

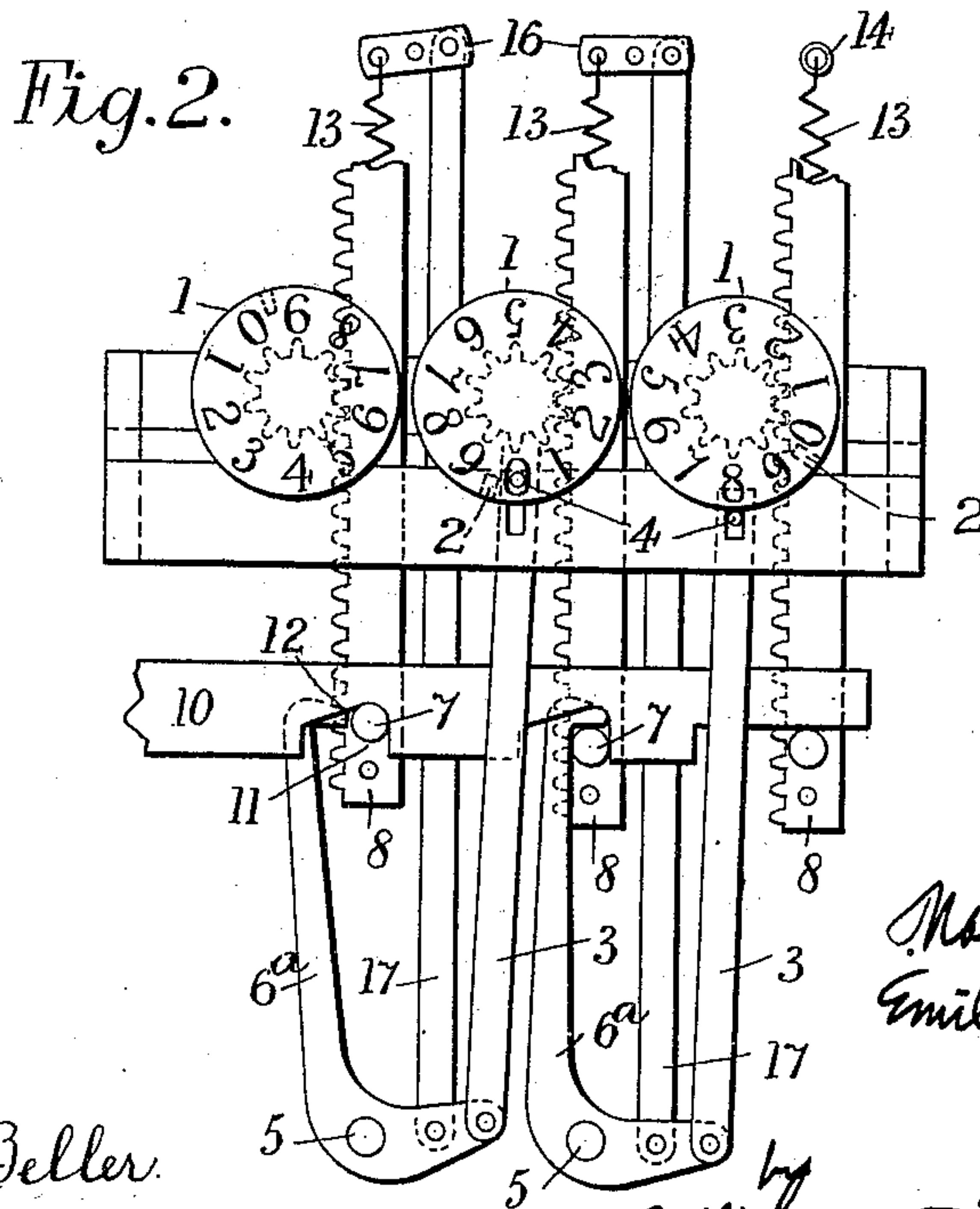
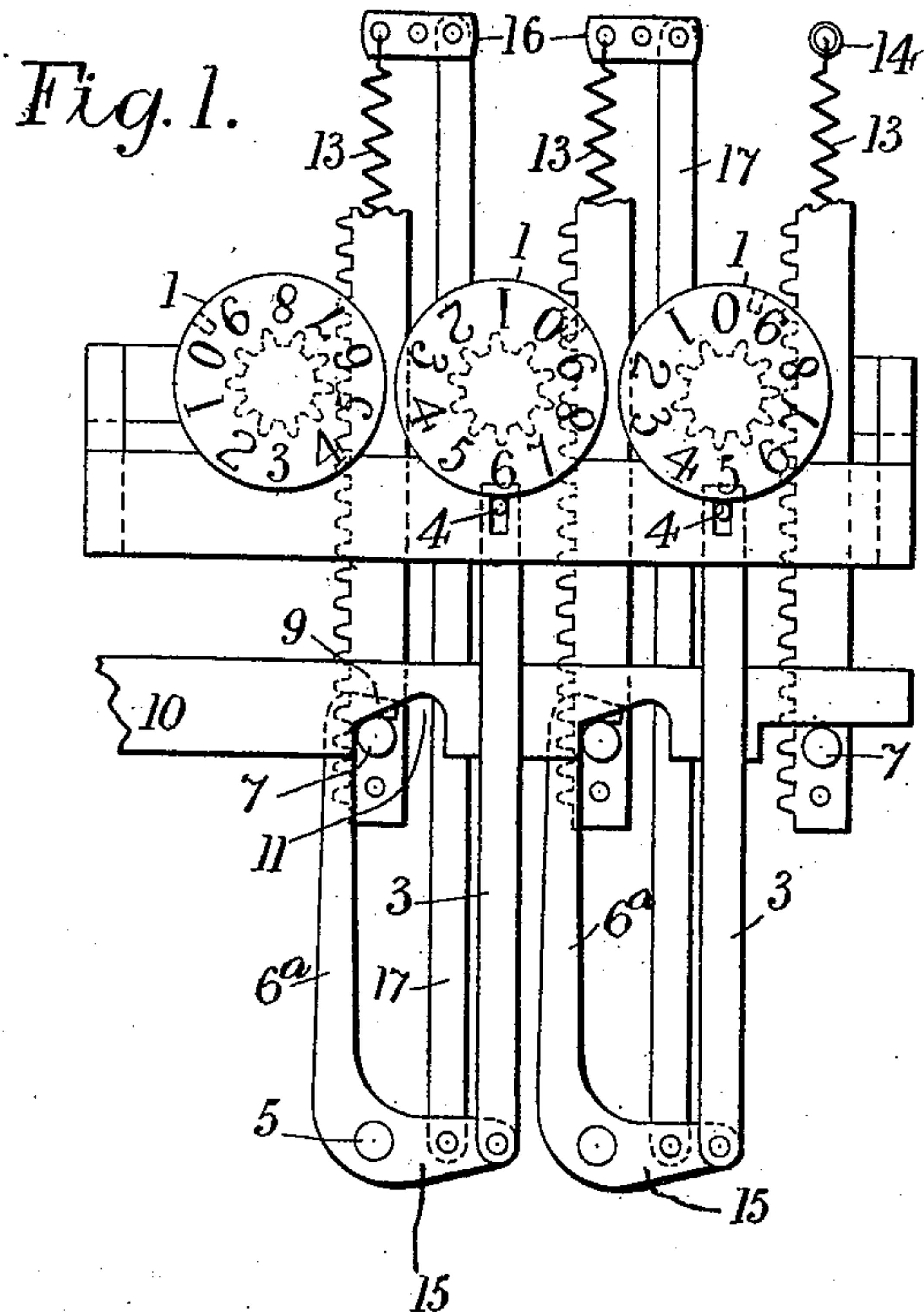
M. KLEIN & E. A. SEITTER.

