Oct. 14, 1958 R. I. GREIDER 2,855,972

TOOL FOR REPAIRING AUTOMOTIVE BODY PANELS

Filed June 24, 1955

Fig-1

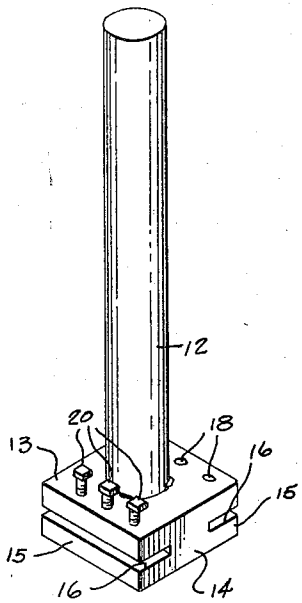


Fig-2

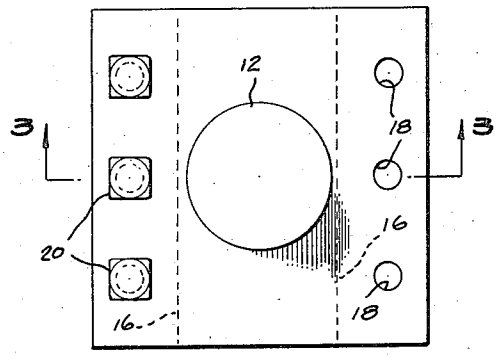


Fig-3

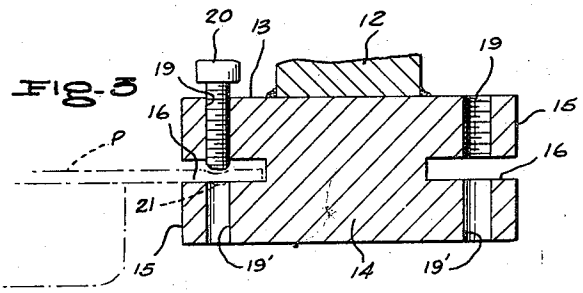


Fig-4

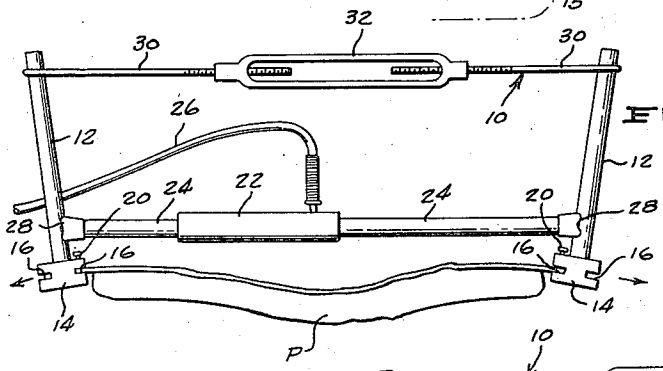
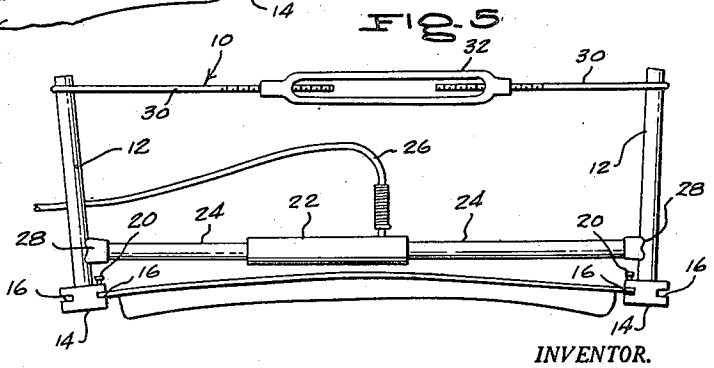


Fig-5



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TOOL FOR REPAIRING AUTOMOTIVE BODY PANELS

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3 Claims. (Cl. 153—35)

In automotive body repair work, it has been heretofore proposed that a hydraulic expander be extended between a pair of clamps adapted to grip opposite edges of a panel that has been bent. In such instances, the expander acts to shift the clamps away from one another, thus to stretch the panel for the purpose of taking the deformations or bends out of the same.

