

No. 671,109.

Patented Apr. 2, 1901.

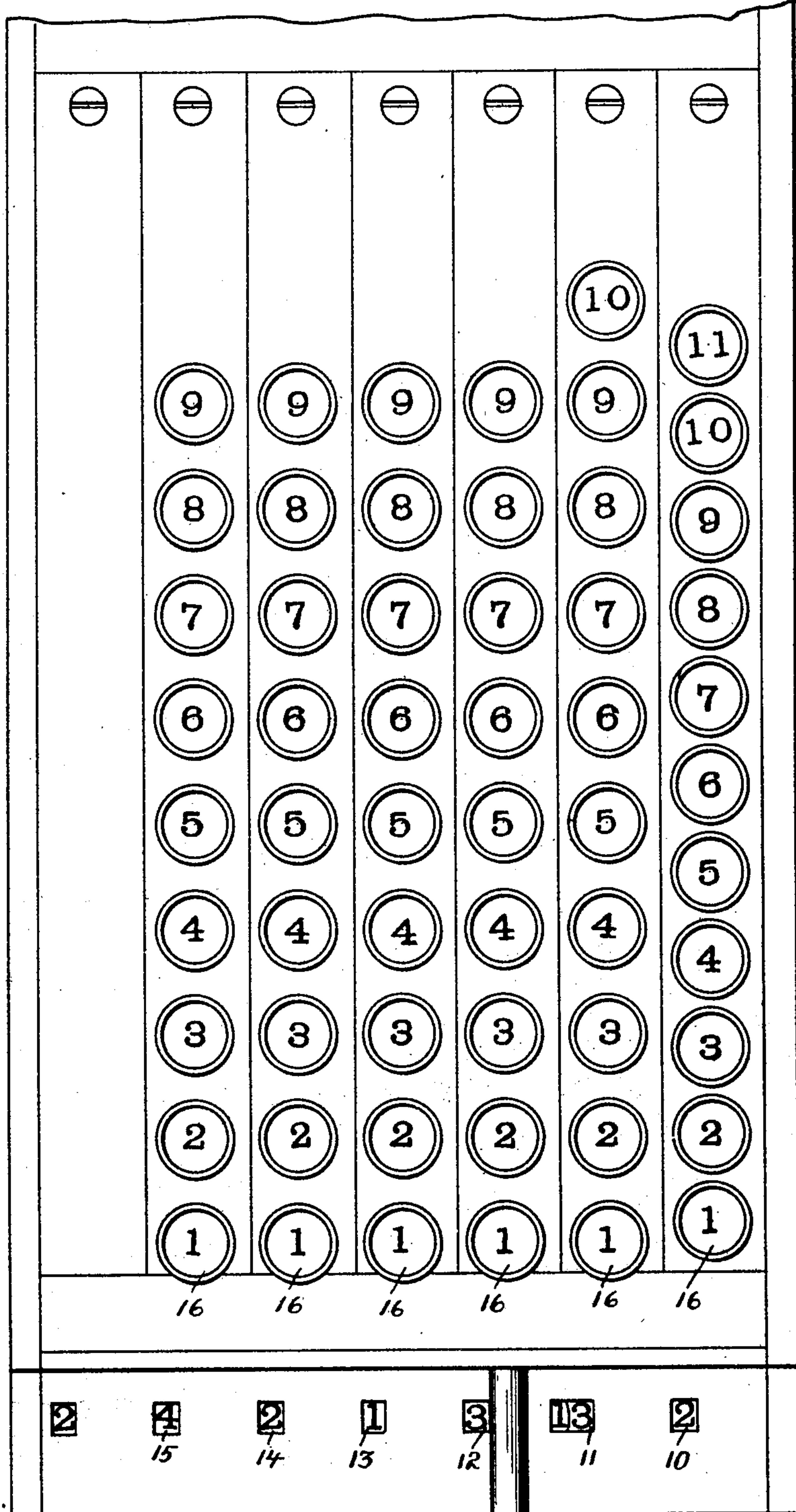
D. E. FELT.  
CALCULATING MACHINE.

(Application filed Oct. 24, 1900.)

(No Model.)

5 Sheets—Sheet 1.

FIG. 1.



