

June 8, 1937.

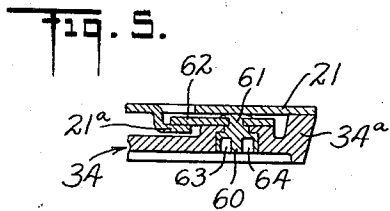
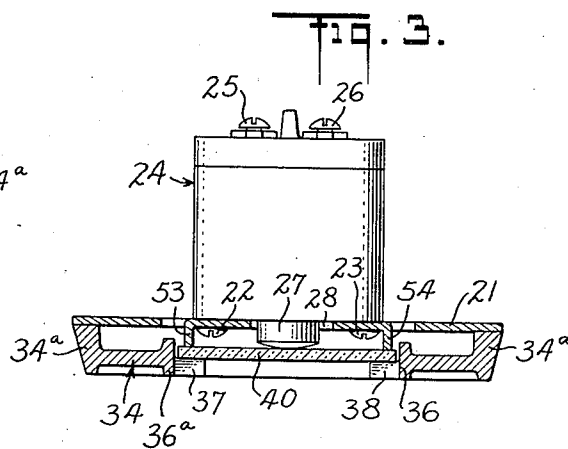
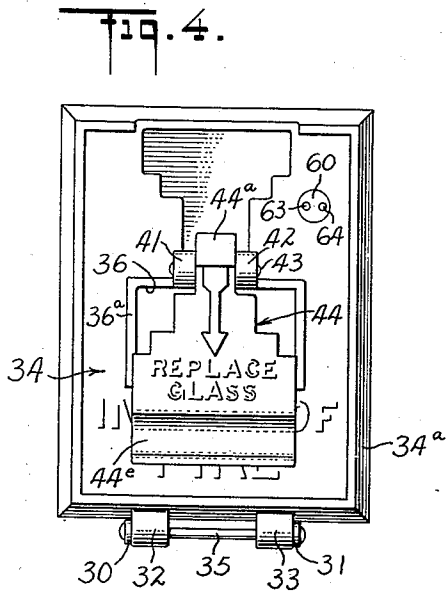
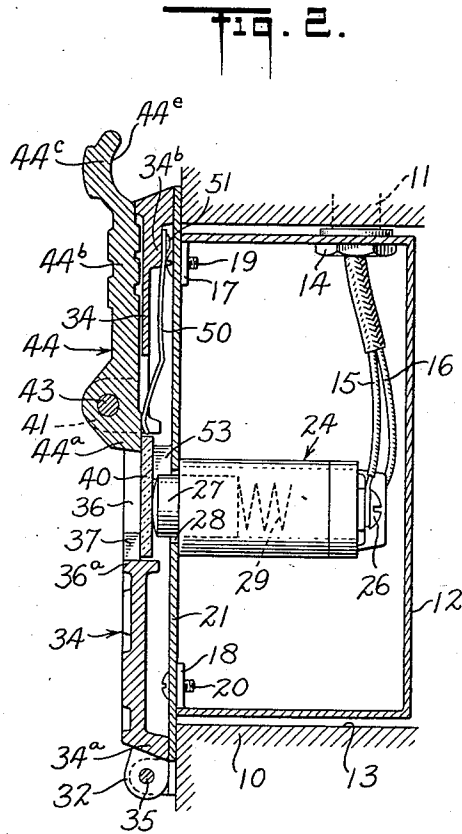
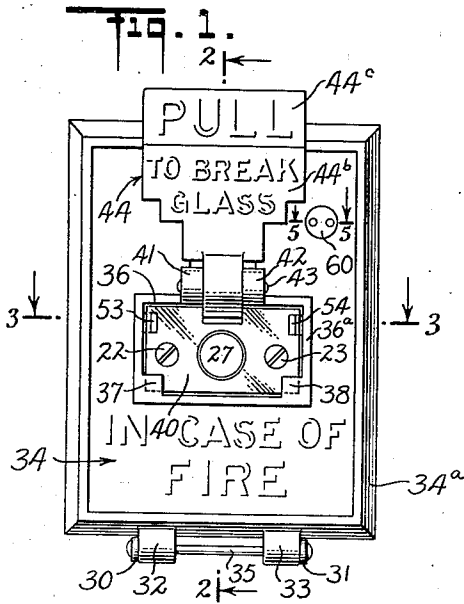
R. S. EDWARDS

