to swing to the left. Said rack is mounted on a shaft Q^2 , and it directly supports the swinging box R already referred to. The result is that the box R is swung downwardly from the position shown in Fig. 1 to a position in which the bills are flat or horizontal. In the last named position, the bills are adapted to rest upon a horizontal table Q^3 and while resting on the table, the same are adapted to have a fastening band placed around them and secured so as to form of the bills a bundle.

The shaft Q^2 is not continuous because it would interfere with the wrapping of the bands about the bunch of bills. The two parts Q^2 Q^2 , however, must rotate together, so I have provided a U-shaped connecting member t^{11} , Fig. 3, forged or secured to Q^2 so that the two shaft parts are substantially solid. This device can be used because said shaft rotates only a quarter revolution.

The toothed segment Q' when rotating strikes against the upper part of lever h^6 , thereby throwing said lever and disengaging the clutch which drives the shaft h^5 . The shaft thereby becomes idle and remains so while the bills are secured into a bundle.

S represents the band-carrying table which will be seen to be located to one side and below the table Q^3 , but parallel therewith. The bands s are shown in dotted lines in Fig. 3. They are stacked horizontally upon the table S. Said table S is capable of moving up and down guided by the wall S' and supported upon springs S^2 tending to push

the stack of bands upwardly. Said springs at the lower ends are secured to the upper part of a fixed standard S^4 . The topmost of the bands is transferred from the table S to the table Q^3 , while the box R is swinging downward. To assist this a cover S^3 is provided, the same being located above the stack of bands and secured to the walls S' , and between the cover and the walls is a narrow space sufficiently large to permit a couple of pushers s' to enter and push one of the bands horizontally to the left, Fig. 3. There is also an opening or slit at the opposite side just beneath the cover S^3 , said opening being large enough to permit only the topmost of the bands to be passed through, upon which the band will take its place upon the table Q^3 prior to the depositing upon said table of the counted bills which are swinging downwardly with the box R.

The pushers s' are joined together and form a sort of fork, which fork is pivotally attached at the upper end of a lever s^2 . Said lever s^2 swings about a fixed pivot at its lower end as best seen in Fig. 2, and at an intermediate point it has pivotally secured to it, a second lever s^3 . Lever s^3 is pivotally secured at s^4 to the segmental gear Q' , see Fig. 1, so that the rotation of the latter operates the levers s^3 and s^2 to actuate the fork s' in the manner described.

I will now describe the manner in which the band s which rests upon table Q^3 is wrapped and secured around the counted bills. A vertically sliding box T is so arranged that its vertical sides t t can encompass the column of counted bills, but in its normal position the box T is at such a low point that the extreme upper edges of its sides are no higher than the top of the table Q^3 and are preferably flush with it. The sides of said box are each composed of two parts, the upper parts t' t^2 being hinged at t^3 to the lower parts, and springs t^4 are provided, whose tendency is to fold the parts t' t^2 toward each other. Normally, however, said parts are maintained in their vertical position by the sides of the table Q^3 .

The box T is intended to be moved upwardly and downwardly, and to cause its upward and downward movement is shown a rack T' , which is rigidly secured to the box T and which at its lower end slides through and is guided by a slide-way T^2 . The pinion t^4 engages the rack T' , said pinion being mounted on a shaft t^5 , upon which are also mounted two clutch parts t^6 t^7 . The clutch part t^7 is loose upon the shaft t^5 and is provided with a sprocket wheel engaged by a sprocket chain t^8 that passes upwardly around a sprocket wheel which is fast upon the sleeve h^3 already mentioned. The other clutch part t^6 is keyed upon the shaft t^5 so as to be capable of sliding thereon and the same is engaged by a fork at the

lower end of the lever h^6 , already mentioned; so that when said lever is thrown it can cause the engagement of the clutch parts t^6 t^7 , thereby effecting the rotation of shaft t^5 and the elevation of the box T. This operation will take place at the time already mentioned when the segmental gear Q' has ceased rotating and has thrown the lever h^6 . At this stage the bills contained in the swinging box R will be in their downmost or horizontal position.

The rising up of the box T has the following result. The upper portion t^2 of the side of the box T is hinged to the lower portion at a point slightly lower than the point at which the part t' is hinged. As the box T ascends and the parts t' t^2 rise on either side of the pile of counted bills, they will reach a point at which the springs t^9 are capable of operating. Said springs will then cause the parts t' t^2 to fold inwardly toward each other. Looking at Fig. 3, the topmost of the secured bands which has been shifted onto the table Q^3 , is marked s^5 . Said band will of course underlie the pile of counted bills, but owing to its length will project laterally at either side. When the table T rises, the walls t' t^2 thereof come up against the bottom face of the securing band, causing the ends of said band to turn or fold sharply upward, in which position they will remain until the box T has risen far enough to bring the hinges t^3 above the level of table Q^3 , upon which the springs, being strong will cause the part t^2 and then t' to immediately turn in and down, so that the bills lying loosely on table Q^3 are compactly pressed together so as to afford a minimum thickness of package. In folding inward and downward the parts t^2 and t' will carry with them the ends of the securing band.

