United States Patent [19]

McKenna et al.

[11] **3,785,225**

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[54] **SAFETY DEVICE FOR REMOVING RADIATOR CAPS**

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[52] **U.S. Cl.** ..... **81/3.1 R**

[51] **Int. Cl.** **B67b 7/44,** B25b 29/00

[58] **Field of Search** ..... 81/3.1 R, 3.1 B, 81/3.34, 90 C, 90 D, 90 B

[56] **References Cited**

UNITED STATES PATENTS

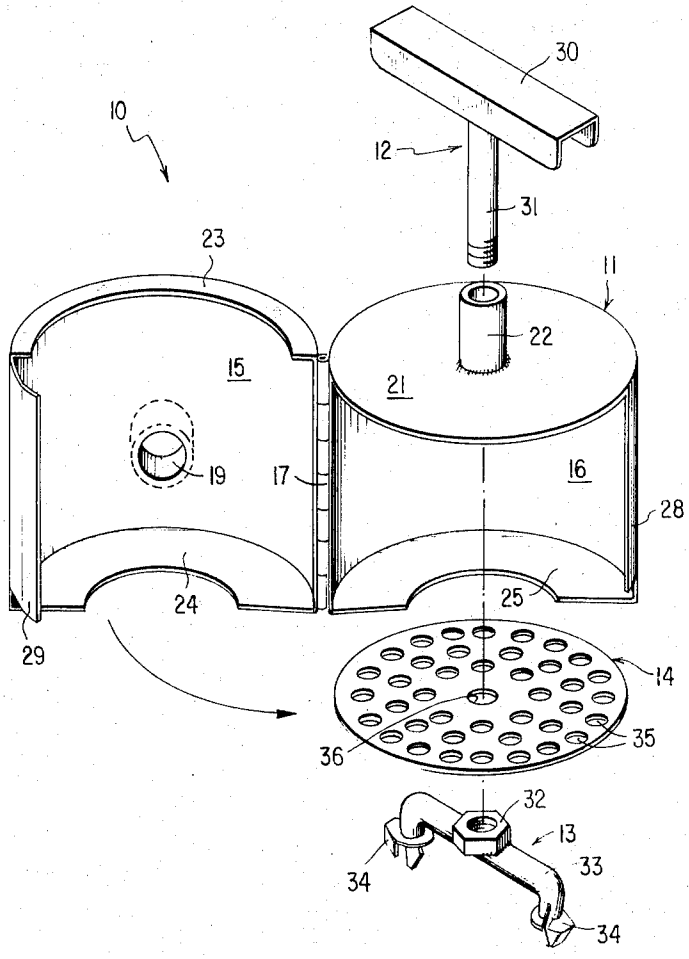
3,037,408	6/1962	Rives et al.	81/90 B
3,371,563	3/1968	Lallo	81/90 B
3,481,227	12/1969	Shook	81/3.1 R
3,618,428	11/1971	Phipps	81/3.1 R

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Assistant Examiner—Roscoe V. Parker
Attorney—D. C. Roylance et al.

[57] **ABSTRACT**

There is disclosed a radiator cap removing device which comprises a steam retainer chamber positionable over a radiator cap. The steam retainer chamber has an opening in the bottom which is at least as large as the neck of the radiator to which the radiator cap is attached but smaller then the greatest width of the radiator cap. The radiator cap projects though this opening. A shaft is slideably and rotatably positioned in the retainer chamber. This shaft includes a cap removal means secured at one end thereof within the retainer and a gripping means at the other end of the shaft outside of the retainer chamber. There is also disclosed a pressure release plate containing a number of orifices slideably positioned on the shaft above the cap removal means. When used to remove a radiator cap from a hot radiator, the device shields the person using the tool from being burned or scalded by steam or water emitting from the radiator and prevents water and the radiator cap from being blown back onto the engine or the person using the device.

