J. GRAMM.

PUSH BUTTON.

APPLICATION FILED DEC. 14, 1916.

1,249,068. Patented Dec. 4, 1917.

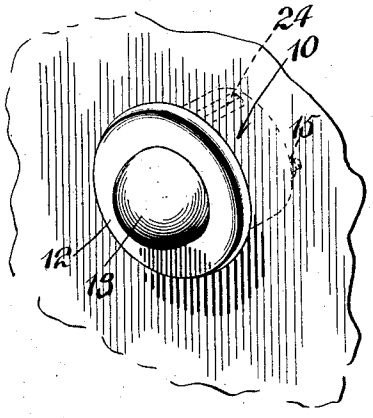
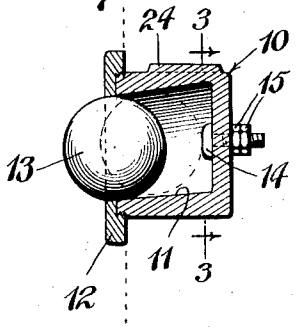


Fig. 1.

Fig. 2.



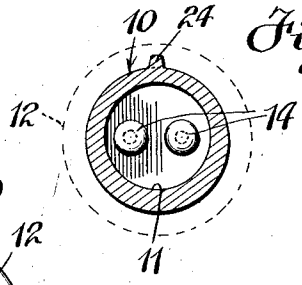


Fig. 3.

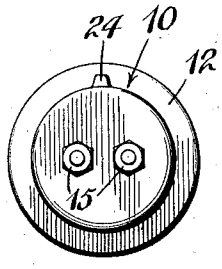


Fig. 4.

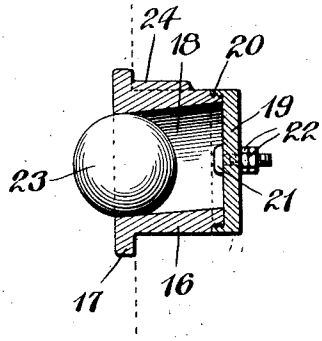


Fig. 5.

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PUSH-BUTTON.

1,249,068. Specification of Letters Patent. **Patented Dec. 4, 1917.**

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To all whom it may concern:

Be it known that I, JOHN GRAMM, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Push-Buttons, of which the following is a specification.

My invention relates to push buttons for use in closing electric circuits, such as bell-ringing circuits, and has as its primary object the provision of a circuit closer of the above described type in which the movable contact member will automatically return to normal position, when released, through gravity. By this means I avoid the use of springs or resilient contact elements.

A still further object of my invention consists in providing a push button of the above described character in which the movable element is properly supported and guided through its movement to insure its correct and accurate engagement with fixed contacts and to insure its being normally held in position accessible to an operator.

Another object of my present invention is the construction of a push button in a simple and economical manner so that it may be cheaply placed upon the market and further so that it may be readily installed and will be durable in use.

With these and other objects in view, my invention will be more fully described, illustrated in the accompanying drawings, and then specifically pointed out in the claims which are attached to and form a part of this application.

In the drawings.

Figure 1 is a perspective view showing my push button applied to a door casing;

Fig. 2 is a vertical central sectional view through the casing;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2 looking in the direction of the arrows;

Fig. 4 is a rear elevation of the casing showing the binding posts for the conductor wires;

Fig. 5 is a view corresponding to Fig. 2 illustrating a modified form of construction.

My improved push button includes a body or casing 10 which is preferably cylindrical and which is formed with a substantially cylindrical socket or recess 11 opening through one end. This socket or recess has its axis disposed at an angle to the axis of the casing so that when the casing is mounted in a door or other support with its axis in a horizontal plane it may be disposed so that the lower face of the recess will incline downwardly toward the open end thereof, as best shown in Fig. 2 of the drawings. This casing is formed preferably of some suitable insulating material although it may be formed of metal and provided with a lining of insulating material and at its forward end it is closed by a cap ring 12 which is preferably threaded about such end and has a portion to project beyond the periphery of the body to provide a flange engageable against the outer surface of a door or other object in which the casing may be embedded when the button is applied as indicated by dotted lines in Figs. 2 and 5. This cap ring also projects slightly across the open end of the socket or recess 11 to provide a retaining means for a spherical movable element 13. This movable element or ball 13 is formed from some suitable current conducting metal such as steel, copper or brass, and the opening in the cap ring is so proportioned as to permit nearly one-half of the ball to project in normal condition of the push button.

A pair of bolts 14 have their shanks passed outwardly through the rear or closed end of the body 10 in spaced relation and threaded upon the shank of each bolt are a pair of nuts 15, one of which serves to secure the bolt in place, while the two together serve to secure a conductor wire. By this means each bolt forms a fixed contact and each bolt, together with its nuts provides a binding post. The casing is so proportioned that when the movable contact or ball 13 is forced inwardly to simultaneously engage the heads of both bolts, but a slight portion of it will project through the opening of the cap ring 12. Obviously because of the inclination of the lower face of the socket or recess to the horizontal, as soon as the ball is released it will roll by force of gravity from the position shown in dotted lines in Fig. 2 to that shown in full lines to open the circuit between the bolts 14 which it has previously closed.

