April 15, 1941. A. RUTTIMAN 2,238,507

ELECTRICALLY OPERATED RECORDING MECHANISM

Filed May 24, 1939 2 Sheets-Sheet 1

Fig. 1.

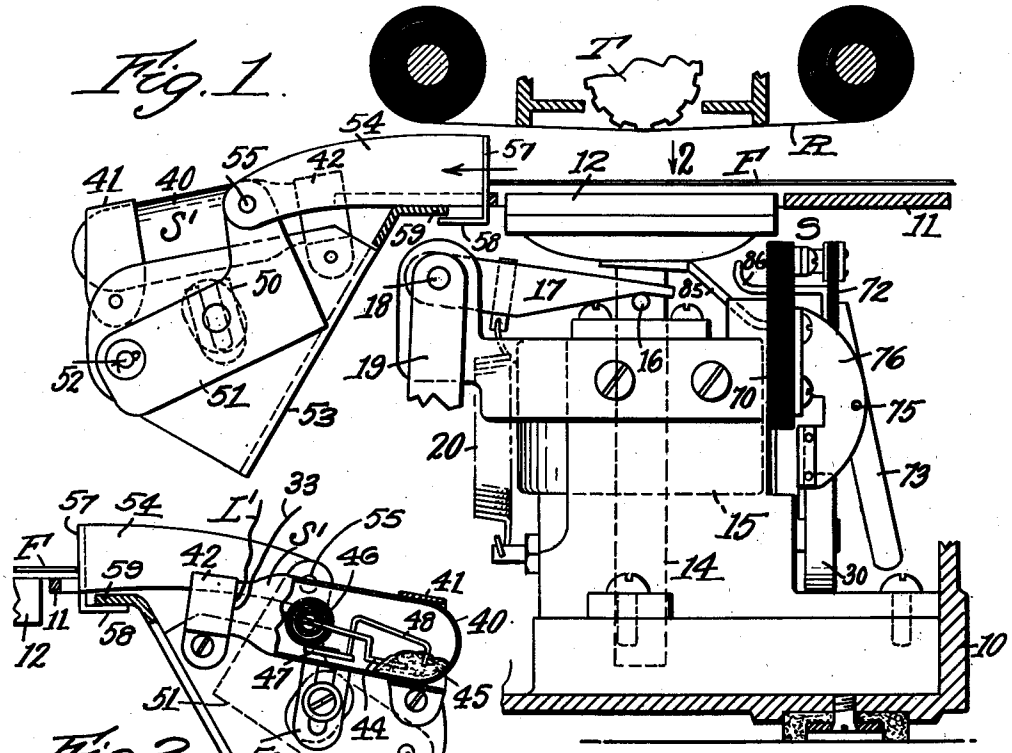
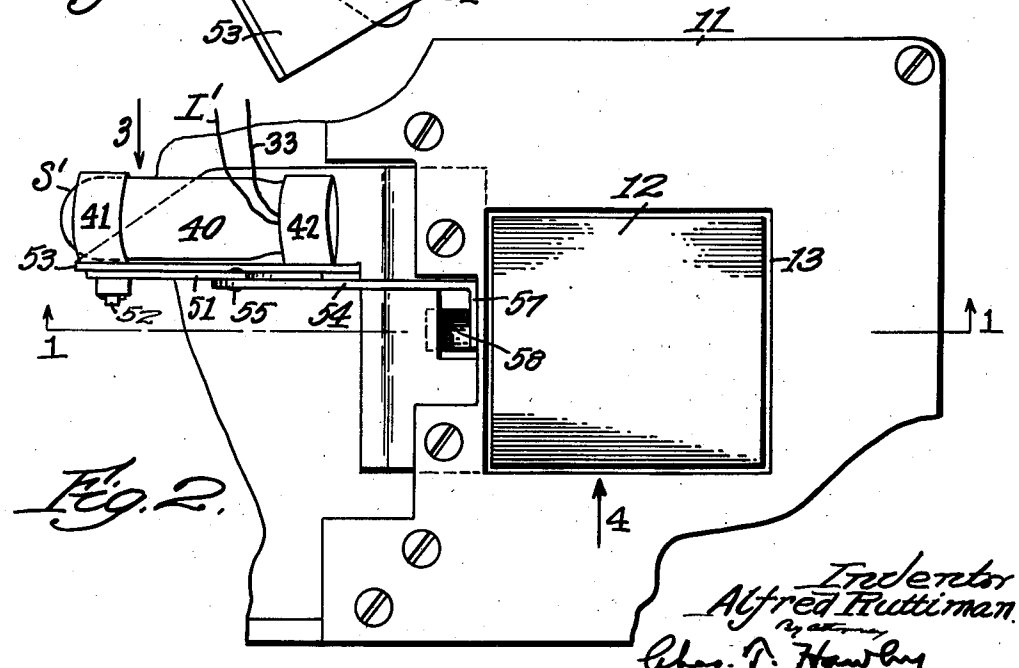


Fig. 3.

