(No Model.)

O. C. DAVIS.

AIR BLOWER.

No. 254,538. Patented Mar. 7, 1882.

Fig. 1.

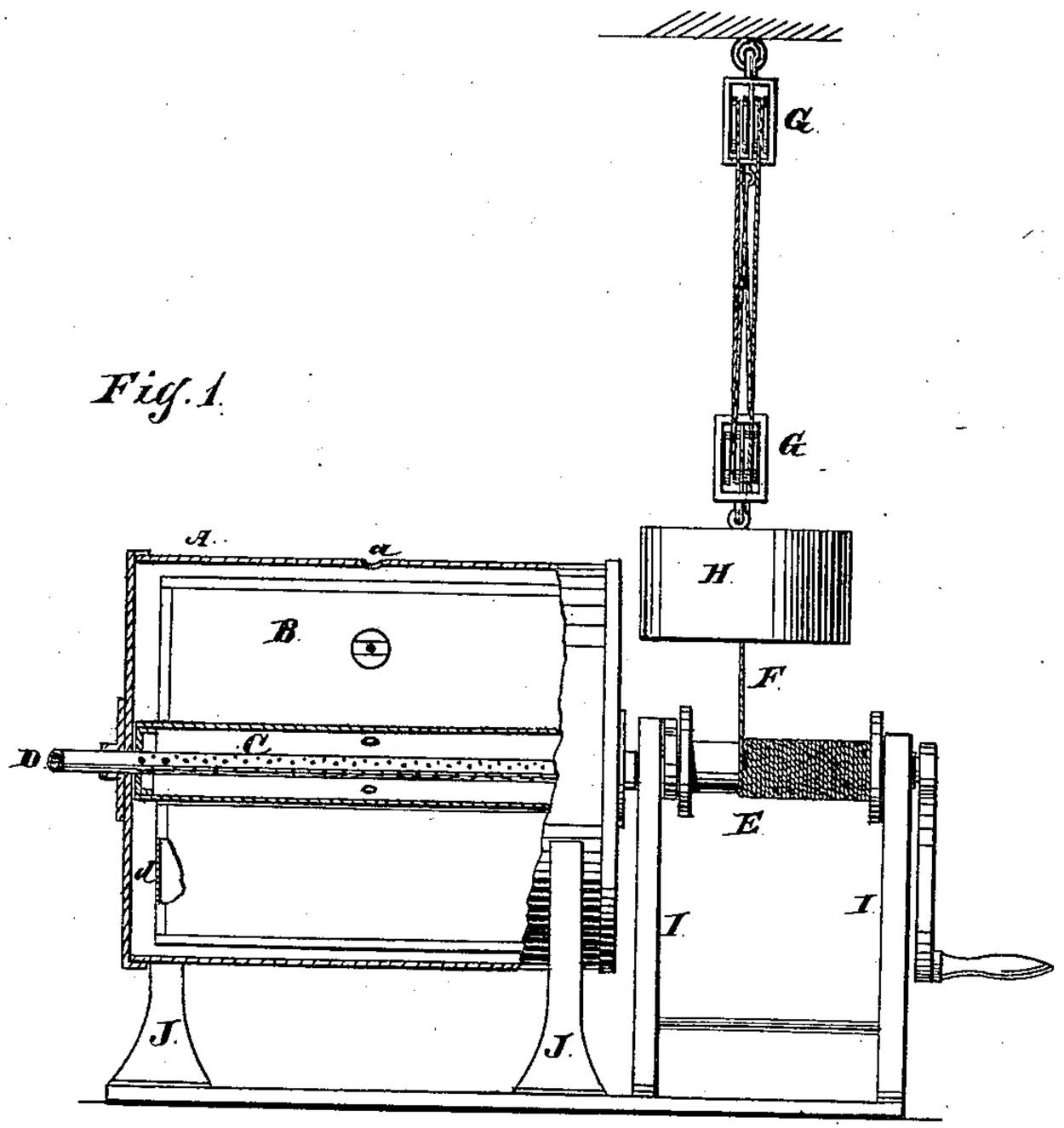


Fig. 2.

