

PATENT SPECIFICATION

Application Date: Sept. 14, 1922. No. 24,934/22.

208,232

Complete Left: March 7, 1923.

Complete Accepted: Dec. 14, 1923.



PROVISIONAL SPECIFICATION.

Improvements in Calculating Machines.

I, GUY BAZELEY PETTER, of Westerfield House, Ipswich, a British subject, do hereby declare the nature of this invention to be as follows:—

5 This invention relates to addition machines of the multiple bank type with a series of ordinal keys in each bank, and has for its object the provision of a simple and efficient machine of this type
10 in which the number of parts is considerably reduced with corresponding easier manipulation and lower cost of manufacture.

The following description is applicable
15 to calculations in the decimal system, but the principle of the machine may be applied to other systems of notation and in particular to the system described in my Specification No. 192,532.

20 According to this invention, I provide in combination:—

(a) A row of figure discs provided
25 respectively with toothed wheels adapted to be engaged respectively by segmental racks on key-actuated rocking levers, each of which is a compound lever, that is, made of two parts the one slidable on the other to an extent depending on the particular key which is depressed, and
30 adapted, on depressing any one key either of one compound lever or of several simultaneously, to engage and rotate the respective figure disc or discs by a corresponding amount and to disengage the
35 said figure discs automatically on being allowed to return to the inoperative position.

(b) Arresting teeth for engaging and
40 holding the teeth of the disc wheels when in the inoperative position.

Referring to the accompanying drawings which illustrate as an example one particular manner of carrying out this invention:—

45 The figure shows in diagrammatic form one unit of a machine made according to this invention.

In the particular machine illustrated, 6 is the figure disc on which the figures 0
5 to 9 are marked. This figure disc is covered by a fixed plate (not shown) with a hole or window in it through which one figure can be seen. The figure discs are
10 mounted on a spindle 28 held in bearings in the frame 32 of the machine. Each
15 figure disc is free to rotate on the spindle, but adjoining discs are preferably separated by intermediate fixed collars, so as to prevent the movement of one
20 disc from affecting the next disc by its friction. Each figure disc carries a
25 toothed wheel with ten or any suitable number of teeth. A segment lever 7, under control of the key-board, engages
30 the teeth of the figure disc when the lever is depressed, but is caused to disengage
35 automatically when the lever rises or returns to its original position. This effect is obtained by means of the sliding
40 movement of the lever 7; the said lever being held in sliding contact with the
45 lever 8 by means of two yokes 9 and 10.

The lever 8 is mounted on a spindle 13
50 held in bearings in the frame of the machine. In the drawing the yoke 10
55 shown combined with key No. 5 on the key-board.

The combined levers 7 and 8 are held
60 in the inoperative position by means of a spring 11, and a stop 12 fixed in the frame of the machine. A row of five
65 keys, 1, 2, 3, 4, 5, is arranged on the key-board and the depression of a single key causes the figure discs to move through
70 a corresponding number of steps or divisions.

For numbers between 5 and 10, successive
75 depressions of suitable keys are made. For example, the successive depression of keys 5 and 4 will move the
80 figure disc through nine divisions.

To illustrate the working of the machine, let it be supposed that the key
85 5 is depressed. The downward movement

of the lever 7, brings the segmental rack thereon into engagement with the teeth of the figure disc 6 which latter is caused to rotate. At the same time, the lever 7 is caused by pressure of the teeth of the disc wheel to slide along below the lever 8, until the stop 14 comes into contact with the end of the lever 8, this being its maximum displacement. On releasing the key 5, the levers 7 and 8 are raised by means of the spring 11 and the segmental rack comes out of engagement with the disc wheel 6, without any tendency to move the latter in the reverse direction. The reverse side 15 of the segmental rack now comes into contact with the stop 12, thereby causing the lever 7 to slide out into its original position.

Keys 1, 2, 3, 4, attached to lever 8, have a small vertical movement on the lever by means of pins 16 on the lever, working in slots 16^a on the keys, and spring 17. Other methods of providing this spring-controlled movement are available. Corresponding differential stops 7^a are fixed in the lever 7. Normally, the keys are held up by the springs 17, so as to be clear of the stops 7^a, and allow the sliding movement of

the lever 7 to take place, but the key when depressed comes into such a position that it engages with its corresponding stop whereby the movement of the levers and disc wheels is limited to the required amount, according to the particular key which is depressed.

