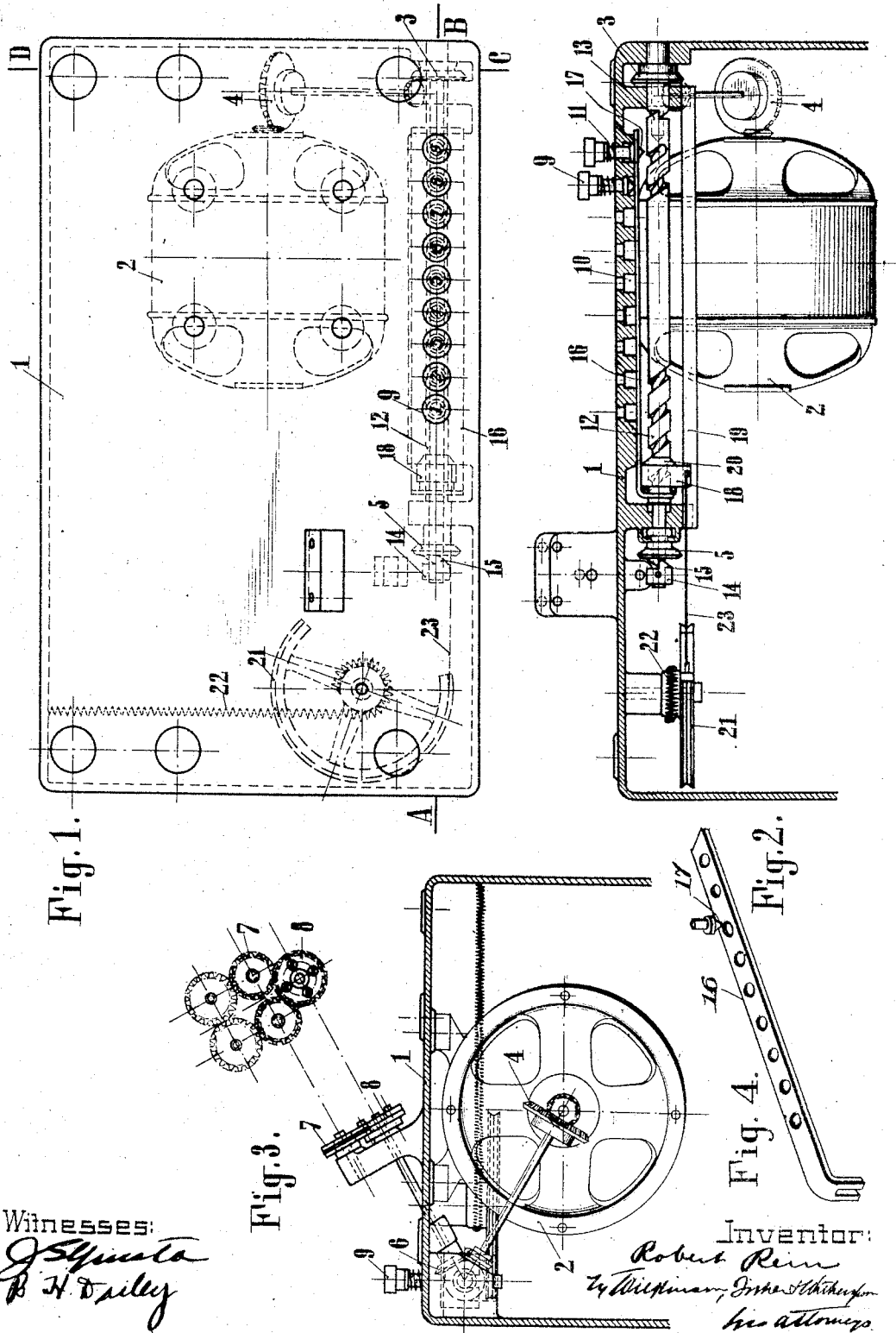


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MOTOR MECHANISM FOR CALCULATING MACHINES.
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MOTOR MECHANISM FOR CALCULATING-MACHINES.

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To all whom it may concern:

Be it known that I, ROBERT REIN, a subject of the German Emperor, residing at Puttkamerstrasse 19, Berlin, Germany, have
5 invented certain new and useful Improvements Relating to Motor Mechanism for Calculating-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as
10 will enable others skilled in the art to which it appertains to make and use the same.