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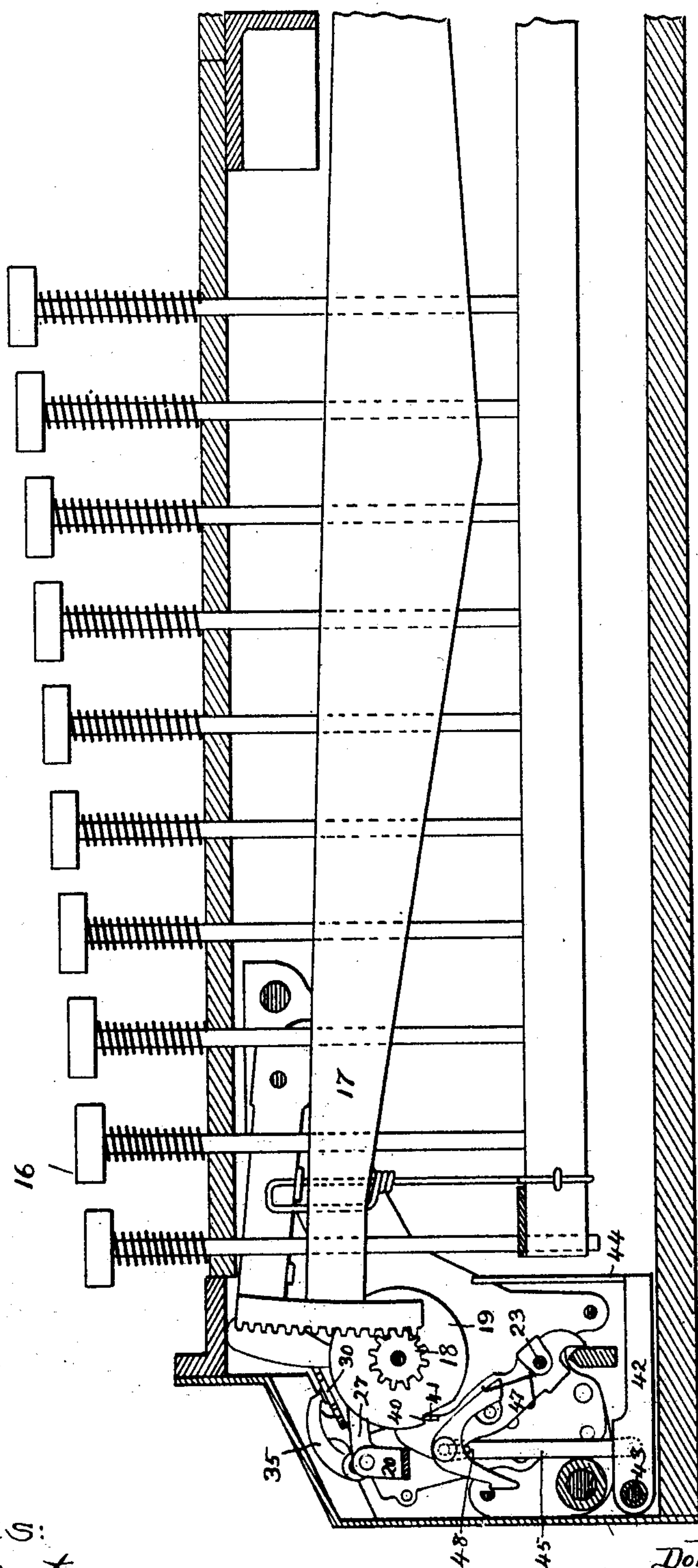
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FIG. 2.



