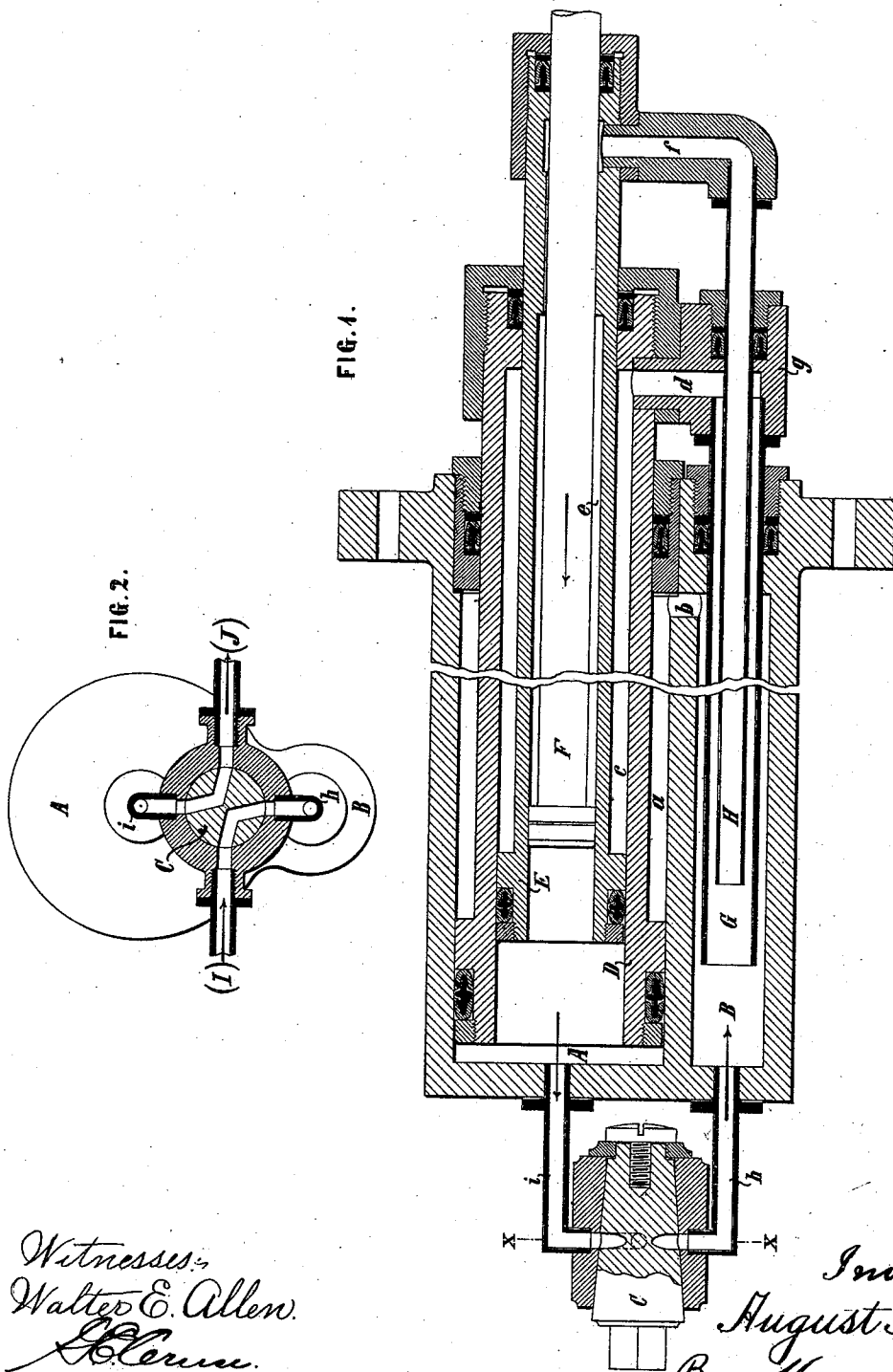


(No Model.)

A. KAMPF.
HYDRAULIC PRESS, &c.

No. 501,426.

Patented July 11, 1893.



Witnesses:
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UNITED STATES PATENT OFFICE.

AUGUST KAMPF, OF MAGDEBURG, GERMANY, ASSIGNOR TO THE GRUSON-
WERK, OF SAME PLACE.

HYDRAULIC PRESS, &c.

SPECIFICATION forming part of Letters Patent No. 501,426, dated July 11, 1893.

Application filed October 5, 1892. Serial No. 447,877. (No model.) Patented in England January 6, 1891, No. 9,640; in Germany March 26, 1891, No. 59,298, and in Italy June 30, 1891, LVIII, 406.

To all whom it may concern:

Be it known that I, AUGUST KAMPF, a subject of the King of Prussia, and a resident of Magdeburg, in the Kingdom of Prussia, Empire of Germany, have invented new and useful Improvements in and Relating to Hydraulic Presses having Telescopic Pistons, (for which I have obtained Letters Patent in Germany, No. 59,298, dated March 26, 1891; in Great Britain, No. 9,640, dated January 6, 1891, and in Italy, Registro Attestate, Vol. LVIII, No. 406, dated June 30, 1891,) of which the following is a specification.

