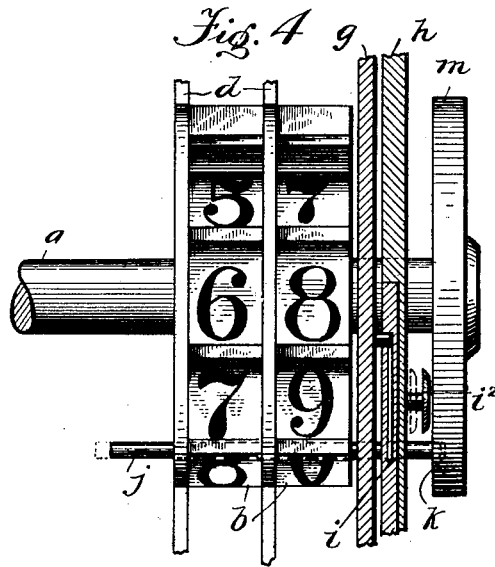
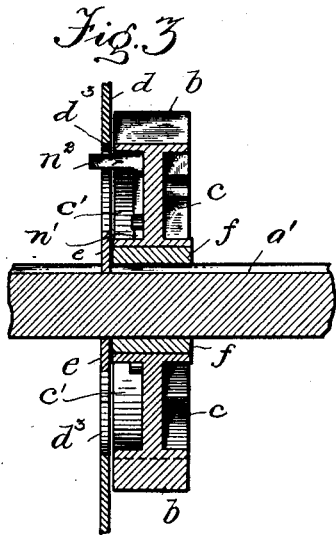
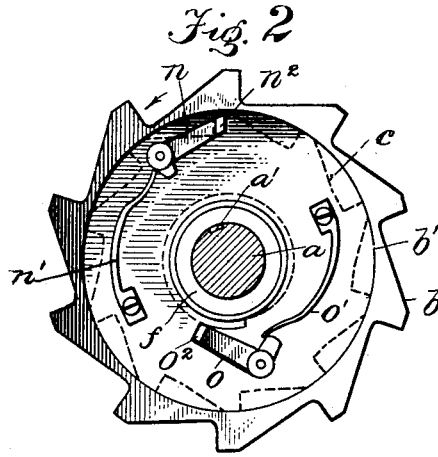
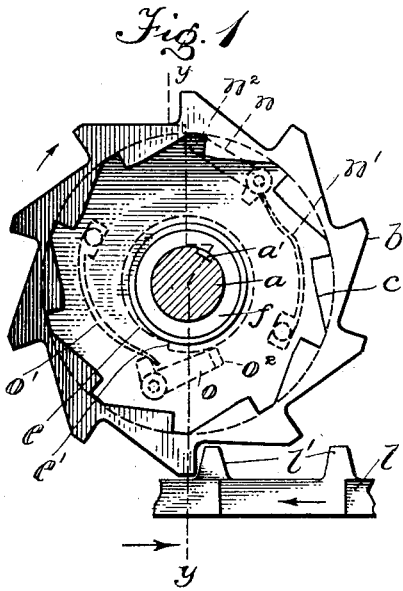


H. GOLDMAN.
CALCULATING MACHINE.

(Application filed Aug. 8, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:
 Edmund A. House
 Wm Carpenter

Inventor
 Henry Goldman
 By Wm Zimmerman
 Atty.

H. GOLDMAN.
CALCULATING MACHINE.

(Application filed Aug. 8, 1898.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 5

