Oct. 15, 1968 P. M. HAWKINS 3,406,386

CHAIN LOCK ALARM

Filed Oct. 4, 1965 3 Sheets-Sheet 1

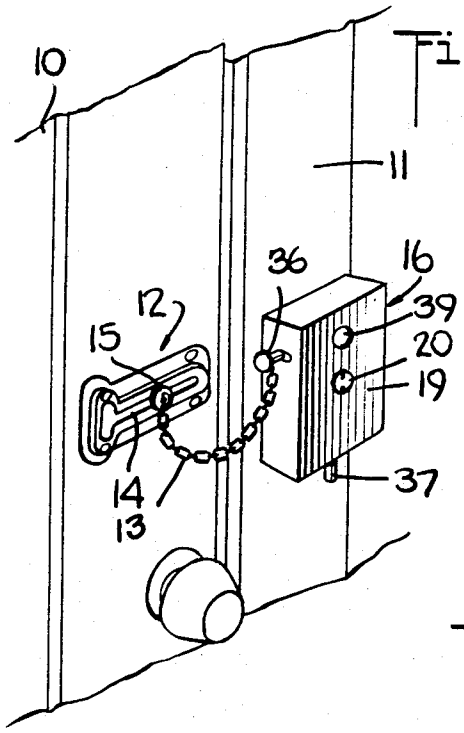


Fig. 1.

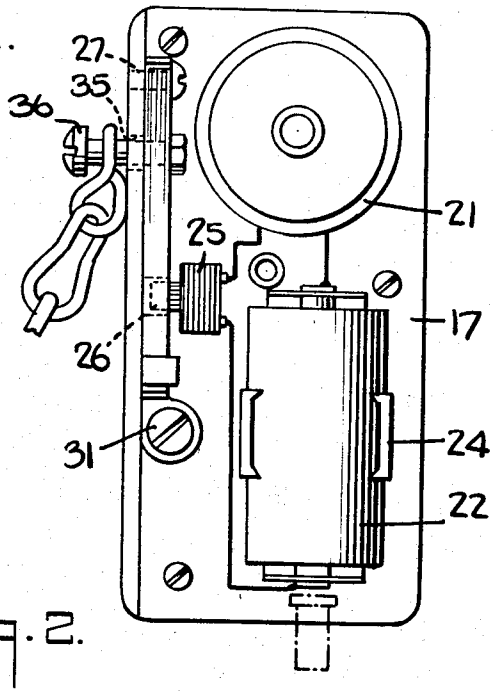


Fig. 2.

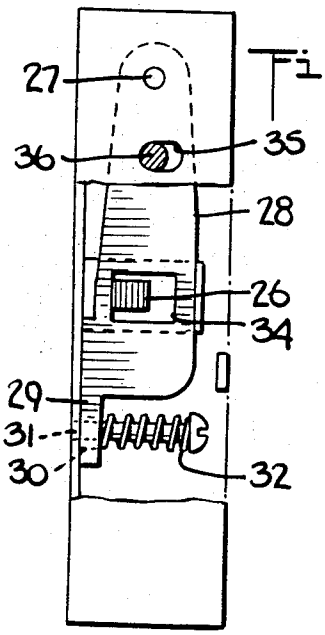


Fig. 3A.

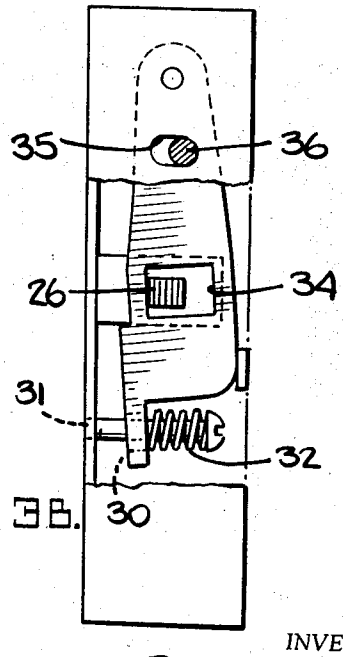


Fig. 3B.

