(No Model.) 3 Sheets—Sheet 1.

F. RHIND.

AUTOMATIC LIGHTING DEVICE.

No. 563,412. Patented July 7, 1896.

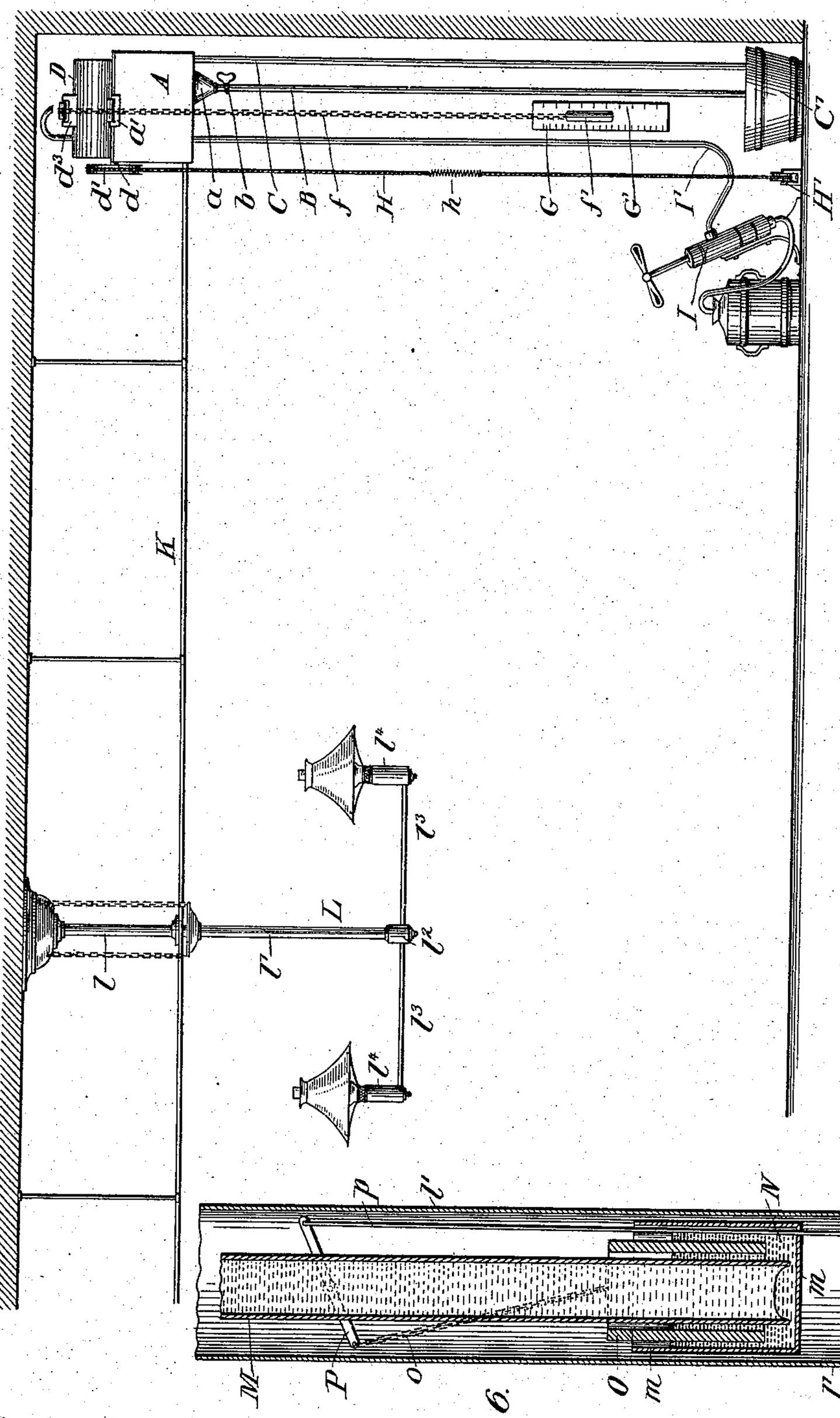

Fig. 1.

Witnesses.
Ella H. Cooper.
Mary J. Rhind.

Inventor.
Frank Rhind
per Geo. L. Cooper Atty.

