United States Patent

[11] 3,585,625

[72] Inventors **Jerome L. Prinsky**
Wynnewood, Pa.;
Alan John Perfect, Willingboro, N.J.

[21] Appl. No. **44,157**
[22] Filed **June 8, 1970**
[45] Patented **June 15, 1971**

[73] Assignee **Wessel Hardware Corporation**
Philadelphia, Pa.

---

[54] **COMBINED DOOR LOCK AND ALARM**
19 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **340/274,** 116/14, 200/61.62
[51] **Int. Cl.** **G08b 13/08**
[50] **Field of Search** 340/274, 276; 116/14; 200/61.67, 61.68, 61.93

[56] **References Cited**

UNITED STATES PATENTS

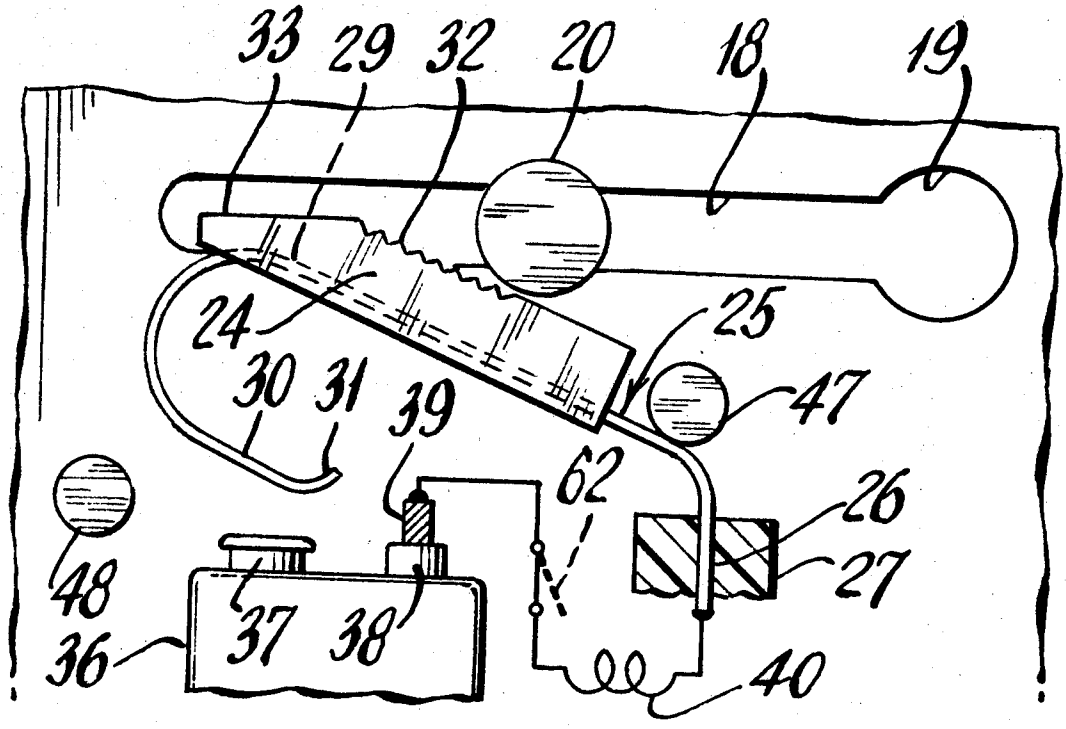
175,612	4/1876	Linnard	116/14
521,239	6/1894	Hoopes	200/61.68
587,377	8/1897	Sutton	116/14
1,062,965	5/1913	Greenberg	116/14
3,263,040	7/1966	Bliven	340/274 X
3,378,830	4/1968	Patrick	340/274

FOREIGN PATENTS

621,453	1927	France	340/274
367,268	1923	Germany	340/274
636,985	1950	Great Britain	340/274

Primary Examiner—John W. Caldwell
Assistant Examiner—Scott F. Partridge
Attorney—Sandoe, Hopgood and Calimafde

ABSTRACT: The invention contemplates an audible or other alarm feature integrated into a door-closure safety device such as a chain-bolt mechanism, wherein the bolt is selectively enterable into a slot in order that the chain may limit door movement, should conventional latch or lock mechanism be inoperative or inadequate. The alarm feature is so arranged as to operate before a would-be intruder has moved the door to the point of chain retention. Also, the alarm feature is retained in alarm condition, until reset only from the incise, i.e., from the protected region.



