

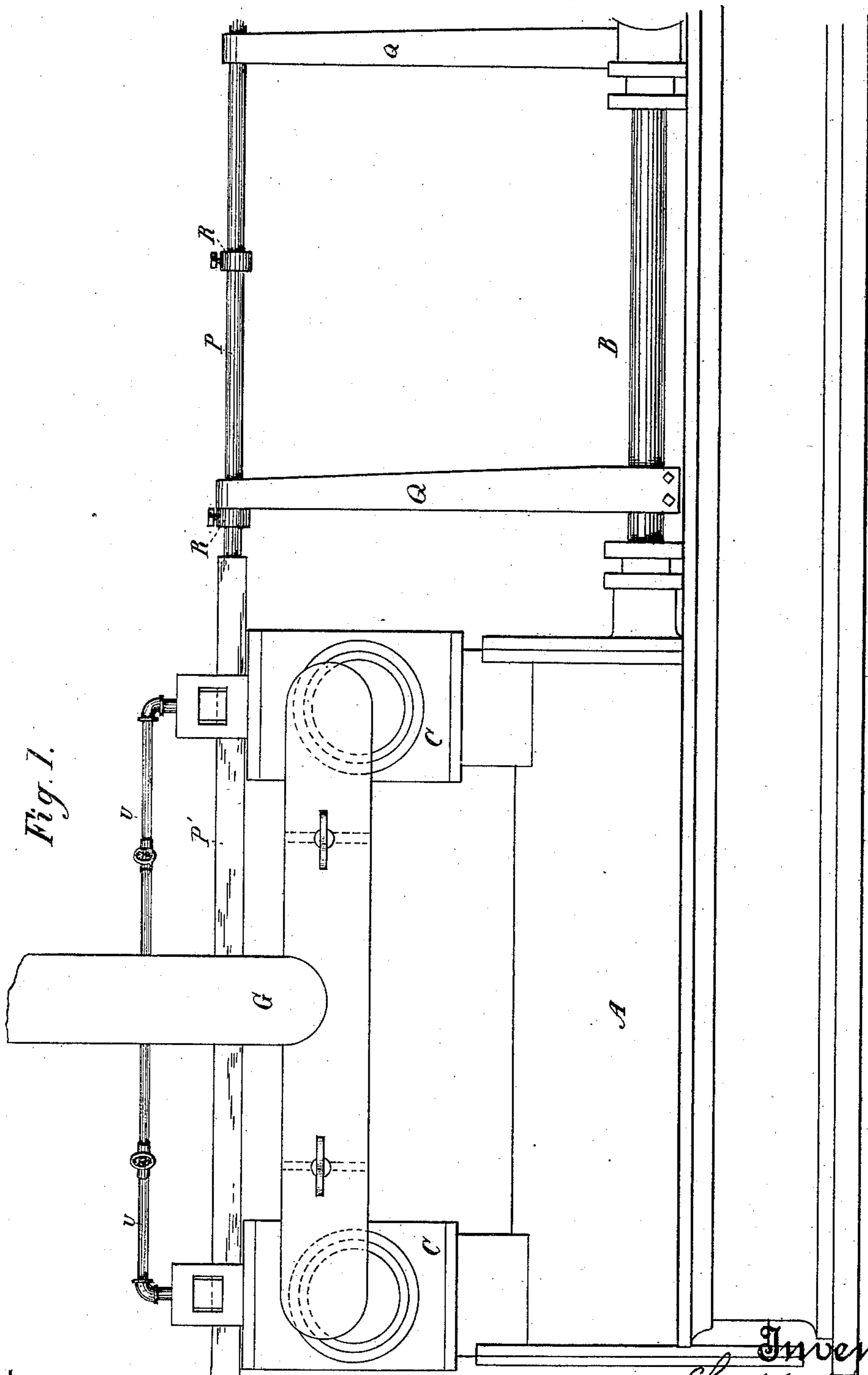
(No Model.)

3 Sheets—Sheet 1.

S. N. KNIGHT.
HYDRAULIC ENGINE.

No. 314,689.