(No Model.) 3 Sheets—Sheet 2.

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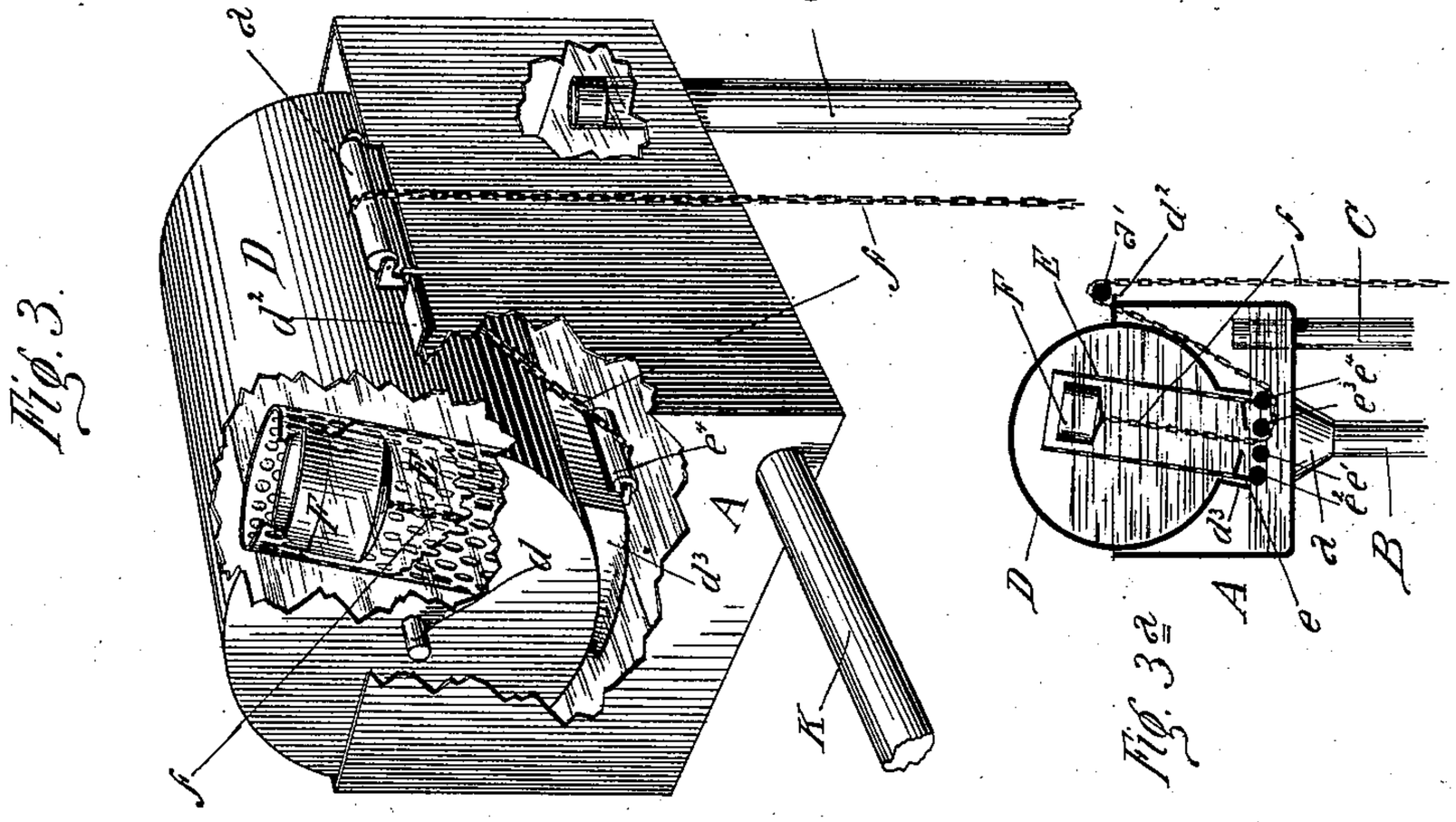

Fig. 3.