2,083,324

ALARM SIGNAL STATION

Filed March 30, 1935

2 Sheets-Sheet 1



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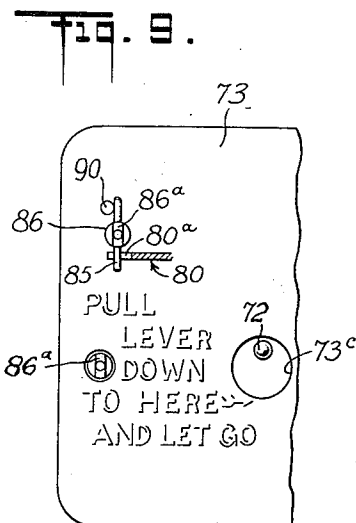
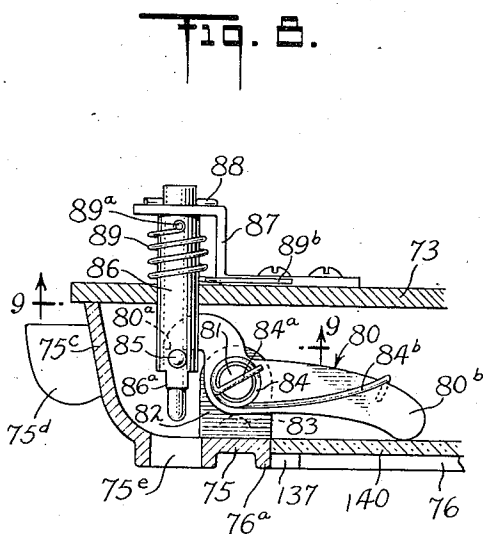
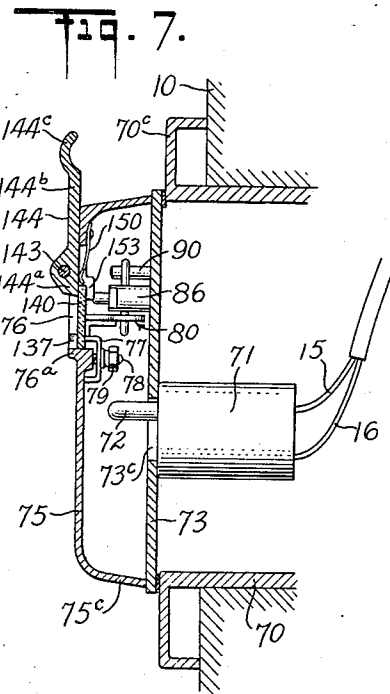
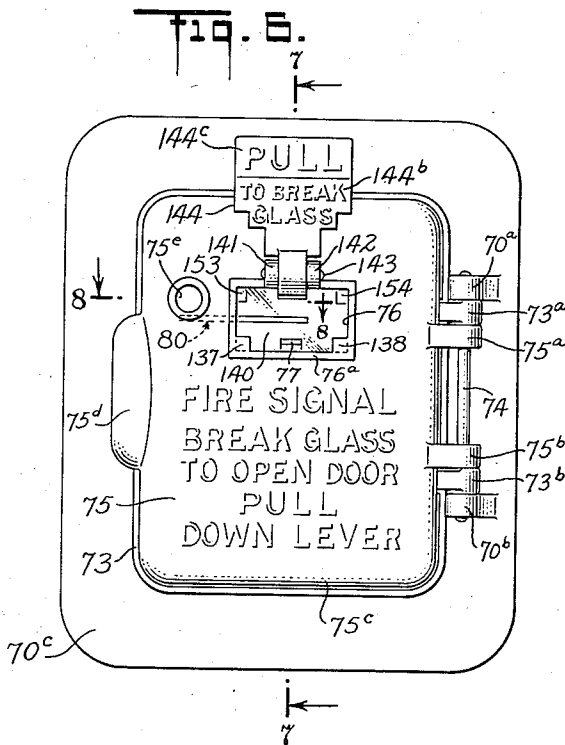
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ALARM SIGNAL STATION

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2 Sheets-Sheet 2



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ALARM SIGNAL STATION

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15 Claims. (Cl. 177—372)

This invention relates to signaling apparatus and more particularly to signal stations such as are employed, for example, in fire or other alarm systems.

One of the objects of this invention is to provide a simple, inexpensive, and practical signal station of the above-mentioned character and capable of ease and speed of assembly and of installation. Another object is to provide an apparatus of the above-mentioned character that will be rugged and compact in construction, dependable in action, and characterized by ease and dependability of manual actuation. Another object is to provide an apparatus of the above-mentioned character in which the actuation thereof may be speedily accomplished by manual movements that are free from awkwardness and thus are quite natural.

Another object of this invention is to provide a signal station of the above-mentioned character in which the actuation of the generally remote signal is accomplished or permitted to be accomplished by the breaking of a piece or sheet of glass and in which the breaking of the glass may be quickly and efficiently achieved and with a minimum of manual effort. Another object is to provide a signal station of the above-mentioned character in which the breaking of the glass may be achieved by mechanism capable of reliable and foolproof actuation, particularly under the usually existing conditions of haste and distress under which particularly fire alarms are actuated and, moreover, by a dependably unitary or self-contained mechanism. Another object is to provide, in apparatus of the above-mentioned character, an inexpensive and mechanically efficient mechanism, capable of being actuated by a natural as distinguished from an awkward manual movement. Another object is to provide an apparatus of the above-mentioned character in which the many disadvantages attendant upon the use of a separate or separable implement, like a hammer, for breaking the glass, may be dependably and reliably avoided. Another object is to provide an apparatus of the above-mentioned character which, while successfully achieving such objects and advantages as have just been noted, may, nevertheless, be quickly and easily incorporated into existing alarm or signal installations. Other objects will be in part obvious or in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts as will be exemplified

in the structure to be hereinafter described and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which are shown several of the various possible embodiments of my invention,

Figure 1 is a front elevation of a signaling or alarm station as it is installed and in readiness for use;

Figure 2 is a central vertical sectional view, on an enlarged scale, as seen along the line 2—2 of Figure 1;

Figure 3 is a horizontal sectional view on a similarly enlarged scale, as seen along the line 3—3 of Figure 1;

Figure 4 is a front elevation like that of Figure 1 but showing the apparatus in the position it assumes after having been manually actuated;

Figure 5 is a fragmentary detailed sectional view on an enlarged scale, as seen along the line 5—5 of Figure 1, showing the details of a key-operated mechanism for holding certain parts in assembled relation;

Figure 6 is a front elevation of a different form or type of signaling or alarm station embodying my invention;

Figure 7 is a vertical sectional view as seen along the line 7—7 of Figure 6;

Figure 8 is a horizontal sectional view on an enlarged scale, as seen along the line 8—8 of Figure 6, and

Figure 9 is a front elevation, certain parts being omitted, as seen along the line 9—9 of Figure 8.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring now again to the drawings and more particularly to Figure 2, there is shown at 10 a wall upon which there is to be mounted the signal or alarm station of my invention; illustratively and to aid in a reader understanding of certain features of my invention, let it be assumed that the wall or support has been selected as the point where the alarm or signal station is to be installed. Illustratively, the circuit of the signaling system, the details of which are well understood in the art and are not shown in the drawings, may be carried in a conduit 11 buried in the wall 10 and in such case I prefer to employ a so-called wall box or outlet box 12, which may be of any suitable and preferably standard construction, set into a suitable recess or hole 13 made in the face of the wall 10 and provided with a knock-out in the wall thereof to or through

which the conduit 11 may be brought and secured as by the nut 14, thus bringing the conductors 15—16 inside of the wall box 12.