INVENTOR.
PAUL MADDISON HAWKINS

BY

Ward, Hasselton, McElhannon, Fisse, Brookens & Fitzpatrick
ATTORNEYS

Oct. 15, 1968 P. M. HAWKINS 3,406,386

CHAIN LOCK ALARM

Filed Oct. 4, 1965 3 Sheets-Sheet 2

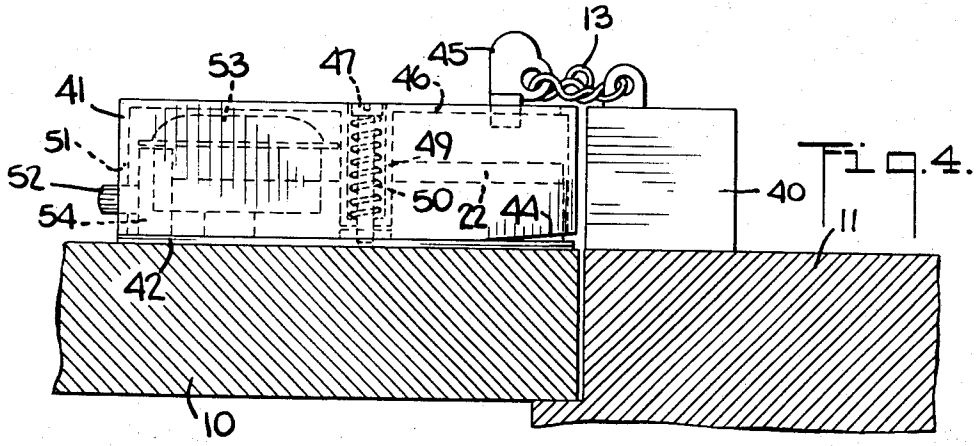


Fig. 4.

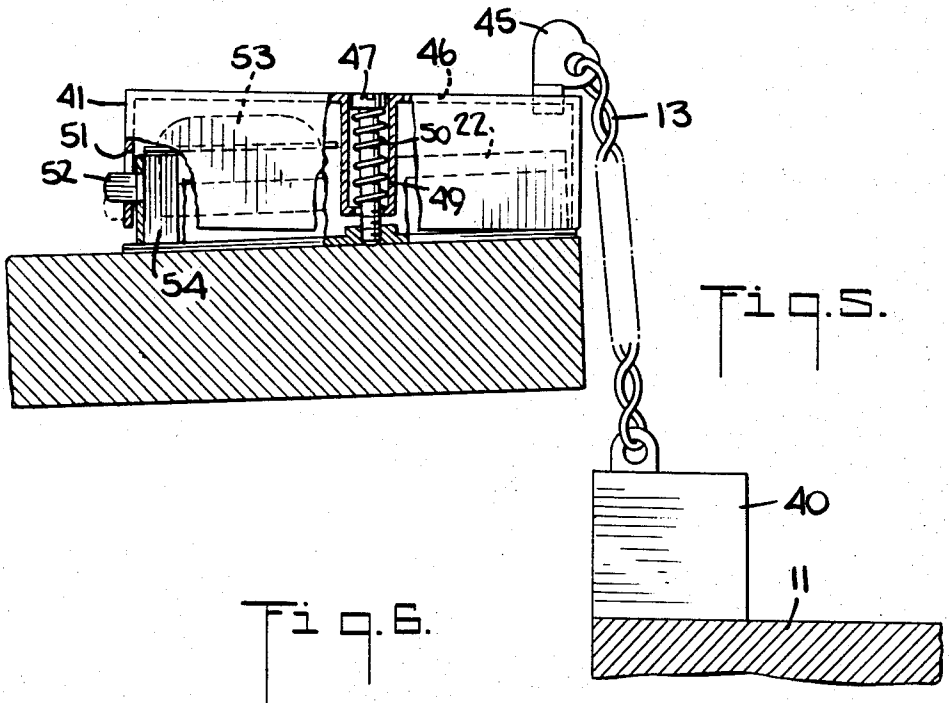
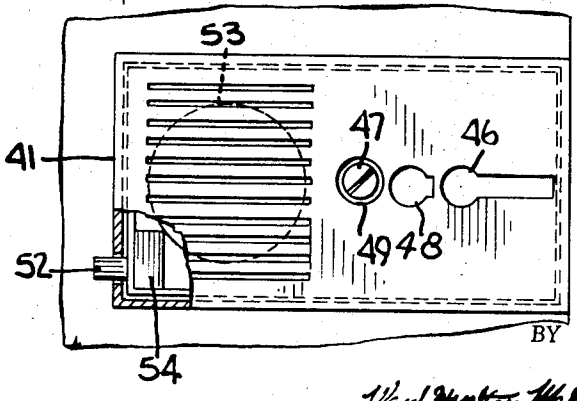


Fig. 5.

Fig. 6.



