

[54] **APPARATUS FOR ACTING OF AND
RESHAPING THE DAMAGED BODYWORK
OF AUTOMOBILE VEHICLES**

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[58] Field of Search..... **72/705, 480, 482,
72/293, 455**

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[57] **ABSTRACT**

In apparatus for repairing the damaged body of an automobile there is provided an elongated bar that supports a carriage assembly which is movable relative to the damaged body of the vehicle. The elongated bar further supports a rod that is adapted to receive a tool for working on the body of the vehicle. The rod is movable about three mutually perpendicular axes in addition to being longitudinally displaceable by the carriage assembly with respect to the automobile body. Further, a portion of the rod is telescoped and hinged in order to provide additional flexibility.

2 Claims, 3 Drawing Figures

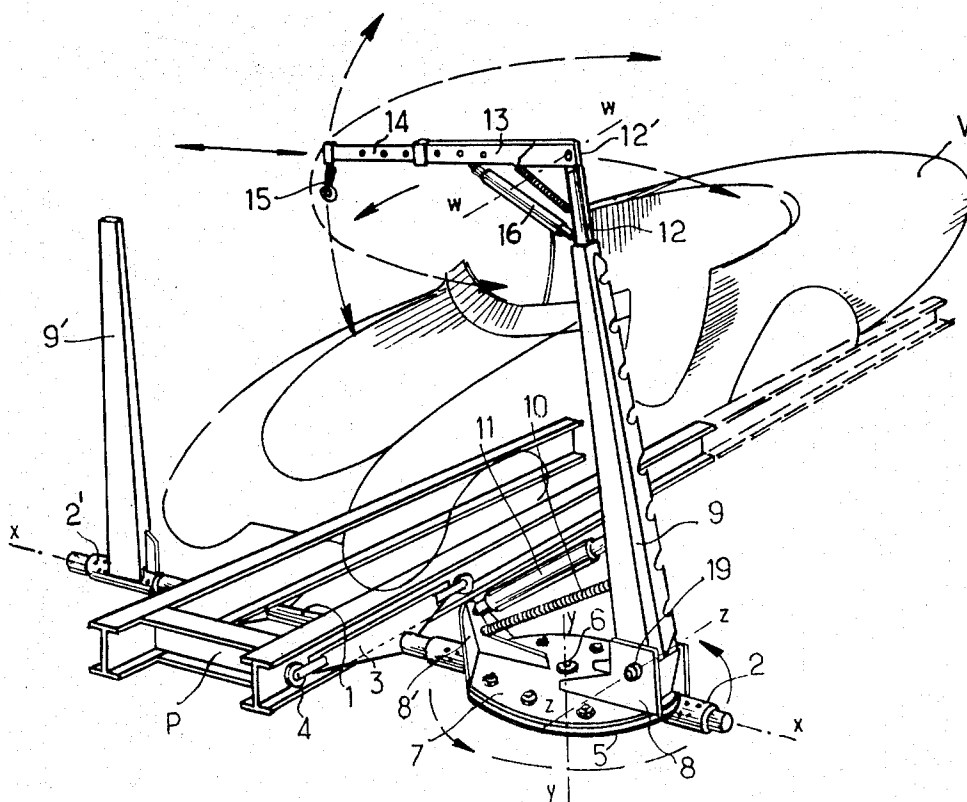
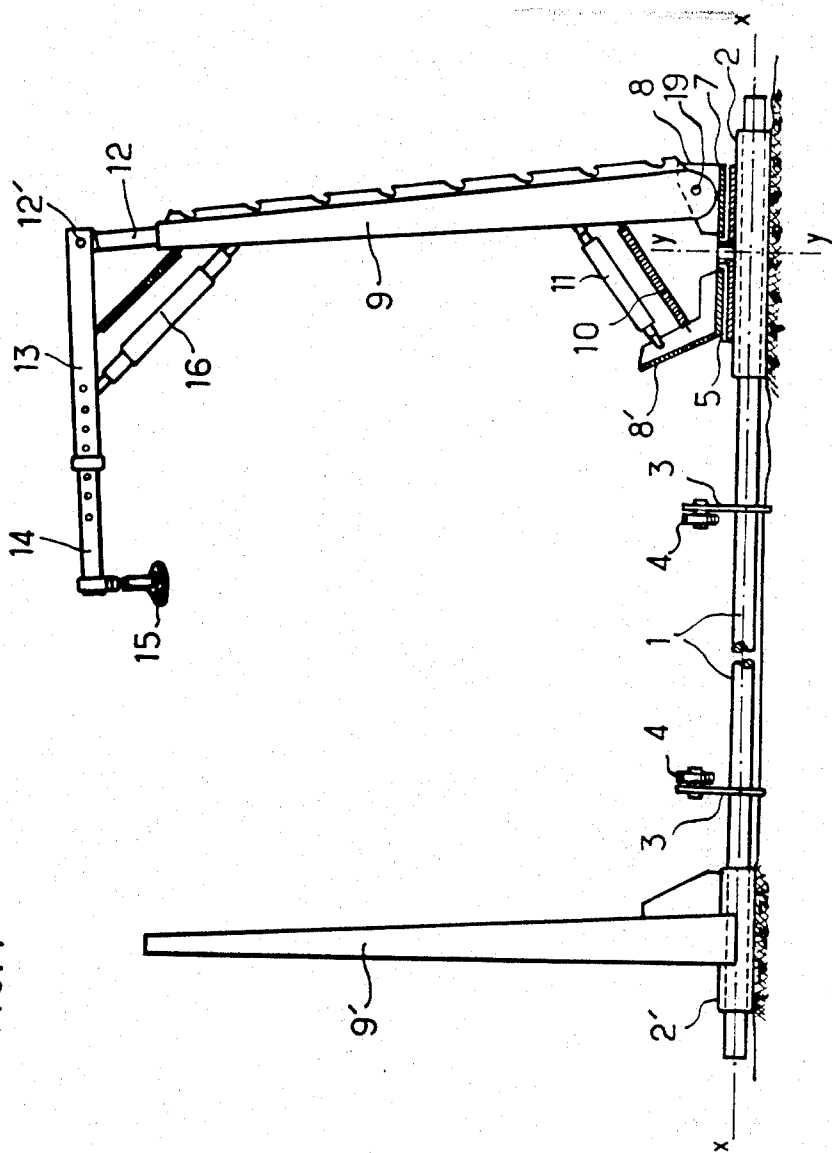
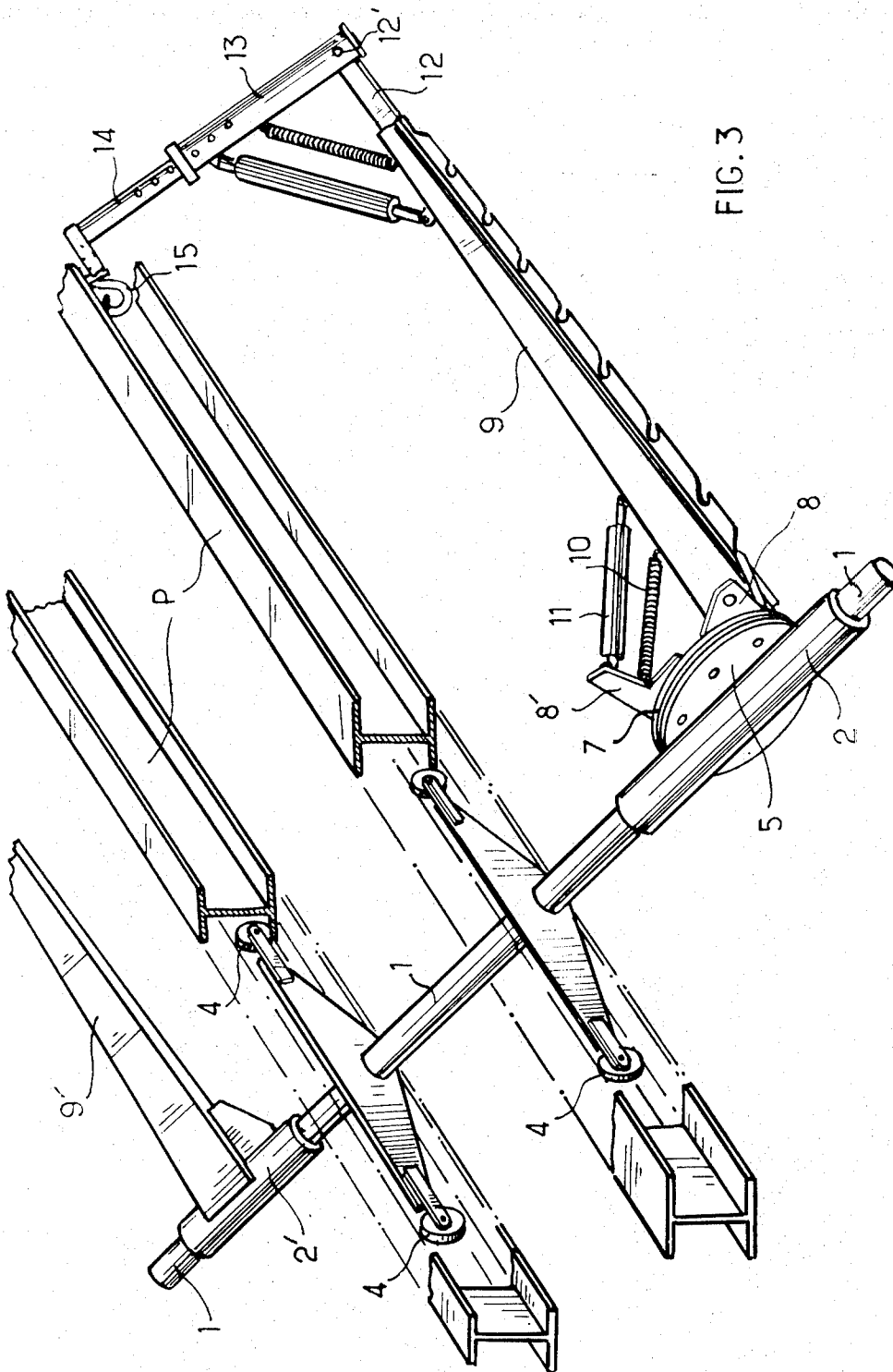


