F. TRINKS.

CALCULATING MACHINE.

APPLICATION FILED NOV. 5, 1908.

928,083.

Patented July 13, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

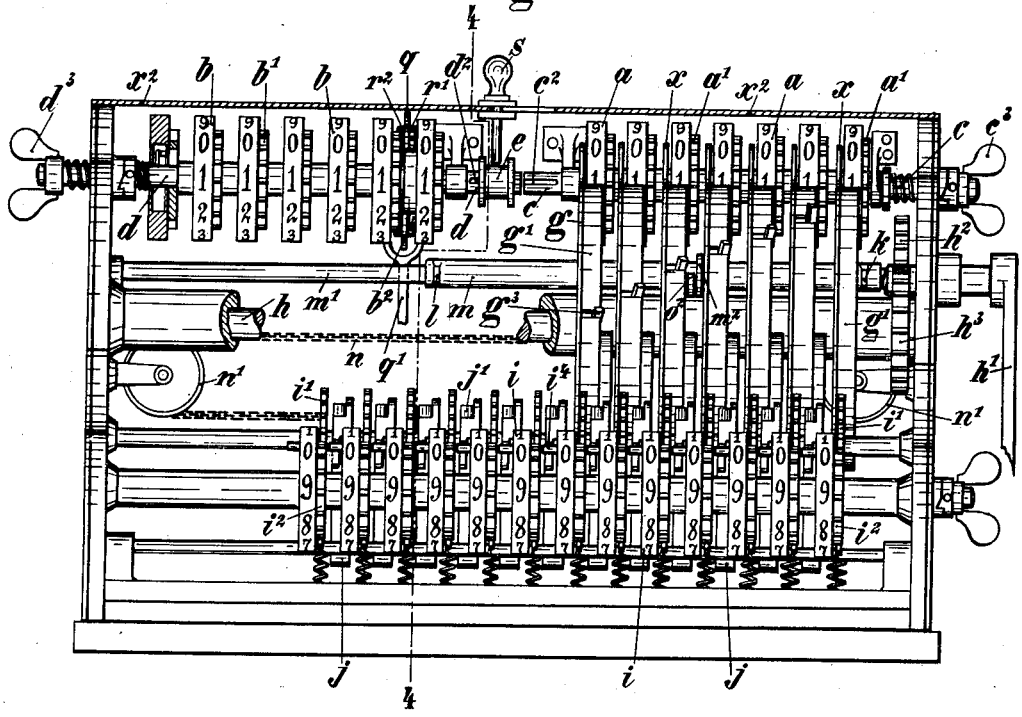


Fig. 4.

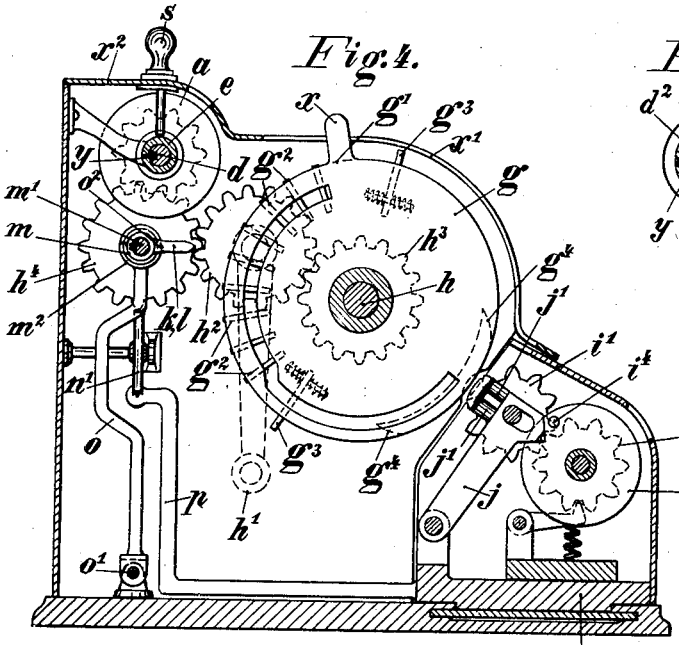
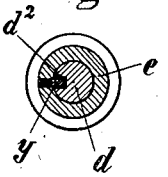


Fig. 4a.



Witnesses:

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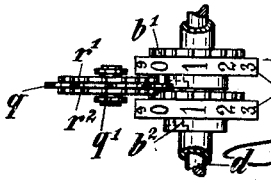
Fig. 7.



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2 SHEETS—SHEET 2.

Fig. 2.

