

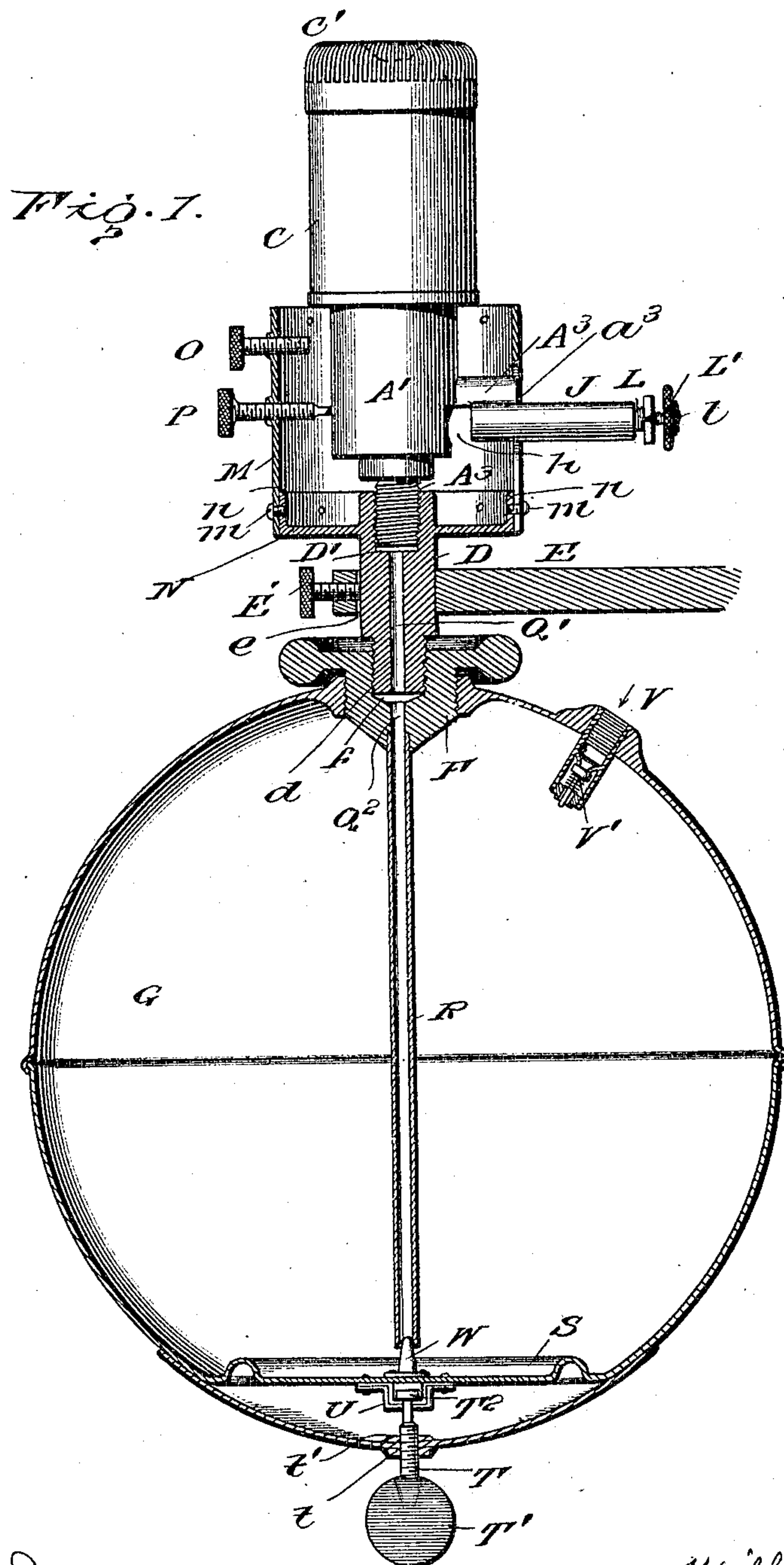
No. 837,238.

PATENTED NOV. 27, 1906.

W. MITCHELL.
VAPOR BURNING LAMP.

APPLICATION FILED NOV. 3, 1903. RENEWED OCT. 14, 1905.

2 SHEETS—SHEET 1.



Witnesses

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Specification of Letters Patent.

Patented Nov. 27, 1906.

Application filed November 3, 1903. Renewed October 14, 1905. Serial No. 282,810.

To all whom it may concern:

Be it known that I, WILLIS MITCHELL, a citizen of the United States, residing at Malden, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Vapor-Burning Lamps; and I 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.

