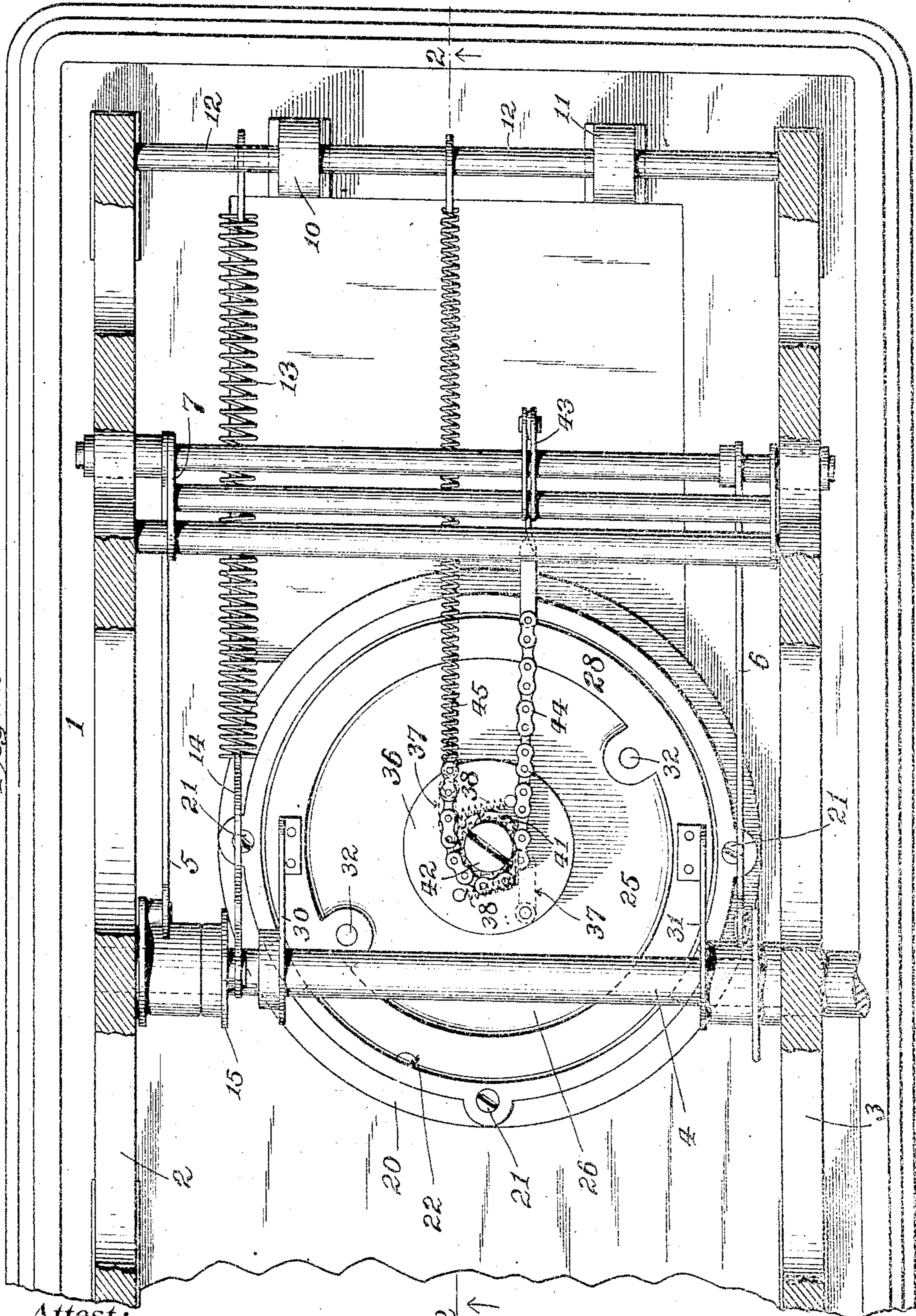


C. N. McFARLAND & C. WALES.
MOMENTUM ABSORBER FOR ADDING MACHINES.

APPLICATION FILED SEPT. 17, 1906.