PATENTED JUN 15 1971

3,585,625

Fig. 1.

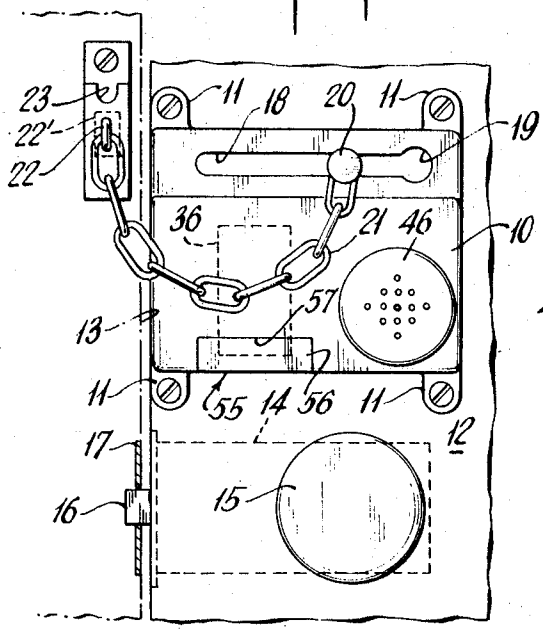
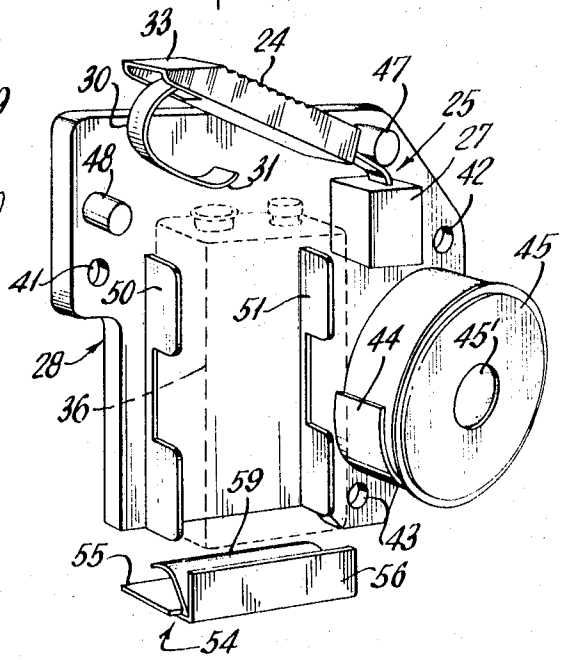


Fig. 2.



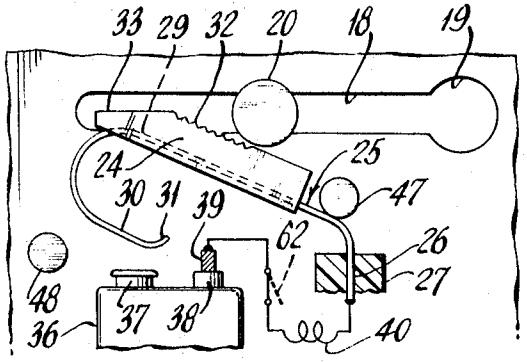


Fig. 4.

Fig. 5.