CALCULATING MACHINE.

APPLICATION FILED SEPT. 20, 1910.

989,367.

Patented Apr. 11, 1911.



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# UNITED STATES PATENT OFFICE.

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## CALCULATING-MACHINE.

989,367.

Specification of Letters Patent.

Patented Apr. 11, 1911.

Application filed September 20, 1910. Serial No. 582,915.

*To all whom it may concern:*

Be it known that we, MAX KLEIN and EMIL ANDREAS SEITTER, both subjects of the German Emperor, and residing in Stuttgart, Germany, have invented a certain new and useful Improvement in Calculating-Machines, of which the following is a specification.

This invention relates to calculating machines and has particular reference to carry-over mechanism therefor.

In the United States Patent No. 974,006 a calculating machine is described wherein sliding racks serve for setting the figures with which the calculation is to be made, and these racks, after being set to the required figures, are engaged by pinions carrying the number wheels so that when the racks are returned to their normal position the number wheels are rotated and caused to indicate the value of the figures to which the racks were previously set. The carry-over of figures from one denomination to the next higher denomination is effected by enabling the sliding racks, of those number wheels which must next be moved forward in accordance with the state of the calculation, to pass beyond their upper zero position whereby the number wheels, in all cases, are rotated one unit when the preceding number wheel is in the position between 9 and 0 that is to say when it has completed one revolution.

The object of the present invention is to enable the spring force influencing the carry-over mechanism to be adjusted in a simpler and more reliable manner than heretofore.

In the accompanying drawings which illustrate the sliding racks and carry-over mechanism, Figure 1 shows the sliding racks in their upper zero position; the carry-over mechanism being inoperative and Fig. 2 is a similar view to Fig. 1 showing one of the racks carried beyond its zero position in order to effect a carry-over.