9 Claims, 3 Drawing Figures



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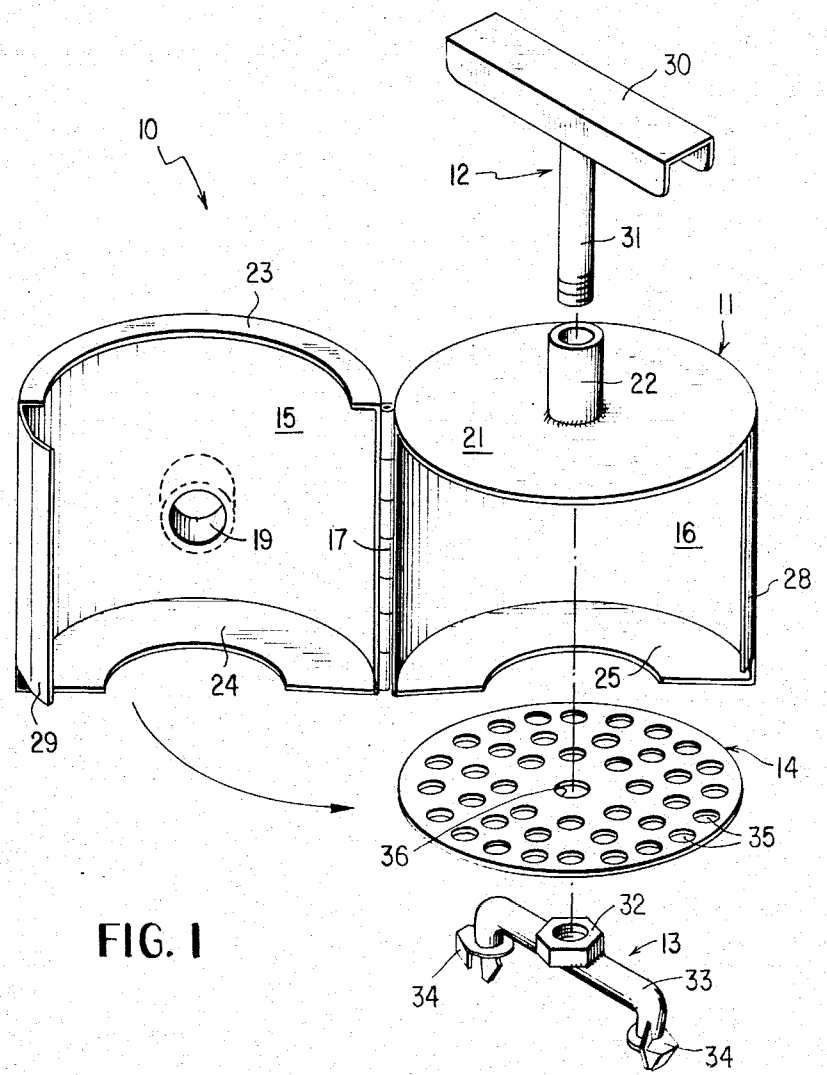


FIG. 1

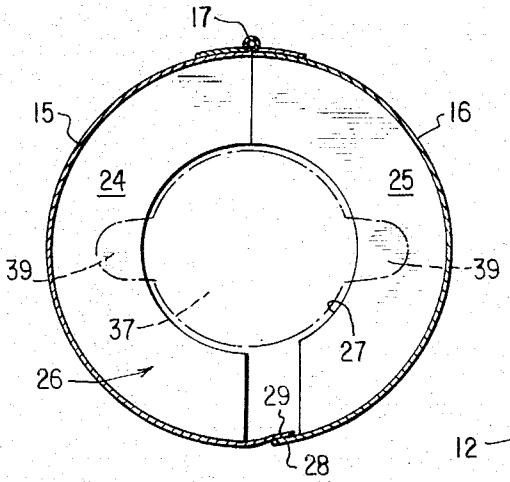


FIG. 3

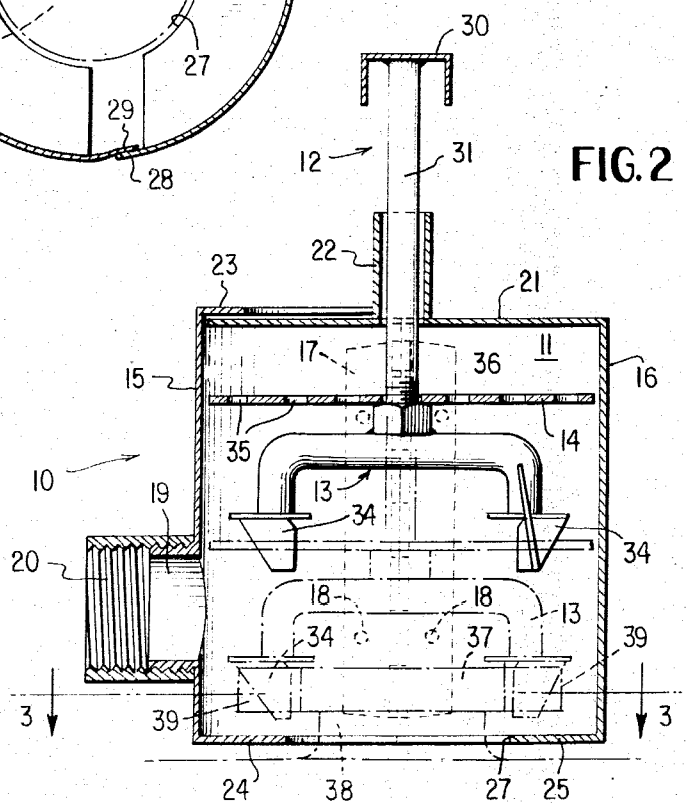


FIG. 2

SAFETY DEVICE FOR REMOVING RADIATOR CAPS

This invention relates to a safety device for removing radiator caps from overheated radiators while shielding the person using the tool from being burned or scalded by steam or water and preventing water and the radiator cap from being blown back onto the engine or the person using the device.

