Dec. 6, 1927.

B. M. SHIPLEY

1,652,057

CASH REGISTER

Filed Jan. 10, 1925

3 Sheets-Sheet 1

FIG. 1

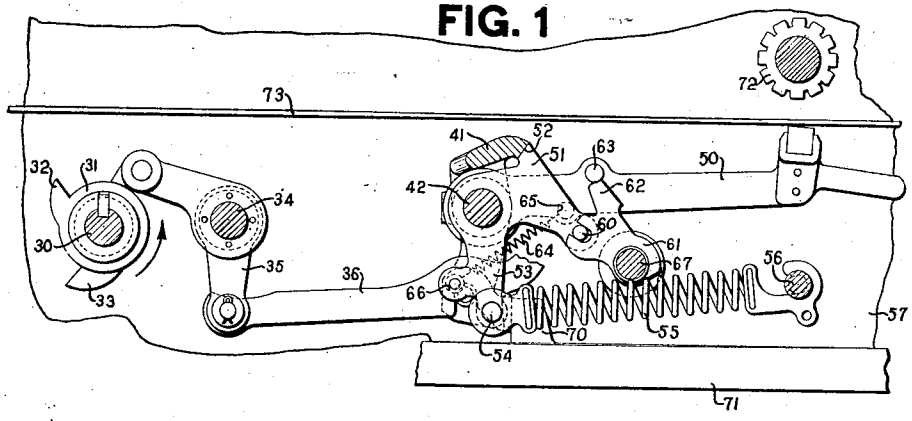



FIG. 2

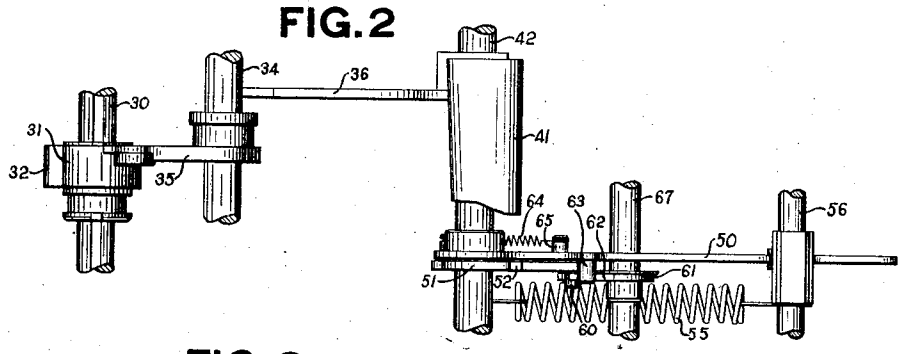
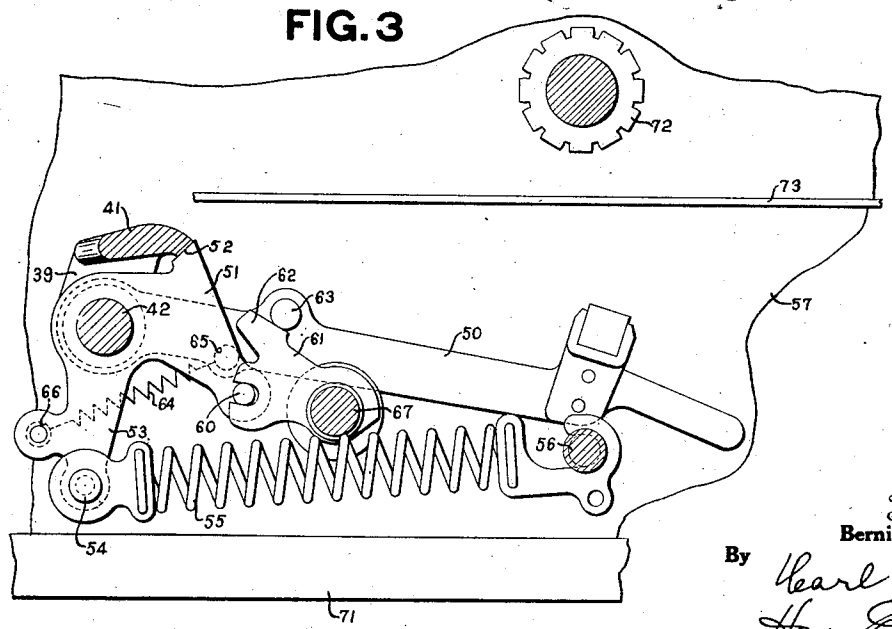



