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M. G. ROLAND

3,264,742

TUMBLER IDENTIFYING KEY READER

Filed April 12, 1965

2 Sheets-Sheet 1

Fig. 1.

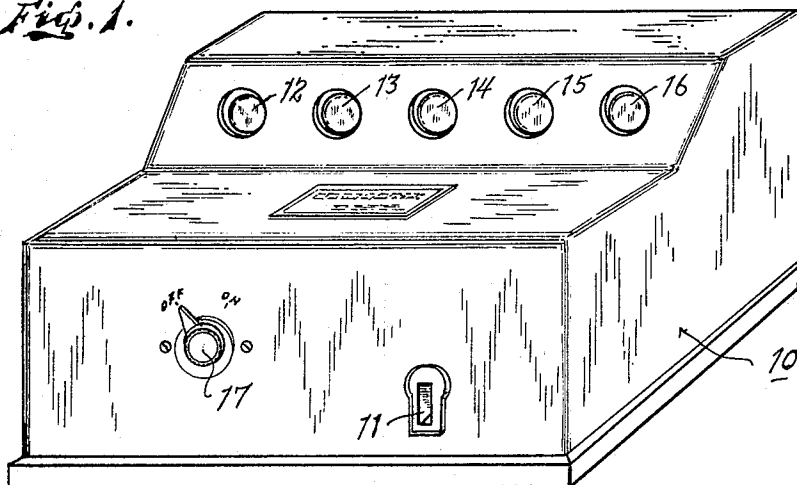


Fig. 2.

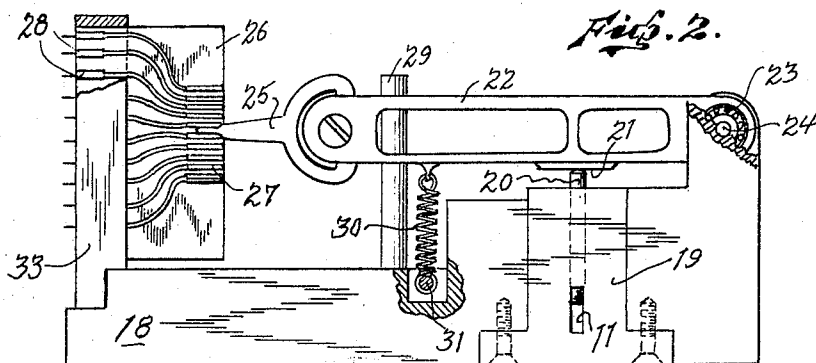
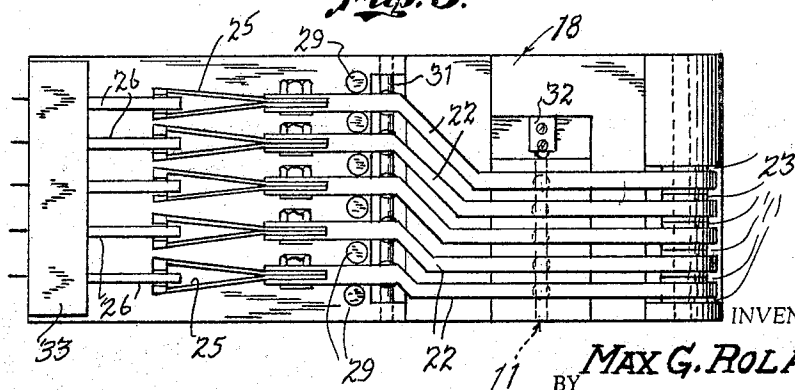


Fig. 3.



INVENTOR.

MAX G. ROLAND.

