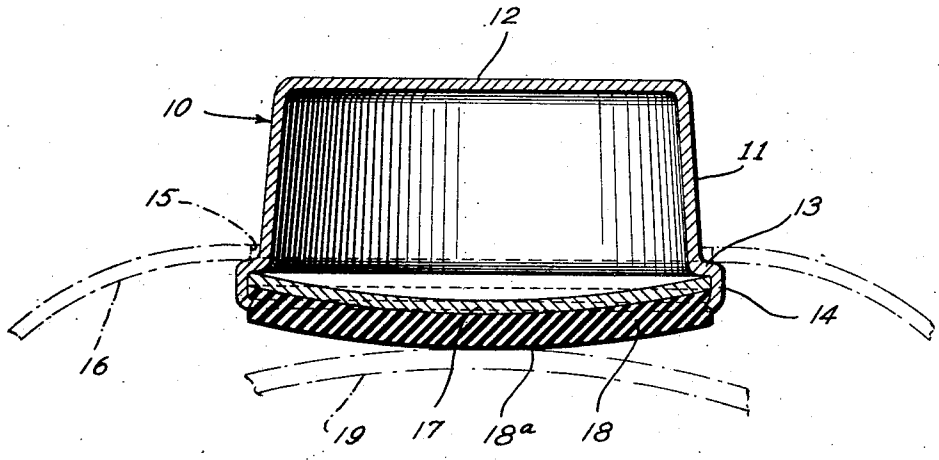
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K. KNUDSEN

PUSH BUTTON AND ART OF MAKING THE SAME

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PUSH BUTTON AND ART OF MAKING THE SAME.

Application filed April 2, 1923. Serial No. 629,403.

To all whom it may concern:

Be it known that I, KNUD KNUDSEN, a subject of the King of Denmark, and a resident of Danbury, in the county of Fairfield and State of Connecticut, have invented an Improvement in Push Buttons and Art of Making the Same, of which the following is a specification.

This invention relates to push buttons, more particularly to that type adapted for use in connection with push button switches, and to an art of making the same.

One of the objects of this invention is to provide a simple and practical push button that may be readily, conveniently and inexpensively manufactured. Another object is to provide a push button of the above character that will be light, yet durable and rugged in construction and, moreover, will be well adapted to meet the conditions of hard practical use. Another object of this invention is to provide a simple and practical art of making push buttons of the above nature that may be in practice rapidly and inexpensively carried on. 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, arrangements of parts and in the several steps and relation and order of each of the same to one or more of the others all as will be illustratively described herein, and the scope of the application of which will be indicated in the following claims.

In the drawing in which is shown one of various possible embodiments of the mechanical features of this invention, the single figure is a vertical sectional view showing the assembled push button, certain parts with which a push button is adapted to be associated being indicated merely diagrammatically.

Referring now to the drawing, there is generally indicated at 10 a member of sheet material, preferably metallic, which is formed as by a stamping operation, for example, into a main body portion 11 preferably of substantially cylindrical shape closed at one end, as at 12, and open at the other end. Adjacent the open end of the main body portion 11 is formed integrally therewith a laterally or outwardly extending flange 13 preferably continuous about the periphery of the open end of the main body portion 11. The flange 13 is extended axially and in a direction away from the closed end 12 of the main body portion 11 to provide a securing flange 14. The sheet metal member 10 may be given the form above described either in one or several stamping operations.

At this point it might be noted that the main body portion 11, which, as above described, is given preferably a cylindrical shape, is adapted to be received within the opening 15 of a push button switch casing diagrammatically indicated at 16, the main body portion 11 with its closed end 12 being thus adapted for manual operation, and the outwardly or laterally extending flange 13 acting as indicated in the drawing to limit the upward or outward movement of the push button with respect to the switch casing 16.

After having given the sheet member 10 the form as above described there is positioned within the securing flange 14 and resting against the flange 13 a sheet metal member 17 which is preferably in the form of a disk. The metallic disk member 17, moreover, is preferably given a convex shape or form, as is clearly indicated in the drawing, and when positioned with respect to the flange 13 is so positioned that it is arched outwardly with respect to or away from the open end of the main body portion 11. The metallic disk member 17 preferably fits snugly within the securing flange 14.