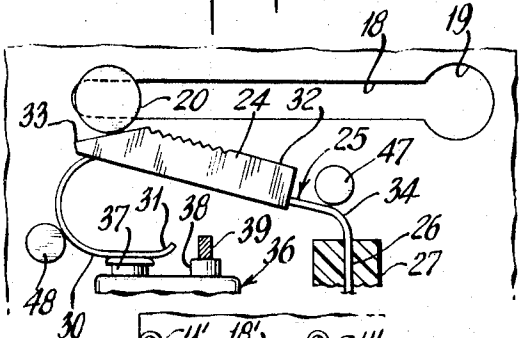
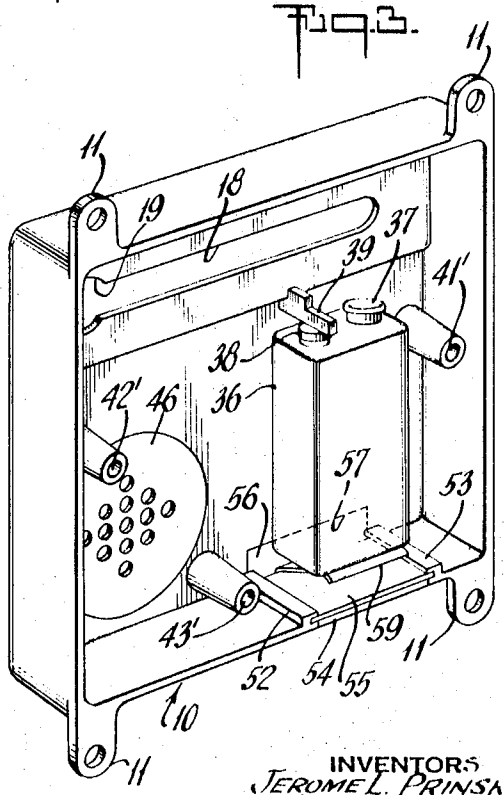


Fig. 3.



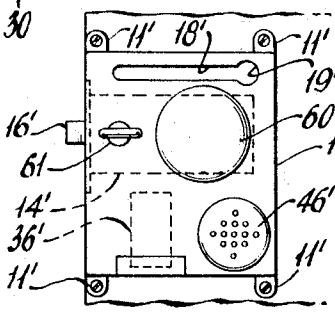


Fig. 6.

INVENTORS
JEROME L. PRINSKY
ALAN J. PERFECT
BY
Sandoe, Hopgood & Calimafde
ATTORNEYS

COMBINED DOOR LOCK AND ALARM

This invention relates to door-closure safety devices and in particular to those of the chain-bolt variety, and incorporates additional security features for such devices.

Lock mechanisms incorporated with conventional bolt-and-strike action have been and will remain the primary means of controlled access to a doorway, but these are all subject to tampering, picking, and other unauthorized access, requiring varying degrees of sophistication in accordance with the sophistication of the basic mechanism. As a common means of added security, chain-bolt mechanisms provide further protection, the bolt being one end of a chain which blocks the door opening, once the bolt is engaged in its slide track. Ordinarily, a would-be intruder will not know that the chain-bolt feature is to challenge him, until he has first been able to pick or force the conventional lock or latch mechanism which holds the door to its strike, in closed position. Having picked the lock or latch, he must of course try the door, to see if it will open, thus at least partially moving the door away from its strike-retained position. He will encounter the chain-bolt barrier only after such small movement, and so he must decide either to abandon his entry or to face the time required to destroy, disable or dislodge the chain lock.

It is an object of this invention to provide an alarm device operative in response to an unauthorized attempted entry into a chain-bolted door system of the character indicated.

Another object is to meet the above object with a device which, once actuated, remains actuated until the chain-bolt is actuated to its safety position, by access only from within the protected region; in other words, it is an object to deny the intruder any opportunity to disable the alarm, once triggered by his initial movement of the door.

A specific object is to meet the foregoing objects with electrically operated audible or other alarm means.

A general object is to meet the stated objects with basically simple mechanism, which is capable of aesthetically acceptable adaptation to doorways, which is self-powered, and which lends itself to simple servicing operations.

