STRAIGHTENER FOR DEFORMED SIDES OF RAILROAD CARRIERS

Fig. 5

Fig. 4

INVENTORS
François LAGUE
Normand RUEL

ATTORNEY
The device of the invention is portable and is intended to straighten the deformed panel-like sides of box cars, gondolas or the like bulk material railroad cars. It is equipped with a single hydraulic motor of the piston-cylinder type which can be suspended horizontally or diagonally from a crane and be operated from a tractor. The hydraulic motor is preferably mounted between side plates for the suspension thereof. It is provided with a piston rod which freely rotates about its longitudinal axis and which is terminated by a hook-like arrangement. It also comprises a fixed rod projecting from the rear end of the motor which is also terminated by a hook-like arrangement. The fixed rod may be telescopic in order to be adjustable. Means are provided to swivel both hook-like arrangements about the longitudinal axes of the two rods and to lock the same into respective positions.

Another object of this invention is to provide an apparatus for straightening the deformed sides of box cars, gondolas or the like bulk material railroad cars and particularly, those which are built of sheet metal.

Other objects of the invention will appear in the following description.

The above and other objects according to the invention may be attained by providing a portable device for straightening the deformed panel-like sides of box cars, gondolas or the like bulk material railroad carriers incorporating a single hydraulic motor of the piston-cylinder type which can be suspended horizontally or diagonally from a crane, wherein the piston rod thereof freely rotates about its longitudinal axis and is terminated by a hook-like arrangement, which also comprises a fixed rod projecting from the rear end of the motor also terminated by a hook-like arrangement. It is understood that means are provided to swivel both hook-like arrangements about the longitudinal axes of the rods and to lock the same into respective positions.

In the drawings which illustrate embodiments of the invention,

FIGURE 1 is a perspective view of the apparatus according to the invention;

FIGURE 2 is a side view of the gondola car straightener illustrating one operation of said apparatus;

FIGURE 3 is a longitudinal cross-section view of the apparatus according to the invention;

FIGURE 4 is a cross-section view taken along line 4-4 of FIGURE 3, showing the bore hole and used for adjusting the left hook to four different positions; and

FIGURE 5 illustrates a different working position of the hooks.

The device illustrated comprises a heavy pressure-fluid, preferably hydraulic motor 1 of the piston-cylinder type mounted between side plates 3 and 5. The device is adapted to be suspended horizontally or diagonally from a crane attachment 11 by means of supports 2 and 7. The heavy hydraulic motor comprises a piston rod 13 which as adapted to reciprocate within the motor cylinder 31 and is freely mounted therein to rotate about its longitudinal axis. The rod is terminated by a hook 15. In the embodiment illustrated in FIGURE 1 of the drawings, the hook 15 is shown to be seated over the upper edge of one side panel A of a gondola car. As will be described below, the hook 15 may adopt other positions depending on the reshaping operation to be carried out. A fixed rod 17 is mounted at the other end of the hydraulic motor 1 and is adapted to adjustably connect in slidable engagement therein a rod 19 which is terminated by hook 21. As illustrated in FIGURE 3, the rod 19 slides into the bore hole 18 of the rod 17. As in the case of hook 15, hook 21 is shown in FIGURE 1 to be seated in a similar fashion over the edge of the opposite side panel B. It is understood that hook 21 may also be rotated about the axis of rod 19 to other selected positions, as will be explained hereinafter.

Referring more specifically to FIGURE 3, it will be realized that the rod 13 is terminated at the outer end thereof with a threaded portion 39 over which the hook 15, formed with threaded bore 40, is fixedly screwed. Since the rod 13 is freely mounted within the cylinder 31 to rotate about its longitudinal axis, it will be understood that the hook 15 may be adjusted to any preselected position by simply rotating the rod 13 about its longitudinal axis. The hook 15 is prevented from rotation about the longitudinal axis of the piston rod 13 by means of the hook position locking rod 25 slidably supported at one end thereof on the hydraulic motor 1 by means of a bracket 27 and attached to hook 15 at the other end thereof of my means of wing screw 29. For that purpose, the hook 15 is provided at the rear portion thereof with four
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3. fixed, preferably welded, substantially square attachment plates 30b, 30c, and 30d (not shown) all threaded in the two side panels thereof and wing screw 29.

