# United States Patent [19]

**Carmien et al.**

[11] **3,879,145**

[45] **Apr. 22, 1975**


[54] **END PLUG FOR FIBERGLASS TOOL HANDLES**


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[73] Assignee: **Nupla Corporation**, Sun Valley, Calif.



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[52] **U.S. Cl.** ..... **403/268**; 145/29 R

[51] **Int. Cl.** ..... **F16b 12/04**

[58] **Field of Search** ..... 403/268, 267, 266, 265, 403/10, 263; 145/29 R



[56] **References Cited**

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[57] **ABSTRACT**

An end plug is mounted within a tool head opening to provide a smooth finished area to enhance the tool appearance and to provide an area for part number, logo or other indicia to be shown. The end plug also conceals the end of the fiberglass handle. The resilient end plug has a body portion formed complementarily to the handle receiving opening of a tool head. The plug has integral hemispherical spacers which resiliently engage the sides of the opening to hold the plug in place. The spacers extend for only half the depth of the body portion and have flat top surfaces. Potting compound is poured into the opening to bond the handle to the tool head. The potting compound flows over the top surface of the spacers and forms a layer of potting compound which permanently holds the plug in place.


**6 Claims, 7 Drawing Figures**

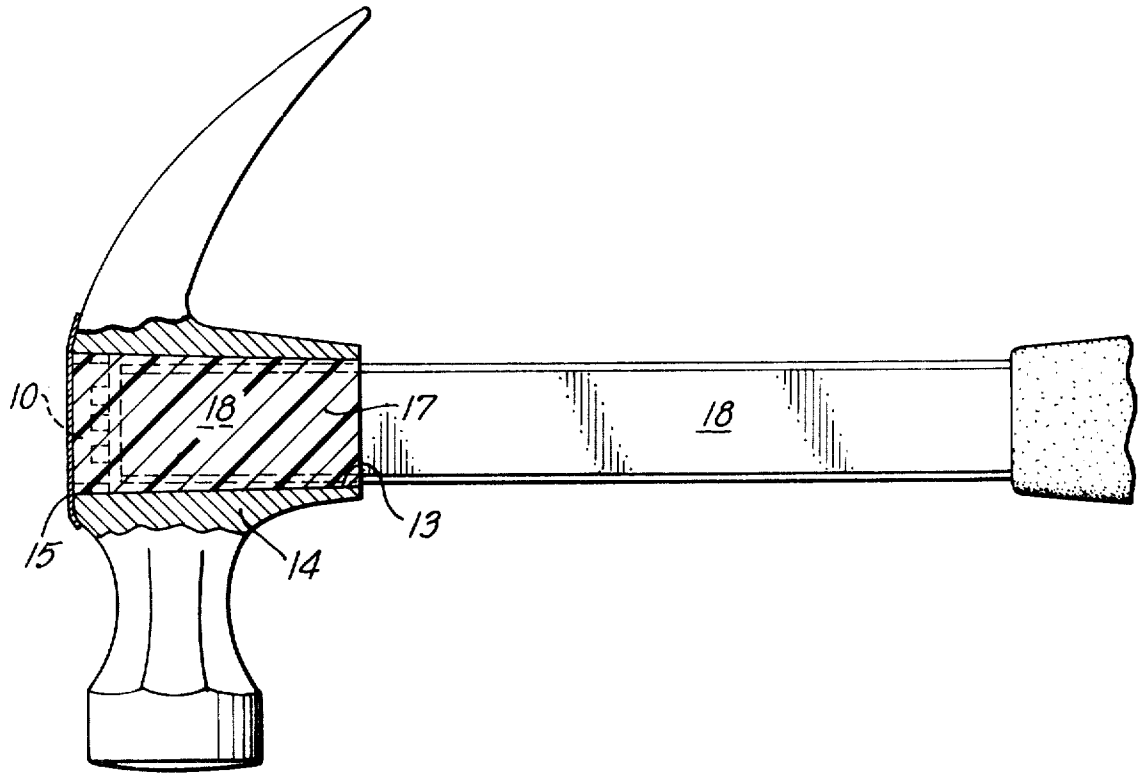


FIG. 1.

