Nov. 25, 1930. M. ANCHELEVICH 1,782,496

LEAK TESTER CAP FOR AUTOMOBILE RADIATORS

Filed Dec. 16, 1929

FIG. 2.

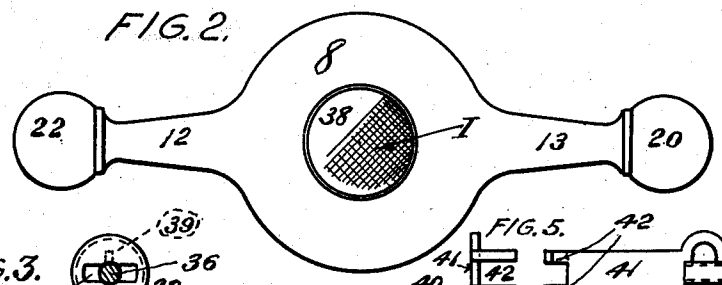
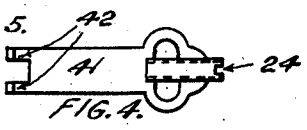


FIG. 3.

FIG. 5.

FIG. 4.



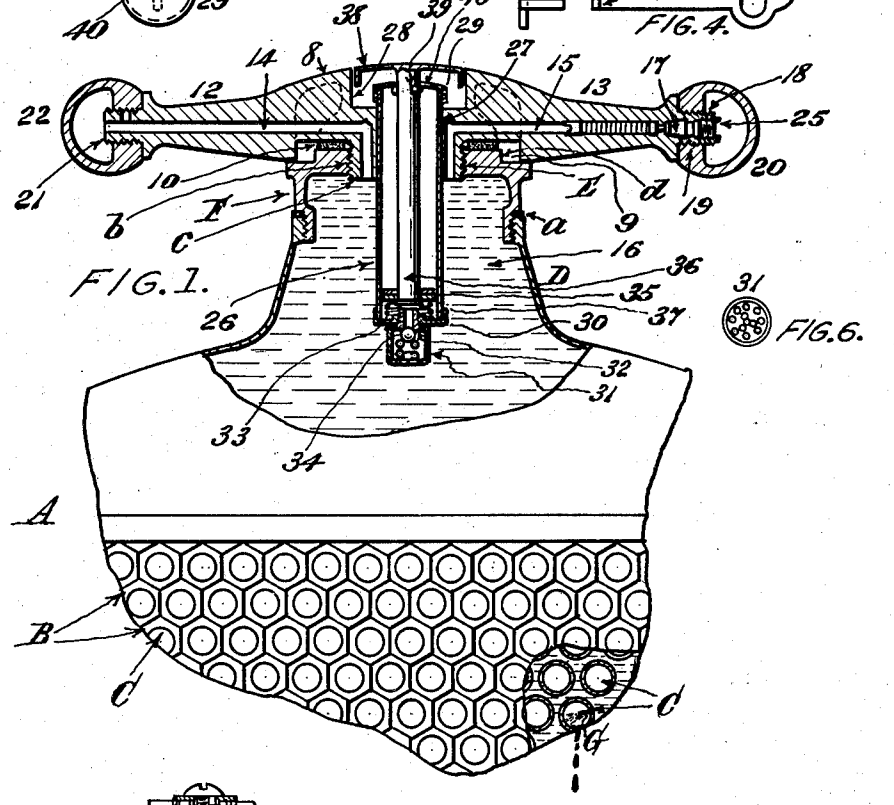
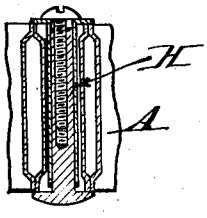


FIG. 1.

FIG. 6.

FIG. 8.



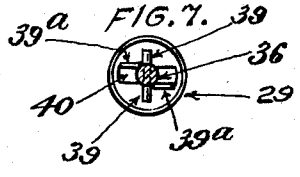


FIG. 7.

