

(No Model.)

J. F. BARKER.  
AIR PUMP.

No. 433,064.

Patented July 29, 1890.

Fig. 1

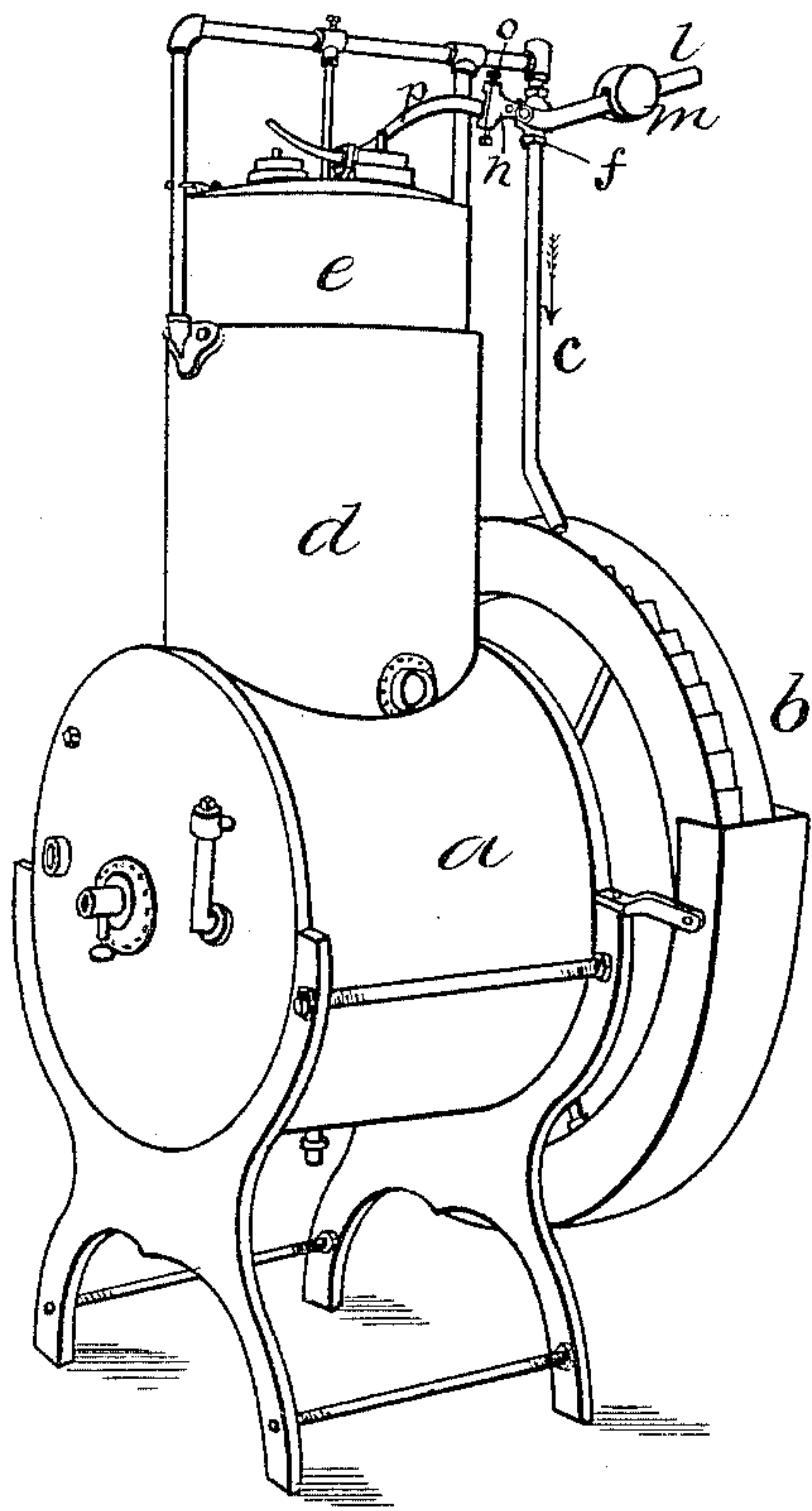


Fig. 2

