No. 775,853. PATENTED NOV. 22, 1904.

O. PHILIPP & R. TRENTZSCH.

HYDRAULIC PRESS.

APPLICATION FILED APR. 19, 1904.

NO MODEL. 2 SHEETS—SHEET 1.

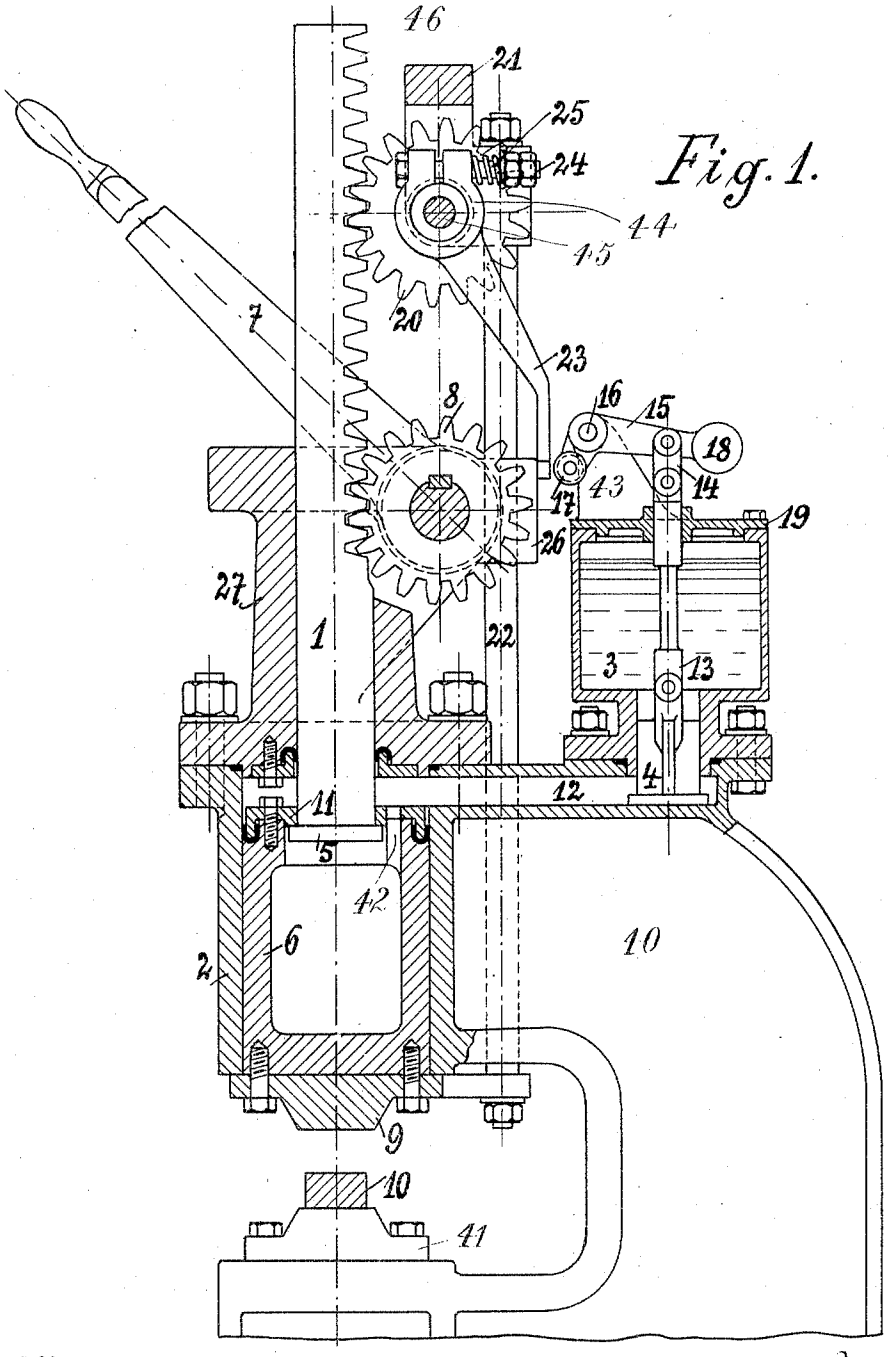


Fig. 1.