INVENTOR.
PAUL MADDISON HAWKINS

BY

Ward, Hunton, McElroy, Crue, Brockett & Kelly
ATTORNEYS

Oct. 15, 1968 P. M. HAWKINS 3,406,386

CHAIN LOCK ALARM

Filed Oct. 4, 1965 3 Sheets-Sheet 3

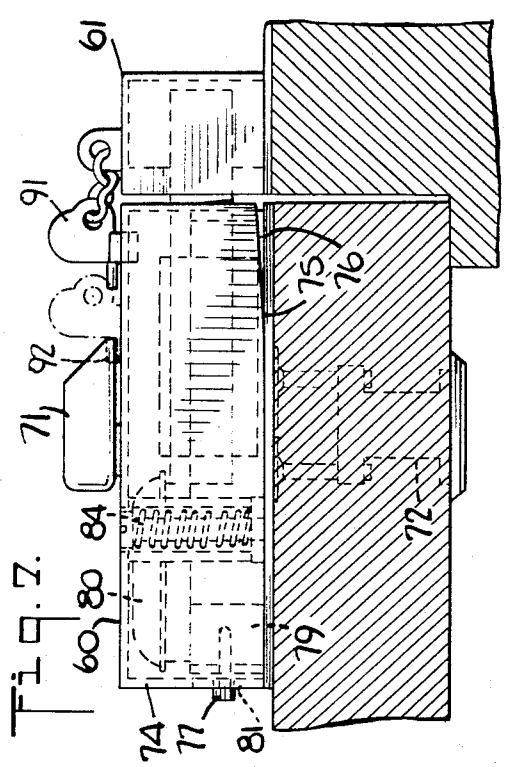


Fig. 7.

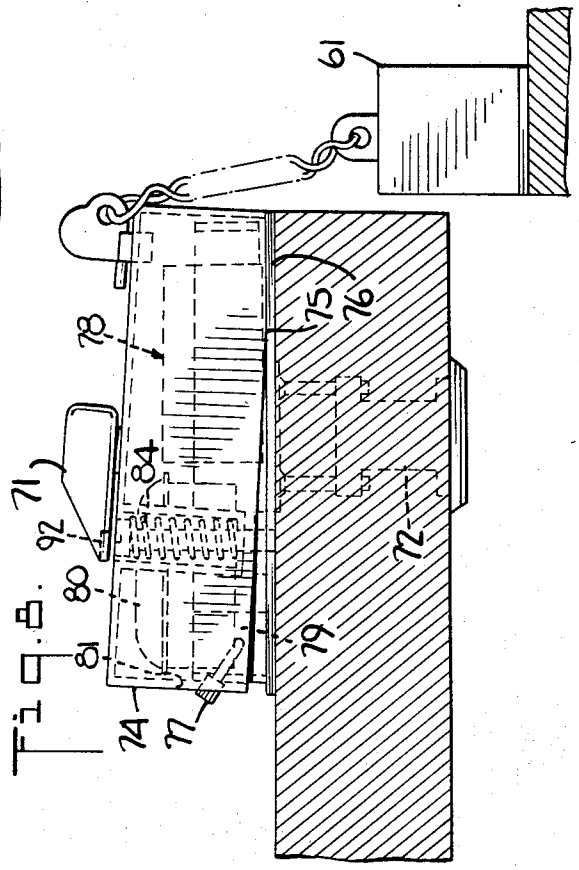


Fig. 8.

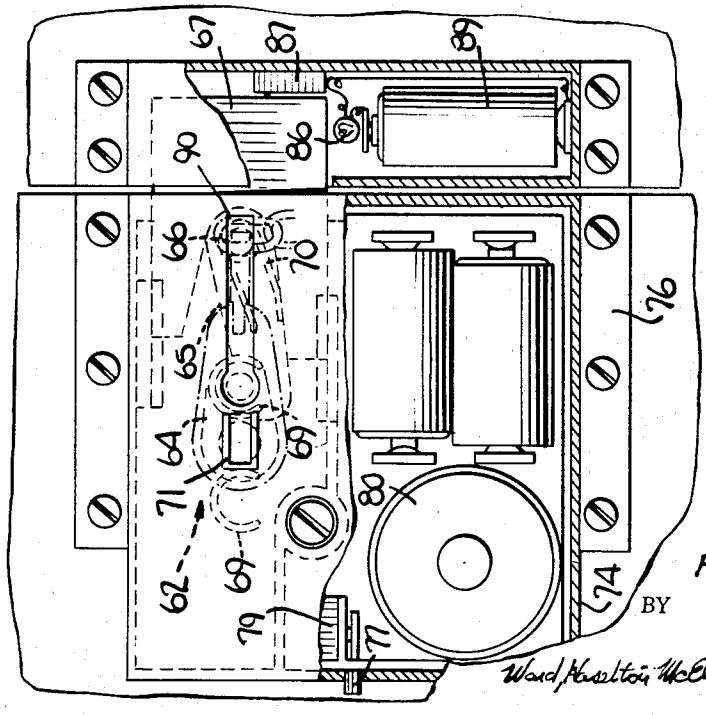


Fig. 9.