Fig. 3a

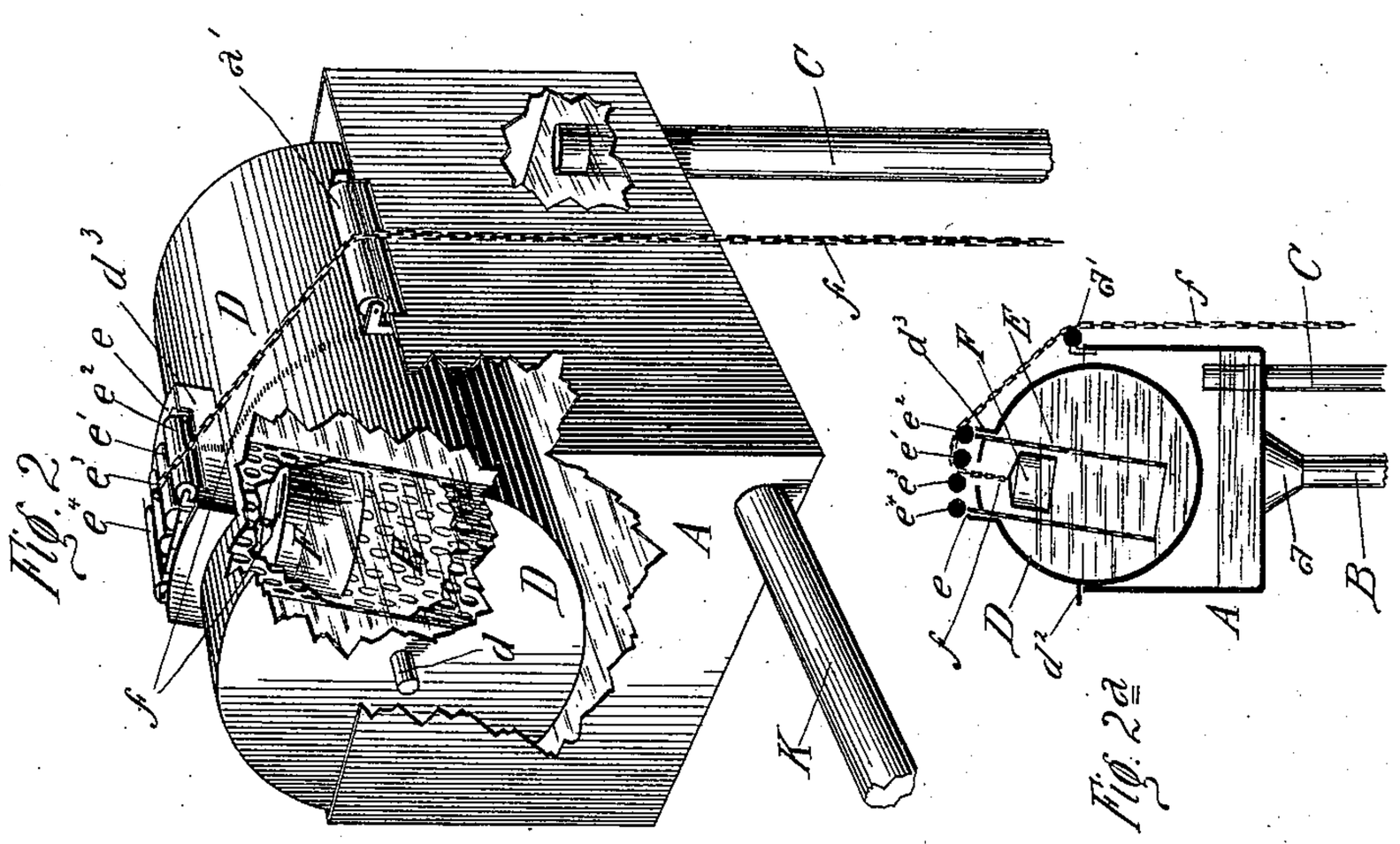

Fig. 2.

Fig. 2a

WITNESSES.

Elmer E. Spencer

Benjamin L. Graham

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ATTORNEY.

(No Model.)

3 Sheets—Sheet 3.

F. RHIND.

AUTOMATIC LIGHTING DEVICE.

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Fig. 4.

