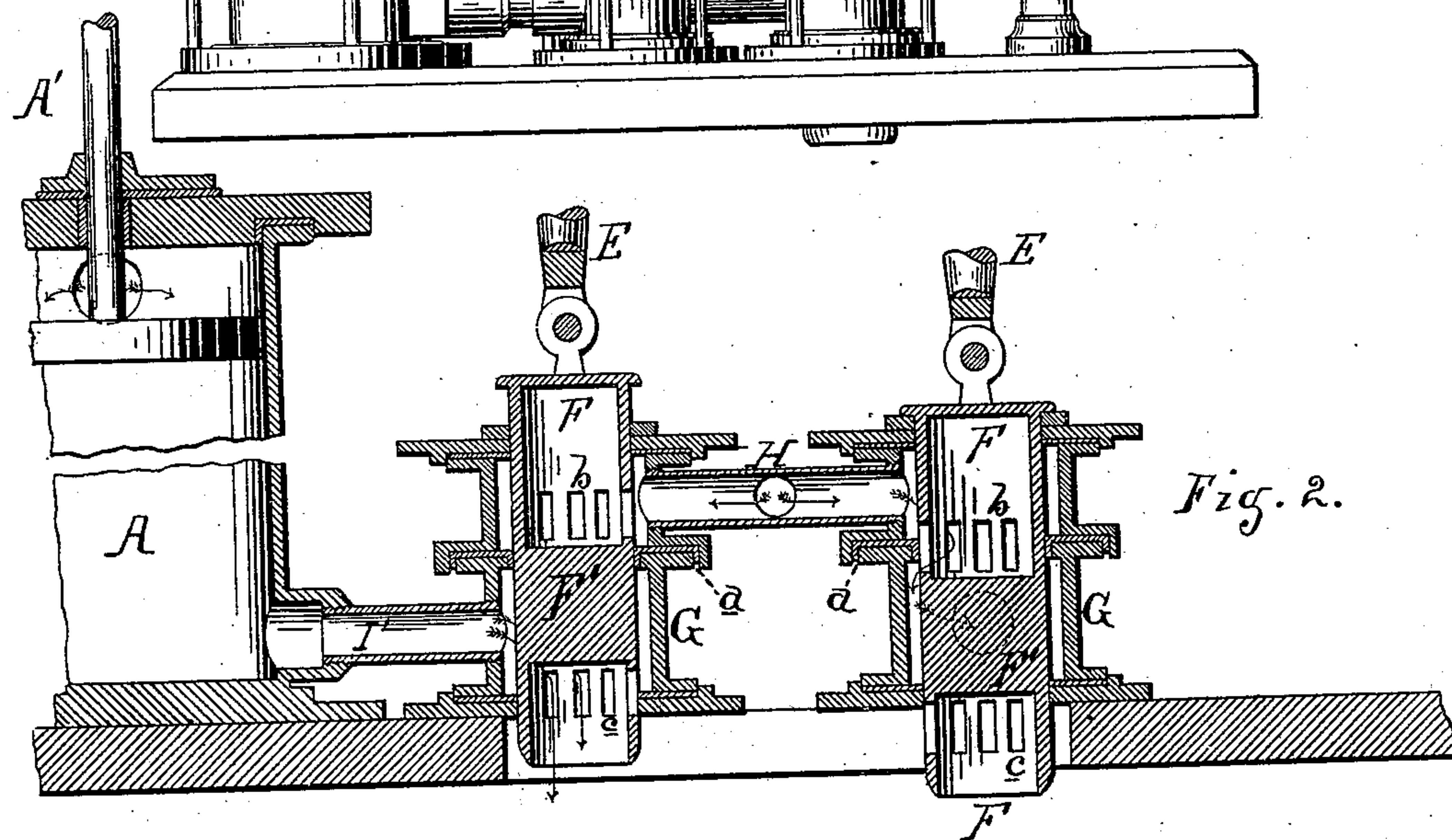
