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PUNCH OR RIVETER.

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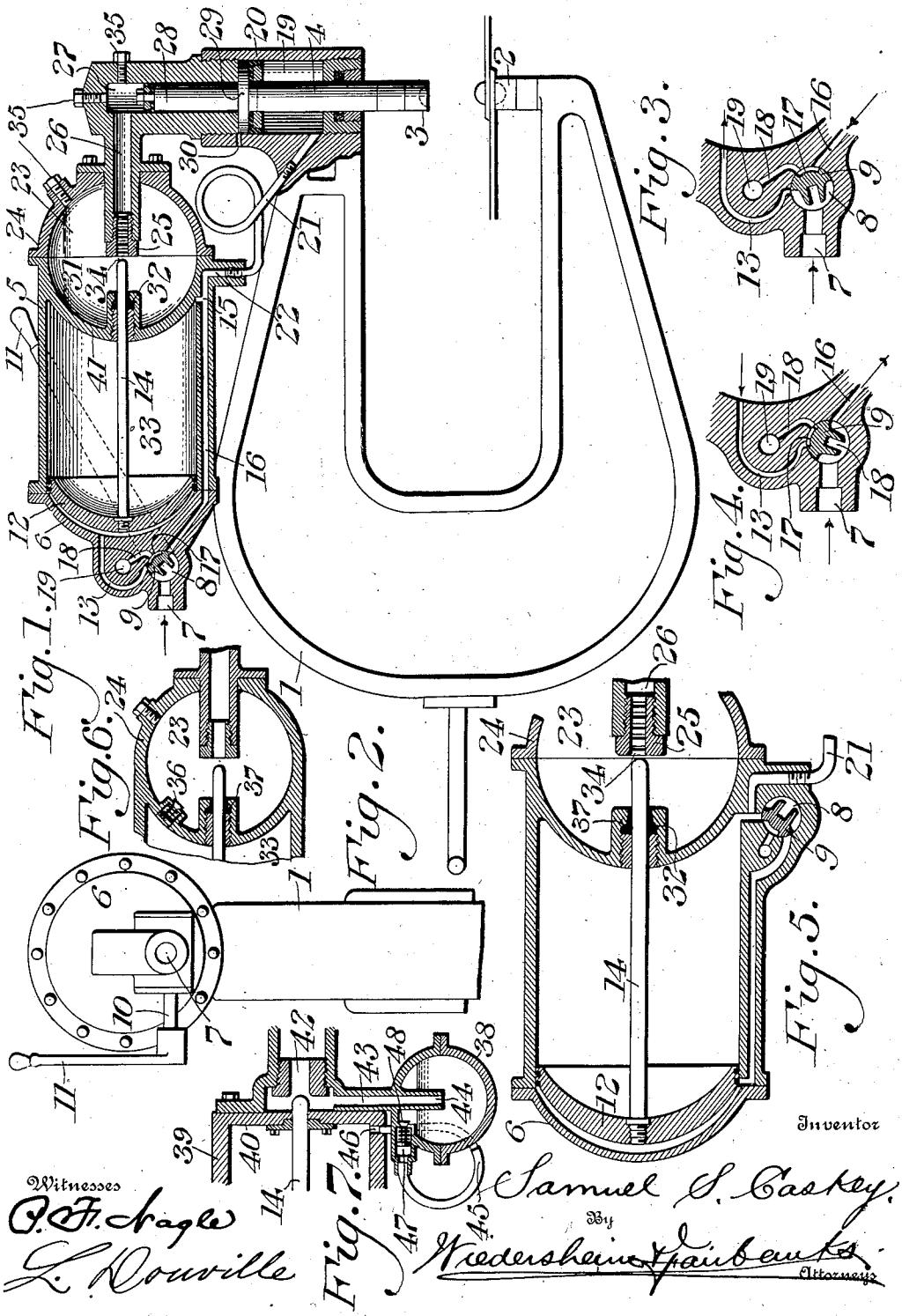

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PUNCH OR RIVETER.

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To all whom it may concern:

Be it known that I, SAMUEL S. CASKEY, 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 Punches or Riveters, of which the following is a specification.

My invention consists of a novel construction of a punch or riveter, wherein I employ an enlarged stationary reservoir adapted to contain oil or other liquid in combination with a riveting device having a passage leading thereto from said reservoir, provision being made for varying the pressure in the passage leading to said riveting device from said reservoir and means being provided for effectively operating the riveting-ram simultaneously with the varying of the pressure in said reservoir.

It also consists of novel means for permitting the inlet of air to the oil-reservoir and in the provisions of means for causing the inlet to the riveting mechanism to always be beneath the surface of the oil in the oil-reservoir in whatever position the riveter or punch may assume.

It further consists of novel details of construction, all as will be hereinafter fully set forth.

