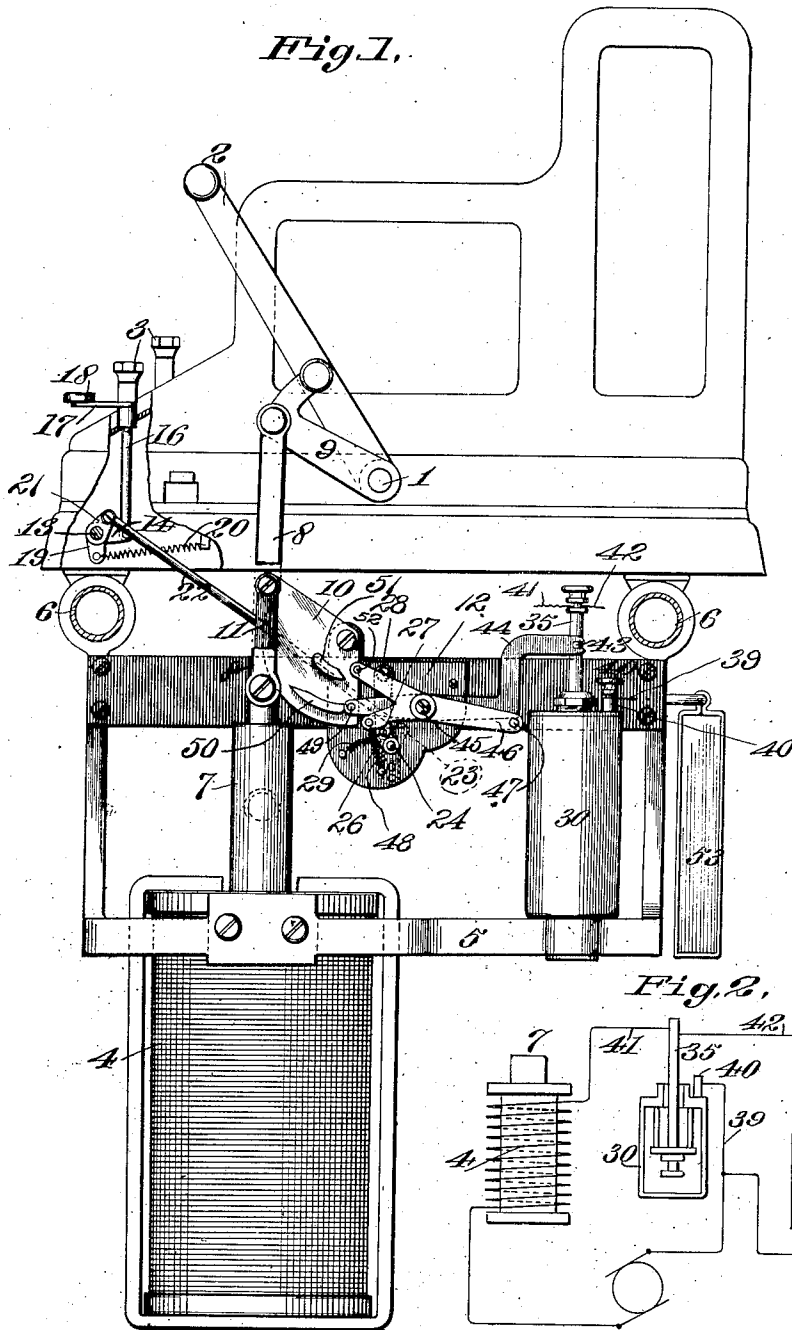


F. R. HOYT.
 OPERATING MECHANISM FOR ADDING MACHINES.
 APPLICATION FILED APR. 25, 1910.

1,005,774.

Patented Oct. 10, 1911.