The hook 15 may thus be locked into four different positions, with the jaws of the hook extending up, right, down or left.

The other hook 21 is also rotatable about the axis of its corresponding rods 17 and 19 and can be maintained at the desired position by means of eyelet bracket 23, holes 24a of rod 17 and holes 24d of rod 19. Although only two holes 24 for the corresponding eyelet brackets 23 have been shown in order not to overload the drawings, it is obvious that more holes 24 are provided on the rod 19 to adjust the length thereof whenever necessary. Referring now to FIGURES 3 and 4, it will be seen that the engagement rod 19 slidably engages within the bore 18 of fixed rod 17 and is capable of rotating about its longitudinal axis, the hook 21 may be rotated to any desired position simply by rotating the engagement rod 19 about its longitudinal axis. For the purpose of locking the hook 21 to any of the four positions illustrated in FIGURE 4 of the drawings, holes 24a perpendicular to holes 24 are provided in the engagement rod 19 so that the eyelet brackets 23 will be able to lock the hook 21 into the four different positions illustrated in FIGURE 4 of the drawings, depending whether holes 24a or 24a are selected in one or the other direction.

The hydraulic motor 1 comprises a cylinder 31 defining a piston chamber 33 adapted to receive piston rod 13 which is displaced by means of oil duct controls 35 and 37. Piston rod 13 is mounted in a slidable engagement within cylinder 31 by means of piston rod guide 41 which is secured to cylinder 31 by a series of bolts 43. Piston rod guide 41 is provided with wipers 44. V-packaging 45 and O-ring 47 prevent oil leaks from piston chamber 33. Piston head 49 is mounted at the other end of piston rod 13 in a pair of resilient B and a pair of cup-shaped gaskets 55 and 57. The piston head assembly is secured together by means of nut 59 over screw 61. Cylinder 31 is mounted on web 63.

For the purpose of illustrating the operation of the device according to the invention in FIGURES 2 and 5. The railroad car straightener secured to crane attachment 11 by means of supports 7 and 9 is lowered into a desired position so that hooks 15 and 21, locked in the respective positions illustrated in FIGURES 1 and 2, are both seated over the upper edges of side panels A of said car. A straight rod-like brace 65 is used to stabilize the points along the side panels which might not require any appreciable degree of straightening or which have already been straightened.

When both hooks 15 and 21 of the device are seated over their respective side panels upper edges A and B, pressure is applied so as to cause a contraction of the motor 1 which pulls the deformed sides A and B inwardly and causes them to regain nearly all their original straightness.

Because the hooks of the device may be rotated and in view of the fact that the rod 19 is adjustable, the device according to the invention has great versatility. For example, it can always be indifferently used to push and pull. For gondola cars, as illustrated in FIGURE 2, it could be used without the brace 65 by arranging the device in a diagonal position, the hook 21 rotated vertically and setting against the bottom corner 67, while the hook 15 is vertically engaged over the upper edge of the opposite side A.

The sides of box cars would easily be reshaped by opening both doors, inserting the straighteners into the cars and engaging both hooks in the horizontal axis (FIGURE 5) on the corresponding vertical sides 69 of opposite doors. In most cases, this is the only operation required to reshape the sides of box cars. To our knowledge, no other apparatus could perform this operation. Similarly, the vertical steel stakes of flat cars used for hauling pipes or the like may be straightened by using the device according to this invention, which operation, to our knowledge, has not yet successfully been carried out with the devices presently available.

While the invention has been particularly described in connection with railroad cars sideward repair work, it is obvious that the features and distinct advantages secured by the machine of the present invention are equally applicable to other industrial uses, and provide a portable hydraulic metal straightening machine which is capable of use in any situation in which the utilities and capabilities provided thereby can be employed. It is not our intention to be limited to the details of the specific embodiment of our invention as defined herein, except as recited in the appended claims.

