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McCollum et al.

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[54] **REMOVAL TOOL FOR AUTOMOTIVE RADIATOR HOSE**

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[52] **U.S. Cl.**.....**29/235,** 29/282

[51] **Int. Cl.**.....**B23p 19/00**

[58] **Field of Search**.....29/221, 235, 237, 239, 267, 29/282

[56] **References Cited**

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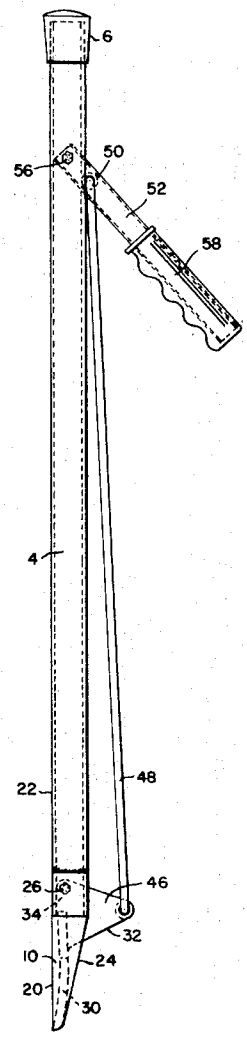
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[57] **ABSTRACT**

Nesting, pivoted bifurcated elements are mounted at one end of a elongated handle, and a remote-control linkage is provided whereby the elements can be forcibly spread apart to remove a radiator hose from the radiator neck. The opening of the inner element is tapered to accommodate various sizes of necks and hoses.

7 Claims, 3 Drawing Figures



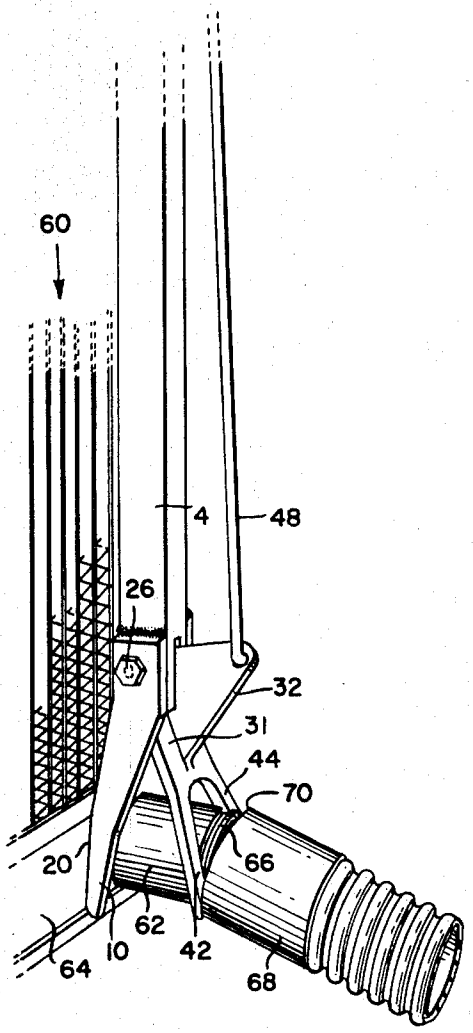


FIG. 3.

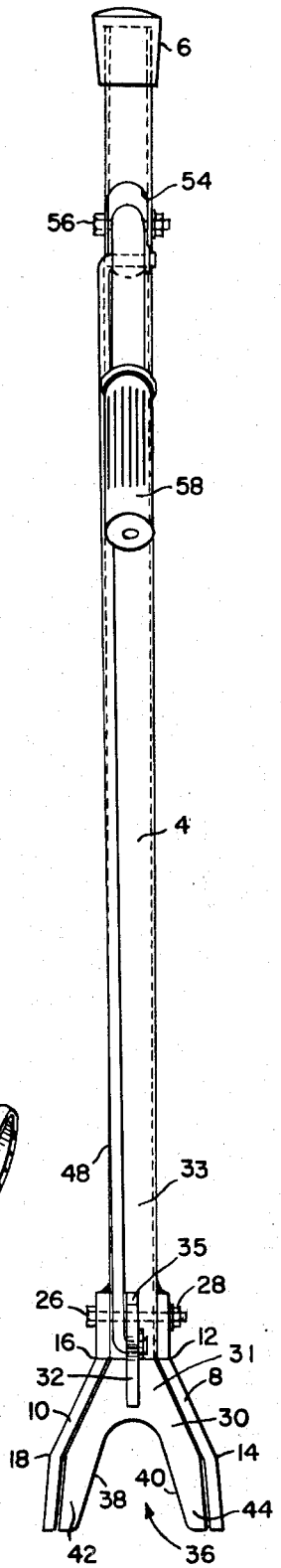


FIG. 1.

