2 Sheets--Sheet 1.

J. B. HYDE.

Improvement in Carbureters.

No. 129,566. Patented July 16, 1872.

FIG. I.

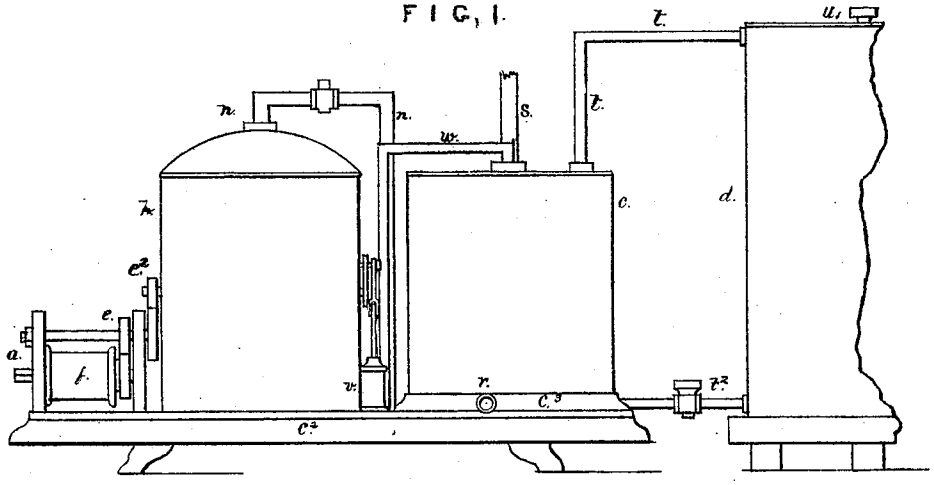
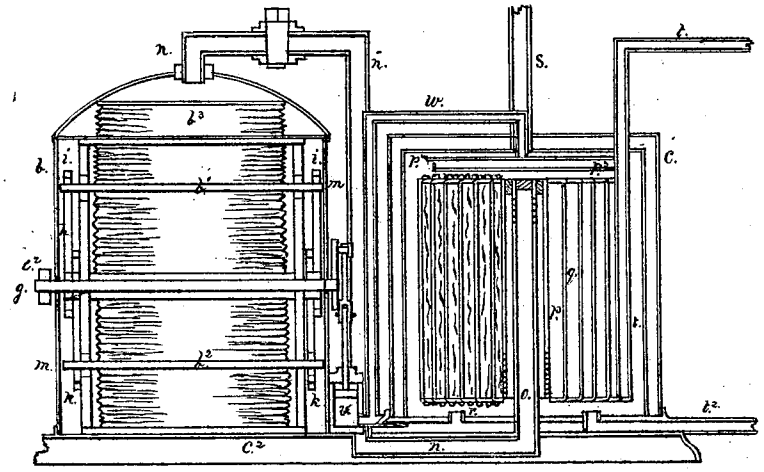


FIG. II.



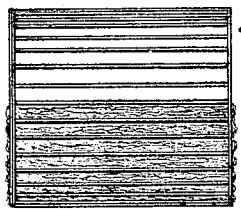
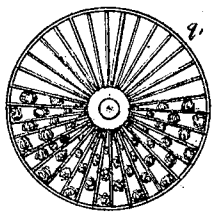


FIG. VII.



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2 Sheets--Sheet 2.

J. B. HYDE.

Improvement in Carbureters.

No. 129,566. Patented July 16, 1872.

FIG. III.

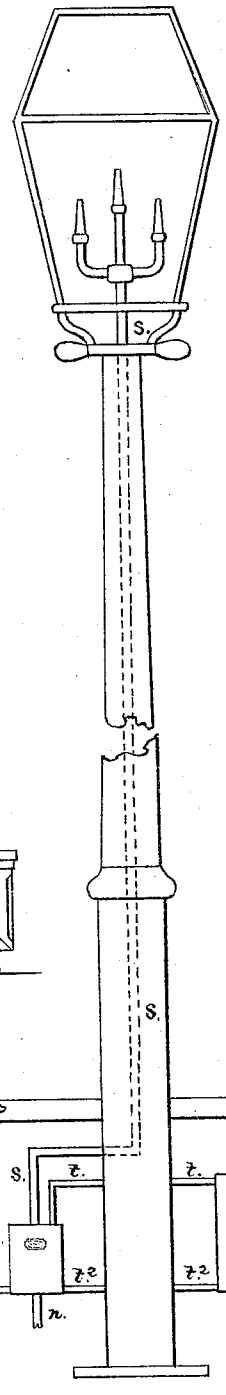


FIG. IV.