With calculating machines provided with handles for carrying out the operations of multiplication as at present constructed, it
15 has been necessary to give the actuating handle as many turns with the hand as the cross sum of the factors. In order to save the tedious work thus involved when performing several processes of multiplication one after
20 the other, it has already been proposed, instead of using a handle, to provide nine sets of mechanisms for effecting multiplication by the numbers from 1 to 9, so that by putting the sets into action motor mechanism
25 has been brought into operation for actuating the counting wheels to an extent corresponding to the number represented on the key controlling the particular set. In these cases, a continuously working motor has been
30 provided and a movable member for forming connection between this motor and the counting mechanism of the calculating machine so that by the shifting of such movable member in one direction the coupling of
35 the motor with the counting mechanism of the calculating machine has been effected, while by shifting such member in the opposite direction the uncoupling has been effected.

40 The motor mechanism forming the subject matter of the present invention belongs to the class of such mechanisms just indicated.

The characteristic feature of the invention
45 consists in providing as the member for transmitting the motion from the motor to the counting mechanism of the calculating machine a worm which is rotatably mounted and capable of longitudinal movement,
50 which worm is brought into operation by pushing down one of a number of multiplying keys. On this worm is a corresponding internally threaded nut which is movable on the worm in the direction of the axis thereof,
55 so that as the worm rotates the nut moves forward until it reaches the depressed

multiplier key and releases same, whereupon the transmitting member (that is the worm) and the releasing member are brought back to their original positions.

One method of carrying out the invention is shown in the accompanying drawing by way of example.

In the drawing, Figure 1 is a plan; Fig. 2 is a longitudinal cross section taken on the
65 line A, B, Fig. 1; Fig. 3 is a cross section on the line C, D, Fig. 1; and Fig. 4 is a perspective view of the strip for moving the worm longitudinally, and one of the multiplying keys in position to enter one of the
70 holes therein.

The same numerals of reference are employed to denote the same parts in all the views.

1 is the framework on which the calculating machine, which is to be driven by the motor, is mounted.

2 is a continually rotating motor located under the lower part of the framework 1, which motor drives, through suitable intermediate gearing 4, a bevel wheel 3 suitably
80 located between bearings in the framework. 5 is another bevel wheel which is loosely mounted on the end of a worm hereinafter referred to and which is held in rotatable en-
85 gagement with a bearing in the casting 1 and meshing with a gear wheel 6, see Fig. 3, which wheel 6 is adapted to transmit the motion of the bevel wheel 5 to the counting mechanism 7 of the calculating machine, when one of the
90 multiplying keys is depressed, suitable intermediate gearing 6, 8 being interposed to suit requirements.

The multiplying keys 9 corresponding to the numbers from 1 to 9 are located side by
95 side in recesses 10 in the framework 1, and are pressed upward by means of spiral springs 11 tending to keep them in the disengaged position. Below the multiplier keys
100 9 is the member for transmitting the motion. This consists of a worm 12 passing through bearings in the framework 1 so as to be capable of rotation and also of longitudinal movement. The pitch of the worm is equal
105 to the distance between two of the multiplier keys. This worm is provided at one of its ends (that to the right) with a coupling clutch 13, which rests in the coupled position against a corresponding notch in the hub of
110 the bevel wheel 3. At its other end is keyed with a corresponding notch on the hub of

the wheel 5, so that in the coupled position the rotation of the wheel 3 is communicated through the worm 12 to the bevel wheel 5 and thence to the counting mechanism of the calculating machine.

