

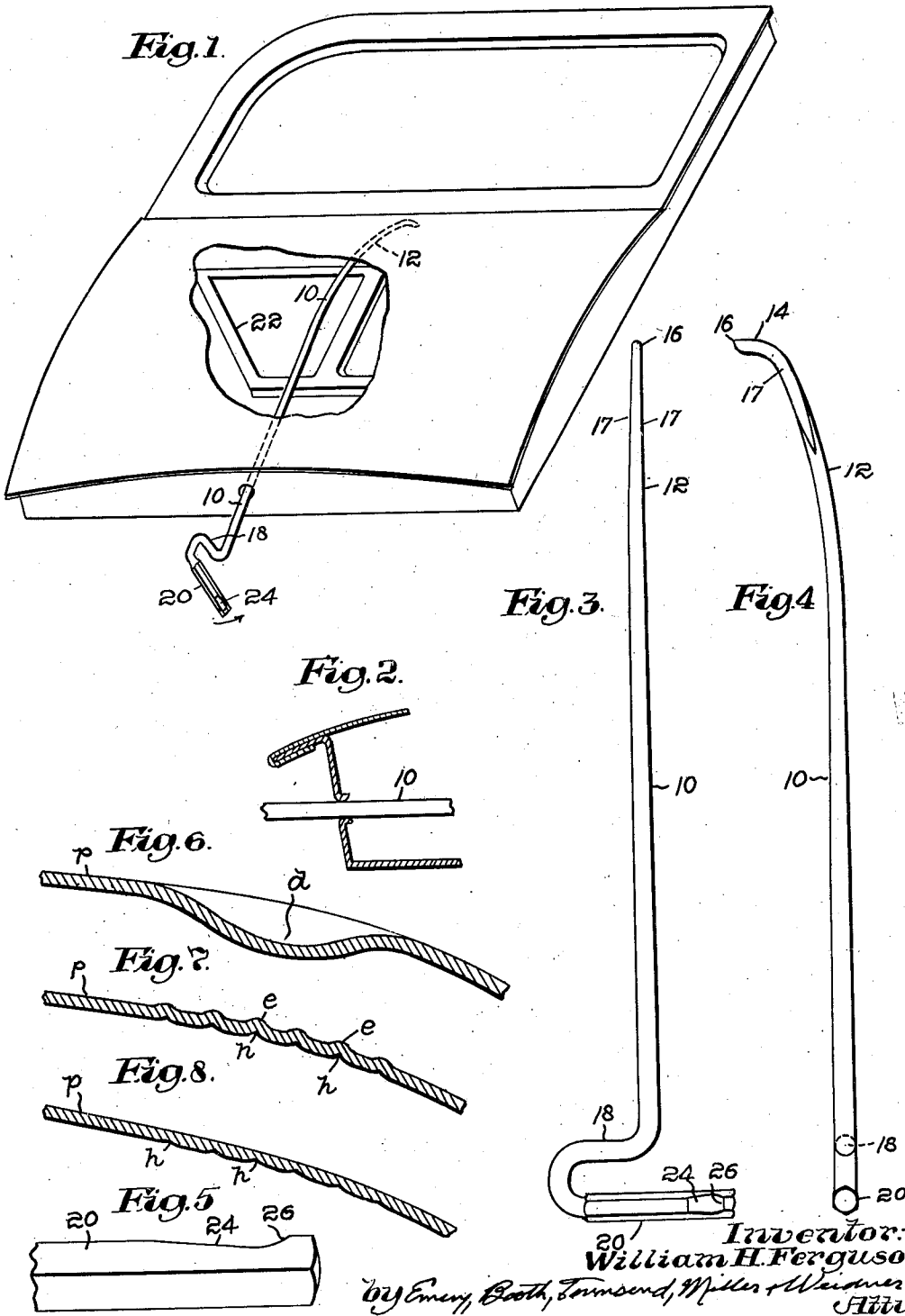
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TOOL FOR RESHAPING AUTOMOBILE PANELS

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TOOL FOR RESHAPING AUTOMOBILE PANELS

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1 Claim. (Cl. 81-15)

1

This invention relates to a tool for reshaping the panels of automobile bodies in removing dents therefrom, more particularly by a series of localized pushing-out operations at closely spaced points by means of which the metal of the displaced portion is gradually returned approximately to its original contour. The individual operations are ordinarily prying ones. The tool herein disclosed and other tools devised by me for effecting such operations I term "picking tools."

