Sept. 3, 1940. E. J. VON PEIN ET AL 2,213,573

RECORDING LOCK

Filed Nov. 22, 1938 3 Sheets-Sheet 1

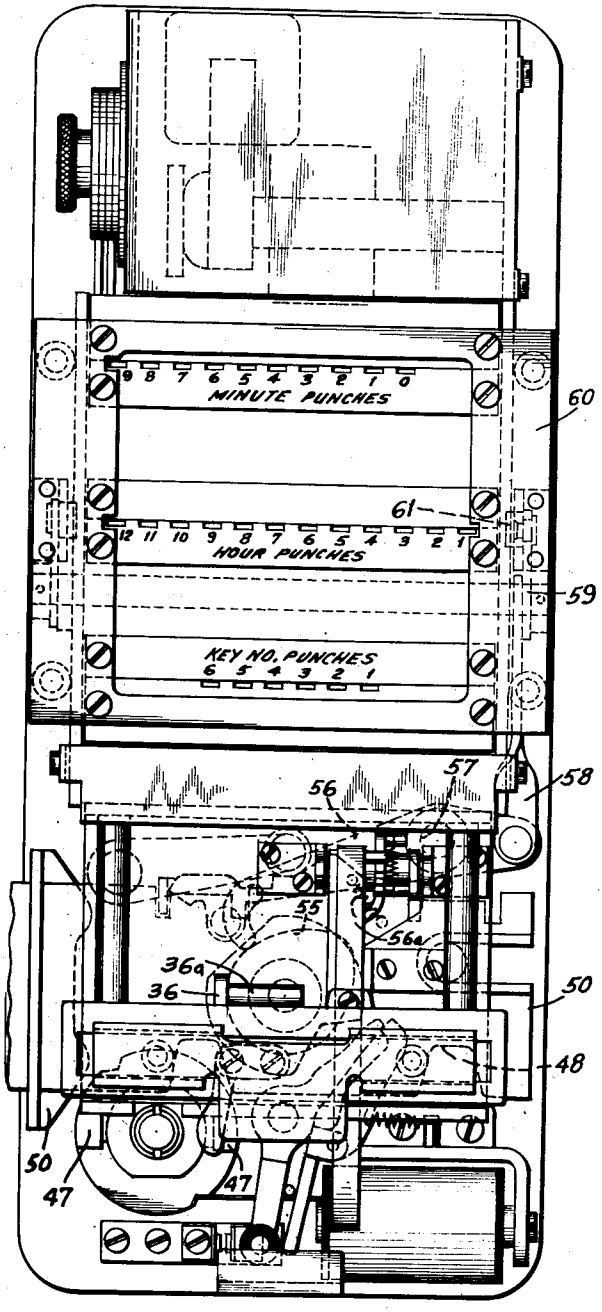
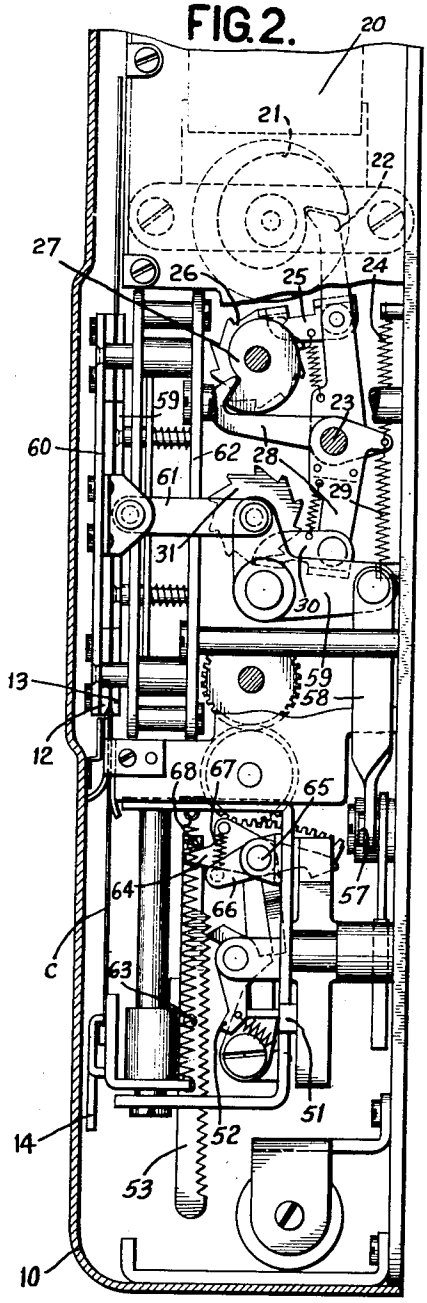