BY

W. H. Atkinson
ATTORNEY

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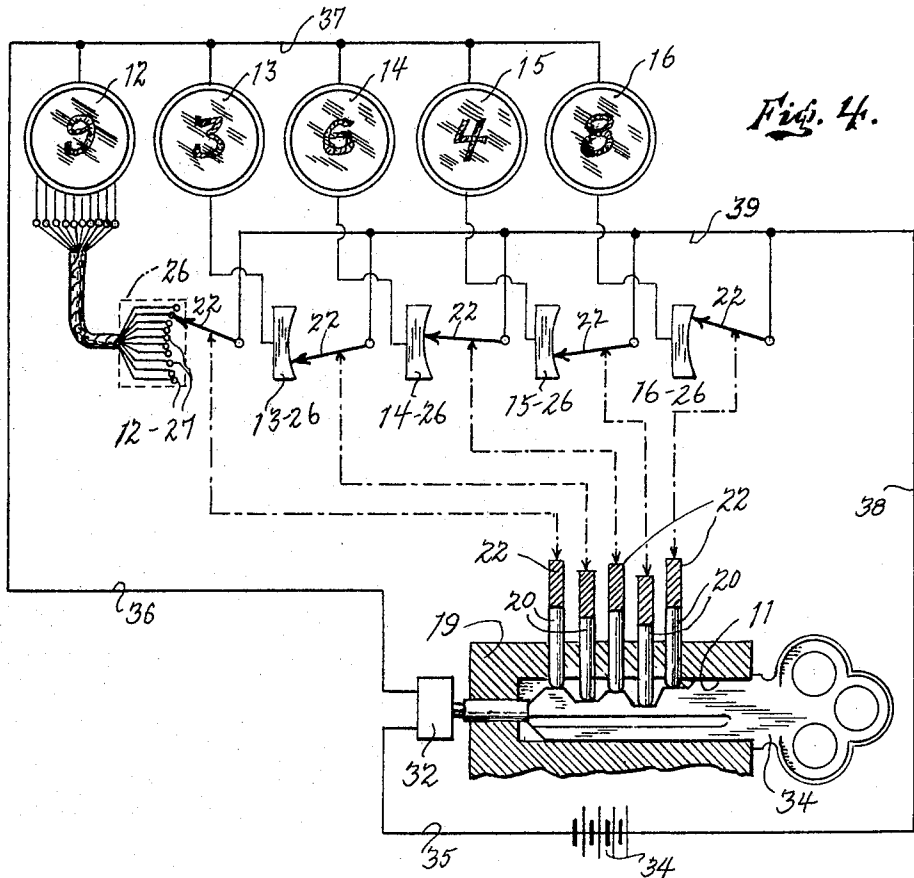
M. G. ROLAND

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2 Sheets-Sheet 2



INVENTOR.
MAX G. ROLAND.
BY
J. H. Robinson
ATTORNEY

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TUMBLER IDENTIFYING KEY READER

Max G. Roland, San Carlos, Calif., assignor to Maromatic Company, Inc., Burlingame, Calif., a corporation of California

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4 Claims. (Cl. 33-174)

This application is a continuation-in-part of my co-pending application Serial No. 378,314, filed June 26, 1964, now Patent No. 3,226,811, dated January 4, 1966, and entitled Tumbler Lock Pin Setting Machine, and is particularly directed to that feature which involves the sensing and selection of the tumbler pins required for a particular lock cylinder for a key with a plurality of tumbler pin engaging bits.

My present invention relates to the manufacture of tumbler locks and more particularly to a tumbler identifying and key sensing device for determining the character of the tumbler pins for a lock cylinder to match the bits of a key to be used therewith.

The principal object of the invention is to provide a device for determining the lengths of the tumbler pins to be assembled in a lock cylinder for use with a particular key.

Another object of the invention is to provide a key reader having visual indicating means for simultaneously indicating the character of any one of a plurality of different tumbler pins for use in a multiple bit key cylinder.

Another object of the invention is to provide an electro-mechanical device for determining in an automatic manner the character of any one of a plurality of pins to be employed in a tumbler lock cylinder by a reading of the bits of a key to be used therewith.

Other objects and advantages will be in part evident to those skilled in the art and in part pointed out hereinafter in the following description taken in connection with the accompanying drawings wherein there is shown by way of illustration and not by limitation a preferred embodiment of the invention.

In the drawings wherein like numerals refer to like parts throughout the several views.

FIGURE 1, is a perspective view showing my invention as embodied in an enclosed portable unit.

FIGURE 2, is a side elevation of the key reading means,

FIGURE 3 is a top view of the device as shown in FIGURE 2, and

FIGURE 4 is a circuit diagram showing electrical connections as contemplated by the invention.