INVENTOR.
PAUL MADDISON HAWKINS

BY

Ward, Hasselton, McElhannon, Fisher, Cooke & Pitts
ATTORNEYS

United States Patent Office 3,406,386
Patented Oct. 15, 1968

3,406,386

CHAIN LOCK ALARM

Paul Maddison Hawkins, Jericho, N.Y., assignor to General Alarm Corporation, New York, N.Y., a corporation of Delaware

Filed Oct. 4, 1965, Ser. No. 492,455
13 Claims. (Cl. 340—274)

ABSTRACT OF THE DISCLOSURE

A chain lock-alarm arrangement wherein a flexible chain element utilized for limiting the amount by which a closure may be opened, is arranged in conjunction with an alarm in such a manner that excessive force produced upon the chain will cause the alarm to be actuated.

This invention relates to a combined lock and alarm, and more particularly, to a lock of the type wherein a chain allows a door, for example, to swing open a limited distance relatively to its jamb, and means for sounding an alarm in the event that a given force is applied to the door while ajar to tension the chain, or in certain aspects of the invention, while the door is fully closed.

Heretofore, a number of lock alarms have been proposed wherein an excessive tension on the chain has been effective to sound a bell through a mechanical linkage or clock work mechanism. However, those lock alarms with which I am familiar have not been commercially successful, possibly because of the ease with which a prospective intruder could reach in through the partially open door and muffle or, in some cases, actually unscrew or otherwise destroy the bell which was always mounted on the jamb within reach of anyone at the door. Then, too many such alarms were constructed to sound only while the prescribed tension was applied so that when the intruder heard the alarm, the sound could be stopped simply by relaxing the pressure on the door, possibly before anyone was aware of the intended intrusion.

I have actually constructed a successfully operating and commercially desirable chain lock alarm that overcomes the foregoing difficulties and disadvantages. Thus, my invention contemplates a chain lock in combination with an alarm for use in connection with relatively moveable members such as a door and jamb, window and sash etc., comprising a flexible chain, means on one of said members for detachably mounting an end of the chain, and a normally open switch mounted on the other member, switch operating means moveable to actuate said switch to closed position, an alarm, electrical means such as a power source and appropriate circuitry are provided to operate the alarm when the switch is closed, and the chain is connected at its other end to the switch operating means whereby the chain shifts the operating means to switch closing position upon the application of a predetermined force to one of the members to move it relatively to the other. The term "chain" is intended to include any flexible elongate member suitable for the intended purpose. My invention also contemplates, in one aspect thereof, the inclusion of a dead bolt arranged to actuate the alarm when a predetermined force is exerted upon the door when it is fully closed and locked.

As a feature of my invention, the alarm may be positioned near the door, or at any suitable remote location, and it may, of course, be of the visual or audible type, or both. I also prefer to provide a housing around the alarm mechanism, particularly in those installations wherein the alarm is mounted adjacent a door, for example, to prevent interference or tampering by prospective intruders.

The switch operating means may be a lever mounted for pivotal movement against the force of an adjustable

spring and formed with means for shifting the switch to closed position when such pivotal movement occurs. The chain is connected to the lever and induces movement of same when under sufficient tension, and the spring is adjustable so as to vary the force required to actuate the alarm to suit the needs of each particular installation. In one embodiment of the invention I utilize the housing to perform the function of the aforementioned lever by causing it to tilt against the force of a spring upon application of a predetermined force to the door. The housing may also be utilized to actuate the alarm switch when an attempt is made to force or jimmy the door when same is dead locked.

It is also a feature of this invention that the lever or housing actuates the switch, but upon relaxation of the actuating force, the alarm continues even though the lever or housing returns to its original position under the influence of the spring. This is accomplished without the need of costly relays by forming the lever or housing with an opening so dimensioned as to engage a switch tab and close the switch during movement in one direction, but may shift back to its original position without engaging the tab. The alarm, once actuated, will thus remain in actuated condition until manually shut off.

Another important feature of my invention resides in the provision of a panic alarm and/or testing facility, whereby the operative condition of the alarm and its circuit components may be tested at will or an alarm sounded. To this end, I provide a button mounted conveniently for manual depression to bypass the actuating switch and complete the alarm energizing circuit, thus advising of the condition of the power source, alarm mechanism and circuitry components or sounding an alarm. However, in certain embodiments of the invention, the alarm actuating switch may be manually accessible for test purposes, in which case a separate test button and bypass circuit is unnecessary.

