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 [21] Appl. No. **828,573**
 [22] Filed **May 28, 1969**
 [45] Patented **Mar. 2, 1971**
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[56]

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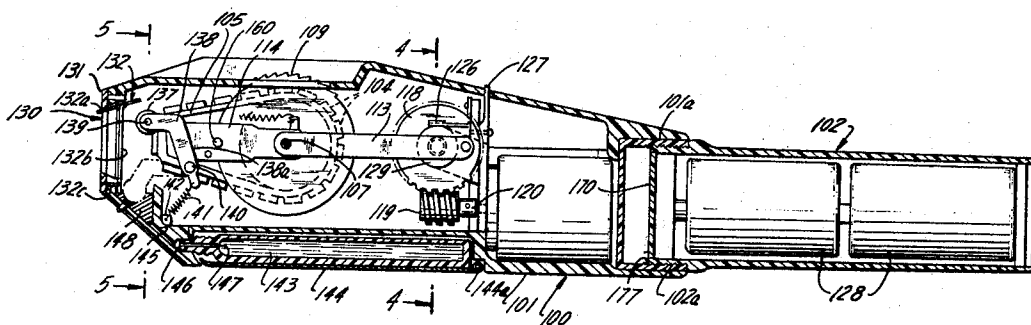
[54] **ELECTROMECHANICAL MARKING DEVICE**
10 Claims, 6 Drawing Figs.

[52] U.S. Cl. **101/108,**
101/111, 101/287, 101/333, 101/35

[51] Int. Cl. **B41j 3/34,**
B41j 7/84

[50] Field of Search..... **101/35, 41,**
44, 72, 108, 103, 105, 111, 287, 333, 316, 317,
318

ABSTRACT: An electrically operated marking device for stamping articles repeatedly with preset characters. Marking of an article is accomplished by placing the marking device in contact with the article with slight pressure to close a switching contact. The closing of the switch causes the marking device to apply an impression of the preset characters to the article.



