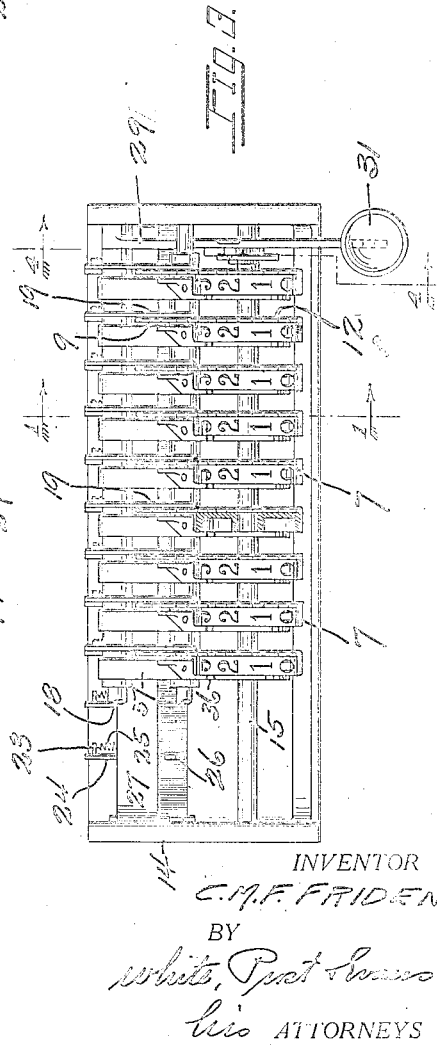
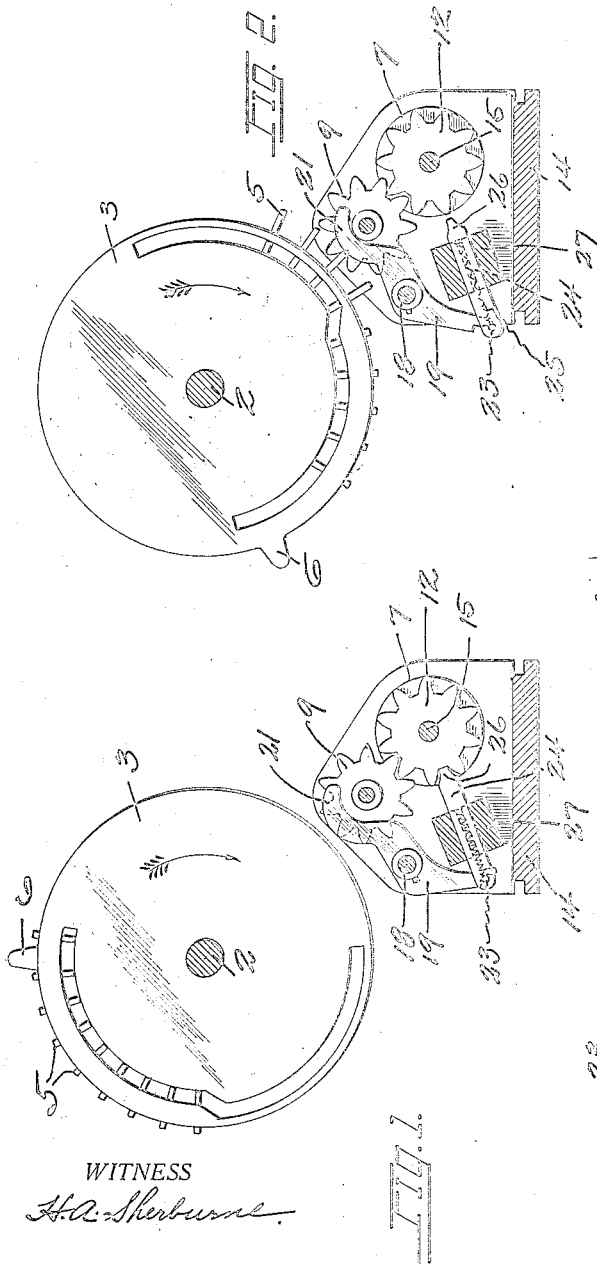


May 8, 1923.