FIG. 3




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FIG. 4

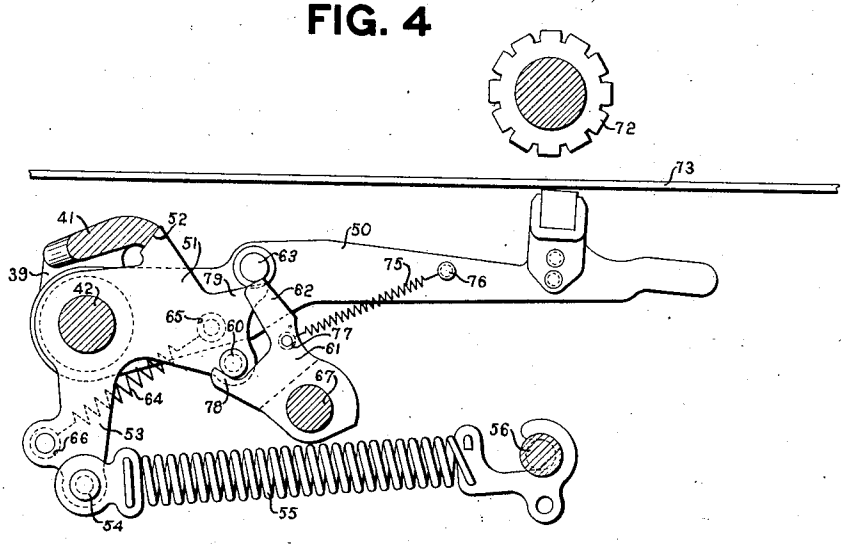
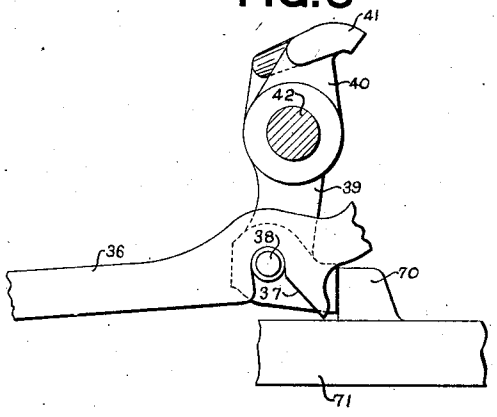