Patented Mar. 31, 1885.



Witnesses,
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J B Moore

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Saml N Knight
By
Dewey & Co.
Attorneys

(No Model.)

3 Sheets—Sheet 2.

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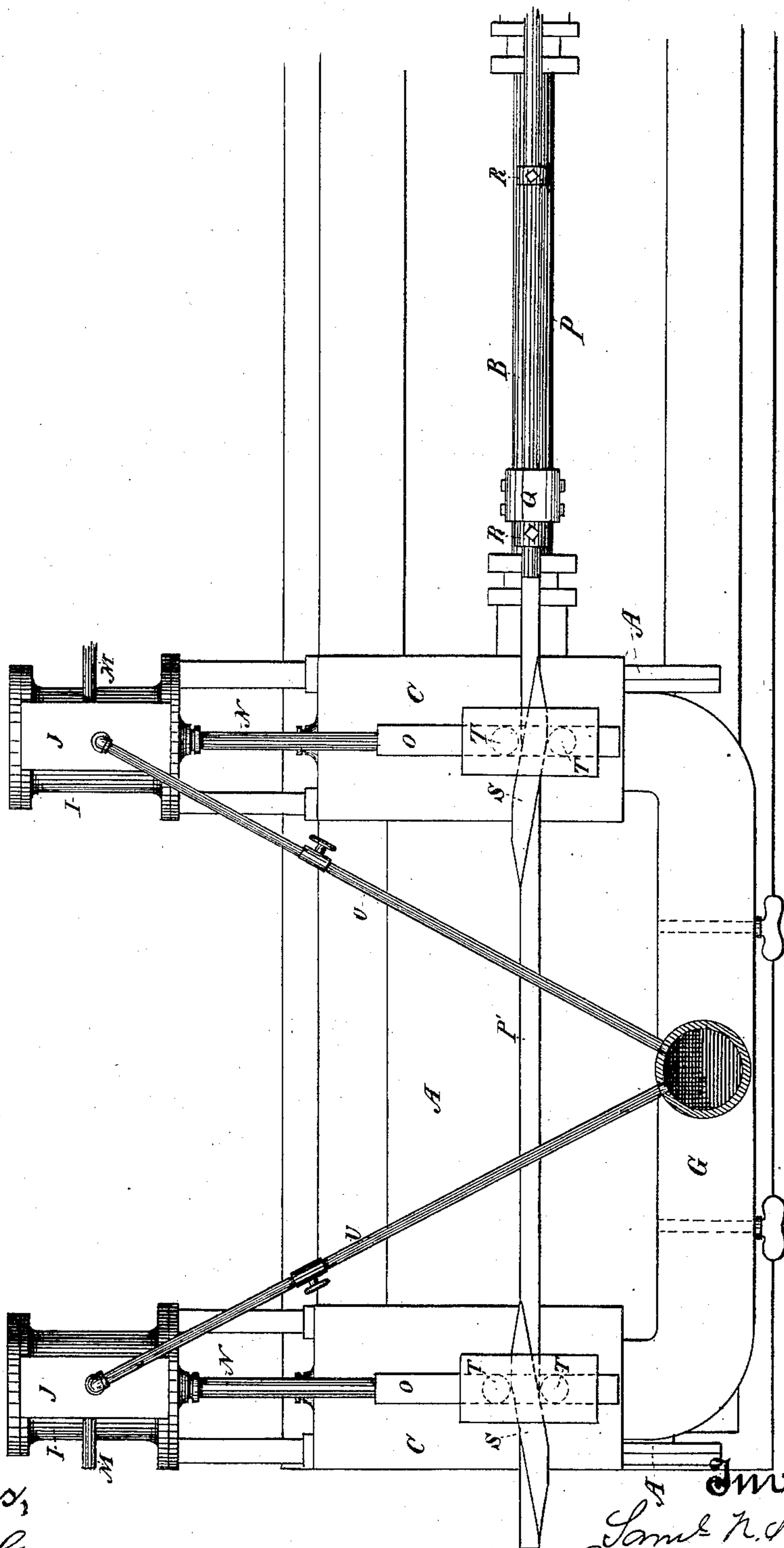


Fig. 2.

