

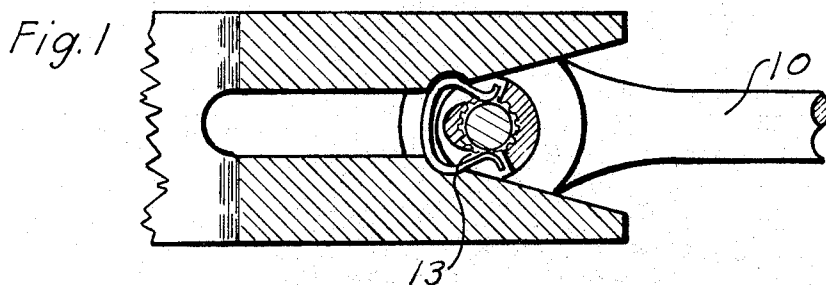
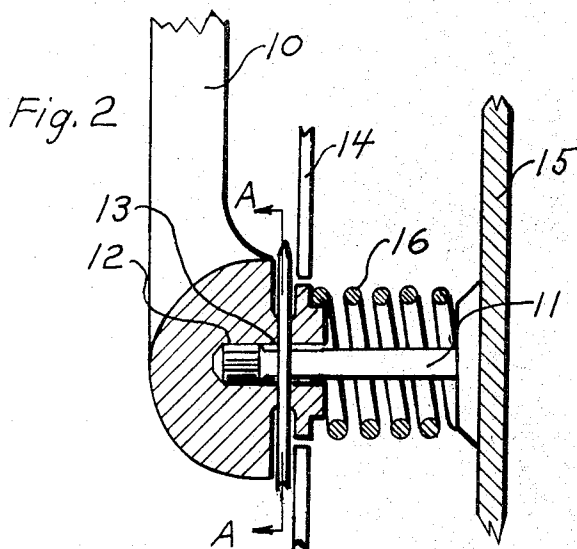
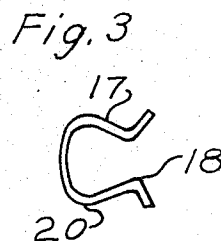
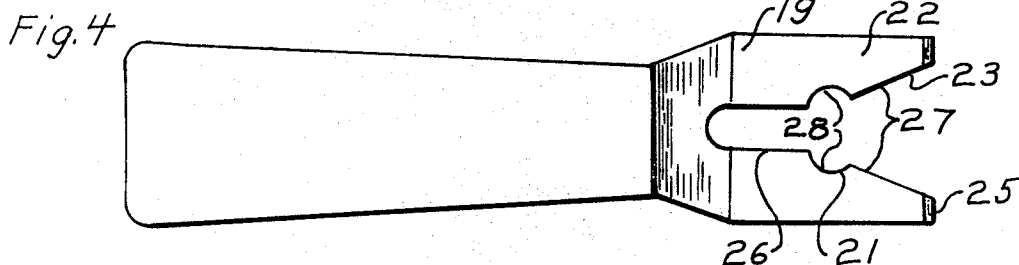
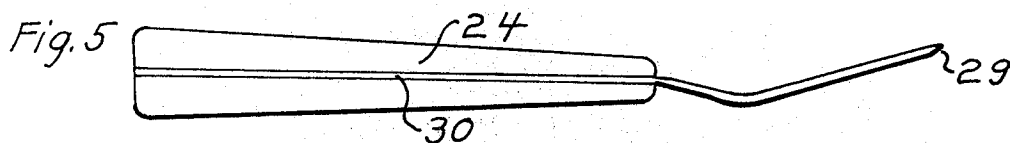
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TOOL FOR REMOVING DOOR HANDLE RETAINING SPRINGS

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1

3,340,592 TOOL FOR REMOVING DOOR HANDLE RETAINING SPRINGS

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ABSTRACT OF THE DISCLOSURE

A hand tool for removing retaining springs from door handles, having an opening to closely surround the spring and an elongated slot extending from the opening to provide resiliency to the opening.

This invention relates to a hand tool which will make possible the quick, easy and non-injurious removal of those spring clips which are almost universally used to secure interior automobile door handles to the lock spindles.

Some tools heretofore used for this purpose, like that shown in Patent #2,597,381 rely for their effectiveness in a sharp bite into the spring clip, which prevents the re-use of the clip, and which subjects the tool to such wear that it has a relatively short useful life.

Other tools, like that shown in Patent #3,196,530 require much skill in operation, and are ineffective if there is any appreciable distortion of the spring clip or the clip retaining portion of the door handle.

The chief object of this invention is to provide a tool which can be used to easily extract door handle retaining spring clips as are conventionally used in the great majority of all automobiles made in this country, without injury to the clips or the other parts of the door lock, or to the tool itself.