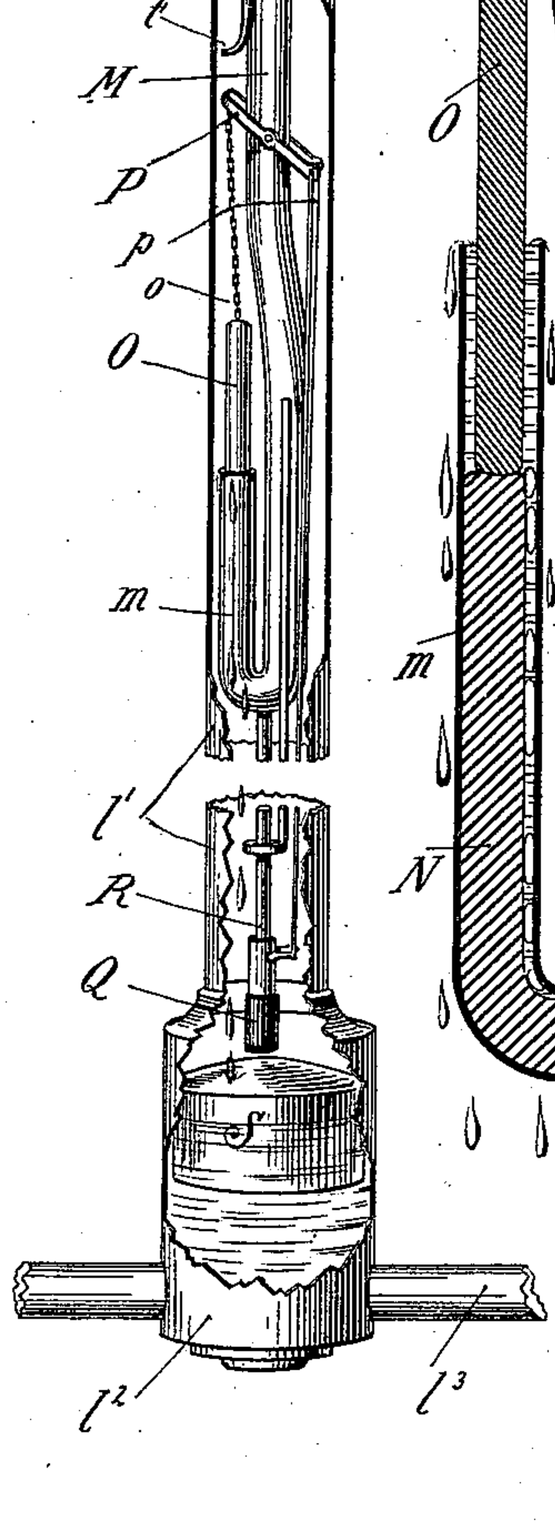


Fig. 4a.

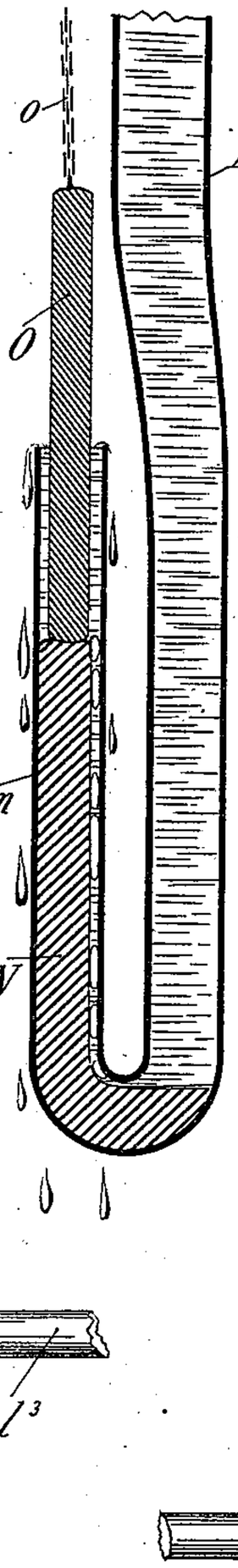


Fig. 7.

