

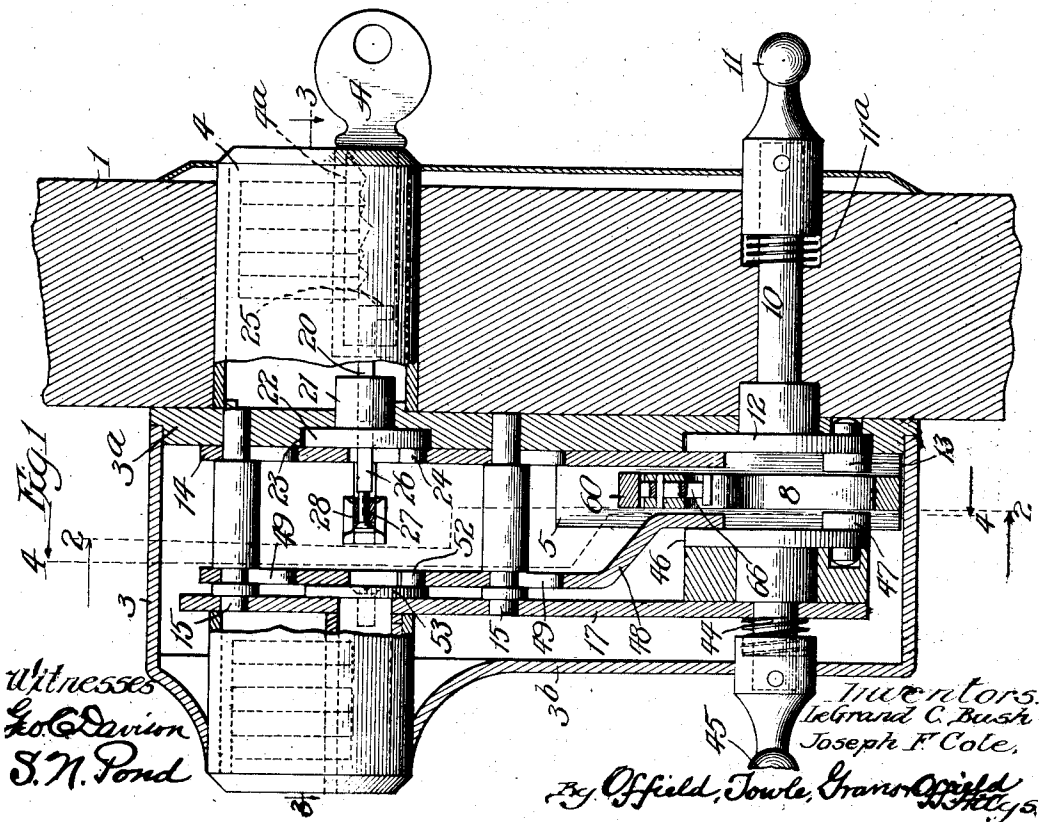
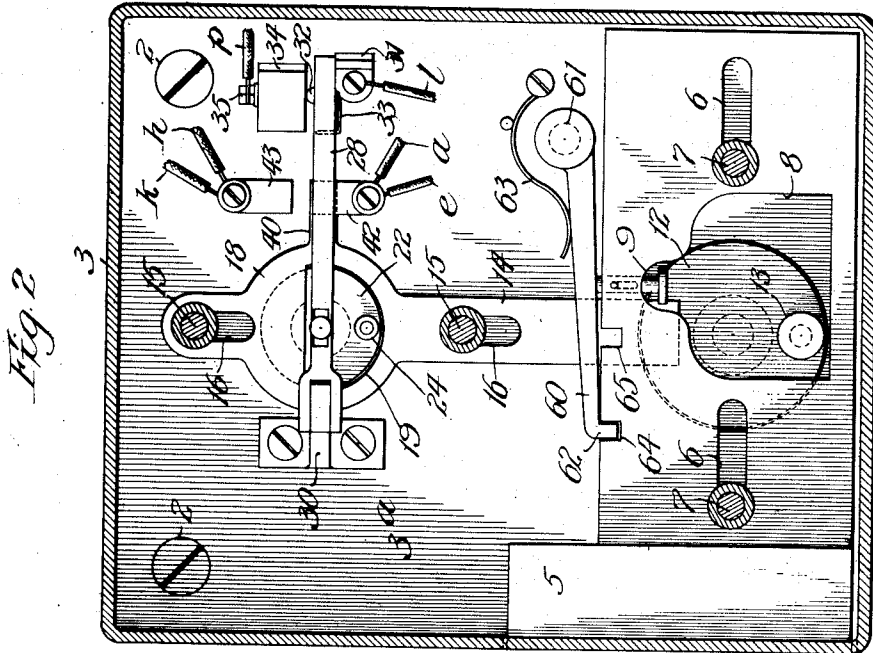
LE GRAND C. BUSH & J. F. COLE.
RECORDING DOOR LOCK.

APPLICATION FILED JUNE 1, 1910.

981,164.

Patented Jan. 10, 1911.

7 SHEETS—SHEET 1.



LE GRAND C. BUSH & J. F. COLE.

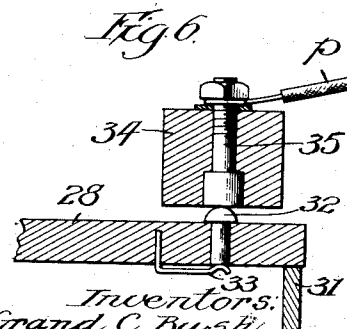
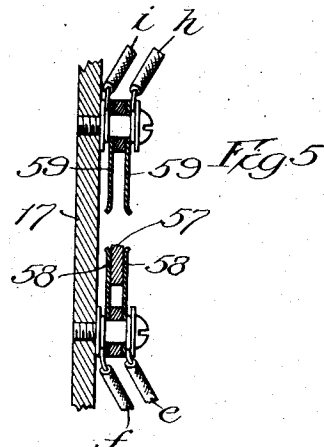
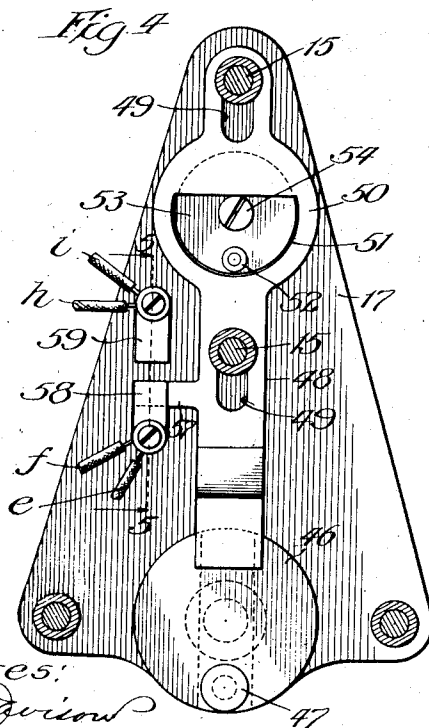
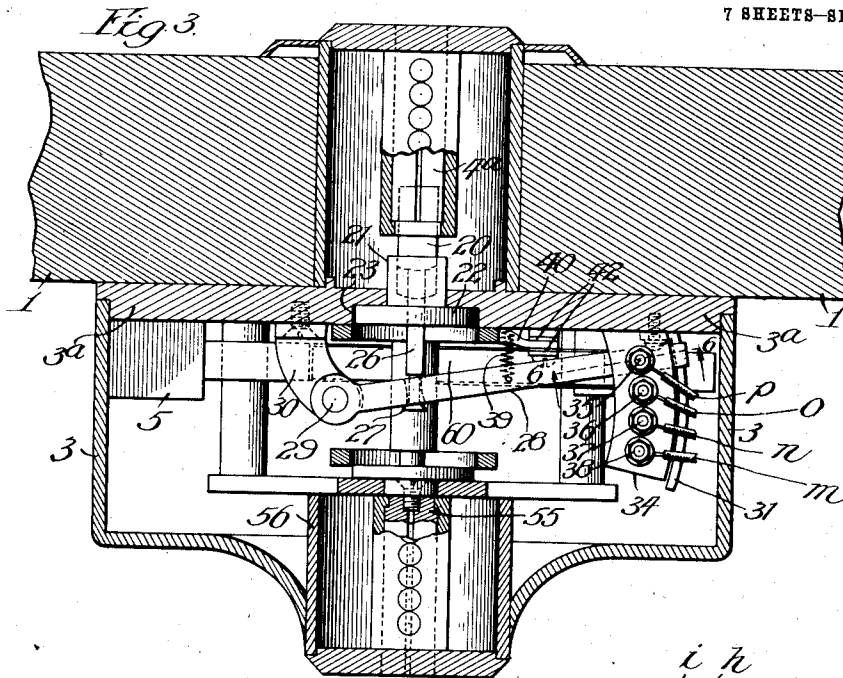
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7 SHEETS-SHEET 2.



