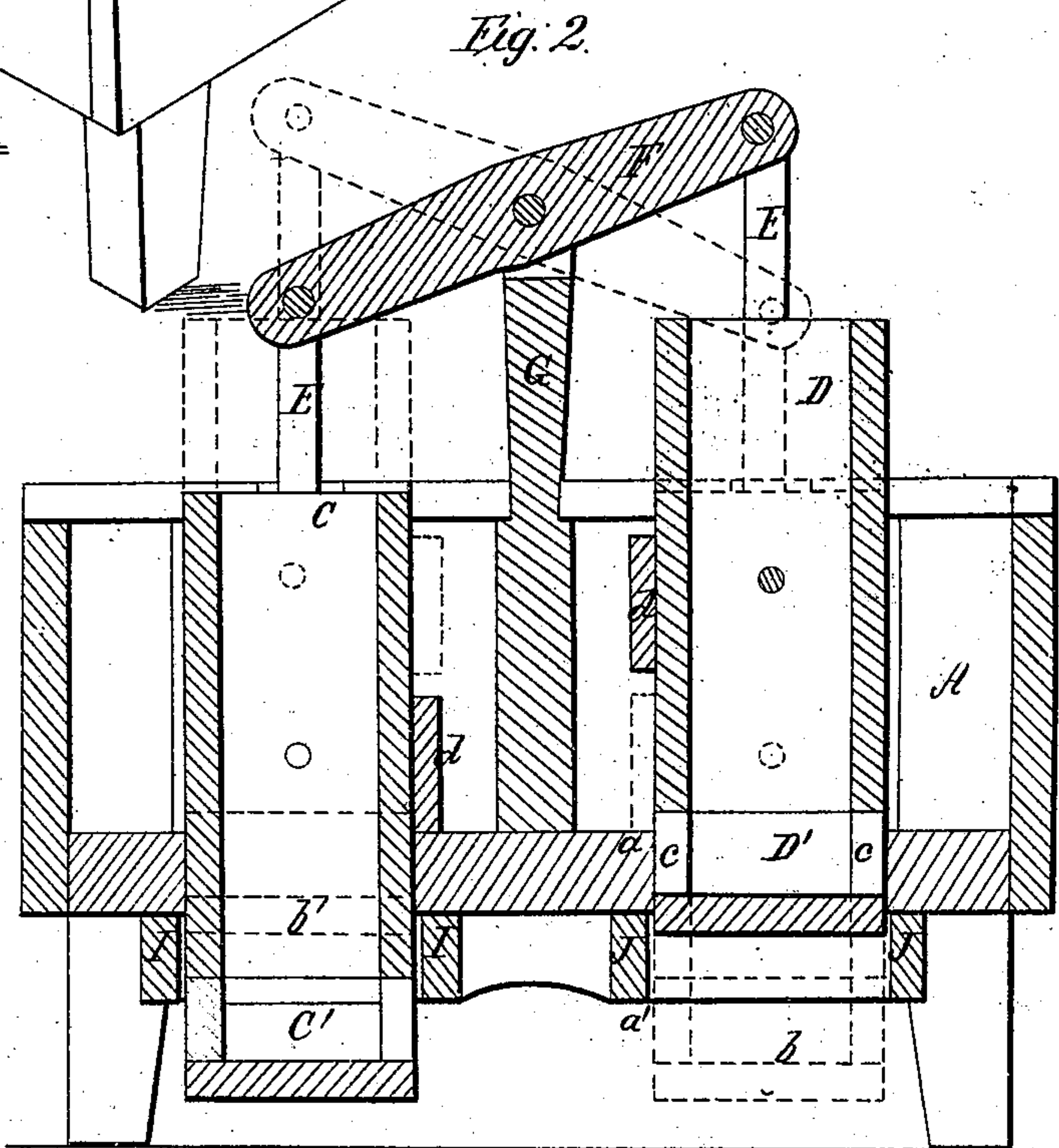
