(No Model.) 3 Sheets—Sheet 1.

C. S. KING & E. G. BROWN.

CARBURETOR.

No. 385,121. Patented June 26, 1888.

Fig. 1.

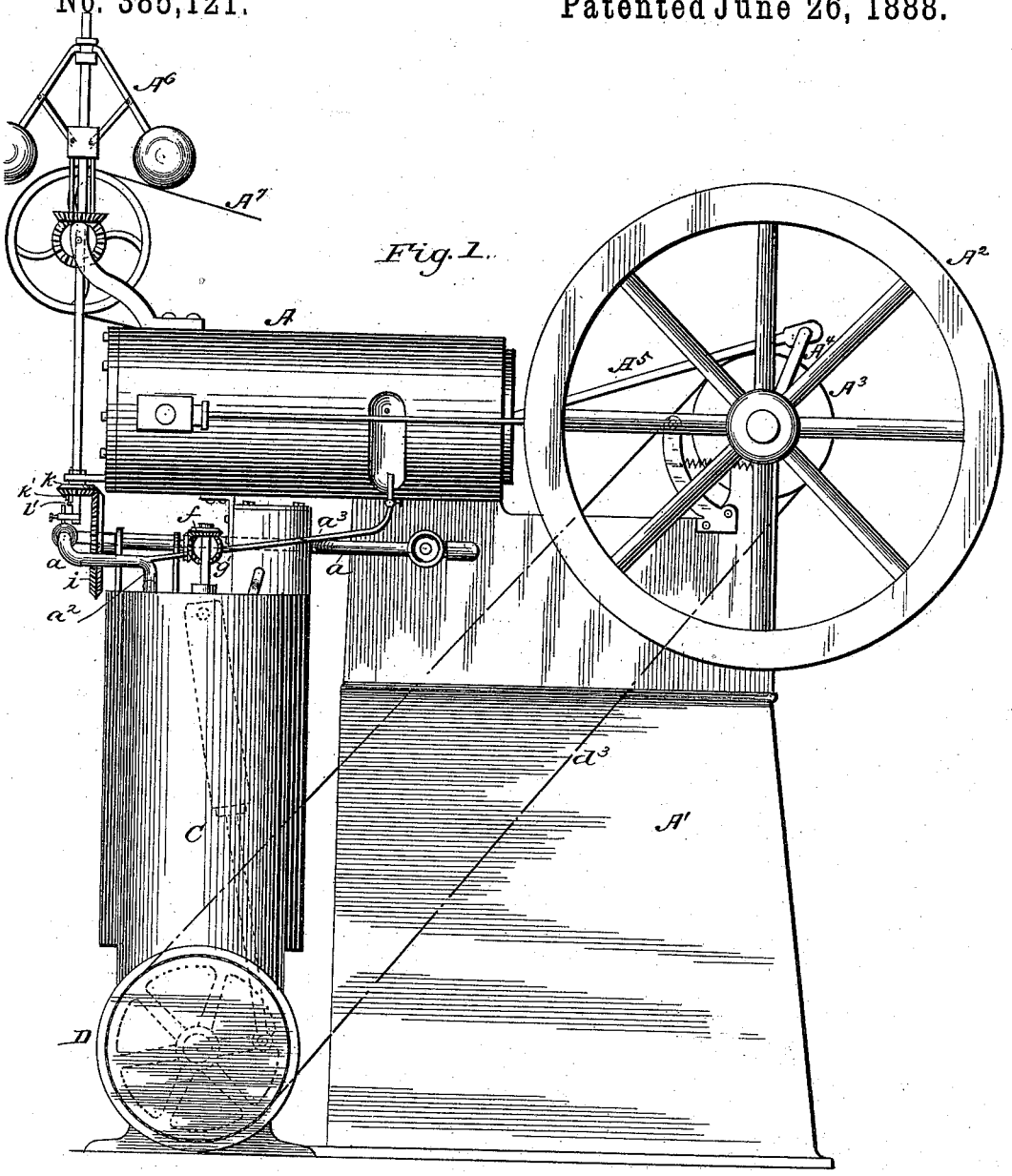

Fig. 3.

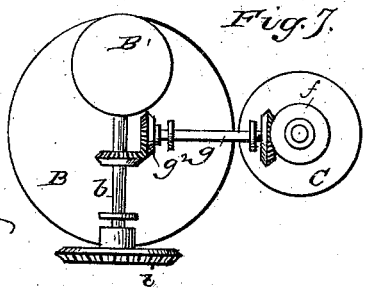

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Fig. 2.