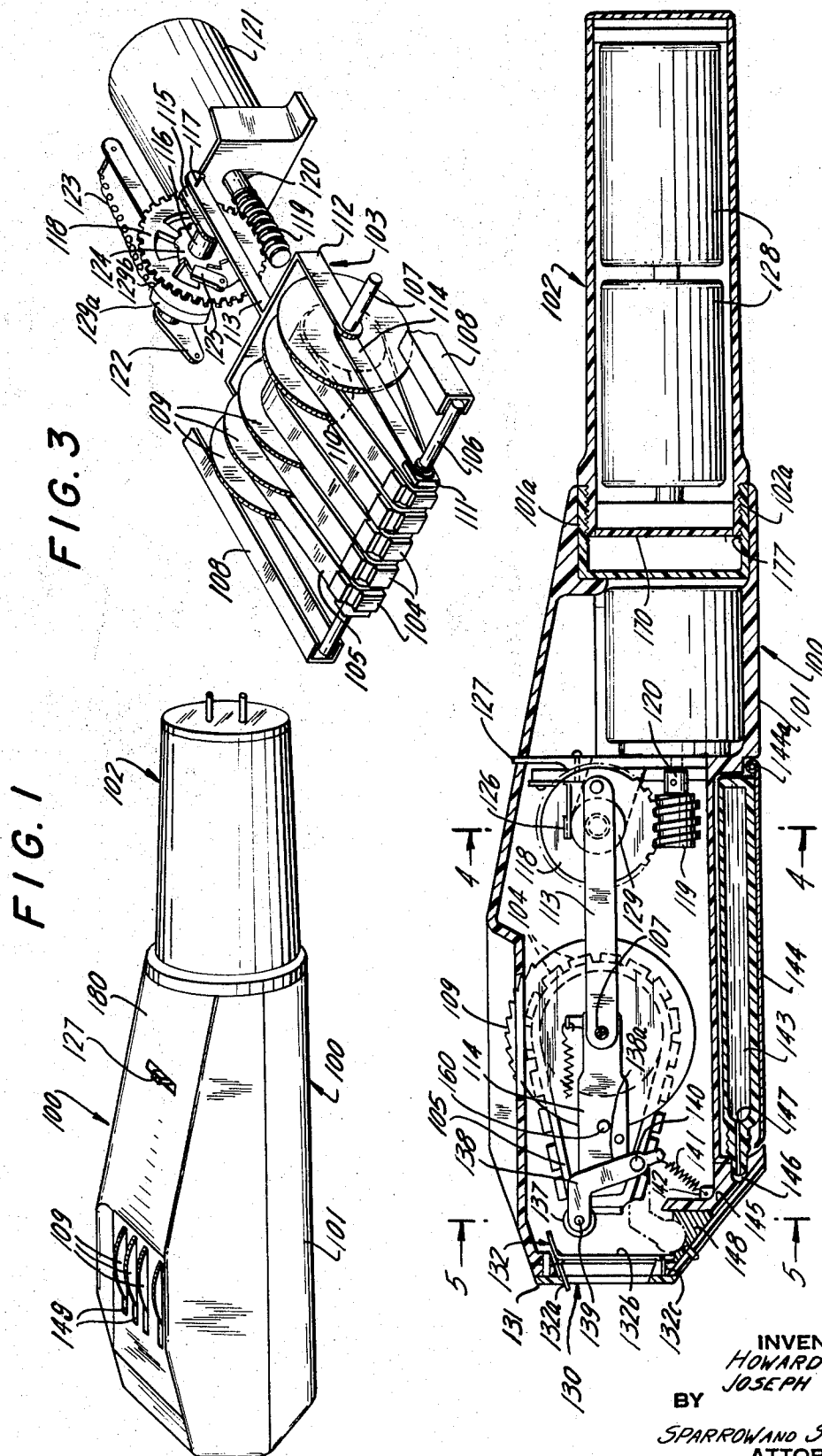


FIG. 4

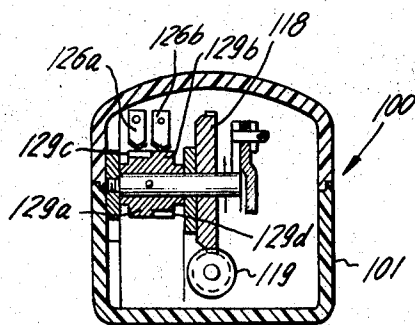
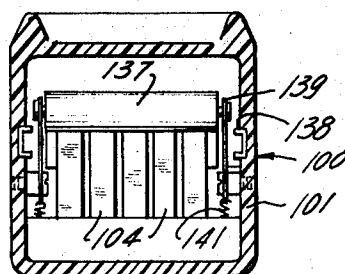
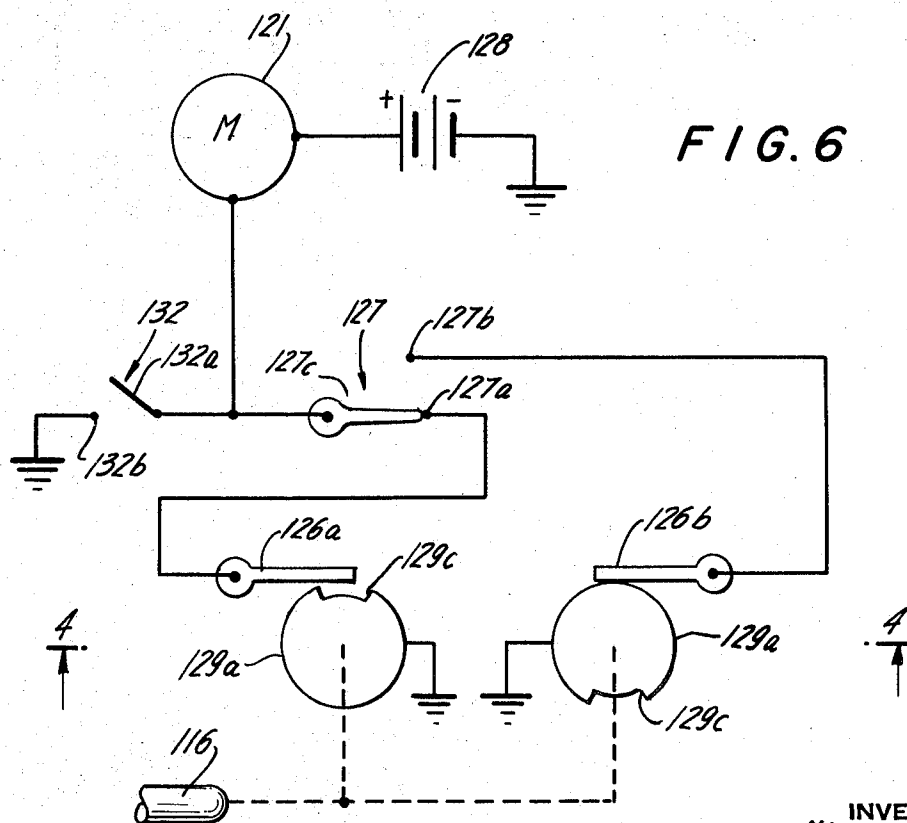


FIG. 5



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ELECTROMECHANICAL MARKING DEVICE

BACKGROUND OF THE INVENTION

This application is related to the copending application Ser. No. 753,290 filed Aug. 16, 1968.