2 SHEETS—SHEET 1.



Attest:
 Charles Pickles
 Sec'y C. Bureau

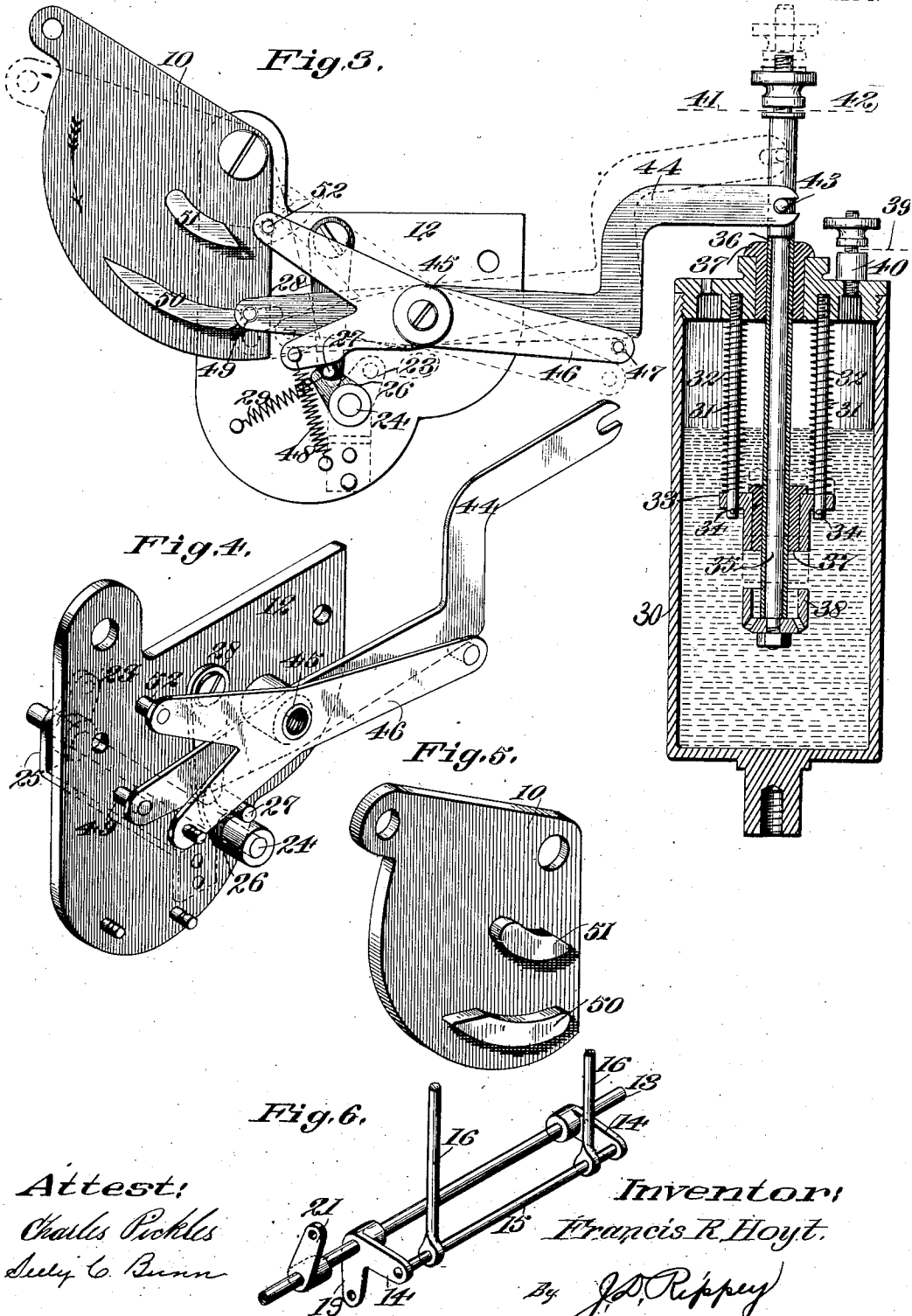
Inventor:
 Francis R. Hoyt,
 By J. D. Rippey atty

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UNITED STATES PATENT OFFICE.

FRANCIS R. HOYT, OF POPLAR BLUFF, MISSOURI, ASSIGNOR TO DALTON ADDING MACHINE COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

OPERATING MECHANISM FOR ADDING-MACHINES.

1,005,774.

Specification of Letters Patent.

Patented Oct. 10, 1911.

Application filed April 25, 1910. Serial No. 557,349.

To all whom it may concern:

Be it known that I, FRANCIS R. HOYT, a citizen of the United States, residing at Poplar Bluff, in the county of Butler and State of Missouri, have invented a new and useful Operating Mechanism for Adding-Machines, of which the following is a specification.

This invention relates to operating mechanisms for adding machines, and an object is to produce improved mechanism whereby an electro-magnet may be caused to actuate adding machines, and other machines which are operated in the same general manner.

Another object is to provide an electro-magnet, preferably of the solenoid type, in connection with an adding machine, and key-controlled mechanism for completing an electric circuit, whereby said magnet may be caused to actuate the adding machine and cause said machine to perform its functions.

A further object is to produce an improved connection between the electric actuating device and the actuated mechanism whereby full strokes of the latter mechanism in both directions will be assured before reverse operation becomes possible.

Other objects will appear from the following description, reference being made to the accompanying drawings in which—

Figure 1 illustrates my invention applied to a "Dalton" adding machine. Fig. 2 is a diagrammatic view of the electro-magnetic mechanism and the circuit therethrough. Fig. 3 is an enlarged detail view of the full stroke and switch devices. Fig. 4 is a perspective view of the actuating levers whereby the switch is operated. Fig. 5 is a perspective view of the full stroke cam-plate which controls the switch operating levers. Fig. 6 is a perspective illustration of the key levers which control the switch levers.