Upon the metallic disk member 17 there is superimposed a disk member 18 made of any suitable non-conductive or insulating material, such as fiber for example, and likewise given a convex shape or form. The securing flange 14 is preferably of such extent in an axial direction as to terminate well within the outer edge portions of the non-conducting member 18, and after the metallic reinforcing member 17 and the non-conducting member 18 have been assembled as above described the outer end portions of the securing flange 14 are forced inwardly in any suitable manner, as for example by spinning, and into substantially the relation shown in the drawing. The outer edge portion of the securing flange 14 is thus forced into or is embedded slightly within the side portions of the non-conducting disk member 18 and thus securely locks the mem-

bers 17 and 18 in assembled relation with respect to the main body portion 11 of the push button.

In thus giving the non-conducting member 18 an arched cross section or a convex form there is attained not only a great mechanical strength and rigidty but also an exposed end face 18[a] which of itself is of arcuate or convex form, thus well adapting the insulating member 18 for efficient mechanical engagement with a conducting switch member within the switch casing 16 and generally taking the form of a spring metal strip generally indicated at 19. The mechanical contact of the operating end of the push button with the conductive switch member 19 is thus in effect a rocking contact throughout the necessary extent of movement and an effective and reliable actuation of the switch member is made to take place. Moreover, as above noted, the convex form given the insulating member 18 makes for great mechanical strength, and I may, if desirable, dispense with the metallic member 17. I prefer, however, to reinforce the non-conducting member 18 and it will be noted that the reinforcing member 17, in being also of an arched cross section, insures not only a very great rigidity and durability of construction, but also the maintenance of the desired relation of the assembled parts.

It will thus be seen that there has been provided in this invention a push button construction and an art of making the same in which the several objects hereinabove noted, as well as many practical advantages, are attained. The construction is of marked simplicity, the several parts are readily and reliably assembled, and, moreover, the entire construction lends itself readily to quantity production. Moreover, it will be seen that the action of the device electrically as well as mechanically is reliable and that the non-conducting member 18 effectively and dependably insulates the main body portion adapted for manual manipulation from the conductive parts or switch members mounted within the switch casing. It will, moreover, be seen that the push button is of very light construction and that this advantage is achieved without impairing the many other advantageous features of construction

As many possible embodiments may be made of the mechanical features of the above invention and as the art herein described might be varied in various parts, all without departing from the scope of the invention, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

I claim as my invention:

1. In push button construction, in combination, a member made of sheet material and formed to provide a substantially cylindrically shaped main body portion closed at one end and adapted to be received within the opening of a switch casing for manual operation of a switch member therein and provided at the other end with a laterally extending projection for limiting the movement of said body portion within said opening, and non-conductive means mounted upon said main body portion and at the open end thereof adapted to engage a switch member within said casing.

2. In push button construction, in combination, a member made of sheet material and formed to provide a substantially cylindrically shaped main body portion closed at one end and adapted to be received within the opening of a switch casing for manual operation of a switch member therein and provided at the other end with a laterally extending projection for limiting the movement of said body portion within said opening, and an outwardly arched member of non-conductive material mounted upon said main body portion and at the open end thereof for engagement with a switch member within said casing.

3. In push button construction, in combination, a member made of sheet material and formed to provide a substantially cylindrically shaped main body portion closed at one end and adapted to be received within the opening of a switch casing for manual operation of a switch member therein and provided at its open end with a laterally and circumferentially extending flange integrally formed therewith for limiting the movement of said body portion within said opening, and a convex disk member of non-conductive material mounted upon said flange and closing the open end of said main body portion adapted to engage a switch member within said casing.

