Sheet 1-2 Sheets.

J. Hount,

Hydraulic Press,

Patented Aug. 21, 1841.

No. 2,221.

Fig. 1.

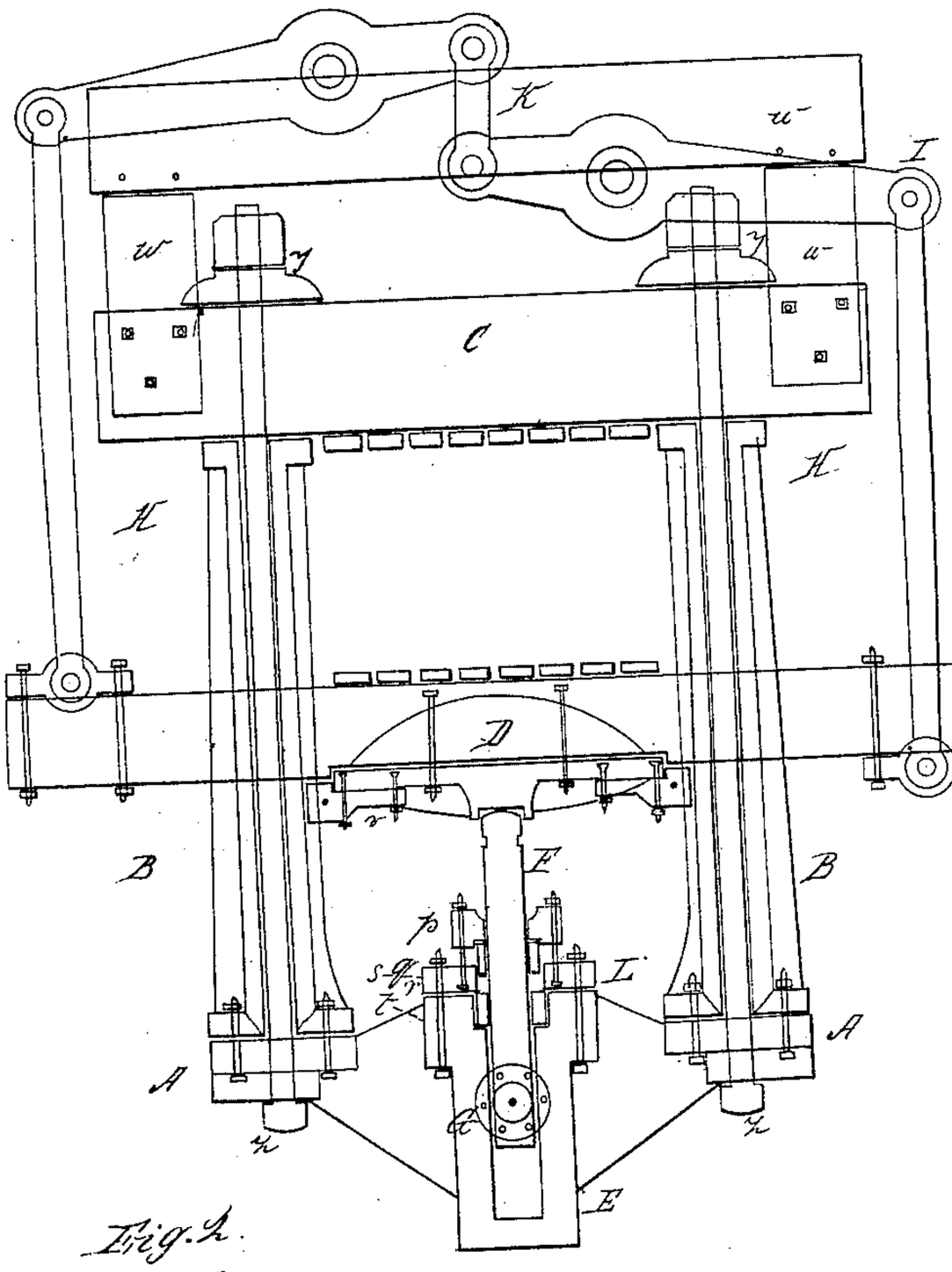


Fig. 2.