3 SHEETS—SHEET 1.

Fig. 1.



Attest:

Edgeworth Breese
Alvin M. Donnell.

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Inventors
Charles N. McFarland and
Charles Wales.
by *William R. Baird* their Atty.

No. 880,158.

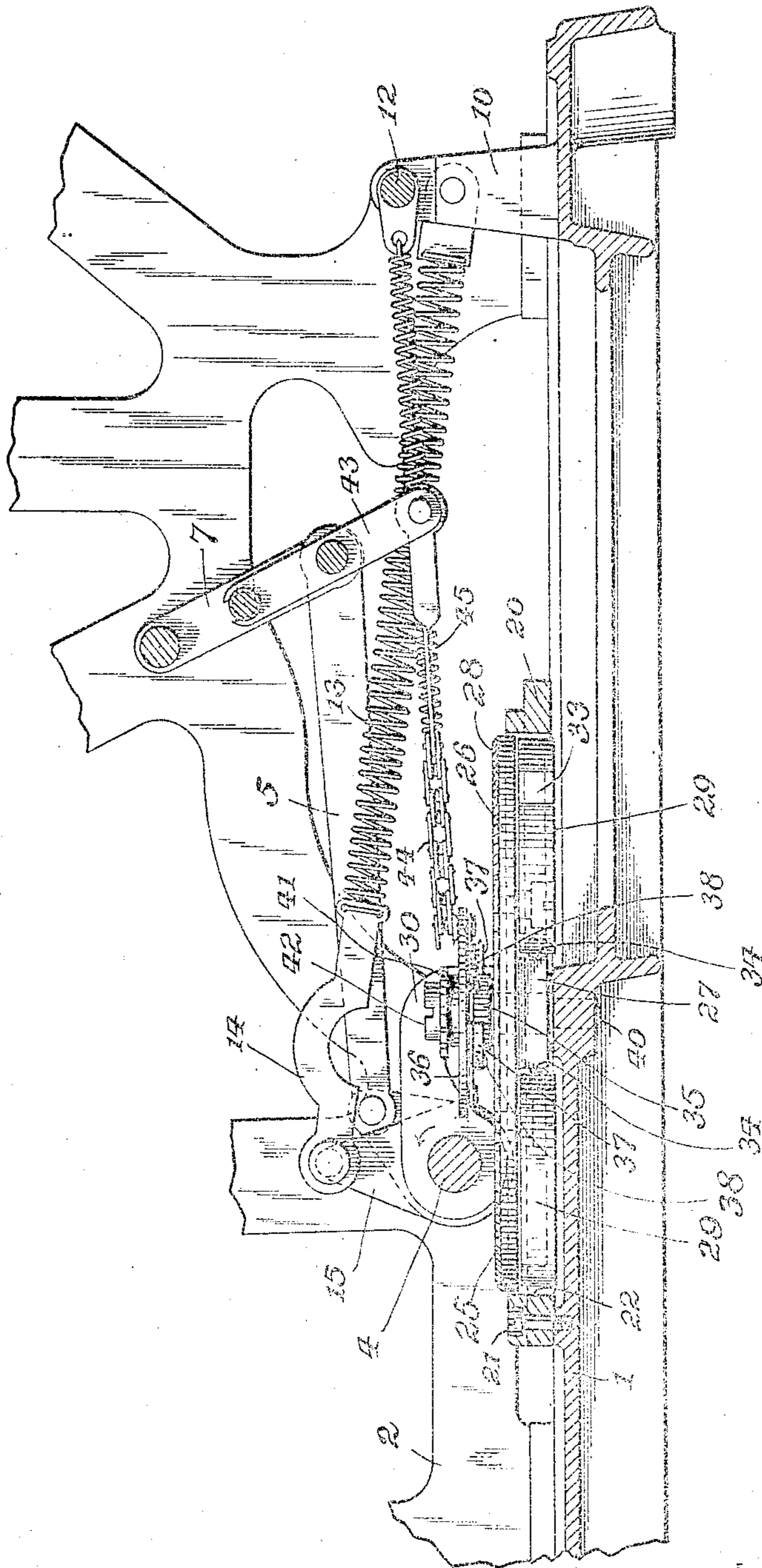
PATENTED FEB. 25, 1908.