4. In push button construction, in combination, a member made of sheet material and formed to provide a substantially cylindrically shaped main body portion closed at one end and adapted to be received within the opening of a switch casing for manual operation of a switch member therein and provided at its open end with a laterally and circumferentially extending flange integrally formed therewith for limiting the movement of said body portion within said opening, a disk member of non-conductive material mounted upon said flange and substantially closing the open end of said main body portion adapted to engage a switch member within said casing, and a metallic reinforcing member interposed between said non-conductive disk member and said flange.

5. In push button construction, in combination, a member made of sheet material and formed to provide a substantially cylindrically shaped main body portion closed

at one end and adapted to be received within the opening of a switch casing for manual operation of a switch member therein and provided at its open end with a laterally and circumferentially extending flange integrally formed therewith for limiting the movement of said body portion within said opening, a convex disk member of metal mounted upon said flange and substantially closing the open end of said main body portion, and a convex disk member of non-conductive material mounted upon said metal disk member and adapted to engage a switch member within said casing.

6. In push button construction, in combination, a sheet metal member formed to provide a substantially cylindrically shaped main body portion substantially closed at one end adapted to be received within the opening of a switch casing for manual operation of a switch member therein, a non-conducting member mounted adjacent the open end of said main body portion and adapted to engage a switch member within said casing, separate means supported by said sheet metal member and interposed between the latter and said non-conducting member for holding the latter against movement inwardly with respect to said sheet metal member, and laterally projecting means associated with said sheet metal member for limiting the movement of said main body portion within the opening in said switch casing.

7. In push button construction, in combination, a sheet metal member formed to provide a substantially cylindrically shaped main body portion closed at one end adapted to be received within the opening of a switch casing for manual operation of a switch member therein, said member being formed to provide a laterally and circumferentially extending flange adjacent the open end of said main body portion for limiting the movement of said main body portion within said opening, a non-conducting member supported by said flange and substantially closing the open end of said main body portion adapted to engage a switch member within said casing, and means associated with said flange for holding said non-conducting member in position.

8. In push button construction, in combination, a sheet metal member formed to provide a substantially cylindrically shaped main body portion closed at one end adapted to be received within the opening of a switch casing for manual operation of a switch member therein, said member being formed to provide a laterally and circumferentially extending flange adjacent the open end of said main body portion for limiting the movement of said main body portion within said opening, a non-conducting member supported by said flange and substantially closing the open end of said main body portion adapted to engage a switch member within said casing, and means integrally formed with said flange and adapted to be bent inwardly for locking said non-conducting member in position.

9. In push button construction, in combination, a sheet metal member formed to provide a substantially cylindrically shaped main body portion closed at one end adapted to be received within the opening of a switch casing for manual operation of a switch member therein, said member being formed to provide a laterally and circumferentially extending flange adjacent the open end of said main body portion for limiting the movement of said main body portion within said opening, a non-conducting member supported by said flange and substantially closing the open end of said main body portion adapted to engage a switch member within said casing, and a circumferential flange extending in an axial direction integrally formed with said first mentioned flange adapted to be bent inwardly to lock said non-conducting member in position.

10. In push button construction, in combination, a sheet metal member formed to provide a substantially cylindrically shaped main body portion closed at one end adapted to be received within the opening of a switch casing for manual operation of a switch member therein, said member being formed to provide a laterally and circumferentially extending flange adjacent the open end of said main body portion for limiting the movement of said main body portion within said opening, a convex disk member of non-conductive material associated with said flange and substantially closing the open end of said main body portion adapted to engage a switch member within the switch casing, and means integrally formed with said flange for holding said convex disk member in position.

11. In push button construction, in combination, a sheet metal member formed to provide a substantially cylindrically shaped main body portion closed at one end adapted to be received within the opening of a switch casing for manual operation of a switch member therein, said member being formed to provide a laterally and circumferentially extending flange adjacent the open end of said main body portion for limiting the movement of said main body portion within said opening, a non-conductive member associated with said flange and substantially closing the open end of said main body portion adapted to engage a switch member within the switch casing, a metallic reinforcing member interposed between said non-conductive member and said flange, and means integrally formed with said flange for locking both said non-con-

ductive member and said metallic reinforcing member in position.

