March 14, 1944. B. COOPER 2,344,234

KEY IDENTIFIER

Filed Dec. 12, 1940 4 Sheets-Sheet 1

Fig. 1.

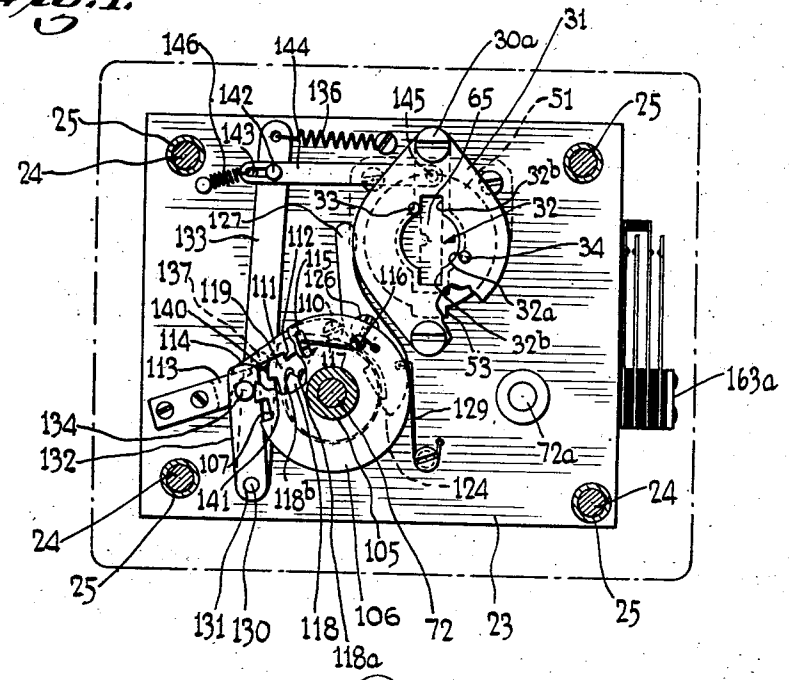
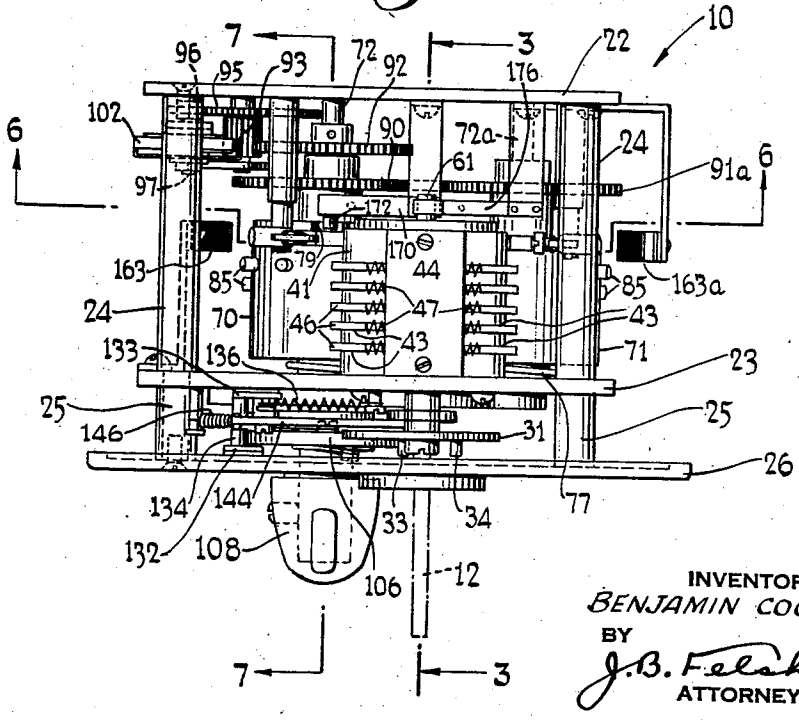


Fig. 2.



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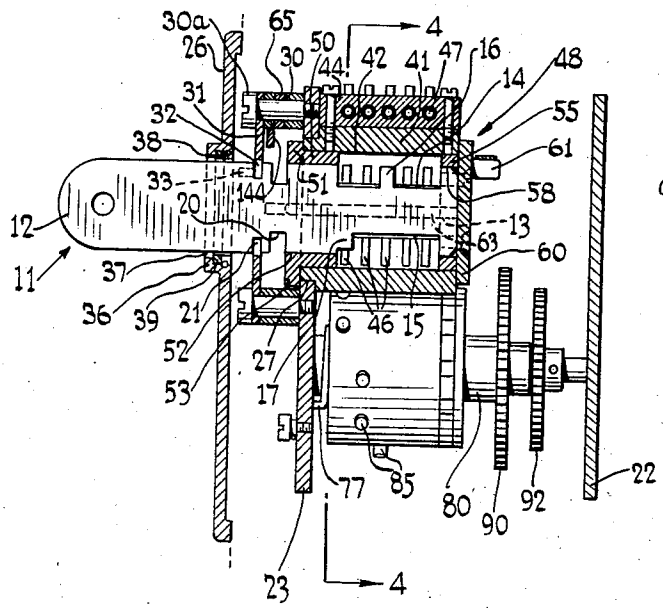


Fig. 3.

Fig. 5.

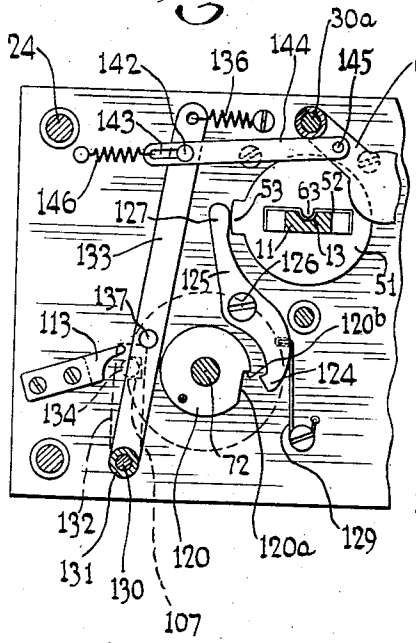
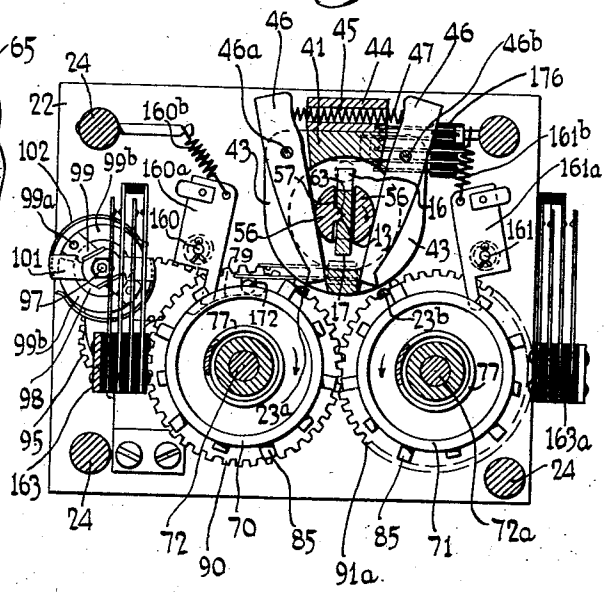


Fig. 4.