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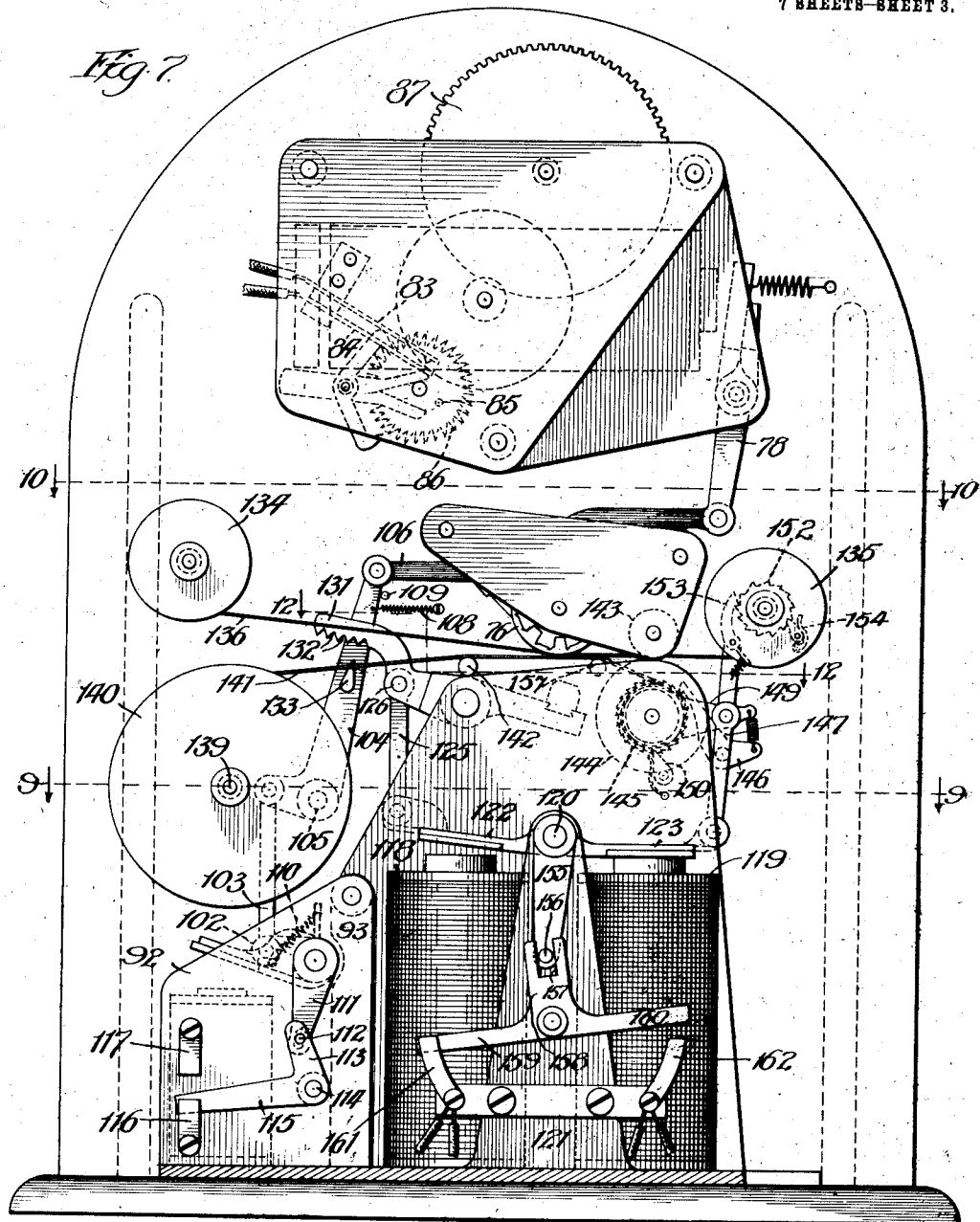
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7 SHEETS—SHEET 3.



