F. TRINKS.

CALCULATING MACHINE.

APPLICATION FILED DEC. 14, 1907.

1,007,618.

Patented Oct. 31, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

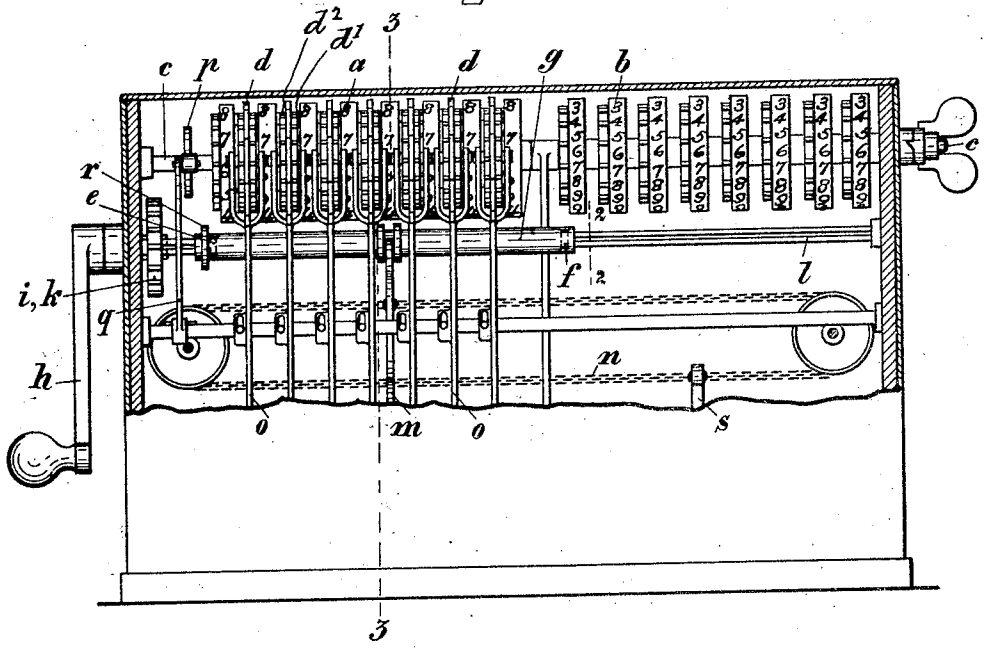
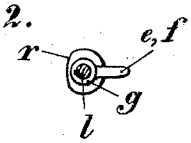


Fig. 2.



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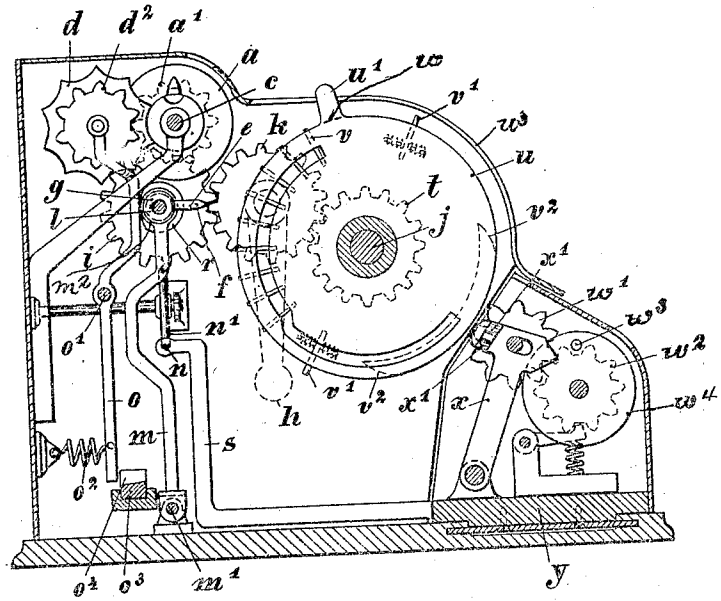
2 SHEETS—SHEET 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

FRANZ TRINKS, OF BRUNSWICK, GERMANY.

CALCULATING-MACHINE.

1,007,618. Specification of Letters Patent. Patented Oct. 31, 1911.

Application filed December 14, 1907. Serial No. 406,442.

To all whom it may concern:

Be it known that I, FRANZ TRINKS, engineer, subject of the Emperor of Germany, residing at Brunswick, Duchy of Brunswick, Empire of Germany, have invented certain new and useful Improvements in Calculating-Machines, of which the following is a specification.

This invention relates to calculating machines having two crank revolution counting mechanisms for registering the rotations of the hand crank. Fundamentally this type of machine is disclosed by British Patent No. 13,700 of 1890, and the present machine is an improvement on that disclosed by the latter patent.