This invention relates to apparatus for effecting the return movement of a telescopic piston in a hydraulic press, after the outward stroke has been completed, by the fluid under pressure. In presses having a single or simple piston, the return movement can be provided for, as is well known, by making the piston not in the form of a plunger, but as a double-acting piston, and conducting the fluid under pressure (after the completion of the outward stroke and after the opening of the exhaust valve of the cylinder) into the annular space in front of the said piston. The problem becomes more difficult if, by reason of local conditions, it is necessary to employ a telescopic piston. The present invention solves this problem by the construction of the several parts or sections of the telescopic piston as double-acting pistons, and the provision of suitable means whereby the annular spaces in front of the several sections may be connected by a common pipe with the force-pumps, the accumulator or the pressure-main on the one hand, and with the exhaust reservoir or main on the other hand.

In the drawings is represented a press having a telescopic piston formed of three parts or sections, and constructed according to this invention.

Figure 1 is a central longitudinal section of the said press and Fig. 2 is a transverse section on the line x, x , Fig. 1.

To the press-cylinder A which is made in one piece with a second smaller or auxiliary cylinder B arranged parallel therewith, the fluid under pressure is conducted through a

fourway cock C or other suitable distributing device. In the said press-cylinder A slides a piston D which is bored out cylindrically; in the bore of the piston D slides a second smaller piston E which is also bored out cylindrically, and in this piston slides a still smaller piston F which may be solid if the telescopic piston is formed of only three parts or sections. The annular space a in front of the piston D communicates, through a channel b at the front end of the press-cylinder A with the auxiliary cylinder B. The annular space c in front of the second piston E also communicates with the cylinder B, through a channel d in the wall of the largest piston D at the front end of the same, and through a suitable pipe G. The pipe G extends into the auxiliary cylinder B, through a stuffing gland, and is firmly connected with the piston D so that it must participate in the movement of the latter. In like manner, the annular space e in front of the smallest piston F is in communication with the cylinder B through a channel f and through a pipe H, which extends through a stuffing gland in the head g of the pipe G. The press cylinder A, moreover, communicates with one of the four ways of the cock C through a pipe i . The transverse section of the annular space c is somewhat larger than the transverse section of the pipe G, and the transverse section of the space e is somewhat larger than the transverse section of the pipe H. The capacity of the fluid space in the cylinder B will be greatest and therefore in the annular spaces a, c, e smallest when the telescopic piston is completely extended, and smallest in the cylinder B and greatest in the spaces a, c, e , when the said telescopic piston is completely pushed in or contracted. The difference between the greatest and smallest capacity is kept slight in order to save as much water under pressure as practicable for effecting the return movement of the piston. The cylinder B communicates with the four way cock C by a pipe h , and the press cylinder A communicates with the said cock by a pipe z .

I, J, Fig. 2, are the supply and exhaust pipes respectively leading to and from the cock C.

- When the extended piston is to be moved back, the cock C is adjusted to place the press-cylinder A in communication with the exhaust-pipe J, and the cylinder B with the supply-pipe I.
- 5 The fluid under pressure then enters the cylinder B and pushes together or closes the telescopic piston and consequently the pipes G and H. When the plug of the cock C is turned so that the cylinder A again receives fluid under
- 10 pressure, and the cylinder B is connected with the exhaust, the pistons D, E and F are moved outward, the piston D carrying with it the pipe G and the piston E carrying with it the pipe H. The annular spaces *a*, *c* and *e*
- 15 thus become gradually contracted, and the liquid contained in them escapes through the channels into the increasing space in the cylinder B while only a small portion of the same flows to the exhaust through the pipe *h*.
- 20 Having now particularly described my invention, what I claim is—
1. A hydraulic press having a telescopic piston and an auxiliary cylinder, and telescopic pipes making communication between
- 25 the annular spaces in front of the respective parts of the telescopic piston and the said auxiliary cylinder, substantially as and for the purpose set forth.
2. The combination of a pressure cylinder
- 30 and an auxiliary cylinder, a double-acting telescopic piston working in said pressure cylinder, sliding pipes working in said auxiliary cylinder, and having permanent communication respectively with the spaces in

front of the parts of the said telescopic piston, and means for supplying pressure to either cylinder at will, as and for the purpose set forth.

3. The combination of a pressure cylinder, a telescopic piston working in said pressure cylinder and consisting of the double-acting sections, an auxiliary cylinder, sliding pipes working in said auxiliary cylinder and permanently attached to the respective sections of the telescopic piston, and having communication with the spaces within the same, substantially as and for the purpose set forth.

4. The combination with the pressure cylinder, and the concentric telescopic piston sections each having a space in front of its rear end, and movable one within another; of the parallel auxiliary cylinder, having communication with the space in front of the outer section of the telescopic piston, concentric telescopic pipes working in the auxiliary cylinder and connected with the sections of the telescopic piston and establishing communication between the spaces in front of the sections and the auxiliary cylinder; and the four-way-cock having ducts communicating with the pressure supply and exhaust, all substantially as and for the purpose set forth.

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Witnesses:

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