Figure 1 represents a side elevation of a punch or riveter embodying my invention, the cylinder, reservoir riveting device, and their adjuncts being shown in section. Fig. 2 represents an end elevation of Fig. 1. Fig. 3 represents, on an enlarged scale, a sectional view of the controlling-valve and its adjuncts, showing the position the parts assume when compressed air is admitted to the piston when in the position seen in Fig. 1. Fig. 4 represents a view similar to Fig. 3, but showing the valve in reversed position. Fig. 5 represents a longitudinal sectional view of the main cylinder and its adjuncts, but showing the controlling-valve in a slightly different position from that seen in Figs. 1, 3, and 4. Fig. 6 represents a sectional view of the stationary reservoir, showing a check-valve employed. Fig. 7 represents a sectional view showing another construction of the stationary reservoir located out of alinement with the cylinder.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings, 1 designates the riveting-hook, upon the lower member of which is formed the lower die 2, the upper die 3 being carried by the riveting-ram 4.

5 designates the main cylinder, having the head 6 secured thereto, said head being provided with the compressed-air inlet 7, whereby the motive fluid is led to the valve chest or chamber 8, in which is contained the valve 9, which is preferably in the present instance of the rotary type, although it will be apparent that other forms of valves may be used without departing from the spirit of my invention.

10 designates the valve-stem, which is operated by the lever 11.

It will be understood that when the piston 12 is in the position seen in Fig. 1 and it is desired to move said piston forwardly or to the right the valve 9 must be turned into the position seen in Fig. 3, whereby live air is permitted to flow into the passage 13, thereby forcing the piston 12 and the intensifying-rod 14 carried thereby forwardly or to the right, it being understood that immediately before the movement of the piston 12 forwardly or to the right of the position seen in Fig. 1 exhaust takes place through the port 15 and passage 16 by means of the groove 17 of the valve, through the passage 18 and exhaust-opening 19, to the atmosphere.

During the exhausting operation above described exhaust is permitted from the chamber 19 of the pull-back cylinder 20, said exhaust passing through the pipe 21 into the passage 22, whereby a communication is had with the passages 16, 18, and 19 above referred to.

It will be apparent that the rod 14 has its extremity when the parts are in the position seen in Fig. 1 located within the enlarged chamber 23 of the reservoir 24, said chamber being filled with oil or other suitable liquid and having an outlet through the bushing or projection 25, which leads to the passage 26, which communicates with the riveting-chamber 27, within which is located the upper portion 28 of the riveting-ram 4.

29 designates the pull-back piston, formed on the riveting-ram and adapted to reciprocate within the chamber 19, said chamber having an exhaust-port 30 located in the upper portion thereof. It will be understood that the pull-back piston 29 and the riveting-ram 28 are provided with suitable packing, whereby the requisite tight joints may be made.

It will be apparent that during the move-

ment of the rod 14 forwardly or to the right and into the passage 26 a powerful and direct pressure will be immediately exerted upon the liquid in the passage 26 and chamber 27 and the ram 28 will be forced forwardly or downwardly on the rivet.

When the upper die 3, the riveting-ram 4, and the pull-back piston 29 are in their lowest positions, it will be understood that the piston 12 and rod 14 have moved to the right of the position seen in Fig. 1, and to restore the parts to the position seen in Fig. 1 again it will only be necessary to turn the valve 9 into the position seen in Fig. 4, wherefrom it will be apparent that the exhaust will take place through the passage 13, groove 17, passage 18, and port 19 to the atmosphere, and the live motive fluid entering the passage 16 will enter the port 15 and force the piston to the left and will simultaneously lift the pull-back piston 29 into its position seen in Fig. 1.

In the construction seen in Fig. 5 I have shown the valve 9 located in a slightly-different position from that seen in Figs. 1, 3, and 4 and the ports and passages slightly changed; but I deem it unnecessary to enter into a detailed description of the same, since the construction and operation will be familiar to those skilled in the art, as will be apparent from the description already given of Figs. 3 and 4.

I desire to call especial attention to the features of the employment of the enlarged reservoir 24, whereby such a supply of oil is always contained therein as will rise nearly to the level shown, approximately to the line 31, whereby the opening 34 of the passage 26 is always under the surface of the oil in whatever position the riveter or punch may assume.

I desire, further, to call attention to the fact that the rod 14 is packed at the point 32 with a packing of such a nature that a slight leakage of compressed air is permitted from the chamber 33 into the reservoir 23, said air exerting pressure upon the oil-level at substantially the line 31, whereby by virtue of the pressure on the oil the passage 26 and the chamber 27 are always kept full of oil, as the riveting-ram 4 approaches the die 2 before the intensifying-rod 14 comes into action. A check-valve 36 anywhere in the wall adjoining the cylinder 33 may also be used to let air into the chamber 23 for the purpose above mentioned. The chamber 23 also acts as a species of trap for all air-bubbles, which might otherwise be caused to exist in the passage 26 and chamber 27, as is evident.

