B. H. ZIEHLER.

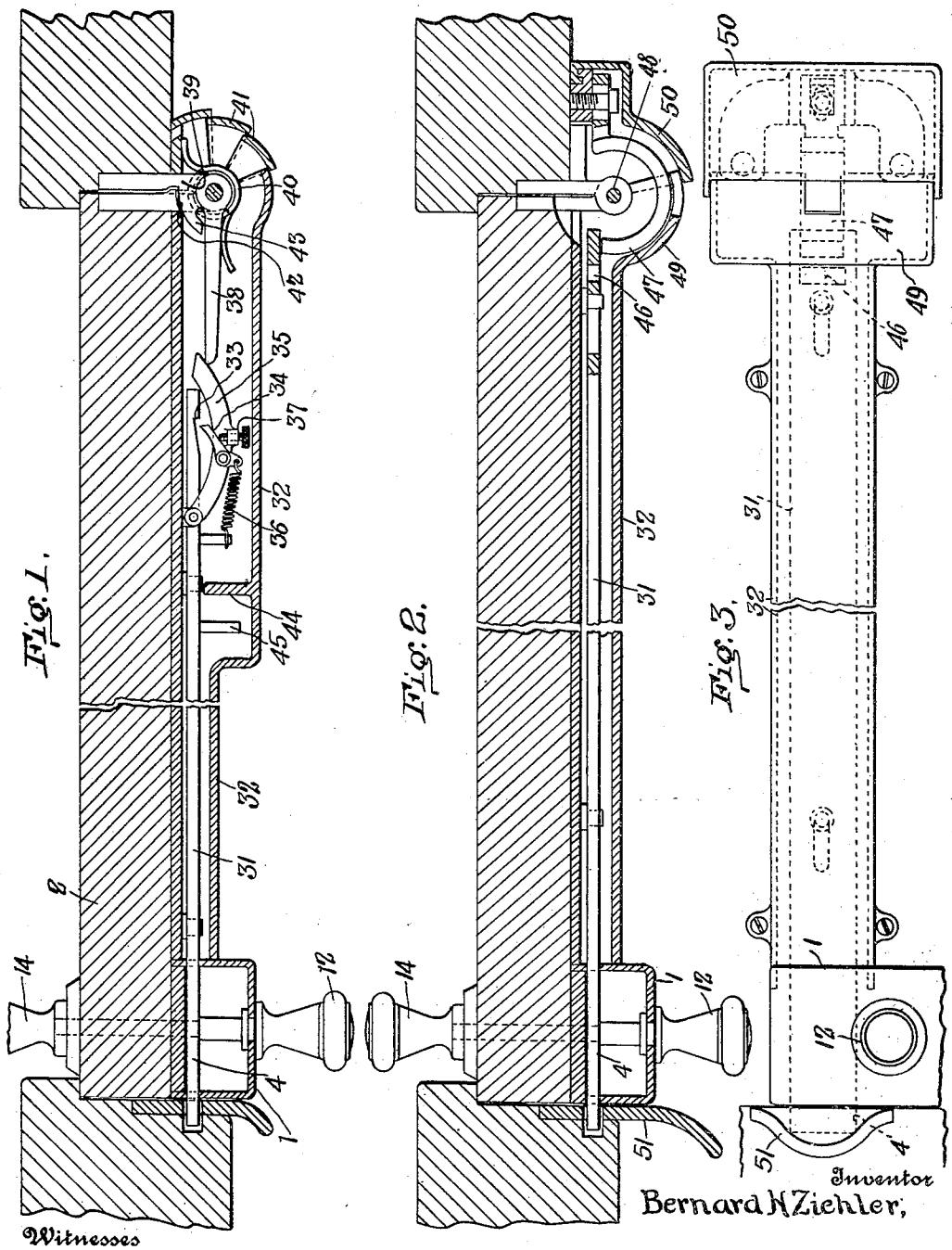
CONTROLLING DEVICE FOR LOCKS.

APPLICATION FILED NOV. 20, 1914.

1,245,302.

Patented Nov. 6, 1917.

3 SHEETS—SHEET 1.



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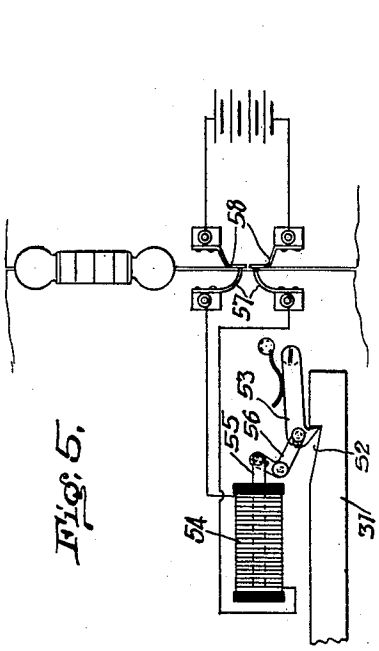

Fig. 5.