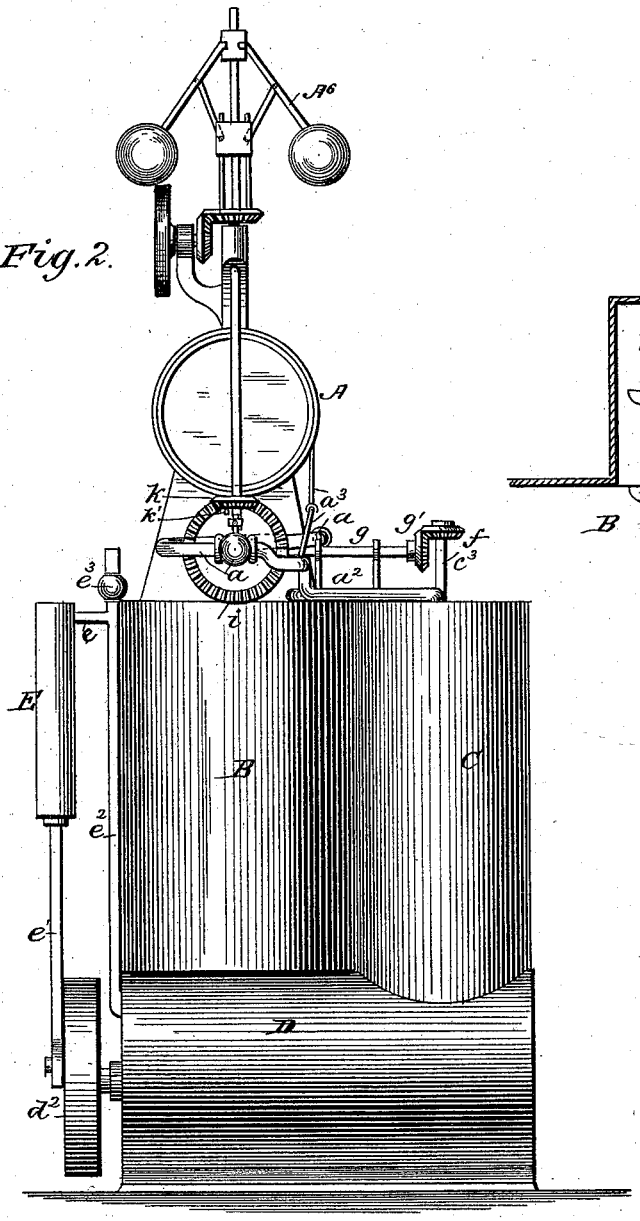


Fig. 5

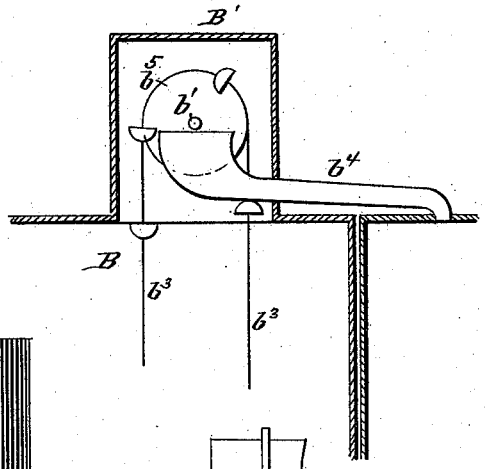
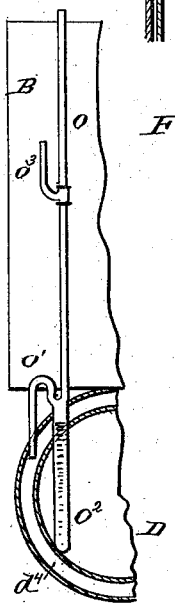


Fig. 6



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CARBURETOR.