Fig. 2.



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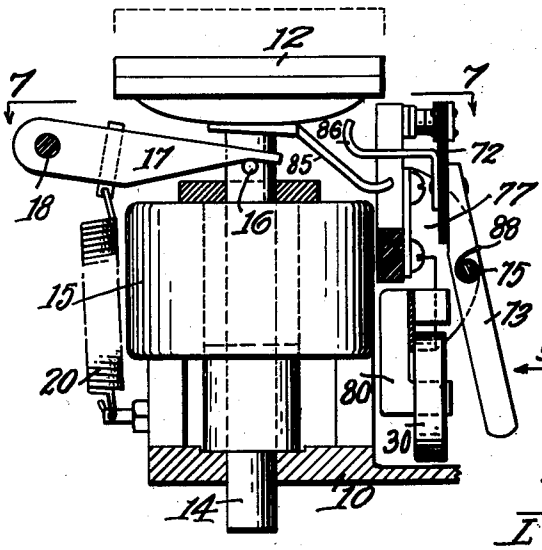


Fig. 4.

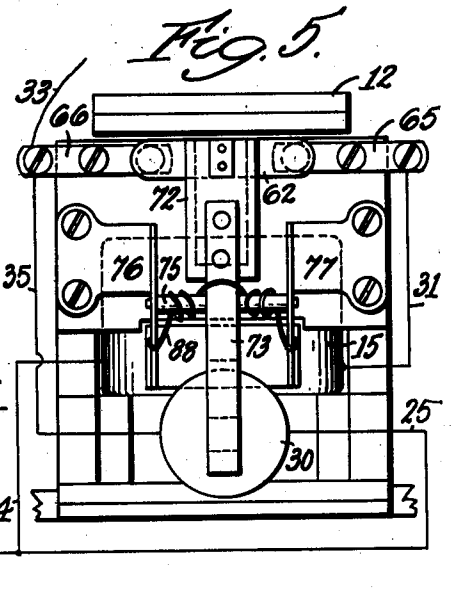


Fig. 5.

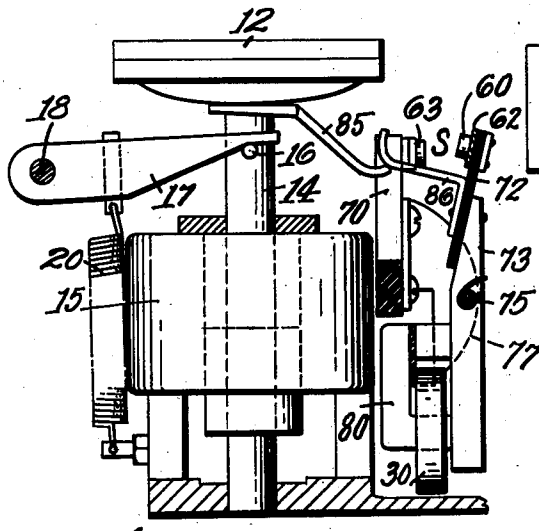


Fig. 6.

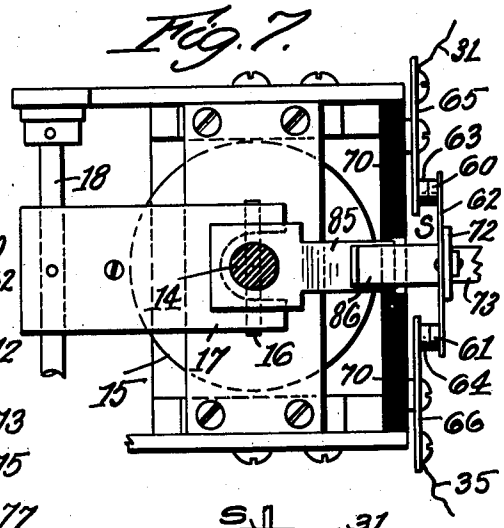


Fig. 7.

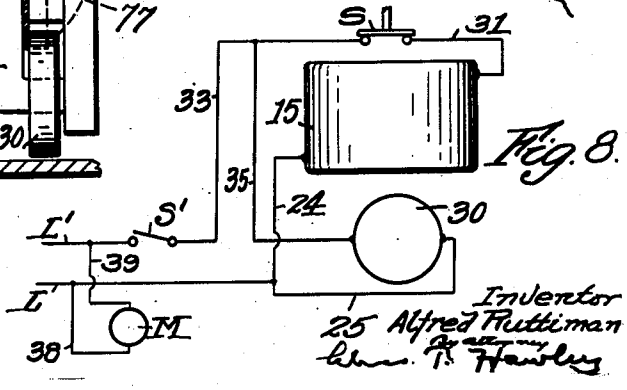


Fig. 8.

