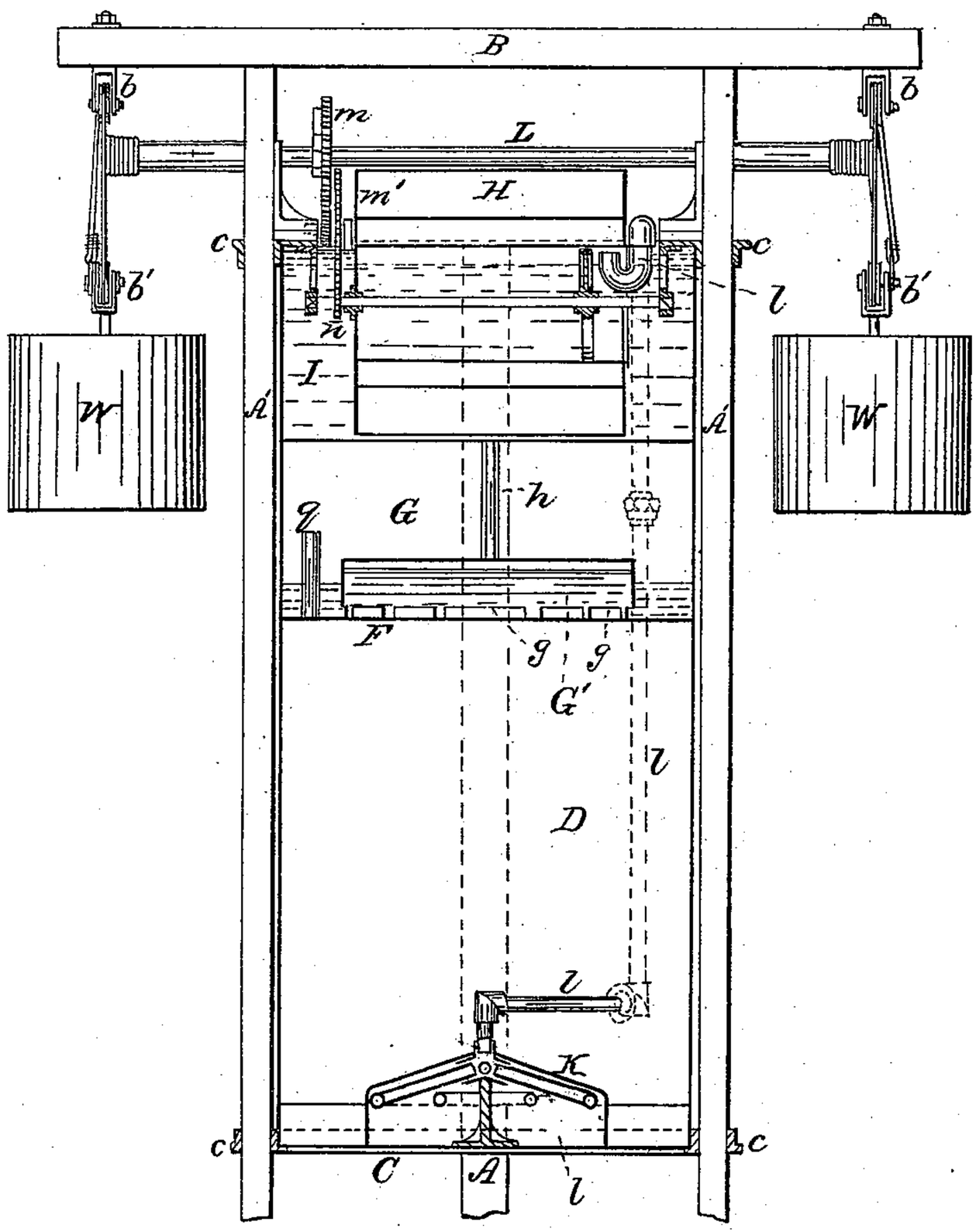
2 Sheets—Sheet 1.

T. F. FRANK.

Carbureter.

No. 83,147. Patented Oct. 20, 1868.

Fig. 1.



