

No. 743,579.

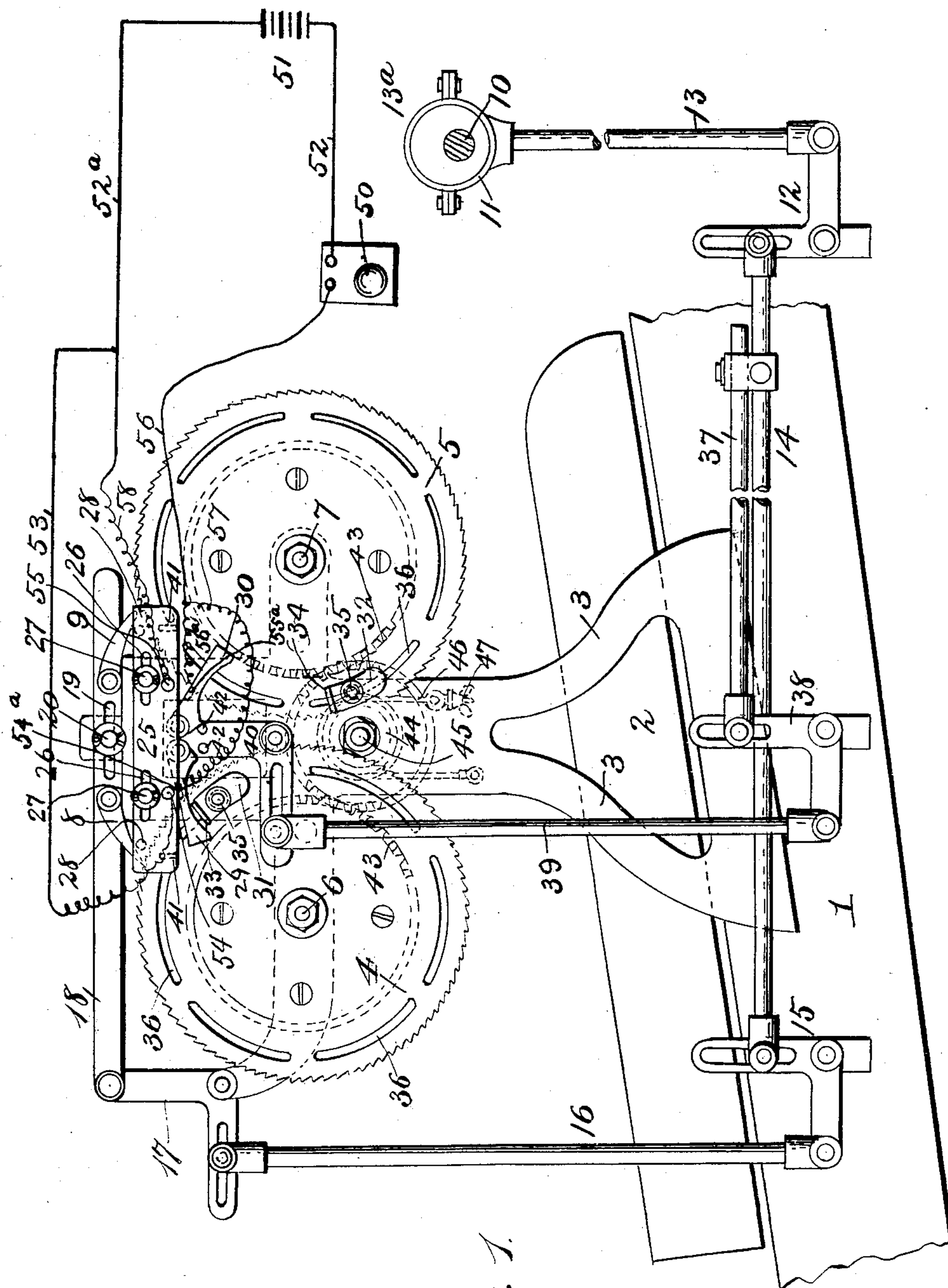
PATENTED NOV. 10, 1903.

J. B. SLEEMAN.  
COUNTING MACHINE.

APPLICATION FILED AUG. 5, 1903.

NO. MODEL.