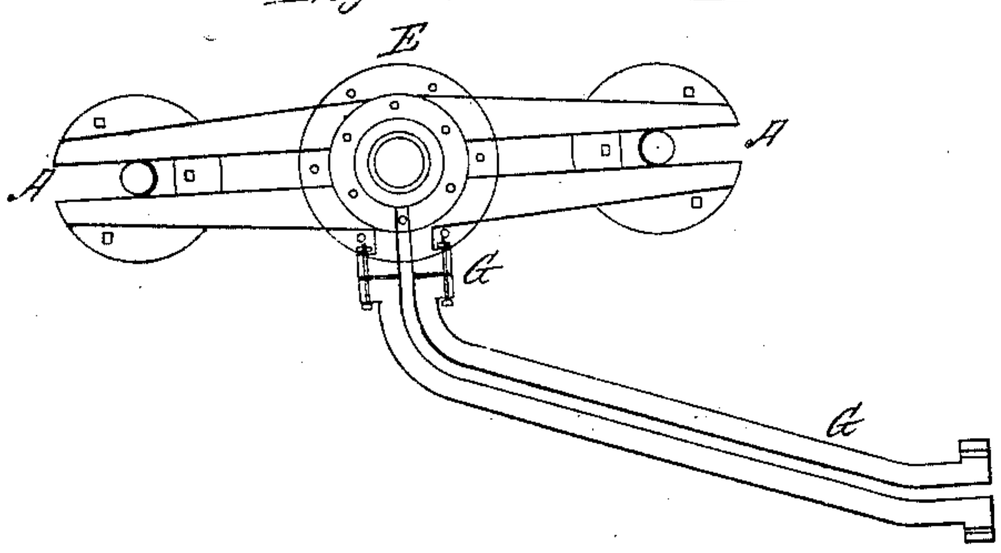
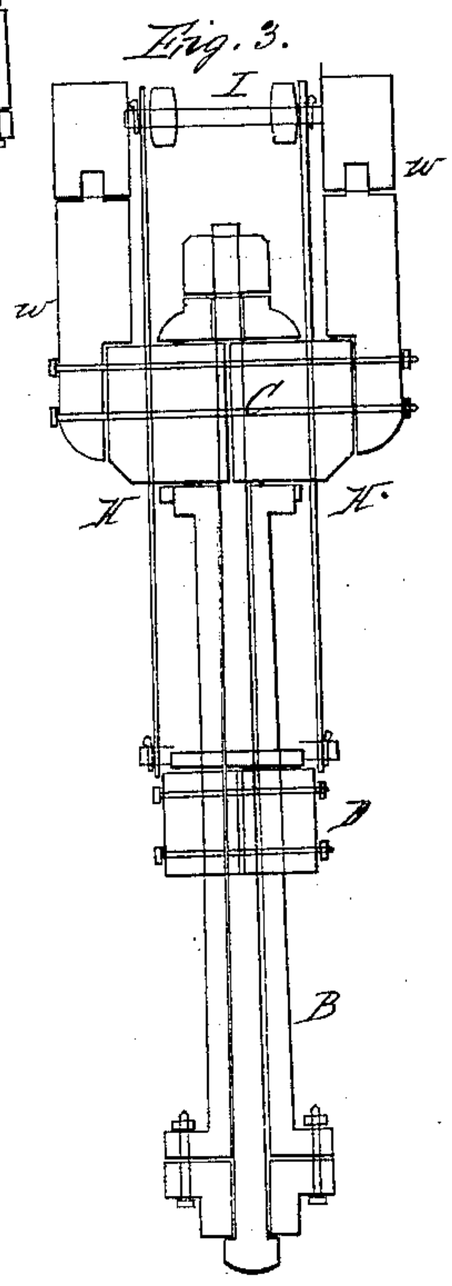


Fig. 3.



Sheet 2 - 2 Sheets.

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Fig. 4.

