

(No Model.)

2 Sheets—Sheet 1.

F. E. THOMAS, N. S. DOUGLAS, A. B. SMITH &  
D. H. TWING.

CRUDE PETROLEUM BURNER.

No. 364,062.

Patented May 31, 1887.

Fig. 1.

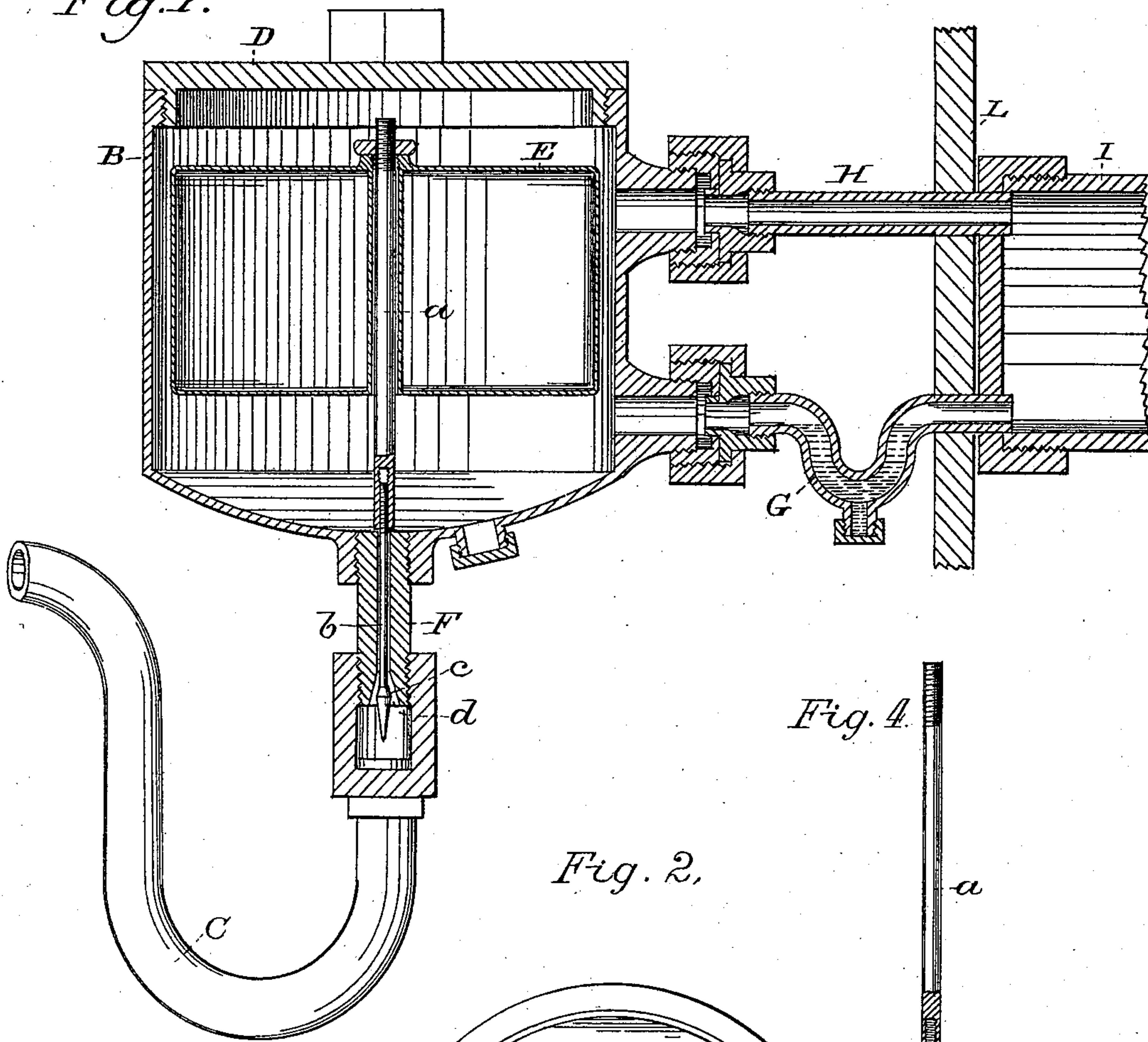
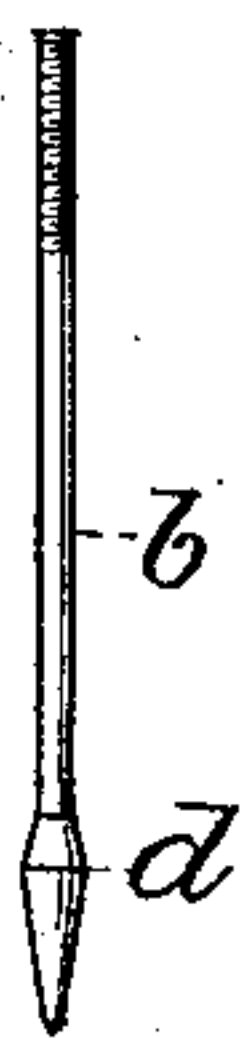
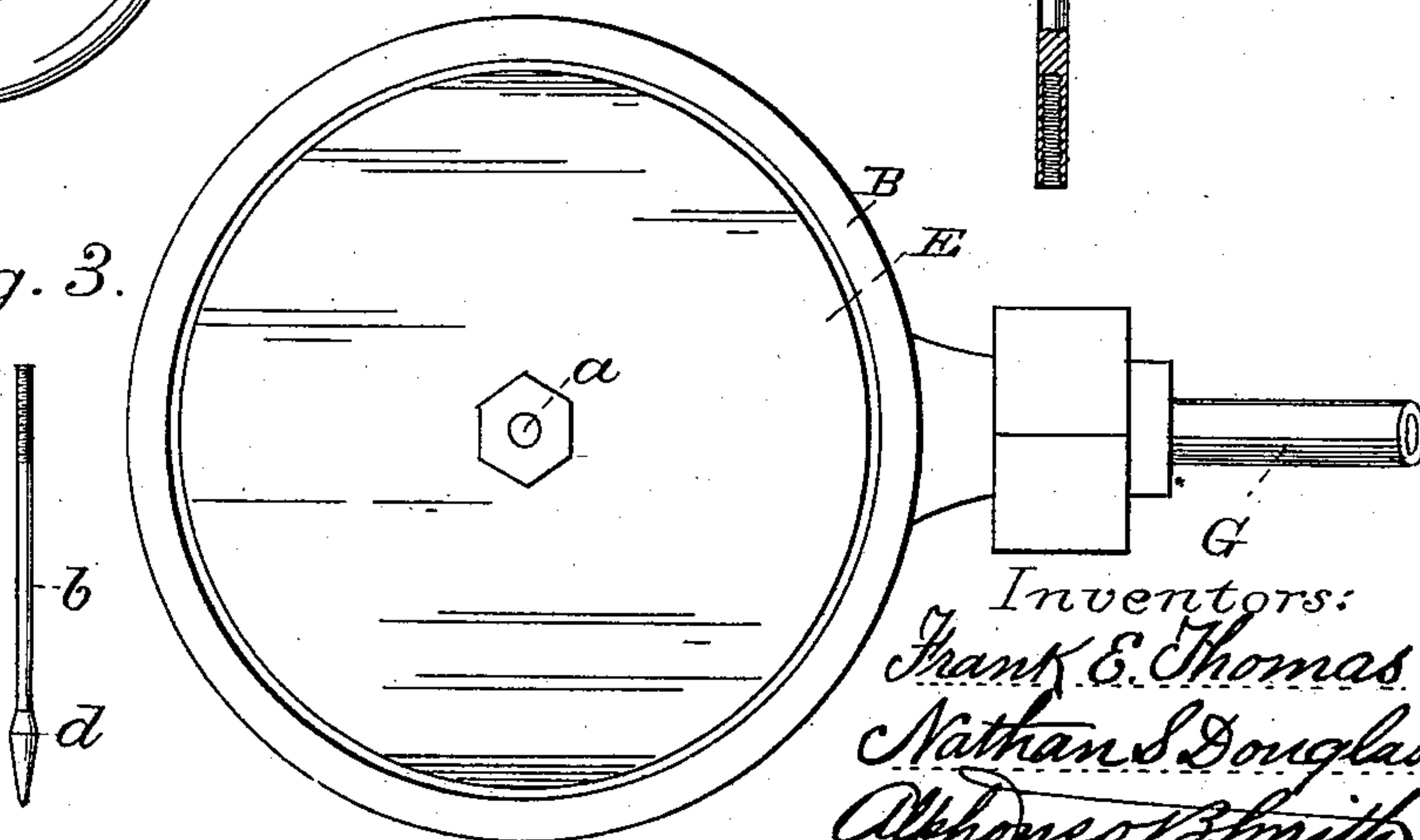


Fig. 4.