The chief object of this invention is to increase the heating-surface, durability, convenience of manufacture, simplicity, and other desirable qualities of vapor-generators for lamps and other devices and to prevent the outflowing vapor from being chilled by proximity to the liquid fuel which flows into the generator. I therefore substitute for the cylindrically-coiled tube heretofore generally used, having its outlet extended down outside of the coil and near the inlet end, a solid generator-body having encircling passages or retorts formed therein and connected to constitute a continuous series, having the outlet through a longitudinal bore of the said body within the said series and protected and heated thereby. This generator is so constructed and arranged with regard to the heating devices that the last of the retorts is heated most intensely, the others being heated less and less in succession, and that which first receives the fuel being heated least. The flow of fuel through each retort is divided into two opposing streams, which meet and delay each other in passing to the next retort.

A further object of this invention is to provide for the convenient removability of the jet inlet or nozzle supplying vapor to the burner, whereby the substitution of a perfect jet for one with a worn and enlarged jet-hole may be effected without disturbing the generator or burner.

Another object of this invention is to insure more perfect and convenient control of the air-pressure on the liquid in the tank in starting the lamp and generally to improve the structure of said tank and the other parts of the lamp structure.

To these ends the said invention consists in the construction and combination of parts hereinafter more particularly set forth and claimed.

In the accompanying drawings, Figure 1 represents a vertical central section of a lamp embodying my invention, the generator and the valve-casing being shown in elevation and the so-called "balcony" which supports the chimney or dome having been removed. Fig. 2 represents a vertical sectional view of the upper part of the same, the generator-body being left unsectioned and its cylindrical shell and burner-cap being slightly separated therefrom. Fig. 3 represents a vertical central detail view of the generator-body, its stem, the lateral extension constituting the valve-casing, and the parts contained in or attached to the latter. Fig. 4 represents a detail perspective view of the slotted burner-cap and generator-shell slightly separated, and Fig. 5 represents the valve-casing and associated parts in longitudinal section slightly separated from each other.

A designates the hollow cylindrical body of my improved generator, having a solid downward extension A' and a short screw-threaded stem A³ on the lower end thereof, taking into a correspondingly-screw-threaded recess D' in the upper end of the short main stem D of the lamp. This latter stem passes through an eye e in a supporting-bracket E and is clamped there by a screw E'. Its lower end is reduced and screw-threaded at d for engagement with the wall of the recess f of a block or plug F, screwed into the top of the globular tank or reservoir G, containing the liquid fuel.

An air and gas passage a' extends from the lower end of the central space a of generator-body A down through extension A', bending to the side of the latter near its lower end, where its inlet is supplied with air and gas from an air and gas mixing space h, the current being up through this passage a' and space a to and through the slotted or foraminous burner-cap C', fitting on the cylindrical shell C. In the exterior part of body A are formed several circular grooves or retorts B, covered and completed by said shell and connected with each other by short grooves b, so that they constitute when said shell is in place a continuous cylindrical series of retorts in which the volatile liquid fuel is vaporized or reduced to a gaseous state. In this condition, usually that of a fixed gas, it flows down through a small bore B', formed longi-

tudinally in the said body A, within the inner circumference of each of the said retorts to supply the jet I, which discharges into the mixing-chamber *h*.

5 The construction of the generator above described is obviously stronger and more durable than that of the coiled tube used, for example, in my Patent No. 722,601. As the retorts B are broad and shallow, the heat of
10 the relatively great central volume of gas and air will be applied to the liquid fuel in said retorts through the medium of the wall of said body to very great advantage, the body itself being raised to a high temperature.
15 There is no chance of any part getting into disorder, as might easily happen with fine coiled tubing. In case of obstruction the shell C is removed, and the retorts and connecting-passages are at once open from end
20 to end, whereas the interior of a fine coiled pipe is practically inaccessible. Manufacture is much more simple in the present instance, as there is only a simple casting to be made with one or two bores instead of the
25 many windings of the coiled tube, which of course must itself first be produced and the careful adjusting and fastening of each one of them in place. Finally the outlet-bore B' is absolutely protected from all contact with or
30 injurious proximity to the liquid fuel, and the heat of the gas flowing through it is maintained by the very high temperature of the body A, in which the said bore is made.

