(No Model.) 2 Sheets—Sheet 1.

J. & R. PINTSCH.

ILLUMINATING APPARATUS.

No. 282,115. Patented July 31, 1883.

Fig: 1

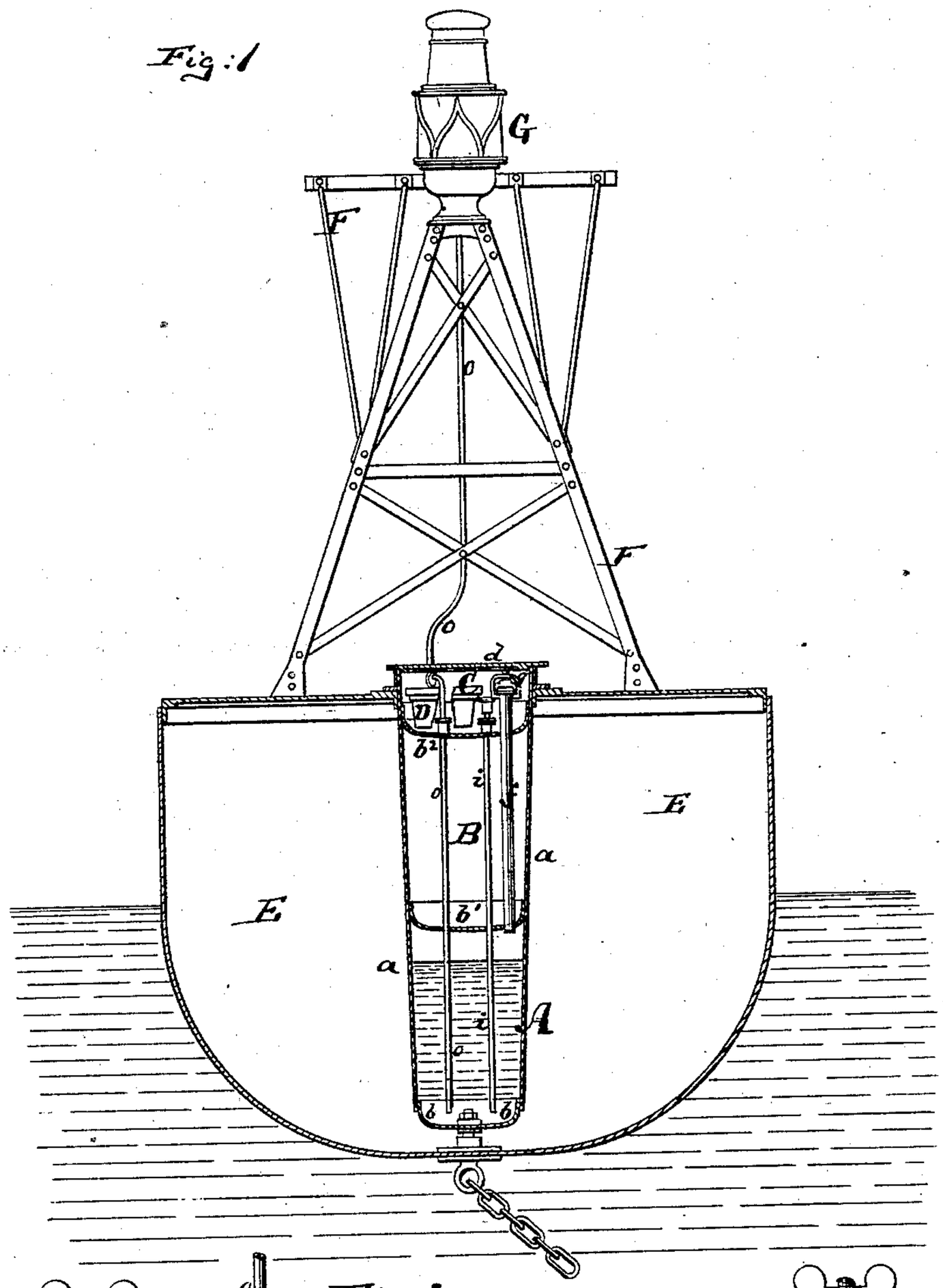
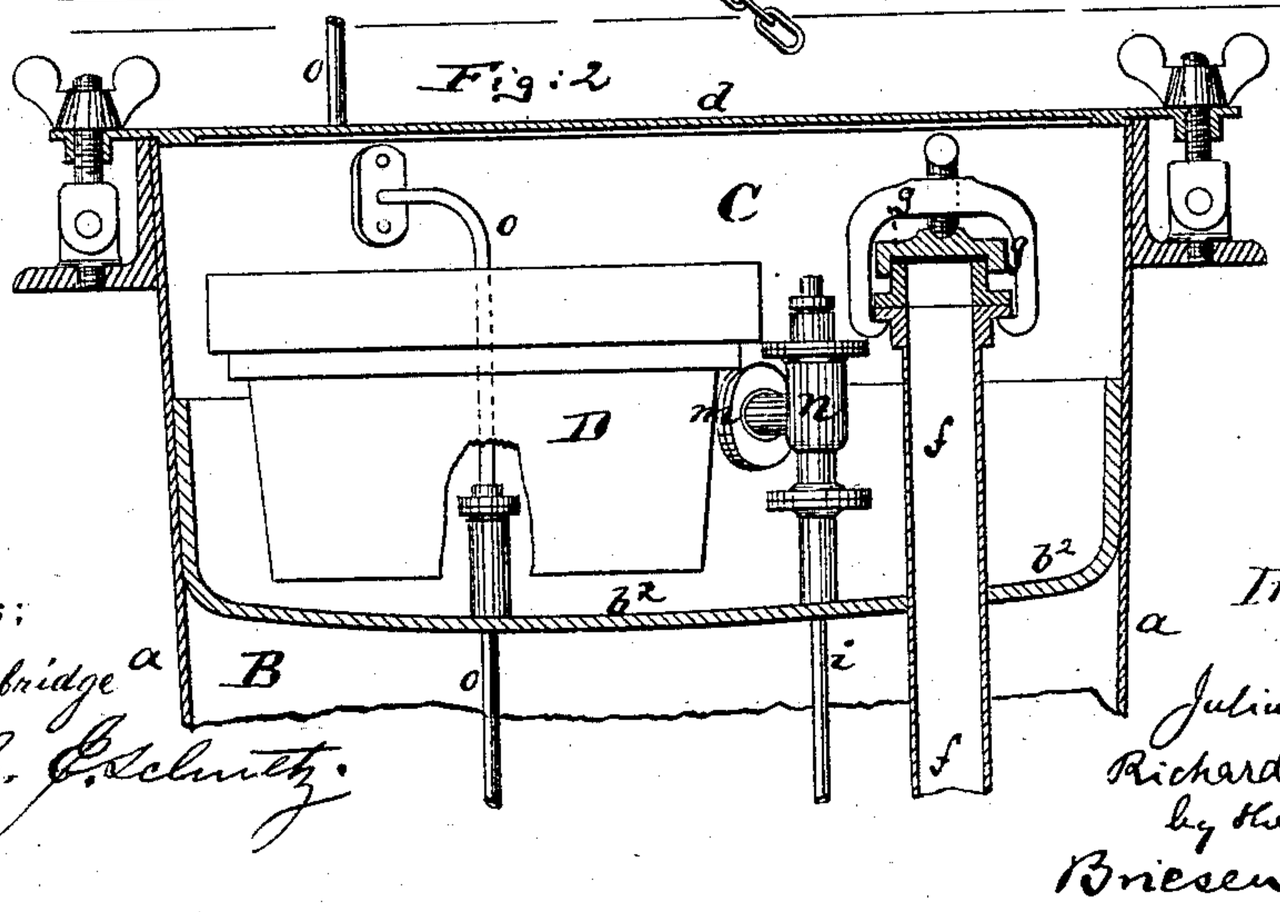


