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MOLDED CAP FOR SHEET METAL SCREWS AND THE LIKE

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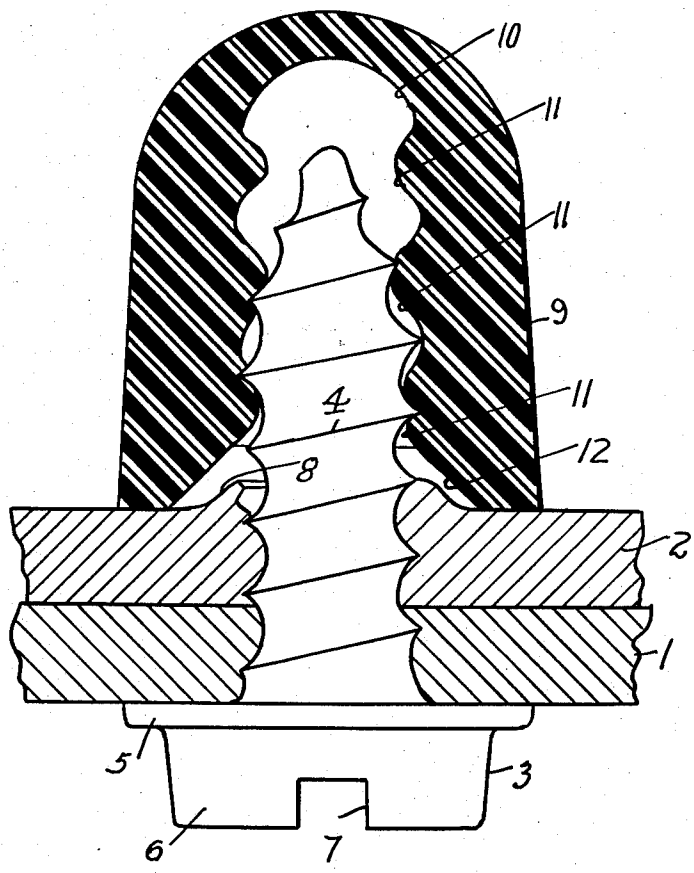


Fig. 1

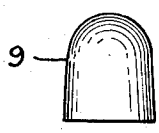


Fig. 2

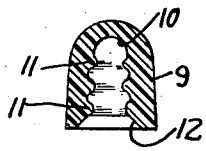


Fig. 3

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MOLDED CAP FOR SHEET METAL SCREWS AND THE LIKE

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2 Claims. (Cl. 189—36)

The present invention relates generally as indicated to a molded cap, as of flexible organic plastic material, for covering the pointed sharp threads and end of a sheet metal or like screw.

In the case of aluminum awnings, for example, the protruding ends of sheet metal screws, aside from their unsightly appearance, are apt to cut or scratch the hands during handling of the awning and to snag or catch on cleaning implements during cleaning of the awning. In addition, there often are burrs on the sheet metal surrounding the punched or drilled hole through which the screw passes, which burrs likewise may inflict injury or snag on cleaning cloths.

There are available so-called "acorn" nuts which are made of sheet metal, but these are relatively expensive, not only in initial cost, but also in assembly cost because the same are designed to be screwed on.

Accordingly, it is an object of this invention to provide a molded plastic cap which is inexpensive to make; which is capable of being installed very quickly, that is, simply by axially pushing the same over the end of a screw; which is securely locked in assembled position so as not to be inadvertently dislodged; which, by reason of its form and the slippery nature of the preferred plastic material, is difficult to axially remove from the screw except by prying as with a knife blade between the end of the cap and the sheet metal engaged thereby; and which effectively covers the pointed end of the screw and also the burrs around the hole of the sheet metal.

Other objects and advantages of the present invention will become apparent as the following description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawings setting forth in detail a certain illustrative embodiment of the invention, this being indicative, however, of but one of a few of the various ways in which the principle of the invention may be employed.

In said annexed drawing:

Fig. 1 is a cross-section view, on much enlarged scale, showing the present molded cap in its assembled position on a sheet metal screw;

Fig. 2 is a side elevation view of the molded cap herein; and

Fig. 3 is a central cross-section view of the cap showing the annular ribs therein in undeformed condition.

Referring now more particularly to the drawing and first to Fig. 1, there are shown sheet metal parts 1 and 2 which are held together by the sheet metal screw 3, and as is well known in the art, the sheet metal parts 1 and 2 will have registering holes punched or drilled therethrough which are of diameter less than the major diameter of the thread 4 of the sheet metal screw 3, whereby, as the screw 3 is turned, the metal around said holes will be deformed to form a thread which engaged with the thread 4 of the sheet metal screw 3.

The sheet metal screw 3 herein shown is of conventional form including a flange 5 which provides a relatively wide bearing surface for the sheet metal part 1 and which has thereadjacent a polygonal head 6 such as, for example, a hex, and also a screw driver slot 7. As a result of the assembly of the parts 1 and 2 or of the hole-forming operation, the upper sheet metal part 2 may have a projecting burr 8 as shown.