The extension A' is provided with an integral laterally-extending arm A³, bent down in
35 an elbow *a*³ to form the air and gas mixing space *h* before mentioned, then out again horizontally, forming the valve-casing J. This casing has a longitudinal bore J', communicating with a bent extension of the small outlet-bore B' before mentioned and receiving in
40 its forward part the elongated jet or nozzle I, (shown in detail in Fig. 5,) having in its side an inlet-hole *i*, registering with the said bore B' and provided at its discharge end with a small jet-hole I'. The outer part of bore J' is enlarged to form a packing-box J³, containing asbestos packing *j*, which surrounds the
45 needle-valve K, controlling said jet-hole. A tubular follower L screws into the open end of this packing-box, engaging screw-threads on the inner face of its wall. This follower is internally screw-threaded to receive a second
50 follower L', which screws into it in like manner, and this again is screw-threaded to receive a screw *l*, which bears against the head of the said needle-valve. This head is preferably spherical and fits a correspondingly
55 concave shoulder *l'* of the second follower L'. The office of follower L is to tighten the packing on the needle-valve and prevent the escape of gas; that of follower L' and screw *l* is to adjust the position of the point of the said valve with regard to the jet-hole, since
60 the follower L' engages the head of said valve

to draw it back when follower is screwed outward and presses against it when turned inward, and the screw *l* may be used independently for this latter adjustment. It is very easy to take out these parts I, J, J³, K, L, L', and *l* for cleaning, repair, or substitution without disturbing the generator or any other part of the lamp. This is important, as the jet-hole after a time wears to a size
70 which will prevent the most advantageous use of the lamp, and in lamps constructed according to the said patent the inconvenience of changing the worn jet-block for a new one has been manifest. Incidentally it compels
75 taking the neighboring elements apart and rearranging them. My present invention saves all such trouble.

M' designates the shade-supporting balcony, which is attached to a cylindrical supporting wall or shell M, the lower part of
85 which is connected by screws *m* to the raised peripheral flange *n* of a broad cap or flanged base N, integral with the main stem of the lamp aforesaid. The shell M is provided with the usual screw-clamp O for supporting
90 the mantle-rod, (not shown,) also with a screw-threaded valve P, working through said wall, to open and close at will a short lateral drip-passage *p* in extension A', tapping the inlet-bore Q, which supplies the series of retorts constituting the generator, as
95 aforesaid. By opening this passage or outlet *p* the operator allows a small quantity of liquid fuel to drip down into the cup or flanged base N. After closing said passage
100 again this oil may be ignited and serve for preliminary heating of the lamp. The same result may be attained by withdrawing the needle-valve a little; but the supply will be slower, and the valve has the advantage of
105 being available for use even while the lamp is burning in case a little extra heat should be required. The passage Q extends down through extension A' and short stem A² and connects with bore Q' of the said main lamp-
110 stem, which again communicates with the bore Q² of the lower part of screw-plug F. The latter bore receives the upper end of a long gasoline-tube R, extending down within the globular reservoir or tank G to the lower
115 part thereof. A tapering plug W, attached to a flexible false bottom S of this tank, enters the lower end of said pipe and will entirely close the same when forced up by an
120 adjusting-screw T, working through the bottom of said tank, which is thickened and screw-tapped at *t* to receive the same. This screw has a large knob T' exterior to said tank for convenience of operation. On its
125 inner end said screw also carries a disk or button T², received in a box U, attached to the under side of the said false bottom, so that the movement of the said screw in either direction will move the plug W likewise, opening or closing the tube R at will. V design-

nates an air-inlet to the said tank, closed by a check-valve V' against any escape of air or vapor.

The operation is as follows: The plug F is first removed, and the tank G is charged with gasoline or other liquid fuel. The screw T is turned to close the tube R. The screw-threaded air-inlet V is then connected to some air-forcing device, and air is forced into the tank sufficiently to maintain the feeding action of the lamp for a reasonable length of time. The air-forcing device is then disconnected and the tube R opened, when the air-pressure in the tank will drive the liquid fuel through the tube and the bores Q² Q' Q to the retorts constituting the generator. The valve P is then opened, supplying the cup or flanged base N below, and the oil therein is ignited for preliminary heating of the generator. The lamp is then ignited at the burner-cap. The mantle acts as usual to intensify the flame and the air-pressure in the tank, forcing the gasoline up from one retort to the other. The last retort is so much more subject to the action of the heated gases checked in some degree by the burner-cap and eddying backward within the generator-body and also in such close contact with the burner that the vaporization of the liquid has fully taken place at this point. The heating action of said point and eddying gases of course decreases steadily toward the first retort, where the heating action is least. The gas passing from the last retort directly to the jet in its hot condition has no chance to condense, and thus produces a satisfactory combustion. When a greater amount of illumination or light is required, a greater amount of pressure is required. The amount of light is regulated by the amount of air-pressure in the reservoir. A supply can be pumped in at any time by a pump furnished with the lamp.