The box 12, secured in the recess 13 in the wall 10 in any suitable manner, is provided with spaced supporting members conveniently in the form of ears 17, 18 formed in or secured to the upper and lower end walls respectively, of the box 12 and provided with threaded openings the vertical spacing of which is preferably a so-called "standard" spacing, to receive screws 19—20, respectively, by means of which a sheet metal plate 21 may be secured in place across the otherwise open front end of the box.

The plate 21 is of greater dimension than the box 12 so that it overlaps the latter and also the wall 10 on all four sides of the box 12 itself. The plate 21 has secured to it, as by screws 22—23 (see now Figure 3) a switch mechanism generally indicated at 24, the latter being thereby carried into and supported within the box 12, being provided with binding screws 25—26 (Figures 2 and 3) to which the conductors 15—16 are connected.

The switching mechanism 24 may be of any suitable construction but it preferably has a plunger 27 at its forward or outer end, plunger 27 extending freely through a hole 28 in the supporting plate 21, thereby to project therethrough outwardly of the box. Plunger 27, furthermore, is spring-pressed outwardly as by a spring diagrammatically indicated at 29 in Figure 2, and the stationary contact members within the switch mechanism 24 to which the binding posts 25—26 are connected and the movable contact member or members coacting therewith and carried or actuated by the plunger 27 are so related that, should the plunger 27 move outwardly beyond the position shown in Figures 2 and 3, the circuit of the signaling system and of which the conductors 15—16 form a part is altered and thereby a remotely positioned signaling apparatus visual, audible, or the like, is actuated.

For example, if the alarm system is of the so-called closed-circuit type, movement of the plunger 27 outwardly of the box 12 beyond the position shown in Figure 2 opens the circuit and the resultant open-circuiting thereof is made to actuate the alarm or signal. Of course, the system might be of any other type, such as the open-circuit type, in which case movement of the plunger 27 beyond the position shown in Figure 2 effects a closing of the circuit with resultant actuation of the signal or alarm.

At the lower end of the plate 21 the latter has formed or upstruck therefrom two spaced ears 30—31 (Figure 1) between which are received the ears or lugs 32—33 of a front cover plate 34, these four ears being apertured to form thereby hinge-knuckles and to receive therethrough a pintle or hinge pin 35 whereby the plate 34, of dimensions or expanse substantially similar to those of the plate 21, is hingedly connected to the plate 21, being normally held in upwardly-swung or normal position by means or mechanism later described.

The front cover plate 34 is preferably a casting, being peripherally flanged as at 34^a (Figures 2 and 3) thereby to hold the central or main body portion of the plate 34 slightly spaced forwardly or away from the plate 21, as is better shown in Figures 2 and 3, and substantially centrally positioned and thereby brought into juxtaposition to the plunger 27 is a substantially rectangularly-shaped opening 36, having extending

thereabout inwardly and outwardly directed flanges 36^a (Figures 2 and 3).

In the lower left-hand corner and in the lower right-hand corner of the opening 36 (see Figure 1) are lugs 37 and 38, respectively, but they are of lesser thickness (see Figures 2 and 3) than the flange 36^a that extends about the opening 36. Thereby there are formed two seats, respectively, for the two lower corners of a sheet of glass 40 also rectangular in shape and sufficiently less in dimension to fit loosely into the rectangular hole 36 but in back of the lugs 37—38.

Just above the rectangular aperture 36 (Figure 1) there are formed in the front cover plate 34 two horizontally spaced lugs 41—42 apertured to receive a pin or pintle 43 about which pivots a lever 44 whose short or small arm 44^a, when the lever is in the position shown in Figures 1 and 2, projects over the upper portion of the aperture 36 and centrally thereof, the short arm portion 44^a (Figure 2) having its inside face substantially in alignment with the plane of the inside faces of the lugs 37—38, thereby forming a third outer support for the glass 40. Thus the short arm portion 44^a, acting at the central portion of the upper edge of the glass 40 (Figure 1) and the two lugs 37—38 acting upon the lower left and right-hand corners, respectively, of the glass 40, contact the outer face of the latter and normally prevent removal of the glass 40 out of its frame, a frame formed by the aperture-flange 36^a, and thus at these three points or by these three parts the reaction of the spring 29 (Figure 2) upon the plunger 27 and through the latter upon the sheet of glass 40 is taken up and the plunger 27 prevented from moving outwardly beyond the position shown in Figure 2.

The lever 44, whose long arm 44^b extends vertically and upwardly along the front face of the front plate 34 (see Figure 2) is, moreover, normally held in this position, a position in which it aids, as above noted, in holding the glass 40 and hence the plunger 27 of the switch mechanism 24 in proper positions, by a leaf spring 50 (see Figure 2) which is secured to a projection or lug 34^b upon the inside face of the front plate 34, as by a screw 51. Spring 50, shaped substantially as shown in Figure 2, extends downwardly into contact with the inside flat face of the short arm portion 44^a, being an upward extension of the same flat face that engages the outer face of the sheet of glass 40; moreover, the engagement of spring 50 with this portion of the lever 44 is, as is clear from Figure 2, below the axis of the shaft or stud 43 about which the lever 44 may swing, and thus the action of the spring 50 is to yieldingly hold the lever 40 with its long arm portion 44^b flush against the front face of the front plate 34.

The spring 50, moreover, is strong enough to hold the lever 44 flush against the front face of the front plate 34 even though the latter is swung in counter-clockwise direction, as viewed in Figure 2, about the axis of the hinge pin 35, and thereby the inner flat face of the short arm portion 44^a of the lever 44 is held in proper alignment with the coacting glass-supporting lugs 37—38. Accordingly, when glass 40 is put in place or is replaced and front plate 34 swung in counter-clockwise direction, as viewed in Figure 2, throughout say 90°, the parts 44^b, 37 and 38 are in proper alignment to have the glass 40 rested against them as it is placed within the frame-like aperture-flange 36^a (see Figure 3), spring 50 thus insuring that lever 44 does not

interfere with the proper replacement of glass 40 in its aperture 36.