The result of the above described operation is that the securing band which originally underlay the pile of counted bills is wrapped around and downward, the two ends of the band being caused to overlap each other on the top of the pile of bills. The mechanism described is seen in perspective in Fig. 4. When the bands are folded down as described, the same should be pinned or glued together, and I have shown a moistener t^{10} against which the end of each band already covered with adhesive, will rub while being wrapped around the counted bills, and being pressed into place, the same will adhere. The pinning or gluing can be done after the parts t' , t^2 have been reopened, the operator holding the compressed bills down and rebending and securing the band ends.

As a convenience, I have also shown a handle T^3 which the operator may grasp to cause the box T to resume its original position, and so that he can remove the bundled and secured package of counted bills. Of course this restoring of the box T to its

original position and the removal of the packages of bills may be affected automatically by easily devised mechanism.

When the parts t' t^2 have folded downwardly over the top of the column of counted bills, it will be seen from Fig. 3 that the same are securely held in place and the swinging boxes R may be rotated upwardly again to their original vertical position. This is because the bills being flexible, their ends can slip out of the boxes R without disturbing them. In order to return the boxes to original position, I have provided a bevel gear u mounted on a vertical stationary axis, and which permanently engages a second bevel gear u' which is permanently fixed to the shaft h^5 . Fast upon the sleeve h^8 is a third bevel gear arranged to engage and disengage with the gear u when said sleeve is slid back and forth on the shaft h^5 . Now when said sleeve is slid toward the right, Fig. 1, which may be done by hand or a lever added for that purpose, causing the bevel gears to engage, it will be seen that the shaft h^5 will rotate in a direction opposite to that of its previous rotation. The effect will be to reverse the action of the worm Q and segmental gear Q' , thereby causing said gear to move toward the right, swinging the box R upwardly, at which stage the rotation of shaft h^5 is to be stopped.

The modification in Fig. 7 is merely one showing a different means of raising the column of uncounted bills c .

V represents a belt which may be made of metal or stiff leather or the like, and to said belt is secured a table V' in such a way that said table will maintain a horizontal position as it rises with the belt.

Having described my invention, I desire, without limiting myself to the precise details shown, to claim the same as follows:

1. In a counting machine, a support adapted to receive and sustain a column of uncounted sheets, means adjacent to the top of said column whereby said sheets are adapted to be removed therefrom one at a time, a suction box adjacent to and below the top of said column whereby the removal of more than one sheet at a time is prevented, and a counting mechanism actuated by said sheet removing device.

2. In a counting machine, a support adapted to receive and sustain a column of uncounted sheets, a suction device adjacent to the top of said column whereby said sheets are adapted to be removed therefrom one at a time, a suction box adjacent to and below the top of said column whereby the removal of more than one sheet at a time is prevented, and a counting mechanism actuated by said sheet removing device.

3. In a counting machine, a support adapted to receive and sustain a column of uncounted sheets, means adjacent to the top of

said column whereby said sheets are adapted to be removed therefrom one at a time, a suction box adjacent to and below the top of said column whereby the removal of more than one sheet at a time is prevented, means constantly evacuating air from said suction box, and a counting mechanism actuated by said sheet removing device.

4. In a counting machine, a support adapted to receive and sustain a column of uncounted sheets, a suction device adjacent to the top of said column whereby said sheets are adapted to be removed therefrom one at a time, a suction box adjacent to and below the top of said column whereby the removal of more than one sheet at a time is prevented, means constantly evacuating air from said suction box, and a counting mechanism actuated by said sheet removing device.

5. A counting and segregating machine for currency bills or the like having a counting mechanism driven by, and assembled in combination with, the following mechanism: a hollow member adapted to be continuously driven, a support for supporting a quantity of uncounted objects with the foremost object in proximity to said hollow member, said member having a slot, and means for maintaining suction within said member whereby the suction may act upon the foremost object through such slot and such object be conveyed with said member from the said support, and a pair of auxiliary suction boxes acting substantially as described at opposite end edges of uncounted objects to insure that none but the foremost be removed.

6. A feeding mechanism comprising in combination a support for the uncounted objects, a rotating cylinder located in proximity to the foremost object, means for rotating said cylinder, means for maintaining suction in said cylinder, and a slot or

slots in said cylinder whereby the foremost object is adapted to be drawn into contact with said cylinder and rotated with it to a point removed from said support, and a pair of auxiliary suction boxes acting substantially as described at opposite edges of uncounted objects to insure that none but the foremost be removed.

7. A feeding mechanism comprising in combination a support for a quantity of uncounted objects, a hollow slotted rotating cylinder in proximity to the foremost object, a hollow suction cylinder within the rotating cylinder, a source of suction, and means for rotating said rotating cylinder; the wall of said inner cylinder being partly cut away so as to cooperate with a slot in said rotating cylinder whereby said slot will open when it comes to the foremost uncounted object and close after said object has been rotated with said rotating cylinder to a removed point, and a pair of auxiliary suction boxes acting substantially as described at opposite edges of uncounted objects to insure that none but the foremost be removed.

8. A feeding mechanism comprising in combination a main suction chamber, a hollow rotating member for engaging and removing by suction the foremost of a series of uncounted objects, means for driving said member, means connecting the interior thereof with said chamber, and a pair of oppositely disposed auxiliary chambers connecting with said main chamber and adapted by suction to insure that none but the foremost of the uncounted objects be removed by said member.

In witness whereof I have hereunto set my hand, this 5th day of October, 1908.

ARTHUR VON BARTH.

Witnesses:

ELIZABETH B. KING,
W. A. TOWNER, Jr.