

(No Model.)

2 Sheets—Sheet 1.

G. PALM.  
GAS REGULATOR AND CUT-OFF.

No. 509,395.

Patented Nov. 28, 1893.

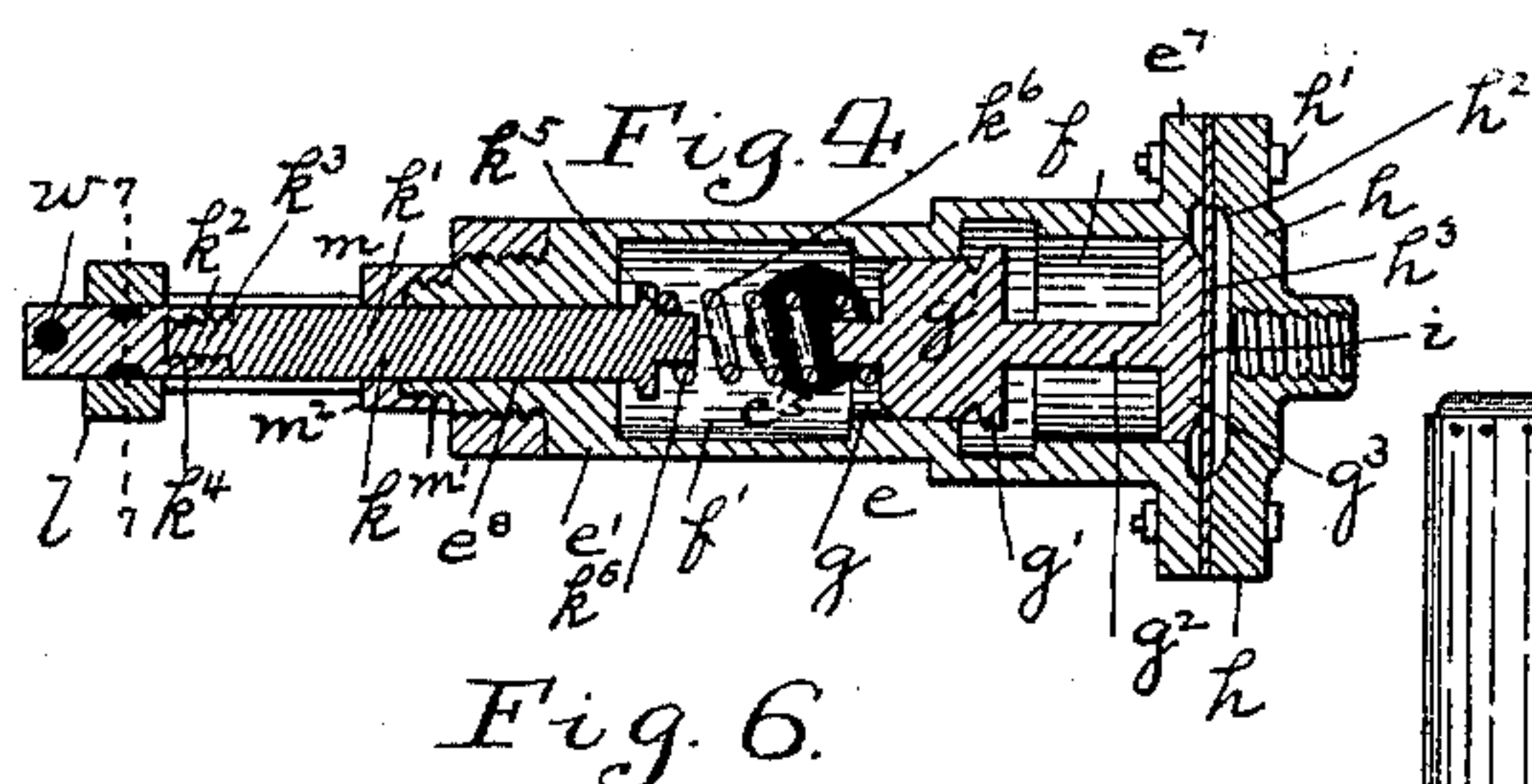
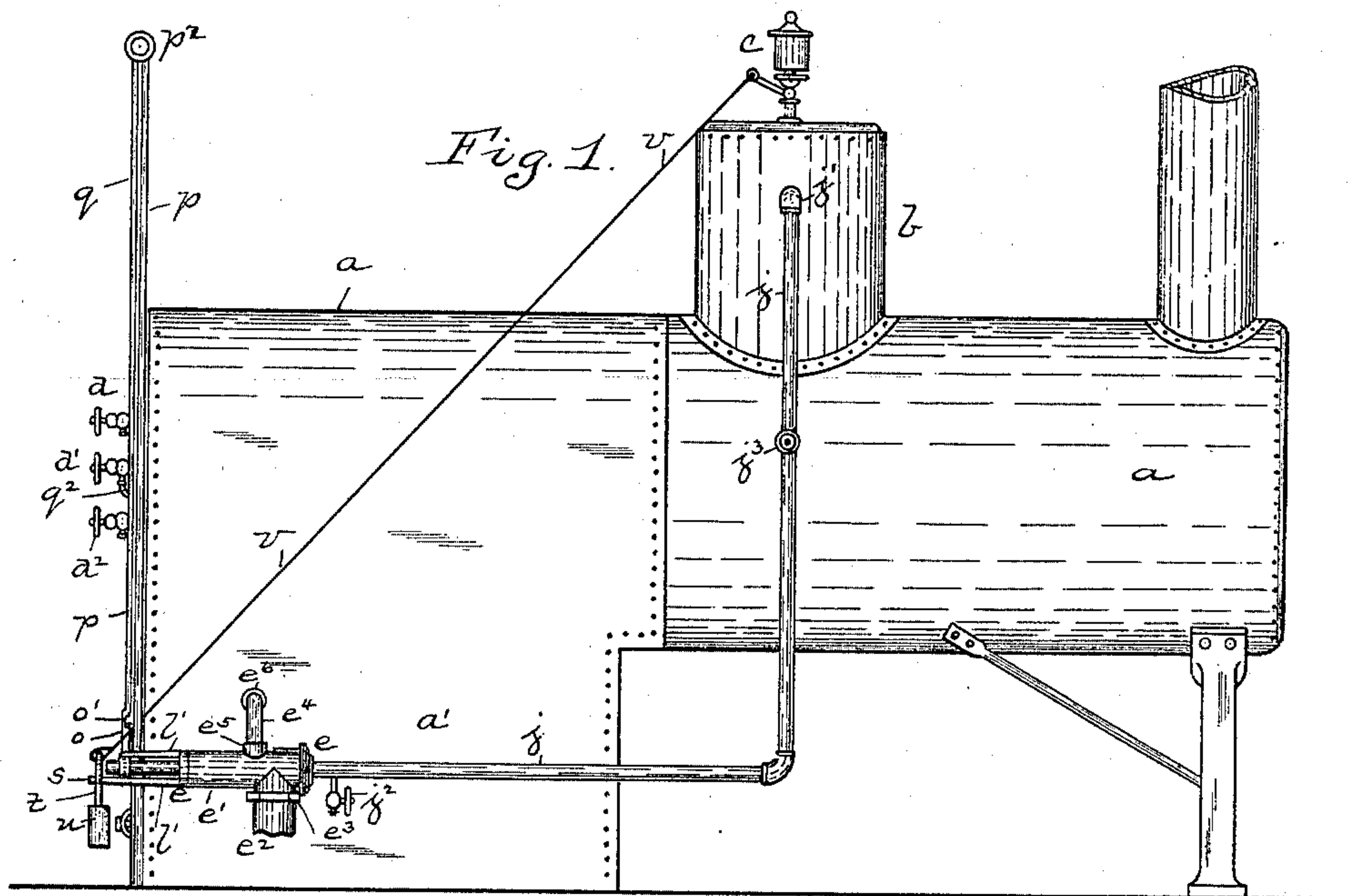