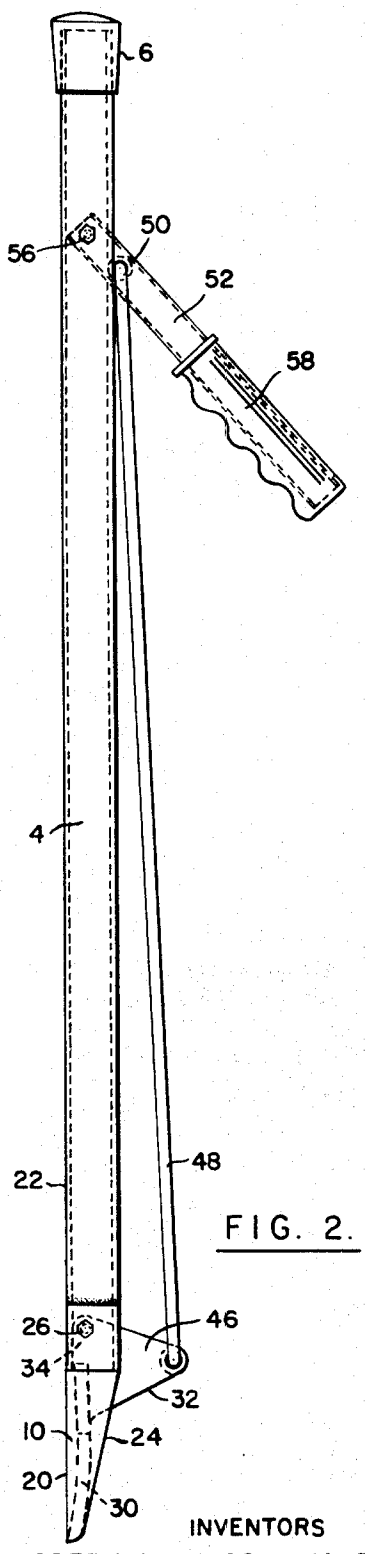


FIG. 2.

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REMOVAL TOOL FOR AUTOMOTIVE RADIATOR HOSE

BRIEF SUMMARY OF THE INVENTION

This invention relates to hose manipulating tools and particularly to a tool for facilitating the removal of the radiator hoses of cars and trucks, particularly the bottom hose which is usually connected to a radiator neck in an almost inaccessible location between the radiator and the engine.

One of the most frustrating problems of the automotive mechanic and the radiator specialist as well is the removal of the bottom radiator hose. Removal of the hose is made difficult not only by the practically inaccessible location of its connection to the radiator neck, but also by the high degree of stiffness of the rubberized fabric of which many hoses are made, the fact that a hose which has been clamped in place for a long time has a tendency to stick to the radiator neck, and by the fact that the hose often extends so far over the radiator neck that it is almost impossible to position a prying tool between the hose and the neck. In addition, removal of the bottom hose is often accompanied by the danger of scalding by hot water released from the radiator when the hose is removed, and this danger can only be alleviated by draining the radiator or by allowing it to cool, either of which procedures consumes considerable time. Radiator hoses exist in a large variety of diameters, and, accordingly, the procedure and tools used for the removal of one hose may be wholly unsatisfactory for the removal of another.

Prior methods of removing radiator hoses have involved tedious manipulations, prying, cutting or grasping and twisting of the hose, all with the use of relatively unsatisfactory tools and all requiring a great deal of time.

