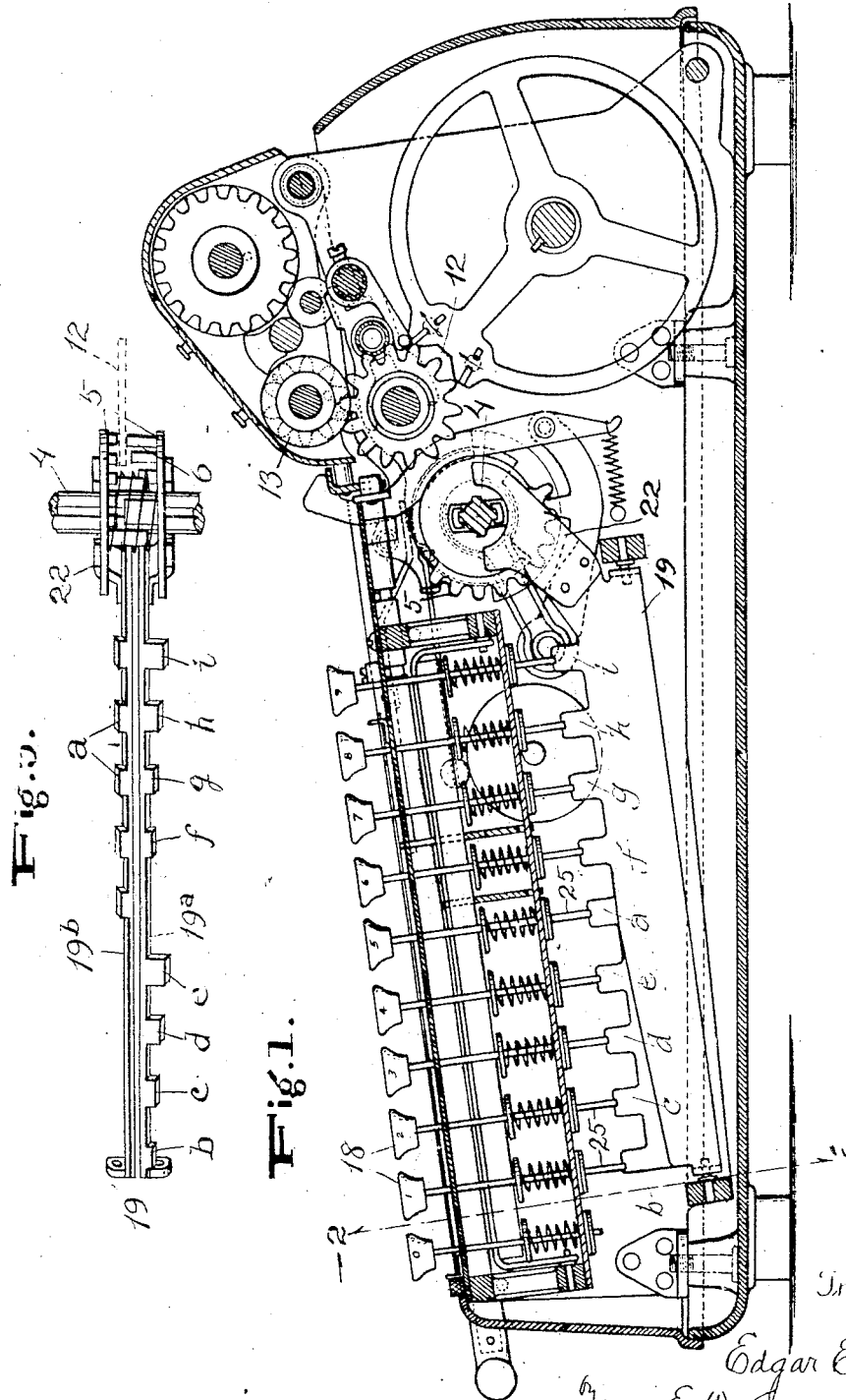


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 SETTING UP MEANS FOR CALCULATING MACHINES.
 APPLICATION FILED MAR. 15, 1920.