Fig. 2.

Fig. 3.



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2 Sheets—Sheet 2.

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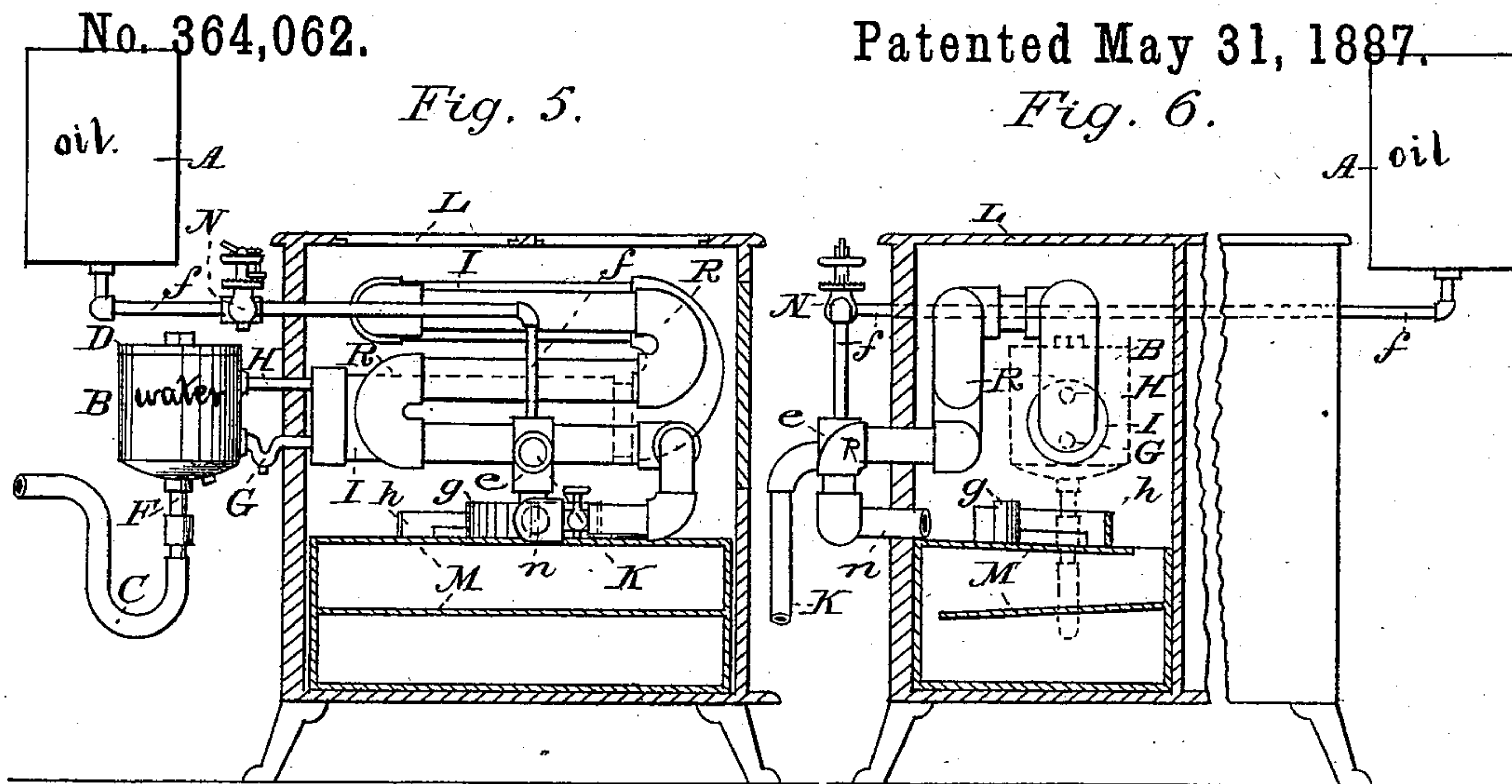


Fig. 8.