When the levers are in the inoperative position, the figure disc is held from rotation by an arresting tooth 18, carried on a lever 19, pivoted on the spindle 13 or on any suitable spindle, and held in position by the spring 20. When the tooth 18 engages with the figure disc, the lever 19 also rests in contact with the lever 8, so that the depression of the lever 8 also causes the lever 19 to be depressed, thereby releasing the figure discs in readiness for rotational movement. Lever 19 carries the stops 18 for all the figure discs and is depressed by movement of any one of the levers 8.

Modifications in the details of the arrangement may be made without affecting the principle of the invention.

Dated this 12th day of September, 1922.

MEWBURN, ELLIS & Co.,
70-72, Chancery Lane, London, W.C. 2,
Chartered Patent Agents.

COMPLETE SPECIFICATION.

Improvements in Calculating Machines.

I, GUY BAZELEY PETTER, of Westersfield House, Ipswich, a British subject, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to calculating or adding machines of the multiple bank type, with a series of ordinal keys in each bank, and particularly to the type of machine in which a differential actuating rack is brought into engagement with the teeth of a numeral wheel in order to operate said wheel, by a sliding movement of the member carrying the said rack, and caused to disengage the wheel by a reverse movement.

It has for its object to provide a simple and efficient means of differential actuation enabling the engagement and disengagement of the coacting parts to take place automatically in a machine of the type referred to, in which an improved construction and a considerably reduced number of parts allow of corresponding easier manipulation and lower cost of manufacture.

According to this invention, I provide

for use in connection with adding machines of the type described, a row of numeral wheels provided respectively with or formed as toothed wheels adapted to be engaged respectively by toothed racks on differential actuating key-operated rocking levers, each of which is made of two parts the one slidable on the other to an extent depending on the particular key which is depressed, and the said rack being adapted, on depressing any one key, to engage automatically and rotate the respective numeral wheel by a corresponding amount and to disengage from the said numeral wheel automatically on the lever being allowed to return to the inoperative position.

Referring to the drawings filed with the provisional specification, which illustrate as an example one particular manner of carrying out this invention, shown as provided with a construction of transfer mechanism described in my Specification No. 208,451 of same date, it being understood, however, that the invention may be used in connection with any other kind of transfer or carrying, zeroising, or other like mechanism:—

Fig. 1 shows in diagrammatic form

one unit of a machine made according to this invention.

Referring to the drawings filed herewith:—

5 Fig. 2 illustrates in diagrammatic form an alternative construction of the machine.

10 In the particular machine illustrated in Fig. 2, A designates generally the transfer mechanism, while B designates generally the intermediate mechanism which automatically unlocks the adding and transfer mechanism on the downward stroke of the actuating levers and automatically locks it again when the said levers are allowed to return to their non-operative position.

15 In the figures, 6 is the numeral wheel on which the figures 0, 1, 2 to 9 are marked. This numeral wheel is covered by a fixed plate (not shown) with a hole or window in it through which one numeral can be seen. The numeral wheels are mounted on a spindle 28 held in bearings in the frame 32 of the machine. Each numeral wheel is free to rotate on the spindle, but adjoining wheels are preferably separated by intermediate fixed collars, so as to prevent the movement of one wheel from affecting the next wheel by its friction. Each numeral wheel carries a toothed wheel 6 with ten or any suitable number of teeth. A rack-bar 7, under control of the key-board, engages the teeth of the numeral wheel when the lever 8 is depressed, but is caused to disengage automatically when the lever rises or returns to its original position. This effect is obtained by means of the sliding movement of the rack-bar 7; the said bar being held in sliding contact with the lever 8 by means of two yokes or guides 9 and 10.

45 The lever 8 is mounted on a spindle 13 held in bearings in the frame of the machine. In Fig. 1 the yoke 10 is shown combined with key No. 5 on the key-board. In Fig. 2 it is replaced by guides provided on the lever 8.

