N. W. BANCROFT.

Gas Machine.

No. 82,786. Patented Oct. 6, 1868.

Fig. 1

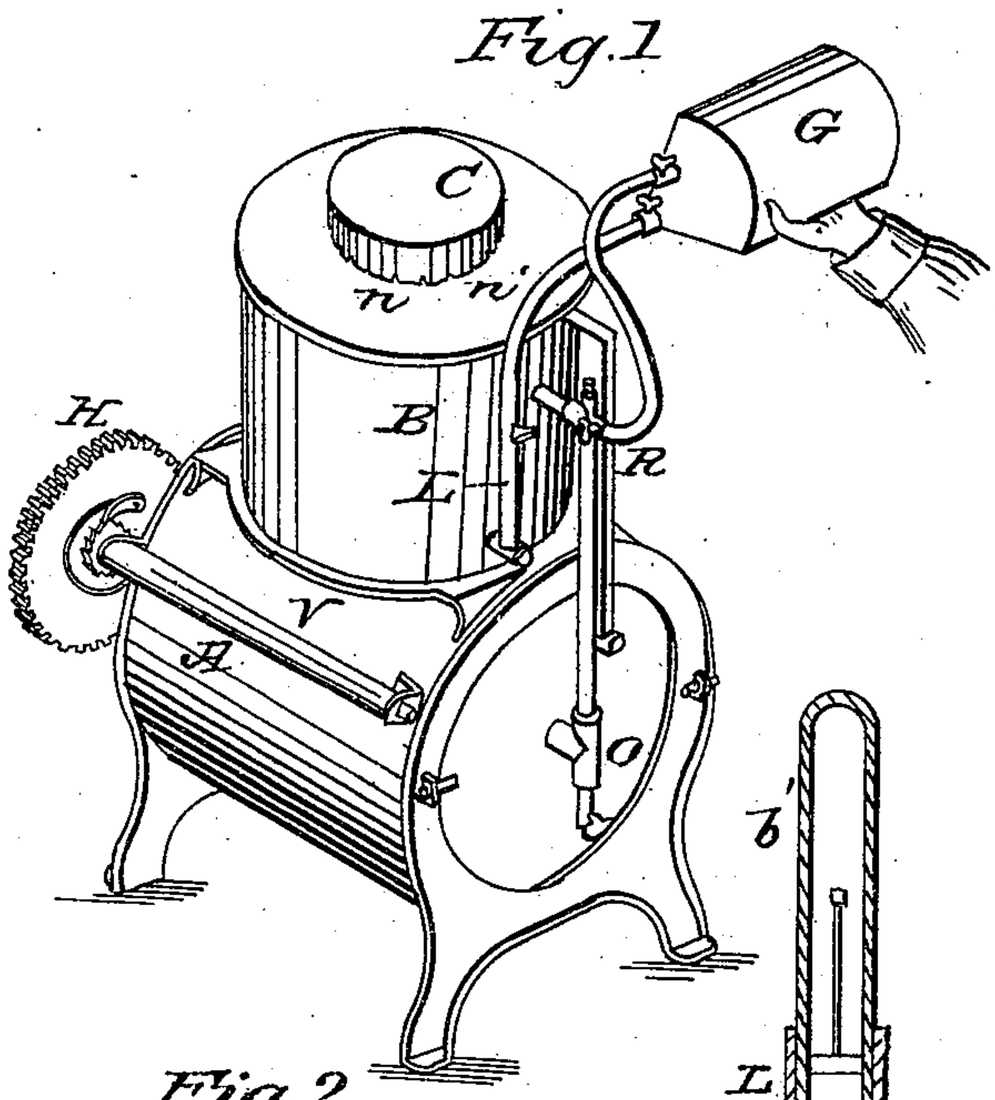