FIG. 1.

FIG. 2.



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FIG. 3.

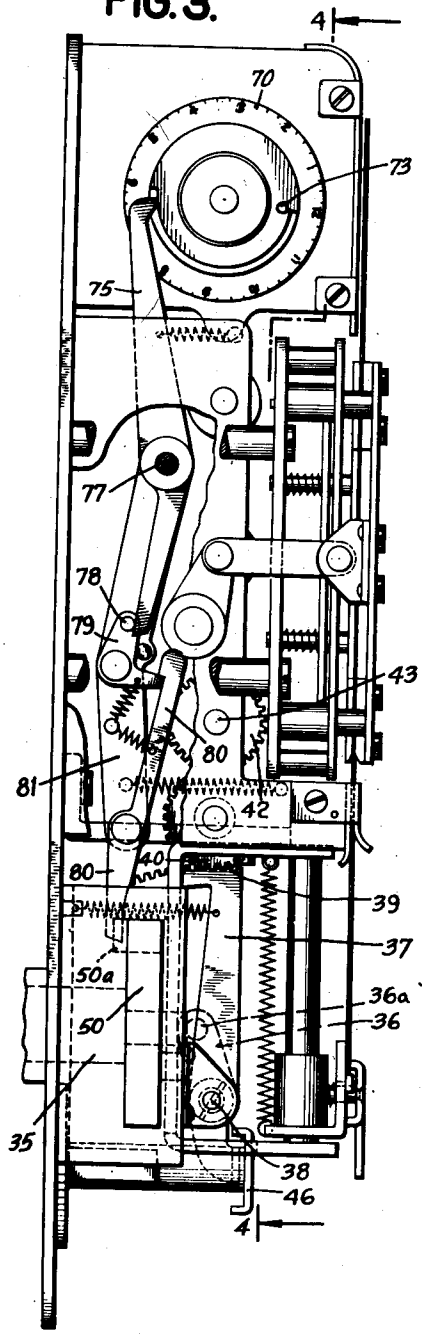
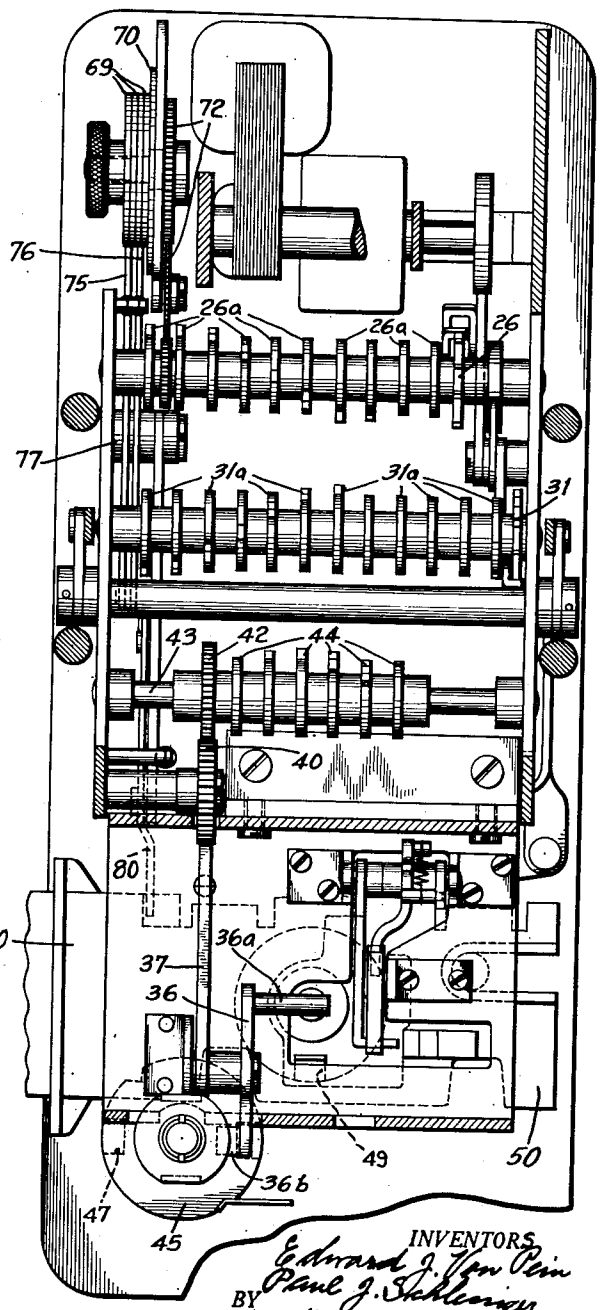