With glass 40 thus inserted, front plate 34 may now be swung in clockwise direction back to its normal vertical position in which it covers over the main supporting plate 21, glass 40 pushing the plunger 27 back to its normal position earlier above-mentioned. At the same time, however, the upper portion of the glass 40 has been brought into juxtaposition to two lugs 53 and 54 (Figures 1 and 3), one lug 53 being closely adjacent to the left-hand edge of the glass 40 and lug 54 being closely adjacent the right-hand edge of the glass 40. Moreover, lugs 53—54 are positioned, as is better shown in Figure 1, in substantial alinement with the short arm portion 44^a of the lever 44.

Lugs 53—54 are carried by the main supporting plate 21 and conveniently and preferably they are struck up out of the plate 21, as is better shown in Figure 3. They are dimensioned so as to leave adequate space between the plane of their outermost edges or faces and the plane of the inner faces of the parts 44^a, 37 and 38 to freely or snugly accommodate therebetween the thickness of the glass sheet 40.

The front plate member 34, with the glass member 40 related to it as above described and to the plunger 27, is held in closing position, the position shown in Figures 1, 2 and 3, by means that is preferably key-controlled or key-operated so that an authorized person provided with a key may swing the front plate 34 open for testing the signal circuit, for replacing the broken glass 40, or for other legitimate purposes. This key-operated mechanism may comprise a small plug 60 (Figures 1 and 5) rotatably mounted preferably in an upper portion of the front plate or cover 34 and provided with a rearwardly directed square shank 61 (Figure 5) which carries and to which is secured a cam-like bolt member 62 adapted to coact with and, when rotated to a proper position, to take in back of a lug or keeper 21^a secured to but preferably struck up from or out of the sheet metal of the main supporting plate 21, all as is better shown in Figure 5.

The front face of the rotatable plug 60 may be and preferably is substantially flush with the front face of the front cover plate 34 and it may be provided with two diametrically opposed apertures 63 and 64 to receive two prongs of a key by which, therefore, the plug 60 and the bolt member 62 may be rotated to lock the front cover and related parts into the position shown in Figure 2, or to unlock the front cover 34 from the plate 21 to permit the front plate 34 to be swung away from the plate 21 for purposes already mentioned above.

Now the long arm portion 44^b of the lever 44 (see Figures 1 and 2) will be seen to be of progressively greater expanse, terminating in a wide finger piece portion 44^c whose inside face 44^e (see Figure 2) is concaved, having a curvature into which the gripping ends of two, three or four of the fingers of the hand conveniently fit, the finger piece portion 44^c being sufficiently spaced away from the front face of the wall 19 (see Figure 2) by the structural features above described as well as by the curvature and shape of the long arm portion 44^b of the lever itself.

The relatively broad expanse of the long arm lever portion 44^b as well as the front part of the finger piece portion 44^c thereof, is large enough to bear suitably large words or legends of instruction,

illustratively, the words "Pull to break glass" substantially as is shown in Figure 1. Where the mechanism is intended to function as a fire alarm station, the lower portion of the front plate 34 may bear appropriate indicia or legends, such as "In case of fire". In any case, when it is desired to actuate the alarm or the remote signal, and it is particularly to be noted that in the case of a fire alarm there is always haste, excitement, and frequently mental confusion and panic, the operator simply, and with a perfectly normal movement of the hand, grasps the finger piece 44^c, simply putting the ends of the fingers in back of the finger piece and fitting them into the concavity 44^e, and then, with what is again a perfectly natural movement, pulls the lever 44 toward him. Because of the arrangement of the parts, the effort or exertion necessary to do this is very small, thus insuring certainty of actuation of the plunger 27 under the urge of the spring 29 and thus insuring the actuation of the remote signal.

This because of certain unique coactions and interrelations of the parts. To begin with, the lever arm 44^a, which acts directly upon the glass sheet 40, is very short in comparison to the relatively very long lever arm 44^b through which the manual force or exertion is brought into play. Thereby a very substantial multiplication of force is achieved and thereby a relatively small manual effort suffices to exert a relatively very great force or effort through or by the short arm 44^a of the lever. The latter, however, acts upon the glass 40 at a point midway between the two laterally spaced supports or lugs 53—54. Hence, this relatively large force, acting upon the glass at a point where there is no support immediately to the rear, is effective quickly to exert a bending and hence fracture or breaking of the glass.

The glass is thus virtually shattered and more particularly the mechanism makes certain that the glass breaks or shatters in the region, illustratively its central region, where the glass theretofore had been acting to hold the signal actuating part or plunger 27 against movement. Thus a positive and certain removal of the obstructing sheet of glass 40 is achieved and the path of movement of the plunger 27 easily and quickly cleared so that the plunger may freely move outwardly or to the left, as viewed in Figure 2.

Accordingly, the alarm or signal is effectively and quickly sounded or set into action.

The continued downward sweep or swing of the lever 44, effecting fracture of the glass member 40, as above described, brings it now into the position shown in Figure 4 from which it will be seen that it now again occupies a position flush or flat against the front cover plate 34 but with the outside face thereof, which as above noted, preferably bears a legend like "Pull to break glass", now facing toward the cover plate 34 and hence that legend is now obscured or hidden from view, but at the same time what is the rear face of the portion 44^b of the lever 44, as viewed in Figures 1 and 2, now becomes exposed (see Figure 4). That face preferably bears a legend such as "Replace glass". Thereby the actuation of the mechanism as above described is made also to visually signal or signify the condition of the mechanism and, by the last-mentioned legend, theretofore obscured as in Figures 1 and 2, is made also to designate literally what has to be done to restore the mechanism to its initial or normal condition. Furthermore, and as appears better in Figure 4, the

downward position of the lever member 44, a position angularly spaced from its normal position by about 180°, substantially closes over or covers the rectangular aperture or opening 36 in the front cover plate and more particularly obscures and thus virtually removes from the temptation of individuals having inclinations toward pranks or tampering, the actuated plunger 27.