The present invention relates to marking devices in which the characters to be stamped may be varied at will. Heretofore, preset rubber stamps had to be manually operated when applying repeated stamping operations to a large number of identical articles desired to be stamped. This has particularly been the case in food markets or supermarkets where a large number of articles must be price marked daily. The present invention overcomes the laborious manual operation of the conventional rubber stamping devices known in the art, by providing a novel improvement in the form of an electrically operated device.

SUMMARY OF THE INVENTION

An electromechanically operated marking device in which a motor is energized by the closing of a switch actuated when the marking device is placed upon the article to be marked. The operation of the motor imparts translatory motion to a carriage which moves preset characters in contact with the article to be marked. An inking roller operated through the action of the carriage applies ink to the characters prior to every impression to be made by them. A novel inking arrangement assures that the proper amount of ink is applied to the printing characters. An interchangeable handle is provided with the marking device for containing battery cells used in the operation of the motor to allow continuous operation of the marking device. The duration of the motor operation is controlled through a novel arrangement of cam operated switches. The cams are mounted on a shaft which determines the motion of the carriage in applying the printing character to the article being marked.

Various further and more specific purposes, features and advantages will clearly appear from the detailed description given below taken in connection with the accompanying drawings which form part of this specification and illustrate merely by way of examples, embodiments of the device of the invention.

BRIEF DESCRIPTION OF THE DRAWING

In the following description and in the claims; parts will be identified by specific names for convenience, but such names are intended to be as generic in their application to similar parts as the art will permit. Like reference characters denote like parts in the several FIGS. of the drawing, in which:

FIG. 1 is an isometric view of the marking device as it appears on the surface, in accordance with the present invention;

FIG. 2 is a longitudinal sectional view of FIG. 1 and shows the internal assembly of the marking device;

FIG. 3 is a perspective view of the carrier and associated mechanism for the operation thereof;

FIG. 4 is a transverse sectional view taken along line 4-4 in FIG. 2;

FIG. 5 is a transverse sectional view taken along line 5-5 in FIG. 2; and

FIG. 6 is a circuit diagram and shows the electrical control arrangements of the marking device in accordance with the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawing, the marking device 100, in accordance with the present invention, has a housing 101 which is recessed at one end to accommodate a handle 102. The internal wall of the recess 101a is internally threaded to receive a corresponding threaded portion 102a on the handle 102. A slidable carriage or carrier 103 is arranged within the housing 101, and has mounted upon it a plurality of endless elastic

bands 105 in juxtapose position. The bands 105 are provided with characters 104 made of suitable material as, for example, rubber. The characters carried upon the bands 105 are reversed so that they print positive characters on the articles to be marked with the device. Post 106 and shaft 107 extend laterally into tracks 108, within the housing 101, for the purpose of guiding the carriage or carrier 103 in straight line motion.

Shaft 107 carries knurled wheels 109 arranged parallel to each other in spaced relation. Each wheel has a hub 110 over which a band 105 is trained in the conventional manner. The bands are further trained over a bar 111. A saddle 112 is mounted on the shaft 107. A centrally disposed bar 113 extends from the saddle 112. Bar 111 is transversely arranged and supported by lateral arms 114 which are mounted on the shaft 107. An arm 115 fixed to a shaft 116, is rotatably connected to the bar extension 113, through a means of the pin 117. A worm gear 118 on the shaft 116, is driven by a worm 119 mounted upon the shaft 120 of a motor 121. The motor 121 is operated through a battery 128, preferably of the rechargeable type. A lever arm 122 is also fixed or secured to the shaft 116, and has attached to it one end of a helical spring 123. The other end of the spring 123 is anchored to a fixed support. A ratchet wheel 124 is also secured or fixed to the shaft 116. A pawl 125 is mounted swivably on the worm gear 118, and meshes with the ratchet wheel 124. Thus, when the motor 121 rotates, shaft 120 and worm 119 rotate the worm gear 118. As a result shaft 116 is also rotated. With the rotation of shaft 116, the lever 122 is also displaced angularly and thereby causes the expansion of the spring 123. With the rotation of the arm 115, at the same time, reciprocal motion is imparted to the bar extension 113, and therefore to the carriage 103, pulling the latter to its retracted position shown in FIGS. 2 and 3. When this position of the carriage is attained the switching device 126 is actuated and the motor 121 is stopped.