Another object is to provide such a tool which can be used by persons without special training, and without danger of injury to persons, the automobile, the tool or the spring clip.

Other objects will be apparent to those skilled in the art from a study of the following description and drawings in which:

FIGURE 1 is a sectional view taken at A-A of FIGURE 2.

FIGURE 2 is a cross section view of a detail of a conventional interior door handle and lock spindle.

FIGURE 3 is a plan view of a conventional handle retaining spring clip.

FIGURE 4 is a plan view of the tool which is the subject of this invention.

FIGURE 5 is a side view of the tool.

In the drawings, where like numerals refer to like parts, 10 represents a conventional automobile interior door handle, fitted upon a lock spindle 11 having a knurled position 12 and a spring clip retaining annular groove 13. The flexible interior surface 14 of the door is shown spaced from rigid door member 15 by a coil spring 16.

The wire spring clip 17 is shown with its inwardly curved projections 18 extending into groove 13 to prevent axial movement of handle 10 relative to spindle 11.

This invention provides a hand tool 19 which positively engages the outwardly curved extremities 20 of clip 17 in correspondingly curved recesses 21 provided in the head 22 of tool 19.

Head 22 is made of tempered spring steel, of a thickness similar to the diameter of the wire used to make clip 17, or about forty thousandths of an inch.

The essence of this invention is in the particular configuration of the working surfaces of head 22, relative

2

to the proportions of the almost universally used standard spring clip 17.

As shown in the drawings, head 22 is one and three-eighths inches wide and has a recess 23 tapering inwardly toward handle 24, measuring one inch in width at the outside edge 25 and tapering down to three-eighths of an inch in width at a distance thirteen-sixteenths of an inch from edge 25.

A slot 26 three-eighths of an inch wide extends beyond the termination of recess 23 to a distance about one and three-quarters of an inch from edge 25. The purpose of slot 26 is to provide that degree of resiliency which will permit limited spreading action of the opposing inclined surfaces 27 of recess 23 when the tool is thrust forward to engage clip 17.

At the points of intersection of inclined surfaces 27 with the edges of slot 26 are provided two curved recesses 28, proportioned to accurately conform to the extreme outer surfaces of clip 17. Recesses 28 preferably are made with radii of eleven sixty-fourths of an inch, positioned to provide a maximum space between the recesses 28 of eleven-sixteenths of an inch, to provide the optimum characteristics of easy engagement of head 22 upon clip 17, while at the same time positively securing clip 17 in recesses 28 for removal of clip 17 from groove 13.

Of less importance, but adding to the convenience of the tool in use, are the provisions of a bevel 29 at edge 25, and about a thirty-five degree bend between the axis of head 22 and handle 30, said bend occurring about one and one-half inches from edge 25. This bend provides room for the fingers of the user of the tool between handle 30 and flexible door surface 14.

In the operation of the device head 22 is inserted between handle 10 and door surface 14. Conventionally clip 17 has been initially inserted from a direction toward, and along the axis of handle 10, and consequently head 22 will ordinarily be similarly inserted to engage the clip.

Head 22 first engages curved extremities 20 along the surfaces of tapering recess 23. This engagement simultaneously squeezes together the projections 18 and slightly spreads apart the surfaces of recess 23. As head 22 is thrust further toward spindle 11, extremities 20 slide along the surfaces of recess 23 until the extremities 20 reach curved recesses 28, which permit the clip 17 to expand to its normal shape, and simultaneously permits the surfaces of recess 23 to contract to their normal shape.

At this position the outward extremities 20 of clip 17 closely fit within the two curved recesses 28 of head 22.

Reversal of axial movement of head 22 will now remove the clip 17 from its position in and around annular groove 13. The inward projections 18 are able to spread apart sufficiently to be pulled past the inner diameter of groove 13 because there is adequate clearance between the surfaces of tapered recess 23 and the outer ends 28 of clip 17 to permit said outer ends to move toward said surfaces of recess 23. The curved recesses 21 simultaneously prevent the withdrawal of clip 17 from head 22.

Clip 17 is not injured by the use of this tool, and may be re-used to fasten handle 10 to spindle 11 by snapping it into position on handle 10 prior to thrusting handle 10 upon spindle 11.

While I have shown the preferred embodiment of my invention, I do not intend to be limited in my patent except within the limitations of the claim.

I claim as my invention:

A hand tool for the removal of a door handle retaining spring comprising a head made of thin sheet metal, said head comprising an outside edge, a tapered recess projecting inwardly from said outside edge and having a curved recess inwardly of said tapered portion proportioned to closely conform to the outside shape of said spring, and

3

having an elongated slot beyond said curved recess proportioned to provide resiliency to said curved recess.

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4

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