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UNITED STATES PATENT OFFICE

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LEAK-TESTER CAP FOR AUTOMOBILE RADIATORS

Application filed December 16, 1929. Serial No. 414,361.

This invention relates to automobile-radiator caps and, more especially, to mechanism comprised in such caps that is adapted to facilitate the instant and positive detection or spotting of the exact point or place of any leakage in the radiator so that any required repairs can be promptly, accurately and economically made without ordinarily needing the removal of the entire radiator from its mounted position in the machine or car that has heretofore taken considerable time and expense, as well as to unduly hold up or detain the vehicle from use and, also, occupying storage and space in which to leisurely make tests and such repairs as may be necessary with the radiator removed and, otherwise, in the way of other valuable service, so to speak. Besides, the delays occasioned by the uncertainty of where each leak is actually placed or located and the costly removal of the radiator, to make leak tests, have delayed the repairs and the further running of the car, to the great and material inconvenience, annoyance and loss to the driver, who, with my improved cap, that is equipped with my simple and inexpensive positive testing and spotting mechanism, can instantly proceed with the repairs and not materially be kept from advancing on his way in his car whose radiator has not been removed nor thereby impaired as is frequently possible and happens.

The details of structure and mode of operation will be quite fully and clearly hereinafter described and then more particularly pointed out in the claims that follow.

In the accompanying sheet of drawings, illustrating my invention, Figure 1 is a fragmentary front elevation partly broken away and in section to show said invention in leak-testing form under the central compression means that extends downwardly from the cap into the water-supply content of the radiator, the latter being of the ordinary honeycomb or hexagon cell type in extensive use everywhere; Fig. 2, a plan view of the cap; Fig. 3, a detail plan view of the slotted top of the central vertical compressor cylinder, with a cross-section of the piston rod or stem, taken on a horizontal line just below the compression presser-head; Fig. 4, a plan view of a special form of manipulating key or spanner-hook used by me in engaging the said slotted top of the compressor cylinder or shell for any required detachment of said slotted top thereof; Fig. 5, a left-end elevation of Fig. 4; Fig. 6, a detail bottom plan view of the lower strainer-end of the compression-cylinder device; Fig. 7, an underside view of the slotted cap seen in Fig. 3; and Fig. 8, a fragmentary sectional elevation of a useful mending device used in the cells of the radiator, the form shown being an approved one covered by me under United States Letters-Patent No. 1,507,449, of September 2, 1924.

In carrying out my invention in practice, three important features are to be observed, viz:—

First: Testing the radiator to instantly locate or find the actual spot or point of leakage and without removing the radiator from the car, the testing being accomplished by the pressure of the hand on an air compressing device, detailed below;

Second: Cleaning the radiator by means of an air-pump, without removing said radiator from the car; and—

Third: Letting steam and gases out of the radiator when in undue heated, steamed and boiled condition, by simply partly removing a screw-cap from a vent-end of one of the cap-handles, detailed fully below also.

A indicates an ordinary automobile-radiator, shown in upper central fragment form, and of the honeycomb hexagonal-cell type, the cells being indicated by the letter B, and the inner tubular radiator-portions of the cells being indicated by the letter C. The neck D has an internally threaded mouth E in which an auxiliary duly externally threaded universal coupling-ring F is secured, with an intervening gasket *a*. Said coupling-ring F has an internally threaded orifice *b* that is engaged by the lower threaded annular-extension *c*, the latter being located centrally in the bottom of the body portion 8 of the cap and surrounded by an annulus 9. The said coupling-ring F has a raised rim *d* of lesser width than the said annulus

9 and a gasket 10 is provided in the space between the upper face of the said rim *d* and the bottom of the annulus for making the usual tight joint necessary to prevent leakage at that point in the structure.

