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D. KENNEDY

LIFTING ATTACHMENT FOR RIVETING MACHINES

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Fig. 2.

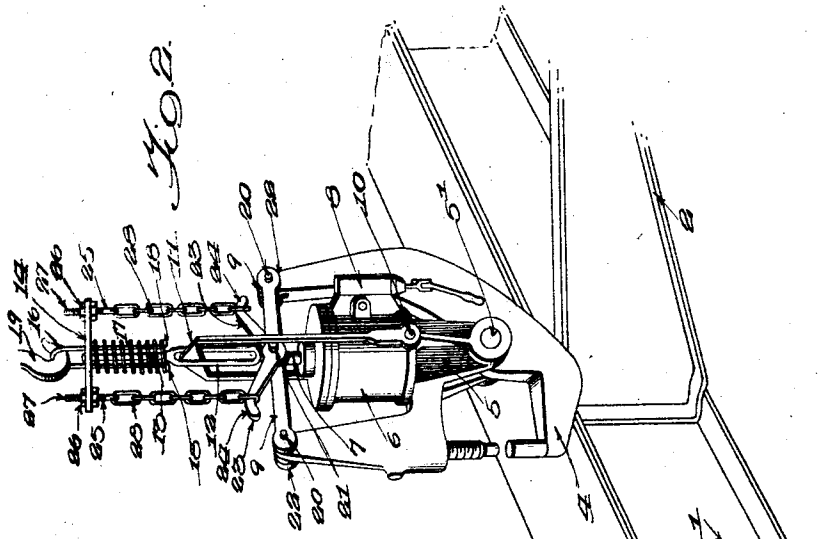
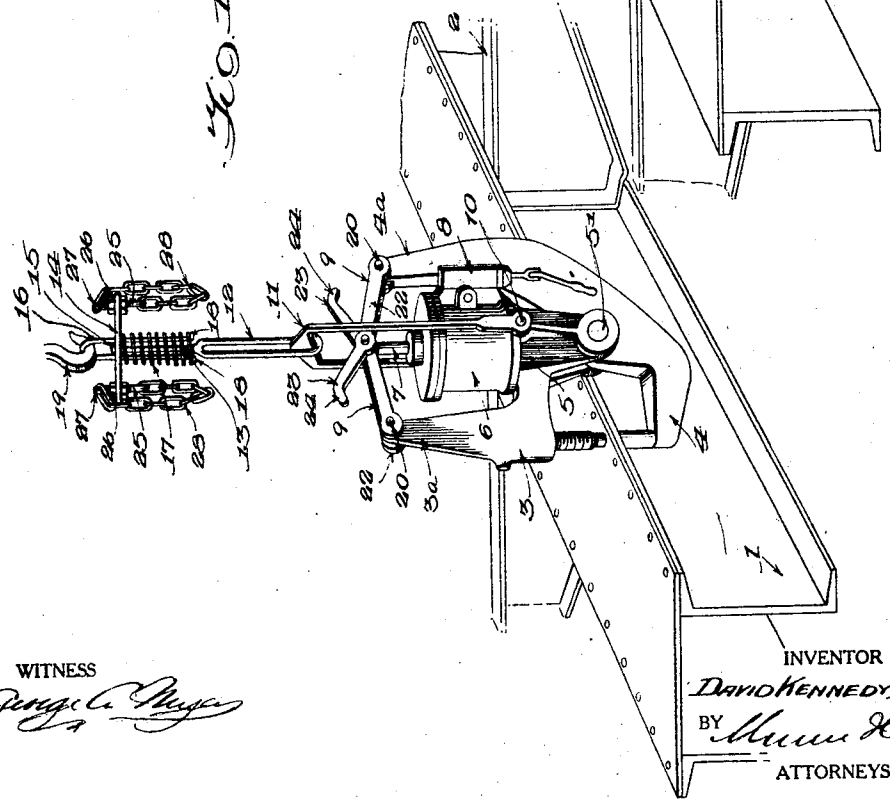


Fig. 1.



WITNESS

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DAVID KENNEDY, OF RICHMOND, VIRGINIA.

LIFTING ATTACHMENT FOR RIVETING MACHINES.

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To all whom it may concern:

Be it known that I, DAVID KENNEDY, a citizen of the United States, and resident of Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Lifting Attachments for Riveting Machines, of which the following is a specification.