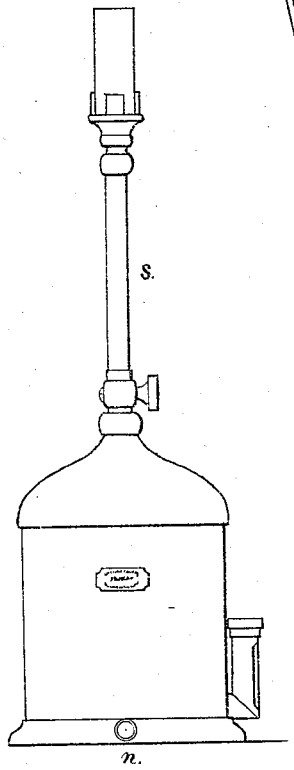


FIG. V.

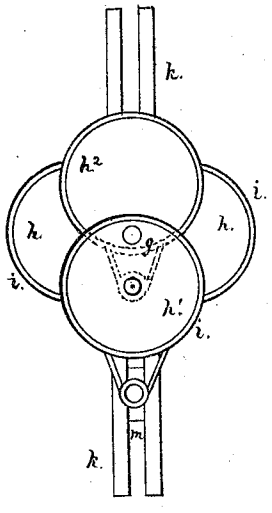
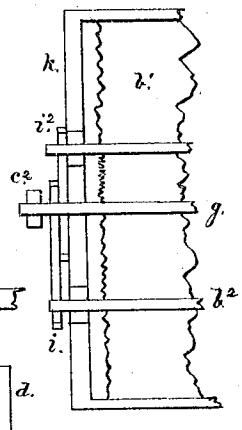


FIG. VI.



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J. Burrows Hyde

UNITED STATES PATENT OFFICE.

J. BURROWS HYDE, OF NEW YORK, N. Y.

IMPROVEMENT IN CARBURETERS.

Specification forming part of Letters Patent No. 129,566, dated July 16, 1872.

Specification describing certain Improvement in Apparatus for Carbureting Air and Gas, and in methods to apply the same for use, invented by J. BURROWS HYDE, of the city, county, and State of New York.

The first part of my invention consists in certain improvements in the driving or power apparatus for actuating the blower. The second part of my invention consists in the manner in which I construct and arrange the several parts of this blowing instrument or air-vessel. The third part of my invention relates to the arrangement and construction of the carbureting-vessel. The fourth part of my invention consists in the method I employ for supplying the hydrocarbon fluid automatically to the carbureter; and, fifth, my improvement consists in my mode of applying the carbureter to street and other stationary lamps and drop or study lights.

I present two sheets of drawing, representing, in Figure 1, a vertical side elevation of the apparatus complete as erected for use, consisting of the driving-machine *a*, the blower *b*, the carbureter *c*, secured upon a common base or pedestal, c^2, and, lastly, the reservoir supply-vessel *d*, shown as partly cut away in the drawing. Fig. 2 represents an enlarged and sectional elevation of the driving-machine, blower, and carbureter as cut vertically through the central longitudinal line. Fig. 3 shows the application of my improvement to a lamp-post for street gas. Fig. 4 represents the application of my carbureter to a "drop" or reading light for commercial gas. Fig. 5 shows an enlarged and detached front view, and Fig. 6 a side elevation, of the contrivance I employ for actuating the bellows in place of cranks, which, however, may be used therefor, if preferred.

Describing the apparatus in the order as set forth I construct the driving-machine upon proper standard or frame-work secured to the base c^2, and within or upon such frame-work provide rotating shafts carrying the winding-drum *f* and the smoother-faced friction-"gear" wheels *e*, three of which are shown in the drawing intermediate between the drum *f* and the friction-pinion l^2, secured to the end of the actuating-shaft *g* of the blower. A cord being wound around the drum *f*, to which one end is secured, the other end is passed vertically to and over a pulley fastened to the floor above, and thence passing to and over a second pulley, below which a suspended weight is attached to the other end of the cord, which weight in its fall actuates the blower. This cord and weight are not represented. It is usual to employ toothed gearing in machines for this purpose, but the extreme delicacy of the gas-flame, and particularly at low pressure, causes the flame to "feel" the impact of each successive tooth, which imparts a corresponding pulsation and flicker to the light, greatly impairing its quality and usefulness, whereas by the use of friction or toothless pinions a smooth, soft, steady gas-flow is obtained. It also greatly reduces the cost of the apparatus by dispensing with the expense of the gear-cutting. A ratchet-wheel with pawl, placed between the end of the drum *f* and the first pinion which runs loosely on the shaft, allows the drum to be wound the reverse way for taking up the cord when the winch is turned by hand. The blowing apparatus *b* consists of two double-acting bellows, b^1 and b^2, forming four blowing instruments working vertically and separated by disks of light wood or other proper material. Placed above the bellows, or in any other convenient position, is a fifth bellows as a receiver and pressure-regulator, b^3, the whole being inclosed within a proper casing of tin or other material. The driving-shaft *g*, shown in the center of the sectional drawing, Figs. 2 and 6, passes between the two pairs of bellows b^1 and b^2, and is rotated by the smooth pinion e^2 on its outer end, and which alternately causes the bellows to expand and collapse through the agency of cranks, cams, or eccentrics secured to the shaft. In the drawing circular cams *h* are shown, and carrying encircling straps *i*, seen in Figs. 5 and 6. As there are two pairs of bellows there are two sets of such cams, one only being seen in the drawing; but this one *h* is shown in four different positions. The cams are placed on each end of the shaft *g*. The lower portion of the straps *i* are prolonged downward to form an arm or lever, which takes the actuating pins or journals secured to the separating-disks between each pair of bellows. *k* shows parallel standards or guides secured vertically near the bellows, between which guides anti-friction slides *m* are shown, and through which the said journals take by easy bearings. The bear-