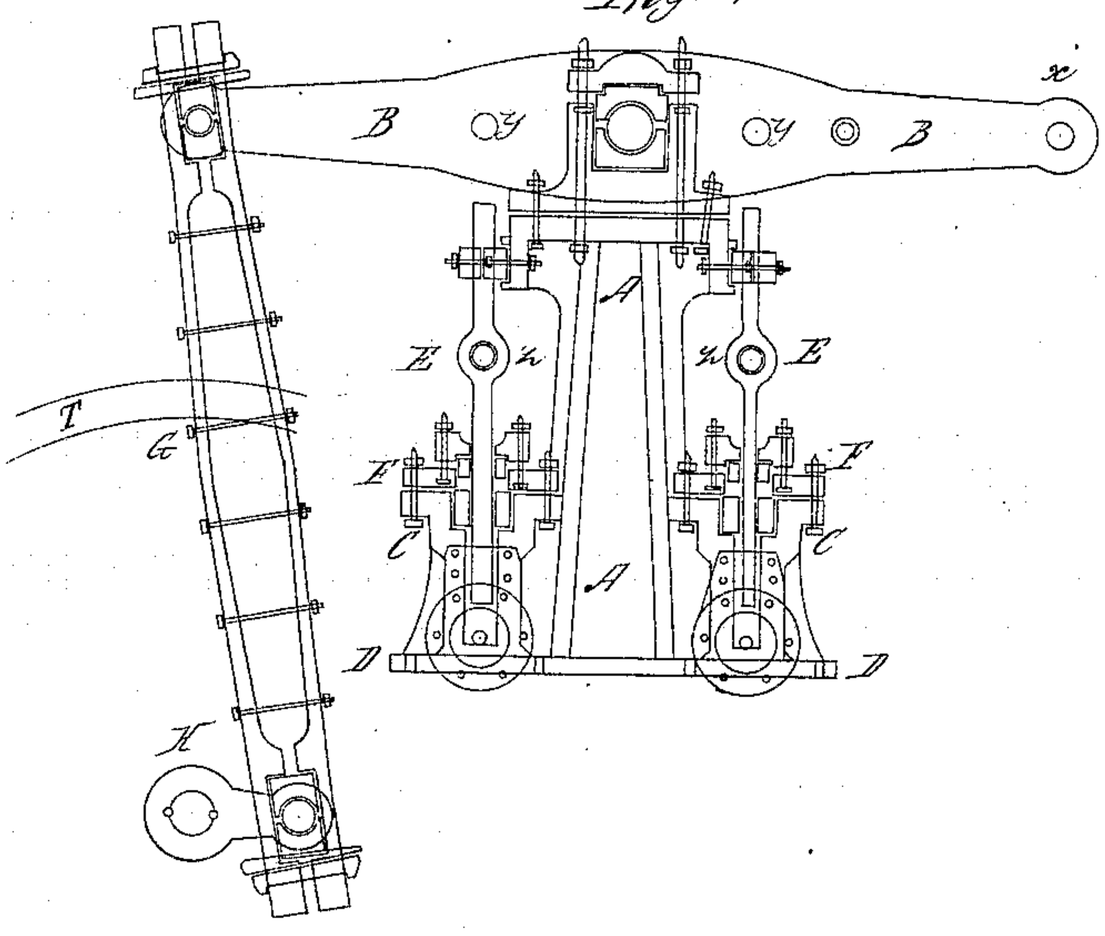


Fig. 6.