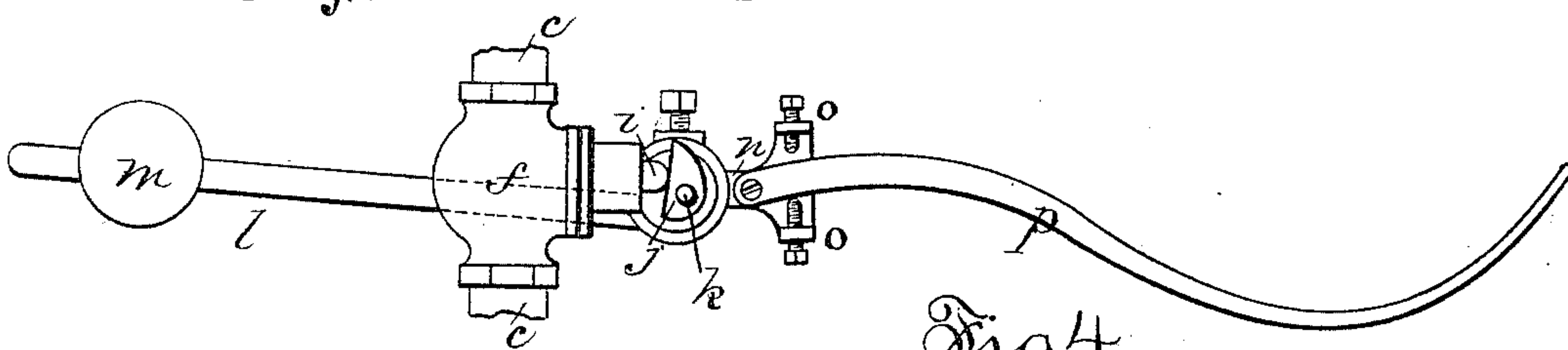


Fig. 3.

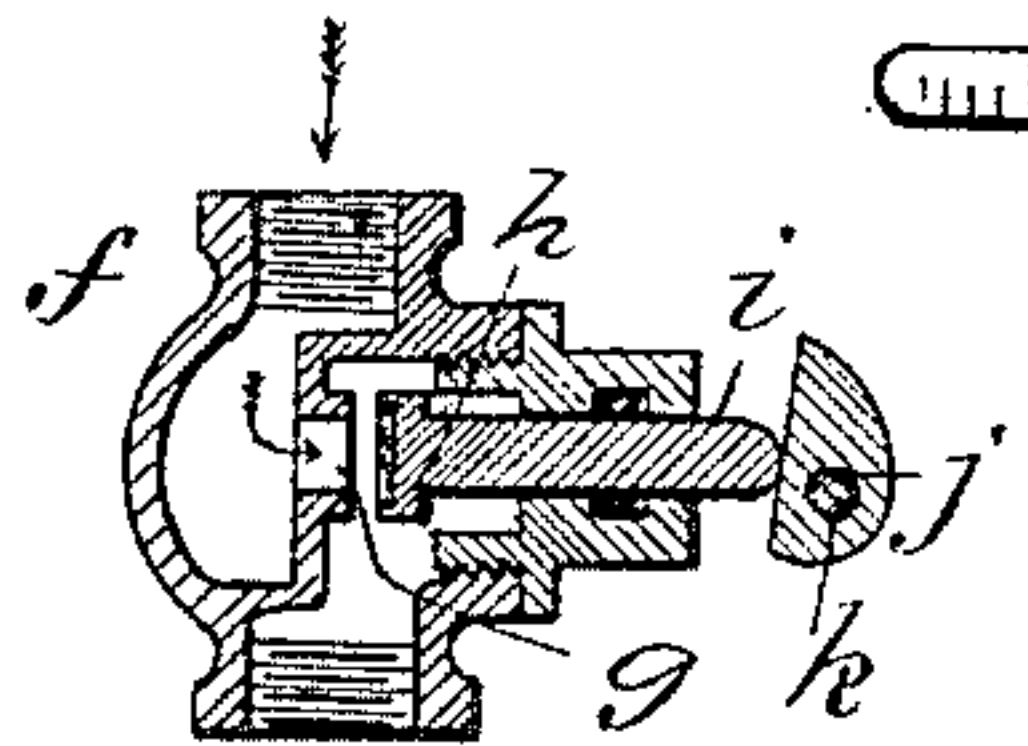
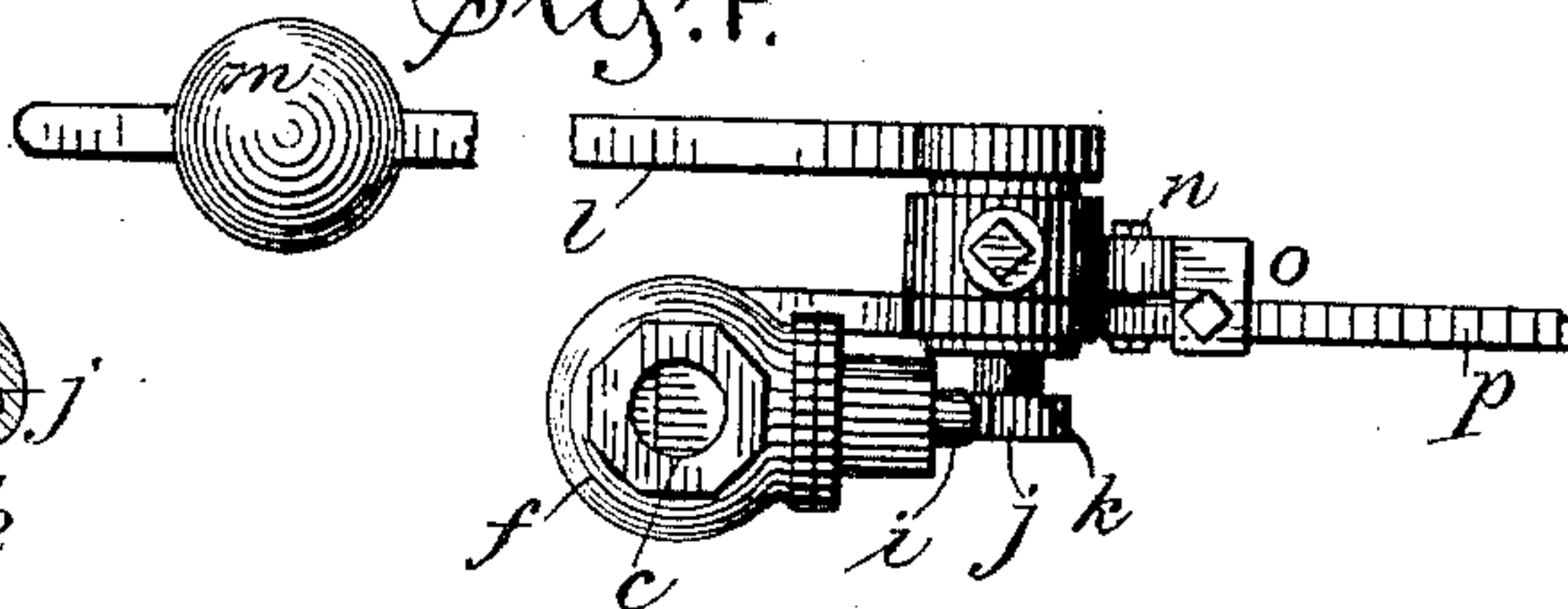