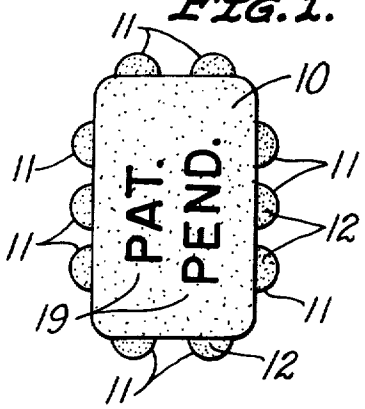



FIG. 2.

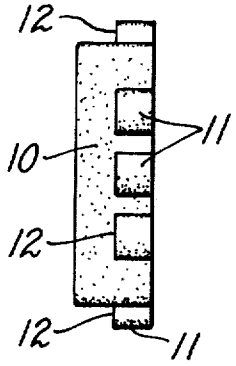



FIG. 3.

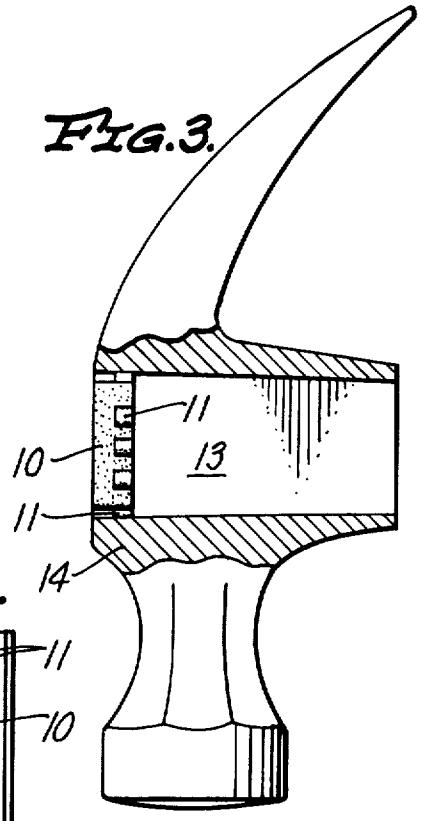



FIG. 5.

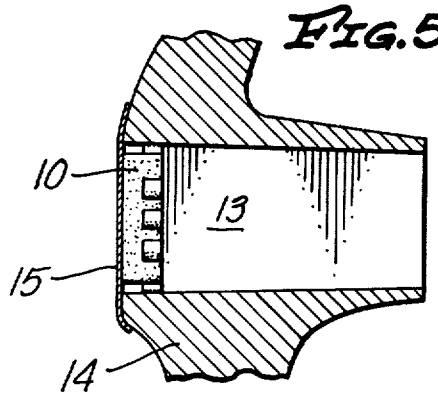



FIG. 4.

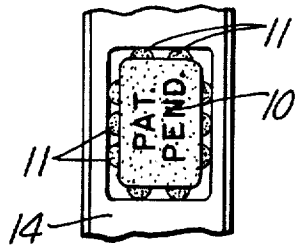



FIG. 7.

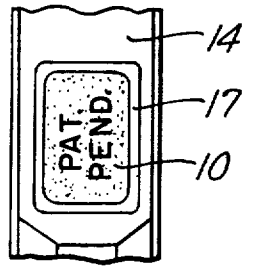



FIG. 6.

# END PLUG FOR FIBERGLASS TOOL HANDLES

## BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to an end plug for mounting within the end of a tool head opening to conceal the end of the fiberglass handle and provide a finished appearance for the tool.

2. Description of the Prior Art

At the present time, fiberglass tool handles are mounted in tool heads with the ends of the handles exposed within the tool head opening. The handle is customarily white or some other color which contrasts with the surrounding epoxy resin or other potting compound which forms the connection between the handle and tool head. Potting, for various causes, will often sink, bubble or have a poor surface finish. The result is that the end of the tool is unsightly and must be painted or coated so that it presents a more attractive appearance to the purchaser. The painting and drying operations required add more steps to the assembly operation, which steps require added expense and materials, labor, and manufacturing time.