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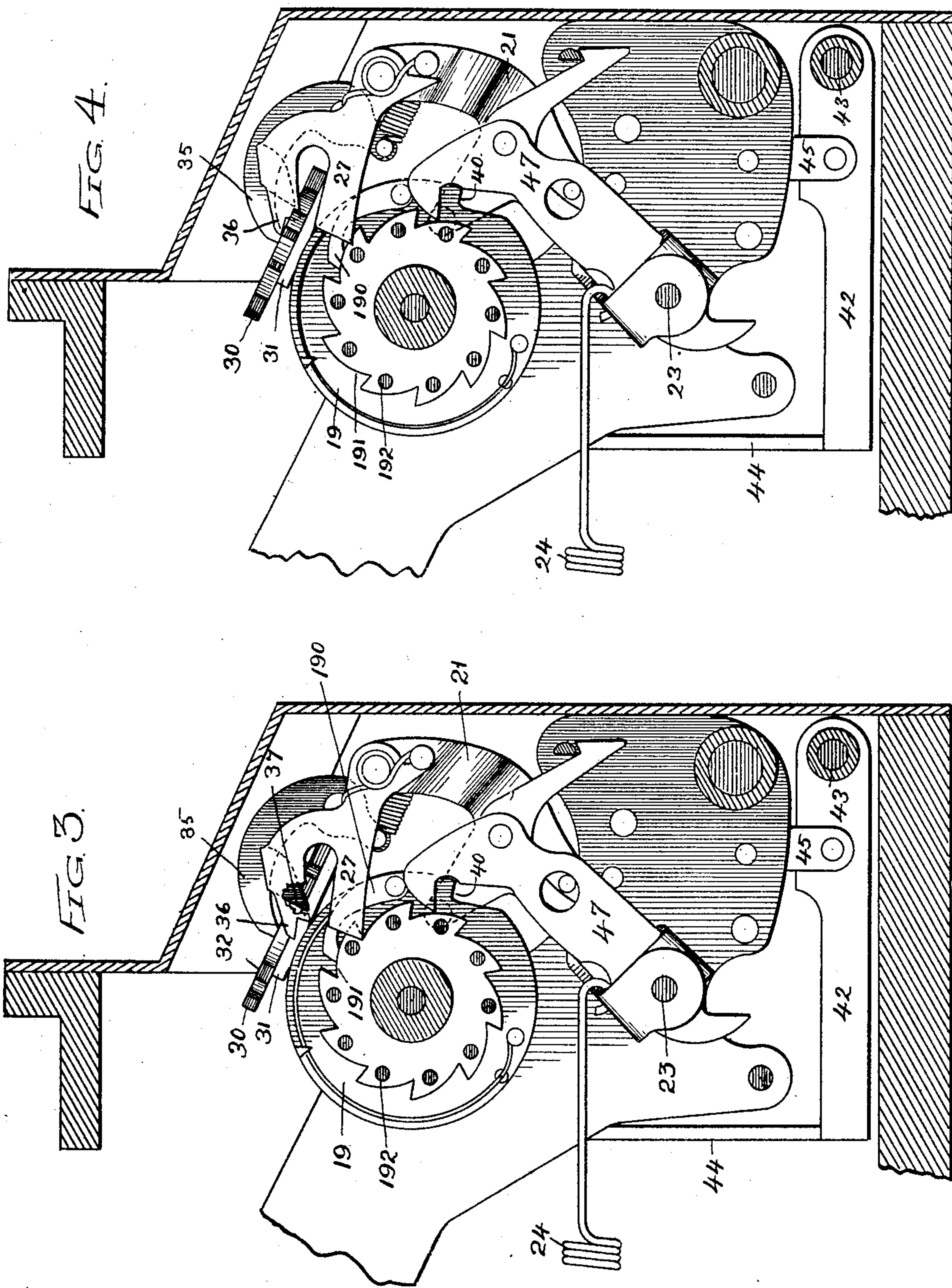


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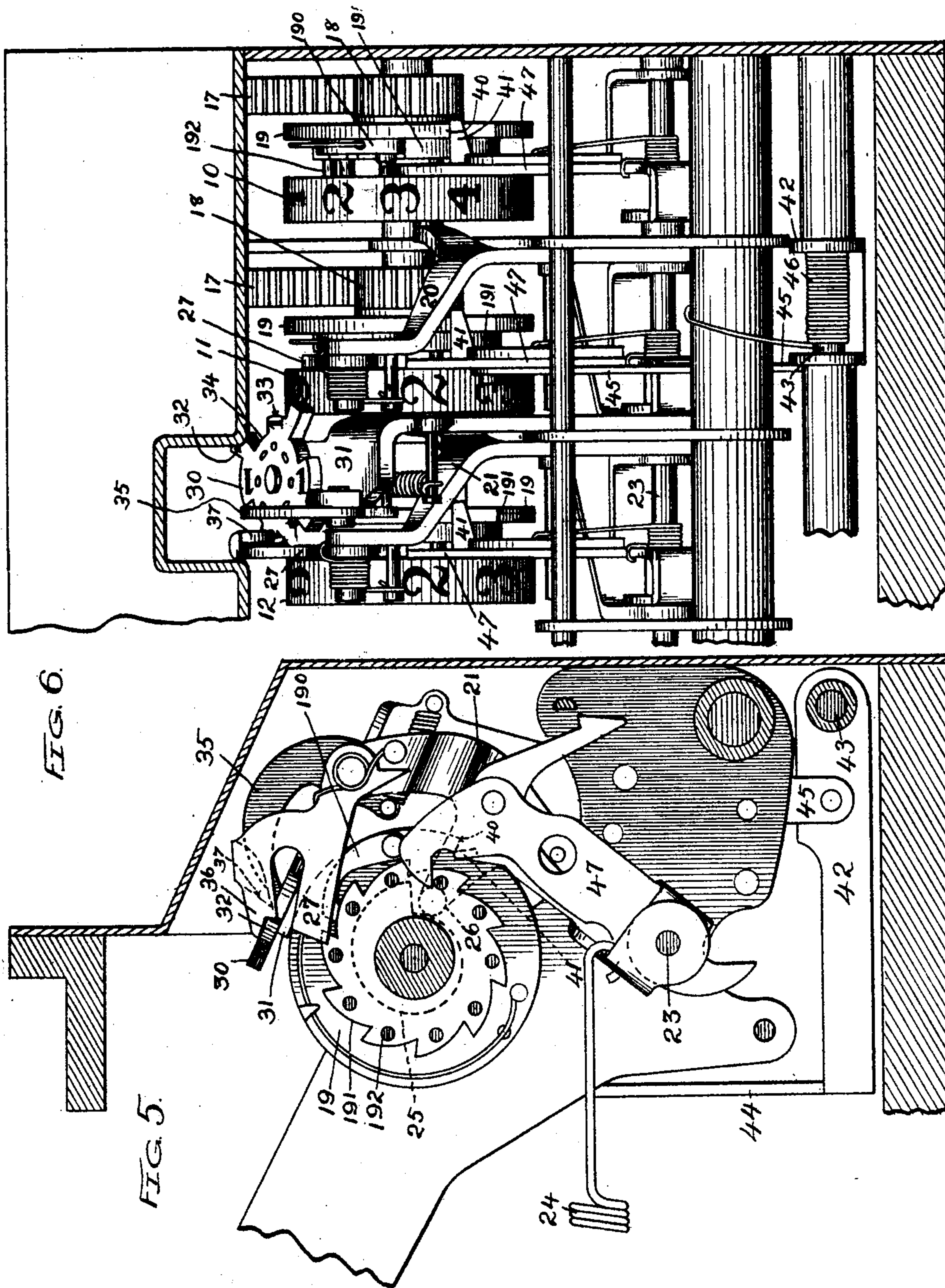
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5 Sheets—Sheet 4.



