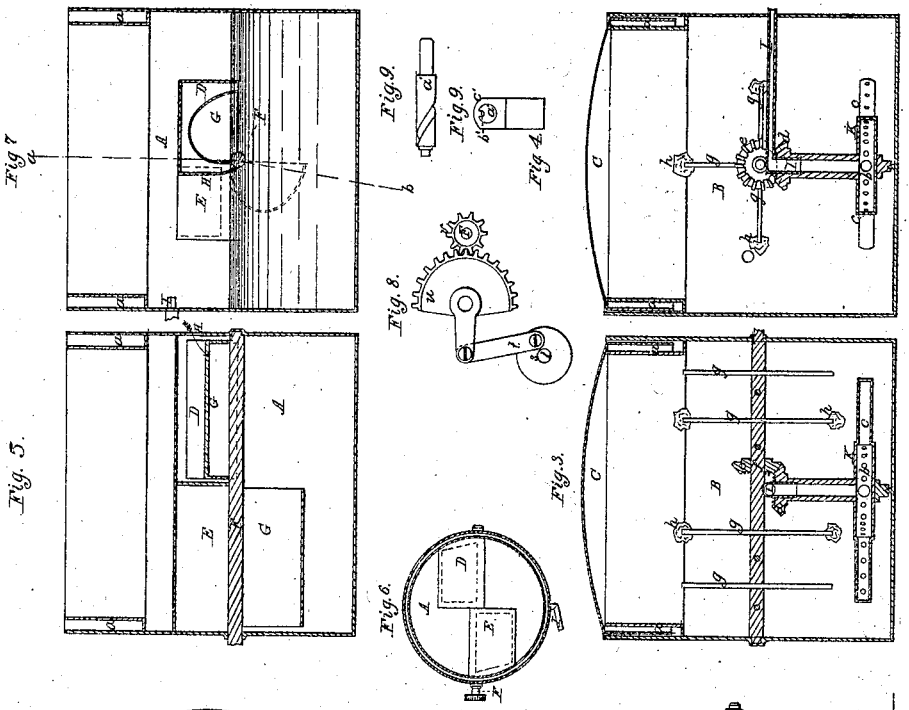
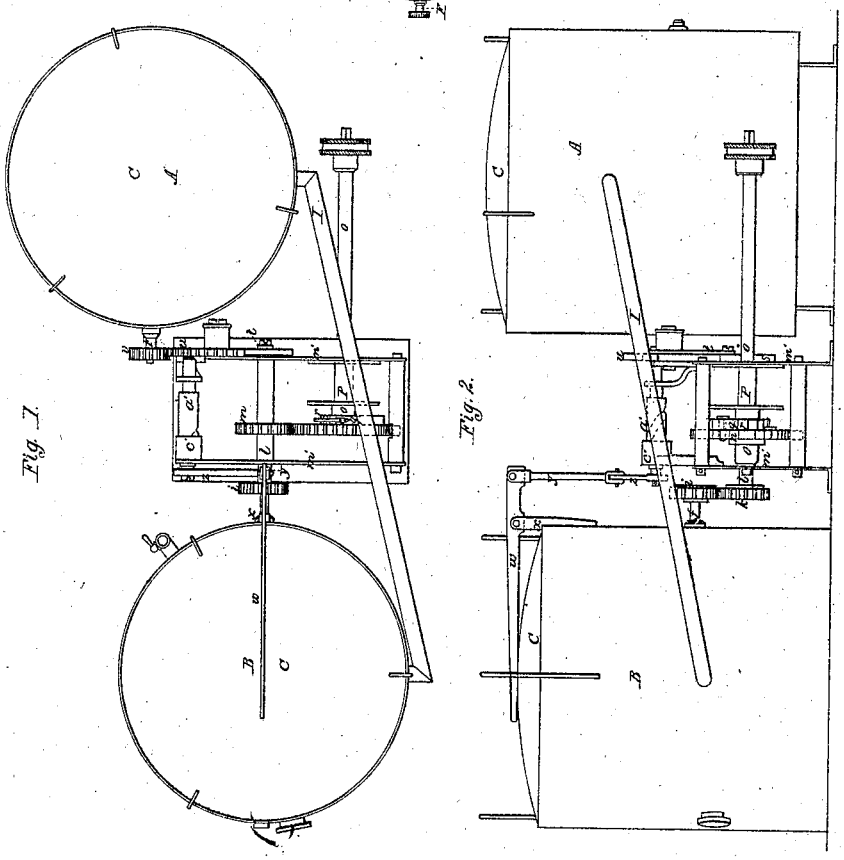
J. B. TERRY.