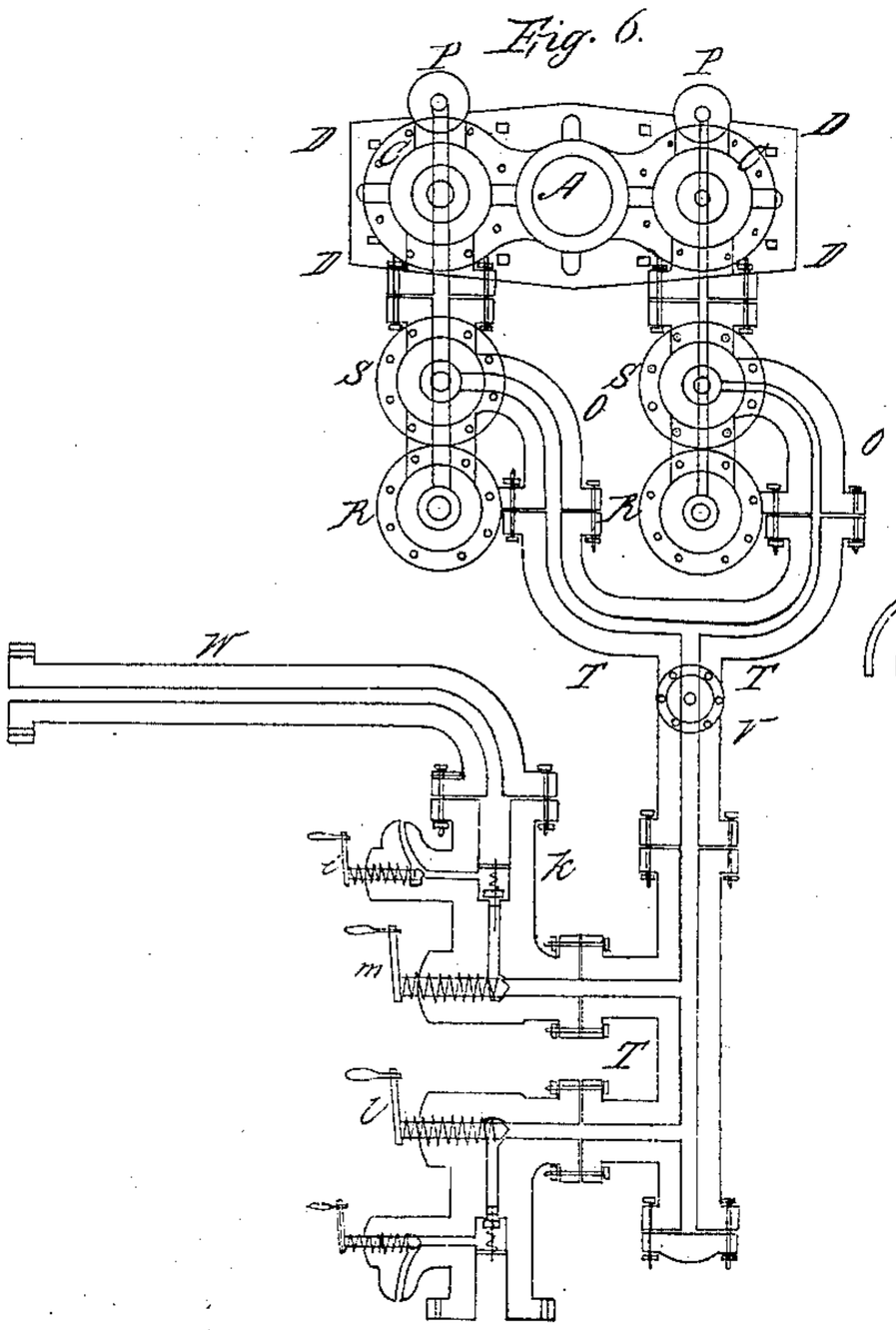
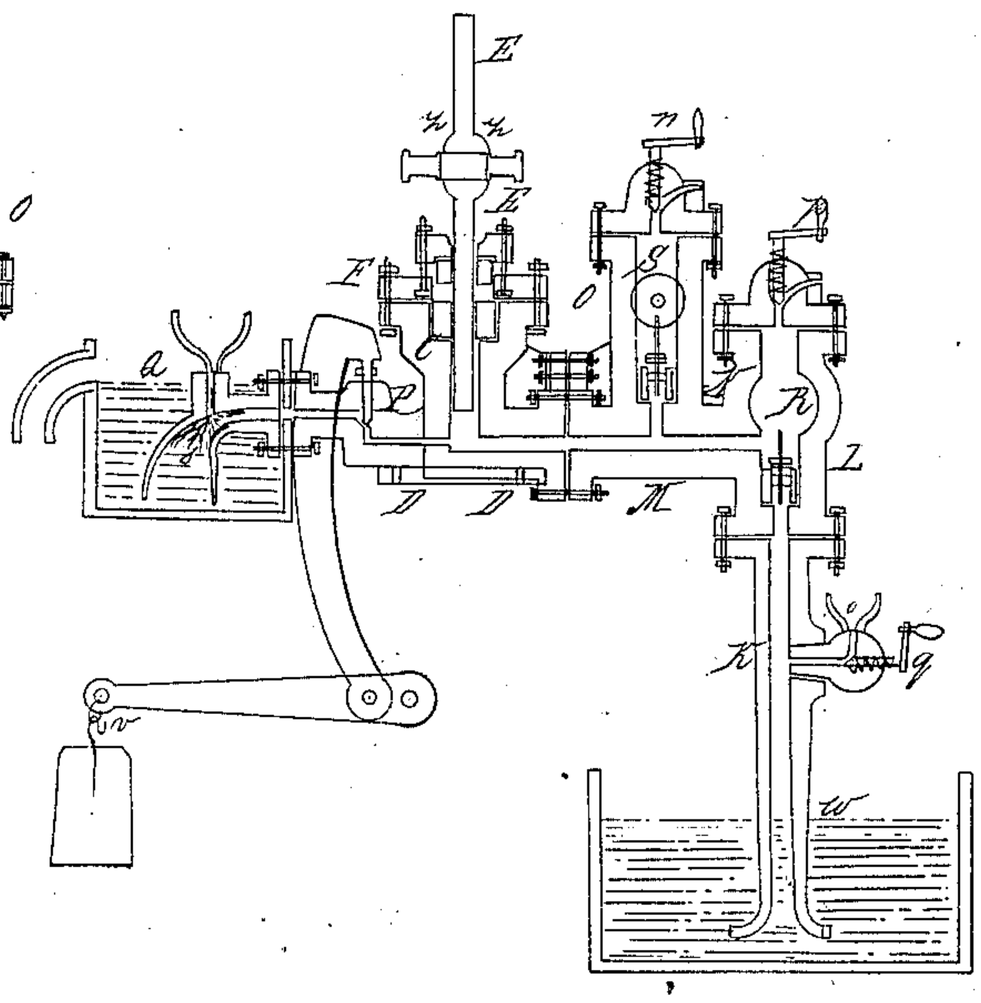