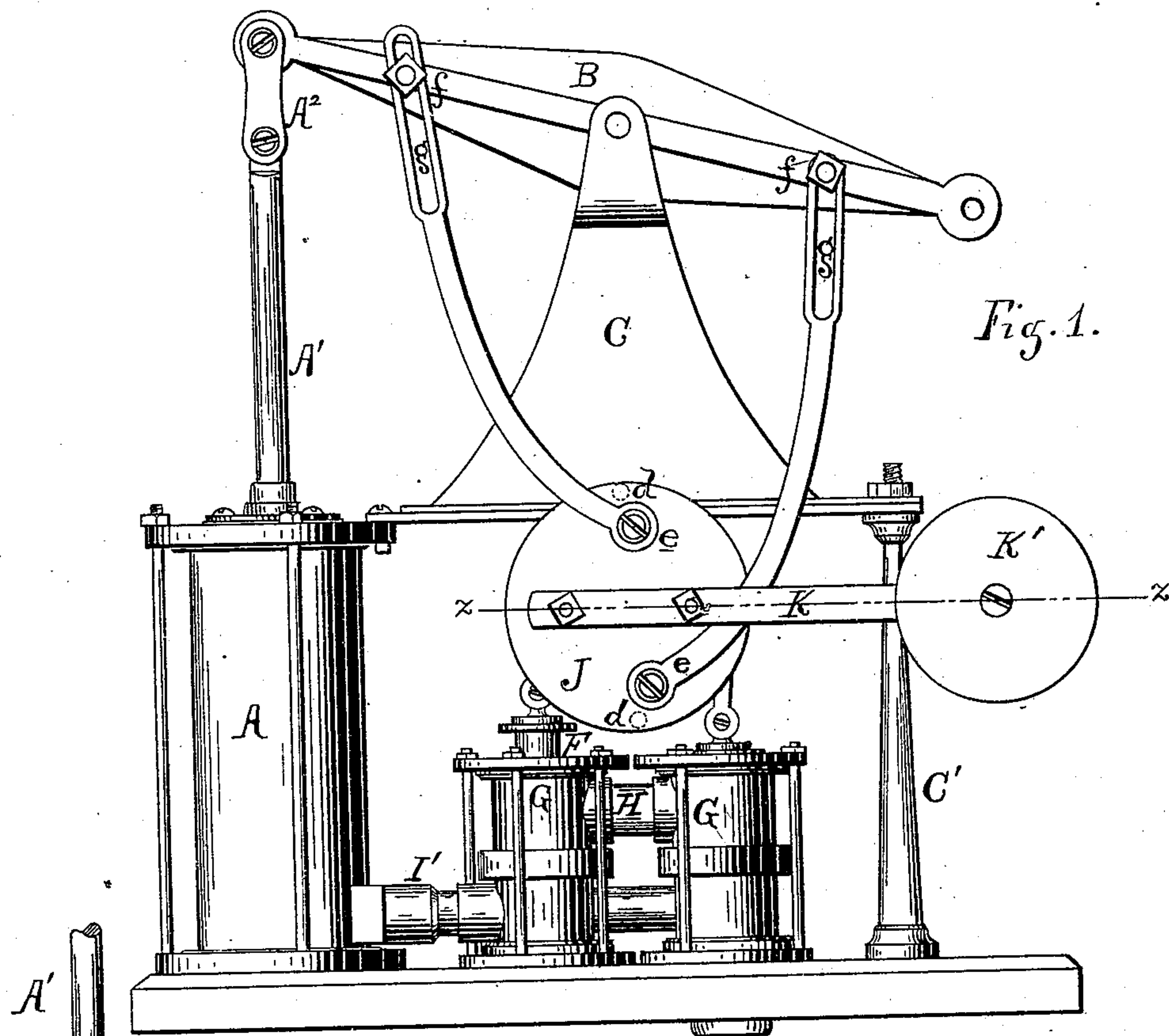


