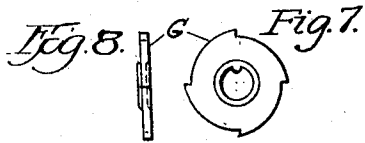
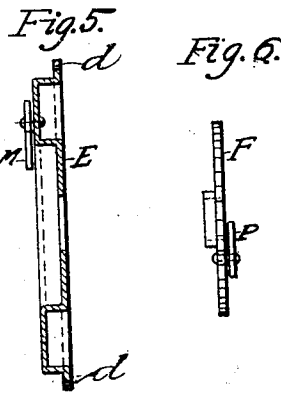
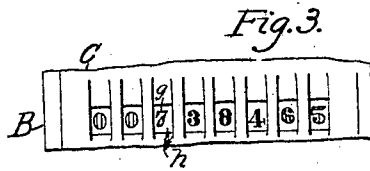
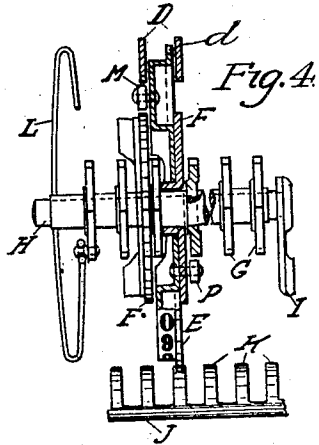
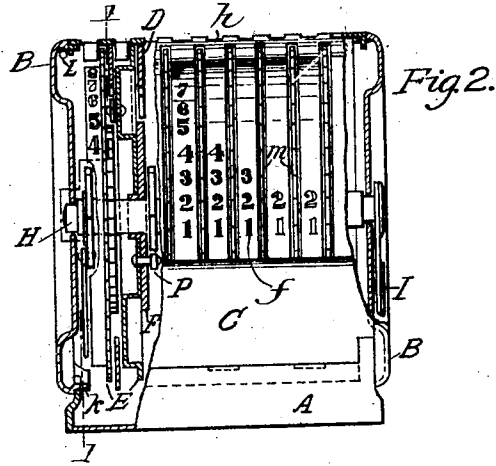
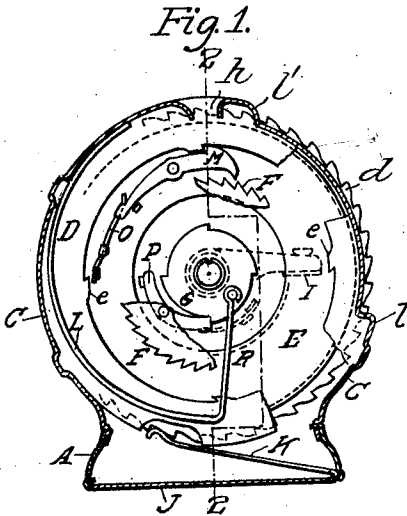


W. H. SMITH.
 ADDING MACHINE.
 APPLICATION FILED OCT. 18, 1915.

Patented Dec. 16, 1919.

1,325,212.



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UNITED STATES PATENT OFFICE.

WILLIAM H. SMITH, OF CHICAGO, ILLINOIS.

ADDING-MACHINE.

1,325,212.

Specification of Letters Patent.

Patented Dec. 16, 1919.

Application filed October 18, 1915. Serial No. 56,435.

To all whom it may concern:

Be it known that I, WILLIAM H. SMITH, a citizen of the United States, and resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Adding-Machines, of which the following is a specification.

My invention relates to adding machines and has particular reference to a novel device which shall be very small in size, efficient in operation and very economical in cost of manufacture.

My object is to provide a thoroughly practical adding machine with a wide range in as small a compass as possible consistent with legibility and easy manipulation, and one reduced to the lowest terms of simplicity by the elimination of all intermediary moving parts between the fingers and the "sight" numbers.

A further object is to provide a device in which the counting devices serve the additional purpose of indexing devices, and in which the arrangement is such that the number wheels may be provided with a plurality of series of digits from 1 to 0, together with suitable mechanism for carrying forward the amount set up on the different number wheels.