APPARATUS FOR CARBURETING OIL.

No. 46,280. Patented Feb. 7, 1865.





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IMPROVED APPARATUS FOR CARBURETING AIR.

Specification forming part of Letters Patent No. **46,280**, dated February 7, 1865.

To all whom it may concern:

Be it known that I, JOHN B. TERRY, of Auburndale, in the county of Middlesex and State of Massachusetts, have made a new and useful or Improved Apparatus for Vaporizing and Aerating a Volatile Hydrocarbon; and I do hereby declare the same to be fully described in the following specification and represented in the accompanying drawings, of which—

Figure 1 is a top view, and Fig. 2 a side elevation, of it. Figs. 3 and 4 are transverse and vertical sections of the vaporizer, one being taken in a plane at right angles to that of the other. Fig. 5 is a vertical section of the air-forcing apparatus, such section being taken in line of the axis of the shaft of such apparatus. Fig. 6 is a top view of the air-forcing apparatus with its bell-cover removed from its cistern. Fig. 7 is a transverse section of such air-forcing apparatus, taken through one of its air cases or cells.

In constructing my apparatus for carbureting air or vaporizing and aerating a volatile hydrocarbon, I employ two cisterns, A B, each having a bell-cover, C, dipping into an annular trough, *a*, for holding water. Within the first of the cisterns—viz, that marked A—I arrange two inverted air cells or cases, D E, each of which is open at bottom. The lower edges of these cases are to be on a level with each other, and on or about on a horizontal shaft, F, which goes through the cistern. These cases project in opposite directions from the said shaft. Within each of the cases D E there is a bucket or air scroop, G, the same being made to project (mouth downward) from the shaft and so as to rotate or vibrate with it. These scoops extend in opposite directions from the shaft. There is an air passage or hole, H, opening out of each air-case and made through the side of the cistern A, such hole being arranged at a level above that at which water is to stand in the cistern, such level being a little above the shaft F. From the same it will be seen that if a reciprocating vibratory motion be imparted to the shaft F, so as to cause the buckets or scoops to be alternately raised out of the water and into the air of their cells, the buckets will receive air and carry it down into the water, and when each bucket may have been moved below the surface of the water more than ninety degrees of a circle the air will escape from the bucket into the water and pass up through the latter and into that part of the cistern which is above the water.

From the air-space of the cistern A a pipe, I, extends and passes into the cistern B, and opens into the head of an agitator and air-distributer, K, which is arranged within the lower part of the cistern B, and in its construction is like the well-known "Barker's centrifugal mill"—that is to say, it consists of a hollow hub, *b*, provided with a series of tubular arms, *c c c c*, which are perforated with holes, so arranged that while air may be ejected from them into a liquid surrounding them such air will operate to put the agitator in rotation within the liquid. The hub may be perforated with holes for ejecting the air in the proper directions to aid in effecting the rotation of the agitator. On the top of the hollow shaft of the agitator there is bevel-gear, *d*, which engages with another such gear, *e*, fixed on a horizontal shaft, *f*, which not only goes through and out of the cistern B, but has a series of arms, *g g g*, &c., extended from it. To each of these arms one or more pieces of sponge, *h*, or other suitable absorbent material, should be affixed. The hydrocarbon fluid to be vaporized and aerated or mixed with air, is to be placed in the cistern B, and so as to cover the agitator or distributer K, and extend nearly, if not quite, up to the shaft *f*. The air from the air-forcing apparatus of the cistern A being blown through the pipe I into the distributer K will be ejected from the orifices thereof directly into the hydrocarbon fluid, and by its action against such fluid the air will cause the distributer to revolve thereon. The revolution of the distributer will not only more or less agitate the liquid, but will cause the air to be very thoroughly distributed in the liquid, and so as to vaporize such liquid. So by the revolution of the shaft *f*, with its arms and the sponges thereof, within the liquid, more or less of the liquid will be taken up into the air-space of the vessel B, and by dripping from the sponges such liquid will be more or less vaporized. The combined air and vapor may be discharged from the vessel B by means of one or more pipes and led to burners, where it may be inflamed for the purpose of obtaining light and heat by its combustion.