In Fig. 5 of the drawings I have illustrated a push button which operates upon the same principle as the one above explained, the sole difference being in the con-

struction of the body or casing. As there shown a cylindrical body 16 is provided at one end with an annular flange 17 and is formed with a substantially cylindrical bore 18 extending completely through it with the axis of the bore at an inclination to the axis of the casing. A cap 19 having a threaded flange 20 for engagement with threads formed upon that end of the body opposite the flange 17 forms a closure for the body at one end and carries the contact forming bolts having nuts 22. The bore 18 while substantially cylindrical tapers slightly from its inner to its outer end so that while a ball contact 23 mounted in it is free for movement into and out of engagement with the heads of the bolts 21 its movement away from such bolt heads will be limited when it reaches the position shown in Fig. 5, that is, when it reaches the more restricted end of the bore.

Obviously either of the push buttons above described may be cheaply manufactured and readily installed. Furthermore, they are extremely durable and there is practically no likelihood of failure of operation due to corroding of the contact surfaces of the movable contact member and bolt heads. This is due to the fact that because of the rolling movement of the spherical contact member a different portion of its surface will be brought into engagement with the fixed contacts upon each operation of the push button. If, however, the contact faces of the fixed contacts or bolt heads should become slightly corroded the ball contact while held in engagement with them may be turned in such a manner as to grind off the oxidized or gummed surface of the contacts.

Although I have illustrated and described my invention in all its details it will, of course, be appreciated that I reserve the right to make any changes in the construction or arrangement of parts which may fall within the scope of the appended claims. For instance the shell or housing may be provided with an external rib or shoulder 24 which when the button is in place will hold it from turning so that it will always be in a position to operate.

Having thus described the invention, what is claimed as new is:

1. A push button including a casing provided with a passage opening through one end, the lower wall of the passage being inclined downwardly toward such end and such end being restricted, fixed contacts projecting into the opposite end of the passage, and a spherical contact movable in the passage into and out of engagement with the fixed contacts and held against displacement from the casing due to the restricted end of the passage.

2. A push button including a casing formed with an inclined passage opening at its lower end through the casing, fixed contacts projecting into the opposite end of the casing, and a movable contact mounted in the passage for engagement with the fixed contacts and for movement out of engagement with the fixed contact through the action of gravity.

3. A push button including a casing formed with a recess opening through one end, the lower wall of the recess being inclined downwardly toward such open end, a cap ring mounted upon the open end of the casing and projecting somewhat across the end of the passage, a spherical contact member mounted for movement in the passage and proportioned when released to be held against escape from the passage by engagement with the cap ring, and contact members projecting into the opposite end of the passage.

4. A push button including a casing formed with a recess opening through one end, the lower wall of the recess being inclined downwardly toward such open end, a cap ring mounted upon the open end of the casing and projecting somewhat across the end of the passage, a spherical contact member mounted for movement in the passage and proportioned when released to be held against escape from the passage by engagement with the cap ring, bolts having their shanks passed outwardly through the closed end of the body with their heads disposed in the patch of movement of the movable contact member, and a pair of nuts threaded upon the outer end of each bolt.

5. A push button including a cylindrical body exteriorly threaded at one end and provided at its opposite end with a circumferential flange, the body being formed with a bore opening through its ends and at an inclination to the axis of the body, the bore tapering slightly from the threaded to the flanged end of the body, a ball contact member mounted in the bore and of a diameter slightly greater than the diameter of the smaller end of the bore, a cap having threaded engagement with the threaded end of the body, and fixed contacts carried by the cap for engagement with the ball contact when the latter is forced into the larger end of the bore.

6. A circuit controlling device including a body providing an inclined run-way open at one end and closed at the other, a contact freely movable along the run-way, means retaining it against displacement therefrom, and fixed contacts disposed in the path of movement of the first contact.

7. In a push button, a casing having an inclined passage opening through one end and tapering toward such end, fixed contacts projecting into the passage adjacent one end, and a further contact freely movable along the passage and adapted in one

position to project partially through the open end of the passage.

8. A push button including a casing provided with an inclined passage open through one end and adapted to be positioned in a recess formed in a supporting body with its open end exposed, means projecting from the casing for engagement with the supporting body to hold the casing against turning movement and maintain it with the open end of its passage at a level below the opposite end thereof, fixed contacts in the inner end of the passage, a freely movable contact mounted in the passage, and means preventing displacement of the movable contact from the passage but permitting said contact to project partially beyond said passage.

In testimony whereof I affix my signature.

JOHN GRAMM. [L. S.]