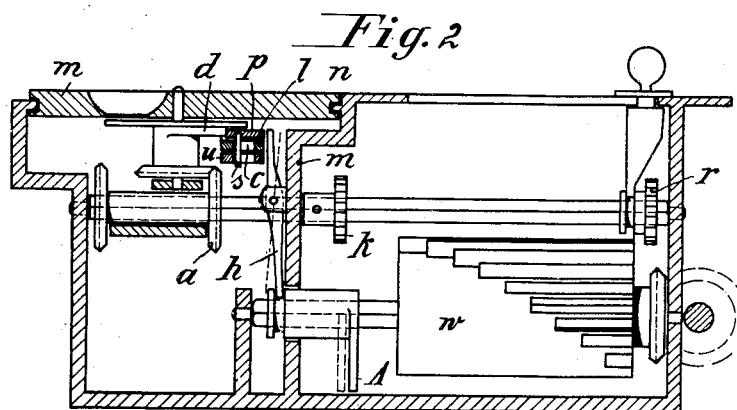
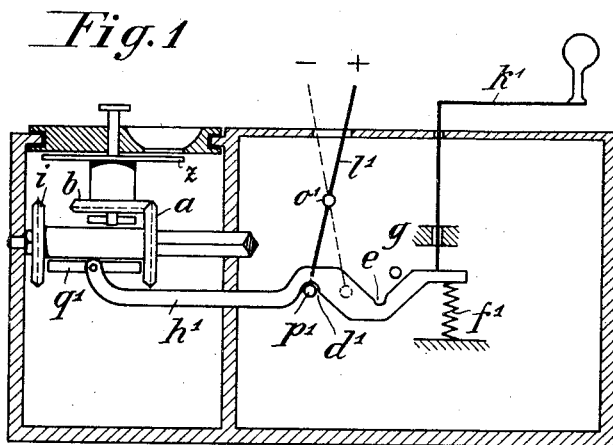


E. JAHNZ.  
 CALCULATING MACHINE.  
 APPLICATION FILED JUNE 28, 1913.

1,081,310.

Patented Dec. 16, 1913.

2 SHEETS—SHEET 1.



Witnesses:  
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 Attorney

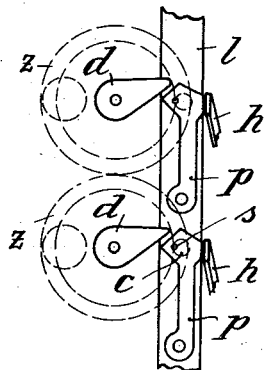
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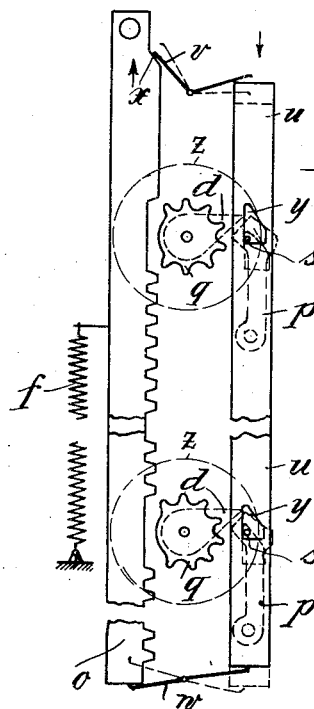
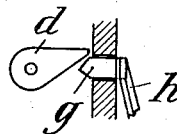
Patented Dec. 16, 1913.

2 SHEETS—SHEET 2.

*Fig. 3*



*Fig. 4*



*Fig. 5*

Witnesses:

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# UNITED STATES PATENT OFFICE.

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## CALCULATING-MACHINE.

1,081,310.

Specification of Letters Patent.

Patented Dec. 16, 1913.

Application filed June 28, 1913. Serial No. 776,402.

*To all whom it may concern:*

Be it known that I, ERWIN JAHNZ, a citizen of Germany, and residing at Zurich, Switzerland, have invented certain new and useful Improvements in Calculating-Machines, of which the following is a specification.

My invention relates to calculating machines, and a primary object is to so improve the construction of the well-known Thomas calculating machine that the slide thereof need not be turned up when it is longitudinally displaced.

The invention consists in the construction, arrangement and combination of parts described hereinafter and pointed out in the claims.

Several illustrative embodiments of my invention are represented by way of example in the accompanying drawings, wherein:—

Figure 1 is a section through a machine of the Thomas type, but fitted with my new device for releasing the slide, Fig. 2 is a similar section showing the mechanism for driving the numeral-disks, Figs. 3 and 4 are plan views of portions of the mechanism associated with the tappets which rotate with the numeral-disks, and Fig. 5 shows the zero-adjusting rack with the interlocking gear actuated thereby.

