

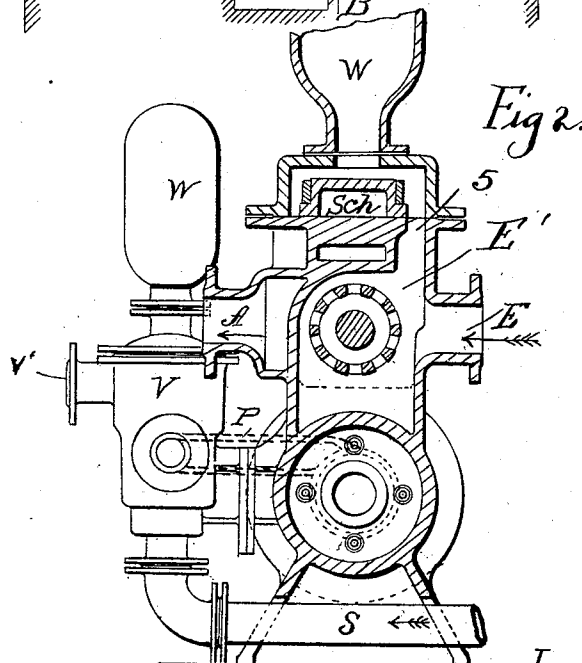
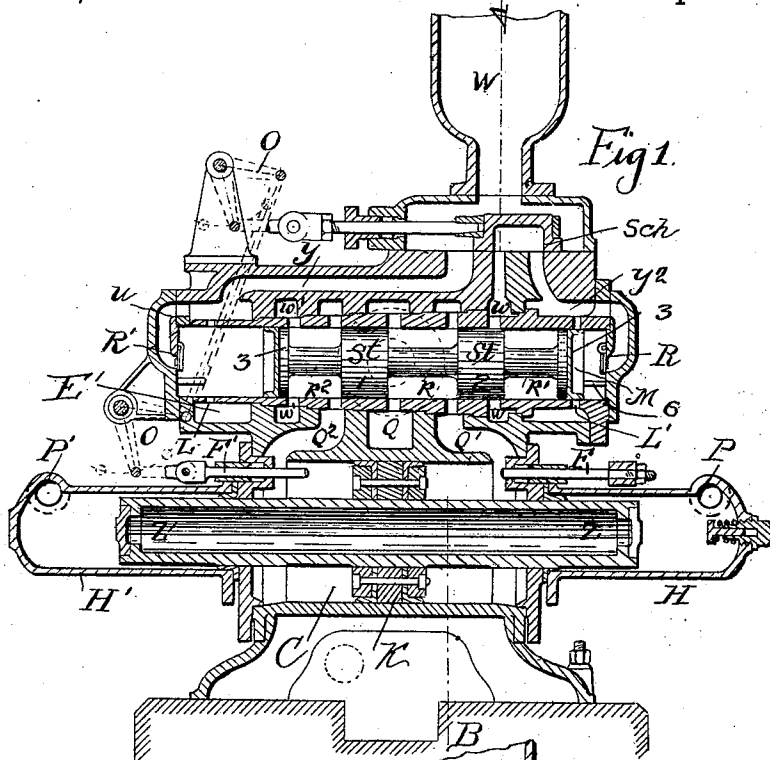
(No Model.)

2 Sheets—Sheet 1.

J. HILLENBRAND.
HYDRAULIC RAM.

No. 495,334.

Patented Apr. 11, 1893.



Attest.
Wm T. Hall.
F. L. Middleton

Inventor.
J. Hillenbrand
by Ellis Spear-
Atty.

(No Model.)

