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2,219,451

LOCKING DEVICE

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FIG. 1

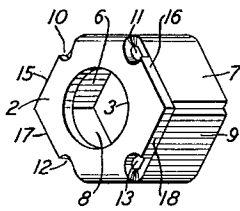


FIG. 2

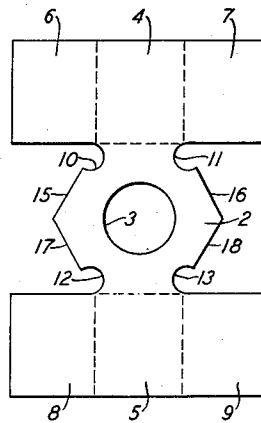
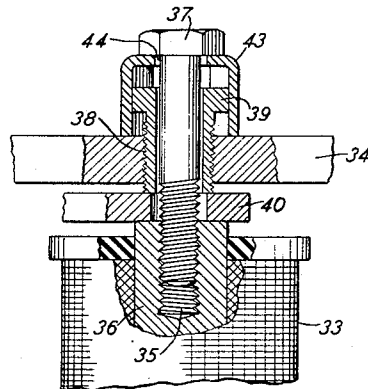


FIG. 3



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LOCKING DEVICE

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11 Claims. (Cl. 85—50)

This invention relates to locking devices and particularly to adjusting caps employed in such devices.

An object of the invention is to simplify, improve and reduce the cost of such adjusting means.

Telephone apparatus such as electromagnets require adjustments on their supporting frames in relation to other parts of apparatus controlled thereby such as armatures and actuating devices as is well known in connection with automatic switches of the Strowger and other similar types. In such switches electromagnets are provided for controlling the vertical and rotary movements of the switches and these magnets are adjustably secured to supporting frames to enable the distance between the magnets and the armatures to be properly adjusted. In the patent to H. Sengebusch et al. 1,592,782 of July 13, 1926, an electromagnetic device of this type has been disclosed with means for adjusting it in relation to a frame structure.

The present invention relates to an improved hexagonal adjusting cap for use in locking arrangements for magnets on the frame structure of step-by-step switches of the type disclosed in the above-mentioned patent and in which a tubular adjusting screw having a hexagonal head is threaded through the frame for adjusting the distance between the magnet core and the frame. A feature thereof is an improvement in this hexagonal adjusting cap which is fitted snugly over the head of the tubular adjusting screw and rests against the frame. The arrangement includes a locking screw that projects through an aperture in the cap through said tubular screw and is threaded into the core to clamp or lock the cap against the frame and the tubular screw in the frame and against the core when the tubular screw has been rotated through the medium of the cap to adjust the magnet in relation to the frame. The adjusting cap illustrated is hexagonal in shape and may be formed in accordance with the present invention from a sheet metal blank cut with a hexagonal flat top portion having a hole therein for the locking screw and in which two of the sides are cut integral with the top portion and bent at right angles to the top portion to form two opposite sides of the cap and with two sides cut integral with and projecting from each of these opposite sides. These sides are bent at a 60 degree angle, inwardly from said opposite sides to form the remaining four sides of the cap. These four sides of the cap are also bent under the

hexagonal flat top portion so that they assist in the support of the top portion of the cap when pressure is applied thereto.

This invention is disclosed in the accompanying drawing in which:

Fig. 1 shows a hexagonal adjusting cap made in accordance with the applicant's invention;

Fig. 2 shows a blank form cut in accordance with the applicant's invention and from which the hexagonal cap may be shaped in its final form;

Fig. 3 shows part of an electromagnet and an assembly of the parts including the adjusting cap for regulating the position of the magnet in relation to a frame.

Referring now to the drawing, and particularly to Figs. 1 and 2, the applicant's invention may take the form of a hexagonal adjusting cap shown in Fig. 1. This cap may be manufactured by first cutting a piece of flat metal in the form shown in Fig. 2 consisting of a hexagonal flat top portion 2 having a hole 3 cut therein and two opposing sides 4 and 5 cut integral with the top portion 2. Projecting from the left and right edges of sides 4 and 5 are sides 6, 7 and projecting from the left and right edges of side 5 are sides 8 and 9. These sides 6 to 9 are of the same size and shape as sides 4 and 5. In the flat portion 2 at points 10 to 13, semicircular cut-outs are made to facilitate the forming of the cap.

