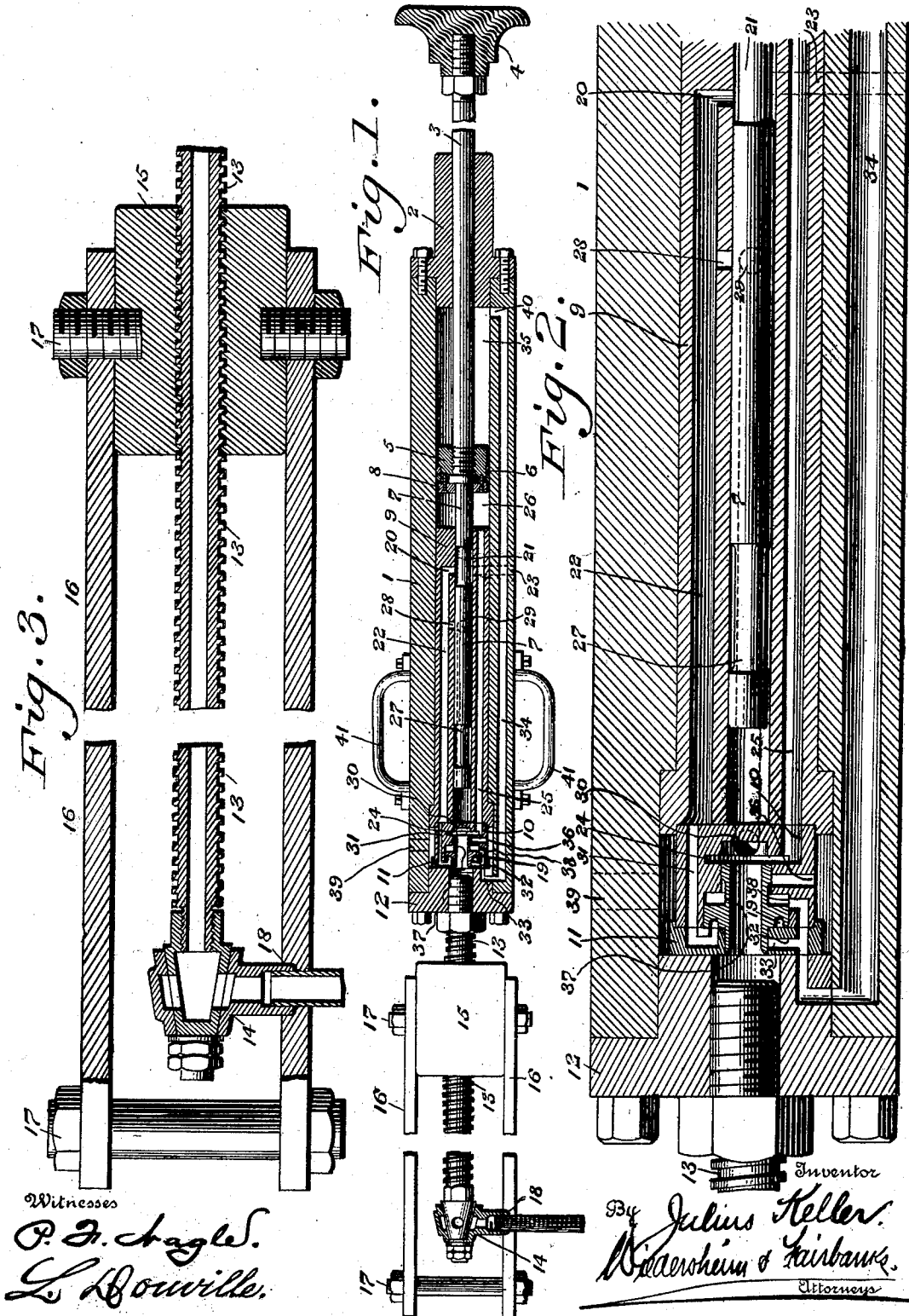


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Patented Apr. 10, 1900.

J. KELLER.
PNEUMATIC RAMMER.
(Application filed Dec. 21, 1899.)

(No Model.)



UNITED STATES PATENT OFFICE.

JULIUS KELLER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE
KELLER TOOL COMPANY, OF PENNSYLVANIA.

PNEUMATIC RAMMER.

