Nov. 13, 1951 D. H. RAGIN 2,574,589

VISE FOR STRAIGHTENING FENDERS

Filed Nov. 15, 1948 2 SHEETS—SHEET 1

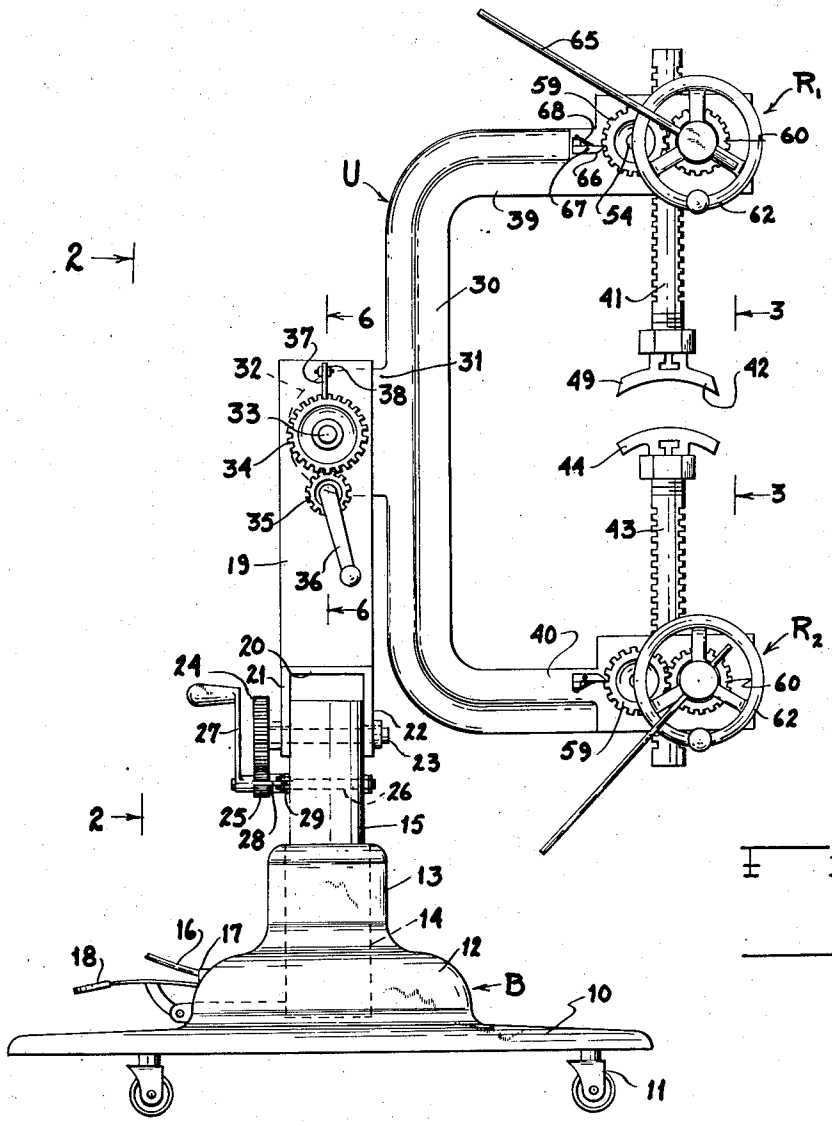


FIG. 1

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VISE FOR STRAIGHTENING FENDERS

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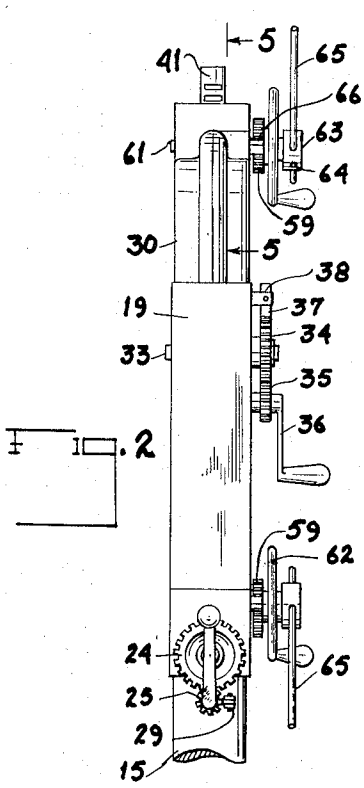