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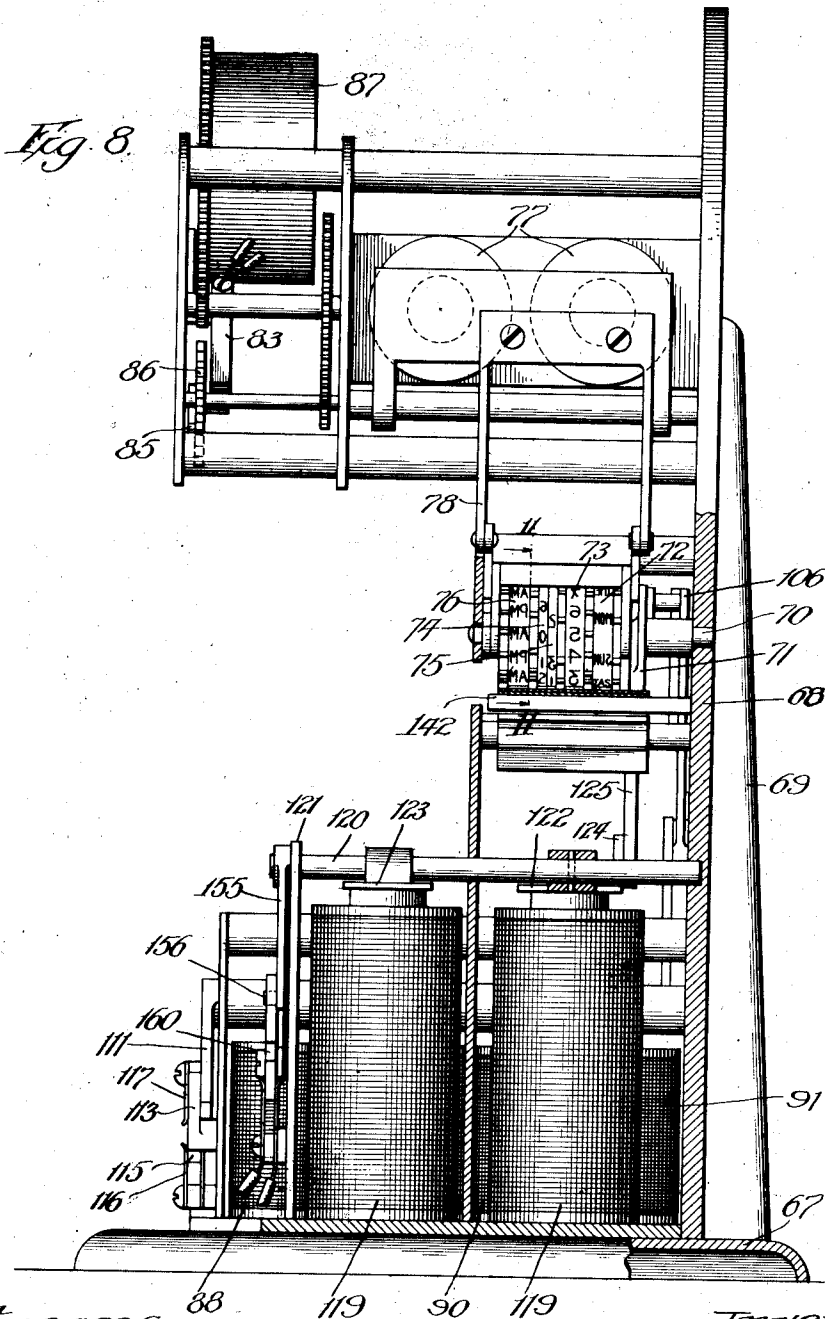
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7 SHEETS—SHEET 4.



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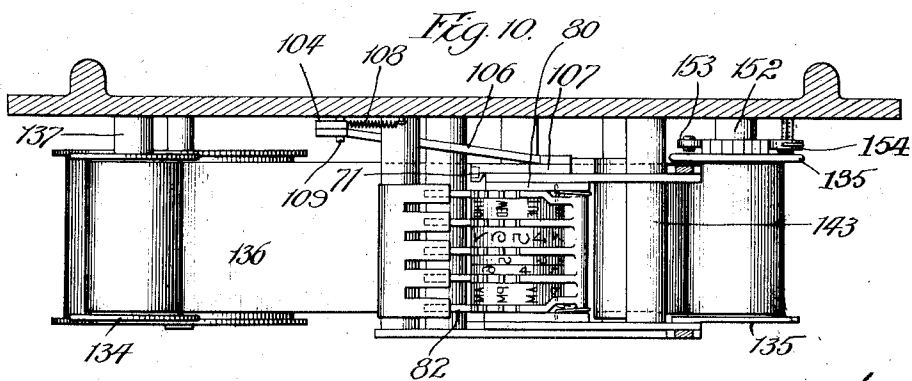
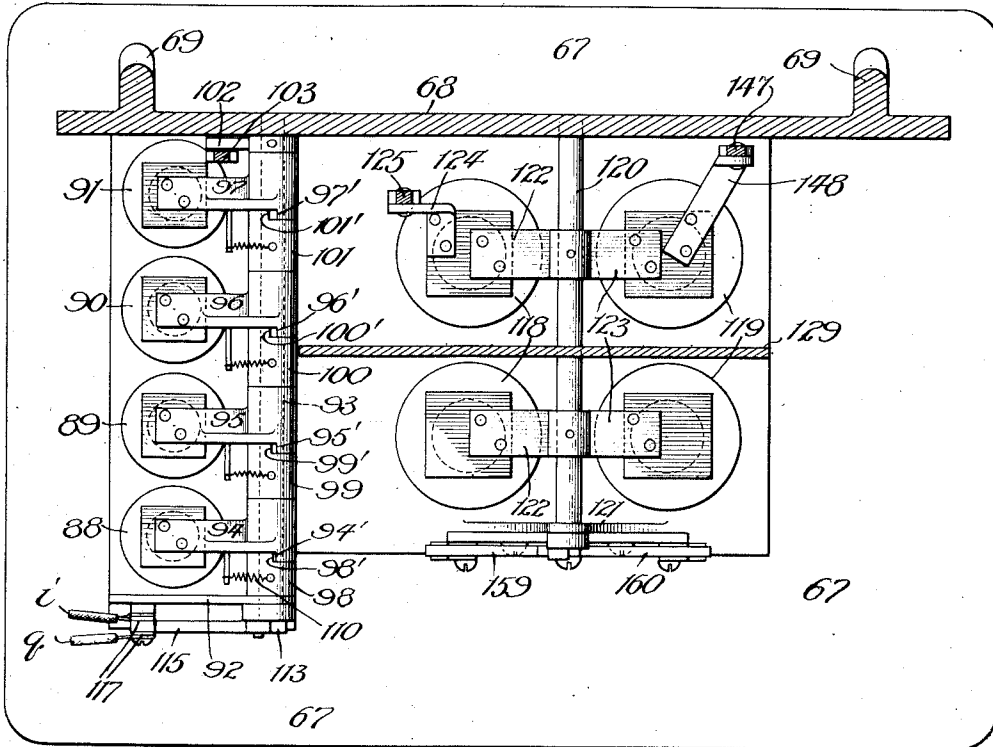
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7 SHEETS—SHEET 5.

Fig. 9.



