

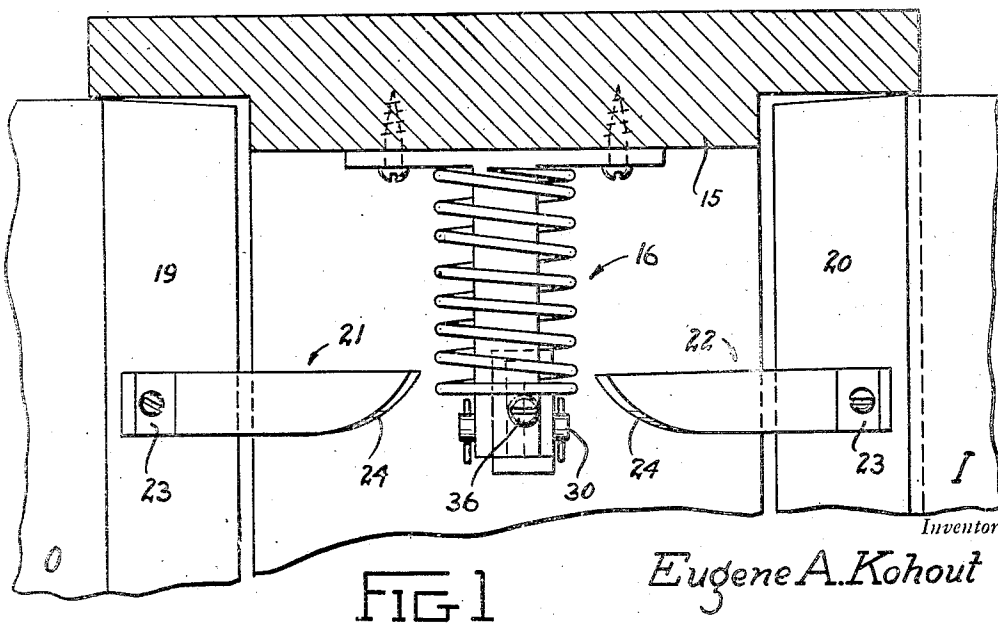
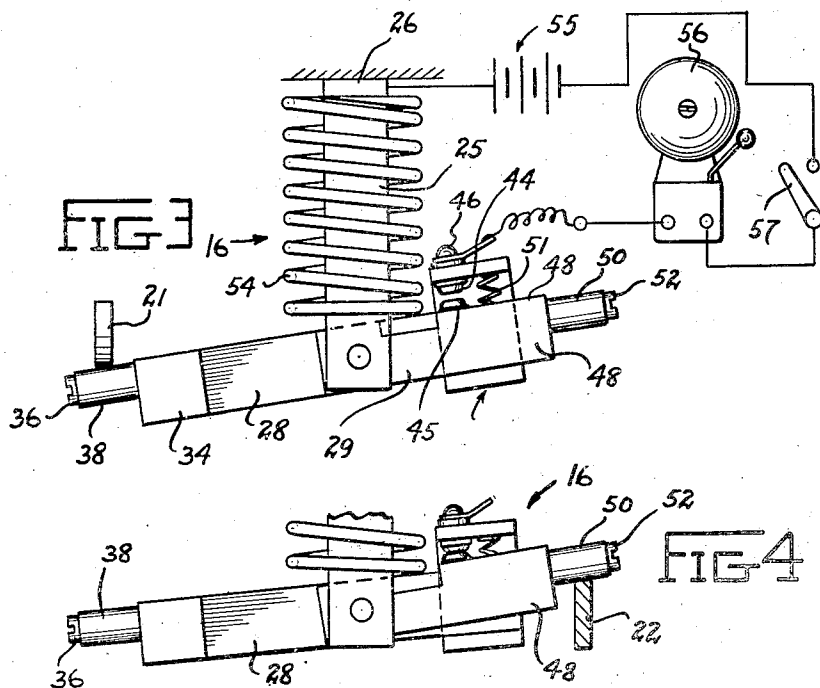
Dec. 7, 1948.