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UNITED STATES PATENT OFFICE

2,238,507

ELECTRICALLY OPERATED RECORDING MECHANISM

Alfred Ruttiman, Gardner, Mass., assignor to Simplex Time Recorder Co., Gardner, Mass., a corporation of Massachusetts

Application May 24, 1939, Serial No. 275,571

2 Claims. (Cl. 101—287)

This invention relates to recording mechanism, such as a time stamp, time recorder or other device used to imprint time or other data on a record sheet.

More particularly, the invention relates to that type of recording mechanism in which the impression is made by a device which is electrically operated and controlled, and in which the circuit is closed by engagement of a switch element by the record sheet.

It is an important object of my invention to provide improved means for positively and automatically breaking the impression circuit after a single actuation of the stamping mechanism and for thereafter holding the impression circuit open until the record sheet is removed.

A further feature of my invention is the provision of electromagnetic means for thus holding the impression circuit open, said means and said impression mechanism being included in parallel branch circuits which are both controlled by a single sheet-actuated switch.

My invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawings, in which

Fig. 1 is a sectional side elevation of portions of a time stamp embodying my improved recording mechanism;

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

Fig. 3 is a sectional side elevation of certain switch mechanism, looking in the direction of the arrow 3 in Fig. 2;

Fig. 4 is a side elevation, partly in section, of the impression mechanism, looking in the direction of the arrow 4 in Fig. 2;

Fig. 5 is a front elevation of the impression mechanism;

Fig. 6 is a view similar to Fig. 4 but showing the parts in a different position;

Fig. 7 is a sectional plan view, taken along the line 7—7 in Fig. 4; and

Fig. 8 is a diagram of certain electrical connections.

Referring to Figs. 1 and 2, I have shown my invention embodied in a time stamp comprising a casing 10, on the upper part of which a paper support 11 is mounted. A platen 12 is positioned in a recess 13 in the plate 11 and is connected to a solenoid plunger 14 actuated by a solenoid coil 15.

When the coil is energized, the platen moves upward and forces the record sheet F against type wheels or other recording devices T, with an ink ribbon R interposed between said sheet and said recording devices. A cross-pin 16 in the plunger 14 engages a forked arm 17 (Fig. 7) on a cross shaft 18 to which is also secured an arm 19 (Fig. 1). A coil spring 20 moves the arm 17 and associated parts yieldingly downward, thus depressing the platen 12. The arm 19 is operative through connections not shown to advance the ink ribbon R during each return movement of the platen 12.

The parts thus far described in themselves form no part of my present invention, which relates particularly to my improved means for closing and controlling the electrical circuit of the solenoid coil 15.

Referring to Fig. 8, current for operating my improved recording mechanism is supplied through line wires L and L' from any usual source of power. The wire L is connected through branch wires 24 and 25 to one terminal of the solenoid coil 15 and to one terminal of a holding magnet 30. The other terminal of the solenoid coil 15 is connected through a wire 31, a normally-closed switch S, a wire 33 and a sheet-operated switch S' to the second line wire L'. The other terminal of the magnet 30 is connected by a wire 35 to the wire 33. Branch wires 38 and 39 may be connected to the line wires L and L' outside of the switch S' to operate a motor M or other device by which the type wheels T may be intermittently advanced, if the recording mechanism is used for time purposes.

The switch S' may be of any usual construction, provided it is closable by slight pressure applied through the record sheet F. As shown herein, the switch comprises a glass bulb 40 (Fig. 3) secured in a fixed inclined position at the rear of the paper support 11 by clamping bands 41 and 42. The line wire L' is connected to a fixed terminal 44 within the bulb 40, said terminal being continuously immersed in a small quantity of mercury 45. The wire 33 is similarly connected through a spring 46 and armature 47 to a second terminal 48, which is movable into and out of the mercury 45 and thereby closes or opens the circuit between the wire 33 and the line wire L'. The spring 46 normally maintains the terminal 48 in raised position, so that the switch is normally open.

A small permanent magnet 50 (Fig. 3) is mounted on a plate 51 (Fig. 1), pivoted at 52 to the fixed bracket 53 on which the switch S' is supported. An arm 54 is pivoted at 55 to the

upper end portion of the plate 51 and is provided with an offset end portion 57 (Fig. 2) adapted to be engaged by the rear edge of a record sheet F resting on the paper support 11. A laterally displaced portion 58 (Fig. 1) of the offset portion 57 of the arm 54 underlies an edge portion 59 of the bracket 53 to prevent accidental displacement of the arm 54.