Other objects and various further features of novelty and invention will be pointed out or will occur to those skilled in the art from a reading of the following specification in conjunction with the accompanying drawings. In said drawings, which show, for illustrative purposes only, preferred and modified forms of the invention:

FIG. 1 is a view in elevation of a combined door lock and alarm of the invention, shown mounted upon a door and in the lock-set condition;

FIG. 2 is a perspective view of a chassis contained within the mechanism of FIG. 1;

FIG. 3 is a perspective view of the door mounted or open side of the housing for the chassis of FIG. 2;

FIG. 4 is an enlarged fragmentary view of coacting parts of the lock and alarm of the invention, for the lock-set condition, certain parts being shown schematically;

FIG. 5 is a view similar to FIG. 4 to illustrate the relation of parts in an alarm condition; and

FIG. 6 is a simplified view in elevation, similar to FIG. 1, to illustrate a modification.

Briefly stated, the invention contemplates an audible or other alarm feature integrated into a door-closure safety device such as a chain-bolt mechanism, wherein the bolt is selectively enterable into a slot in order that the chain may limit door movement, should conventional latch or lock mechanism be inoperative or inadequate. The alarm feature is so arranged as to operate before a would-be intruder has moved the door to the point of chain retention. Also, the alarm feature is retained in alarm condition, until reset only from the inside, i.e., from the protected region.

Referring to FIG. 1 of the drawings, the invention is shown in application to a combined door lock and alarm device contained within housing structure **10** which may be a single

plastic or metal casting or otherwise formed with mounting means such as lugs **11** for securing the same to the inner face of a door **12** for which the closure is to be additionally protected. The door in its locked condition fits into a frame or jamb schematically indicated **13**. The door may incorporate conventional lock or latch mechanism **14** operated by a knob **15** and having a bolt **16** received in a strike **17**, for the closed position shown. Key-operated means forming part of the mechanism **14** has been omitted as unnecessary to the present description.

The combined mechanism of the invention, namely, that contained within the housing **10**, forms part of a chain-bolt system utilizing an elongated slot or guide **18**. The slot **18** may be stamped or otherwise cut out of the material of housing **10** and includes an enlarged opening **19** at its end remote from the jamb **13**, whereby the enlarged tail of a slide bolt **20** may be removably entered into the slot or guide **18**. Bolt **20** is carried at the free end of a chain **21**, the other end of which is fixed to a suitable bracket fixture or the like **22**, shown mounted near the jamb and upon the door frame. The particular fixture **22** which is shown incorporates an enlarged opening **23** into which the tail of bolt **20** may be received when the chain-bolt is not in the lock-set condition.

For the relation of parts shown in FIG. **1**, the chain-bolt **20** is in the lock-set condition wherein the conventional latch or lock mechanism **14** holds the door closed to the strike **17**, and the bolt **20** is at an intermediate position along the length of the guide means or slot **18**. In this condition, no alarm is sounded and no alarm will be sounded, in the absence of attempted forced entry by an outside intruder. If there has been no such attempted intrusion, the door is unlocked by sliding the bolt **20** all the way to the right to the access enlargement **19** so that the chain-guard feature is disconnected, and again no alarm condition is set off.

In accordance with the invention, the alarm condition is actuated only when the slide bolt **20** is moved to the region of guide means **18** which is adjacent the jamb end, i.e., to the region generally to the left of position of bolt **20** in FIG. **1**. In the source of such movement, the tail of the bolt **20** proceeds through a path of movement which interferes with and therefore actuates a pivoted or otherwise displaceable element such as a cam member **24** FIGS. **2**, **4**, and **5**). As shown, the cam member **24** forms part of a movable electrical contact based upon a single compliant and electrically conductive ribbon member **25**.

The compliant member **25** is shown fixedly anchored or referenced at one end **26** to an upstanding projection **27** forming part of the chassis **28** contained within housing **10**. Cam member **24** is preferably of suitable molded plastic for purposes of achieving quiet and smooth coaction with the tail of bolt **20**, as the bolt **20** slides along its guide means **18**; as shown, member **24** is suitably fixed or otherwise carried by an upwardly and laterally extending stretch **29** of the compliant member **25**. Beyond the outer end of cam member **24**, the compliant member **25** includes a downward bend **30** which in a wide loop doubles back beneath the cam member **24**, with a free end **31** which is in substantial clearance relation with the underside of cam member **24**.

