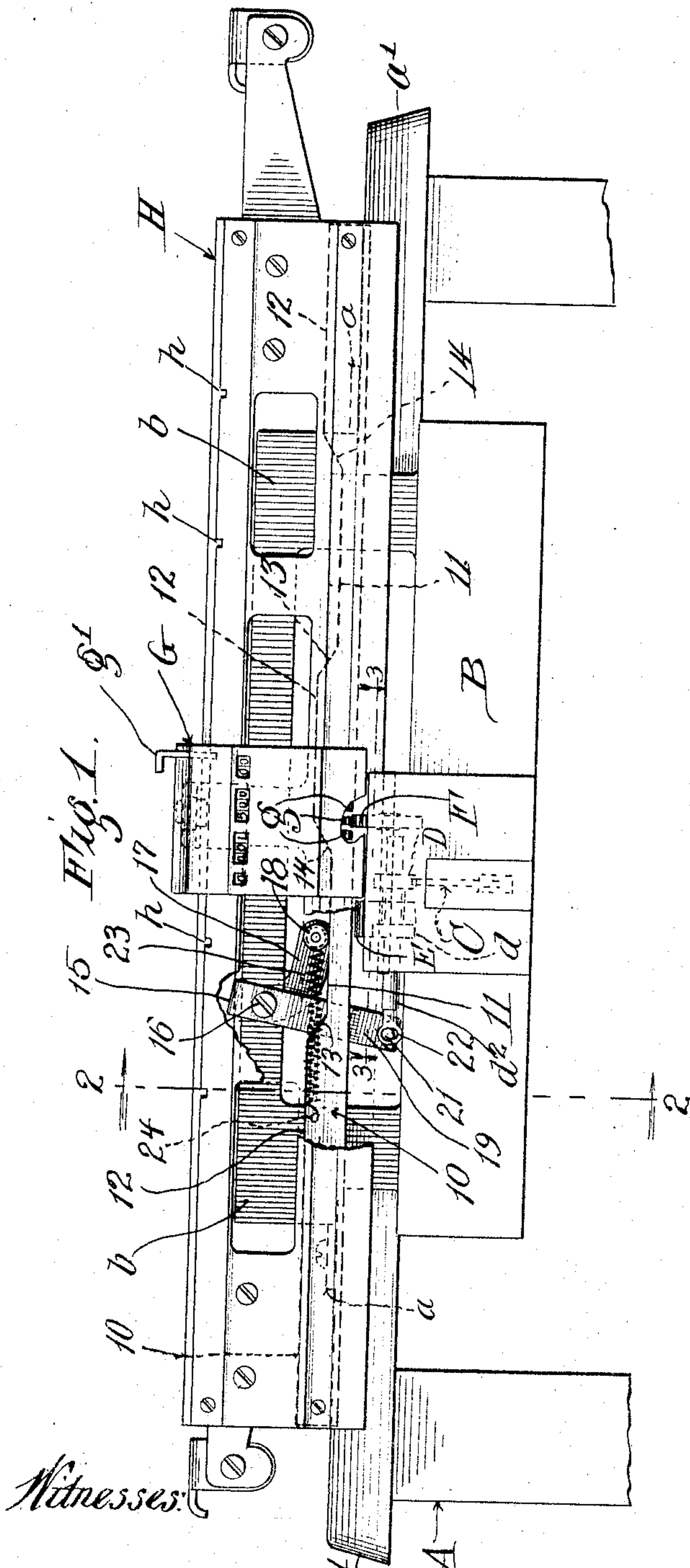


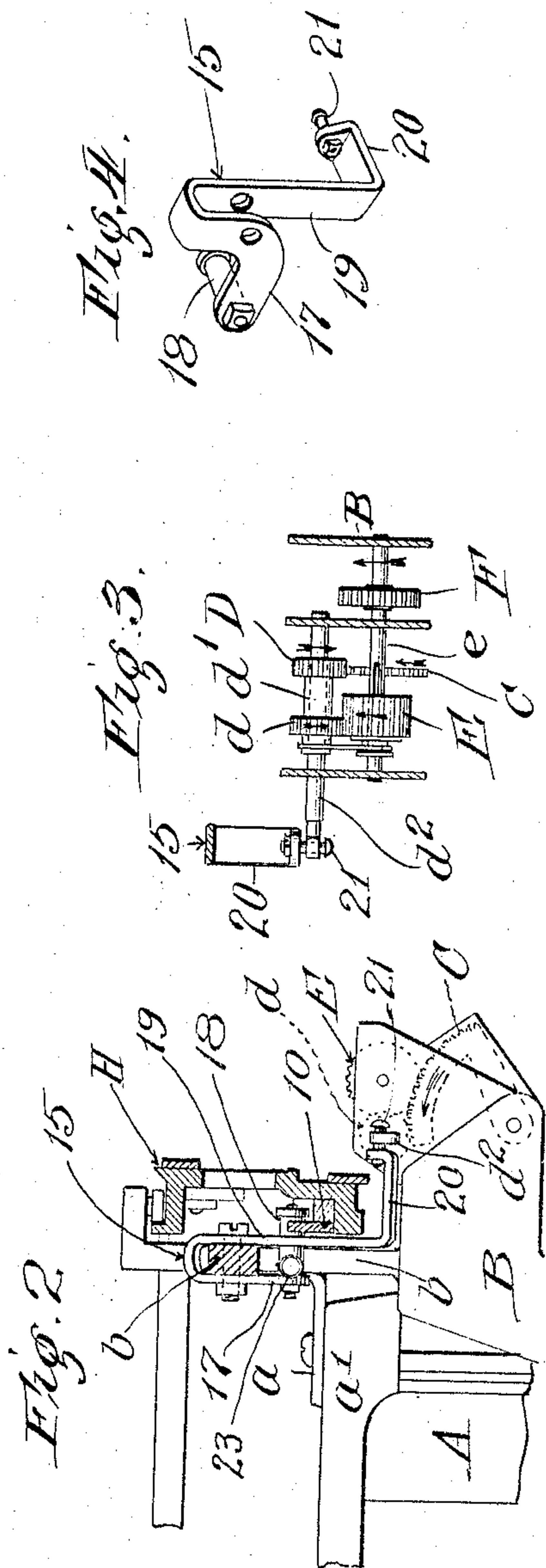
976,087.

Patented Nov. 15, 1910.



Witnesses:

Fannie F. Richards
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Inventor:
Fred F. Main,
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UNITED STATES PATENT OFFICE.

FRED F. MAIN, OF CHICAGO, ILLINOIS.

COMPUTING-MACHINE.

976,087.

Specification of Letters Patent.

Patented Nov. 15, 1910.

Application filed May 16, 1910. Serial No. 561,710.

To all whom it may concern:

Be it known that I, FRED F. MAIN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Computing-Machines, of which the following is a specification.

This invention relates to computing machines and more particularly to computing machines of that class in which the amounts are written in several columns, and the sum or difference recorded in a register.

The objects of my invention are to relieve the operator of the detail work necessary in operating the typewriter-adding machine, or the adding machine when used for tabulating purposes. Whenever the registering mechanism of the machine needs to be changed for work in any given column, or columns, either to cause it to subtract, to add or to introduce additional features, it has heretofore been necessary to move or shift certain mechanism by hand and also to manually return said mechanism to the original position after having recorded in the special column. The difficulties now encountered are the time and interruptions necessary to make such changes, together with the danger of failing to move the shifting mechanism when entering such special column; together with the greater danger of forgetting to return the shifting mechanism to its normal position after leaving the special column. In order that the operator may be freed from these petty details and be given freedom for rapid and accurate work, I provide the machine with automatic means for making whatever changes or shifts are necessary in the special columns, and restoring the mechanism to normal position in the other columns, no