

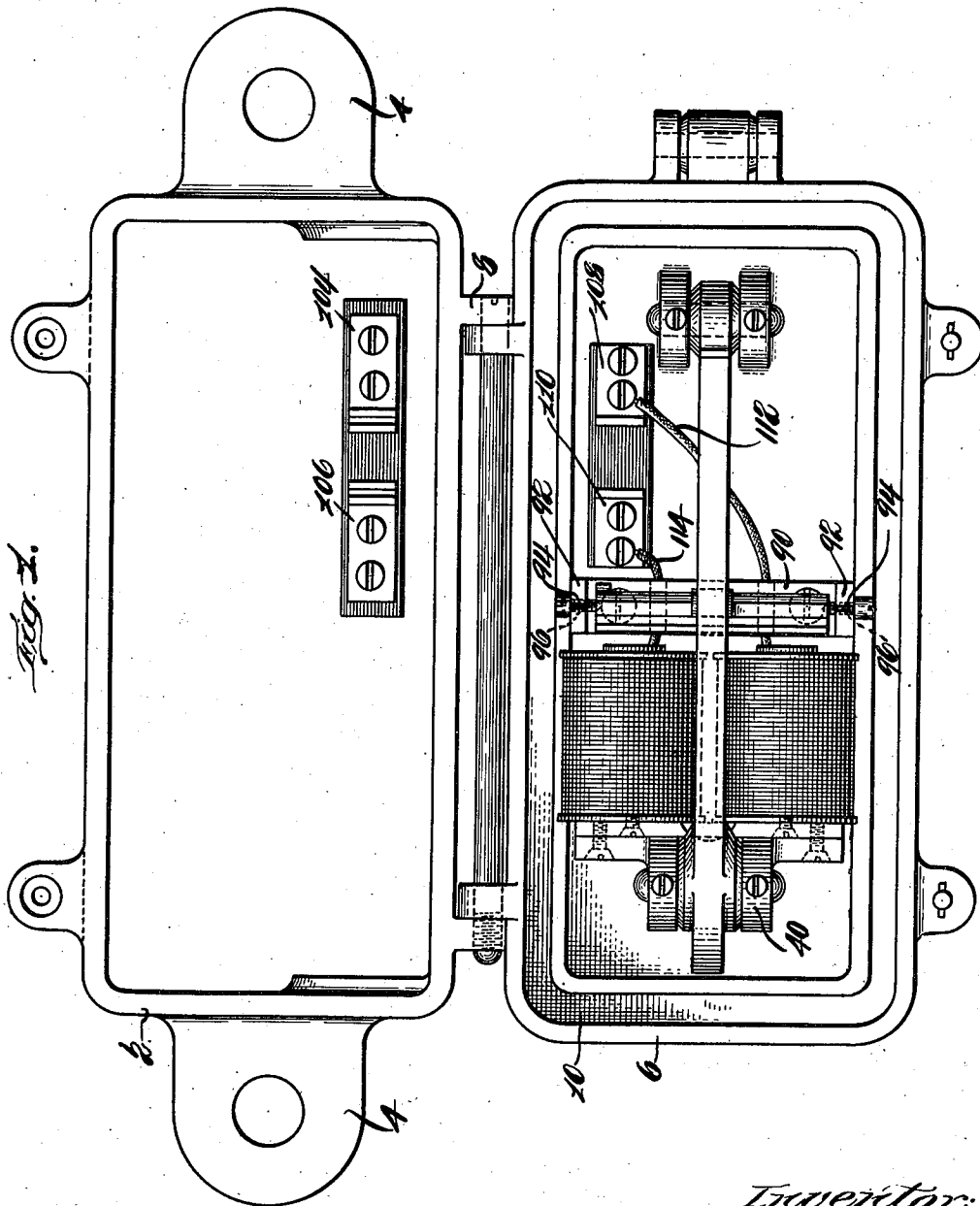
J. H. DERBY.
RELEASE BOX.