Preferably, the upper surface of cam member **24** is characterized by a first stretch **32** which in the normal or no-alarm condition (shown in FIG. **4**) presents a gentle ramp to be engaged by the tail of bolt **20** for positions leftward of that shown in FIG. **1**. The outer end of the upper surface of cam member **24** is characterized by a down slope **33**, i.e., portion **33** slopes downward with respect to the stretch **32**. Thus, in the course of movement of bolt **20** from the no-alarm condition represented by FIG. **4**, to the alarm condition represented by FIG. **5**, the tail of bolt **20** moves cam member **24** downwardly against the compliant reaction of increased bending at **34**, with resultant depression or increased down slope of the outer cam region **33** ultimately engaged by bolt **20**. In this outer position, representing the alarm condition, it will be noted that the surface **33** and the axis of guide means **18** diverge out-

wardly. There thus can be no tendency of the bolt **20** to return to the right (i.e., to the no-alarm position), regardless of the amount of vibration to which the door, the chain or other parts of the mechanism may be subjected by the would-be intruder.

In accordance with the invention, the doubled-back portion **30** of the compliant member **25** forms an electrical contact element which determines the open or closed condition of an electrical circuit for initiating an audible or other alarm. In FIG. **4**, a dry battery **36** powers the alarm circuit and includes two upwardly facing terminals **37**, **38**. Terminal **38** is grounded, as indicated at **39**. The alarm device is symbolized by a coil **40** in series with the ground connection and with the conductive compliant member **25**. Preferably, the displacement of cam member **24**, as a result of bolt movement from the FIG. **4** to the FIG. **5** position, is of such extent as to assure adequate wipe of the doubled end or contact **30** at the battery terminal **37**. The degree of this wipe is suggested in FIGS. **4** and **5** by the difference in clearance between the end **31** and the inside of cam member **24**, for the different positions shown in these two FIGS. Serrations are shown formed in the stretch **32** of cam member **24**, in the region in which it is engageable by chain bolt **20**; thus, if the alarm circuit should be completed before bolt **20** rides over to surface **33**, the serrations will serve to "hold" the alarm, even in the presence of sound vibrations generated by the alarm.

In accordance with a further feature of the invention, assembly and reliability of the device of the invention are enhanced by embodying them in a two-part frame. The basic housing **10** forms one of the parts (FIG. **3**); the chassis **28** forms the other (FIG. **2**). The housing **10** is shown as generally rectangularly prismatic and having an open side which is applied against the face of the door **12** when mounted thereto. The chassis **28** is received within this open side of housing **10** and is secured in assembled relation by suitable screws or bolts (not shown) passing through openings **41**, **42**, **43**, aligned with tapped bosses **41'**, **42'**, **43'** which may be cast integrally within the housing, as clearly seen in FIG. **3**.

The chassis **28** is preferably made of electrically insulating material, such as a suitable injection-molded plastic. The integral projection **27** for anchorage of compliant member **25** has already been identified. Other projections include an arcuate flange **44** defining means for retaining an electrically driven sound generator, buzzer or other alarm means **45**. Such a device need merely be axially inserted and frictionally held in the socket defined at **44**, with suitable electrical connection in series with compliant member **25**, as already described. For the device **45** shown, sound generation is developed by axial displacement of a diaphragm **45'** within a central opening in the shell **45** shown. This opening is preferably in register with a suitably foraminated region **46** in the housing **10**, to allow for adequate sound propagation external to the housing **10**. For a buzzer **45** which is preassembled in its own conductive shell, as shown, such shell may be one of the electrical terminals of the buzzer, so that only one lead wire need be involved in making circuit connections; thus, such wire may be connected to the spring ribbon **25**, and for the case of a conductive metal housing **10**, reliance can be placed on clamp action at **42**, **43** to establish the ground connection, it being understood that bosses **42'**, **43'** are so sized relative to the axial extent of the buzzer **45** that clamp action (and, hence, good electrical grounding contact) is assured.