SPECIFICATION forming part of Letters Patent No. 647,416, dated April 10, 1900.

Application filed December 21, 1899. Serial No. 741,120+. (No model.)

To all whom it may concern:

Be it known that I, JULIUS KELLER, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Pneumatic Rammers, which improvement is fully set forth in the following specification and accompanying drawings.

My invention relates to an improved construction of a pneumatic rammer or tamping machine; and it consists of a novel construction of auxiliary valve, a case therefor, a valve-box, main valve, and its adjuncts, whereby said main valve is caused to shift at the proper intervals, and thus regulate the flow of the motive fluid.

It also consists of a novel construction of hollow feed-screw or feeding device, which is secured to the cylinder-head and serves to conduct the motive fluid directly into the internal chamber of the valve.

It also consists of a novel construction of universal joint common to said feed-screw or feeding device and the supply-hose, whereby the tool can be raised or lowered, according to requirements, without necessitating the uncoupling of the hose.

It further consists of novel details of construction, all as will be hereinafter fully described, and particularly pointed out in the claims.

Figure 1 represents a longitudinal sectional view of a pneumatic rammer embodying my invention, certain of the parts being shown in elevation. Fig. 2 represents a longitudinal sectional view of the valve-box, auxiliary-valve case, cylinder, and their adjuncts on an enlarged scale. Fig. 3 represents a longitudinal sectional view of the hollow feed-screw or feeding device employed to convey the motive fluid to the interior of said screw.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings, 1 designates the cylinder of the rammer, and 2 its nosed-piece, through which passes the piston-rod 3, to which is attached the stamper 4.

5 designates the piston, provided with packing or rings 6 and having secured thereto the auxiliary valve 7 by means of the plate 8.

9 designates the auxiliary-valve case, ad-

jacent the upper end of which is the main-valve box 10, provided with the top 11.

12 designates the cylinder-head, which is engaged by the hollow feed-screw or feeding device 13, which supports or carries the universal-joint connection 14, said feed-screw passing through the feed-nut 15, which is secured between the hangers 16, which are braced by the hanger-bolts 17, it being apparent that the rammer can be suspended from a crane by the upper or left-hand bolt 17. The supply-pipe for the motive fluid connects with the universal joint at the point 18, the motive fluid passing through the hollow screw or feeding device 13 to the main valve 19. When the parts are in the position seen in Fig. 1 or Fig. 2, the piston 5 is near the end of its stroke. The auxiliary valve 7, whose function is to control admission and exhaust of the motive fluid to and from the large pressure area of the main valve 19, now opens the port 20 through the reduced neck 21 and releases the pressure from the large pressure area of said main valve through the ports 20 and 22 and exhaust-port 23. The main valve 19 has moved backward or to the left and the slot 24 in the valve-box 10 is open, communication being now made with the port 25, and the motive fluid passes through said slot 24 and port 25 into the rear end or portion 26 of the piston-chamber and drives the piston forward or to the right until the reduced neck 27 of the auxiliary valve 7 connects the ports 28 and 29. The port 30 is always open for live motive fluid, which now passes through the ports 30, 29, and 28 to the large pressure area of the main valve 19 by means of the passages 22 and 31 and drives said main valve forward or to the right, thus closing the slot 24 and opening port 32. The motive fluid can now flow through the port 32 and ports 33 and 34 and, entering the front end 35 of the piston-chamber, drives the piston back or to the left. When the main valve 19 is in its forward position, the slot 24 and exhaust-port 36 are connected by the reduced neck 37 of said main valve. Therefore the motive fluid from the back end of the piston will exhaust through port 25, slot 24, exhaust-port 36, and main exhaust-port 39. When the main valve 19 is in its backward position, as seen in Fig.

1, the ports 36 and 38 are connected by the reduced neck 37 of said main valve and exhaust takes place from the ports 40, 34, 33, 38, and 36 to the main exhaust 39.

5 The tool can be used without the feed-screw and hangers and held by the operator by the handles 41. In practice a throttle-valve (not shown) engages the exhaust-port 39 and by throttling the exhaust the action of the machine is readily controlled. The tool can be easily raised or lowered to suit the work by turning the cylinder 1, the feed-screw or hollow feeding device turning in unison therewith in the feed-nut 15 without disturbing the supply-hose, as the same is connected to the feed-screw by the universal joint 14.