FIG. 5




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FIG. 6

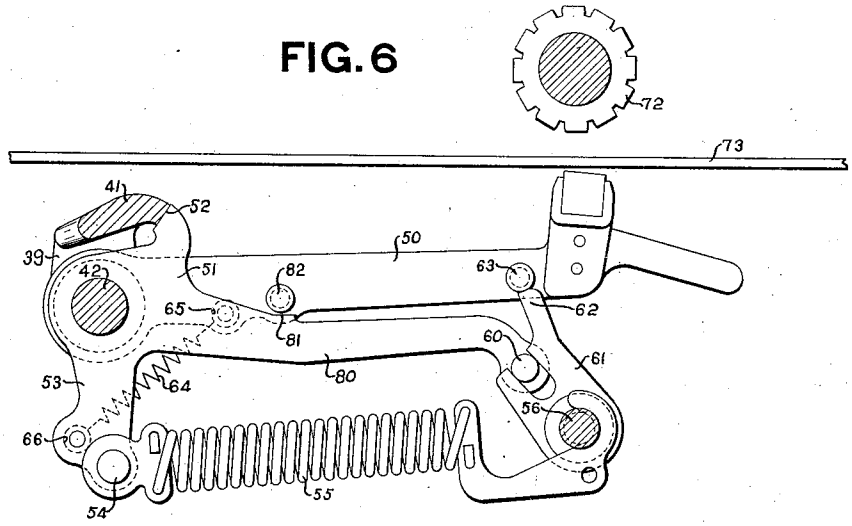



FIG. 7

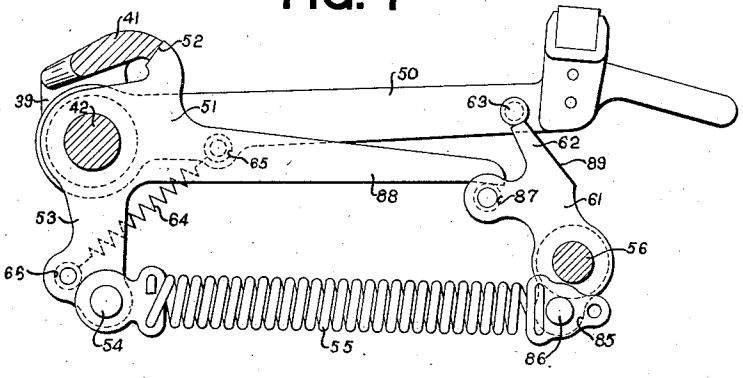
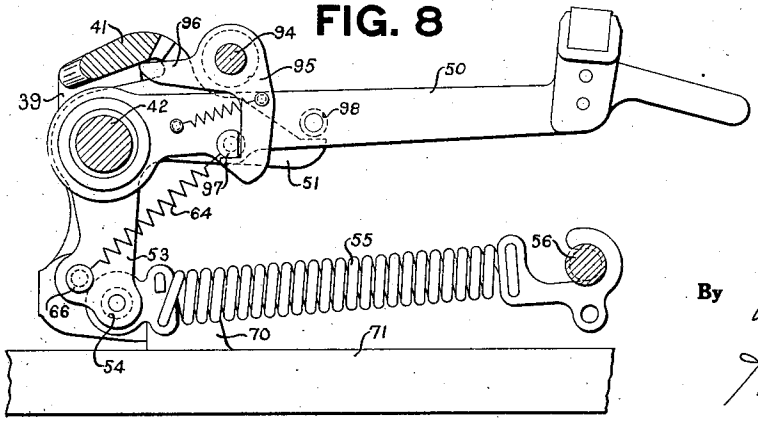



FIG. 8




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Patented Dec. 6, 1927. 1,652,057

# UNITED STATES PATENT OFFICE.

BERNIS M. SHIPLEY, OF DAYTON, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE NATIONAL CASH REGISTER COMPANY, OF DAYTON, OHIO, A CORPORATION OF MARYLAND.

## CASH REGISTER.

Application filed January 10, 1925. Serial No. 1,586.

This invention relates to cash registers, and more particularly to improvements in impression hammers of the kind used in machines of the type shown and described in Letters Patent of the United States, No. 1,311,884, issued to Frederick L. Fuller, August 5, 1919, and a co-pending application by the present applicant, Serial No. 610,273, filed January 2, 1923.

The principal object of this invention is to provide mechanism to prevent rebound of spring actuated printing hammers.

With this and incidental objects in view, the invention consists of certain novel features of construction and combinations of parts, the essential elements of which are set forth in appended claims and preferred forms of embodiment of which are hereinafter described with reference to the drawings which accompany and form part of this specification.

Fig. 1 is a side elevation of the printing hammer and its associated mechanism.

Fig. 2 is a plan view of the mechanism shown in Fig. 1.

Fig. 3 is a detail side view, on an enlarged scale, of the impression hammer and the mechanism for actuating it, shown in the position which it assumes just before being released to take an impression.

Fig. 4 is a side view of a modified form of the mechanism, shown in Fig. 3.

Fig. 5 is a detail side view of a part of the impression hammer driving mechanism, shown on an enlarged scale.

Fig. 6 is a side view of another modified form of the mechanism shown in Fig. 3.

Fig. 7 is a side view of still another modified form of the mechanism shown in Fig. 3.

Fig. 8 is a side view of still another modified form of the mechanism shown in Fig. 3.

### *In general.*

In impression hammer mechanisms of the type herein disclosed the hammer is actuated by a powerful spring, which when released forces the hammer against type carriers with a sudden blow. In the above mentioned co-pending application when the hammer falls back to its normal position, it reacts against the driving spring which causes the hammer to rebound, and in some instances this rebound is sufficient to cause a second impression to be made. In the present application there are five modifications shown, each of which has a means for stopping the hammer before it can react against its driving spring.