Fig. 6.

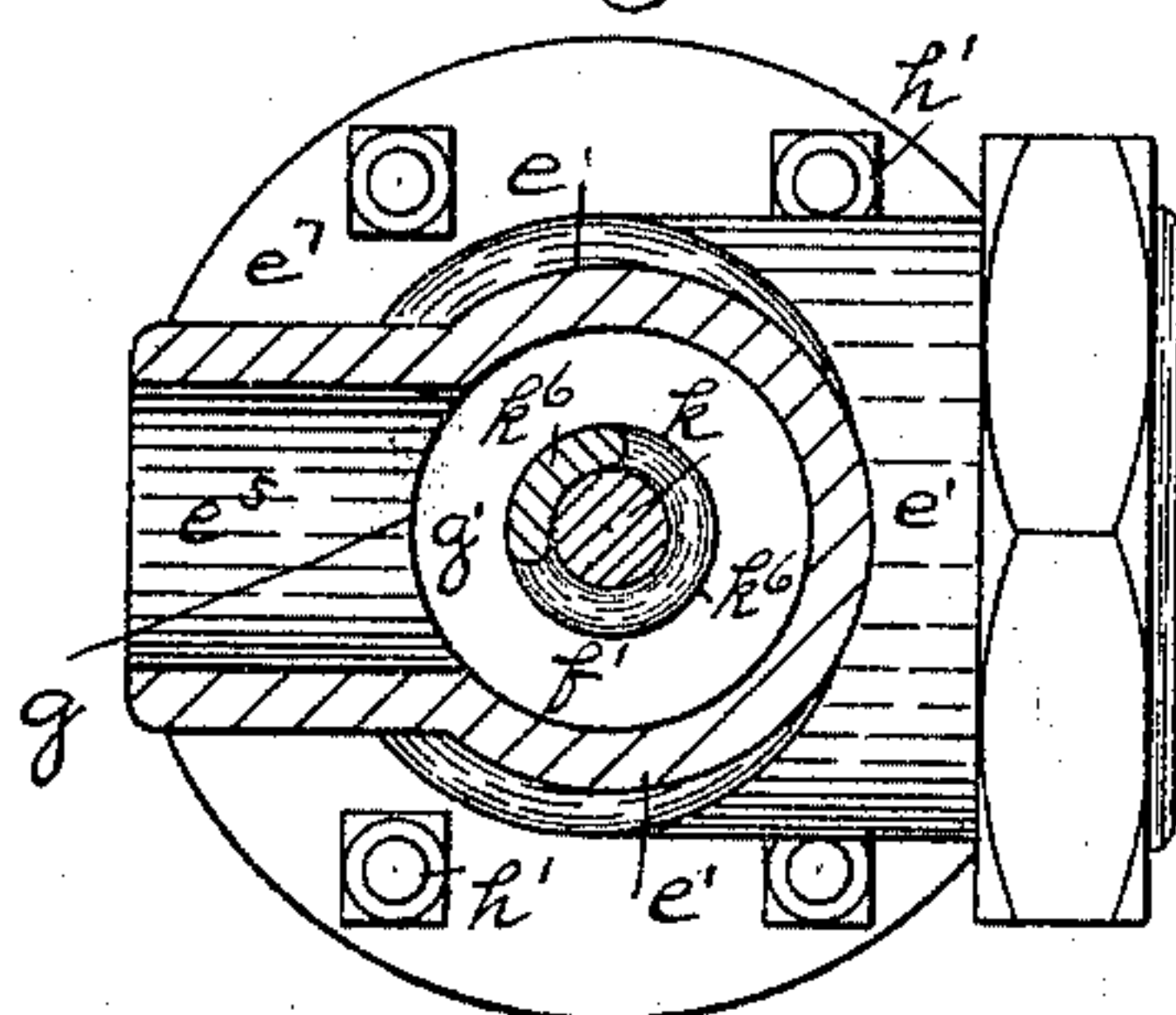
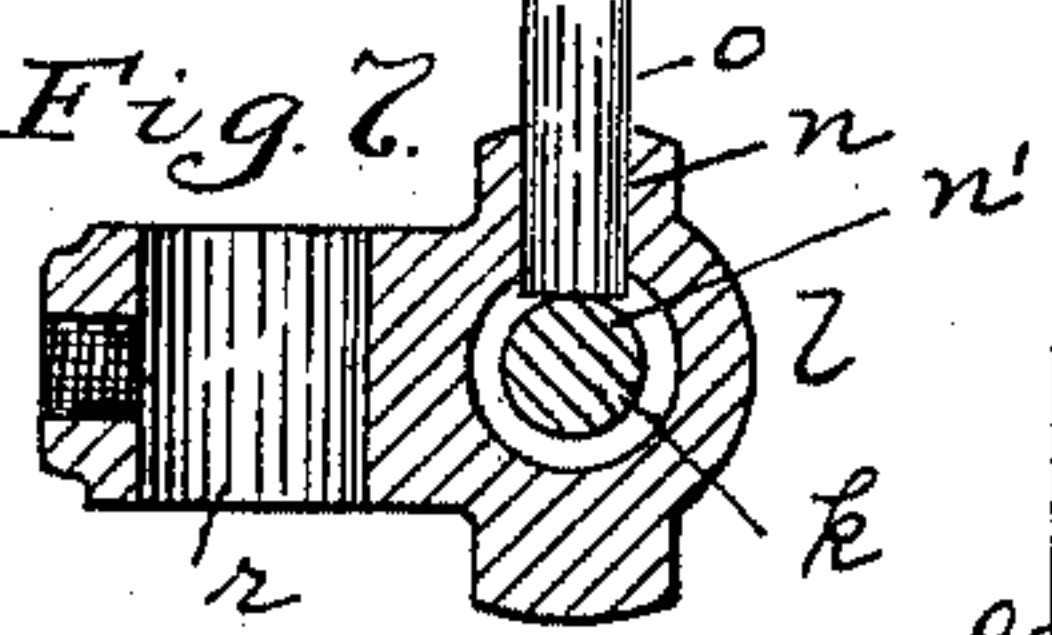