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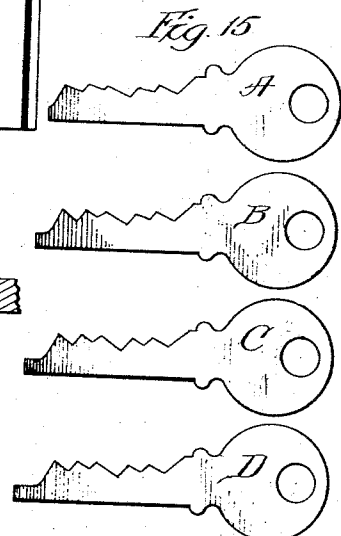
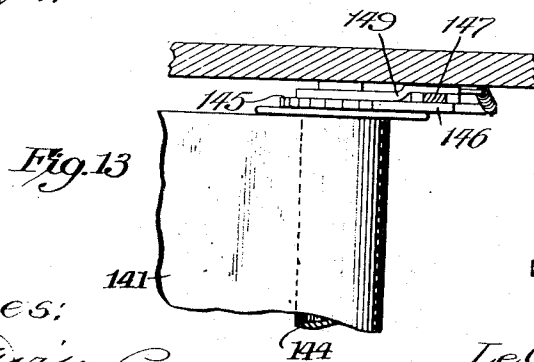
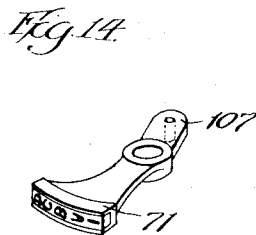
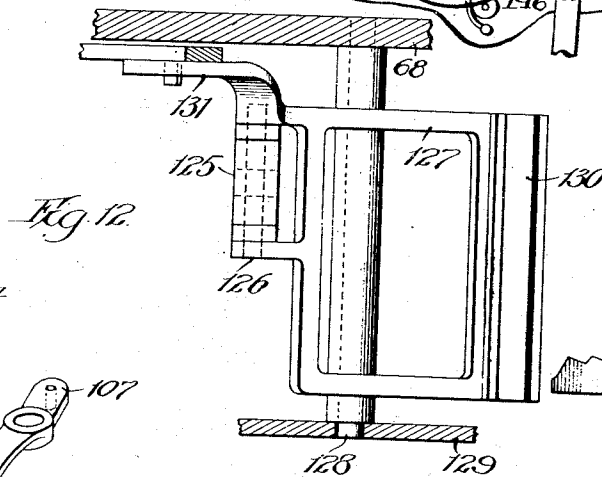
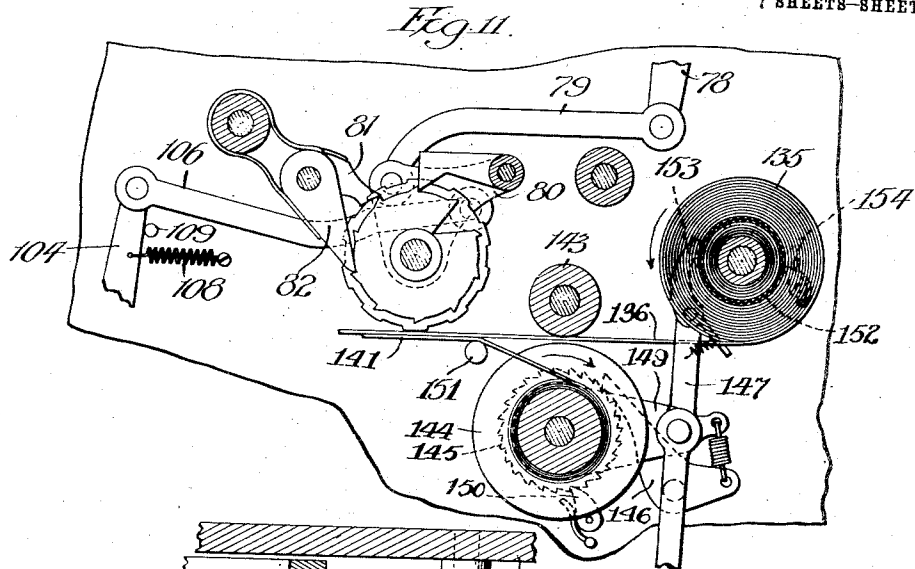
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 RECORDING DOOR LOCK.
 APPLICATION FILED JUNE 1, 1910.

981,164.

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7 SHEETS—SHEET 6.



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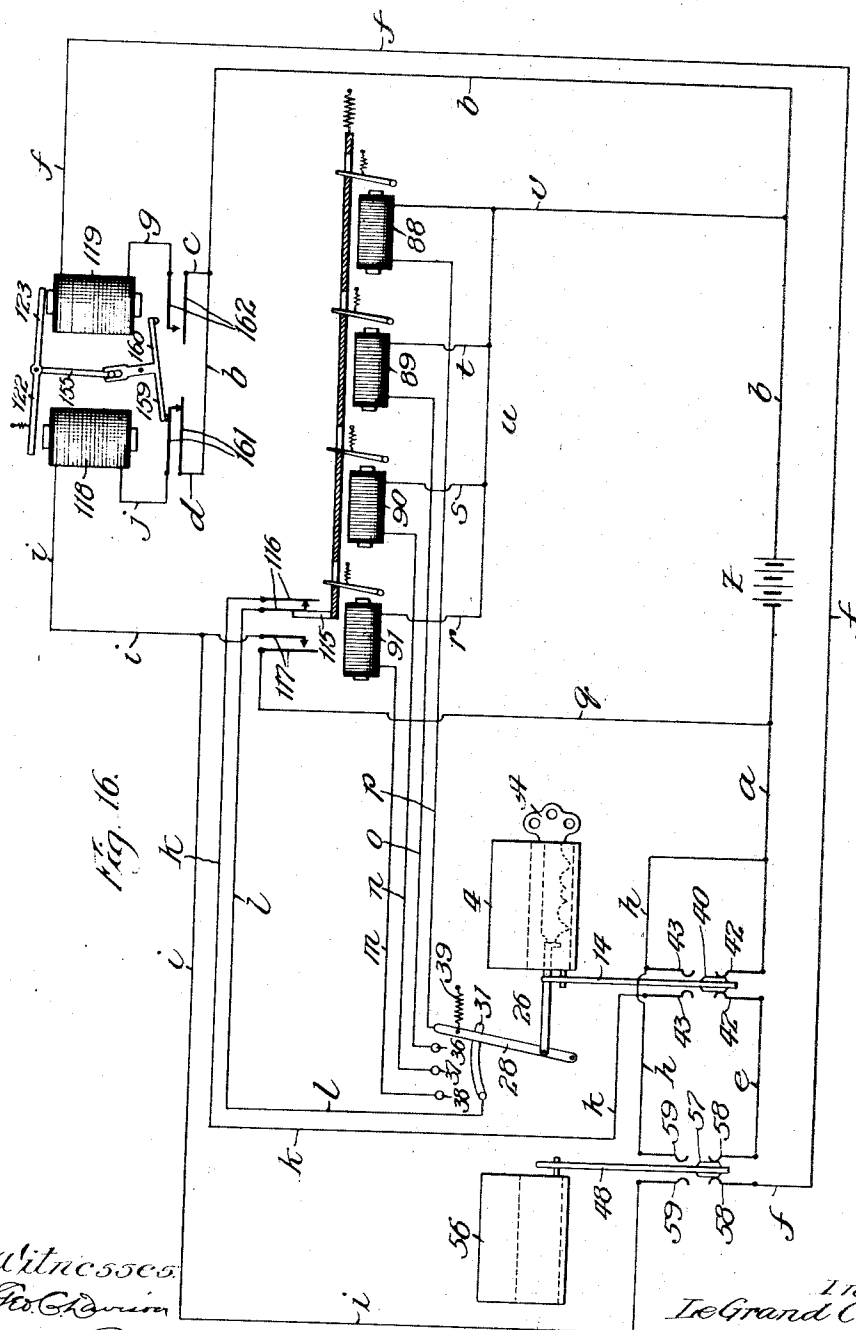
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LE GRAND C. BUSH & J. F. COLE.
RECORDING DOOR LOCK.
APPLICATION FILED JUNE 1, 1910.

981,164.

Patented Jan. 10, 1911.

7 SHEETS—SHEET 7.



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UNITED STATES PATENT OFFICE.

LE GRAND C. BUSH, OF CHICAGO, ILLINOIS, AND JOSEPH F. COLE, OF ELKHART, INDIANA, ASSIGNORS OF ONE-THIRD TO WALTER J. MULLER, OF AURORA, ILLINOIS.

RECORDING DOOR-LOCK.

981,164.