W. F. CLASS.
Valve-Gear for Fluid Motors.

No. 226,494.

Patented April 13, 1880.



Attest:
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Inventor:
Wm F. Class
per atty H. F. Oberts

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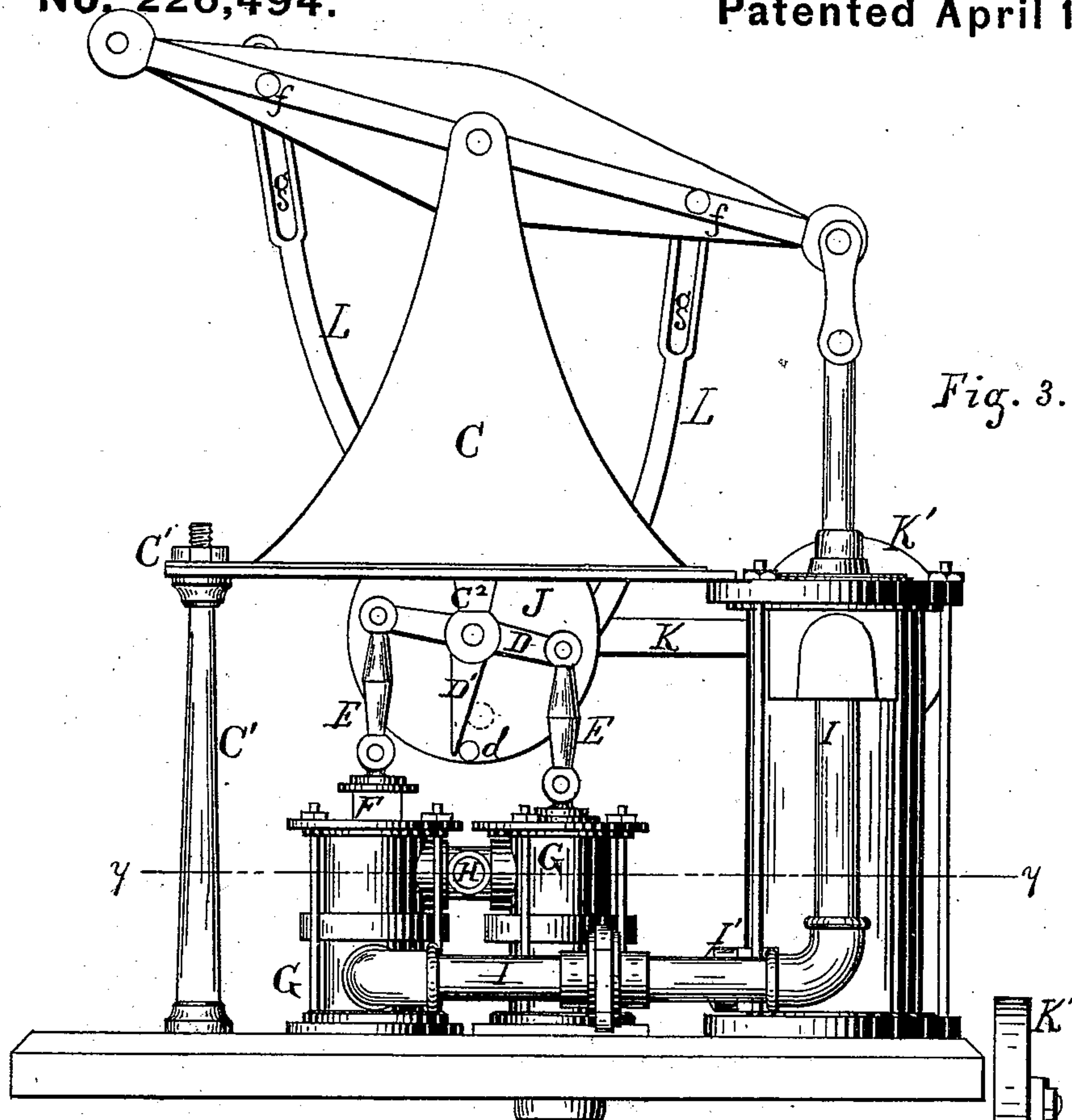


Fig. 3.