The switching device 126 has two spring contacts 126a and 126b engaging conductive cams 129a and 129b. These two cams are rotated by the shaft 116 upon which they are securely mounted. The spring contact 126a is connected to one selectable terminal 127a of a switch 127 which functions as a selector switch. The other selectable contact or terminal 127b of the switch 127 is connected to the spring contact 126b. The operation of the spring contacts 126a and 126b with their respective cams is such that a closed circuit condition prevails when the spring contact 126a, for example, is in contact with the periphery or body of the conductive cam 129a, which does not include the gap 129c.

When the cam 129a, made of electrically conducting material, is rotated so that the gap 129c lies opposite or faces the spring contact 126a, an open circuit condition prevails since no current flow can take place through the air gap 129c between the spring contact 126c and the body of the cam 129a. This same operational condition applies to the spring contact 126b and its associated cam 129b. The movable contact 127c of the switch 127 is connected to one terminal of the motor 121. This same terminal of the motor and the movable contact 127c are also connected to the switch 132 at the front of the marking device. The other terminal of the motor 121 is connected to one terminal of the battery 128 held within the handle of the marking device. The remaining terminal of the battery 128 is connected to the housing of the marking device which is made of conductive material. The connection of this battery terminal to the housing is represented schematically in the drawing as a ground connection. This ground connection or negative terminal of the battery 128 may also be directly connected to the switch 132 through a conductor such as a connecting copper wire, instead of taking the conductive path through the housing so as to join the negative terminal of the battery to the switch 132. In a similar manner, this negative terminal of the battery 128 may also be directly applied through a copper wire path to the shaft 116 or more directly the cams 129a and 129b.

Since the cams are rotating members, a contacting brush would be required to establish a continuous circuit between the moving cam and the fixed wire. By connecting the negative terminal of the battery 128 to the housing in accordance with the present invention, however, such contacting brushes may be avoided since the shaft 116 is held in bearings which are in electrical contact with the housing. The shaft 116, and hence the cams, have thereby the negative battery potential directly applied to them. The cam 129a and associated spring contact 126a function to operate the motor 121 so that the carriage 103 carrying the marking numerals is brought forward and held in the forward position to allow setting of the marking numerals or characters. When it is desired to bring the carriage forward for setting the characters to be marked on the article by rotating wheels 109 the movable contact 127c is brought into electrical contact with the fixed selectable contact 127a. This moving of the contact 127c is accomplished manually by the operator or user of the device. In this position of the selector switch 127, the electrical circuit to the motor 121 is completed so that the motor will operate and thereby rotate the shaft 116. This shaft will, as a result, rotate the cam 129a until the gap 129c lies opposite the spring contact 126a, at which instant the circuit to the motor 121 is interrupted and the motor ceases to operate. This is shown in FIGS. 4 and 6. At that point where the gap 129c lies opposite the spring contact 126a, however, the carriage of the marking device is precisely in the forward position and available to the user of the device for varying the setting of the numerals or characters as desired. Thus, the gap 129c is a relatively narrow gap and will appear under the spring contact 126a only when the carriage is in the forward position. At the same time, however, the gap 129c is made sufficiently wide to assure that the motor 121 may come to a stationary position within the gap and that, therefore, no overshoot of the motor will result across the gap.

After the numerals of the marker have been set by the user as desired, the carriage may be retracted to its opposite extreme position within the housing of the marking device by shifting selector switch in the opposite direction and thus actuating or displacing the movable contact 127c so that it is in electrical contact with the fixed selectable contact 127b. In this position of the switch 127, the circuit to the motor 121 is completed through the cam 129b and the spring contact 126b. The motor 121 will thereby rotate until the shaft 116 connected to the motor positions the cam 129b so that the gap 129d lies opposite the spring contact 126b. In this position of the cam 129b, the circuit to the motor becomes interrupted and the latter is thereby brought to a stationary position. The gap 129d is arranged relative to the gap 129c so that the two gaps are thus displaced 180° from each other. Displacement of the two gaps by 180° results from the condition that the forward position of the carriage is directly opposite to the retraction position. Since one revolution of the cam constitutes a full cycle of movement of the carriage, the cams will rotate 180° when the carriage moves between the forward and retracted positions. When the angular rotation of the shaft 116 and hence cam 129b has been attained, so that the motor is stopped by interrupting its circuit leading to the battery 128, the spring 123 is under tension. Counterclockwise rotation of the shaft 116 resulting from the tension in spring 123, is prevented through the action of the ratchet 124 and the pawl 125. The device is now set or in the state for operation.

