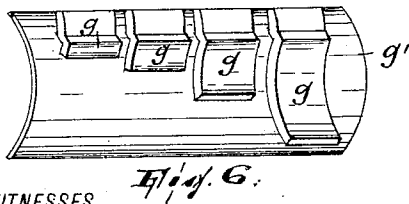
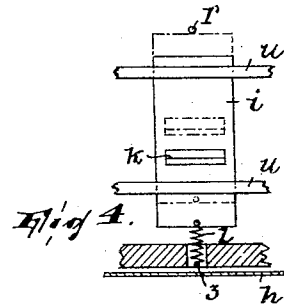
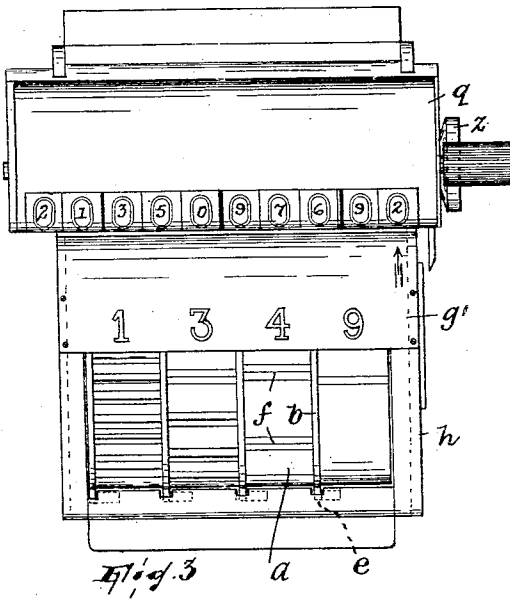
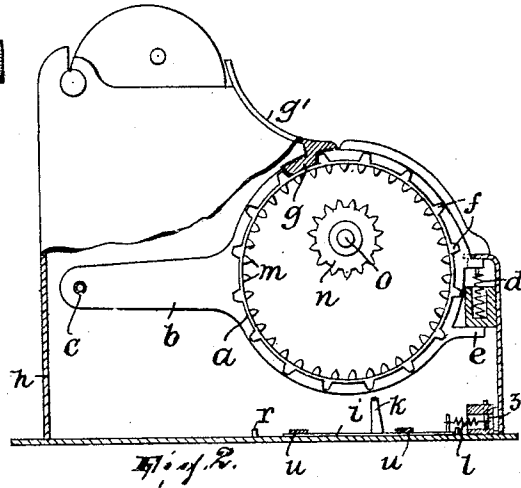
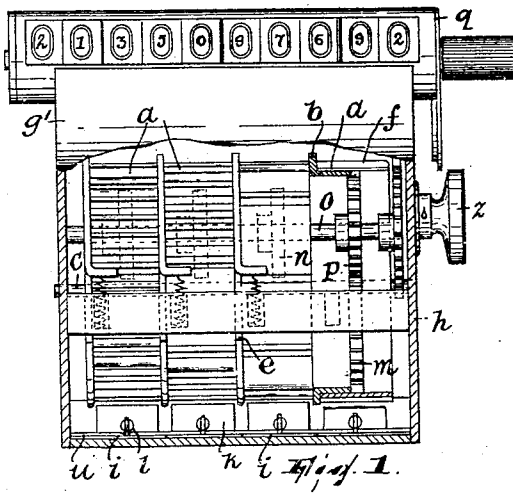


R. BÜRK.
DISPLACING DEVICE FOR CALCULATING MACHINES.
APPLICATION FILED DEC. 17, 1907.

947,526.

Patented Jan. 25, 1910.



WITNESSES

Wm. D. Zell.
Elie Kaufmann.

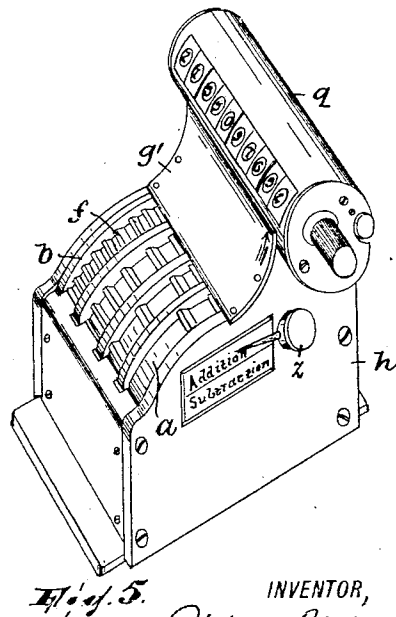


Fig. 5.

