E. H. WRAY.

FORGING PRESS AND HAMMER.

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959,094.

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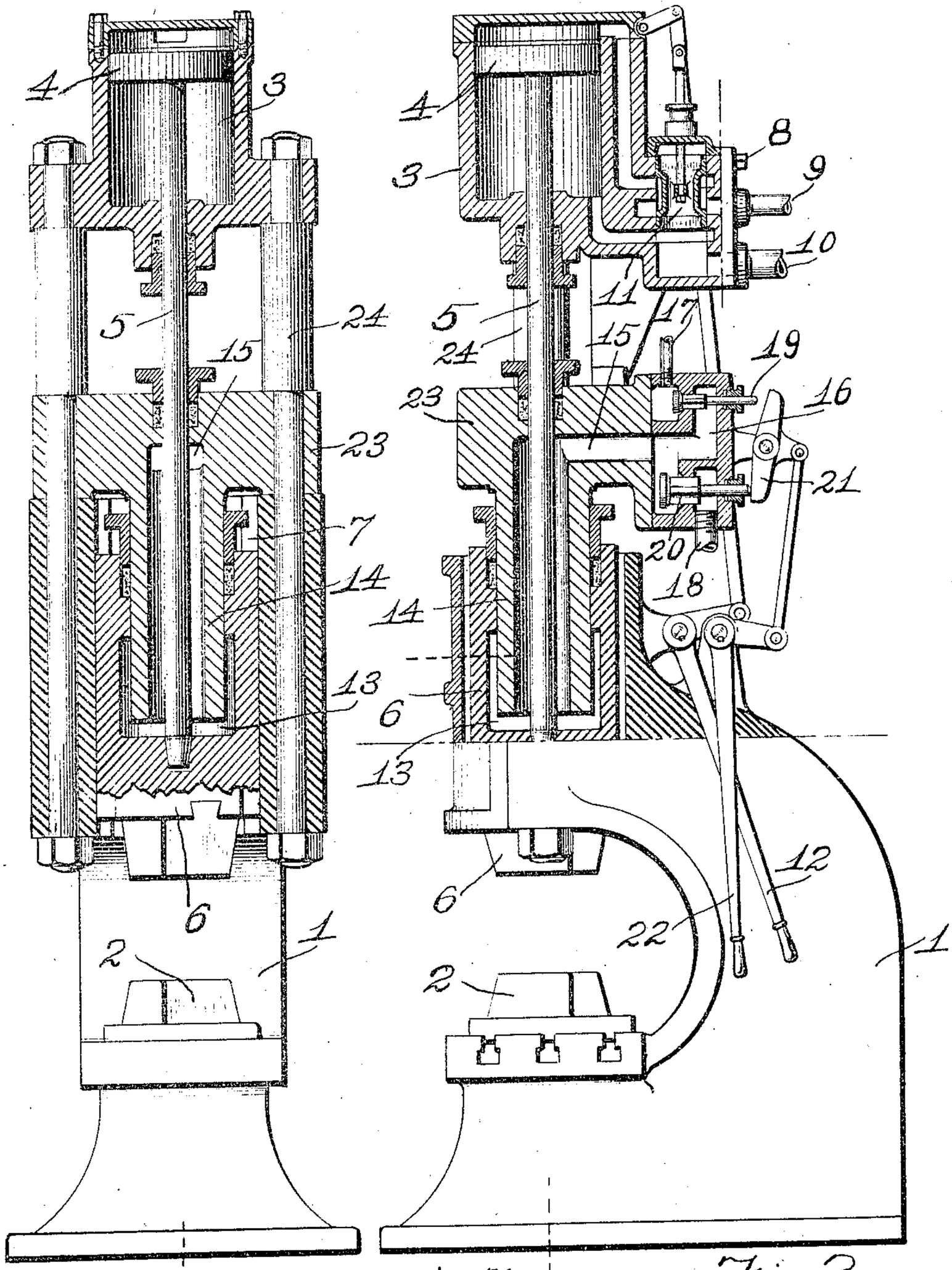

Fig. 1.

Fig. 2.