The cap of an automobile radiator is frequently removed while the radiator is hot enough to emit steam. An automobile engine operates more efficiently when its cooling system is under pressure. Accordingly, after the engine has been in service for some time, the coolant liquid in the radiator may be at a temperature above the boiling point of the liquid at atmospheric pressure when the cap is removed. The coolant liquid may then spontaneously gush out of the radiator when the cap is removed, causing the possibility of injury to the person removing the cap.

Various devices have been proposed to remove a radiator cap from a hot engine which are designed to prevent the user from being burned or scalded during the removal of the cap. For example, U.S. Pat. No. 3,371,563 discloses a device comprising a chamber having an opening so that a radiator cap projects within the chamber. There is a port in the chamber which is in communication with a hose for exhausting steam from the chamber. Depression of a handle moves a plate into engagement with the radiator cap. When the handle is turned, the cap is removed and the steam escapes from the radiator through the hose. U.S. Pat. Nos. 3,014,389; 3,037,408; 3,352,184; 3,481,227; and 3,618,428 disclose devices comprising a gripping means for a radiator cap located inside a shield with a handle integrally mounted on the shield. When the handle is turned, the radiator cap is turned and removed and the radiator fluids are diverted by the shield. U.S. Pat. Nos. 2,599,668; 3,007,356; 3,035,466; 3,261,242; and 3,274,864 disclose hand held radiator cap removing tools with extended handles so that the radiator cap can be removed at safe distance. U.S. Pat. Nos. 3,121,355 and 3,253,485 disclose hand held resilient radiator cap removing devices which fit over the radiator cap and divert hot fluids emitting from the radiator by means of a flange.

It is an object of this invention to provide an improved safety device for removing radiator caps from overheated radiators.

It is another object of this invention to provide a radiator cap removing means which includes a protective shield and disposed therein a pressure release plate.

It is a further object of this invention to provide a safety device for removing radiator caps from overheated radiators which shields the person using the tool from being burned or scalded by steam or water and prevents water and the radiator cap from being blown back onto the engine or the person using the device.

These and other objects are attained by the practice of this invention which, briefly, comprises providing a radiator cap removing device which comprises a steam retainer chamber positionable over a radiator cap. The steam retainer has an opening in the bottom thereof which is at least as large as the neck of the radiator to which the radiator cap is attached but smaller then the greatest width of the cap itself. There is a shaft means slideably and rotatably positioned in the steam retainer chamber. The shaft includes a cap removal means secured at one end thereof within the chamber and a gripping means at the other end of the shaft outside the chamber.

The invention will be more particularly described with reference to the accompanying drawings wherein:

FIG. 1 is an exploded perspective view of the safety device of this invention.

FIG. 2 is an elongated sectional view of the safety device.

FIG. 3 is a sectional view taken along line 3—3 of FIG. 2.

Referring more particularly to the drawings, there is shown a radiator cap removing device **10** comprising a shield means **11**, a handle **12**, a radiator cap engaging means **13** and a pressure release plate **14**.

The shield means or chamber **11** comprises two semicylindrical portions **15** and **16** joined together at one edge by a hinge **17** which extends longitudinally from the top to the bottom of the adjacent edges of the semicylindrical portions **15** and **16**. The hinge **17** is secured to the edges of the portions **15** and **16** by rivets **18**. The hinge **17** permits the two semicylindrical portions **15** and **16** to close to form the cylindrical shield **11**.

In one of the vertical walls of the semicylindrical portion **15** is an annular orifice **19**. A threaded flange **20** extends outwardly from the side of the semicylindrical portion **15** which surrounds the annular orifice **19**.

A circular plate **21** is secured to the top edge of the semicylindrical portion **16**. The diameter of the top plate **21** is substantially the same as and not greater then the inner diameter of the cylinder **11** formed when the semicylindrical portions **15** and **16** are in their closed positions. Extending upwardly from the center of the circular top plate **21** is a collar **22**. A flange **23** is secured to the top edge of the semicircular portion **15** so that it overlaps a portion of the circular top plate **21** when the semicylindrical portions **15** and **16** are in their closed positions.

Secured to the bottom edge of each of the semicylindrical portions **15** and **16** are arcuate plates **24** and **25**. When the semicylindrical portions are in their closed positions the arcuate plates **24** and **25** form an annular opening **27** as shown in FIG. **3**.