There has thus been outlined rather broadly the more important features of the invention in order that the detailed description thereof that follows may be better understood, and in order that the present contribution to the art may be better appreciated. There are, of course, additional features of the invention that will be described hereinafter and which will form the subject of the claims appended hereto. Those skilled in the art will appreciate that the conception upon which this disclosure is based may readily be utilized as a basis for the designing of other structures for carrying out the several purposes of the invention. It is important, therefore, that the claims be regarded as including such equivalent construction as do not depart from the spirit and scope of the invention.

A specific embodiment of the invention has been chosen for purposes of illustration and description, and is shown in the accompanying drawings, forming a part of the specification wherein:

FIG. 1 is a view of the present lock and alarm combination as it may be used in connection with a door and jamb;

FIG. 2 is a front view of the alarm with the housing cover removed;

FIG. 3A is a side view of part of the switch operating mechanism in the off position;

FIG. 3B is a view similar to FIG. 3A but showing the parts in the on position;

FIG. 4 is a side elevational view of another embodiment of my invention with some of the internal parts illustrated in broken lines, and shown in inactive position;

FIG. 5 is similar to FIG. 4, but shows the apparatus in active position;

FIG. 6 is a plan view of the apparatus of FIGS. 4 and 5 without the chain;

FIGS. 7 and 8 are views similar to FIGS. 4 and 5 but illustrating the chain alarm system in combination with a dead bolt; and

FIG. 9 is a top view of the device of FIGS. 7 and 8 with the housing removed.

Referring now to the drawings, and more particularly to FIG. 1 thereof, there is shown a door **10** and jamb **11** in connection with which a preferred form of my invention may be put to use. Thus, I mount on the door a plate **12** formed with an elongate T-shaped slot **14** shaped to receive at the juncture of its horizontal and vertical arms a grooved bolt or chain anchor **15** which may be positioned at the bottom of the vertical arm of the slot to keep taut the chain **13** to which it is attached, and thus keep the door closed; or the bolt may be positioned in the horizontal arm to permit the door to swing ajar a slight distance for identification of a caller while maintaining security. The T-shape of the slot **14** allows the same plate **12** to be mounted on the jamb if desired or on left or right handed doors.

In accordance with the present illustration, I mount on the jamb opposite the plate **12** a housing **16** comprising a back plate **17** and a cover **19** held to the back plate by a screw **20**. Within the housing, I provide an alarm **21** such as a conventional buzzer, bell or the like, and a battery **22** supported in clip **24**. The power circuit includes a single pole, single throw switch **25** with an operating handle **26** extending laterally thereof. Suitable wiring is provided to enable the battery source to energize the alarm when the switch is closed.

At this point it should be understood that while I have shown the alarm as a buzzer located in the housing, it can take the form of a flashing light, for example, and may be located remote from the lock, as for instance at a central guard's office in the building, or at both locations. Where a remote alarm is employed, a miniature transmitter may be used in lieu of the wiring shown to signal the remote alarm.

In order to actuate the alarm I provide switch operating means in the form of a lever **28** mounted in the housing **16** to pivot about pin **27**. The lever has a projection **29** formed with a hole **30** through which a screw **31** extends, the latter being threaded into a portion of the housing. A compression spring **32** surrounds the screw and bears at one end against the projection **29** and at the other against the screw head so that clockwise pivotal movement of the lever, as viewed, is resisted by the spring. The spring tension may be adjusted to the desired value by adjusting the screw **31**.

The lever **28** is also formed with a square opening or hole **34**, the sides of which embrace the switch handle **26**; but when the parts are in their normal "off" position, the hole **34** and handle **26** are so related that the handle extends into the hole adjacent the left side thereof, as viewed in FIG. 3A. The hole is actually of larger dimension than is necessary to embrace the handle **26**, for a reason to be later described.

The side of the housing cover has an arcuate opening or hole **35** located between the pivot pin **27** and the hole **34** in lever **28**. A rivet or bolt **36** which is permanently affixed to the lever, extends through the opening **35** and an end of the chain **13** is attached to it.

In operation, when the door is closed, the chain anchor **15** may be positioned in the vertical or horizontal arm of slot **14**. If in the vertical arm of the slot, any attempt to open the door will place the chain **13** under tension; if in the horizontal arm of the slot, the door may be opened somewhat before the chain comes under tension. In any case, if a chain tensioning force is applied to the door to create a movement in the lever **28** sufficient to draw the latter from its "off" position (FIG. 3A) to the position shown in FIG. 3B, it will shift the switch handle **26** to the "on" position, thus actuating the alarm. Because the opening **34** is oversized and eccentric relatively to the handle **26**, the switch will remain in the "on" position even if the chain tension is subsequently relaxed so that the lever **28** returns to its original position.

In installations wherein the alarm is mounted adjacent the door, the housing prevents a would-be intruder from interfering with operation of the alarm.