Fig: 2



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Briesen & Steele

(No Model.) 2 Sheets—Sheet 2.

J. & R. PINTSCH.

ILLUMINATING APPARATUS.

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Fig: 3

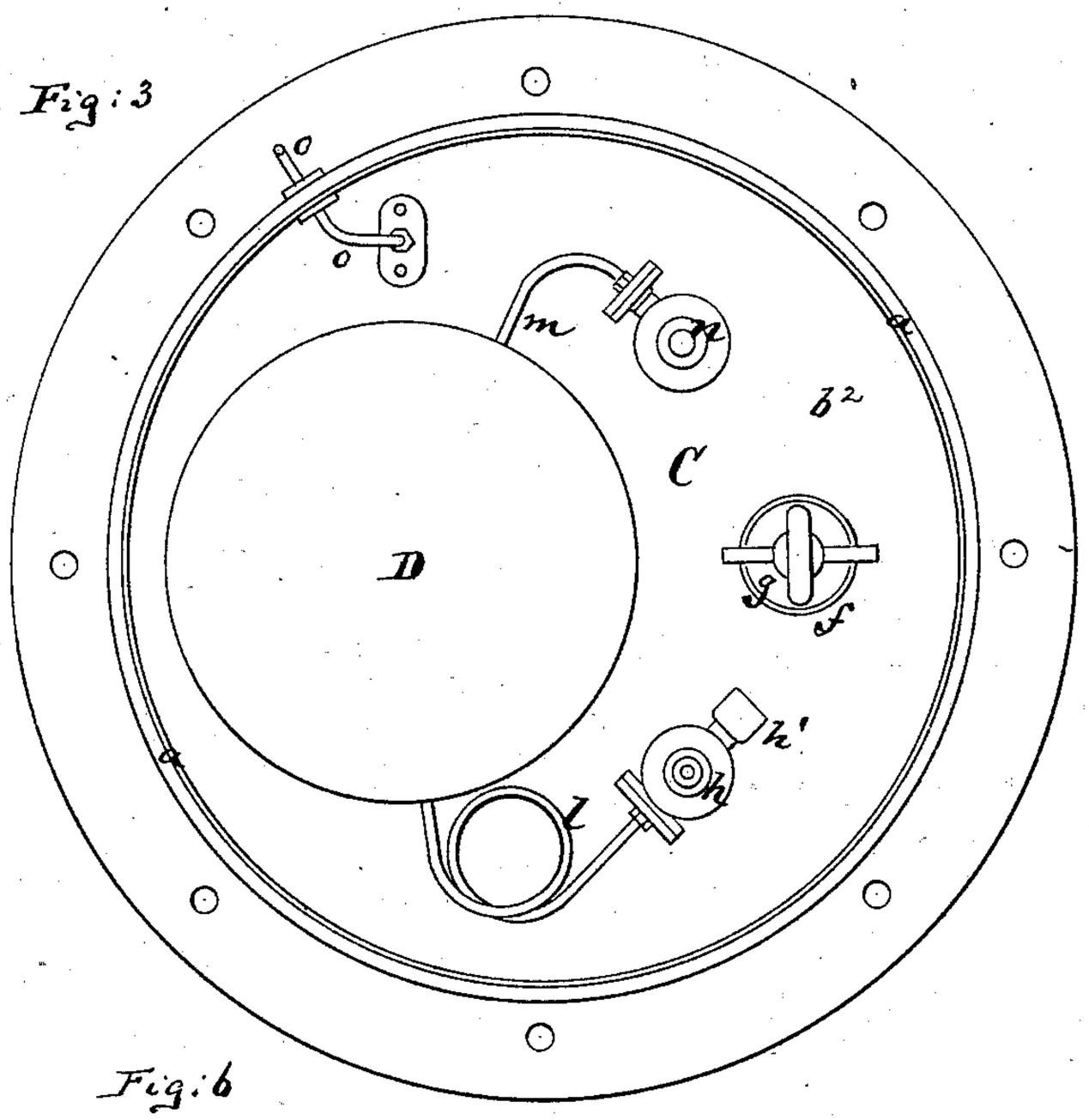


Fig: 6

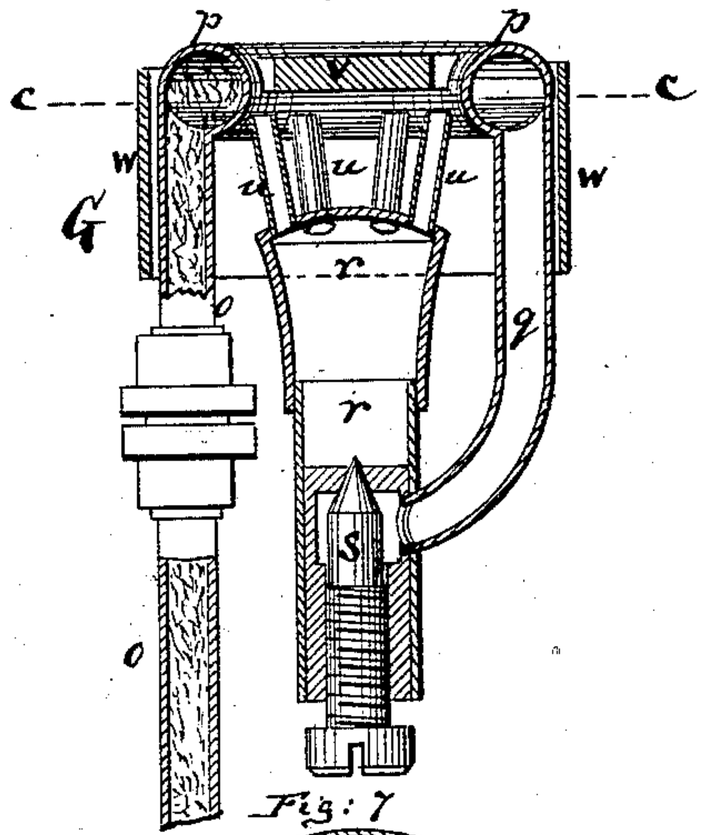


Fig: 5

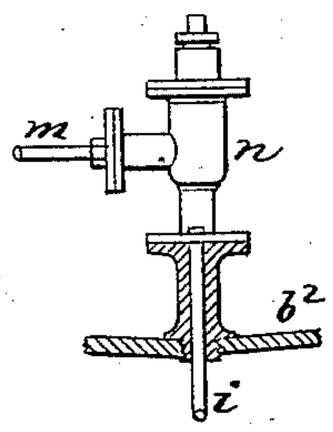