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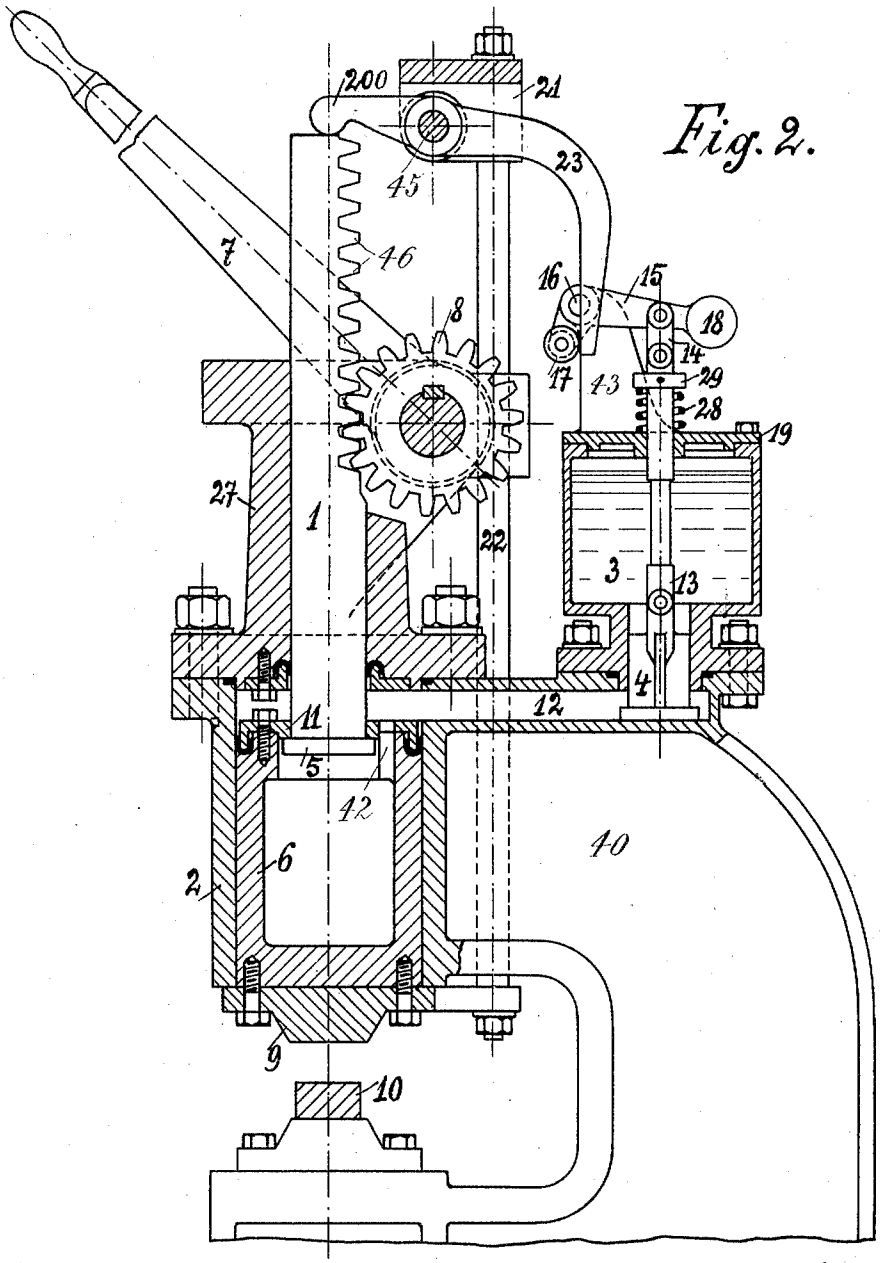
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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.



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No. 775,853. Patented November 22, 1904.

UNITED STATES PATENT OFFICE.

OTTO PHILIPP, OF DRESDEN, AND ROBERT TRENTZSCH, OF LEIPZIG, GERMANY, ASSIGNORS TO ELEKTROGRAVÜRE, GESELLSCHAFT MIT BESCHRÄNKTER HAFTUNG, OF LEIPZIG, SELLERHAUSEN, GERMANY.

HYDRAULIC PRESS.

SPECIFICATION forming part of Letters Patent No. 775,853, dated November 22, 1904.

Application filed April 19, 1904. Serial No. 203,829. (No model.)

To all whom it may concern:

Be it known that we, OTTO PHILIPP, a resident of Dresden, and ROBERT TRENTZSCH, a resident of Leipzig, Germany, citizens of Germany, have invented new and useful Improvements in Hydraulic Presses, of which the following is a specification.

This invention relates to a hydraulic press of the class in which the spindle has an independent movement from the movable platen while the press is running light.

The invention consists more particularly in the means for operating the valve that admits the water to the cylinder during the forward stroke of the piston and discharges it during the return stroke.

In the accompanying drawings, Figure 1 is a vertical section, partly in elevation, of our improved hydraulic press; and Fig. 2, a similar view of a modification.

The numeral 40 represents the frame of the press, provided with a fixed platen 41 and a fixed cylinder 2 above such platen. Within the cylinder 2 moves a hollow piston 6, to the lower end of which the movable platen 9 is attached. The piston 6 is provided with a perforated cover 11, through which passes a pressure-spindle 1, carrying a collar 5, from which the piston 6 is normally suspended. The spindle 1 is guided in a fixed tubular sleeve 27, mounted on frame 40, and is reciprocated in suitable manner. The drawings show the spindle to be made in the form of a rack 46, engaged by a pinion 8, which is adapted to be turned by a hand-lever 7. The pinion 8 is journaled in a fixed bearing of sleeve 27.