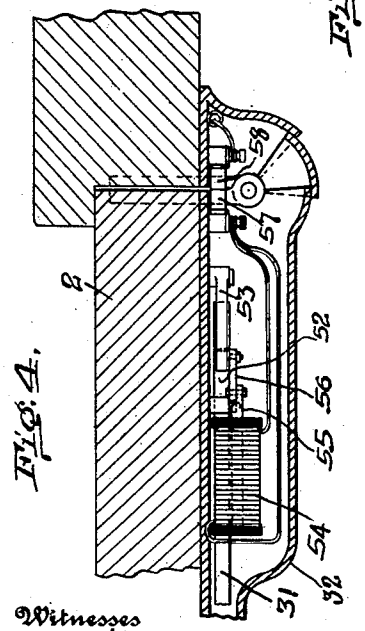

Fig. 4.

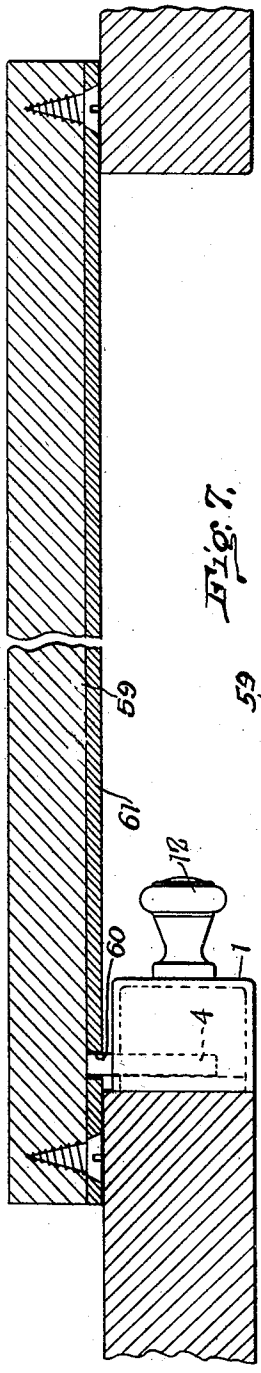

Fig. 6.

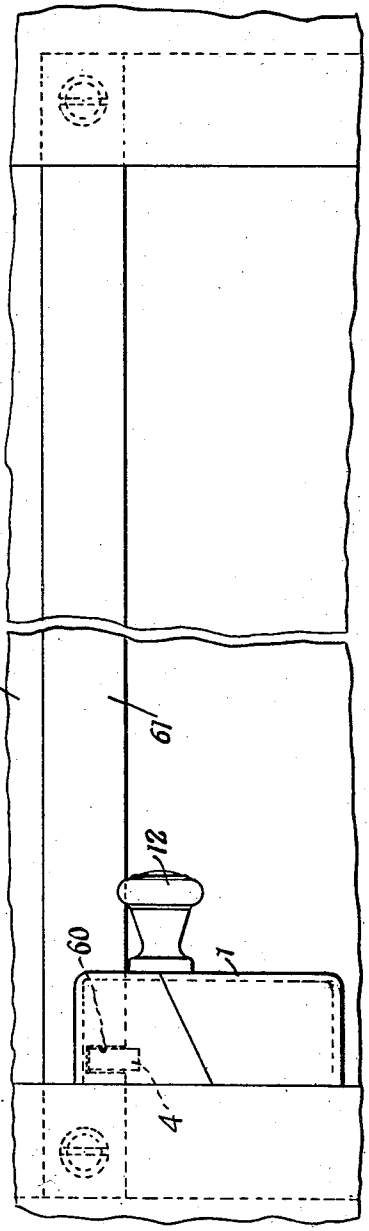

Fig. 7.

Witnesses

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3 SHEETS—SHEET 3.

Fig. 8.