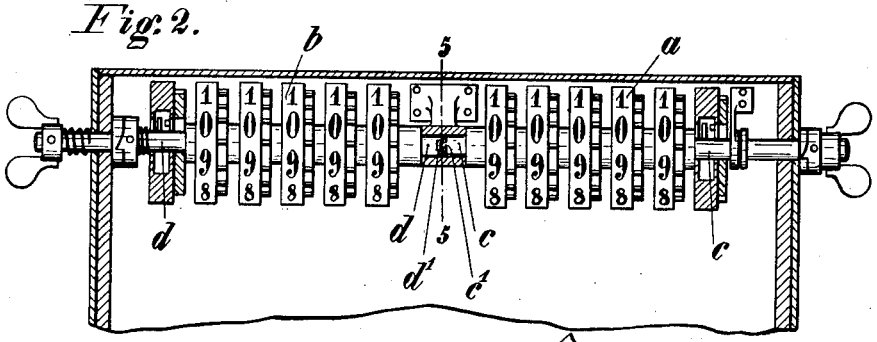


Fig. 5.

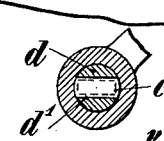


Fig. 3.

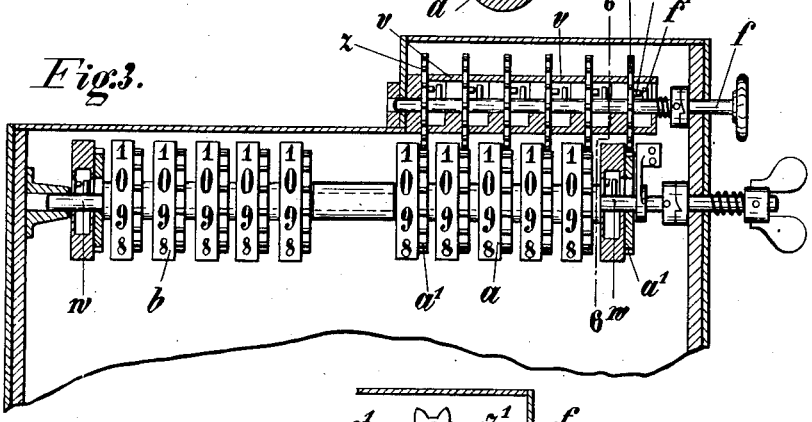
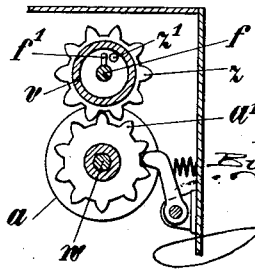


Fig. 6.



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UNITED STATES PATENT OFFICE.

FRANZ TRINKS, OF BRUNSWICK, GERMANY.

CALCULATING-MACHINE.

No. 928,083. Specification of Letters Patent. Patented July 13, 1909.

Application filed November 5, 1908. Serial No. 461,257.

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. 13700 of 1898, and the present machine is an improvement on that disclosed by the latter patent. One of these crank revolution counting 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. At least one of these crank revolution counting mechanisms must be provided with well known tens transferring means, as disclosed for instance in U. S. Letters Patent No. 662,899, or any other tens transferring means. In machines of this class a common zero setting mechanism has been provided, which, by a single operation, removes the indications on both of said revolution counting mechanisms.

The object of the improvements is to so construct the zero setting mechanism that the revolution counting mechanisms can be used to a further purpose, which will be understood from the following. If in performing successive operations of multiplication and addition of the form $a. m + b. n + c. o +$ etc. the values to be set on the machine (multiplicands) are m, n and o and the values to be registered on the machine by the revolutions of the crank (multipliers) are a, b, c, etc., the usual revolution counting mechanism, which does not require tens transferring means, shows the value a at the end of the first multiplication $a. m$. Before beginning the second multiplication $b. n$, the number a must be removed from the revolution counting mechanism by the zero setting mechanism, whereupon, after the second multiplication $b. n$, the revolution counting mechanism shows the number b, etc. If now the machine is provided with a second counting mechanism having tens transferring means, the latter shows the value $a + b + c +$ etc., unless it has been set to zero simultaneously with the first named counting mechanism. If now the numerals m, n, o, etc. indicate the prices of the goods sold, and a, b, c, etc. the numbers of the pieces of goods sold, the first revolution counting mechanism which separately indicates the values a, b, c, etc., controls the correct registration of the separate numbers of pieces sold, while the second one which shows the sum $a + b + c +$ etc., indicates the sum of all the pieces, whereby good controlling means is afforded. However, to enable such operations to be made, both revolution counting mechanisms must be provided with separate zero setting mechanisms requiring a double zero setting operation after each multiplication, when not performing the calculating operation described, because both revolution counting mechanisms would have to be set to zero.

