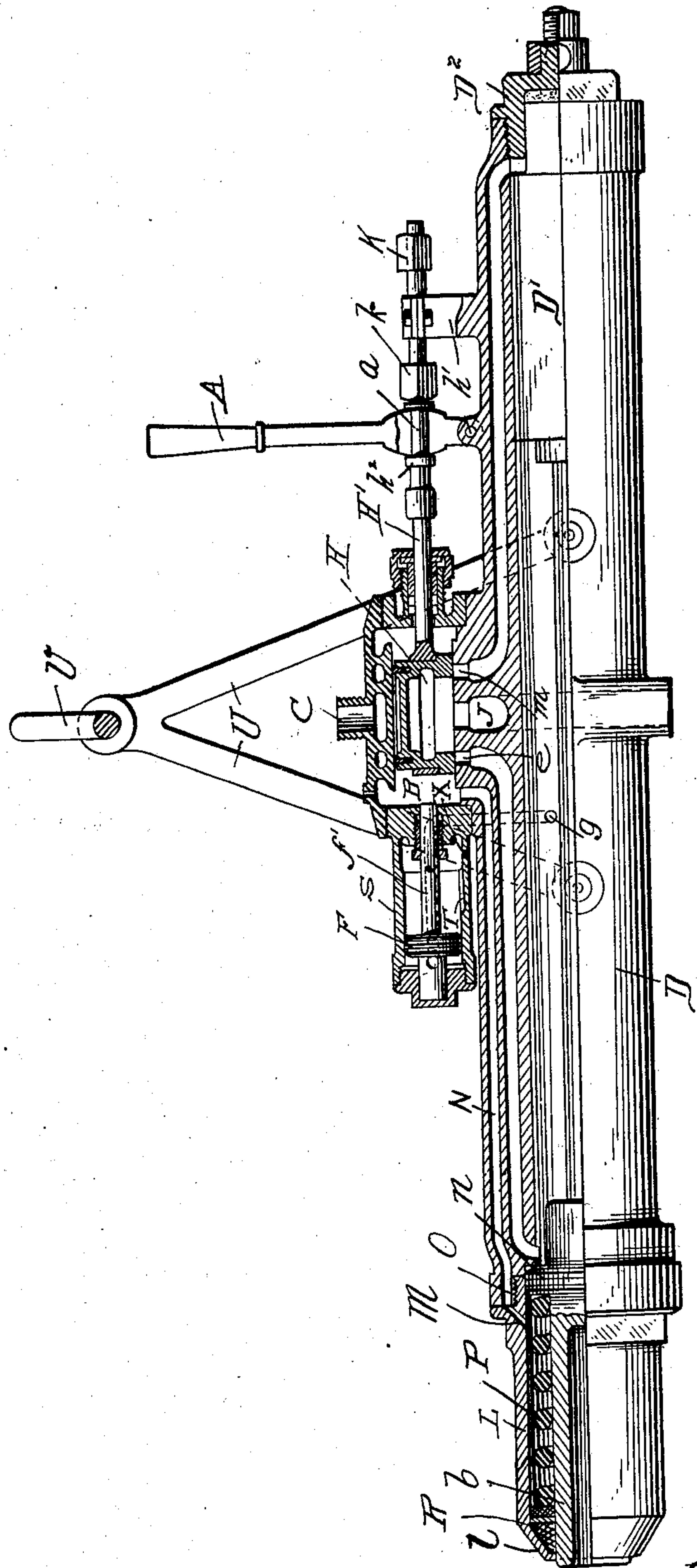


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PATENTED JULY 7, 1903.

J. B. BARNES.
PORTABLE PNEUMATIC RAM.
APPLICATION FILED JAN. 21, 1903.

NO MODEL.



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PORTABLE PNEUMATIC RAM.

SPECIFICATION forming part of Letters Patent No. 732,696, dated July 7, 1903.

Application filed January 21, 1903. Serial No. 140,019. (No model.)

To all whom it may concern:

Be it known that I, JOSHUA BARTLETT BARNES, a citizen of the United States, residing at Springfield, Illinois, have invented certain
5 new and useful Improvements in Portable Pneumatic Rams, of which the following is a specification.