50 The lever 8 is held in the inoperative position by means of a spring 11, and a stop 12 fixed in the frame of the machine. A row of five keys 1, 2, 3, 4, 5, is arranged on the key-board and the depression of a single key causes the numeral wheel to move through a corresponding number of steps or divisions.

55 For numbers between 5 and 10, successive depressions of suitable keys are made. For example, the successive depression of keys 5 and 4 will move the numeral wheel through nine divisions, but the full requisite number of keys, for example 9 in the decimal system, may be provided.

To illustrate the working of the machine, let it be supposed that the key 5 is depressed. The downward movement of the rack-bar 7, brings the rack thereon into engagement with the teeth of the numeral wheel 6 which latter is caused to rotate. At the same time, the bar 7 is caused by pressure of the teeth of the toothed wheel to slide along below the lever 8, until the stop 14 comes into contact with the end 8^a (Fig. 3) of the lever 8, this being its maximum displacement. On releasing the key 5, the members 7 and 8 are raised by means of the spring 11 and the rack comes out of engagement with the wheel 6, without any tendency to move the latter in the reverse direction. The reverse side 15 of the rack now comes into contact with the stop 12, thereby causing the bar 7 to slide out into its original position.

Keys 1, 2, 3, 4, attached to lever 8, have a small vertical movement on the lever by means of pins 16 on the lever, working in slots 16^a on the keys, and springs 17. The pins may be so shaped as to act as guides for the keys, or any other arrangement may be used for the purpose. Other methods of providing this spring-controlled movement are available. Corresponding differential stops 7^a are fixed in the bar 7. Normally, the keys are held up by the springs 17, so as to be clear of the stops 7^a, and allow the sliding movement of the bar 7 to take place, but the key when depressed comes into such a position that it engages with its corresponding stop whereby the movement of the lever 8 and wheel 6 is limited to the required amount, according to the particular key which is depressed.

When the lever 8 is in the inoperative position, the numeral wheel is held from rotation by an arresting tooth 18, carried on a lever 19, pivoted on the spindle 13 or on any suitable spindle 13^a, and held in position by the spring 20, or the arresting tooth may be fixed on an independent member working in conjunction with lever 19 and adapted to bring the tooth in and out of engagement with the teeth of the toothed wheel 6 as and when required. When the tooth 18 engages with the wheel 6, the lever 19 also rests in contact with the lever 8, by such means as a roller 8^b bearing on a suitable rail 19^a, so that the depression of the lever 8 also causes the lever 19 to be depressed, thereby releasing the numeral wheels in readiness for rotational movement. Lever 19 or its co-acting member carries the teeth 18 for all the numeral wheels and is depressed by movement of any one of the levers 8. Means other than tooth 18 for the alignment of the numeral wheels may be used.

In the foregoing specification I have described by way of illustration one particular method of carrying out my invention, but I wish to make it clear that the method can be varied without departing from the spirit of the invention as set forth in the appended claims. Furthermore, the machine may be provided with suitable locking devices, ratchets, *etc.*, as are customary in such machines for the purpose of preventing involuntary movement of the parts.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In calculating machines of the type described differential actuating levers adapted to engage automatically the teeth of the numeral wheels on the downward stroke of any one or more ordinal key or keys, and to disengage automatically from same on the upward or return stroke of the said key or keys.

2. In calculating machines of the type described actuating levers each comprising a pivoted rocking lever in combination with a sliding bar, the latter carrying a rack adapted to engage the teeth of the numeral wheels on the downward movement of the lever and to disengage on the upward or return movement.

3. In calculating machines of the type described actuating levers each comprising a pivoted rocking lever in combination with a sliding bar, the latter carrying a rack adapted to engage the teeth of the numeral wheel on the downward movement of the lever in such a manner as to cause the sliding bar to slide relatively to the rocking lever by pressure of the teeth of the numeral wheel, finger keys on the rocking lever provided with small spring controlled movements enabling them severally to engage differential abutments on the sliding bars whereby the amount of the sliding movement is determined in relation to the particular key depressed for the purpose of giving the corresponding requisite amount of rotation to the numeral wheel, and an inclined surface formed preferably at the rear of the rack and adapted to engage a fixed abutment in such a manner as to return the sliding bar to its original position on the return movement of the rocking lever.