Adding machines of the type shown are controlled by a shaft 1, frequently denominated the main shaft, which is rocked in its bearings by a handle 2 to effect operation of the machine. Such a machine is shown in British patent to Hopkins, No. 854, of 1904. It is well known also that such machines employ keys, shown at 3, by which the numbers to be added are introduced into the machine. When any number is to be added it is introduced into the machine through the medium of the keys, and then

the shaft 1 is rocked in order to set in motion the mechanism for performing the work of addition, etc. As stated above this shaft may be rocked manually by use of the handle 2; or it may be entrained with suitable actuating mechanism to avoid the necessity of manual operation.

The subject matter of the present invention comprises such power mechanism and entraining devices whereby it may be caused to control the operation of the shaft 1, and thereby the entire adding machine.

A magnet 4, preferably of the solenoid type, is supported by a bracket or frame 5 which is attached to the stand 6 on which the adding machine is mounted. The core of the magnet is tubular and the armature 7 is located within said core. A link 8 has its lower end pivoted to the armature 7 and its upper end pivoted to a crank 9 which is secured to the shaft 1. By this connection the reciprocation of the armature 7 will rock the shaft 1 and thereby operate the adding mechanism to perform its usual functions. To effect this operation it is necessary that the magnet be energized intermittently, in order to reciprocate the armature. The mechanism for performing this operation comprises an important part of the present invention and includes devices arranged to prevent interruption of any stroke of the armature and of the mechanism operated thereby, so that a full stroke will be assured at every operation of the operating mechanism.

The armature 7 is connected with a plate 10 by a link 11. The plate 10 is pivoted to a support 12 on the bracket 5. Near the front of the adding machine, preferably in front of the keys 3, is a rock shaft 13 having rearwardly extending arms 14 which are connected by a rod 15. Stems 16 have their lower ends pivoted to the rod 15 and their upper ends protruding through the key-board plate of the adding machine (Fig. 1). Forwardly extending arms 17 on the upper ends of said stems support a bar 18 which is located in convenient relation to the keys so that it may be operated readily after each item is introduced into the machine, after the manner of the space-bar or key of a typewriter. An arm 19, which may be a part of one of the arms 14, is rigid with the rock shaft 13 and has a spring 20 connecting with some part of the

adding machine case or frame. Said spring is effective to restore to idle position the switch key 18 and the parts operated thereby after each operation. An arm 21, rigid with the shaft 13, is connected by a link 22 with an arm 23 attached to a rock shaft 24 which is supported by the part 12 and a bracket 25 secured to said part 12. An arm 26 contacts with a pin 27 carried by the lower end of a pendant link 28 and is effective to swing said pin and link rearwardly whenever the key 18 is depressed. The spring 29 connecting the link 28 with the supporting part 12 actuates said link forwardly to its idle position.

A cup 30, partially filled with oil, is supported in proper relation to the mechanism above described (Fig. 1) and contains the contact or switch mechanism which controls the electric circuit whereby the magnet is energized. Two rods 31 depend from the inner side of the cup closure and are encircled by springs 32. A tubular member 33 has a flange on its upper end having holes through which the rods 31 extend, said member being supported by pins 34 on the lower ends of the rods 31 and being actuated downwardly by the springs 32. A rod 35, inclosed in a cover 36 of insulating material is mounted to reciprocate through the cup closure, being supported by said cup and the member 33 in each of which is an insulation bushing 37 through which the rod 35 and the encasement therefor reciprocate. A cup-shaped contact member 38 is attached to the lower end of the rod 35 and is movable by said rod into and out of contact with the member 33 to complete and break the electric circuit which energizes the magnet. It will be noted that both of the contact or terminal members 33 and 38 are constantly immersed in the oil contained in the cup. The end of the wire 39 is connected to an ordinary binding post 40 secured to the cup closure, and the other wire 31 is connected to the rod 35 by a suitable binding device 42. Since the rod 35 is insulated from the cup it is necessary to move the rod 35 so as to bring the member 38 into contact with the member 33, thereby to complete the circuit. The rod 35 has a projection 43 which is engaged by the notched or bifurcated end of a lever 44. The lever 44 is pivoted upon a stud 45 upon which also another lever 46 is pivoted, the last-named lever having a pin 47 extending under said lever 44. The forward end of the lever 46 is bifurcated and a spring 48 connects the lower arm thereof with the support 12 and has a tendency to elevate the rear end of said lever which movement would also operate the lever 44 and cause the latter to move the contact member 38 into contact with the member 33 and complete the circuit. Such action of the levers,