When the offset portion 57 is engaged and pushed rearward by the sheet F, the arm 54 moves to the position shown in Fig. 3, thus raising the magnet 50 close to the bulb 40. In this position, the magnet exerts sufficient magnetic pull through the glass to draw the armature 47 downward, thus immersing the terminal 48 in the mercury 45. The parts will remain in this position until rearward pressure of the sheet F is relieved, whereupon the magnet 50 will move downward, releasing the armature 47, and the spring 46 will lift the terminal 48 out of the mercury, breaking the circuit.

When the switch S' is closed, parallel branch circuits are simultaneously closed through the solenoid 15 and the holding magnet 30, the switch S being normally closed. The solenoid 15 thereupon actuates the plunger 14 and platen 12 to stamp an impression on the record sheet F by which the circuit was closed.

It is desirable that the stamping circuit be broken immediately after the making of the impression, so that the solenoid coil may not become overheated and also that continuous pressure may not be applied to the type wheels T, particularly if time-operated.

I will now describe the novel devices which I have provided for breaking the solenoid circuit after a single impression and for holding the circuit open until the sheet F is removed, thus allowing the switch S' to open.

The switch S (Figs. 4 to 7) comprises a pair of contacts 60 and 61 (Fig. 7) mounted on a cross plate 62 and engaging contacts 63 and 64 mounted respectively on fixed plates 65 and 66 to which the wires 34 and 35 (Fig. 5) are respectively connected. The plates 65 and 66 are supported on fixed insulating blocks 70 (Fig. 3) and the cross plate 62 is mounted on a plate 72, also of insulating material and fixed to the upper end of an armature lever 73.

The lever 73 is provided with a cross shaft 75 (Fig. 5) pivoted in fixed brackets 76 and 77. The lever extends downward adjacent the U-shaped core 80 of the holding magnet 30 previously described. The core 80 and magnet 30 are mounted in fixed position, and the circuit through the magnet 30 is completed whenever the switch S' is closed, all as previously described.

An arm 85 (Figs. 4 and 6) is fixed to the upper end of the solenoid plunger 14. On upward movement of said plunger the arm 85 engages the outer end of a bracket 86, secured to the upper end of the armature lever 73. A spring 88 (Fig. 5) acts to normally close the switch S' by moving the parts to the position shown in Fig. 4.

When the solenoid 15 is energized, the plunger 14, platen 12 and arm 85 move upward to the position shown in Fig. 6 and during such movement the arm 85 engages the bracket 86 and forcibly opens the switch S, shifting the switch parts to the position also shown in Fig. 6.

In this position, the armature lever 73 is attracted by the holding magnet 30 and its core 80 with sufficient force to prevent return movement of the armature lever 73 and associated parts as the solenoid plunger descends and until the holding magnet circuit is broken by the opening of the switch S'. Thereupon the armature lever 73 and associated parts return to the normal position shown in Fig. 4, with the switch S closed.

It will thus appear that I have provided means for closing both the solenoid and the holding magnet circuits by insertion of a paper or record sheet, together with effective means to forcibly open the switch S on the first upward or stamping movement of the platen 12, and that I have also provided means for holding the switch S open until the switch S' is opened by removal of the record sheet. The control of the circuits is thus positive and reliable and possible overheating of the solenoid coil is wholly avoided.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:

1. In a recording mechanism having a platen, a solenoid to move said platen, a solenoid circuit and a normally-open manually-operated main switch in said circuit, that improvement which comprises a normally closed switch in the solenoid circuit, a holding magnet in a parallel circuit controlled only by said main switch and which is itself non-effective to open any circuit, means associated with said platen which directly engages and positively opens said normally closed switch as the platen completes an operative movement given by said solenoid, and means through which said magnet acts to thereafter hold said latter switch open as long as the manually operated main switch remains closed.

2. In a recording mechanism, a main circuit, a manually operated switch to close said main circuit, a holding magnet in said main circuit which is itself non-effective to open any circuit, a platen, a solenoid to actuate said platen, a branch circuit for said solenoid controlled by said main switch, a normally closed switch in said branch circuit in series with said main switch and having a circuit-opening element, a movable support for said circuit-opening element, and means associated with said platen which mechanically engages and positively moves said support and circuit-opening element to open said second switch and the solenoid branch circuit controlled thereby on the completion of an operative movement of said platen, a portion of said movable support being thereby positioned by said means adjacent the core of said holding magnet and being thereafter retained by said magnet until the main circuit is broken.

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