In accordance with this invention, a bifurcated base is mounted at one end of an elongated handle, and a bifurcated shoe is pivoted at the same end of the handle and arranged with respect to the base so that, by rotation of the shoe about its pivot, the shoe and base can be brought into nesting relationship. The shoe is connected by a linkage to a lever mounted near the opposite end of the handle. The lever is operable, through the linkage, to rotate the shoe out of nesting relationship with the base with a great deal of force. Thus, when the shoe is positioned over the exposed part of the radiator neck, it can be rotated by the lever so that it engages the end of the hose and forces the hose off the neck. The base pushes against the part of the radiator to which the neck is attached.

The opening of the shoe is tapered to permit the tool to accommodate various sizes of car and truck radiator necks. When the tool is moved into place over the radiator neck, it is automatically positioned, by virtue of the tapered configuration of the shoe opening, so that it properly engages the end of the hose regardless of its diameter.

The nesting relationship of the base and shoe allows the tool to be used even where the hose extends so far over the neck that the length of the exposed part of the neck is very short.

In addition, the shoe is slightly curved in such a way that the side which contacts the hose is convex. As a result of the curvature of the shoe, assuming that the hose extends far over the neck, the positioning of the shoe over the neck results in an initial small outward push on the hose which is supplemented by the push afforded by the subsequent rotation of the shoe with respect to the base. The curvature of the shoe thus provides a push on the hose through a greater range than would be otherwise achieved. Aside from the foregoing, the curvature of the shoe allows it to exert a removing force through a longer stroke while still firmly in contact with the end of the hose.

The elongated handle and the remote operating lever allow the user to remove the bottom hose without crawling underneath the vehicle by reaching downwardly with the tool from above. The elongated handle and remote operating lever give rise to a saving of time by allowing the hose to be removed while hot water is in the radiator.

The principal object of this invention, therefore, is to provide a tool which removes automotive radiator hoses quickly and reliably, which accommodates necks and hoses in a wide range of lengths and diameters, and which allows the user to manipulate the hose from a convenient position. Other objects will be apparent from the description herein read in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a front elevation of the removal tool in accordance with the invention;

FIG. **2** is a side elevation of the tool; and

FIG. **3** is a perspective view illustrating the operation of the tool.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. **1** and **2** show the full length of the tool, which is made up of an elongated handle **4**, consisting of a hollow, heavy gauge steel tube having a rectangular transverse cross-section. A rubber cushion **6** is provided at the upper end of the handle for convenient handling.

The base is made up of a pair of heavy steel members **8** and **10**, both of which are welded at their upper ends to the handle. The base elements extend downwardly from the handle and are sufficiently spaced from each other that they may engage the face of a radiator on either side of its neck. Base element **8** is bent outwardly at **12** and downwardly at **14**, and element **10** is similarly bent at **16** and **18** so that the base elements are gradually spread farther apart from each other with increasing distance from the bottom of the handle. As shown in FIG. **2**, edge **20** of base element **10** is parallel to side **22** of the handle. Edge **24** of base element **10** is so disposed that the base is tapered as shown in FIG. **2**. Base element **8** is shaped similarly.

The handle **4** is fastened to the base in such a way that, when the base is engaged with the face of a radiator with its elements on either side of a neck as shown in FIG. **3**, the handle extends substantially parallel to the radiator face and transverse to the neck. Thus, it can extend upwardly from the neck through the restricted space between the radiator and engine, to an unrestricted space above the engine.

A bolt **26** passes through base element **10**, transversely near the handle at its lower end, and through base element **8**, and is secured by nut **28**. The intermediate portion of the bolt acts as a pivot for the shoe **30**. The

heel 31 of shoe 30 is secured to lever arm 32, and bolt 26 passes through a hole in corner 34 of the lever arm 32. Face 33 of handle 4 is provided at its lower end with a slot 35 in which lever arm 32 fits and which permits pivoting movement of lever arm 32. The pivot constrains the shoe for movement from between elements 8 and 10 away from the radiator face.

The bifurcated shoe 30 is formed from a heavy gauge piece of steel shaped to conform to the space between base elements 8 and 10. The shoe fits between elements 8 and 10 of the base while in the same orientation as the base. Thus, it can approach the face of the radiator very closely and engage the end of a hose even though the hose extends so far over the neck that only a small part of the neck is exposed. It is provided with a tapered opening 36 having sides 38 and 40, which provide a gradually decreasing spacing between prongs 42 and 44 of the shoe in order to accommodate different radiator neck and hose diameters. The dimensions are chosen with regard to the sizes of radiator necks which are commonly used. As shown in FIG. 2, shoe 30 is slightly curved so that its legs present convex surfaces to the end of the hose being pushed off the radiator neck.