APPLICATION FILED MAR. 14, 1916.

1,187,135.

Patented June 13, 1916.

2 SHEETS—SHEET 1.



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Chas. Clark

Inventor:
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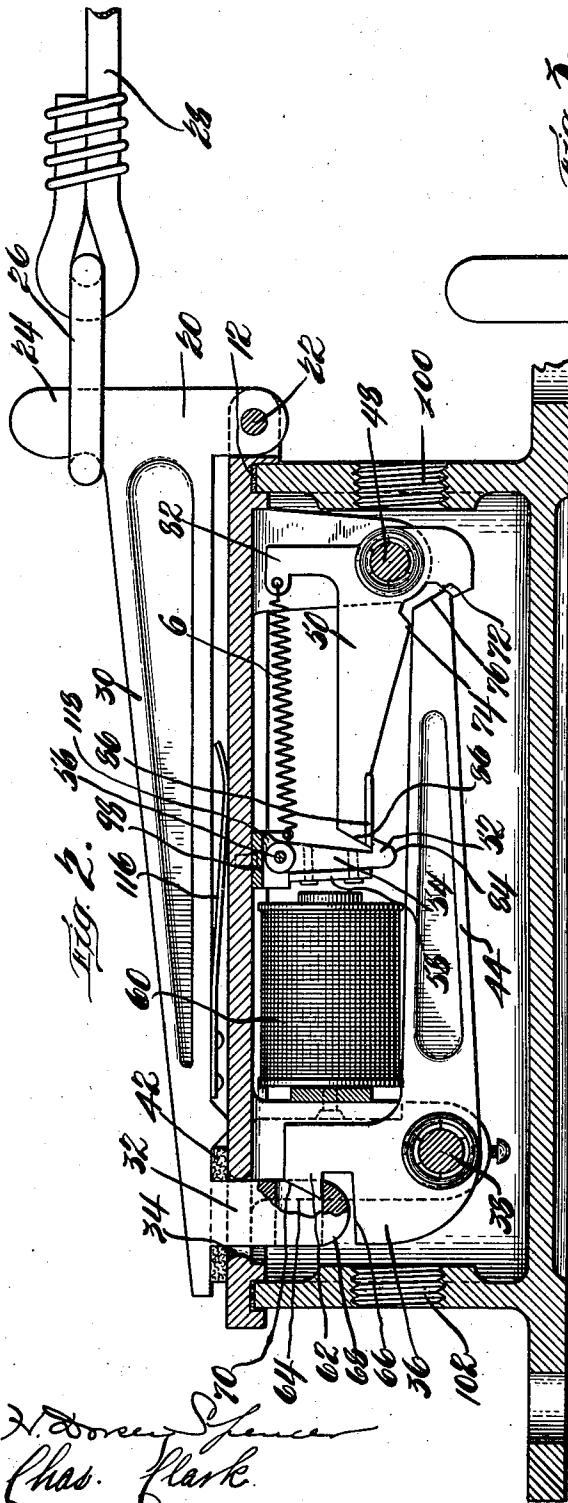


Fig. 2.

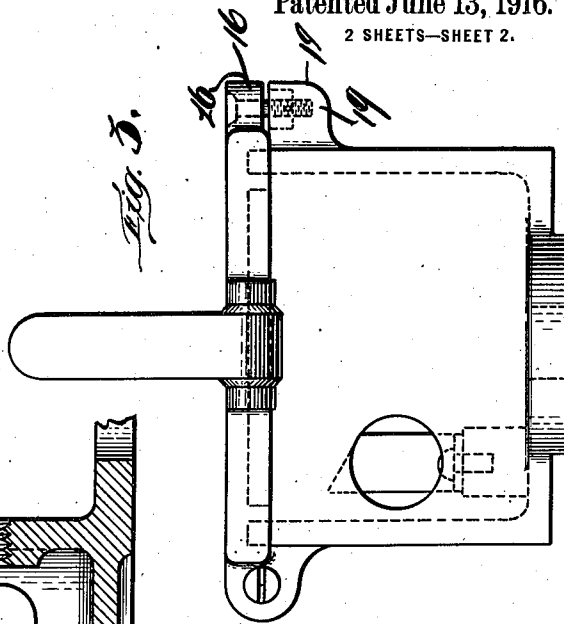


Fig. 3.