FIG. 2

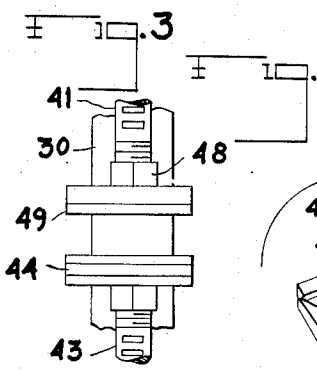


FIG. 3

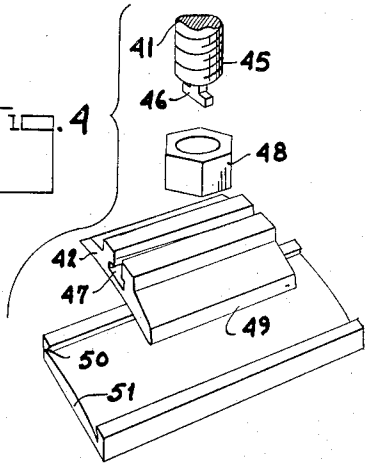


FIG. 4

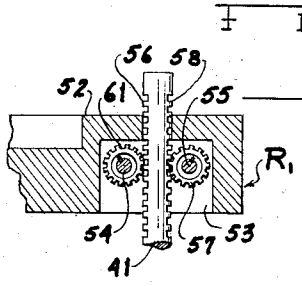


FIG. 5

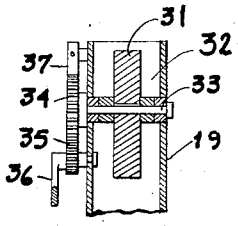


FIG. 6

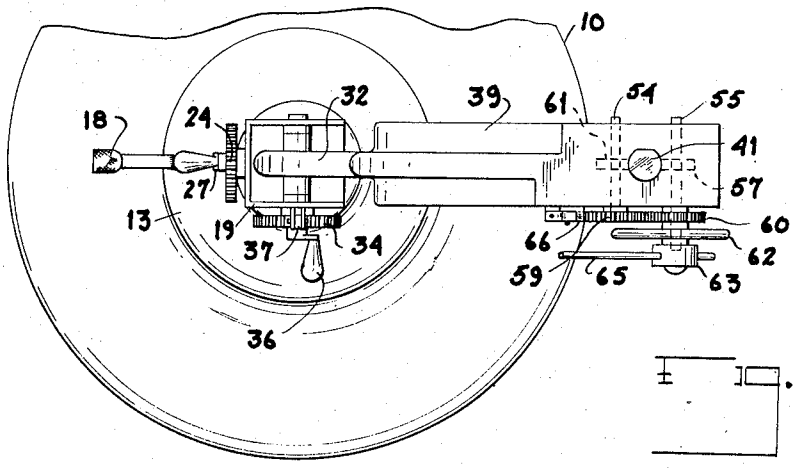


FIG. 7

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2,574,589

UNITED STATES PATENT OFFICE

2,574,589

VISE FOR STRAIGHTENING FENDERS

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Application November 15, 1948, Serial No. 60,007

2 Claims. (Cl. 153—32)

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This invention relates to a vise for straightening the fenders of automobiles and is concerned primarily with the provision of such a vise that is easily manipulated and yet is operable to apply great pressure to the portions of the fender being straightened.

Under modern traffic conditions, a certain number of collisions is inevitable. These conditions result in damage to automobile fenders; with the damage being of various degrees. In some cases the fenders are so completely deformed as to place them beyond repair. However, in other cases the dents or mars are of such a nature they can be "ironed-out." The present invention is concerned with apparatus for straightening such fenders without necessitating their removal from the motor vehicle.

The shape of the fenders of the modern motor vehicle is fairly well standardized. The repairman is, of course, not able to determine in advance the location of any dent or damaged part which he will be called upon to repair. Hence any machine of the type with which this invention is concerned, must be so mounted that access may be had to all parts of the fenders.

With the foregoing conditions in mind, the present invention has in view as its foremost objective the provision of a vise for straightening fenders which consists essentially of a movable base which carries a hydraulically actuated piston. Pivotally mounted on this piston is a supporting plate on which, in turn, is pivotally mounted a U-shaped bracket for vise elements. It is important to note that the two pivotal mountings recited assume directions substantially normal to one another whereby universality of adjustment of the U-shaped bracket is obtained.

Particular features and objects of the invention are tied up with these pivotal mountings. One such feature is the provision of means for locking either pivotal connection in an adjusted position, and the other lies in the provision of gearing for achieving mechanical advantage during adjustment.

In order to render apparatus of this type usable under practical conditions, it is important that the jaws or dies be quickly movable under low mechanical advantage to bring them into engagement with the work. That is, there must be a rapid traverse for the jaws of the vise together with means for then actuating the jaws under high mechanical advantage to perform the metal straightening operations.

Thus, a further object of the invention is the provision, in a fender straightening vise of the

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character noted, of a pair of complemental jaws together with mechanism for moving the jaws either under rapid traverse or high mechanical advantage.