Fig. 5.



UNITED STATES PATENT OFFICE.

JOHN HOUPT, OF FORKLAND, ALABAMA.

IMPROVEMENT IN HYDROSTATIC OR HYDRAULIC PRESSES FOR PRESSING COTTON, &c.

Specification forming part of Letters Patent No. **2,221**, dated August 21, 1841.

To all whom it may concern:

Be it known that I, JOHN HOUPT, of Forkland, in the county of Greene and State of Alabama, have made certain Improvements in the Hydraulic Press or Apparatus for Pressing Cotton and other Substances Requiring great Power; and I do hereby declare that the following is a full and exact description thereof.

My first improvement consists in the formation of an air-chamber within the force-pump apparatus, which air-chamber is to operate as a regulator of the charge of water received into the force-pump, diminishing this charge as the pressure increases and the power required to force the water into the cylinder of the hydraulic press becomes greater.

My second improvement is in the manner of connecting the follower with the cap of the press, so as to cause said follower to rise vertically, and to preserve its parallelism with the cap or head of the press during its whole movement.

In the accompanying drawings, Figure 1 is a longitudinal vertical section of the press. Fig. 2 is a sectional ground plan of the press and the tube by which it is connected with the force-pump. Fig. 3 is a transverse elevation of the press, consisting, mainly, of a section through one of its side pillars or supports. Fig. 4 is a longitudinal elevation of the force-pumps, showing them in section and exhibiting the apparatus by which the water is forced into the cylinder of the hydraulic press. Fig. 5 is a transverse section of one of these pumps, and Fig. 6 a horizontal sectional ground plan exhibiting the passages through the respective tubes in that direction.