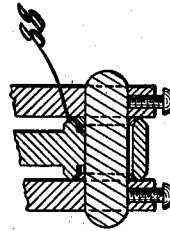


Fig. 4.



Fig. 5.

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UNITED STATES PATENT OFFICE.

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RELEASE-BOX.

1,187,135.

Specification of Letters Patent.

Patented June 13, 1916.

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To all whom it may concern:

Be it known that I, JOHN H. DERBY, a citizen of the United States, residing at New York city, New York, have invented certain new and useful Improvements in Release-Boxes, of which the following is a clear, full, and exact description.

This invention relates to devices for controlling the operation of movable parts and particularly to devices which can be operated from a distance to release fire doors, traps, dip tank covers, theater ventilators, theater drop curtains, etc., which are held by said devices against their normal tendency to move to closed or open position.

The invention is herein shown as embodied in a device commonly termed a "release box" but it will be understood that the invention is not restricted to the illustrated embodiment or to the particular uses above enumerated.

Release boxes are frequently, and in fact usually located in places where they are exposed to dust, vapors, insects, etc. In many of the locations in which they are placed, they are operated only infrequently, but when they are to be operated it is important that they operate with certainty, especially when used for fire prevention purposes. As hitherto constructed, release boxes have soon become unreliable because of the corrosion of their elements and the accumulation of dirt and other foreign substances within the boxes, and unless frequently inspected and cleaned or replaced, considerable risk attended their use.

An object of the invention is to provide a compact and reliable release box which can be utilized for the above enumerated and other purposes, and which can be located wherever the use of a release box may be desirable, without risk of its failure to operate whenever the occasion for its operation arises.

A particular object of the invention is to provide a release box in which there is a great multiplication of leverage, and consequently great sensitiveness in operation in a minimum space.

Another object of the invention is to provide a release box, in which springs and other similar elements likely to deteriorate when kept for a long time under tension, are substantially eliminated or are utilized only in places where they are not required for the releasing operation of the box.

The invention aims further to provide a release box in which the resetting of the box may be effected merely by the restoration of the outermost of a series of connected levers to its normal holding position.

Other objects and important features of the invention will appear from the following description and claims when considered in connection with the accompanying drawings, in which—

Figure 1 is a plan view of a release box embodying the invention, this view showing the cover of the box swung to open position; Fig. 2 is a longitudinal section through the box with the cover closed and the box set; Fig. 3 is an end view looking from the right in Fig. 2; Fig. 4 is a transverse section through one of the bell cranks at its bearing; and Fig. 5 is a longitudinal section across the bearing of one of the bell cranks.

The illustrated release box comprises a box 2 having ears 4 by which it may be attached to the wall or other surface, and a cover 6 hinged to the box at 8, the cover 6 having a groove 10 in which the edge of the box 2 is received, and in which groove packing material 12 is preferably located in order to insure the sealing of the box against dust, vapor, etc. The box may be secured in closed position by screws 14 passing through lugs 16 on the cover into lugs 18 on the box.

The releasing element of the illustrated box comprises a bell-crank lever 20 fulcrumed at 22 upon one end of the cover, the bell-crank having a short arm 24 over which may be hooked a ring 26 upon the end of a rope 28 connected to a fire door, trap, dip tank cover, or other element to be released, or to a mechanism for controlling the operation of blower systems or other machinery, and a long arm 30 which extends along the face of the cover and is provided with a lateral extension 32 arranged to pass through an opening 34 of the cover into the inside of the box where it coöperates with the short arm 36 of a second bell-crank lever fulcrumed at 38 between depending ears or lugs 40 upon the inside of the cover. Surrounding the lateral extension 32 is a washer 42 of felt or other suitable packing material, which serves to seal the opening 34 against moisture, dust, etc., when the bell-crank 20 is in set position, as shown in Fig. 2.