The invention consists in such an arrangement of coupling means between the zero setting shafts of the two crank revolution counting mechanisms that both mechanisms simultaneously may be set to zero by one and the same operation, and that the counting mechanism, which does not possess or does not need tens transferring means, may be set to zero independently of the other counting mechanism.

The invention further consists in the details of construction and arrangement of several coupling devices.

For the purpose of illustrating the invention, I have shown some forms embodying the same in the accompanying drawings, in which the same letters of reference have been used to indicate corresponding parts.

In said drawings: Figure 1 is a front elevation of the machine with the casing cover removed and parts broken away, showing the two co-axially arranged crank revolution counting mechanisms, and, by way of example, a clutch mechanism for the zero setting mechanisms. Fig. 2 is a similar view of the two crank revolution counting mechanisms showing a modification of the clutch mechanism. Fig. 3 is a similar view to Fig. 2 showing a separate zero setting mechanism for one of the revolution counting mechanisms and a common zero setting mechanism for both of said revolution counting mechanisms, either one of which zero setting mechanisms may be operated at will. Fig. 4 is a vertical cross-section of Fig. 1, taken on the line 4—4. Fig. 4^a shows the clutch mechanism of Figs. 1 and 4 on an enlarged

scale. Fig. 5 is a similar cross-section, taken on the line 5—5 of Fig. 2. Fig. 6 is a similar cross-section, taken on the line 6—6 of Fig. 3. Fig. 7 is a detail plan view of a portion of the mechanism showing the arrangement of a tens transferring means.

In the drawings, Figs. 1 and 4, each of the well known cam disks g is arranged adjacent to an adjusting wheel g^1, all these adjusting wheels being fixed on the common shaft h, and the cam disks g being loose and revolubly mounted on the hubs of the wheels g^1. The cam disks when rotated bring the radially displaceable teeth g^2 of the adjusting wheels g^1 into and out of operating position. Each of the cam disks g is rotated by a projection or handle x, see Fig. 4, projecting through a slot x^1 in the casing cover x^2 and exteriorly engageable. It will be understood that a suitable number of the cam disks and adjustable wheels g^1 having the radially displaceable teeth g^2 will be employed and the number of slots x^1 will correspond to the number of cam disk handles or operating devices x. The adjusting wheels g^1 when rotated by means of the machine crank h^1 and the intermediate spur gear wheels h^2, h^3 transmit their movement by means of gear wheels i^1, i^2 to the figure wheels i of the main counting mechanism. This latter mechanism is mounted on a displaceable carriage i^3 movable parallel with relation to the axis h, so that the teeth g^2 of the adjusting wheels g^1 may act on the gear wheels i^1 of the higher figure wheels i, for instance that at the extreme right of Fig. 1, but the adjusting wheel g^1 may act similarly on the second or third gear wheels i^1 or on the figure wheels i of higher denomination. The main counting mechanism is also provided with well known tens transferring means consisting of pivoted levers j operated by pins i^4 of the figure wheels i so as to bring a beveled face j^1 in position for engagement with a pivotal tooth g^3 of the adjusting wheels g^1 and thus set up engagement between the latter and the gear wheel i^1. The beveled face j^1 forms a part of the upper extremity of each pivoted lever j, and two of the teeth g^3 and two beveled faces j^1 form a part of the complement of each lever j and each wheel i to accommodate right and left hand rotations of the machine crank h^1. Beveled faces g^4 are provided on the peripheries of the adjusting wheels g^1 to bring the tens transferring levers j back into their positions of rest or in normal condition.

The two crank revolution counting mechanisms a and b are located within the upper part of the machine casing above the adjusting wheels g^1 and co-axially with relation to each other, and the driving member for each counting mechanism, namely, the single toothed wheels k and l are coupled to each other by means of a sleeve m to which the teeth k and l are secured. The sleeve m is movable or displaceable axially on a shaft m^1 rotated through the medium of spur gears h^2, h^4 from the machine crank h^1 in such manner that the shaft m^1 makes a full rotation simultaneously with the crank h^1. The sleeve m is displaced by means of an endless band or chain n running over two pulleys n^1 located at opposite extremities of the machine, the upper part of the chain n being connected to an arm o sliding at its lower extremity on a shaft o^1, see Fig. 4, and having a fork o^2 at its upper extremity to engage between circumferential shoulders m^2 on the sleeve m, see Fig. 1. The lower part of the chain n is connected to an arm p which is secured to and movable with the main counting mechanism carriage i^3, see Fig. 4. When the carriage i^3 is moved laterally one value distance, that is to say, when one figure disk i is moved in place of the adjacent figure disk i, both teeth k and l of the crank revolution counting mechanisms or figure disks a and b are moved simultaneously one value distance laterally, but in an opposite direction so that both teeth or tappets k and l are always brought in position to engage the correct gearings a^1, b^1 of the respective crank revolution counting figure disks a and b when the machine crank h^1 is turned. The counting mechanism b is provided with well known tens transferring means capable of being disengaged in a well known manner. The tens transferring means or mechanism is shown only partially applied to avoid confusion in reading the drawings, or between the units and tens figure disks. In practice this means or mechanism will be used with the remaining figure wheels. Between each two adjacent figure disks b is arranged such a tens transferring means, which consists, as shown in Fig. 1, of a Maltese cross disk q and two gears r^1, r^2 respectively engaging a single tooth b^2 of a figure disk b of one value and the toothing b^1 of the next higher figure disk b, as shown in Fig. 1, the transferring means being mounted in a swinging arm q^1.