As the lever 44 is swung in counter-clockwise direction, as viewed in Figure 2 and as above described, to break the glass 40, the earlier portions of this downward swing take place against the action of the spring 50 whose lower end is cammed or bowed inwardly to let the glass-engaging end of the short lever arm by-pass the spring and to become ultimately exposed forwardly and upwardly as shown at 44^a in Figure 4. By that angular change in the lever member 44 by about 180°, that portion of the lever 44 that appears to the left of the pivoting stud 43 is disposed to the right of the stud 43 and that outer surface thereof that is to the lower left of the stud 43, as now seen in Figure 2, becomes substantially aligned with the intermediate inclined portion of the spring 50. Moreover, these parts are so shaped, all as clearly shown in Figure 2, that, with the lever 44 in its downward position (that of Figure 4) no portion of the lever 44 is available to serve as an abutment that is aligned with the lugs 37 and 38, and accordingly an attempt now made to put in a glass 40 is met with an outward tilting of the replacement glass since its upper outer edge is devoid of a supporting abutment that is aligned with the lower outer lugs 37, 38. This preferred construction, action and arrangement are for a purpose about to be set forth.

The restoration of the mechanism to normal condition may now be proceeded with substantially in the manner already indicated or described above. The authorized person thereupon utilizes a suitable key to rotate the key plug 60 to disengage the rotary bolt or cam member 62 from the keeper 21^a (Figure 5) whereupon the outer cover plate 34 may be swung in counter-clockwise direction as viewed in Figure 2, about the hinge pin 35, thereby making the inner face of the member 34 accessible for the replacement of the glass member 40. A new glass piece may now be inserted but it is to be noted that the construction is such that the lever member 44 must first be returned to its normal position, as shown in Figures 1 and 2, spring 50 being effective to hold it in such normal position as above described; this because the right-hand vertical face of the short arm portion 44^a (Figure 2) of the lever member 44 is preferably made to constitute one of the supports for the glass member 40 and accordingly a new glass member cannot be put into position unless this face of the lever member 44 is first properly positioned, and to do that requires the restoration of the member 44 to its normal position relative to the cover member 34.

When the lever member 44 is so restored to the position shown in Figure 2 the right-hand vertical face of the short lever arm 44^a again becomes aligned, as shown in Figure 2, with the two lower lugs 37, 38, and these three parts may thus serve to receive thereon the replacement glass member 40, it being noted that, during this operation, the cover member, swung in counter-clockwise direction about the axis pin 35 and away from the plate 21, is preferably held in a position approximating the horizontal.

The glass having been replaced, the cover member 34 is swung back and during this operation the

replaced glass 40 is carried against the spring pressed plunger 27, the latter being pushed inwardly thereby, and the upper right- and left-hand portions of the glass 40 (see Figures 1 and 2) become snugly juxtaposed to the laterally spaced lugs 53, 54. Thereupon the lock mechanism 60—62 is again actuated to hold the member 34 in closing position. The rear face of the portion 44^b of the lever 44 and which face bears the legend "Replace glass" now becomes obscured and held from view while the theretofore obscured legend, such as "Pull to break glass" on the front face of the lever portion 44^b is now again exposed to view.

In Figures 6-9 I have shown, as illustrative of other embodiments of certain features of my invention, a signal or alarm station of a somewhat different type; this station comprises a box 70 which may be set into a suitable recess in the wall 10 (Figure 7), the box 70 having mounted therein or related to it a suitable signal-control mechanism generally indicated at 71 and, where it is electrical, connected as by the conductors 15-16 to the desired or appropriate circuit. The mechanism 71 may be of any desired or suitable form and it has projecting outwardly of the box 70 (to the left in Figure 7) a device, illustratively and usually a lever 72 whose manual actuation is necessary before the signal is brought into actuation.

The box 70 is preferably closed by an inner door 73 (Figures 6 and 7) hinged to the hinge pin or pintle 74 by its hinge knuckles 73^a and 73^b, hinge pin 74 being supported by ears or hinge knuckles 70^a and 70^b formed on the front flange 70^c of the box 70.

The inner door 73 is held in closed position by any suitable means, preferably a key-controlled or other suitable lock mechanism (not shown) and the door 73 has a suitable opening 73^c (Figures 7 and 9) through which the lever 72 projects so that it may be manually operated without having to open the inner door 73. The inner door 73 may have on its front face a suitable legend of instructions, such as the legend as shown in Figure 9, dealing with how to operate the lever 72.

Access, however, to the lever 72 is barred by an outer cover plate or closure 75, hereinafter called the "outer door" which is hollow-like so as to enclose between its outer wall, its peripheral flange 75^c, and the inner door 73, a suitable space for accommodating the lever 72 and certain other mechanisms about to be described. The two doors 73 and 75 will be seen to be of substantially the same expanse when viewed in plan, as in Figure 6. The outer door 73 is provided with ears or hinge knuckles 75^a and 75^b (Figure 6) through which the hinge pin 74 passes whereby, when the outer door 75 is conditioned as later described to permit of its swinging on its hinge, it may be swung open and away from the inner door 73 and thereby expose the actuating lever 72. Preferably the outer door 75 is provided with a handle-like projection 75^d (Figures 7 and 8) to facilitate this opening movement of the door manually.

Appropriately positioned in the wall of the door 75, the latter conveniently being a casting, is a rectangularly shaped opening 76 (Figures 6 and 7), like the opening 36 of Figures 1, 2 and 3, having extending thereabout a flange 76^a which projects inwardly and outwardly (Figure 8), and just above the opening 76 the front door 75 is provided with horizontally spaced lugs 141 and 142 to receive a pin or pintle 143 about which pivots a lever 144 of a configuration and char-

acteristics exactly like the lever 44 of Figures 1-3 and already above described in detail in connection with those figures, the inner face of the door (Figure 7) having mounted thereon a flat spring 150 constructed and mounted as is the spring 50 of Figure 2 for engagement with the short arm portion 144^a of the lever and to coact therewith as was already described above in connection with the construction of Figures 1-3.

The opening 76 is closed by a piece of glass 140, like the glass 40 earlier described. And to hold the glass 140 in place (Figures 6 and 7) against outward movement (to the left as viewed in Figure 7) the inner vertical face of the lever arm 144^a engages the glass 140 substantially centrally of its upper portion (Fig. 7) and has coacting therewith two lugs 137 and 138 integrally formed with the flange 76^a and engaging the glass 140 at its lower left and right-hand corners.