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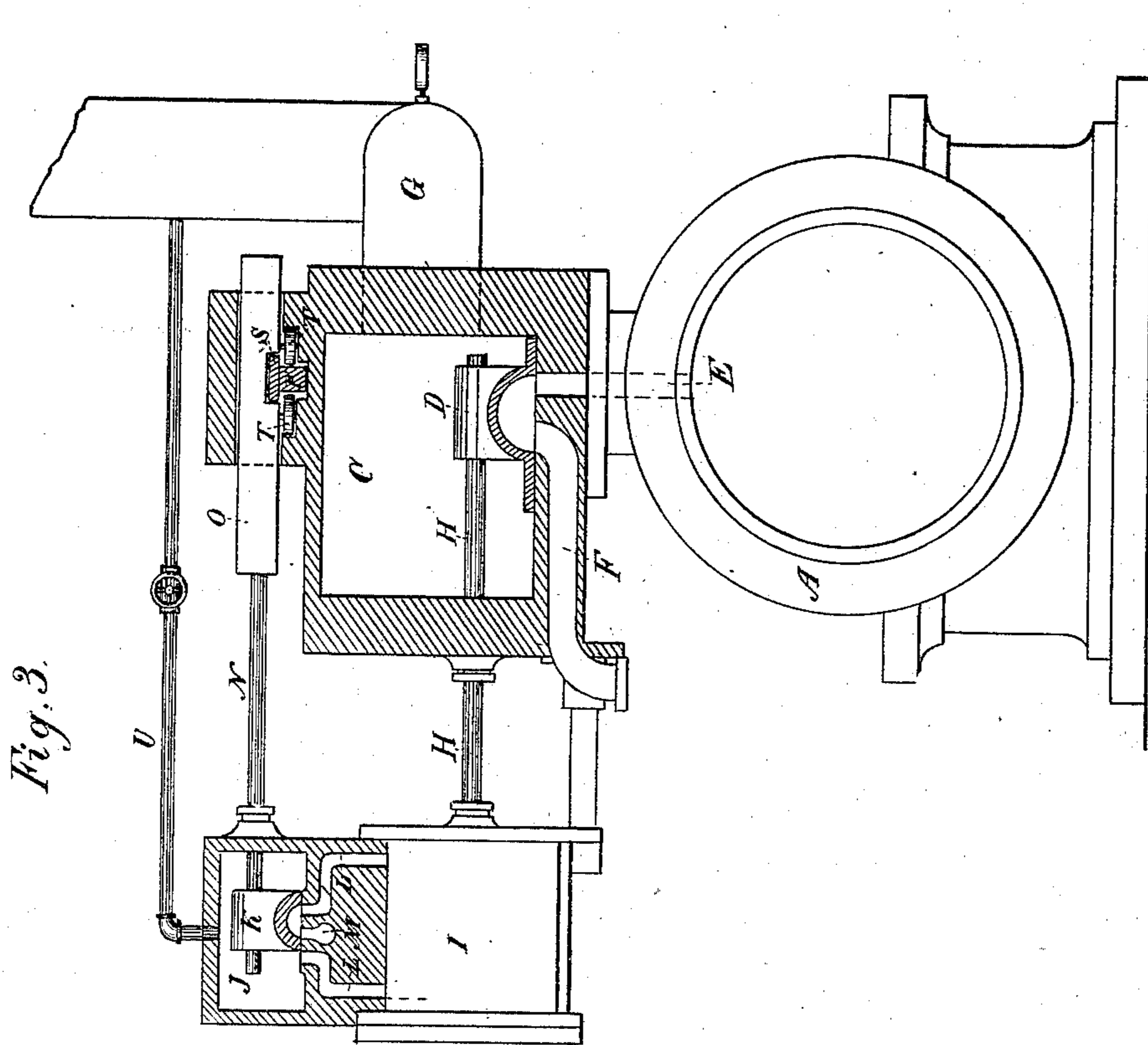
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UNITED STATES PATENT OFFICE.

