

No. 878,298.

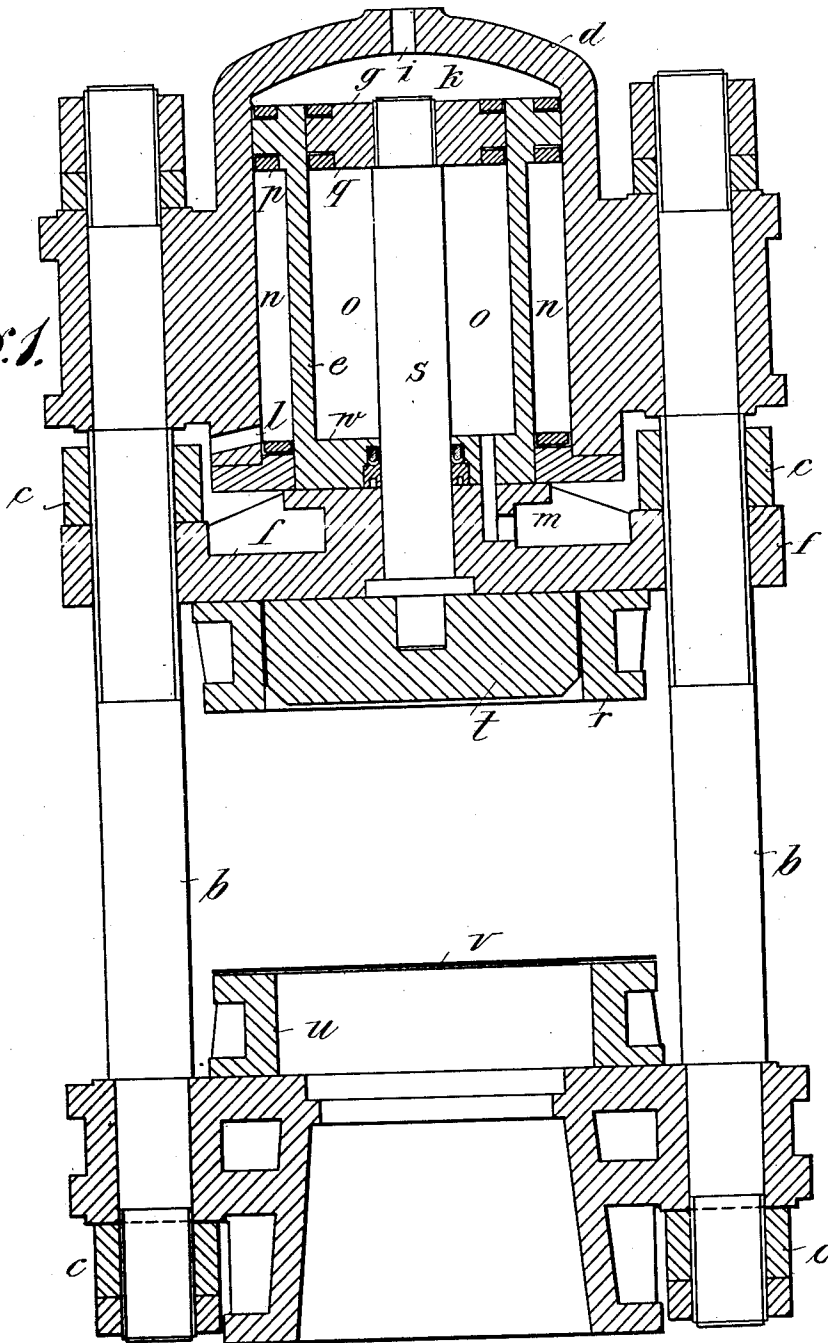
PATENTED FEB. 4, 1908.

I. LICHTIG.
PRESS.

APPLICATION FILED JULY 8, 1905.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
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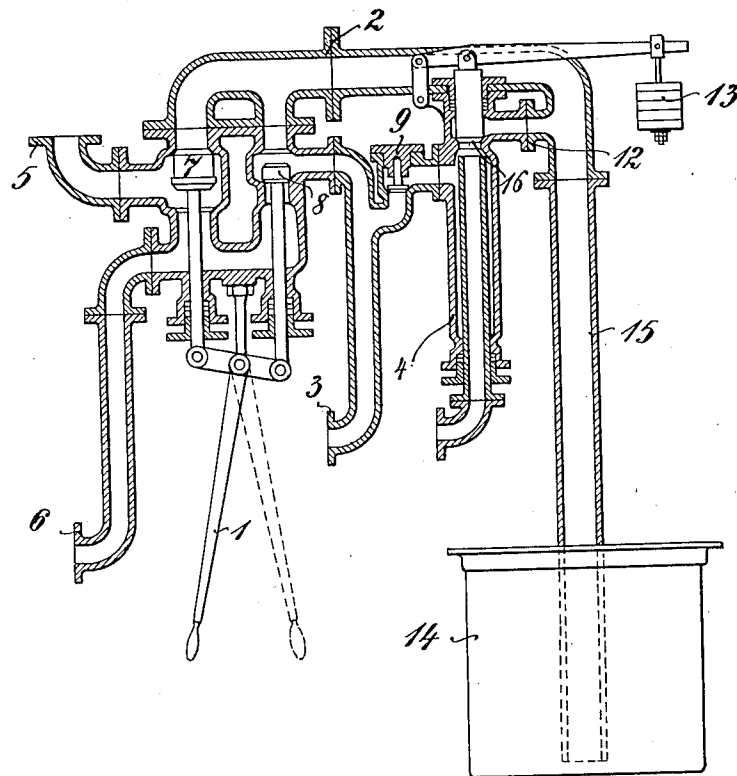
PATENTED FEB. 4, 1908.