FIG. 4.



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FIG.5.

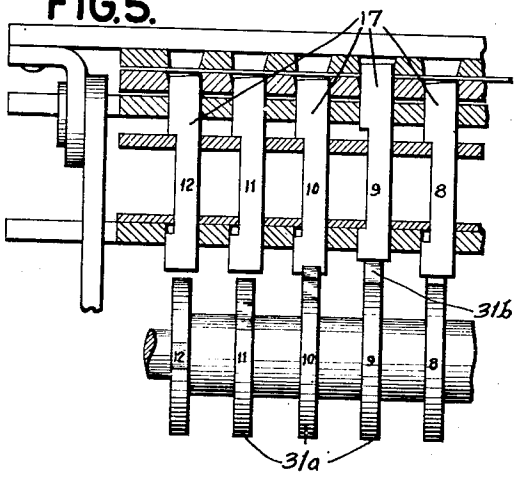


FIG.6.

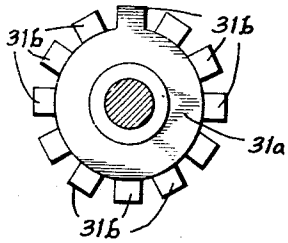


FIG.8.

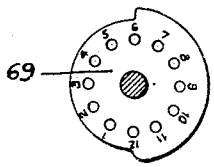
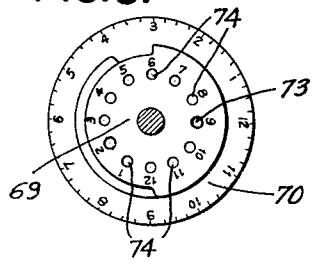


FIG.9.