Fig. 7.



Witnesses:  
W. L. Dorsey  
H. J. Martin.

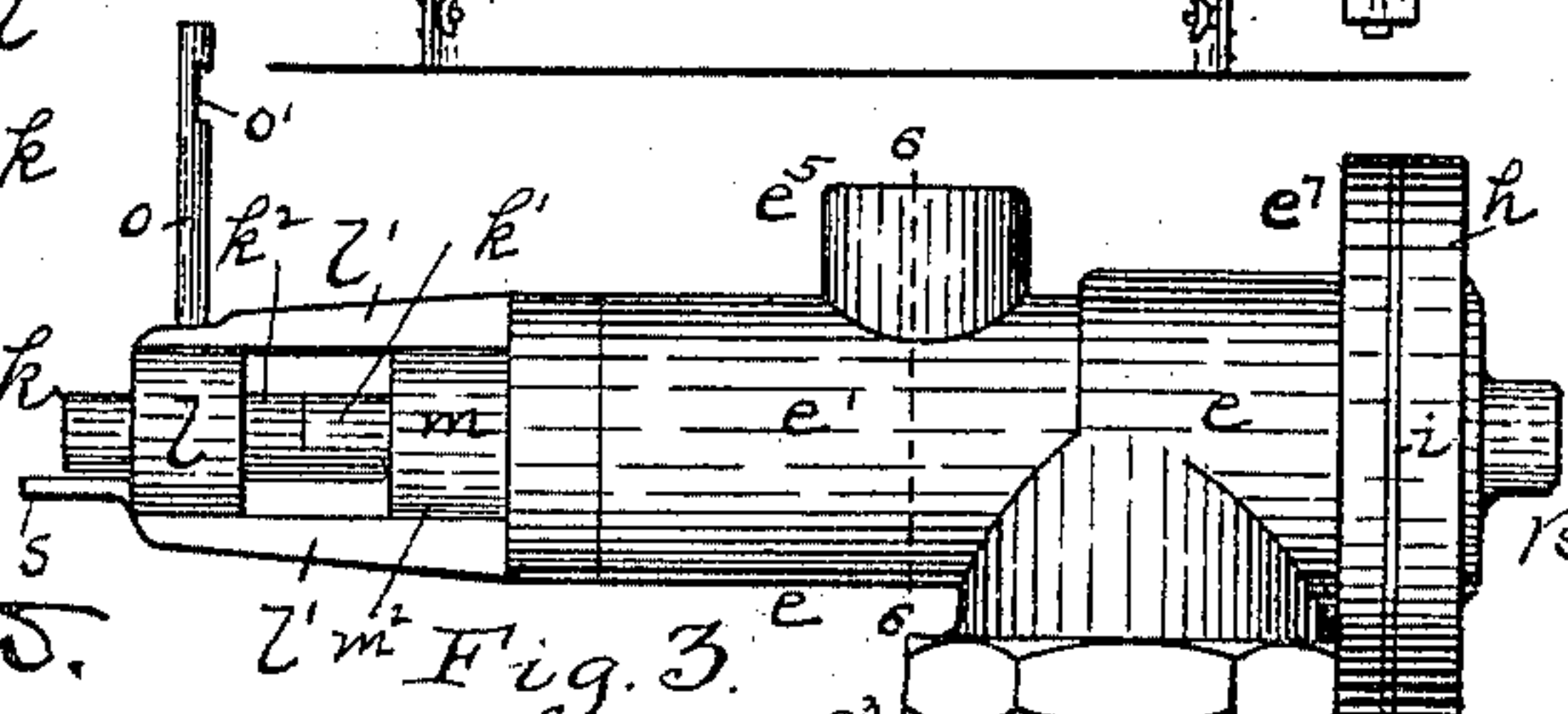


Fig. 3.

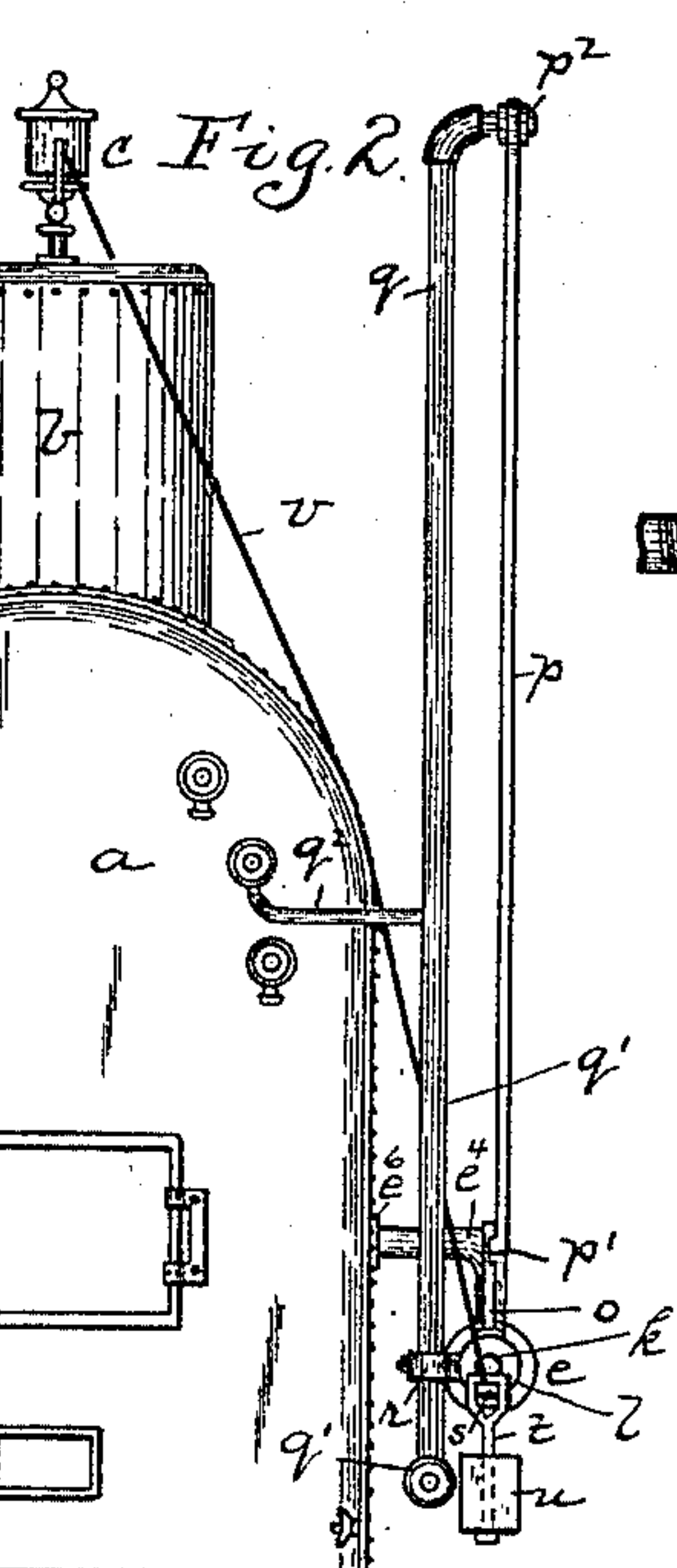


Fig. 2.