My invention will be well understood by reference to the following description of the illustrative embodiment thereof shown by way of example in the accompanying drawing, wherein:

Fig. 1 is a perspective view of an automobile door with parts broken away and illustrating a characteristic application of the tool;

Fig. 2 is a detailed section of the same on a larger scale illustrating how the tool is introduced into the interior of the door;

Fig. 3 is a plan and Fig. 4 a side elevation of the tool;

Fig. 5 is an enlarged detail of the butt of the tool as seen from the lower side of Fig. 3; and

Figs. 6, 7, and 8 are diagrammatic views, not to scale or in relative proportion, illustrating successive stages of the picking process performed.

In reshaping the panels of automobile bodies which have been injured in collisions the major deformations may be brought back to their approximate original position by use of pushing tools of suitable design conveniently powered by a hydraulic jack. Other dents, if easily accessible from both sides, may be hammered into their proper contour by use of a hammer and suitable dolly blocks. In modern automobile practice many parts are not so accessible because covered over by the interior construction through which avenues of access are most restricted. Frequently, relatively small dents occur along margins of the panels to which access is most difficult. Even when not of functional importance, such dents are often particularly unsightly, detracting from appearance and from the resale value of the car.

I have found that by the use of suitable tools, of which that disclosed in the present application is an example, such dents may be quickly and satisfactorily reformed by a series of prying actions on the interior or convex surface of the dent performed at closely spaced points by means of a rigid, pointed tool formed to permit access from a relatively remote point either through an existing available opening or through an opening of restricted size formed for the purpose and

2

which may thereafter be closed. As distinguished from pressing actions effected by means of contoured spoons, the successive pressures are concentrated substantially at single points of the work. While much of the reshaping, as directed by the skill of the operator, will be pressing back of the panel to its original contour, in general smaller reversed bends in the nature of small hollow domes will be formed representing a gathering of the stretched metal into smaller rugosities or sinuosities to permit it to die in general along its original contour of smaller area. Characteristically the panel when so roughly reformed will show on the exterior minor excrescences or "pimples" at the points where pressure was applied at the interior, which should not be so high that their interior hollows extend outwardly past the contour line of the panel. These may be dressed off by filing or grinding to provide a smoothly contoured outer surface which may be refinished. The repairs in some instances may be effected by repeated application of these steps.

Thus, referring to the diagrams Figs. 6, 7, and 8 in Fig. 6 I show, without pretense to dimensional verisimilitude, a contoured panel *p* in which there is an inward dent *d*. Fig. 7 shows the dent brought back approximately to the original contour by prying operations on the side which is lower in the figure, the work leaving the rebent part interrupted by smaller reverse bendings *e*, wherein the metal has been strained in the opposite direction and in part pressed up in such manner as to show small excrescences at the exterior. We may consider that a part of the excess area of metal as seen in Fig. 6 has been redistributed in a series of smaller sinuosities approximating the shorter simple curvature of the original contour. Fig. 8 shows the outer surfaces of these excrescences *e* dressed off to the original contour; the hollows *h* formed thereby at the underside of the figure, which represents the interior surface of the panel which is out of sight, being still present.

A characteristic application of the tool here shown is to effect a picking operation by a prying action effected in a plane remote from the place of access to the work. Thus, referring to Fig. 1, which will be more fully described later, the tool is there shown as introduced through an opening in the bottom header of an automobile door to operate on a portion of the outer panel near the belt line, the prying action being exerted in a plane transverse to the door (one which would be horizontal or thereabouts with the door in its normal position of use).

