

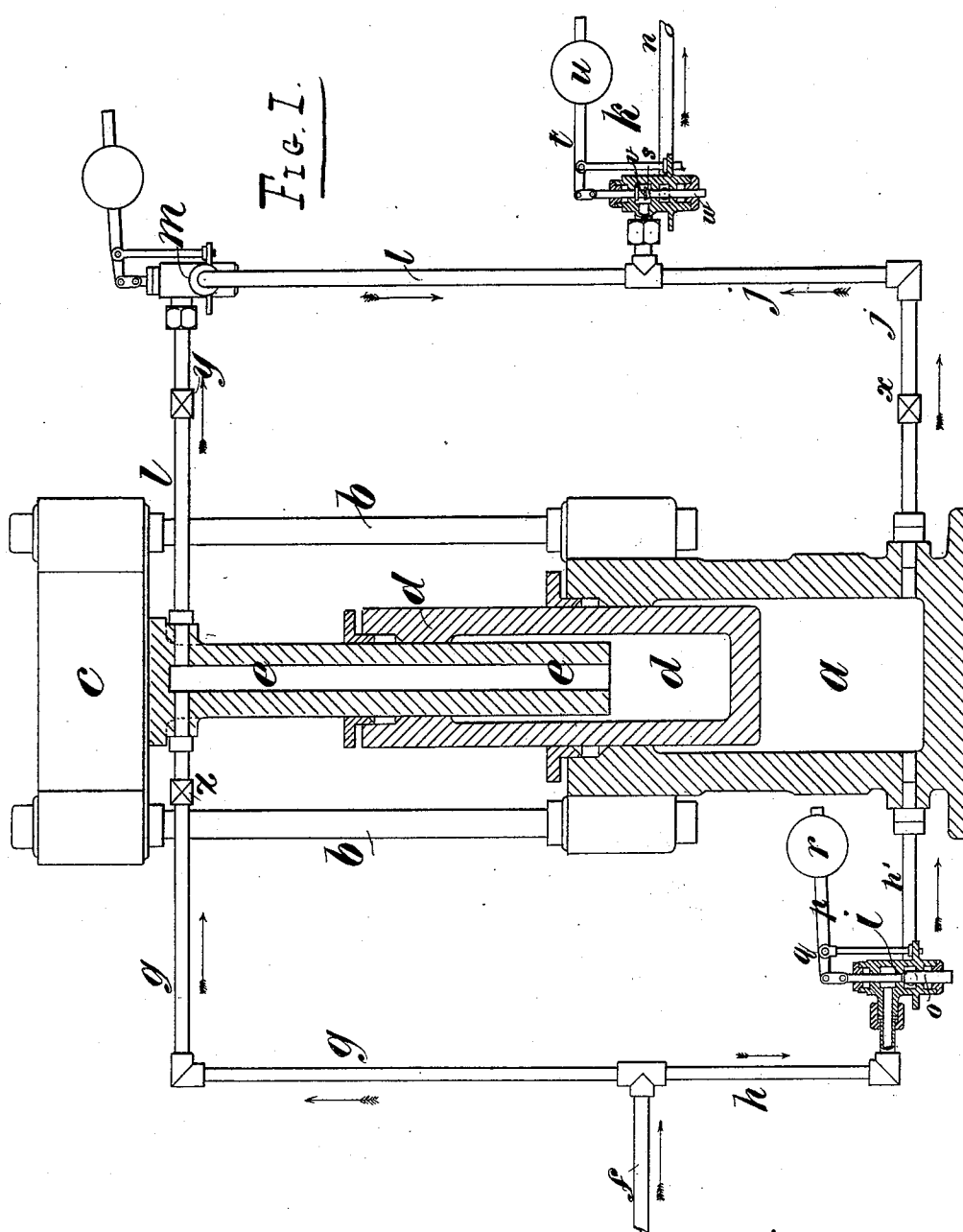
(No Model.)

2 Sheets—Sheet 1.

E. L. BELLHOUSE.
APPARATUS FOR HYDRAULIC PACKING PRESSES.

No. 406,193.

Patented July 2, 1889.



Witnesses
E. J. Griswold.
Geo. A. Crane.

INVENTOR
E. L. Bellhouse.
By his Attorneys
Howson and Howson

(No Model.)