To hold the glass against movement inwardly (to the right as viewed in Figure 7) I provide two lugs 153 and 154 (Figures 6 and 7) integrally formed with the flange 76^a but spaced rearwardly sufficiently so that the thickness of the glass 140 may be accommodated between them and the lever end 144^a.

The glass 140 is inserted or replaced after opening the door 75 and hence it is inserted from the inside of the door, the upper portion of the glass 140 being inserted between lever arm 144^a and the lugs 153-154, the lower end of the glass 140 taking against the lugs 137-138; to prevent this lower end of the glass 140 from moving inwardly of the door, I then swing into position a U-shaped clamp 77 (Figure 7), clamp 77 being pivoted on a stud 78 carried on the inside face of the door 75 and having its free end threaded to receive a nut 79 which, upon being tightened up, causes the lower end of the glass 140 to be clamped between the clamp member 77 and the lugs 137-138.

Mounted upon the inside face of the door 75 and positioned to coact with the glass 140 and also with the box or the inside door 73 is a spring latch 80 (Figure 8), having a latch portion 80^a and a controlling lever portion 80^b; latch 80 is mounted to pivot about a vertical axis which is provided by a stud or pin 81 that is carried by an L-shaped bracket 82 secured to the inside face of the door 75 as by screws or rivets 83 and the stud 81 is so positioned relative to the opening 76 and the controlling arm or lever 80^b of the latch 80 is so dimensioned that the free end of portion 80^b engages the glass 140 substantially centrally of the latter and of course at its rear face. Furthermore, a coiled spring 84 having one end 84^a anchored to the stud 81 and having its other end 84^b in engagement with the arm portion 80^b (Figure 8) acts yieldably to hold the latch 80 in a position such that the lever arm 80^b thereof is held in engagement with the glass 140, the latter thereby acting to limit the action of the spring 84 and thus acting as a stop to limit the movement of the latch 80.

The latch portion 80^a (Figure 8), being substantially hook-shaped, is positioned to be engaged by a yieldably mounted keeper bar 85 (Figure 9), keeper bar 85 being rigidly carried by a shaft 86 rotatably carried by the inner door 73. More specifically the shaft 86 (Figure 8) passes through a hole in the door 73, the walls of the hole forming one bearing therefor, whence its inner end, being stepped as shown in Figure 8, is rotatably received through a suitable hole,

forming the other bearing therefor, in a bracket 87 secured to the inside face of the door 73. The shoulder of the stepped shaft 86 bears against one face of the bracket 87 and a cotter pin or the like 88 secured to the end of the shaft 86 bears against the other face of the bracket 87 and thus holds the shaft and hence the keeper bar 85 against movement in an axial direction.

A coiled spring 89 (Figure 8) has one end 89^a thereof anchored to the shaft 86 and has its other end 89^b extending into engagement with the bracket 87; this spring is tensioned so that it tends to rotate the shaft 86 and hence the keeper bar 85 in counter-clockwise direction, as viewed in Figure 9, and hence it acts yieldingly to hold the parts 85-86 in the position shown in Figures 8 and 9 against a stud or pin 90 mounted upon the outer face of the door 73 and being of sufficient length to be in the path of swinging movement of the upper end of the keeper bar 85, as viewed in Figure 9.

Now the shaft 86 and the keeper bar 85 are so positioned relative to the latch portion 80^a of the latch member 80 (Figure 8) that, as the outer door 75 is swung to closed position up against the inner door 73, the lower end (Figure 9) of the latch bar or keeper bar 85 is in the path of movement of the latch portion 80^a of the member 80; but due to the curved inner face of the hook-shaped latch portion 80^a, acting as a cam when it engages the latch bar 85, causes the latter and the shaft 85 to be rotated in clockwise direction (Figure 9) against the action of the spring 89 and when the door 75 completes its closing movement relative to the inner door 73, the latch bar 85 rides off the curved face or edge of the latch portion 80^a and under the urge of the spring 89 snaps into engagement with the latch portion 80^a substantially as shown in Figures 8 and 9.

Accordingly, the outer door 75 is now securely locked in closed position; the door cannot be opened so long as the interengagement of the parts 80 and 85 remains as just described. But it is to be noted that the glass 140 (Figure 8) is instrumental in fixing the position of one of these two parts, namely, the part 80, while in turn (see now Figure 7) the short arm portion 144^a of the lever 144 is instrumental in fixing the position of the glass 140. Where, therefore, the spring 84 (Figure 8) acts upon the latch member 80 as above described, and preferably this spring is relatively powerful, as will later appear, the reaction of this spring 84 is taken up by the lever 144 (Figure 7) and spring 84 thus also acts to hold the lever 144 in its uppermost position with its long arm portion 144^b against the wall of door 75.

The door 75 preferably bears appropriate legends or instructions indicative of how to operate the signal station; for example, it may have prominently displayed thereon, as indicated in Figure 6, a legend reading, for example, "Fire signal—Break glass to open door—Pull down lever". But the lever 144, when in its normal position, prominently displays the legend or instruction, for example, "Pull to break glass". Accordingly, when the signal station is to be used, the broad curved expanse 144^c of the long lever arm portion 144^b, forming a finger piece or hand grip portion therefor, the operator simply grasps the finger portion 144^c by putting the ends of the fingers in back thereof and with an entirely natural movement he pulls the lever 144 toward him. Again, due to features above de-

scribed in connection with Figures 1-3, a multiplication of force is achieved whereby a small manual effort is made effective reliably and dependably to break the glass 140, the short arm 5 portion 144^a applying this multiplied force to the glass 140 at a point substantially intermediate of the widely laterally spaced supports 153-154 (Figure 6) which hold the glass 140 against inward movement.