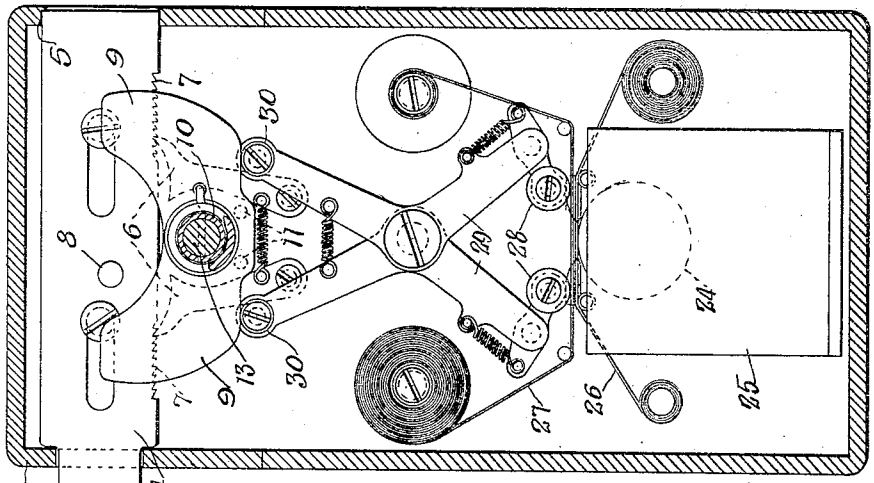


Fig. 10.

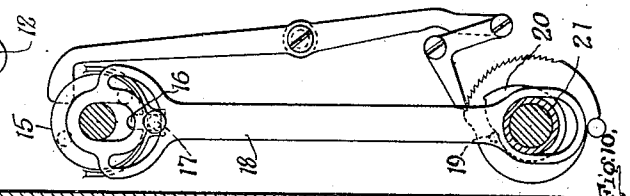
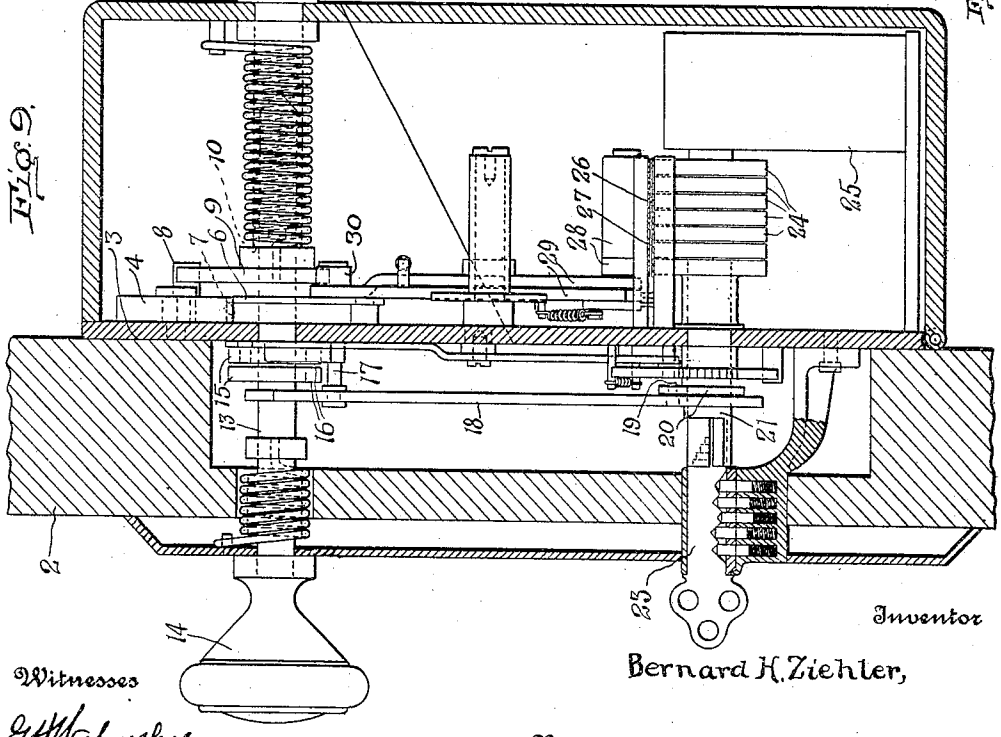


Fig. 9.



Witnesses

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UNITED STATES PATENT OFFICE.

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CONTROLLING DEVICE FOR LOCKS.

1,245,302. Specification of Letters Patent. Patented Nov. 6, 1917.

Application filed November 20, 1914. Serial No. 873,232.

To all whom it may concern:

Be it known that I, BERNARD H. ZIEHLER, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Controlling Devices for Locks, of which the following is a specification, reference being had thereing to the accompanying drawing.

This invention relates to controlling devices for locks and is designed more particularly for use in connection with recording locks, although it is not restricted to this use. Recording locks have been designed which will preserve a record of the manipulations of the lock. Some of these devices preserve a record to identify the particular key employed to operate the lock; others record the time of day at which the lock was operated; and others preserve both of these records. In these devices, as heretofore designed, however, it has been possible for the lock and recording device to be manipulated when the door has been moved into its open position, either by unauthorized persons or with intent to produce a misleading record. Such operation of the lock or recording device is highly objectionable in that it provides a way in which the purpose of the lock may be defeated to a greater or lesser extent.