To increase the security of the system, the screw **20** may be formed with a special head as shown in FIG. 1 so that ordinary screw drivers will not be effective for removal of the cover **19**. The tenant will, of course, be provided with a special key or screw driver for removing the cover to service the system.

The cover **19** may also have a circular opneing **39** (FIG. 1) for mounting the chain anchor **15** when the door is opened wide.

To test the alarm system or sound a panic alarm, I provide a push button **37** which projects out of the bottom of the housing **16**. When depressed, the button simply grounds the negative side of the battery **22** to the housing to complete the circuit to the alarm which is also grounded to the housing. The button **37** thus effectively bypasses the switch **25**.

Turning now to FIG. 4, I show a further embodiment of the invention according to which the chain **13** is secured to a decorative anchor **40** mounted on the door panel or jamb **11**, while the housing **41** is mounted on a base plate **42** secured to the door **10**. It is to be noted here that the edge of the housing **41** adjacent the plate **42** is relieved slightly at the right hand side, as viewed, so that the relieved portion **44** of edge is normally slightly angulated relatively to the surface of the plate. The housing is secured to the plate **42** by a screw **47** that extends down through a cylindrical recess **49** formed in the housing, and into the plate **42**. A spring **50** bears against the bottom of the recess and against the head of the screw to bias the housing into the position shown in FIG. 4.

As has been stated, one end of the chain **13** is secured to the anchor **40**. The other end of the chain is connected to a chain anchor **45** adapted to enter a chain anchor slot **46** (FIG. 6) at its large end and slide lengthwise in its slot to allow for partial opening of the door while retaining chain security. A similar hole **48** has a shortened slot and may accept the chain anchor **45** without allowing for partial opening of the door.

The housing **41** has a slot **51** formed in one of its sides through which slot a switch handle **52** (similar to handle **26** of FIGS. 2, 3A and 3B) extends, and an alarm **53** and one or more batteries **22** may be contained within the housing. It will be understood that, as in the previously described embodiment, the power source and alarm may be remotely located. A simple series circuit (not shown) is arranged to supply power from the batteries to the alarm when the switch **54** is closed.

In the operation of the embodiment of FIGS. 4, 5 and 6 of my invention, the chain is set as shown in FIG. 4 and is, of course, of sufficient length so that the door may be opened somewhat without actuating the alarm. However, if the door is opened and then forced beyond a predetermined limit, the chain serves to rock the housing **41** about the point of juncture of the plane of the relieved portion **44** with the plane of remainder of the inner edge of the housing. Thus, this point of juncture becomes a fulcrum about which the housing rocks to the position shown in FIG. 5. The spring **50** resists this movement and may be adjusted by means of the screw **47**, to increase or decrease the load necessary to be overcome in order to rock the housing. The housing moves to the position of FIG. 5, the lower edge of the slot **51** (as viewed in FIGS. 4 and 5) raises the switch handle **52** from the inactive position of FIG. 4 to the switch closing position of FIG. 5. Upon relaxation of the opening force, the spring **50** returns the housing **41** to its normal position (FIG. 4) but, because the slot **51** is longer than the switch handle **52**, the arm remains in switch closed position and the alarm **53** continues to function until the switch is thrown manually to "off" position. Of course,

a holding relay could be used to maintain the alarm circuit closed, but I find the described system simple and inexpensive. The switch may be thrown to closed position at any time to test the circuit and power supply or sound a panic alarm. If the chain anchor **45** is positioned in hold **48**, the same switch actuation will occur upon application of force against the door when in fully closed position.

If desired for esthetic purposes, the chain may be encased in a sleeve of leather or plastic, for example, and the housing may be formed so that the chain anchor slot **46** is at the bottom of a groove of a depth whereby the chain will be flush with the surface of the housing.

A further embodiment of my invention is shown in FIGS. 7 to 9 wherein the chain lock and alarm are substantially identical to those already described in connection with FIGS. 4 to 6. However, the housing **60** and strike plate **61** are larger than those described so that the former can house, in addition to the alarm unit, batteries and switch, a dead bolt lock mechanism identified generally by the numeral **62** in FIG. 9, and the latter becomes a keeper for a dead bolt. This lock mechanism **62** is conventional and comprises briefly, a rotatable crank **64** pivoted to a connecting arm **65** that is in turn pivotally connected at **66** to a dead bolt **67**. The crank **64** can swing only 180° between bolt retracting and projecting positions, its limits of movement being defined by stops **69**. A torsion spring **70** having one end anchored to the arm **65** and the other to a relatively stationary member, provides a toggle action to movements of the bolt. The crank is manually actuated from inside the door by a thumb turn **71** (FIGS. 7 and 8) and from outside the door by a key operated lock cylinder **72**.