In the manufacture of cylinder locks of the type contemplated, the practice has become generally standardized in that the selection of tumbler pins involves pins of ten different lengths that are numerically identified as from zero to nine. Similarly the diameters of these pins are also more or less standardized and range in diameters from 0.094" to 0.115". The prevailing practice for door and like locks the keys have a total of five bits, but in special cases the key may have six or more bits. Spacing of the bits upon the key will be determined by the diameters of the pins to be used therewith and this for a five bit key is approximately $\frac{5}{32}$ of an inch. This series of bits must also have a definite location with respect to a shoulder or hilt formed upon the key in order to insure a proper register with a complementary pin. In the case of the glove compartment or trunk lock as practiced in the automobile art, the locks may have a smaller number of tumbler pins for example the glove compartment may require a key with only three bits while a trunk lock might require a four bit key.

In accordance with present procedure the individual keys are pre-cut and stamped with a series of numbers

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corresponding to the bits of the particular key. These keys are then threaded upon a rod or wire for presentation at the cylinder lock loading station where the operator will insert into the lock cylinder a series of tumbler pins corresponding with the numbering upon the key. After this the cylinder with the tumbler pins and the particular key will be passed on for a further assembly operation where the cylinder thus equipped with pins will be inserted in the lock body where the driving pins and springs will be finally assembled into the lock. In this procedure with the key bits identified by stamped numbers, the experience and skill of the operator is quite important. In other instances where the pre-cut keys are forwarded to the pin assembly station without bit identifying numbers, the operator is then required through knowledge gained by experience to select a proper pin for a particular key. When it is considered that there are some ten different pins from which this selection must be made, it will be readily appreciated that extreme skill will be required. It is therefore a further and more particular object of my present invention to provide a key reading means by which the bits of a particular key may be identified for numbering and/or related to a complementary tumbler pin for assembly into a tumbler lock cylinder.

For a more detailed description of the invention reference is now made to the accompanying drawings where in FIGURE 1, I have shown my invention as mounted within a portable cabinet 10 having a key accommodating slot 11 at its front and five visual character indicating devices 12, 13, 14, 15 and 16 upon which the characteristics of the different tumbler pins for use with a particular five bit key are indicated and registered. While not shown it will be understood that an electric source of power will be connected with the cabinet 10 from any suitable source and for controlling this circuit there is an exposed OFF-ON switch 17 that is mounted at a convenient point on the front of the cabinet 10.

Upon referring to FIGURES 2 and 3 of the drawings it will be noted that except for the visual indicating registers 12, 13, 14, 15 and 16 and the required circuit connections, my key sensing means consists of a unitary assembly which comprises a base 18 with a replaceable key slot carrying member 19 into which the key slot 11 referred to hereinbefore is formed. This member 19 will vary in accordance with the particular type of key that is to be sensed and may carry operating pins or key bit engaging feelers 20 which in number and spacing will also conform with the key in question. These operating pins 20 terminate at their lower ends within the key slot 11 and extend a sufficient depth to engage with the lowermost bit of a key. At their upper ends the bit engaging feelers or pins 20 engage surface plates 21 carried by contact carrying levers 22 which correspond in number to the number of operating pins 20 carried by the key slot carrying member 19. In this instance the device has five electrical contact carrying levers 22 that are pivotally mounted at one end upon anti-friction bearings 23 carried by a transversely extending shaft 24. At their extending ends these levers 22 each have flexible contact engaging members 25 that are arranged in pairs to contact with opposite sides of a printed circuit carrying member 26 having a circuit with spaced contacts 27 and extending line terminals 28 printed thereupon. To insure a proper alignment of the individual levers 22 with the printed circuit carrying members 26 there is provided a number of spacing posts 29 between which these several levers operate and for biasing these levers into their lowermost position they each carry a tension spring 30 that is secured to a transversely extending rod 31 upon the base 18. As better shown FIGURE 3 the base 18 also carries a microswitch 32 at the inner end of the key

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accommodating slot 11 which will be engaged by a key when inserted fully therein. It will also be noted that the levers 22 are spaced at their pivotal end in accordance with the spacings of the tumbler pins of a lock and at their outer free ends they are spaced further apart to accommodate the five printed circuit carrying members 26 which are firmly positioned outwardly therefrom and carried in a vertical plane by a supporting bracket 33.