As is well known to those skilled in the art, it is very essential in devices of this character that there shall be no air-bubbles anywhere in the passage 26 or chamber 27, because if any such should be present the result would be that a compressible medium would exist in said passage and chamber, thereby impairing the efficiency of the device, and it is imperative that a practically non-compressible medium should occupy said passage 26 and chamber 27.

It will consequently be apparent that by permitting the slight leakage of compressed air hereinbefore referred to into the chamber 23 a small body of air under pressure is constantly pressing upon the liquid in said chamber, whereby a species of trap is formed therein over the opening 34, leading to said passage 26, thereby preventing air from ever entering said passage so long as the level of the oil is above said opening 34.

In prior devices with which I am familiar wherein it has been attempted to utilize the principle of a rod telescoping into a passage containing oil or other liquid the importance has not been appreciated of employing an enlarged reservoir containing a chamber, such as 23, whereby an adequate supply of oil is always provided for the purposes above set forth, and it will be apparent that by the employment of said enlarged reservoir 24, containing the chamber 23, I am enabled to dispense with the employment of any auxiliary cylinders or oil-reservoirs extending in proximity to the main cylinder or in any other similar location, and I am also enabled to dispense with the employment of diaphragms, springs, pistons, and other objectionable mechanism heretofore employed.

It will be apparent that while I have shown the reservoir 24 as having the contour of a hollow sphere the same may be rectangular, cylindrical, or of other contour without departing from the spirit of my invention.

It will be apparent from the foregoing that this riveter is built for very hard usage and there is very little liability of breakage. The packings are easy of examination and the construction of the machine secures the maximum pressure on a rivet with as little weight in the machine as is possible. It works rapidly, without shock or jar, is easy to handle, and gives a uniform pressure on every rivet. No blow is given when using this machine, and therefore no crystallization takes place upon the rivet when being driven.

The riveter is suspended by a bail, which allows it to be moved and operated in either a vertical or horizontal position. By changing the bail it can be used sidewise with equal facility. The operating-lever is so constructed and connected that the operator can control all movements of the riveter, whether standing at the side, back, or front of the machine.

By the use of the hydrocarbon fluid in the oil-chambers and cylinders the operation of the machine in very cold weather and in other places is permitted with no danger of freezing, which is not the case in riveters of hydraulic pressure alone.

By removing the filling-plugs 35 the chambers 23 27 and passages 26 are readily accessible and can be filled with the oil.

It will be apparent that various 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 to the exact construction herein shown and described.

In Fig. 6 I have shown the reservoir 24 as provided with a check-valve 36, which opens inwardly, whereby it will be understood that a slight leakage of compressed air from the chamber 33 into the chamber 23 in the reservoir 24 is permitted through said check-valve in addition to that through the packing 37. A packing effecting the purpose required is shown in Figs. 1 and 5. It will be understood that either the construction seen in Fig. 6 or in Fig. 1 may be employed without departing from the spirit of my invention.

In Fig. 7 I have shown the reservoir 38 as located to one side of or below the cylinder 39, which latter may be provided with a rectilinear head 40 instead of a curved head 41, as seen in Fig. 1.

42 designates the inlet to the passage which leads to the riveting device, it being understood that the extremity of the intensifying-rod 14 assumes substantially the position seen in Fig. 7 when its piston and the rod are in their extreme left-hand position. It will be understood that the reservoir 38 is filled with oil, as is also the connection 43, leading therefrom to the inlet 42, the lower portion 44 of the connection 43 terminating in proximity to the central portion of the reservoir 38. In order to provide for the admission of air to the oil or other liquid in the chambers or passages 38, 43, and 42, I provide a connection 45, which leads from the opening 46 around to the check-valve chamber 47, in which is located the check-valve 48, whose construction and method of operation will be apparent from Fig. 7, whereby it will be seen that the required air-pressure is at all times admitted to the liquid in the chamber 38 and passages 43 and 42. It will be further understood that, if desired, I may also employ a plurality of such reservoirs.

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

1. In a riveter or punch, a stationary non-compressible reservoir adapted to normally contain oil or other liquid and communicating directly with the riveting-chamber, and having an outlet in proximity to the central portion of said reservoir, said outlet being normally always beneath the surface of said liquid, and means for admitting a slight leakage of compressed air upon the surface of said liquid.

2. In a riveter or punch, a stationary non-compressible reservoir adapted to contain oil or other liquid, a riveting device, an outlet leading from the central portion of said reservoir directly to said riveting device, said outlet being always normally below the surface of said oil, and means for varying the pressure upon said riveting device.