E. A. KOHOUT
ALARM SYSTEM FOR DOORS HAVING A PLURALITY
OF DOOR PANELS OPERATED IN SUCCESSION

2,455,780

Filed Oct. 16, 1946

3 Sheets-Sheet 1



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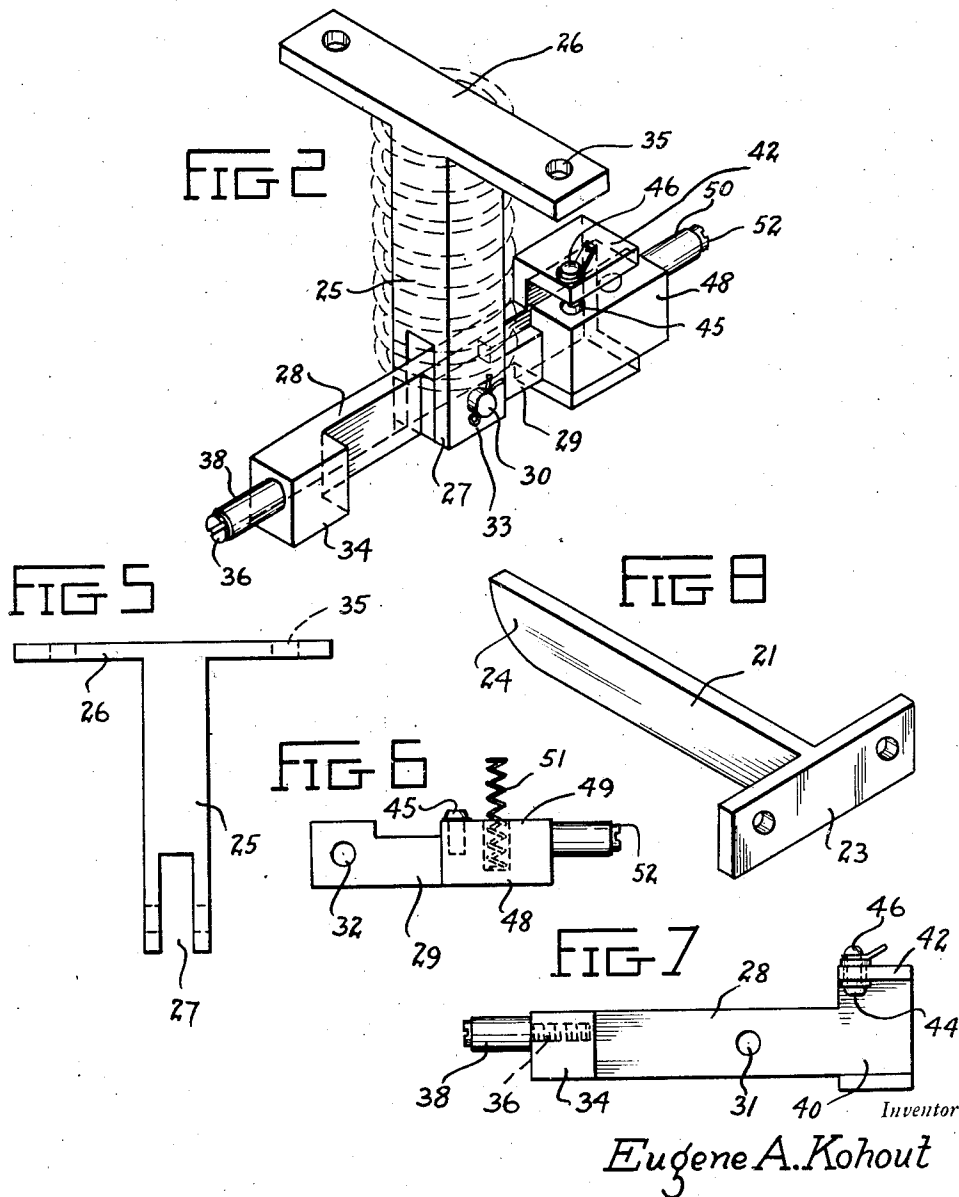
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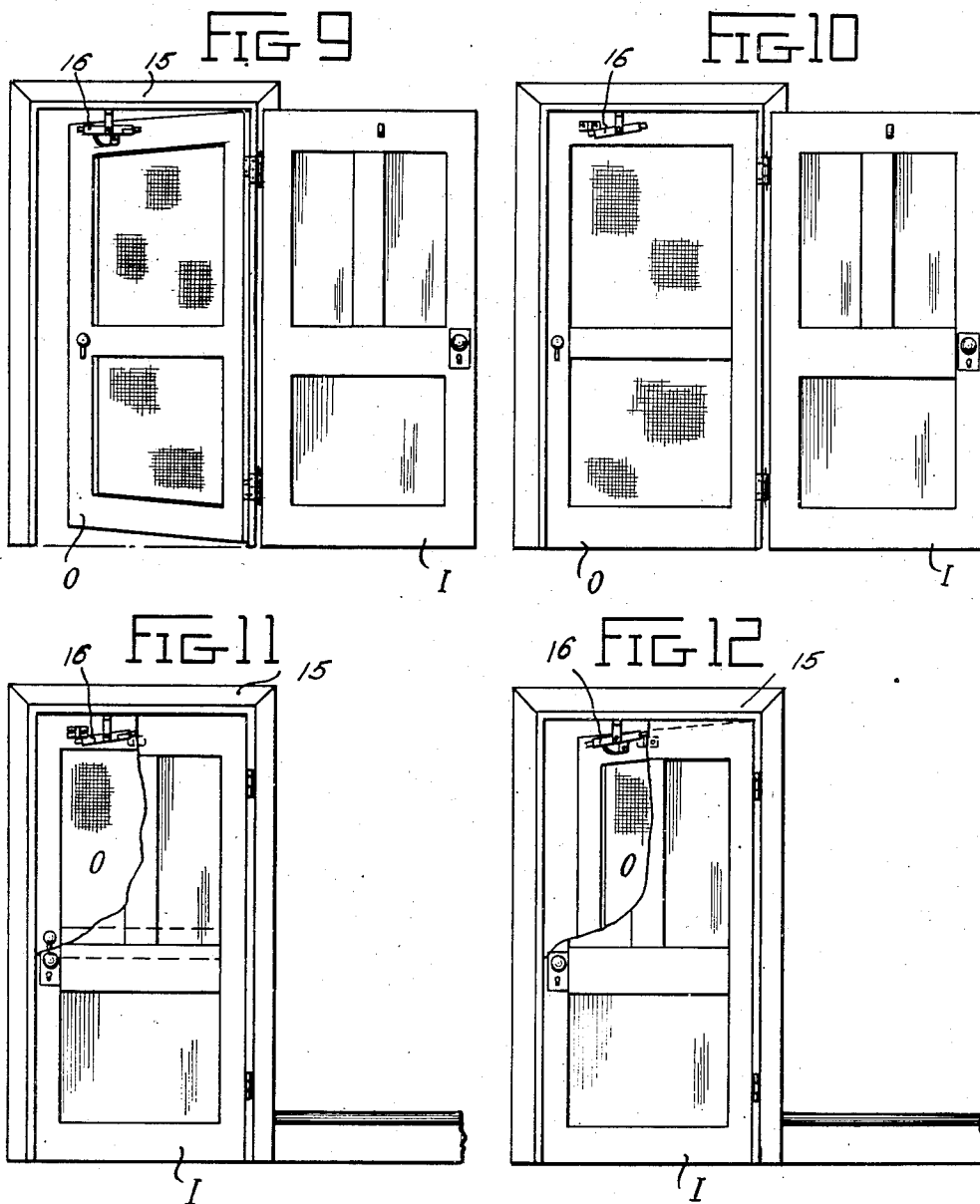
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UNITED STATES PATENT OFFICE

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ALARM SYSTEM FOR DOORS HAVING A PLURALITY OF DOOR PANELS OPERATED IN SUCCESSION

Eugene A. Kohout, Miami, Fla.