4. In calculating machines of the type described, the actuating levers substantially as described and illustrated in the drawings referred to herein.

Dated this 12th day of September, 1922.

MEWBURN, ELLIS & Co.,
70—72, Chancery Lane, London, W.C. 2,
Chartered Patent Agents.

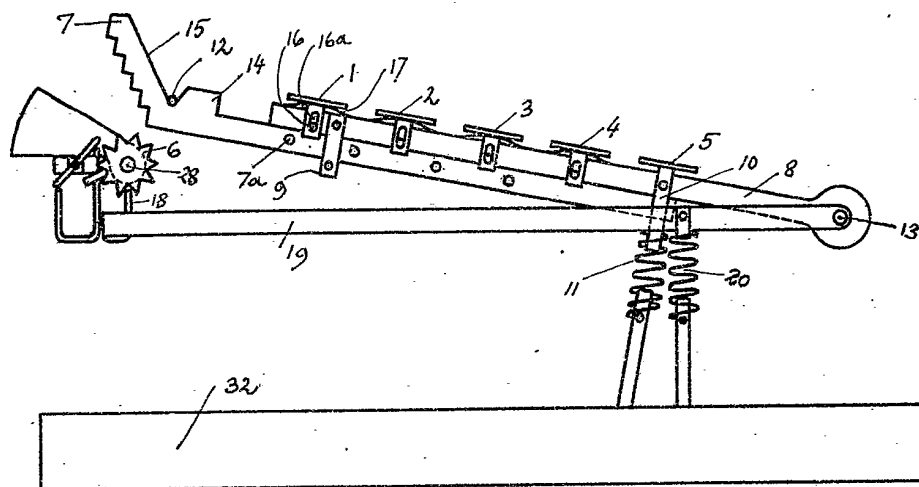
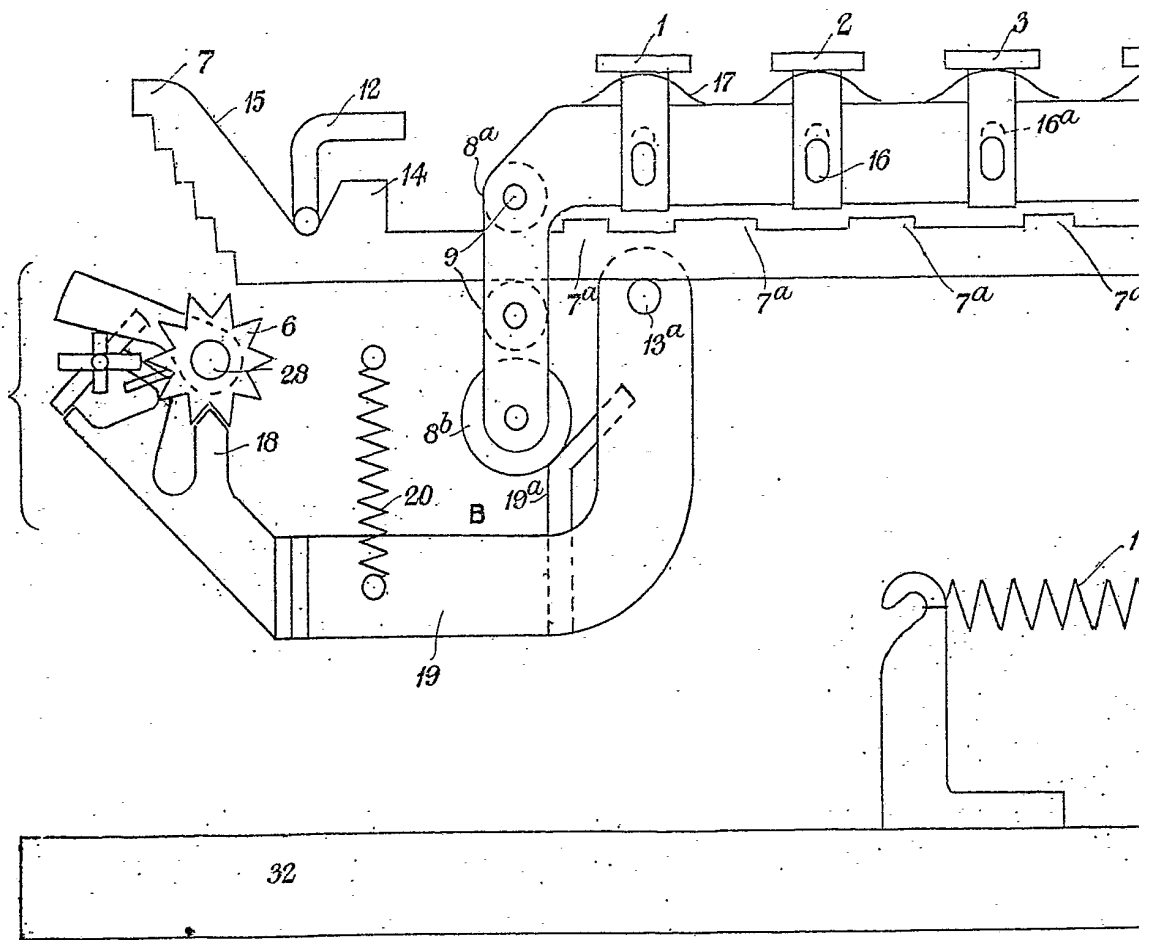