Fig. 2

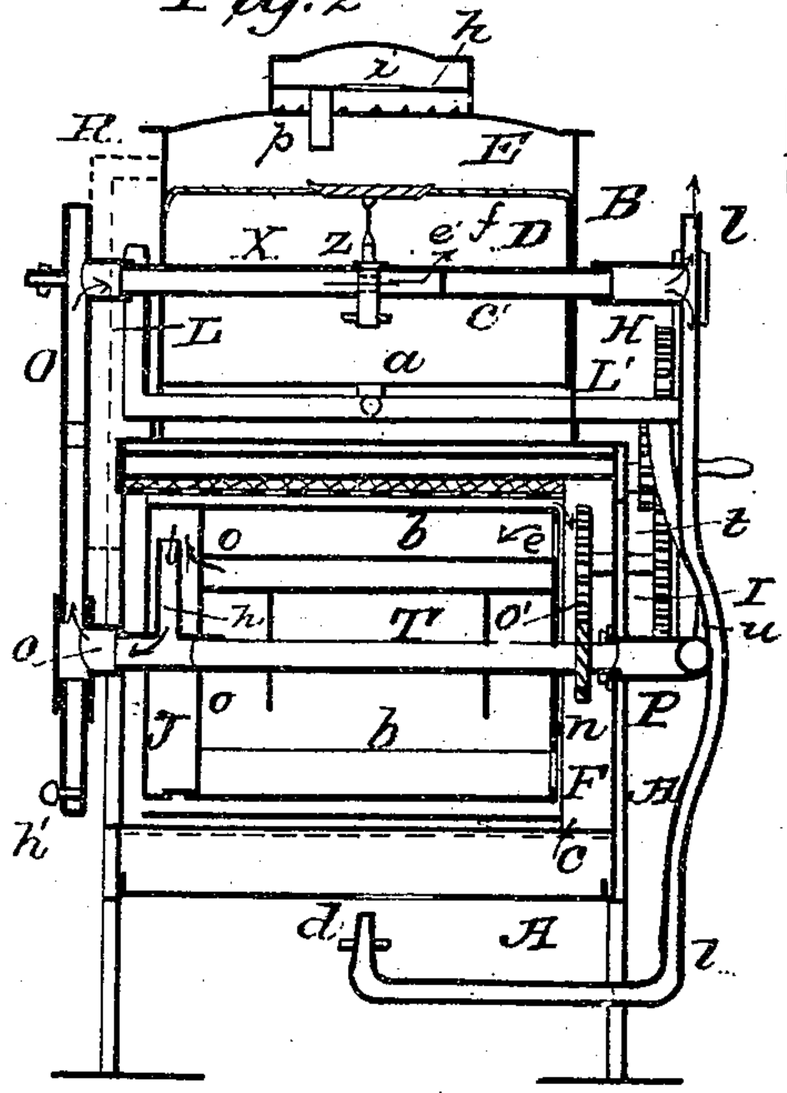
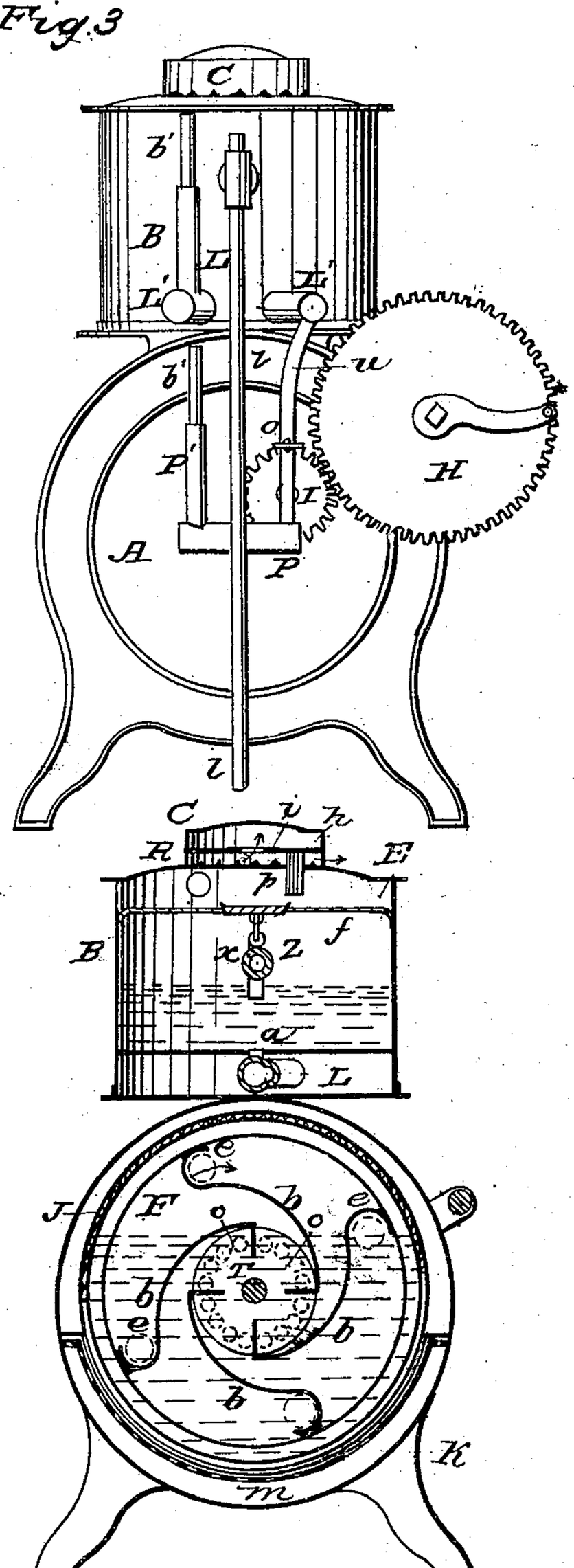


