Dec. 30, 1930. G. L. HUNT 1,786,847

MECHANISM FOR OPERATING UPON METAL PARTS OF AUTOMOBILES AND THE LIKE

Filed March 1, 1929 3 Sheets-Sheet. 1

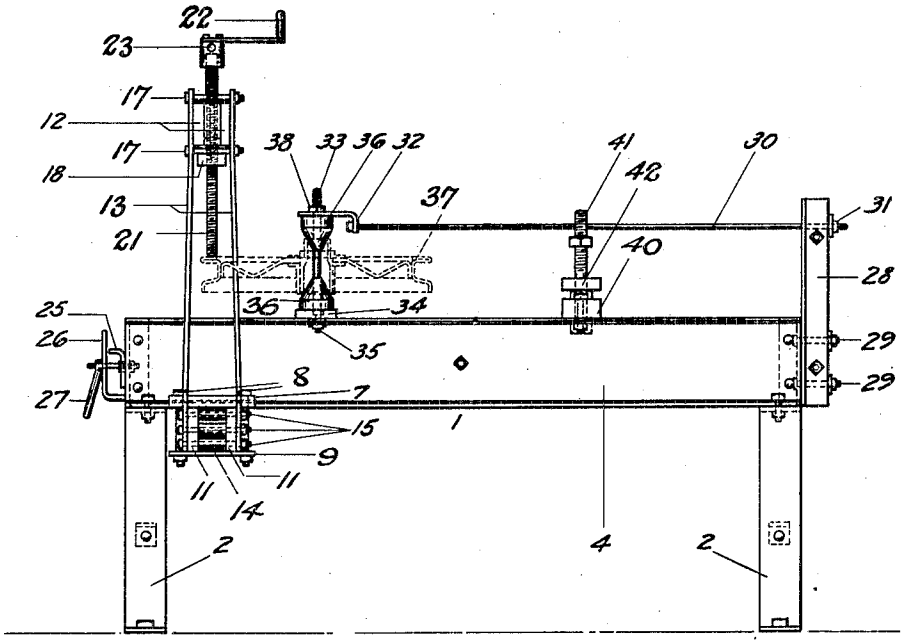

FIG-1

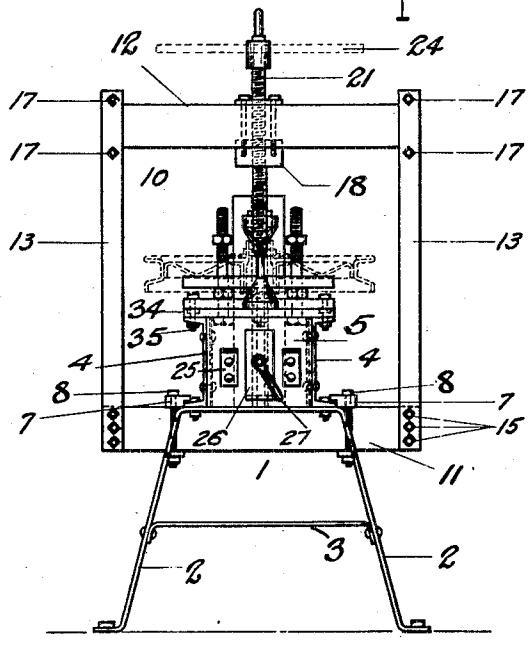

FIG-2

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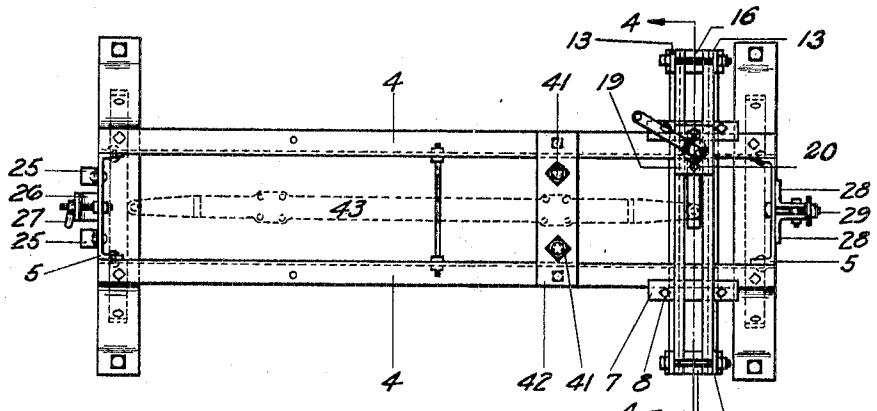