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Fig. 6.

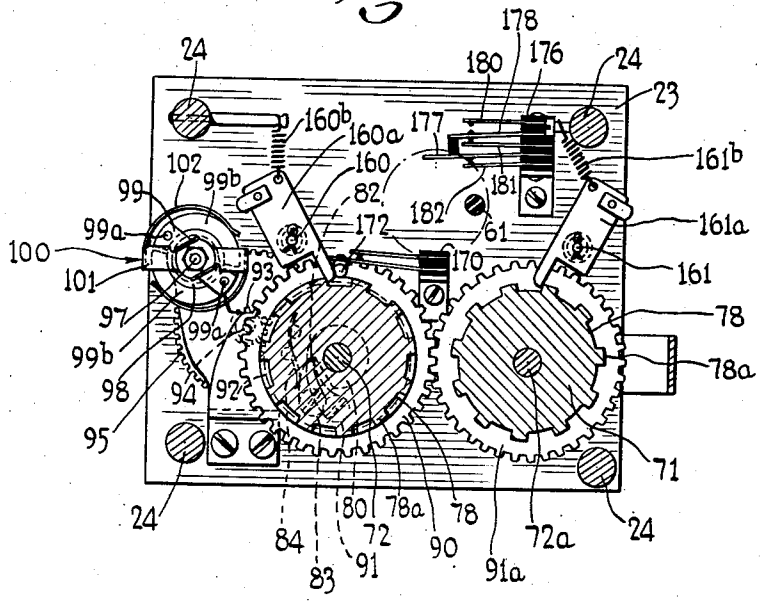
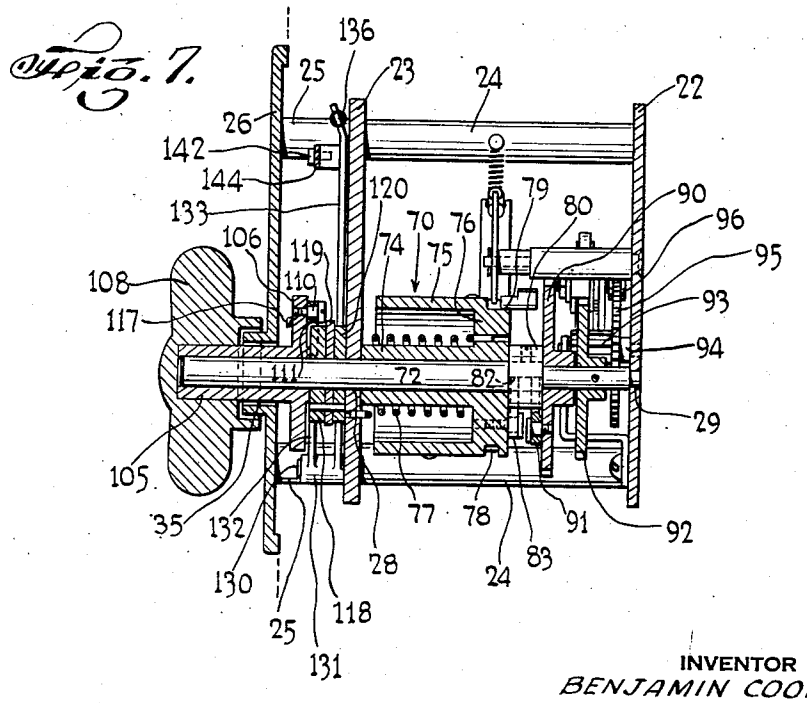


Fig. 7.



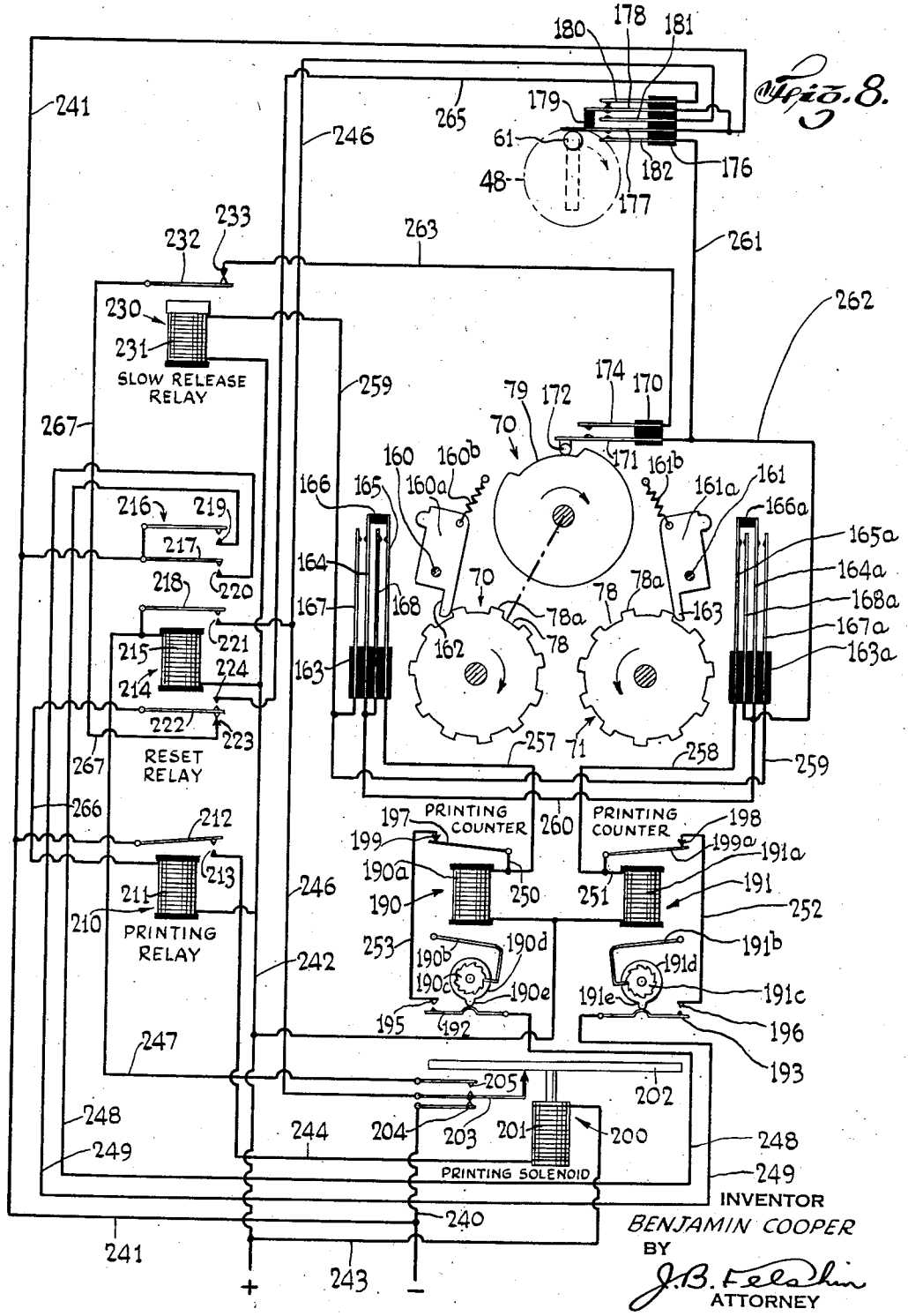
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KEY IDENTIFIER