FIG. 1





APPARATUS FOR ACTING OF AND RESHAPING THE DAMAGE BODYWORK OF AUTOMOBILE VEHICLES

The present invention relates to apparatus for acting on and reshaping the damaged bodywork of automotive vehicles.

It is known that, for recomposing and returning accidentally deformed metal plates or panels forming the bodywork of automotive vehicles involved in collisions to their original shape, it is necessary to effect delicate and sometimes difficult shaping operations.

Devices and means are known for this reshaping purpose, but even those if optimally designed, represent in themselves or in small groups, however, systems which require in the development of the operations for which they are intended, a long series of accessories and a particular arrangement for which the use of necessarily skilled labour is an important factor in re-establishing the original condition of the metal sheeting.

The apparatus forming the object of the present invention and constructed according to the following description provides the user with a means of intervention whereby, in addition to a possible and valuable continuous check of its degree of operative intervention, makes it possible to determine from time to time not only the position of its operating members, but also the direction of the action thereof, such that these means become located in the best positions for executing their optimum intervention not only with regard to the conformation to be given to the damaged plate, but in particular, with respect to the intensity of their intervention according to the quality of the material of which the panels are formed.

The principal characteristic of the apparatus of the present invention is substantially as follows: one of its tool carrying arms may assume any position in space considered the most suitable for effecting the operation to be carried out. Thus any point of the panel forming part of the bodywork of a damaged vehicle to be returned to its original shape, may be engaged by one of the known devices or tools adapted for the purpose once it is applied to an arm of the apparatus of the present invention without, however, it being necessary to employ other devices or complementary objects for the purpose. This object is achieved in that the device, formed of a series of rods and arms, structural and functionally connected to be displaceable relatively to each other by means of links and hinges, may be positioned so that the operating device or utensil may be disposed at any point in space relatively to the centre of star-shaped range of displacement of a rod of the apparatus which in turn is displaceable both longitudinally and transversely relatively to the bridge supporting the vehicle to be repaired.

According to the present invention there is provided an apparatus for acting on and reshaping the damaged bodywork of automotive vehicles, comprising a mechanical construction capable of being displaced or supported on a carriage, said construction being provided with a rod or the like means, one end of which is displaceably and pivotably secured whilst being lockable in positions assumed thereby in such manner that the position in space of the other end of the rod is determined by its displacements, and is permitted by its mobility along the generating lines of the conical surfaces generated by its central axis relative to the points of connection of its end with respect to the structure

which supports it and, consequently, relative to the vehicle to be treated, the free end of said rod or the like, being adapted to form an element for the direct or indirect application of at least one tool for effecting or facilitating, the working or shaping of the sheet metal of the vehicle.

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is an elevation of the apparatus when in an inoperative position and vertically disposed on the ground;

FIG. 2 is a perspective view of the apparatus connected to a bridge supporting vehicle (V) to be repaired, and located in positions suitable for operation on the upper part of the bodywork; and

FIG. 3 is a perspective view of the apparatus located in a position to be used on a lower central portion of the vehicle bodywork.

The apparatus of the present invention substantially consists of a bar 1 which in operation, is disposed in a horizontal plane parallel to that in which the vehicle (V) is disposed with its longitudinal axis extending at right angles to the longitudinal axis of the vehicle. Two strong sleeves 2 and 2' are threaded on the ends of the bar 1, may be laterally displaced along the axis ($x-x$) of the bar, and are rotatable about said axis when they are not connected to it by means of known devices providing a rigid connection. Ribs 3, each provided with rollers 4, are secured to the bar 1, symmetrically about an approximately intermediate point of the bar 1 and hence within the space comprising the two sleeves. Thus the members of a carriage 3-4 are connected to the bar 1 with the axes of the rollers 4 being generally parallel to the axis of the bar 1 (see FIG. 1).

A rod 9' is rigidly secured to the sleeve 2' and is capable of being subjected to appreciable bending forces for the purpose of resisting the counterthrust of the operating device and a baseplate 5, provided with a centre stud 6, is secured to the sleeve 2. A disc-shaped counterplate 7, rotatably displaceable about the axis ($y-y$) of the stud 6 but also rigidly connectable to said baseplate 5 by known means, is slipped on said centre stud 6. The counterplate 7 comprises two square yokes 8 and 8', one of which (8) pivotably supports a rod 9 which is a twin to the symmetrically disposed rod 9', whilst the other yoke (8') carries attachments for the eyelets of one end of a spring 10 and of the hinge of a ram or hydraulic cylinder 11. The other end of said spring and the end of the piston rod of the ram are secured to two intermediate points on the rod 9 so that, under the action of the ram, said rod 9 may be subjected to large angular displacements about the axis ($z-z$) of the pivot 19 in a plane at right angles to the surface of the disc-shaped counterplate 7. The rod 9 is hollow and has a rod 12 telescopically displaceably therein. An arm 13 provided with a telescopic extension 14 is loosely secured at 12' to the end of rod 12 and extension 14 is in turn secured, by known means, in a desired position relatively to the arm 13. Thus the members 13-14 may be subjected to wide angular displacements relative to the axis of 12' within the plane defined thereby with the rod 9. An operating device 15 is permanently secured to the end of the extension 14 and a ram or hydraulic cylinder 16 is interposed between the solid rod 12 and the arm 13 and actuates angular

displacements of the system 13-14 relatively to the rod 9.