2 SHEETS--SHEET 1.



2. 647

Witnesses  
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2 SHEETS—SHEET 2.

Fig. 2.

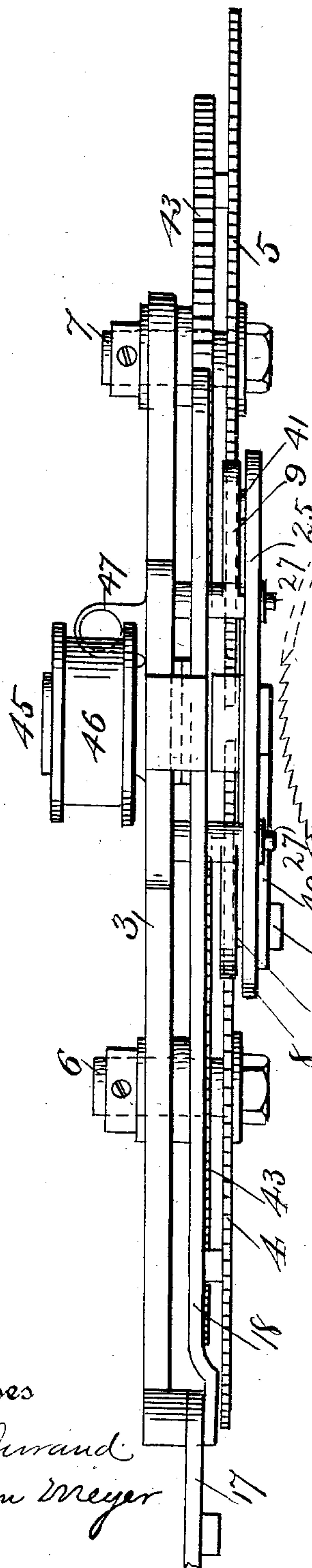
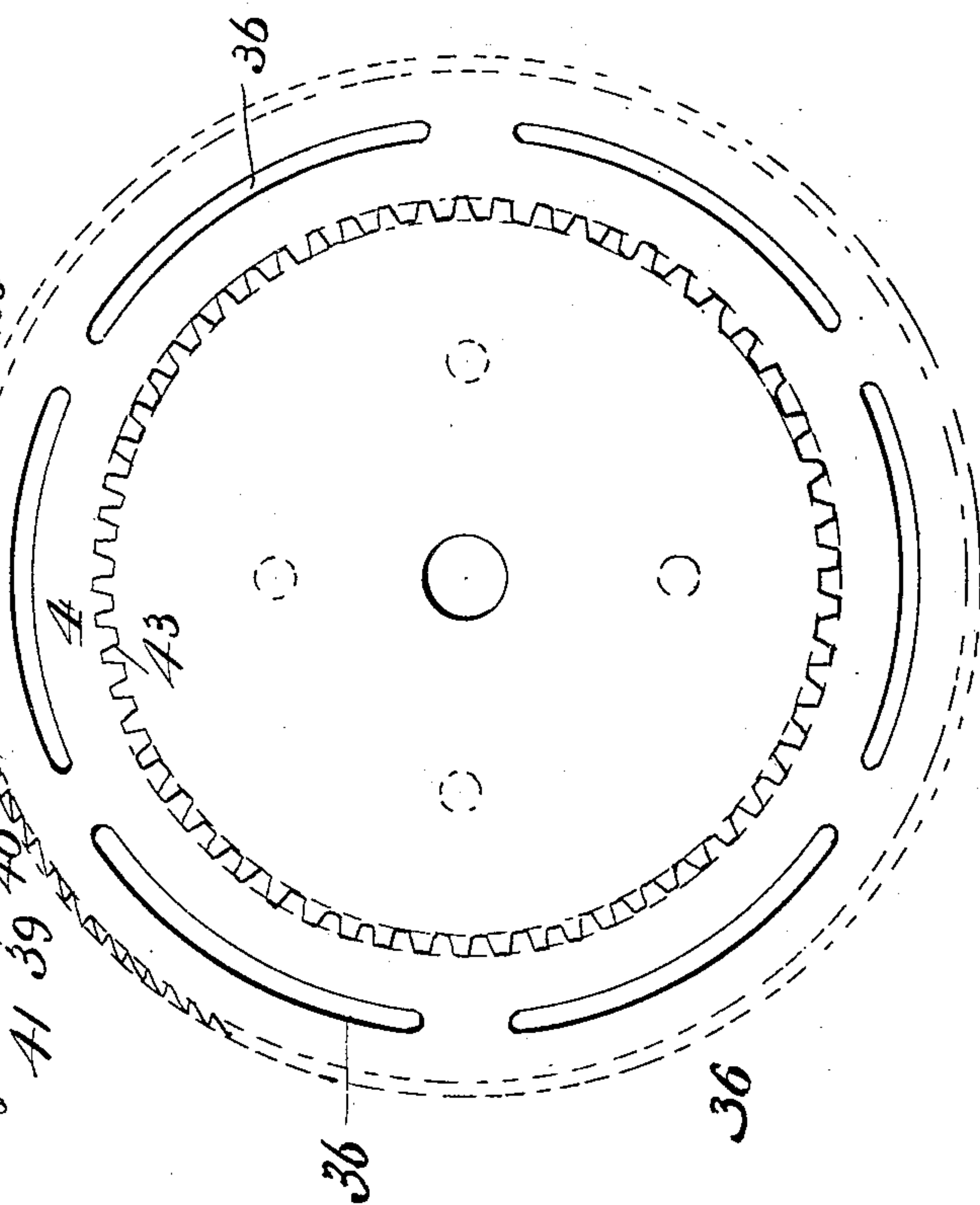


