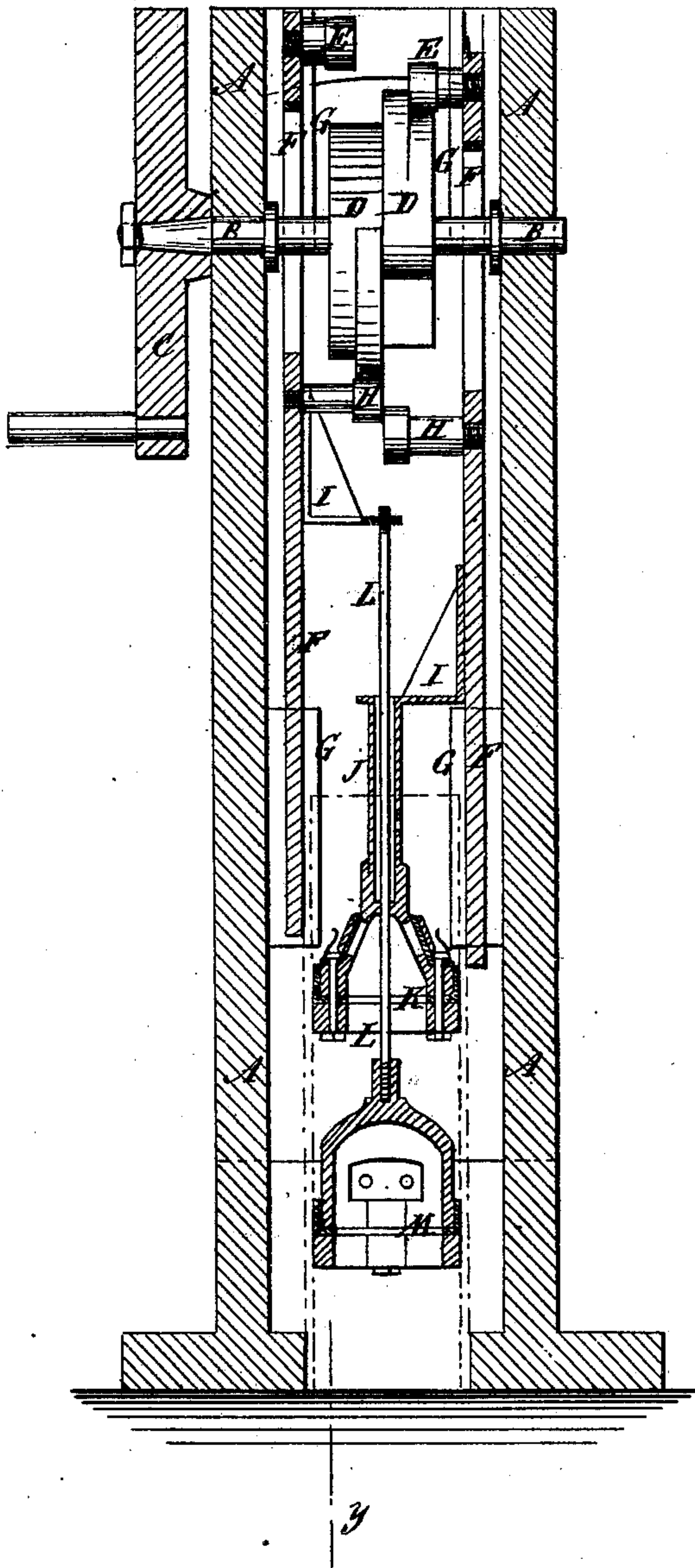


E. HAWKES.  
Pump.

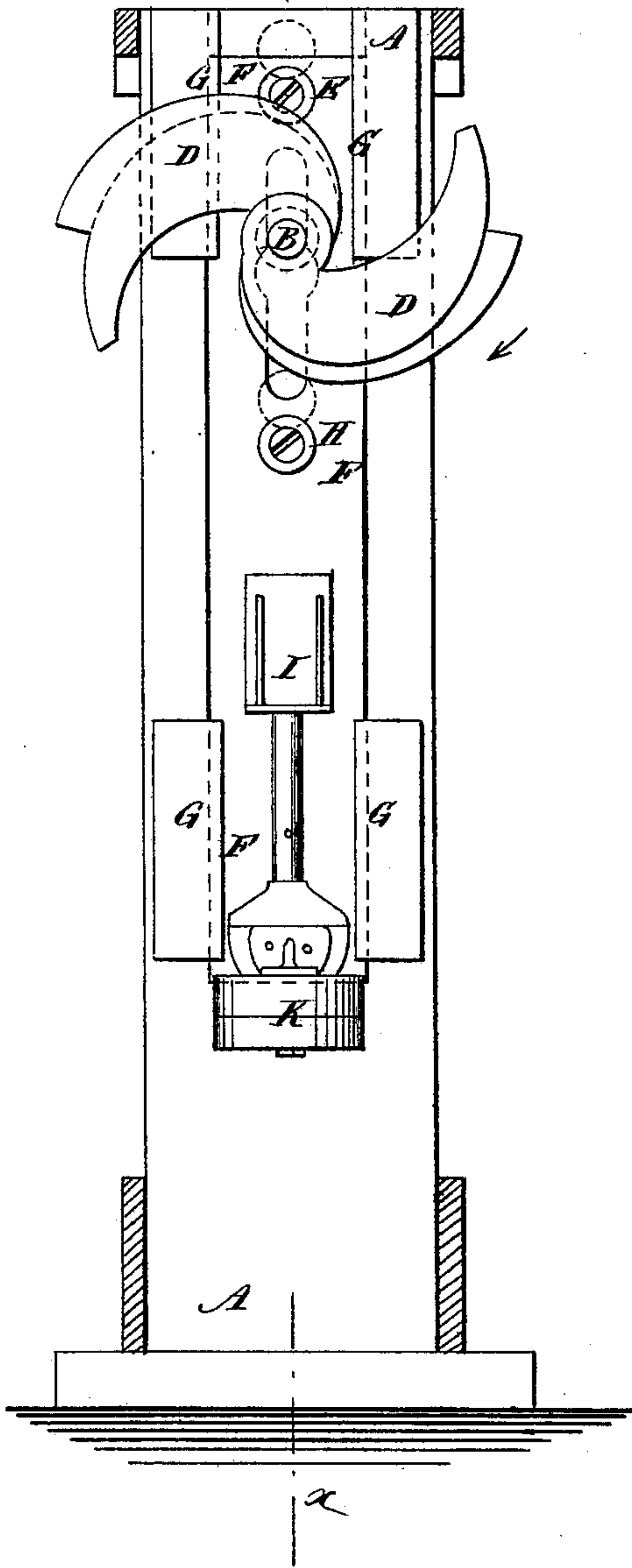
No. 206,728.