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3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3.

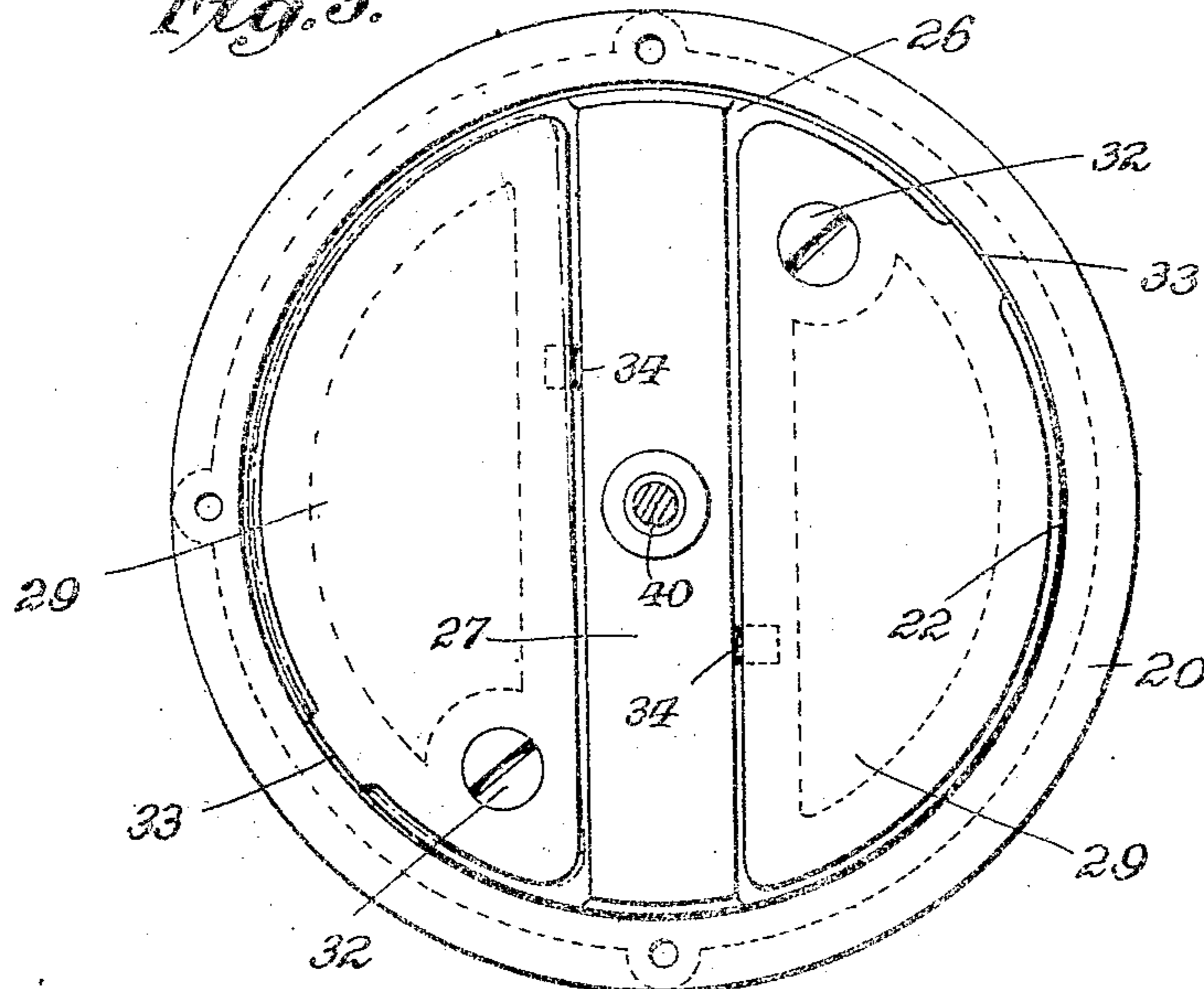
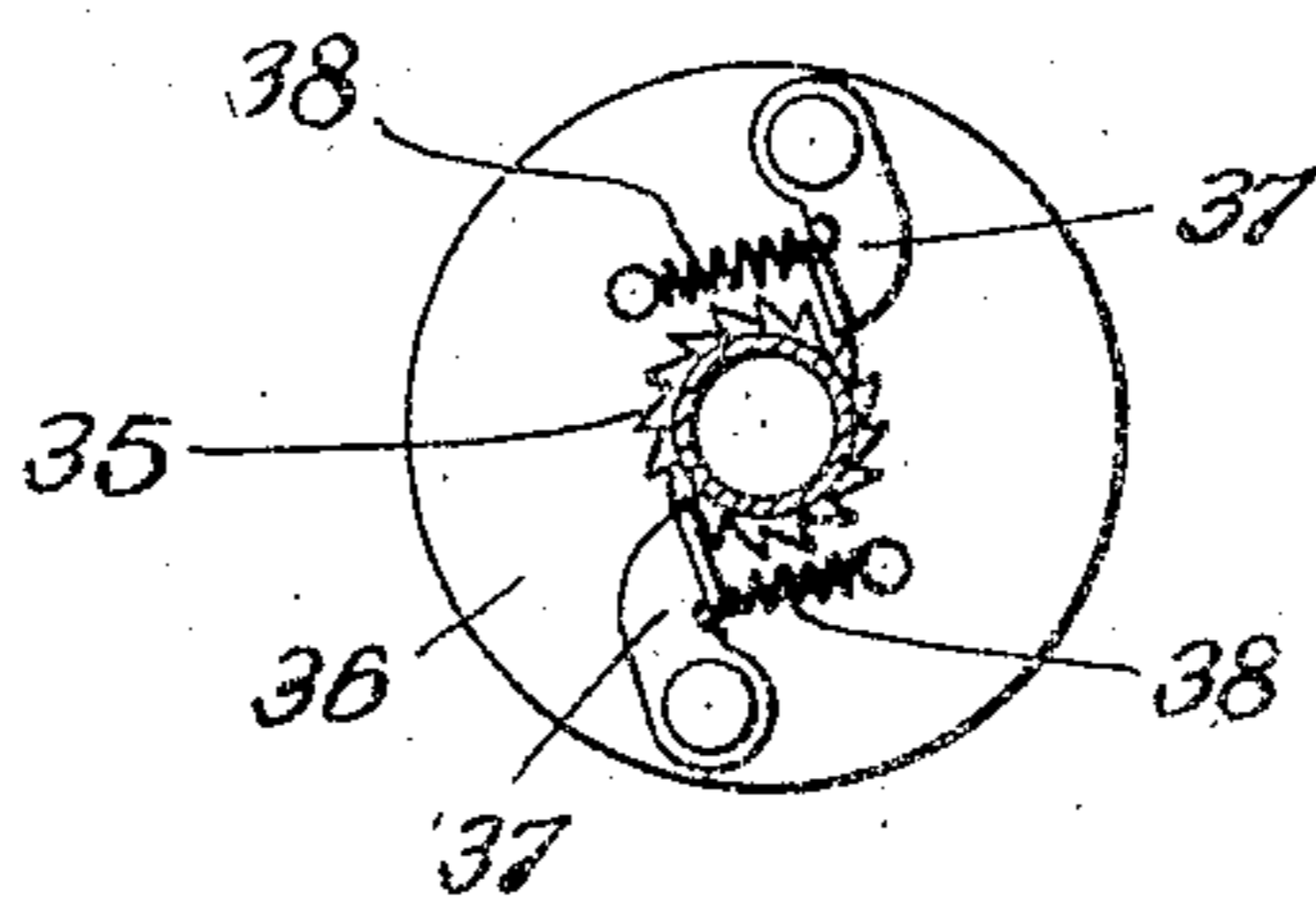


Fig. 4.