Corner 46 of lever arm 32 is provided with an opening in which there is connected a linkage rod 48. Linkage rod 48 is connected at its upper end to openings 50 in an intermediate part of lever 52. Lever arm 52 extends through an opening 54 in side 33 of the handle, and is pivotally mounted on a bolt 56 which extends through the handle at a location sufficiently remote from the base, that when the base elements are properly engaged with the face of a radiator on either side of its neck, the lever arm 52 is well above the top of the radiator and engine so that its operation is not obstructed. The free end of the lever is provided with a rubber handle 58.

Opening 50 in lever 52 is positioned to provide a high degree of mechanical advantage, producing a great deal of pulling force on rod 48 to effect a strong push on the radiator hose by the pivoted shoe. Achieving a large mechanical advantage requires a large movement of the lever handle, but this presents no problem, since in the operation of the tool, the lever handle, being above the radiator, is unobstructed.

FIG. 3 shows an automobile radiator 60 having a lower neck 62 fastened to a face 64. Neck 62 has a lip 66, and is normally connected to a radiator hose which fits over the neck and which is clamped in place.

A radiator hose 68 is shown in the final stages of removal by the tool in accordance with this invention. As will be apparent from FIG. 3, edge 20 of base element 10 and the corresponding edge on base element 8 push against the face 64 of the radiator, and legs 42 and 44 of the shoe push against the end 70 of the hose forcing it off the end of neck 62.

From the foregoing, it will be apparent that the removal tool in accordance with the invention provides a great advantage in the removal of automotive radiator hoses, since it allows rapid and reliable removal of the hose, accommodates various sizes of hose, and allows hose manipulation from a convenient position.

It will be apparent that various departures can be taken from the structure specifically described herein.

I claim:

1. A removal tool for automotive radiator hose comprising

a bifurcated base adapted to fit over the neck of a radiator and to rest against the face of the radiator to which the neck is connected, said base comprising a pair of elements sufficiently spaced from each other that they may engage said face on either side of said neck and means connecting ends of said elements together;

a bifurcated shoe comprising a heel and a pair of prongs spaced from each other and rigidly connected together by said heel, said prongs defining an opening adapted to slide over said neck and said prongs being adapted to engage the end of a hose on said neck, said shoe being capable of fitting between the elements of said base in the same orientation as said base in order to come within close proximity to the face of the radiator;

means interconnecting said base and said shoe, and constraining said shoe for movement from between the elements of said base away from said face; and

lever means for effecting said movement of said shoe.

2. A tool according to claim 1 in which the spacing between said prongs gradually decreases from their ends toward said heel thereby providing a tapered opening capable of accommodating various sizes of radiator necks.

3. A tool according to claim 1 including an elongated handle fastened to said base so that it extends substantially parallel to a face when engaged by said base elements.

4. A tool according to claim 1 including an elongated handle fastened to said base so that it extends substantially parallel to a radiator face when said face is engaged by said base elements, and wherein said lever means comprises a lever arm pivoted on said handle at a location remote from said base and a linkage operable by said lever arm and connected to said shoe to effect movement of said shoe from between the elements of said base away from said face.

5. A tool according to claim 1 in which said interconnecting means comprises means pivoting the heel of said shoe to the means connecting ends of said base elements together.

6. A tool according to claim 1 in which said interconnecting means comprises means pivoting the heel of said shoe to the means connecting ends of said base elements together, and in which the side of said shoe away from the radiator face is convex.

7. A tool according to claim 1 in which said interconnecting means comprises means pivoting the heel of said shoe to the means connecting the base elements together, and including an elongated handle fastened to said base so that it extends substantially parallel to a radiator face when said face is engaged by said base elements, and wherein said lever means comprises a lever arm pivoted on said handle at a location remote from said base and a linkage operable by said lever arm and connected to said shoe to effect movement of said shoe from between the elements of said base away from said face by rotation of said shoe about said pivoting means.

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