It will be evident that changes may be made by those skilled in the art which will come within the scope of my invention, and I do not therefore desire to be limited in every instance to the exact construction I have herein shown and described.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a pneumatic rammer, the combination of a cylinder having a nose-piece through which the piston passes, a rammer connected to said piston-rod, a piston, an auxiliary valve connected to said piston, an auxiliary-valve case located within said cylinder and having ports therein adapted to align with the necks of said auxiliary valve, and a main valve for controlling the movement of said piston, said main valve being actuated by the passage of fluid through said ports.

2. The combination of a cylinder, a piston therein, an auxiliary valve, an auxiliary-valve-rod case within said cylinder, a valve-box adjacent said case, a top on said box, a main valve in said box, a cylinder-head having an inlet for the motive fluid and discharging into the interior of said main valve, the latter being controlled by the movements of said auxiliary valve.

3. A pneumatic rammer, consisting of a cylinder, a cylinder-head therefor, a piston, an auxiliary valve, an auxiliary-valve case having ports therein, a valve-box, a main valve contained in said box, a cap for said valve-box, a feed-screw secured in said cylinder-head and a feed-nut through which said screw passes.

4. The combination of a cylinder, a cylinder-head therefor, a feed-screw secured to said head and passing through a feed-nut, hangers attached to the latter, a hanger-bolt engaging the extremity of said hangers, a passage extending longitudinally through said feed-screw, and a universal joint for said feed-screw having a hose attached thereto.

5. In a pneumatic rammer, a cylinder, a piston, an auxiliary valve connected to said piston and provided with necks, exhaust-ports controlled by said necks, an auxiliary-valve casing located in said cylinder and containing said ports, a main valve having dif-

ferent pressure areas and always exposed to fluid-pressure and ports for conducting live motive fluid to and from said piston.

6. A pneumatic rammer having a piston, an auxiliary valve connected thereto and provided with reduced necks, exhaust-ports controlled by said necks, a main valve having different pressure areas, and always exposed to fluid-pressure, ports controlled by said main valve for admitting live motive fluid to either side of said piston, and exhaust-ports also controlled by said main valve for permitting the exhaust of the motive fluid past said valve to the atmosphere.

7. In a pneumatic rammer, a cylinder, an auxiliary valve, an auxiliary-valve casing, a piston, a piston-rod connected therewith and carrying a rammer, said auxiliary valve being connected to said piston and having a plurality of necks and exhaust-ports in said casing controlled by said necks in combination with a main valve for controlling the movement of said piston, said main valve being controlled by said auxiliary valve.

8. In a pneumatic rammer, a cylinder, an auxiliary-valve casing having ports therein, a piston, a piston-rod connected therewith and carrying a rammer, an auxiliary valve located in said casing and connected to said piston and having a plurality of necks adapted to align with said ports for enabling the exhaust to be controlled, and a main valve, in combination with ports controlled by said main valve for admitting the fluid to said piston, said main valve being controlled by the auxiliary valve.

9. In a pneumatic rammer, a cylinder, a cylinder-head therefor, a hollow feed-screw engaging said head, a supply-hose, and a universal coupling common to said hose and feed-screw.

10. In a pneumatic rammer, a cylinder, a cylinder-head, a hollow feed-screw engaging said head, a feed-nut in which said screw is rotatably mounted, hangers engaging said nut and means for enabling said cylinder and hanger to be suspended from the desired point.

11. In a pneumatic rammer, a cylinder, a valve therein, a cylinder-head, a piston having an auxiliary valve provided with reduced necks, a piston-rod carrying a rammer, a hollow feed-screw engaging said head, a feed-nut in which said screw is mounted, hangers secured to said nut, and a bolt joining the outer extremities of said hangers.

12. In a pneumatic rammer, a cylinder, a valve therein, a cylinder-head, a piston having an auxiliary valve connected thereto and provided with reduced necks, a piston-rod carrying a rammer, a hollow feed-screw engaging said head, a feed-nut in which said screw is mounted, hangers secured to said nut, and a bolt joining the outer extremities of said hangers, in combination with a supply-hose and a universal coupling common to said hose and feed-screw.

13. The combination of a pneumatic rammer, a hollow feed-screw for supplying motive fluid thereto, a supply-hose, and a coupling common to said hose and feed-screw.