Specification of Letters Patent.

Patented Jan. 10, 1911.

Application filed June 1, 1910. Serial No. 564,478.

To all whom it may concern:

Be it known that we, LE GRAND C. BUSH and JOSEPH F. COLE, both citizens of the United States, and residents, respectively, of Chicago, Illinois, and Elkhart, Indiana, have invented certain new and useful Improvements in Recording Door-Locks, of which the following is a specification.

This invention relates to door locks of that type used to some extent on stores, factories, warehouses, and similar buildings, which are provided with a plurality of keys for manipulating them, designed to be carried by different parties having authorized admission to the building, and which are further provided with means for recording the particular key by which the lock is operated at any time and hence disclosing the person using such key, and are also ordinarily further equipped with a time-recording mechanism for making a record of the times when the lock was operated. In locks of this character as hitherto constructed it has heretofore been customary, so far as we are aware to embody within the housing or casing of the lock itself the time and key-recording mechanisms; the time recording mechanism being actuated more or less directly from each of the several keys which actuate the bolt, and the key-recording mechanism being set to the proper position to record the particular key employed through differentiating means wholly or partly embodied in or on the keys themselves.

The main object of the present invention is to produce an improved lock of this general character; and the principal feature of novelty which the invention presents, broadly considered, consists in the location of all of the recording mechanism at some point or place outside of and more or less distant from the lock itself and its actuation by electrical energy through circuits which are controlled primarily by keys or other differentiated tools, such keys or tools having, however, as their functions to effect the proper control of the electric circuits and also the control of a bolt-actuating device, but not in themselves effecting the actuation of the bolt in either direction.

In the accompanying drawings we have illustrated one practical form in which the principle of our invention may be embodied, and referring thereto—

Figure 1 is a vertical sectional view

through the lock casing and its contained mechanism and the door or door casing to which it is attached. Fig. 2 is a vertical section through the lock casing and its contained mechanism on the line 2—2 of Fig. 1. Fig. 3 is a horizontal section through the parts shown in Fig. 1 on the line 3—3 of the latter figure. Fig. 4 is a detail elevation of parts of the lock mechanism in cross section through its supporting devices on the line 4—4 of Fig. 1. Fig. 5 is a detail vertical section, enlarged, on the line 5—5 of Fig. 4. Fig. 6 is a detail vertical section, enlarged, on the line 6—6 of Fig. 3. Fig. 7 is a front elevation of the recording mechanism. Fig. 8 is a side elevation of the recording mechanism, partly in vertical section. Fig. 9 is a horizontal section through the recording mechanism on the line 9—9 of Fig. 7. Fig. 10 is also a horizontal section through the recording mechanism on the line 10—10 of Fig. 7. Fig. 11 is a vertical section through part of the recording mechanism on an enlarged scale on the line 11—11 of Fig. 8. Fig. 12 is a detail in horizontal section, enlarged, on the line 12—12 of Fig. 7, showing the printing platen and the aligning device for the key indicating segment. Fig. 13 is a detail plan, enlarged, of a portion of the receiving spool of the inking ribbon of the printing mechanism and its actuating devices. Fig. 14 is a perspective detail of the key indicating segment. Fig. 15 is a group view of a series of differentiated keys adapted to be used with the lock. Fig. 16 is a diagram showing the electric circuits and circuit connections between the lock mechanism on the door or door casing and the recording mechanism located at the office or other place remote from the lock mechanism.

Referring to Figs. 1 to 6 inclusive, which illustrate that part of the mechanism adapted to be mounted on the door or door casing, 1 may designate a portion of the door, to the inner side of which is secured, as by screws 2, the casing or housing of the lock designated as an entirety by 3. 4 designates the tumbler-barrel of the well-known Yale pattern, which is mounted in the door 1 and is adapted to be operated by any one of a series of keys herein shown as 4 in number and designated A, B, C, and D, respectively, which keys are differentiated in respect to length, as shown in the detail

view Fig. 15. In the lower part of the lock casing 3 is the locking-bolt 5, the stem or shank of which has slots 6 by which it is slidably mounted on bolts 7 projecting from the back plate 3^a of the lock casing. The shank of the bolt is also provided between the slots 6 with an opening 8, the upper edge of which is formed with a vertical notch 9. In a hole formed through the door 1 below the Yale section 4 is rotatably mounted the shank 10 of a bolt actuating knob 11; and to the inner end of the shank 10 is secured a disk 12 from the front face of which projects an eccentric pin or roller 13. The shank 10 and its knob 11 and disk 12 are adapted to have a limited sliding movement as well as a rotary movement, so as to carry the roller 13 into and out of engagement with the opening 8 in the shank of the bolt, the parts being shown in their normal retracted position in Fig. 1. The disk 12 is normally locked against inward movement by means of a locking bar 14 that is mounted to have a limited vertical sliding movement upon and relatively to the back plate 3^a of the lock casing, said locking bar being guidingly supported by means of pins 15 which engage slots 16 in said bar, said pins 15 being mounted in the back plate 3^a and in an intermediate frame plate 17. The locking-bar 14 is formed with an enlargement 18 near its upper end (Fig. 2) in which is a segment-shaped opening 19 adapted to be engaged by a key-actuated device for raising said locking-bar. This device comprises a slide 20 that engages a slot in the inner end of the rotatable tumbler-tube 4^a of the Yale section 4 and also a similar slot in the hub 21 of a disk 22 that lies in a recess 23 in the back-plate 3^a of the casing. On the face of the disk 22 is a pin or roller 24 that projects into the segmental opening 19 of the locking-bar and, through engagement with the upper horizontal edge of the latter, raises said locking-bar out of locking position relatively to the bolt-actuating disk 12 when the key is turned half way around. On the outer end of the slide 20 is a depending flange 25 (Fig. 1) adapted to be engaged by the inner ends of the keys B, C, and D of varying lengths, whereby said slide will be pushed inwardly to varying extents according to which of said keys is used; it being unnecessary in the arrangement shown that the shortest key A should effect any longitudinal movement of said slide. Integral with or secured to the inner end of the slide 20 and projecting through a hole in the center of the disk 22 is a rod 26 that has a swivel-joint connection 27 to a contact-arm 28, this latter being hinged at 29 to a bracket 30 secured to the back-plate 3^a. The free end of the arm 28 rests on a support 31 (Figs. 3 and 6) secured to the back-plate 3^a,

and near its free end it carries a contact member 32 that is pressed upwardly by a spring 33 into engagement with the lower side of a bracket 34 that projects from the base-plate 3^a and constitutes a support for a series of four stationary contact members 35, 36, 37 and 38. The arm 28 is normally impelled to the position shown in Figs. 3 and 16 by a spring 39 connected to said arm and to the back-plate 3^a.

Projecting from one edge of the locking-bar 14 is a contact member 40 that, when the locking-bar is in its lowered position, forms an electrical connection between a pair of contact-strips 42 secured to the back-plate 3^a and suitably insulated therefrom and from each other, and, when the locking-bar is in its raised position corresponding to a half-turn of the key, forms an electrical connection between a similar pair of contact-strips 43.

