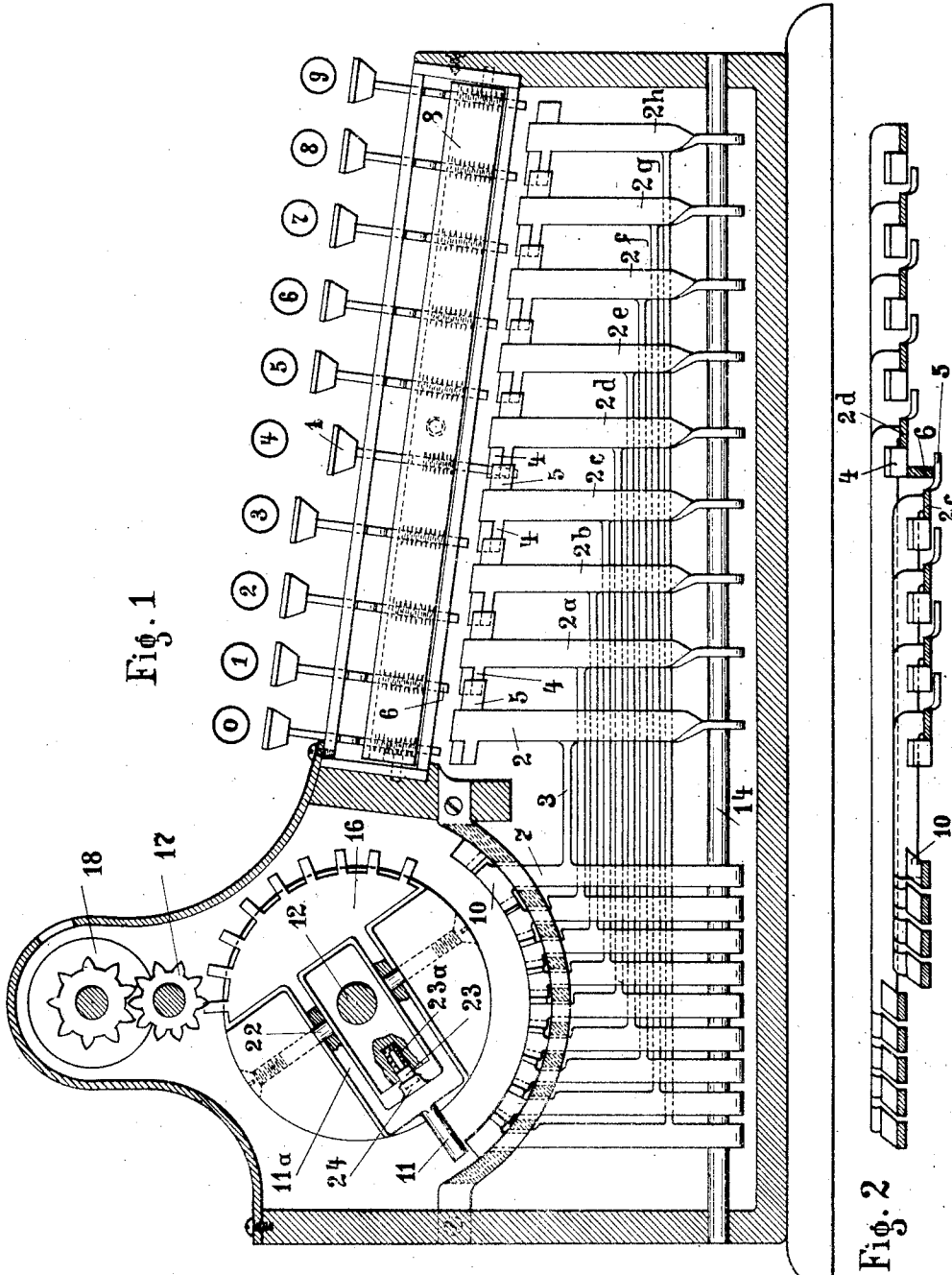


1,220,009.