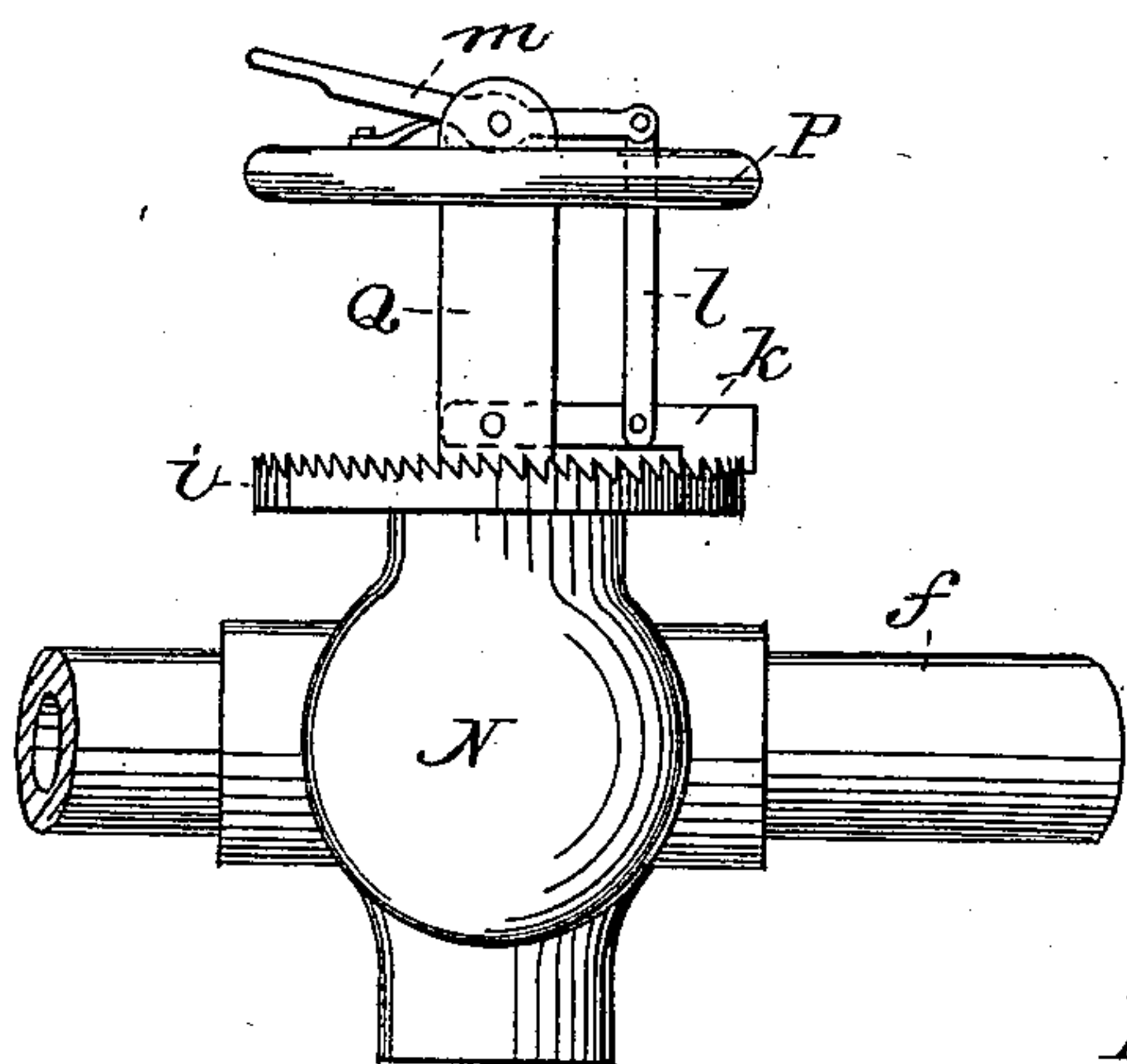


Fig. 9.