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FIG. 9.

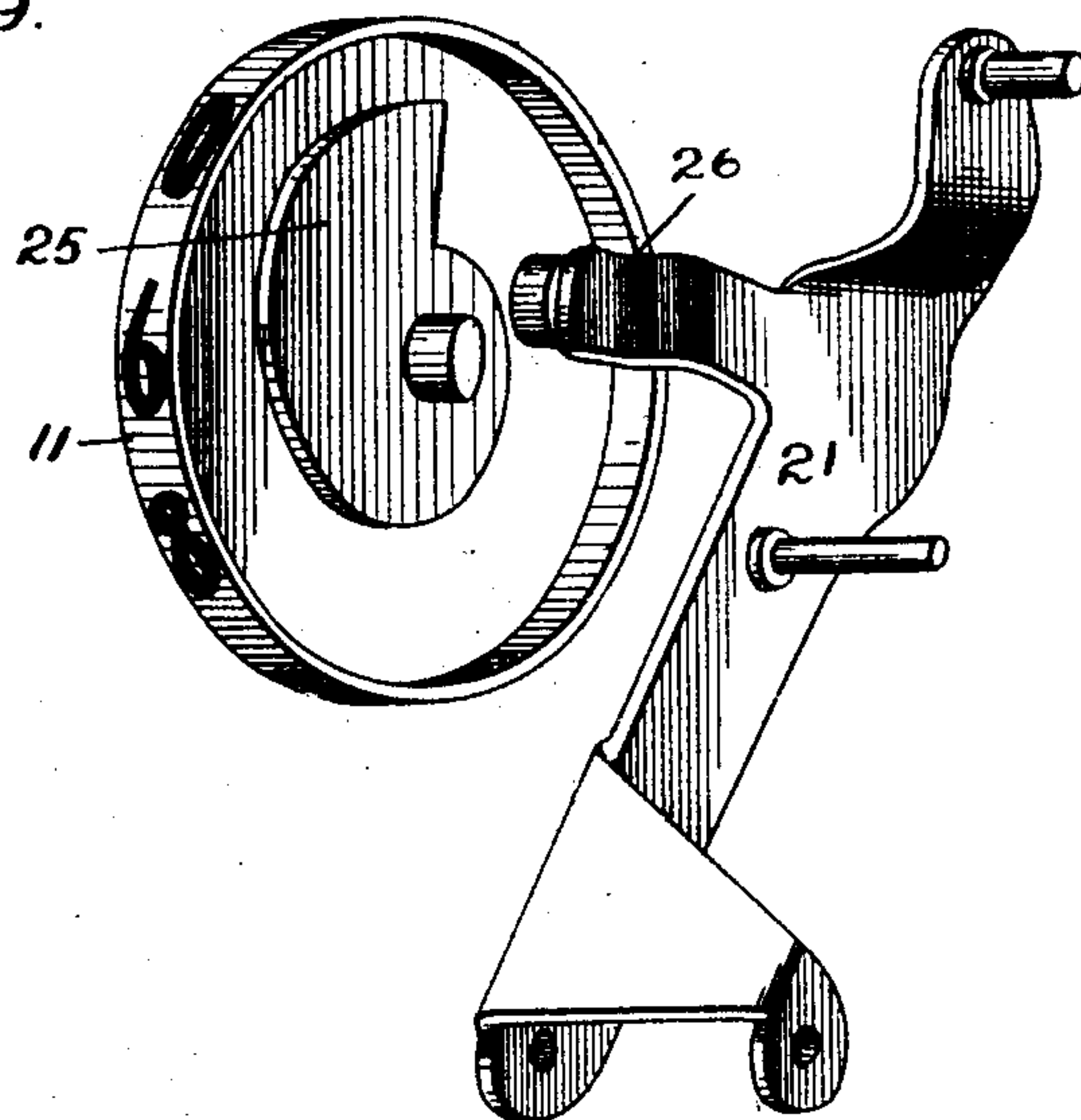


FIG. 7.