The water or other liquid is contained within a reservoir 3, having cover 19, and communicating by channel 12 with cylinder 2. The channel 12 likewise communicates by duct 42 with the cavity of piston 6. A valve 4 controls the flow of liquid between reservoir 3 and channel 12.

The rod 13 of valve 4 is by link 14 pivoted to an angle-lever 15. This lever is fulcrumed at 16 to a fixed support 43 and carries at one end a weight 18, which tends to normally open valve 4. The other end of lever 15 carries a roller 17, adapted to contact at its left side with a finger 23, movable between such roller and a fixed abutment 26. The finger 23 has a split hub 44, fitted on the collar of a pinon 20, which engages the teeth 46 of spindle 1. The hub 44 is frictionally held to this collar by a clamp-screw 24 and surrounding spring 25. The pinion 20 is adapted to rotate upon a pin 45, mounted on a slidable frame 21. This frame is connected to the movable platen 9, and consequently to piston 6, by rod 22.

The operation is as follows: The spindle 1 is lowered to correspondingly lower the hollow piston 6, suspended therefrom, which is filled with water. The piston will thus remain suspended while the press is running light—*i. e.*, until the platen 9 strikes the work-piece 10, supported on platen 41. During this time the valve 4 will be open and water will flow through channel 12 into cylinder 2 to fill the space vacated by the piston. As the frame 21 participates in the movement of the piston and spindle, the pinion 20 will be lowered without rotating, so that the finger 23 will glide down along abutment 26. Thus the finger will not influence the lever 15, and the valve 4 will remain open.

When the platen 9 strikes the work-piece 10, the piston 6 will no longer follow the descent of spindle 1. The latter will therefore descend independently into the hollow of the piston, and as the frame 21 is now stationary this independent movement of the spindle will cause its teeth 46 to turn pinion 20. In this way the finger 23 will be tilted to engage roller 17 and turn lever 15 against weight 18 on fulcrum 16. Thus the valve-stem 13 will be raised and the valve 4 closed. The spindle 1 will, during its further descent, displace water in piston 6, which will flow through duct 42 into cylinder 2 to act upon the cover 11 of the piston. In this way working pressure is exerted upon the piston, the force of which depends upon the ratio between cross-section of spindle 1 and area of cover 11.

Upon the return stroke the spindle 1 will

first rise independently until its collar 5 engages cover 11. At the beginning of this movement the pinion 20 will be turned in the opposite direction, owing to the fact that its frame 21 does not participate in the movement of the spindle. In this way the finger 23 will be turned to release roller 17 and permit the lever 15 to be tilted by the action of weight 18, so as to open valve 4. While the spindle 1 is raised within piston 6, water will be sucked from cylinder 2 through duct 42 into the cavity of the piston.

When the piston 1 has been raised to such a height that its collar 5 engages the cover 11, the piston 6 will participate in the upward movement of the spindle and the water from cylinder 2 will be returned into reservoir 3, as during this latter portion of the return stroke the frame 21 has the same movement as the spindle 1, the pinion 20 will be raised without being rotated, the valve 4 consequently remaining open.

In Fig. 2 the stem 13 of valve 4 is provided with a collar 29, engaged by a spring 28, that normally closes the valve. The roller 17 of lever 15 is engaged at its right side by a finger 23, turning on arbor 45 and bearing with its arm 200 upon spindle 1.

When the spindle begins to descend into the cavity of piston 6, as previously described, the spindle will be withdrawn from underneath lever-arm 200. In this way the spring 28 is free to tilt finger 23, and consequently to close valve 4.

When during the return stroke the spindle reëngages lever-arm 200, it will tilt finger 23, and thereby open valve 4 against the action of spring 28.

What we claim is—

1. In a hydraulic press, the combination of a spindle with a hollow piston suspended therefrom, a surrounding cylinder, a valve-controlled channel adapted to communicate with the cylinder and piston, a frame movable with the piston, and means intermediate the frame and valve for operating the valve, substantially as specified.

2. In a hydraulic press, the combination of a spindle with a hollow piston suspended therefrom, a surrounding cylinder, a valve-controlled channel adapted to communicate with the cylinder and piston, a frame movable with the piston, a finger pivoted to said frame and operated by the spindle, a lever adapted to be engaged by the finger, and means for operatively connecting said lever to the valve, substantially as specified.

Signed by us at Leipzig, Germany, this 31st day of March, 1904.

OTTO PHILIPP.
ROBERT TRENTZSCH.

Witnesses:
RUDOLPH FRICKE,
P. V. P. DUNN.