Referring to the drawings, each of the number wheels 1, except that one on the extreme left of the figures, is provided with a peripheral slot 2. A pin 4 rests against the periphery of each of these wheels and is adapted to enter the slot 2 and pass up into the interior of the number wheel. The pin 4 is carried by a bar 3 which is pivoted to one arm 15 of a double-arm lever 6<sup>a</sup> pivoted at 5 to the frame of the machine. The

other arm 6 of the double-arm lever terminates in a nose 9 which normally lies in the path of a pin or stop 7 carried by the rack 8 of the next higher denomination. A spring 13 is connected at one end to the rack 8 and at the other end it is made fast to one arm of a rocking lever 16 the other arm of which is connected by means of a draw bar 17 to the arm 15 of the lever 6<sup>a</sup>. The spring 13 is always in tension so that it tends to draw the rack 8 upwardly past its zero position and at the same time presses the pin 4 against the periphery of the number wheel through the medium of the rocking lever 16, draw bar 17, lever 6<sup>a</sup> and bar 3.

The bottom figure on the number wheel is always visible at the dial plate so that the number 365 will be seen in Fig. 1. If the number 43 be added to this, the result 408 will appear at the dial plate, as shown in Fig. 2. Before, however, this can take place a unit must be carried over from the tens number wheel to the hundreds number wheel. This is effected in the following manner:—The units number wheel will be rotated three units which will bring 8 to register at the dial plate while the tens number wheel will be rotated four units thus registering 0 at the dial plate. In so doing the slot 2 registers with the pin 4 whereupon the pin passes through the slot into the interior of the number wheel under the influence of the spring 13. This causes the double arm lever 6<sup>a</sup> to turn about its pivot and thus swing the nose 9 clear of the pin or stop 7 on the rack, which operates the hundreds number wheel, with the result that the rack is carried beyond its upper zero position by the spring 13. Thus the carry-over is effected and the hundreds number wheel rotated one unit to bring 4 opposite the dial plate opening.

A slide 10 is articulated to the main slide of the machine (not shown) and is provided with recesses 11 having cam surfaces 12. This slide is moved from right to left during the calculating operation. The pins 7 are located in these recesses so that when the slide moves from right to left they may enter the deeper portions thereof. On the slide 10 being moved back from left to right again the pins 7 ride along the cam surfaces 12 and consequently the racks are returned to their normal zero position.

In the carry-over mechanism described in the United States Patent No. 974006 before



referred to, two springs are employed to effect the carry-over, one to carry the rack beyond its zero position and the other serving to press the pin 4 against the periphery of the number wheel. This arrangement gave rise to serious inconveniences owing to the great difficulty experienced in obtaining a correct relative adjustment of the two springs, so as to avoid on the one hand, an excessive braking action on the number wheels and to insure on the other hand, a sufficiently reliable release of the racks. Now the relation between the two springs played an important part in this release, because the spring acting on the rack determined the frictional resistance between the pin or stop 7 and the nose 9 and this resistance had to be overcome by the spring serving to press the pin 4 on the number wheel while at the same time avoiding excessive pressure on the number wheels. In course of time it was found that a reliable working of the carry-over mechanism could not be attained with the two springs and this led to the present invention wherein the spring 13 is arranged to perform the function of the two springs formerly employed. Thus it will be seen that it is only necessary to determine the exact ratio of the levers and the pressure of the pin 4 on the number wheel can be set to the correct degree without any fear of it altering.

It will be obvious that the invention may be modified in respect of the details of its construction shown and described.

What we claim is:—

1. In a carry-over mechanism for calculating machines the combination of a plurality of number wheels of progressive denomination a rack and pinion for operating a number wheel of a higher denomination, means for normally holding the rack from passing

beyond its zero position, means for permitting the release of said holding means when the number wheel of the next lower denomination has completed one revolution, a spring operatively connected to the rack and to the rack holding means, said spring acting to effect the release of the rack holding means and also to carry the rack beyond its zero position for the purpose of advancing the number wheel of the higher denomination one degree or unit, and means for returning the rack to its zero position.

2. In carry-over mechanism for calculating machines the combination of a plurality of number wheels of progressive denomination, a rack and pinion for operating a number wheel of a higher denomination, means for normally holding the rack from passing beyond its zero position, means for permitting the release of said holding means when the number wheel of the next lower denomination has completed one revolution, a rocking lever, a draw bar connected to one arm of the rocking lever and also connected to the rack releasing means, a spring, one end of which is connected to the rack and the other end connected to the other arm of the rocking lever, said spring acting to effect the release of the rack holding means and also to carry the rack beyond its zero position for the purpose of advancing the number wheel of the higher denomination one degree or unit, and means for returning the rack to its zero position.

In witness whereof we have hereunto set our hands in the presence of the two subscribing witnesses.

MAX KLEIN.

EMIL ANDREAS SEITTER.

Witnesses:

REINHOLD KING,

ALBERT A. RINSINGER.