Fig. 3.



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# UNITED STATES PATENT OFFICE.

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## COUNTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 743,579, dated November 10, 1903.

Application filed August 5, 1903. Serial No. 168,304. (No model)

*To all whom it may concern.*

Be it known that I, JAMES B. SLEEMAN, a citizen of the United States, and a resident of Huntingdon, in the county of Huntingdon and State of Pennsylvania, have invented certain new and useful Improvements in Counting-Machines, of which the following is a specification.

This invention relates to improvements in devices for counting the movements made by rotary portions of certain machines, and particularly of ruling-machines, whereby it counts the number of sheets of paper or counts in signatures of any stated amount which pass through said machine; and the invention consists in certain peculiarities in the construction of parts and in certain novel combinations of elements, substantially as hereinafter described, and particularly pointed out in the subjoined claims.

A leading object of the invention is to provide a counting-machine adapted to be used in connection with a machine having a revoluble part the number of rotations of which is to be counted—for example, the feed-roller of a paper-feeding machine attached to a paper-ruling machine—so as to count the number of sheets or sets of sheets which pass therethrough, and which is adapted to count successively any quantity desired or to count in signatures of any stated amount, odd or even. This object is well accomplished by the construction shown in the accompanying drawings, which illustrate what is deemed to be the best embodiment thereof.

In said drawings, Figure 1 is a side elevation of a counting-machine containing, as stated, what is deemed to be the best embodiments of the present improvements. Fig. 2 is a plan view thereof. Fig. 3 is a side view of one of the ratchet-disks and its returning-gear viewed from the side opposite that shown in Fig. 1.

The same numerals of reference designate the same parts in the several views.

The counting device is mounted on a suitable frame 1, which may form a part of the frame of the machine with which said device is to be used. The frame 1 (shown in the drawings) is the part of the frame of a paper-ruling machine which supports the lay-boy 2.

3 designates the frame of the counting de-

vice proper, and 4 and 5 designate ratchet-disks which are fixed on shafts 6 and 7, journaled in the frame 3 and are moved intermittently and one at a time by pawls 8 and 9, which are connected with and controlled by the shaft 10, the revolutions of which are to be counted. Said shaft may be that which carries one of the feed-rolls of a paper-feeding machine; but as said machine forms no part of the present invention it is not deemed to be necessary to illustrate it herein. The means by which the pawls are actuated under the control of said shaft 10 preferably comprise an eccentric 11, mounted on said shaft, a bell-crank lever 12, one arm of which is connected with said eccentric by a rod 13 and eccentric-strap 13<sup>a</sup>, a rod 14, extending from the other arm of said bell-crank lever to one arm of a second bell-crank lever 15, a rod 16, extending from the other arm of the second bell-crank lever to one arm of a third bell-crank lever 17, and a lever 18, extending from the other arm of the third bell-crank and to which the pawls 8 and 9 are pivoted in proper juxtaposition to the toothed peripheries of their respective ratchet-disks 4 and 5. It will thus be seen that rotary motion of the shaft 10 is converted into reciprocatory motion which is transmitted to the pawl-carrying lever 18, causing said lever by means of said pawls 8 and 9 to intermittently actuate said ratchet-wheels 4 and 5. The lever 18 is suitably guided in its reciprocations by the elongated slot 19 and pin 20, for example.