### *Driving mechanism.*

In the embodiments herein shown the mechanism is operated from a main printer cam shaft 30 (Figs. 1 and 2), which may be driven in any suitable manner. In the above mentioned patent and application, this cam shaft is driven from the main operating shaft of the machine, which in turn is driven by a motor. Slidably mounted on this shaft 30, and keyed thereto, is a cam 31 having two high points 32 and 33. Loosely mounted on a shaft 34 is a bell crank 35, the upper end of which is adapted to be engaged by the above mentioned high points 32 and 33. The lower arm of the bell crank has pivoted thereto a link 36 (see also Fig. 5), which is bifurcated at 37 to surround a stud 38 mounted on an arm 39. The arm 39 is connected to an arm 40 by a cross member 41. The arms 39 and 40 are loosely mounted on a shaft 42.

The cam 31 is slidably mounted on the shaft 30 so that the hammer can be controlled to take one or two impressions. The point 32 extends across the width of the cam 31. The high point 33, however, is only substantially one-half the width of the cam 31. From this it can be seen that if the cam 31 is shifted to one position, two impressions are taken, while if the cam is shifted to the other position only one impression is taken. This shifting mechanism forms no part of the present invention and no further description is thought necessary. A complete disclosure and description can be had by referring to the above-mentioned co-pending application.

### *Impression hammer.*

The impression hammer 50 is pivoted on the beforementioned shaft 42. Also mounted on the shaft 42 is a bell crank 51 having an upwardly projecting extension 52 which normally engages the cross member 41. A lower arm 53 of the bell crank 51 has mounted thereon a stud 54 to which a spring 55 is secured, the other end of which is hooked on a stud 56 carried by a frame 57. Also mounted on the beforementioned bell crank 51 is a stud 60 which is adapted to engage a bifurcation of an arm 61 having an up-

wardly extending arm 62, the upper end of which normally engages a stud 63 mounted on the hammer 50. A spring 64 is stretched betwen a stud 65 mounted on the hammer 50 and a stud 66 mounted on the bell crank 51. The spring 55 tends to rotate the bell crank 51 in a counter-clockwise direction but is prevented from doing so by the cross member 41. The arm 39 of the cross member 41 normally engages a lug 70 cast on a base 71 of the machine. This lug 70 acts as a stop for the cross member 41 thereby limiting the movement of the bell crank 51.

From the above description it can be seen that when the cam shaft 30 is given a rotation the high points 32 and 33 will alternately cam the bell crank 35 in a clockwise direction, and through the link 36 rock the cross member 41 in a clockwise direction. The cross member 41 will rotate the bell crank 51, and through the arm 53 stretch the spring 55. This rotation of the bell crank 51 causes counter-clockwise rotation of the arm 61 and thereby rocks the arm 62 from underneath the stud 63, which permits the hammer 50 to be pulled down to the position shown in Fig. 3 by the spring 64. When one of the high points 32 or 33 passes from underneath the bell crank 35, the spring 55 causes rapid counter-clockwise movement of the bell crank 51. The bell crank 51 in turn rapidly rotates the arm 61, which, through its engagement with the stud 63, cams the hammer 50 upward. The cross member 41 will be suddenly stopped by the lug 70 and will thereby stop the bell crank 51 and the arm 61. The arm 50 will move on by reason of its momentum to strike type carriers 72 a blow and make an impression on the record material which has been previously laid on a slip table 73. At this time the arm 62 will have been returned to the position shown in Fig. 1. When the arm 50 settles back to its normal position after striking the typewheel 72 the stud 63 again engages the arm 62, which is so disposed on a shaft 67 that the force of the returning hammer is entirely taken up by the shaft 67.

In the above described co-pending application this return force of the hammer is taken up by the spring 55, which spring is stretched sufficiently to cause the hammer to be again carried against the typewheel 72 and in this manner cause a second impression to be made.

In the present application only one hammer 50 has been shown. However, it is apparent that any number of hammers may be operated by the cross member 41, as is disclosed in the above mentioned co-pending application.