matter whether the carriage be moved in one direction or the other. Whenever the work is to be done in the special column, the machine will always stand in position to record the work as required in the special column or columns. The present condition of the art requires the operator of the combined typewriter and adding machine to perform the usual functions of the typewriter operator, also those of the adding machine operator. As these operations are intermittently performed, the care and annoyance caused for the operator greatly impedes him in the work, both as to

speed and accuracy. By using a cam or form which may be changed at will to meet the requirements of any work to be done, I am enabled to cause the shifting mechanism to accurately and positively follow the movements of the carriage in such a way as to relieve the operator of all attention or care of the adding machine mechanism, leaving him free to operate the typewriter or in the case of the adding machine leaving him free to devote his attention to the keys and the amounts to be recorded. I accomplish these objects by means of certain novel mechanism consisting chiefly of a traveling cam track or bar having depressions or off set portions which correspond to the special columns, and a motion transmitting device actuated by said cam track or bar and adapted to operate the element of the registering mechanism which is to be shifted for the special columns and back again for the other columns.

The invention further consists in the several novel features of construction, arrangement and combination of parts hereinafter described and more particularly pointed out in the claims.

The invention is illustrated in the drawing furnished herewith in which—

Figure 1 is a front elevation of a fragment of a typewriter provided with computing mechanism and showing my invention embodied therein, Fig. 2 is a detail vertical cross section taken on the line 2—2 of Fig. 1, Fig. 3 is a horizontal section taken on the line 3—3 of Fig. 1 and Fig. 4 is a perspective view of a shifting lever.

