C. L. HEYWOOD & R. BOEKLEN.

Carbureting Apparatus.

No. 224,592. Patented Feb. 17, 1880.

Fig. 3.

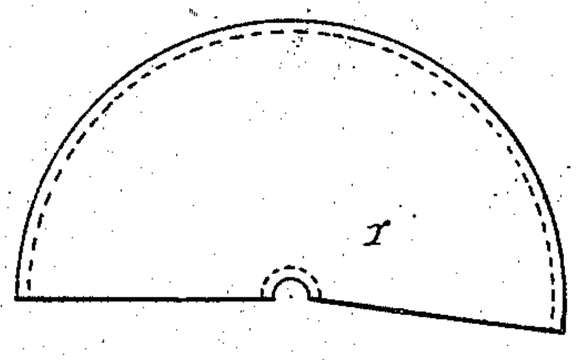


Fig. 2.

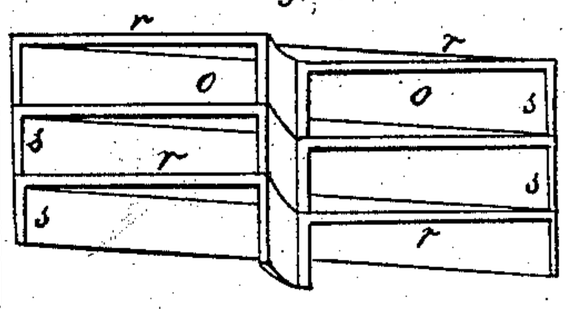


Fig. 5.

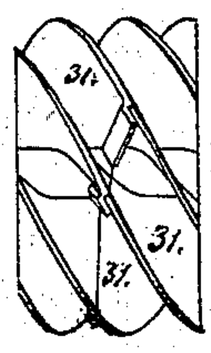


Fig. 1.

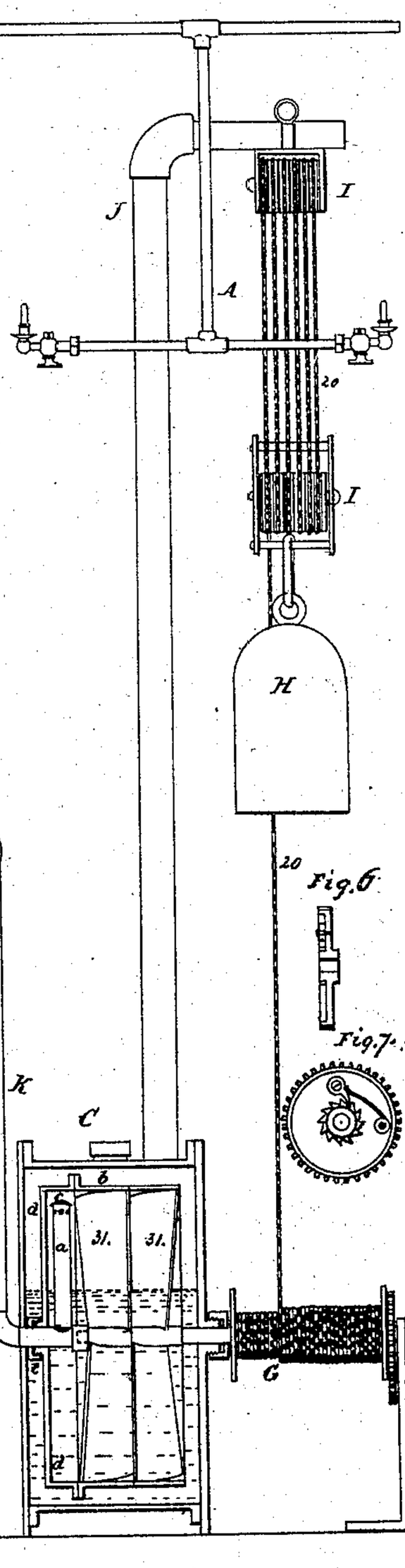
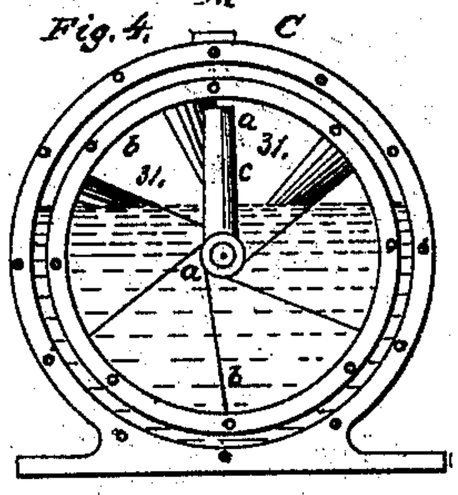


Fig. 6.

Fig. 7.

Fig. 4.



Witnesses.

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UNITED STATES PATENT OFFICE.