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8 Claims. (Cl. 177—314)

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This invention relates to door alarm systems adapted to operate an alarm signal upon non-legitimate use of a door or doors and it has for its general object to provide an alarm system which is permanently in a state of readiness to operate, but which is kept from being actually operative by door panel operated contacts, open as long as a legitimate use of the door is made, but closed for alarm operation upon a nonlegitimate use of the door, leading to the premises to be guarded.

To attain the object of the invention a method of distinguishing between a legitimate and a non-legitimate use of the door has to be introduced and for this purpose the chronological order is made use of in which doors having at least two door panels, hinged to opposite sides of a door frame, are operated. The way in which the door panels are opened and closed in succession upon entering and leaving the guarded premises, is not the same when the outer door for instance is opened from within in order to admit a person (legitimate entry) and when an attempt is made to enter by opening the outer door panel from the outside first (nonlegitimate entry). According to the invention, therefore, an alarm contact device is arranged, operated by members connected with the panels which remains unaffected by those predetermined successions of panel movements which are regarded as due to a legitimate use, but which is operated by a succession of panel movements which is regarded as occurring upon nonlegitimate use.

Further differentiating conditions may be added, in order to restrict the alarm to certain cases of irregular use.

A more specific object of the invention consists in providing a movable contact device carrying relatively movable alarm contacts, which may be shifted, rocked or otherwise moved as a unit by members connected with the door panels without producing a relative movement of the alarm contacts as long, as such shifting, rocking or other movement follows a predetermined pattern, but which entails such relative movement of the alarm contacts, as soon as a sequence of movements of the door panels occurs which deviates from the selected pattern. This in particular may be achieved by pivoting the alarm contact carrying members influenced by the door panels separately on a fixed member while coupling them by means of an elastic or spring member. The selected pattern of successive movements moves the device as a unit, its separately pivoted members being coupled by the coupling means and spring, but an undesired sequence attempts to move the separate members in a way which compresses the said spring and therefore provides a relative movement of the alarm contacts.

The invention will be better understood when

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described in detail with reference to the accompanying drawings.

Merely one embodiment of the invention is illustrated in the drawings but it is to be understood that the specific embodiment shown is an example selected with a view of explaining the principles on which the invention is based, as well as their application in a specific instance. It is therefore obvious to the expert skilled in the art that modifications of the embodiment shown do not necessarily form a departure from the essence of the invention.

In the accompanying drawings:

Figure 1 is an elevational view, partly in section, of the main active device and members of the system;

Figure 2 is a perspective view of the movable contact device fixed to the door frame;

Figure 3 is an elevational side view of the device shown in Figure 2 with the contact members in one position, in which they are out of contact;

Figure 4 is a partial elevational side view of the same device with its contact members in their position of contact;

Figures 5, 6 and 7 are elevational side views of details;

Figure 8 is a perspective view of one of the push blocks fastened to the door panels and moving with them.

Figures 9 to 12 are elevational views of the doors looking from the interior towards the outside and illustrating several positions of the doors and corresponding positions of the contact device.

As already explained, the invention consists in a door alarm for homes, shops or the like which is permanently in an operative position, and which endeavors to differentiate between several ways of using the door, some of which are considered as legitimate while one or several of them are considered as illegitimate. This differentiation is obtained by means of a double door, with two panels hinged to the same frame on the inside and outside of the wall, which are separated by the width of the door jamb.