In all devices of this type of which I have knowledge, the clamps are shifted outwardly from one another in a straight line. It has been noted, in this regard, that this operating characteristic of the prior art devices is not effective to bring the panel to its proper shape, under all circumstances. This is due to the fact that few if any automotive body panels in use today are flat. Rather, there is some curvature in almost all presently used body panels. Therefore, straight line movement of the clamps fails to operate with full efficiency in returning the panel to its original cross sectional configuration.

In view of the above, one important object of the present invention is to effect travel of the edge-gripping clamps through arcuate paths whenever such movements of the clamps are found desirable in straightening a curved body panel, with the paths in which the clamps travel forming, during the portion of the clamp movement in which power is being applied for the purpose of correcting the shape of the panel, extensions of the curvilinear cross section of the panel being worked on.

A further object of importance is to provide a device as stated which, despite its improved operating characteristics, will still be more simply constructed than the majority of the prior art devices in use for the same purpose, and it is an additional object, in this connection, that the simplified construction of the device be effected while still being adapted to result in a body repair tool that will be possessed of a particularly great strength.

Yet another object of importance is to provide a particular clamp formation that will grip the associated panel edge securely under all circumstances, so as to prevent slippage of the clamp from said edge.

Yet another object is to associate with each clamp an upstanding, elongated post which, in association with a conventional hydraulic expander and a connecting element extending between the posts and adjusted to a preset length, will act as a lever when the expander is extended during the application of pressure against the posts, to effect the travel of the clamps through the previously discussed arcuate paths.

Other objects will appear from the following description, the claims appended thereto, and from the annexed drawing, in which like reference characters designate like parts throughout the several views, and wherein:

Figure 1 is a perspective view of one of the clamps;

Figure 2 is a top plan view of the clamp on an enlarged scale;

Figure 3 is a sectional view on line 3—3 of Figure 2, a panel to be straightened being shown fragmentarily and in dotted lines;

Figure 4 is an elevational view of the complete tool as it appears prior to straightening an automotive body panel; and

Figure 5 is a view similar to Figure 4 showing the tool and panel at the conclusion of the straightening operation.

The automotive repair tool constituting the present invention has been generally designated **10**, and includes a pair of posts **12** welded at one end upon the top wall **13** of clamping blocks **14**. Each clamping block is of solid, rectangular formation, and in opposite side walls **15** of the block, medially between the flat top and bottom surfaces of the block, coplanar clamping slots **16** are formed opening through respective side walls **15**.

Spaced rows of spaced openings **18** are provided transversely through the block **14** adjacent the opposite side walls **15** and intersecting the respective slots **16**. That portion **19** of each of the openings **18**, opening at one end through the top wall **13** and into a respective slot **16** at its other end, is internally threaded. Clamping screws **20** are threadably engaged in the portions **19** of the openings **18** through the end thereof opening through the top wall **13**. After the edge of a panel P is inserted in a selected slot **16**, the screws **20** adjacent the selected slot are turned to advance toward and into gripping contact with the inserted panel edge. As the screws move into gripping contact the inserted edge of the panel P contacted by the screws will be depressed, as at **21**, into the end of the other portion **19'** of the opening **18** opening into the selected slot **16**. This will practically obviate the possibility of accidental displacement of the panel edge from the selected slot.

It will be understood that as used hereafter, the term "clamp" will comprise both a post **12** and the clamping block **14** to which it is connected, together with the screws **20** carried by the block, and the lower portions **19'** of the openings **18**.

A conventional hydraulic expander **22** constitutes a component of the complete tool, and includes oppositely extending push rods or rams **24** and a hose **26** through which fluid is forced under pressure into the cylinder of the expander, to extend the rams in opposite directions from said cylinder. On the outer ends of the rams, there are formed post-engaging heads **28** which are recessed to receive the posts. The expander is shiftable longitudinally of the respective posts, to permit the heads **28** to be engaged with the posts at any selected location along the length of the posts.

Used in association with the expander is a connecting means adapted to extend between the posts at a location spaced longitudinally thereof from the expander. The connecting means, in a preferred embodiment of the invention, is adjustable as to length, it being understood that once the connecting means has been adjusted to a selected length, it will be left at that length, ordinarily, during the application of power to the expander for the purpose of extending the rams or push rods **24**. In the illustrated example, the connecting member includes a pair of rod elements **30** having eyes at their outer ends loosely receiving the posts **12**, and having at their inner ends threads of opposite hand engaged in a turnbuckle **32**.