Referring to the drawings, as is well known in the ordinary Thomas calculating machine with twin-bevel-gears, the slide must be turned up each time when:—(a) the numeral disk  $z$  is adjusted to a number, or (b) the numeral disk  $z$  is adjusted to zero, or (c) the slide  $n$  is desired to be displaced longitudinally. This is because in each case the bevel-gears  $b$  for the numeral-disks  $z$  must be lifted from the twin bevel-gears  $a, i$  of the driving mechanism, either in order that these gears  $b$  may be able to rotate freely, or in order to allow the slide to be longitudinally displaced. This lifting of the guide is however very inconvenient, and if the slide is removable there is, in addition, a danger of its jumping up spontaneously when the crank is quickly rotated and of errors in calculation arising on this account. Moreover, in this system of guiding the slide, the latter could be supported only at a few points, whereby it was easily deflected and so impaired the operation of the machine. All these defects are obviated if the bevel-wheels of the re-

versing gear can be thrown out of gear, for then the slide need not be lifted at all, and consequently can be so securely guided that it can neither spring up nor be deflected. Now, as is already known, the bevel-gears  $b, a$  and  $i$  can be thrown out of gear by arranging that the twin bevel-gears  $a, i$  can be axially displaced into a middle position, wherein neither the gear  $a$  nor the gear  $i$  meshes with the gear  $b$ .

According to the present invention the twin bevel-gears  $a, i$  are displaced by giving a special movement to the crank when in its zero or normal position. Referring to Fig. 1, the twin bevel-gears  $a, i$  can be axially displaced in known manner by means of a bar  $q'$  which passes between them and is arranged longitudinally of the machine. According to my invention, I pivotally connect to this bar  $q'$  a lever  $h'$  having two V-shaped recesses  $d', e$ . The recess  $d$  is adapted to be engaged by a pin  $p'$  mounted on the lever  $l'$ . The recess  $e$  is adapted to be engaged by the stationary pin  $g$ . The lever  $l'$  is fulcrumed at  $o'$  on the framework of the machine. This latter lever determines according to its + or - position that position of the twin bevel-gears which is required for addition or subtraction.

The axle  $k''$  of the crank-handle  $k'$  is axially displaceable, and its lower end rests on one end of the lever  $h'$ . A spring  $f'$  tends to force the lever  $h'$  and the crank-axle upwardly. The axle  $k''$  and the lever  $h'$  are depressed before the handle is rotated, and the lever  $h'$  remains in its depressed position (as shown in Fig. 1) for the entire period during which the handle is rotated. When however the handle is released after being rotated, the spring  $f'$  raises both the lever  $h'$  and the axle  $k''$ . Consequently the V-shaped recess  $d'$  is removed from the pin  $p'$ , and the right slanting face of the other V-shaped recess  $e$  simultaneously bears against the stationary pin  $g$ , and by sliding on the latter draws the lever  $h'$ , the bar  $q'$  and the twin bevel-gears  $a, i$  to the right, until the vertex of the recess  $e$  bears against the pin  $g$ . This brings the twin bevel-gears  $a, i$  into their middle position, wherein neither of the twin gears  $a, i$  meshes with the gear  $b$ . Had however the lever  $l'$  and the twin bevel-gears  $a, i$  been in the - position, they would have been also displaced to their middle positions, but in this case by means of the left slanting face

of the recess *e*. In this middle position of the twin bevel-gears (*a*) the numeral-disks *z* can be freely adjusted to a number, or (*b*) the numeral-disks *z* can be adjusted to zero, or (*c*) the slide *n* can be longitudinally displaced without needing to be lifted.

It is preferable to arrange on the crank-handle *h'* an interlocking device which not only prevents the handle from being rotated before it is depressed, but also prevents the spring *f'* from pressing up the lever *h'* and the handle *h'* before the latter has arrived at its normal position. Such devices are however already known and need not be further described.