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C. M. F. FRIDEN
CALCULATING MACHINE
Filed June 8, 1920

2 Sheets-Sheet 1



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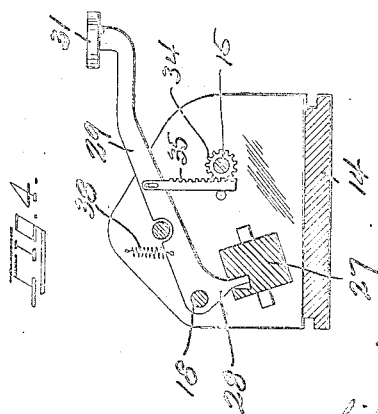
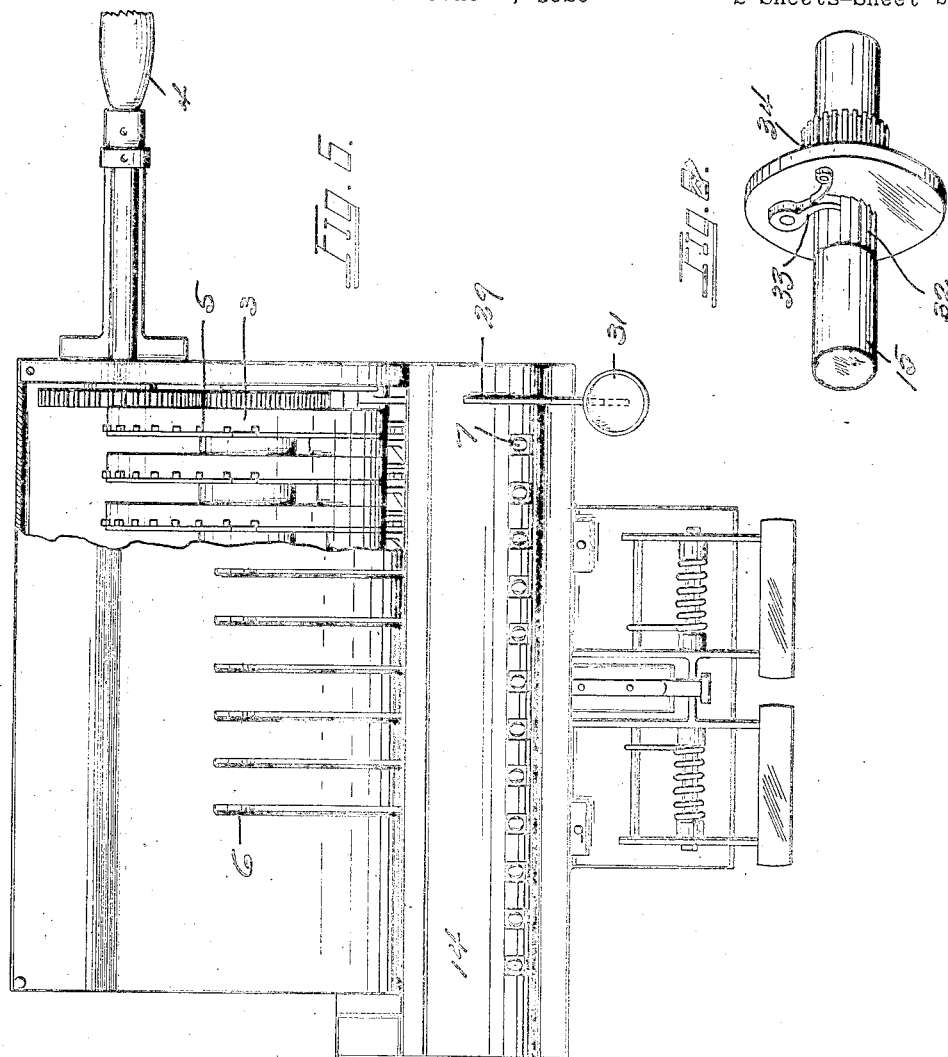
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C. M. F. FRIDEN

CALCULATING MACHINE

Filed June 8, 1920

2 Sheets-Sheet 2



WITNESS

H. A. Sherburne

INVENTOR

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BY

White Post & Evans

his ATTORNEYS

UNITED STATES PATENT OFFICE.