ing-surfaces of the cams h and straps i should be quite smooth, and may be cut away at intervals to reduce the friction as much as possible. It follows that as the shaft g is rotated the cams h, being firmly secured thereto, must rotate with it, and the straps i must oscillate upon the journal-pin, and as the pin is held to the vertical line by the guides k the pin must move in the direct vertical line, and the slides m be carried up and down, working the bellows accordingly. h^1 shows the position when at the extreme stroke down, and h^2, with dotted lines, showing the opposite extreme of elevation in working the bellows b^2. A second pair of cams is secured to the shaft, inside of h at each end, and placed at right angles with h, being similarly provided with straps, but having their prolonged or lever portions on their upper sides for actuating the bellows b^1 in the same manner. From each of the four working bellows proper receiving-valves, closing internally, lead to the external air, and delivery or pressure valves, closing externally, lead by proper pipes to the reservoir-vessel b^3, which is loaded to the proper pressure and provided with an exit-valve leading to the conducting-pipe n and to the carbureter c. The carbureter-case c I construct of thick tin, brass, galvanized iron, or cast-iron, and I prefer the sides to be double, the outer and inner sides being, say, half an inch asunder, and each being tightly soldered to the bottom. I prefer a cylindrical shape, with a depth of about twelve inches, uniformly and irrespective of the diameter, which should be proportionate to the power or number of lights required. The space within the double sides I fill with sand, clay, hair, or other porous non-conducting material. I place this vessel c upon a cast-iron base, c^3, elevating it about one inch. A central vertical inlet-pipe, o, is strongly and closely secured to the center of the bottom of c, below which it extends about half an inch, its upper end reaching to within about two inches of the top of the vessel. Both ends of this pipe o are threaded to about half an inch, below which, at the upper end, a series of holes, whose united area equal the caliber of the pipe, is drilled through and through the pipe, and to a distance of two or more inches below the screw-thread. p shows a second pipe, encircling o, and extending from one-eighth of an inch above the top of o to within an inch of the bottom of the vessel. The upper end of this pipe p is closed by a metallic plug not less than half an inch long, having on its inside center a threaded bore to receive and fasten the upper threaded end of o, a space between the two tubes being thus formed for the free passage of air or gas downward from the inlet-pipe and out at the holes bored through the bottom end of the pipe p. The outer end of the pipe o takes an elbow, into which a short pipe leads to a second elbow secured to the lower end of the vertical pipe n, leading from the blower or from the gas-meter, as one or the other may be used. q shows a basket or frame-work of wire or perforated metal fitting the inside of the carbureter-case, and extending from an inch above the bottom of c to the top of the tube p, upon which it rests and is supported, the bottom having a central orifice to pass over the tube. This basket or frame is shown separate at Fig. 7. It may be filled with cut sponge or other proper capillary material; but I prefer to use ordinary lamp-wick made up in groups of several strands and secured vertically in the frame-work, and extending from top to bottom, leaving vertical spaces for a free circulation of the air or gas from the center pipe to the outside. But if the diameter of the frame exceed six inches, I leave radial—say three or more—passages from the center to within one inch of the exterior, and not less than one-fourth of an inch wide, for the free and rapid passage outward of the mediums to be carbureted, to produce a general circulation among the capillaries. After this charged frame-work has been placed in the case c a circular perforated plate of tin, p^4, to serve as a distributer of fluid, as will be described, is placed upon it. p^3 is a second circular plate of tin, about three inches less diameter than the basket, and secured about one-fourth of an inch above p^4. This is to deflect the gas-current outward from a vertical direction. The basket and other parts having been placed in position, the top or double cover, filled with the same non-conducting material as the sides, is firmly soldered thereto. r shows a short pipe leading into the bottom of the vessel c, and provided with a cock for drawing off the fluid from the carbureter. s shows the gas-outlet pipe. The basket shown at Fig. 7 is made of wire, cut in proper lengths. The two ends are bent inward and secured to a circular tin plate at the top and an annular plate at the bottom. One-half the basket is shown as charged with wicks. At t a pipe is shown extending from near the bottom of c, passing upward vertically and through the top, above which, by an elbow, it turns off and is secured at its outer end to the top of the supply-vessel d. A second pipe, t^2, leads from the bottom part of the carbureter to the bottom of the vessel d. Now, all being closely connected, and d being charged with fluid, and the cock in t^2 being opened, the fluid will fill into the carbureter until it covers and seals the lower and open end of t, which action, arresting the passage of the air or gas from c into d, will arrest the flow of the fluid until it be so exhausted as to uncover the end of t, when the process will be repeated, thus insuring continous action until the whole is exhausted. u shows the cap-covered pipe by which the supply-tank is replenished with fluid. v shows a pump actuated by a crank or cam on the prolonged end of the shaft g. A small pipe leads from the pump to the bottom of the carbureter, and a second pipe, w, leads from the pump upward and enters the center of the top of the carbureter. The purpose of