In Fig. 1, A A, which constitutes the lower part of the frame of the press, is a strong casting of iron, forming one piece with the cylinder E of the hydraulic press. B B are the two side pillars, usually made of cast-iron. These pillars are cast hollow to admit stout iron bolts to pass through them, the heads of which are seen at Z Z bearing against the bottom casting, and their upper ends passing through the head or cap timber C, which is secured to them by screw-nuts Y Y. D is the follower, upon which the bale or other article to be pressed is placed, and which is to be forced up by the piston or ram F of the hydraulic press. H H are guider-rods, of which there are four—two at each end of the press—as shown at H H in Fig. 3. At their lower ends they are connected by joint-pins or gudgeons to the follower D, and at their upper ends they are similarly connected to two lever-beams, as shown at I I. These two lever-beams are coupled together by a rod or link, K, and they have their fulcra in a stout frame of timber, W W, attached to and standing above the cap-timber C. Under the follower D there is a plate of cast-iron, against the center of which the plunger F of the hydraulic cylinder operates, and to this plate are attached brass or composition metal sliding pieces V V, adapted to slide on the inner sides of the pillars B B, and by means of these and of the guider-rods H H, connected to the lever-beams, as above described, the follower D will be made to rise without deviating from the horizontal position, notwithstanding any greater resistance it may meet with in one part than in another. G is the conducting-tube through which water is forced into the cylinder E. There is a stuffing-box at L, to prevent the escape of water around the plunger.

In Fig. 2, which is the sectional ground plan of the press, A A is the lower piece of the frame E, the cylinder cast with it, as shown and described in referring to Fig. 1. G G is the conducting-tube for the passage of water to the cylinder.

In the transverse section, Fig. 3, of this press the respective parts which are shown are designated by the same letters of reference as the corresponding parts in Figs. 1 and 2.

In the longitudinal section, Fig. 4, of the pumping apparatus two force-pumps are represented of different powers or capacities. In this figure A A is a pillar or column of cast-iron, supporting a lever-beam, B B. This beam is worked by means of a steam-engine, or otherwise. The connecting-rod G leads from it to the crank H on the shaft of the fly-wheel I I. C C are the pump-cylinders, which are cast onto the sides of the column A and rest on a common base, D D. The plungers E E of the force-pumps pass through stuffing-boxes F F in the usual manner, and these plungers are to be connected to the lever-beam by links and bolts at Z Z Y Y.

In Fig. 5, which is a transverse section of

one of these pumps, there are also exhibited the manner of connecting it with the supply-tubes, those for conveying the water to the hydraulic press, the pump-valves, safety-valves, the air-chamber, and other parts. Those marked C, D, E, and F are similarly designated in Fig. 4. K is the supply-pipe dipping into the cistern *w*. L is the lower valve on the upper end of the supply-pipe; M, a horizontal tube, forming a communication between the lower valve-chamber and the pump-cylinder. N is the upper valve, between the pipe M and the chamber S, into which the pipe O opens, through which the water is to be forced into the hydraulic cylinder. P is a safety-valve for the escape of water when the pressure is as great as ought to be admitted, which valve may be loaded by a weight, *v*, to any desired amount. Q is a cistern to receive the water which may escape through the safety-valve. Through the opening leading into the cistern Q the pump may be oiled in the following manner: If oil is poured through the funnel *t*, it will pass down to *s*, and if the safety-valve be then raised while the plunger E is rising said oil will be drawn into the pump and will lubricate it.