CHARLES L. HEYWOOD AND REINHOLD BOEKLEN, OF BOSTON, MASSACHUSETTS, ASSIGNORS TO THE CARBURETTED AIR GAS COMPANY, OF SAME PLACE.

CARBURETING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 224,592, dated February 17, 1880.

Application filed June 11, 1879.

To all whom it may concern:

Be it known that we, CHARLES L. HEYWOOD and REINHOLD BOEKLEN, both of the city of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Carbureting Apparatus, of which the following is a specification.

The improvements herein relate to the construction of the carbureter; and they consist in providing it with a spiral carbureting-conduit, in which the hydrocarbon liquid is held distributed in an absorbent, with a central air-tube for the air-supply, and provided with a gas-adulterating valve or faucet, and with peculiar means for forcing and charging the carbureter with the requisite liquid without waste of gas, and, finally, constructing the carbureter-case with solid bottom and sides and a single ground-joint cap, hereinafter specified, to have it more safe and guard against leakage than with others heretofore.

In the annexed drawings, forming part of this specification, Figure 1 represents a vertical central section of the carbureting apparatus with our improvements, and adapted for illuminating houses, steamboats, and other suitable places. Fig. 2 is a detached edge view of the plates for forming a portion of the spiral conduit of the carbureter. Fig. 3 is a top view of one of the above-mentioned plates. Fig. 4 is a face view of the air-pump of the apparatus, the cap of the inner and outer drum of the same shown removed. Fig. 5 is a side view of the spiral conduits of the inner drum of the same. Figs. 6 and 7 represent a cross-section and face view of the winding-gear, pawl, and ratchet attached to the air-pump.

The letter of reference A indicates the gas-fixture of the apparatus, and B the gas generator or carbureter; C, the air-pump; D, the pressure-regulator. E represents a barrel or oil-can containing the hydrocarbon liquid with which, from time to time, the carbureter is charged. F is a hand air-pump for compressing the air in the can to cause the liquid to flow into the carbureter.

The air-pump C furnishes the air to the carbureter, and is provided with an automatic stop, so that its action is controlled by the pressure or consumption of the gas.

In apparatus for dwellings, factories, street-lamp posts, and similar applications, said pump preferably is made, as shown in the drawings, Figs. 1, 4, and 5, on the principle of the wet-meter, with a drum revolving inside of secondary outer drum made and held stationary, and containing the sealing-liquid, water, glycerine, oil, or mercury, and the inner revolving drum having spiral conduits 31, which press and deliver the air in a rear chamber, *c*, sealed by the liquid, and from which said air is discharged, through the so-called "bent pipe" *a*, from the pump and delivered to the carbureter through an air-pipe, K.

The propelling mechanism of this pump may be a weight, H, as shown, or a spring, and the said mechanism may consist of clock-work and gearing; or it may be a chain or rope and a winding-drum, G, and pulley-blocks I, as shown. According to the dimension of the apparatus, the locality, or its application, said propelling mechanism may be selected most adapted for the application. In all cases the said mechanism has proper gearing and sufficient spring or weight to operate the pump for the full length of time or number of hours for which the illumination or operation of the apparatus is desired to continue before rewinding the same; but said weight or spring and said gearing and mechanism are insufficient in power against a surplus pressure of the gas or air obtained by an insufficient consumption of the gas, so that the operation of the pump is controlled by the consumption of the gas automatically. To obtain this object fully the inner drum, *b*, of the pump is constructed with its bent pipe *a* to enter the rear pressure-chamber, *c*, centrally, and the rear side, *d*, of said chamber is made with a stuffing-box and bearing, *e*, instead of the usual central passage through the same, to prevent the air from escaping through said opening and allowing the pump to continue to operate and raise the proper sufficient pressure.

By these means a higher pressure of air is

obtained than by the ordinary wet-meter pump, which is often required, in gas apparatus of this class, to furnish the light at locations considerably above the carbureter.

For the more convenient manufacture and to facilitate the repairing of these pumps, the outer drum has detachable heads, each having a proper flange on its periphery, which joins a flange formed on the drum, and which are furnished with a proper equally-distributed number of screws or bolts to clamp said flanges together.

The carbureter B is made of cylindrical shape. To avoid leakage the number of joints is reduced to the one of its cap or top head, U. The bottom is cast in with it, and a flange is made on both of its ends, and both the bottom and cap are made concave or depressed, as shown, from the outside; and both depressions of the cap and bottom are covered by flat sheet-metal plates *p p*, and over the peripheries, and from flange to flange, is employed a cylindrical case, *q*.

The spaces in the depressions of the cap and bottom and the space around the body and under the case *q* are all filled in with plaster-of-paris or other fire-proof material, so that the carbureter may be subjected to a great deal of heat without danger of exploding. The joint of the cap U, with the top of the carbureter, is properly finished and ground air-tight, and a proper number of equally-distributed screws are employed, passing through the flanges of the cap and carbureter, to clamp the cap firmly down.