We claim:

1. A device adapted to straighten the side panels of railroad cars while automatically operating a single hydraulic motor of the type which can be suspended horizontally or diagonally from a crane, said hydraulic motor formed of a cylinder, a piston slidable in said cylinder and a piston rod movable by said piston and freely rotatable about its longitudinal axis, said piston rod extending out of said cylinder, said hydraulic motor being driven by a hydraulic motor, a first hook fixedly mounted at the outer end of said rotatable piston rod, said fixed rod securely fastened at the other end of said cylinder, axially thereof, a second hook rotatably mounted at the outer end of said fixed rod and means to swivel said hooks about the longitudinal axis of said hydraulic motor, one of said engaged rods fixedly mounted at the other end of said rods and to lock the same into selective positions.

2. A device according to claim 1, in which said fixed rod is telescopic and is formed with two slidable engageable rods in order to adjust the length of said fixed rod, one of said engageable rods fixedly mounted at the other end of said rods and to lock said engaging rods into selective positions.

3. A device according to claim 2, in which said fixedly mounted engageable rod is provided with a longitudinal bore, said other engageable rod shaped to slide and rotate within the longitudinal bore of said fixedly mounted engageable rod, having a second hook fixedly mounted at the outer end thereof, said fixedly engageable rod and said other engageable rod provided with transversely aligned openings, eyelet brackets which are received into said openings to lock said engageable rods, said other engageable rod also provided with perpendicular openings and said eyelet brackets engaging said openings therein, in order to lock said other engageable rod and said second hook into four different positions.

4. A device according to claim 3, in which further openings are provided in said other engageable rod to fixedly adjust the length of said telescopic rod.

5. A device according to claim 1, which comprises a first hook position locking rod slidably mounted at one end thereof on said cylinder, said first hook having a substantially square cross-section at the back portion thereof to define four faces, an attachment plate fixedly mounted on each of said four faces, and means for securely connecting the other end of said first hook position locking rod to one preselected attachment plate.

6. A device adapted to straighten the side panels of railroad cars which comprises a single hydraulic motor of the type which can be suspended horizontally or diagonally from a crane, said hydraulic motor mounted between a pair of parallel side panels provided with means on the upper edges thereof for the horizontal or diagonal suspension of said hydraulic motor, said hydraulic motor formed of a cylinder, a piston slidable in said cylinder and a piston rod movable by said piston and freely rotatable about its longitudinal axis, said piston rod extending out of said cylinder at one end thereof and reciprocable along the axis of said hydraulic motor, a first hook provided with downwardly extending jaws fixedly mounted
at the outer end of said reciprocable, rotatable piston rod, a first hook position locking rod slidably mounted at one end thereof on said cylinder, said first hook having at the back portion thereof a substantially square cross-section to define four faces, said first hook having an attachment plate fixedly mounted on each of the said four faces, means for fixedly connecting the other end of said first hook position locking rod to one preselected attachment plate, said device also comprising a telescopic rod fixedly secured at the other end of said cylinder, axially thereof, said telescopic rod formed with a first engageable rod provided with a longitudinal bore fixedly mounted at the other end of said cylinder and a second engageable rod shaped to slide and rotate within the longitudinal bore of said first engageable rod and having a second hook provided with downwardly depending jaws fixedly mounted at the outer end thereof, said first and second engageable rods provided with transversely aligned openings, eyelet brackets which are received into said aligned openings to lock said engageable rods, said second engageable rod also provided with a second set of openings similar to said first openings therein but perpendicular thereto, the number of openings of each of said sets in said second engageable rod being equal but greater than the number of openings in said first engageable rod so constructed and arranged that each of said hooks may be swivelled and locked into four different positions and said second hook is longitudinally adjustable.

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CHARLES W. LANHAM, Primary Examiner.

E. SUTTON, Assistant Examiner.