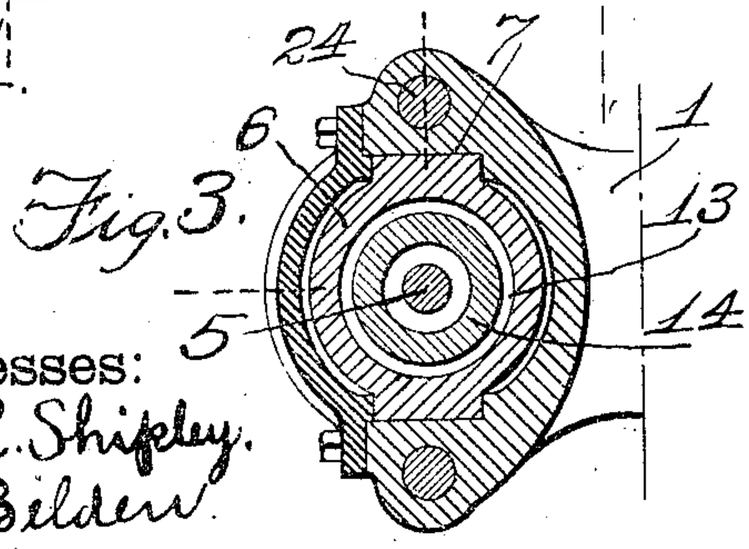

Fig. 3.

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EDWARD HENRY WRAY, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO NILES-BEMENT-POND COMPANY, OF JERSEY CITY, NEW JERSEY.

FORGING PRESS AND HAMMER.

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To all whom it may concern:

Be it known that I, EDWARD HENRY WRAY, a citizen of the United States, residing in Philadelphia, Philadelphia county, Pennsylvania, (post-office address care Niles-Bement-Pond Company, Philadelphia, Pennsylvania,) have invented certain new and useful Improvements in Forging Presses and Hammers, of which the following is a specification.

This invention, relating to a combined hammer and forging press will be readily understood from the following description taken in connection with the accompanying drawing in which:—

Figure 1 is a front elevation, part vertical section of a forging hammer and press exemplifying my invention: Fig. 2 a side elevation, part vertical section, of the same: and Fig. 3 a horizontal section through the hammer-head and its guides.

In the drawing:—1, indicates the hammer-frame, of usual steam-hammer form: 2, the anvil: 3, the steam-cylinder, supported by the frame: 4, the steam-piston: 5, the hammer-rod, connected with the steam-piston: 6, the hammer-head fast on the lower end of the hammer-rod and sliding in vertical guides in the frame: 7, the frame-guides for the hammer-head: 8, the steam-chest: 9, the steam inlet to the steam-chest: 10, the steam exhaust connection: 11, the steam-valve: and 12, the lever for actuating the steam-valve.

As thus far described the device does not materially differ from an ordinary steam-hammer and its operation would be the same, that is to say, by actuating the steam-valve the steam will be admitted to and exhausted from below and above the steam-piston, alternately, and it is to be understood that the illustrated steam-valve with its actuating mechanism is merely typical and that any of the usual appropriate valves and valve actuating devices of steam-hammers may be employed in lieu of the specific devices illustrated. The parts thus far described constitute a steam-hammer capable of use after the manner of ordinary steam-hammers and quite regardless of the forging press features to be later described.

Proceeding with the drawing:—13, indicates a water-cylinder formed in the hammer-head concentric with the hammer-rod and closed at its lower end: 14, a plunger rigidly supported by the frame and projecting down into the water-cylinder through suitable packing: 15, a water passage leading through the plunger to permit water to flow to and from the water-cylinder: 16, a water-valve casing connected with the water passage 15: 17, a water inlet for the water-valve casing: 18, a water outlet from the water-valve casing: 19, a water inlet valve to control the flow of water from the water inlet to the water-cylinder: 20, a water outlet valve to control the flow of water from the water-cylinder to the water outlet 18: 21, a rocker adapted to open either of the water-valves, selectively: 22, a lever for actuating the rocker: 23, a flange formed in the upper end of plunger 14 and resting on the general frame of the structure: and 24, studs securing flange 23 firmly to the hammer-frame and projecting upwardly into engagement with the steam-cylinder to serve in uniting the steam-cylinder firmly to the hammer-frame.

As the parts are shown in Fig. 2 the inlet water-valve is closed and the outlet water-valve is open so that the water-cylinder is without pressure and, for the time being, without office. The steam-valve is in position to admit steam above the steam-piston and to permit steam to exhaust from below the piston, the steam-valve being in position corresponding with the beginning of the down stroke of the hammer when employed as a steam-hammer. When the hammer, acting as a steam-hammer, has completed its down stroke then the steam-valve will be reversed and the steam be permitted to exhaust from above the steam-piston while live steam enters below the steam-piston and lifts the hammer again.