Patented Aug. 6, 1878.

*Fig. 1*



*Fig. 2*



WITNESSES:

*C. Neveux*  
*C. Sedgwick*

INVENTOR:

*E. Hawkes*

BY

*Munroe*

ATTORNEYS.



# UNITED STATES PATENT OFFICE.

EUGENE HAWKES, OF SAN DIEGO, CALIFORNIA.

## IMPROVEMENT IN PUMPS.

Specification forming part of Letters Patent No. **206,728**, dated August 6, 1878; application filed December 24, 1877.

*To all whom it may concern:*

Be it known that I, EUGENE HAWKES, of the city and county of San Diego, and State of California, have invented a new and useful Improvement in Pumps, of which the following is a specification:

Figure 1 is a longitudinal section of my improved pump taken through the line *x x*, Fig. 2, the pump-cylinder being omitted. Fig. 2 is a longitudinal section of the same, taken through the line *y y*, Fig. 1, the pump-cylinder and the lower valve being omitted.

Similar letters of reference indicate corresponding parts.

The object of this invention is to furnish improved lifting and force pumps which shall be so constructed as to discharge the water in a continuous stream without loss of power and in much larger quantity than is possible with pumps of the same size of cylinder constructed in the usual way.

The invention consists in a pump in which two valves are used, working in line with each other, and so arranged that each valve will begin its stroke before the other has quite completed its stroke, to cause each valve to begin to act upon the liquid while moving in the same direction and at about the same velocity, so that there will be no shock or jar, no interruption of the discharge, and no loss of force or motion; and in the combination of the two double cams, the two sliding slotted bars provided with studs, and the brackets with the two valve-stems and the two valves, working in line with each other and with the crank-shaft, as hereinafter fully described.

A is a box or frame, which is designed to serve as a support for the shaft to which the operating-cams and the driving-crank, pulley, or gear-wheel are attached, and for the ways that guide the sliding bars.

In bearings in the upper part of the box or frame A revolves a shaft, B, to one end of which is attached a crank-wheel, C, which may be made large and heavy, so as to serve also as a balance-wheel.

To the shaft B, within the box or frame A, are attached two double cams, D, projecting in opposite directions. The outer parts of the

cams D act upon studs E, attached to the upper parts of the sliding bars F, which slide up and down in ways G, attached to the sides of the box or frame A, and are slotted longitudinally to receive the shaft B. The inner parts of the cams D act upon studs H, attached to the sliding bars F a little below the lower ends of their slots. The outer parts of the cams D are made longer than the inner parts, as shown in Fig. 2.

The friction between the cams D and the studs E H is lessened by friction wheels or rollers placed upon the said studs.

To the sliding bars F are attached two brackets, I, the one being a little farther from the lower ends of the said bars F than the other. To the lower bracket, I, is attached the upper end of the stem J of the upper valve, K. The stem J is made hollow, so that the stem L of the lower valve, M, may pass through it freely. The upper end of the valve-stem L is attached to the upper bracket, I.

By this construction each valve will begin its stroke before the preceding valve has quite completed its stroke, so that each valve will begin to act upon the water while moving in the same direction and at about the same velocity, thus preventing any shock or jar and any interruption of the discharge of water without any loss of force or motion.

The valve-stems J L may be extended to any desired length, so that the valves K M may be placed at any required depth in the cylinder.

The working of the pump makes it especially adapted to heavy work, such as deep wells, mines, fire-engines, &c.

For pumps for very heavy work the cams may be divided into two parts, cast solid, and placed upon one or two shafts. In this case cross-heads will be used instead of studs and brackets, and the guides will be different, but still producing the same motion of the valves.

The piston heretofore described is hereby disclaimed, as it forms the subject-matter of another application bearing even date with this one.

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

The combination of the two double cams D, the two sliding slotted bars F, provided with the studs E and H, and the brackets I with the two valve-stems J L of the two valves K

M, working in line with each other and with the crank-shaft B, substantially as herein shown and described.

EUGENE HAWKES.

Witnesses:

A. H. JULIAN,

A. H. DONOHUE.