The cap is formed to take the shape shown in Fig. 1, that is, the sides 4 and 5 are bent in towards each other at right angles to the top portion. The sides 6, 7, 8 and 9 are then bent towards each other at an angle of 60 degrees until the outer edges of sides 7 and 9 touch and the outer edges of sides 6 and 8 touch and are so located that they form with the sides 4 and 5, a perfect hexagonal cap or tubing. It will be noted that the sides 6, 7, 8 and 9 are bent inwards each other so that they also extend under the edges 15, 16, 17 and 18, respectively, of the flat top portion. The purpose of this is so that when pressure is exerted on the top portion 2, these sides 6, 7 and 8, 9 will be held in place and not have a tendency to spread out but be locked in their normal positions. The cut-outs at points 10 to 13 are made to prevent any undue strain and concentration of metal at these points that would interfere with the bending operations of the sides.

Fig. 3 shows the application of this adjusting cap to a locking arrangement for magnets such as are employed in telephone apparatus of the Strowger switch type and other similar type

switches or apparatus. For example, the requirement may be that the magnet 33 should be adjusted to occupy a certain position in relation to the frame 34. For this purpose a hole 35 is drilled and threaded in the core 36 of the magnet 33 and through which the bolt or locking screw 37 may be inserted. In the frame 35 is first threaded a tubular adjusting screw 38 having a hexagonal head 39. This screw is adjusted to approximately place the core 36 a certain distance from the frame 34. Between the screw and the core is normally placed a yoke piece 40 having a hole for the locking screw 37. Over this screw 38 is then placed an adjusting cap 43 constructed in accordance with the applicant's invention, as for example, shown in Fig. 1. This cap 43 fits snugly over the head 39 of screw 38. Then the locking screw 37 is passed through the hole 44 in the cap 43 and through the hollow screw 38 and is screwed into the threaded hole 35 in the core 36 until the core 36 is securely held against the yoke piece 40 which in turn is held against the end of screw 38 and the head of screw 37 rests against the upper surface of cap 43 which in turn at its lower edge rests against the upper surface of frame 34. Thus all the parts are securely and permanently held together by the locking screw 37. If a finer adjustment is required of the distance between the core 36 and the frame 34, the fact that the adjusting cap 43 fits snugly over the head 39, permits the rotation of the adjusting cap and the screw 38 together by turning the adjusting cap by means of an ordinary wrench to adjust the screw 38 to any desired distance and when this is done, the locking screw 37 is tightened. The adjusting cap 43, as constructed in accordance with the applicant's invention, is particularly suitable for use in adjusting telephone apparatus as the tighter the locking screw 37 is adjusted, the more securely will the adjusting cap be held as the flat portion 2 as shown in Fig. 1 will press more tightly against the sides 6 to 9 to hold them in place and counteract any tendency of these sides to separate or spread apart. This cap is also cheaper to manufacture than caps heretofore employed which were pressed out from a single blank piece of metal and shaped into the hexagonal form required.

What is claimed is:

1. A hollow hexagonal cap comprising an upper hexagonal flat portion, two opposite parallel flat side portions extending downwardly from opposite sides of the flat portion to form two side walls of the cap, two flat portions extending from the sides of each of said first-mentioned side portions to form the remaining four sides of the cap, said last-mentioned four side walls extending under the corresponding sides of the upper flat portion to support it when a downward pressure is applied thereto.

2. A hollow hexagonal cap having an upper flat portion provided with an aperture through its center, six flat side walls concentrically arranged around said upper portion to form six flat side surfaces of the cap inclining toward each other at an angle of 60 degrees, two of said side walls being integral with and extending from the upper portion and the remaining four side walls being integral with and extending from the first-mentioned two side walls.