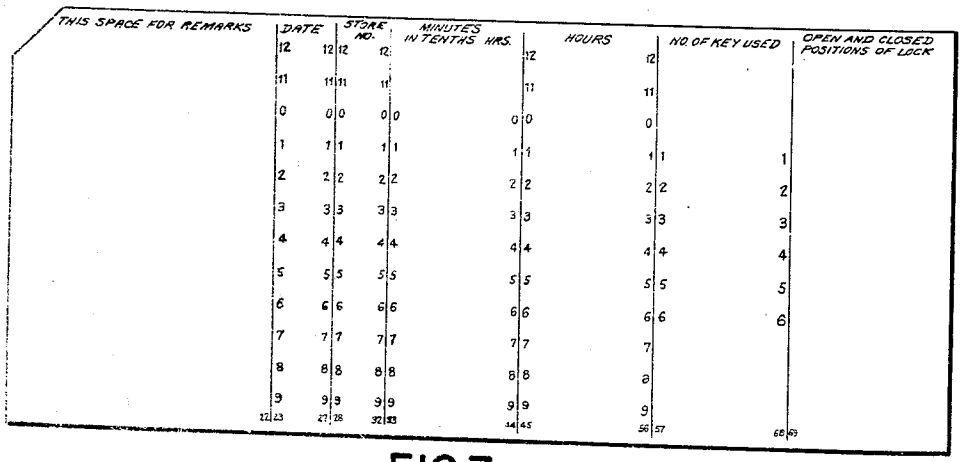


FIG.7.

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RECORDING LOCK

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Application November 22, 1938, Serial No. 241,794

7 Claims. (Cl. 70—433)

This invention relates to recording door locks in which the time of operation of the manipulation of the bolt of the lock is recorded within the lock together with the identification of the key with which the manipulation is effected.

More particularly, this invention relates to a recording door lock in which the essential data recordings are effected by punching a record receiving medium in which the perforations so made become the record of operation of the lock instead of a printed record as heretofore generally used.

The purpose of a recording lock is to provide a record of the time a place of business is opened for business and when it is closed so that the owner may delegate the opening of his establishment to an employee and have a record as to the manner in which this is carried out. This is particularly true of chain stores where each store is under the immediate supervision of a manager in whom lies the responsibility of seeing that his store is opened promptly in the morning and remains open for the full period as set forth by the central management of the company. With the printed record, these records are sent in each week to the general office and there they are examined and the time computed and wages, bonuses, or deduction figures in accordance with each company's rules and policies. With the present invention it is contemplated perforating holes in a card of the well-known Hollerith type which are used in tabulating machines in which each perforation is made at index point positions on the card corresponding to the data it is desired to record, whether time, in hours and minutes, a key number, or other fixed data such as a store number which may be prepunched. If reports therefore can be timed in with the key number and time properly perforated on such a card, these reports coming from a large group of stores can be quickly run through a tabulating machine and the results quickly, neatly, and accurately tabulated.

It is an object of the present invention to provide a lock having perforating mechanism controlled by the operation of the lock for manifesting perforating time and key designation characteristics on a record receiving medium.

Another object of the invention is to provide a lock having time controlled punching elements selectively located in an operative position in accordance with the time.

Still another object is to provide a lock having key controlled punching elements selectively located in an operative position in accordance with the key used for operating the lock.

A further object of the invention resides in the provision of a lock having a die for cooperating with punch elements which is operable by effecting operation of the lock bolt.

A still further object of the invention is to provide a recorder, means for shifting a record sheet upon completion of a punching operation therein and further in accordance with time intervals.

Still another object of the invention is to provide a recording lock having a time controlled program device settable to control a disabling mechanism whereby operation of the lock is permitted only during certain predetermined periods of time.

Other objects and advantages of this invention will be apparent from the specification and the accompanying drawings which show one embodiment of this invention and wherein similar reference numerals indicate similar parts and wherein in the drawings.

Fig. 1 is a front elevation of the recording lock.

Fig. 2 is a side view of the same as viewed from the right (Fig. 1).

Fig. 3 is a side view of the same as viewed from the left (Fig. 1).

Fig. 4 is a section taken through lines 4—4 of Fig. 3.

Fig. 5 is a detailed view of the punch mechanism and interposers.

Fig. 6 is a detailed end view showing the arrangement of the interposers.

Fig. 7 is a view of the record card.

Fig. 8 shows one of a set of open and close timing discs.

Fig. 9 shows the disc of Fig. 8 set in place to control the time that the recorder lock is to come into operating position.