Fig. 1.

Fig.2.



[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 2.

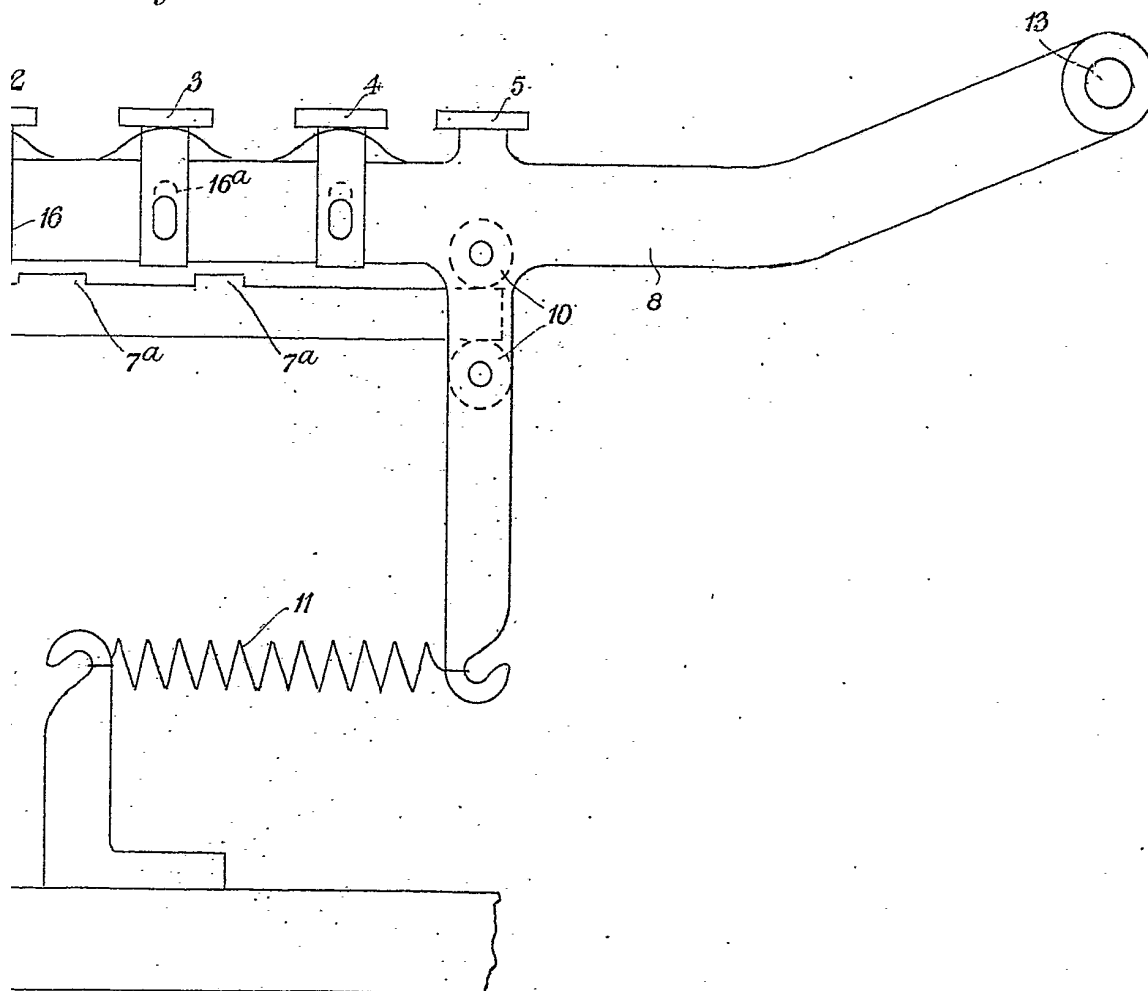