1,399,652.

Patented Dec. 6, 1921.

2 SHEETS—SHEET 1.



Inventor.

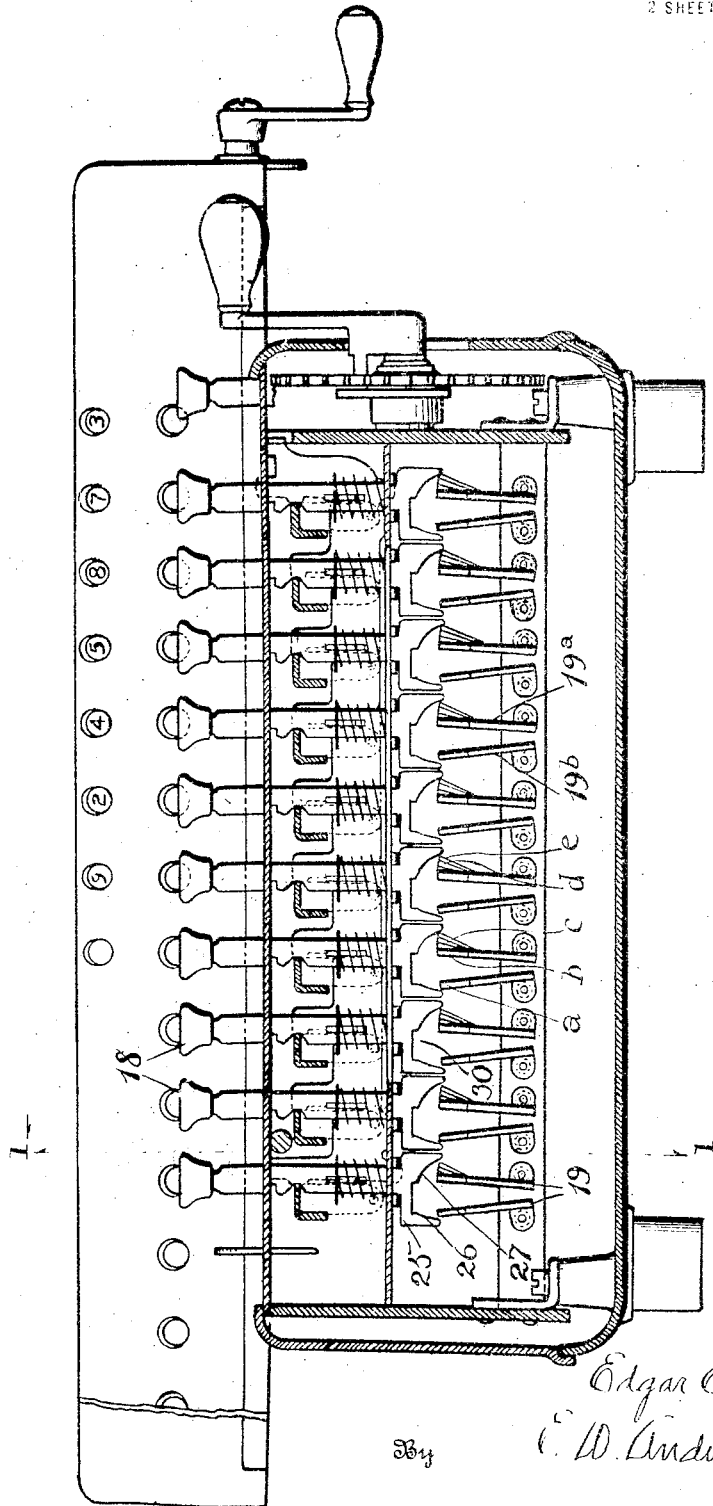
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Fig. 2.



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UNITED STATES PATENT OFFICE.

EDGAR E. PHINNEY, OF WEST ORANGE, NEW JERSEY, ASSIGNOR TO MONROE CALCULATING MACHINE COMPANY, OF ORANGE, NEW JERSEY, A CORPORATION OF NEW YORK.