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DISPLACING DEVICE FOR CALCULATING-MACHINES.

947,526.

Specification of Letters Patent. Patented Jan. 25, 1910.

Application filed December 17, 1907. Serial No. 406,900.

To all whom it may concern:

Be it known that I, RICHARD BÜRK, a citizen of the German Empire, residing at Schwenningen, Württemberg, Germany, have
5 invented certain new and useful Improvements in Displacing Devices for Calculating-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable
10 others skilled in the art to which it appertains to make and use the same.

This invention relates to calculating apparatus and particularly to that part of the mechanism of such an apparatus which is
15 employed for actuating or displacing the counting mechanism thereof.

The principal objects of the invention are to simplify the mechanism, render it substantially noiseless in operation, reduce to
20 the minimum the mental work necessary in performing those calculations in which the mechanism is useful and so simplify the operation of the apparatus as to require practically no skill in the use thereof.

25 Generally stated, my invention employs, in connection with any suitable counting mechanism and a rotary part to transmit actuation thereto, manually operated rotatable devices each adapted to rotate said
30 part according to certain figure values appropriated thereto, say, 1, 3, 4 and 9, each said rotary devices having a series of ribs spaced from each other according to the figure value assigned to such device, a series
35 of supports, one for each rotary device, normally sustaining said devices out of engagement with the rotary part and in engagement with means for locking them against rotation, but movable under the pressure of the hand, in order to turn the rotary
40 devices, to an extent sufficient to bring the ribs of said rotary devices within the range of suitable means for limiting their rotation.

My invention will be found fully illustrated in the accompanying drawing, wherein,
45

Figure 1 is a front view of the apparatus, showing it partly in section; Fig. 2 is a side view, also showing the apparatus partly in
50 section; Fig. 3 is a plan view of the apparatus; Fig. 4 is a plan view, partly in section, of the means for limiting the rotation of the rotary devices; Fig. 5 is a perspective view of the apparatus; and, Fig. 6
55 is an underneath view of a detail.

In the drawings, *a* designates a series of

annular wheels each revolubly arranged in the annular free-end portion of a lever *b*, the several levers being fulcrumed at *c*. These levers are normally held in the position
60 shown in Fig. 2 by springs *d*, in which position they are limited against upward movement by the projections *e*. Each wheel *a* is provided externally with a series of equidistantly spaced ribs *f*; the ribs *f* for the
65 different wheels *a* are spaced from each other distances corresponding to the respective figure values of said wheels, say 9, 4, 3 and 1 reading from right to left in Fig. 3. *g'* is a suitably supported plate arranged
70 on the case *h* over the wheels and on which may be inscribed the numbers 9, 4, 3 and 1, corresponding to the wheels; on the under side of this plate are formed blocks *g*, one
75 for each wheel *a*, the dimension of each block corresponding with the direction in which its particular wheel rotates being equal to the distance between any two of the ribs of said wheel. In the normal position of said
80 parts shown in Fig. 2, the spring-actuated levers hold the several wheels engaged with their blocks or stops *g*, so that the wheels cannot rotate. The wheels *a* have internal gear teeth *m*. The several wheels and levers
85 are penetrated by a rotary shaft *o* carrying a series of pinions *n*, one pinion for each wheel *a*; when any wheel *a* is depressed so that it is disengaged from its stop *g*, it is thrown into mesh with its corresponding pinion *n*, and in the rotation of the wheel *a*
90 incident to its depression, the pinion *n* and consequently shaft *o* are rotated. Shaft *o* carries a gear *p* whereby to transmit the actuation from shaft *o* to the counting
95 mechanism, shown at *q*, which counting mechanism may be of any well-known type. When each wheel is depressed and turned, thereby rotating shaft *o*, its rotary motion is limited as follows: *i* designates one of a
100 series of slides having a projection *k* and guided for rectilineal movement by the straps *u*; each slide is arranged directly beneath the corresponding wheel *a* and it is normally drawn forward by a spiral spring
105 *l* attached to a pin 3, the rearward movement of said slide being limited by a stop *r*. It should be remarked that the projection *k* is designed to be engaged by one of the ribs of the corresponding wheel *a* when the latter is depressed, the slide yielding rearwardly
110 until it impinges against the stop *r* under the rotary action of the wheel at this time.