My invention is a lifting attachment for portable riveting machines, and it consists in the combinations, constructions and arrangements herein described and claimed.

An object of the invention is to effect an economy in the use of time, labor and power in lifting a portable power operated riveting or like machine over obstructions to the passage of the machine in a horizontal plane, as for example along the side of a horizontal girder.

A further object of the invention is to provide an attachment of the character described which affords facilities for utilizing the power which is available for the operation of the machine to effect bodily movement of the machine upward from the level at which the machine is supported when the machine is in normal or operative position.

A further object of the invention is to provide an attachment of the character described which is adapted to be applied to riveting machines of ordinary construction without any extensive changes in the construction of the latter and without interfering with the operation of the riveting machine in an ordinary manner.

Other objects and advantages will be apparent from the following description, considered in conjunction with the accompanying drawings, in which

Figure 1 is a perspective view showing a riveting machine equipped with an attachment embodying the invention, and suspended in position for use in riveting a horizontal girder, the attachment being in inactive position, and

Figure 2 is a view similar to Figure 1, showing the attachment in active position and the riveting machine raised above position for use in riveting the horizontal girder.

In the drawings, the numeral 1 designates a horizontal girder which may be a member of the under frame of a freight car or like structure. A horizontal brace or cross member 2 extends substantially at right angles to the member 1 and is in abutting relation at one end to a lateral face of the latter. In an underframe for a freight car or like structure, the horizontal girder 1 has a plurality of the cross members 2 connected therewith, the respective cross members 2 being spaced apart and joined to the girder at intervals along the length of the latter. A riveting machine of ordinary construction adapted for use in accomplishing the riveting together of the component parts of the girder 1 is shown in the drawing. The riveting machine comprises a pair of vertically spaced cooperative jaw members 3 and 4 respectively which are connected to each other and to the lower end portions of the vertically disposed arms of a yoke 5 by a horizontal pivot element 5′. The arms of the yoke 5 straddle the connected together portions of the jaws 3 and 4 and the web portion of the yoke is integral with the bottom or lower end of a vertically disposed power cylinder 6. The cylinder 6 is adapted for the reciprocation therein of a plunger, not shown, and a plunger rod 7 extends from the upper end of the cylinder above the level of the latter. Admittance of a pressure fluid, such as compressed air, into the upper part of the cylinder 6 to cause downward movement of the plunger in the cylinder and therefore downward axial movement of the plunger rod 7 is controlled by means of an ordinary valve attached to the cylinder, such as that shown more or less diagrammatically and indicated at 8, the valve being of any suitable known type of construction and being adapted in any suitable known manner for connection with a source of pressure fluid supply, not shown. The jaws 3 and 4 respectively have vertical extensions indicated at 3^a and 4^a which extend in horizontally spaced relation and at opposite sides of the cylinder 6 above the level of the latter. The extensions 3^a and 4^a terminate at their upper ends at the same level and ordinarily are connected to each other and to the upper end of the plunger rod 7 by a toggle joint. The toggle connection between the upper ends of the extensions 3^a and 4^a comprises a pair of identical bars 9 having their outer ends connected by horizontal pivot elements to the upper ends of the extensions 3^a and 4^a and having their inner ends connected to each other and to the upper end of the plunger rod 7 by a horizontal pivot element.

The cylinder 6 is provided at its juncture with the arms of the yoke 5 with a pair of diametrically opposite laterally extending trunnions as indicated at 10 which are journaled in openings in the end portions of the arms of a bail 11. The bail 11 extends through a vertically elongated loop 12 which is integral at its upper end with a vertical attaching rod 13. The latter extends loosely through an opening in a cross head 14 and is upset at its upper end as indicated at 15 to prevent displacement of the cross head from the rod. A U-shaped suspension member 16 has the bight portion thereof disposed above the cross head and has the arms thereof extended through openings in the cross head in straddling relation to the rod 13. A coil spring 17 surrounds the arms of the suspension member 16 below the cross head 14 and is held against displacement from the arms of the suspension member 16 which are disposed below the cross head by the engagement of the lower end of the coil spring 17 of the outturned end portions 18 of the arms of the suspension member 16.

