

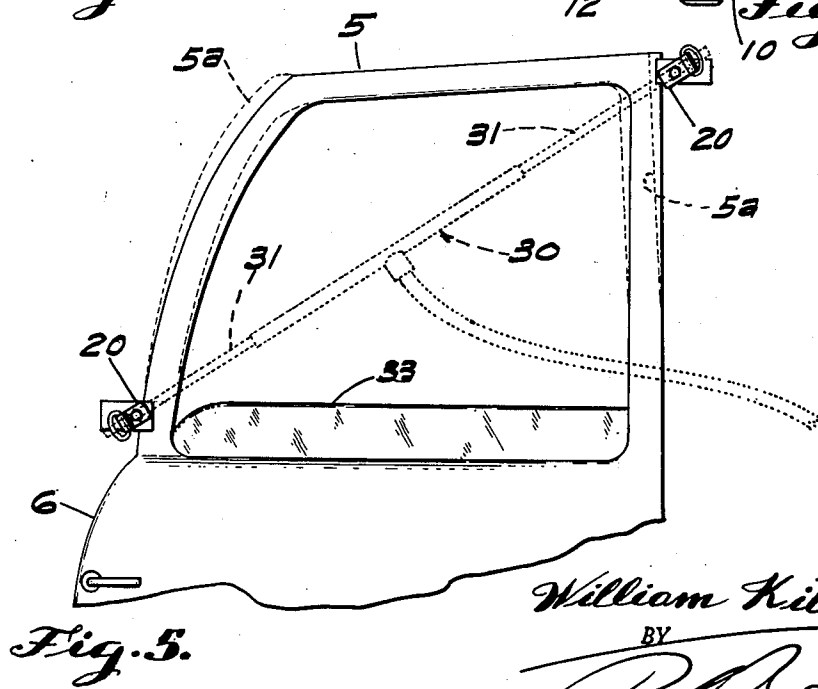
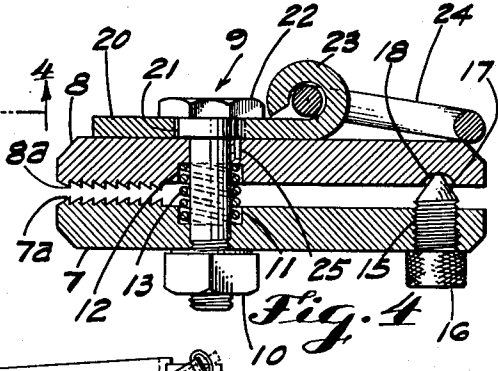
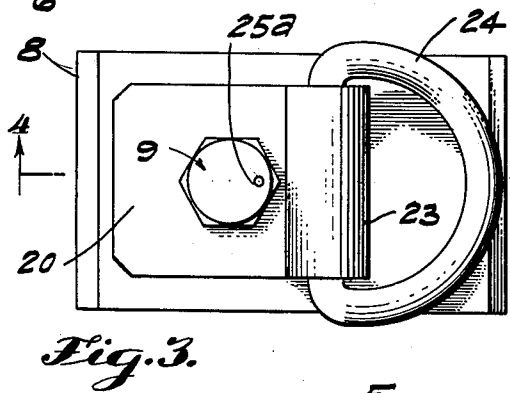
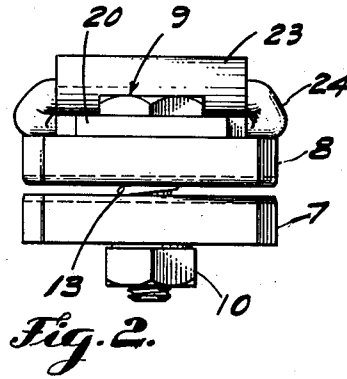
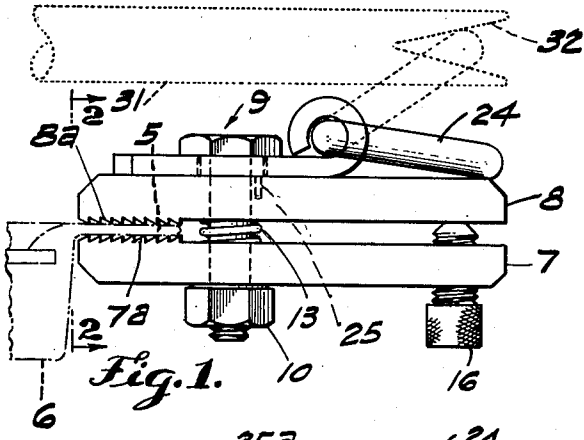
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CLAMP HAVING A SWIVELED TRACTION CONNECTION