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Fig. 4

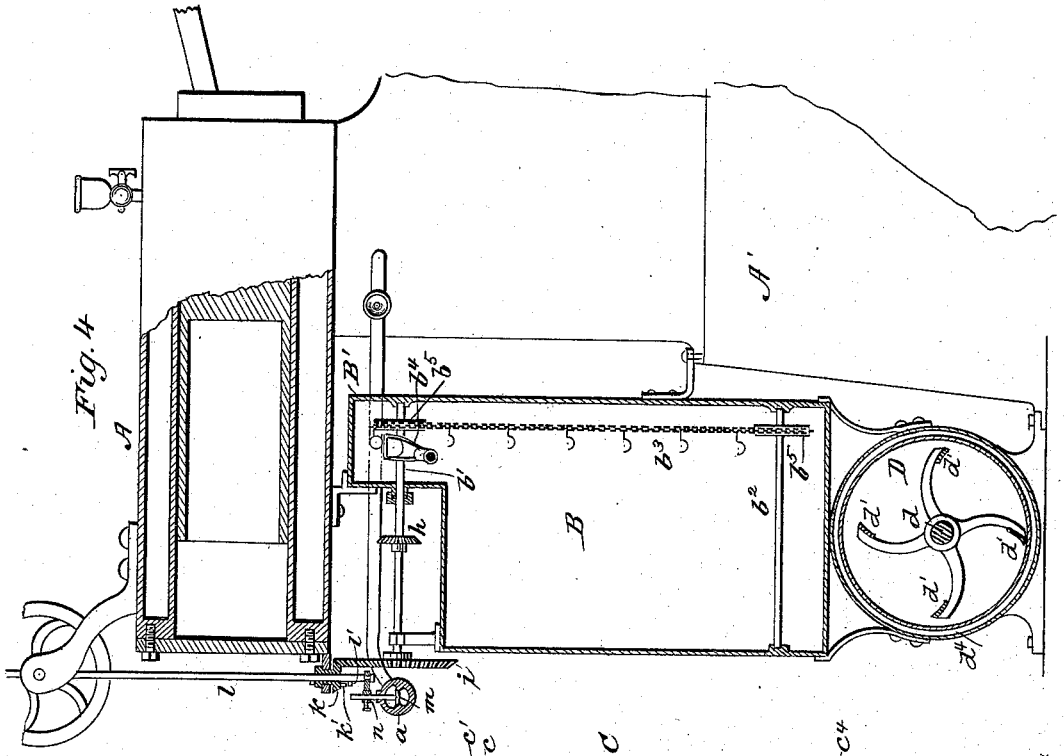
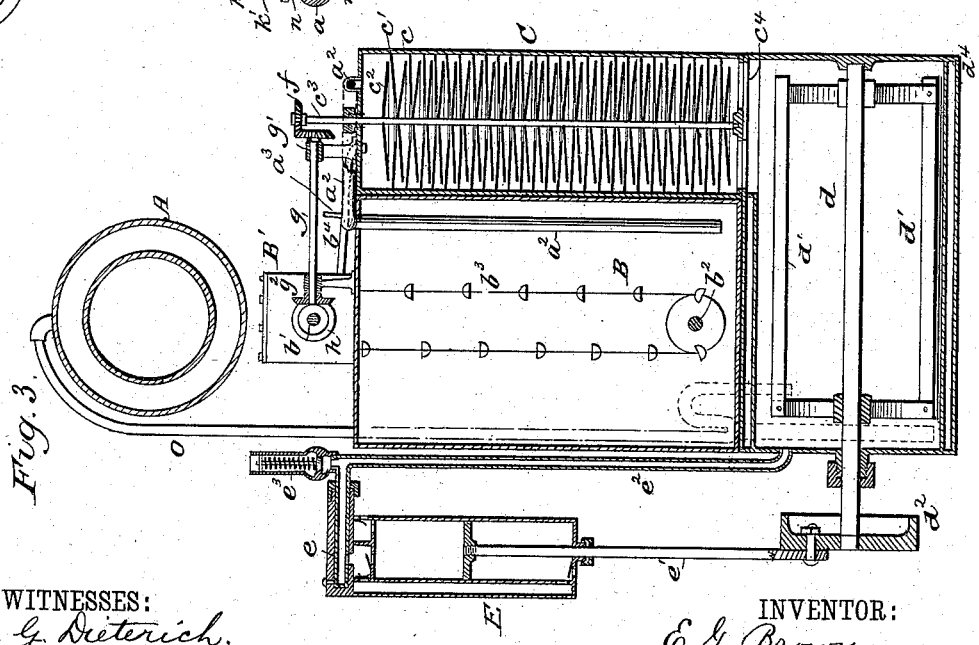


Fig. 3.



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UNITED STATES PATENT OFFICE.

CHESTER S. KING AND EDWARD G. BROWN, OF SMETHPORT, PENNSYLVANIA.

CARBURETOR.

SPECIFICATION forming part of Letters Patent No. 385,121, dated June 26, 1888.

Application filed October 25, 1887. Serial No. 253,313. (No model.)

To all whom it may concern:

Be it known that we, CHESTER S. KING and EDWARD G. BROWN, of Smethport, in the county of McKean and State of Pennsylvania, have invented a new and useful Improvement in a Combined Gas-Engine and Carbureting Apparatus, of which the following is a specification.

The object of our invention is to provide a combined gas-engine and carbureting apparatus, wherein the latter is operated by the engine and made to supply the carbureted air to be mixed with air to form an explosive mixture for use in the engine, and wherein the speed of the engine is made to control the speed of the carburetor, the supply of hydrocarbon thereto, and the supply of gas to the said engine.