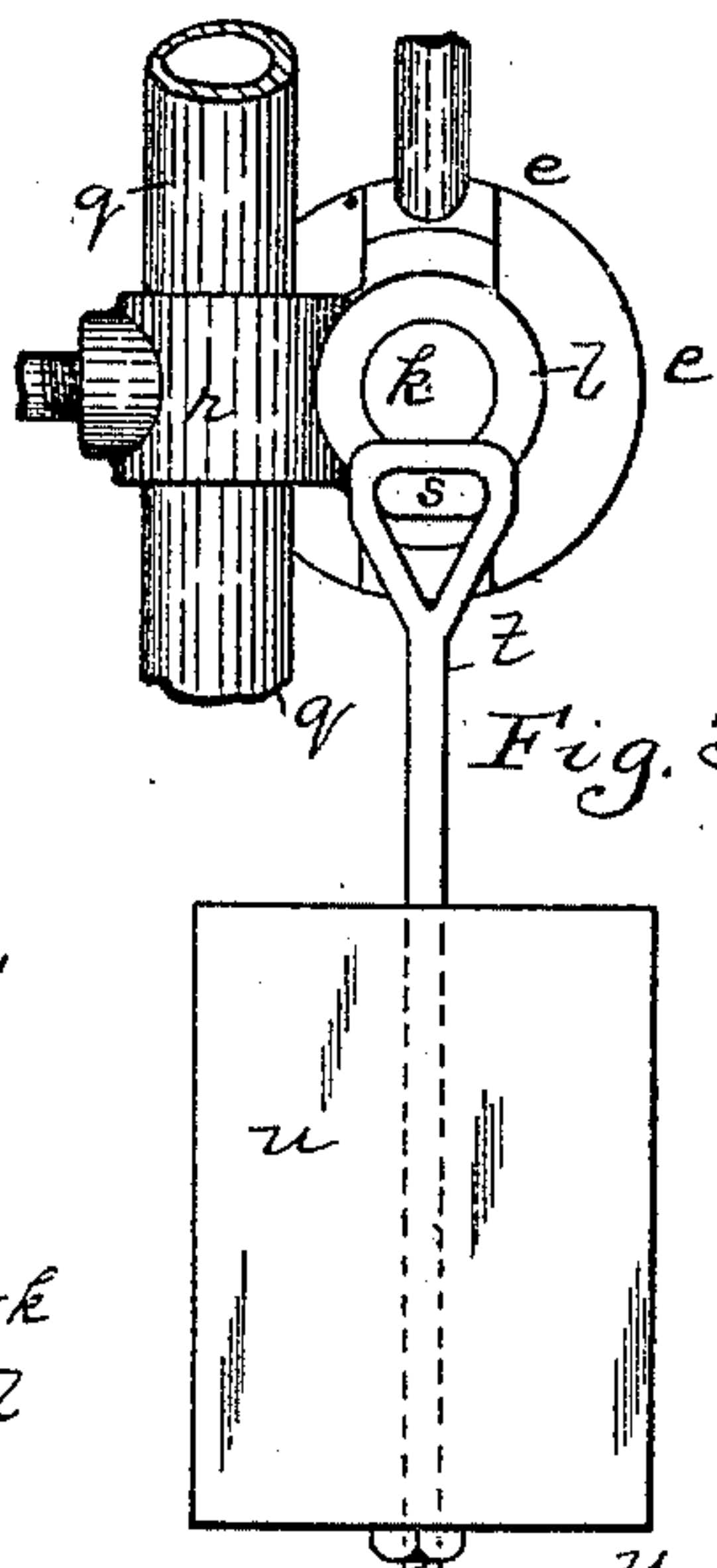


Fig. 5.

Inventor:  
George Palm.  
By Kay, Totten & Cooke  
Attorneys

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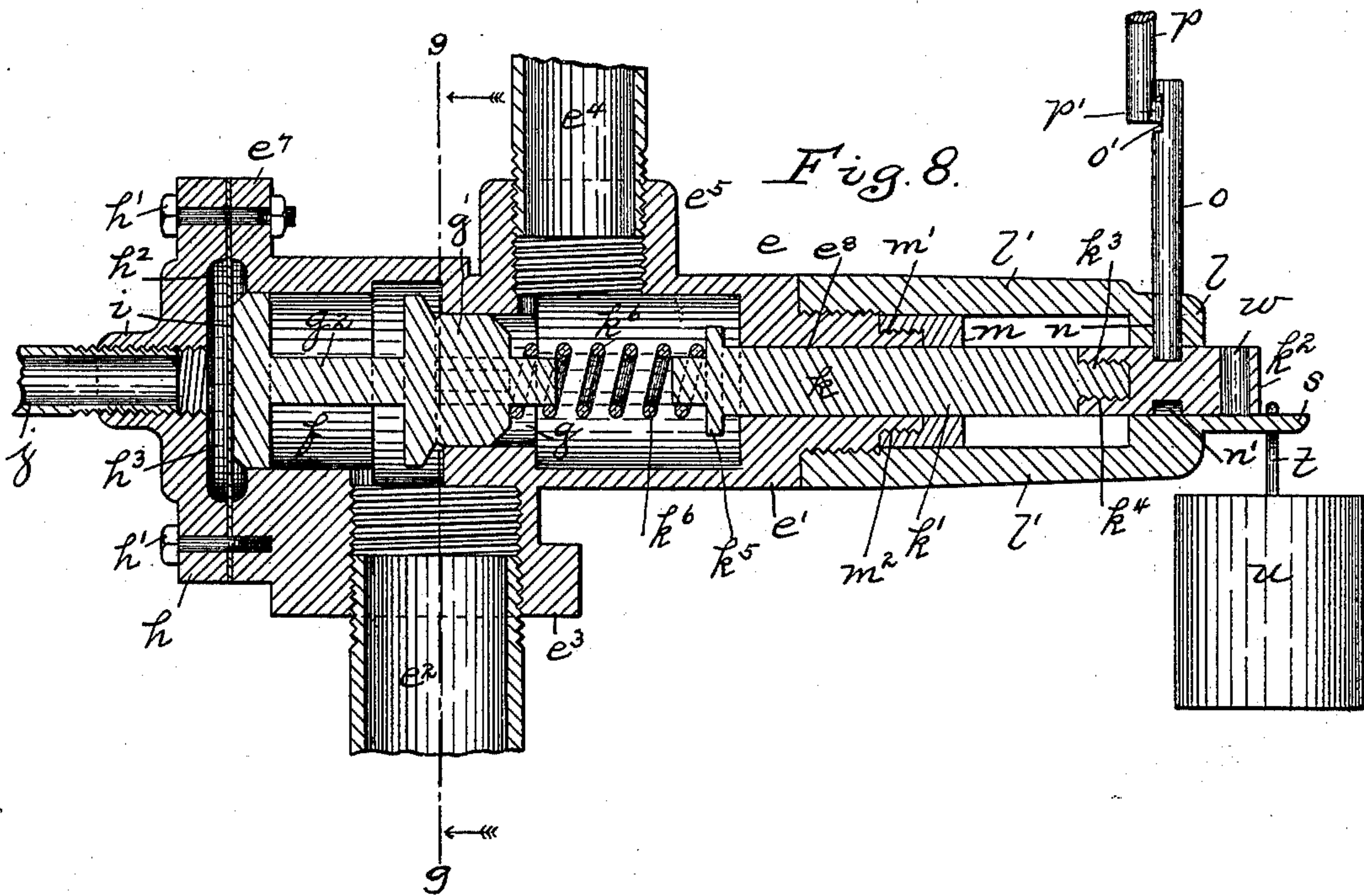