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Fig. 8.



Patented Mar. 14, 1944

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UNITED STATES PATENT OFFICE

2,344,234

KEY IDENTIFIER

Benjamin Cooper, Jersey City, N. J.

Application December 12, 1940, Serial No. 369,858

14 Claims. (Cl. 177—380)

This invention relates to key operated identifiers. It is particularly directed to an identifier for use in registers, watchman systems, toll checking apparatus, and for the like purposes, and having a pulser actuated by a key to actuate printing counters, whereby a number may be printed corresponding to the shape of the key.

An object of this invention is to provide a key operated identifier of the character described having pulsers operated by a manually wound spring, the identifier being provided with means to prevent insertion of the key into the identifier unless the spring is fully wound and in condition to tilt the pulsing mechanism.

A further object of this invention is to provide in an identifier of the character described, a rotatable member adapted to operate a pulser a number of times depending upon the angle of rotation of the rotatable member, and means to limit rotation of the rotatable member in accordance with the height of a portion of the key and the longitudinal position of said portion.

A further object of this invention is to provide a highly improved compact and rugged identifier of the character described which shall be easy to operate, relatively inexpensive to manufacture, positive in action, which shall have a large variety of applications, and yet be practical and efficient to a high degree in use.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described, and of which the scope of application will be indicated in the following claims.

In the accompanying drawings, in which one of the various possible illustrative embodiments of this invention is shown,

Fig. 1 is a front view of a key identifier embodying the invention, with the front plate removed;

Fig. 2 is a top plan view of the identifier;

Fig. 3 is a cross-sectional view taken on line 3—3 of Fig. 2;

Fig. 4 is a cross-sectional view taken on line 4—4 of Fig. 3;

Fig. 5 is a partial view, similar to Fig. 1, and showing the position of the parts after the key to be identified has been inserted and rotated to pulsing position;

Fig. 6 is a cross-sectional view taken on line 6—6 of Fig. 2;

Fig. 7 is a cross-sectional view taken on line 7—7 of Fig. 2; and

Fig. 8 is a wiring diagram of the circuit controlled by the identifier.

Referring now in detail to the drawings, 10 designates an identifier embodying the invention for identifying a key 11. The key 11 is flat and elongated, and has a handle 12 at one end. One side of the key 11 is formed with a longitudinal central groove 13, for the purpose hereinafter appearing.

The end of the key opposite to the handle end, is formed with a pair of longitudinal notches 14 and 15 into which project shoulders 16 and 17. The shoulders 16 and 17 may be either of full height, as indicated by shoulder 16, or of half height, as indicated by shoulder 17. Each of the shoulders may be located in any one of five longitudinal positions. The shoulder 16 is in a middle position, whereas, the shoulder 17 is in an end position. The height of the shoulders, as well as the longitudinal positions thereof, are for the purpose of illustration only, and the identifying mechanism, as will appear hereinafter will identify the key 11 by two digit numbers, one digit number identifying the position of one of the shoulders, and the other digit number, the position of the other shoulder. Since each shoulder has five longitudinal positions and two heights, the size and location of the shoulder can be identified by one of ten digits.

At substantially the mid portion of the key 11 are a pair of opposite notches 20, for the purpose hereinafter appearing, and a second pair of opposite notches 21, spaced from the notches 20.

The identifier 10 comprises two parallel walls 22 and 23 spaced apart by four spacer rods 24. Fixed to wall 23 as by four spacer rods 25 is a face plate 26 parallel to said wall. Wall 23 is provided with a through opening 27 disposed near the central portion of said wall, and with a through opening 28 disposed below and to one side of the opening 27. Wall 22 is provided with a through opening 29 aligned with opening 28 in wall 23.

Fixed to the outer surface of wall 23, as by spacer rods 30 and screws 30a, is a key guide 31, parallel to said wall and aligned with the opening 27. Key guide 31 is provided with a key slot 32 to receive key 11, having a circular portion 32a, and vertically disposed grooves 32b. Guide 31 is further provided with a stop pin 33 to limit the counter clockwise rotation of key 11, and a stop pin 34 to limit the clockwise rotation of said

key (Fig. 1). Said stops limit rotation of the key 11 to 90 degrees.

Face plate 26 is provided with a circular through opening 35 aligned with the opening 28 of wall 23; and with a raised portion 36 provided with a through opening 37 aligned with the opening 27 in wall 23. Rotatably mounted in the opening 37 is a slotted disc 39. Fixed in the rear portion of opening 37 is a split ring clamp 38, holding the slotted disc 39 in place.