I. LICHTIG.
PRESS.

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2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

IVOR LICHTIG, OF BONN-SUD, GERMANY, ASSIGNOR TO BONNER MASCHINENFABRIK & EISENGIESSEREI FR. MÖNKEMÖLLER & CIE., OF BONN, GERMANY.

PRESS.

No. 878,293.

Specification of Letters Patent.

Patented Feb. 4, 1908.

Application filed July 8, 1905. Serial No. 263,814.

To all whom it may concern:

Be it known that I, IVOR LICHTIG, a subject of the King of Prussia, residing at Bonn-Süd, in the Kingdom of Prussia and German Empire, have invented a new and useful Improvement in Hydraulic Presses, of which the following is a specification.

The present invention relates to improvements in hydraulic presses in which two pistons are arranged one within the other in a cylinder or casing common to both, the inner piston, which carries the die, being constructed in disk form and sliding in the outer annular piston, which carries the sheet metal holder. In such presses the piston rod connected with the inner piston passes through the outer piston.

In the accompanying drawing illustrating the invention: Figure 1 shows an hydraulic press in section and Fig. 2 is a diagrammatic view of the piping.

The cylinder *d* is supported by the columns *b* secured by the nuts *c*, said columns serving at the same time as guides for the table *f* secured to the piston *e*. Said piston *e*, which moves in the cylinder *d* is constructed as cylinder for the inner or disk piston *g*. Both pistons *g* and *e* are provided with return surfaces, that *p* of the piston *e* being larger than that *q* of the piston *g*.

The water under pressure passes first to the valves (Fig. 2), whose control lever 1, before commencing to work, is in the dotted position (Fig. 2) in which the water supplied by the pump or the like through the pipe 6, flows through the valves 8 and 9, and safety valve 16 into the reservoir 14 without doing any work and without exercising any considerable back pressure on the pump piston, while the chamber *k* (Fig. 1) over the two pistons *g* and *e* is connected with the reservoir 14 (Fig. 2) through the channel *i* (Fig. 1) and pipes 5, 2 and 15 (Fig. 2). The chambers *n* and *o* (Fig. 1) being also connected with the reservoir 14 through the channels *l* and *m* (Fig. 1) and the pipes 3 and 4 respectively (Fig. 2), the water in said chambers will flow into the reservoir 14 under the pressure due to the weight of the two pistons *g* and *e* which fall by reason of their own weight, when the valve 16 is sufficiently relieved which is done at the beginning of the operation by lifting weight 13; while, on the other hand, water will be sucked out of the reservoir 14 through the channels 15 and 2 (Fig.

2) into the chamber *k* by the pistons, until the sheet metal holder ring *r* and the die *t* on the piston rod *s* arrive on the sheet of metal *v* placed on the matrix *u*. At that moment the lever 1 is turned into the full line position (Fig. 2) and thus valves 7 and 8 (Fig. 2) so moved that the connection of the reservoir 14 with the chamber *k* through the pipes 15, and 2, valve 7 and pipe 5 is cut off. Water under pressure then passes from the pump through the pipes 6 and 5 (Fig. 2) and inlet opening *i* (Fig. 1) into the chamber *k* and acts on the top surface of both pistons. The die *t* connected with the piston *g* then presses the sheet metal *v* into the matrix *u*, while the piston *e* exercises the pressure necessary to hold the sheet metal. If the pressure acting on the piston *e* in the chamber *k* does not suffice to hold the metal sheet, the water in the chamber *o* must not be let off freely, but under pressure by suitably adjusting the safety or regulating valve 13, 16 (Fig. 2). This pressure then acts on the surface *w* of the piston *e*, by which means the pressure for holding the metal sheet is increased.

When the pressing process is completed the lever 1 is brought into the dotted position, the channel *i* thus connected with the reservoir 14 through the pipe 5, and the water under pressure conducted through the channels *l* and *m* and pipes 3 and 4 into the chambers *n* and *o*, by which means both pistons are raised and the water above said pistons pressed back into the reservoir.

9 is a clack valve.

Instead of water, air, gas or such like may be used.

What I claim and desire to secure by Letters Patent of the United States is:

In an hydraulic press, the combination with a closed-top cylinder, an open-top closed-bottom hollow piston in said cylinder, and a solid piston within said hollow piston, said cylinder having a port *i* communicating with the space above both pistons and a port *l* communicating with the space beneath the hollow piston, and said hollow piston having a port *m* in communication with the space beneath the solid piston; of a pipe conducting fluid under pressure to port *i*, a reservoir, a by-pass in said pipe having a branch 15 communicating with said reservoir, a branch 3 leading from said by-pass in advance of branch 15 to port *l*, a branch 4 between said other branches leading to port *m*, a relief

valve in the by-pass between branches 4 and 15, a forward-opening check valve in the by-pass between branches 3 and 4, branch 3 having an outlet in advance of said check valve, 5 a valve 7 adapted in one position to close the pipe and cause the fluid to enter the by-pass, a valve 8 adapted when valve 7 is open to close the by-pass in advance of the branches leaving the outlet to branch 3 open, and,

when valve 7 is closed, to open the by-pass 10 and close said outlet, and operating means for valves 7 and 8.

In testimony whereof I have hereunto set my hand in the presence of two witnesses.
IVOR LICHTIG.

Witnesses:

WILLIAM THUEPPER,
JOH. SCHWLEZ.