In the preferred embodiment of the invention as shown in the drawings, the recording lock is adapted to use the well-known type of Hollerith card as a record receiving medium. Such a card is shown and described in the U. S. patent to C. D. Lake #1,772,492, dated August 12, 1930. These cards are printed with index positions so located on the cards that perforations occurring in the different index positions may be analyzed by electric tabulating machines and the indicia represented by said perforations tabulated in printed form on a sheet of paper placed in this machine in a manner well-known in the tabulating machine art.

A typical card is illustrated in Fig. 7, the card

being marked off into fields representing different data. The pertinent information generally required of recording door locks includes the date, the store number, the number of the key either opening or closing the lock, and the time in hours and minutes of the opening or closing of the lock. Each part of this information is allotted to a different field of the card. For purposes of illustration, the card in Fig. 7 shows columns 23 to 27 indicating the date; columns 28 to 32, the store number; columns 33 to 44 the minutes in tenths (0 to 9); columns 45 to 56, the hours (1 to 12), the zero position representing 10 and the 11th and 12th positions representing 11 and 12 respectively; columns 57 to 68, the number of the key used including the inside latch key (1 to 6); columns 69 to 80, the open and closed position of the lock. The recording door lock according to the present invention punches only the time in hours and minutes and the key number. The remaining information referred to above may be written on the card at the time it is inserted and punched later on a standard card punch.

Referring now to Fig. 2, a cover 10 is readily removable to allow the insertion of a card C in the card guide 11 which directs the card between the die 12 and the stripper 13. The lower end of the card is seated in a card clamp, generally designated 15, by moving the lower end of a card holder lever 14 to the right as viewed in Fig. 2 so as to open the clamp to permit clearance enough for the card to be seated therein. When lever 14 is released, the clamp grips on the card holding it firmly in position against a stop 16.

A synchronous motor 20 or other suitable means may be employed to drive a stepped cam 21. The drive connection with the motor 20 is so arranged that cam 21 makes one revolution in six minutes and as it rotates it causes a minute transfer lever 22 to be rocked first clockwise and then counterclockwise about its pivot 23. The lever 22 is in effect a cam follower and is biased against the surface of cam 21 by a spring 24. When lever 22 drops off the step of cam 21, it moves briskly to the left and a feed pawl 25 pivotally mounted on this lever imparts a feed stroke to a minute punch selector ratchet 26 to advance the minute punch selector one-tenth of a revolution. It will be noted that the ratchet 26 has ten teeth and consequently it takes ten revolutions of the cam 21, at six minutes apiece, to cause one complete revolution of the minute punch selector. Fastened to the face of ratchet 26 is a stepped cam 27 with which an hour transfer lever 28 cooperates. The lever 28 is pivoted on the common pivot 23 and is biased against the surface of the cam 27 by a spring 29. The lower extremity of lever 28 carries a feed pawl 30 and as lever 28 drops off the step of cam 27 upon the completion of one revolution or, in other words, once each hour, this pawl is moved briskly to the left to advance an hour punch selector ratchet 31 one-twelfth of a revolution.

The minute and hour punch selectors comprise ten selector rings 26*a* and twelve selector rings 31*a*, respectively, as shown in Fig. 4. These rings have lugs 31*b* which are spaced thirty-six degrees for the minute selector and thirty degrees for the hour selector. The relative location of the lugs of the hour selector is illustrated in Fig. 6 which shows the end ring with its lug at the top and with the lugs of the other rings behind the end ring successively spaced thirty degrees further from the lug position of the end ring. Each of the rings is mounted directly opposite the one of the punches 17 which each ring represents, that is, number 9 minute selector ring is opposite number 9 minute punch so that each punch has a corresponding selector ring opposite it as shown in Fig. 5. As the rings 26*a* and 31*a* revolve, due to the action of the transfer levers 22, 28 as previously described, a lug 31*b* of one of the rings of each selector unit always comes into the path of its corresponding punch, placing that punch in a piercing position as illustrated by the number 9 punch in Fig. 5.