Fixed to plate 23 is a housing member 41 having a portion fitted within the opening 27 and formed with a cylindrical internal bore 42. The side portions of housing 41 are formed with a plurality of similar, symmetrically disposed, slots 43 extending from top to bottom. For the purpose of illustration, there are five slots 43 on each side of the housing 41. The housing 41 is solid at the top and bottom. Fixed to the top portion of the housing 41 is a block 44 formed with through openings 45, aligned with the slots 43. Pivotally mounted within each slot 43 is a lever 46. The levers 46 on one side of the housing are pivoted about a common pivot 46*a* traversing said slots, and the levers on the other side of the housing are pivoted on a common pivot pin 46*b*, traversing the slots and parallel to the first pivot pin. The upper ends of the levers extend above the openings 45. Within the openings 45 are coil compression springs 47 for rotating the lower ends of the levers inwardly toward each other.

Rotatably mounted within the housing 41 is a cage 48 comprising a front cylindrical portion 50 at the front end of which is a vertical plate 51 formed with a slot 52 to receive a key 11 and aligned with the slot portions 32*b* of opening 32, and also with the slot in the slotted disc 39. On plate 51 is a radial lug 53 for the purpose hereinafter appearing.

At the rear end of the cage 48 is an annular disc 55 interconnected to the cylindrical wall 50 by parallel spaced portions 56 forming a slot 57 therebetween through which the key passes. The disc 55 also has a slot 58 to receive one end of the key. Attached to disc 55 is an enlarged circular plate 60 contacting the rear end of the housing 41. Fixed to the plate 60, and extending rearwardly therefrom, is an insulated pin 61 for the purpose hereinafter appearing. On one of the parallel portions 56 is a longitudinal rib 63 adapted to engage within the groove 13 of the key 11. The rib 63 extends to the front face of plate 51.

It will now be understood that the key 11 may be inserted through the slot 37 and through the slot in the slotted disc 39 and through the slot portions 32*b* of opening 32 and through the slot 52 in plate 51 and through the slot 57 between the parallel portions 56 and into the slot 58 in the rear wall 55. When the key is fully inserted, the rear end thereof will contact the circular plate 60. In such position, the slots 21 are aligned with the key guide plate 31 and the slots 20 are disposed in front of the cage 48. The grooved portions 14 and 15 of the key are located within the housing 41 and between the cylindrical wall 50 of the cage and the rear plate 55 of the cage.

The key is inserted horizontally with the upper and lower edges thereof in horizontal position, so that the key is in a vertical plane. In such position, the shoulder 16 points upwardly and the shoulder 17 points downwardly. Shoulder 16 will be in the plane of one pair of levers 46 and shoulder 17 in the plane of another pair of said levers. In such position, one stop 33 will contact one side of the key. The key may then be turned in a clockwise direction, looking at Fig. 1, through an angle of 90 degrees until it contacts the other stop 34. During such rotation, the shoulder 16 will swing the lever 46 on one side of the housing, and aligned therewith, in a counterclockwise direction, and the shoulder 17 will swing a lever on the opposite side of the housing and aligned therewith in a clockwise direction.

It will be noted that the longer shoulder 16 will swing its lever 46 through a greater angle than the shorter shoulder 17. Thus, the location of the shoulders selects the levers to be swung outwardly and the height of the shoulders determines the degree of rotation of the levers.

Means is provided to prevent insertion of the key into cage 48. To this end, there is pivoted to screw 30*a*, a shutter plate 65 disposed in front of the cage and suspended in a position to block the slot 52. Thus, when the shutter is suspended in vertical position, it prevents insertion of the key into the cage, and only when the shutter is swung away to clear the slot 52, in a manner hereinafter to be explained, can the key be inserted into the identifier.

The levers 46 which are swung outwardly by rotation of the key serve as stops to limit angular rotation of a pair of pulsing cylinders 70 and 71 to be described hereinafter. The pulsing cylinder 70 is rotatably mounted on a horizontal shaft 72 journalled within the bearing openings 28 and 29 and passing forwardly through the opening 35 in the face plate 26. The cylinder 70 has a central sleeve 74 journalled on said shaft, and a cylindrical outer wall 75 connected to the sleeve by an end wall 76. The end wall 76 is connected to wall 23 by a torsion spring 77 having one end engaging said end wall and the other end engaging the frame wall 23.

The cylinder 70 is formed with ten equally spaced notches 78 forming teeth 78*a*. At one end of the cylinder is a notch 79 for the purposes hereinafter described. On shaft 72 is a fixed sleeve 80 contacting one end of the cylinder 70 and formed with a ratchet groove 82. Pivoted on a pin screwed to the rear face of the end wall 76, is a pawl 83 adapted to engage the ratchet groove 82, and held in said groove by a spring 84. Rotation of the shaft in one direction will not be accompanied by rotation of the pulsing cylinder 70. Rotation of the shaft 72 in an opposite direction will cause rotation of the cylinder 70 to wind the torsion springs 77, and rotation of the cylinder in the first direction will rotate the shaft as the spring is wound down.

On the cylindrical portion 75 of the pulsing cylinder 70 are ten radially extending stop pins 85. The stop pins 85 are equiangularly distant one from the other. There are two stop pins aligned with each of the five levers 46, one of which is longer than the other. The stop pins progress around the cylinder from one end of the cylinder to the other. If the levers 46 on one side of the housing 41 are rotated outwardly by a longer shoulder on the key, it will be sufficiently long to engage one of the short pins 85, and if the lever is swung outwardly by a short tooth or shoulder, it will be swung only sufficiently to engage one of the longer stop pins. Thus, each lever on one side of the housing when swung downwardly will engage one of the two teeth aligned therewith depending upon whether it is

swung outwardly by a short or long tooth or shoulder on the key.

It will now be understood that the pulsing cylinder 70 cooperates with the set of levers on one side of the housing. The pulsing cylinder 71 cooperates with the levers 46 on the other side of the housing. Said cylinder 71 also has radial pins 85 similar and symmetrically disposed to the stop pins on the cylinder 70. Said cylinder 71 is rotatably mounted on the shaft 72a journalled in the frame and parallel and aligned with the shaft 72. Fixed to wall 23 are a pair of stops 23a and 23b each adapted to cooperate with one of the stop pins 85 on their respective pulsing cylinders 70 and 71, to retain said cylinders in initial position. The cylinder 71 is also formed with equiangularly spaced, peripheral notches 78 forming ten radial teeth 78a.

Rotataly mounted on shaft 72 is a gear 90 carrying a pawl 91 held by a spring within the ratchet groove 82. Fixed to shaft 72a is a gear 91a, meshing with the gear 90 so that the two pulsing cylinders will rotate simultaneously in opposite directions.

Means is provided to regulate the speed of rotation of the cylinders. To this end, there is fixed to shaft 72, a gear 92 meshing with a pinion 93 carried on a shaft 94 journalled in the frame. On said shaft, and fixed to the pinion 93, is a gear 95 meshing with a pinion 96 on a shaft 97 journalled in the frame.