The device is especially practical when used in connection with the moving register as described in my application for patent on computing machine filed March 9, 1910, Serial No. 548321, and will be more fully understood by reference to said application, since the work of this kind is both in vertical columns and in horizontal ones, and may change from one to the other and in the writing of some of the lines some of the columns are necessarily omitted because of no data for those columns, hence it is impossible to use mechanism which performs these duties in a regular cycle. With my device no regular cycle is required, and it makes no difference whether the machine be used in cross footing or vertical

footing or alternately, the results are carried by the register and the additions and subtractions are always made in the columns designed for either of these operations.

5 The drawing shows the well known Remington-Wahl type of machine with its register, register supporting bar and actuator adapted to cause said register to record the amounts printed and also shows the shifting lever which has heretofore been manually moved to cause the register to subtract the amounts recorded or to add the amounts recorded, the mechanism being such that
10 whenever a total is written it is necessary to move this shift or lever to the subtracting position in order that the register may be cleared or brought to zero point, there being no other mechanism in this register to return the register to the normal position.
15 Also in direct subtraction as in finding the balance between credits and debits, it is necessary to shift this lever, which I now do automatically.

Referring now more particularly to the machine shown in the drawings, the typewriter frame A, supports an actuator B, by means of brackets a , that are attached to the top a^1 , of the typewriter machine and secured to an upwardly extending flange b , on the actuator. The actuator contains mechanism (not shown) operated by the several number keys of the typewriter and arranged to move a segmental rack C, in the direction of the arrow thereon in Fig. 2,
25 each time that a number key is depressed to print and record an amount. In actuators of this type, mechanism is provided for throwing the segmental rack out of operative position in its return movement so that it has no effect upon the work. In the form shown said segmental rack is adapted to engage with either of two pinions D, E, depending upon which of the two is thrown into mesh with the segmental rack, and said
30 pinion E, is slidably keyed on a shaft or arbor e , that turns the actuator pinion F, which meshes with and drives several gears g , of the register G, depending of course upon which of the gears g , is in mesh with the actuator pinion F. An intermediate pinion d , is interposed between the pinions D, E, for the purpose of reversing the direction of movement of the arbor or shaft e , said pinion d , being rigidly connected to the
35 pinion D, as for instance by sleeve d^1 , secured upon a shifter rod d^2 . The mechanism comprising the shifter rod d^2 , the connected pinions d , and D, and the pinion E, may be termed an element to be shifted in the registering mechanism of the machine.
40

As the pinion d , meshes directly with the pinion E, it is obvious that when the segmental rack C, is in mesh with the pinion D, the actuator pinion F, will be moved in the
45 direction of the arrow by the action of the

segmental rack C, on the pinion D, thereby causing the register to subtract, but that when the pinion D, is shifted out of mesh with the segmental rack C, and the pinion E, is shifted into mesh with said rack, the actuator pinion F, will be caused to rotate in the reverse direction, thereby reversing the movement of the register gears g , and causing the register to add. The shifter rod d^2 , is supported in the actuator frame
50 and may be shifted back and forth therein to alternately bring the pinions D, E, into mesh with the segmental rack C. All of the parts thus far described are well known and heretofore it was necessary to manually shift said shifter rod d^2 , to cause the forward and backward rotation of the actuator wheel F.
55

In the form of machine shown the register G, is carried and moved by a register supporting bar H, which is carried by the typewriter carriage and moves in unison therewith from right to left in the writing of the numbers on the sheet of paper carried by the carriage, and said register supporting bar is provided with notches h , in its upper edge in any one of which may be placed a dog g^1 , which is provided on the register to connect the register with the register carrying bar at certain predetermined
60 positions in its length, said notches being arranged to correspond with the positions of the various columns to be printed. The register may be manually shifted upon the register supporting bar for each column to be printed or it may be automatically shifted by suitable mechanism, as for instance like that described in my prior application above referred to.
65

Operatively connected with the moving carriage is a cam track or bar 10, which as shown in the drawings is secured upon the rear side of the register carrying bar H, and said bar is formed with a number of depressions or off set portions 11, arranged to correspond with the special columns in which it is desired to do special work with the register. The depressed or off set portions of the cam track join the main portions 12, thereof, by inclined portions 13, 14, which
70 actuate a shifter lever 15. Said shifter lever is fulcrumed on some portion of the stationary part of the machine, here shown as fulcrumed upon the flange b , of the actuator as at 16, one arm of said lever being actuated by the cam track and the other arm in turn acting upon the shifting rod d^2 . In the peculiar form of shifting lever shown, a bell crank form of lever is used, one arm
75 17, of which bears a roller 18, that rides upon the working face of the cam track, the other arm 19, extends down below the register supporting bar, is bent forward as at 20, and has a pin or stud 21, that extends through a slot 22, in the end of the shifter
80 130