Keys of different lengths are adapted to be inserted in the lock, and the length of each key indicates its number. When a key is inserted in the lock, it forces key cylinder 35 (Fig. 3) up against pin 36*a* projecting from lever 36 of the key key selector sector 37, causing the sector 37 to be rocked clockwise a corresponding distance on its pivot shaft 38. Sector 37 is provided with gear teeth 39 which mesh with the teeth of an idler gear 40 mounted on a hub 41 (Fig. 4). Motion is transmitted through the idler gear 40 to actuate the key number selector unit comprising a gear 42 fixed to a shaft 43 to which is also provided a plurality of key number selector rings 44, each having a lug 44*b* thereon. The rings 44 are all rotated a certain extent in accordance with the magnitude of movement of the sector 37 and a lug of one of the rings is brought into the path of its punch. The punch selected in this manner is the one representing the number of the key which was inserted in the key cylinder 35. An inside latch cylinder 45 (Fig. 4) is provided and when the key for this latch cylinder is inserted, it causes a latch disc 46 to revolve. A projection 36*b* on the selector sector lever 36 cooperates with a cam surface on the disc 46 to impart movement to the sector lever 36 and, hence, to the sector 37 so as to rotate the selector unit into the path of the punch representing the inside latch key.

The bolt and lock mechanism is of the conventional form and is described in detail in the U. S. Patent #1,611,579 issued to Le Grand C. Bush on December 21, 1926. Accordingly, only such portions of this mechanism which is necessary for an understanding of the present invention will be set forth and more detailed information may be obtained by referring to the aforementioned patent.

As a key is inserted in the key cylinder 35 and turned clockwise, the key cylinder also rotates clockwise causing a sliding bolt 50 to be withdrawn to its unlocked position. Locking may be effected by turning the key reversely. To lock the device from the inside of the door, the inside latch cylinder 45 receives a plain special inside latch key. The disc 46 which is attached to cylinder 45 is provided with lugs 47 adapted to engage a supplementary notch 48 on the lower surface of the bolt so that the rotation of the cylinder will cause the operation of the bolt.

As shown in Fig. 2, the sliding bolt 50 is provided with a card feed escape pawl cam 51 fastened thereto which is shaped so as to permit a card feed escape pawl 52 to escape one tooth in relation to a card feed rack 53. The card feed rack is under spring tension for feeding the card C through the punching mechanism. A card column of each of the minute, hour, and key number column groups is in a punching position ready to receive a perforation upon operation of a key cylinder.

The revolving of key cylinder 35 (Fig. 1) causes a cam 55 thereon to rock a cam follower lever 56

which is pivoted at 57 and operatively connected to one end of a vertical link 58 which has its other end connected to a bell crank 59 (Fig. 2). The bell crank is connected to the punch die 60 through a horizontal link 61, and thus the die is moved to the right, as viewed in Fig. 2, toward the punches which are held in position by the punch holder 62. This forces the card C, which is now positioned between the die 60 and the stripper 59 by the card holder 14, to come into contact with the punches. Where one of the lugs or interponents of a selector ring comes into the path of a punch, that punch is held stationary and the die forces the card over the punch, piercing the card, as illustrated in Fig. 5. Where the punches are free of the selector ring interponents, the card simply pushes the punches back with it and no piercing action results. The stripper plate 59 frees the card of the punches and allows the latter to return to their normal position, as the die moves away from the punches after the punching operation, under the impetus of a return spring 56*a* on the die operating cam follower 56.