SETTING-UP MEANS FOR CALCULATING-MACHINES.

1,399,652.

Specification of Letters Patent.

Patented Dec. 6, 1921.

Application filed March 15, 1920. Serial No. 365,970.

To all whom it may concern:

Be it known that I, EDGAR E. PHINNEY, a citizen of the United States of America, and resident of West Orange, in the county of Essex and State of New Jersey, have made a certain new and useful invention in Setting-Up Means for Calculating-Machines; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the invention, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 is a sectional view of a calculating machine embodying the invention, taken on the line 1--1, Fig. 2.

Fig. 2 is a section on the line 2--2, Fig. 1.

Fig. 3 is a detail plan view of a pair of rock-bars, 19, with the related selecting elements.

The invention has relation to means for adjusting the selecting or differential actuating elements of key-set calculating machines in accordance with the denominational values of the keys actuated, being an improvement upon the device for this purpose disclosed in the reissue patent to Baldwin, No. 13,841, and the invention consists in the novel construction and combinations of parts, as hereinafter set forth.

An object of the invention is to decrease the number of patterns needed in the setting-up means, facilitate the assembling of the parts and to provide for more economical manufacture.

In the accompanying drawings, illustrating an embodiment of the invention, the numeral 5 designates the selecting or differential actuating elements, arranged in pairs upon the shaft 4, and each member having teeth 6, of graded lengths, extending toward each other, the members of each pair being movable toward each other through the medium of rock bars 19, having extensions 22 engaging said elements. Varying degrees of movement of one or both of these selecting elements will bring different numbers of teeth 6 into position to act upon intermediate gears 12, located between said elements

and engaging the gears of registering dials 13, all as described in said patent.

In order to accomplish the movement of said rock bars and members as stated in setting up a problem, the stems of the keys 18 are provided respectively with lower heads 25, each having at one side a cam surface 26 and at the other side an opposed cam surface 27, the lower cam heads of all of the key stems being of the same pattern. The cam faces 26 and 27 form the lateral walls of recesses 30, within which are located the upper edges of the rock bars 19.

The cam surface 26 is adapted to engage the rock bar member 19^a and move said member laterally to move the corresponding selecting element member 5, having five teeth, all of the same length, a distance which is always the same, to bring the five teeth into play or position for driving engagement with the gear 12 whenever said member is actuated.

The cam surface 27 has engagement with the rock bar member 19^a, and moves said member laterally, to move laterally the corresponding selecting element member 5, having four teeth, of different lengths, distances which vary according to whether the 1, 2, 3 or 4 key is operated, to bring into play or position for driving engagement with the gear 12, one, two, three or four of the said teeth, and in order to accomplish this result with the uniform cam surface or edge 27 for the 1, 2, 3 and 4 keys, the rock bar 19^a is adapted to contact with the cam surface 27 at different periods in the movement of the key. In other words, the rock bar 19^a is adapted to be actuated by varying fractions of the cam face 27.

That is to say, the four key being operated, the rock bar 19^a is adapted to contact with the cam face 27 throughout the key movement, for a maximum lateral movement of the bar 19^a, to bring all four teeth 6 into play; the key 3 being operated, the bar 19^a is adapted to contact with the cam face 27 shortly after the key has started to move, to accomplish a less lateral movement of the bar 19^a, to bring three teeth 6 into play; the 2 key being operated, the bar 19^a is adapted to contact with the cam face 27

at a point nearer the end of the key movement, to accomplish a still less movement of the bar 19^a, to bring two teeth 6 into play, and the 1 key being operated, the bar 19^a is adapted to contact with the cam face 27 near the upper end of said face, whereby the bar 19^a is moved laterally only a short distance, to bring one tooth 6 only into play.