3. A hollow hexagonal cap having an upper flat portion provided with an aperture through its center, six flat side walls concentrically ar-

ranged around said upper portion to form six flat side surfaces of the cap inclining toward each other at an angle of 60 degrees, two of said side walls being integral with and extending from the upper portion and the remaining four side walls being integral with and extending from the first-mentioned two side walls, said upper portion extending over the upper edges of said four side walls.

4. A hollow hexagonal cap comprising a metal blank cut to form a hexagonal flat top portion with two opposite side walls cut to extend from opposite sides of the hexagonal top portion and bent at right angles towards each other from said top portion and with two adjacent side walls cut to extend from the sides of each of said two first-mentioned side walls and bent inwardly towards each other at a 60 degree angle from the corresponding side wall, said six side walls forming a closed hexagonal chamber extending from the flat top portion.

5. A hollow hexagonal cap having an upper flat portion being substantially hexagonal in contour and provided with an aperture through its center, six flat side walls concentrically arranged around said upper portion to form six flat side surfaces of the cap inclining toward each other at an angle of 60 degrees, two of said side walls being integral with and extending respectively from the opposite edges of the upper portion and the remaining four side walls being integral with and extending from the first-mentioned two side walls, said upper flat portion being so cut that the remaining four edges thereof extend only over portions of the upper edges of said four side walls.

6. A hollow hexagonal cap comprising a metal blank cut to form a hexagonal flat top portion with two opposite side walls cut to extend from opposite sides of the hexagonal top portion and bent at right angles towards each other from said top portion with two adjacent side walls cut to extend from the sides of each of said two first-mentioned side walls and bent inwardly towards each other at a 60 degree angle from the corresponding side walls, said six walls forming a hexagonal chamber extending from the flat top portion, said top portion being cut out to form opposite openings in said chamber at the corner points where the two opposite side walls join the flat top portion.

7. A hollow hexagonal cap comprising a metal blank cut to form a hexagonal flat top portion with two opposite side walls cut to extend from opposite sides of the hexagonal top portion and bent at right angles towards each other from said top portion, said flat top portion being cut in from the hexagonal form at the point where it is joined to the opposite side walls to form a joint that is slightly narrower than the width of the side walls and with two adjacent side walls cut to extend from the sides of each of said two first-mentioned side walls and bent inwardly towards each other at a 60 degree angle from the corresponding side walls, said six side walls forming a hexagonal chamber extending from the flat top portion, said top portion being so cut that it will overlap the upper edges of the above-mentioned four side walls so that when pressure is exerted on the upper side of the flat portion, said side walls will be held in place.

8. A cap comprising an upper flat portion having six substantially equal sides, a plurality of flat side portions integral with said upper portion and extending downwardly from a plurality

of sides thereof, said side portions being bent at successive intervals to form the successive side walls of the cap, a plurality of said side walls extending under the corresponding sides of the upper flat portion to support it when pressure is applied thereto.

9. A cap comprising an upper flat portion having a plurality of substantially equal sides, a plurality of flat side portions integral with said upper portion and extending downwardly from a plurality of sides thereof, said side portions being bent at successive intervals to form the successive side walls of the cap, a plurality of said side walls extending under the corresponding sides of the upper flat portion to support it when pressure is applied thereto.

10. A cap comprising an upper flat portion having a plurality of substantially equal sides, a flat side portion integral with said upper portion and

extending downwardly from one of the sides of said upper portion, said side portion being bent at successive intervals to form successive side walls for the cap, a plurality of said side walls extending under the corresponding sides of the upper flat portion to support it when pressure is applied thereto.

11. A cap comprising an upper flat portion having a plurality of substantially equal sides, a plurality of flat side portions integral with said upper portion and extending downwardly from a plurality of sides thereof, each of said side portions being bent to form a plurality of side walls, one for each of the equal sides of said upper portion, a plurality of said side walls extending under the corresponding sides of the upper flat portion to support it when pressure is applied thereto.

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