The connection of the rod 14 with the bell-cranks 12 and 15 is preferably adjustable, which is also true with respect of the connection of rod 16 with bell-crank 17, whereby the length of the thrust of the pawls is adjustable to suit the size of the teeth of the ratchet-disks. By this means ratchet-disks of the same diameter, but having different sizes and numbers of teeth, may be used interchangeably. This adjustment may be very desirably provided for by forming the cranks with elongated slots 21, adapted to the pivots of said rods, and employing suitable set-screws 22 for fixing the connection at any place in the lengths of said slots.

The ratchet-disks are operated alternately, and each may be moved through a predetermined series of steps, (corresponding, for ex-



ample, to the number of sheets of paper constituting a signature,) when its operation is discontinued until the other disk, meanwhile at rest, has been moved through a like series of steps. In order that this may be accomplished automatically and to the end that the parts may be so adjusted as to vary the number of steps through which each disk is operated before it discontinues and the other takes up the count, means are provided by which one pawl is automatically lifted out of operative relation with its ratchet-disk, while the other pawl simultaneously is adjusted into operative relation with its disk, said means comprising adjustable devices by which this movement may be made to occur automatically at the end of any predetermined number of revolutions (from one up) of the shaft 10 or other part the movements of which are to be counted. A most desirable means for this purpose comprises a slide 25, suitably guided in its movements by the elongated slots 26 and guide-pins 27, for example, and having projecting devices, such as the pins 28, which respectively engage the pawls and disengage them alternately from the contiguous ratchet-teeth, and means adjustable to cause said slide to move from one side to the other at the end of any predetermined number of revolutions of said shaft 10 to thereby automatically cause the pawl which was disengaged from its ratchet-disk to engage said disk and at the same time cause the other pawl to be raised out of engagement with its disk. The particular means devised and preferably employed for adjusting said slide comprise a pair of pivoted arms 29 and 30, which project in opposite directions from a suitable rocking support and which are normally disengaged from the slide 25, so as to communicate no movement thereto during their said rocking movement and while in their said normal position, and striking devices carried by the ratchet-disks and projecting therefrom and set thereon so that when a disk has made the number of steps through which it is set to operate while the other disk is inactive its striking device will be brought into engagement with the contiguous arm 29 or 30 and will adjust the same into operative relation with the slide 25, so that the next rocking movement of the said adjusted arm will cause it to adjust the slide toward one side, and thereby lift the pawl at said side from the ratchet-disk and permit the other pawl to drop into engagement with its disk, whereby the latter takes up the count where the other left off.

The striking devices preferably employed comprise plates 31 and 32, having lugs 33 and 34 to engage the pivoted arms 29 and 30, respectively, and each adjustably set on its ratchet-disk by a screw 35, extending into an elongated slot 36 in each disk. Each ratchet-disk is formed with a plurality of said slots, so that practically a continuous slot for adjustment of the striking devices is formed

around the entire face of the disk. By this means the device may be set to count in signatures or series of any desired amount, odd or even, up to the number of teeth on the disk. A most desirable means for rocking said arms 29 and 30 comprise a rod 37, carried by the rod 14 and receiving motion therefrom and having one of its ends engaged with one end of a bell-crank lever 38, and a rod 39, extending from the other arm of said lever to one arm of a second bell-crank lever 40. To the other arm of said lever 40 the arms 29 and 30 are pivoted, and said lever thus constitutes the rocking support for said arms. For purposes of adjustment bell-cranks 38 and 40 are preferably slotted at the place of connection therewith of the rods 37 and 39, respectively.