Attest:
Edgewood Burns
Alan McDonnell

Inventors
Charles N. McFarland and
Charles Wales
by *William R. Baird* their Atty.

UNITED STATES PATENT OFFICE.

CHARLES N. McFARLAND, OF KINGSTON, PENNSYLVANIA, AND CHARLES WALES, OF CLEVELAND, OHIO, ASSIGNORS TO THE ADDER MACHINE COMPANY, OF KINGSTON, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

MOMENTUM-ABSORBER FOR ADDING-MACHINES.

No. 880,158.

Specification of Letters Patent.

Patented Feb. 25, 1908.

Application filed September 17, 1906. Serial No. 335,027.

To all whom it may concern:

Be it known that we, CHARLES N. McFARLAND, a citizen of the United States, residing at Kingston, in the county of Luzerne, State of Pennsylvania, and CHARLES WALES, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Momentum-Absorbers for Adding-Machines, of which the following is a specification.

Our invention relates to calculating machines and more particularly to those in which the accumulating and printing mechanisms are actuated by a vibratory shaft which receives its motion in one direction manually or from a motor and to which the rearward motion is imparted by springs which are charged during the forward stroke. The result accomplished through our invention is the easy return of the actuating mechanism and other parts of the machine controlled thereby to their normal positions, by preventing undue acceleration in the movement of the parts which are subject to the constant tension of the return springs. A device for substantially the same purpose is shown in Letters Patent of the United States No. 759,944, issued to Charles Wales, one of the present applicants, and the subject matter of this application may, in a sense, be considered as an improvement on that device.

In machines of the class referred to, the items to be added are set up in the machine by the depression of keys and the actuating shaft is then oscillated, or vibrated, usually by the forward motion of a manually operated handle. A main spring secured to any one of the main moving parts of the machine is put under tension by this forward motion and it is the exertion of the stored energy in this spring which brings the parts back to their initial positions. When the forward motion of the handle has been completed and the return vibration of the shaft has begun, the motion of the parts under the influence of the main spring is at first easy and smooth but the parts soon acquire an undesirable momentum. It is the purpose of our invention to absorb this excessive momentum, but to allow a sufficiently speedy return of the parts to their normal positions.

The means which we employ consists briefly of a rotatable wheel actuated by the

energy stored in the main spring which wheel also carries a centrifugal brake which becomes effective against its cooperating friction surface proportionately to the increases in speed of rotation of the wheel and the brake. In addition to this, after the parts moved from the main shaft have been returned to their initial positions, a supplemental brake is employed which quickly stops the further rotation of the primary brake plate by bringing to bear upon it the full force of the pressure of the main spring. The device is also rendered almost, if not quite, noiseless by the use of appropriate cushions upon parts of the primary brake plate so that the noise as well as the momentum is absorbed.

In the drawings, Figure 1 is a top plan view of a preferred form of mechanism embodying our invention; Fig. 2 is a central vertical section of the parts on the plane of the line 2—2 in Fig. 1 and a side elevation of some of the parts; Fig. 3 is a bottom plan view of the friction surface, the rotary brake and its wings; Fig. 4 is a bottom plan view of the brake pawl.

Referring to the drawings, 1 indicates the base of the machine upon which all of the parts are mounted. 2 and 3 are side frames adapted to support the mechanism arranged above that. In these frames are suitable apertures serving as bearings for the vibrating actuating shaft 4 of the machine which is rocked by a handle (not shown) manually moved by the operator, or in any other suitable manner. This shaft is connected by two rods 5 and 6 to a vibrating frame 7 from which some of the parts of the machine receive their movement. It is not necessary to describe or illustrate such parts as they form no part of our invention. The calculating machine itself is of the type shown and described in Letters Patent of the United States issued to Charles Wales, September 15, 1903, No. 797,032.

