

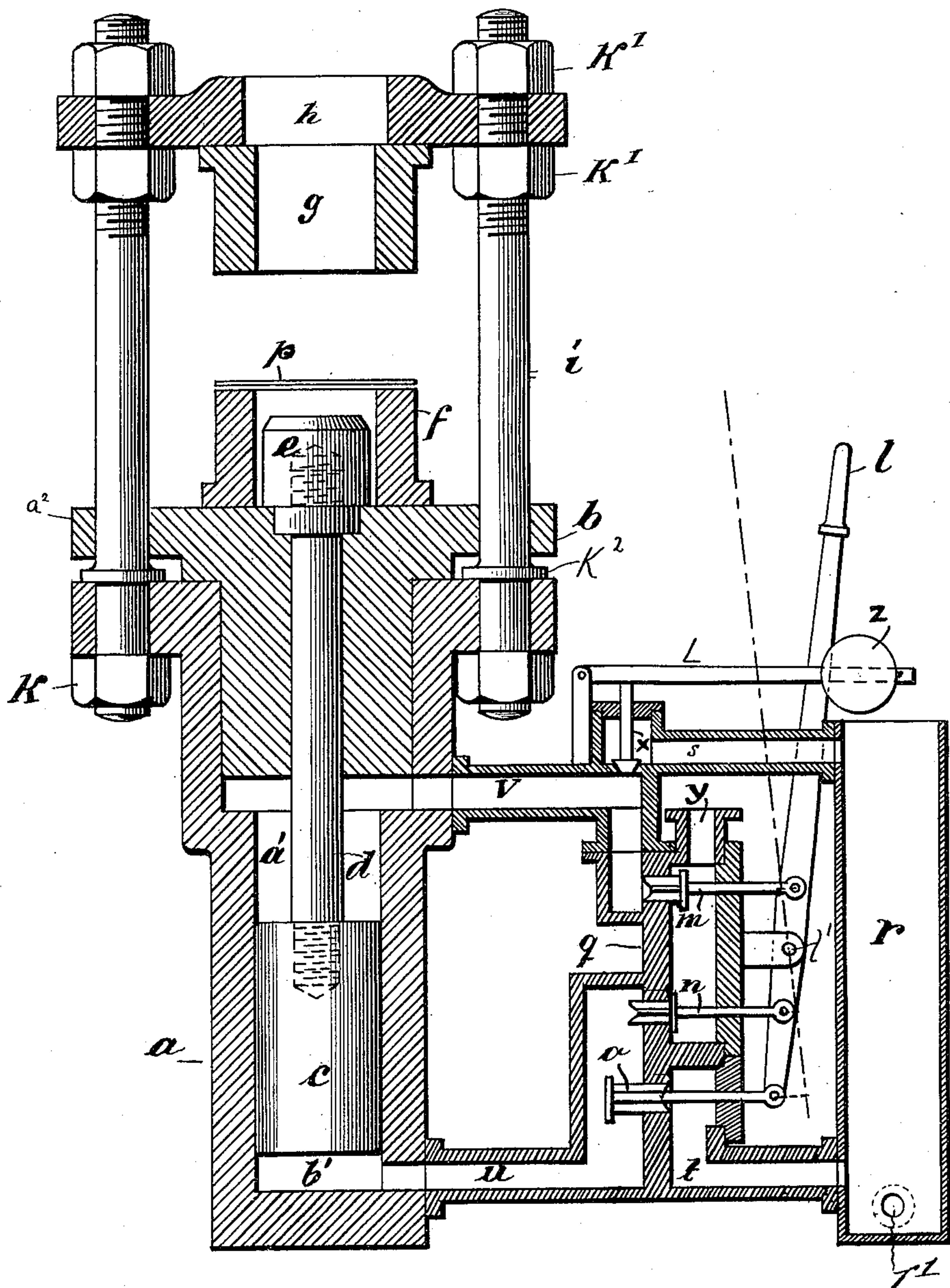
No. 607,442.

Patented July 19, 1898.

L. P. LANDTVED.
HYDRAULIC PRESS.

(Application filed Jan. 10, 1898.)

(No Model.)



Witnesses:

B. L. Olsen.

B. L. Sommers

Inventor,
Lauritz P. Landtved.
by *[Signature]*
Atty.

UNITED STATES PATENT OFFICE.

LAURITZ P. LANDTVED, OF COPENHAGEN, DENMARK.

HYDRAULIC PRESS.

SPECIFICATION forming part of Letters Patent No. 607,442, dated July 19, 1898.

Application filed January 10, 1898. Serial No. 666,215. (No model.)

To all whom it may concern:

Be it known that I, LAURITZ P. LANDTVED, of Copenhagen, Denmark, have invented certain new and useful Improvements in Hydraulic Presses; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, and to letters of reference marked thereon, which forms a part of this specification.

This invention has for its object certain improvements in hydraulic presses—as, for instance, in presses for shaping sheet metal or making sheet-metal ware or utensils—applicable also to other purposes.

In the accompanying drawing I have shown my improved hydraulic press by a vertical sectional elevation, in which a indicates the cylinder, the interior diameter of which varies, and is fitted with two pistons b and c , arranged in tandem, the former, b , working in the upper portion of greatest diameter of the cylinder and the piston c in the lower portion of least diameter of said cylinder, said pistons being so arranged as to leave a fluid-space a' between them and a like space b' below the smaller piston.

The piston b carries the support f for the sheet metal to be shaped.

The piston c has secured thereto a rod d , that passes fluid-tight through the piston b and carries at its upper end the male die e .

