Aug. 7, 1962 L. E. MILES ETAL 3,048,067

RADIATOR CAP TOOL

Filed Feb. 14, 1961

FIG. 2

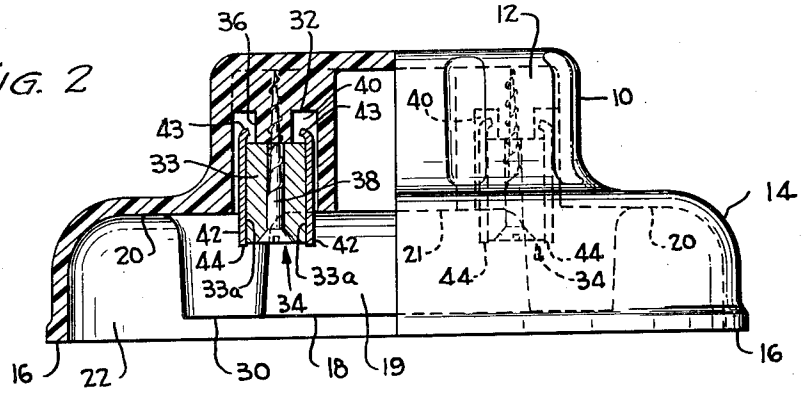


FIG. 1

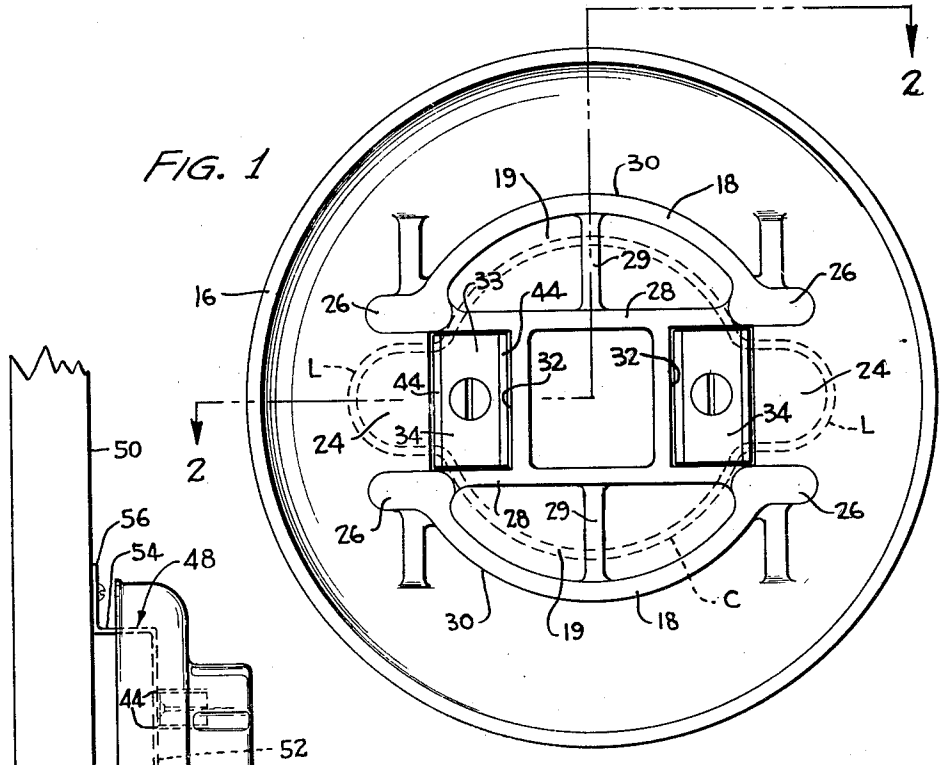


FIG. 3

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RADIATOR CAP TOOL

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This invention relates to an automobile radiator cap removing and holding tool especially adapted to remove a usual pressure cap from an overheated automobile radiator, while shielding the user from the mixture of hot water and steam which tends to violently erupt from the overheated radiator upon removal of the cap.

The invention contemplates the provision of an argement of novel magnetic retaining means for holding the removed cap within the tool, said means also being especially adapted for cooperation with a supporting bar or bracket to magnetically support the tool thereon in easily removable and accessible manner. Also included in the invention is the combination of the tool and its said supporting bracket.

The tool of the invention is adapted for integral formation of its body by usual plastic molding methods and comprises a generally cylindrical socket open at one end for reception of the circular radiator cap and formed with diametrically opposed gaps in the socket walls for reception of the usual radially projecting twisting lugs of the cap whereby rotary force applied to the socket will be effectively transmitted to the cap for the purpose of unscrewing same from the filling pipe of the radiator. It is the circumferential ends of the socket walls on opposite sides of the gap which thus engage the cap lugs, and these will preferably be thickened and reinforced to better adapt them for this purpose; however, the socket walls themselves, while not absolutely essential from a broad standpoint, serve the important function of facilitating application of the tool and locating the tool on the cap.