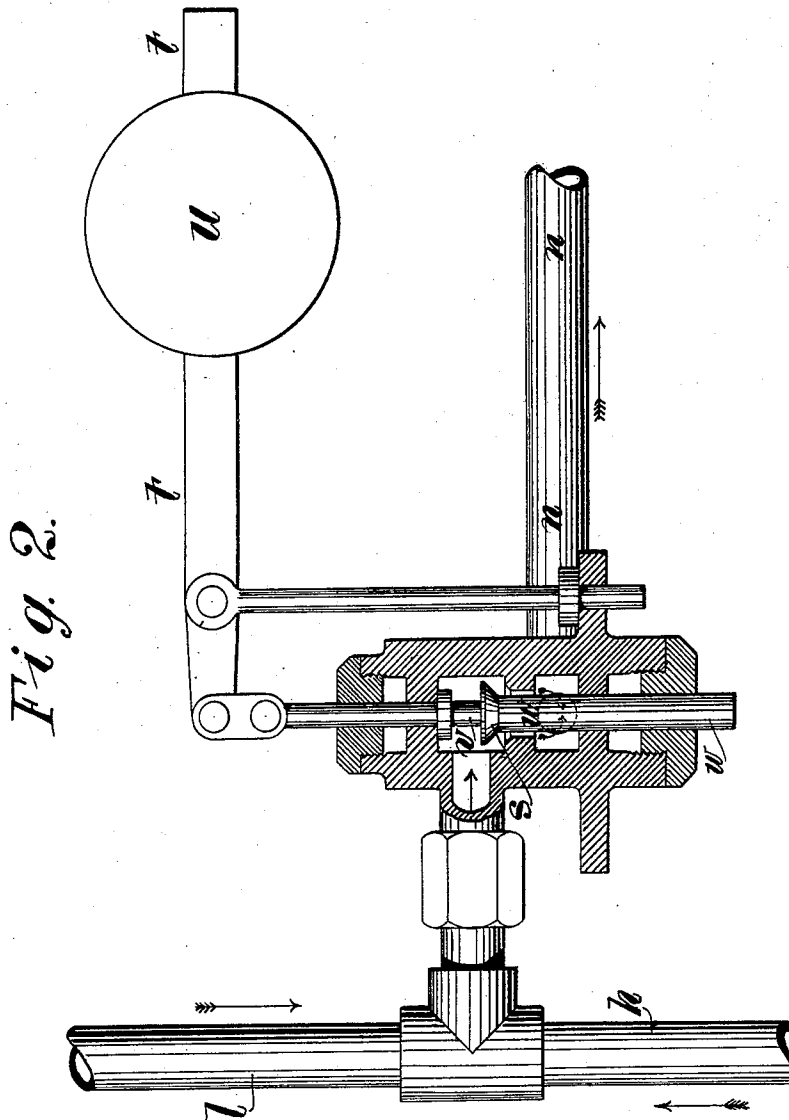
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E. J. Griswold
John Revell

INVENTOR.

Edward L. Bellhouse.

By his Atty. Horner and Horner

UNITED STATES PATENT OFFICE.

EDWARD LAFONE BELLHOUSE, OF MANCHESTER, COUNTY OF LANCASTER,
ENGLAND.

APPARATUS FOR HYDRAULIC PACKING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 406,193, dated July 2, 1889.

Application filed May 29, 1888. Serial No. 275,512. (No model.) Patented in England April 25, 1888, No. 6,118.

To all whom it may concern:

Be it known that I, EDWARD LAFONE BELLHOUSE, a subject of the Queen of Great Britain and Ireland, of the firm of E. T. Bellhouse & Company, of Hunt Street, Manchester, county of Lancaster, England, engineers, have invented certain Improvements in Apparatus Applicable to Hydraulic Packing-Presses, (for which I have obtained British Patent No. 6,118 of April 25, 1888,) of which the following is a specification.

My said invention relates to apparatus whereby I am enabled to progressively increase the pressure in hydraulic packing-presses automatically without increasing the forcing-power of the pumps or accumulator. In hydraulic presses used for packing cotton, fodder, and other compressible goods and materials the first pressure required, during which the "slack" of the bale is being taken up, is comparatively slight; but as the bale is compressed the pressure requisite is in a rapidly-increasing ratio. To effect automatically a rapid taking up of the slack and to obtain the requisite increase of pressure toward the end of the stroke without an increase of the forcing-power is the object of my invention.

In the accompanying drawings, Figure 1 is a sectional view of my improved apparatus; Fig. 2, an enlarged view of one of the valves.

The hollow cylinder *a* is bolted to a suitable foundation, and is connected by stays *b* to a thrust-block *c*. A hollow trunk-piston *d* slides in the cylinder *a*, and upon a fixed cylinder *e*, which is bolted to the thrust-block *c*. The cylinder *e* is hollow in the center, as shown, so as to allow of the passage of liquid. The pipe *f* leads the fluid-pressure from the force-pumps or accumulator toward the apparatus. A branch *g* leads into the interior of the fixed cylinder *e*, and another branch *h* leads to a self-acting valve *i*, and thence by the continuation *h'* to the foot of the hollow cylinder *a*. Another pipe *j* leads from the foot of the cylinder *a* to an automatic pressure-regulating valve *k*, and similarly a pipe *l* leads from the top of the fixed cylinder through the self-acting valve *m*, also to the valve *k*. From the valve *k* a pipe *n* extends to the press.