CARL M. F. FRIDEN, OF PIEDMONT, CALIFORNIA, ASSIGNOR TO MERCHANT CALCULATING MACHINE COMPANY, OF OAKLAND, CALIFORNIA, A CORPORATION OF CALIFORNIA.

CALCULATING MACHINE.

Application filed June 3, 1920. Serial No. 337,439.

To all whom it may concern:

Be it known that I, CARL M. F. FRIDEN, a subject of the King of Sweden, and a resident of Piedmont, Alameda County, and State of California, have invented certain new and useful Improvements in Calculating Machines, of which the following is a specification.

The invention relates to calculating machines of the type embodying a registering mechanism comprising rotatable figure discs and relates particularly to means for freeing and locking said discs at different times during the operation of the machine.

The invention relates to calculating machines of the type embodying toothed counting wheels or discs having radially movable teeth, variable as to the number operatively projected and also provided with cam discs arranged on the wheels by the adjustment or rotation of which the teeth on the counting wheels are brought into or moved out of operating position. The values adjusted on the counting wheels or discs are transmitted on the rotation of a crank handle, indirectly by means of intermediate wheels, to the figure discs of the registering mechanism. The registering mechanism is usually disposed in parallel displaceable relation to the counting mechanism axis, for the purpose of making possible the direct action of the units counting wheels of the figure discs of higher value. The teeth operatively projected from the counting disc contact with and rotate the intermediate wheel which transfers its rotation to the figure discs of the registering mechanism. Each figure disc is usually provided with a spring-pressed detent mechanism to prevent overthrowing of the disc and to properly position the disc after it has been rotated by the intermediate wheel. These detent mechanisms have retarded the rotation of the figure discs so that considerable force is required to be applied to the crank when a plurality of discs are simultaneously rotated and have been somewhat noisy in operation.

An object of my invention is to provide means for relieving the figure discs of restraint during their rotation so that rotation is easy and noiseless and for positively

locking the figure discs after they have completed their predetermined rotation.

Another object of the invention is to provide means for simultaneously freeing all of the figure discs so that they can be set to zero easily and noiselessly.

Another object of the invention is to provide means for simultaneously releasing the figure discs and resetting them to zero.

The invention possesses other advantageous features, some of which, with the foregoing, will be set forth at length in the following description where I shall outline in full, that form of my invention which I have selected for illustration in the drawings accompanying and forming part of the present specification. In said drawings, I have shown one embodiment of my invention, but it is to be understood that I do not limit myself to such form since the invention, as expressed in the claims, may be embodied in a plurality of forms.

Referring to said drawings:

Figure 1 is a cross section of the registering mechanism showing a detent in engagement with a registering wheel.

Figure 2 is a similar cross section showing the detent out of engagement with the registering wheel.

Figure 3 is a plan view of the registering mechanism, parts thereof being removed to disclose the construction.

Figure 4 is a cross section of the registering mechanism showing the means for releasing all of the registering wheels.

Figure 5 is a plan view of one form of calculating machine embodying my invention, parts thereof being broken away to disclose the construction.

Figure 6 is a perspective view on an enlarged scale of a portion of the registering clearing mechanism.

The calculating machine shown in the drawings, and which embodies the present invention, comprises a suitable frame in which the shaft 2 of the counting toothed wheels 3 is journaled and which is suitably connected to the crank handle 4. Each wheel 3 carries a plurality of radially movable teeth 5, which are moved inwardly and outwardly, variable as to number, by cams arranged within or associated with the

wheels. The cams are provided with projecting fingers 6, so that they may be readily moved circumferentially to vary the number of projecting teeth.