Surrounding the shaft 97, and fixed to the frame, is a fixed drum 98. Attached to said shaft is a transverse member 99, and attached to member 99 at 99a, are a pair of curved governor arms 99b adapted to fly outwardly by centrifugal force when shaft 97 rotates. There is also fixed to the drum 98 a member 100 made of spring metal having outwardly extending radial arms 101 and curved wings 102 overlying the governor arms 99b.

It will now be understood that when the shaft 72 rotates, shaft 97 will also be rotated to cause the governor arms 99b to fly outwardly. The spring wings 102 keep the governor arms from flying out too far. The governor arms are adapted to press outwardly against the fixed spring wings 102, thus causing the shaft 97 to rotate at a constant speed.

Means is provided to control the winding of the spring 77 and the rotation of the pulsing cylinders. To this end, there is rotatably mounted on the front end of the shaft 72, a sleeve 105 formed with a disc 106 at its rear end. Disc 106 is formed with a peripheral notch 107, for the purpose hereinafter appearing. The sleeve 105 passes through the opening 35 in the face plate, and fixed to the forward end thereof, is a handle 108.

It will be noted that disc 106 is spaced forwardly from wall 23 and is disposed parallel thereto. Pivoted to the inner face thereof, as on pin 110, is a pawl 111 formed with an intermediate shoulder 112. Fixed to the front surface of wall 23 is a block 113 adapted to engage the free end 114 of the pawl 111. Disc 106 is formed with a radial slot 115 and on the front face of the disc is a pin 116 to which there is attached a spring 117 passing through the slot 115 and fixed to the pawl 111, urging the pawl to swing inwardly.

Fixed on the portion of the shaft 72 which is located between the disc 106 and the frame wall 23 are a pair of discs 118 and 120 and a cam 119 disposed between said discs. Disc 118 is formed with a notch 118a forming a shoulder 118b adapted to engage the shoulder 112 of the pawl 111 to stop rotation of the shaft in a clockwise direction, looking at Fig. 1 of the drawings, when said pawl is in position to engage said shouder. Disc 120 is formed with a notch 120a forming a shoulder 120b adapted to engage a finger 124 of a pawl 125 to stop rotation of the shaft in a clockwise direction, looking at Fig 1, when the finger engages said shoulder. The pawl 125 is pivoted on pin 126 located at the front face of wall 23. Said pawl has an upwardly extending finger 127 adapted to be engaged by the lug or the projection 53 of the cage 48 when the key is turned, to disengage the finger 124 from the shoulder 120b. The pawl 125 is urged into shoulder engaging position by a spring 129 on wall 23.

On plate 23 is a pin 130, and rotatably mounted thereon, is a collar 131 carrying a short upwardly extending arm 132 and a longer upwardly extending arm 133. At the upper end of arm 132 is a pin 134 normally contacting the periphery of disc 106 and adapted to be received in notch 107 of said disc, when the pin is aligned with said notch. Interconnecting the upper end of arm 133 with the frame is a tension spring 136 normally urging arms 133 and 132 to rotate in a clockwise direction, looking at Fig. 1 of the drawings.

On arm 133 is a fixed pin 137 adapted to be engaged by the cam 119 in initial position to keep the pin 134 out of engagement with the disc 106. The cam 119 has a high part 140 and is formed with a radial shoulder 141. On the upper end of arm 133 is a fixed pin 142. The pin 142 is received in a slot 143 of a connecting rod 144 pivoted at one end, as at 145, to the shutter 65. When the parts are in initial position, the pin 142 is at the right end of slot 143. Connecting rod 144 is connected by coil tension spring 146 to wall 23. Spring 146 tends to move the connecting rod to the left, but is weaker than the spring 136.

The parts are shown in Fig. 1 in initial position, before the key is inserted, and before the spring is wound. In such position it will be noted that the high part of the cam 119 retains arm 133 in such position that the shutter is in vertical position and thus prevents insertion of the key. Upon rotating the handle 108 first in a clockwise direction through somewhat less than 360 degrees, the sleeve 105 and disc 106 will be rotated without rotating the shaft 72 in a clockwise direction bringing the pawl 111 to a position where the finger 114 thereof is below the block 113. In such position, the pawl 111 will drop under the action of spring 117 into engagement with the shoulder 118b. Rotation of the handle 108 in a counterclockwise direction looking at Fig. 1 will thus cause rotation of the shaft 72 due to engagement of the pawl 111 with the shoulder 118b.

The shaft 72, together with the pulsing cylinders 70 and 71, are then rotated by reason of the engagement of the pawl 111 with the shoulder 118b, and also by reason of the engagement of the pawl 83 with the shaft and the meshing gears 90 and 91a. During such rotation, the pin 137 will ride off the high part of the cam 119 causing arm 133 to swing slightly in a clockwise direction, looking at Fig. 1, to bring the pin 134 against the periphery of the disc 106. When the handle is rotated in a counterclockwise direction, through substantially 360 degrees, the pin 134 will drop into notch 107 of the disc 106

causing arm 133 to swing still further to the right to swing the shutter in a counterclockwise direction about its pivot pin 30a, Fig. 5, and expose the key slots to permit insertion of the key. When the pin 134 drops into the notch 107, finger 124 of pawl 125 will engage shoulder 120b of disc 120, thus holding the spring in wound condition.

As the pulsing cylinders rotate in opposite directions during winding of the spring, pins 85 which were in initial position in engagement with the stops 23a and 23b, move away from said stops. The key may then be inserted and rotated to move the selected two levers 46 to a position which will engage one of the ten stop pins 85 on the pulsing cylinders. Simultaneously, lug 53 on the cage 48 will engage finger 127 of pawl 125, swinging the same in a counterclockwise direction about the pivot pin 126, Fig. 5, causing finger 124 to disengage from shoulder 120b and permitting the pulsing cylinders to rotate in an opposite direction to unwind the spring and cause pulsations in a manner hereinafter explained.

During this action, handle 108 and sleeve 105 and disc 106 do not rotate. At the end of the unwinding motion, the high part of cam 119 will again engage pin 137 to swing arm 133 to the left and disengage pin 134 from the notch 107. During this movement of arm 133, the pin 142 moves to the left in slot 143, without pulling the shutter down. The shutter will be held in exposed position by the key itself until the key is withdrawn, at which time the spring 146 will pull the connecting arm 144 to the left and pull the shutter down to vertical position. Unwinding movement of the cylinders will stop when the stop pins 85 in alignment with the stops 23a and 23b contact the same. During the winding movement of the handle, the pawl 111 is brought back to its initial position, shown in Fig. 1.