12. In push button construction, in combination, a sheet metal member formed to provide a substantially cylindrically shaped main body portion closed at one end adapted to be received within the opening of a switch casing for manual operation of a switch member therein, said member being formed to provide a laterally and circumferentially extending flange adjacent the open end of said main body portion for limiting the movement of said main body portion within said opening, a convex metallic disk member mounted upon said flange, a non-conductive convex disk member superimposed upon said metallic disk member, and means integrally formed with said flange for locking both said metallic and said non-conductive members in position.

13. The herein described art of making push buttons which consists in forming a member of sheet material into a substantially cylindrical main body portion closed at one end, forming a laterally extending projection adjacent the open end of said cylindrically shaped main body portion, and mounting a non-conductive member at the open end of said main body portion.

14. The herein described art of making push buttons which consists in forming a member of sheet material into a substantially cylindrical main body portion closed at one end, forming a laterally and circumferentially extending flange about the open end of said cylindrically shaped main body portion, giving a non-conductive disk member a convex form, and mounting said convex non-conductive member adjacent the open end of said main body portion.

15. The herein described art of making push buttons which consists in forming a member of sheet material into a substantially cylindrical main body portion closed at one end, forming a laterally and circumferentially extending flange about the open end of said cylindrically shaped main body portion, giving a metallic disk member a convex form, giving a non-conductive disk member a substantially similar convex form, and mounting said two disk members upon said flange with the metallic disk member interposed between the flange and the non-conductive disk member.

16. The herein described art of making push buttons which consists in forming a sheet metal member into a substantially cylindrical main body portion closed at one end, forming a laterally and circumferentially extending flange adjacent the open end or said cylindrically shaped main body portion, and securing a non-conductive member to said flange to substantially close the open end of said main body portion.

17. The herein described art of making push buttons which consists in forming a sheet metal member into a substantially cylindrical main body portion closed at one end, forming a laterally and circumferentially extending flange adjacent the open end of said cylindrically shaped main body portion, giving a non-conductive disk member a convex shape and securing said disk member to said flange to substantially close the open end of said main body portion.

18. The herein described art of making push buttons which consists in forming a sheet metal member into a substantially cylindrical main body portion closed at one end, forming a laterally and circumferentially extending flange adjacent the open end of said cylindrically shaped main body portion, giving a metallic disk member a convex form, giving a non-conductive disk member a substantially similar convex form, and mounting said two disk members upon said flange to substantially close the open end of said main body portion with the metallic disk member interposed between said flange and said non-conductive disk member

19. The herein described art of making push buttons which consists in forming a sheet metal member into a substantially cylindrically shaped main body portion closed at one end, forming a laterally and circumferentially extending flange adjacent the open end of said main body portion, bending an outer portion of said flange in the direction away from the closed end of said main body portion and substantially at right angles to said flange, positioning a non-conductive member upon said flange to substantially close the open end of said main body portion, and bending inwardly said bent portion of said flange to lock said non-conductive member in position.

20. The herein described art of making push buttons which consists in forming a sheet metal member into a substantially cylindrically shaped main body portion closed at one end, forming a laterally and circumferentially extending flange adjacent the open end of said main body portion, bending an outer portion of said flange in the direction away from the closed end of said main body portion and substantially at right angles to said flange, positioning a metallic reinforcing member adjacent said flange to substantially close the open end of said main body portion, superimposing upon said metallic member a non-conductive member, and bending inwardly said bent portion of said flange to lock said metallic member and said non-conductive member in position.

21. In push button construction, in combination, a hollow metallic main body portion of substantially cylindrical shape closed at one end adapted to be received within the opening of a switch casing for

manual operation of a switch member therein and provided adjacent its open end with an integrally formed and laterally extending projection for limiting the movement of said main body portion within said opening, and non-conductive means mounted upon said main body portion and at the open end thereof adapted to engage a switch member within said casing and to insulate said metallic main body portion from said switch member.

In testimony whereof, I have signed my name to this specification this 27th day of March, 1923.

KNUD KNUDSEN.