For manipulating the tool there is provided a handle which is preferably integral and coaxial with the socket and which may advantageously define the upper end of the socket while also providing recesses in which are housed the holding magnet or magnets for cooperation with the radiator cap. Extending radially outwardly and downwardly from the cap is the shield, the outer peripheral edge of which extends concentrically about the socket and is radially spaced substantially outwardly from the socket to constitute an effective barrier which will extend completely around and over the end of the radiator filler pipe at the time the cap is removed, to most effectively protect the user. Preferably the shield is generally bell shaped with its lower peripheral edge extending slightly below the socket, the bell shape assisting in deflecting downwardly any steam and/or hot water erupting through the upwardly opening radiator filler pipe over which the cap is normally applied.

The foregoing features and advantages, as well as others of an incidental nature, are all inherent in the preferred exemplification of the invention illustrated in the accompanying drawing, in which:

FIGURE 1 is a bottom plan view of the radiator cap removing and holding tool of the invention.

FIGURE 2 is a view partly in elevation and partly in section on the line 2—2 of FIGURE 1.

FIGURE 3 is a side elevational view showing the manner in which the tool of the invention cooperates with a special supporting bracket adapted to removably support the tool in a readily accessible location.

Referring now in detail to the accompanying drawings, the body of the tool is formed by usual plastic molding and fabricating methods from any usual preferably

thermosetting plastic material. The body comprises the upwardly projecting generally cylindrical handle **10**, which in the present embodiment is formed with a plurality of radially projecting axial ribs **12** to facilitate its manual gripping and twisting. Cast integrally with the handle **10** and extending from the lower end periphery thereof is an outwardly and downwardly flaring bell shaped shield **14** having its lower edge **16** disposed in a radial plane with respect to the axis of the cylindrical handle **10**.

Within the recess **22** defined by the downwardly opening shield **14** is the gripping socket **19** of the tool which, in the present embodiment, is defined by a pair of relatively opposed arcuate depending rib segments **18—18**, both integral with the downwardly presented inner face or surface **20** of the shield. These rib segments **18—18** in substance are merely segments of a common cylindrical sleeve, having diametrically opposed gaps **24—24** defined by the relatively spaced ends of the segments. The arrangement is such that the circular portion of the radiator cap C, shown in broken lines in FIGURE 1, is received within the socket **19** defined by the ribs **18—18**, and the radially projecting lugs L—L of the conventional pressure cap C are received in the gaps **24—24** so that the circumferential abutments at the ends of the respective ribs **18—18** may abut against them to transmit twisting force thereto for removal and replacement of the cap.

For the purpose of economizing on material there may be provided a number of recesses extending through the upper end of the socket **19** into the handle **10**, and separated by a network of relatively intersecting reinforcing vertical webs, having their lower edges in a common plane defining the upper end **21** of the socket **19**.

The rib ends may advantageously be enlarged and strengthened to perform their intended function. To this end they may constitute relatively thickened abutments or bosses, each designated **26**, extending parallel to the diametrical line of symmetry between the two rib segments **18—18** and each reinforced by a web or buttress **28** molded integrally with the abutment **26** and the adjoining bottom or end **20** of recess **22**. Similar buttresses **29** reinforce the rib segments **18—18** themselves.

Preferably the lower peripheral edge **30** of each of the socket defining segments **18** will be spaced somewhat above the lower peripheral edge **16** of the shield, whereby the latter may extend somewhat below the radiator cap and the pipe end opening to which same is applied, when the tool is in use.

The above mentioned recesses in the handle **10** include a pair of recesses **32—32**, in each of which is housed a magnet, generally designated **34**, having its opposite poles projecting downwardly into the socket **19** for operative holding engagement with the upper surface of the radiator cap C, all to the end that the cap may be readily removed from the filler pipe of the radiator without danger of its being dropped into some relatively inaccessible area of the engine housing.

The exact form of the magnet or magnets is immaterial from a broad standpoint, though in the instant embodiment there is employed a particularly advantageous arrangement of magnets. Thus each such magnet is of composite construction including a main magnetic body **33** provided with relatively laterally opposed flat polar faces **33A** and also with a flat upper end which abuts against a downwardly directed boss **36** extending from the upper end of its respective recess. A conventional screw **38** extending through a vertical bore in the magnetic body **33** is threaded into the plastic material of the boss **36** to secure the magnetic body **33** firmly in place. This arrangement leaves clearance spaces **40—40** between the upper end of the magnetic body **33** and the upper end of its respective recess. Plates **42** of magnetic material, such

as any of the ferrous metals or alloys, are slidably held flush against the polar faces of body 33 and formed at their upper ends with inwardly turned flanges 43 to limit the downward movement of the plates 42. The lower end edges 44 of the respective plates in this arrangement serve as the opposite poles of the composite magnet thus formed, as will be readily apparent to those skilled in the art, and as is shown in FIGURE 2. These plates are spaced somewhat from the adjacent side walls of their respective recesses, as shown in FIGURE 2, or in other words have sufficient clearance that they are free to slide vertically on the magnetic body 33 to thus project themselves into strong holding engagement with the upper face of the radiator cap C, even though the latter may not be fully received within the socket 19 sufficiently to engage the lower end face of the body 33.