Witnesses:
Edward Wilhelm
Jay Hyatt

Inventor:
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2 Sheets—Sheet 2.

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Fig. 2.

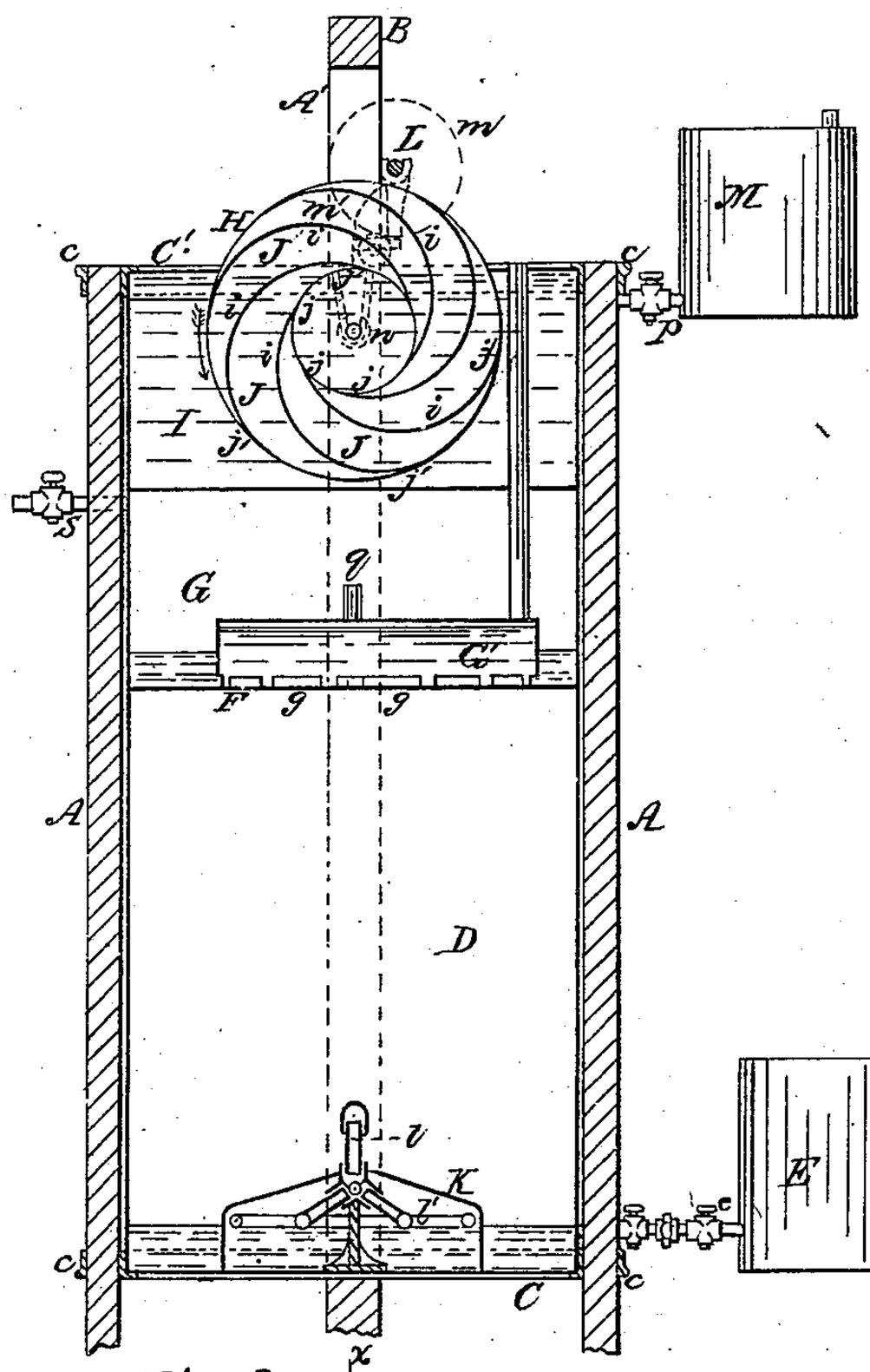
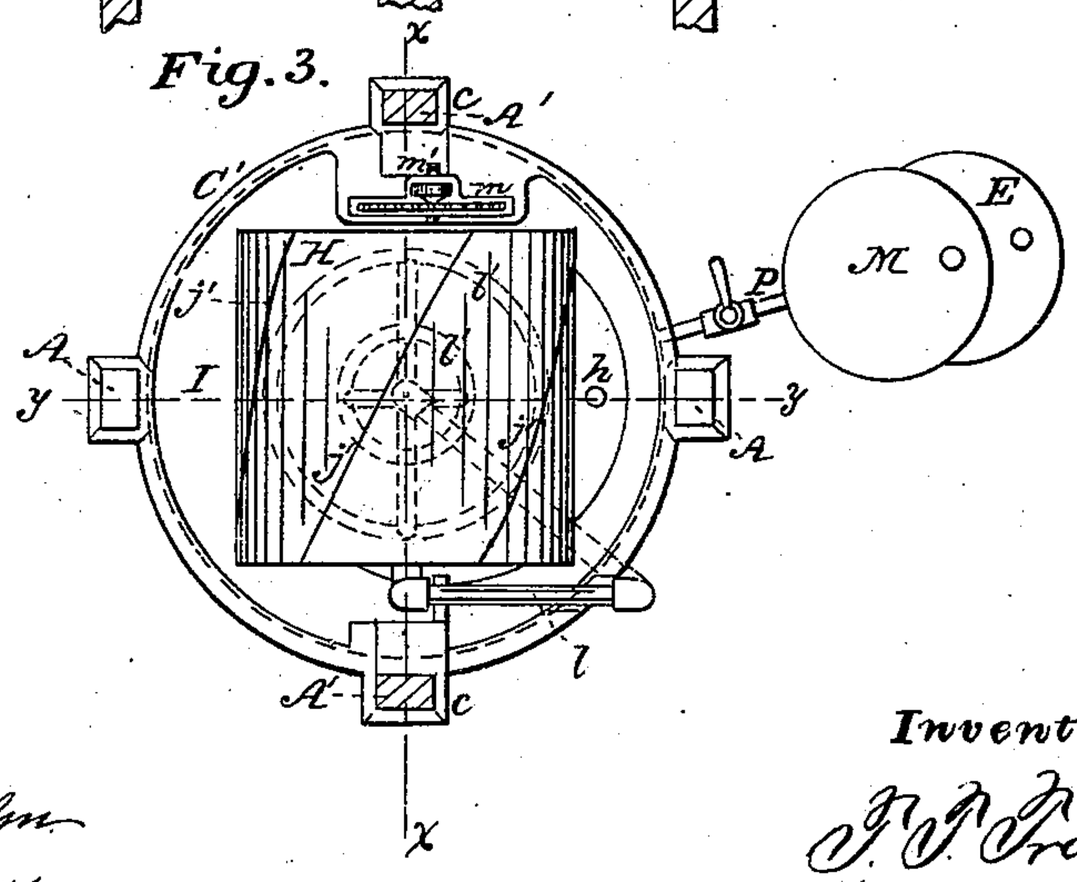