The side edges **28** and **29** of the semicylindrical portions **15** and **16** opposite the edges joined by the hinge **17** extend somewhat beyond the arcuate plates **24** and **25**. Thus, when the semicylindrical portions are in the closed position, the side edge **28** overlaps the side edge **29**. The edges **28** and **29** may be fitted with a suitable clamp or latch device (not shown) to insure that the chamber stays closed.

The handle **12** comprises a horizontal bar **30** and a rod **31** perpendicular thereto. The bottom portion of the rod **31** is threaded so that it may be screwed into the nut **32** on the cap engaging means **13**. The nut **32** is fastened to a horizontal bar **33** which has a 90° bend at each end thereof. Secured to each end of the bar **33** are tabs **34** which are adapted to engage the protuberances on a radiator cap.

The pressure release plate **14** comprises a plurality of openings **35** and an annular orifice **36** in the center thereof. When the radiator cap removing device is assembled, the rod **31** on the handle **12** is inserted through the collar **22** and through the annular orifice **36** of the pressure release plate and is secured to the cap engaging means **33** by means of the nut **32**.

The use of the radiator cap removing device of this invention is illustrated in FIG. **2.** The device is positioned over a radiator so that the radiator cap **37** projects within the chamber **11.** This is accomplished by placing the device while open, i.e., as shown in FIG. **1** so that one of the arcuate plates **24** or **25** is in approximate contact with the neck **38** of the radiator and the device is then closed by rotating the other semicylindrical portion on the hinge **17** so that side edges **28** and **29** overlap. Depression of the handle **12** moves the cap engaging means **13** and pressure release plate **14** downwards. The tabs **34** on the radiator cap engaging means **13** contact the protuberances **39** on the radiator cap **37** on opposite sides thereof so that when the handle is rotated, the radiator cap is unloosened and removed. The tabs **34** on the cap engaging means may have fingers thereon which will extend underneath the protuberances on the radiator cap thus permitting the radiator cap **37** to be raised when the handle **12** is raised. When steam at great pressure emits from the radiator, its initial force is partially dissipated by the pressure release plate **14.** If the pressure of the steam is sufficiently great, the pressure release plate **14** may slide part way up the rod **31,** thus absorbing much of the energy of the steam. The pressure release plate **14** also helps prevent steam from escaping through the collar **22.** The steam does escape through the orifice **19.** The threaded flange **20** may be fitted with an elbow (not shown) which may be directed downward when the steam is being released and which may then be turned upward so that the radiator may be refilled by pouring water into the top of the elbow so that it will pass through the orifice **19.** This device shields the person using the tool from being burned or scalded by steam or water emitting from a hot radiator and prevents water and the radiator cap from being blown back onto the engine or the person using the device.

The component parts of the radiator cap removing device of this invention may be made of metal or plastic or any other solid material that is capable of withstanding heat and pressure.

While a particularly advantageous embodiment of the invention has been described and illustrated, it will be recognized by those skilled in the art that various modifications can be made therein without departing from the scope of the claims.

We claim:

1. A radiator cap removing device which comprises a steam retainer positionable over a radiator cap, said steam retainer having an opening in the bottom thereof which is at least as large as the neck of the radiator to which the radiator cap is attached but smaller then the greatest width of the radiator cap, a shaft slideably and rotatably positioned in said retainer, said shaft including a cap removal means secured at one end thereof within said retainer and a gripping means at the other end of said shaft outside of said retainer said retainer being vertically separable into two sections and includes means for releasably securing the two sections whereby said chamber may be positioned over said radiator cap by bringing together said sections.

2. A device as defined in claim **1** wherein a vertical edge of one of said sections is attached to a vertical edge of the other of said sections by a hinge means.

3. A device as defined in claim **2** wherein the bottom portion of each of said separable sections comprises an arcuate plate whereby when said sections are brought together to form said steam retainer chamber, said arcuate plates form an annular opening through which a radiator cap will project.

4. A device as defined in claim **3** wherein one of said separable sections contains an annular orifice in the side thereof, and means in communication with said orifice for directing steam away from said device.

5. A device as defined in claim **1** wherein each of said separable sections is semicylindrical in shape and one of said semicylindrical sections has a circular plate secured to the top edge thereof, the diameter of said circular plate being substantially the same as and not greater then the inner diameter of the cylindrical chamber formed when said semicylindrical sections are brought together.

6. A device as defined in claim **5** wherein the other of said semicylindrical sections has a arcuate flange secured to the top edge thereof which overlaps a portion of said circular plate when said semicylindrical sections are brought together.

7. A device as defined in claim **5** wherein said top plate has a collar in the middle thereof through which said shaft extends.

8. A device as defined in claim **5** comprising a pressure release plate slideably siutated on said shaft means.

9. A device as defined in claim **8** wherein said pressure release plate comprises a circular plate having a diameter approximately equal to the inner diameter of said chamber and containing a plurality of openings therein.

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