The object of the invention is to provide means for preventing the manipulation of the lock or the operation of the recording device when the door has been moved from its fully closed position; and further, to provide such a device which will be controlled by the movement of the door itself. A further object of the invention is to so construct the device that a very slight movement of the door will render the lock or recording device inoperative; and to provide such a device which will be simple in its construction and operation, thereby not only enabling the device to be produced at a low cost but also rendering it less liable to become disarranged in such a manner as to cause it to fail to perform its functions or as to interfere with the normal operation of the lock and recording device.

In the accompanying drawings, Figure 1 is a plan view, partly in section, of a device embodying my invention; Fig. 2 is a similar view of a modified form of the invention; Fig. 3 is an elevation of that form of the device shown in Fig. 2; Fig. 4 is a plan view of an electrically operated device embodying the invention; Fig. 5 is an elevation of the device shown in Fig. 4; Fig. 6 is a plan view of the device as applied to a sliding door; Fig. 7 is an elevation of the device shown in Fig. 6; Fig. 8 is a front elevation of a recording lock to which my invention may be applied; Fig. 9 is a vertical, sectional view of such a lock; and Fig. 10 is a detail view of the connecting devices for the knob.

In carrying out the invention it may be applied either to the lock itself or to the recording device for the lock or to the key or other actuating device for the lock. In the present instance I have illustrated the invention as connected directly with the bolt of the lock, and, in that form of lock illustrated, by controlling the bolt I also control the operation of the recording device and the manipulation of the lock-actuating devices. It will be understood, however, that the invention may be applied to the control of any one of these devices independently of the others and further that the device may be used independently of recording locks and in any relation in which it may be desired to control a lock or other device in accordance with the position of the door. It will also be understood that the term "door" or "closure" as herein employed is intended to include not only the door of a building or a room but also the door of a receptacle or compartment; in fact, a movable closure of any kind to which a lock may be applied.

In carrying out the invention the controlling device is connected with the lock or other part to be controlled and is so arranged that it will not interfere with the manipulation of the lock when the door is in its closed position, that is, the position in which the lock may be operated to lock the door against movement. The mechanism for the controlling device may be of various kinds and may be controlled either mechanically or otherwise. Further, the mechanism may be of such a character that it may be applied either to a hinged door or a sliding door.

In order that the purpose and manner of operation of the present invention may be more readily understood I will first describe briefly one form of recording lock to which

the invention may be applied. It will be understood, however, that this form of lock is chosen for the purpose of illustration only and that the invention may be applied to locks, either recording or otherwise, of various kinds, and further, that the particular recording lock here illustrated is not a part of the present invention but forms in part the subject matter of an application for patent filed by me October 26th, 1914, Ser. No. 868,739. As here shown this lock comprises a casing 1 mounted upon a door 2, to which the back wall 3 of the casing 1 is rigidly secured, this back wall forming a support for the several parts of the mechanism. A bolt 4 is slidably mounted in the casing 1 and is adapted to be projected longitudinally through an opening 5 in one side of the casing. This bolt may be manipulated in various ways. As here shown it is held normally against movement by two dogs 6 engaging teeth 7 in the lower part of the bolt and is provided on one face with a pin or projection 8 adapted to be engaged by one or the other of the arms 9. These arms are mounted on a shaft 10 and are so shaped that when one or the other of them engages the projection 8 longitudinal movement will be imparted to the bolt, the direction of this movement depending upon which arm is in engagement with the projection. In order that the dogs 6 may be automatically disengaged from the teeth 7 the arms 9 are provided with pins 11 arranged to engage one or the other of the pawls, depending upon the direction in which the arms are moving, and disengage the same from the teeth of the bolt. Preferably, the bolt may be operated at any time from the inside of the door and, to this end, the shaft 10 is extended through the casing 1, on the inside of the door, and provided with a knob 12. The operation of the bolt from the outside of the door is, however, key-controlled and, to this end, a second shaft 13 is mounted in the door and is normally free to rotate relatively to the shaft 10. As here shown the adjacent ends of the two shafts are telescopically arranged. The shaft 13 is also provided with a handle or knob 14, by means of which it may be rotated. A clutch mechanism is provided to connect the two shafts to enable the bolt to be moved by the outer knob 14. This clutch mechanism is key-controlled and is here shown as comprising two disks 15, each having a notch 16 in the periphery thereof, which notches are arranged in alinement when the shafts are in their normal positions. A pin 17 is mounted adjacent to the disks and is adapted to be moved into and out of the notches 16 to connect and disconnect the disks and the shafts. As here shown, the pin 17 is carried by a bar 18 mounted for vertical movement and having at its lower end a pin 19 adapted to be engaged and actuated by a cam 20. This cam is mounted on a shaft 21 adapted to be operated by a key 23, which key may be of any suitable character. It is here shown as a well known type of key coöperating with the ordinary cylinder lock. It will be apparent, therefore, that the rotary movement of the key will, through the cam 20, bar 18 and pin 17, connect the disks 15 one to the other so that the movement of the knob 14 will throw the bolt. Mounted in the casing 1 are a series of type wheels 24, a part of which are connected with clock mechanism 25. The taking of a record from these type wheels is controlled by the movement of the bolt and, as here shown, an ink ribbon 26 and a web of paper 27 are fed across the printing points of the type wheels and two platens 28 are so arranged that one of them will be moved across the type wheels to cause an impression to be taken therefrom when the bolt 4 is operated. To this end the two platens are mounted at the lower ends of two levers 29 provided at their upper ends with projections or rollers 30 arranged in the paths, respectively, of the arms 9, the outer edges of these arms being curved to form cams which, when they are actuated to move the bolt, will cause operating movement to be imparted to the respective levers and a record to be taken. It is unnecessary to herein describe the details of construction and operation of this recording lock as the brief description given will enable the plan of its operation to be understood. It may be stated, however, that one of the remaining type wheels constitutes a key-identifying type wheel and another indicates the direction in which the bolt was moved. Further, it will be noted that inasmuch as the bolt can be moved only by the operation of the arms 9 and that the recording device can be operated only by these arms, the recording device can be operated only when the bolt is operated. Hence, if the bolt is locked against movement this serves not only to prevent the operation of the actuating devices for the lock, that is, the knobs and their connecting devices, but also prevents the taking of a record from the recording devices.