FIG-3

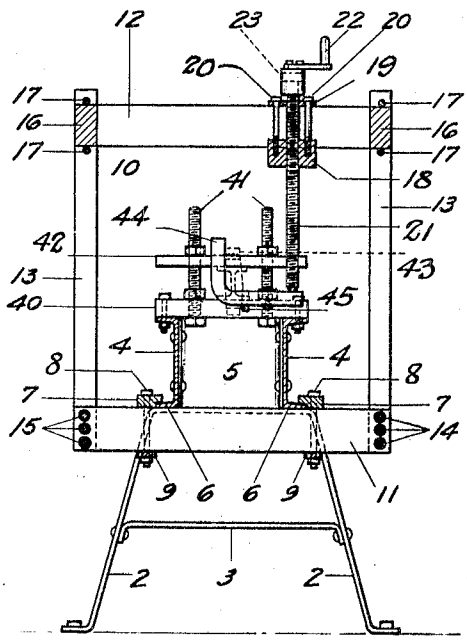

FIG-4

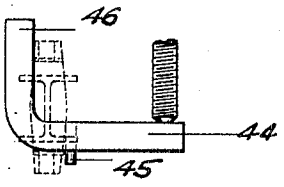

FIG-5

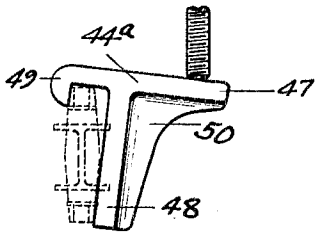

FIG-6

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MECHANISM FOR OPERATING UPON METAL PARTS OF AUTOMOBILES AND THE LIKE