Stop projections **47**, **48** also form part of the chassis **28**. Stop **47** is poised to limit upward movement of the compliant member **25**, thus providing a resilient preload against downward deflecting actuation by bolt **20**. The stop **48** is poised in clearance relation below the outer end of member **25** so as to prevent damage to member **25**, as by unauthorized tampering via the slot **18**. The stop projections **47**, **48** are preferably of axial extent to seat and position the chassis **28** with respect to the inner wall of housing **10** when the chassis is secured at **41**, **42**, **43**.

To complete the description of chassis **28**, it is shown in FIG. **2** with integral upstanding parallel guide members **50**, **51** for locating engagement with opposed longitudinal edges of the battery **36**. For the type of battery shown, i.e., a generally rectangularly prismatic battery, the adjacent flat face or base of the chassis **28** locates one large side face of the battery, and the adjacent inner wall of the housing **10** locates the opposite face of the battery.

In accordance with a feature of the invention, access to the battery for checking or for replacement is available via a side port in housing **10**. This port is provided along the bottom edge, for the mounting configuration shown in FIG. **1**. The port is defined between spaced parallel guide means **52**, **53** (FIG. **3**) on a guide alignment which is generally normal to the plane of the open side of the housing **10** and which is also generally normal to the axis of insertion of the battery **36**. The port may be closed by a slide **54** having ears (as at **55**, FIG. **2**) received in guide means **52**, **53**. As shown, the plate **54** has an upstanding externally accessible lip or flange **56** for ease of access and, accordingly, the port for battery insertion extends slightly around the lower outer corner of the housing, as indicated at **57** in FIG. **3**. It will be understood that when the slide **54** is fully inserted in its guide means **52**, **53**, the flange **56** thereof may be received inconspicuously within the port edge **57** and may thus appear to be flush with and aesthetically integrated into the smooth overall appearance of the housing **10**.

To complete the description of the battery-positioning means, it should be noted that the grounding device **39** for the case of a metallic housing **10** may be integrally formed as part of a lug case within the open end carrier of the housing (FIG. **3**). The battery is inserted through the bottom part, and only the terminal **38** is topped by the grounding lug **39**. In this condition, the other terminal **37** is poised in alignment with the contact end **30**. The slide closure **54** preferably includes a spring-loading element, such as an arched compliant member **59**, carried by or forming part of the slide plate **54**, and the unstressed distension of element **59** is such as to interfere with the bottom of the battery **36** as plate **54** is guided by means **52**, **53** into its closed position. When fully closed, spring **59** is depressed to resiliently load the battery against the grounding contact **39**.

FIG. **6** illustrates a modification wherein the described features contained within the housing **10** of FIG. **1** are incorporated into a similar housing **10'** which also serves as the mount or journal for the knob **15'** and its associated spindle **60**. The spindle alignment is of course selected so as not to interfere with above-described action of alarm-actuating parts, and the spindle alignment **60** registers with that of conventional lock mechanism **14'**, having a projecting bolt or latch **16'**. Other parts in FIG. **6** will be recognized for their similarity to those already described and therefore the same reference numerals are used, with primed notation.

FIG. **6** serves to illustrate an additional function achievable when combined with the latch mechanism **14'**. Such latch mechanism is shown to include an additional knob, lever or other actuating device **61** which is externally accessible to determine whether or not the lock feature has been selected. The actuator **61** will be understood to symbolize additional incorporation of an electrical switch, schematically indicated at the dashed line **62** in FIG. **4**. Switch **62** may be in series with the battery connection to coil **40** and the coordination will be understood to be such that when the lock device **61** is in the lock-set condition, the battery circuit to coil **40** is complete, subject to bolt actuation of the contact **30**. On the other hand, when the control member **61** is not in the lock-set condition, as for example, when the door is to be openable by knob actuation from either side, the switch **62** is in the open condition and no amount of bolt actuation will set off the alarm. The utility of this optional provision will be appreciated for the condition that the occupant of the protected area may wish to utilize the chain-bolt **20** merely to set the door in a slightly ajar condition and of source, when thus set, it is not desired to operate the alarm.