The invention will be more readily understood by reference to the accompanying drawings, wherein—

Figure 1 is a transverse vertical section showing portions of the device in elevation;

Fig. 2 is a view showing some of the parts in section and some in elevation, the view being taken from the front of the device with the casing partly broken away;

Fig. 3 is a fragmentary plan showing the windows with the index numbers exposed therein;

Fig. 4 is a fragmentary sectional view showing the shaft upon which the parts are mounted, which shaft acts also as a portion of the reset mechanism;

Fig. 5 is a sectional view through one of the number wheels;

Fig. 6 is an edge view of the ratchet wheel which is fixed to the number wheel shown in Fig. 5, and

Figs. 7 and 8 are face and edge views respectively of the clearing or reset ratchet.

The casing for the device is of novel construction and consists of four parts. The casing includes the base A, ends B, cover C and bottom J. The cover is stiffened by the

partition rings D concentric with the shaft H. On the inner edge of these partition rings are located equidistantly spaced projections *e*, which act as cams for a purpose hereinafter described.

The moving parts are mounted upon a single longitudinally extending shaft H, the ends of which are journaled in the end pieces B. On the shaft H are rigidly secured against rotative movement a plurality of clearing ratchets G, one of these ratchets being supplied for each number wheel. The shaft H also supports the number wheels E, these wheels being freely rotatable on the shaft and being spaced apart by the ratchets G and the ratchets F, which are rigidly secured to the number wheel. Secured to each of the number wheels is a pawl M, one end of which is engaged by a spring O. The end of each pawl is arranged in the plane of the partitions D, and the pawls are adapted to be actuated by the projections, or cams, *e* on the partition. The pawl is by this means forced into engagement with the teeth of the ratchet F, this constituting the carrying mechanism.

It will be noted that I have provided one of these projections, or cams, *e* for each series of figures on the number wheel, and the number shown will be increased or diminished in accordance with the number of sets of digits disposed on the periphery of the number wheels.

It will be noted that the number wheels are provided with a peripheral flange *d*, this flange being notched or toothed, one tooth being provided for each digit displayed on the face or periphery of the number wheel. This notched peripheral flange projects through a slot in the cover, as best shown in Fig. 1, nine of the notches being disposed between the stops *l*, *l'*. As a means for steadying the number wheels and preventing overthrow, I provide the springs K secured in the base of the casing and projecting upwardly therein at an angle to the bottom J, one of these springs engaging each number wheel.

Secured to an overhung end of the shaft is a handle I, by means of which the shaft and the ratchets G may be positively rotated. When it is desired to re-set the number wheels, *i. e.*, to bring the number wheels to naught, the handle or lever I is turned through an arc of 90°, thus moving the ratchets G. Pawls P are mounted on the

ratchet wheel F, and, as best shown in Figs. 1 and 6, are arranged to engage the teeth on the ratchet G, and as the ratchets are moved clockwise, as viewed in Fig. 1, the number wheels are moved under the action of the pawl P. In normal operation the pawl rides over the ratchet wheel without engagement. The shaft and ratchets are held in the position of Fig. 1, by the spring L, and to which position they are returned by said spring when pressure is removed from the handle I after resetting the number wheels for clearing the machine. But one of these springs need be employed. It will be noted that I have provided four notches, or teeth, on the ratchet wheels G, this number being fixed by the number of series of figures on the periphery of the number wheels.

On the upper front portion of the cover C, in vertical rows between the number wheel slots, are arranged the guide numbers *f*, two columns for cents, and ordinarily six columns for dollars, one number opposite each projecting finger tooth *d*. The manual operation of the device is simple. The finger of the operator is placed on a tooth *d*, corresponding to the number which is to be added, whereupon the number wheel is rotated until the finger strikes the stop *l*, where the number wheel remains. If the addition of subsequent numbers requires that an amount be carried over to the next unit, the action is as follows: As the number 9 appears in the window opening of a certain unit, the cam-shaped point of the pawl M contacts one of the projections *e*. Further rotation of the unit causes the pawl to be depressed by the cam and to engage the ratchet wheel F of the next higher unit, thereby moving the next higher unit one point forward. At that time the pawl has cleared the projection *e* and will not engage another projection until the number wheel has traveled nine more points. It will be noted that the windows *h* in the casing are so located that as an amount is set up by the finger of the operator the corresponding number of the next succeeding series of digits appears in the window.