In order to effect the coupling of the worm 12 by the depression of one of the multiplier keys 9, and then to effect the uncoupling and return of the same to the starting position after a number of rotations corresponding to the number on the multiplier key which has been depressed, the following arrangements are provided. In the drawings one of the multiplying keys is shown depressed, and the worm 12 shifted and coupled with gear wheel 3, to transmit motion to gear wheel 5. 16 is a strip located beneath the multiplier keys. This strip is formed with a forked portion which embraces the worm 12 and operates between guides on the same, in such a way that the worm can rotate freely but is obliged to move longitudinally with the strip 16. This strip 16 has nine holes, corresponding to the nine multiplier keys which holes are normally out of vertical alinement with the multiplier keys in the uncoupled position of the worm 12. The multiplier keys 9 are provided with cone shaped ends 17, which, when the keys are depressed and begin to enter the holes move the strip 16 longitudinally to the right, carrying with it the worm 12 so that the clutches 15 and 13 take into the corresponding notches of the bevel wheels 5 and 3 and coupling is effected. In order to effect the uncoupling at the correct moment corresponding with the number on the multiplier key which has been depressed, a nut 18 is provided on the worm, which nut is carried along on a guide bar which prevents it rotating. This nut 18 runs on the thread of the worm 12 when the worm is rotating after coupling has taken place, in a forward direction until its inclined face 20 reaches the cone shaped end 17 of the depressed key, and pushes the same upward. The forward movement of the nut 18 at the same time winds up a spring 22 which passes around the hub of a segmental wheel 21. The nut 18 is connected with this segmental wheel 21 by a wire or cord 23. Therefore, as soon as the nut 18 with its projecting face 20 presses up the depressed multiplier key, the strip 16 which has become free again moves the worm 12 under the influence of the spring 22, first longitudinally toward the left so that uncoupling is effected, and then as the nut 18 is pulled by the spring 22 it brings the uncoupled worm 12 back to its starting position. As the pitch of the worm 12 corresponds exactly to the distance of two of the multiplier keys from one another, the movement of the nut 18 from one multiplier key to the next corresponds exactly to one revolution of the worm 12. As

in the starting position the first multiplier key is distant by one turn of the worm from the nut 16, and it is obvious that on depressing the first multiplier key the worm 12 makes exactly one revolution, after which the release is effected. If the seventh multiplier key is depressed on the other hand it makes seven revolutions before being released, and so on. It is moreover obvious that with this gear, in spite of the fact that the motor is continually running, the machine can be worked with a handle because so long as the multiplier keys are not actuated there is no coupling between the counting mechanism of the calculating machine and the motor.

What I claim and desire to secure by Letters Patent of the United States of America is:—

1. In motor mechanism for calculating machines comprising a constantly rotating motor and means brought into operation by the depression of a key for coupling the counting mechanism with the motor, and uncoupling same; the combination of a worm adapted to be brought into the coupling position by the depression of a key so as to couple the motor to the counting mechanism, the said worm having a nut adapted to slide axially along such worm and to be carried along by the rotation of the worm until it comes into contact with a depressed key and releases same, with means for then returning the worm to the uncoupled position and the nut to the starting position substantially as described.

2. In motor mechanism for calculating machines comprising a constantly rotating motor and means brought into operation by the depression of a key for coupling the counting mechanism with the motor, and uncoupling same; the combination of a worm so mounted as to enable it to be laterally displaced and to couple up the motor mechanism with the calculating mechanism in one position and to be disengaged in another position, a strip adapted to embrace said worm and cause it to move longitudinally, a row of multiplier keys above such strip, conical ends to said keys, a row of holes in such strip and coming to one side of the axes of the keys in the uncoupled position so that on depressing one of such keys the conical end enters one of the holes in the strip and brings the worm into the coupling position substantially as described.

3. In motor mechanism for calculating machines comprising a constantly rotating motor and means brought into operation by the depression of a key for coupling the counting mechanism with the motor, and uncoupling same; the combination of a worm so mounted as to enable it to be longitudinally displaced and to couple up the motor mechanism with the calculating mechanism

anism in one position and to be disengaged
in another position, a strip adapted to em-
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5 such strip, conical ends to said keys, a row
of holes in such strip and coming to one side
of the axes of the keys in the uncoupled po-
sition so that on depressing one of such keys
the conical end enters one of the holes in the
10 strip and brings the worm into the coupling
position, a nut sliding on a guide and em-
bracing the said worm, a spring adapted to

be put in tension by the nut when moved
along under the action of the worm until
it reaches a depressed multiplier key and 15
releases same, whereupon the spring returns
the worm and the nut to the starting posi-
tion substantially as described.

In testimony whereof, I affix my signa-
ture, in presence of two witnesses.

ROBERT REIN.

Witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."