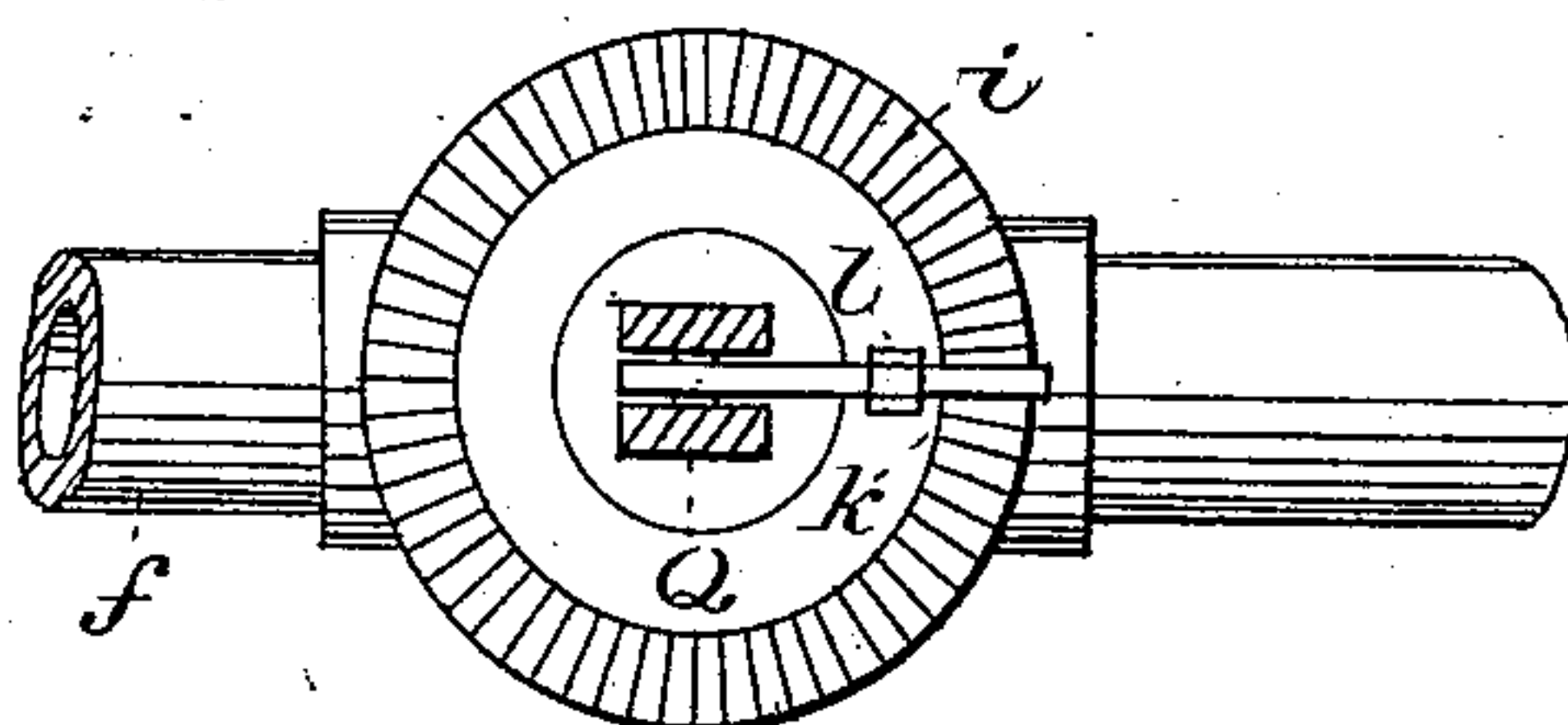