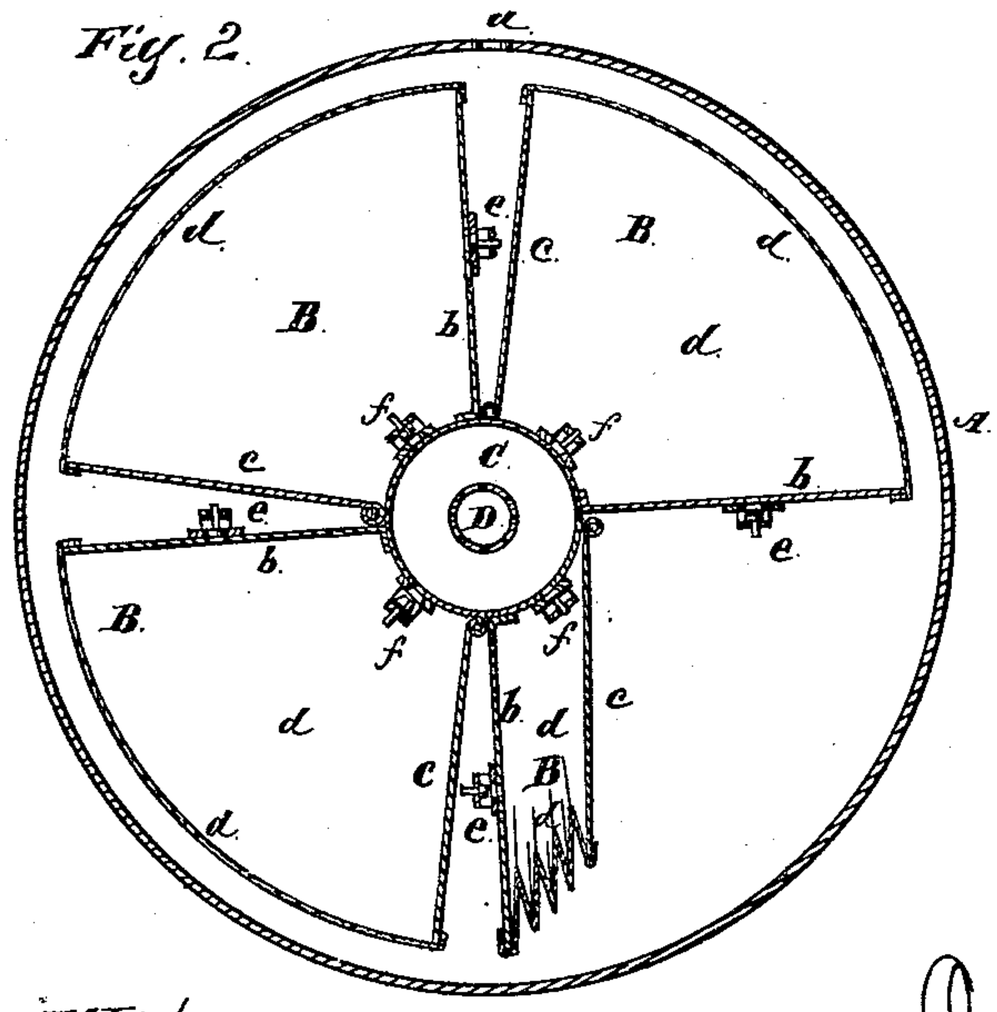
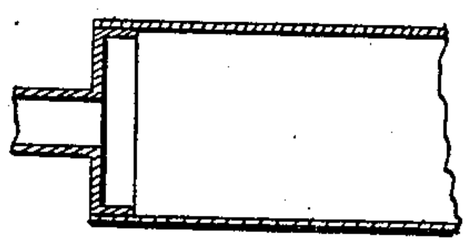


Fig. 3.



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UNITED STATES PATENT OFFICE.

OSSIAN C. DAVIS, OF RACINE, WISCONSIN, ASSIGNOR TO HIMSELF AND PARKER GRACE, OF CHICAGO, ILLINOIS.

AIR-BLOWER.

SPECIFICATION forming part of Letters Patent No. 254,538, dated March 7, 1882.

Application filed October 28, 1880. (No model.)

To all whom it may concern:

Be it known that I, OSSIAN C. DAVIS, residing at Racine, in the county of Racine and State of Wisconsin, and a citizen of the United States, have invented a new and useful Improvement in Air-Blowers, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation, with a portion of the blowing apparatus in vertical section, showing the interior construction; Fig. 2, a cross-section through the outer cylinder and interior devices constituting the blowing apparatus; Fig. 3, an enlarged detail, showing a modified form of construction for the interior cylinder.