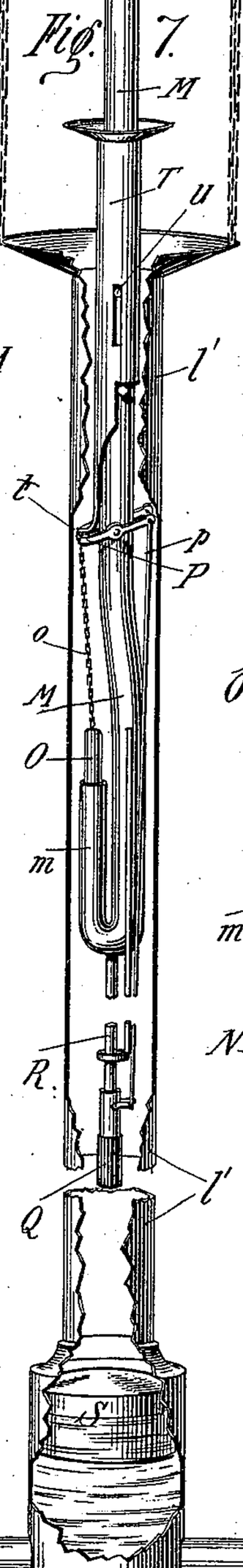


Fig. 5a.

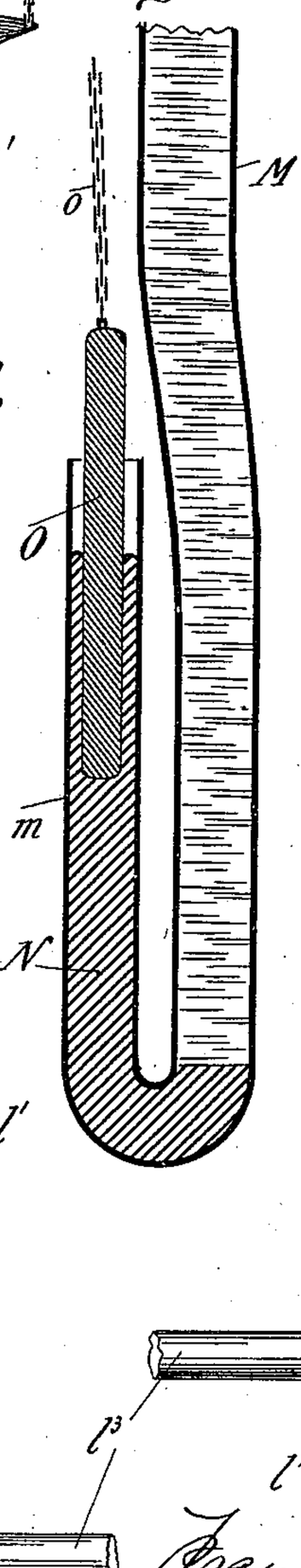
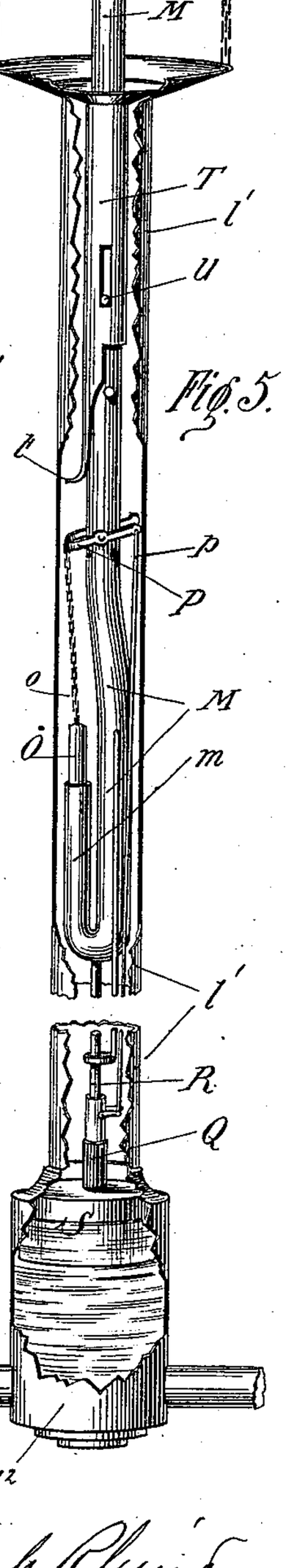


Fig. 5.