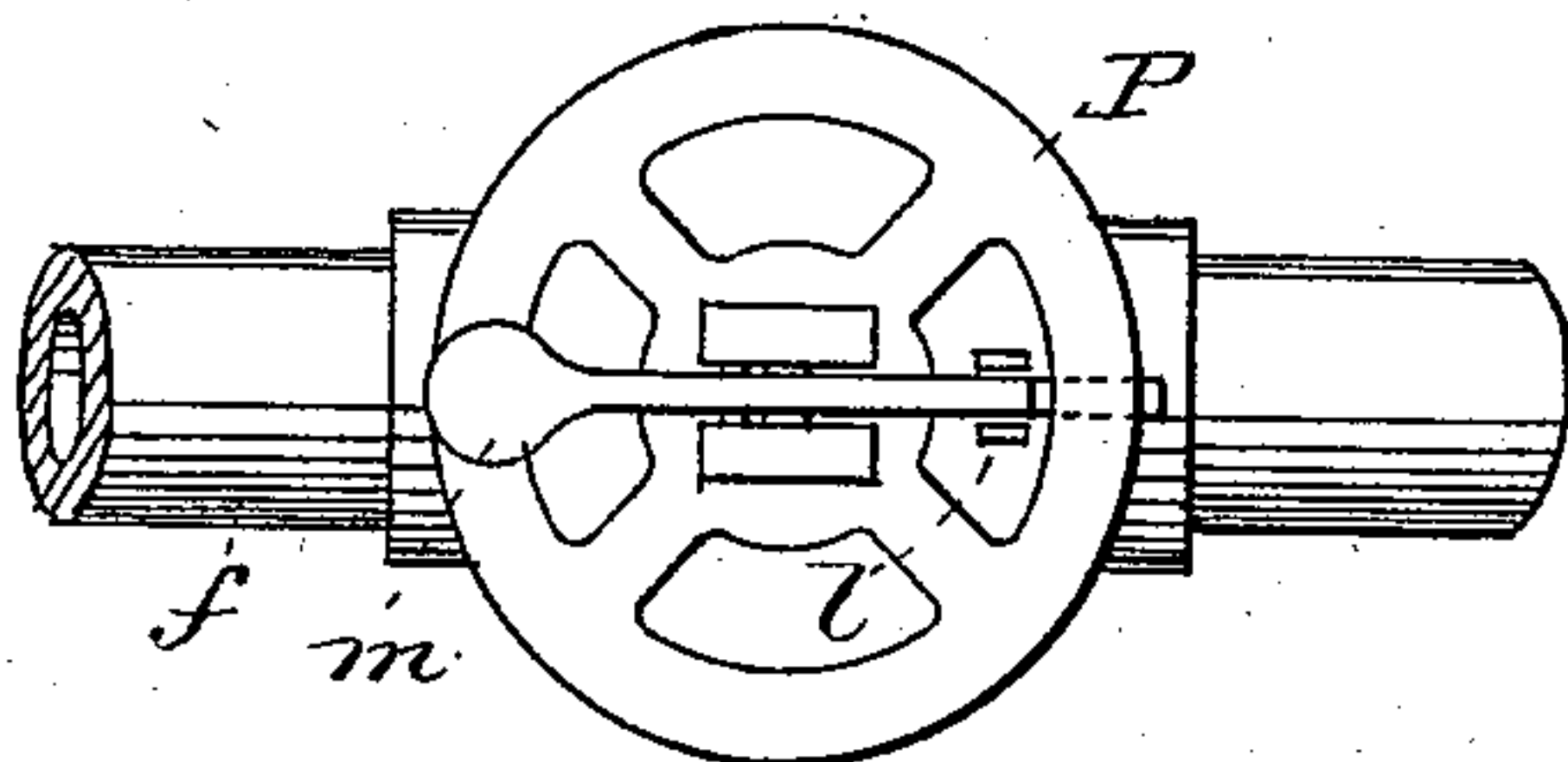