Fig. 3



WITNESSES

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N. W. BANCROFT, OF WORCESTER, MASSACHUSETTS.

Letters Patent No. 82,786, *dated October* 6, 1868.

IMPROVED GAS-MACHINE.

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, N. W. BANCROFT, of Worcester, in the county of Worcester, and State of Massachusetts, have invented certain new and useful Improvements in Gas-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, and to the letters of reference marked thereon, like letters indicating like parts wherever they occur.

To enable others skilled in the art to construct and use my invention, I will proceed to describe it.

My invention relates to that class of machines denominated gas-machines, and in which ordinary atmospheric air is carburetted by passing it through the more volatile hydrocarbon-oils; and my invention consists in certain details of construction whereby the machine is more perfect in its operation and less liable to accidents, as hereinafter more fully explained.

Figure 1 is a perspective view of my improved machine.

Figure 2 is a longitudinal vertical section.

Figure 3 is an end elevation, and

Figure 4 is an end elevation, viewed from the opposite end, with the lower portion shown in section, at right angles to fig. 2.

In constructing my machine, I provide a cylindrical case A, upon which is placed a reservoir, B, surmounted by a small air-chamber, C, as represented in the drawings.

Within the lower or main case A, I place the carburetting-apparatus, which consists principally of a suction-fan, F, which is mounted on a shaft, T, having bearings at each end within the case A, in such a manner as to permit it to revolve, and draw the air in, and carry it under the fluid.

This fan consists of a cylinder, F, having arranged within it four or more longitudinal wings or partitions, *b*, curved, as shown in fig. 4, with an opening, *e*, in one end or head of the cylinder, near the outer edge of each wing *b*, as shown in red in fig. 4, and with a series of smaller holes or openings, *o*, arranged in a circle in the opposite end, as represented in dotted lines in fig. 4. This fan, thus constructed, is placed within a cylinder, J, which is located within the main case A, with an annular space between the two latter. An opening is made in the lower side of the main case A, at the centre, as represented in fig. 2, and around the lower side of the cylinder J is secured a copper plate, K, as a conductor of heat from the burner *d*.

Within the cylinder J, around its lower half, is secured a plate, *c*, fastened at each end of the cylinder, with an opening, *m*, at the bottom at one end, and with an opening at the upper ends of the plate *c*, so that when the fluid becomes heated, it will flow in through the opening *m*, and upward out over the upper edges of the plate *c*, and thus keep up a constant circulation.