Filed March 1, 1929 3 Sheets-Sheet. 3

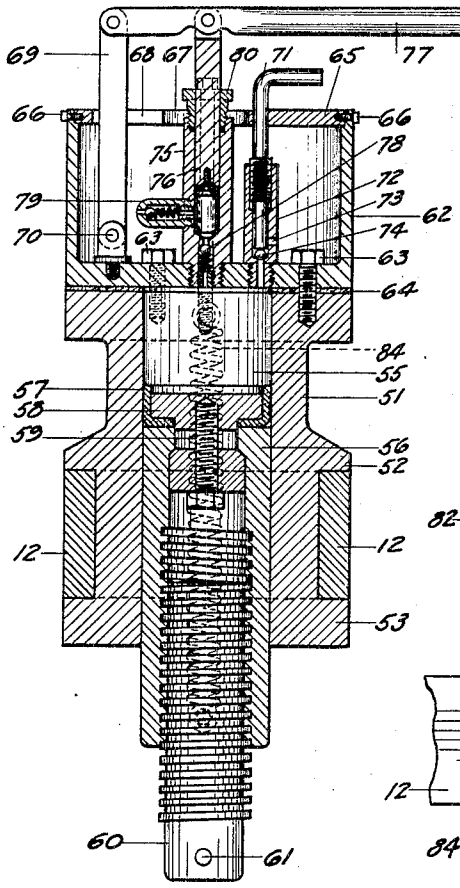

FIG-7

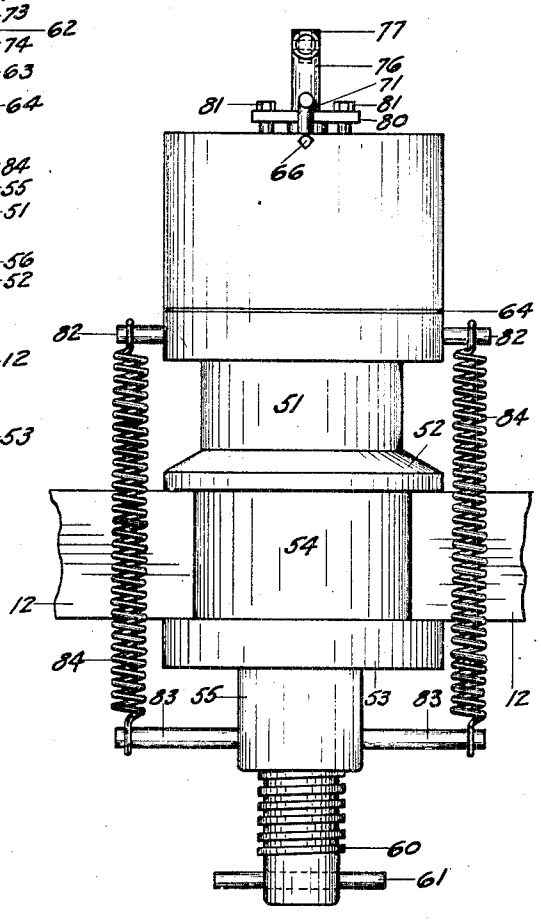

FIG-8

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Patented Dec. 30, 1930 1,786,847

UNITED STATES PATENT OFFICE

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MECHANISM FOR OPERATING UPON METAL PARTS OF AUTOMOBILES AND THE LIKE

Application filed March 1, 1929. Serial No. 343,732.

The present invention pertains to means for operating upon metal parts of automobiles and is more particularly concerned with the straightening of disc wheels, axles, and frame members. Among the objects of this invention are to provide a machine with which metal parts of an automobile or the like may be straightened; to provide mechanism for the straightening of metal wheels; to provide mechanism for the straightening of axles; to provide mechanism for the straightening of automobile frame members; to provide improved metal bending mechanism; to provide mechanism which is capable, with but slight changes, of serving as both wheel straightener and axle straightener; and such further objects, advantages and capabilities as will hereafter appear and as are inherent in the construction herein disclosed. My invention further resides in the combination, construction and arrangement of parts illustrated in the accompanying drawings and, while I have shown therein what is now considered the preferred embodiment of my invention and a variant of a part thereof, I desire this disclosure to be construed in an illustrative sense and not as limiting the invention.

In the drawings annexed hereto and forming a part hereof, Fig. 1 is a lateral elevation of my invention showing the same in use as a wheel straightener; Fig. 2 is an end view of the construction shown in Fig. 1; Fig. 3 is a plan view of this construction showing the same in use as an axle straightener; Fig. 4 is a transverse section of the structure, as illustrated in Fig. 3, substantially along the plane indicated by the line 4—4 of said Fig.; Fig. 5 is an elevation of a tool for use in the twisting of axles, the same being shown on a somewhat enlarged scale from that illustrated in Fig. 4; Fig. 6 is an elevation of a modified form of this tool; Fig. 7 is a longitudinal section, substantially central, of a modified form of means for applying power to the work; Fig. 8 is an elevation of the structure shown in Fig. 7 taken at an angle of 90° thereto.

Referring more in detail to the annexed drawings, a frame or support designated generally by the numeral 1 comprises legs 2, braces 3 and channel members 4 tied together at their ends by end pieces 5. The lower flanges 6 of the channels serve as tracks for under-cut members 7 through which pass bolts 8. These bolts also pass through cross bars 9 located below a supporting frame designated generally by the numeral 10 and comprising lower members 11, upper members 12 and side members 13. Extending between the lower members 11 are tubes 14 through which pass bolts 15 which draw the plates or bars 11 against the ends of the tubes 14, making a rigid frame element. When the nuts on bolts 8 are tightened up against the cross members 9, elements 7, 8 and 9 are rigidly held together with sufficient space between members 7 and 11 so that the latter can be readily moved lengthwise of the supporting frame but will not have sufficient play to have an undue amount of lateral tipping motion. The lateral ends of the plates 12 are held spaced by means of blocks 16 and, with the blocks 16 and side members 13, are held tightly assembled by means of the bolts 17. Parts 11 to 17, inclusive, constitute a supporting frame or tool holding frame which, as indicated above, is readily slidable longitudinally of the first named frame. In connection with the cross members 12 of the frame 10, there is a block 18 which is held to the plate 19 by means of bolts 20 as is apparent in Fig. 4. These bolts pass through the space between the plates 12 and into the block 18 and are tightened just enough so that this unit of the construction may be readily moved longitudinally of the bars 12. A heavy screw 21 provided with a handle 22 and a transverse opening 23 in which may be placed a cross bar 24, if desired, extends through a screw threaded opening in the block 18 and may be screwed up or down during the operation of the machine which will be described hereinafter.