It will be appreciated that by combining a dead bolt with the apparatus of FIGS. 4 to 6, I contribute an additional measure of protection in that any effort to force or jimmy the door when the bolt is thrown will cause the bolt to bear against the inner surface of the keeper and thus tilt the housing **74** about the fulcrum point **75** bearing against the base plate **76**, thus lifting the far end of the housing and with it the switch actuating handle **77** to the position shown in FIG. 8 wherefrom it closes alarm switch **79** to place the alarm **80** in circuit with the power source such as batteries **78**. The alarm may be of several types, as mentioned, and in any location. The slot **81** in the housing through which the switch handle **77** projects, is again dimensioned to permit the switch to remain in switch closed position even when the force on the door is relaxed and the adjustable spring **84** returns the housing to its normal position.

The chain lock operates to actuate the alarm in the manner already described in connection with FIGS. 4 to 6.

In this embodiment of the invention I have arranged for the provision, where desired, of a bolt condition indicator which may constitute a simple flag moveable with the thumb turn or lock cylinder to indicate bolt condition. However, I prefer to utilize an electric lamp which is lighted when the bolt **67** is retracted. Accordingly, I provide a lamp **86** beneath a viewing opening in the keeper **61** and within the keeper I locate a switch **87** such as a microswitch operable when the bolt is thrown to protracted position to open a series circuit which includes a battery **89**, thus to deenergize the lamp. Upon retraction of the bolt, the switch closes to energize the lamp, thus indicating the retracted condition of the bolt. For this purpose, house power may be used if desired in lieu of the battery **89**. A viewing opening may be located on the opposite side of the lamp **86** so that the bolt condition will be observable from the exterior of the door.

It will be appreciated of course that the housing and keeper may be mortised into the door and jamb rather than surface mounted.

A further feature of my invention resides in the provision of a key lock-out device which operates to prevent unlocking of the lock from outside whenever the chain anchor **91** (FIG. 7) is slid forward in its slot **90** (FIG. 9) to engage the thumb-turn **71** (FIG. 8). The chain anchor **91** is engaged in the anchor slot **90** and can be so positioned, as shown in its dotted outlined position, to engage a slot **92** (FIG. 8) in the thumb-turn **71** when the thumb-turn is turned to its locked position as shown in FIG. 7. This prevents retraction of the dead bolt by any means until the chain anchor **91** is first removed from the slot **92** of the thumb-turn **71**.

From the foregoing description, it will be seen that I have provided a combined lock and alarm which avoids several difficulties noted in connection with prior efforts in the art, and which is tamper proof, permits remote positioning of the alarm and including means for testing the circuitry at will or sounding a panic alarm. I also contribute means for actuating the alarm upon application of an excessive force to the chain when the door is opened, and even when the door is closed and locked as by a dead bolt. Where a dead bolt is employed, a bolt condition indicator may conveniently be included as part of my novel contribution. Thus, I actually contribute a relatively simple, but reliable and inexpensive, lock and alarm system. It will be appreciated that the present system is not confined only to use in connection with doors, as in the illustrative embodiments, but may be used to guard windows and other closures.

I believe that the construction and operation of my novel combined lock and alarm will now be understood, and that the advantages of my invention will be fully appreciated by those persons skilled in the art.

I claim:

1. In apparatus of the class described, the combination of a chain lock and alarm for use in connection with relatively moveable members comprising, a flexible chain, means securing an end of said chain to one of said members, a housing and normally open switch, means within said housing mounted on the other of said members, an alarm, means including a power source in circuit with said alarm and switch and operating said alarm when said switch is closed, said housing being fulcrumed to rock relatively to the member upon which it is mounted and having an opening through which said switch projects for actuation to closed position when said housing rocks about its fulcrum, spring means resisting said rocking movement, and means securing the other end of said chain to said housing whereby said chain exerts a force upon said housing to rock same and close said switch upon application of a predetermined force to said door, one of said chain securing members being manually releasable.

2. Apparatus according to claim **1**, wherein said housing has a keyhole slot and said chain has a grooved bolt at its end for sliding movement in said slot and said opening in said housing is so dimensioned relatively to the projecting part of said switch as to permit same to remain in circuit closing position upon return of said housing to normal position under the influence of said spring means when said predetermined force is released.

3. In apparatus of the class described, the combination of a lock and alarm for use in connection with relatively moveable members comprising, a flexible chain, mounting means on each of said members for anchoring an end of said chain, a normally open switch on one of said members, an alarm, means including a power source in circuit with said alarm and switch and operating said alarm when said switch is closed, one of said mounting means housing said switch being contoured to rock relatively to its respective member upon the application of a predetermined force to said chain and engaging and shifting said switch to circuit closing position upon such rocking movement, said chain being detachable from one of said members, and a manually operable bolt and keeper mounted for cooperation on respective of said members to maintain same relatively immoveable and to shift said switch operating means to switch closing position upon the application of a predetermined force upon said bolt.

