T. A. DICKS.

WORK CLAMPING AND CUSHIONING ATTACHMENT FOR PNEUMATIC HAMMERS.

APPLICATION FILED APR. 3, 1920.

1,430,292.

Patented Sept. 26, 1922.

2 SHEETS—SHEET 1.

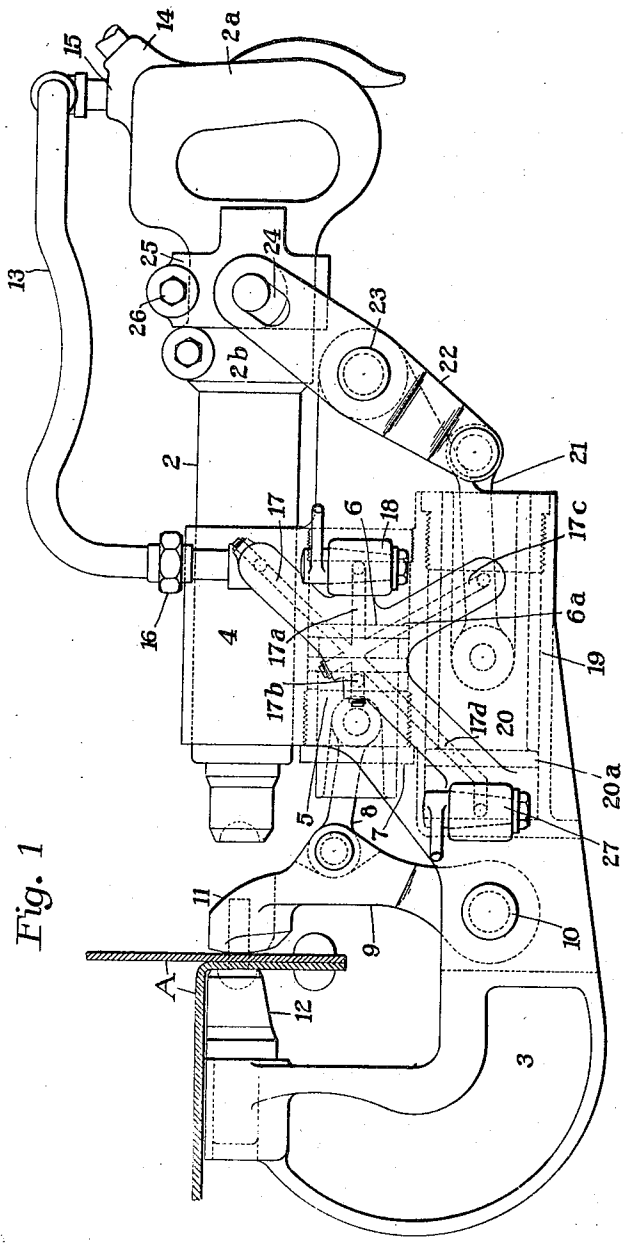


Fig. 1

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Fig. 3

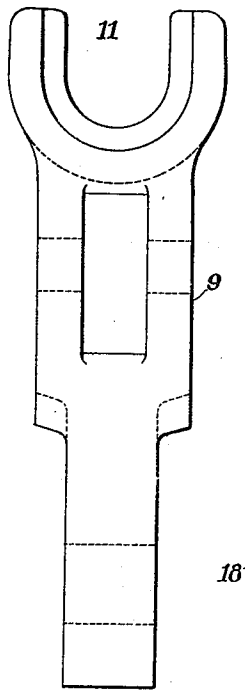
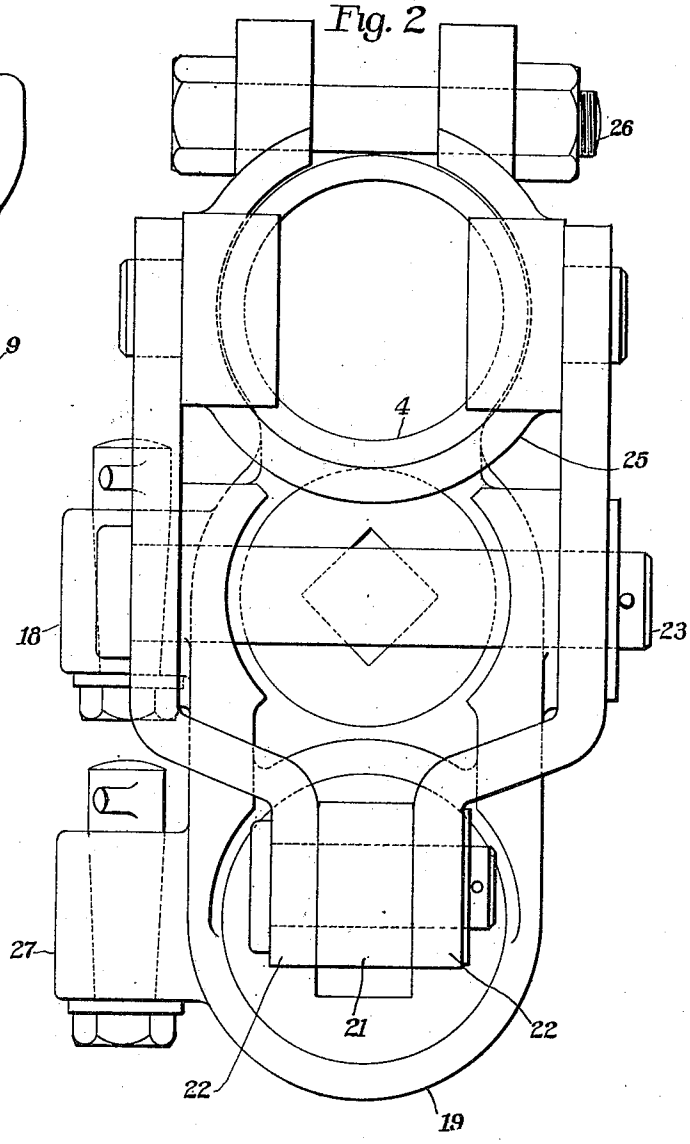