5 Arranged on the frame adjacent the counting toothed wheels, and parallel to the axis thereof, are one or more series of figure discs 7, in the present instance only one series being shown for the
10 purpose of simplicity. The values adjusted on the toothed wheels are transferred to the figure discs 7 through the interposed toothed wheels 9 which mesh with toothed wheels 12, formed on or secured to the figure discs
15 7. The figure discs are suitably connected by tens carrying mechanism, to cause the rotation of one disc through a complete revolution to advance the disc of the next higher denomination one point. A suitable
20 mechanism for this purpose is shown in my copending application Serial No. 375,689, filed in the Patent Office on April 22, 1920.

The figure discs, with their associated transfer levers, intermediate toothed wheels
25 and attached toothed wheels, are preferably mounted in a displaceable carriage 14 for the purpose set forth. The figure discs 7 are mounted on a shaft 15 journaled in the carriage. The intermediate wheels 9, which
30 are in mesh with the toothed wheels 12 secured to the figure discs, are journaled on the shaft 17 and lie in position to be engaged and rotated by the projected teeth 5 on the counting wheels.

35 Bearing in the carriage and disposed in parallel relation to the other shafts therein is a rock shaft 18 on which is journaled a plurality of bent levers 19, each lever having a curved or rounded head 21 contiguous
40 to an intermediate toothed wheel 9, there being a lever associated with each wheel. The head lies adjacent the intermediate toothed wheel in the zone of engagement of the projected teeth 5 with the wheel, and the
45 lever is normally held in such position that the outer or curved face of the head lies in the circle of the ends of the teeth on the wheel. The projected teeth on the counting discs are sufficiently wide to engage both the
50 intermediate toothed wheel and the contiguous lever head, so that when a disc with projected teeth is rotated, the projected teeth simultaneously engage the head 21 and depress it and engage and rotate the toothed
55 wheel.

At its lower end, the lever engages a pin 23 secured to a slide or detent 24 which is disposed radially with respect to the axis of the figure discs 7, and which is normally
60 held in engagement with the toothed wheel 12, by a spring 25. The detent is provided on its end with a tooth 26 which seats between two teeth of the wheel 12, holding the wheel against rotation. When the head of
65 the lever is pressed down by the projected

teeth on the counting wheel, the detent is withdrawn from the tooth wheel 12, permitting the figure disc to be freely rotated by the engagement of the projected teeth with the intermediate wheel.

70 A detent is provided for each figure disc and the plurality of detents, each of which is engaged by a lever, are slidably mounted in the bar 27. The bar 27 is slidably mounted in the carriage, to be moved parallel to
75 the line of movement of the detents, so that all of the detents may be simultaneously disengaged from the toothed wheels 12 to permit the figure discs to be freely reset to zero. Connected to the bar 27 at opposite
80 ends are levers 28, which are secured to the rock shaft 18, and means are provided for rocking the shaft to move the bar. Secured to the rock shaft is a lever 29 projecting to the front of the carriage and carrying
85 on its end a key 31 which, when depressed, disengages the detents from the toothed wheels 12 so that the figure discs may be reset to zero.