The magnetic structures thus described, in conjunction with the socket itself, may cooperate with a special bracket 48 shown in FIGURE 3, to securely but removably support the tool on a vertical wall or post 50 located in an accessible spot where, for instance, a gasoline station attendant can readily reach and use it, and can as readily replace it following its use. In order for the tool to thus cooperate with its supporting bracket, it is important that the two magnetic structures, and in particular poles 44—44, be diametrically aligned with the gaps 24—24.

The bracket 48 may be formed of strap metal, consisting essentially of a relatively flat bar 52 of a width for diametrical reception in the gaps 24 and in holding engagement with the diametrically aligned magnet poles 44 of the tool, the length of the bar being such as to permit its easy reception in the recess 22 of the shield, or in other words being somewhat less than the internal diameter of the recess. The bar 52 is supported in spaced relation from the surface 50 by its legs 54, which may constitute merely angularly bent extensions of the flat metal bar 52. These terminate in base plates 56—56 which may be secured by screws or otherwise to the supporting surface 50.

When it is desired to use the tool, it may be readily grasped and pulled off of its supporting bracket 48. The user may then place it over the pressure cap C of the automobile radiator in such manner that the cap will be received within the socket 19, with its usual radial legs L projecting into the gaps 24—24 for circumferential engagement by the abutments 26 as indicated in FIGURE 2. When thus applied, the shield 14 will extend completely around and over the radiator cap, with its lower periphery substantially at the level of or below the opening in the filler pipe to which the cap is applied.

With the tool thus applied, the cap may be readily unscrewed and removed merely by imparting manual rotation to its handle 10, and in the course of the removal any steam or hot water ejected through the open end of the filler pipe will impinge against and be deflected by the bell like inner surface of the shield 14. The depending skirt like or bell shaped shield serves the important function of confining the ejected fluid against lateral spreading and thereby minimizes the possibility of its contacting the hands or body of the user.

At the same time the magnetic structures of the tool will continue to grip and hold the cap C as it is lifted away, so that it will not be inadvertently dropped, with the possibility of its being lost or becoming lodged in a place from which its retrieval might be difficult. The cap may be reapplied by use of the tool in obvious manner, though normally when reapplied the radiator and the cap itself will have been cooled sufficiently that replacement may be accomplished manually in conventional manner.

In this application we have shown and described only the preferred embodiment of our invention, simply by way of illustration of the preferred mode of carrying out our invention. However, the described and illustrated structure is obviously capable of other and different embodiments, and its several details are susceptible of modification in various ways, all without departing from the invention as defined in the accompanying claims.

Having thus described our invention, we claim:

1. A radiator cap removing and holding tool comprising a generally bell shaped circular shield defining a downwardly opening recess of substantially greater lateral extent than a conventional radiator pressure cap, relatively circumferentially spaced pairs of abutments fixed to the shield and depending into said recess from said shield, said pairs of abtuments being relatively spaced diametrically of the recess sufficiently to receive between them the circular portion of such a pressure cap, said spaced abutments of each said pair being positioned to receive between them the usual radial gripping lugs of the cap, to thereby interlock the cap and lugs together for rotary movement, and magnetic means disposed in said recess, said means including a magnetic body fixedly secured to said tool with its poles in the form of flat surfaces facing generally diametrically of the said recess and shield, in combination with plates of magnetic material magnetically attracted to and in slidable engagement with the said respective flat pole surfaces, the lower ends of said plates projecting downwardly into said recess and functioning as extensible and retractible magnetic poles for operative holding engagement with said cap.

2. A radiator cap removing and holding tool comprising a circular shield defining a downwardly opening generally cylindrical recess for reception of a conventional radiator pressure cap, relatively circumferentially spaced pairs of abutments fixed to said shield within the recess and relatively spaced diametrically of the recess for reception between them of the circular portion of the radiator pressure cap, said spaced abtuments of each pair being positioned to receive between them the usual radial gripping lugs of the cap, and magnetic means disposed in said recess, said means including a magnetic body member with its poles in the form of surfaces extending rectilinearly in the direction of the cylindrical axis of said recess, and a plate member of magnetic material magnetically attracted to and in slidable engagement with one of said surfaces, one of said members being secured to said tool, and the other said member projecting downwardly into said recess and functioning as an extensible and retractible magnetic pole for operative engagement with said cap.

3. A radiator cap removing and holding tool comprising a circular shield defining a downwardly opening generally cylindrical recess for reception of a conventional radiator pressure cap, relatively circumferentially spaced pairs of abutments fixed to said shield within the recess and relatively spaced diametrically of the recess for reception between them of the circular portion of the radiator pressure cap, said spaced abutments of each pair being positioned to receive between them the usual radial gripping lugs of the cap, and magnetic means disposed in said recess, said means including a magnetic body member secured to said tool and having one of its poles in the form of a surface extending in the direction of the cylindrical axis of said recess, and a plate member of magnetic material magnetically attracted to and in slidable engagement with said surface, said plate member projecting downwardly into said recess and functioning as an extensible and retractible magnetic pole for operative engagement with said cap.

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