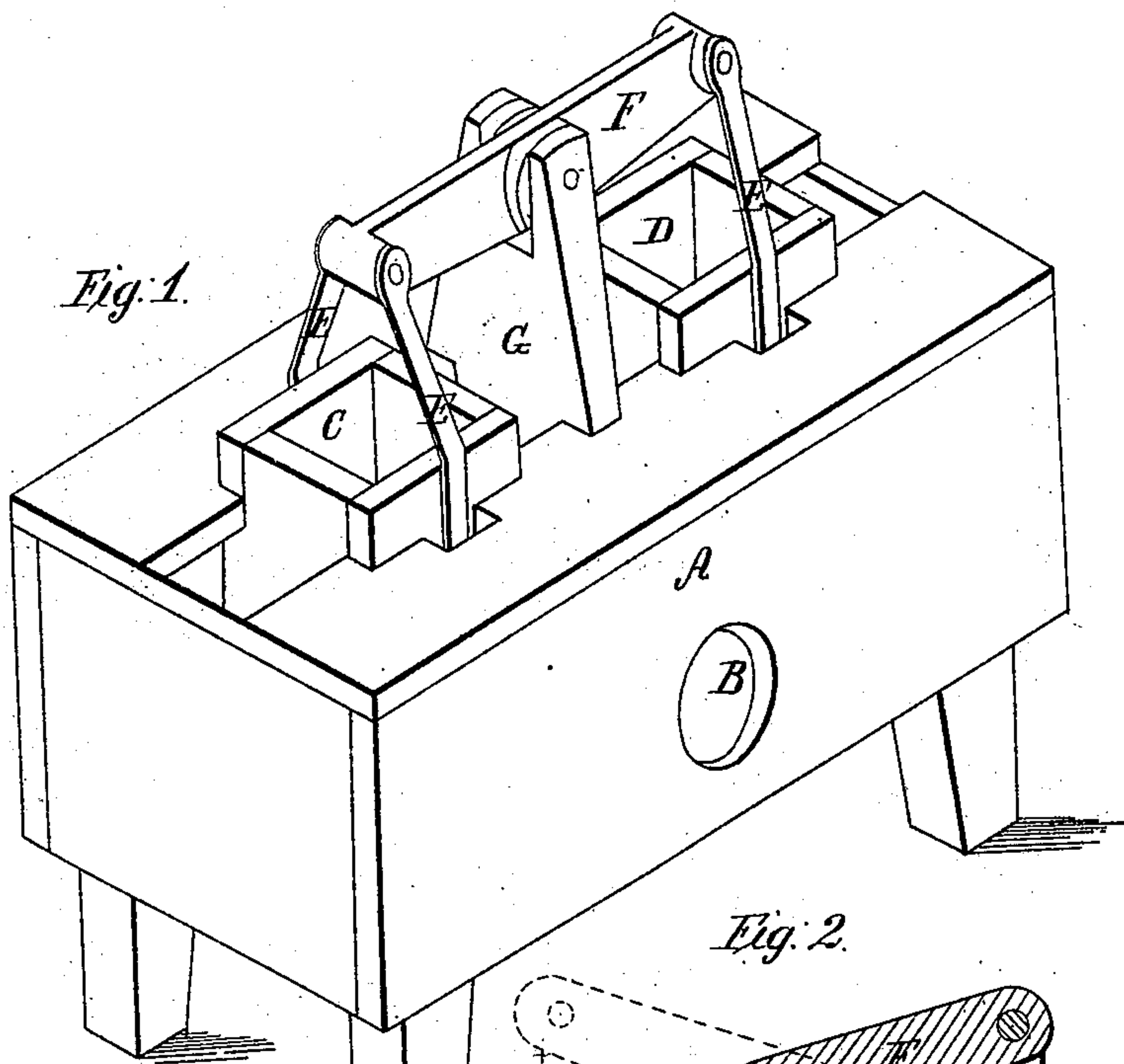