Means is provided to cooperate with the pulsing cylinders to cause sets of pulses, the number of pulses in each set being dependent upon the degree of angular rotation of one of the pulsing cylinders. To this end, there is pivoted on a pair of horizontal, parallel pins 160 and 161 fixed to the frame, insulated switch arms 160a and 161a, held against the cylinders by springs 160b and 161b. The pivoted switch members 160a and 161a have fingers 162 and 163 engaging the teeth 78a of the cylinders. As the cylinders rotate during the winding movement, the teeth 78a merely oscillate the switch arms 160a and 161a without causing any pulsations. During the unwinding movement, however, said switch arms are oscillated by the teeth 78a in opposite directions, and each switch arm will have as many oscillations as there are teeth which pass the switch arms, and the number of teeth passing the switch arms depend upon the angle of rotation of the pulsing cylinder.

Mounted on one of the frame walls is an insulating block 163, carrying a pair of switch arms 164 and 165, interconnected at their outer ends by an insulated connector 166. Said block also supports a pair of switch blades 167 and 168. The switch arms 164 and 165 are normally out of engagement with the blades 167 and 168 and each oscillation of the switch member 160a will cause interengagement of the switch arms 164 and 165 with the blades 167 and 168.

On the identifier frame is another block 163a carrying switch arms 164a and 165a interconnected by an insulating connector 166a. On said block are also switch blades 167a and 168a normally out of engagement with the switch arms 164a and 165a, but adapted to engage the same for each oscillation of the switch member 161a.

On the frame is also an insulating block 170 carrying a switch arm 171 carrying an insulated pin 172, normally received in the notch 79 of cylinder 70. On block 170 is another switch arm 174 normally out of engagement with the switch arm 171, but adapted to engage the same when the cylinder 70 rotates away from its initial position, due to lifting of the pin 172 as it rides out of the notch 79.

On the identifier wall is another insulating block 176 carrying a pair of switch arms 177 and 178 interconnected by an insulating connector 179. The lower switch 177 is normally engaged by pin 61 of the cage 48. On the block 176 is a switch arm 180 normally engaged by the switch arm 178. On said block is another switch arm 181 normally out of engagement with the switch arm 178, but adapted to be engaged thereby, when the cage is rotated and the pin 61 moves away from switch arm 177. On the block 176 is another switch arm 182 normally in engagement with the switch arm 177, but adapted to be moved away from said switch arm.

Means is provided to transmit pulses caused by rotation of the cylinders to electro-magnetic printing counters 190 and 191. Said counters comprise coils 190a and 191a, controlling armatures 190b and 191b, adapted to advance ratchet wheels 190c and 191c carried on shafts which also carry the usual printing wheels. On said shafts are also carried insulated wheels 190d and 191d carrying radial lugs 190e and 191e. The lugs 190e and 191e are adapted to hold switch arms 192 and 193 out of engagement with fixed contacts 195 and 196, when the printing wheels are in zero position. When the printing wheels move out of zero position, said switch arms will move into engagement with the fixed contacts 195 and 196. The coils 190a and 191a when energized are adapted to move normally closed switch arms 197 and 198 out of engagement and fixed contacts 199 and 199a.

There is further provided means to print against the counters 190 and 191, said means including a printing solenoid 200 including a coil 201 and controlling a platen 202. When the printing solenoid is not energized the platen 202 presses down against a switch arm 203 to hold the same in contact with a fixed contact 204, and out of engagement with another fixed contact 205. When the solenoid 200 is energized, the platen 202 moves upwardly permitting switch arm 203 to move out of engagement with contact 204, and into engagement with contact 205.

There is further provided a printing relay 210 comprising a coil 211 adapted to move a switch arm 212, normally open, into engagement with a fixed contact 213. There is further provided a resetting relay 214 comprising a coil 215 adapted to move normally open switch arms 216, 217, and 218 into engagement with fixed contacts 219, 220, and 221, respectively. Said relay 214 is also adapted to move a switch arm 222 normally in engagement with a contact 223 out of engagement therewith and into engagement with another contact 224.

There is further provided a slow release relay 230 comprising a coil 231 adapted to open a switch arm 232 which is normally in engagement with a fixed contact 233.

The minus power supply is connected by wire

240 to the fixed contact 204 and by wire 241 with the switch arms 212, 216, and 217, and with the switch arms 177 and 178. The positive power supply is connected by wire 242 to one side of each of the coils 190a and 191a and to one side of the coils 211, 215, and 231. The positive power supply is also connected by wire 243 to one side of the coil 201 of the printing solenoid. The other side of said coil of the printing solenoid is connected by wire 244 to the fixed contact 213. Switch arm 203 is connected by wire 246 to fixed contact 221 and switch arm 181. Fixed contact 205 is connected by wire 247 to the other side of coil 215 and to switch arm 218. Switch 192 is connected by wire 248 to fixed contact 219.

Switch arm 193 is connected by wire 249 to fixed contact 220. The switch arms 197 and 199a are connected to the other sides of the coils 190a and 191a by wires 250 and 251. The fixed contact 198 is connected by wire 252 to the fixed contact 196. The fixed contact 199 is connected by wire 253 to the fixed contact 195. Said other sides of the coils 190a and 191 are connected by wires 257 and 258 to the switch arms 165 and 165a respectively. The switch arm 167a is interconnected by wire 259 to the switch arm 167 and also to the other side of the coil 231. The switch arm 168a and 164a are interconnected electrically and are also connected by wire 260 to the switch arms 164 and 168 which are also interconnected electrically. Switch arm 171 is connected by wire 261 to the switch arm 182 and by wire 262 to the switch arms 164a and 168a. Switch arm 174 is connected by wire 263 to the fixed contact 233. Switch arm 180 is interconnected by wire 265 to fixed contact 224.

The other side of the coil 211 of the printing relay is connected by wire 266 to switch arm 222. Fixed contact 223 is connected by wire 267 to switch arm 232.

The operation of the printing counters 190 and 191, and of the printing solenoid 200 will now be described.

When key 11 is inserted into the key slot 57 and turned 90° to initiate the rotation of the cylindrical pulsers 70 and 71, as previously described, cage 48 will be rotated in a counter clockwise direction (Fig. 8), permitting switches 177—182 and 178—181 to close. By closing switch 177—182, negative polarity is placed on the spring fingers 164 and 168, and spring fingers 164a and 168a through wires 241, the switch 177—182, wires 261, 262, and 260. Spring finger 171 is also of negative polarity through wire 261 upon closing switch 177—182.