In the present construction, means are
90 provided whereby the depression of the key not only frees the figure discs, but also rotates them to zero. The figure discs are frictionally mounted on the shaft 15 in such
95 manner that, with the detents withdrawn, the discs may be rotated either by the intermediate toothed wheels or by rotation of the shaft 15. The shaft is provided on its surface adjacent one end with a ratchet 32
100 which is engaged by a spring-pressed pawl 33 pivoted to the gear 34. Meshing with the gear 34 is a rack 35 which is pivotally attached to the lever 29, by a slip joint, so that the lever 29 may be depressed a sufficient distance to withdraw the detents from
105 the toothed wheels 12 before the rack is moved. Further depression of the rack causes the shaft to be rotated to bring the figure discs to zero. Secured to each figure disc on the side opposite the toothed wheel
110 12 is a projection 36 which operates to move the transfer lever 37, the head of which normally lies in the path of the projection and, when the projection is in contact with
115 the transfer lever, the figure wheel is set at zero. As the shaft is rotated, the figure wheels are rotated until the projections contact with the transfer levers, at which time rotation of the figure disc ceases, even though the shaft may continue to rotate.
120 A spring 38 is provided for returning the key to raised position when it is released and, due to the presence of the pawl and ratchet, the upward movement of the rack does not cause rotation of the shaft, so that
125 the figure discs retain their zero setting.

I claim:

1. In a calculating machine, a plurality of rotatable counting wheels having adjustable
teeth, registering mechanism including a

plurality of pairs of meshing toothed wheels, one of the wheels of each pair being arranged to be engaged and rotated by the adjustable teeth on said counting wheels, detents cooperating with the other toothed wheels of each pair, means actuated by the adjusted teeth on any counting wheel for moving the detent from engagement with the corresponding second toothed wheel during engagement of the adjusted teeth with the corresponding first toothed wheel and means for simultaneously moving all of the detents from engagement with said second toothed wheels.

2. In a calculating machine, a plurality of rotatable counting wheels having adjustable teeth, registering mechanism including a plurality of pairs of meshing toothed wheels, one of the wheels of each pair being arranged to be engaged and rotated by the adjustable teeth on said counting wheels, a bar, detents slidable in said bar and engaging the other toothed wheels and means for moving said bar to move all of the detents from engagement with said second toothed wheels.

3. In a calculating machine, a plurality of rotatable counting wheels having adjustable teeth, registering mechanism including a plurality of pairs of meshing toothed wheels, one of the wheels of each pair being arranged to be engaged and rotated by the adjustable teeth on said counting wheels, a bar, detents slidable in said bar and engaging the other toothed wheels, means actuated by the adjustable teeth for moving the detents from engagement with said toothed wheels and means for moving the bar to move all of the detents from engagement with said toothed wheels.

4. In a calculating machine, a rotatable figure disc, means normally holding the disc against rotation, counting mechanism arranged to remove said holding means and rotate the figure wheel and zero setting mechanism arranged to remove the holding means and rotate the figure wheel to zero position.

5. In a calculating machine, a plurality of rotatable figure discs, a detent associated with each disc and normally holding the disc

against rotation, counting mechanism associated with each disc and arranged to withdraw the detent from the associated disc and rotate said disc, and means for simultaneously withdrawing the detents from all of the discs and rotating said discs to zero position.

6. In a calculating machine, a plurality of rotatable figure discs, counting mechanism for independently rotating the respective discs, a detent engaging each disc and holding it against rotation, and a lever connected to said detents and to said discs whereby depression of the lever removes all of the detents and rotates the discs to zero position.

7. In a calculating machine, a plurality of rotatable figure discs, a shaft on which said discs are rotatably and frictionally mounted, counting mechanism for independently rotating the respective discs, detents normally holding the discs against rotation, means operative by the counting mechanism for withdrawing the detents and means connected to the detents and to the shaft for withdrawing all of the detents and rotating the shaft to bring the discs to zero position.

8. In a calculating machine, a plurality of independently rotatable figure discs, a detent cooperating with each disc, counting mechanism cooperating with each disc, means operative during the operative connection of a counting mechanism with a disc for withdrawing the detent cooperating with said disc, means for simultaneously moving all of said detents from said discs and means associated with said last named means for rotating the discs to zero position.

9. In a calculating machine, a registering mechanism including a plurality of toothed wheels, a plurality of independently movable detents engaging said wheels, a bar engaging all of said detents and means for moving said bar to move all of the detents from operative engagement with said toothed wheels.

In testimony whereof, I have hereunto set my hand.

CARL M. F. FRIDEN.