Fig. 2



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UNITED STATES PATENT OFFICE.

THOMAS A. DICKS, OF WILKINSBURG, PENNSYLVANIA.

WORK CLAMPING AND CUSHIONING ATTACHMENT FOR PNEUMATIC HAMMERS.

Application filed April 3, 1920. Serial No. 371,036.

To all whom it may concern:

Be it known that I, THOMAS A. DICKS, a subject of the King of Great Britain, residing at Wilkinsburg, Allegheny County, Pennsylvania, have invented a new and useful Improvement in Work Clamping and Cushioning Attachments for Pneumatic Hammers, of which the following is a full, clear, and exact description, reference being had to the accompanying specification and drawings, forming part of this specification, in which—

Figure 1 is a side elevation showing my invention applied to a pneumatic hammer, the material being worked upon by the hammer being shown in section.

Figure 2 is an end view of the attachment removed from the hammer, and

Figure 3 is a plan view of the movable work clamping member removed.

My invention has relation to attachments for pneumatic hammers. One object of my invention is to provide means of simple and effective character by which the workpiece can be securely held to the action of the hammer.

A further object of my invention is to provide means of effective character for cushioning shocks or vibrations of the hammer, thereby relieving the operator therefrom.

My invention also provides means for carrying out the above stated objects which is capable of being readily applied to existing pneumatic hammers and which is of simple and practical construction.

The nature of my invention will be best understood by reference to the accompanying drawings in which I have shown a preferred embodiment thereof and which will now be described, it being premised, however, that various changes can be made in the details of construction, arrangement and combination of the various parts, without departing from the spirit and scope of my invention as defined in the appended claims.

In these drawings, the numeral 2 designates a pneumatic hammer of well known character such as is employed in riveting. 3 designates the frame of the attachment which is provided with a cylindrical saddle or guide portion 4 in which the barrel of the hammer is designed to be loosely supported. This frame is formed with a cylinder 5 in which is mounted a hollow piston 6 which projects through the ring 7 secured in the otherwise open end of the cylinder. This piston is connected by a link or pitman 8 with the intermediate portion of a work clamping arm which is pivoted to the frame at 10 and which has a forked work clamping portion 11 above its pivot, and through which the bit of the hammer is designed to work. The work, such as the pieces A, to be riveted is clamped between the lever 9 and the anvil 12 which is also supported by the frame 3. 13 designates a hose connection which is tapped into the regular air supply connection 14 for the hammer, as indicated at 15, and which is connected to the frame 3 by the coupling 16. A port 17 leads from this coupling through a projection on the frame, with one branch 17^a communicating with the rear end of the cylinder 5 through the valve 18, and another branch 17^b communicating with the opposite end portion of said cylinder, as indicated, this branch being constantly open, while the branch 17^a is arranged to be opened and closed by means of the valve 18. The piston 6 has a shoulder or head 6^a against which the air admitted through the branch ports 17^b normally acts. So long as the valve 18 is in its closed position, the air admitted through the port branch 17^b will act to hold the piston, and thereby the clamping lever 9, in retracted position. As soon, however, as the valve is opened and air is admitted against the rear end of the piston which is of larger area than the effective area of the head 6^a, the piston will be moved forwardly, thereby setting said clamping lever against the work, as shown in Figure 1. As soon as the valve 18, which may be an ordinary two-way valve, is turned to closed position, the air behind the piston will exhaust and the air acting against its opposite side will release the clamp.