The front-plate 3^b and intermediate plate 17, of the lock casing and frame support devices for actuating the locking-bolt and controlling the bolt-actuating means, as well as for controlling certain circuits through which is recorded the fact of the lock having been operated from the inside. These devices are substantial duplicates of parts already pointed out, but may be briefly described as follows. 44 designates a knob-shank and 45 a knob secured to the outer end thereof, the two being slidably supported and guided in the front and intermediate plates 3^b and 17, and said shank having fast on its inner end a disk 46 carrying on its inner face a pin or roller 47 that, when the knob is pushed inwardly, enters the opening 8 of the bolt in a position to actuate the latter when the knob is turned. 48 is a locking-bar similar in function to the locking-bar 14 mounted to slide vertically on the pins 15 which engage slots 49 in said bar (Fig. 4). The lower offset end of said locking-bar normally overlies the inner face of the disk 46, as clearly shown in Figs. 1 and 4, and prevents the inner knob from being thrown into operative engagement with the bolt. A circular enlargement 50 near the upper end of the bar 48 is formed with a segment-shaped opening 51 within which operates a pin or roller 52 eccentrically mounted on the inner face of a disk 53 secured as by a screw 54 to the inner end of the tumbler-tube 55 of the inner Yale section 56. Projecting from one edge of the locking-bar 48 is a contact member 57 that, when the locking-bar is in its lowered position, forms an electrical connection between a pair of contact-strips 58 (Fig. 5) secured to the plate 17 and suitably insulated therefrom and from each other, and, when the locking-bar is in its raised position corresponding to a half turn of the key, forms an electrical connection between a similar pair

of contact-strips 59. A bolt-latch 60 (Fig. 2) is pivoted at 61 to the back-plate 3^a and at its free end has a down-turned dog 62 that, by a spring 63 bearing on the back of the latch, forces said dog into a notch 64 in the upper edge of the bolt when the latter has been retracted and into a similar notch 65 when the bolt has been shot to locking position. The latch is released upon the turning of either knob in either direction by the engagement of either of the rollers 13 and 47 with the lower end of a latch releasing pin 66 slidably mounted in the upper portion of the bolt-shank, its lower end extending into the notch 9 of the latter.

The above-described parts represent a typical embodiment of that portion of the complete mechanism that is designed to be applied to the door itself or its casing. The mechanism for making a record of the times when the lock is operated, the keys by which it is operated, and whether it is operated from the outside or the inside, is located outside the lock casing and preferably at a greater or less distance therefrom, such as in the office of the building; and it is operated by electrically actuated means, the circuits of which are opened and closed in proper order and relation to effect the proper positioning of the printing wheels, the actuation of the printing platen and the feed of the paper and ribbon of the printing mechanism by certain of the key-actuated parts of the lock and circuit making and breaking devices set in operation by the latter, all as will be now fully described in detail.

Referring to Figs. 7 to 15, inclusive, which show the part of the mechanism intended to be located in the office or elsewhere outside of the lock casing, 67 designates a supporting base and 68 a vertical wall strongly secured thereto as by the brace 69, on which base and wall are mounted the recording devices and their controlling and operating means. On a horizontal shaft 70 mounted substantially centrally of the vertical wall 68 is pivoted a key indicating segment 71 shown in detail in Fig. 14, said segment bearing on its printing edge the characters I, A, B, C, and D, in the order named; the letter I designating the word "Inside" and indicating the operation of the lock from the inside, and the letters A, B, C and D indicating the correspondingly identified keys. On the same shaft 70 are also mounted a series of type disks such as the disks 72 designating the days of the week, disks 73 designating hours, the disks 74 and 75 designating, respectively, the units and tenths of a minute, and disks 76 designating A. M. and P. M. These several time-indicating printing disks are moved in properly timed relation to each other by a series of pawls cooperating with suitably formed ratchets on the sides of the respective disks,

and themselves actuated from an electro-magnet 77 through a lever 78, link 79 (Fig. 11) and yoke 80 on which the actuating pawls are carried, cooperating with suitable spring-pressed detent pawls 81 and 82 to prevent overthrow and backward movement of the disks. With the details of this printing mechanism our invention is not concerned, as the mechanism is old and well known, and for a more complete description thereof reference may be had to the patent to F. W. Hubbard No. 717,405, granted December 30, 1902. The magnet 77 is energized once each minute by the closing of a circuit which includes the winding of the magnet through a pair of normally separated spring contacts 83, 84 by an eccentric pin 85 (Fig. 7) on the face of the escape-ment wheel 86 of an ordinary clock-train indicated as an entirety at 87 mounted upon and supported by the supporting wall 68 above the type wheels of the printing mechanism.

On the base 67 are mounted side by side a series of four electro-magnets 88, 89, 90 and 91 (Fig. 9), opposite and parallel with the upper ends of which is mounted in the wall 68 and an upright 92, a shaft 93, on which latter are loosely mounted the hubs of a series of armature arms 94, 95, 96 and 97, cooperating with the magnets 88, 89, 90 and 91, respectively. The hubs of said armature arms are provided at one end, respectively, with radial shoulders 94', 95', 96' and 97' which, when the armatures are attracted by the magnet, cooperate with similar shoulders 98', 99', 100' and 101' on collars 98, 99, 100 and 101 fast on the shaft 93 and alternating with the hubs of the armature arms. The shoulders 98', 99', 100' and 101' are disposed at different and consecutively increasing angular distances from the shoulders 94', 95', 96' and 97', which latter are all disposed in a line parallel with the shaft 93 when the armature arms are in their normal elevated positions, as clearly shown in Fig. 9. The result of this construction is that the several magnets 88, 89, 90 and 91 can operate independently upon the shaft 93, and each, when energized, imparts to said shaft a slight turning movement, these movements varying in extent according to which magnet acts. The main function of the magnets 88, 89, 90 and 91 is to set the key indicating segment 71 to proper printing position, according to which key is used. The mechanical transmission from the shaft 93 to the key indicating segment 71 consists, as best shown in Fig. 7, of a short arm 102 fast on one end of the shaft 93, a link 103 connecting the free end of said arm with the shorter arm of an elbow lever 104 pivoted at 105 to the wall 68, and a link 106 connecting the upper end of the elbow lever with the upper end of a radial arm 107 (Figs. 10 and 14).

of the key indicating segment 71. The elbow lever 104 is normally drawn to a position corresponding with the "I" printing position of the key-indicating segment by a spring 108 (Fig. 7), the movement of said elbow lever in such direction being limited by a stop-pin 109. The several armature arms 94, 95, 96, and 97 are normally maintained in raised position by suitably applied springs, such as those indicated at 110. Fast on the opposite end of the shaft 93 is a depending arm 111 having a pin and slot connection 112 with the upstanding arm 113 of an elbow lever pivoted to the plate 92 at 114, the other arm 115 of said lever constituting a contact device to alternately open and close electric circuits between two pairs of spring contact strips 116 and 117, respectively, secured to and insulated from the plate 92.