Fig. 10.



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# UNITED STATES PATENT OFFICE.

FRANK E. THOMAS, NATHAN S. DOUGLAS, ALPHONSO B. SMITH, AND DANIEL H. TWING, OF OAKLAND, CALIFORNIA; SAID SMITH ASSIGNOR TO E. F. DELGER, OF SAME PLACE.

## CRUDE-PETROLEUM BURNER.

SPECIFICATION forming part of Letters Patent No. 364,062, dated May 31, 1887.

Application filed June 16, 1886. Serial No. 205,385. (No model.)

*To all whom it may concern:*

Be it known that we, FRANK E. THOMAS, NATHAN S. DOUGLAS, ALPHONSO B. SMITH, and DANIEL H. TWING, all citizens of the United States of America, and residents of the city of Oakland, county of Alameda, State of California, have invented new and useful Improvements in Crude-Petroleum Burners, of which the following description is a full, clear, and exact specification.

Our invention relates to crude-petroleum burners for stoves, furnaces, and other uses, in which crude petroleum is mixed with water or steam and air in suitable proportions before feeding the mixture for burning to the stove or furnace; and the invention consists in the features of construction and combinations of parts, hereinafter fully described, and pointed out in the claims.

In the drawings, Figure 1 is a sectional elevation of the feed-water tank, steam and water pipes, stove plate or shelf, water and steam pipes within the stove, valve or cut-off, and also showing main or supply pipe. Fig. 2 is a top view of the cover of the feed-water tank. Fig. 3 is a detail view of the valve-stem. Fig. 4 is a view of the adjusting-rod connecting the float with the valve-stem. Fig. 5 is a diametrical side view of the stove, showing water and oil pipes, flame distributors or deflectors, oil plates or shelves, oil-tank, connecting-pipe, stop-cock, feed-water tank and its connecting-pipes. Fig. 6 is a diametrical end view of the stove, showing the oil-tank, connecting-pipe, stop-cock, air-pipe, flame-deflectors, and oil plates or shelves. Fig. 7 is a front view of an oil plate or shelf and the flame deflectors or distributor. Fig. 8 is a side view of the stop-cock for regulating the flow of oil, with its ratchet and lock-stop. Fig. 9 is a horizontal view of the ratchet and lock-stop bar on valve, and Fig. 10 is a horizontal view of the upper wheel and the lever on valve.

Referring to the drawings, A represents a tank of ordinary construction.

e represents a mixing box or chamber, which is connected with the oil-tank by means of a pipe, f. The oil passes through the said pipe f, to the mixing-chamber, where it meets a flow of fresh air from the air-pipe K (which

communicates with the mixing chamber at one side thereof) and water or steam, which issues from pipes R. These pipes are heated by the fire which is burning between and below them on the oil plates or shelves M. For regulating the flow of oil we have constructed a stop-cock, N, wherewith the flow or feed of oil is regulated as desired. The body of this stop-cock N has on its top a rim, whose upper surface is notched in such a manner as to form a ratchet, i, for setting or locking the valve-stem Q at any desired point. To this valve-stem Q is pivoted a bar, k, whose outer end fits snugly into any groove of the ratchet. For lifting the bar k we have provided a rod, l, which is pivotally connected with the bar k at one end, its other end being pivoted to a lever, m, which is pivoted near its center on top of the turning-wheel P or to a projection of valve-stem Q. When it is desired to have a flow of oil, the outer end of the lever m is pressed downwardly, thereby lifting the bar k out of the ratchet, and by turning the wheel P the valve is opened or closed, as desired.

It will be seen that by the construction before described the valve is securely locked in a closed position, but at the same time that it may be readily unlocked by simply depressing lever m to raise the bar k from engagement with the ratchet, and locked by simply releasing said lever.

For regulating the feed of water which is obtained from the main water-supply pipe we have constructed a metal tank, B, whose cover D is screwed on. For regulating the supply of water to this tank we have provided an automatic-acting valve, which is constructed in the following manner: Connected with the bottom of the tank B is a short metallic pipe, F, connecting the same with the main supply-pipe C. The pipe F has a small hole through its center lengthwise, and at its bottom this hole is enlarged. Through the hole in the pipe F we pass loosely a rod or stem, b, one side of which is flattened or grooved for the passage of water. This stem b is provided at its lower end with a projection or enlargement, d. The upper portion or shoulder of this enlargement fits closely in the lower end or seat of the hole c, and when brought to that



position will close the supply of water from the main. To the top of the stem *b* is adjustably connected a rod or stem, *a*, which passes through a tube, *a'*, in a hollow float, *E*, in the tank *B*, and the float is secured on said rod by a nut, *a*<sup>2</sup>. When the water is low in the tank, it drops and lowers the stem *b*. The projection will drop from its seat in the hole *c* and allow the water to pass into the tank until its height is sufficient, raising the float, which draws up the stem *b*, and closing further supply of water. For the purpose of passing the water from the tank *B* into the pipes *R* within the stove we have provided and connected therewith at its lower end a siphon pipe or trap, *G*. This siphon shape we prefer, as it will prevent the backflow of steam at this point to the tank *B* from pipes *R*.