The valves *i* and *m*, which are exactly simi-

lar, are constructed as follows: Referring to the valve *i* which is shown in section, a seated valve *o* is held up against its seat and in its place by a weighted lever *p*, pivoted at *q*. By shifting the weight *r* nearer to or farther from the pivot *q* the valve is held on its seat with a greater or less pressure. The valve *i* is loaded to a greater extent than the valve *m*. The shell of the self-acting pressure-reducing valve *k* is in the example similar to that of the valves *i* and *m*; but the valve is so arranged as to close when a fixed maximum of pressure in the press has been reached. In the example the valve *s* is upheld from its seat by a weighted lever *t*. By adjusting the weight *u* on the lever *t* the pressure is fixed at which the valve will close. The area of the part *v* is slightly less than the area of the part *w*. When the pressure-fluid passes through the valve, the fluid gets between the shoulder on the stem *v* and the casing. The shoulder has the same pressure above as below, so that it is in equilibrium, and the working of the valve depends upon the difference in areas of the parts *v* and *w* of the stem. This valve, like the others, is thus self-acting, and when the pressure is sufficient to push down the valve against the resistance of the weight *u* the valve is closed. When the press is put to work, the pressure from the force-pumps or accumulator flows first through the pipe *g* into the hollow fixed cylinder *e* and thence into the sliding trunk *d*, which now descends, forcing the water in the cylinder *a* through the pipe *j*, check-valve *x*, and controlling-valve *k* into the pipe *n*, whereby it is led to the press. The resistance to the descent of the trunk *d* increases as the bale is compressed until the pressure in the cylinder *e* and pipe *l* reaches such a pitch that it opens the valve *m* against the resistance of the weight *r*, and allows the pressure to flow through the pipe *l* and controlling-valve *k* to the press, which is now worked at a slower rate by the direct pump or accumulator pressure. The pressure in the pipes continues to rise until the more heavily-loaded valve *i* is in its turn opened by the increased pressure, which then flows into the lower part of the cylinder *a*. The trunk *d* now rises, and the water con-

tained therein is forced through the pipe *l*, check-valve *y*, and valve *m* to the press, the check-valve *z* preventing return through the pipe *g*. This concluding pressure is carried
5 on until the operation is finished, or until the desired maximum of pressure is attained, when the valve *k* becomes closed.

The ram of the press is thus subject to three different and progressive degrees of pressure:
10 First, the pressure due to the descent of the trunk *d* in the ram *a*, in which the pump or accumulator pressure acts through a small area upon a larger area; second, the direct pump or accumulator pressure, and, third, the
15 pressure due to the ascent of the trunk *d* in the cylinder *a*, in which the pump or accumulator pressure acts through a larger area upon a small area. I thus obtain three progressive degrees of pressure from the same initial forcing-pump or accumulator power.
20

I claim as my invention—

1. The combination of a large and a small cylinder, an intermediate hollow piston sliding in the large cylinder and on the small cylinder, with a supply-pipe having two branches,
25 one valved and communicating with the large cylinder and the other communicating with the small cylinder, two other branches leading to a hydraulic press, one branch being
30 valved and leading from the small cylinder and the other leading from the large cylinder, and suitable check-valves, all substantially as described.

2. The combination of a large and small

cylinder, an intermediate hollow piston sliding in the large cylinder and on the small cylinder, with a supply-pipe having two branches,
35 one communicating with the large cylinder and the other with the small cylinder, and an automatic valve on the latter branch, two
40 other branches leading to a hydraulic press, one branch leading from the small cylinder and the other from the large cylinder, suitable check-valves, and an automatic valve on
45 the branch leading from the small cylinder loaded to a greater extent than the valve on the branch leading to the large cylinder, all substantially as described.

3. The combination of a small and large cylinder, an intermediate hollow piston sliding in the large cylinder and on the small cylinder, with a supply-pipe having two branches,
50 one valved and communicating with the large cylinder and the other communicating with the small cylinder, two other branches leading to a hydraulic press, and one being valved
55 and leading from the small cylinder and the other leading from the large cylinder, suitable check-valves, and a regulating-valve on the piping leading to the press, all substantially as set forth.
60

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

E. LAFONE BELLHOUSE.

Witnesses:

DAVID FULTON,
FREDK. DILLON.