Fig. 3.



Witnesses:

Edward Wilhelm

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Inventor:

T. F. Frank.

United States Patent Office.

THEODORE F. FRANK, OF BUFFALO, NEW YORK.

Letters Patent No. 83,147, *dated October* 20, 1868.

IMPROVED MACHINE FOR CARBURETTING AIR.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, THEODORE F. FRANK, of the city of Buffalo, in the county of Erie, and State of New York, have invented certain new and useful Improvements in Machines for Carburetting Air; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure I is a central vertical section of my improved apparatus, in plane of line *x–x*, Fig. III.

Figure II is a similar section, on plane of line *y–y*, at right angles to the former.

Figure III is a plan of the same, with the gearing-shaft removed.

Like letters of reference designate like parts in all the figures.

The invention consists—

First, in arranging the carburetting-chamber, regulating-compartment, and the water-tank, in which the air-drum revolves, respectively, one above the other, in a single upright cylinder, which is supported within a frame provided with an elevated cross-piece, from which are suspended the two weights that operate the drum, by which arrangement great compactness and cheapness in construction, and steadiness and uniformity in the action of the machine, are attained

Second, in constructing the regulating water-vessel, which neutralizes the pulsations of the gas, with an elevated tube, that prevents it from overflowing, and which also operates to regulate the action of the machine, and prevents the escape of the gas when the machine is at rest, all as hereinafter set forth.

In the drawings, A A′ represent four standards of the frame, and B the extended cross-piece at the top of A′ A′, to which the weight-supporting tackle is attached. C C′ are two cast-iron rings, formed with ears, *c c*, through which are inserted the standards A A′, formed with suitable shoulders for supporting them. D is the carburetting-vessel, arranged within and supported by the ring A.

The gasoline or other fluid is supplied to the carburetting-vessel, from an air-tight reservoir, E, through a pipe, *e*, provided with suitable stop-cocks and coupling, by which the gasoline-vessel may be detached and filled, as required.

The reservoir E being air-tight, it is evident that the gasoline will, on the stop-cocks in pipe *e* being opened, fill in the carburetting-vessel till the liquid reaches the top of the pipe, so as to close its mouth, when the flow will cease.

As the liquid is vaporized in the carburetter, it will subside below the mouth of *e*, when the air, entering the gasoline-vessel through the pipe, will cause the fluid to flow till the pipe is closed again, thus automatically maintaining a uniform supply of the gasoline or other liquid in the carburetting-vessel at all times.

In the upper portion of the carburetting-vessel is a floor or diaphragm, F, forming a water-tight compartment, G, above. Within this vessel, in an inverted position, is a vessel, G′.

From the top of G′, a pipe, *h*, extends upwards to the top of the machine.

H represents the air-drum, rotating in a vessel, I, arranged at the top of the machine, immediately above the compartment G. This drum revolves on a horizontal shaft, mounted preferably in pendent brackets from the upper ring, C′. It consists of two heads, closed, except an opening at the centre, for the passage of the water, between which are secured wings, *i i*, of involute curvature, dividing the drum into buckets or compartments, J J. These wings commence at about the relative distance shown from the centre, and terminate at the periphery, so as to leave openings, *j* and *j′*, at the centre and outside. The wings are so formed that their edges at the centre and outside run spirally around the drum, as clearly shown in Fig. III.

This last feature of construction causes the mouths of the buckets to gradually dip and emerge from the water, so that the influx and efflux of the fluids will be gradual, so as to prevent a certain irregularity of movement in the actions of the drum, which ensues when the entire mouths of the buckets are submerged or emerge at the same instant.

A bent pipe, *l*, conducts the air from the top of the central space of the drum to the bottom of the carburetting-vessel, in a manner similar to the corresponding pipe in gas-meters. The lower end of this pipe terminates in a pipe-ring, *l′*, provided with minute perforations in the under side, for the escape of the air into the gasoline, into which the lower portion of the ring *l′* just dips.

The end of the gasoline-pipe *e* and the ring *l′* are protected, by a perforated shield, *k*, from the fibrous or other material which is filled in the vessel above.

Two of the standards, A A′, extend above the rest of the machine, and are connected, at their upper ends, by an extended cross-piece, B, to the ends of which are attached tackle-blocks, *b b*.

A weight, W, is suspended from each of the lower sheaves, *b′ b′*, from whence the ropes wind around a horizontal gear-shaft, L, the necessary intermediate gear, *m m′*, meshing with pinion *n* on the end of the drum-shaft.

Water is filled in the upper vessel, and maintained at an unvarying height, by means of an air-tight reservoir, M, communicating with vessel I by means of a pipe, *p*, and which operates automatically, in a similar manner to that of the gasoline-vessel before described.

The water in the vessel I should be of such a height that the air, when subjected to the required pressure, will depress the water within the central space of the drum to a point a little below the mouth of the air-pipe—about as represented in the drawings.

Water is filled into the regulating-chamber G, so that, when the machine is operating, and the gas press-

ing on the surface outside of G′, the water in the latter will not quite fill the vessel, so as to leave sufficient space therein for the proper yielding of the liquid in counteracting the pulsations of the gas.