Referring next to the printing platen and its actuating means, 118 and 119 designate, respectively, a pair of twin-spool magnets mounted on the base 67, between and parallel with the upper ends of which is a shaft 120 journaled in the side wall 68 and an upright 121. Fast on this shaft 120 are oppositely extending twin armature arms 122 and 123 that cooperate with the magnets 118 and 119, respectively. Rigidly secured to one of the arms 122 (Fig. 9) is an angle-bracket 124, to which is pivoted the lower end of a link 125, the upper end of which latter is pivoted at 126, (Fig. 12) to a platen frame or carrier 127 that is, in turn, pivoted through its opposite sides on a rod 128 journaled in the wall 68 and an intermediate upright wall 129 between the two magnets of each pair of magnets 118 and 119. On the upper side of the free edge of the platen frame 127 is securely mounted the platen bar or strip 130 that cooperates with the type wheels and printing segment in printing the record on an interposed tape. The platen frame 127 is formed with an upwardly and rearwardly extending arm 131 that lies across the upwardly extending arm of the elbow lever 104, and is provided on its lower edge with a series of notches 132 adapted to cooperate with a tooth 133 on the side of the lever 104 to insure the exact alinement of the type of the key indicating segment, and a guard against any possible inaccuracy in the actuation of said segment by any of the magnets 88, 89, 90 and 91.

134 and 135 designate, respectively, delivery and receiving spools for a paper strip or tape 136 that extends beneath the type-carrying elements of the printing mechanism and beneath an idler roller 143, as clearly shown in Figs. 7 and 10; said spools being rotatably mounted on suitable spindles 137 and 138, respectively, projecting from the vertical wall 68. Beneath the delivery spool 134 and rotatably mounted

on the spindle 139 is a delivery spool 140 carrying an inking ribbon 141, which ribbon is passed over idler rollers or supports 142 and 151 and thence around a receiving spool 144. Receiving spools 135 and 144 are intermittently driven by a pawl and ratchet mechanism actuated in properly timed relation to the printing operation from one of the armature arms 123. The mechanism shown comprises ratchets 145 and 152 on corresponding ends of the spools 144 and 135, respectively, spring-actuated pawls 146 and 153 engaging said ratchets, a link 147 on which said pawls are pivoted, a bracket 148 (Fig. 9) secured to the armature arm 123 and to which the lower end of the link 147 is pivoted, and a radius arm 149 pivoted on the spindle of the spool 144 and at its outer end pivoted to the link 147. The usual detent pawls or dogs 150 and 154 are also employed to prevent back movement of the spools 144 and 135.

Fast on one end of the armature shaft 120 is a depending arm (Fig. 7) 155, the lower end of which carries a laterally projecting pin 156 engaging a vertical notch 157 in the upwardly extending arm 158 of a double bell-crank lever, the other arms of which 159 and 160 constitute contact-members adapted to operate between two pairs of contact strips 161 and 162 supported upon and suitably insulated from the standard 121.

One practical arrangement of the circuits connecting a battery or other source of electric current with the several electro-magnets and contact devices described is shown diagrammatically in Fig. 16, such arrangement being operative with the use of but a single battery or other source of current. The arrangement of the circuits as shown by this diagram will be readily understood when considered in connection with a description of the manner of operating the mechanism.

The various parts are shown in the drawings in the relative positions which they occupy when the door is either locked or unlocked, excepting only that when the door is locked the bolt 5, which appears in Fig. 2 in the unlocking position, is in the locking position. Assuming that the bolt is shot and the door is locked, and is to be opened from the outside by a person carrying the A key, the said key is first inserted in the tumbler-tube 4*, as shown in Fig. 1, and is given a half turn. This, through the tumbler-tube 4*, slide 20, hub 21, disk 22, and concentric pin 24, raises the locking bar 14 out of interference with the disk 12 of the bolt-actuating knob 11, allowing the latter to be pushed inwardly so that the pin or roller 13 engages the opening 8 of the bolt. A complete turn of the knob 11 throws the bolt to the retracted position shown in Fig. 2, the en-

5 gagement of the roller 13 with the pin 66 effecting the release of the latch 60 just before said roller, through engagement with the notch 9, shoots the bolt. The knob having
 10 been completely turned is retracted either manually or by a spring such as that shown at 11^a in Fig. 1. The recording of this un-
 15 locking operation and of the fact that it was performed by the A key is effected in the following manner. The raising of the lock-
 20 ing bar 14 establishes, through the contact plug 40, the closing of a circuit through the contact strips 43, the circuit being from one
 25 pole of the generator Z (Fig. 16) through wire *a*, wire *h*, contact strips 43 and plug 40, wire *h*, contact strips 116 at such time closed
 30 through contact arm 115 (see Fig. 7), wire *l*, bar 31 to which wire *l* is connected (see Fig. 2), arm 28, closed contacts 32 and 35
 35 (Fig. 6), wire *p*, magnet 88, wire *v*, and wire *b* to the opposite pole of the generator. This energizes magnet 88 which, through
 40 the armature of said magnet and the described connections therefrom to the key-indicating segment 71, turns said segment
 45 to the A-printing position. The turning of the shaft 93 by the armature arm of the magnet 88 shifts the contact plug represented by arm 115 to a position opening the
 50 circuit between the contact strips 116 and closing a circuit between the contact strips 117. This, it will be seen, establishes a
 55 closed circuit through the printing magnets 118, the circuit being from one pole of the generator Z by way of wires *a*, *q*, contact
 60 strips 117 and plug 115, wire *i*, magnets 118, wire *j*, contact strips 161 and contact plug 159 (see Fig. 7), and wires *d*, and *b*, to the
 65 opposite pole of the generator. This energizing of the printing magnets 118 instantly following the energizing of the segment-
 positioning magnet 88, actuates the platen and the segment alining mechanism through the connection shown and described and
 thus effects the printing on the tape 136 of the time and key designating symbols. The energizing of the printing magnets 118
 through their armature arms, and the jointed arms 155 and 158 and the contact plugs 159 and 160 opens the previously established
 circuit at the contact strips 161 and places the contact strips 162 into electrical connection with each other, the circuit including
 said contact strips 162 being, however, open at this time between the contact strips 42.
 The key is then given its remaining half turn, which lowers the locking-bar 14 into locking position relatively to the knob 11,
 and at the same time carries the contact plug 40 from between the contacts 43 to closing position between the contacts 42, thus closing the circuit through the relief
 magnets 119, such circuit comprising the wire *a* leading from one pole of the battery,
 contact strips 42 and plug 40, wire *e*, con-

tact strips 58 and plug 57, wire *f*, magnets 119, wire *g*, contact strips 162 and plug 160 and wire *b* to the opposite pole of the battery Z. The energizing of the relief magnets 119 restores the contact strips 162 to
 normal open position and effects the feed of the printing tape and ribbon by means of the receiving spools 144 and 135 and the described actuating mechanism thereof connected to the armature of the magnets 119.

The above described operations occur both in the locking and unlocking of the door from the outside, and also when using any one of the series of keys. When using the B, C, or D key, however, the insertion of
 such key in the tumbler-tube shifts the arm 28 into engagement with the contacts 36, 37 or 38, so that upon the closing of the circuit at the contacts 42 the magnet 89, 90 or 91 is actuated through the circuits thereof clearly
 shown in Fig. 16, and the key-indicating segment 71 is thereby actuated to the proper extent to effect the printing of the symbol corresponding with the symbol designating the key used.