In the modified form, as shown in Fig. 4, the same driving mechanism is used, as shown in Fig. 1. The only difference is in the method of driving the arm 61 and of actuating the impression hammer 50. In this modification the hammer 50 is driven directly by the bell crank 51. It will be remembered that in the first modification, the arm 61 drives the hammer 50 and is positively driven in both directions by the bell crank 51. In the modification shown in Fig. 4, a spring 75 is used to return the arm 61 after the bell crank 51 has been released. This gives the arm 61 an independent movement. The spring 75 is stretched between a stud 76 on the hammer 50 and a stud 77 on the arm 61. When the bell crank 51 is cammed downwardly, the stud 60 engages a lug 78 to drive the arm 61 counter-clockwise. When the bell crank 35 (Fig. 1) is permitted to drop off the high point 33 of the cam 31 the bell crank 51 is moved rapidly in a counter-clockwise direction carrying a projection 79 against the stud 63 on the hammer 50 and thereby forcing the hammer against the typewheel 72. The spring 75 then carries the arm 62 underneath the stud 63 to prevent rebound in the same manner as in the first modification.

The modified mechanism shown in Fig. 6 is also driven by the same mechanism as that shown in Fig. 1. In this form the stud 63 is mounted on the hammer 50 a greater distance from its pivot than in the form shown in Fig. 1. The arm 61, which is of somewhat different shape, but which performs the same function as the arm 61 (Fig. 1), is mounted on the spring stud 56 instead of on a shaft 67. The bell crank 51 has a long arm 80 extending to the right (Fig. 6) carrying the stud 60 which engages a bifurcated portion of the arm 61. The arm 80 has a flattened surface 81 adapted to engage a stud 82 on the hammer 50 for forcing the hammer against the type carrier 72. When the cam 31 rotates the bell crank 51 in a counter-clockwise direction in the manner described in connection with the modification shown in Fig. 1, the stud 60 disengages the arm 62 from the stud 63, thereby permitting the spring 64 to carry the hammer downward so that the stud 82 thereon engages the surface 81 of the arm 80. When the spring 55 is released to rapidly rotate the bell crank 51, the surface 81 engages the stud 82 to force the hammer 50 against the type carriers 72. The stud 60 on the arm 80 carries the arm 62 into the path of the stud 63 in the same manner as described in connection with the first modification. The arm 61 is disposed on the shaft 56 in the same manner as the arm 61 of the first modification is disposed on the shaft 67 and prevents rebound of the hammer 50 in identically the same manner.

The modified form shown in Fig. 7 will now be described. An arm 61 is pivoted on the shaft 56 and has a downwardly projecting portion 85 carrying a stud 86. The

spring 55 is stretched between this stud 86 and the stud 54 of the bell crank 51. The parts are held in the position shown in Fig. 7 by the cross member 41. Also mounted on the arm 61 is a stud 87 which is adapted to engage an arm 88 on the bell crank 51. Spring 55 normally tends to rock the arm 61 in a clockwise direction, but is prevented from doing so because the bell crank 51 is held in position by the cross member 41. When the cam 31 rocks the cross member 41 in a clockwise direction, the arm 88 of the bell crank 51 rocks the arm 61 counter-clockwise and thereby permits the stud 63 to engage the surface 89 of the arm 62. This movement of the bell crank 51 and the arm 61 stretches the spring 55. When the spring 55 is released the arm 61 is given a rapid clockwise movement and, through the engagement of the surface 89 with the stud 63, cams the hammer 50 rapidly in an upward direction. The bell crank 51 and the arm 61 are suddenly stopped by the cross member 41 but the hammer is free to move on, due to its momentum, and thereby strike the type carrier 72 a blow sufficient to take an impression therefrom. The hammer then drops back on the arm 62, as shown in Fig. 7.