The front end 130 of the housing 101 is open and is surrounded by a frame 131. A second switch 132 is located within the housing and in the vicinity of the opening or front end 130. The switch 132 has two spring contacts 132a and 132b. The spring contact 132a has an angled arm which protrudes beyond the front face of the marking device. The spring contact 132a is fixed at one end 132c, to the housing 101. The spring contact 132b is similarly fixed at one end to the housing 101. The spring contacts 132a and 132b are arranged to cooperate with each other, so that when slight pressure is applied to the protruding angled arm of the spring con-

tact 132a, the latter is moved into electrical contact with the spring 132b, and thereby establishes circuit closure for the switch 132. When any pressure applied to the spring contact 132a, in this manner, is released, the latter moves away from the spring contact 132b, and thereby interrupts the electrical circuit through the spring contacts. As a result, the switch 132 is in the open state.

To initiate a marking cycle, the user brings the front end of the device in contact with the surface to be marked. This action closes the switch 132 by bringing the contact spring contact 132a against the fixed contact 132b. With switch 132 closed in this manner, the circuit to motor 121 is closed and, as a result, the latter commences to rotate. Worm gear 119 and shaft 116 become thereby rotated until lever arm 122 moves clockwise over dead center in relation to spring 123 to allow the latter to contract. Through contraction of the spring 123 shaft 116 becomes rapidly rotated and a "kick" is imparted to the carriage 103 while bringing the latter to its extreme forward position. In this forward position the desired surface becomes marked, and the carriage is thereafter retracted since the motor continues to rotate as a result of the position of switch 127 in which movable contact 127c rests against fixed contact 127b. When the carriage has arrived at its extreme retracted position, air gap 129d lies opposite contact 126b so that motor 121 stops rotating and a marking cycle has been completed.

An inking roller 137 is pivotably mounted upon an arm 138, through means of the pin 139. The arm-shaped lever 138 is itself rotatably mounted upon a pin 140. A spring 141 has one end attached to the arm-shaped lever 138, and one end to a fixed portion 142 of the housing 101. The spring 141 is tensioned so that the lever 138 and hence the inking roller 137 are in the position shown in the drawing, when the carriage 103 is in the retracted state or position. An inking wick or pad 148 is retained within a reservoir shaped in the form of a compartment from the housing 101. The inking wick or pad 148 applies ink to the inking roller 137 when the latter is dipped into the wick when in the position shown by the phantom lines in the drawing. The ink is supplied by a cartridge 143 located in an accessible manner within the housing 101. The cartridge 143 is of the disposable type, in that it may be discarded when the ink within the cartridge has been exhausted. When replacing the cartridge 143, the door 144 hinged to the housing by means of the pivot 144a is swung open. When using the device in normal operation, the door or flap 144 is closed and flush with the exterior surface of the housing 101. The cartridge 143 has an opening 147 leading into a reservoir or cavity 146. A duct or passage 145 within the housing wall 101 communicates with the reservoir 146 and the wick 148. When the marking device 100 is operated, ink flows by gravity from the cartridge 143 to the wick 148, through the action of gravity. As a result, the wick 148 is continuously maintained moist with ink. At the same time, excess ink within the wick is avoided, for once the wick is sufficiently moist, ink will cease to flow from the cartridge 143, in view of the relatively narrow dimension of the passage 145. When the carriage 103 is moved forward for the purpose of carrying out a marking operation, the pin 160 upon the arm 114 bears against the lever 138 and forces the latter to pivot about the pin 140. Thus, when the carriage 103 moves forward, the pin 160 rides along the surface 138a, and this action results in angular rotation of the lever 138, which in turn causes the inking roller 137 to dip into the wick 148. When the inking roller is thus dipped into the wick 148, the roller is also out of the way of the marking characters 104 which may now move forward to carry out the desired marking operation. When the carriage 103 is again retracted at the end of the marking operation, the spring 141 returns the lever 138 to its initial position shown by the solid lines in the drawing. While returning to this initial position, the inking roller 137 contacts the characters 104 and applies ink to them in preparation for the next marking operation.