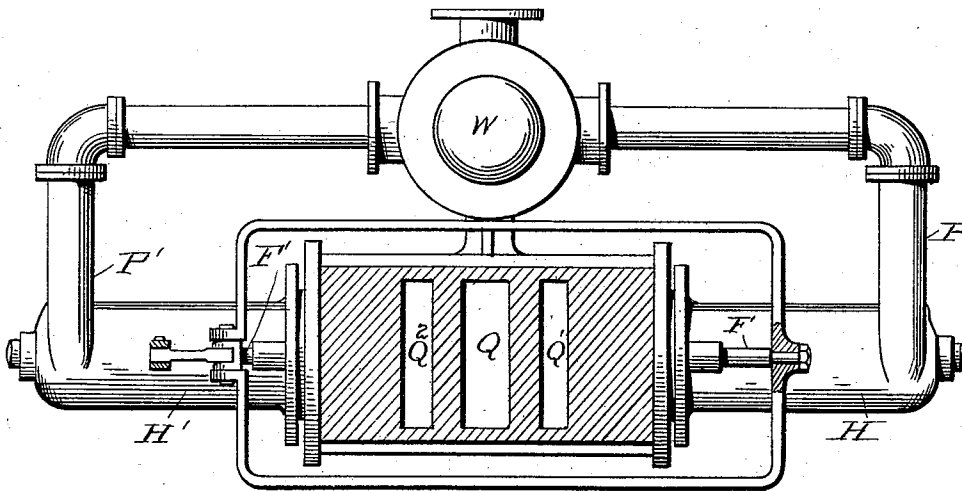
2 Sheets—Sheet 2.

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Fig. 3.



Inventor
Julius Hillenbrand
by Ellis Spear
Att'y.

UNITED STATES PATENT OFFICE.

JULIUS HILLENBRAND, OF MANNHEIM, GERMANY, ASSIGNOR TO LEOPOLD JOSEPH, OF SAME PLACE.

HYDRAULIC RAM.

SPECIFICATION forming part of Letters Patent No. 495,334, dated April 11, 1893.

Application filed May 27, 1892. Serial No. 434,558. (No model.)

To all whom it may concern:

Be it known that I, JULIUS HILLENBRAND, a citizen of the German Empire, residing at Mannheim, in the Empire of Germany, have
5 invented certain new and useful Improvements in Hydraulic Rams, of which the following is a specification.

It is the object of my invention to provide
10 a double acting hydraulic engine adapted to be operated by water pressure derived from a natural source or from a stand pipe to drive pumps or machinery of any kind or for purposes of elevating water for like uses.

In the accompanying drawings Figure 1, is
15 a vertical longitudinal section through the engine; Fig. 2, a transverse section. Fig. 3 is a plan view of a section taken above the main cylinder and through the ports thereof, some of the parts being shown in plan.

20 The engine includes a double acting pumping piston K, arranged in a cylinder C, and having plunger extensions Z, Z' extending axially therefrom and into the supplemental caps or cylinders H H', secured to the ends of
25 the main piston cylinder C. The ends of cylinder C, communicate through ports Q' Q², with a supplemental cylinder in which is arranged a regulating piston S, t. This cylinder is provided with lateral perforations and
30 is arranged within a chamber E' which communicates with the inlet port E. The ends of this cylinder communicates through port Y, Y² with the valve chest in which is located the D valve S c h, and above this valve chest the
35 air chamber W is arranged. The exhaust port from the valve chest marked w, is arranged between the ports Y, Y², and leads to the outside in the ordinary manner.

Q, represents the inlet port leading from
40 the main inlet chamber E' into the space R, between the heads 1, 2, of the regulating piston S t. The regulating piston has at its ends heads 3 provided with leather cups and between these heads and the heads 2, are spaces
45 R', R² arranged to communicate with the ports Q', Q² respectively leading from the main cylinder C, and to connect said ports with the exhaust ports w, w', leading from the casing of the regulating piston. Ports L, L'
50 are formed near the ends of the regulating casing and these communicate with the sur-

rounding space. The ends of the ports Y, Y², are controlled by valves R, R', adapted to close and form cushions between the ends of the regulating piston and the ends of its cas- 55
ing to prevent shock and secure an easy action. Pins F, F', extend through the ends of the main piston cylinder C, and these are connected through suitable transmitting devices with the stem of the valve S c h, in the upper 50
valve chest.