WITNESSES.

Elmer E. Spencer.
Benjamin L. Graham.

Frank Rhind
INVENTOR.

BY Geo. L. Cooper
ATTORNEY.

UNITED STATES PATENT OFFICE.

FRANK RHIND, OF MERIDEN, CONNECTICUT.

AUTOMATIC LIGHTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 563,412, dated July 7, 1896.

Application filed September 13, 1894. Serial No. 522,899. (No model.)

To all whom it may concern:

Be it known that I, FRANK RHIND, a citizen of the United States, residing at Meriden, New Haven county, Connecticut, have invented a new and useful Improvement in Automatic Lighting Devices, of which the following is a specification.

My invention relates to that class of lighting devices in which one or more burners are supplied with a liquid hydrocarbon from a source above their own level. It is intended to make such devices safe, cleanly, and in the highest degree automatic in their action.

In the accompanying drawings, Figure 1 represents my device in elevation. Figs. 2 and 3 show a portion of my device in perspective and partly broken away, Figs 2^a and 3^a being cross-sections of Figs. 2 and 3, respectively. Figs. 4, 5, and 7 show in elevation, partly broken away, another portion of my device, Figs. 4^a and 5^a being sectional views, on an enlarged scale, of a part of Figs. 4 and 5, respectively. Fig. 6, in vertical section and on the same scale as Figs. 4^a and 5^a, shows a modification of that portion of my device.

The same letters refer to like parts in the several views.

A designates an oil-feeding tank provided with funnel-bottom *a* and guide *a'*; B, a waste-pipe provided with cock *b*; C, an overflow-pipe; C', an overflow vessel; D, a rotatable oil-tank provided with trunnions *d*, pulley *d'*, stop d^2, and mouth d^3; E, a guide-tube provided with mouth *e* and guides e' e^2 e^3 e^4; F, a float with attached cord or chain *f* and counterpoise *f'*; G G', scales; H, a belt provided with spring *h*; H', an idler; I, a pump; I', a feed-pipe; K, a conducting-pipe or pipe system; L, a chandelier formed with upper or stationary part *l*, movable part *l'*, well or case l^2, arms l^3, and burner portions l^4; M, a feed-tube formed with a cup *m*; N, a body of mercury in the cup *m*; O, a plunger suspended from a cord or chain *o*; P, a lever or rock-shaft; *p*, a cord or wire; Q, a weight; R, a guide-rod; S, a float; T, a sleeve formed with finger *t*; U, a pin or stop.

In the example of my invention illustrated the feeding-tank A is shown as a rectangular box, the bottom of which is formed with a funnel-shaped depression *a*, to which is secured a waste-pipe B, provided with a stop-cock *b*. At the ends of the tank A are formed semicircular bearings, and at one side of the tank is a guide-roll *a'*. The overflow-pipe C is shown as passing into the tank A, having an opening some distance above the bottom of the tank and emptying into an overflow vessel or catch-basin C'. The trunnions *d* of the rotatable tank D, here shown as cylindric, rest in the bearings in the ends of the tank A. At the end of one of the trunnions *d* is attached a pulley *d'*, the function of which will hereinafter appear.

In the side of the tank D is a mouth or neck d^3, within which is secured, as by friction, the mouth *e* of the guide-tube E. At the mouth *e* are four guides e' e^2 e^3 e^4, here shown as parallel idler-rolls. Within the guide-tube E is the float F, shown as cylindric and of a size to move freely within the tube E in a longitudinal direction. To the float F is attached a cord or chain *f*, at the other end of which is a counterpoise or bob *f'*, running before scales G G'. A belt H passes over the pulley *d'* and an idler H', located beneath the tank A, and may have included in its length a tension-spring *h*, as shown.

A force-pump I is used to raise oil from any suitable can through the pipe I' to the tank D, the upper end of the pipe I' being bent downward immediately over the mouth d^3 of the tank.