A contact device is fixedly arranged between the door panels and is operated by members attached to and projecting from the door panels, this operation progressing in a certain chronological order or sequence upon each opening and closing of the door panels.

This contact device may be provided with movable members, shifted or otherwise moved everytime the door panel is opened or closed, and operating alarm contacts, connected with said movable members, merely when a definite chronological sequence of such movements occurs. This chronological sequence may then, for instance, be selected in such a manner that it corresponds to a door operation which is considered as illegitimate.

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To obtain the desired result a door is used consisting of the door jamb 15 and the two door panels 19, 20 closing from opposite sides. To distinguish the two door panels more clearly they have been marked by reference letters O and I, the letter O being used for the outer and the letter I for the inner door panel. According to the invention, the door jamb 15 is provided with a contact device generally indicated by reference numeral 16 while the two panels 19, 20 closing from the outside and inside respectively are each provided with push fingers 21, 22 located at an appropriate height and at an appropriate distance with respect to the door hinges so that they are capable of cooperating with the contact device in the manner described below.

Preferably each push finger projects at right angle, as shown in Figure 8, from the push block having a base 23 fixed to the door panel by means of screws; at the tips 24 the fingers 21, 22 may be curved or rounded on their lower side or on both sides.

In Figure 1 the doors with the push blocks are shown in a position in which they are only half closed or are on the way of being closed. It will therefore be understood that upon further movement of the doors the tips 24 of the fingers will cross the plane passing through the central axis of the contact device 16 and will overlap. Moreover it is to be understood that the push fingers 21 and 22 are arranged at different distances from the hinges, so that when the doors are closed they stand apart from each other and project into the space between the doors at a certain distance.

The contact device 16 which is arranged between the doors (Figure 2) comprises a central standard 25 mounted on a base 26 (see Figure 5) provided with screw holes 35 which is fixed on the upper portion or ceiling of the door jamb and is depending therefrom. At its depending end the standard may be bifurcated (at 27). This bifurcated portion carries the two swing arms 28, 29 (see Figures 6 and 7) both supported by a pin 30 passing through a hole 31, 32 respectively of the swing arms. The pin 30 may be secured to the standard by means of a cotter pin 33.

The swing arm 28 is a two armed lever supported by the forked portion 27 of the standard 25 and having its fulcrum approximately in the center; the said fulcrum is formed by the pin 30 passing through the bifurcated end 27 and the pin hole 31 of the swing arm.

One end of the swing arm 28 is provided with a head 34 carrying a bolt or screw 36, fixed in said head 34 and surrounded by a cylindrical roller 38. This roller faces the push finger 21 of the outer door 19. The other end of the swing arm 28 carries a head 40 of channel form, with two horizontally projecting leg members 42 projecting at a distance from each other. The upper leg member 42 carries a contact 44 mounted on or connected with a contact terminal 46 to which one of the connecting wires may be soldered.

The second swing arm 29 is a one armed lever supported by the bifurcated portion 27 of standard 25 alongside with swing arm 28 and having likewise its fulcrum formed by pin 30 passing through hole 32 near one of its ends. The other end is formed by a prismatic head 48 which is held and may move to a certain extent between the two leg members 42 of the channelled head 40. The head 48 carries another contact 45 which may cooperate with contact 44 of the channel shaped head. Moreover the prismatic head is

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provided with a bore 49 which serves as a housing for a coiled spring 51 projecting beyond the upper surface of head 48 and pressing against the upper leg 42 of the channel shaped head 40.

When the two swing arms 28 and 29 are both supported in the bifurcated portion 27 of the standard 25 and when head 48 is inserted between the legs members of the channel shaped head 40 the spring 51 will tend to move head 48 towards the lower leg member of head 40 and will have the tendency to separate the two contacts 44 and 45.