The invention consists in the peculiar construction and arrangement of parts, all as hereinafter fully described, and pointed out in the claims.

Figure 1 is a side elevation of our improvement. Fig. 2 is an end elevation of the same. Fig. 3 is a vertical sectional elevation. Fig. 4 is a side elevation, partly in section and partly broken away; and Figs. 5, 6, and 7 are detail views.

Referring to the drawings by letter, A is the working-cylinder in which the explosion takes place, A' the base, A^2 the fly-wheel, A^3 the pulley, A^4 the crank, A^5 the pitman, and A^6 the governor, driven by belt A^7, of a common form of gas-engine which receives its supply through the valved pipe *a*.

B is a reservoir for containing gasoline or other hydrocarbon, which is supplied thereto through the inlet *b* at the top. Upon the reservoir B is arranged the dome B′, in which and in the lower part of the reservoir are journaled the shafts b' b^2, respectively, carrying the chain-wheels b^5 b^5, over which pass the endless chain of buckets b^3, which supply the gasoline or other hydrocarbon to the carburetor C through the pipe or trough b^4. The carburetor C is arranged at one side of the reservoir, and consists of the open-bottom cylinder *c*, having a series of concave or dished and centrally-apertured plates, *c′*, secured to its inner surface, and a series of convex or oppositely-dished plates, c^2, secured to a revolving shaft, c^3, stepped in a spider, c^4, at the bottom of the cylinder, and operated by means hereinafter described.

Below the reservoir and carburetor is arranged the cylinder D, in which is eccentrically journaled the shaft *d*, carrying a series of beaters or agitators, *d′*. The shaft *d* projects through the cylinder, and is provided with the pulley d^2, from which the belt d^3 passes to the pulley A^3 of the engine, and by which the agitator-shaft is operated.

E is a double-acting air-pump, which is suspended upon an axis, *e*, about which it oscillates, and has its piston *e′* connected with the pulley d^2. The pump is connected with the cylinder D by means of the pipe e^2, which is provided with a spring-actuated pressure-regulating valve, e^3.

On the upper end of the shaft c^3 of the carburetor is mounted the bevel-pinion *f*, which meshes with the bevel-pinion *g′* on the shaft *g*, journaled in bearings on the top of the reservoir B and carburetor C. The other end of the shaft *g* carries the bevel-pinion g^2, which meshes with the bevel-pinion *h* on the shaft *b′*, which projects through the dome and is supported in a suitable bearing on the top of the reservoir B. The outer end of the shaft *b′* carries a large bevel gear-wheel, *i*, which meshes with a loose bevel-wheel, *k*, on the governor-shaft *l*.

In the gas-supply pipe *a* is arranged the valve *m*, whose stem projects upward through the said pipe and is adjustably connected to the lower end of the governor-shaft by means of the clamp *n*. The under surface of the bevel-wheel *k* is provided with a downwardly-projecting lug, *k′*, adapted to engage a laterally-projecting lug, *l′*, on the governor-shaft *l* when the said shaft is elevated.

For keeping the hydrocarbon in the agitator-cylinder at the desired temperature the said cylinder is formed with a water-jacket, d^4, which is connected with the water-jacket of the engine-cylinder A. The pipe *o*, connecting the two water-jackets, is provided with the bent portion *o′*, entering the water-space of the cylinder D, and the extension o^2, projecting down into and to within a short distance of the bottom of the cylinder D, and is nearly filled with mercury. The pipe *o* is also pro-

vided with an outlet-pipe, o^3, which will permit the escape of the water when the temperature of the contents of the cylinder D rises to such a degree as to cause the mercury in the extension o^2 to rise in the pipes above the juncture of the bent pipe o', thereby closing the lower end of the said pipe o and preventing the entrance of water from the engine-cylinder to the agitator-cylinder.

The supply-pipe a, leading from the carburetor, is provided with an extension, a^2, leading down to within a short distance of the bottom of the reservoir B, for returning to said reservoir any excess of hydrocarbon in the said gas-pipe, and the said pipe is also provided with a small jet-pipe, a^3, which is arranged in said pipe a between the valve m and the carburetor.