A conducting-pipe K leads from the tank A to one or more chandeliers L or other desired lighting fixtures. The chandelier L is exteriorly of ordinary telescopic construction, having a stationary vertical tube *l*, attached to a ceiling-canopy, and a vertically-adjustable tube *l'*, at the lower end of which is a float-case l^2 and horizontal arms l^3, bearing the ordinary burner portions l^4. Passing downward through the axis of the chandelier L and tapping the conducting-pipe K is the vertical feed-pipe M, which is provided at its lower end with a cup *m*. (Shown in Figs. 4, 5, and 7 as a return-bend.) A body of mercury N roughly approximates in volume the capacity of the cup *m*, into which it is poured. Vertically adjustable within the open end of the bent portion *m* of the tube M is the plunger

O, here shown as a rod, preferably of metal. The plunger O is supported by a cord, chain, or wire *o*, attached at its upper end to one end of a lever or rock-shaft P. The lever P is here shown of U shape and pivoted on the tube M. To the other end of the rock-shaft P is attached a depending chain or wire *p*, leading downward to a counterpoise Q, which is limited to vertical motion by a guide-rod R. The float S is capable of vertical motion within the well or case l^2, and when near its highest position strikes against the weight Q, as shown in Fig. 5. A sleeve T, formed with a projecting finger *t*, has a vertical motion on the tube M, limited by the stop U.

The operation of my device will be readily understood from an examination of the drawings. The oil-feeding tanks A and D may be supported at or near the level of the ceiling of the room in which the lighting devices are to be placed or they may be at a distance or at a higher level. The tank D being turned to the position shown in Figs. 1 and 2, oil is pumped by the operator through the pipe I′ into the tank D. The counterpoise *f′*, falling as the float F rises in the guide-tube E, serves to show on the scale G when the tank D is full. If for any reason the operator should continue to pump too long, the surplus oil will flow over tank D into tank A and down to catch-basin C′ through overflow-pipe C. When the tank D is filled, it is turned to the position shown in Fig. 3. Oil then flows from tank D to tank A until the neck or mouth d^3 is immersed, when the flow ceases, the remaining oil in tank D being supported by atmospheric pressure. It is clear that as tank D is inverted the float F shifts to the other end of tube E and acts as oil is consumed to show the varying level of oil in tank D by the position of the counterpoise *f′* on scale G′. It will be noted that cord or chain *f* passes over guides e' e^2 at one side of mouth *e* when tank D is being filled and over guides e^3 e^4 at the other side of mouth *e* when the tank D is emptying by consumption. Any sediment or acid which may find its way into tank A being heavier than the oil drops into the funnel-bottom *a*, whence it may be occasionally drawn by opening cock *b*. The oil-conducting pipe K passes to the chandeliers L, one only of which is shown in the drawings. It is obvious that any desired number of chandeliers, brackets, or the like may be connected with the pipe K. In the axis of the chandelier-tubes *l* and *l′* is placed the feed-tube M, with its lower end *m* bent upward, as described. It is clear that oil passing from tank A through pipes K and M will overflow tube portion *m*, as shown in Fig. 4 of the drawings, the passage of the oil-bubbles through the mercury N being clearly shown at 4^a. When the oil in the well l^2 rises to the point shown in Fig. 5, the float S acts to raise the counterpoise Q, thus permitting the plunger O to descend in the tube or cup *m* and into the mercury N. The effect of this is to increase the height of the mercurial column in tube *m* and to shut off the flow of oil, as clearly shown in Figs. 5 and 5^a. Obviously as the oil-level in float-case l^2 is lowered by consumption at the burners l^4 the float S sinks, the counterpoise Q acts to lift the plunger O, the mercurial column shortens, so that it fails to balance the column of oil in tube M, and the flow recommences. While on the score of cheapness of construction I prefer the form of device just described it is clear that the modification shown in Fig. 6 of the drawings is precisely similar in its working. The difference is that I here show the tube M as opening into a separate cup *m* and the plunger O as tubular and surrounding the lower end of tube M.

When the adjustable portion *l′* of the chandelier L is lowered, as for lighting or trimming, carrying with it the float S, the sleeve T, normally-supported by its flanged upper end resting on the upper end of the tube *l′*, drops so that its projecting finger *t* strikes the plunger-supporting end of the rock-shaft P and depresses the plunger, thereby shutting off the flow of oil, as shown in Fig. 7. The body of oil in the burner portions l^4 and well l^2 is ample to support combustion until the chandelier can be returned to its normal position and the flow of oil resumed.