The prismatic head 48 carries a bolt or screw 52 which is surrounded by a roller 50. This roller is arranged to face push block 22 of the inner door panel 20. It is thus seen that the push fingers 21, 22 have to be arranged on the door panels at such a distance from the hinges and from the upper edge of the door panel that when the doors are closed they will stand apart at a distance which is equal to the distance between the rollers 38 and 50, as will be seen from Figures 3 and 4.

The standard 25 may be surrounded by a helical coil spring 54 which either directly or by means of washers (not shown) presses against the base 26 of the bifurcated standard 25 on one side and against the upper faces of the two swing arms 28, 29 on the other side. This spring has the effect of holding the two swing arms in a substantially horizontal and balanced position, when no pressure is exerted on them by the push blocks.

It will thus be seen that when the outer door 19 is closed the push finger 21 is moved inwardly (toward the right in Figure 1) and finally the tip of the tongue meets the roller. The swing arms 28 and 29 are kept in a substantially horizontal position, such as shown in Figures 1 and 2, by the helical coil spring 54. However when the tongue of the push finger 21 advances towards the middle the rounded end below its tip strikes against the roller 38 and depresses it whereby the swing arm 28 will assume the position shown in Figure 3. Thereby the lower leg of head 40 supporting swing arm 29 moves the latter with it. The spring 51 keeps the swing arm 29 pressed against the lower leg member of head 40 and keep contacts 44 and 45 separated.

Roller 50 is now in a lifted position. If door panel 20 is now closed and push block 22 is moved inwardly (to the left in Figure 1) the tip of the tongue will enter below the roller 50.

This movement will not lift swing arm 29 from its seat on head 40 as long as roller 38 and head 34 are pressed downwardly. However if now push finger 21 is withdrawn by opening the door while push finger 22 remains in its position, swing arm 28 moves downwardly on account of its weight and on account of the pressure of coiled spring 54 on the raised lever arm and thereby the pressure of spring 51 is overcome so that contacts 44, 45 meet. This position is shown in Figure 4.

The alarm circuit is thereby closed. This circuit is indicated in Figure 3 as consisting merely of conventional units, such as a battery 55, an alarm bell 56, a switch 57; but it may include any number of elements in lieu of or in addition to those shown. Any type of alarm circuit whether operated by A. C. or D. C. may be used.

It will be clear from the foregoing description that the closing of the contacts of the alarm circuit is a result of certain conditions which have been produced by a certain sequence of operations.

It will also be clear that it depends on the ad-

justment of the movable members with respect to each other and of the alarm contacts on them whether one chronological order of operations of the members of the contact device is to be considered as the illegitimate or as the legitimate use.

The example which was described and which will be used to explain in detail the various phases of the operation represents, one of many frequently occurring cases. This case, which is illustrated in Figures 9 to 12 may serve to describe the operation in detail.

The example as illustrated relates to the case of a double door, with a screen door on one side and a solid door on the other side of the door frame. The screen door is without key and may be either self locking or fixed by a hook or other mechanism from the inside, with the self locking mechanism put out of action, when the owner leaves and locks the regular, solid door. The latter is provided with a lock and key and may be provided with a self-locking latch. It is assumed that the owner of the house uses his key, while other people when the screen door is hooked or engaged in the self locking mechanism have to gain admission by ringing the bell. It follows that after the owner has entered the house and has fixed the screen door, reopening of the latter can only be done by damaging the screen and is therefore considered as illegitimate. It will also be seen that when first the inner door is opened (as in the case of an admission of a person by some one inside the house), the door operation has to be considered as a legitimate use of the door and should not operate the alarm device. Likewise leaving the house (after putting the screen door hook or self locker out of operation) and reentering it, is to be counted as a legitimate use of the door.