SAMUEL N. KNIGHT, OF SUTTER CREEK, CALIFORNIA.

HYDRAULIC ENGINE.

SPECIFICATION forming part of Letters Patent No. 314,689, dated March 31, 1885.

Application filed September 18, 1884. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL N. KNIGHT, of the town of Sutter Creek, in the county of Amador and State of California, have invented an Improvement in Hydraulic Engines; and I hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to engines by which pumps or other reciprocating apparatus may be driven.

It consists in the combination of devices hereinafter described and claimed.

Figure 1, Sheet 1, is a side elevation of my machine. Fig. 2, Sheet 2, is a plan view of the same. Fig. 3, Sheet 3, is a transverse section of the main cylinder, showing also a section of the main and supplemental valve-chambers and the supplemental cylinder for driving the main valve.

A is the main cylinder, within which the piston is fitted to reciprocate, having piston-rod B extending out from a suitable stuffing-box and connecting with the pump-piston or other apparatus to be driven.

C C are valve-chambers situated, as shown in the present case, above the cylinder A, and having ordinary slide-valves, D, fitted to travel upon seats within the valve-chambers and alternately open to admit water through the ports E at opposite ends of the cylinder, and then to discharge or exhaust the water after its work is done through the exhaust-passages F. These valve-chambers are arranged transversely across the ends of the cylinder

A, and are supplied with water through the pipe or trunk G. The stems H of the valves D extend out through stuffing-boxes in the ends of the valve-chambers, and the opposite ends of these rods connect with pistons within cylinders I, so that when these pistons are reciprocated within the cylinder the valves D will be moved to alternately admit and discharge water, as before described.

J are valve-chambers situated above the cylinders I, and having within them valves K, which control the inlet-passages L and the outlet or exhaust passage M of the cylinders I. The valve-stems N of the valves K extend out through stuffing-boxes and connect with bars O, which move in guides upon the tops of the valve-chest C. These bars move at right angles with the main piston. P is a rod

extending through guides above and parallel with the main piston-rod B, and R R are collars which are secured to the rod P at any desired points by set-screws. An upright arm, Q, is fixed to the main piston-rod B so as to be moved with it, and its upper end is constructed so as to alternately come in contact with the collars R as the piston finishes its stroke toward the other end, and thus move rod P backward and forward a short distance and in line parallel with the movement of the main piston. The portion P' of this rod, which passes above the valve-chest C, is preferably made rectangular in shape, and has fixed to it the inclined plates S in such a position that they will reciprocate beneath the bars O. These bars have anti-frictional rollers journaled upon vertical pins projecting downward from the bars, so that the inclines S will pass between these rollers T. It will be seen that, when the rod P is caused to reciprocate, carrying with it the inclined or diagonal plates S, with these plates acting upon the rollers T or the bars O, the valve-rods N and their attached valves K will be caused to reciprocate, so that water may be admitted into the cylinder I to move the main valves D. Water is supplied to the valve-chambers J by pipes U, which extend from the main trunk G to the valve-chambers J, as shown.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A hydraulic engine having a main cylinder, piston, and piston-rod, transversely-placed valve-chambers at the ends of the cylinder containing valves, and supplemental cylinders and pistons, valve-stems having rollers attached, and valves by which water is admitted to and exhausted from these cylinders, in combination with arm Q on the piston B, and the inclined plates S, adapted to move the valve-stems of the supplemental cylinder transversely to their own motion, as herein described.

2. A hydraulic engine having a main cylinder, piston, and piston-rod, valve-chambers placed transversely across the ends of the cylinder, and having valves operated by supplemental pistons, together with the rod P, having collars R R fixed to it, an arm, Q, secured to the main piston-rod so that its

movement will actuate the rod P, inclined
plates S, fixed to the rod P and moving in
slots or between rollers which are mounted
upon the supplemental valve-stems O, so that
5 the movement of the rod P will actuate these
valves and move the stems at right angles
with its own motion.

In witness whereof I have hereunto set my
hand.

S. N. KNIGHT.

Witnesses:

S. H. NOURSE,
H. C. LEE.