It will be seen that the invention amply meets the stated objects and that the described device is basically simple and easy to service and maintain. The replaceable parts are assembled and retained merely by sliding insertion, as for the case of the battery **36** and for the base of the buzzer or other alarm device **45**. The parts may be rugged and fashioned in full aesthetic harmony with other hardware applied to the particular door.

The invention has been shown in application to a door which swings from a right-edge hinge axis (in the sense of FIGS. **1** and **6**), but this represents no limitation, in that the housing **11** is merely reversed, when installed to a door that is hinged from its left edge. In that event, of course, the chain-bolt guide **18** is below the cam member **24** and the battery **36**, but operation is exactly as already described. The only difference is that to replace the battery **36**, removal of the slide closure **54** will drop the battery in the FIG. **1** arrangement but will leave the battery unmoved, in the reverse arrangement. In the latter event, battery removal is facilitated by entering the slide-bolt **20** in its guide **18** and sliding the same until cam **24** is actuated; such cam actuation elevates the battery to an extent (1) to disconnect the ground connection **39** (and thus not sound the alarm) and (2) to facilitate removal of the battery **36**.

As a further feature of the invention, a snap-lock or key-operated lock may be incorporated in the connection of chain **21** to the anchor fixture **22**. Such a connection is schematically indicated at **22'** in FIG. **1**. With such separable connection, it will be appreciated that an individual can leave via the door **12** and, with the chain-bolt **20** in a "set" condition in its guide **18**, he need only snap-engage the chain connection at **22'** before closing the door to set the latch **16** at strike **17**. If connection **22'** is key operated, he may gain access via the key at **22'**, plus the key (not shown) for the standard lock-set **14**; otherwise, he will have to have some other means of entering if he is not to set off his own alarm.

Although the invention has been described in connection with the preferred and modified forms shown, it will be understood that further modifications may be made without departing from the scope of the invention.

What we claim is:

1. A door-closure safety device for use with a chained slide-bolt, comprising a unitary frame with means for securing the same to one of two relatively movable door and door-frame structures to be monitored for effectively closed position, said frame including elongated guide means for the guided captive sliding displacement of an inserted slide bolt on an alignment generally normal to adjacent openable edges of said structures, said guide means having a bolt-insertion opening remote from said openable edges and terminating at a stop end near said openable edges, and electrically operated alarm means including a circuit comprising a battery and an alarm generator and circuit-closure means, said alarm means including a member normally resiliently urged out of circuit-closing position and having a cam surface normally in the path of movement of an inserted slide-bolt along said guide means at a location intermediate said opening and said stop end, said member being displaceable into circuit-closing condition upon cammed actuation by said slide-bolt only for slide-bolt positions between said intermediate location and said stop end, and latch means operative upon said bolt primarily at said stop end of slide-bolt movement to provide an action unique to the stop end to retain at said stop end a displaced condition of said member for slide-bolt movement to said stop end, whereby said alarm means is inoperative to generate an alarm indication when the inserted slide-bolt is in the region at and near the insertion location, and whereby said alarm means is operative to hold alarm-circuit closure when and as long as the inserted slide-bolt is in the region between said stop end and the location of initial circuit closure, and especially in the operative condition of said latch means.

2. A safety device according to claim **1**, in which said latch means comprises a down-ramp formation in said member and operative upon said slide bolt substantially only at the stop end of said guide means.