Looking at Fig. 2, assume, now, that the steam-valve be shifted so as to admit live steam below the steam-piston and exhaust the steam from above the steam-piston, and assume that the valve be left in that position, the hammer will then be raised by the steam-piston and be held in raised position.

Assuming, now, that the machine is to be used as a forging press, the steam-valve being in the position just mentioned, the hammer being supported in upward position by the steam pressure below the steam-piston. By properly shifting the lever 22 the water outlet valve 20 will be closed and the water

inlet valve 19 will be open thus admitting water to the water-cylinder under pressure, being understood that the water inlet 17 is connected with the source of supply of water under heavy pressure. The water acting in the water-cylinder forces the hammer-head down, against the yielding resistance of the steam under the steam-piston. When it is desired that the hammer rise then the lever 22 is actuated to close the water inlet valve and open the water outlet valve, whereupon the steam acting under the steam-piston will raise the hammer-head. In this manner the device is employed as a forging press.

It is to be observed that the general machine stands ready for instant selective use either as a steam-hammer or as a forging press, the parts of one member of the system not interfering at all with the action of the parts of the other member of the system.

It is to be understood that the water-valve mechanism specifically illustrated is merely typical and that it may find its equivalent in appropriate valvular mechanism for controlling the flow of water to and from the water-cylinder. The location of the water-cylinder within the hammer-head to cooperate with the fixed plunger is a matter of preference as compared with the fixed cylinder coöperating with the plunger moving with the hammer-head.

I have set forth the principle of the invention and the best mode in which I contemplate embodying that principle, and the structure specifically set forth is to be viewed as a single exemplification of the invention.

It should be understood that it is not new to combine a steam hammer and a hydraulic press in such manner that a hammer-head may do its work by blows or by pressure as desired, but it should also be understood that where this has been done the hydraulic press quality of the combined machine has been made primary while the steam hammer has been of the nature of a secondary adjunct. The result has been that the steam-hammer feature of the machine has been lacking in many of the qualities found in steam hammers not conjoint with hydraulic presses. In my machine the steam-hammer is the primary agent, the hydraulic press being supplemental or secondary, and the construction is such that the steam-hammer has all of the virtues of ordinary steam-hammers notwithstanding the presence of the hydraulic press. For instance, it will be noticed that in my construction the hammer-rod forms a direct connection extending axially from the steam piston to the hammer-head after the manner of ordinary steam-hammers, the hydraulic press not interfering with this direct connection of the hammer rod because the cylinder and plunger of the hydraulic press surround the hammer-rod, in other words, the hammer-rod passes axially through the hydraulic press.

I claim:—

1. A forging press and hammer comprising, a frame, a steam cylinder supported thereby, a hammer-head fitted to slide in the frame and disposed below the steam cylinder and in its axial line, a hammer-rod directly connecting the steam-piston and hammer-head, valvular mechanism for controlling the flow of steam to and from the steam cylinder, a water cylinder, a plunger in the water cylinder, the water cylinder and plunger surrounding the hammer rod between the steam-piston and hammer-head and forming a coöperative couple one of whose members is connected with the hammer-head, and valvular mechanism for controlling the flow of water to and from the water cylinder, the two valvular mechanisms being independent of each other, combined substantially as set forth.

2. A forging press and hammer comprising, a frame, a steam cylinder supported thereby, a hammer-head fitted to slide in the frame and disposed below the steam cylinder and in its axial line, a hammer-rod directly connecting the steam-piston and hammer-head, valvular mechanism for controlling the flow of steam to and from the steam cylinder, a water cylinder formed in the hammer-head, a plunger rigidly supported by the frame below the steam cylinder and projecting down into the water cylinder, the water cylinder and plunger surrounding the hammer-rod and having their axes coincident with the axis of the hammer-rod, and valvular mechanism for controlling the flow of water to and from the water cylinder, the two valvular mechanisms being independent of each other, combined substantially as set forth.

3. A forging press and hammer comprising a frame, a hammer-head fitted to slide in the frame and having a water-cylinder formed within it, a plunger coöperating with said water-cylinder and projecting upwardly therefrom, side flanges at the top of the plunger and resting on the frame, studs securing said flanges to the frame and projecting upwardly, a steam-cylinder secured to the upper ends of said studs, a piston in the steam-cylinder, a hammer-rod connecting the hammer-head and piston and passing axially through the plunger, and valvular mechanism for the steam-cylinder and water-cylinder, combined substantially as set forth.

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