A pair of brackets 25 are mounted upon one end 5 and serve as supporting means for an axle which is clamped against the end of the frame by the clamp 26 drawn up by member 27.

To the opposite end of the support 1 are se-

cured uprights 28 in the form of angles, these uprights being held in place by means of bolts 29 passing through the end member 5. These uprights constitute an anchor for the rod 30 having on its outer end a nut 31 whereby the tension on the rod 30 may be varied. At its inner end this rod passes through one arm of an angular member 32 whose other arm is perforated and mounted upon a bolt 33. A cross bar 34 is secured to the upper flanges of the channels 4 by means of bolts 35 passing through perforations in these flanges. The cross bar 34 is perforated substantially centrally and has the bolt 33 passing through and secured in said perforation. On this bolt 33 are mounted rim supporting members 36, shown as being somewhat conical in shape. In use, as shown in Fig. 1, the lower member 36 is put in place and the wheel rim 37 mounted thereon. The upper member 36 is then put in place, the member 32 being next put on and then the nut 38 is tightened down to hold the parts in assembled relation. The bolt 30 is then inserted between the uprights 28 and the nut 31 is tightened up so that the bolt 33 is stayed against the tipping force of the screw 21 when the latter is screwed down against the wheel rim 37. It will be seen from Fig. 1 that a considerable pressure can be exerted against a side of the rim to cause bending of the wheel, when the latter has been accidentally gotten out of true form. It will of course be understood that the wheel may be applied either side up, depending upon which way the same is bent. Also, if it is desired to spread the straightening force over a considerable length of rim flange, a heavy block may be inserted between the screw 21 and the rim. It will also be understood that the block 18 may be adjusted laterally from the axial line of the machine, if desired, this arrangement being shown in Figs. 3 and 4.

In order that this device may serve as an axle or bar straightener, a heavy cross tie 40 is secured to the upper flanges of the channels 4 and has bolts 41 fixedly mounted therein. On these bolts is mounted another cross member 42 which is used to clamp the axle or bar down against the bar 40, as illustrated in Figs. 3 and 4. When using the machine in this manner, the rod 30 and connecting member 32 are removed and the cross bar 34, together with the parts supported thereby, may be removed if desired.

The operation of this construction will be described in connection with Sheet 2 of the drawings. The axle 43 is first placed on the cross bar 40 and then the cross bar 42 is put in place and the nuts tightened down on the bolts 41 until the axle is held rigidly in place. If the axle has been twisted, so that the spindles are not in the same plane, a twisting tool 44, shown most clearly in Figs. 5 and 6, is then inserted through the yoke at the end of the axle with the abutment 45 resting against one side of one arm of the yoke and the end 46 resting against the opposite side of the other arm. The frame 10 is then adjusted into the plane of the tool 44, the block 18 being adjusted laterally until the end of the screw 21 can contact with the end of the horizontal arm of tool 44. The crank 22 is then turned to advance the screw 21 until the axle is twisted so that the two spindles will lie in the same plane. It will of course be understood that the tool 44 may be inserted the opposite direction through the yoke of the axle, if the twist is to be made in the opposite direction.

The tool 44*a* is merely a modification of that shown in Fig. 5 and comprises a normally substantially horizontal part 47 and a substantially vertical part 48. From one corner of this tool extends a hook 49 which may be hooked over one arm of the axle yoke, the vertical part 48 resting against the other arm. A strengthening web 50 is preferably formed between the arms 47 and 48 to prevent accidental breaking of one or the other of these. If the hook is too wide for the axle, as shown in Fig. 6, a suitable block can be placed between the end of the hook 49 and the arm of the axle yoke so that the tool 44*a* will be leveled up, as will be readily understood.