As the card is fed through the die, column by column, by the action of opening and closing of the lock, and when the last column of the card is brought into punching position by the lock being opened, a pin 63 on the card feed rack 53 comes in contact with escape pawl latch 64, causing the latch to be moved clockwise about a pivot 65, as viewed in Fig. 2, into a position wherein a lower extension 64*a* thereof latches up the escape pawl 52 and keeps the pawl out of engagement with the rack 53. Another latch 66 is connected to latch 64 by a spring 67 and therefore moves with it, dropping in a slot in the sliding bolt 50 and preventing the bolt from moving. The escape pawl 52 and the sliding bolt 50 remain latched up until the card feed holder 14 which carries the card feed rack 53 is pulled down to its home or start position, causing another pin 68 on the card feed rack to trip the escape pawl latch 64 and allow the escape pawl and sliding bolt to return to normal. The recorder is now restored to an operating condition.

Provision is made whereby the recorder lock can be set to operate at any predetermined time of the day and to remain in an operative position only within a set period of time. Once the lock is operated within the set period, another operation of the lock within the same period is prevented. The control means for accomplishing the above includes four timing discs 69, such as the one shown in Fig. 8, which are settable in position relative to a graduated timing dial 70 as shown in Fig. 9 to set the time when the recorder lock is to become operative.

The disc 69 shown in Fig. 8 represents either an open or closed timing disc with twelve locating holes, each hole representing an hour of the day. The timing dial 70 with a locating pin 71 is rotated through one complete revolution every twelve hours by a gear train generally designated 72 having a 12:1 ratio which forms a driving connection with the minute punch selector unit 26. A locating pin 73 is provided on the timing dial at the twelve o'clock time with respect to the bolt latch operating mechanism which will be described presently. Thus, by placing the disc 69 on the dial so that the locating pin fits through one of the holes 74 the time which the bolt latch becomes either operative or inoperative is predetermined. When three other similar discs are mounted in adjacent position to the disc just described, two of the discs will represent the open and closed position for the first time period in the day and the other two discs will represent the open and closed position for the second time period in the day. Two levers 75 and 76 are held in contact with the open and closed discs of the first and second time periods respectively. The levers are pivoted at 77 and the lower ends thereof operate against a pin 78 on a bolt latch pawl 79 which is normally held in a latched position by bolt latch 80. Both the pawl 79 and the latch 80 are pivotally mounted on bolt latch lever 81 which in turn revolves freely about the pivot 77. When levers 75 or 76 fall into a recessed portion formed by the open and close timing discs representing the time of day in which the lock is to become operative, bolt latch lever 81 is revolved carrying the pawl 79 out of the path of the sliding bolt of the lock. Pawl 79 is held out of the path of the sliding bolt for the duration of the time represented by recessed portion formed by the timing discs or until the lock has been actuated by a key, in which event the sliding of the bolt 50 will trip the bolt latch 80 because of a high point 50*a* provided on the bolt for this purpose. The bolt latch 80 in freeing itself from the pawl 79 allows the bolt latch lever 81 carrying the latch 80 to move into the path of the sliding bolt thereby placing the recorder lock in an inoperative position. When the bolt latch operating levers 75 and 76 are on the high surfaces of the open and close timing discs, the bolt latch 80 will again latch up with the pawl 79 and will hold the bolt latch lever 81 in a position where the lock will remain inoperative until another recessed portion formed by the open and close timing discs comes into the path of the bolt latch operating levers.

While there has been shown and described and pointed out the fundamental novel features of the invention as applied to a single modification, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention therefore to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In a recording lock, key controlled means for operating the lock, punching mechanism including a die and a plurality of groups of punching elements for coacting with the die to punch a record card therebetween, a plurality of selector units having interposer means associated with the aforesaid punching elements for selecting the punching elements for operation, a timing device, means controlled by said timing device for positioning a portion of said interposer means for selecting the associated punch elements in accordance with time, means controlled by the key controlled means, upon operating the lock for positioning another portion of said interposer means to select a punching element in accordance with the key, and means also controlled by operation of the lock by the key for moving the die and punch elements relatively towards each other to punch the record card in accordance with the selection of the punching elements.