3. A door-closure safety device for use with a chained slide-bolt, comprising a unitary frame with means for securing the same to one of two relatively movable door and door-frame structures to be monitored for effectively closed position, said frame including elongated guide means for the guided captive sliding displacement of an inserted slide-bolt on an alignment generally normal to adjacent openable edges of said structures, said guide means having a bolt-insertion opening remote from said openable edges and terminating at a stop end near said openable edges, and electrically operated alarm means including a circuit comprising a battery and an alarm generator and circuit-closure means, said alarm means including a member normally resiliently urged out of circuit-closing position and having a cam surface normally in the path of movement of an inserted slide-bolt along said guide means at a location intermediate said opening and said stop end, said member being displaceable into circuit-closing condition upon cammed actuation by said slide-bolt only for slide-bolt positions between said intermediate location and said stop end, and said bolt and cam surface being formed to maintain a displaced condition of said member for slide-bolt movement to said stop end, whereby said alarm means is inoperative to generate an alarm indication when the inserted slide-bolt is in the region at and near the insertion location, and whereby said alarm means is operative to hold alarm-circuit closure when and as long as the inserted slide-bolt is in the region between said stop end and the location of initial circuit closure, said cam surface portion of said member including an up ramp in approach to but effectively terminating prior to slide-bolt limiting at said end and including a down ramp in the vicinity of slide-bolt limiting at said end, whereby resilient loading of said member retains the slide-bolt at said end should it be chain driven to said end.

4. A door-closure safety device according to claim **3**, in which said frame includes an outer housing into which said securing means is embodied, said housing having an open side which is applied against the member to which the mounted frame is securable, and an electrical chassis carried within said housing and bodily removable through the open side of said housing.

5. A door-closure safety device according to claim **4**, in which said member is carried by said chassis.

6. A door-closure safety device according to claim **4**, in which said chassis includes means for the bodily removable support of a unit-handling buzzer.

7. A door-closure safety device according to claim **4**, in which said chassis includes battery-support means comprising spaced parallel guide members for guided retention of a battery inserted along its longitudinal axis, said housing having a lateral port aligned with said axis and of size to permit battery insertion and removal without requiring frame dismounting.

8. A door-closure safety device according to claim **7**, in which said axis is parallel to but offset from the plane of the open side of said housing, and a closure member carried by said housing for removably closing said port.

9. A door-closure safety device according to claim **8**, in which said removable closure member is a plate, slidably guided by said housing on an insertion axis generally normal to the battery insertion axis and to the plane of the open side of said housing.

10. A door-closure safety device according to claim **9**, in which said housing is electrically conductive and includes an integral battery-terminal-engaging grounding lug positioned in the path of movement of a terminal of an inserted battery.

11. A door-closure safety device according to claim **10**, in which said removable closure plate includes resilient means engaging an inserted battery and loading the inserted battery into pressured terminal contact at said grounding lug.

12. A door-closure safety device according to claim **3**, and including knob-spindle journal means aligned in clearance with said alarm means.

13. A door-closure safety device according to claim **3**, and latch mechanism including a knob spindle journaled on an

alignment through said frame and in clearance with said alarm means, said latch mechanism including externally actuable means for selectively dogging the same, and switch means operated by said externally actuable means and operatively associated with said circuit.

14. A door-closure safety device according to claim 13, in which said switch means is series connected with said circuit, the connection being such that said switch is closed for the dog-selected condition of said externally actuable means, and said switch is open for the selected condition in which said latch mechanism is not dogged.

15. A door-closure safety device according to claim 3, and including a slide-bolt, chain and door-frame anchoring device, said chain and anchoring device having removable locking engagement.

16. A door-closure safety device according to claim 15, in which said last-mentioned locking engagement is key operated.

17. A door-closure safety device according to claim 15, in which said last-mentioned engagement is snap locking.

18. A door-closure safety device according to claim 3, in which said frame is electrically conductive and includes a fixed battery-grounding element contacting one pole of said battery, said member including a flexible conductive contact wiper element displaceable into and out of resiliently loaded wiping contact with the other pole of said battery in accordance with displacement of said member.

19. A door-closure safety device according to claim 3, in which the cam surface portion of said member is electrically insulative.