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## CLAMP HAVING A SWIVELED TRACTION CONNECTION

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1 Claim. (Cl. 24-73)

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This invention relates to a clamp having a swiveled traction connection.

One of the drawbacks relating to tools heretofore used for correcting the upper portions of deformed automobile doors resides in the fact that the hydraulic jack, the only tool now available for this class of work, has the extremities of its thrusting members formed in the angular opposite corner portions of the window portion of the door. For example, if the glass portion of the door partly protrudes from its pocket into the window space, and the door is damaged in an accident whereby its window portion is drawn out of alignment so that the housed plate of glass cannot be elevated or depressed, it would then be impossible so to mount a conventional jack so that, without breaking the glass, such a jack could be used to restore the door to its normal contour.

Accordingly, it is an object of this invention to provide means whereby the flanged portion of the door may be gripped with a bite utilizing all the gripping portion of a clamp, and the hydraulic jack, when operatively related to clamp units grips opposite edge portions of the door outside the plane the glass would occupy if in the raised position, so that said jack may be operated to correct the door panel frame in such a manner that the glass may thereafter be elevated without being broken.

Other objects of this invention are: to provide a clamp structure which can be used, in conjunction with a hydraulic jack to correct deformed automobile doors without marring their rim portions; to provide an improved universal joint connection between the jaws of the door clamps and the rods or arms of a hydraulic jack used to exert a corrective force upon the distorted door; and to provide so simple and easily adjusted a clamp structure for the above stated purposes that it will be an important time saver in the operations of mechanically correcting deformed plates, doors and the like. The time saved by this invention over present day methods and equipment by the use of this invention in some recorded instances has amounted to as much as 400%.

Other objects, advantages and features of invention will hereinafter appear.

Referring to the accompanying drawing, which illustrates a preferred, reduced to practice embodiment of the invention,

Fig. 1 is a side elevation of the device. In this view a fragment of a hydraulic jack is shown in dotted lines operatively related to one of the handle or link portions of the device.

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Also a fragment of a door is shown in broken lines to illustrate the application of the clamp thereto.

Fig. 2 is an end elevation of the device, the viewpoint of the observer's plane of vision being indicated by line 2-2 on Fig. 1. In this view the jack is omitted.

Fig. 3 is a top plan view of the structure shown in Fig. 1, with the jack removed.

Fig. 4 is a longitudinal section taken on line 4-4 of Fig. 3, except that parts are shown in elevation.

Fig. 5 is a side elevation showing a fragment of a door frame being operated upon by means of mechanism of which the device forms a part.

Referring in detail to the drawing, the clamp structure is therein shown operatively related to the rim portion 5 of a door 6. Said clamp structure comprises two elongated, rectangular jaw plates 7 and 8, the former being stationary and the latter movable. Said plates are respectively provided with sets of ratchet type gripping teeth 7a and 8a, these sets of teeth being located at one end of the device in a cooperative relation to each other.

Nearer to its toothed end than to its opposite end each of said plates is laterally bored through at its midwidth, and through the aligned passages thus provided extends a headed clamping bolt 9 having screwed upon it a clamping nut 10. The bore through the clamping plate 7 has a diametrically enlarged inner end portion 11 and the other bore has a corresponding diametrical enlargement 12, thus providing space for the end portions of a compression spring 13 loosely coiled around the bolt 9, said spring tending to hold the jaw plates in a spaced apart relation to each other, as shown in Figs. 1, 2 and 4.

Near the end of the device which is opposite to its toothed portion the jaw 7 has through it, at its midwidth, a screwthreaded bore 15 within which is screwed an adjusting fulcrum screw 16 having a conically tapered, pointed inner end 17 which centrally engages a semicircular seat 18 in the adjacent end portion of the movable jaw 8.