however, is prevented by the pin 27 which normally is engaged with the lower arm of the lever 46 and supports the front end thereof. The pin 27 may be moved rearwardly by operation of the key 18 which permits the spring 48 to operate the levers 44 and 46 effectively to close the switch and complete the circuit. When this is done the magnet 4 becomes energized and actuates the adding machine, as previously described. The front end of the lever 44 has a pin 49 extending toward the plate 10. On said plate is an arcuate rib or cam 50. The first result of depression of the key 18 is to permit the front ends of the levers 44 and 46 to drop so that the pin 49 is below the lower edge of the cam 50. When the magnet becomes energized it operates the plate 10, moving the cam 50 over the pin 49, thereby holding the contact members 33 and 38 together, and preserving the circuit from becoming broken until the full stroke is completed. At the completion of the stroke the cam 50 leaves the pin 49 and the springs 32 expand and slightly lower the rod 35 which also raises slightly the end of the lever 44 so that the pointed front end of the cam 50 will extend under the pin 49. A similar cam 51 moves under a pin 52 on the upper arm of the lever 46 and moves said lever to normal adjustment. When the key 18 is released the spring 29 acts to draw the pin 27 forwardly and holds the lever 46 in idle position after the cam 51 passes therefrom. As soon as the cam 50 releases the pin 49 the lever 44 is free to oscillate and the heavier rear end of the lever 44, added to the weight of the rod 35 and parts carried thereby, releases the member 38 from the member 33, thereby breaking the circuit. The adding machine shaft 1 and other parts actuated thereby are then returned to their normal position by their usual well known actuating devices (not shown) and the machine is ready for another operation. While the mechanism is returning to idle position the pins 49 and 52 are above the cams 50 and 51, so that it is impossible to actuate the levers 44 and 46 to complete the circuit again until the full return stroke has been completed. A condenser 53 may be employed in the circuit if desired.

In operation the key 18 is depressed after each numerical item has been introduced into the machine, or when it is desired to obtain a total, a sub-total, or clear the machine. The depression of the key 18 rocks the shaft 13, pushes the link 22 rearwardly, and rocks the shaft 24 which releases the pin 27 from the lever 46. The spring 48 then operates the levers 46 and 44 effectively to move the contact member 38 against the contact member 33 to complete the circuit. This causes the magnet to become energized which draws downwardly the armature 7, 130

thereby rocking the shaft 1 and permitting the adding mechanism to operate. The key 18 may be released almost instantly and the full stroke will be assured by the cams 50 and 51 which prevent disengagement of the contact members 33 and 38 until the said cams leave the pins 49 and 52 on the levers 44 and 46, respectively. When the said cams pass from said pins, the key 18 having been previously released, the spring 29 acts to restore the lever 46 to idle position, while gravity restores the lever 44 to idle position and breaks the circuit by moving the member 38 out of contact with the member 33. As soon as the circuit is broken the adding machine restoring springs (not shown) act to return the shaft 1 and other parts to idle position, also moving the cams 50 and 51 under the pins 49 and 52, respectively, which prevents operation of said levers until the full return stroke is completed.

I am aware that there may be various changes and alterations in the construction and arrangement of the parts comprising this invention without departure from the spirit and scope of the invention. I do not restrict myself to details of construction but

What I claim and desire to secure by Letters Patent is—

1. The combination with the main shaft in an adding machine, a handle on said shaft whereby said shaft may be manually operated, and an arm on said shaft, of an armature, a link pivoted to said arm and to said armature, electric mechanism for operating said armature, full stroke mechanism, and a link connecting said armature with said full stroke mechanism, substantially as specified.

2. The combination with the main shaft in an adding machine, of an arm attached to said shaft, a link pivoted to said arm, an armature pivoted to said link, electric mechanism for moving said armature effectively to rock said shaft, a full stroke device, and a link connecting said armature with said full stroke device, substantially as specified.

3. The combination with the main shaft of the machine, of an arm attached to said shaft, an armature, a magnet for actuating said armature; an electric circuit for energizing said magnet, a switch in said circuit, a key for operating said switch, a device holding said switch closed during movement of said armature in one direction, a link connecting said armature with said device, and another link connecting said armature with said arm, substantially as specified.

4. The combination with the main shaft of an adding machine, an arm on said shaft, an armature, and electric mechanism for operating said armature, of a switch controlling said electric mechanism, of a locking device arranged to prevent opening of said switch during the time said armature is being moved by said electric mechanism, a link connecting said armature and said locking device, and another link having one end pivoted to said armature and the other end pivoted to said arm, substantially as specified.

In witness whereof, I have signed this specification in the presence of two subscribing witnesses.

FRANCIS R. HOYT.

Witnesses:

CHARLES PICKLES,
SEELY C. BUNN.