10 The glass 140 is thus virtually shattered and, as with the arrangement of Figures 1-3, the broken pieces quickly fall out of the way; thereby the relatively powerful spring 84 (Figure 8) swings the latch member 80 in clockwise direction, its lever end 80^b, due to the shattering and removal of the glass 140, being now freed for further movement under the action of the spring 84; accordingly, a sufficient clockwise movement of member 80 takes place to swing the latch end 20 80^a thereof out of engagement with the latch bar or keeper bar 85, whereupon the outer door 75 may be freely opened, and the lever 72 or like mechanism exposed through the inner door 73 may be manually operated to actuate the signal mechanism 71. Preferably, the flange 76^a (Figure 8) acts as a stop to limit undue clockwise movement of the member 80 when the glass 140 is broken out of the aperture.

The lever member 144 now assumes a position 30 relative to the opening 76 and the door 75 like that shown in Figure 4 with respect to the lever 44; like the latter it also bears a legend (not shown) which can read, for example "Replace glass". Replacement of the broken glass may 35 now be proceeded with, the new piece of glass being inserted from the inside of the open door 75 in a manner already above described.

Authorized access to the interior of the mechanism may, however, be gained without having 40 to break the glass 140, and this is preferably achieved by providing a keyhole 75^c (Figures 6 and 8) in the outer door 75 but in line with the axis of the shaft 86 whose outermost end is squared off as at 86^a (Figure 9) so that it may 45 be engaged by a suitably shaped key inserted through the keyhole and by the key rotated in clockwise direction (Figure 9) to move the latch bar 85 out of engagement with the latch end 80^a of the latch member 80.

50 In either of the illustrative embodiments of my invention above described, it will be seen that dependable breakage of the glass or other suitable or appropriate fragile member upon which the lever and force-multiplying mechanism operate, is achieved and, moreover, by simple and foolproof means capable furthermore of actuation by a quite natural manual movement. These 55 features and the simplicity of arrangement and operation insure that the signal-controlling means and the signal itself are actuated with certainty and free from confusion or the like.

Furthermore, in accordance with certain other features of my invention, I make certain that replacement of the broken part, such as the glass 65 40 of Figures 1-4 or the glass 140 of Figures 6-7, is made to take place in such a manner that the restoration of the hand-lever and its glass-breaking part to normal operating position, as shown in Figures 1-2 and Figures 6-7, is safely and dependably assured. For example, the left-hand 70 face or edge of the short arm lever portion 44^a of Figure 2 or 142^a of Figure 7 has such a configuration that, when the lever 44 or 144 is in its operated or lowermost position (as in Figure 4), this left-hand face or edge, now facing to the

right or inwardly, forms an obstruction to the proper fitting into the aperture of a new or replacement piece of glass. Thereby I make certain that, before the replacement glass piece can be fitted into the aperture in the front cover or door, the operating lever must first be swung back to its normal or uppermost position, thereby to remove this obstruction and thereby to permit the insertion of a new or replacement part. In this connection, I may and preferably do also so shape 10 the short lever arm, particularly where, as in the preferred embodiments, I utilize a face or edge of the short lever arm to function directly in holding the breakable part in place, so that it functions to aid in holding the glass part in the aperture 15 only when or after it is swung into its uppermost or normal position. Thus, I dependably eliminate faulty or improper restoration of the apparatus to its normal condition.

It will thus be seen that there has been provided in this invention an apparatus and construction in which the various objects hereinabove noted together with many thoroughly practical advantages are successfully achieved. The apparatus will be seen to be of a thoroughly practical character, compact, self-contained, and has no parts, such as a hammer or the like, heretofore employed, to become lost or separated from the mechanism. Moreover, the apparatus is simple and convenient to operate and makes for great certainty and reliability of operation. Furthermore, it will be seen that the apparatus is exceedingly well adapted to meet the peculiar conditions of practical use, particularly where the mechanism is employed in fire alarm systems. 35

As many possible embodiments may be made of the above invention and as many changes might be made in the embodiment above set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings, is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. In signaling apparatus, in combination, a wall member having an aperture therein, an easily breakable part adapted to substantially close said aperture, means related to the latter for holding said part in aperture-closing position and including three members spaced apart, two of said members holding said part by engagement therewith on one face thereof and the third holding said part by engaging said part on the other face thereof, means mounting one of said members to be capable of movement in a direction relative to the remaining two members to effect breakage of said part, means operating to hold said one movable member against movement out of holding relation to said breakable part, and means for manually effecting movement of said movable member in said first-mentioned direction. 60

2. In signaling apparatus, in combination, a wall member having an aperture therein, an easily breakable part adapted to substantially close said aperture, means related to the latter for holding said part in aperture-closing position and including three members spaced apart, two of said members engaging said part on one face thereof and the third engaging said part on the other face thereof, a lever pivotally supported by said wall member and having a long arm provided with means whereby it may be manually grasped and operated and having a short arm whose end portion comprises one of said three members and which short arm, upon operation of said lever, thereby effects breakage of said breakable part 75

and is moved out of part-holding relationship with respect to the remaining of said three members, whereby, to replace said breakable part, said lever must first be given a reverse actuation to restore said part-holding relationship with respect to a replacement breakable part.

3. In signaling apparatus, in combination, a wall member having an aperture therein, an easily breakable part adapted to substantially close said aperture, means related to the latter for holding said part in aperture-closing position and including three members spaced apart, two of said members engaging said part on one face thereof and the third engaging said part on the other face thereof, force-multiplying means for manually moving one of said members in a direction to effect breakage of said breakable part, and means preventing movement of said one movable member out of part-holding relationship to the others excepting by said force-multiplying means.

4. In signaling apparatus, in combination, a wall member having an aperture therein, an easily breakable part adapted to substantially close said aperture, a manually movable member having two portions, means movably supporting said member with respect to said wall member in such a position that one of said portions is juxtaposed to said breakable part and the other of said portions is juxtaposed to said wall member and is by the latter blocked against movement toward said wall member, whereby said one portion is held against movement out of juxtaposition to said breakable part but is movable in a direction toward said breakable part, and means holding said breakable part in said aperture and against the force exerted thereon by said one portion when said other portion is moved in a direction away from said wall member.