Fig: 4

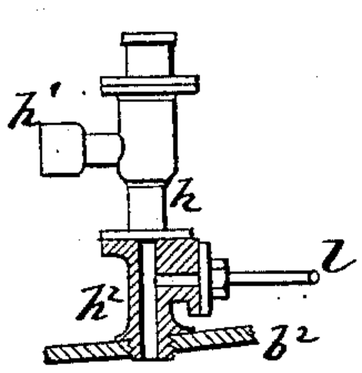


Fig: 7

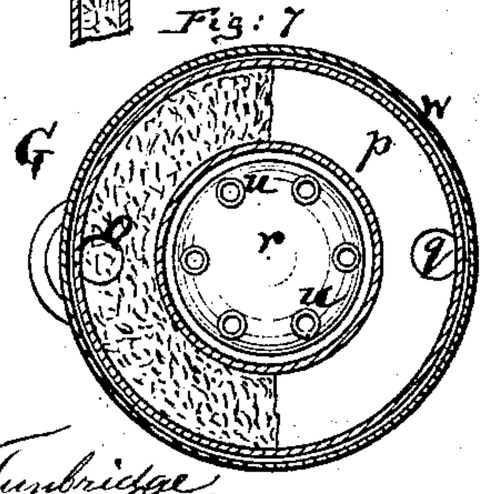
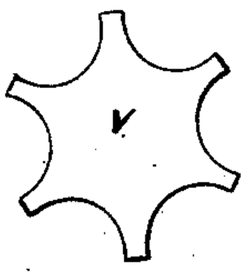


Fig: 8



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UNITED STATES PATENT OFFICE.

JULIUS PINTSCH AND RICHARD PINTSCH, OF BERLIN, GERMANY, ASSIGNORS TO THE PINTSCH LIGHTING COMPANY, OF NEW JERSEY.

ILLUMINATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 282,115, dated July 31, 1883.

Application filed March 15, 1883. (No model.)

To all whom it may concern:

Be it known that we, JULIUS PINTSCH and RICHARD PINTSCH, subjects of the King of Prussia, residing at Berlin, Prussia, German Empire, have invented certain new and useful Improvements in Illuminating Apparatus; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 is a side view, partly in section, of our improved illuminating apparatus. Fig. 2 is an enlarged central section of the chamber containing the regulator. Fig. 3 is a top view of said chamber, showing the cover detached. Fig. 4 is a side view, partly in section, of the pipe which conducts the compressed air from the reservoir to the regulator. Fig. 5 is a side view, partly in section, of the pipe that conducts the compressed air from the regulator to the fuel-reservoir. Fig. 6 is a central vertical section, on an enlarged scale, of the burner; Fig. 7, a horizontal section of said burner on the plane of the line *c c*, Fig. 6; and Fig. 8 is a top view of the upper heating-plate of the burner.

This invention relates to a new apparatus for producing light from liquid hydrocarbons, and is adapted for use in floating buoys, light-houses, beacons, railway-cars, ships, buildings, and other places. The principal constituents of the apparatus are a receptacle which contains the liquid hydrocarbon, and another receptacle containing compressed air or gas, which communicates through a pressure-regulator with the vessel containing the fuel and with a lantern having a burner. As compared with other known means of illuminating floating buoys, for example, this apparatus, in using the fuel in liquid form, requires a much smaller fuel-reservoir than those which contain it in gaseous form; but inasmuch as the distance between the fuel-reservoir and the burner in such devices is considerably greater, in fact, than could be overcome for the elevation of the fuel by the use of capillary devices, it becomes essential that the column of liquid in the feed-pipe that leads to the burner shall be balanced to the proper extent by artificial means—that is to say, held to a certain invariable level, from which capillary devices will further lift it to the burner. To this end we use a chamber containing compressed air in connection with a pressure-regulator in such manner that during the entire operation of the apparatus the fuel in the feed-pipe of the burner will always be maintained at a certain proper level. The compressed air utilized in this process is not wasted, but is only gradually transferred in part from its own reservoir into the fuel-reservoir; hence the compressed-air reservoir may also be relatively small. The burner itself is made of a certain construction so as to evaporate the fuel before it reaches contact with the flame.

In the accompanying drawings we have illustrated an apparatus which is more particularly calculated for use on floating buoys or beacons.

Fig. 1 shows the general arrangement of parts. The vessel for containing the fuel is here shown united with that for containing the compressed air—that is to say, in the cylindrical or nearly cylindrical vessel *a* are securely fastened the partitions *b b' b²*, so as to form three chambers, of which the lower one, A, serves to receive the fuel, the central one, B, the compressed air, while the upper one, C, contains the regulator D. The upper chamber, C, of the cylinder *a* is closed on top by a removable cover, *d*, which is more clearly shown in Fig. 2. The cylinder *a*, with all its attachments, is shown to be suspended from the cover of a buoy, E, and fastened to said buoy, which latter may be anchored in the usual manner. On this buoy is supported a framing, F, which carries a lantern, G. For supplying the chamber A with liquid fuel we provide a pipe, *f*, which may traverse the chamber B, and which extends from the chamber C into the chamber A. Within the chamber C this pipe *f* is closed (when the apparatus is in use) by a cover, *g*, which is held tightly in place by a bolt and set-screw, as shown in Figs. 2 and 3, or by other means. On the partition *b²*, which divides the chamber C from the chamber B, stands a short pipe, *h*, having a nipple, *h'*, and