This invention is primarily designed for use with an air-carburetor of a gas-machine, and has for its object the production of a more uniform and reliable blast of air for use in such carburetor, and to increase the speed and volume of the air passed through such carburetor and insure the taking up of the vapor in sufficient quantities to produce the desired results for illuminating purposes at the point of combustion, and have the pressure of the air self-regulating and its flow or discharge from the blower dependent on the condition of the carburetor; and its nature consists in providing one or more self-compressible buckets or receivers located and revolving within a stationary receiving cylinder or reservoir; in providing the self-compressible buckets or receivers with self-acting valves for allowing the air to enter the buckets and to be discharged therefrom into the main cylinder or reservoir; in providing a revolving cylinder located within the main cylinder or reservoir and carrying the self-compressible buckets or receivers; in providing an inlet-pipe located within the interior revolving cylinder for conveying air into such cylinder, to be discharged into the self-compressible buckets; and in providing self-operating mechanism for actuating the interior cylinder and self-compressible buckets or receivers thereto attached or carried thereby.

In the drawings, A represents the stationary cylinder or reservoir; B, the self-compressible buckets or receivers; C, the interior revolving cylinder; D, the inlet pipe or tube; E, the windlass; F, the rope for working the windlass; G G, the pulleys for regulating the speed of the windlass; H, the operating-weight; I I, the posts or standards for the windlass; J J, the posts or frame-work for the main cylinder or receiver; *a*, the discharge-opening of the main cylinder or reservoir; *b*, the stationary side of the self-compressible buckets or receivers; *c*, the hinged or movable side of the self-compressible buckets or receivers; *d*, the flexible casing or sides of the self-compressible buckets or receivers; *e*, the discharge-valve from the self-compressible buckets or receivers; *f*, the inlet-valve for the self-compressible buckets or receivers.

The main reservoir A may be made in a cylindrical form and of sheet-iron or other suitable material, and of any desired dimensions, according to the amount of air it is desired for it to receive. It may be supported upon standards J, or other suitable frame-work that will maintain it in a stationary position.

The compressible buckets or receptacles B are located within the main reservoir or chamber A, and one or more of them may be used, as shown—four are provided. When one is used it may be made larger in proportion than with four, but its size must not be increased so as to interfere with its operation. The dimensions of these receptacles or buckets B must be less than the interior diameter of the reservoir A, so that when located in the cylinder a sufficient space will be left between them and the walls of the cylinder in which they can revolve, and for the passage of air to the outlet of the main cylinder, and they are located in relation to each other so as not to interfere with the receiving and discharging of the air. Each bucket or reservoir has two of its sides *b c* made of any firm, stiff, and unyielding material, and its ends and one of the remaining sides are closed by a flexible air-tight material, *d*, that will fold together and allow the buckets to act on the principle of a bellows, the remaining side being closed by the interior cylinder or other device from which air passes into the buckets or receivers. The side *b* is rigidly secured to the interior cylinder and remains stationary. The side *c* is hinged or otherwise secured to the interior cylinder and rises and

falls, or opens and closes, and the flexible material is attached to the edges of these side pieces, *b c*, so as to produce an air-tight joint, the entire structure forming substantially an air-tight compartment or chamber, when attached to the air-supply cylinder or device. At or near the center, as shown, of the stationary side *b* of each bucket B is located a valve, *e*, which valve is so arranged and operates that the pressure of the air from the inside, when the receptacle B is full and descending, will serve to open it, and when the air is discharged the pressure induced by the air in the main cylinder to enter the receptacle will tend to close it, the valve *e* in these respects being self-acting. The valves *e* shown have their seats in the sides *b*, and their stems operate in a suitable guide or holder located on the outside of the side *b*, but they may be of any other well-known form of construction for self-acting valves, and their location and arrangement may be varied from that shown, but the changes must not be such as to affect in any manner their action in opening and closing at the proper times.

The cylinder C may be made of sheet metal or other suitable material. It is located within the main cylinder A, at the center thereof, and its ends are supported in suitable bearings, or otherwise, so that it is free to revolve, as shown. It is attached to a hollow shaft or tube, D, which has its bearings in the ends of the main reservoir A. This cylinder C supports and carries the self-compressible buckets B, which are arranged thereon in such relation as not to interfere with each other, and when revolved the shaft, with its buckets or receivers B, serves as a fan-blower, to act on the air discharged in the main receiver A.

The hollow shaft or tube D, as shown, forms a conduit for the external air, and extends the entire length of the cylinder C and projects beyond the ends of the main reservoir, and that portion of the tube within the cylinder C is provided with perforations, as shown, through which the air taken from the outside can escape into the cylinder, from which cylinder it passes through suitable valves to the receivers or buckets B. The valves *f*, as shown, are located at or near the center of the space on the cylinder, between the sides *b c* of each bucket B, and are so arranged that the pressure of the air in the cylinder C will open them when the receptacle B is being filled, and the pressure of the air within the receptacles B will overcome the pressure of the air and close the valve when the receptacle is being emptied or air is discharging therefrom, the valves in these respects being self-acting. These valves *f* may be of any form of construction for self-acting valves, and their location and arrangement may be varied from those shown. Such variations must not affect in any manner their operation in opening and closing properly. As shown, these valves *f* have their respective seats in the cylinder, and are provided with stems located and supported in suitable guides on the outside of the cylinder. An inlet-valve, *f*, and an outlet-valve, *e*, are provided for each bucket or receptacle B, and their action in relation to one another is such that as one is opened the other will close, and vice versa.