As already stated, the operating tool may be actuated as an entire unit although it may be preferable in certain cases to remove the pair 13-14 and to operate the single rod 9 as the working portion of the apparatus to which there is applied, in known manner, a chain, or plug to exert a compression action on the damaged part of the panel for the traction of the panel.

Obviously, the operation of the apparatus will depend upon the requirements of the work to be effected by operating from time to time on a concave or convex portion of a panel. In the first case, the ram 11, connecting the square yoke 8' with the operating rod 9, may displace the latter towards the vehicle so as to exert a compressive action from outside via an operating tool, for example, a plug 15, towards the interior of the surface to be treated. In the second case, however, the ram may exert a traction from inside towards the outside of the vehicle, which is obtained by rotating the counterplate 7 through 180° relatively to the baseplate 5. The different actions of traction or compression of the rod 9 or of the associated unit 13-14 may, in contrast to the system using single action winches, be more suitably effected with rams having a double action.

It will also be noted that, in the preceding portion of the description concerning FIGS. 2 and 3, the apparatus of the present invention is described on a carriage displaceable along a carriage supporting bridge (P) defined by a pair of laterally spaced apart H-shaped beams (see FIG. 2 and 3) whose flanges and webs are substantially perpendicular to the axes of the rollers 4 and the bar 1. The rollers 4 are guided along the flanges of the H-shaped beams of the carriage support bridge (P). It may readily be perceived that the apparatus may also be mounted on a carriage independent of the supporting bridge. In this case, the apparatus is displaceable as a whole relatively to the vehicle, since it is possible, during the operating phase, to rigidly secure it relatively to said supporting construction at a most suitable point for the period of time necessary for accomplishing one of the individual operations necessary for returning the bodywork to its previous condition. A displacement thereof to another position relatively to the vehicle is effected when another operation has to be effected at another position on the body itself. It is therefore possible for the user to disconnect and resecure the carriage supporting the apparatus from time to time when the position thereof is changed in order to engage

the particular portions of the body which have been damaged. It may be observed that even under such different conditions of use, the apparatus of the present invention is not changed in any manner with regard to its construction, its members and the parts of which it is composed.

The present invention has been illustrated and described with reference to a preferred embodiment, but it should be understood that constructional variations of the present apparatus may be made thereto without departing from the scope of protection of the patent application.

What I claim is:

1. Apparatus for repairing the damaged body of a vehicle such as an automobile or the like, said apparatus comprising, in combination:

- a. a carriage assembly connected to an elongated bar
- b. means for supporting said carriage assembly and said bar for movement in a direction substantially perpendicular to the longitudinal axis of said bar;
- c. at least one sleeve mounted on said bar for rotation about the longitudinal axis thereof;
- d. a plate assembly rigidly secured to said sleeve, said plate assembly being rotatable about an axis substantially perpendicular to the axis of said bar;
- e. a rod assembly having a first end pivotally mounted on said plate assembly for angular displacement about an axis that is substantially perpendicular to the rotational axes of said bar and said plate assembly, the second end of said rod assembly being adapted to receive a tool for repairing the body of the vehicle; and
- f. means for angularly displacing said rod assembly.

2. The apparatus in accordance with claim 1 wherein at least the second end portion of said rod assembly is hollow and is defined by a telescoping section that is substantially L-shaped, a first leg of said telescoping section being received in said hollow second end portion of said rod assembly, the second leg of said L-shaped section being defined by two telescoping portions a first one of which is pivotally secured to said first leg of said L-shaped telescoping section for angular displacement about an axis that is substantially parallel to the pivotal axis of said first end of said rod assembly and means for angularly displacing said second leg of said L-shaped second end portion with respect to said first leg thereof.

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