having a cock by means of which the connection between said nipple h' and pipe h can at any time be interrupted or re-established. The lower part, h^2, of the pipe h is open to the chamber B. Whenever the chamber B is to be charged with compressed air, a suitable hose or other pipe is coupled to the nipple h' and connected with a vessel containing the compressed air. The cock in the pipe h is then opened, so that the compressed air may flow into the recipient B. When the latter has been properly charged, the said cock is closed and the feeding or supply pipe or hose uncoupled from the nipple h'. From the lower part, h^2, of the pipe h, or from any part of the cover b^2, extends a pipe, l, which communicates with the regulator D, which regulator may be of any well-known construction, and should be such as to equalize the pressure of the air or gas that passes from it to the fuel-reservoir A. The air that enters the regulator D escapes from it through a pipe, m, (see Figs. 3 and 5,) which leads to an upright pipe, n, that stands on the partition b^2. A suitable cock that may be opened or closed at will is contained in this pipe n, for the same must be closed whenever the pipe h is opened in charging the reservoir B; but when the apparatus is in operation the cock in the pipe n is opened. With the pipe n communicates and from it extends downwardly a tube, i, which leads through the reservoir B into the lower part of the reservoir A. In like manner a tube, o, extends from the lower part of the reservoir A upward through the reservoir B, and thence through the chamber C, and thence to the burner G. This tube o is the fuel-supply pipe for the burner. Both tubes o and i are at their open ends on substantially the same level as indicated in Fig. 1.

Instead of passing the tubes o and i through the vessels A and B in manner shown, they may also be carried alongside of said vessels, provided that their lower open ends enter the vessel A near its lower part. It is evident that whenever any pipe or pipes o i f traverse any one of the partitions b' b^2, all leakage must be prevented by careful packing.

The burner which is best adapted to this above-described apparatus is shown in Figs. 6 and 7, where the feed-pipe o is represented as entering an annular pipe, p, within which the liquid fuel will be converted into gaseous fuel by heat created by the burner. From the annular pipe p extends a pipe, q, to the head r of the burner, a pointed screw, s, regulating the amount of fuel admitted to said head. From the head r of the burner extend upward the burner-tubes u u, which by preference stand in slightly-inclined position, as shown, and which are open at their upper ends. Above them is held by the ring-tube p a plate, v, having scalloped edge, as indicated in Fig. 8. The flames escaping from the tubes u will heat the pipe p, and also the plate v. The pipe p, and also the upper part of the tubes o and q, are embraced by a sleeve or outer casing, w, which serves to equalize the amount of air that is fed to the flame and to prevent undue escape of heat from the burner, also giving greater strength to the parts thereof. The ring-pipe p is partly or wholly filled with asbestus. Fig. 7 shows it partly filled with asbestus. In like manner the upper part of the tube o is filled with asbestus, so far, at least, as it is apt to be made very hot by the flame. Below the asbestus filling there may be a filling of cotton or other capillary substance in the upper part of the tube o. The regulator D is so adjusted that the compressed air in the vessel B, passing through the tube i, will have a tendency to hold the liquid in the tube o always on a level at which the cotton or other capillary substance will dip into the liquid fuel, and thence feed it to the burner. In burning, this fuel is evaporated, and then brought to the flame in the gaseous form. Suitable contrivances may be added to the lantern to prevent violent gusts of wind from extinguishing the flame; but such is not part of the invention.

In its main features the apparatus here described is applicable to every purpose of illumination, either for fixed or movable lights, but particularly for lighting railway-switches, railway-signals, light-houses, ships, buoys, beacons, &c.

We claim—

1. The combination of the vessel a, having partitions b' and b^2, with the pipe f, cap g, pipes i n m, regulator D, pipes l h, having charging-nipple h', and pipe o, substantially as set forth.

2. The fuel-supply pipe o, in combination with the fuel-receptacle A, and with the compressed-air receptacle, which communicates with the receptacle A, and with the annular pipe p, connecting-pipe q, burner-head r, which communicates directly with the flame-tubes u, and plate v, which is placed in the plane of the ring-pipe p, substantially as herein shown and described.

3. The combination of the liquid-fuel receptacle A, compressed-air vessel B, regulator D, pipe m, and pipe i with the fuel-supply pipe o and with the burner affixed thereto, and with the inner filling capillary substance arranged in the upper portion of said tube o, substantially as and for the purpose herein shown and described.

In testimony whereof we affix our signatures in presence of two witnesses.

JULIUS PINTSCH.
RICHARD PINTSCH.

Witnesses:
A. DEMELIUS,
B. ROI.