In the interior of the carbureter is arranged a central air-pipe, M, which conducts the air from the cap to the bottom part of the carbureter. Around said air-pipe, and from it to the inner periphery of the carbureter, is arranged a spiral conduit, O, which commences near the bottom, above the bottom screen, N, and continues around said air-pipe, rising until a short distance from the cap, where it terminates, and is covered by the top screen, P.

The bottom end of the pipe M rests upon the bottom of the carbureter; but said end is made of larger diameter, and is made with perforations, so that the air passes freely through the sides of said end, and from there it passes through the bottom screen, N, into the spiral conduit, and, revolving through the spirals, it rises to the top screen, P, and through it, and passes into the gas-conduit Q in the cap. Said spiral conduit is constructed, for convenient manufacture, of semicircular sections *r r*, as shown detached in Figs. 2 and 3, each describing a full semicircle, and having a rim, *s*, on its outer periphery, and a semicircular hub for fitting around the pipe M. The cap U has a hub extending downward, into which the pipe M is fitted, and said hub is threaded, and has a screw-cap, *t*, fitted upon it and over the pipe M, to serve as a stuffing-box and close the joint of said hub with the pipe M. On the top side of the cap U is made a large central hub, *u*, which has two chambers, Q and Q′, of which one leads into the pipe M as an air-passage. The other is the gas-conduit Q, leading directly into the top of the carbureter. The connecting-pipe of each of said chambers has a faucet, of which the valve L is for admitting air, and is attached and connected with the air-passage and pipe M, and with the hose or pipe K, delivering the air from the air-pump C. The valve R is attached and connected with the gas-conduit Q, and serves as the main gas-cock valve and discharges into the gas-pipe T. In the central partition in the said hub *u* is made the seat and plug of a third valve, S, which is used as a mixing-cock, to cause a portion of the air passing from the air-valve L to flow directly through the valves S over into the gas-conduit Q and adulterate and mix with the gas, which has its flow to the gas-valves interrupted and divided by means of a screen employed on the entrance of said gas-valves.

In the practical operation of the carbureter it is found that the gas, before adulteration, is too rich in carbon for illuminating purposes and for proper combustion, and nearly one-third of air is required to be mixed with it for the said combustion, and in producing gas for heating purposes nearly two-thirds of air are required to be mixed with it. Therefore the gas produced is rendered, with the adulterating or mixing device, a great deal less expensive. Said device affords great convenience to adjust the quality of the gas suitable for either illuminating or heating purposes, and in a simple and ready manner.

Both valves R and L are furnished with union-couplings V V, so that the carbureter may be detached at any moment and another substituted.

In case the carbureter is required to be charged in some other locality from that in which it is operated, as on board of vessels, where it is desirable that the carbureter should be charged with liquid on land, the same is readily put on board and attached. In either case of charging the carbureter with liquid the said liquid is forced into the carbureter by means of the hand air-pump F, which is connected with the top of the can E by means of the pipe or hose *v;* and the can-top is furnished with a secondary hose or pipe, which is connected with the gas-conduit Q of the carbureter either through the gas-pipe, gas-valve, or directly with said conduit, by means of a small valve, *w*, which is closed after the charge is made.

The top cap, *x*, of the can is threaded to properly fit over the threaded inlet of the can. Said cap has the pipe *y* secured to it, which projects down in the can to receive the liquid, and a space for the air to enter into the can-top is made in said cap. For each inlet and outlet from said cap is provided a valve, 10,

to prevent the escape of the gas or vapor of the liquid after the can is detached from the carbureter.

To regulate the pressure proper for the illumination is employed the regulator D.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The carbureter-case B, constructed with the solid bottom and sides, and the ground single-joint cap or head U, in combination with the central air-pipe, M, spiral conduit O, and screens P and N, substantially as and for the purpose herein specified and shown.

2. The combination of the carbureter B with the can E, its cap *x*, with its valves 10, the pipes *v* and *y*, and the filling-faucet *w* or 15, substantially as and for the purpose herein described.

3. The spiral conduit O, with its semicircular sections *r*, each having flanges or sides *s*, with a central semi-hub to fit around the air-pipe M, in combination with the carbureter-case, substantially as and for the purpose herein specified.

4. In a carbureter, the cap U, cast with a central hub having a gas-conduit, Q, an air conduit or chamber, Q′, in combination with the air-pipe K, having the valve L, the central air-pipe, M, the gas-pipe T, with the valve R, and the central diluting-valve, S, substantially as and for the purpose herein set forth.

In witness whereof we hereunto set our hands this 20th day of May, 1879.

CHARLES L. HEYWOOD.
REINHOLD BOEKLEN.

In presence of—
JAS. B. BELL,
JOS. WEST.