C. Whipple,

Hydraulic Engine.

N^o 42,891.

Patented May 24, 1864.



Witnesses;
W. H. Burridge
C. C. Morgan

Inventor;
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UNITED STATES PATENT OFFICE.

CARLYLE WHIPPLE, OF DETROIT, MICHIGAN.

IMPROVEMENT IN WATER-ENGINES.

Specification forming part of Letters Patent No. 42,891, dated May 24, 1864.

To all whom it may concern:

Be it known that I, CARLYLE WHIPPLE, of Detroit, in the county of Wayne and State of Michigan, have invented new and useful Improvements in a Combined Water Engine and Pump; and I do hereby declare that the following is a full and complete description of the construction of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a perspective view, and Fig. 2 is a vertical section.

Like letters refer to like parts in the different views.

The nature of my invention relates to constructing a combined water engine and pump so that it may be used either for a motive power or a pump, as hereinafter described.

A represents the flume, and B the opening that conveys the water from the penstock into the flume.

C and D are square trunks, with apertures C' D' on each side at the lower end. These trunks are suspended by connecting-rods E, attached to the sides of the trunk, and jointed to the ends of the walking beam F. This walking beam is hung in the center by a pin-joint to the standard G, and upon which it vibrates.

I J are curbs extending below the flume, in which the trunks move up and down alternately by the motion of the walking-beam. The floor of the flume forms the upper part of the curbs that extend from *a* to *a'*. When the trunk D is elevated, as in Fig. 2, the water in the flume flows in through the upper part of the aperture into the trunk D, a close chamber being formed by the bottom of the trunk and side of the curb, as represented, excepting the opening *c* above the curb. As the water flows in, filling up the trunk, the increased weight causes it to descend, and the trunk C, being empty, rises by the action of the walking-beam, the trunk D descending while the trunk C is ascending, until they are in the position indicated by the dotted lines *b b'*. The apertures of the trunk D being below the curb, the water flows out at the same time that the trunk C is being filled through the part of the apertures D' that are above the curb I. When the trunk C is filled with water, it descends, and the trunk D, being empty, rises, and so on, ascending and descending alternately. The motive power may be accu-

mulated from the walking-beam, or from any other suitable point, and converted into a rotary motion by means of a balance-wheel.

It is found in practical operation that in constructing this machine for a water-engine that the depth of the curb must be equal to one-eighth of the length of the stroke, and the depth of the apertures C' D' must be one-half of the length of the stroke, so that the trunks, when they rise, will bring one-fourth of the aperture above the top *a* of the curbs, and they will fall till one-half of the apertures are below the curbs. The object of this is to prevent the water from increasing in the trunks more rapidly than it discharges; but when this arrangement is used as a pump for elevating water this order should be reversed, the apertures rising higher above the curb than they fall below.

When used for raising water, the power may be applied to the center L of the walking-beam, operating the beam so as to alternately raise and lower the trunks. If the trunk C, for example, is below the curb, the level of the water being a little above the bottom of the curb, the water flows in through the apertures, filling up the trunk when it is raised till the apertures are above the top of the curb, when the water flows out and can be discharged through the opening B. At the same time the trunk D is being filled, and can be elevated and discharged in a similar manner.

The parts should be so constructed, as before stated, that the apertures would rise higher above than they fall below the curbs, that the water may be entirely discharged from one trunk while the other is being filled. The piece *d* on the sides of the trunks coming against the top of the curbs, gage the descent of the trunks. The trunks may be round, in the form of round cylinder, or of any other desired shape.

What I claim as my improvement, and desire to secure by Letters Patent, is—

The flume A, cylinders C D, having openings C' D', in combination with the walking-beam F and connecting-rods E, the several parts being constructed, arranged, and operating as and for the purpose herein set forth.

CARLYLE WHIPPLE.

Witnesses:

DUNCAN MACKAY,
HENRY E. DOWNER.