During the pulsing operation previously described, switch 165—168 will close each time the fingers 160a and 161a are engaged by a tooth 78a. For each pulse of switch 165a—168a, the printing counter 191 is energized, the circuit being from the negative polarity of switch 165a—168a through wire 258, coil 191a of said counter, through wire 242 to plus power supply. Each time coil 191a is energized armature 191b advances the ratchet wheel 191c one step to advance the digit wheel of said counter. Printing counter 190 is similarly energized for each closure of switch 165—168, the circuit being through said switch and wire 257 through the coil 190a, and the wire 242.

Each time the switches 165—168 and 165a—168a are pulsed, switches 164—167 and 164a—167a are pulsed, energizing the slow release relay 230, the circuit being from negative polarity, switches 164—167 and 164a—167a, wire 259, coil 231 of said relay and wire 242 to plus power supply. By energizing the relay 230 switch 232—233 is opened, and remains open until the pulsing of said switches has stopped, at which time relay 230 is allowed to become de-energized, allowing switch 232—233 to again close.

At the beginning of the pulsing operation, the insulated pin 172 of switch arm 171 will ride in notch 79 of the cylinder 70, keeping switch 171—174 open until switches 164—167 and 164a—167a have started pulsing to energize the slow release relay 230. Insulated pin 172 will then ride over the periphery cylinder 70, closing the switch 171—174.

Upon deenergizing the slow release relay 230, switch 232—233 will close, energizing the printing relay 210, the circuit being from negative polarity of switch 171—174, through wire 263, switch 232—233, wire 267, switch 223—222, wire 266, through coil 211 of said relay, wire 242 to plus power supply. Energizing relay 210 will close switch 212—213 to energize the printing solenoid 200, the circuit being from minus power supply, through wire 241, switch 212—213, wire 244, through coil 201 of said solenoid, wire 243 to plus power supply. Upon energizing the printing solenoid 200, platen 202 will move upwardly against the printing wheels of the printing counters 190 and 191, paper and printing ribbon being interposed, to print the identification number of an identification key 11.

Platen 202, in moving upwardly will carry with it the switch arm 203, closing the switch 203—205. By closing switch 203—205, the reset relay 214 becomes energized, the energizing circuit being from the negative polarity of switch 178—181, through wire 246, switch 203—205, wire 247, coil 215 of said relay, and wire 242 to plus power supply.

Energizing relay 214 will close switch 218—221, closing a holding circuit for coil 215 of said relay, the circuit being from plus power supply, through wire 242, coil 215, switch 218—221, wire 246, switch 181—178, to minus power supply.

Switch 222—223 will open upon energizing relay 214, and switch 222—224 will close. Opening switch 222—223 will deenergize the printing relay 210. By deenergizing relay 210, switch 212—213 will open to deenergize the printing solenoid 200. Platen 202 will return to its initial position opening switch 203—205 and closing switch 203—204. By opening switch 203—205, relay 214 will not become deenergized due to the holding circuit for coil 215 previously described. Closing switch 203—204 will close another holding circuit for relay 214, the circuit being from minus power supply through wire 240 through said switch, wire 246, switch 218—221, coil 215, wire 242 to plus power supply.

In holding relay 214 energized switches 216—219 and 217—220 are held closed to reset the digit wheels of the printing counters 190 and 191. By holding switches 216—219 and 217—220 closed the printing counters are energized, the circuit for counter 190 being from minus power supply through wire 241, switch 216—219, wire 248, closed switch 192—195, wire 253, switch 197—199, wire 250, coil 190a, wire 242 to plus power supply. When counter 190 becomes energized switch 197—199 will open to deenergize said relay and then close again to energize said relay. The pulsing of the counter 190 will continue until armature 190b has advanced the digit wheel to zero position, at which time the protrusion 190e of the insulated disc 190d will engage the switch

arm 192 to open the switch 192—195, thus opening and holding open the afore described energizing circuit.

Printing counter 191 is similarly advanced by closure of switch 217—220 and the circuit through switches 193—196 and 198—199a.

Upon turning the key 11 to withdraw the same from the identifier, cage 48 will be rotated to its initial position, pin 61 engaging the switch arm 177 causing switches 177—182 and 178—181 to open and switch 178—180 to close. By opening switch 177—182 negative polarity is removed from the pulsing switches, thus permitting the pulsing cylinders to return to their initial position without affecting the printing counters. By opening switch 178—181 the first holding circuit for the reset relay 214 is opened, the relay being held energized, however, by the second holding circuit through switch 203—204 previously described.

By closing switch 178—180, the printing relay 210 is again energized, the circuit being from plus power supply through wire 242, coil 211 of said relay, wire 266, switch 222—224, wire 265, switch 180—178, wire 241 to minus power supply. By energizing relay 210, printing solenoid 200 is again energized in the manner previously described. Platen 202 in moving upwardly will open switch 203—204, thus deenergizing the reset relay 214. By deenergizing the reset relay switch 222—224 opens, opening the energizing circuit of the printing relay 210. By deenergizing the relay 210 switch 212—213 will open, deenergizing the printing solenoid 200. The circuit is thus restored to its initial condition, the pulsing cylinder 70 returning to its initial position, will permit pin 172 to fall into notch 79 of said cylinder opening the switch 171—174.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

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

1. A key identifier comprising a pulsing means controlled by a key inserted into the identifier, a manually operated spring motive means to operate said pulsing means, means to prevent insertion of the key into the identifier and means controlled by the motive means in wound condition to remove the preventing means.

2. A key identifier comprising means to receive a key, a pair of opposed sets of movable members in the identifier on opposite sides of the key receiving means, one of each set of which is adapted to be selected and moved by one portion on opposite sides of the key, the selection depending upon the positions of said portions in one direction and the extent of movement of the selected members depending upon the positions of said portions in directions transverse to the first direction, pulsing means controlled by the selected members and the positions to which they are moved by the key, said pulsing means comprising a pair of cylinders, spring means to rotate the same and manual means to charge the spring means.

3. An identifier comprising means to receive a key, pulsing means controlled by a key in the key receiving means, said pulsing means comprising a rotary member, spring motive means to rotate said member, means independent of the key to wind said spring motive means, means to retain said rotary member from rotating, and means controlled by the key to release said retaining means and means controlled by the key to limit rotation of said rotary member.