Various other more detailed objects and advantages of the invention such as arise in connection with carrying out the above noted ideas in a practical embodiment will in part become apparent and in part be hereinafter stated as the description of the invention proceeds.

The invention therefore comprises a vise for straightening fenders which consists essentially of a U-shaped bracket in which a pair of complemental jaws are mounted for rapid traverse and movement under high mechanical advantage together with a base and universal connections between said bracket and said base.

For a full and more complete understanding of the invention reference may be had to the following description and accompanying drawings wherein:

Figure 1 is a view in side elevation of a vise for straightening fenders which is designed in accordance with the precepts of this invention.

Figure 2 is a "so-called" rear view; that is it is a view in elevation taken normal to the showing of Figure 1, and looking in the direction of the arrows 2—2 of Figure 1.

Figure 3 is a detailed view in elevation taken about on the plane represented by the line 3—3 of Figure 2.

Figure 4 is an enlarged detailed perspective showing the elements of one jaw assembly in exploded relation.

Figure 5 is an enlarged detailed section bringing out the actuating mechanism for the rack bars. This view is taken about on the plane represented by the line 5—5 of Figure 2.

Figure 6 is another enlarged detailed sectional view through the pivotal mounting for the bracket, and is taken about on the plane represented by the line 6—6 of Figure 1 and

Figure 7 is a top plan of the device shown in Figure 1.

Referring now to the drawings wherein like reference characters denote corresponding parts, and first more particularly to Figure 1, a vise which is made in accordance with the teachings of this invention is shown as comprising a base that is identified in its entirety by the reference character B. This base B comprises a platform 10 which is movably mounted on the casters shown at 11. Upstanding from the platform 10 is a pedestal 12 which terminates in an upper reduced cylindrical portion 13. This portion 13

and the pedestal 12 are formed with a cylinder represented by the broken lines at 14. A piston 15 is mounted for reciprocation in the cylinder 14 under the influence of a hydraulic medium which may be admitted thereto. A flexible conduit 16 is shown as representing the connection to the source of supply of the hydraulic medium under pressure. This line communicates with the pedestal 12 at the valve represented at 17 which is under the control of the said operating pedal 18.

The apparatus described for raising the piston 15 hydraulically is not a particular part of the present invention and is merely taken as a conventional hydraulic lift for such a piston.

A supporting plate 19 carries a bracket 20 which is anchored to one end thereof, and which presents a pair of ears 21 and 22 which embrace the piston 15. These ears 21 and 22 together with the piston 15 are formed with aligned openings through which passes a shaft 23. A gear 24 is carried by the shaft 23 and is drivably connected to the ear 21 of the bracket 20. A pinion 25 meshes with the gear 24 and is journaled on a shaft 26 that is mounted in the piston 15. A crank handle 27 is drivably connected to the pinion 25 and is operable to rotate this pinion. A detent or locking dog 28 is pivotally mounted as represented at 29 on the piston 15 and is adapted to engage the pinion 25 to hold the latter against rotation. It is evident that with the dog 28 out of engagement with the pinion 25, the latter may be rotated under the influence of the crank handle 27 to turn the gear 24 under mechanical advantage and thereby rotate the plate 19 about the shaft 23 as an axis.

A U-shaped vise bracket is referred to in its entirety by the reference character U. This bracket includes a back 30 that is formed with an ear 31 which is received in a recess 32 formed in the plate 19. A shaft 33 extends through aligned openings in the plate 19 and ear 31, and this shaft is keyed to the ear 31. A gear 34 is also keyed to the shaft 33 so as to establish a driving relation between the gear 34 and the ear 31. A pinion 35 is rotatably mounted on the plate 19 and meshes with the gear 34. A crank arm 36 is drivably connected to the pinion 35. A pinion or locking dog 37 is pivotally mounted on the plate 19 as indicated at 38 and is adapted to engage the gear 34 to lock the latter against rotation.

It is evident that with the locking dog 37 out of engagement with the gear 34, the crank handle 36 may be availed of to rotate the pinion 35 and thereby drive the gear 34 to turn the bracket U on the shaft 33 as an axis. Moreover, the bracket U may be held in an adjusted position when the detent 37 engages the teeth of the gear 34.

The bracket U includes two legs 39 and 40. Operatively mounted on each of these legs is a rack bar assembly designated R1 and R2 respectively. These rack bar assemblies are substantial duplicates and only one of them will be herein described in detail for the purposes of this invention. However, it will be noted that the assembly R1 includes a rack bar 41, the free end of which carries a jaw 42 while the assembly R2 includes a rack bar 43 on the free end of which is a jaw 44 that is complemental to the jaw 42.