The long arm 44 of the bell-crank 36, 44, is arranged to extend substantially parallel to the arm 30 of the bell-crank 20 when the

box is in set condition and the bell-crank 36, 44, is retained against movement by engagement of the long arm 44 with the short arm 46 of a third bell-crank fulcrumed at 48 and having a long arm 50 overlapping and substantially parallel to the arm 44 when the box is in set condition. The last mentioned bell-crank is retained against movement about its fulcrum by reason of the engagement of its long arm 50 with the catch 52 on a trip-lever 54, fulcrumed at 56 upon the inside of the cover, said trip-lever carrying an armature 58 which coöperates with a pair of electromagnets 60 also carried upon the inside of the cover.

It will be noted that the connection between the extension 32 of the bell-crank 20 and the arm 36 of the bell-crank 36, 44, comprises a tooth 62 upon the arm 36 which enters a slot 64 in the extension 32, and that below said tooth the arm 36 is provided with a stop surface 66 against which the rounded end 68 of the extension 32 may abut to rock the bell crank 36, 44, toward set position when the box has been released and is to be reset. It will further be noted that the tooth 62 has a cam face 70 arranged to be engaged by the rounded end 68 of the extension 32 to facilitate the resetting of the box in the event that the bell-crank 36, 44, is at some position between its set position and its release position. In order that the transmitted pull may be reduced to a minimum and the sensitiveness of the box therefore increased, the connection between the extension 32 and the arm 36 is preferably arranged to transmit the pull exerted upon the bell-crank 20 along a line passing close to the fulcrum 36.

The retaining connection between the arm 44 of the bell-crank 36, 44, and the arm 46 of the bell-crank 46, 50, comprises, as shown, an inclined retaining face 72 upon the arm 46 arranged to be engaged by a correspondingly inclined face upon the end of the arm 44, the arm 50 of said bell-crank 46, 50, having a stop face or projection 74 arranged to be engaged by the upper face of the arm 42 to effect the rocking of the bell-crank 46, 50, when the box is to be reset. In the event that the bell-crank 46, 50, should be in a position between its set position and its release position, a cam face 76 upon the end of the arm 44 by engagement with a coöperating cam face 78 upon the arm 46 will serve to move said bell-crank into such position that the resetting of the box by the engagement of the arm 44 with the stop 74 may proceed.

In order that the resetting of the box may be completed automatically, the trip-lever 54 is normally impelled toward the end of the arm 50 of the bell-crank 46, 50, by a spring 80 connected at one end to said trip-lever 54 near its fulcrum and at its other

end to an upwardly extending arm 82 on the bell-crank 46, 50, and the catch 52 of said trip-lever is provided with a cam face 84 which coöperates with the cam face 86 on the end of the arm 50. To insure the easy disengagement of the catch 52 and lever arm 50, the contact face of the lever arm 50 is preferably formed by some non-corrosive material 86, such, for example, as a plate of silver.

The bearings of the various levers are preferably three point bearings 86, as shown in Fig. 5, the levers being provided with lateral knife edges 88, as shown in Fig. 4. The bearing for the trip-lever 54 and armature 58 is shown in Fig. 1 of the drawings, this bearing being carried by a bracket 90 attached to the inner face of the cover 6 and having depending ears 92 which are split at 94. A conically pointed screw 96 having a shouldered head is threaded through the split portion of each of the ears 94, the conical end of this screw being received in bearing sockets in the end of the rock shaft 98 which carries the lever 54 and armature 58.