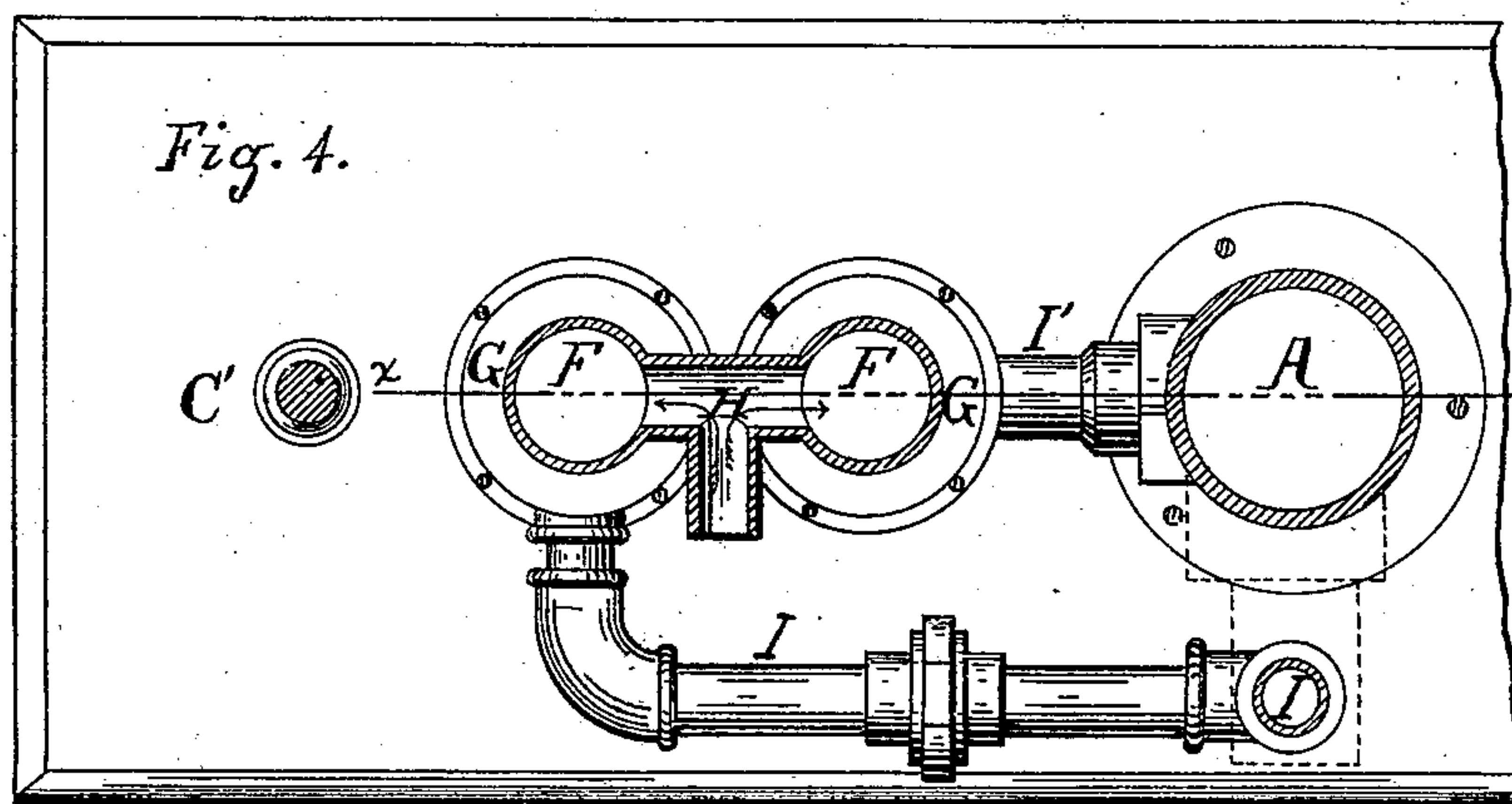


Fig. 4.