Each of the jaws 42 and 44 is mounted on its respective rack bar in the same manner. Figure 4 illustrates the connection between the jaw 42 and the bar 41. The end portion of the latter is threaded as shown at 45 and the free end thereof carries a T 46. The jaw is formed with a complemental T-slot 47 into which the T 46 fits. After this interlock has been established, a nut 48, which is carried by the threads 45, may be tightened to lock the parts in assembled relation. It will be noted that the edges of the jaw 42 are mitred as indicated at 49 whereby they are adapted to be received in undercut grooves 50 formed in a die piece 51. Thus, dies of various configurations may be positioned on the jaw 42. In a similar manner complemental die elements may be positioned on the jaw 44.

Referring now more particularly to Figures 3 and 5 which will be considered in conjunction with Figure 1, the detailed constructions of the rack bar assembly R1 will be described. The leg 39 is enlarged as represented at 52 and this enlarged portion is formed with a recess 53. Journaled in the walls in the opposite sides of the recess 53 is a pair of shafts 54 and 55. Keyed to the shaft 54 is a pinion 61 that engages the teeth 56 formed on one side of the rack bar 41, another pinion 57 is keyed to the shaft 55 and engages the teeth 58 formed in the opposite side of the rack bar 41. It is evident that rotation of the gears 61 and 57 will cause rectilineal movement of the rack bar 41.

Keyed to an outer end of the shaft 54, which projects beyond the face of the enlarged portion 52, is a gear 59. Another gear 60 mesh with the gear 59 and is keyed to the outer end of the shaft 55. A handwheel 62 is also keyed to the shaft 55 and is adapted to be rotated to move the rack bar 41 at high speed and under low mechanical advantage. On the outer free end of the shaft 55 is a hub 63 formed with a series of openings 64, any of which is adapted to receive one end of an operating lever 65.

As shown in Figure 1, a dog 66 is pivotally mounted as represented at 67 on the leg 39 and biased by a spring 68. This dog normally engages the teeth of the gear 59 to prevent rotation in one direction and when disengaged from the teeth rotation in that direction is permitted.

Operation

While the operation of the above described apparatus is believed to be evident from the descriptions of the parts given, it may be briefly outlined by noting that the entire machine is first moved into a desired location with respect to the fender to be repaired by moving the base B on the casters 11. The piston 15 is now adjusted to a proper height by operation of the foot pedal 18. The plate 19 may now be swung about the shaft 23 as an axis by operating the crank handle 27. When the desired position is achieved, the detent 28 will engage the teeth of the pinion 25 to lock it in that position.

The bracket U is next swung on the shaft 33 as an axis by operating the crank handle 36, and the dog 35 placed in engagement with the teeth of the gear 34 to lock it in that postiion. Obviously these operations of the piston 15, plate 19 and bracket U could take place in any sequence other than that described in order to achieve the ultimate result of getting the jaws 42 and 44 into proper position with respect to the work. Either or both of the handwheels 62 is now availed of to move either or both of the jaws 42 and 44 with a rapid traverse to engage the opposite faces of the work. Both of the jaws will be

locked in such adjusted position by the dog 66. The operator now takes one of the levers 65 and positions it in one of the holes 64. Due to the length of the lever he is enabled to rotate the shaft 55 under great mechanical advantage and thereby urge the jaws 42 and 44 against the work.

With each machine there will be supplied a variety of dies 51, any set of which may be fitted over the jaws 42 and 44. Thus, any particular set of dies will be selected for any operation depending upon the curvature of the fender to be repaired.

While a preferred specific embodiment of the invention is hereinbefore set forth, it is to be clearly understood that the invention is not to be limited to the exact constructions, mechanisms and devices illustrated and described because various modifications of these details may be provided in putting the invention into practice within the purview of the appended claims.

What is claimed is:

1. In a vise for straightening fenders, the combination of: a movable base, a piston mounted for vertical reciprocation in said base, hydraulic means for actuating said piston, a plate pivotally mounted on said piston, means for locking said plate in an adjusted position, a U-shaped bracket pivotally mounted on said plate on an axis normal to that of the first pivotal mounting, means for locking said bracket in an adjusted position, and complemental jaw elements operatively mounted in said bracket.

2. In a vise for straightening fenders, the combination of: a base, a piston mounted for vertical reciprocation in said base, a plate pivotally mounted on said piston, a detent pivotally mounted on said piston for locking said plate in an adjusted position, a U-shaped bracket pivotally mounted on said plate on an axis normal to that of the first pivotal mounting, a detent pivotally mounted on said plate for locking said bracket in an adjusted position, and complemental jaw elements operatively mounted in said bracket.

DOUGLAS HOWELL RAGIN.

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