Each one of the bands 105 is operated by a knurled wheel 109 which protrudes through suitable slots 149 in housing 101. Wheels 109 are preferably arranged so that they do not protrude above the top plane of the housing 101. This design prevents accidental movement of the wheels.

While the invention has been described and illustrated with respect to certain preferred examples which give satisfactory results, it will be understood by those skilled in the art after understanding the principle of the invention, that various changes and modifications may be made without departing from the spirit and scope of the invention and it is intended therefore in the appended claims to cover all such changes and modifications.

We claim:

1. An electromechanically operated marking device comprising, in combination, a housing open at one end; a handle secured to the other end of said housing; a source of energy within said handle; carrier means movable within said housing; adjustable marking characters on said carrier means; electromechanical operating means coupled to said carrier means and electrically connected to said source of energy for moving said carrier means between a forward position and a retracted position within said housing, said marking characters on said carrier projecting from said housing opening when said carrier is in said forward position, said carrier being in said forward position for printing and adjusting selectively said marking characters; first switch means in proximity to said housing opening and connectable between said electromechanical means and said source of energy and adapted when actuated for operating said electromechanical means, said first switch means being actuated by mechanical pressure applied thereto at said housing opening and connecting when actuated said electromechanical operating means to said source of energy, said first switch means being in circuit opening state when deactuated by removal of said pressure; second switch means connectable between said electromechanical means and said source of energy for holding said carrier means stationary when in said forward position; means linked to said carrier means and actuating said second switch means in relation to the position of said carrier means, said second switch means being actuated through motion of said carrier and disconnecting said source of energy from said electromechanical means only when said carrier is in said forward position; third switch means connectable between said electromechanical means and said source of energy for holding said carrier means stationary when in said retracted position; means linked to said carrier means and actuating said third switch means in relation to the position of said carrier means, said third switch means being actuated through motion of said carrier and disconnecting said source of energy from said electromechanical means only when said carrier is in said retracted position; and manually operated fourth switch means connected to said second and third switch means for selectively connecting one of said second and third switch means between said electromechanical means and said source, said carrier being moved by said electromechanical means from said retracted position to said forward position and returned to said retracted position upon actuation of said first switch means and when said fourth switch means connects said third switch means between said source and said electromechanical means, said carrier means being moved to said forward posi-

tion and held in said forward position when said fourth switch means connects said second switch means between said source and said electromechanical means.

2. The electromechanically operated marking device as defined in claim 1 wherein said fourth switch means comprises manually operated selector switch means selectively connectable to said second and third switch means for holding said carrier means stationary in one of said positions, said selector switch means having two selector positions for selectively connecting, on one hand, said first switch means between said source and said electromechanical means, and connecting, on the other hand, said second switch means between said source and said electromechanical means, whereby said carrier is held stationary in said forward position when said selector switch is in one selector position and said carrier is held stationary in said retracted position where said selector switch is in the other selector position.

3. The electromechanically operated marking device as defined in claim 1 wherein said first switch means comprises a single pole normally open switch mounted at said open end of said housing and actuated by pressure between said housing and the surface to be marked by said marking device, closure of said first switch means by said pressure connecting said source to said electromechanical means and thereby operating said electromechanical means.

4. The electromechanically operated marking device as defined in claim 1 wherein said second and third switch means each comprise a cam member mechanically linked to said carrier means and positioned as a function of the motion of said carrier; and a contact member bearing against said cam member.

5. The electromechanically operated marking device as defined in claim 4 wherein said cam member has a cutout gap for interrupting electrical contact between said cam member and said contact member in a predetermined position of said cam member.

6. The electromechanically operated marking device as defined in claim 5 wherein said cutout gap in said second switch means is displaced 180° of cam rotation from the cutout gap in said third switch means.

7. The electromechanically operated marking device as defined in claim 2 wherein said selector switch comprises a multiposition switch with a movable member displaceable between at least two positions of said multiposition switch, one position of the same connecting said electromechanical means to said second switch means and another position of said multiposition switch connecting said electromechanical means to said third switch means.

8. The electromechanically operated marking device as defined in claim 1 wherein said source of energy is an electrical voltage source with one terminal connected to said housing.

9. The electromechanically operated marking device as defined in claim 8 wherein said source of energy comprises a battery.

10. The electromechanically operated marking device as defined in claim 1 wherein said electromechanical means comprises a motor with shaft mechanically coupled to said carrier means, said motor being electrically connected to said source of energy.