## SUMMARY OF THE INVENTION

The present invention solves this problem by providing an end plug which is mounted within the tool head opening at the time the connection between the handle and tool head is made. The end plug is secured within the tool head opening at the same time and by the same means used to make the connection between the handle and tool head. More specifically, the potting compound engages the end plug in such a manner that the plug is securely held within the end of the tool head in overlying relationship to the end of the tool handle. The plug provides a cosmetic finish for the tool and a location for indicia such as a logo, patent number, part number, etc.

If the end plug is formed in a black color, it will match the color of the surrounding epoxy resin potting compound, which is actually transparent but which appears to be black because no light is passing through it. The end of the tool accordingly provides a finished appearance without any secondary painting or coating of any kind.

The primary advantage and benefit provided by the invention is the elimination of the painting and drying operation which is now required. This results in a saving in time, labor and materials, thereby reducing the cost of manufacture of the finished product. It also provides the manufacturer with the flexibility of using alternate forms of plugs with various data or indicia molded therein.

It is accordingly among the objects of the invention to provide an end plug for fiberglass tool handles having the advantages and benefits of the structure set forth above and described in further detail hereafter in this specification.

Another object of the invention is to provide an end plug for fiberglass tool handles which eliminates painting and all other finishing operations.

A further object of the invention is to provide such an end plug which is held in place by the epoxy resin or other material used to secure the handle to the tool head. It is a more particular object of the invention to provide a structure in which the end plug is formed of material which is somewhat resilient, so that the end plug is self-held within the tool head opening prior to completion of the attachment operation.



It is another object of the invention to provide an end plug having means for compensating for minor variations in the dimensions and tolerances of the tool head opening, so that a single pre-formed plug is capable of use with all tool head openings of the appropriate approximate dimensions. A further object of the invention is to provide such an end plug which is capable of being formed by molding, so that it is economic to manufacture and use.

The invention also comprises such other objects, advantages, and capabilities as will later more fully appear and which are inherently possessed by the invention.

While there is shown in the accompanying drawings, preferred embodiment of the invention, it should be understood that the same is susceptible of modification and change without departing from the spirit of the invention.

## DESCRIPTION OF THE DRAWINGS

FIG. **1** is a top plan view of the end plug;

FIG. **2** is a side elevational view of the same;

FIG. **3** is a side elevational view of a tool head partially broken away and shown in section, with the end plug mounted;

FIG. **4** is an end view of the structure shown in FIG. **3**;

FIG. **5** is a partial sectional view similar to FIG. **3**, with masking tape mounted on the end of the tool head;

FIG. **6** is a side elevational view of a completed tool before removal of the masking tape, partly broken away and shown in section;

FIG. **7** is a end view of the completed tool shown in FIG. **6** after removal of the masking tape.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

A preferred embodiment which has been selected to illustrate the invention comprises an end plug which may conveniently be molded and which is preferably formed of elastomeric material such as polyvinyl chloride or other material having suitable resilient properties.

The end plug has a substantially rectangular body portion **10** with rounded corners. Spaced around the periphery of the body portion **10** are a plurality of integral spacers **11**. In the embodiment shown in the drawings, there are two spacers **11** on each end of the body portion **10** and three on each side. The spacers **11** are substantially hemispherical in shape, with their flat sides disposed adjacent to the sides of the body portion **10**.

The spacers **11** are only approximately half as long in vertical dimension as the body portion **10**, so that each spacer **11** is provided with a flat top surface **12** which is disposed adjacent to the vertical center of the body portion **10**.

The number of spacers **11** and their arrangement may be varied, as desired, in accordance with the usage of a particular end plug. The structure shown in the drawings is adapted for use in a tool head opening which is substantially rectangular in shape, with substantially straight sides. Other tool head openings may have other contours and the configuration of the body portion and spacers of the end plug may vary accord-

ingly so that the end plug is complementary to the configuration of the tool head opening in which it is used.