To prevent the movement of this bolt and hence the operation of the recorder when the door is in any position other than its fully closed position I have mounted on the door and connected with the lock a device which will prevent the movement of the bolt when the door has been moved from its fully closed position. In that form of the invention here shown the bolt 4 has connected therewith an extension or rod 31 which extends across the door to a point near the opposite edge thereof and is preferably inclosed in a casing 32 of such a character as to prevent access being had

either to the extension 31 or to its controlling devices for the purpose of tampering therewith. The controlling mechanism shown in Figs. 1 to 5 comprises a detent adapted to engage the rod 31 when the door has been moved from its closed position to prevent the movement of the bolt, and to be disengaged from the rod 31 when the door has been again moved into its closed position, to release the bolt 4. In that form of the invention shown in Fig. 1 the rod 31 is provided with a notch 33 adapted to receive and to be engaged by a detent 34 which, in the present instance, is in the form of a pawl carried by an arm 35 pivotally mounted on the door adjacent to the rod 31 and extending lengthwise of the rod. A spring 36 connected with the pawl serves to hold the pawl and the arm 35 normally in such positions that the pawl will not interfere with the movement of the rod 31 and bolt 4. The position of the pawl relatively to the arm 35 may be adjusted by means of a screw 37. The pawl 34 is normally so adjusted that a slight movement of the free end of the arm 35 toward the door will carry the end of the pawl 34 into the notch 33 and thus lock the rod and bolt against movement. This movement of the arm 35 is accomplished by the first movement of the door away from its closed position and, as here shown, it is caused by a finger 38 mounted independently of the door and so arranged that when movement is imparted to the door the arm 35 will be moved into engagement therewith and caused to move about its pivotal connection to the door. Preferably, the finger 38 is yieldable so that after sufficient movement has been imparted to the arm 35 to lock the rod 31 against movement the finger will yield to permit of the further movement of the door. To this end the finger is here shown as pivotally mounted on an axis substantially coincident with the axis of the hinge 39 on which the door is mounted. A spring 40 holds the finger 38 in its normal position adjacent to the end of the arm 35. The spring 40 is of greater stiffness than the spring 36 and, consequently, the spring 36 will yield to permit the movement of the arm 35 before the finger 38 will move, but the movement of the arm 35 will bring the same into engagement with the door or other fixed stop and the end of the arm 38 will then ride over the outer surface of the arm and will be moved outward against the tension of the spring 40. The outer edge of the arm 35 is preferably inclined or curved to permit the end of the finger to slide over the same. In this manner it will be apparent that the instant the door is opened, even to a very slight extent, the arm 35 will be moved inward and the pawl caused to engage the rod 31 to lock the same against movement, and likewise that the movement of the door to its fully closed position will permit the arm and its detent to return to their normal positions and release the rod and the bolt.