Fig. 4.



Witnesses:

A. R. Williams

G. G. Haddow.

Inventor,

John F. Barker

By *Simmons & Burdett*  
Attys

# UNITED STATES PATENT OFFICE.

JOHN F. BARKER, OF SPRINGFIELD, MASSACHUSETTS.

## AIR-PUMP.

SPECIFICATION forming part of Letters Patent No. 433,064, dated July 29, 1890.

Application filed April 23, 1888. Serial No. 271,497. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN F. BARKER, of Springfield, in the county of Hampden and State of Massachusetts, have invented a certain new and useful Improvement in Air-Pumps, of which the following is a description, reference being had to the accompanying drawings, wherein—

Figure 1 is a view of an apparatus embodying my improvement. Fig. 2 is a detail view, on an enlarged scale, of a water-supply valve and the appurtenant parts referred to hereinafter, the view being from the back side as the parts are represented in Fig. 1. Fig. 3 is a detail view, in central vertical section of the same water-supply valve, and of the finger which operates the valve-stem. Fig. 4 is a top plan view of the valve-chamber, the weighted lever, the valve-operating finger, and the lever which has connection to the air-holder.

As the title given to this improvement hereinbefore indicates, it is an improvement in air-pumps. Such an air-pump as is herein described may be of course applied to any proper purpose; but the particular purpose for which I use it is to furnish the air for hydrocarbon illumination.

The letter *a* denotes a rotary air-pump as a whole of the kind used in connection with hydrocarbon illuminating apparatus.

*b* denotes the water-wheel as a whole which drives this pump.

*c* denotes the water-supply pipe through which water comes to drive the wheel.

*d* denotes a vessel on the top of the pump, which is partially filled with water.