Fig. 8.

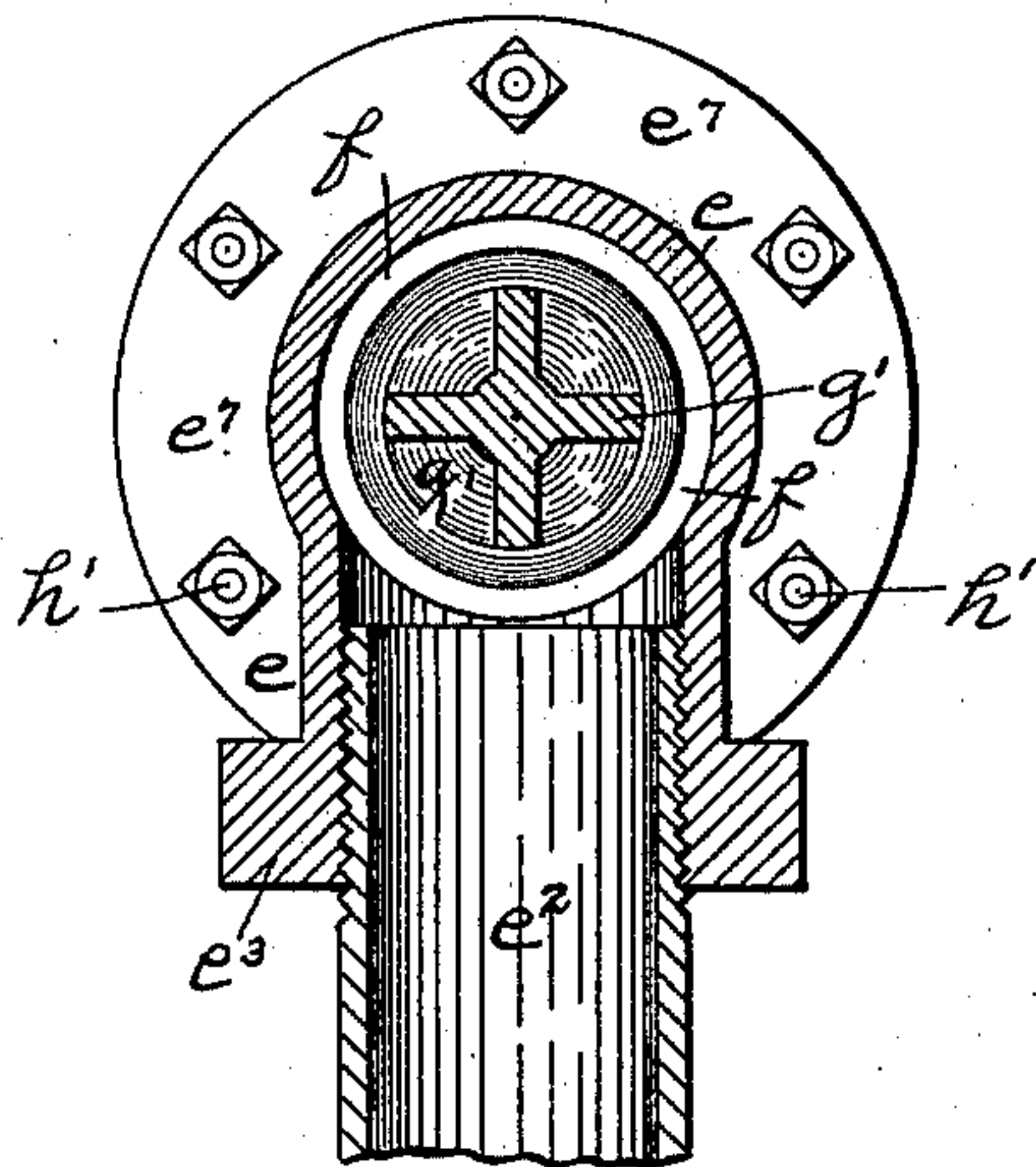


Fig. 9.

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# UNITED STATES PATENT OFFICE.

GEORGE PALM, OF BUTLER, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO  
M. H. BROOKS, OF SAME PLACE.

## GAS REGULATOR AND CUT-OFF.

SPECIFICATION forming part of Letters Patent No. 509,395, dated November 28, 1893.

Application filed January 13, 1893. Serial No. 458,204. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE PALM, a resident of Butler, in the county of Butler and State of Pennsylvania, have invented a new and useful Improvement in Gas Regulators and Cut-Offs; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to gas regulators and cut-offs, and has special reference to a device for use on steam boilers although it can be used in connection with other objects and for other purposes.