From the above description the operation of the machine thus far described will readily be understood to be as follows: Let it be assumed, for example, that sheets of paper from a ruling-machine are to be counted in series of twenty-five. The striking devices 31 and 32 will be set back twenty-five subdivisions (each subdivision in the present construction being represented by a tooth of the ratchet-disk) from the beginning of the respective ratchet-disks 4 and 5. To facilitate this adjustment, the ratchet-disks may be marked with the proper numeral in each subdivision or at the end of each predetermined series of the same. Each subdivision may be represented by a single tooth, in which event the thrust of the pawls will be such as to move the disks a distance equal to one tooth at a time. Referring to Fig. 1, it will be seen that pawl 8 is engaged with ratchet-disk 4 and pawl 9 disengaged from ratchet-disk 5. The ruling-machine being in motion, each revolution of its shaft 10 causes lever 18 to reciprocate by means of eccentric 11 and the rods and bell-cranks 12, 13, 14, 15, 16, and 17, thus causing the pawl 8 to turn the ratchet-disk 4 a distance equal to one tooth. Until the shaft 10 has made twenty-five revolutions the slide 25 remains stationary, because it is disengaged from the rocking arm 29; but meanwhile the ratchet-disk 4, moving step by step with the revolutions of the shaft 10, will at the twenty-fifth revolution of said shaft have brought the striking device 31 into engagement with said arm and have caused it to raise said arm into engagement with a wall or projection 41 of the slide 25, so that the rocking movement imparted to said arm during said revolution will cause it to press said slide in the direction of said movement, thus lifting the pawl 8 from the ratchet-disk 4 and permitting pawl 9 to drop into engagement with ratchet-disk 5, which latter thus takes up the count through the next series of twenty-five, when its pawl is lifted (by means of the striking device 34 acting on the arm 30 and through said arm on the slide 25) and pawl 8 simultaneously re-engaged with disk 4, which disk meanwhile has been returned to its starting-place by



suitable means, such as those hereinafter set forth.

The bell-crank lever 40 is provided with stop-pins 42, arranged to engage the under sides of the levers 29 and 30 and to confine the downward pivotal movement thereof.

The means preferably employed to return the ratchet-disks to their starting-places comprise gear-wheels 43 43, mounted on the shafts 6 and 7 and intermeshed with an intermediate gear 44, which is mounted on a shaft 45, carried by the frame 3. It will thus be seen that while one ratchet-disk is being moved in one direction by its pawl the gear on the shaft of said disk is acting through the intermediate gear 44 and the gear on the shaft of the other ratchet-disk to turn the latter in the reverse direction, and thus return it to the starting-place automatically. In order to steady the operation of the gears and the ratchet-disks, a band-brake 46 is applied to the shaft 45, said band-brake having suitable adjustable means 47 for regulating its tension.

From the above description of the construction and operation of the machine its advantages will readily be apparent. It will be noted that the machine is simple and durable in construction and that it will operate automatically to count consecutively up to any number and will count in sets or signatures of any desired number within that of the teeth of the disks. The count may be communicated in any suitable manner or by any suitable means to any suitable registering or recording device; but as this is not essential to the present invention it is considered to be unnecessary to show the same herein.

It is very desirable to employ in connection with the above-described counting mechanism a suitable indicating means, such as a recorder, a register, or an alarm-bell. Said indicating means may be very desirably electrically operated under the control of the slide 25 or arms 29 and 30. There is shown as an example in the accompanying drawings an alarm-bell 50, situated in normally open circuits which are closed to sound the alarm, and thereby warn the attendant when a predetermined count to which the device is set has been reached, said alarm mechanism comprising, in addition to the bell 50 and battery 51, contacts 54 and 55 on the slide 25 and contacts 54<sup>a</sup> and 55<sup>a</sup>, carried by the arms 29 and 30 and brought by the upward movement thereof into engagement with the contacts 54 and 55, respectively. The circuit connections shown in the drawings comprise a wire 52, which leads from one binding-post of the bell to one pole of the battery, a wire 52<sup>a</sup>, which leads from the other pole of the battery and is connected, by means of a wire 53, with the contact 54 and by means of wire 58 with the contact 55, and a wire 56, which leads from the other post of said bell and has connection with both contacts 54<sup>a</sup> and 55<sup>a</sup> through branches 56<sup>a</sup> and 57.