The wires for the electric connections are brought into the box 2 through conduits threaded into the box at 100 or 102, these wires being received upon switch blocks 104 and 106 which coöperate with switch members 108 and 110 respectively, on the cover. From the switch members 108, 110, wires 112 and 114 run to the magnets 60. It will be seen that by this arrangement the circuit is broken whenever the box is opened, thus providing means for detecting tampering with the box, the circuit being preferably normally closed and having a light current passing therethrough for testing purposes. Whenever the box is to be operated, the strength of the current is increased sufficiently to cause the magnet 60 to attract the armature 58 and release the lever arm 50.

If desired, a spring 116 may be placed between the lever arm 30 and the cover of the box with its tension so adjusted as to tend to move said arm away from the cover. This spring would thus serve two functions; that is, it would indicate when the box is not set and it would tend to accelerate the release of the box. The spring 116 is, however, unnecessary to the successful operation of the box.

A short arm 118 upon the trip lever 54 is arranged to engage the base of the bracket 90 to limit the movement of the trip lever toward the arm 50 of the bell crank 46, 50, thus maintaining the cam face 84 in proper relation to the cam face 86 of the arm 50.

What I claim as new is:—

1. An electrically-operated release box comprising a series of bell crank levers each having a long arm and a short arm and having its long arm connected with the short arm of the succeeding lever, said bell cranks

having their long arms substantially parallel when the box is set, and a magnetically-controlled trip engaging the long arm of the last of said bell-cranks.

2. A release box comprising two bell crank levers arranged to move in the same plane and each having a long arm and a short arm, said levers having spaced fulcrum and having their long arms substantially parallel and overlapping, the long arm of one lever engaging the short arm of the other, and electromagnetically-controlled means operating upon the long arm of said other lever to hold said levers against movement about their fulcrum.

3. An electrically-operated release box comprising a series of bell crank levers, each having a long arm and a short arm, said levers being arranged with their arms all in one plane and with the long arms substantially parallel to each other and with the short arms substantially parallel to each other, and magnetically-controlled means for retaining the long arm of the last of the series against the pull exerted upon the short arm of the first of the series.

4. A release box, comprising a series of normally engaged levers arranged to move in one plane and each having a long arm and a short arm, and a box having a cover upon the outside of which one of said levers is mounted and upon the inside of which the others of said levers are mounted, one of said levers having a part extending through said cover to provide for the engagement of the outside lever with an inside lever.

5. A release box, comprising a series of normally engaged levers arranged to move in one plane and each having a long arm and a short arm, the long arm of each lever engaging the short arm of the succeeding lever and the long arms of successive levers extending in opposite directions from their respective fulcrum, an electro-magnet operating lengthwise of said lever system, and means controlled by said magnet for holding said lever system in set condition.

6. A release box, comprising a series of normally engaged levers arranged to move in one plane and each having a long arm and a short arm, a box having a cover upon the outside of which one of said levers is mounted and upon the inside of which the others of said levers are mounted, one of said levers having a part extending through said cover to provide for the engagement of the outside lever with an inside lever, and means carried by said part and operative when the lever system is in set condition for sealing the communication through the cover against air, dust and vapor.

7. An electrically-operated release box comprising a series of bell cranks each having a long arm and a short arm, and having their long arms parallel and engaging the

short arms of the respective succeeding bell cranks, the short arm of the first of the series of bell cranks being utilized for connection to the part to be released, and a magnetically-controlled trip for the long arm of the last of the series of bell cranks, said trip being movable lengthwise of said arm into releasing position.

8. An electrically-operated release box comprising a box and a cover therefor, a bell crank release lever fulcrumed upon the outside of said cover and having its long arm adjacent to said cover, means upon the inside of said box for retaining said bell crank in holding position, said means comprising a series of cooperating bell crank levers having their long arms parallel to the long arm of said first-mentioned bell crank, and a magnetically-controlled trip for the long arm of the last of said bell cranks, the long arm of each of said bell cranks engaging the short arm of the succeeding bell crank.