In the normal position of the key-indicating segment the character "I" thereof lies in the printing position, and hence, when locking or unlocking the door from the inside it is unnecessary to call into action
 the segment-positioning mechanism. In locking or unlocking the door from the inside any one of the keys may be used, the release of the inside knob and the subsequent
 actuation of the bolt thereby being effected in the same manner as that already described through the substantially duplicate mechanism shown in the inner portion of the lock.
 The turning of the key half way around carries the contact plug 57 (Figs. 4, 5 and 16) from the position shown in said figures to a position connecting the contact strips 59.
 This establishes a circuit through the printing magnets 118, such circuit comprising the wire *a*, from one pole of the battery, wire *h*,
 contact strips 59 and plug 57, wire *i*, magnets 118, wire *j*, contact strips 161 and plug 159, wire *d*, and wire *b*, to the other pole of the battery. The energizing of the mag-
 nets 118 also breaks this circuit as soon as the printing is done, and closes the contact strips 162 through plug 160; whereupon, upon the completion of the turning move-
 ment of the key and the closing of the circuit through contact strips 58 and plug 57, the parts are restored to normal positions and relation, as shown in Fig. 16.

From the foregoing it will be seen that a leading feature of our invention resides in the location of the recording mechanism at a point outside the lock-casing, and the employment of electrically actuated means for operating said recording mechanism, which electrically actuated means are, in turn, controlled primarily by the key-actuated cir-

cuit-closing means carried by the lock mechanism. This greatly simplifies and reduces in size the lock mechanism proper carried by the door or its casing as compared with those devices wherein the recording mechanism is itself mounted within the lock casing and is primarily actuated from the key itself. It will also be observed that in our invention the element we have termed the "key" is not used to actuate the bolt of the lock, but finds its principal function in selecting and controlling certain electric circuits pertaining to electric magnets or like motors through which the key-indicating segment is moved to proper printing position and through which the printing or recording is done, including the feeding of the inking ribbon and paper strip and the restoration of the circuits to their normal position upon the completion of the locking or unlocking operation. A further function of the tool which we designate as a "key" is in controlling, through locking devices, such as the locking bars 14 and 48, the operative connection between the bolt and the knob which effects the throw of the bolt.

It will be manifest to those skilled in the art that the particular mechanical embodiment of the operative principle of our invention herein shown and described might be considerably varied in detail without involving any departure from such operative principle or sacrificing any of the advantages secured thereby. Hence, we do not limit the invention to the particular mechanism or relative arrangement of the parts shown and described, except to the extent clearly indicated in specific claims.

We claim:

1. In a recording door-lock, the combination with a lock mechanism mounted on the door of a time-recording mechanism mounted outside the lock-casing, electrically actuated means for operating said recording mechanism, a plurality of circuits for said electrically actuated mechanism, contact devices for said circuits, and a key for each circuit controlling its contact devices.

2. In a recording door-lock, the combination with a lock mechanism mounted on the door of a time-recording mechanism mounted outside the lock-casing, electrically actuated means for operating said recording mechanism, a plurality of circuits for said electrically actuated means, and key-actuated circuit-closing means carried by said lock-mechanism, and a key individual to each circuit for operating said key actuating means.

3. In a recording door-lock, the combination with a lock mechanism mounted on the door, of a time-recording mechanism mounted outside the lock-casing and including a plurality of clock-controlled type-carriers, a key-recording mechanism also mounted

outside the lock-casing and including a movable key-designating member, electrically actuated means for setting said key-designating member to printing position, a normally open circuit therefor, electrically actuated means for effecting the printing operation, a normally open circuit therefor, key-actuated means carried by said lock mechanism for closing one of said circuits, and means actuated by the actuating means of said key-designating member for closing the other of said circuits, substantially as described.

4. In a recording door-lock, the combination with a lock mechanism mounted on the door, of a key-recording mechanism mounted outside the lock-casing and including a differentially movable key-designating member carrying type corresponding to the identifying symbols of a plurality of keys, a plurality of magnets for differentially moving said key-designating member to printing position, a corresponding plurality of normally open circuits each including one of said magnets, and key-actuated means carried by said lock mechanism for closing the circuit through any one of said magnets, substantially as described.

5. In a recording door-lock, the combination with a lock mechanism mounted on the door, of a key-recording mechanism mounted outside the lock-casing and including a differentially movable key-designating member carrying type corresponding to the identifying symbols of a plurality of keys, a plurality of magnets for differentially moving said key-designating member to printing position, a corresponding plurality of normally open circuits each including one of said magnets, a circuit-closing device carried by said lock and actuated by the turning movement of said key, and a switch also carried by said lock and actuated by the longitudinal movement of the key, substantially as described.

6. In a recording door-lock, the combination with a lock-mechanism mounted on the door, of a time-recording mechanism mounted outside the lock-casing and including a plurality of clock-controlled type-carriers, a key-recording mechanism also mounted outside the lock-casing and including a differentially movable key-designating member carrying type corresponding to the identifying symbols of a plurality of keys, a plurality of magnets for differentially moving said key-designating member to printing position, a corresponding plurality of normally open circuits each including one of said magnets, a magnet for effecting the printing operation, a normally open circuit therefor, circuit-closing means including a differentially movable key-actuated member carried by said lock mechanism for closing the circuit through any one of said actuating

magnets of said key-designating member, and means actuated by any of the latter for closing the circuit through said printing magnet, substantially as described.

- 5 7. In a recording door-lock, the combination with a lock mechanism mounted on the door, of a time-recording mechanism mounted outside the lock-casing and including a plurality of clock-controlled type-carriers and a ribbon-feed mechanism, a key-recording mechanism also mounted outside the lock-casing and including a differentially movable pivoted segment carrying type corresponding to the identifying symbols of a plurality of keys, a plurality of magnets for differentially moving said segment to printing position, a corresponding plurality of normally open circuits each including one of said magnets, a magnet for effecting the printing operation, a normally open circuit therefor, a magnet for actuating said ribbon-feed mechanism, a normally open circuit therefor, key-actuated circuit-closing means including a differentially movable member carried by said lock mechanism for closing the circuit through any one of said actuating magnets of said segment, means actuated by any of said last named magnets for closing the circuit through said printing magnet, and means actuated by said printing magnet and cooperating with said key-actuated circuit-closing means to close the circuit through the actuating magnet of said ribbon feed mechanism, substantially as described.

8. In a recording door-lock, the combination of a lock-casing, a bolt slidably mounted therein, a knob for actuating said bolt, a key-actuated locking-bar normally locking said knob out of working relation to said bolt, a recording mechanism, an electro-magnet for actuating said recording mechanism, a circuit including said electro-magnet having a pair of terminals within said lock-casing, and a circuit-closing device carried by said locking-bar, substantially as described.

9. In a recording door-lock, the combination with a lock-mechanism mounted on the door of a key-recording mechanism mounted outside the lock-casing, electrically actuated means for operating said recording mechanism, a plurality of circuits controlling said electrically actuated mechanism, and a circuit-controlling member individual to each circuit but inoperative as to the other circuits.

10. In a recording door-lock, the combination with a lock-mechanism mounted on the door, of a key-recording mechanism mounted outside the lock-casing, electrically actuated means for operating said recording mechanism, a plurality of circuits therefor, and a key-controlled member for each circuit and operable only by its individual key.

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Witnesses:

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