*e* denotes a reciprocating air-holder, into which the pump forces air, and out from which the air goes to be carbureted. All these parts are well-known and need no more specific description than this.

The letter *f* denotes a valve located in the water-supply pipe *c*, controlling the supply of water to the water-wheel, which I denominate the "water-supply valve." Speaking generally, the water-supply valve is opened by the downward movement of the air-holder *e* and closed by its upward movement—that is, the relation of the parts when in proper adjustment to each other is such that when the air-holder rises to a certain point it closes

the valve, thus stopping the water-wheel, and when the air-holder falls it opens the valve and starts the water-wheel, the object being to keep the air-holder as near as may be at the same point of elevation. I say "speaking generally," for the apparatus has features of construction and operation which are not accurately expressed by these words just used, which I will now describe.

The letter *g* denotes the valve-orifice inside the valve.

*h* denotes the valve-disk, and *i* denotes the valve-stem. The pressure of the current of the water flowing in the direction of the arrow will tend to open the valve and to keep it open, if it be not interfered with. The outer end of the valve-stem *i* presses against the finger *j*, which is fast to the oscillating shaft *k*, and on the same shaft is a weight-arm *l*, carrying a weight *m*, which is adjustable along the weight-arm just mentioned. This weight *m* I call a "counter-balance," and in the use of the machine it is so adjusted that its weight will close the valve if left to itself. On this same shaft *k* is an arm *n*, provided with the adjustable stops *o o*.

The letter *p* denotes a lever hinged or pivoted to the arm *n* and having vertical play between the stops *o o*. The outer end of this lever *p* is loosely attached, as by a joint, to the reciprocating air-holder *e*.

Supposing the reciprocating air-holder to be at the top of its play, the valve will be closed and the lever *p* will be somewhere between the two stops *o o*—at least out of contact with the lower one of these stops. Now when the air-holder descends, carrying the outer end of the lever *p* with it, the under side of that lever will strike against the lowermost of the two stops *o*, and then, farther descending, it will permit the water-supply valve to open, let water upon the wheel, and the wheel will revolve and force additional air into the air-holder. Now when the air-holder again rises it will arrive at a point where it will permit the counter-balance *m* to close the water-supply valve, and thus shut off the supply of water to the wheel; but the wheel will not instantly stop when the water-supply valve closes, but obviously will continue to rotate until it has emptied of water so many of its buckets that those remaining



filled will just balance the pressure of the air in the air-holder. To permit this rotation of the water-wheel, which must occur after the water-supply valve is closed, the lever *p* has the described "lost motion" on the arm *n* and between the adjustable stops *o o*. This provision for the lost motion of the water-wheel, of the air-holder, and of the lever *p*, after the water-supply valve closes, is one important feature of my invention.

Another feature of my invention is a function, office, or purpose growing out of the use of the counter-balance *m*. Theoretically, the air-pressure induced by the apparatus should be always the same. As a matter of fact, it must vary slightly, in order that the air-holder may rise and fall; but this variation is one that is of no practical account. It will, however, be readily understood that in giving this air-holder such work to do as that of opening and closing the water-supply valve the amount of force or power required to exert that function should be made as little as is practically possible. As a fact that is obvious the moment it is stated, the water-pressure in the water-supply pipe will vary very considerably in different places of use; but by using the counter-balance *m* and making it adjustable it can be so adjusted as to overcome any given water-

pressure, and therefore permit the whole apparatus to work with very slight exertion of power by the air-holder.

I claim as my invention—

1. In combination, the water-wheel, the air-pump, the reciprocable air-holder, the valve-chamber in the water-pipe provided with a valve, the oscillating shaft *k*, having the valve-operating finger *j*, the arm *n* on the shaft *k*, provided with the adjustable stops *o*, the lever *p*, fulcrumed on the arm *n*, to move between the said stops, and weighted lever *l* on the shaft *k*, all substantially as and for the purpose specified.

2. In combination, the reciprocating air-holder, the air-pump, the water-wheel, the water-supply pipe, the valve-chamber having the valve-stem *i*, the oscillating finger *j* on the shaft *k*, arranged to engage the end of the valve-stem, the arm *n*, provided with adjustable stops, and a lever fulcrumed to the arm and arranged to have a movement between the stops, and having its free end loosely connected to the top of the reciprocating air-holder, substantially as shown and described.

JOHN F. BARKER.

Witnesses:

W. E. SIMONDS,  
G. G. HADDOW.