2. In a recording lock, key controlled means for operating the lock, punching mechanism including a die and a plurality of groups of punching elements for coacting with the die to punch a record card therebetween, card feeding means for feeding the record card relative to the punch-

ing mechanism, a plurality of interposers associated with the punching elements, a timing device, means controlled by the timing device for positioning part of said plurality of interposers to select the associated punching elements in accordance with time, means also controlled by the timing device to render the card feeding means operable at the end of predetermined intervals of time, means controlled by the key controlled means upon operation of the lock for positioning another part of said plurality of interposers to select a punching element in accordance with the key, means also controlled by operation of the lock by the key for moving the die and punch elements relatively towards each other to punch the record card in accordance with the selection of the punching elements, and means controlled by the punching means to render the card feeding means operable following a punching operation during one of said predetermined intervals of time.

3. In a recording lock, key controlled means for operating the lock, punching mechanism, a timing device comprising a graduated timing dial with a plurality of timing discs settably mounted thereon, means under the control of the timing device for selecting a portion of said punching mechanism for operation in accordance with time, means controlled by the key controlled means upon operating the lock for selecting another portion of the punching mechanism for operation in accordance with the key, means also controlled by operation of the lock for effecting operation of the punching mechanism to punch a record card in accordance with the portions of the punching mechanism selected for operation, and means to render the lock operable during a predetermined time interval as determined by the setting of the timing discs on the timing dial.

4. In a recording lock, key controlled means for operating the lock, punching mechanism including a die and a plurality of punching elements for coacting with the die to punch a record card therebetween, a timing device comprising a timing dial and a plurality of timing discs settably mounted thereon, means controlled by said timing device for selecting some of said punching elements for operation in accordance with time, means controlled by the key controlled means upon operating the lock for positioning others of said punching elements in accordance with the key, means also controlled by the key controlled means upon operating the lock by the key for moving the die and punch elements relatively towards each other to punch the record card in accordance with the selection of the punching elements, and means controlled by the timing discs for preventing more than one operation of the lock during a time interval predetermined by the positioning of said timing discs on the timing dial.

5. In a recording lock, key controlled means for operating the lock, recording mechanism, a timing device comprising a graduated timing dial with a plurality of timing elements settably positioned thereon, means under the control of the timing device for selecting a portion of said recording mechanism for operation in accordance with time, means controlled by the key controlled means upon operating the lock for selecting another portion of the recording mechanism for operation in accordance with the key, means also controlled by the operation of the lock for effecting operation of the recording mechanism to record on a record in accordance with the portions of the recording mechanism selected for operation, and means to render the lock operable during a predetermined time interval as determined by the setting of the timing elements on the graduated timing dial.

6. In a recording lock, key controlled means for operating the lock, perforating mechanism including a die and a plurality of perforating elements for coacting with the die to perforate a record card therebetween, a timing device embracing a timing dial with a plurality of timing elements settably mounted thereon, means controlled by the timing device for selecting certain of said perforating elements for operation in accordance with time, means controlled by the key controlled means upon operating the lock for positioning other of said perforating elements in accordance with the key, means also controlled by the operation of the lock by the key for moving the die and perforating elements relatively towards each other to perforate a record card according to the selected perforating elements, and means to render the lock operable during a predetermined time interval as determined by the setting of the timing elements on the timing dial.

7. In a recording lock, key controlled means for operating the lock, punching means including a die and a plurality of punching elements for coacting with the die to punch a record card therebetween, time punch selecting means for selecting the punch elements for punching a time designation in the record card, key code selecting means for selecting the punch elements to punch a key code designation in the record according to the code characteristics of the key, means effective upon operation of the lock by the key for moving the die and punch elements relatively towards each other to punch the record card in accordance with the selection of the punching elements by each of the aforementioned selecting means, a timing dial with a plurality of time period control discs settably attached thereto, and means to render the lock operable during a predetermined time period as determined by the setting of the control discs on the timing dial.

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