

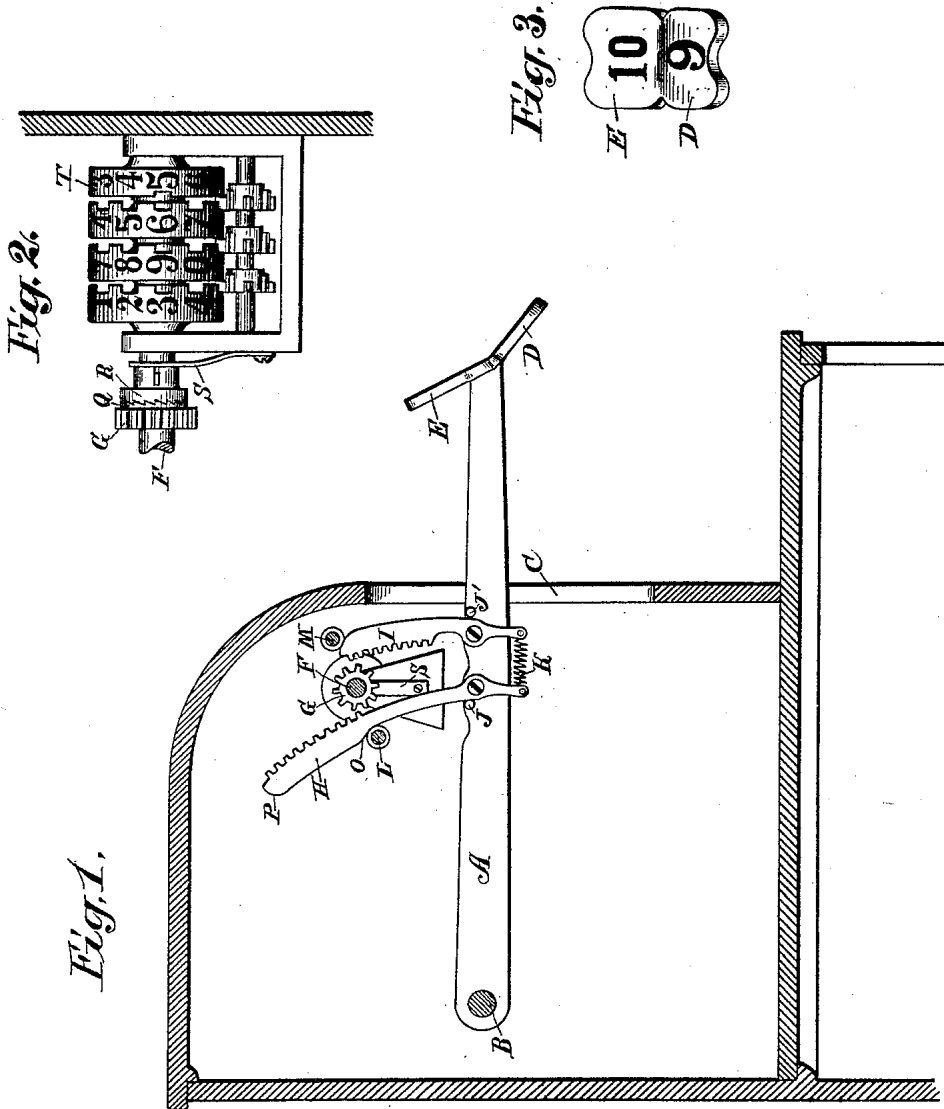
(No Model.)

L. EHRLICH.

MECHANICAL MOVEMENT FOR CALCULATING MACHINES.

No. 520,040.

Patented May 22, 1894.



Witnesses,  
S. W. Brinard,  
M. H. Clarke.

Inventor,  
Leo Ehrlich  
by Edward Rector  
his atty

# UNITED STATES PATENT OFFICE.

LEO EHRLICH, OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE NATIONAL CASH REGISTER COMPANY, OF DAYTON, OHIO.

## MECHANICAL MOVEMENT FOR CALCULATING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 520,040, dated May 22, 1894.

Application filed December 20, 1893. Serial No. 494,208. (No model.)

*To all whom it may concern:*

Be it known that I, LEO EHRLICH, a citizen of the United States, residing at the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Registering-Machines, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification.

My invention consists in a new mechanical movement for such machines by which an operating key or lever may be made to operate the register to different degrees by its strokes in opposite directions and thereby register different values according to the direction of its movement.

In the accompanying drawings Figure 1 represents a vertical section of a casing containing sufficient parts of a registering mechanism to illustrate my invention; Fig. 2 an enlarged detail elevation of the actuating pinion, clutch and register; and Fig. 3 a detail view of the finger-piece of the operating lever.

The same letters of reference are used to indicate identical parts in all the figures.

In Fig. 1 but a single lever, A, is shown, hung at its rear end upon a shaft B and provided at its front end, which projects outside the casing C, with two finger-pieces D, E, by which the front end of the lever may be lifted or depressed. Loosely mounted upon a rotary shaft F above the lever A and approximately in line with it is a pinion G. Pivoted to the lever A are two levers H, I, having the opposing faces of their upper ends provided with racks adapted to co-operate with the pinion G. These rack-levers are yieldingly held in the normal position shown, against stop pins J J', upon the lever A and with their racks out of engagement with the pinion G, by a coiled spring K connecting their lower ends. Located upon opposite sides of the pinion are two fixed rods L M, preferably surrounded by anti-friction rollers where they contact with the outer faces of the levers H I. The upper portion of the lever H is widened, forming a shoulder or cam O at the lower end of such widened portion, while the extreme upper end of the lever I is beveled or rounded off to form a similar cam at P. If the lever A be pressed downward from the middle position

shown in Fig. 1 the rack H will be thrown into engagement with the pinion G and turn it. On the other hand if the lever H be lifted from the position shown in Fig. 1 the rack I will be thrown into engagement with the pinion and the latter be turned by it.