Around the upper inner side of the cylinder J, I place several thicknesses of Canton flannel or similar fibrous material, and hold it in position by means of a sheet of wire gauze, *g*, as represented in fig. 4, this fibrous material absorbing the fluid by capillary attraction, and being thus kept saturated throughout at all times by the fluid.

Motion is communicated to the fan F by means of a pinion, *n*, on its shaft, T, which engages with a spur-wheel, *o'*, secured upon a shaft, *t*, which extends through the end of the case A, and carries on its outer end, outside of the case, another wheel, I, which, in turn, engages with another wheel, H, secured to a shaft, V, upon which is wound a cord with a weight attached, as is usual in this class of machines.

The reservoir B is divided into two compartments, D and E, by means of a flexible diaphragm, *f*, as shown in figs. 2 and 4, the lower compartment, D, serving to receive the fluid and the gas, and the upper one, E, to receive the air. Upon the top of this reservoir is located an air-chamber or receiver, C, which is also divided by a rigid diaphragm, *h*, having a valve, *i*, in it, opening upward, and with one or more tubes, *p*, extending from the upper part of the air-receiver C down into the chamber E in the upper part of the reservoir B, as shown in figs. 2 and 4, there being a series of openings, *n'*, around the lower edge of the air-chamber C, through which the air enters the machine.

The reservoir B is supplied with the fluid through a pipe, L, as represented in fig. 1, from a can, G, which is of peculiar construction, and which is to form the subject-matter of a separate application for a patent, and need not, therefore, be herein more fully described. This pipe L passes down the outside of the reservoir B, thence along underneath it to the centre, where it communicates with the chamber D by a short pipe, *a*, as shown in figs. 2 and 4, the pipe L extending through under the reservoir B, and protruding at its opposite side, where it terminates in a short vertical branch, having a glass tube or indicator, *b'*, secured to its upper end, as shown in fig. 3. Within this vertical arm of the tube L, I place a float, having a stem extending up into the glass part *b'*, which thus serves as an indicator to show the height of the fluid in the reservoir B, by which I am enabled to keep it always at the required height, which should be a little below the gas-tube X, as indicated in fig. 4, this indicator being shown more clearly, detached, in fig. 5.

From the supply-pipe L, where it connects with the bottom of the reservoir B, extends a branch-pipe, L', as shown more clearly in fig. 3, and which has connected to it a vertical pipe, *u*, leading down outside of the machine at one end, to a cross-pipe, P, which has a branch extending into the cylinder J below, as shown in fig. 3, there being a cock, *o'*, in the pipe *u*, by which communication is opened or closed at pleasure.

From the opposite end of the cross-pipe P extends a vertical branch-pipe, P', which also has an indicator, *b'*, attached, the same as above described, to indicate the height of the fluid in the carburetting-chamber J, which should be such as to a little more than cover the holes *o* in the end of the cylinder, as indicated in fig. 4.

From the opposite end of the cylinder or chamber J extends a pipe, O, the entrance to which is through a vertical branch-pipe, *p'*, the upper end of which extends above the surface of the fluid in the chamber, and is open. The pipe O extends upward, as represented in fig. 2, and connects with the gas-pipe X, which extends transversely through the chamber D in the reservoir B. This pipe X has a valve, *z*, working vertically through it, which is connected by a link to the flexible diaphragm *f*, so that when the pressure of gas becomes excessive in the chamber D, the diaphragm will be raised, and thereby close the valve *z*, and thus cut off or regulate the flow of the gas. The pipe X is closed by a partition or plug, *r*, a short distance beyond the valve *z*, there being an opening, *e'*, between the valve and the partition *r* in the pipe, through which the gas flows out of the pipe X, there being another opening, *c'*, on the opposite side of the partition *r*, on the under side of the pipe X, through which the gas enters the pipe again, and passes thence out of the chamber D to the pipe *l*, from whence it is led to the burners by suitable pipes, the pipe *l* having its opposite end extending down alongside of the machine, and passing underneath the case A, terminating in a burner, *d*, by which the fluid in the chamber J may be heated when desired.