For the purpose of heating the water within the tank *B* we have provided a pipe, *H*, which connects the upper section of tank *B* and pipe *R*.

Whenever a fire is desired, we first admit the crude petroleum through the pipes *f* and *n* to the surface of the oil plates or shelves *M*, which are made of suitable metal and placed at an incline, and may be either plain or corrugated. Water is then admitted to the pipes *R* from the tank *B*, while the air-pipe may be always open. We then ignite the petroleum which is on the plates or shelves *M*. By means of the heat obtained from the ignited petroleum the water in the pipes *R* is heated and steam generated, which passes through the pipes *R* into the mixing-chamber *e* and mixes therewith the petroleum and air, and being thus combined the mixture will pass through pipe *n* onto the plates or shelves *M*, where it is instantly ignited, as it is then in a gaseous condition, or in the shape of hydrocarbon. The supply of each ingredient may be regulated by suitable stop-cocks. (Not shown.)

For spreading the flame when issuing from the pipe *n* we have provided the upper plate or shelf *M* with devices which we call "flame-distributing" or "scattering" plates *g h*, Fig. 7. This we construct in the following manner: At a distance of about two inches from the mouth of the pipe *n*, and secured to the upper plate *M*, is a double-curved piece of metal, *g*, Fig. 7, the center of the flame striking its sharp point, and curves or scatters off on its side flanges. At a further distance of about two inches (more or less) there is secured to plate or shelf *M* another circular-shaped deflecting or flame-distributing plate or shelf, *h*, for completing the distribution and combustion of the flame. We generally use several oil plates or shelves *M*, one above the other, so that if there is more petroleum on the upper plate than will burn off readily it will drip upon the lower plate or shelf, and there be readily consumed.

We are aware that it is not broadly new to combine with a valve a locking device comprising an arm projecting from the valve-stem and a disk secured to the body of the valve

and having a series of openings to receive movable pins, said pins being set in place to serve as stops for said arm; but this construction is objectionable, since it is necessary every time the valve is to be opened or closed to remove the pins to allow the arm connected with the valve-stem to be turned.

We are also aware that the fire-plates of petroleum-burners have been provided with a rim or ledge, so that when the plates are placed one above the other a space will be formed between them; but our invention differs essentially from this construction, in that we provide our plates with a peculiar construction of scatterer or distributor for spreading the flame.

We are also aware that the oil-plates have been provided with projections to serve as scatterers, such construction being shown and described in the patent of Cook, No. 68,704; but our invention differs from this construction in the peculiar construction and arrangement of the plates *g h*, whereby the oil is more effectually spread than it can be by said projections.

We are also aware that it is not broadly new to locate a mixing-chamber within the range or stove, and to provide oil, water, and air pipes to enter the same, hence do not claim such construction, broadly; but

We claim—

1. In a hydrocarbon-furnace, the combination, with the oil-tank, mixing-chamber, and pipe connecting them, of the stop-cock *N*, with ratchet *i*, pivoted bar *k*, connecting-rod *l*, pivoted lever *m*, wheel *P*, and valve stem *Q*, substantially as set forth.

2. In a hydrocarbon-furnace, the combination, with the stove, the mixing-chamber, and the oil, water, and air supply pipes connected with said chamber, of the plates *M* within the stove, the supply-pipe *n*, leading from the mixing-chamber to said plates, the flame-distributing plate *g*, and the circular flame-distributing plate *h*, said distributing-plates being arranged upon the plates *M*, as set forth.

3. In a hydrocarbon-furnace, the combination, with an oil-tank and a water-feed tank, of a mixing-chamber arranged exterior to the stove or range, a pipe connecting the oil-tank with the mixing-chamber, an air-supply pipe connecting with the mixing-chamber, the pipes *R*, communicating with the water-tank and mixing-chamber, the plates *M*, and the pipe *n*, leading from the mixing-chamber to the plates, substantially as set forth.

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