Having thus described the invention, what is believed to be new, and desired to be secured by Letters Patent, is—

1. In a counting-machine, the combination with a pair of ratchet-disks, of means for operating said disks intermittently and alternately from a moving part of a machine whose movements are to be counted, comprising pawls, means for reciprocating said pawls to thereby impart intermittent movement to the respective disks, and means controlled by the respective ratchet-disks for automatically shifting the pawls one at a time out of engagement with their respective disks at predetermined places in the travel of the disks.

2. In a counting-machine, the combination with a pair of ratchet-disks, of means for operating said disks intermittently and alternately from a moving part of a machine whose movements are to be counted, comprising pawls, means for operating said pawls to impart intermittent movement to the respective ratchet-disks, means controlled by the respective ratchet-disks for automatically shifting the pawls one at a time out of engagement with their respective disks at predetermined places in the travel of the disks, and means for returning the disks to their starting-places when disengaged from said pawls.

3. In a counting-machine, the combination with a pair of ratchet-disks, of means for operating said disks alternately and intermittently from a moving part of a machine whose movements are to be counted, comprising pawls, means for operating said pawls to impart intermittent movement to the respective ratchet-disks, means controlled by the respective ratchet-disks for automatically shifting the pawls one at a time out of engagement with their respective disks at predetermined places in the travel of the disks, a gear partaking of the movement of each of said disks, and means for transmitting movement from one of said gears to the other in reverse direction.

4. In a counting-machine, the combination with a pair of ratchet-disks, of means for operating said disks alternately and intermittently from a moving part of a machine whose movements are to be counted, comprising operating means for the pawl, and means for automatically lifting one pawl out of operative relation with its ratchet-disk while the other pawl is simultaneously adjusted into operative relation with its disk, comprising adjustable devices controlled by the movements of the respective disks and pawl-lifting means operated by said devices.

5. In a counting-machine, the combination with a pair of ratchet-disks, of means for operating said disks intermittently and alternately from a moving part of a machine whose movements are to be counted, comprising pawls, means for operating said pawls to impart intermittent movement to the respective ratchet-disks, a slide having means to engage said pawls and adjust them one at a time out



of engagement with the respective disks, and means controlled by the movement of the respective disks for moving the slide in one direction when one disk has moved a predetermined distance and for adjusting the slide in the other direction when the other disk has moved a predetermined distance.

6. In a counting-machine, the combination with a pair of ratchet-disks, of means for operating said disks intermittently and alternately from a moving part of a machine whose movements are to be counted, comprising pawls to engage said disks, operating means for the pawls, and means for automatically lifting one pawl out of operative relation with its disk while the other pawl is simultaneously adjusted into operative relation with its disk, comprising a slide having means to engage said pawls, pivoted arms, means for moving said arms bodily, and means controlled by the movements of the ratchet-disks for moving said arms respectively into engagement with the slide whereby the bodily movement thereof may adjust said slide.

7. In a counting-machine, the combination with a pair of ratchet-disks, of means for operating said disks alternately and intermittently from a moving part of a machine whose movements are to be counted, comprising pawls, operating means for the pawls, a slide having means to engage said pawls, pivoted arms, means for moving said arms bodily, and devices adjustably secured to the ratchet-disks and adapted to engage and raise the respective arms into engagement with said slide.

8. In a counting-machine, the combination with a pair of ratchet-disks having elongated slots, of means for operating said disks alternately and intermittently from a moving part of a machine whose movements are to be counted, comprising pawls, means for reciprocating the pawls, a slide having means to engage said pawls, pivoted arms, means for moving said arms bodily, plates having lugs to engage the respective arms, and set-screws adjustable in the slots of said disks for securing said plates adjustably to said disks.

9. The combination with a rotatable shaft, a lever and connecting means between said shaft and lever adapted to convert rotary movement of the shaft into reciprocatory movement of the lever, of pawls carried by said lever, ratchet-disks engaged by said pawls, and means for adjusting the pawls one at a time out of engagement with their respective ratchet-disks, comprising an adjustable device to engage the pawls and means for adjusting said device under the control of the ratchet-disks.