Below the cylinder 5 the frame is provided with a second cylinder 19 which is similar to the cylinder 5, but of larger diameter, and reversed end for end with respect to the cylinder 5. This cylinder 19 has therein a piston 20 which is similar to the piston 6 in that it is a hollow piston with a head or shoulder 20^a against which air is adapted to act. The piston 20 is connected by a link or pitman 21 with two levers 22 which extend upwardly at opposite sides of the frame, being pivoted at their intermediate portions on opposite end portions of the pin 23 supported in a projection

of the frame 3, and whose upper end portions have a pin and slot connection 24 with opposite sides of a collar 25. This collar is secured by a clamp bolt 26 on the barrel of the pneumatic hammer adjacent to its handle portion 2^a and against the shouldered portion 2^b. A branch 17^c of the port 17 serves to constantly admit air into the cylinder 19 at the rear of the head or shoulder 20^a, while another branch 17^d of said port admits air to the opposite end portion of said cylinder under the control of a valve 27 which may be similar to the valve 18. The pressure admitted through the branch port 17^c normally holds the piston 20 and levers 22 in the position shown in full lines in Figure 1. When the valve 27 is opened to admit air to the opposite end of the cylinder 19, the pressure acting upon the opposite side of the piston is overbalanced and said piston is moved rearwardly in the cylinder, thereby actuating the levers 22 to move the hammer 2 forwardly to the work.

It will be readily seen that the cylinder 19 and its piston will constitute an effective cushioning device to take up the shocks and vibrations of the hammer, thereby greatly relieving the operator. The advantages of this cushioning device will be readily appreciated by those familiar with the operation of pneumatic hammers, and to whom the effects of the more or less constant vibrations which are ordinarily transmitted to the operator, are well known.

My invention can be readily applied to ordinary pneumatic hammers, since these are usually provided with a plugged opening 15 where the supply connection 13 for the cylinders is attached. By removing this plug the coupling 15 can be seated in this opening. The attachment can, therefore, be operated by one and the same air supply.

It will also be understood that while I prefer to embody in the attachment both the work holding device and the cushioning device, either one of these devices may be employed without the other, if desired. It will be readily understood that various changes can be made in the form and arrangement of the various parts; in the specific manner of connecting the attachment to a hammer; in the arrangement of ports for supplying the cylinders; in the construction and arrangement of the valves employed, and in various other details within the scope of the appended claims.

I claim:

1. A work clamping device for pneumatic hammers, comprising a frame in which the hammer is mounted, an anvil on said frame, a clamping lever adapted to clamp the work against the anvil, a cylinder on the frame, a differential piston in said cylinder, an actuating connection between the piston and lever, and means for admitting air to said cylinder at opposite sides of the piston, substantially as described.

2. A work clamping device for pneumatic hammers, comprising a frame in which the hammer is mounted, an anvil on said frame, a clamping lever adapted to clamp the work against the anvil, a cylinder on the frame, a differential piston in said cylinder, an actuating connection between the piston and lever, air supply connections leading to the cylinder at opposite sides of the piston, one of said connections being constantly open and the other of said air supply connections having a controlling valve, substantially as described.

3. A cushioning appliance for pneumatic hammers, comprising a support in which the hammer is slidably mounted, a cushioning cylinder, a piston therein, a connection between the said piston and the body of the hammer, and means for admitting a cushioning medium to said cylinder to move said piston in either direction, substantially as described.

4. A cushioning appliance for pneumatic hammers, comprising a support in which the hammer is slidably mounted, a cushioning cylinder, a differential piston therein, a connection between said piston and the body of the hammer, and means for admitting air to said cylinder at opposite sides of the piston, substantially as described.

5. A cushioning appliance for pneumatic hammers, comprising a support in which the hammer is slidably mounted, a cushioning cylinder, a differential piston therein, a connection between said piston and the body of the hammer, and air supply connections leading into said cylinder at opposite sides of the piston, one of said supply connections being constantly open, and the other of said connections having a controlling valve, substantially as described.

6. A cushioning appliance for pneumatic hammers, comprising a frame having a hammer support, a cylinder carried by said frame, a piston in said cylinder, and a lever connection between the piston and the body of the hammer, together with means for admitting a cushioning medium to said cylinder, substantially as described.

7. An attachment for pneumatic hammers, comprising a frame having a support for a pneumatic hammer, a work-clamping device mounted on said frame, a cushioning device also mounted on said frame, and air-supply connections adapted for attachment to the regular air-supply of the hammer and to supply air to both the work-clamping device and the cushioning device to move the same either to or from operative position, substantially as described.

8. An attachment for pneumatic hammers, comprising a frame having a supporting guide for the barrel of a pneumatic

hammer, a member independent of said frame and having means for detachably securing it to the body of the hammer, and a cushioning device carried on said frame and rigidly connected to said member, substantially as described.

9. An attachment for pneumatic hammers, comprising a frame having a supporting guide for the barrel of a pneumatic hammer, a member having means for rigidly securing it to the body of the hammer, and a cushioning device carried on said frame and rigidly connected to said member, together with a connection arranged to supply air to said cushioning device for moving the same in either direction and adapted for connection to the regular air-supply of the hammer, substantially as described.

In testimony whereof I have hereunto set my hand.

THOMAS A. DICKS.