

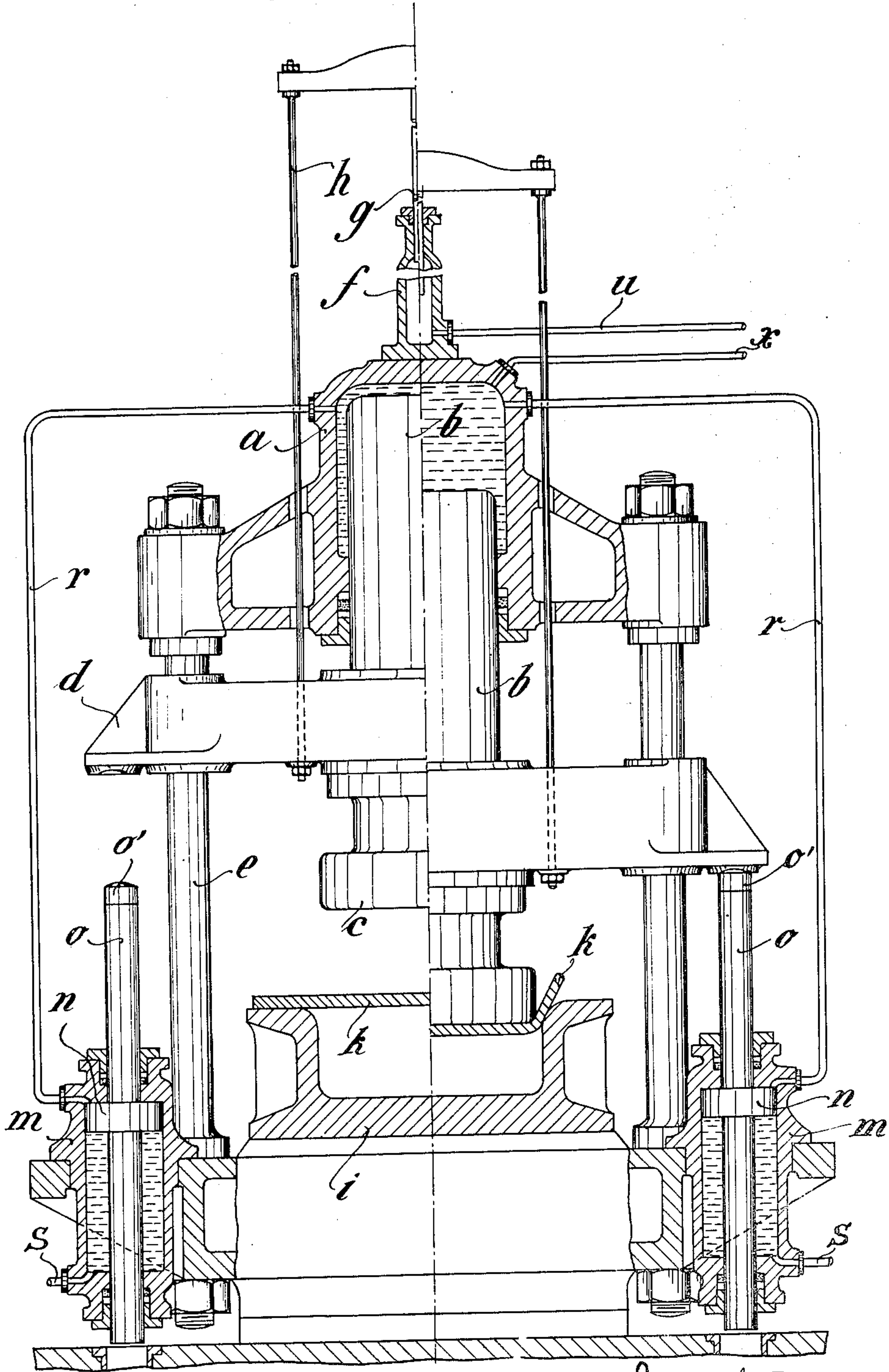
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W. ASTFALCK.

DRAWBACK MECHANISM FOR PRESSES.

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UNITED STATES PATENT OFFICE.

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DRAWBACK MECHANISM FOR PRESSES.

No. 897,048.

Specification of Letters Patent.

Patented Aug. 25, 1908.

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To all whom it may concern:

Be it known that I, WILAND ASTFALCK, engineer, a subject of the German Emperor, and resident of No. 21 Schlossstrasse, Tegel, near Berlin, Germany, have invented certain new and useful Improvements in Drawback Mechanism for Presses, of which the following is a specification.

In hydraulic presses which act solely on external surfaces of the work, the mechanism for withdrawing the hammer has only to overcome the inertia and weight of the moving parts, and the weight may in part be balanced. It is different in the case of hydraulic presses which are, for example, used for punching, perforating, drawing and the like, since in such presses the tool or upper die becomes more or less jammed in the work, and the work in the matrix or lower die, so that for withdrawing it force is required to overcome the frictional resistance. If a withdrawing device is used capable of overcoming not only the weight and inertia of the moving parts, but also the resistance due to the jamming of the tool and work, the device is unwieldy and requires an unnecessary expenditure of force for its actuation after the tool has been removed from the work. For efficient and economical working it is therefore necessary to provide separate means for overcoming, with the least possible expenditure of force, the entirely independent resistances encountered. The present invention effects this by providing that during the penetration of the tool into or through the work, an auxiliary piston or pistons, independent from the withdrawing mechanism which overcomes the weight and inertia of the moving parts, is or are automatically brought into working position, so that when the main hydraulic cylinder is placed in communication with the discharge conduit, the auxiliary piston or pistons is or are hydraulically actuated for separating the tool from the work.