9. An electrically-operated release box comprising a box having a cover, a lever fulcrumed upon the outside of the cover and having a part extending through the cover to the inside of the box, and electrically-controlled means within said box for preventing the movement of said lever, said means comprising two bell cranks each having a long arm and a short arm and having their long arms and short arms respectively parallel to each other and all arranged in the same plane, and magnetically-controlled means for preventing the rocking of said bell cranks.

10. A release box comprising a box having a cover, a lever fulcrumed upon said cover at one end thereof and having an arm extending lengthwise of said cover, means within the box for preventing movement of said lever arm away from said cover comprising multiplying levers having their long arms substantially parallel to the aforementioned lever arm and having their short arms extending substantially at right angles thereto, means extending through the cover at a point remote from the fulcrum on said cover for connecting said outside lever to the short arm of one of the inside levers, and a magnetically-controlled trip acting upon the long arm of the last of the series of inside levers.

11. A release box, comprising a series of normally engaged levers, a box having a cover upon which said levers are mounted, one of said levers being arranged to be connected to the part to be released, electromagnetically controlled tripping means for holding the lever system against movement, and a switch in said box arranged to be moved into circuit-breaking condition by the opening of said cover.

12. A release box comprising a series of

normally engaged levers arranged to move into disengagement when the box is released, the outermost of said series being connected with the part to be released, and electro-
5 magnetically controlled tripping means for holding the innermost lever of the series against the transmitted pull of the part to be released, successive levers of said series having cooperating cam and stop surfaces
10 through which said lever system may be reset by the restoration of said outermost lever to its holding position.

13. A release box, comprising a series of normally engaged levers arranged to be
15 moved into disengagement when the box is released, the outermost of said series being connected with the part to be released, a tripping lever for holding the innermost lever of the series against the transmitted
20 pull of the part to be released, an electromagnet arranged to move said trip lever in one direction, and a spring for moving said trip lever in the other direction, successive
25 levers of said series having cooperating cam and stop surfaces through which said lever system may be reset by the restoration of said outermost lever to its holding position.

14. A release box, comprising a box having a cover, a lever fulcrumed upon the out-
30 side of said cover and having a part extending through said cover, a second lever fulcrumed upon the inside of said cover and having a part cooperating with said first mentioned lever to hold said lever against
35 movement about its fulcrum, and a third lever fulcrumed upon the inside of said cover and having a part arranged to hold the second lever against movement, said second and third levers each having stop sur-
40 faces arranged to be engaged by the preceding levers of the series to move said second and third levers into set position, and elec-

tro-magnetically controlled means for holding the third lever of said series in set position.

15. A release box, comprising a box hav-
45 ing a cover, a bell-crank lever fulcrumed upon the outside of said cover and having a long arm extending along the face of said cover and a short arm arranged to be con-
50 nected to the part to be released, said cover having an opening and said long arm having a part projecting through said opening, means carried by said arm for sealing said
55 opening when said lever is in set position, a second bell-crank lever fulcrumed upon the inside of said cover and having a short arm provided with a part arranged to engage and
60 hold said first mentioned bell-crank against movement about its fulcrum, said second bell-crank having a long arm arranged substantially parallel to the long arm of said first mentioned bell-crank, a third bell-crank pivoted
65 upon the inside of said cover and having a long arm arranged substantially parallel to the long arm of said second bell-crank and a short arm constructed to engage the long arm of said second bell-crank and hold it
70 against movement, a trip lever fulcrumed upon the inside of said cover and having a catch arranged to engage the long arm of said third bell-crank, a spring connecting
75 said third bell-crank and said trip lever and tending to hold them in operative engagement, and an electromagnet arranged to act upon said trip lever and move said trip lever out of engagement with said bell-crank.

Signed at New York, N. Y., this 9th day of March, 1916.

JOHN H. DERBY.

Witnesses:

BEATRICE MIRVIS,
C. CLARK.