rod d^2 . It is to be observed that oscillations of the arm 17, in a vertical direction will cause a corresponding oscillatory movement of the arm 19, in a horizontal direction and that when said shifter lever is sufficiently moved from one of its positions to another it will shift the element to be shifted from one position to another where the actuator wheel F, is caused to rotate either forward or backward by the action of the segmental rack. The cam track may of course comprise a bar having a groove formed therein corresponding to the shape of the upper edge of the cam bar 10, in which case the roller 18, will be positively moved in both directions in said groove as the carriage moves along from one side of the machine to the other, but where a single working face or edge is employed, as in the present case, I have applied a spring 23, for causing the roller to follow the contour of the cam track and operating to move the lever in the opposite direction to which it is moved by the inclined portions of the track. The spring is shown as extending from the end of the arm 17, to a pin 24, secured to the flange 6. This particular arrangement is however, immaterial, as the spring may be placed at any place where it operates to move the shifter rod in the reverse direction to which it is moved by the action of the cam track.

The roller 18, is shown in the drawings as occupying a position in one of the depressions or off set portions of the track, consequently holding the shifter rod and mechanism operated thereby in such position that rotation of the actuator wheel F, causes the register to subtract. Further movement of the carriage toward the left will bring the inclined face 14, into engagement with the roller 18, thereby raising said roller, swinging the shifter lever upon its fulcrum and shifting the shifter rod d^2 , over, throwing the pinion D, out of mesh with the segmental rod C, and bringing the pinion E, into mesh with the segmental rack.

It is to be understood of course that the register must be shifted to its next position upon the register carrying bar in order to register in the corresponding column to be printed. The cam track may be shaped to correspond with the class of work to be performed and the depressions or off set portions may be placed wherever it is desired to cause the register to subtract or perform any other special work. It is evident that with the use of this device the operator need give no attention to the shifting mechanism of the actuator, because it will be automatically taken care of by the mechanism which forms the subject matter of this invention.

I realize that various alterations and modifications of this device are possible without departing from the spirit of my in-

vention, and I do not therefore desire to limit myself to the exact form of construction shown and described.

I claim as new and desire to secure by Letters Patent:

1. In a computing machine, the combination with an element to be shifted in a register actuating mechanism, of a traveling track having offset portions arranged at predetermined positions thereon, and a power transmitting device arranged between the element to be shifted and the track and arranged to transmit a shifting motion to the element to be shifted.

2. In a computing machine, the combination with an element to be shifted in a register actuating mechanism, of a traveling cam track having offset portions arranged to correspond with certain of the columns to be printed and a rocking element having a member riding said track and being operatively connected to the element to be shifted.

3. In a computing machine, the combination with an element to be shifted in a register actuating mechanism, of a traveling cam track having offset portions arranged at predetermined positions thereon, a lever having an arm riding on said cam track, an arm operatively connected with the element to be shifted and a spring for causing the arm of the lever to follow the contour of the cam track.

4. In a computing machine, the combination with an element to be shifted in a register actuating mechanism, of a traveling cam track having offset portions arranged at predetermined positions thereon, and a bell crank lever fulcrumed upon a stationary portion of the machine and having an arm riding on said cam track and an arm pivotally connected to the element to be shifted.

5. In a computing machine, the combination with an element to be shifted, of a traveling cam track having offset portions, arranged at predetermined points thereon, a bell crank lever fulcrumed upon a stationary portion of the machine and having an arm riding on said cam track and an arm pivotally connected to the element to be shifted, and a spring for maintaining the first named arm in operative position upon the cam track.

6. In a computing machine, the combination with an actuator element which is to be shifted, of a bell crank lever having an arm operatively connected to the element to be shifted and being provided with a roller upon its other arm, a traveling cam track having off set portions arranged at predetermined positions thereon and traveling along said roller, substantially as and for the purposes set forth.

7. In a computing machine, the combination with an actuator element which is to be shifted, an actuator pinion operated by said

element to be shifted, a traveling register
actuated by said actuator pinion, a register
supporting bar, a cam track carried by said
bar and having offset portions arranged in
5 predetermined positions thereon, and a bell
crank lever operatively connected with said
element to be shifted and having an arm
riding on said cam track and adapted to be
actuated thereby.
10 8. In a computing machine, the combina-
tion with an actuator element which is to be
shifted, register actuating mechanism oper-
ated by said element to be shifted, a travel-
ing register actuated by said actuating
15 mechanism, a register supporting bar, a cam
track carried by said bar and having offset

portions arranged in predetermined posi-
tions thereon, a bell crank lever operatively
connected with said element to be shifted
and having an arm riding on said cam track 20
and adapted to be actuated thereby, and a
spring engaging said lever and adapted to
maintain it in operative position upon the
cam track.

In witness whereof I have hereunto sub- 25
scribed my name at Chicago, Cook county,
Illinois, this 13th day of May 1910.

FRED F. MAIN.

Witnesses:

LEWIS E. GARY,
J. EDWARD MAASS.