14. The combination of a pneumatic rammer, and a hollow feed-screw for supplying motive fluid thereto.

15. The combination of a pneumatic rammer, a hollow feeding device for supplying motive fluid thereto, a feed-nut suitably supported, a supply-hose, and a universal coupling common to said hose and feeding device.

16. The combination of a pneumatic rammer, a hollow feed-screw for supplying motive fluid thereto and suspension devices for said feed-screw.

17. The combination of a pneumatic rammer, a hollow feed-screw for supplying motive fluid thereto, suspension devices for said feed-screw, a supply-hose and a universal coupling common to said hose and screw.

18. In a pneumatic rammer, a cylinder, a piston therein, a nosepiece, a piston-rod connected to said piston passing through said nosepiece, a valve for controlling ports common thereto and to said piston, said valve consisting of a hollow shell or cylinder, the interior surface thereof being always open to fluid-pressure, said valve being located exteriorly to said piston, and means for enabling said valve to control the movements of said piston.

19. In a pneumatic rammer, a cylinder, a piston therein, a nosepiece, a piston-rod passing through said nosepiece and having a rammer thereon, a main valve for controlling ports common thereto and to said piston, said main valve consisting of a hollow shell or cylinder, the interior surface thereof being always open to fluid-pressure, an auxiliary valve having necks thereon, an auxiliary-valve case, and ports in said case coacting with said necks and auxiliary valve, said auxiliary valve controlling said main valve.

20. In a pneumatic rammer, a cylinder, a piston therein, a nosepiece, a piston-rod passing through said nosepiece and having a rammer thereon, a main valve for controlling ports common thereto and to said piston, opposing pressure areas upon said valve against which the motive fluid acts to shift the valve in opposite directions, an auxiliary valve having necks thereon, an auxiliary-valve case, and ports in said case coacting with said necks and auxiliary valve, said auxiliary valve controlling said main valve.

21. In a pneumatic rammer, a cylinder, a nosepiece therefor, a piston, a piston-rod projecting through said nosepiece and carrying a rammer, an auxiliary-valve case within

said cylinder, an auxiliary valve located in said case, and a main valve adapted to coact with ports in said cylinder and auxiliary-valve case, said auxiliary valve controlling said main valve.

22. In a pneumatic rammer, a cylinder, a nosepiece therefor, a piston, a piston-rod projecting through said nosepiece and carrying a rammer, an auxiliary-valve case within said cylinder, an auxiliary valve located in said case and having necks thereon, and a main valve adapted to coact with ports in said cylinder and auxiliary-valve case.

23. In a pneumatic rammer, a cylinder, a piston therein, an auxiliary valve attached to said piston, an auxiliary-valve case within said cylinder, and a main valve adapted to coact with ports in said cylinder and auxiliary-valve case.

24. In a pneumatic rammer, a cylinder, a piston therein, an auxiliary valve attached to said piston and having necks thereon, an auxiliary-valve case within said cylinder, and a main valve adapted to coact with ports in said cylinder and auxiliary-valve case.

25. In a pneumatic rammer, a cylinder, a nosepiece therefor, a piston, a piston-rod connected to said piston and projecting through said nosepiece, an auxiliary-valve case within said cylinder, an auxiliary valve located in said case, a main valve consisting of a hollow shell whose interior surface is always open to fluid-pressure, said main valve being located exteriorly to said piston, and means for enabling said main valve to control the movements of said piston.

26. In a pneumatic rammer, a cylinder, a nosepiece therefor, a piston, a piston-rod projecting through said nosepiece, an auxiliary-valve case within said cylinder, an auxiliary valve located in said case and having necks thereon, a main valve consisting of a hollow shell whose interior surface is always open to fluid-pressure, said main valve being located exteriorly to said piston, and means for enabling said main valve to control the movements of said piston.

27. In a pneumatic rammer, a cylinder, a piston therein, a main valve, a valve-rod case in said cylinder intermediate said piston and main valve, and an auxiliary valve connected to said piston and mounted in said auxiliary-valve case, said auxiliary valve controlling the movement of said main valve and the latter being adapted to coact with ports in said cylinder, and auxiliary-valve case.

JULIUS KELLER.

Witnesses:

WM. CANER WIEDERSHEIM,
C. D. MCVAY.