In the horizontal sectional plan, Fig. 6, the respective tubes of communication running horizontally are exhibited, together with the stop-cocks, discharging-cocks, and other portions of the apparatus. The parts marked A, C, D, and P are the same with those so designated in Figs. 4 and 5. In these last-named figures one only of the force-pumps is shown; but in Fig. 6 the connection of the two is exhibited, together with the arrangement by which they are connected to the hydraulic cylinder. R R are the lower valve-chambers, one of which is seen at R, Fig. 5; P P, the safety-valve openings, and S S the flanges of the upper valve-chambers, as at S, Fig. 5. T T and U are the conductor-tubes, through which the water is to be forced, the tube U connecting with the tube G in Fig. 2. A screw-valve or stop-cock at *m* prevents the water from passing into the tube U until its action is wanted in the press-cylinder. An indicator or apparatus showing the pressure of the water may be connected with the tube T, as at V, and this indicator may be constructed in any of the known modes of forming such instruments. There should be two or more press-cylinders and presses connected to the same forcing-pumps, so that when one is forced up and the pressing being completed another may be set at work while a fresh bale is being supplied to the former. The valve or stop-cock at *i* serves to discharge the water when the pressure of a bale is completed, and that at *l* serves to allow the water to pass onto a second press. *k* is a retaining-valve, which prevents the water from flowing back through the tube U into the tube T, when it is allowed to pass to a second press by the opening of *l*.

A main feature of my improvement is the combining of an air-chamber with one of the force-pumps in such a manner as that it shall operate in regulating the charge or quantity of water received into the force-pump, and consequently that supplied to the pressing-cylinder. In hydraulic presses, where two or more force-pumps are used, they are graduated in size, so that when the resistance becomes too great for the action of a large pump a smaller may be made to operate.

In my press one of the pumps is made considerably larger than the other, and in the chamber R, Fig. 5, connected with the larger pump, I form an air space or vessel, within which the air will be compressed in proportion to the increase of pressure within the apparatus. *q*, Fig. 5, is a valve, by which air may be admitted into, and *p* one by which it may be discharged from, the chamber R, it being important to regulate the quantity, as if this be too great it will yield too readily to the action of the force-pump and prevent the forcing the water with sufficient power; and if too small the advantage to be derived from its use will be in part lost. This regulation, however, is easily made by the means provided for that purpose. Should any difficulty result from the absorption of air by the water, this may be obviated by making the chamber R cylindrical, and placing a piston in it which shall operate between the air and the water; but as in pressing the air and the water may be reversed between every operation, there is but little, if any, difficulty to be apprehended from this cause.

When the water in the pump is forced by the plunger E, the air in the air-chamber will be compressed and a part only of the charge of water will be forced through the upper valve, N, into the press-cylinder. As the plunger returns the air will expand and send forth a portion of water from the air-chamber into the pump-cylinder, making a part of its next supply, and a portion also will be raised through the lower valve, L. As the strain increases the air in the air-chamber will undergo greater compression, and will consequently expand more, thereby diminishing the fresh supply from the reservoir, and the first or larger force-pump will thus be made to operate in the manner of a succession of pumps of diminished capacity and increasing power, and thus gradually prepare the apparatus for the action of the smaller force-pump, which is not to be furnished with an air-chamber, and by which the packing is to be completed.

I will here remark that instead of the air-chamber a piston operated upon by steel springs may be employed, such springs being placed above what I have denominated the "air-chamber," and being made to act by their elasticity upon a piston within it in contact with the water. Their action, however, will be less perfect than that of the air.

In describing this apparatus I have not only set forth those parts thereof which I consider as new and as of my invention, but I have also exhibited what I consider to be the most

convenient and the best arrangement of those parts which are substantially the same with those already known and used, and to which I do not therefore make any claim; but

What I do claim is--

1. The manner of combining the follower of the press with its head or cap-piece by means of two lever-beams and their connecting-rods, arranged and operating in the manner and for the purpose set forth.

2. The combining, with the force-pump of the hydrostatic press, an air-chamber, the air in which shall be compressed in proportion to the force with which the press is operating, and in such manner as that it shall by its reaction gradually diminish the quantity of water raised from the reservoir, and thus graduate the action preparatory to the operation of a smaller or more powerful force-pump, as herein fully made known.

JOHN HOUPT.

Witnesses:

THOS. P. JONES,

M. E. JONES.