The zero setting shafts c and d of the two crank revolution counting mechanisms a and b when turned engage pins of the counting disks and are separated from one another, and a coupling device is used to connect both shafts c and d so that on rotation of one zero setting shaft, for instance c, by means of its winged or thumb screw c^3, see Fig. 1, the other zero setting shaft, d, is turned. In this manner it is possible to turn either zero setting shaft independently of the other, or both shafts c and d simultaneously. The coupling device for connecting both shafts consists, in the example illustrated, of a clutch sleeve e which is axially displaceably arranged on the adjacent ends of the shafts c and d and which, with an inner key or rib y,

see especially Fig. 4ª, engages according to its position one or both of the axially extending grooves c^2 and d^2 of the shafts c and d. In the position of parts shown by Fig. 1, both shafts c and d are disconnected, but when the sleeve e by means of a slide s is moved to the right, the shafts c and d are coupled with each other. If the said clutch mechanism is thrown into operation so as to connect the shafts c and d, the revolution counting mechanisms operate in the usual way; but when performing calculating operations of the character $a.m+b.n+c.o+$etc., the clutch mechanism is thrown out of operation, and the shafts c and d are disconnected from each other, so that the zero setting mechanism of the revolution counting mechanism a can be separately operated. In this case, after completing the calculating operation, the clutch mechanism is thrown into operation and the revolution counting mechanisms are simultaneously set to zero.

It will be understood that at the end of each complete calculating operation the revolution counting mechanism b and the counting mechanism a must be set to zero. Therefore, the clutch mechanism can be constructed in such a way that it is normally out of operation, while it is automatically thrown into operation, when using the zero setting mechanism of the continuous revolution counting mechanism b. An example of such a construction is shown in Figs. 2 and 5, in which the shaft d of the zero setting mechanism is provided in its face with a groove d^1 engaged, when the shafts c and d are in their positions of rest, by a nose c^1 of the shaft c of the zero setting mechanism, and thereby the shaft d, when rotated, carries along the shaft c, while the nose c^1 is disengaged from the groove d^1 by axial displacement of the shaft c upon rotation of the latter; or, a clutch mechanism can be used which acts only in one direction so that the zero setting mechanism of the continuous revolution counting mechanism b carries along the zero setting mechanism of the ordinary counting mechanism a, while the latter can be rotated independently of the zero setting mechanism of the continuous revolution counting mechanism.

In the example shown in Figs. 3 and 6, both of the revolution counting mechanisms are provided with a common zero setting mechanism, and the ordinary counting mechanism is provided with a second separately operated zero setting mechanism. In the example illustrated, the common zero setting mechanism is operated in the usual manner by rotating the shaft loosely carrying the disks of the revolution counting mechanisms, while the special zero setting operation for the single counting mechanism is effected from a second shaft f arranged parallel with the shaft of the zero setting mechanism, and carrying spur gears engaging corresponding spur gears of the separate counting disks. The shaft f, when being rotated, is axially displaced, so that its pins f engage studs z^1 formed on the spur gears z which are loosely mounted on the shaft f, but have no axial displacement thereon. Said spur gears are in engagement with the teeth a^1 of the counting disks a. If, however, the common zero setting shaft w is rotated, the shaft f remains stationary. The spur gears z are held in their correct distances from one another by sleeves v.

What is claimed is:

In a calculating machine, the combination with registering mechanism, of two crank revolution counting mechanisms, tens transferring means for one of said revolution counting mechanisms, a zero setting mechanism, and means for operatively connecting said zero setting mechanism with both counting mechanisms, the zero setting mechanism being disconnectible from the counting mechanism having tens transferring means.

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

FRANZ TRINKS.

Witnesses:
WILHELM LEHRKE,
WILLI FAHN.