12 and 13 indicate a pair of arms extending in opposite directions diametrically from the cap-member 8 and both provided with right-angled passages 14 and 15, respectively, that lead from the water-chamber 16 to the outer ends of said arms, the passage 14 being for the venting-exit of steam and hot air when the radiator is too highly heated or when it is desired to repair a leak, and the other passage 15 being for the inlet of air into the radiator by pump-pressure, from an auxiliary hand or foot pump (not shown) for cleaning purposes that is under the control of an ordinary spring-seated valve 17 that lies within the outer end of said passage 15 and with a screw-threaded nipple 18 extending from the outer end of said arm 13 for the attachment of the ordinary foot or hand pump that is easily accessible, and said nipple being also adapted to receive the internally-threaded inner part 19 of a spherical hollow cap 20 for normally closing said passage 15.

The outer end of the arm 12 is provided with a threaded nipple 21 to receive a removable spherical hollow cap 22 to correspond to the other cap 20 and intended to close the pasage 14 at its outer end. A lateral minute vent-opening 23 is made in the said nipple 21 for the escape or exit of any undesired steam or hot air from the passage 14 in cooling the radiator when the cap 22 has been but partly removed or unscrewed for that purpose. It is obvious that said closure-caps 20 and 22 can be made with ribbed or grated (not shown) outer faces, if desired, when cooler grip-surfaces are made possible or presented for the quick removal thereof by the bare hand if necessary.

In Fig. 4 is shown, at the handle-end of the key thereof, a cross-slotted or notched formation 24 for use in adjusting the externally threaded valve 17 in the outer end of the air-inlet passage 15, a pair of spaced minute projections 25 being extended from the outer end of said valve for engagement by said notched formation 24 when it is desired to manipulate said valve in adjusting or removing it.

It is obvious that sufficient air-pressure could be introduced through the valved nipple 18 to use in testing the radiator for a leak and instantly locating the exact spot or place of leakage so as to follow up with the required repairs instantly and without removing the radiator from the car, but I provide an even more adequate means of determining or making such "finder" or "spot" test or disclosure by using a vertical air-compressor in the central or body portion of the cap 8. This air-compresor is composed primarily of an upright cylinder 26 that is rigidly mounted in a circular opening 27 bored in the thickened center of the cap 8 and with a socket or recess 28 of greater diameter than said concentric opening 27 in its upper face, thereby allowing for an upward extension of the cylinder 26 sufficient for at least the depth of an internally-threaded circular downwardly-flanged cap 29 that is detachably-secured to the upper end of the said cylinder.

Said compressor is further composed of a lower cap or centrally-orificed flanged bottom 30; a strainer 31, having an upright hollow nipple 32 that has threaded engagement with an internally threaded orifice 33 in said bottom 30; a spring-controlled ball check-valve 34 seated to operate in said hollow nipple 32; a piston-head 35 at the lower end of a rod or stem 36 in said cylinder 26; a retracting spiral spring 37 between said piston-head and the said cylinder bottom 30 for causing and augmenting the automatic reaction of the said piston when the pressure of the hand on the depressing handle or circular knob 38 at the top of the said rod or stem 36 has been withdrawn from downwardly-actuating place in making a compression of air in the water-content of the radiator; and a transverse projecting pin 39 in the upper part of said rod or stem 36 for limiting-engagement with stops 39^a provided on the underside of the dome (see Fig. 7) of said upper cap 29 to hold the piston down into normal position against the upward pressure of the said spiral spring 37 when the device is at rest ready for an emergency compression on the presence of springing of a leak that is to be specifically or definitely located and instantly, if desired, remedied or stopped.

The cylinder cap 29 is transversely slotted at 40 for the exit of the stop-pin 39 on the piston-rod 36 in the automatic outward movement or stroke of the piston in the cylinder preparatory to a compression-stroke of the said piston in exerting the necessary forced circulation of the water in the radiator, to duly expand it and thereby cause a jet to immediately emit from the hole or break in the cell wall where the leak is actually and positively located and definitely found, as shown at G in Fig. 1, and ready for immediate repairs by the handy insertion of the bolt and draft-screw device, as seen at H in Fig. 8. The said slot 40 in the removable cap 29 of the cylinder 26 permits the stop-pin 39 to pass downwardly into the cylinder when the piston is lowered and the device is closed against the piston rising when the thumb is pressed on the duly knurled (at I) knob 38 and turned slightly to the right or left to cause said stop-pin to engage under the edges of said slot 40, as shown (dotted) in Fig. 3, for anchoring the piston in locked position against rising until a compression is

necessary for locating a leak or desirable otherwise.