Two brackets 10 and 11 are mounted upon the base 1 and together with parts of the side frames 2 and 3 support a bar 12 transversely mounted across the machine. Below the bar 12 is a pin to which there is secured one end of a main spring 13, the other end of which spring is secured to a link 14 pivoted to a crank 15 connected to the shaft 4.

When the actuating shaft 4 is rocked to-

ward the operator who stands in front of the machine, and the parts connected with the vibrating frame 7 are moved thereby, the main spring 13 is stretched to an extent determined by the arc through which the shaft has been moved, which arc is usually 60° or more. When the shaft is released, the energy stored in the spring 13 is employed to retract the parts to their initial position and while their movement at first may be easy and smooth, these parts soon acquire an undesirable momentum and develop a tendency to dislocate the mechanism. It is the purpose of this invention, as above set forth, to absorb the momentum so developed. To that end we provide a suitable brake normally out of contact with an adjacent friction surface against which the brake is brought to bear together with various supplementary devices aiding the action of the parts.

Mounted upon the base of the machine is a ring 20 secured by screws 21, 21, or in any other suitable manner, and the inner periphery 22 of which forms a friction surface against which the brake will act.

The brake 25 comprises a central pivot 40. Adapted to rotate around this pivot is a disk or plate 26 having a downwardly projecting rib 27 and provided with an upper annular friction surface 28 adapted to cooperate with supplementary brakes 30 and 31 which are secured to the shaft 4 and move with it. Pivoted eccentrically upon the brake plate or disk 26 are two substantially semi-circular friction wings or plates 29, 29 threaded screw bolts 32, 32, serving to hold the wings upon their pivots. Each wing is provided with a friction lug 33 adapted to be brought into contact with the friction ring 20 and its inner surface 22 preferably near the pivotal point of the wing. These wings 29 lie on each side of the rib 27 and are each provided with a pad 34 forming a cushion to soften the contact between the wings and rib 27.

Mounted above the disk 26 and secured to or made integral therewith is a ratchet wheel 35. Above it and on the same pivot is a pawl disk 36 to which, on its lower surface, are secured two pawls, 37, 37, under tension of springs 38, 38, and which are adapted to cooperate with the teeth of the ratchet wheel 35. Secured to the disk 36 is a sprocket wheel 41 and above it and holding all of the parts on the pivot 40 is a screw 42. Secured to the vibrating frame is a forked arm or pair of links, 43, connected to a sprocket chain 44 adapted to encircle the sprocket wheel 41 and the other end of which chain is secured to a tension spring 45 fastened to the rod.

The operation of the device is as follows:— When the actuating shaft is moved toward the operator and the vibrating frame 7 and its connected parts have been moved there-

by, the forward oscillation of the frame moves the links 43 and the sprocket chain 44 and permits the tension of the spring 45 to pull the chain around the sprocket wheel 41, which, together with the disk 36 rotates readily because the pawls 37 do not engage with the teeth on the ratchet wheel 35 when moving in that direction and do not move said ratchet wheel. When the handle is released or the actuating shaft is otherwise permitted to return to its initial position under tension of the spring 13, the vibrating frame is moved in the reverse direction. This movement is communicated through the chain 44 to the sprocket wheel 41, the pawl disk 36 engaging the pawls 37, 37, with the ratchet wheel 35, thereby starting the entire mass of metal in the disk 26 and wings 29 in rotary motion, thus absorbing temporarily the energy of the spring 13. As the speed of the rotation of the parts 26 and 29 increases under the constant energy of the spring 13, the centrifugal force developed therein tends to throw out radially the wings 29, which must swing on the pivot screws 32 and brings the friction surfaces 33 against the cooperating friction surface 22 of the ring 20 and owing to the greater leverage due to the location of the friction surfaces contact with the ring with much more force than if they were located near the free end of the wings. If the rotation of the disk 26 is relatively great, a great amount of friction is naturally developed between the wings 29 and the friction ring 20, and this friction tends to absorb the momentum of the parts as promptly as it is developed and to bring the brake plate and its connecting parts to a stop.