Essentially the invention consists in uniting the motive power of two crank revolution counting mechanisms, and also in the use of the dual counting mechanisms. One of these mechanisms may be disposed on the carriage of the machine and the other disposed in the upper part of the casing, or both mechanisms may be disposed in the upper part of the casing. One of these crank revolution counting mechanisms is provided with well known tens transferring means, and the counting mechanism thus equipped may be employed in simplified multiplication and subtraction operations as will be more fully hereinafter explained.

The invention further consists in the details of construction and arrangement of the several parts which will be more fully hereinafter specified.

The mechanism embodying the present invention has been devised to obviate disadvantages and inconveniences incident to machines of this class as heretofore constructed.

The improved organization embodying the present features of the invention is shown in preferred form in the accompanying drawings, and in the latter:

Figure 1 is a rear view of the machine, the upper part of the rear wall and the adjusting mechanism being removed, the main counting mechanism being covered in this figure by the unbroken portion of the rear wall. Fig. 2 is a cross section taken on the line 2—2 of Fig. 1 and showing in detail the driving parts for the revolution counting mechanism. Fig. 3 is a cross section on the line 3—3 of Fig. 1.

Similar characters of reference are employed to indicate corresponding parts in the several views.

In the drawings, Fig. 3, each of the well known cam disks u is arranged adjacent to an adjusting wheel w, both the cam disks and adjusting wheels being fixed on the common shaft j, the cam disks when rotated bringing the radially displaceable teeth v of the adjusting wheels into and out of operating position. Each of the cam disks is rotated by a projection or handle u' projecting through a slot u^3 in the casing cover and exteriorly engageable. It will be understood that a suitable number of the cam disks and adjustable wheels having the radially displaceable teeth will be employed and the number of slots u^3 will correspond to the number of cam disk handles or operating devices u'. The adjusting wheels when rotated by means of the machine crank h and the intermediate spur gear wheels k, t transmit their movement by means of gear wheels w', w^2 to the figure wheels w^4 of the main counting mechanism, the said latter mechanism being mounted on a displaceable carriage y movable parallel with relation to the axis j so that the teeth v of the adjusting wheels may act on the gear wheels w' of the higher figure wheels w^4, for instance, the tens or hundreds figure wheel. The main counting mechanism is also provided with well known tens transferring means as disclosed in Letters Patent No. 975,180, granted to me November 8, 1910, and consisting of pivoted levers x operated by pins w^3 of the figure wheels w^4 so as to bring a beveled face x' in position for engagement with a pivotal tooth v' of the adjusting wheel and thus set up engagement between the latter and the gear wheel w'. The beveled face x' forms a part of the upper extreinity of each pivoted lever x, and two of the teeth v' and two beveled faces x' form a part of the complement of each lever x and each wheel w^4 to accommodate right and left hand rotations of the machine crank h. Beveled faces v^2 are provided on the peripheries of the adjusting wheels to bring the tens transferring levers x back into their positions of rest or in normal condition.

In the present machine, two crank revolution counting mechanisms are embodied and the object and function of the same are fully disclosed in Letters Patent No. 935,565, granted to me September 28, 1909, and No. 975,180, granted to me November 8, 1910. The counting mechanism, which has no

"tens" transferring means, is the usual revolution counting mechanism heretofore employed in the machines embodied in my patents above noted. These crank revolution counting mechanisms are employed in multiplication, division, addition, and subtraction, and each counting wheel is provided with two scales of figures from "0" to "9" running in opposite directions, the scales being differentiated by coloring the same. To calculate in an abbreviated manner, a crank revolution counting mechanism with tens transferring means is required. In order to satisfy all commercial demands it is necessary that a calculating machine of this type be provided with two crank revolution mechanisms, one with tens transferring means and the other without said transferring means.