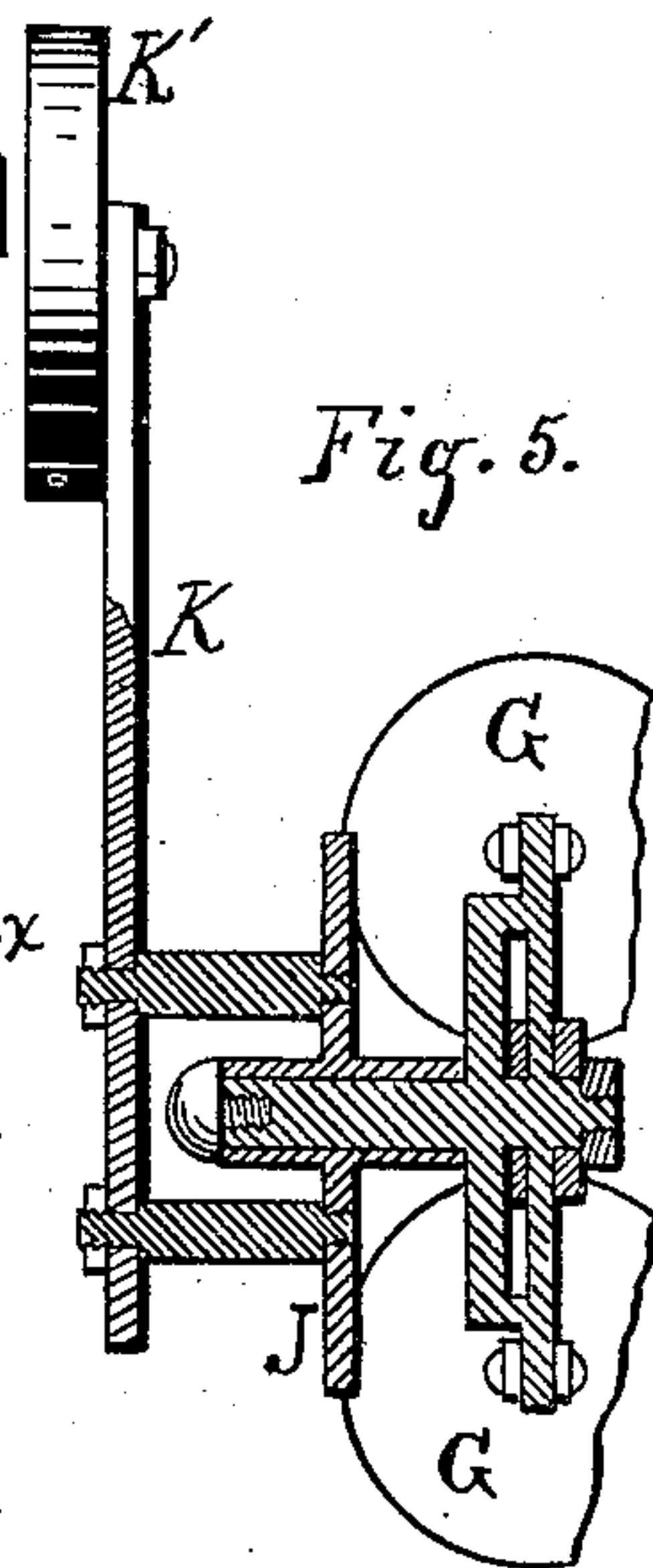


Fig. 5.

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UNITED STATES PATENT OFFICE.

WILLIAM F. CLASS, OF CLEVELAND, OHIO, ASSIGNOR TO KIRK D. BISHOP,
OF SAME PLACE.

VALVE-GEAR FOR FLUID-MOTORS.

SPECIFICATION forming part of Letters Patent No. 226,494, dated April 13, 1880.

Application filed December 5, 1879.

To all whom it may concern:

Be it known that I, WILLIAM F. CLASS, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain Improvements in Valve-Gear for Fluid-Motors, of which the following is a specification.

My invention has relation to an improvement in reciprocating motors of that class in which water or other fluid under pressure follows the piston throughout the length of the stroke.

The object I have in view, more particularly, is to provide a walking-beam motor with a simple and effective valve-gear for reversing the flow of the fluid at the end of each stroke.

The invention consists in an oscillating disk or motion-plate, heavily weighted at one side, connected through diametrically-opposite wrists and slotted lifting-links with studs on the walking-beam, and provided on the opposite side with two studs for actuating a tappet through which to shift the valves; also, in combination with the said valve-gear, a pair of piston-valves and their chambers, connected with the supply-pipe and opposite ends of the motor-cylinder, as more fully hereinafter set forth.

Figure 1, Sheet 1, is an elevation of the motor from the front or working side. Fig. 2 is a longitudinal vertical section through the valves at *x x*. Fig. 3, Sheet 2, is a rear elevation of the motor. Fig. 4 is a horizontal section through the valves at *y y*. Fig. 5 is a similar section through the rock-shaft and face-plate at *z z*.