After the desired additions have been made, the machine may be cleared as follows: The lever I being rotated, together with the ratchet G, the pawls P are progressively engaged as the points come in contact with the teeth on the ratchet and the number wheels are rotated to a point where the zero sign appears in the windows H. The construction shown lends itself to extreme economy in construction, due to the fact that, excepting the shaft, the parts may all be pressed from sheet metal and assembled without the employment of skilled labor. The device is small in size, the drawings herewith submitted showing the machine in its actual size. Many of the ad-

vantages gained in the present device might be secured in modified forms thereof, and such modifications as are within the scope of my claims I consider within the spirit of my invention.

I claim:

1. In an adding machine, the combination with a casing of cylindrical form, of a shaft extending longitudinally thereof, a plurality of number wheels rotatably mounted on said shaft, a ratchet wheel associated with each of said number wheels and movable therewith, a plurality of inwardly extending annular partitions also arranged at the inner face of said casing and located in the plane of said ratchet wheels but spaced therefrom, said partitions serving to brace the casing, and a series of pawls carried by said number wheels and disposed within the spaces between the ratchet wheels and said partitions, each of said pawls cooperating with the ratchet of the number wheel of next higher order to actuate the same one step, and means associated with said partitions for operating said pawls at predetermined times to effect such movement of the number wheels.

2. In an adding machine, the combination with a casing of cylindrical form, of a shaft extending longitudinally thereof, a plurality of number wheels rotatably mounted on said shaft, a ratchet wheel associated with each of said number wheels and movable therewith, a plurality of annular partitions also arranged in said casing and located in the plane of said ratchet wheels but spaced therefrom, said partitions serving to brace the casing, and a series of pawls carried by said number wheels and disposed within the spaces between the ratchet wheels and said partitions, each of said pawls cooperating with the ratchet of the number wheel of next higher order to actuate the same one step, and inwardly-projecting cams arranged at the inner edges of said partitions and adapted to engage said pawls in the travel of the latter and operate the pawls to effect such movement of the number wheels.

3. In an adding machine, the combination with a casing, of a shaft extending longitudinally thereof, a plurality of number wheels rotatably mounted on said shaft and provided with a plurality of series of digits, means for effecting rotation of said wheels, means for transferring motion from each of said wheels to the wheel of the next higher order, a plurality of ratchets mounted in spaced relation on said shaft and fixed thereto, said ratchets serving to space the number wheels apart, the teeth of said ratchets corresponding in number to the number of series of digits carried by the number wheels and relatively spaced from each other to correspond to the relative spacing and arrangement of the several series of digits,

pawls carried by said number wheels and co-
operating with the teeth of the ratchets,
whereby to restore said number wheels to
zero position when said ratchets are rotated,
5 a handle connected to said shaft at the ex-
terior of the casing for rotating said shaft
to effect movement of said ratchets, and a
spring arranged in the casing and acting
to move the shaft and handle to normal
10 position when pressure is removed there-
from after clearing the machine, said
spring having one of its ends connected to
one side of one of said ratchets and its other
end bearing against the inner side of the
15 casing.

4. In an adding machine, the combination
with a casing, of a shaft extending longi-
tudinally thereof and journaled in the ends
of the casing, a plurality of annular parti-
20 tions arranged within said casing concen-
trically of said shaft and positioned at the
inner face of the casing, the inner edges of

said partitions being spaced away from said
shaft, a plurality of number wheels rotatably
mounted on said shaft, a ratchet wheel as- 25
sociated with each of said number wheels
and movable therewith, a pawl pivotally
mounted on the side of each of said number
wheels, said pawls projecting into the spaces
between the ratchet wheels and said parti- 30
tions and being in alinement with the latter,
each of said pawls cooperating with the
ratchet of the number wheel of next higher
order to actuate the same one step, and means
arranged at the inner edges of said parti- 35
tions for operating said pawls at predeter-
mined times to effect such movement of the
number wheels.

Signed at Chicago, Illinois, this 15th day
of October, 1915.

WILLIAM H. SMITH.

Witnesses:

T. D. BUTLER,
H. C. JACOBS.