Reference is now made to FIGURE 4 of the drawings for a description of the operation of the invention. In this showing a bitted key 34 is inserted into the slot 11 of the slot accommodating member 19 and the operating pins 20 are each shown as in a position determined by the particular bit of the key 34 with which they are in contact. To diagrammatically illustrate the further function of the device the respective operating levers 22 are shown at different points of elevation so that the terminal engaging contacts carried thereby will assume different positions with respect to the contacts 27 of the printed circuit carrying members 26 and the contacts 27 of the printed circuit carrying member 26 will be related to corresponding terminals of each of the visual character indicating registers 12, 13, 14, 15 and 16. In this figure of the drawings only one such circuit is indicated, but it is to be understood that in each of the other registers similar circuits will be involved. As here indicated the key has an arrangement of bits which call for a nine, a three, a six, a four and an eight tumbler pin in the lock cylinder with which the key is to be employed. As a source of electrical power I have shown a storage battery 34, but it will be understood that any other source of power as determined by the character of the indicating registers 12 to 16 may be employed. Most of the registers now on the market operate on a low voltage D.C. current. The battery 34 is connected at one side by a conductor 35 through the micro-switch 32 and a conductor 36 to a bus conductor 37 that connects with terminals of the registers 12 to 16 inclusive. At the other side of the battery there is a conductor 38 which connects with a bus conductor 39 that is connected to the pivotal ends to each of the contact-carrying levers 22 or as an alternative and more simplified form the conductor 38 may be grounded upon the lever supporting base 18.

With the above described equipment it will be seen that by inserting a key into the key slot 11 the order and character of pins to be inserted in a complementary lock cylinder will be clearly indicated by registers 12 to 16 and there then only remains for the operator to select the indicated pins in their order from pre-selected groups of pins having characteristics corresponding with the pin identifying registers.

While I have, for the sake of clearness and in order to disclose my invention so that the same can be readily understood, described and illustrated a specific form and arrangement, I desire to have it understood that this invention is not limited to the specific form disclosed, but may be embodied in other ways that will suggest themselves to persons skilled in the art. It is believed that this invention is new and all such changes as come within the scope of the appended claims are to be considered as part of this invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a tumbler pin identifying means for a cylinder lock assembly the combination of, a base member hav-

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ing a key accommodating slot formed therein, a plurality of circuit controlling levers mounted above said slot, a plurality of key bit engaging feelers projecting into said key accommodating slot and spaced to conform with the several bits of a key and operating to move said levers as determined by the engaged bits of the key, a visual character indicating means associated with each of said pivotal levers, an electrical circuit for energizing said character indicating means having connections with a plurality of spaced stationary contacts, a circuit completing contact wiper carried by each of said levers and engaging said contacts one at a time as determined by the bits of a key engaged by said feelers, and a circuit controlling means for rendering said character indicating means operative only when a key is fully projected into the key accommodating slot of said base.

2. In a tumbler identifying means for a cylinder lock assembly the combination of, a base member having a key accommodating slot formed therein, a plurality of levers pivotally mounted above said slot, corresponding in number and position to the bits of a key and a plurality of key bit engaging pins projecting into said key accommodating slot and spaced to engage with the several bits of a key when projected into said key accommodating slot, a visual character indicating means associated with each of said levers, electrical circuits including a number of spaced contacts for energizing said character indicating means, a contact engaging means carried by each of said levers and engaging the spaced contacts of said electrical circuits as determined by said key bit engaging pins, and a power circuit controlling switch for rendering the circuits of said character indicating means operative only when a key is projected fully into the key accommodating slot of said base.

3. A tumbler pin identifying key reader for a tumbler lock assembly operation comprising, means having a tumbler lock key accommodating slot, a plurality of key bit engaging pins extending to and exposed at one edge of the key accommodating slot of said means adapted and arranged to individually engage with the different bits of a key projected into said key accommodating slot, independent lever means operated by each of said key bit engaging pins, electrical visual key bit indicating means, circuits for said visual indicating means controlled by each of said lever means, and a power circuit controlling switch for rendering said visual indicating means operative only when a key to be read is projected fully into the key accommodating slot of said first means.

4. The invention as set forth in claim 3 characterized by the fact that the tumbler lock key accommodating slot of said first means is carried by a replaceable member to accommodate keys of different dimensions.

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LEONARD FORMAN, *Primary Examiner.*

SAMUEL S. MATTHEWS, *Examiner.*