The pipe or shaft D is arranged to take air in at that end represented broken off in the drawings. The other end of this shaft is made solid or closed, so that the air must pass through the openings of the perforated portion thereof, and this closed end is connected with a windlass or other motive power that will act to cause it to revolve and impart motion to the cylinder C and buckets or receptacles B. As shown, a windlass, E, is the motive power, which windlass may be of any suitable construction, mounted in suitable bearings at the upper ends of the standards or posts I, or other support therefor. To this windlass is attached one end of a rope, F, which rope, after passing through suitable pulleys, G G, has attached to its end a weight sufficiently heavy to unwind the rope from the windlass, causing the windlass to revolve and drive the shaft D. To set the apparatus in working order, the rope is wound onto the windlass, raising the weight and allowing of its descent to act on the windlass; and the rapidity with which it descends can be regulated by means of the pulleys G G, around the wheels of which the rope can be made to pass, so as to give the desired rapidity of descent.

Other motive power than the windlass, weight, and rope may be used, and in place of making the shaft carry the cylinder C, such cylinder may have suitable journals provided, one of which is hollow, as shown in Fig. 3, into which the induction-pipe D can enter, the other journal being left solid or closed, and the motive power being applied thereto; or the cylinder may be driven by pulleys and gearing, or in some other suitable manner.

The operation is as follows: The buckets or receivers B and cylinder C will be revolved by the descent of the weight or the action of the motive power, causing the buckets to successively and continuously ascend and descend in the main cylinder or reservoir. The air admitted by the shaft or pipe D passes into the secondary revolving cylinder C, and from thence it passes through the valve *f* into the receivers or buckets B, the air passing into each bucket as it is ascending, at which time the valve *f* will be open and the valve *e* closed, and the stationary side *b* will be the upper one, allowing the hinged side to drop down and the receiver to be filled with air. As the side *c* of the receivers or buckets passes the center of gravity this board will be the upper one and will drop as the center of gravity is passed, causing the air in B to exert sufficient pressure to close the valve *f* and open the valve *e*, so that during the descent of the bucket the contained air will be discharged from the valve *e* into the main receptacle or receiver A, the side

c falling down and compressing the air as the bucket descends, the valve *e* remaining open and valve *f* closed until the bucket commences its ascent, when the valve *f* will open and the valve *e* close to again fill the receiver with air on its ascent. By this arrangement it will be seen that the receivers B are filled and discharged automatically and in regular order, and that the air is discharged from under pressure into the reservoir A in a continuous and steady stream, and will be discharged at the outlet *a* in a like manner, entering the carburetor under pressure and passing through and taking up the vapor in an efficient and reliable manner. When the flow from the carburetor is shut off the flow of air therein will cease, because the pressure of the discharged air in the reservoir A will counterbalance the weight or other motive power, stopping the cylinder C, so that the buckets will not act to receive and discharge the air, making the action self-regulating. By using four self-acting compartments or buckets B the air will be received and discharged more uniformly, as by the time one bucket has been discharged another will be in position and commence the discharge of the contents, having been filled in its ascent.

What I claim as new, and desire to secure by Letters Patent, is as follows:

1. In combination with a main receiving and discharging reservoir of an air-blower, one or more self-compressible buckets or receivers, located and operating within such main reservoir and having a continuous rotation therein, by which they are made to ascend and descend and automatically open and close, and self-acting in respect to receiving and discharging air for producing a more uniform, reliable, and efficient current, substantially as and for the purposes specified.

2. The combination, in a stationary air receiving and discharging reservoir, of a hollow revolving cylinder arranged horizontally within the reservoir, one or more automatically compressible or expansible buckets or receptacles connected and rotating with the cylinder, and an inlet pipe or tube extending into the cylinder for supplying air to the same and to the buckets or receptacles, all substantially as and for the purpose described.

3. The main receiver or reservoir A and buckets B, constructed to be self-compressible, and having an outlet-valve, *e*, in combination with the cylinder or air-conduit C, having an inlet-valve, *f*, leading to each receiver B, and a mechanism for revolving the cylinder, whereby the receivers B will be caused to ascend and descend and to receive and discharge air, substantially as and for the purposes specified.

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