The operation is as follows: By pressing a finger on the wheel *a* which is to be operated, it is moved downwardly, one result of this being that its internal teeth *m* engage with the teeth of pinion *n* and another result being that the pressure causes the wheel to turn; the turning of the wheel *a* thus transmits rotary motion to the pinion *n*, which is one of several pinions, one for each wheel *a*, fixed on shaft *o*, so that said shaft and the gear *p*, also fixed on said shaft, are rotated, causing the actuation of the counting mechanism *q* to which the motion is transmitted through mechanism (not shown) connecting gear *p* with said counting mechanism. In the downward movement of the lever and wheel and the rotation of the latter, one of the ribs on the wheel engages the stop *h* of the corresponding slide which yields rearwardly until the movement is checked by the stop *r*; it being remarked that the ribs on the wheels are differently spaced according to the respective figure values of the wheels, the extent of movement thus allowed to the wheel *a* being operated depends upon the distance between any two of its ribs. Accordingly, the wheel *a* will transmit a rotary movement to shaft *o* (and advance the counting mechanism) in accordance with its own extent of movement. When the pressure on the wheel is relieved, the spring *d* returns the lever *b* so that the wheel *a* is brought against the stop *g* which, by fitting between two of the ribs on the wheel, locks the latter against rotation until again depressed.

It will be understood that more than four wheels *a* and their accessories may be employed, if desired; four are preferred so that there will be one for each finger of one hand, the figures in the column to be added being followed by the other hand. When figures occur in the column being added which do not correspond to the figure-values of the wheels (1, 3, 4 and 9), the calculation is effected either by operating one of the wheels twice (say, the wheel marked "1" to produce the figure 2) or by operating two of the wheels successively (say the wheels marked "3" and "4" to produce the figure 7).

It will be apparent to those skilled in the art that the mechanism may be adapted for subtraction as well as addition by providing suitable means for causing the movement from shaft *o* to be transmitted to the counting mechanism in the direction the reverse

to that for addition; such means (not shown) may be controlled by the reversing knob *z* in Fig. 5.

Having thus fully described my invention, what I claim is:

1. The combination of a supporting structure, a part to be rotated journaled therein, a plurality of levers fulcrumed in said structure, actuating devices for said rotary part engageable with said rotary part to rotate the same and each journaled in a lever, each lever normally retaining its actuating device disengaged from the rotary part, and said actuating devices having abutments, and means, adapted to be engaged by said abutments when the actuating devices are operatively engaged with said rotary part, for limiting the movement of said actuating devices, substantially as described.

2. The combination of a supporting structure, a part to be rotated journaled therein, a plurality of levers fulcrumed in said structure, actuating devices for said rotary part engageable with said rotary part to rotate the same and each journaled in a lever, each lever normally retaining its actuating device disengaged from the rotary part, and said actuating devices having abutments, and spring-pressed means, adapted to be engaged by said abutments when the actuating devices are operatively engaged with said rotary part, for limiting the movement of said actuating devices, substantially as described.

3. The combination of a supporting structure, a part to be rotated journaled therein, a plurality of levers fulcrumed in said structure, actuating devices for said rotary part engageable with said rotary part to rotate the same and each journaled in a lever, each lever normally retaining its actuating device disengaged from the rotary part, and said actuating device having abutments, means, adapted to be engaged by said abutments when the actuating devices are operatively engaged with said rotary part, for limiting the movement of said actuating devices, and means, adapted to be engaged by said abutments, for restraining said actuating devices against rotation when the levers are in their normal positions, substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses.

RICHARD BÜRK.

Witnesses:

JEAN GULDEN,
HERMANN HOPPE.