Referring to Fig. 2, in Thomas's calculating machine, the numeral-disks *z* are driven by the graduated cylinder *w* by means of ten displaceable numeral wheels, as *r*, and the bevel-gears *i*, *a*, *b*. The tens are transferred by means of transferring tappets *t* which rotate with the axles of the graduated cylinders but can be axially displaced into positions below the numeral wheels *k* by means of the preparing tappets *d* (Figs. 2 and 3) for the numeral-disks *z*, owing to the latter tappets actuating the levers *p* and the slanting two-armed levers *h*, whereby, when the transferring tappets *t* rotate, they drive the wheels *k*, the bevel-gears *a*, *b* and finally the numeral-disk *z*. The levers *p* are mounted on a carrier *l*, which in the heretofore known constructions of Thomas's calculating machine has been fast on the middle wall *m* of the stationary framework of the machine, while the preparing tappets *d* which coact with these levers *p* are mounted (at the numeral-disks *z*) on the displaceable slide *n*. Owing to this arrangement the slide *n* had to be lifted each time before being longitudinally displaced in order that the tip of the tappet *d* might pass the point on the lever *p* which was turned toward it. According to my invention, however, the guide *n* need not be lifted when it is displaced longitudinally. To this end, I arrange that the carrier *l* carrying the levers *p* is fast not on the machine framework *m*, but on the slide *n*. Consequently when the slide *n* is longitudinally displaced, the levers *p* travel with the tappets *d*, and the tips of the latter of course no longer need to be raised over the points on the levers *p*. On the other hand, the rear sides of the levers *p* now slide past the ends of the levers *h*, and can do this without encountering obstruction because the ends of these levers are in a straight line parallel to the direction of motion of the guide. Moreover, the bevel-gears *a*, *b* must of course be thrown out of gear, for example by adjusting the gears *a* into a middle position.

The mounting of the levers *p* on the slide *n* has the additional advantage that when the numeral-disks *z* are in their zero posi-

tion, the levers *p* can be used as stops to prevent these disks *z* from overrunning their zero positions. When for example the zero position is obtained in known manner by a rack *o* (Fig. 5), which meshes with the pinions *q* of the numeral-disks *z*, it is possible that if the said rack *o* be quickly moved the numeral-disks *z* may be jerked beyond their zero positions. In order to prevent this, when the rack begins to move the levers *p* are locked in their normal positions owing to the longitudinal displacement of the locking bar *u*, and, while the numeral-disks are being brought to their zero positions, thus constitute stops which the tappets *d* cannot pass. In the levers *p* are riveted pins *s* which extend downwardly through holes *c* in the carrier *l* (Figs. 2, 3 and 5). The locking bar *u* locks the levers *p* owing to the slanting face on it bearing against the pins *s* of the levers *p*. The locking bar *u* is displaced by the zero-adjusting rack *o* owing to the slanting face *x* on the latter driving the lever *v* (Fig. 5). After the numeral-disks have been adjusted to their zero positions, the rack *o* is brought back to its normal position by the spring *f*, and simultaneously presses the locking bar *u* back into its initial position by means of the lever *w'*. The holes *c* in the carrier *l* (Fig. 3) form stops for the pins *s* and so prevent the levers *p* from swinging out into the spaces between two levers *h* while the slide *n* is being displaced, and so obstructing further movement of the slide *n*. It is obvious that the levers *p* can be replaced by other members, *e. g.* by pins *g'* (Fig. 4) movably mounted in the framework of the slide, without in any way departing from the scope of the invention.

I claim:—

1. In a Thomas calculating machine comprising a frame, a slide movable longitudinally therein, a plurality of numeral disks journaled in the slide, a plurality of pairs of differential bevel-gears axially displaceable in the frame, each pair of bevel-gears being normally disengaged from, but adapted in its end position to drive, one of side disks, a bar for axially shifting the pairs of bevel-gears; the combination of a crank-shaft journaled in the frame and axially displaceable therein, and an intermediate member operated by the displacement of the crank-shaft and operating said bar to bring the bevel-gears from their middle position into their plus or minus position.

2. In a Thomas calculating machine comprising a frame, a slide movable longitudinally therein, a plurality of numeral disks journaled in the slide, a plurality of pairs of differential bevel-gears axially displaceable in the frame, each pair of bevel-gears being normally disengaged from, but adapted in its end position to drive, one of side

disks, a bar for axially shifting the pairs of  
bevel gears; the combination of a crank-  
shaft journaled in the frame and axially dis-  
placeable therein, a fixed and a movable stop  
5 mounted on the frame, and a spring-con-  
trolled intermediate member operatively  
connected to said bar, adapted to be dis-  
placed by said crank-shaft and having two  
V-shaped recesses, the fixed stop being nor-  
10 mally in a vertex of one recess and the mov-  
able stop being normally at one side or the  
other of the entrance of the other recess.

3. In a Thomas calculating machine com-

prising a frame, a slide movable longitudi-  
nally therein, a plurality of numeral disks 15  
and appertaining tens-cams, the combina-  
tion of a plurality of tens-tappets adapted  
to be driven by means of said tens-cams and  
arranged on the said movable slide.

In testimony whereof, I affix my signature 20  
in the presence of two witnesses.

ERWIN JAHNZ.

Witnesses:

CARL CUBLER,  
AUGUST RUEGG.