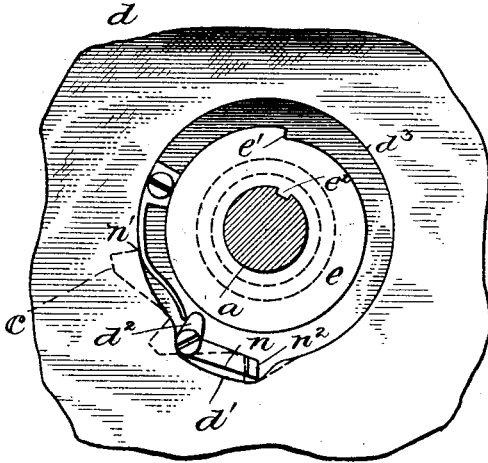


Fig. 6

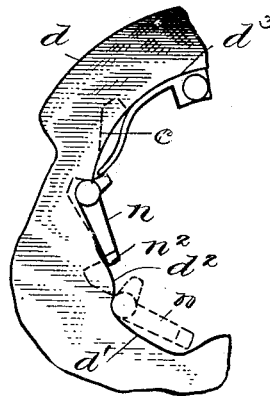


Fig. 7

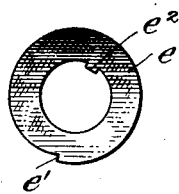


Fig. 8

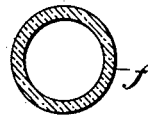


Fig. 9

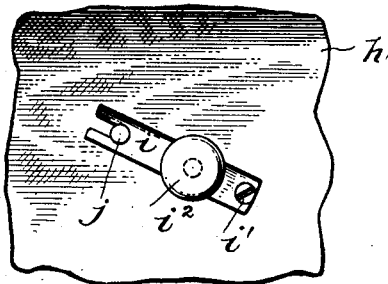


Fig. 10



Witnesses:

Edmund A. Strauss
Wm Carpenter

Inventor:
Henry Goldman,
Wm Zimmerman,
Atty.

By

UNITED STATES PATENT OFFICE.

HENRY GOLDMAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE INTERNATIONAL ARITHMACHINE CO., OF ILLINOIS.

CALCULATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 669,969, dated March 12, 1901.

Application filed August 8, 1898. Serial No. 688,069. (No model.)

To all whom it may concern:

Be it known that I, HENRY GOLDMAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Calculating-Machines, which are fully set forth in the following specification, reference being had to the accompanying drawings, forming a part hereof, and in which—

Figure 1 shows a numerating-wheel for a calculating-machine as seen from the right-hand side of the structure, the shaft thereof being in end section and the construction of the opposite side shown in broken lines, and a fragment of the actuating-chain. Fig. 2 shows Fig. 1 on its reverse side with the mechanism before it on the shaft in Fig. 1 in broken lines. Fig. 3 shows the wheel Fig. 1 in central longitudinal section, taken on the plane $y y$, looking in the direction of the arrow, and on a fragment of its shaft. Fig. 4 shows the right-hand end of a shaft with two numerating-wheels, a fragment of the right-hand side of the case, the resetting-wheel, and its stop mechanism. Fig. 5 shows a fragment of a septum placed between any two numerating-wheels, an end section of the shaft, the notched hole in the septum, and the resetting-cam, a spring-pawl, and a fragment of a numerating-wheel in broken outlines. Fig. 6 shows a fragment of the septum shown in Fig. 5 with the spring-pawl advanced to the position where it releases the tooth shown caught in Fig. 5. Fig. 7 shows a resetting-cam. Fig. 8 shows a sleeve in end view. Fig. 9 shows the spring of the stop mechanism and its push-button on the side of a fragment of the case. Fig. 10 shows the working end of the stop-bar.

Like letters of reference denote like parts.

The object of my invention is to improve the construction of the mechanism in counting and calculating machines and numbering devices and to make it more easy and simple of construction and reliable in operation and more compact in its arrangement of its several parts. To attain said desirable end, I construct my said new mechanism in substantially the following manner, namely:

Each numerating-wheel b is provided on the side nearest toward the hand-wheel or resetting-wheel m with a set of ten teeth c , in a cavity or recess of the side of the wheel, which point in a direction opposite to their corresponding exterior teeth, and on the opposite side of each wheel—*i. e.*, farthest from the hand-wheel m —is a corresponding recess c' , within which are a pair of spring-actuated pawls $n o$, whereof the former is so connected with its spring n' as to have its free end, with its transverse spur n^2 , pushed outward centrifugal to the axle a , while the spur o^2 on the free end of the pawl o is pushed inward centripetal to the axle a . Said transverse spurs $n^2 o^2$ move upon the edges of the hole or cam d^3 in the septum or septums d and outer edge of the notched cam e , respectively. The cam e is of about the same thickness as the septum d and is placed in the same plane. Therefore it is in the opening of the septum bounded by the periphery d^3 . Said cam has a spur e^2 , which fits into a groove a' of the axle a , whereby it turns with said axle. It also has a notch e' , and all spurs e^2 and notches e' are in like places, radially, thus placing the notches e' of a series of cams e in a line parallel to the axis of the shaft a . All cams d^3 have notches d' , which are in a line parallel to the shaft a . The first or right-hand wheel b of any series has no right-hand or rear cavity; but the one next to it has such right-hand cavity, with teeth c , while the first wheel has a left-hand cavity, with the pawls n and o , whereof the spur n^2 of the pawl n reaches over and engages with one of the teeth c whenever the wheel which carries the pawl n has brought it into the notch d' , the only place in the cam d^3 where the spur n^2 can go out to engage the teeth c of the next adjoining wheel to its left. Said spur thereby moves said next wheel until the said spur n^2 is again lifted out of the notch d' , which is so shaped as to make such action easy and so as to move said wheel only one space corresponding to one exterior tooth of the wheel b . The motion of the said wheel b is in the direction indicated by the arrows, which is contacted by the spur l' of the chain l and driven thereby. Each succeeding wheel

of the series to the left makes a tenth of a revolution to a complete revolution of its driving-wheel.