If a bend in a vertical plane is to be formed in the axle or a bar, the same may be placed substantially in the position shown in Fig. 3 and the frame 10 moved to the appropriate place so that the force can be applied in a manner to produce the desired bend at the desired location. If the bend is to be placed near the end of the axle, that is, between the yoke and the place of attachment of the spring, the parts will be set up very much as in Fig. 3 except that the screw 21 will bear against the end of the axle in the vicinity of the base of the yoke. If the bend is to be made toward the middle, the frame 10 will be placed appropriately for this purpose. In such use, it will probably be desirable to keep the cross bar 34 in place on the supporting frame.

As a substitute for the pressure applying means of the previously described construction, the structure shown in Figs. 7 and 8 may be provided. As a matter of fact, this construction is preferable when considerable pressure is required. In this construction an hydraulic device 51 is provided with a pair of separated flanges 52 and 53 between which is a reduced portion 54. Between the flanges 52 and 53, are located the cross bars 12 of the power unit supporting member. The mounting of this device will be understood by reference to Figs. 4, 7 and 8. This hydraulic device has a cylinder 55 within which is located a piston 56, the same having a packing 57 as will be readily understood. This packing is

held in place by means of the nut 58 and bolt 59 as shown clearly in Fig. 7. The piston 58 is hollow and screw-threaded and has mounted therein a screw-threaded element 60 which may be longitudinally adjusted within the piston as is evident from the drawings. If desired, a cross pin 61 may be provided to assist in turning the plunger 60 within the piston 56. This gives adjustment additional to that which is secured by movement of the piston longitudinally within the cylinder 55. A chamber 62 is mounted on the upper end of member 51 by means of bolts 63, the connection of the two being made tight by means of a gasket 64 placed between the bottom of the container 62 and the top of the member 51. This container is provided with the top 65 held in place by any suitable means such as bolts 66. This cover 65 has a central aperture 67 from which extends a slot 68 within which the link 69 may swing laterally about its pivot 70 which is suitably secured to the bottom of the container 62. The cover 65 is also provided with a perforation through which extends the shaft 71 of a valve operating means. The valve is denoted by the numeral 72 and has through one wall thereof an opening 73 which permits the fluid, preferably oil, to pass from the cylinder 55 out past the ball 74 into the container 62, when the shaft 71 is screwed backwardly to permit the ball to be unseated. As is evident from Fig. 7, the valve 72 is screwed into a tapped opening extending through the bottom of the container 62.

Provided centrally of the bottom of the container 62 is another tapped perforation into which is screwed a reduced end of a pump body 75. This pump has a cylindrical opening through the major portion of its length and in this cylindrical opening is located a piston 76 which may be reciprocated by the handle 77 which has pivotal connection with the piston 76 and also with the link 69. As the handle is moved up and down, the piston 76 also moves up and down causing oil to be pumped from the container 62 into the cylinder 55 where it exerts its pressure against the end of the piston 56. A ball 78 is spring pressed against its seat in member 75 and prevents the fluid from flowing back from cylinder 55 to the container 62. This spring yields under pressure from the piston 76 and permits the fluid to be forced past the ball and into the chamber 55. A valve member 79 is screwed into one side of the member 75 and has an opening therethrough connecting the chamber 62 with the interior of the cylinder in which the piston 76 slides. The ball in this valve is pressed against its seat by a spring, as in the last previously described construction. Removable seats are provided for the springs in both instances, as will be clear from the drawings, and further description thereof is believed unnecessary. It should perhaps be stated that the pump cylinder 75 is braced in position by means of a cross member 80 secured to the top 65 by means of bolts 81. Pins 82 extend into the upper portion of the body 51 of the hydraulic means as is apparent in Fig. 8. Corresponding pins 83 extend into the bottom portion of the piston 55 and springs 84 are connected to the pins 82 and 83 to exert a tension upon the piston 55, tending to draw the same upwardly when the valve 72, 73, 74 is opened.