C. SCHALLER.
CALCULATING MACHINE.
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2 SHEETS—SHEET 1.



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Fig. 1a

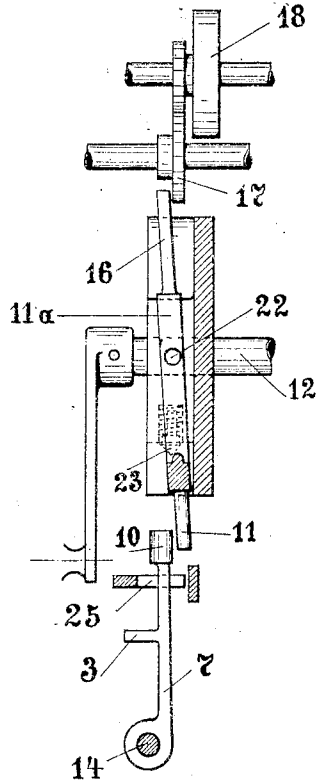


Fig. 3

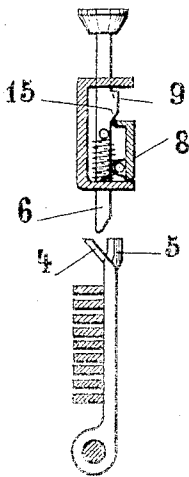
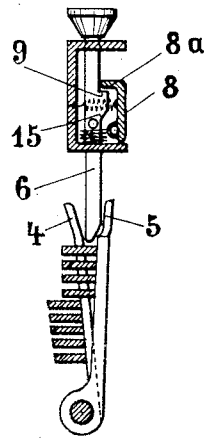


Fig. 4



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CALCULATING-MACHINE.

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To all whom it may concern:

Be it known that I, CARL SCHALLER, workmaster, citizen of the Duchy of Brunswick, Empire of Germany, residing at Brunswick, Germany, have invented certain new and useful Improvements in Calculating-Machines, of which the following is a specification.

My present invention relates to calculating machines, and in particular to calculating machines of the character described and illustrated in my United States Patent No. 1109471, dated September 1, 1914. Machines of the character in view comprise a mechanism for setting up numbers and items, which is actuated by means of keys which being operated, engage rocking bars having a common vertical axis of rotation. The stems of the keys are extended and provided with lateral shoulders which vary in number in accordance with the value which the respective key is representing, the said shoulders cooperating with a corresponding number of the said rocking bars. At their ends the rocking bars carry controlling members adapted to perform a setting movement parallel to the axis of the driving mechanism when the said bars are being rocked through their respective keys. The thus shifted controlling members cooperate with a revoluble tooth provided in conjunction with each registering numeral disk and revolving with the driving mechanism of the machine; the said tooth being thereby caused to assume an operative position in consequence of which the same is coupled with the associated numeral disk which now partakes of the revolving movement of the tooth and renders the value set up by the swinging of the corresponding number of rocking bars, visible in the accumulating mechanism.

It is the object of my present invention to provide for improvements in the construction and operation of the mechanism used for actuating the accumulating mechanism. By means of the novel improvements it is prevented that two keys of the same denominational value can be depressed simultaneously, nor can these two keys occupy the depressed position simultaneously. Through my present invention the construction of the calculating machine is simplified considerably and its reliability greatly enhanced.

I will now describe my invention in detail with reference to the accompanying draw-

ings in which I have illustrated an embodiment of the same by way of example; Figure 1 representing in a side view one column of keys and the parts cooperating therewith; Fig. 1^a shows the driving and setting mechanism in a view seen from the left in Fig. 1, while Fig. 2 shows, in a plan view, the swinging shift bars adapted to be actuated by the key stems, with one key stem in operative position. Fig. 3 is a cross sectional view through a column of keys seen from the right in Fig. 1; the key visible being in inoperative position, while Fig. 4 is a similar view with one key stem in operative position.