The water for operating the apparatus as before stated may be derived from any suitable source and is led to the main chamber E' through the port E, and supposing the regu- 65
lating piston to be in a position shown in Fig. 1, the water will enter the space R, between the heads 2, of the regulating piston through the port Q, and pass from said space through the port Q' to the right of the main 70
piston, thus forcing the same toward the left and forcing the charge which has been drawn into the supplemental cylinder H' out through the pipe P' connected to the upper part and at the end of said supplemental cylinder. 75
This pipe as shown in Fig. 2, dotted lines communicates with a valve chest V, which may be of any ordinary construction arranged to control the inlet and outlet of water through the said pipe P' and the pipe P communicating with the supplemental cylinder at the op- 80
posite end of the machine. The water to be forced enters the valve box V shown at Fig. 2, through the pipe S and from said valve box it enters either one of the supplemental cylin- 85
ders H, H' through the pipe P or P' according to the position of the valve V, and the stroke of the piston K, and it will be understood that the water having entered either supplemental cylinder through either pipe is 90
forced out through the same pipe when the piston reverses its motion and then it passes through the valve box V again and out through the final discharge port V'. The water from the main chamber E' gets to the 95
valve chest by passing around the casing of the regulating piston as shown in Fig. 2, and through the side port δ , and from the valve chest the water of course will pass either to the right or left through the port Y² or Y ac- 100
cording to the position of the valve S c h. As shown in Fig. 1, the valve is at the extreme of

the right hand limit and the port Y admits the water to the left hand end of the regulating piston and has forced it to the right, the water entering the piston casing by forcing open the valve R'. During the movement toward the right of the regulating piston, valve R closes and confines the water at the right end of the casing to form a cushion against which the piston acts. The discharge now takes place only through the small port L' to the space immediately about the piston casing which space communicates through the port Y² and the D valve and the port W to the main exhaust. The port L is gradually closed by the leather cup M on the regulating piston and thus an easy cushioning effect is secured and the piston is finally limited in its movement by the pin 6 projecting inwardly from the end wall of the casing. When the regulating piston is in the position shown in Fig. 1 and the forcing piston is moving toward the left the exhaust water is free to pass through the port Q², the space R², between the heads of the regulating piston and to exhaust finally through the port W'. As the forcing piston reaches the limit of its leftward movement it strikes the pin F' and through the transmitting mechanism O' the valve S c h, will be shifted toward the left admitting the water to the right end of the regulating piston and shifting it to the left so as to reverse the action of the forcing piston in an obvious manner. The cushion is now formed at the left of the regulating piston cylinder and all the actions above described takes place in the regu-

lar order. The air chambers W are provided in order that the air therein will press upon the water and tend to make the flow of the same steady.

I claim—

In combination, the central forcing cylinder C, having supplemental suction and forcing cylinders H, H', the main forcing piston K having the extensions z, z' adapted to the supplemental cylinder, the pipes leading from the supplemental cylinders to the valve box V, the main pressure chamber E' above the forcing cylinder, the central inlet opening Q, the passages Q', Q² leading to the ends of the main cylinder, the casing extending through the chamber E' and having lateral ports communicating with the passages Q, Q', Q² and with exhaust passages W, the piston valve S t in said casing having the heads 1, 2, with the central space R communicating with the passage Q, and the end heads, the controlling D valve S c h, the box therefor above the main chamber E', the ports Y, Y² leading therefrom to the ends of the piston valve casing, the exhaust passage between the ports Y, Y², the side passage 5, leading from the chamber E' upwardly to the D valve S c h and the means for operating the said valve, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

JULIUS HILLENBRAND.

Witnesses:

S. STEINHEIMER,
FERD. BOPP.