10. The combination with a rotatable shaft, a lever and connecting means between said shaft and lever adapted to convert rotary movement of the shaft into reciprocatory movement of the lever, of pawls carried by said lever, ratchet-disks engaged by said pawls and means for adjusting the pawls

one at a time out of engagement with their respective ratchet-disks, comprising an adjustable device to engage said pawls, pivoted arms, a rocking support for said arms and means carried by the ratchet-disks and adjustable thereon for engaging the respective arms and adjusting the same into engagement with said adjustable device at predetermined places in the travel of said disks.

11. The combination with a rotatable shaft, a lever, connecting means between said shaft and lever adapted to convert rotary movement of the shaft into reciprocatory movement of the lever, said connecting means having a reciprocatory rod, pawls carried by said lever, and ratchet-disks engaged by said pawls, of means for adjusting the pawls one at a time out of engagement with their respective ratchet-disks, comprising an adjustable device to engage said pawls, a bell-crank, means connecting said bell-crank with said rod for transmitting motion from the latter to the former, arms pivoted to said bell-crank, and means adjustable on the disks and projecting therefrom to engage said arms and raise the same into engagement with said adjustable device at predetermined places in the travel of the disks.

12. The combination with a rotatable shaft, a lever, and connecting means between said shaft and lever adapted to convert rotary movement of the shaft into reciprocatory movement of the lever, of pawls carried by said lever, ratchet-disks engaged by said pawls, a slide having means to engage said pawls and lift the same one at a time out of engagement with their respective ratchet-disks, a rocking support, arms pivoted on said support and normally out of engagement with said slide, means carried by the ratchet-disks for adjusting said arms into engagement with said slide, gears partaking of the intermittent movement of said disks, and means for transmitting movement from one of said gears to the other in reverse direction.

13. In a counting-machine, the combination with a pair of ratchet-disks and pawls operated to adjust the same alternately and intermittently from a moving part of a machine whose movements are to be counted, and means for adjusting said pawls comprising a slide having projections to engage the respective pawls, and arms operated to adjust said slide, of an indicating means controlled by the movement of said slide.

14. In a counting-machine, the combination with a pair of ratchet-disks, pawls operated to adjust the same alternately and intermittently from a moving part of a machine whose movements are to be counted, and means for adjusting said pawls comprising a slide and arms operated to adjust said slide, of an indicating means comprising electrical circuits having contacts carried by said slide and contacts carried by said arms.

15. In a counting-machine, the combina-



tion with a pair of ratchet-disks, and means  
for operating said disks alternately and inter-  
mittently from a moving part of a machine  
whose movements are to be counted, compris-  
5 ing pawls, operating means for the pawls, a  
slide having means to engage said pawls, piv-  
oted arms, means for moving said arms bodily,  
and means controlled by the movements of the  
ratchet-disks for moving said arms pivotally  
10 into engagement with the slide, of indicating  
means comprising electrical circuits having  
contacts carried by said slide and contacts  
carried by said arms.

15 16. In a counting-machine, the combina-  
tion with a disk provided with ratchet-teeth,  
means controlled by a device the movements  
of which are to be counted for actuating said  
disk, comprising a pawl to engage the teeth  
of said disk and actuating connections for  
20 said pawl, of an indicating means and means  
for operating the same when said disk has  
turned a predetermined extent, comprising

an electrical circuit, contacts therein, a piv-  
oted support for one of said contacts, and  
means projecting from said disk and arranged 25  
to engage said support to adjust the contact  
carried thereby into engagement with the  
other contact.

17. In a counting-machine, the combina-  
tion with a slotted disk, means controlled by 30  
a device the movements of which are to be  
counted for actuating said disk, of an indi-  
cating means, an electrical circuit having con-  
tacts and a device adjustable in the slot of  
said disk for closing the circuit through said 35  
indicating means.

Witness my hand this 27th day of July,  
1903, at Huntingdon, in the State of Penn-  
sylvania.

JAMES B. SLEEMAN.

Witnesses:

D. ELLIOTT JOHNSTON,  
W. A. MAGUIRE.