The two crank revolution counting mechanisms *a* and *b* are located within the upper part of the machine casing above the adjusting mechanism and on the same axis *c*, and the driving member for each counting mechanism, namely, single toothed wheels *e* and *f* are coupled to each other by means of a sleeve *g* and to which the said teeth *e* and *f* are secured. The sleeve *g* is movable or displaceable axially on a shaft *l* rotated through the medium of spur gears *i*, *k* from the crank *h* in such manner that the shaft *l* makes a full rotation simultaneously with the crank *h*. The sleeve *g* is displaced by means of an endless band or chain *n* running over two pulleys *n'* located at opposite extremities of the machine, the upper part of the chain *n* being connected to an arm *m* held at its lower extremity by a shaft *m'*, see Fig. 3, and having a fork m^2 at its upper extremity to engage between circumferential shoulders *g'* on the sleeve *g*, see Fig. 1, and the lower part of the chain *n* is connected to an arm *s* in turn secured to and moving with the main counting mechanism carriage *y*, see Fig. 3. When the carriage *y* is moved laterally one value distance, that is to say, the distance from one figure disk w^4 to the next, or greater distances, both teeth or tappets *e* and *f* of the crank revolution counting mechanisms *a* and *b* are moved simultaneously one or more value distances laterally, but in an opposite direction so that both teeth or tappets *e* and *f* are always brought in position to engage the correct teeth *a'*, *b'* of the respective crank revolution counting mechanisms *a* and *b* when the machine crank *h* is turned. The counting mechanism *a*, as shown by Figs. 1 and 3, is provided with well known tens transferring means, consisting of a Maltese cross disk *d* and two gears *d'* and d^2 respectively engaging a single tooth of a figure disk *a* of one value and the tooth of a next higher figure disk *a*, as clearly shown by Fig. 1. This tens transferring means or mechanism is well known in this class of machines, and the Maltese cross disk *d* and gears *d'* d^2 are arranged on a common shaft, as d^3, see Figs. 1 and 3. All of the groups of gears and the Maltese cross disks are loosely arranged on the said shaft d^3, the Maltese cross disks being disposed between the gears *d'* and d^2 of each group and rigidly connected therewith and formed with a series of peripheral notches which coöperate with the adjacent counting disks, and said notches are equal in number to the teeth of the gears associated therewith. At intervals the gears *d'* and d^2 and the Maltese cross disk *d* are secured against rotation and at other times rotation of these parts ensues when a transfer of one value to the next higher value is to be effected. The operation of this well known tens transferring means as above specified is clearly disclosed in my copending application Serial Number 378,854, filed June 13, 1907.

To render the machine practicable it is obvious that means must be provided to disengage the tens transferring means without interfering with the counting disks *a* representing higher values than the one or more of such disks that may have been operated. For this purpose each tens transferring device *d*, *d'*, d^2 is held by a forked two-armed lever *o* which swings on the axis *o'* and is influenced by a spring o^2 so as to hold the tens transferring means or transferrer in engagement with the counting disk gearing. A slidable or displaceable bar o^3 located adjacent the lower extremities of the levers *o* locks the latter against disengagement during the tens transferring operation and is notched as at o^4 to permit release and swinging-out movement of one lever *o* at a time for unlocking the counting disk *a* next higher than the similar disk which has been operated. The operating means for the bar o^3 is clearly disclosed in my Patent No. 975,180, hereinbefore referred to, in a corresponding part indicated by the numeral 68 in said patent, and the operation of this bar is therefore well known. The disengagement of the tens transferring devices is effected by means of a cam *r* connected to the sleeve *g* and rotatable with the teeth or tappets *e* and *f*. This cam *r* moves uniformly with the sleeve *g* on the shaft *l* so as to regularly coincide with each transferring device and press the same outwardly and consequently release the tens transferrer means coöperating with each counting disk *a* in accordance with the general operation of the machine.

The shaft *c* of the crank revolution counting mechanisms is provided with a cam disk *p* to operate in conjunction with a lever *q* fixed on the shaft *o'* and whereby, during the operation of bringing the figure disks back into zero position, all the tens transferring means or transferrers *d*, *d'*, d^2 are si-

multaneously swung outwardly, the free end of the lever q engaging the cam p.

Changes in the number of the several parts as well as disposition in places other than those specifically described may be adopted without in the least modifying the mechanism other than obvious duplication or variation in the dimensions and proportions.

Having thus described the invention, what is claimed as new, is:

1. In a calculating machine, the combination with main registering mechanism and a displaceable carriage supporting the same, of two sets of counting mechanisms each comprising a plurality of counting elements indicating the number of operations of a main rotating means, main rotating means for actuating the registering mechanism, the sets of counting mechanisms being arranged separately with relation to the registering mechanism and its carriage, tens devices cooperating with one of said counting mechanisms, means to connect the main rotating means with the counting elements of both counting mechanisms, and means operated by said registering mechanism to effect the connection between the rotating means and the proper counting elements according to the position of the carriage.

2. In a calculating machine, the combination with a main registering mechanism, its carriage and means to rotate said mechanism, of two sets of counting mechanisms each comprising a plurality of counting elements indicating the number of the operations of the said means for rotating the registering mechanism and arranged separately from the latter and its carriage, tens devices coöperating with one of said counting mechanisms, means connected with each other to connect said rotating means with the counting elements of both counting mechanisms, and means operated by said main registering mechanism to effect the connection between the rotating means and the proper counting elements according to the position of said carriage.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRANZ TRINKS.

Witnesses:
WILHELM LEHRKE,
RICHARD KÜLBS.