5. In signaling apparatus, in combination, a wall member having an aperture therein, an easily breakable part adapted to substantially close said aperture, a manually movable member having two portions, means movably supporting said member with respect to said wall member in such a position that one of said portions is juxtaposed to said breakable part and the other of said portions is juxtaposed to said wall member and is by the latter blocked against movement toward said wall member and in such manner that movement of said other portion away from said wall member moves said first portion in a direction to break said breakable part, a device engaging said breakable part on the side thereof remote from said one portion of said manually actuatable member, and spring means pressing said device against said breakable part and the latter against said one portion and thereby holding said other portion against said wall member, whereby said one portion breaks said breakable part when said other portion is moved away from said wall member and thereby frees said spring-pressed device for movement into said aperture.

6. In signaling apparatus, in combination, a wall having an aperture therein, two movable members, means movably supporting one of said members on one side of said wall member and in juxtaposition to said aperture, means pivotally supporting the other of said movable members on the other side of said wall member, said other member having one portion normally juxtaposed to said aperture and a handle portion for manually effecting movement of said member, stop means coacting between said wall and said other movable member to hold it against movement by said handle portion in such a direction as

would carry said one portion out of juxtaposition to said aperture and to permit movement by said handle portion only in a direction to move said one portion into said aperture, and an easily breakable part mounted in said aperture and interposed between said one portion of said one movable member and said other movable member and in the respective paths of movement thereof.

7. In signaling apparatus, in combination, an enclosure having an opening therein, a lever having a long lever arm and a short lever arm, means pivotally mounting said lever to said enclosure so that said long lever arm is exposed exteriorly of said enclosure and said short lever arm is normally exposed to said opening and to swing about an axis such that manual actuation of said long lever arm effects movement of said short lever arm transversely of the plane of said opening, an easily breakable part positioned in said opening with its outer face against said short lever arm, a member movably mounted within said enclosure and having a path of movement transversely of and through the plane of said opening, spring means tending to move said member along said path and against the inner face of said breakable part and thereby holding the latter against said short lever arm, and abutment means holding said breakable part against movement in response to actuation of said lever in a direction to move said short lever arm from its normal position and inwardly of said opening, whereby actuation of said lever in the said direction effects breaking of said breakable part and said member is thereby freed to partake of movement along said path.

8. A construction as claimed in claim 7 in which there is provided yieldable means for yieldably holding said lever, after breakage of said breakable part and after a reversed manual actuation of said lever, in a position to present and hold said short lever arm exposed to said opening and thereby for the proper reception of a replacement breakable part with respect to said opening, said abutment means and said short lever arm.

9. In signaling apparatus, in combination, an enclosure having a front wall that is substantially flat and has an opening therein whose upper edge is spaced downwardly from the upper edge of said wall, a lever having a relatively short lever arm and a relatively long and wide lever arm, means pivoting said lever intermediate of its said lever arms and externally of said wall with its short lever arm overhanging said opening and with its long and wide lever arm resting flatwise against the portion of said wall above said opening, whereby the latter wall portion permits movement of said lever only in a direction to carry said long lever arm away from said wall portion and to move said short lever arm inwardly of said opening, a relatively easily breakable part shaped to close said opening, a spring pressed member movably mounted to the rear of said wall and engaging said breakable part and urging the latter in a direction outwardly of said opening and hence against said overhanging short lever arm and thereby holding said pivoted lever with its wide lever arm resting flatwise against said wall portion, and means related to said opening and operating, when said lever is swung to move its long lever arm away from said wall portion, to cause the resultant inward movement of said short lever arm to break said breakable part and thereby free said spring pressed member for movement.

10. A construction as claimed in claim 7 in

which said short lever arm has those portions thereof that are presented to said opening after the conclusion of the part-breaking action thereof so shaped as to be ineffectual to have a replacement breakable part rested thereagainst, thereby to necessitate a reverse actuation of said lever to its initial position before a replacement breakable part can be related to said opening.

11. A construction as claimed in claim 7 in which said short lever arm has those portions thereof that are presented to said opening after the conclusion of the part-breaking action thereof so shaped as to be ineffectual to have a replacement breakable part rested thereagainst, thereby to necessitate a reverse actuation of said lever to its initial position before a replacement breakable part can be related to said opening, and means acting upon said lever with sufficient force to hold it in its said initial position when returned thereto but with insufficient force to prevent manual actuation of said lever out of said initial position for a subsequent part-breaking actuation.

12. A construction as claimed in claim 9 in which the face of said long lever arm that is normally toward said wall bears an inverted legend like "Replace glass" which is exposed and turned right side up when said lever is swung to break said breakable part.

13. A construction as claimed in claim 9 in which said front wall is cut away adjacent the edge of said opening to accommodate said short lever arm as said lever continues to swing about its pivot in part-breaking direction, and a spring mounted to the rear of said front wall and acting through said cut away portion of the latter upon said lever to hold the latter, upon a return swinging of the latter to bring the long and wide lever arm thereof against said front wall portion, in

its returned position, and to hold said short lever arm in overhanging relation to said opening for the reception thereagainst of a replacement breakable part.

14. In signaling apparatus, in combination, a cover for a signal or alarm box, said cover having an opening therein, a relatively easily breakable member shaped to close said opening, means for holding said breakable member in opening-closing position, said means including a movable part, means movably mounting said movable part on said cover so that it may partake of movement in a direction to break said breakable member, means holding said movable part against movement in a direction out of holding relationship with respect to said breakable member, and manually actuatable force-multiplying means operative upon said movable part to move it in a direction to effect breakage of said breakable part.

15. In signaling apparatus, in combination, a cover for a signal or alarm box, said cover having an opening therein, a relatively easily breakable part for closing said opening, said opening having adjacent thereto means for engaging said part at at least two relatively widely spaced points, a lever having two effective lever arms, one of which is shaped to be engaged by the hand for swinging said lever, and means pivoting said lever to said cover at a point intermediate of said two lever arms and in such a position that the other lever arm of said lever, when the latter is manually swung, engages said breakable part intermediate of said two spaced points but on the other face of said breakable part and moves transversely of a line joining said two spaced points and thereby effects breakage of said breakable part.

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