A handle plate 20 has its inner face superimposed upon a jaw plate 8 and loosely surrounds a diametrically enlarged part 21 of bolt 9 subjacent to its polygonal head 22, being thus freely swiveled to said bolt. One side of said swiveled plate has an outwardly curled edge portion 23 projecting from the outer face of the plate, through which loosely passes the straight side of a semicircular ring 24 manually operable to

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adjust the swiveled plate 20 to the desired angle in relation to the long axis of the device.

In order positively to hold the bolt 9 against turning when the nut 10 is tightened a key pin 25 is provided to prevent relative rotation between said bolt and the adjustable jaw plate 8. In assembling the device the inner end portion of said key pin is inserted within a small hole therefor drilled into the outer face of the plate 8 close to the bore therethrough that receives the bolt 9. Then the bolt 9, provided in its diametrically enlarged part 21 with a small drilled hole 25a to receive the outer end portion of said pin 25, is inserted after bringing the latter drilled hole into alinement with said pin.

In Fig. 5 the device is shown in the position it occupies after being utilized to restore a deformed automobile door to its normal contour. In this view two of the clamps appear, said clamps being shown applied to diametrically opposite corner portions of the part of a door rim 5 which was deformed. The dotted lines 5a show the contour of the deformed door rim. In this view a conventional hydraulic expander 30 is shown carrying opposed twin push rods 31, each of said rods having a forked outer end portion 32 (see Fig. 1) engaged with the ring or link 24 at its side of the structure. This arrangement avoids danger of breaking the glass 33.

It is to be observed that, in applying the device to the rectangular corner portions of the doors, or to the corner portions of other plate-like structures, the two jaws of the device should be directed at a right angle to the edge portion of the object to which they are applied, this being necessary in order to utilize them to grip a larger area than they would grip if arranged with their lengths alining with the aforesaid rods 31. Hence when two of the clamping devices are thus applied to diagonally opposite corner portions of a deformed door or plate and a push mechanism bridges the space between them, the presence of the swivel plates 20 and of their swingable handles 24 is required in order to make proper operative connections between said mechanism and the two clamping devices.

It is mainly in the particular just pointed out that the present invention makes an advanced step in the art to which it pertains. This will be better understood when it is noted that, if the clamps were arranged with their long axes in alinement with the push rods, only a part of their toothed areas would grip the door, rendering the foothold of each clamp insecure; or else their small footholds upon the door would overstrain the gripped metal.

The device is particularly well adapted to be used in conjunction with a hydraulic jack like the jack 30 provided with push rods 31 as shown in Fig. 5, one reason for its suitability for this kind of work residing in the fact that the pivotal connections of the links 24 with the turnable

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plate 8 is outwardly offset a material distance from the plane occupied by the gripping teeth 7a and 8a, so that there is a clearance between the back face of the door and the applied push rods which prevents the latter from marring the face of the rim portion of the door.

By the term "traction" as hereinbefore used is meant any force upon the links 24 tending to move them farther apart, whether it be a push or pull force.

Although only one specific piece of work has been shown being operated upon, it is obvious that many other distorted structures may be restored to normal contour by applying the invention to them.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the subject matter claimed.

I claim:

In a device for engaging the end of a rectilinearly extensible straightening tool, a pair of complementary plates having opposed plane gripping surfaces at one end and having aligned bores inwardly of said gripping surfaces adjacent said end, a clamping bolt extended through the aligned bores and loosely disposed in the bore of at least one of said plates, a spring sleeved about said bolt to yieldingly urge the plates apart, a third plate seated flat against the outer face of one of said complementary plates and having an opening through which said bolt passes to effect swivel connection of the third plate on the bolt, a ring attached to one end of the swivel plate and disposed to swing pivotally thereon in a plane perpendicular to the plane of said plate, one of said complementary plates having a threaded bore adjacent the end opposite the bolt, a screw engaging said threaded bore and manually operative to cause its inner end to contact the opposite complementary plate for tilting the latter plate about the bolt, and teeth inwardly directed toward said aligned bores formed on said opposed gripping surfaces of the complementary plates.

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