If this example is taken as a base, it will be seen that Figure 9 illustrates a phase in which a person is about to enter or to leave the house in the regular way, and which may be considered the initial phase for the operation of the alarm contact device. In this stage or phase in which the inmate of the house passes the door both doors O, I are open. The contact device 16 is therefore in a horizontal position. Let it now be assumed that a person leaves the house then the inner door I closes first the block 22 depresses roller 50 and the swing arms 28, 29 assume an inclined position, the contacts being however separated. If now the outer or screen door O is closed, push finger 21 gets under roller 30, but does not raise it. The alarm circuit is therefore not closed.

If under the conditions thus established a person re-enters the house regularly, both doors will again be open during a phase of this operation as shown in Figure 9; in this case the screen door O closes first and will bring the contact device into an inclined position corresponding to the position shown in Figure 3. If now the door I closes, as shown in Figure 11 the push finger 22 is able to catch the underside of roller 50. This would however not have been the case if screen door O would not have closed previously. The screen door may be fastened or made to engage its locking device before the inner door is closed. If after these regular operations an irregular operation is attempted for instance if door O is opened, while door I remains closed, the contacts will close as illustrated in Figure 4 by virtue of the release of swing arm 28 and the alarm will be sounded.

It will thus be clear that the alarm will not be

sounded if the door is used regularly either from within, opening door I at first or from without.

If door I is opened first, say in response to a call, the operation is the same as that already above described in connection with the leaving of the house and a person now entering and opening the screen door brings the device back into its horizontal position with both doors open as shown in Figure 9. Likewise, if a person opening the screen door, does not enter but merely after delivering some message leaves so that the outer door closes first no alarm signal is given as this case is the same as that described above, when a person is entering the house. Even if, for some reason, the person opening the inner door should close the latter first before the screen door has been closed no alarm is given as merely push finger 22 would have engaged the top side of roller 50 inclining the contact device from left to right in Figure 3. In this case the push finger 21 would have engaged the underside of roller 38 and the subsequent opening of the outer door O would not cause the alarm to sound.

The preferred form of the device, as illustrated, is designed for the guarding of doors which are located in the rear of houses and shops through which, on account of such location, illegitimate entry would most likely be attempted.

In occupied houses several contact devices may be used to guard front and rear doors simultaneously. However, it will be manifest that the location of the doors, as selected for illustration, and also the sequence of operations leading to the operation of the alarm contact is rather arbitrary and may be changed to suit different cases. Moreover constructional changes of a minor nature do not affect the invention or the principle on which it is based.

It will also be clear that the mechanism may be associated with the doors in such a way that it is not visible or is not conspicuous.

I claim:

1. An alarm system for the permanent supervision of premises with doors having at least two door panels hinged on a fixed structure to be opened and closed in succession, comprising a contact device, carried by the fixed door structure and provided with at least two separately movable contact carrying members, means for coupling said members mechanically for joint movement in one direction without change of their relative position, operative members associated with said door panels for engaging and moving each of said contact carrying members, the movements produced by the said members, upon a predetermined successive operation of the door panels, occurring all in the direction in which the two separately movable members are coupled, while separate and relative movements of the contact carrying members are produced upon deviation from the predetermined succession and means for operating an alarm circuit upon a change of the relative position of the movable contact members.

2. An alarm system for the permanent supervision of premises with doors having two door panels to be opened and closed in succession, comprising operative push fingers fixed to the door panels and moving with the same, a contact device mounted fixedly between said door panels within reach of the push fingers of the door panels, at least two contact arms, pivotally mounted for a rocking motion on said contact device, means on one of said members for supporting and moving the other member, separate and independent means on each of said members

for engagement by push fingers on the door panels and for rocking the member upon movement of the engaging finger, means for moving the two members relatively to each other when not supported and contacts on said members for establishing an electric contact upon such relative movement, and means for operating an alarm signal connected with the said contacts.

