

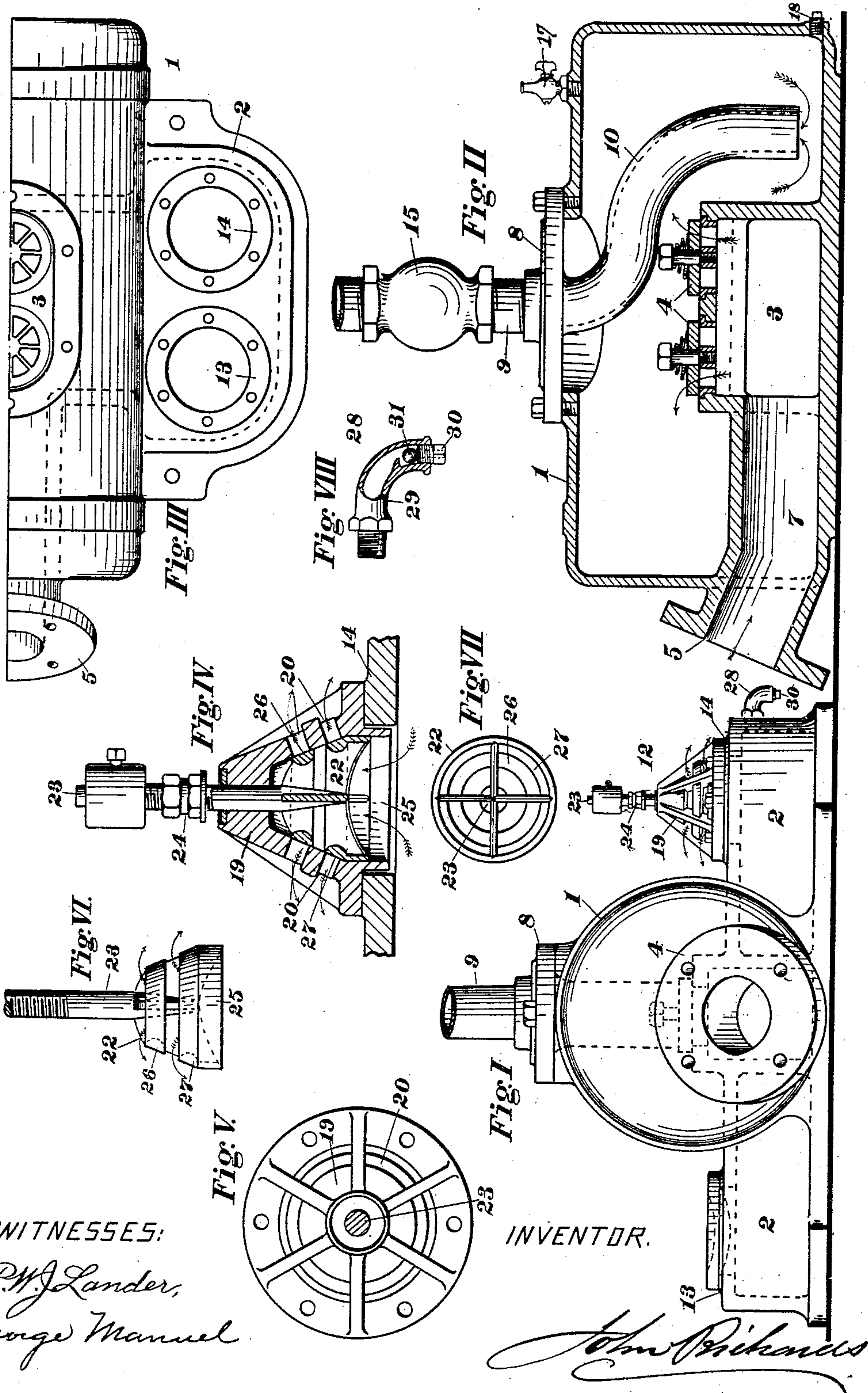
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J. RICHARDS.
HYDRAULIC RAM.

(Application filed Mar. 15, 1902.)

(No Model.)



WITNESSES:

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HYDRAULIC RAM.

SPECIFICATION forming part of Letters Patent No. 711,076, dated October 14, 1902.

Application filed March 15, 1902. Serial No. 98,400 $\frac{1}{2}$. (No model.)

To all whom it may concern:

Be it known that I, JOHN RICHARDS, a citizen of the United States, residing at San Francisco, county of San Francisco, and State of California, have invented certain new and useful Improvements in Hydraulic Rams; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to hydraulic rams and to certain useful improvements therein.

These improvements consist in various novel features of a constructive and operative nature, hereinafter particularly described, and illustrated by drawings that form a part of this specification.

The drawings comprise Figure I, which is an end elevation of a hydraulic ram constructed according to my invention; Fig. II, a central longitudinal section through the same machine; Fig. III, a partial plan view of Figs. I and II; Fig. IV, an enlarged vertical section through one of the waste-valves; Fig. V, a plan view of Fig. IV; Fig. VI, a side view of one of the waste-valves removed from its housing; Fig. VII, a bottom view of the same valve; and Fig. VIII, an enlarged view, partially in section, of a snifting-valve to admit air.

In the operation of impulsive hydraulic apparatus such as enters into common use there are losses due to various unavoidable causes, especially to the water that escapes during the closing of the waste-valves after the maximum flow in the driving-pipe has been arrested, also by inertia of the driven water by concussion and otherwise, which it is the object of the present invention to avoid as far as possible.

Referring to the drawings, 1 is the main body of the machine, consisting, mainly, of a vessel of cylindrical form disposed in a horizontal position and formed integrally with the waste-valve chambers 2 at its sides and a central check-valve chamber 3 in the middle. In the top of this middle chamber 3 are placed the check-valves 4, one or more in number, as the volume of water or their size may require. The supply or driving pipe is connected to the nipple 5 and by a passage 7

communicates with the check-valve chamber 3.