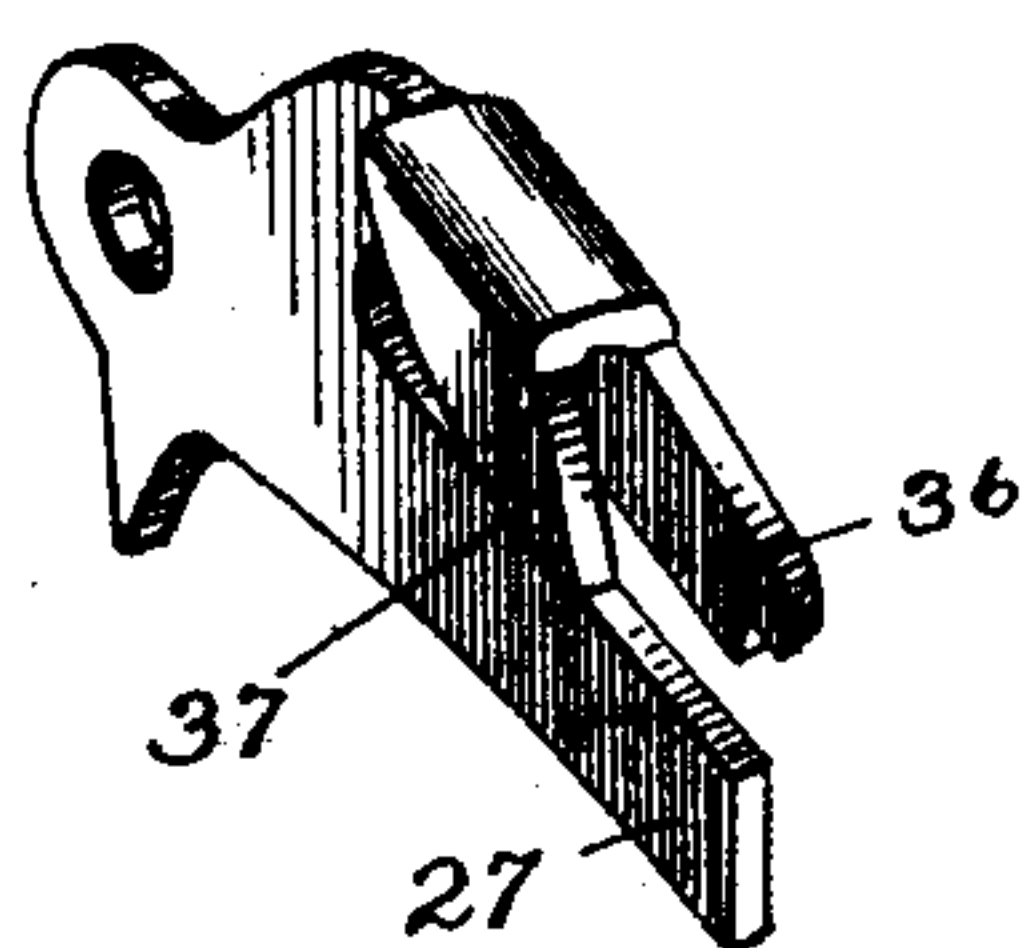
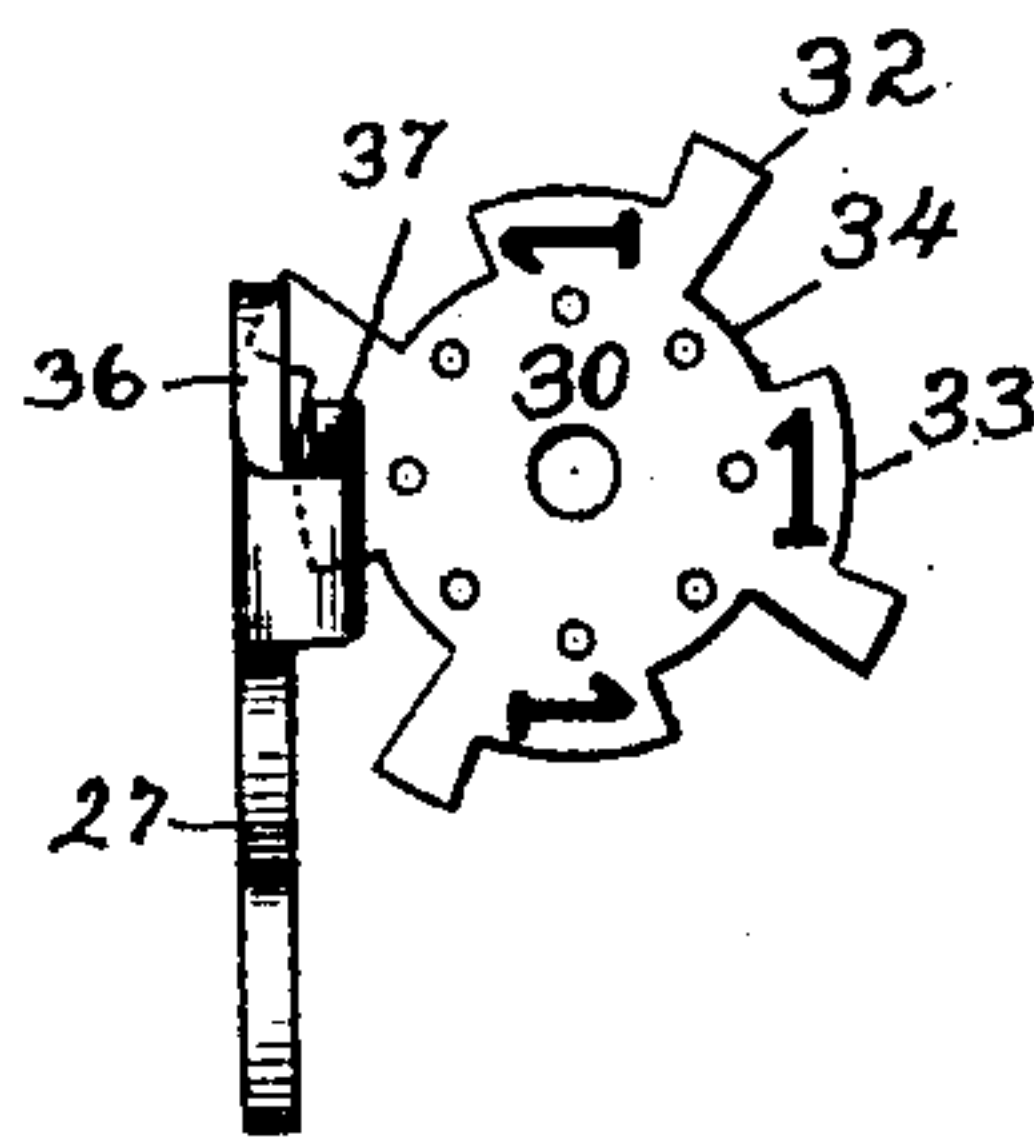