4. An identifier comprising means to receive a key, pulsing means controlled by a key in the key receiving means, said pulsing means comprising a rotary member, spring motive means to rotate said member, means independent of the key to wind said spring motive means, means to retain said rotary member from rotating, means controlled by the key to release said retaining means, means to limit rotation of the winding means, and means controlled by the key to limit rotation of the rotary member.

5. An identifier comprising means to receive a key, pulsing means controlled by a key in the key receiving means, said pulsing means comprising a rotary member, spring motive means to rotate said member, means independent of the key to wind said spring motive means, means to retain said rotary member from rotating, means controlled by the key to release said retaining means, means to limit rotation of the winding means, means controlled by the key to limit rotation of the rotary member, and means to couple the winding means to the rotary member, and means to automatically uncouple the winding means from the rotary means when the rotary member moves to initial unwound position.

6. An identifier comprising means to receive a key, pulsing means controlled by a key in the key receiving means, said pulsing means comprising a rotary member, spring motive means to rotate said member, means independent of the key to wind said spring motive means, means to retain said rotary member from rotating, means controlled by the key to release said retaining means, means to limit rotation of the winding means, means controlled by the key to limit rotation of the rotary member, means to couple the winding means to the rotary member, and means to automatically uncouple the winding means from the rotary means when the rotary member moves to initial unwound position, and means to permit the rotary member to move back to initial unwound position upon removal of the key from said key receiving means.

7. In an identifier, a key receiving means, a key insertible thereinto and having a shoulder, a set of movable members longitudinally positioned relative to the key when the latter is in the key receiving means, said shoulder being in position to move the movable member of said set which is aligned therewith, upon rotating the key in said key receiving means, and said shoulder being adapted to move the member of the set which is aligned therewith to an extent depending upon the height of said shoulder from a longitudinal base line on the key, a pulser including a movable part, said movable member having a plurality of stops in the plane of each of the movable members of said set, the stops in each plane being of progressive heights dependent upon the degrees of movement to which the movable member of said set and in said plane may be moved, and means to move said movable part until one of the stops engages the moved member of said set whereby said movable part is moved to an extent dependent upon which one

of the plurality of movable members of said set is moved and upon the extent of its movement.

8. A key identifier comprising a key receiving means, a plurality of parallel members pivoted within said key receiving means, one of said members being adapted to be angularly displaced by a shoulder on a key inserted and rotated in said key receiving means, the member displaced being dependent upon the longitudinal position of said shoulder on said key, and the angular displacement thereof being dependent upon the height of said shoulder from a longitudinal base line on said key, a rotatable member, a plurality of stop means on said rotatable member of varying heights in the plane of each pivoted member, one of said stops being adapted to engage the pivoted member positioned by said key upon rotation of said rotatable member, which stop engages the pivoted member being dependent upon the degree of rotation of said pivoted member, and means to pulse a number of times corresponding to the extent of rotation of said rotatable member.

9. A key identifier comprising a key receiving means, a plurality of parallel members pivoted within said key receiving means, one of said members being adapted to be angularly displaced by a shoulder on a key inserted and rotated in said key receiving means, the member displaced being dependent upon the longitudinal position of said shoulder on said key, and the angular displacement thereof being dependent upon the height of said shoulder from a longitudinal base line on said key, a rotatable member, a plurality of stop means on said rotatable member of varying heights in the plane of each pivoted member, one of said stops being adapted to engage the pivoted member positioned by said key upon rotation of said rotatable member, which stop engages the pivoted member being dependent upon the degree of rotation of said pivoted member, means to pulse a number of times corresponding to the extent of rotation of said rotatable member, said pulsing means including a spring motor to rotate said rotatable member, and means to prevent the insertion of said key into said key receiving means unless said spring motor is charged.

10. A key identifier comprising a key receiving means, a plurality of parallel members pivoted within said key receiving means, one of said members being adapted to be angularly displaced by a shoulder on a key inserted and rotated in said key receiving means, the member displaced being dependent upon the longitudinal position of said shoulder on said key, and the angular displacement thereof being dependent upon the height of said shoulder from a longitudinal base line on said key, a rotatable member, a plurality of stop means on said rotatable member of varying heights in the plane of each pivoted member, one of said stops being adapted to engage the pivoted member positioned by said key upon rotation of said rotatable member, which stop engages the pivoted member being dependent upon the degree of rotation of said pivoted member, means to pulse a number of times corresponding to the extent of rotation of said rotatable member, said pulsing means including a motive means to rotate said rotatable member, and means controlled by the motive means to prevent insertion of the key into said key receiving means.

11. A key identifier comprising a key receiving means, a plurality of parallel members pivoted within said key receiving means, one of said members being adapted to be angularly displaced by a shoulder on a key inserted and rotated in said key receiving means, the member displaced being dependent upon the longitudinal position of said shoulder on said key, and the angular displacement thereof being dependent upon the height of said shoulder from a longitudinal base line on said key, a rotatable member, a plurality of stop means on said rotatable member of varying heights in the plane of each pivoted member, one of said stops being adapted to engage the pivoted member positioned by said key upon rotation of said rotatable member, which stop engages the pivoted member being dependent upon the degree of rotation of said pivoted member, means to pulse a number of times corresponding to the extent of rotation of said rotatable member, said pulsing means including a spring motor to rotate said rotatable member, means to prevent the insertion of said key into said key receiving means unless said spring motor is charged, and a governor controlling the rotation of said rotatable member.

12. An identifier comprising, means to receive a key, pulsing means controlled by a key in the key receiving means, said pulsing means comprising a rotary member, spring motive means to rotate said member, means independent of the key to wind said spring motive means, means to retain said rotary member from rotating, means controlled by the key to release said retaining means, means to prevent insertion of a key into the identifier and means controlled by said motive means in wound condition to remove said preventing means.

13. An identifier comprising, means to receive a key, pulsing means controlled by a key in the key receiving means, said pulsing means comprising a rotary member, spring motive means to rotate said member, means independent of the key to wind said spring motive means, means to limit rotation of the winding means, means to retain said rotary member from rotating, means controlled by the key to release said retaining means, means to prevent insertion of a key into the identifier and means controlled by said motive means in wound condition, to remove said preventing means.

14. An identifier comprising, means to receive a key, pulsing means controlled by a key in the key receiving means, said pulsing means comprising a rotary member, spring motive means to rotate said member, means independent of the key to wind said spring motive means, means to retain said rotary member from rotating, means controlled by the key to release said retaining means, means controlled by the key to limit rotation of the rotary member, means to prevent insertion of a key into the identifier and means controlled by said motive means in wound condition, to remove said preventing means.

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