It is evident that after the rotary brake, and its cooperating ring have performed their functions, it is desirable that the brake itself should be quickly brought to rest and its brake disk 26 prevented from further rotation. This is accomplished by means of the brakes 30 and 31, which are secured to the shaft 4 and move with it. These brakes comprise arms provided on their extremities with shoes, which, by the oscillation of the shaft are brought into contact with the friction surface 28 on the upper side of the disk 26, and as the shaft 4 reaches the end of its stroke, these shoes, coming in contact with this friction surface on the disk, promptly stop its rotation. It will be observed also that the full tension of the spring 13 is at that time being brought to bear against the actuating shaft and serves to hold the supplementary brakes against the disk.

In the actual operation of this device, it was found that when the parts were restored to their initial positions, the wings 29, 29, would be brought sharply into contact with the rib 27 of the disk 26 and make an undesirable noise. The cushions 34 are inter-

posed between the surfaces for the purpose of preventing such noise and lessening the force of contact between these parts.

What we claim as new is:—

- 5 1. In a machine of the character described, a vibratory shaft, devices actuated thereby, elastic means adapted to retract the shaft to its initial position and means adapted to prevent a too-sudden return of said devices to their initial positions, including a friction 10 ring, a rotating plate pivoted centrally within said ring moved by the retraction of said elastic means and provided with a diametric rib, a plurality of substantially semi-circular 15 members each pivoted eccentrically on the outside of said rib normally in contact therewith, and lugs on the peripheries of said members near their pivotal points adapted to be thrown in contact with the inner surface 20 of said friction ring by the centrifugal force of rotation of the plate.
2. In a machine of the character described, a vibratory shaft, devices actuated thereby, elastic means adapted to retract the shaft to 25 its initial position and means adapted to prevent a too-sudden return of said devices to their initial positions, a rotary brake, an independent means adapted to bring it quickly to rest after the shaft has been retracted to 30 its initial position.
3. In a machine of the character described, a vibratory shaft, devices actuated thereby, elastic means adapted to retract the shaft to its initial position and means adapted to pre- 35 vent a too-sudden return of said devices to their initial positions, a rotary brake and independent means adapted to bring it quickly to rest after the shaft has been retracted to its initial position, comprising one or more 40 brake shoes carried by the shaft and adapted to contact with rotating part of the brake.
4. In a machine of the character described,

a vibratory shaft, devices actuated thereby, elastic means adapted to retract the shaft to its initial position and means adapted to pre- 45 vent a too-sudden return of said devices to their initial positions, a rotary brake and independent means adapted to bring it quickly to rest after the shaft has been retracted to its initial position, comprising one or more 50 brake shoes carried by the shaft and adapted to contact with a rotating part of the brake, and upon which shoes the force of the elastic retracting means is brought to bear.

5. In a machine of the character described, 55 a vibratory shaft, devices actuated thereby, elastic means adapted to retract the shaft to its initial position and means adapted to prevent a too-sudden return of said devices to their initial positions, a rotary brake com- 60 prising a friction ring, a plate centrally pivoted therein, wings eccentrically pivoted to the plate adapted to contact with the inner surface of the ring, and a brake shoe rigidly 65 secured to the vibratory shaft and adapted to contact with the rotating plate at the end of the movement thereof.

In witness whereof, the said CHARLES N. McFARLAND has affixed his signature hereto 70 in the presence of two witnesses, at Kingston, Pa., the 15th day of August 1906, and the said CHARLES WALES, has affixed his signature hereto, in the presence of two witnesses, at Cleveland, Ohio, the 11th day of August 1906.

CHARLES N. McFARLAND.
CHARLES WALES.

Witnesses as to Charles N. McFarland:

H. B. PAYNE,

CHAS. M. SNYDER.

Witnesses as to Charles Wales:

E. I. SCHNELL,

F. S. WHEELER.