My invention relates to a ram designed more especially for use in breaking or cutting
10 stay-bolts in fire-boxes of locomotives, driving out the ends of stay-bolts so broken from the sheets of the fire-boxes, driving in or driving out rivets or frame-bolts, driving out crank-pins, breaking off projections of heavy
15 castings, and, in fact, in all work where heavy sledging or tedious drilling has been the custom in the past.

The object of the invention is to provide a simple and effective form of ram which is
20 portable, and thus may be used in any part of the shop, and which by its carrying-arms can be suspended to overhead cranes or hooks, thus obtaining a large range of work.

A further object is to provide a construction in which a single blow will be delivered
25 and the piston or hammer automatically stopped in initial position ready for the next blow.

I have further aimed to provide an efficient
30 air-cushion for cushioning the blow of the piston and means for regulating the force of the blow.

With these objects in view the invention comprises the construction hereinafter described, and particularly pointed out in the
35 claims.

The invention is illustrated in the accompanying drawing, in which the figure is a sectional elevation of a ram constructed in accordance with my invention.
40

In the drawing the letter D represents a cylinder of suitable size, in which is located a hammer-piston D' of substantially the usual or any desired construction. The rear end
45 of the piston is closed by a screw-cap D², while at its forward end is provided a casing L, which is screwed into the end of the cylinder, as indicated at O. Within this casing is movably held a tool-holder b, which is guided at
50 its forward end by the contracted portion l of the casing, while at its rearward end the tool-

holder is provided with an enlargement or flange n, fitting the interior of the casing. Between the casing L and the holder b at the forward end is located suitable packing material R, and a spring P, encircling the tool-holder in the space between it and the casing, bears at one end against this packing, thus holding it compressed into the contracted
55 portion, forming a fluid-tight joint. At its other end the spring bears against the annular flange or enlargement n and tends to return the tool-holder to its initial position after each blow. Air is admitted to the opposite ends of the cylinder through ports or passages
60 e and m, leading into the valve-casing B, which is in communication through the inlet portion C with a suitable source of supply of fluid under pressure, connection being made, if desired, by a flexible pipe. (Not shown.)
70 The exhaust-port J leads from the valve-casing centrally of the ports or passages e and m. Within this valve-casing is located a slide-valve H, which is of box form, and its open side is of such shape and dimensions
75 that when it is at the extremity of its movement in one direction one of the passages e or m will be placed in communication with the exhaust, while the other will be placed in communication with the source of fluid-pressure.
80 In order to impel the piston forward to strike the blow, I provide the valve H with a rod H', extending through a suitable stuffing-box and guide at its outer end in a standard or projection from the cylinder, while at h' a handle
85 A is pivoted to the cylinder and is provided with a portion a, adapted to bear against a projection h² on the rod, so that by pushing forward on the handle the valve H will be moved into such a position as to admit the
90 pressure fluid through the passage m to the rear end of the cylinder and at the same time place the opposite end of the cylinder through the passage e in communication with the exhaust J. The result is that the piston is pro-
95 pelled forward with great force to strike a blow upon the tool-holder.

In order to return the valve to initial position and thereby return the piston, I provide a port or passage g, leading from the main
100 cylinder at a suitable point to the forward end of a supplemental cylinder S, which

forms practically a continuation of the valve-casing. Within this supplemental cylinder is located a piston F, having a valve-stem f' , which projects through the wall of the valve-casing and is normally out of contact with the valve. As the piston D' moves forward to deliver the blow it uncovers the port g and permits a portion of the motive fluid to enter the supplemental cylinder in front of the piston F, whereupon said piston moves in the opposite direction, and its rod f' contacting with the valve moves the latter at once to its rearward or right-hand position. This throws the forward end of the cylinder into communication with the motive fluid and at the same time allows the opposite end to exhaust through the passage m , whereby the hammer-piston is at once returned to the rear or right-hand end of the cylinder.

In order to limit the throw of the valve to secure a blow of greater or less force as desired, I provide adjustable nuts K k on the rod H', which are adapted to contact with the opposite sides of the standard or projection h' .