In order that the right-angled passages 14 and 15 in the handle-arms 12 and 13, respectively, of the radiator-cap, may extend more deeply into the water-content of the radiator, extension-tubing (not shown) may be inserted in the lower ends of the vertical portions of the said right-angled passages and terminate about the level of the lower end of the cylinder 26, whereby somewhat greater or quicker expansion of the water-content may be effected for the consequent somewhat better ejection of the telltale jet of leaking water at the visible "spot" G seen in Fig. 1.

The key 41, seen in Figs. 4 and 5, has downturned spanner-projections or prongs 42 that are used to insert in the said slot 40 of the cylinder-cap 29 when it is desired to turn the latter into or from attached place on the cylinder.

I claim:—

1. An air-controlling cap for automobile-radiators for use in detecting and spotting leaks, the same comprising a detachable cap-member proper, radially-extending handle-arms, passage-ways leading from the central core or body of said cap-member and the water-chamber along said handle-arms to capped inlet and outlet ends, and an air compression pump extending from said cap-member downwardly into the neck and water-chamber of the radiator, whereby, when a leak in any of the radiator tubes or walls is present, the operation of said pump serves to forcibly and noticeably expel a minute jet or stream of the leaking water at the exact location of the leak so that repairs can be immediately or promptly and intelligently made, substantially as shown and described.

2. An air-controlling cap for automobile-radiators for use in selectively detecting and spotting leaks, the same comprising a detachable cap-member proper, radially-extending handle-arms, passage-ways leading from the central core or body-portion of said cap-member and the water-chamber along said handle-arms to capped air inlet and outlet ends, a vertical compressor-pump depending from a central orifice in said core or body-portion of the cap-member into the neck and water-chamber of the radiator and having a cylinder, a piston, a piston-rod, a reacting spiral spring under said piston, a removable cap on the cylinder, a slot in the said last-named cap, a transverse lock-pin on said piston-rod adapted for engagement under said last-named cap and through said slot, and a strainer-bottom at the lower end of said cylinder, a spring actuated check-valve in said strainer-bottom, and coupling means for interchangeably securing the said cap-member proper in using-place on the said neck of the radiator, substantially as shown and described.

3. An air-controlling cap for automobile-radiators for use in venting an unduly heated water-chamber, the same comprising a detachable cap-member or body-portion, radially-extending handle-arms having passage-ways therein that lead from the neck and water-chamber of the radiator to the outer air, nipples at the outer ends of said handle-arms, removable closure-caps on said nipples, a lateral air-vent in the nipple of one of said handle-arms for the escape of the overheating element into the atmosphere when the closure-cap on said nipple has been either partially or wholly removed, and air compression or forcing means adapted to be applied to the other handle-arm and to the core-portion of the main cap-member of the radiator whereby the said escape or venting of the overheating element within the radiator is augmented, substantially as shown and described.

4. An air-controlling cap for automobile-radiators for use in cleaning and otherwise airing the water-chamber, the same comprising a detachable cap-member proper or body-portion, radially-extending handle-arms having passage-ways therein that lead from the neck and water-chamber of the radiator to the outer air, detachable closure-caps at the outer ends of said arms, and a spring-controlled check-valve in one of the said passage-ways that is adapted to the inflow of air under pressure of a detachable air-pump applied to the nipple at the outer end of the handle-arm in which said check-valve is mounted and when the closure-cap thereof has been first removed, substantially as shown and described.

In testimony whereof I hereunto affix my signature.

MAX ANCHELEVICH.