The operation is as follows: The engine being put in motion, the hydrocarbon will be fed from the reservoir B, by means of the endless chain of buckets b^3, to the carburetor C through the pipe b^4. The hydrocarbon falls upon the convex plate c^2, then passes down onto the concave plate c' and through the aperture thereof to the next plate, and so on to the bottom of the carburetor, the heavier particles passing into the agitator-cylinder D. The hydrocarbon in the cylinder D is broken up and comminuted into fine particles by the revolving blades d' to facilitate its absorption by the air, which is forced into the said cylinder by the pump E. The air then passes up through the carburetor C, meeting the hydrocarbon in its passage through the same, and escapes completely carbureted through the supply-pipe a to the engine-cylinder A. As the speed of the engine decreases, the governor-shaft l rises and opens the valve m in the supply-pipe a. At the same time that the shaft rises its lug is brought into engagement with the lug on the pinion k and causes the same to revolve therewith, and through the bevel gear-wheel i and the bevel-pinions f, g', g^2 and h cause the endless chain of buckets to be operated to supply the hydrocarbon to the carburetor and the shaft c^3 of the carburetor revolved. When the speed of the engine increases, the governor-rod l descends, the valve m closes, and the bevel-pinion k is disengaged from the governor-rod, so that it will revolve freely thereon, whereby the endless chain of buckets and carburetor-shaft will be stopped.

It will be seen that as the air passes through the carburetor C it is brought into contact with the hydrocarbon therein, and the inlet and exit openings both being at the top the gas, when it reaches the top and just before leaving the carburetor, is brought into contact with fresh hydrocarbon, so that it will be thoroughly saturated. By means of the agitator below the carburetor the heavier particles of hydrocarbon, which are usually lost, are saved, and being subjected to heat and acted upon by the beaters, are broken up, so that they be absorbed by the air admitted to the cylinder and passed through the carburetor. Then, again, the agitator-cylinder being below the carburetor, we are enabled to apply heat only to the residuum or the heavier particles of the hydrocarbon which alone reach the agitator-cylinder.

Instead of a pump any air-forcing apparatus may be employed.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination, with a carbureting-cylinder, of a cylinder arranged below and communicating with the carbureting-cylinder and provided with an agitator, substantially as and for the purpose set forth.

2. The combination, with a carbureting-cylinder having an open bottom, of a cylinder arranged below the carbureting-cylinder for receiving the heavier particles of hydrocarbon passing through the carbureting-cylinder, and an agitator in said cylinder, substantially as herein shown and described.

3. The combination, with a carbureting-cylinder, of a cylinder arranged below the carbureting-cylinder and communicating therewith and having a water-jacket surrounding it, and an agitator in the said jacketed cylinder, substantially as described, whereby provision is made for heating and breaking up the heavier particles of hydrocarbon passing through the carbureting cylinder, as set forth.

4. The combination of a carbureting-cylinder, a cylinder arranged below and communicating with the carbureting-cylinder and having a water-jacket surrounding it, an agitator in the jacketed cylinder, and an air-forcing apparatus connected to the said jacketed cylinder, substantially as herein shown and described.

5. In a carburetor, the combination of a cylinder having an open bottom and provided with an inlet for the hydrocarbon and an exit for the carbureted air at the top, a series of concave and centrally-apertured plates secured within the cylinder, a shaft journaled in the cylinder, and a series of convex plates of less diameter than the cylinder and secured to the shaft between the concave plates, substantially as described.

6. The combination, with an engine-governor, of a hydrocarbon-reservoir, a carbureting-cylinder, an endless chain of buckets for supplying the hydrocarbon to the carbureting-cylinder, and intermediate mechanism between the buckets and governor-shaft, substantially as described, whereby provision is made for regulating the supply of hydrocarbon to the carbureting-cylinder from the governor, as set forth.

7. The combination, with an engine-governor, of a carbureting-cylinder, a shaft journaled therein, a hydrocarbon-reservoir, a feeder for supplying the hydrocarbon to the carbureting-cylinder, and intermediate mechanism between the feeder, the carburetor-shaft, and the governor, substantially as described, whereby provision is made for regulating the

supply of hydrocarbon to the carbureting-cylinder and the operation of the carburetor from the governor, as set forth.

8. The combination, with an engine and its governor, of a carbureting-cylinder, a hydrocarbon-reservoir, a feeder for supplying hydrocarbon to the carbureting-cylinder, a shaft journaled in said carbureting-cylinder, a pipe for supplying carbureted air to the engine, a valve in the said pipe, and intermediate mechanism between the valve, the feeder, and the carburetor-shaft and the governor, substantially as described, whereby provision is made for regulating the supply of hydrocarbon to the carburetor, the supply of carbureted air to the engine, and for controlling the operation of the carburetor, as set forth.

9. The combination, with the water-jacket of an engine-cylinder and an agitator-cylinder having a water-jacket, of a pipe connecting the two water-spaces and having an extension projecting into the body of the agitator-cylinder for containing mercury, substantially as and for the purpose set forth.

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