The bight portion of the member 16 is engaged with a hook 19 which may be carried at the lower end of the hoisting cable of any suitable hoisting device or other suspension device not shown, whereby, the spring 17 will be compressed between the head 14 and the lower ends of the arms of the member 16 and the riveting machine will be swingingly and resiliently supported. The toggle joint connection between the upper ends of the extensions 3^a and 4^a of the jaw members of the riveting machine is such that the toggle arms 9 will be substantially horizontal when the plunger rod 7 is at the end of its stroke downward. The downward axial movement of the plunger rod of course is caused by the downward movement of the plunger in the cylinder 6 which is effected by the action of a suitable pressure fluid thereupon, the pressure fluid which ordinarily is compressed air being admitted through the valve 8 to the upper part of the cylinder 6 when desired. The toggle arms 9 will be upwardly inclined toward their inner ends when the plunger rod 7 is in raised position.

It will be understood that the movement of the jaws 3 and 4 of the riveting machine toward each other in order that the riveting machine may perform the function for which it is intended is caused by the downward movement of the plunger rod 7 and the consequent movement of the bars 9 which causes spreading of the extensions 3^a and 4^a.

In riveting together the component parts of the girder 1, the riveting machine is moved longitudinally of the girder. The riveting machine must be lifted over each obstruction, such as the cross member 2. Prior to my invention, it has been necessary for the operator of the riveting machine to lift the riveting machine manually over obstructions such as the cross member 2 and since the riveting machine is of relatively great weight, the task of lifting the riveting machine over numerous obstructions such as the cross member 2 causes considerable fatigue to the operator of the riveting machine and tends to delay completion of the work of riveting together the parts of the girder. If the weight of the riveting machine were too great to permit of its being lifted by the operator over the obstructions, it has been necessary prior to my invention to operate a hoisting device from which the riveting machine was suspended or to make use of an auxiliary hoisting device to lift the riveting machine over each obstruction to the horizontal movement of the riveting machine along one side of the girder. Considerable time, labor and power thus were consumed in lifting the riveting machine over the cross members and like obstructions.

In carrying out my invention, I replace the usual horizontal pivot element which connects the outer end of the toggle arms 9 to the upper ends of the extensions 3^a and 4^a by similar horizontal pivot elements indicated at 20 which differ from the pivot elements which they replace only in that they are of greater length than the usual pivot elements. The horizontal pivot element which connects the inner end portions of the toggle arms 9 to one another and to the upper end of the plunger rod 7 also is replaced by a relatively long horizontal pivot element as indicated at 21. With this arrangement, the pivot elements 20 and 21 have the end portions thereof protruding beyond the lateral faces of the toggle arms 9 and auxiliary toggle arms 22 are supported pivotally on the end portions of the pivot elements 20—21, there being an auxiliary toggle arm 22 for each toggle arm 9. Each of the auxiliary toggle arms 22 is provided at its inner end with an upwardly inclined elongated extension 23 which is merged at its lower end into the inner end portion of the auxiliary toggle arm 22 at an angle greater than a right angle. Each extension 23 is turned downwardly at its upper end at 24, thus producing a hook. Vertical eye bolts 25 having the eyes thereof disposed downward extend through openings in the end portions of the cross head 14 and are secured to the latter by any suitable means, such as the nuts 26, the shanks of the eye bolt projecting above the cross head as indicated at 27. Suspension members such as the chains 28 are engaged at their upper ends with the eyes of the eye bolts 25. When desired, the lower end portions of the