The modified form shown in Fig. 8 will now be described. Pivoted on a shaft 94 mounted in the frame 57 of the machine is a spring-actuated pawl 95 having a tail 96 projecting into the path of the cross member 41. The pawl 95 is adapted to engage a stud 97 mounted on the hammer 50 when in the home position. The spring 64 is stretched between this stud 97 and the stud 66 on the arm 53 of the bell crank 51. Also mounted on the hammer 50 is a stud 98 which is adapted to be engaged with an arm of the bell crank 51. When the cam 31 rocks the cross member 41 in a clockwise direction the bell crank 51 rotates in a clockwise direction, but the hammer 50 is held in the upper position by the pawl 95 until the cross member 41 has rocked a distance sufficient to disengage the pawl 95 from the stud 97. This disengagement of the pawl 95 from the stud 97 is effected by the engagement of the cross member 41 with the tail 96 of the pawl. When the pawl has become disengaged from the stud 97, spring 64 carries the hammer 50 downward until the stud 98 engages the arm on the bell crank 51. This clockwise movement of the bell crank 51 stretches the spring 55 until it is released by a high point of the cam 31 to cause rapid rotation of the bell crank 51. This rapid rotation is arrested by the cross member 41 when its arm 39 engages the lug 70, as before described. The momentum of the hammer 50 at this time is sufficient to cause it to move upward to strike the type-carrier a blow sufficient to take an impression therefrom. After making the impression the hammer 50 drops back on the pawl 95, and since the pawl 95 is on a fixed shaft the blow is taken up by the shaft and thus prevents rebound of the hammer in a manner similar to that described in connection with the above mentioned forms.

While the forms of mechanism herein shown and described are admirably adapted to fulfill the objects primarily stated, it is to be understood that it is not intended to confine the invention to the forms of embodiment herein disclosed, for it is susceptible of embodiment in various forms, all coming within the scope of the claims which follow.

What is claimed is:

1. The combination of an impression hammer, type carriers, an actuator for said hammer, means for stopping the actuator after it has given the hammer momentum sufficient to impel it against the type carriers, and means controlled by said actuator for preventing said hammer from reacting against the actuator.

2. The combination of an impression hammer, type carriers, an actuator for said hammer, a spring for driving said actuator, means for driving the actuator positively in one direction to store energy in said spring, means for stopping said actuator after the spring is released and after said actuator has given the hammer momentum sufficient to impel it against the type carriers, and means controlled by said actuator for preventing said hammer from reacting against the acuator.

3. The combination of an impression hammer, type carriers, means for impelling said hammer against the type carriers for taking an impression therefrom, an actuator for said impelling means, an arm normally engaging the hammer for preventing the hammer from engaging the impelling means and adapted to be disengaged from said hammer by said impelling means, and means for engaging said arm with the hammer after it has taken an impression from the type carriers for preventing said hammer from reacting against the impelling means.

4. The combination of an impression hammer, type carriers, a spring-actuated means for impelling the hammer against the type carrier for taking an impression therefrom, an arm driven in one direction by said spring-actuated means to permit said spring-actuated means to become effective, and means for moving said arm independent of said actuating means for preventing said hammer from reacting against the spring-actuated means.

5. The combination of an impression hammer, type carriers, an arm for impelling said hammer against the type carrier for taking an impression therefrom, a spring-actuated member for driving said arm, and

a shoulder on said arm adapted to stop said hammer after an impression has been taken.

6. The combination of an impression hammer, type carriers, and a means for impelling the hammer against the type carrier and for positively stopping the hammer after the impression has been taken.

7. The combination of an impression hammer, type carriers, and an arm having a surface adapted to impel the hammer against the type carrier and another surface adapted to stop the hammer after the impression has been taken.

8. The combination of an impression hammer, type carriers, and an arm having a surface adapted to impel the hammer against the type carrier and another surface adapted to stop the hammer after the impression has been made said stopping surface disposed to prevent movement of said arm by the impact of the hammer.

9. The combination of an impression hammer, type carriers, a spring-actuated means, and an arm adapted to impel the hammer against the type carrier and to stop the hammer after the impression has been made, said arm being actuated by said spring-actuated means.

10. The combination of an impression hammer, type carriers, a spring-actuated means, an arm adapted to impel the hammer against the type carrier and to stop the hammer after the impression has been made, said arm being actuated by said spring-actuated means, and a means for resiliently holding the hammer in engagement with the said arm adapted to permit movement of the hammer independent of the spring-actuated means.

11. The combination of an impression hammer, type carriers, an arm for impelling said hammer against said type carriers, a member for controlling said arm, a spring adapted to drive the said member and said arm, and a shoulder on said arm adapted to stop said hammer after an impression has been taken disposed to prevent the hammer from reacting against the said impelling arm.

In testimony whereof I affix my signature.

BERNIS M. SHIPLEY.