Although the generator, the jet, and the proximate parts are shown and described herein as parts of a vapor-burning or gas-burning lamp, they may of course be used with smoothing-irons, soldering-irons, and many other articles and structures employing easily-vaporizable liquid fuel. This is equally true of the tank. The generator and other cylindrical parts of course are not confined to that form, but may be square in cross-section or have any desired number of sides.

Many changes of form, proportion, or arrangement may be made without departing from the spirit and scope of the invention.

The retorts and connections constitute a continuous passage-way; but by connecting the circular retorts, as shown, by smaller grooves the current of vaporizable liquid is repeatedly divided and sent in opposite directions, meeting at each connecting-groove, and the double obstruction of opposing cur-

rents and reduced passage-way insures perfect vaporization.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A generator for lamps and other articles, consisting of a hollow part having a series of annular retorts formed therein and connected by narrow passages, and provided with an outlet-bore extending down through the body of said hollow part within the circumference of the said retorts, in combination with a burner at one end of the said hollow part, a jet supplied with gas or vapor through the said outlet and discharging into the interior of said hollow part at the other end thereof, means for supplying liquid fuel to the lowermost retort and means for conducting gas to the jet from the uppermost retort substantially as and for the purpose set forth.

2. A generator for lamps and other articles consisting of a hollow part having a series of annular retorts formed therein and connected by narrow passages, in combination with a slotted burner-cap mounted on the top of the said hollow part, a jet discharging vapor or gas into the interior of said hollow part at the bottom thereof, means for conducting gas to said jet from the uppermost retort and means for supplying liquid fuel to the lowermost retort, the fuel being caused to flow through all the retorts in succession substantially as and for the purpose set forth.

3. A generator for lamps and other articles consisting of a hollow part having a series of annular retorts formed therein and connected by passages distinct from said retorts, in combination with a burner at one end of said hollow part, a jet supplied with vapor or gas from the retort nearest to the said burner and discharging into the interior of the said hollow part at the other end thereof, means for conducting the gas or vapor from said retort to said jet, and means for supplying liquid fuel to the retort farthest from the burner, each retort being gas-tight except at a single point of inlet and a single point of outlet, and these points being in opposite parts of its circle, in order that the inflowing fuel may divide into two currents, which flow in opposite directions partly around the said circle, meeting at the outlet of said retort substantially as set forth.

4. A generator for lamps and other articles, consisting of a hollow part having a series of annular retorts formed therein and connected by passages distinct from said retorts, in combination with a burner at one end of said hollow part, a jet-nozzle supplied with vapor or gas from the retort nearest to the said burner and discharging into the interior of the said hollow part at the other end thereof, means for conducting the gas or vapor from said retort to the said jet-nozzle, means for supplying liquid fuel to the retort farthest from the

burner, a valve-casing inclosing the said nozzle, arranged transversely with respect to said hollow part and leaving an air and gas mixing space between them and a needle-valve working through the said jet-nozzle to govern the jet-hole thereof, each retort being gas-tight except at a single point of inlet and a single point of outlet and these points being in opposite parts of its circle in order that the inflowing fuel may divide into two currents which flow in opposite directions partly around the said circle, meeting at the outlet of said retort substantially as set forth.

5. The combination of a generator a jet-nozzle and connecting devices provided with a passage for liquid and gas or vapor, with a tank provided with a flexible false bottom, a tube connected with said passages and extending down within said tank, a plug arranged to close and open the lower end of the said tube, and a screw working through the bottom of the said tank and provided with a head or button engaging the said false bottom, to advance or withdraw the said plug at will substantially as set forth.

6. A generator consisting of a hollow body, having annular grooves constituting retorts formed in its wall in vertical series and having vertical grooves of less diameter formed also in said wall, connecting said retorts to each other, and an inlet-passage and an outlet-passage to and from the end retorts of the series, in combination with means for supply-

ing liquid fuel to the said inlet-passage, a lamp-burner supported on the said generator, and an approximately horizontal removable nozzle supplied with gas or vapor by said outlet-passage and discharging into the hollow interior of said generator-body, substantially as and for the purpose set forth.

7. A generator consisting of a hollow body having retorts formed in its wall in vertical series and having passages formed also in its wall, passages connecting said retorts to each other, and an inlet-passage and an outlet-passage to and from the end retorts of the series, in combination with means for supplying liquid fuel to the said inlet-passage, a lamp-burner supported on the said generator, an approximately horizontal removable nozzle supplied with gas or vapor by said outlet-passage and discharging into the hollow interior of said generator-body and a tubular lateral arm rigid with said generator-body and inclosing and supporting the said nozzle but permitting the flow of gas or vapor into the same from the said outlet-passage substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIS MITCHELL.

Witnesses:

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