In order to effect the vibratory movements of the scoop or bucket-shaft F and to insure a rotary motion of the agitator or distributer K, I make use of mechanism, which may thus be described: On the outer end of the shaft *f* a gear, *i*, is fixed. This gear engages with another gear, *k*, carried by a shaft, *l*, which is supported within a frame, *m'*, arranged between the two vessels A B. The shaft *l* carries a gear, *m*, which engages with another gear, *n*, fixed on the shaft *o* of a barrel or pulley, *p*. A cord or chain attached to such pulley and wound around its periphery is to have a weight suspended from it, the gravitating power of the weight being employed to effect the rotation of the shaft *o*. The gear *n* turns freely on the shaft *o* in one direction, but by a pawl, *q*, and ratchet *r* is estopped from revolving in an opposite direction on the shaft. This enables the cord of the weight to be wound upon the barrel or pulley without producing a rotary motion of the shaft *l*. During a descent of the weight the shaft *l* will be put in revolution, and thus a positive motion will be imparted to the agitator as well as to the sponge-shaft and arms within the tank or cistern B. On one end of the shaft *l* is a crank, *s*, which, by means of a connecting-rod, *t*, and while in revolution, imparts a reciprocating vibratory motion to a toothed rocker-sector, *u*, which engages with a pinion, *v*, fixed on the scoop-shaft F. Fig. 8 represents a side view of the crank *s*, the connecting-rod *t*, the rocker-sector *u*, and the pinion *v*, such being the mechanism by which the scoop-shaft F obtains its reciprocating motions during and by the revolutions of the shaft *l*.

With the vaporizing-cistern B and the mechanism for operating the scoop-shaft F, I have combined a mechanism for regulating the movements of the scoops or the air-forcing apparatus to the required production and consumption of carbureted air from time to time, the apparatus ceasing to act during any excess of production and pressure of the mixture of the air and vapor within the vessel B. The mechanism in question is a friction-brake, to act against one side of the rocker-sector *u* or to be forced against the same by the pressure of the carbureted air within the vessel B. To this end a lever, *w*, whose fulcrum is supported on a stationary standard, *x*, has its longer arm projecting directly over the bell C of the vaporizing-cistern B. The shorter arm of the said lever is jointed to the upper end of a connecting-rod, *y*, whose lower end is jointed to an arm, *z*, which projects from a screw-shaft, *a'*, arranged at right angles to the rocker-sector *u*. The said screw-shaft has a helix groove in its outer surface, as seen in Fig. 9, such groove being made to receive a stud or pin, *b'*, projecting from one of the shaft-bearings *c'*, (see Fig. 10,) which is a cross-section of the bearing and screw-shaft.

From the above it will be seen that during the vertical rise of the bell C of the vaporizing cistern B, such bell will so move the lever *w* as to cause the screw-shaft to be forced endwise against the rocker-sector in such manner as to produce friction sufficient to overcome the tendency of the weight suspended from the barrel *p* to revolve such barrel, in which case the scoop-shaft F, as well as the shaft *f*, will have their motions arrested, and they will not be again put in movement until the pressure in the vaporizing-cistern may have diminished.

Having thus described my said improved apparatus for vaporizing a hydrocarbon and mixing air with the vapor thereof, what I claim therein as of my invention is as follows, viz:

1. The combination of one or more air-cells and vibratory scoops or buckets, applied together and within the cistern A, substantially in manner and so as to operate therewith as described.

2. The combination of the "Barker's mill," or rotary air and agitating distributer K, with the vaporizing-cistern B, the cistern A, and its air-forcing apparatus.

3. The combination and arrangement of the shaft F, its arms and sponges or their equivalents, with the agitating and air distributer K, the cisterns A B, and the air-forcing apparatus of the cistern A.

4. The combination of the friction-brake apparatus consisting of the lever *w*, the connecting-rod *y*, the arm *z*, the screw-shaft *a'*, and the stud *b'*, or its equivalent, for the purpose set forth, with the air-forcing apparatus and the vaporizing-cistern B, provided with the bell C, to operate as specified.

5. The said friction apparatus, constructed substantially as described, as well as its arrangement with respect to the bell C and the vibratory sector, as specified.

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