In use, the end plug is inserted through any suitable method or means into the upper or outer end of a handle receiving opening **13** of a tool head **14**. The end plug is mounted so that the flat top surfaces **12** of the spacers **11** are disposed downwardly or inwardly from the end of the tool head **14**.

The end plug should preferably be dimensioned so that at least some and preferably all of the rounded outer surfaces of the spacers **11** will frictionally engage the inner walls of the opening **13**. The spacers **11** should preferably make sufficient frictional engagement to hold the body portion **10** in a position wherein it extends straight across the end of the opening **13**. The outer or top surface of body portion **10** should preferably be flush with the end or top of the tool head **14**. The spacers **11** are sufficiently resilient so that they are adapted to compress and flatten where necessary to compensate for minor variations in the dimensions and tolerances of the opening **13**.

After the end plug is in place within the opening **13**, a piece of masking tape **15** is preferably adhered to the tool head **14** so that it covers the entire end of the opening **13**. The masking tape **15** may also be adhered to the top or outer surface of the body portion **10** of the end plug.

A suitable quantity of potting compound **17** of conventional type is then poured into the opening **13**. A fiberglass tool handle **18** is then inserted into the opening **13**, with the end of the handle **18** preferably being disposed directly adjacent to the bottom or inner surface of the end plug.

The potting compound **17** forms a bond between the fiberglass handle **16** and the metal tool head **14**. The type of potting compound which is customarily used is epoxy resin, which will not form a chemical bond with an elastomeric material such as polyvinyl chloride. The potting compound **17** does, however, flow between the spacers **11** to prevent any lateral or twisting movement of the body portion **10**. The potting compound **17** also flows over the flat top surfaces **12** of the spacers **11** and forms a layer of potting compound equal to half the thickness of the body portion **10** between the top surfaces **12** of the spacers **11** and the outer end of the tool head **14**. This layer acts to hold the end plug in place and prevent any undesired outward movement of the end plug.

After the potting compound **17** has been cured and hardened by heat and/or time, masking tape **15** is removed. The end of the handle receiving opening **13** appears to be completely black and requires no painting or covering operation. In addition, the exposed face of the body portion **10** may carry a trademark, warning notice or other legend or indicia as indicated at **19**.

I claim:

**1.** An end plug for fiberglass tool handles or the like of the type having an elongated handle mounted within the eye opening of a tool head, said end plug comprising a body member disposed within the end of said opening in transverse overlying relationship to the end of said handle, and potting compound disposed within said opening and engaging said end plug and handle to hold said end plug and handle in fixed relationship to each other and to said tool head, said end plug having its outer periphery formed substantially complementarily and dimensionally equal to the cross-section of the inner periphery of said opening, the outer periphery of said end plug frictionally and resiliently engaging the inner periphery of said opening to maintain said end plug in place within said opening prior to the pouring of said potting compound, said end plug being formed of resilient material not bondable to said potting compound, said end plug having integral portions engagable with said potting compound to provide a physical interengagement which prevents displacement of said end plug from said potting compound after curing of said potting compound.

**2.** The structure described in claim **1**, one side of said body member being substantially flush with the end of said tool head, said side of said body member being exposed and carrying indicia thereon.

**3.** The structure described in claim **1**, said end plug being black, said potting compound when cured appearing to be black to provide uniform coloration of the end of said tool without any coating.

**4.** The structure described in claim **1**, said end plug comprising a body member having integral spacers, said spacers having flat ends disposed inwardly from the exposed end of said opening, said potting compound being disposed in overlying relationship to said flat ends of said spacers.

**5.** The structure described in claim **4**, one side of said body member being substantially flush with the end of said tool head, said side of said body member being exposed and carrying indicia thereon.

**6.** The structure described in claim **4**, said end plug being black, said potting compound when cured appearing to be black to provide uniform coloration of the end of said tool without any coating.

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