In use, and assuming that a panel having a curved cross section has been deformed and is to be repaired, the opposite edges of the panel are engaged in confronting slots **16** of the clamping blocks **14**, after which the clamp screws or bolts **20** are turned home against said edges. The connecting means **30**, **30**, **32** is extended between the posts at a selected distance from the clamping block, and the hydraulic expander is engaged at its opposite ends with the posts between the connecting means and the clamping blocks, at a selected distance from the clamping blocks.

Pressure is now applied to extend the expander, so that the push rods **24** exert pressure against the posts **12**

tending to shift the same away from one another. Since the connecting member is at an adjusted, unchanging length during the application of power, extension of the push rods will cause the clamping blocks to swing about the points at which the connecting rod elements **30** are engaged with the posts, the clamping blocks swinging through arcuate paths outwardly from one another in the direction of the arrows shown in Figure 4. The paths through which the clamping blocks travel under these circumstances constitute substantial extensions of the curvilinear path through which the panel extends, and this has been found to be particularly effective in efficiently taking out dents or bends in the panel. The panel is thus effectively straightened with the clamping blocks moving through arcuate paths of travel throughout the application of power, rather than in a straight line as has been found to be the case with the prior art devices.

Of course, the tool by reason of the construction illustrated has considerable versatility with respect to particular straightening functions to be performed thereby. The hydraulic expander can be used at any location along the length of the post, and similarly, the connecting member comprising a turnbuckle **32** and the rods **30** can also be adjusted along the length of the posts **12** relative to the hydraulic expander and clamping block. This permits the posts to travel about any of various axes, to shorten or lengthen the radius of the arc within which the clamping blocks travel, depending upon the particular operation to be performed. Panels of various cross sectional contours can thus be effectively repaired, by varying the angle of pull of the device thereupon.

It will be understood that wherever used herein, the term "straighten" does not necessarily mean the reducing of the panel to a flat condition, but rather, refers to the elimination of deformations, dents, and bends in a panel which may itself be of curvilinear cross section, to return the panel to its original shape.

In use of the device, the posts can be positioned at selected angles relative to one another, to correspondingly angularly relate the clamping blocks, and at all times, the tool will be under the full control of the operator, for the purpose of causing travel of the clamping blocks through prescribed, arcuate paths.

It is believed apparent that the invention is not necessarily confined to the specific use or uses thereof described above, since it may be utilized for any purpose to which it may be suited. Nor is the invention to be necessarily limited to the specific construction illustrated and described, since such construction is only intended to be illustrative of the principles, it being considered that the invention comprehends any minor change in construction that may be permitted within the scope of the appended claims.

What is claimed is:

1. A tool for removing dents from a transversely curved automobile door panel comprising a pair of rigidly constituted clamps having at least one flat jaw element said clamps being adapted to grip opposite edges of said panel and an elongated post secured at one end to said jaw member and extending normal thereto, longitudinally expansible pressure applying means having at its ends heads freely engaging the respective posts and freely slidable upon the posts in a direction longitudinally thereof for locating the heads at selected adjusted distances from said jaw element, and an adjustable pressure absorbing means connected at its opposite ends to and extending between the respective posts at locations between said heads and the outer free ends of the posts, said posts, said pressure applying means and said pressure absorbing means lying in a common plane, said pressure absorbing means being adjustable in length and said clamps pivoting on the ends of the pressure absorbing means for travel of the panel gripping ends of the clamps in arcuate paths about the connections of the clamps to said opposite ends of the pressure absorbing means responsive to longitudinal expansion of the pressure applying means, said arcuate paths being in approximate extension of the transverse curvature of the panel, each head extending at opposite sides of the clamp engaged thereby to restrict the clamps to swinging movement in said common plane.

2. A tool according to claim 1 wherein said pressure applying means comprises a hydraulic expander including a cylinder intermediate its ends and rams projecting from opposite ends of the cylinder.

3. A tool according to claim 1 wherein the heads of the pressure applying means are in engagement with confronting inner side surfaces of the posts, and said pressure absorbing means includes at opposite ends thereof eyes bearing against outer side surfaces of the posts at locations diametrically opposed to but spaced longitudinally of the posts from the locations at which the heads are in engagement therewith, said eyes being freely slidable along the lengths of the posts.

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