H. S. MORGAN.

CAP FOR AUTOMOBILE RADIATORS AND THE LIKE.

APPLICATION FILED AUG. 14, 1917.

1,349,137.

Patented Aug. 10, 1920.

FIG. 1

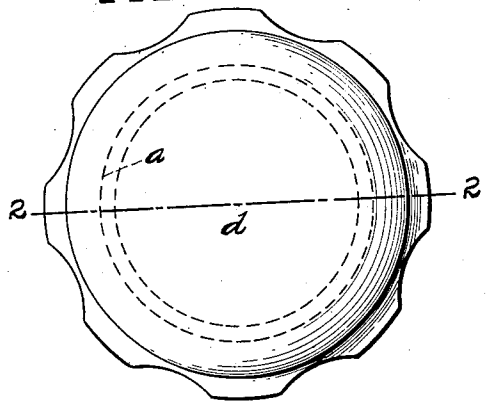


FIG. 2

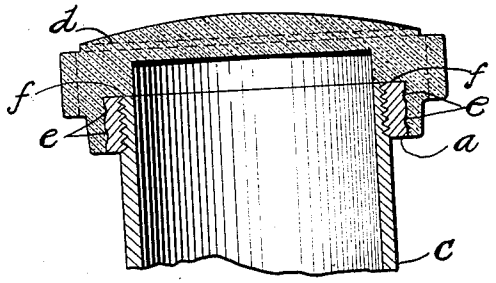
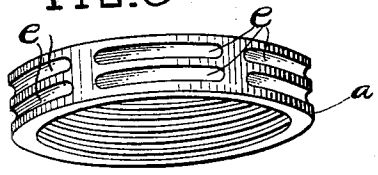


FIG. 3



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By his Attorneys.

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UNITED STATES PATENT OFFICE.

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CAP FOR AUTOMOBILE-RADIATORS AND THE LIKE.

1,349,137.

Specification of Letters Patent. Patented Aug. 10, 1920.

Application filed August 14, 1917. Serial No. 186,115.

To all whom it may concern:

Be it known that I, HENRY S. MORGAN, a citizen of the United States, and a resident of Poughkeepsie, in the county of Dutchess and State of New York, have invented an Improvement in Caps for Automobile-Radiators and the like, of which the following is a specification.

This invention relates to caps for automobile radiators and the like, and with regard to certain more specific features, to a cap made principally of molded material.

The principal object of the invention is to provide a cap constructed primarily of molded material, with a minimum of metal, the metal being provided only for screw threads, at the point where the cap is attached to the radiator of the automobile. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claim.

In the accompanying drawings, in which is shown one of various possible embodiments of this invention,

Figure 1 is a top plan of a preferred form of cap.

Fig. 2 is a vertical section on the line 2—2 of Fig. 1, showing the cap in position on the top of the radiator pipe.

Fig. 3 is a perspective of the threaded bushing removed from the molded material of the cap.

Similar reference characters refer to corresponding parts throughout the several views of the drawings.

This invention is characterized by constructing the metallic part in such a way that the amount of metal used is reduced to a minimum, and is reduced to such a value that the force of expansion of the metal with increase of temperature is insufficient to affect deleteriously the molded material of the cap. The molded covering material is preferably bakelite or condensite rather than hard rubber or other substance, since the former have a relatively high elastic limit, and are unaffected by the action of steam or hot water and may therefore be directly exposed to the interior of the radiator without the interposition of metal. It has been found in practice that caps constructed partly of metal and partly of molded material are subject to breakage and loosening of parts if the expanding force of the metallic part is enough to damage the molded material or to cause the metallic part to become separated from the molded material at any point. The metal, particularly if brass is used, has ordinarily a higher coefficient of expansion than has the molded material, and this unequal or differential expansion of the two parts of the cap causes mechanical strains which may or may not damage the cap, according to the magnitude of the strains and the resisting power of the adjacent material. For example, if a large amount of brass be used, compared with the amount of molded material, the brass in time may actually crack the molded material or cause it to become permanently distorted from its original and proper form. With the disposition and proportioning of parts in the article of the present invention, however, this liability to derangement by repeated differential expansion of the component elements is reduced to a minimum, and in many cases is eliminated entirely from the list of factors tending to shorten the life of the cap.

Referring now to the accompanying drawings, the bushing referred to above is denoted by *a*, and may readily be formed into thin metallic brass piping by passing the same through an automatic threading machine and cutting the same off to size. As now generally formed, these bushings are cast integrally with a top piece which covers the opening in the bushing at one end, or they are provided with an annular top piece forming an annular shoulder for the radiator pipe to abut against when the cap is in position. The former type of cap requires a great deal more metal than the latter type, and of course requires a great deal more metal than the cap of the present invention. The latter cap, with the annular metallic shoulder for the top of the radiator pipe, is a notable improvement on the former type, and is set forth in my Patent 1,134,890, dated April 6, 1915, for cap for automobile radiators and the like. The present invention is an improvement on both of these former types of caps.

The exterior covering *d*, as will be seen, is exposed to the interior of the pipe *c*, whereas in the former of the prior-art caps

noted above, the thickness of metal has separated the covering from the space inside the pipe in order to prevent the deleterious action of the steam or hot water upon such covering. In the present case, however, the covering, where it is exposed, consists of a material which is not affected by the action of steam. An admirable material for this purpose is either the well-known bakelite or condensite, which consist of a properly treated mixture of phenol and formaldehyde. This material is molded over the top and around the sides of the cap in any suitable manner, the bushing being preferably provided with grooves *e* to retain the same; and then the molded material is cured or hardened so as to form a rigid impervious covering around the bushing, which it holds in place.

It will be noted from the accompanying drawings that the amount of metal, preferably brass, used is simply enough to form screw threads for attaching the cap to the radiator pipe. The top of the radiator pipe is seated against an annular shoulder *f* of the molded material, not of brass, so that no metal is utilized even for this purpose. The axial length of the screw threads is determined partly by the requirements for a secure fit of the cap upon the radiator pipe, but this length is made as short as may be, in order to minimize the quantity of metal used. Similarly, the radial thickness of the metal is kept to a minimum, and is only sufficient to give to the metal enough body so that the screw threads may be cut into it and so that the metal may be securely held in position by the molded material. By this proportioning of parts, and by eliminating any metal across the top of the screw threads either to form a shoulder for the radiator pipe or to protect the molded material from the action of the steam and hot water within the radiator, the metal content is kept low enough so that the differential expansion of metal and molded material with rise of temperature does not give rise to mechanical strains that would tend to crack the molded material or to cause the metal to become loosened from the molded material at any point.

The advantages of the present improvement and their application will be obvious without further exposition. They may be applied to a variety of uses other than in radiator caps, all of which will be readily understood.

I claim:

A cap for automobile radiators and the like, comprising a bushing adapted to fit a radiator pipe and open at both ends, a covering of hard moldable material unaffected by the action of steam or hot water and having a relatively high elastic limit, said covering surrounding the periphery and closing one end of the bushing, and provided with an annular shoulder against which the end of said pipe may abut, the ratio of mass and disposition of bushing to covering being low enough so that the bushing does not crack the covering by differential expansion with changes of temperature.

In testimony whereof, I have signed my name to this specification this 13th day of August, 1917.

HENRY S. MORGAN.