The check-valves 4 instead of being at the bottom of the main chamber 1 or air-space therein are set at its center or above to prevent their being submerged. This arrangement avoids the inertia of a thick stratum of water over the top of these valves that causes both resistance and delay to their sudden action.

Over the check-valves 4 is a removable plate 8, that permits access to these valves, also receives the discharge-pipe 9 and an interior pipe 10, that communicates with the discharge-pipe and extends down near the bottom of the main chamber 1 to prevent the escape of air from this vessel.

The check-valve chamber 3 extends laterally to the waste-valve chambers 2, as indicated by dotted lines in Fig. III, and from there communicates with the waste-valves 12, that may be of any number. These waste-valves 12 are attached to the seats 13 and 14 at one or both sides of the main vessel 1, as their number may determine.

The plurality of waste-valves 12 enables them to be of uniform construction, of small size and weight to avoid the shock and wear common to large valves, also enables the machine to be operated with one or more valves at a time and at various degrees of duty, as may be required, other parts remaining the same.

A check-valve 15 is placed in the discharge-pipe 9, which insures against backflow in case the check-valves 4 should leak, also enables the main vessel to be drained of water by closing the supply-pipe, opening the air-cock 17, and removing the plug 18. (Shown in Fig. II.)

The waste-valves 12 are shown enlarged in Figs. IV, V, VI, and VII. These are of the multiported type, in the form of conic sections that fit the interior of a perforated housing 19, and have a lateral discharge through the double passages 20, that are opened by the descent of the movable part 22. This part 22 is guided and supported at the top by a stem 23, provided with adjustable stop-collars 24 and at the bottom by an extension 25, that fits loosely in the housing 19. The valve is shown closed in Fig. IV, the annular seats

26 27 covering the passages 20. The vertical range of the valve is by this construction reduced to the width of the passages 20, and its effective area is as the sum of these passages.

5 So the movement is short and quick, limiting accordingly the amount of water that escapes during the time the valve is closing. The stem 23 is provided with a weight that is made heavy enough to control the desired frequency
10 of the pulsations or as the pressure of the driving-head may require.

A snifting-valve 28 (shown enlarged in Fig. VIII) is attached at some convenient point to communicate with the chamber 3 or the pas-
15 sage 7, so it will open slightly when the waste-valves 12 react or open, admitting a small amount of air at each stroke to replenish that contained in the main chamber 1. This snift-
20 ing-valve is of simple construction, as shown in Fig. VIII, consisting of the main body 29, a hollow screw-plug 30 therein, and a ball 31, that acts as a check-valve. The main body
25 29 is made in a curved form, so it can be set at various angles to change the weight of the ball-valve 30 and modify its action.

The waste-valves 12 act synchronously and can be instantly thrown out of action by fast-
30 ening them in their closed position. Their number is from two to eight, and they have preferably about ten inches of effective area each, answering for supply-pipes of various sizes.

Having thus described the nature and ob-
35 jects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a hydraulic ram, a cylindrical air-
40 chamber horizontally disposed, a receiving-chamber therein, integral therewith, having a supply-pipe connection, said receiving-chamber projecting laterally beyond the air-cham-
45 ber on each side, waste-valves mounted on said projections, check-valves mounted on the receiving-chamber centrally within the air-chamber, and a discharge-pipe opening from
the air-chamber below the level of the check-
valves, substantially as specified.

2. In a hydraulic ram, an air-chamber hori-
50 zontally disposed, a receiving-chamber therein, integral therewith, projecting laterally beyond said air-chamber on each side, a plu-
rality of waste-valves mounted on said lateral projections, a plurality of check-valves
mounted on the receiving-chamber centrally

within the air-chamber, a supply-pipe con-
55 nection to the receiving-chamber through the air-chamber, and a discharge-pipe opening from the air-chamber near its bottom and below the level of the check-valves, substan-
tially as specified.

3. In a hydraulic ram, an air-chamber hori- 60
zontally disposed, a receiving-chamber there-
in, integral therewith, projecting laterally beyond said air-chamber on each side, waste-
valves mounted on said projections, check-
65 valves mounted on the receiving-chamber cen-
trally within the air-chamber, a supply-pipe
connection to the receiving-chamber, a re-
movable cover-plate over the check-valves,
and a discharge-pipe connected with and re-
70 movable with said cover-plate, said pipe ex-
tending to near the bottom of the air-chamber,
below the level of the check-valves, substan-
tially as specified.

4. In a hydraulic ram, in combination with
75 an air-chamber horizontally disposed, having
a receiving-chamber therein, integral there-
with, projecting laterally beyond the said air-
chamber on each side, a plurality of waste-
valves mounted on said projections, conical
80 in form, with lateral waste-passages, said
valves having a moving part within adapted
to open and close said passages, and a weighted
central directing-stem, substantially as speci-
fied.

5. In a hydraulic ram, an air-chamber hori- 85
zontally disposed, a receiving-chamber there-
in projecting laterally beyond said air-cham-
ber on each side, waste-valves mounted on
said projections outside of the air-chamber,
check-valves mounted on said receiving- 90
chamber inside of the air-chamber, a supply-
pipe to the receiving-chamber, a discharge-
pipe from the air-chamber, and a curved
snifting-pipe, having a ball-valve at its ex-
95 tremity, for admitting air to the air-chamber,
said pipe being adjustable at various angles
to vary the gravitating resistance of the ball
to the ingress of air, substantially as specified.

In testimony whereof I have signed my
name to this specification in the presence of 100
two subscribing witnesses.

JOHN RICHARDS.

Witnesses:

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