In the improved construction according to my novel invention, the key stems 6 are of a short length. Each of the nine controlling members provided in conjunction with each column of keys, is mounted on a swinging frame comprising two substantially parallel levers 7 and 2 bridged by a connection bar 3 and pivotally carried by a horizontal bar 14 which forms the common support for the entire set of nine frames. At its extreme the lever 7 carries the respective controlling member 10, while the lever 2 is provided at its upper end with two projections 4 and 5 extending laterally in opposite directions. In the example shown in the drawings to illustrate the invention, the projections extending to the left of Fig. 1 are designated by the reference numeral 4, while each opposite projection of the same lever is marked 5. The arrangement of the projections of two adjoining levers 2 is so that each projection 5 of the lever 2 overlaps the adjoining projection 4 of the consecutive lever 2. The projections 4 are roof-like inclined toward the front in Fig. 1, and the key stems 6, at their lower ends, are provided with a front face inclined in the opposite direction. On depressing one of the keys, for instance, the key representing the value 4 in Fig. 1, its stem end enters between the projection 5 of the lever 2^a and the inclined face of the projection 4 carried by the adjoining lever 2^a, whereby the lever 2^a is caused to swing out of its normal position while simultaneously, the key stem 6 locks the adjoining lever 2^a in its normal position; Figs. 2 and 4. The projection 4 of the lever 2^a, while the latter is being swung out of its normal position, causes the levers 2^b, 2^c, and 2, positioned to the left of the lever 110

2^c, to participate in the swinging movement, whereby in addition to the controlling member 10 of the lever 2^c which is directly moved by its associated key stem 6, all the controlling members 10 adapted to be directly actuated by keys representing lower values than the depressed key, are shifted also.

Thanks to the thus described arrangement it is rendered impossible that two keys representing values of equal denominational order can be simultaneously depressed, or can simultaneously occupy the depressed position. For, if a key is being depressed the coacting lever 2 of which has been previously swung out of its normal position through depression of a key of a higher value, as for instance the key provided for the value 1, the respective key stem 6, in its displacing action, would then return the swung out levers on the side on which the values are increasing, that is, the levers 2^a, 2^b, and 2^c, and would lock the rest of the swung out levers against participating in the returning movement.

For locking the keys in their depressed position and for automatically releasing the depressed keys on depression of another key in the same column, a yielding latching plate 8 is provided, having a laterally extending ledge 8^a which is below the inclined shoulder face 15 of the keys when the latter are in their elevated position. When a key is being depressed its inclined shoulder face 15 rides over the ledge 8^a and thereby shifts the latching plate 8 out of the way of movement until the rectangular shoulder face 9 gets below the ledge 8^a whereupon the latching plate 8 is enabled to yield to the action of a spring indicated in Fig. 4, and locks the said key stem in its depressed position.

On depression of another key in the same column, the latching plate 8 is again displaced and thereby releases the key previously depressed and held locked against a return.

A tooth 11 is provided to coöperate with those controlling members 10 that have been shifted for that purpose by a depression of any of the keys in the column, and is adapted to thereby actuate an accumulating mechanism 18 to transmit thereto the value set up by means of the keys. The said tooth 11 extends radially from a frame 11^a which carries a sector having nine teeth opposite the said tooth 11 and is pivotally mounted on a disk 12^a which revolves with the driving shaft 12. An intermediate gear wheel 17 is provided between the sector 16 and the pinion of the accumulator 18, although the sector may just as well engage the said pinion directly. When the sector is in the plane of the intermediate gear 17, the sector will revolve the accumulator on the driving shaft 12 being turned by means of the handle shown in Fig. 1^a. The driving connec-

tion is maintained as long as the sector 16 is retained in engagement with the wheel 17 by those of the controlling members 10 which have been shifted in the direction of the arrow indicated in Fig. 1^a in proximity to the connection bridge 3. The members 10, during their swinging movements, are controlled by guides 25. On return of the tooth 11 to its normal position, shown in Fig. 1^a, the sector 16 having performed the carrying action required for the proper transmission of the set-up value, is laterally shifted while still in mesh with the wheel 17.

To secure the said toothed sector 16 in its two extreme positions, viz. the operative and the inoperative position, there is provided a yielding locking pin 23 of well known construction. The locking pin 23 is under the action of the spring 23^a and is mounted in the revoluble disk 12 so as to coöperate with a bridge 24 of the frame 11^a. While the frame 11^a is being swung the spring 23^a offers a slight resistance.