To this end, in the present embodiment, the rock bar member 19^b is provided at one end portion thereof with a series of five lugs or extensions *a*, all of the same extent or degree, and engaged respectively by the 5, 6, 7, 8 and 9 keys, the cam surface 26 of each key stem alone acting; and the rock bar member 19^a is provided at one end portion with a series of lugs, *b*, *c*, *d* and *e*, of graded extent or degree, providing contacting points of varying angular relation to the axis of the member and engaged respectively by the 1, 2, 3 and 4 keys, the cam surface 27 of each key stem alone acting, and at the other end portion thereof with a series of lugs *f*, *g*, *h* and *i*, of the same extent or degree as the lugs *b*, *c*, *d* and *e*, and providing similarly related contacting points but located respectively opposite the respective lugs *a* of the other rock bar member, with the exception of the first lug *a*, which is engaged by the 5 key. The lugs *b*, *c*, *d* and *e* of the rock bar member 19^a and the remaining lugs *a* of the member 19^b are engaged in pairs respectively by the 6, 7, 8 and 9 keys, the cam surfaces 26 and 27 of the key stems both acting. The lugs or extensions *a* are in line with the rock bar 19^b, and are engaged throughout the movement of the key by the cam 26, the showing being similar to that of the reissue patent stated. The lugs or extensions *b* and *f* are located in line with the bar 19^a, but under the higher or upper end portion of the cam surface 27 of the related key and engaged thereby at the end portion of the key stroke. The series of lugs or extensions *c*, *d* and *e*, and *g*, *h* and *i* are bent laterally out of line with the bar 19^a to an increasing extent.

The rock bar members 19^a and 19^b are made in two patterns, one for each member, and the key stems in one pattern, as stated, whereas formerly it was necessary to make the key stems of nine differing patterns, the assembling of the parts being accordingly complicated and increasing the expense of manufacture.

It is obvious that the rock bar members 19^a and 19^b may be provided with continuous differential contact faces or edges, instead of being cut away to form the lugs or extensions stated.

I claim:

1. In a calculating machine having a differential actuating element, a series of de-

nominal keys having a common degree of operative movement, and means for setting up said element by the operation of any key, including cam heads all of the same pattern for the stems of said keys, and a movable member adapted for differential actuation by varying fractions of the cam faces of said heads.

2. In a calculating machine having differential actuating elements, a series of denominational keys for each of said elements, said keys having a common degree of operative movement, and means for setting up each element by the operation of any member of the related series of keys, including cam heads all of the same pattern for the stems of said keys, and a set of movable members for each element, each set being of the same pattern and adapted for differential actuation by varying fractions of the cam faces of said heads.

3. In a calculating machine having differential actuating elements, a series of denominational keys, and means for setting up said elements by the operation of said keys, including heads for the stems of said keys all of the same pattern and having each opposed cam faces, and rocking members for each said element adapted for differential actuation by the cam faces of said heads.

4. In a calculating machine having differential actuating elements, a series of denominational keys for each of said elements, and means for setting up each element by the operation of a member of the related series of keys, including cam heads all of the same pattern for the stems of the keys, and two rocking members for each element and adapted for differential actuation by the cam faces of said heads.

5. In a calculating machine having differential actuating elements, a series composed of denominational keys having a common degree of operative movement, and means for setting up said elements by the operation of said keys, including heads for the stems of said keys all of the same pattern and having each opposed cam faces, and rocking members for each said element adapted for differential actuation by varying fractions of the cam faces of said heads.

6. In a calculating machine having a differential actuating element, a series of denominational keys, and means for setting up said element by the operation of any key, including cam heads all of the same pattern for the stems of said keys, and a rocking member having contacting points for said cam heads of varying angular relation to the axis of said member.

7. In a calculating machine having differential actuating elements, a series of denominational keys for each of said elements, said

keys having a common degree of operative movement, and means for setting up each element by the operation of any member of the related series of keys, including cam
5 heads all of the same pattern for the stems of said keys, and a set of rocking members for each element, each set being of the same pattern and including a member having contacting points for said cam heads of vary-

ing angular relation to the axis of said member.

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

EDGAR E. PHINNEY.

Witnesses:

L. D. SAGGART,
E. G. BRITEN, Jr.