I have also provided means to prevent anyone tampering with the controlling mechanism, as by inserting wires about the ends of the casing or through the hinge. To this end one end of the casing 32 is enlarged to inclose the hinge and is made up of telescoping sections 41 so that the hinge will always be inclosed but the casing will not interfere with the movement of the door. Further, I have provided that hinge of the door about which the controlling device is mounted of a special construction to prevent the insertion of a wire between the two leaves of the hinge. As here shown, one leaf of the hinge has a recess 42 through which extends a curved projection 43 carried by the other leaf of the hinge. Thus, the two parts of the hinge will overlap in all positions and it will not be possible to insert a wire or any implement between the two parts of the hinge. For a similar reason I have provided a guard at that end of the controlling device remote from the hinge. As shown, the casing 32 is enlarged to receive the controlling mechanism and I have secured to the enlarged portion of the casing at a point slightly removed from the end wall thereof a partition or rib 44 and have secured to the rod 31 a projection 45 which extends into the space between the projection 44 and the end wall of the enlarged portion of the casing. Thus these projections constitute baffles which will effectually prevent the insertion of a wire, even though access might be had thereto at the point of connection of the two parts of the casing 32.

In Figs. 2 and 3 of the drawings I have illustrated another embodiment of the invention. As here shown the rod 31 is mounted in the casing 32 as before and is provided at its rear end with an aperture 46 which, when the bolt is in its retracted position, will be moved into alinement with and adapted to receive a detent 47 which is here shown as a finger mounted on the door casing and curved about the hinge 48 and having its free end arranged close to the rod 31. It will be apparent that inasmuch as the finger is held against movement, the movement of the door will cause the end of the finger to enter the aperture in the rod and thus lock the rod and the belt against movement. The hinge and finger are preferably inclosed in a telescoping casing to prevent access being had thereto. This casing as a whole is substantially semi-spherical in shape and one wall, 49, thereof is secured to the casing 32, while the other wall, 50, is secured to the door frame. This device is very simple and very strong but in

practical operation the clearance between the parts would probably be such that the free edge of the door would have to be moved a considerable distance before locking engagement was had between the finger 47 and the rod 31 and to prevent the manipulation of the bolt or lock before this locking engagement is had the keeper for the bolt is provided with a long guard 51 which prevents the bolt being moved into its extended or locking position until the door has been moved far enough to cause a locking engagement between the finger 47 and the rod 31.

Electrical or electrically operated devices may also be provided and in Figs. 4 and 5 I have illustrated one form of electrical device in which the circuit is broken and closed by the movement of the door. As there shown the rod 31 is provided with a notch 52 as in the form shown in Fig. 1. A spring-actuated pawl 53 is pivotally mounted adjacent to the notch 52 and is held normally in engagement with the rod so that it will enter the notch when the bolt is moved to its retracted position. This movement, however, is prevented by the action of an electro-magnet 54 which is here shown in the form of a solenoid, the core 55 of which is connected with the pawl 53 by means of a lever 56. When the door is in its closed position the electro-magnet will be energized and the pawl held out of engagement with the rod. When the door is moved away from its closed position the magnet will be deënergized and the spring will move the pawl into the notch. Any suitable circuit breaker and closer may be employed. As here shown both sides of the circuit are broken and to this end the door is provided with two contact members 57 which move therewith and the door frame is provided with two other contact members 58, these contact members being connected with the respective parts of the circuit and being so arranged that when the door is moved from its closed position the contact members 57 will be moved out of engagement with the contact members 58 and the circuit broken.

In Figs. 6 and 7 I have illustrated the invention as applied to a sliding door. The door is indicated at 59 and the lock casing 1 is mounted on the frame of the door. The bolt 4 projects into a recess or keeper 60 on the face of the door. In the present instance this keeper is in the form of a recess 60 formed in a bar 61 which extends across the face of the door. When the door is in its fully closed position the recess 60 will be in alinement with the bolt. When the bolt has been retracted and the door moved out of its closed position the face of the bar will be moved in front of the bolt and it will be impossible to move the same into its locking position and, consequently, it will be impossible to operate the recording devices.

From the several illustrations of the invention which are herein shown and described it will be apparent that the invention may be embodied in any one of a great many forms and further, it will be apparent that it may be applied to various uses, for while it is here illustrated in connection with a recording lock it will control the operation of the lock either in connection with or independently of a recording device and is useful wherever such control may be desired. I, therefore, wish it to be understood that I do not desire to be limited to the details of construction shown and described for obvious modifications within the scope of the claims will occur to a person skilled in the art and I consider myself the first to provide means of any kind for controlling the manipulation of a lock or the operation of a recording device by the position of the door.