Through my present invention I am enabled to considerably simplify the construction of the calculating machine. It is now possible to dispense with the carrying mechanism described and illustrated in my United States Patent No. 1109471, dated September 1, 1914, since I am now able to substitute therefor the carrying system described and illustrated, for instance, in the United States Patents No. 1075073, dated October 7th, 1913, and No. 1088485, dated February 24th, 1914, which carrying system has proved its usefulness in actual practice in calculating machines in which driving or setting up wheels are applied having a variable number of actuating teeth. In connection with my present invention the restoration of the zero position of the accumulating wheels 18 may be obtained in the manner as set forth in the United States Patents specified above.

It is obvious that in connection with my present invention, an accumulating mechanism may be used in which the numbers and items set up by means of the keys are visible at any time.

What I claim as my invention and desire to secure by Letters Patent of the United States, is:—

1. A machine of the character described, comprising in combination with each key for setting up numbers and items, a two-armed frame adapted to oscillate about a horizontal axis and extending toward an accumulating mechanism and having one arm adapted to co-act with said key to be oscillatingly displaced thereby, a controlling member carried by the second arm of said frame, an accumulating mechanism positioned relatively to said controlling member, and a revoluble coupling member between said accumulating mechanism and said con-

trolling member and adapted to be moved into and out of coupling position by said controlling member.

2. A machine of the character described, comprising, in combination with an accumulating mechanism, means for revolving the same, and a plurality of keys arranged in a column for setting up numbers and items, a plurality of two-armed frames one in conjunction with each key, said frames being adapted to oscillate about a common horizontal axis, one arm of each frame extending toward the accumulating mechanism while the second arm is positioned below the associated key, a controlling member on said first arm and adapted to perform a shifting movement substantially parallel to the axis of said revolving means, two oppositely disposed projections at the end of said second arm, one of said projections being adapted to be displaced by the associated key thereby causing said frame to swing out of its normal position, and the second projection being adapted to be locked in normal position by the adjoining key toward which said projection extends, each first projection of one arm overlapping the juxtaposed second projection of the adjoining arm, whereby a plurality of arms can be coupled to move synchronously in either direction when set in motion through any of said keys, and in operative connection with said means for revolving said accumulating mechanism, a revoluble coupling member adapted to actuate said accumulating mechanism and to be shifted into operative connection therewith by said controlling member, whereby said revoluble coupling member is enabled to actuate said accumulating mechanism in accordance with the value of the controlling members shifted.

3. A machine of the character described, comprising, in combination with an accumulating mechanism, means for revolving the same, and a plurality of keys arranged in a column for setting up numbers and items, a plurality of two-armed frames one in conjunction with each key, said frames

being adapted to oscillate about a common horizontal axis, one arm of each frame extending toward the accumulating mechanism while the second arm is positioned below the associated key, a controlling member on said first arm and adapted to perform a shifting movement substantially parallel to the axis of said revolving means, the plurality of controlling members forming a circular path about the axis of said revolving means, two oppositely disposed projections at the end of said second arm, one of said projections being adapted to be displaced by the associated key thereby causing said frame to swing out of its normal position, while the second projection being adapted to be locked in normal position by the adjoining key toward which said projection extends, each first projection of one arm overlapping the juxtaposed second projection of the adjoining arm, whereby a plurality of arms can be coupled to move synchronously when set in motion through any of said keys, a resilient latching bar in operative connection with said keys, whereby a previously latched key is automatically released on depression of another key in the same column, a revoluble frame in positive connection with said revolving means and adapted to oscillate in the direction of the axis of said revolving means, a tooth on said frame and disposed so as to swing through the circular path of said controlling members, a toothed sector on said frame and opposite said tooth, said sector being disposed so as to enter into actuating connection with said accumulating mechanism when being caused to swing by said controlling members, the number of controlling members shifted determining the extent to which said accumulating mechanism is actuated.

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

CARL SCHALLER.

Witnesses:

WILHELM LEHRKE,
EUGENE C. HARTER.