The stroke of the auxiliary piston or pistons is only of such amplitude as to effect or assist in effecting, the separation of the tool from the work; after this separation the ordinary withdrawing mechanism acts on the tool and main press-piston alone.

The annexed drawing illustrates by way of example a vertical, downwardly acting press provided with the auxiliary withdrawing mechanism. The press is shown partly in

section and partly in elevation, with the press-piston in two different positions.

a is the main press-cylinder, *b* the press-piston and *c* the upper die, the parts *b* and *c* being guided by means of the cross-head *d* and pillars *e*. The ordinary withdrawing mechanism consists of the hydraulic cylinder *f* and piston *g*, the latter being connected to the cross-head *d* by rods *h*.

i is the lower die or matrix and *k* the work.

At the sides of the press are arranged auxiliary cylinders *m* containing pistons *n* the rods *o* of which extend so far upwards that the cross-head *d* comes into contact therewith as soon as the die *c* begins to penetrate into the matrix with the work. The space above the piston in each cylinder *m* communicates by a pipe *r* with the main cylinder *a*, and the space below the piston communicates by a pipe *s* with a high-pressure accumulator or main.

The action of the press is as follows: It will be assumed that a dish or pot is to be made out of the plate *k* placed on the matrix *i*. The pipe *u* communicating with the cylinder *f* is placed in communication with a discharge conduit and the pipe *x* is placed in communication with an accumulator or a low-pressure pipe. Any suitable known mechanism may be used for controlling the respective valves in the manner required. When the said connections have been made the parts *b*, *d* and *c* descend, as shown at the right hand side of the drawing, and the cross-head abuts against the piston rods *o* either at the moment at which the die *c* begins to swage the plate *k*, or at a slightly later stage, as required. The position at which this abutment takes place depends on the height of the matrix and the nature of the work, so that rods *o* may in some cases be too short or too long. The said rods are, therefore, preferably provided with exchangeable end-pieces *o'* of varying lengths. The press-cylinder having become filled to the extent corresponding to this position, the pipe *x* is placed in communication with the high-pressure conduit, so that water under high pressure enters the cylinder *a* and forces the die *c* into the matrix. Water under high pressure then flows from the cylinder *a* into the cylinders *m* and acts on the pistons *n* from above, so that the one-sided pressure on the said pistons from below is neutralized and the pistons can be easily moved to their lower posi-

tions. The length of the downward movement of the pistons *n* is equal to or smaller than the effective working stroke of the main piston *b*. When the swaging operation is completed the pipe *u* is connected to the high-pressure pipe, and the pipe *x* to the discharge-pipe. The water above the pistons *n* is thus discharged and the said pistons are lifted by the water acting on their under-surfaces. The die *c* is thus lifted back to the position shown at the right-hand side of the drawing, whereupon the pistons *n* cease to act, having completed their upward strokes. The continued upward movement of the die is produced by means of the piston *g* alone; if desired the arrangement may be so made that the piston *g* does not begin to act until the pistons *n* have completed their upward strokes. The lifting mechanism *f, g* may be single or double, as desired.

The opposite surfaces of the pistons *n* need not necessarily be of equal area, as in the case illustrated, but may be of different areas if desired.

The construction of the press itself and the location of the auxiliary mechanism *m n o* are immaterial to the invention.

What I claim as my invention and desire to secure by United States Letters Patent is:—

1. In a hydraulic press, the combination with the press cylinder, and the press piston, of a pair of independent drawback mechanisms for the press piston; one of said mechanisms being adapted to act on the piston during the first part of the return stroke of the piston and the other mechanism being adapted to act on the piston during the remainder of the return stroke of the piston.

2. In a hydraulic press, the combination with the press cylinder and the press piston, of a pair of independent drawback mechanisms for the press piston; one of said mechanisms being adapted to act on the piston during the entire return stroke of the piston and the other mechanism being adapted to act on the piston during the first part only of the return stroke of the piston.

3. In a hydraulic press, the combination with the press cylinder, the press piston and the tool connected to the press piston, of a pair of independent drawback mechanisms for the press piston, co-acting during a part

of the return stroke of the press piston to withdraw the tool from the work.

4. In a hydraulic press, the combination with the press cylinder, the press piston and the tool connected to the press piston, of a drawback mechanism for the press piston, an auxiliary drawback mechanism for the press piston, means whereby said auxiliary mechanism is subjected to constant pressure in the direction of the return stroke of the press piston, and means whereby the auxiliary mechanism is subjected to a greater pressure in the opposite direction during the working stroke of the press-piston to cause the auxiliary mechanism to move into its effective position, whereby, when the last-named pressure is relieved, the pressure acting on the auxiliary mechanism in the direction of the return stroke of the press piston causes the auxiliary mechanism to withdraw the tool from the work.

5. In a hydraulic press, the combination with the press cylinder, the press piston having a cross-head and the tool carried by the press piston, of a drawback mechanism for the press piston, an auxiliary drawback mechanism for the press piston comprising a cylinder, a piston operating in said cylinder and having a piston rod projecting outside of the cylinder and adapted for engagement with the cross-head of the press-piston, a high pressure conduit in continuous communication with the lower end of the auxiliary cylinder to hold the auxiliary piston in its uppermost position, and a conduit providing communication between the press cylinder and the upper part of the auxiliary cylinder to cause the high pressure in the press cylinder to move the auxiliary piston and its piston rod into their lowermost position during the working stroke of the press piston, whereby, when the high pressure in the press cylinder is relieved the pressure acting on the under side of the auxiliary piston causes the auxiliary piston and its piston rod to move upwardly to withdraw the tool from the work.

The foregoing specification signed at Berlin this 17th day of December, 1907.

WILAND ASTFALCK.

In presence of—

WOLDEMAR HAUPT,
HENRY HASPER.