In order to cushion the blow of the hammer, I provide a passage N, leading from the valve-casing through the wall of the cylinder and communicating through a port m with the space between the casing L and the tool-holder. I also provide the cylinder with carrying-arms U, provided at their upper ends with a suitable link V, by which the cylinder may be supported from an overhead crane, whereby a large range of work is readily obtained.

By the construction above described it will be seen that I provide a device of simple and compact form, which may be readily transferred to and used at any desired point in the shop and which may be operated to strike a single blow of any desired power, the parts returning automatically to initial position ready to be operated to strike a second blow.

A leakage-groove is provided in the cylinder S, as indicated at T. The fluid-pressure enters cylinder S from cylinder D through port g and forces the piston F backward until the forward face of piston F travels over the forward end of leakage-groove T. The instant the piston F travels over the leakage-groove T the fluid-pressure on piston F is allowed to escape through the leakage-groove T and opening X to the atmosphere. The object of the leakage-groove is to regulate the travel of the piston F, so that the rod f' , coming in contact with valve H, will move the valve H just far enough backward to open port e and allow the fluid-pressure in chest B to enter the forward end of cylinder D, forcing the piston or hammer backward.

Having thus described my invention, what I claim is—

1. A compressed-fluid ram comprising a cylinder, a tool-holder movably carried at one end thereof, a piston reciprocating within the cylinder, a valve-chamber having inlet and exhaust ports for the motive fluid and hav-

ing passages leading to opposite ends of the cylinder, a valve controlling said passages, manually-operated means for throwing said valve in one direction to admit the motive fluid in rear of the piston to propel it forward and fluid-pressure-operated means for returning the valve to initial position, substantially as described.

2. A compressed-fluid ram comprising a cylinder, a tool-holder movably carried at one end thereof, a piston reciprocating within the cylinder, a valve-chamber having inlet and exhaust ports for the motive fluid and having passages leading to opposite ends of the cylinder, a valve controlling said passages, means designed to move said valve in one direction to admit the motive fluid in rear of the piston to propel it forward, and independent means for returning said valve to initial position at the completion of the forward stroke of the piston whereby the motive fluid is admitted to the forward end of the cylinder and the piston returned to initial position, substantially as described.

3. A compressed-fluid ram comprising a cylinder, a tool-holder movably carried at one end thereof, a piston reciprocating within the cylinder, a valve-chamber having inlet and exhaust ports for the motive fluid and having passages leading to opposite ends of the cylinder, a valve controlling said passages, manually-operated means for moving said valve in one direction to admit motive fluid in rear of the piston, a supplemental cylinder having a passage communicating with the main cylinder and adapted to be opened to the pressure fluid by the piston on its forward stroke, and a piston in said supplemental cylinder having means for returning the valve to initial position, substantially as described.

4. A fluid-pressure ram comprising a cylinder, a valve-chamber having inlet and exhaust passages for the motive fluid, and passages leading to opposite ends of the cylinder, a valve movable in said chamber, manually-operated means for moving said valve to admit fluid in rear of the piston, a supplemental cylinder in line with said valve-chamber and having one end thereof in communication with the main cylinder, and a piston in said supplemental cylinder having a stem projecting into the valve-chamber and adapted to contact with said valve, substantially as described.

5. A fluid-pressure ram comprising a cylinder, a piston therein, a valve-chamber having inlet and exhaust ports for the motive fluid and passages leading to opposite ends of the cylinder, a valve for controlling the admission and exhaust to and from the opposite ends of the cylinder, manually-operated means for moving the valve in one direction, independent means for moving the valve in the opposite direction and adjustable means for limiting the throw of the valve, substantially as described.

6. A fluid-pressure ram comprising a cyl-

inder, a piston therein, a valve-chamber having inlet and exhaust ports and passages leading to opposite ends of the cylinder, a valve working in said chamber, a rod projecting through the wall of said chamber, a handle for moving said rod manually, adjustable stops for limiting the throw of the rod, and fluid-pressure-operated means at the opposite side of the valve-chamber for

returning said valve to initial position after the forward movement of the piston, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOSHUA BARTLETT BARNES.

Witnesses:

E. R. JEFFERY,

A. B. MARS.