The object of my invention is to provide a gas regulator and cut-off which will automatically shut off the supply of gas or other fluid fed to the boiler when the steam pressure becomes too high therein, thereby putting out the fire and preventing explosions so frequent from neglect and carelessness.

Another object of my invention is to regulate the supply of gas fed to the boiler, so that the steam pressure cannot get too high or too low in the boiler, but can always be kept at the desired amount required to operate the machinery.

My invention consists, generally stated, in combining with a fuel regulator, a steam boiler and furnace, a fuel supply pipe leading to the regulator, a fuel exit pipe leading therefrom to the furnace, a valve in the regulator, a detent for the valve, a thermostatic tube leading from the boiler at or about the low water line, a rod connecting the end of said tube with the detent so that by the expansion of the tube the detent is released and means for closing the valve.

It also consists in certain other details of construction and combination of parts, all of which will be more fully hereinafter set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings in which—

Figure 1 is a side view of a steam boiler showing my invention applied thereto. Fig. 2 is a front view of the same. Fig. 3 is a plan view of the gas regulator or cut-off. Fig. 4 is a longitudinal section of the same. Fig. 5 is an end view of the same. Fig. 6 is an en-

larged cross section of the same on the line 6—6, Fig. 4. Fig. 7 is an enlarged cross section on the line 7—7, Fig. 4. Fig. 8 is an enlarged longitudinal section of the gas regulator and cut-off, and Fig. 9 is a cross section of the same on the line 9—9, Fig. 8.

Like letters herein indicate like parts in each of the figures of the drawings.

My invention is shown as applied to a steam boiler of common form, but it may be used with any other form of boiler or object desired. The steam boiler *a* has the steam dome *b*, whistle *c* communicating therewith, and the high, medium and low water gage cocks *d d' d<sup>2</sup>* on the front of the steam boiler.

Located on one side of the steam boiler *a* near the fire box *a'* is the gas regulator and cut-off *e* which has formed in its case *e'* the chambers *f f'* which are connected by a passage *g* formed between them. Moving within said passage *g* is the valve *g'* which has the valve stem *g<sup>2</sup>* thereon, having at one end the head *g<sup>3</sup>*. The gas regulator and cut-off *e* has the gas supply pipe *e<sup>2</sup>* leading into it, as at *e<sup>3</sup>*, and the gas discharge pipe *e<sup>4</sup>* leading therefrom at *e<sup>5</sup>* and into the fire box *a'* of the steam boiler *a*, as at *e<sup>6</sup>*. The gas regulator or cut-off *e* has the flange *e<sup>7</sup>* formed on one end to which is bolted the plate *h* by means of the bolts *h'*, this plate *h* being cut away, as at *h<sup>2</sup>*, to form the steam pressure chamber *h<sup>3</sup>* for the entrance of the steam. Interposed between the flange *e<sup>7</sup>* and the plate *h* is the diaphragm *i*, while leading into the chamber *h<sup>3</sup>* through the plate *h* is the steam pipe *j* which takes its supply from the dome *b* of the steam boiler *a*, as at *j'*. The steam from the steam pipe *j* acts to regulate the supply of gas to the steam boiler *a* by means of the steam pressing against the diaphragm *i* which is communicated to the valve *g'* by means of the head *g<sup>3</sup>* on the valve stem resting against the diaphragm. The steam pressure pipe *j* has the valve *j<sup>3</sup>* thereon, and the petcock *j<sup>2</sup>* near the gas regulator or cut-off *e*, so that the steam can be exhausted from said pipe *j* when desired. At the opposite end on the gas regulator or cut-off *e* from the flange *e<sup>7</sup>* is the opening *e<sup>8</sup>* through which passes the detent *k*. This detent *k* is formed in two parts *k' k<sup>2</sup>* and passes through the bearing *l* connected with



the gas regulator or cut-off *e* by means of the supports *l'* formed as part of the bearing *l* and gas regulator and cut-off. The part *k'* of the detent *k* has the threaded end *k<sup>3</sup>* with which the part *k<sup>2</sup>* having the threaded socket *k<sup>4</sup>* engages. The detent *k* is provided with the annular collar *k<sup>5</sup>* between which and the valve *g'* in the passage *g* a heavy spiral spring *k<sup>6</sup>* is interposed.

The gas regulator and cut-off *e* has the stuffing box *m* through which the detent *k* passes, the said stuffing box *m* being formed by the threaded end *m'* on the gas regulator and cut-off *e*, and the threaded coupling *m<sup>2</sup>* engaging with said threaded end *m'*.

Passing through an opening *n* in the bearing *l* and entering an annular seat *n'* in the detent *k* is the pin *o* which has the notch *o'* thereon with which a rod *p* engages by means of a hook *p'* thereon, this rod *p* being connected at *p<sup>2</sup>* to an expansion pipe *q* which extends up vertically alongside of the steam boiler *a* and in line with the rod *p*. The expansion pipe *q* is supported in a bearing *r* extending out and forming part of the gas regulator and cut-off *e* and has the drip valve *q'* thereon, while communicating with the expansion pipe *q* is the branch pipe *q'* which connects with the gage cock *d'* at or near the low water line in the boiler.