FIG. 8



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# UNITED STATES PATENT OFFICE.

DORR E. FELT, OF CHICAGO, ILLINOIS.

## CALCULATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 671,109, dated April 2, 1901.

Application filed October 24, 1900. Serial No. 34,206. (No model.)

*To all whom it may concern:*

Be it known that I, DORR E. FELT, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have  
5 invented a new and useful Improvement in Calculating-Machines, of which the following is a specification.

This invention relates to improvements in calculating-machines, and is intended to  
10 adapt such machines to be used in making calculations in British money.

The invention has been devised more especially for use in the class of machines heretofore devised by me and which have been ex-  
15 tensively marketed and are generally known as the "comptometer" and the "comptograph."

The invention consists in the novel construction of parts and devices and in the novel  
20 combinations of parts and devices hereinafter set forth, and its nature will be understood from the accompanying drawings, in which—

Figure 1 is a partial plan of a comptometer provided with my present improvement. Fig.  
25 2 is a longitudinal vertical section. Figs. 3, 4, and 5 are enlarged partial vertical sections showing the parts in different positions. Fig. 6 is a partial front elevation. Fig. 7 is a perspective of the carrying-pawl for carrying the  
30 shillings to the pound-column. Fig. 8 shows this pawl and the supplemental wheel whereby it is prevented from acting upon the unit-pounds wheel except at alternate actuations. Fig. 9 is a perspective of one of the numeral-  
35 wheels and its carrying-lever.

In said drawings, 10 to 15, inclusive, represent the numeral-wheels, 10 and 11 being, respectively, the pence and shillings wheels, and the others representing the pounds.  
40 Each is accompanied by its own row of operating-keys, all of which are designated by 16, there being eleven keys for operating the pence-wheel, which is provided with twelve indicating spaces or figures, ten keys for operating the shillings-wheel, and nine keys for  
45 operating each of the pounds-wheels. The shillings-wheel and the pounds-wheels are all divided into ten spaces numbered from "1" to "0", successively. Each series of keys and  
50 its numeral-wheel are combined with a vibrating segment-lever 17, whereby the keys may operate the wheels, and these levers

carry teeth on their segmental ends which mesh with pinions 18 and through such pinions actuate the numeral-wheels, the pinions  
55 being connected to the numeral-wheels in any suitable way—as, for instance, by disks 19, fast to the pinions, the pawls 190, carried by the disks, and the ratchets 191, engaged by the pawls and joined to the respective numeral-  
60 wheels by pins 192. These pins are equispaced and agree in number with the number of spaces into which the wheels are divided, so that the pins may receive the impulses of the carrying-levers, and thus form part of the  
65 carrying mechanism. The strokes imparted to the segment-levers by the keys are graduated according to the power of the keys in the usual manner.