this contrivance is to supply a requirement of fluid when the carbureter is being worked at full capacity when the capillary action may be deficient, and then the fluid may be thrown in in small quantities on the top of the perforated distributing-plate *p*, whence it will percolate the plate and search its way downward among the capillaries. The pump may be worked or not, at will, by disconnecting the crank-motion, and a rotary pump may be used instead of the kind represented.

Fig. 3 shows a lamp-post for street and public buildings, the carbureter and supply-vessel being placed below the surface of the ground or sidewalk, or in the base of the post, the gas or air being supplied by the pipe *n*. Fig. 4 shows the carbureter arranged as a drop-light, particularly for gas, which passes into the instrument by an elastic tube attached to the tube *n*, the fluid being supplied by the indicating-tube *u*. Air may also be used with this instrument.

All the letters apply to similar parts throughout.

This construction of carbureter is particularly adapted to railroad cars and street-cars, in which case the blowing apparatus may be actuated by one of the axles, the air being conducted to an intermediate reservoir or air-supply to compensate for times when the car may cease moving when *en route*.

As a sealing medium or luting for pipes or other connections, I make a mixture of glue and glycerine, adding white oxide of zinc or any proper comminuted material as a *corpus*, which mixture is most conveniently applied when warmed. Neither naphthaline fluid or their vapors will attack this compound.

I am aware that plaster of Paris and other non-conducting mediums have been used in a solid condition to serve as non-conductors to carbureters. I, however, use a conducting material—sand or other proper granulated substance—in a condition to be readily removable, when required, without destroying the instrument. This gives also a solid exterior to the carbureter, while the air contained in the interstices aids in isolating the carbureter proper. At the same time the sand presents a like mechanical medium of safety against ignition of the inclosed gas as does the Davy lamp to exterior gas.

I claim—

1. The use of smooth-surfaced or friction pinions, instead of toothed wheels, for increasing, reducing, or driving speed in transmitting power in the actuating-machines for carbureting air.

2. The cams *h*, with the encircling-straps *i* and guide-plate *k* and sliding carrier *m*, combined, for working the bellows b^1 and b^2, with the pressure-bellows b^3 confined within a closed chamber, as described.

3. The compound air-inlet, composed of the concentric pipes *o* and *p*, perforated at opposite ends and connected at the top, for the purpose described.

4. The deflecting-plate p^4, in combination with the exit-pipe *s*.

5. The combination of the distributing-plate p^3 with the deflecting-plate p^4, as described.

6. The combination, with a carbureting apparatus and its supply-tank placed at a suitable distance therefrom, of the tubes *t* and t^2 for automatically regulating the feed of the fluid to the carbureting-vessel.

7. The combination of a street-lamp with a carbureting apparatus placed at or near the base of the supporting column or post.

8. A carbureting apparatus, in combination with a drop-light, substantially as set forth.

9. A detachable wick-carrier or cap made of wires, as described, and supported in position by the central vertical receiving and distributing tube *p*, from which it may be readily removable on opening the instrument.

10. A jacket of sand or other proper granulated material, to give solidity to and insulate the contents of a carbureting-vessel, in the manner and for the purpose described.

11. The combination and arrangement of friction-gearing with the mechanism for driving a blowing apparatus for carbureters, so as to produce a steady blast, substantially as set forth.

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