3. An alarm system for the permanent supervision of premises with doors having a frame and two door panels to be opened and closed in succession, comprising operative push fingers fixed to the door panels and moving with the same, a contact device fixedly mounted on said door frame between said panels within operative reach of the push fingers of the door panels, contact arms mounted for independent rocking motion on said device, both arms being provided with heads, and one of said heads being surrounded by the other while free to move relatively to it to a limited extent, a spring between said members, contacts on said members adapted to come into electrical contact upon relative movement of said members towards each other, means on each of said members engageable with a finger attached to one of the panels, spring means to hold the said contact members in a middle position and means to give an alarm signal associated with the contacts.

4. An alarm system for the permanent supervision of premises with doors, having a frame and two door panels on both sides of the said frame to be opened and closed in succession, comprising a contact device fixed on said frame between said panels, with two separately movable and swingable contact carrying members, means on each of said members for entraining the second member in one direction thus producing in this direction a joint movement of the said contact carrying members, means for moving at least one of the said contact carrying members into a middle position, a contact on each contact carrying member, said contacts being closed upon relative movement of the contact carrying members, operative fingers on each of said door panels, separate means on each of said contact carrying members engageable with said fingers moving said contact carrying members in the direction in which they are moving jointly upon successive engagement of the contact carrying members in a predetermined sequence, while moving them separately and relatively to each other so as to close the contacts upon successive engagement in a sequence deviating from the predetermined sequence, and means for operating an alarm circuit associated with the contacts of the contact carrying members.

5. An alarm system for the permanent supervision of premises with doors, having a frame and two door panels to be opened and closed in succession, comprising a contact device fixedly mounted on said frame, provided with a stationary member and two swingable contact carrying members, one of said members being provided with means for engaging the other for a joint movement spring, means for moving the first member to a middle position, operative fingers on the door panels, means on each of said contact carrying members engageable with the fingers on the door panels, contact means closed upon disengagement of the said first mentioned member from one of said door panel fingers, while the second member remains engaged by the other door panel finger and means for operating an alarm signal associated with said contacts.

6. In an alarm system for the permanent supervision of premises provided with a double door

having a frame and two door panels to be opened and closed in succession, comprising a contact device fixedly arranged between said door panels, said device including two jointly rockable but relatively movable members provided with spaced contacts, closed upon relative movement of said members, means on each of said members to move the second member in one direction, means on each door panel to move one of said contact carrying members and to hold it in its position upon closure of the door panel, said means upon movement of the door panels in a predetermined sequence producing a joint movement of said members with spaced contacts during successive closing and opening of the door panels but producing a separate and relative movement of the contact carrying members upon successive operation of the door panels deviating from the predetermined sequence, and means for operating an alarm circuit connected with said contact.

7. In an alarm system for the guarding of premises with a door having a frame and at least two door panels to be opened and closed in succession, comprising a contact device mounted between said door panels, said device including a fixed support, two separately movable members pivoted to said support, each carrying a contact, one of said movable members being provided with projecting portions adapted to hold, to contact and to move the other member in one direction and to be moved by the same in one direction, a spring member between said two contact carrying members, spacing the contacts and holding the members against each other, a projection on the outer movable end of each of said contact carrying members, an operating finger on each door panel, adapted to engage the projection at the end of one of the contact carrying members, elastic means for holding said members in a middle position and for returning the same into this position when released and means for operating an alarm circuit upon relative movement and closure of the contacts of the two contact carrying members, the operation of the door panels when performed in a predetermined sequence, engaging the projections of the contact carrying members and moving them in a direction in which the said members move each other with spaced contacts, while a movement of the panels deviating from the predetermined sequence produces a relative movement of the contact carrying members towards each other against the action of the spring and a closing of the contacts.

8. In an alarm system as claimed in claim 7, wherein the fixed support is forked at its end, for accommodating the two pivoted contact carrying members alongside of each other, and wherein the elastic means for holding the contact members in a middle position consists of a coiled spring encircling said support and pressing on the end faces of both contact carrying members simultaneously.

EUGENE A. KOHOUT.

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