With each of the numeral-wheels except  
70 the highest is a carrying-lever, that for carrying from the pence-column to the shillings being shown at 20, that for carrying from the shillings-column to the units of pounds being shown at 21, and the others for carrying from  
75 the one-pound column to the next column above not being shown. All the levers are alike in construction, but lever 20 carries when the pence-wheel reaches or passes "12," while all the others, except lever 21, carry  
80 when their respective wheels reach or pass "0." The levers are made much like the lever M of my Patent No. 371,476 of October 11, 1887, are pivoted on the rod 23, and are actuated  
85 by springs 24, in which the necessary power is stored preparatory to each carrying operation by the cams 25 on the numeral-wheels, such cams acting through the medium of arms  
26 on the levers to force the levers backward gradually, and thus distend the springs. Each  
90 lever is provided with a push-pawl 27, engaging pins 192 of the numeral-wheel next higher in order, and this pawl is pivoted to the lever and provided with a spring pressing it down on the pins. The springs 24 act as soon as the  
95 arms 26 pass off the highest part of cams 25.

With lever 21, which carries the shillings to the lowest or unit column of pounds, I employ an auxiliary device, which is actuated  
by said lever each time the wheel 11 reaches  
100 or passes "0," but which prevents the lever from moving wheel 12 except at alternate actuations of the lever. In other words, the auxiliary device prevents any carrying of



shillings to pounds except at each second rotation of the shillings-wheel, and this is the principal function of the device. In the preferred form the device is a rotatable disk 30, arranged on the upper end of a stationary support 31 between wheels 11 and 12, and its periphery is cut so as to form several series composed of projections 32, number-spaces 33, and notches or blank spaces 34, all relatively arranged as shown. I prefer to divide the periphery into four such series, in which case the disk will have eight positions and should be provided with eight holes to receive the overthrow-preventing spring-detent 35, also mounted on the support 31. Co-operating with the disk 30 are two pawls 36 and 37, both attached to or formed on the push-pawl 27 of lever 21. One of these pawls 36 is notched and projects in advance of pawl 37, and the latter is also located laterally of pawl 36, being formed by bending over or doubling the metal of the push-pawl. The number-spaces are preferably marked with the figure "1," as shown, so that when they come in proximity to the shillings-wheel that figure may be read with such one of the figures on the wheel as is at the sight-opening of the machine, thus indicating that the shillings registered in the machine number, say, fifteen or other number in excess of ten.

The operation of the auxiliary wheel and the pawls 36 and 37 is as follows: The disk 30 is so located that the projections 32 move into the path of the notched pawl 36, so that the latter both engage and ride on said projections. When the pawl is positioned on one of the projections 32, it will at the next following actuation of the carrying-lever by its spring impart a one-eighth turn to the disk, and the projection at the same time prevents the pawl from falling low enough to enable pawl 27 to engage the pins 192, so that no carrying of the numeral-wheel occurs at the movements occurring while the pawl rides on projection 32. The eighth of a turn given the disk by the pawl 36, as stated, leaves the disk in such position that when the carrying-lever next moves back to store up power in its motor-spring the acting ends of the pawls will fall to the plane which permits the carrying of the numeral-wheel as soon as pawl 36 has moved off from projection 32, and the pawl 37 enters the blank-space 34 at the same time. With the pawls in this position it will be seen that the carrying-lever when it is next operated by its motor-spring will actuate the numeral-wheel 12, and also that the pawl 37 will turn the disk 30 another eighth of a turn and bring the next projection 32 into position to lift and sustain the pawl 36, so that at the next succeeding or third operation of the carrying-lever no actuation of the numeral-wheel occurs. All subsequent operations are but mere repetitions of those set forth, and as will be seen they result in the carrying of the numeral-wheel at each sec-

ond or alternate revolution of the numeral-wheel 11.

Of course I do not wish to be limited to an auxiliary numeral-wheel having four projections and four notches or spaces to engage the pawls, as obviously the wheel may have any desired number of such devices and should receive a corresponding amount of movement at each impulse.

Fig. 3 shows the carrying devices in position to operate the numeral-wheel and pawl 37 in the disk-notch 34. Fig. 4 shows the position of the lever and pawls just previous to one of the actuations in which the auxiliary wheel is moved without any movement being given to the numeral-wheel, and Fig. 5 shows the positions at the conclusion of the same.