chains 28 may be engaged with the hooked outer ends of the extensions 23 to the auxiliary toggle arms 22.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood. During the use of the riveting machine in the usual manner as a means for securing rivets in place in the girder, the suspension members 28 are detached from the extensions 23 and are supported above the latter and out of the way in any suitable manner, as by having the normally lower ends thereof hooked over the upstanding ends 27 of the eyebolt shanks. However, when the riveting machine must be elevated above the normal level to clear an obstruction such as the cross member 2, the suspension members 28 are engaged adjacent to their lower ends with the hooked outer ends of the extensions 23 to the auxiliary toggle arms. This is done while the plunger rod 7 is in raised position. Pressure fluid then is admitted to the upper part of the cylinder 6 in the usual manner and the downward movement of the plunger rod and the consequent downward swinging movement of the outer ends of the extensions 23 will cause the riveting machine to be lifted upward from the position illustrated in Figure 1 to the position illustrated in Figure 2, the auxiliary toggle arms 22 and the extensions 23 thereto constituting levers which are fulcrumed intermediate their length and which connect the upper ends of the extensions 3^a and 4^a of the jaw members to the suspension elements 28. The arrangement is such that the movement of the plunger rod 7 from its raised to its lowered position will be sufficient to cause bodily movement of the riveting machine upward from its normal level a distance sufficient to clear obstructions such as the cross member 2 when the suspension members 28 are attached to the hooked outer ends of the extensions 23 to the auxiliary toggle arms. After the riveting machine has been moved bodily above the obstruction to a desired position, the pressure fluid within the upper part of the cylinder 6 is permitted to escape in the usual manner and the weight of the arms 3 and 4 will cause upward movement of the plunger rod and consequently the riveting machine will be lowered to normal position and the suspension element 28 then may be detached from the hooked ends of the extensions 23 and again secured in out of the way positions, as illustrated in Figure 1.

It of course will be understood that the usual toggle arms 9 may be replaced by the so-called auxiliary toggle arms 22 or the extensions 23 may be formed as separate members and secured to the usual toggle arms 9 at the inner ends of the latter in any suitable known manner. Also it will be manifest that a lifting action on the riveting machine will take place when the suspension members 28 are secured directly to the inner ends of the toggle arms which connect the plunger rod to the extensions 3 and 4 coincidentally with the downward movement of the plunger rod.

Obviously, my invention is susceptible of embodiment in forms other than that illustrated in the accompanying drawing and I therefore consider as my own all such modifications and adaptations of the form of the device herein described as fairly fall within the scope of the appended claims.

I claim:—

1. In combination, a vertically movable machine comprising a pair of elongated body members, a horizontal pivot element connecting said elongated members so that said members terminate at their upper ends above the level of the pivot element, a vertically reciprocable member disposed between the upper end portions of said elongated body members, a flexible suspension device having connection with said pivot element, toggle arms pivotally connected at their inner ends to said vertically reciprocable member and pivotally connected at their outer ends to the upper ends of said body members, and means for connecting said vertically reciprocable member to said suspension device at a point on the latter above the level of the upper ends of said body members.

2. In combination, a vertically movable machine comprising a pair of elongated body members, a horizontal pivot element connecting said elongated members so that said members terminate at their upper ends above the level of the pivot element, a vertically reciprocable member disposed between the upper end portions of said elongated body members, a flexible suspension device having connection with said pivot element, toggle arms pivotally connected at their inner ends to said vertically reciprocable member and pivotally connected at their outer ends to the upper ends of said body members, upwardly inclined extensions to the inner ends of said toggle arms, said extensions having hook portions at the upper ends thereof and terminating at their upper ends above the level of the upper ends of said body members, and means connected with the suspension device at a level above that of the upper ends of said body members and engageable with the hooked ends of said extensions to said toggle arms.

3. In combination, a vertically movable machine comprising a pair of elongated body members, a horizontal pivot element connecting said elongated members so that said members terminate at their upper ends above the level of the pivot element, a vertically reciprocable member disposed be-

tween the upper end portions of said elongated body members, a flexible suspension device having connection with said pivot element, toggle arms pivotally connected at their inner ends to said vertically reciprocable member and pivotally connected at their outer ends to the upper ends of said body members, upwardly inclined extensions to the inner ends of said toggle arms, said extensions having hook portions at the upper ends thereof and terminating at their upper ends above the level of the upper ends of said body members, said suspension device having stops both above and below said cross head, and a spring arranged between said cross head and the lower of said stops and urging said cross head against the upper of said stops, and flexible connecting members pendant from the ends of said cross head and engageable at will with the hooked ends of said extensions to said toggle arms.

4. In combination, a flexible suspension device, an elongated body supported on said suspension device to swing about a horizontal axis, a vertically reciprocating member disposed above the axis of swinging movement of the body, a lever fulcrumed on said vertically reciprocating member and pivotally connected at one end to said body, said lever being inclined from its said one end toward its connection with the vertically reciprocating member when the latter is at the end of its stroke upward, and means for connecting the second end of said lever to said suspension device at a point on the latter above the level of the upper end of said lever.

DAVID KENNEDY.