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

1. In a device of the character described, the combination with a mechanism adapted to be mounted on a door, and having a part to be operated, of means controlled by the movement of said door to control the operation of said part, said means being operable only by the movement of said door.

2. In a device of the character described, the combination with a mechanism adapted to be mounted on a hinged door at a point remote from the axis thereof and having a part to be operated, of means mounted near the hinged edge of said door and controlled by the movement of said door from its closed position to prevent the operation of said part, said means being inaccessible for manual operation when the door has been moved from its closed position.

3. In a device of the character described, the combination with a mechanism adapted to be mounted on a hinged door at a point remote from the axis thereof and having a part to be operated, of means mounted near the edge of said door and controlled by the movement of said door from its closed position to prevent the operation of said part, and a casing to inclose said means to prevent it from being manually operated when said door has been moved from its closed position.

4. In a device of the character described, the combination with a mechanism adapted to be mounted on a hinged door at a point remote from the axis thereof and having a part to be operated, of means mounted near the edge of said door and controlled by the movement of said door from its closed position to prevent the operation of said part,

and a casing to inclose said means, said casing having relatively movable parts adapted for connection respectively with the door and a fixed part adjacent to the door, and arranged to permit the door to be moved without opening the casing.

5. The combination with a lock for a door, comprising a casing, and a device operatively connected with said lock, of means to control the operation of said device comprising a part extending beyond said casing, and means mounted exteriorly of said casing and controlled by the movement of said door to lock said part against movement.

6. The combination, with a lock for a door, comprising a casing, and a device operatively connected with said lock, of means to control the operation of said device comprising a rod extending beyond said casing, and a detent arranged to engage said rod to hold the same against movement when said door has been moved from its closed position.

7. The combination with a lock for a door, comprising a casing, and a device operatively connected with said lock, of means to control the operation of said device, comprising a rod extending beyond said casing, a detent to be mounted on said door exteriorly of said casing, and means adapted to be mounted independently of said door to cause said detent to engage said rod and hold the same against movement when said door has been moved from its closed position.

8. The combination with a lock for a swinging door, said lock comprising a bolt, of means controlled by the swinging movement of the door to prevent the movement of said bolt when said door has been moved from its closed position, said means being incapable of manual operation.

9. The combination with a lock for a swinging door, said lock comprising a bolt, of means controlled by the swinging movement of the door to prevent the movement of said bolt when said door has been moved from its closed position, and means to prevent access being had to said door controlled means when said door has been moved from its closed position.

10. The combination with a lock for a door, comprising a casing and a bolt mounted in said casing, of means to control the operation of said bolt comprising a rod connected thereto and extending beyond said casing, and means mounted exteriorly of said casing and controlled by the movement of the door to lock said rod against movement.

11. The combination with a lock for a door, said lock comprising a bolt, of controlling devices comprising an extension to said bolt, and a locking member supported at a point remote from said bolt and arranged to be moved into locking engagement with the extension of said bolt when said door is moved from its closed position.

12. The combination with a lock for a door, said lock comprising a casing and a bolt mounted within said casing, of means to control the movement of said bolt comprising a part connected therewith and extending beyond said lock casing and a locking member mounted exteriorly of said casing and arranged to operatively engage said part when said door is moved from its closed position.

13. The combination with a lock for a door, said lock comprising a casing and a bolt mounted in said casing, of means to control the movement of said bolt comprising a part to be mounted on said door exteriorly of said lock casing and connected with said bolt, and a part adapted to be mounted independently of said door, said parts being arranged to be brought into operative engagement by the movement of the door and to thereby cause the bolt to be locked against movement.

14. The combination with a lock for a door, said lock comprising a casing and a bolt mounted in said casing, of means to control the movement of said bolt comprising a part to be mounted on said door exteriorly of said lock casing and connected with said bolt, a part adapted to be mounted independently of said door, said parts being arranged to be broguht into operative engagement by the movement of the door and to thereby cause the bolt to be locked against movement, and means for inclosing said controlling means to prevent the manual operation thereof.

15. The combination with a lock for a door, said lock comprising a casing and a bolt having an extension projecting beyond said casing, of a detent mounted exteriorly of said casing and adapted to operatively engage said extension when said door is moved from its closed position.

16. The combination with a lock for a door, said lock comprising a casing and a bolt having an extension projecting beyond said casing, of a detent mounted exteriorly of said casing and supported normally out of engagement with said extension, and means controlled by the movement of said door to cause said detent to engage said extension.

17. The combination with a lock for a door, comprising a bolt having an extension, of a detent adapted to be mounted on said door adjacent to said extension and to be moved into and out of operative engagement therewith, and a part to be supported on the door frame to cause said detent to be moved into operative engagement with said extension.