In calculating-machines it becomes necessary to reset all the wheels *b* to zero or the starting-point for each new operation. To attain said end in this construction, a circular cam *e*, with a notch *e'*, whose shoulder faces the pawl *o*, is mounted on the shaft *a*, on which it is held from revolving by a spur *e²*, which fits into the groove *a'* of the shaft *a* and which occupies the same plane as the septum *l*. To the right-hand end of the shaft *a* is attached a resetting or hand wheel *m*, which has a notch *k* on its inner face to receive the end of a stop-rod *j*, thrown into said notch by a flat spring *i*, whose forked free end passes into the groove *j'*, and thus lifts the stop into said notch *k*, and which when out of the notch presses against the smooth side of the hand-wheel until it is thrown into said notch to stop the hand-wheel. Said wheel is released by depressing said spring through pressure on the stud *i²*, said parts being attached to the side of the casing of the machine. The wheels *b* and *m* move in the same direction, as indicated. Always, therefore, when the wheels *b* are moved by the chain *l* the pawl-spur *o²* passes over the notch *e'* from its rear; but whenever the hand-wheel turns the shoulder or face of the notch *e'* catches the spur *o²*, and thus causes the wheel *b* to move with it. The spur *o²* may be at rest in any one of its ten places when the notch *e'* takes it, and thus a single revolution of the hand-wheel *m* will bring all the wheels *b* to their zero or starting point.

The chamber containing the pawls *n o* extends from the hub to the outer circle *b'*, under the base of the teeth. (Shown in Fig. 1.) The chamber, which contains the interior teeth of the wheel *b*, extends from the hub to the line of the teeth, as shown in Fig. 2.

To prevent the friction of the sides of the wheels upon each other, the sleeve *f* is made slightly longer than the thickness of the wheels, and it also contacts with and holds the cams *e* in their true places and planes of revolution.

50 What I claim is—

1. The combination with numerating-wheels, chambered on both sides, one of said chambers having circumferential teeth, of

fixed and rotating cams in pairs between said wheels and a centripetally and a centrifugally acting pawl in the other of said chambers, counteracted by one of said cams, one of said pawls connecting with its next wheel and the other with said rotating cam, substantially as specified. 55

2. The combination with numerating-wheels, chambered on both sides, one chamber circumferentially toothed the other provided with a centripetally and a centrifugally acting pawl, of notched cams to counteract said pawl action and receive said pawls and mechanism to reset the numerating-wheels and mechanism to release and to stop said resetting mechanism, substantially as specified. 60

3. The combination with a numerating-wheel, chambered on both sides, one chamber being circumferentially toothed and the other provided with a centripetally and a centrifugally acting pawl, of a non-rotatable cam and a rotatable cam, said rotatable cam and numerating-wheel moving in only one and the same direction, and a stop for said cam, whereof a revolution resets the numerating-wheels to zero, substantially as specified. 65

4. The combination with a revolving shaft, adjoining wheels thereon, free from said shaft, each with a centripetally and a centrifugally acting pawl, one of said pawls spurred to reach the next wheel thereto, of a revolving cam to actuate one pawl and means to connect said shaft and revolving cam, substantially as specified. 70

5. The combination with a revoluble shaft and independent revoluble wheels thereon, centripetally and centrifugally acting pawls with means to actuate the next wheel and means to reset said wheels to zero, of cams in fixed positions to actuate said pawls, substantially as specified. 75

6. The combination with a revoluble shaft, and non-reversible toothed notation-wheels independently revoluble thereon and centripetally and centrifugally acting pawls with means to actuate the next wheel and means to reset said wheels to zero, of cams in fixed positions to actuate said pawls, substantially as specified. 80

HENRY GOLDMAN.

Witnesses:

WM. ZIMMERMAN,
P. H. HOLLAND.