3. In a riveter or punch, a stationary non-compressible reservoir adapted to contain oil or other liquid, means for admitting air under pressure upon the surface of said oil, a riveting device, an outlet leading from the central portion of said reservoir, directly to said riveting device, said outlet being always normally below the surface of said oil and means for varying the pressure upon said riveting device.

4. In a riveter or punch, a stationary non-compressible hollow reservoir adapted to be filled with oil or other liquid, a riveting device, means for admitting air under pressure to the surface of the oil in said reservoir, a passage leading directly to said riveting device, from the central portion of said reservoir, and means for varying the pressure in said passage.

5. In a riveter or punch, an enlarged stationary non-compressible reservoir adapted to be filled with oil or other liquid, a riveting device, an outlet leading from the central portion of said reservoir directly to said riveting device, a cylinder having a piston therein, an intensifying-rod secured to said piston and having its extremity adapted to coact with the outlet from said reservoir, and means for controlling the movements of said piston.

6. In a riveter or punch, an enlarged stationary non-compressible reservoir adapted to be filled with oil or other liquid, a riveting device, an outlet leading from the central portion of said reservoir directly to said riveting device, a cylinder having a piston therein, an intensifying-rod secured to said piston and having its extremity adapted to coact with the outlet from said reservoir, and means for controlling the movements of said piston, in combination with a pull-back piston on said riveting device and means for raising said pull-back piston, simultaneously during the movement of said piston away from said reservoir.

7. In a riveter or punch, a cylinder, a piston therein, a non-compressible reservoir at one end of said cylinder, adapted to contain oil or other liquid, a riveting-cylinder, a riveting-ram therein, an outlet from the central portion of said reservoir normally always below the surface of said liquid and leading directly to said ram, an intensifying-rod on said piston and adapted to enter said reservoir and outlet, and means for controlling the reciprocations of said piston.

8. In a riveter or punch, a cylinder, a piston therein, a non-compressible reservoir at one end of said cylinder, adapted to contain

oil or other liquid, a riveting-cylinder, a riveting-ram therein, an outlet from the central portion of said reservoir normally always below the surface of said liquid and leading directly to said ram, an intensifying-rod on said piston and adapted to enter said reservoir and outlet, and means for controlling the reciprocation of said piston, in combination with means for admitting air under pressure to the surface of the liquid in said reservoir.

9. In a riveter or punch, a non-compressible stationary spherical reservoir adapted to be filled with oil or other liquid, a riveting device, an outlet leading from the central portion of said reservoir directly to said riveting device, a cylinder having a piston therein, an intensifying-rod secured to said piston and having its extremity adapted to coact with the outlet from said reservoir, and means for controlling the movement of said piston.

10. In a machine for riveting, a stationary, non-compressible reservoir adapted to contain a liquid, an outlet from said reservoir constructed and arranged to be always normally below the surface of said liquid and communicating directly with the riveting-chamber, said liquid being adapted to flow through said outlet, and means for causing a compressible fluid to contact with the surface of said liquid.

11. In a machine for riveting, a riveting device, a stationary non-compressible reservoir adapted to contain a liquid, means for causing a compressible fluid to contact with the surface of said liquid, and an outlet for said liquid situated within said reservoir, said outlet being constructed and arranged to be always normally below and to be covered in all positions of the riveting device by said liquid.

12. In a machine for riveting, a riveting-chamber, a stationary, non-compressible reservoir adapted to contain a liquid, an outlet-pipe leading from said reservoir, the inlet to said pipe being always normally below the surface of said liquid, and said pipe being in suitable communication with the riveting-chamber, said liquid being adapted to flow through said pipe to said riveting-chamber, and means for causing a compressible fluid to contact with the surface of said liquid.

13. The combination of a riveting device, a stationary reservoir adapted to contain a liquid, means for causing a compressible fluid to contact with the surface of such liquid, an outlet for such liquid within said reservoir constructed and arranged to be always below and to be covered by such liquid in all positions of the riveting device and coacting means including the walls of said outlet for actuating the riveting device.

14. In a machine for riveting, a riveting-chamber, a stationary non-compressible reservoir adapted to contain a liquid, a suitable communication between said chamber and said reservoir, the intake of which is constructed and arranged to be always and normally below the surface of said liquid, the latter being adapted to flow from said reservoir to said riveting-chamber and means for causing a compressible fluid to contact with the surface of said liquid.

15. In a machine for riveting a riveting-chamber and plunger, a stationary non-compressible reservoir adapted to contain a liquid, means for causing a compressible fluid to contact with the surface of said liquid and an outlet from said reservoir to said chamber, said outlet being constructed and arranged to be always normally below and to be covered in positions of the riveting-machine by said liquid.

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