Now, by providing the racks with different numbers of teeth it will be seen that a full stroke of the lever A in one direction will turn the pinion a given portion of a revolution, while a full stroke of the lever in the opposite direction will turn it a less distance. In the present instance the rack H is shown provided with ten teeth, and as the pinion G also has ten teeth a full depression of the lever A will turn the pinion one complete rotation, while the rack I is provided with nine teeth, so that a full upward stroke of the lever A will turn the pinion nine tenths of a rotation. The finger-pieces D E on the front end of the lever A are therefore provided with the numbers 9 and 10, respectively, Fig. 3, to indicate that when the lever is lifted by means of the piece D nine will be registered, and that when it is depressed by means of the piece E it will cause ten to be registered. The pinion G of course turns both ways with the respective racks, being simply oscillated forward and backward by the operations of the lever A, so that it is necessary to provide means for transmitting its movement in only one direction to the registering wheels. To this end the pinion G has fast upon its right hand side, Fig. 2, one member Q of a clutch whose other member R is splined upon the shaft F so as to slide upon but turn with it. A flat forked spring S secured at one end to a fixed part of the framework and bearing at its other against the side of the member R yieldingly holds the two members of the clutch in engagement, so that when the pinion is turned in one direction it will carry the shaft F with it and when it is turned in the opposite direction the teeth of the clutch member Q may slip backward over those of the member R and the latter and the shaft F remain stationary. The shaft F has mounted upon it a train of registering wheels of common form, the primary one of which is fast upon the shaft, while the others are loose upon it. Suitable transfer devices interposed between the several wheels

cause the rotations of one wheel to be added upon the next higher wheel in the series as is usual.

Where a series of the levers A is employed, 5 as may be done in connection with a single register, the pinion G will be extended into the form of a fluted shaft, or fluted sleeve upon the shaft F, and arranged to co-operate with the racks of all the levers. Any usual or suitable 10 mechanism for compelling full strokes of the levers A may be employed, and where my invention is used in a cash register and indicator any suitable form of indicating mechanism may be arranged to co-operate with it. 15

Where only a few levers, or a single one, are employed any other suitable form of fixed cams or abutments may be substituted for the rods L M for throwing the racks into engagement with the pinion. Springs may be applied 20 to the lever A in any convenient manner to yieldingly hold it in and return it to its normal middle position.

So far as I am aware I am the first in the art to combine an operating key or lever with 25 a register in such manner that the strokes of the lever in opposite directions will cause different amounts to be added upon the register. My invention is therefore not limited, in its broader aspect, to the details of construction 30 and arrangement which have been illustrated and described, but contemplates broadly the combinations and modes of operation set forth in my claims.

Having thus fully described my invention, 35 I claim—

1. In a registering mechanism, the combination of a pinion, an operating key or lever having registering strokes in opposite directions, two racks actuated by the lever and 40 provided with different numbers of teeth and co-operating with the pinion upon opposite sides of it, said racks being normally disengaged from the pinion and means for alternately engaging the racks with the pinion automatically when the lever is moved in opposite 45 directions, substantially as and for the purpose described.

2. In a registering mechanism, the combination of a pinion, an operating key or lever, 50 two racks actuated by the lever and co-operating with the pinion upon opposite sides of it, means for alternately engaging the racks with the pinion when the lever is moved in opposite directions, a registering wheel, and 55 a clutch between the pinion and wheel for causing the former to transmit its movement

in one direction to the latter, substantially as and for the purpose described.

3. In a registering mechanism, the combination of a pinion, an operating key or lever, 60 two racks independently pivoted to said lever upon opposite sides of the pinion and normally disengaged from the latter, and means for alternately engaging the racks with the pinion automatically when the lever is moved 65 in opposite directions, substantially as and for the purpose described.

4. In a registering machine, the combination of a pinion, an operating key or lever, 70 two racks independently pivoted to the lever upon opposite sides of the pinion, a spring normally holding said racks out of engagement with the pinion, and means for automatically engaging the respective racks with the pinion when the lever is moved in opposite 75 directions, substantially as and for the purpose described.

5. In a registering mechanism, the combination of a pinion, an operating key or lever, 80 two racks having different numbers of teeth and independently pivoted to said lever upon opposite sides of the pinion, a spring yieldingly holding them in normal position, means for alternately engaging them with the pinion 85 as the lever is moved in opposite directions, a registering wheel and a clutch between the same and the pinion, substantially as and for the purpose described.

6. In a registering machine, the combination of a register, an operating key or lever 90 normally occupying an approximately horizontal middle position and having registering strokes upward and downward therefrom, and provided with two finger-pieces, one bearing a number indicating the amount the lever 95 will register when moved in one direction and the other the amount it will register when moved in the opposite direction, and means intermediate the lever and register for imparting different degrees of movement to the 100 latter at opposite strokes of the lever, substantially as described.

7. The combination of the lever A, shaft F, pinion G loose thereon, the racks H I pivoted to the lever A, spring K, rods L M, clutch Q 105 R, and registering wheel T, substantially as and for the purpose described.

LEO EHRLICH.

Witnesses:

W. PALMER CLARKSON,  
JOHN C. ORRICK.