The piston b has laterally-projecting perforated ears a^2 , through which pass the guide-rods i , that serve to guide the same in its reciprocating movements, said rods having their upper and lower ends screw-threaded for the reception of nuts k and provided with an abutment flange or collar k^2 , that seats upon perforated ears or projections on the cylinder a , through the perforations of which the rods pass and are secured by means of said nuts k . At their upper end the rods carry a suitable cross-head h , secured thereto by means of nuts k' , said cross-head carrying the female die g in a well-known manner.

On one side of the cylinder a is arranged a distribution-valve chest q , whose branch y is connected with a source of fluid-supply under pressure, as a force-pump, while its branch

t is connected with a receiving-chamber r . From the valve-chest q lead two ducts u and v to the space b' below the smaller piston c and to the space a' between said piston and the larger piston b , respectively. The duct v is in communication with the valve-chest q through a port controlled by a valve m , and duct u communicates with said valve-chest through a port controlled by a valve n and with the receiving-chamber r through the duct t and a suitable port controlled by a valve o . The duct v is, furthermore, in communication with a duct s , leading to receiving-chamber r through a port controlled by a pressure-regulating valve x , connected with a weighted lever L , the weight Z of which is adjustable on its lever, which is fulcrumed to a suitable standard rising from the duct v in the valve-chest.

The duct s , forming a by-pass from the duct v through the safety or regulating valve x , discharges into the chamber r , and the pressure with which the work is held between the support f and die g can be regulated by suitably positioning the weight on the lever L . This valve also allows the escape of the displaced water due to the rise of the cylinder c .

The stems of the valves m , n , and o are pivoted to a two-armed lever l , fulcrumed at l' to a bracket on the valve-chest.

The operation of the press is as follows, the parts being shown in the drawing in their relative positions for operation: A sheet of metal p being placed upon the annular support f and the force-pump started the water will flow through the open port m to the space a' between the pistons b and c , and as the superficial area of the face of piston b acted upon by the water is greater than that of the proximate face of piston c the former or larger piston will be caused to ascend, carrying with it the smaller piston c . When the said piston b has carried the plate p nearly to the female die g , the valve-shifting lever l is moved from its extreme position to the right, as shown in the drawing, to its extreme position to the left of its mean vertical position, whereby the valves m and o are moved to close their respective ports, while the valve n is moved to open its port, thereby admitting water under pressure to the chamber b' below piston c , whereby the latter is caused

to move upward, the pressure being likewise transmitted to the body of water between the pistons, thereby causing piston *b* to complete its upward movement and hold the plate *p* 5 to the female die *g*, while the piston *c* completes its movement to shape said plate by the action thereon of the male die *e* and the coöperation therewith of said female die *g*. Should the male die stick fast in the matrice 10 *g* from any cause, the valve-shifting lever *l* is moved to the first position to the right, thereby causing the pressure of the water to be exerted upon piston *c* in a downward direction, because piston *b* is still in contact 15 with the female die and is thereby held against upward motion, so that the said piston *c* will be caused to move out of said die. After the described operation the valve-shifting lever is moved to its third or normal position—*i.* 20 *e.*, its mean perpendicular position—thereby moving all the valves to uncover their respective ports and allowing the pump to work without actuating the pistons, both of which drop into their normal positions.

25 It will of course be understood that the suction-pipe (not shown) is connected with the reservoir *r* at *r'* and the force-pipe of said pump with the inlet branch *Y* of the valve-casing, as above stated.

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

1. In a hydraulic press, the combination with a stationary die, the press-cylinder, two 35 pistons of unequal diameter arranged in tandem, the piston of greater diameter adapted to support the material operated upon, and the coöperating die secured to the smaller piston; of means for admitting a fluid under 40 pressure at will between the two pistons and below the smaller piston respectively, for the purpose set forth.

2. In a hydraulic press, the combination with a stationary die, the press-cylinder, and 45 two pistons of unequal diameter arranged in tandem, the piston of greater diameter adapted to support the material operated upon, and the coöperating die secured to the smaller pis-

ton; of a valve-chest, a receiving-chamber, 50 valved ducts leading from said valve-chest and chamber to the cylinder above and below the smaller piston respectively, a valved port leading from said chest to the duct connect- 55 ing the cylinder with the receiving-chamber, and a shifting lever to which the three valves are connected, said valves arranged relatively to the ports controlled thereby to uncover the 60 same when the lever is in a normal position, to respectively open and close the ports in the valve-chest for the ducts leading to the cylinder above and below the smaller piston and 65 open the port connecting the last-named duct with the receiving-chamber when the lever is shifted in one direction, and to cut off the communication between the cylinder and re- 70 ceiving-chamber and the duct leading to said cylinder above the smaller piston and to open the port leading from the valve-chest to the cylinder below the smaller piston when said lever is shifted in a reverse direction, for the purpose set forth.

3. In a hydraulic press, the combination with the cylinder, its two pistons of unequal diameter arranged in tandem, a valved duct 75 leading to the cylinder between its pistons, and a receiving-chamber, of a by-path connecting the receiving-chamber with the afore-said duct, and a pressure-regulating valve in said by-path, for the purpose set forth.

4. In a hydraulic press, the combination 80 with the cylinder, its two pistons of unequal diameter arranged in tandem, a valved duct leading to the cylinder between its pistons, and a receiving-chamber; of a by-path connect- 85 ing the receiving-chamber with the afore-said duct, and an adjustable pressure-regulating valve in said by-path, for the purpose set forth.

In testimony that I claim the foregoing as invention I have signed my name in presence 90 of two subscribing witnesses.

LAURITZ P. LANDTVED.

Witnesses:

HANS PETER NIKOLEY JANSEN,
JULES BLOW.