Owing to the solvent-qualities of the hydrocarbons, it has heretofore been difficult to construct a flexible diaphragm that would remain in working order for any considerable length of time, the cement used being soon dissolved, and thus letting the diaphragm come to pieces. By experiment I have discovered that a cement composed of about two parts of molasses and one part of glue, will answer the desired object, and that a diaphragm composed of leather, united by this cement, will remain intact and unaffected by the solvent-qualities of the hydrocarbon or its vapor. Hence, I construct my diaphragm of leather, so cut as to give it the requisite form, and then cement the parts together by the cement above described. The same may also be used for securing the edge of the diaphragm to the case, and for all purposes where a cement may be required about the machine.

By placing the hydrocarbon in the machine itself, I dispense with the use of water, both for sealing the air or gas-chambers, and also for running the fan in, and thus I produce a machine that cannot be affected by the freezing of the water, and which, consequently, can be located in any suitable out-building or exposed situation.

The machine being thus constructed and arranged, and being supplied with the proper quantity of gasoline or other proper fluid, and set in motion by being wound up, the operation is as follows:

The air is drawn, by the suction of the fan F, in through the small openings around the base of the air-chamber C, into the lower compartment thereof, from whence it passes up through the opening covered by the valve *i* into the upper chamber, from whence it passes down, through the tube *p*, into the chamber E, from thence out through the pipe R, down into the chamber J, passing along in contact with the saturated fibrous lining thereof to the opposite end, where it enters the fan through the openings *e*, and is carried by the revolving fan down into the fluid, from which it escapes, through the holes *o* at the opposite end, into the space at the end of the fan, having, by this contact with the fluid, become thoroughly carburetted or saturated with the vapor of the hydrocarbon. From this space it passes, by entering the upper open end of the tube *p'*, flowing thence through the pipe O upward into the pipe X, from which it passes at *e'* into the chamber D, where the excess of vapor is condensed by contact with the cold fluid in said chamber, after which it re-enters the pipe X through the opening *c'*, and passes thence out through X to the pipe *l*, whence it is conveyed to the burners for use.

The course of the air through the machine is clearly indicated by the arrows in fig. 2; the air before it is saturated, being represented by the arrows in red, and after it has been saturated, by the arrows in blue.

By this method of constructing the machine, I avoid the risk of the escape of the gas therefrom, as the mouth of the supply-pipe L, when it enters the reservoir, is submerged, and thereby kept sealed, and the only bearing or journal that passes through the case is also sealed in a similar manner; and, at the same time, I prevent the possibility of the gas escaping through the inlet or air-supply chamber C, by means of the peculiar arrangement of the valve and pipe therein, and, by the same means, prevent fire from entering the machine at that point.

I also secure a thorough saturation of the air, and, by condensing the excess of vapor in the chamber D, I prevent the gas-pipes from being filled up by condensation therein.

Having thus described my machine, what I claim as new, and of my invention, is—

1. The pump or fan, consisting of the cylindrical case F, with the curved partitions *b*, and having the inlet-openings *e*, and exit-holes *o*, arranged substantially as described.

2. The air-chamber C, having the partition *h*, with the valve *i* and pipes *p*, arranged to operate as set forth.

3. The reservoir B, with the flexible diaphragm *f*, and the gas-pipe X with its regulating-valve *z*, constructed and arranged to operate substantially as described.

4. The copper plate K, located under the chamber J, for the purpose of conducting and equalizing the application of heat to the fluid, as set forth.

5. The circulating-chamber, formed by the application of the plate *c*, with its opening *m* arranged within the chamber J, substantially as described.

6. The use of the cement, herein described, for preparing the flexible diaphragm and other parts of the machine, as set forth.

N. W. BANCROFT.

Witnesses:

W. C. DODGE,

J. McKENNEY.