In most instances, the pointed, threaded end of the sheet metal screw 3 will protrude a substantial distance beyond the plane of the sheet metal part 2 whereby, as in the case of aluminum awnings, for example, persons handling the awning may cut or scratch their hands. In addition, it becomes rather a nuisance to clean awnings put together with sheet metal screws, since the sharp threads and pointed end, and also the aforesaid burr 8, usually catch or snag the wash cloth, thus necessitating the bother of pulling off the snagged threads or pieces of cloth after the cleaning operation has been completed. Furthermore, such protruding ends of the sheet metal screws, where visible, are unsightly and often corrode by exposure to the elements.

The molded cap 9 herein is preferably made of an organic thermoplastic material, and it has been found that polyethylene and related materials are admirably suited for this purpose because of their slippery nature which, in combination with the smooth exterior surface of the cap without laterally projecting flanges, makes dislodgment of the cap 9 from the sheet metal screw 3 virtually impossible except by prying as with a knife blade between the end of the cap 9 and the surface of the sheet metal part 2 engaged thereby.

The cap 9 itself is of generally cylindrical form with a rounded, generally hemispherical closed end, the exterior surface thereof preferably being slightly tapered, as shown, to facilitate the molding operation and also to contribute to the difficult axial removal of the cap 9 once it has been installed on a sheet metal screw 3.

Said cap 9 is formed with a recess 10 therein which includes a plurality of inturned annular ribs 11 which are of inside diameter corresponding to, or preferably slightly less than, the minor diameter of the thread 4 of the sheet metal screw 3. The recess 10 terminates in a flare mouth 12 which, as best shown in Fig. 1, clears any burrs 8 or protrusions of the sheet metal part 2, and thus the cap 9 may be firmly seated against said sheet metal part 2.

In installing the molded cap 9 herein, all that it is necessary to do is to apply axial pressure thereon at the closed rounded end, whereupon the same is resiliently deformed and is firmly gripped by the sharp threads 4 of the screw 3 which cross over and embed in the annular ribs 11.

The diameter of the recess 10 corresponds generally with the major diameter of the threads 4 of the sheet metal screw 3, but, if desired, such recess diameter may be slightly less so that the threads 4 also slightly embed in the wall of the recess between and adjacent said ribs 11.

By reason of the smooth exterior surface of the molded cap 9 and the rounded end, and also by reason of the slippery nature of the preferred thermoplastic material aforesaid from which the cap is made, it is very difficult to axially remove the cap 9 from the screw 3, and thus said cap 9 will not become accidentally dislodged during the handling of the awning or cleaning thereof. Moreover, tampering with the caps 9 is discouraged. The caps 9, of course, may be readily removed by prying as aforesaid.

By way of specific example, a No. 6 sheet metal screw has threads 4 of .140" major diameter and .110" minor diameter, the threads being quite sharp as shown in Fig.

1 and having a pitch of say fourteen threads per inch. It has been found that a cap **9** formed with a recess **10** of ⅛" diameter and a plurality of annular ribs **11** spaced apart a distance of .080" and having radiused roots and crests and a maximum minor diameter of about .110" operates well insofar as ease of assembly and difficulty of removal are concerned. The flare mouth **12** may be at an angle of 45° and of diameter so as to provide a sizeable clearance space to clear any burrs **8** around the hole through which the sheet metal screw **3** passes.

It has been found that the present molded caps have utility also in protecting the sheet metal screws which are being used for joining corrugated plastic, glass fiber reinforced sheets, the ends of the molded caps **9** conforming both to the convex and concave curvatures of the corrugations of said sheets when pushed onto the screws which extend through the overlying crests and valleys of the corrugations.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims, or the equivalent of such, be employed.

I therefore particularly point out and distinctly claim as my invention:

1. In combination, at least two sheets held together by a sheet metal screw extending through axially alined holes in said sheets, said screw having a head bearing on one sheet and a pointed, threaded end projecting beyond the other sheet, and a push-on cap for covering the pointed, threaded end of said screw, said cap comprising

a generally cylindrical body of flexible plastic material which has a closed, rounded end, an axial recess in said body terminating in a flaring opening in the other end of said body, said recess having inwardly extending, axially spaced apart, annular ribs which have the threads of said metal screw embedded therein when said cap is pushed on the screw, said flaring opening forming an enlarged mouth for said recess which is adapted to laterally clear, and thus conceal burrs and displaced material around the hole of said other sheet, said cap having a smooth outer surface which tapers slightly from a maximum diameter at said other end toward the rounded end and which, in conjunction with the rounded end, renders manual axial removal of said cap from said screw extremely difficult except by prying between the abutting surfaces of said cap and said other sheet.

2. The combination of claim 1 characterized further in that said cap is made of a material that has the slipperiness of polyethylene whereby axial manual removal of the cap is rendered yet more difficult.

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