The advantages of my device are numerous. It will be seen that no oil is to be laboriously lifted or carried to the supply-tank, that by no carelessness on the part of the operator can the tank be overflowed, that the same bob acts to show the operator the exact level of oil in the tank both in operation and when filling, that the rotatable tank containing the bulk of the oil can readily be turned to its non-feeding position when the lights are not in use, thereby materially lessening the danger of flooding in case of a broken pipe, that a constant level is maintained in the lower tank, which insures a constant head or pressure of the oil column in the chandeliers and that no valves or packings are depended on to hold oil at any point. It will also be noted that it is not necessary in case of a very high ceiling to provide a correspondingly long and heavy column of mercury to balance an increased head of oil, as there is no practical limit to the length of guide-rod R and connecting-wire *p*, so that the float S may be separated from the cup *m* by any desired distance, the oil in any case dropping or running from cup *m* to well l^2.

I am aware that many mechanical alterations may be made in the various parts of my device without departing from my invention and that the separate parts thereof, which are not of necessity to be combined in each device, are capable of many different applications.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is as follows:

1. In combination a pump, a rotatable tank,

a pipe leading from said pump and with its free end adapted to discharge into said tank and a second tank into which said first-named tank is adapted to discharge, substantially as described.

2. In combination a pump, a rotatable tank, a mouth in the side of said tank, a pipe leading from said pump and with its free end above said mouth when said tank is turned to bring said mouth to its highest position and a second tank into which said mouth dips when said first-named tank is given substantially a semirotation, substantially as described.

3. In combination an elevated rotatable tank, a second and stationary tank below said first-named tank and into which it is adapted to discharge and means substantially as described for giving said first-named tank a partial rotation from beneath.

4. In combination an elevated rotatable tank, a second and stationary tank below said first-named tank and into which it is adapted to discharge, a waste-pipe leading from said stationary tank and means as a cock for closing said waste-pipe, substantially as described.

5. In combination an elevated rotatable tank, a second and stationary tank below said first-named tank and into which it is adapted to discharge and an overflow-pipe in said stationary tank with its opening above the normal liquid-level in said tank, substantially as described.

6. In combination a rotatable tank, a float in said tank and a counterpoise connected with said float and adapted to show the level of liquid in said tank in either of its acting positions, substantially as described.

7. In combination a rotatable tank, provided with a mouth, a guide-tube in said tank, a float in said guide-tube, a counterpoise, a cord or chain between said float and said counterpoise and a guide at either side of said mouth over one of which said chain passes when said mouth is at its highest point and over the other of which said chain passes when said mouth is at its lowest point, substantially as described.

8. In combination a liquid-discharge pipe, a cup at the lower end of said pipe, a balancing column of a relatively heavy liquid in said cup, a plunger adapted to move within said cup, a well beneath said discharge-pipe adapted to receive the liquid therefrom, a float in said well and means for communicating motion from said float to said plunger, substantially as described.

9. In combination a liquid-discharge pipe, a cup at the lower end of said pipe, a balancing column of a relatively heavy liquid in said cup, a plunger adapted to move within said cup, a counterpoise normally acting to raise said plunger, a well and a float in said well separate from and adapted to raise said counterpoise, substantially as described.

10. In an oil-chandelier in combination a stationary portion, a portion vertically movable on said stationary portion, an oil-discharge pipe in said chandelier, a cup at the lower end of said discharge-pipe, a plunger adapted to move within said cup and means substantially as described for forcing said plunger into said cup when said movable chandelier portion is lowered.

11. In an oil-chandelier in combination a stationary portion, a portion vertically movable on said stationary portion, an oil-discharge pipe in said chandelier, a cup at the lower end of said discharge-pipe, a balancing column of a relatively heavy liquid in said cup, a plunger adapted to move within said cup and a sleeve or weight within said chandelier and normally supported by said movable portion, said sleeve being adapted when said movable portion is lowered to force said plunger into said cup, substantially as described.

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Witnesses:
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ELLA H. COOPER.