The tool is of a size to be wielded in one hand but is of a section which provides substantial rigidity under manually exerted strains in use. Thus the drawings illustrate an actual tool which was forged from a steel rod of hexagon cross section measuring $\frac{3}{4}$ of an inch across. The length of the tool may vary but a substantial reach is provided for. Referring to Figs. 3 and 4, the exemplary form of tool there shown comprises an elongated straight shank 10 tapering somewhat distally or toward its working end, the distal portion of the shank being curved outwardly at 12 along a gentle curve which terminates in a sharply deflected portion 14 at the extremity of which is the blunt point 16 located at the extremity of the convex side of the curve and formed by rounding off the end of the tool on the concave side. The curve may be termed arcuate since it has no point of inflexion or cusp. The tip portion of the tool may be flattened at opposite sides as shown at 17 for purposes which will appear.

The point 16, which is the extreme exposed end of the working portion of the tool, I have here referred to as a blunt point. That is, it is not needle sharp but nevertheless is adapted to operate on the panel on a substantially single point and its form is to be distinguished from a broad face or peen or from a chisel-shaped edge. The proximal end of the shank is bent outwardly at 18 and then returned past the axis of the shank 10 to provide a cross-grip or T handle 20 which may be of the original hexagon shape as illustrated, spaced from the end of the shank to provide for its encirclement by a grasping hand. This hand grip is located in a plane perpendicular to the plane in which the offset pointed end of the tool lies.

Referring now to Figs. 1 and 2, suppose we were called upon to take out a dent in the outer panel of a door near the belt line. It is permissible to punch a hole through the bottom header of the door, as illustrated in Fig. 2, through which the tool may be inserted. Such a hole may be welded up later if desired. If, however, we attempted to insert through such a hole a straight tool and operate it in a vertical plane (referring to the normal position of the door), then in the case of a wieldable tool of reasonable length and handiness the lever arm through which the resistance of the work acted would be several times as long as that through which the force was applied and the work could not be well performed. In the case of the present tool the tip end may on account of its form be readily threaded through a hole of restricted size and the point 16 advanced to the location of the dent near the belt line. The straight portion of the shank 10 may find a bearing at some remote interior point conveniently near the location of the work, as, for instance, the offset portions 22 of the inner panel of the door seen in Fig. 1. Its shank 10 may be rotated about its axis on this bearing by means of the crank arm provided by the handle 20. The distal end portion of the tool is raised from a more or less horizontal position and the point 16 pressed up against the inner side of the dent with an outwardly and in part laterally exerted prying action to pick up the surface in the manner already described.

A pipe extension may be slipped over the han-

dle 20 to increase the force if desired. In general the handle shown substantially centrally located across the end of the shaft and of a length to accommodate the hand provides adequate power, and the work may be easily controlled by the judgment of the operator as guided by the direct feel of the work.

To facilitate the control of the tool and to indicate to the workman the position of the point 16, which in use will ordinarily be hidden from him by intervening portions of the structure of the automobile, the end of the grip 20 on the side thereof which faces in the same direction as the point 16 may be formed with a recess 24 (best shown in Fig. 5) the wall of which inclines inwardly of the stock and outwardly toward the butt end of the handle 20 to provide a shallow, inwardly facing shoulder 26, the construction as a whole forming a seat for the ball of the thumb when the stock is grasped by the fingers of the hand.

I have previously referred to the flattening 17 of the working end of the tool. This facilitates introduction of the point from the side into narrow spaces where, for example, surfaces may have been crushed together substantially into contact.

I am aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and I therefore desire the present embodiment to be considered in all respects as illustrative and not restrictive, as is in fact clear in several matters from the description itself. Reference is to be had to the appended claim to indicate those principles of the invention exemplified by the particular embodiment described and which I desire to secure by Letters Patent.

I claim:

A tool for picking up dents in sheet metal panels by repeated prying actions thereon at closely spaced points comprising a lever wieldable in one hand and of a section rigid under manually applied stress and comprising a long straight shank extending toward the distal end of the tool without increase of or abrupt changes in dimension and which merges smoothly into an arcuate distal portion deflected laterally thereon and which distal portion terminates in a blunt point, the proximal portion of the shank having a cross-bar handle transverse to the plane in which the distal portion is deflected.

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