Projecting out from the end of the gas regulator and cut-off *e* is the extension or lug *s* on which hangs by a hook or loop *t* the weight *u*, this loop *t* extending up in front and in the course of the detent *k*. Connected to the weight *u* by any suitable means is the cord *v* which operates the whistle *c* on the boiler. An opening *w* is formed in the end of the detent *k* into which any suitable bar or lever can be inserted to turn the part *k<sup>2</sup>* by means of its threaded socket *k<sup>4</sup>* being connected to the threaded end *k<sup>3</sup>* on the part *k'* and so increase or decrease the tension on the spring *k<sup>6</sup>* and the length of movement of the valve *g'* in the gas regulator and cut-off.

The operation of my invention is as follows:—The steam boiler *a* contains the usual amount of water which generates the steam under the influence of the fire contained in the fire box *a'*, the steam filling the space in the upper part of the boiler *a* and the dome *b* to which is connected the steam pressure pipe *j* attached to the gas regulator or cut-off located at the side of the boiler. In case the steam pressure in the boiler becomes too high, the steam passes into the pipe *j* and strikes the diaphragm *i* against which rests the head *g<sup>3</sup>* of the valve *g'*, and so acts to regulate the amount of gas fed through the passage *g'* from the gas supply pipe *e<sup>2</sup>* and the chamber *f* into the fire box *a'* of the boiler through the discharge pipe *e<sup>4</sup>*. When the water in the boiler becomes too low, the hot steam will pass into the expansion pipe *q* through the branch pipe *q<sup>2</sup>* from the gage cock *d'* on the boiler, so heating said expansion pipe *q* and expanding the same which raises the rod *p*

connected thereto and to the pin *o*, and frees said pin *o* from engagement with its seat *n'* in the detent *k*. The detent *k* is then released and the pressure on the spring *k<sup>6</sup>* relieved, which allows the valve *g'* to close the passage *g* and shut off the supply of gas fed into the chamber *f* from the gas supply pipe. In order to sound an alarm upon the shutting off of the gas, the end of the detent *k*, at the instant almost of its release by the withdrawal of the pin *o*, strikes against the loop *t*, carrying the weight *u*, which knocks the said weight *u* off the extension or lug *s* on the gas regulator or cut-off *e* and blows the whistle *c* on the dome *b* of the boiler through the medium of the cord *v* attached thereto. When it is desired to reset the valve *g'*, all that is necessary is to shut off the entrance of the steam into the pipe *j* by means of the valve *j'*. Then the petcock *j<sup>2</sup>* can be opened, allowing any surplus steam in the pipe *j* to escape, when the detent *k* can be pushed back by hand so compressing the spring *k<sup>6</sup>* which moves the valve *g'* back so as to open the passage *g* for the entrance of the gas. The pin *o* is then inserted in the annular seat *n'* of the detent *k* and the rod *p* connected to the pin *o*; the valve *j'* can then be opened and the petcock *j<sup>2</sup>* closed, when the gas regulator and cut-off is again ready for another operation.

The apparatus is simple in its construction, positive in its movement, and not liable to get out of order. It can be applied to any form of boiler easily and cheaply, and overcomes all liability of explosions so frequently caused by low water and high steam pressure.

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

1. In gas regulators and cut-offs, the combination with a fuel regulator, of a steam boiler and furnace, a fuel supply pipe leading to the regulator, a fuel exit pipe leading therefrom to the furnace, a valve in the regulator, a detent for the valve, a thermostatic tube leading from the boiler at or about the low water line, a rod connecting the end of said tube with the detent so that by the expansion of the tube the detent is released, and means for closing the valve, substantially as and for the purposes set forth.

2. In gas regulators and cut-offs, the combination with a fuel regulator, of a steam boiler and furnace, a fuel supply pipe leading to the regulator, a fuel exit pipe leading therefrom to the furnace, a valve in the regulator, a detent for the valve, a thermostatic tube leading from the boiler at or about the low water line and having a rod connected thereto, a pin connected to the rod and to the detent for the valve, so that when the said pin is withdrawn, the detent is released and will permit the closing of the valve and so shut off the fuel supply, substantially as and for the purposes set forth.

3. In gas regulators and cut-offs, the combination with a fuel regulator, of a steam



boiler and furnace, a fuel supply pipe leading to the regulator, a fuel exit pipe leading therefrom to the furnace, a valve in the regulator, a detent for the valve, a thermostatic tube 5 leading from the boiler at or about the low waterline and having a rod connected thereto, a pin connected to the rod and to the detent for the valve, said detent being spring operated so that when said pin is withdrawn 10 the spring operated detent is released and will permit the closing of the valve and shut off the fuel supply, substantially as and for the purposes set forth.

4. In gas regulators and cut-off apparatus, 15 the combination of a regulator case, a fuel supply pipe, an exit pipe, a cut-off valve within the regulator case, a separate detent sliding in the case, a spring confined between the valve and detent and a pin holding the detent in place, and means for operating the 20 valve when the detent is released, substantially as and for the purposes set forth.

5. In gas regulators and cut-off apparatus, the combination of a regulator case, a fuel

supply pipe, an exit pipe, a cut-off valve within the regulator case, a separate detent sliding in the case, a spring confined between the valve and detent and a pin engaging with a seat in said detent and holding it in place, and means for operating the valve when the 30 detent is released, substantially as and for the purposes set forth.

6. In gas regulator and cutoff apparatus, the combination of a regulator case, a separate detent sliding in the case, a spring confined between the valve and detent, a whistle, 35 and a weight supported in the course of the detent and adapted to drop when forced from its support by the detent and so act to operate the whistle, substantially as and for the 40 purposes set forth.

In testimony whereof I, the said GEORGE PALM, have hereunto set my hand.

GEORGE PALM.

Witnesses:

G. W. CAMPBELL,  
J. N. COOKE.