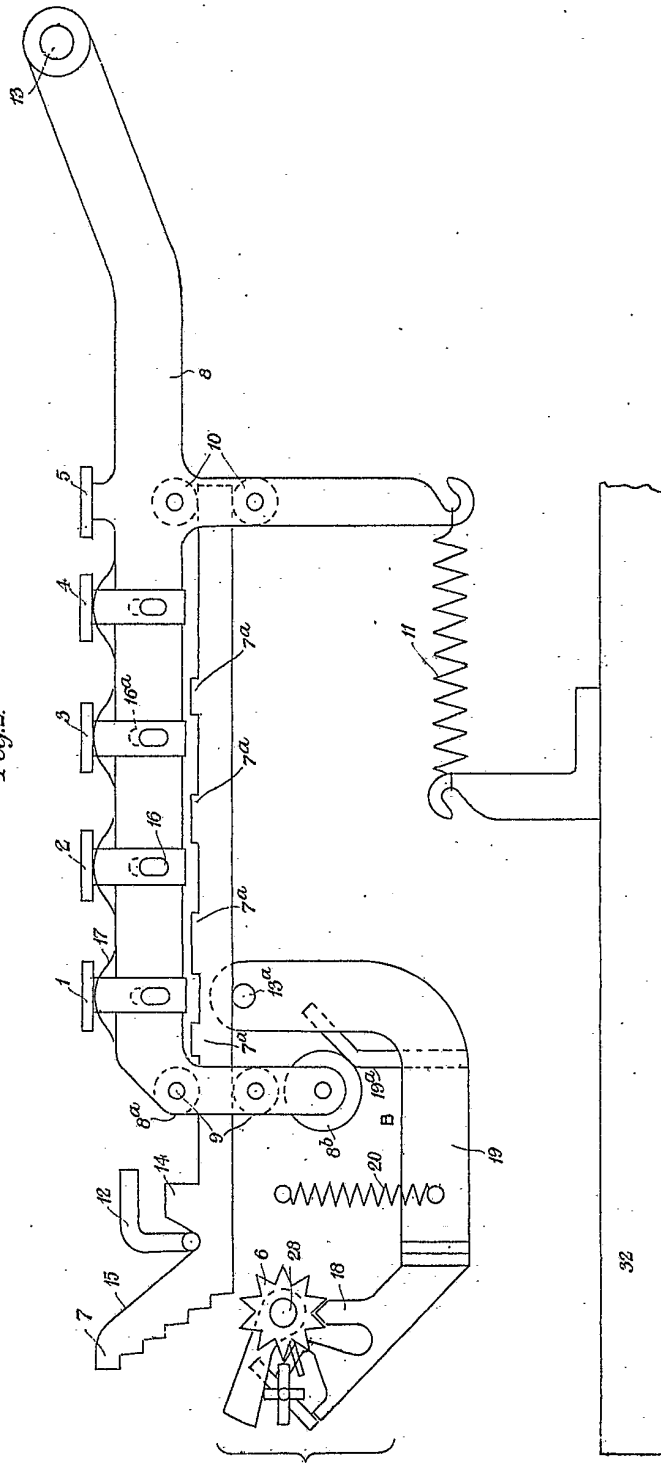


Fig. 2.



[This Drawing is a reproduction of the Original on a reduced scale]