The different vessels being properly supplied with the required liquids, as before described, sufficient weight is attached to set the drum revolving in direction of the arrow in Fig. II.

The outer mouths, *j′*, of the buckets or compartments becoming closed by the water, which enters at *j″* as the machine revolves, the air is forced or escapes through the inner openings, *j*, as they emerge from the water into the central space of the drum. It then enters the pipe *l*, which conducts it to the bottom of the carburetting-vessel, when, escaping through the minute perforations in the ring *l′*, it is diffused and charged with the volatile hydrocarbon-elements of the gasoline.

After passing through the fibrous or other packing-material in the vessel D, it ascends, through the pipe *q*, above the water in the regulating-vessel G. It here presses upon the surface of the water around G′, causing the liquid to rise to a greater or less height in the latter vessel, according to the degree of pressure.

The air, in passing through the drum, acquires, to a certain extent, a sort of pulsating or irregular movement, which it is essential to neutralize before it passes to the burners, otherwise a flickering and unsteady light will be the result. This is accomplished by the vessels G G′, the great mobility of the water permitting it to yield in the vessel G, and rise and subside in G′, according to the varying impulse of the gas, so that it flows to the burners, through the pipe *s*, with an equalized and unvarying pressure.

The size of the weights should be so adjusted as to be only adequate to cause the drum to operate, to force the air with the required pressure, when it is evident that the machine will stop working as soon as the resistance or pressure of the gas exceeds that limit, and recommence operating when the pressure is again reduced to the required degree.

Its operation is thus automatically regulated by the pressure of the gas, or the amount consumed, the drum moving faster or slower, according to the escape, or number of burners in use, the machine stopping when all the burners are shut off, and again starting when one or more are lighted.

When the machine is at rest, and especially in warm weather, a certain amount of gas will be evolved, which might press with sufficient force on the water in G to depress it to the passages communicating into G′, when the gas would rise through the latter, and escape into the apartment. To prevent this occurring, led to the employment of the elevated tube *h*. With this improvement, the water, as soon as the vessel G′ is filled, will be forced up in this tube, the capacity of which is comparatively so small that the water in G cannot be but slightly depressed without causing a considerable rise in the tube, the pressure arising from which, according to the well-known law of hydrostatic pressure, will confine and compress the gas sufficiently to prevent its further evolution.

No danger can result from this confinement, for, should the pressure be sufficient, the water would be forced to the top of the tube, and overflow into the vessel I, when the gas would finally escape through the same pipe, and thus prevent the possibility of the bursting of the machine.

The arrangement of the pipe *h* not only performs the function before described, but also serves as a means through which water may be introduced into the regulating-compartment.

The general arrangement of my machine is such as to require for its location the least possible floor-space, which removes it from the great objections raised against other machines by parties who have only a limited space in which to locate the apparatus.

The arrangement of the carburetting-vessel, regulating-chamber, and water-tank, as described, enables them to be contained in a single cylindrical vessel, and consequently be manufactured at a greatly-reduced cost over that required when they are made separate. There is an equal saving in the manner of supporting the parts within the frame A A′. The air-drum is readily supported in pendent bearings from the upper ring, C, while its elevation is such that, with the cross-piece B of the frame, the operating-weights can be suspended from the latter without the necessity of suspending them from ceiling, which it is sometimes impracticable or inconvenient to do. This construction also renders the machine more portable, as it is complete in itself, and can, therefore, be placed in the most convenient locality. The weights, being supported from the cross-piece of the frame at both ends, balance the shaft, and diminish the friction thereof, while their gravity, added to that of the apparatus, renders it more stable, and, consequently, the action of the same more uniform.

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

1. An upright cylindrical vessel, forming the carburetting-chamber D, regulating-compartment G, and water-tank I, containing the air-drum H, arranged respectively one above the other, and with the supporting-frame A A′ B, and operating-weights W W, substantially in the manner and for the purpose set forth.

2. The combination and arrangement of the elevated pipe *h* with the regulating-vessel G G′, substantially as and for the purpose specified.

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Witnesses:
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