In the drawings, A represents the cylinder of the motor, fitted with a piston, whose rod A' is connected with one end of the walking-beam B by a link, A². The beam is mounted in the jaws of a pillar, C, forming the upper part of a frame, C', with a pendent hanger, C², Fig. 3, in the jaws of which a rocker-arm, D, is pivoted at its middle. To each end of this arm is pivoted a connecting-rod, E, whose lower end is in turn pivoted to a piston-valve, F, working through both heads of a cylindrical valve-case, G. The bore of these cylinders is greater than the diameter of their respective valves, and it will be noticed that each cylinder is in two halves. Where these join an

internally-projecting packing ring or cup, *a*, is inserted, as is also one under each head of the valve-cylinders. These cup-packings form, with the valves, two annular chambers in each cylinder. To the upper one the supply-pipe H is connected, and with the lower chamber of one cylinder the pipe I opens a communication with the upper part of the motor-cylinder A above the piston. From the lower chamber of the other cylinder a pipe, I', extends into the lower part of said cylinder A below its piston.

The valve F is a hollow cylindrical piston, closed at the top, open at the bottom, with a partition, F', in the middle, separating its upper from the lower chamber. Into the upper chamber vertical slots are cut, forming ports *b*, and into the lower chamber are cut similar ports *c*, through which the fluid is exhausted from the cylinder A. The top of the valve has a flange, under which is a rubber gasket to cushion the impact of the flange in arresting the descent of the valve. When the valve is moved down water or other fluid under pressure from the supply-pipe enters the upper compartment of the valve-case, passes into the upper chamber of the valve through the ports *b*, which are then partially below the middle packing-ring, *a*, and passes through into the lower compartment of the valve-case, thence out through eduction-pipe I or I' of the cylinder A. The ports *c* being now below the lower packing-ring, *a*, the fluid cannot escape through the lower ports of the valve. When the valve is raised so that the ports *b* are above the middle packing-ring, *a*, the further admission of the fluid is cut off and the exhaust from the cylinder A comes back through the pipe I into the lower chamber of the valve-case, passing out through the ports *c*, and is discharged through the bottom of the valve.

To operate these or other reciprocating valves a pendent tappet, D', may be keyed on the trunnion of the rocker-arm D. On a stud in the axis of the trunnion a disk, J, is mounted. An arm, K, is bolted to it, with a heavy weight, K', projecting to one side. On the back side of the disk are two roller-studs, *d d*, diametrically opposite to each other, one of

which, in each semi-rotation of the disk, strikes the tappet D' and moves it enough to shift the position of the valves. This movement is timed to take place just as the piston in the

5 motor-cylinder is about to complete its stroke.

L L are two slotted links or connecting-rods, curved as shown. The lower end of each is pivoted to the face of the disk by a wrist, *e*, while a beam-stud, *f*, projects through a slot, 10 *g*, at its upper end, so that the said studs *f* act only in lifting the rods L, starting a semi-rotation of the disk. As the weighted arm passes the vertical plane it drops with such force that the roller-stud *d* will strike the tap- 15 pet with an impact sufficient to shift the valve.

From the free end of the beam motion may be transmitted to the machinery to be operated by this motor in any convenient manner.

Although I have shown a form of valves 20 that is peculiarly adapted to water-motors, I do not wish to be confined to the use of this

particular form, as it is evident that the valve-gear shown may be employed to actuate valves of various other forms.

What I claim as my invention is—

1. The eccentrically-weighted disk J and its roller-studs *d d*, and the slotted connecting-rods L L, in combination with the walking-beam B and its studs *f f*, for actuating a valve-tappet, substantially as described. 25

2. In combination with the cylinder of a motor, eduction and induction pipes, and a valve-gear, substantially as described, the double-chambered piston-valves F, provided with ports *b c* and working through the divided 30 valve-chambers G G, having the packing-rings *a a*, arranged substantially as and for the purpose set forth. 35

WILLIAM F. CLASS.

Witnesses:

JOS. H. DOLL,

JOHN C. BRIEGLER.