4. In apparatus of the class described, the combination of a chain lock and alarm for use in connection with relatively moveable members comprising, a flexible chain, means securing an end of said chain to one of said members, a housing and normally open switch, means within said housing mounted on the other of said members, an alarm, means including a power source in circuit with said alarm and switch and operating said alarm when said switch is closed, said housing being fulcrumed to rock relatively to the member upon which it is mounted and having an opening through which said switch projects for actuation to closed position when said housing rocks about its fulcrum, spring means resisting said rocking movement, means securing the other end of said chain to said housing whereby said chain exerts a force upon said housing to rock same and close said switch upon application of a predetermined force to said door, one of said chain securing members being manually releasable, and a manually operable bolt and keeper mounted for cooperation on respective of said members to maintain same relatively immoveable and to shift said switch operating means to switch closing position upon the application of a predetermined force upon said bolt.

5. Apparatus according to claim 4, wherein the position of said bolt is indicated by provision of an electric indicator and an indicator control switch operable by said bolt.

6. In apparatus of the class described, a chain lock having a key lock out feature comprising a lock adapted to be mounted on one side of a door with a thumb-turn on said one side for manipulating said lock and means adapted to be engaged by a key from the opposite side of said door also for manipulating said lock with consequent turning of said thumb-turn, a flexible chain, means for attaching one end of said chain securely to a door casing, a chain anchor attached to the opposite end of said chain, guide means on said lock for securing said chain anchor to said lock and for allowing limited sliding movement of said chain anchor on said lock, and means associated with said chain anchor for engaging said thumb-turn and preventing its rotation when said chain anchor is moved to a given position on said lock.

7. A chain lock-alarm device comprising in combination, a flexible chain, means for securing one end of said chain to one of two relatively movable members, a housing, means for securing the other end of said chain to said housing, means for mounting said housing to the other of said members in a manner permitting limited movement of said housing on said other member in response to tension in said chain when said members are forced toward a mutually separated condition, spring means arranged to bias said housing against said limited movement of said housing, and an alarm actuating switch enclosed by said housing, said switch including a switch arm arranged such that movements of said housing caused by excessive tension on said chain operates said switch to an alarm actuating condition.

8. A chain lock-alarm device as in claim 7 wherein a bolt is provided to project from and to retract into said housing, for locking and unlocking respectively said members in closed condition, whereby forcing of said members as so locked toward an open condition will cause said bolt to move said housing in a manner to operate said switch to an alarm actuating condition.

9. A chain lock-alarm device comprising in combination, a flexible chain, means for securing one end of said chain to one of two relatively movable members, a housing arranged to be secured to the other of said members, an electrical alarm actuating switch of the type which remains in any condition to which it is set, said switch being carried in said housing, a switch actuating member also carried in said housing and guided entirely by said housing for movement between two fixed positions therein, spring means with said housing biasing said actuating arm to one of said two positions, means for securing the other end of said chain to said arm for causing said arm to be pulled by said chain to its other position by tension imposed upon said chain when said members are forced toward a mutually separated condition and means interconnecting said switch and said arm in a manner such that movement of said arm to its said other position operates said switch to an alarm actuating condition, and movement of said switch actuating member to its said one position does not operate said switch.

10. A chain lock-alarm device as in claim 9 wherein said interconnecting means comprises a switch arm extending from said switch into engagement with said actuating arm, one of said arms having a portion which extends through an opening in the other of said arms.

11. A chain lock-alarm device as in claim 10 wherein said opening is elongated in the direction of actuating arm movement by an amount at least as great as the distance of movement necessary to operate said alarm actuating switch whereby return movement of said actuating arm will not cause alarm deactuating movement of said switch arm.

12. A chain lock-alarm device as in claim 9 wherein there is provided an alarm within said housing and arranged to be actuated by operation of said alarm actuating switch.

13. A chain lock-alarm device as in claim 9 wherein there is provided in said housing a test switch connected in parallel with said alarm actuating switch.

References Cited

UNITED STATES PATENTS

1,156,809	10/1915	Pidgeon	340—274
1,157,863	10/1915	Hamelin	340—274
2,818,475	12/1957	Harry	200—61.64

FOREIGN PATENTS

636,985	5/1950	Great Britain.	

JOHN W. CALDWELL, *Primary Examiner.*

D. L. TRAFTON, *Assistant Examiner.*