From the foregoing, it will be seen that the device shown in Figs. 7 and 8 may be substituted for the corresponding device shown in Figs. 1 to 4, inclusive. If such a substitution is made, the operation will be similar to the operation of the other construction. However, when the frame is put into position to operate upon the work, as in Figs. 1 to 4, the screw 60 is turned outwardly until it engages or substantially engages the work. If the valve 72 has not been closed, this will now be done and the handle 77 will be operated to pump the fluid from the container 62 through the valves 79 and 78 into the cylinder 55. When this is done, considerable pressure is exerted upon the piston by reason of the fact that the area thereof subject to the pressure of the fluid is so many times greater than the area of the face of piston 76. It will therefore be possible to exert much pressure upon the work by a comparatively small amount of force applied to the handle 77. This construction is merely another means for employing the same principle as that set forth in the previously described construction but enables a greater force to be applied to the work for a given amount of force applied to the handle.

Various other uses for this machine than those illustrated in the present drawings will be obvious to a skilled mechanic and no attempt is therefore made to set forth all of such uses. It is of course understood that various departures may be made from the structure described herein, without departing from the spirit of my invention as set forth in the appended claims.

Having now described my invention, I claim:

1. In a wheel straightening machine, a supporting frame having longitudinal flanges, a second frame transverse to the first frame, mounted on the flanges and slidable thereon, said second frame having a part spaced upwardly from the first frame and extending transversely thereof, a screw extending through said part and operable therein to exert a downward pressure, and means on the first frame to rigidly support a wheel thereon in position to have pressure exerted thereon by the screw.

2. In a mcahine of the character described, a support, a supporting frame thereon movable lengthwise thereof, power transmitting means carried by the supporting frame and adjustable transversely of the support, work

holding means on the support designed to rigidly hold the work for the application of force by the power transmitting means, and a hook to be applied to the work and engaged by the power transmitting means whereby force may be applied to the work.

3. In a machine of the character described, a supporting frame, a supporting member mounted on and capable of traveling lengthwise of the frame, said supporting member extending transversely of the supporting frame, a reciprocable member in said supporting member adapted to be operated therein to move toward or recede from the supporting frame, work holding means on the supporting frame adapted to hold work while being operated upon means for operating said reciprocable member.

4. In a machine of the character described, a support, a supporting frame thereon movable lengthwise thereof, power transmitting means carried by the supporting frame and adjustable transversely of the support, and work holding means on the support designed to rigidly hold the work for the application of force by the power transmitting means, said power transmitting means including hydraulic means for exerting pressure upon the work.

5. In a machine for the purpose indicated, a supporting frame, a tool holding frame carried thereby and capable of moving lengthwise thereof, said tool holding frame rising above and extending transversely of the supporting frame, power applying means in the tool holding frame capable of being moved transversely of the supporting frame to apply power at various points transversely thereof, said last named means comprising a hydraulic means for applying power to the work and resilient means for withdrawing the movable element of the hydraulic means when it is desired to withdraw it.

6. In a machine of the character described, a supporting means having a track thereon, a frame mounted on and capable of traveling lengthwise of the track, said frame rising above and extending transversely of the supporting means, supporting means on the frame, a screw in said second mentioned supporting means adapted to be operated therein to move toward or recede from the first mentioned supporting means, and work-holding means on the first mentioned supporting means adapted to hold work while being operated upon.

7. In a metal bending press, a supporting frame having a longitudinal track, a tool holding frame mounted on and capable of traveling lengthwise of the track, said tool holding frame rising above and extending transversely of the supporting frame, pressure applying means in said tool holding frame capable of being moved therein transversely of the supporting frame and adapted to be operated to move toward or recede from the supporting frame, and work holding means on the supporting frame adapted to hold work while it is being bent.

8. In a metal bending machine, a support, supporting means thereon movable lengthwise thereof, force transmitting means carried by the supporting means and adjustable transversely of the support, work holding means on the support to rigidly hold the work for application of force by the force transmitting means, and a work engaging member to be applied to the work and engaged by the force transmitting means whereby force may be applied to the work to bend the same.

9. In a mechanism for the purpose indicated, a support for supporting the work to be operated upon, supporting means carried by the first named support, power applying means carried by the supporting means, said power applying means comprising a body member movable with relation to the support and supporting means, said body member having a cylindrical opening in which there is mounted a reciprocable piston, and hydraulic means for actuating said piston in one direction.

In witness whereof, I hereunto subscribe my name to this specification.

GEO. L. HUNT.