Each numeral-wheel has a detent 47 engaging the pins 192 and stopping the motion of the wheel, and this detent is withdrawn at each actuation of the wheel by providing it with a lug 41, projecting laterally and riding on the periphery of the disk 19 of the same wheel. A shoulder 40 is formed in the periphery of the disk, and the lug normally lies under it, and inasmuch as the periphery below the shoulder slopes gradually outward to the full diameter of the disk it will be seen that as soon as the disk begins to rotate under the power of the segment-lever the lug will be forced backward, so as to withdraw the detent from its acting position. The detent is also withdrawn by the carrying-lever preparatory to a carrying operation.

The shillings-wheel 11 is liable to receive complete rotations from the striking of the ten-shillings key, and of course the disk 19 of that wheel receives like complete rotations. In these complete rotations of the disk, unless means of prevention were provided, the detent-lug will engage the shoulder 40 when the segment-lever reaches the limit of its downstroke, so that the disk and its pinion cannot then turn in the reverse direction and allow the segment-lever to return upward. To obviate this action, I provide means for preventing this engagement at such times, and these means are thrown into action by the segment-lever as it nears the limit of the downstroke. The construction I have adopted consists of a frame 42, pivoted on rod 43, having an upward arm 44 extending up into the path of the segment-lever and adapted to be depressed by such lever, and also having a loosely-jointed link 45 extending upward and supporting the pivot of the detent. A spring 46 acts on the frame 42 and tends to keep it in its normal position. When the segment-lever depresses the arm 44, it also draws the detent-lug away from its acting position, so that at the moment the shoulder of the disk passes the lug 41 the latter is held out of action. The detent is allowed to return to its normal position, however, as soon as the segment-lever moves up and releases its pressure on arm 44, and consequently the



detent may act at the conclusion of the reversed action of the disk.

I claim—

1. In a machine for making computations in British money, the combination with the shillings-wheel and pounds-wheel of carrying mechanism imparting movement to the pounds-wheel at the alternate revolutions only of the shillings-wheel and embracing a horizontal rotating disk 30, substantially as specified.

2. In a machine for making computations in British money, the combination with the shillings-wheel and pounds-wheel of carrying mechanism imparting movement to the pounds-wheel at the alternate revolutions only of the shillings-wheel and embracing a horizontal rotating disk 30 carrying figures adapted to be read in conjunction with the figures upon the shillings-wheel, substantially as specified.

3. In a machine for making computations in British money, the combination with the wheel registering the shillings having ten spaces and positions and the wheel registering the units of pounds, of carrying mechanism embracing a pawl actuated at each revolution of the shillings-wheel, and an auxiliary disk interposed between the pawl and the pounds-wheel and engaging the pawl and holding it out of action at each of its alternate actuations, substantially as specified.

4. The combination with the push-pawl of the carrying mechanism belonging to the wheel registering the shillings, of a detachable disk engaged by and operated by pawls carried by said push-pawl and acting to keep said push-pawl out of action at alternate revolutions of the wheel, substantially as specified.

5. The combination with the push-pawl of the carrying mechanism of the shillings-wheel, and pawl 36 attached to and controlling said push-pawl, of disk 30 having projections engaging said pawl 36 and acting through such projections to keep the push-pawl out of action at alternate revolutions of the wheel, substantially as specified.

6. The combination with the push-pawl of the mechanism for carrying shillings to pounds, of an automatically-operated rotat-

ing device engaging and lifting said pawl at each alternate actuation thereof, and means whereby the lifting device may be rotated by the pawl, substantially as specified.

7. The combination with the shillings-wheel and mechanism for carrying from it to the pounds-wheel, of a disk mounted upon an axis not coincident with that of the shillings-wheel and located in proximity to said wheel so that the figures thereon may be read in conjunction with those on the wheel, substantially as specified.

8. The combination with the shillings-wheel and mechanism for carrying from it to the pounds-wheel, said mechanism embracing a movable controlling device having an axis arranged at an angle to that of the wheel and also having figures adapted to be read with those on the wheel, substantially as specified.

9. The combination with the shillings-wheel and mechanism for carrying from it to the pounds-wheel, of the disk 30 mounted upon an axis standing at an angle to that of the wheel and constructed and operating substantially as set forth.

10. The combination with the shillings-wheel and its carrying mechanism, the latter embracing the disk 30 having the projections, the number-spaces and the blank spaces, and pawls 36 and 37, substantially as specified.

11. The combination with the disk 19 of the shillings-wheel, the segment-lever, and the pinion actuating the disk, of the detent and lug thereon, and means for preventing said detent-lug from acting at the end of the downstroke of the lever when it imparts a complete revolution to the disk, substantially as specified.

12. The combination with the shillings-wheel, the segment-lever thereof, and the key whereby said lever actuates the lever in giving a complete revolution to the wheel, of the detent 47, disk 19 arrested by said detent, and means for preventing said detent from acting on the disk at the end of the downstrokes of the lever imparting a complete turn to the disk, substantially as specified.

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Witnesses:

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