18. The combination, with a lock for a door, said lock comprising a bolt having an extension, of a supporting member adapted to be movably mounted on said door, a detent carried by said supporting member, and a part to be mounted independently of said door to engage said supporting member when movement is imparted to said door and move said detent into engagement with said extension.

19. The combination, with a lock for a door, said lock comprising a bolt having an extension, of an arm adapted to be pivotally mounted on said door, a detent carried by said arm and adapted to be moved into and out of operative engagement with said extension by the movement of said arm, and a finger to be mounted adjacent to said door and arranged to engage said arm when said door is moved from its closed position.

20. The combination, with a lock for a door, said lock comprising a bolt having an extension, of an arm adapted to be pivotally mounted on said door, a detent carried by said arm and adapted to be moved into and out of operative engagement with said extension by the movement of said arm, and a yieldable finger to be mounted adjacent to said door and arranged to engage said arm when said door is moved from its closed position.

21. The combination, with a lock for a door, said lock comprising a bolt having an extension, of an arm adapted to be pivotally mounted on said door, a detent carried by said arm and adapted to be moved into and out of operative engagement with said extension by the movement of said arm, a finger to be pivotally mounted adjacent to said door and having its free end arranged in the path of said arm, and a spring to resist the movement of said finger when engaged by said arm.

22. The combination, with a lock for a door, said lock comprising a bolt having an extension, of an arm adapted to be pivotally mounted on said door, a detent carried by said arm, a spring to hold said arm and said detent normally in their inoperative positions, a finger to be pivotally mounted adjacent to said door and arranged to be engaged by said arm when movement is imparted to said door, and a spring to resist the movement of said finger when engaged by said arm, said last-mentioned spring being of greater strength than the spring connected with said arm.

23. The combination, with a lock for a door, said lock comprising a bolt having an extension, of an arm adapted to be pivotally mounted on said door, a pawl mounted on said arm and adapted to be moved into operative engagement with said extension, means to adjust said pawl relatively to said arm, and a yieldable finger to be mounted adjacent to said door adapted to engage said arm when movement is imparted to said door and move said pawl into engagement with said extension.

24. The combination, with a lock for a door, said lock comprising a bolt, of coöperating devices controlled by the movement of said door to lock said bolt against movement, and a collapsible casing to inclose said coöperating devices.

25. The combination with a lock for a door, said lock comprising a bolt, of coöperating devices to control the movement of said bolt, a part of said devices being adapted to be supported by the door and a part by the door frame, and a casing inclosing said coöperating parts and having relatively movable parts adapted to be connected respectively with the door and with the door frame and arranged to maintain the casing closed when the door is in any position.

26. The combination, with a lock for a door, said lock comprising a bolt, of coöperating devices to control the movement of said bolt, a part of said devices being adapted to be supported by the door and a part by the door frame, and a collapsible casing adapted to be mounted in part on said door and in part on said door frame to inclose said coöperating parts without interfering with the movement of said door.

27. The combination, with a door, a hinge to support said door, and a lock for said door comprising a bolt, of coöperating devices to control the movement of said door, said devices being supported partly by the door and partly by the door frame, said door hinge having interlocking parts to prevent access to said coöperating devices.

28. The combination, with a lock for a door, said lock comprising a bolt having an extension, of coöperating devices mounted adjacent to said extension to control the movement thereof, a housing to inclose said extension and said coöperating devices, and baffle plates carried by said housing and said extension to prevent the insertion of an implement in said housing.

29. The combination with a lock for a swinging door, comprising a device to be operated arranged at a point remote from the axis of said door, of means controlled by the movement of said door to positively prevent the operation of said device when said door is out of a predetermined position, and other means to prevent the manual manipulation of the first-mentioned means.

30. The combination with a lock for a swinging door, comprising a device to be operated arranged at a point remote from the axis of said door, of automatic means to positively prevent the operation of said device when said door is in any position ex-

cept its closed position, and means to prevent the manual manipulation of said automatic means.

31. In a device of the character described, the combination with a mechanism adapted to be mounted on a door and having a part to be operated, of coöperating devices controlled by the movement of said door to control the movement of said part, a portion of said devices being adapted to be supported by the door, and another portion of said devices being adapted to be supported by the door frame.

32. The combination with a lock for a swinging door, said lock comprising a bolt, of coöperating devices to control the movement of said bolt, a part of said devices being adapted to be supported by the door, and a part by the door frame, and means to prevent access being had to said bolt controlling devices when said door has been moved from its closed position.

In testimony whereof, I affix my signature in presence of two witnesses.

BERNARD H. ZIEHLER.

Witnesses:

EDWARD L. REED,

H. L. HAMMAKER.