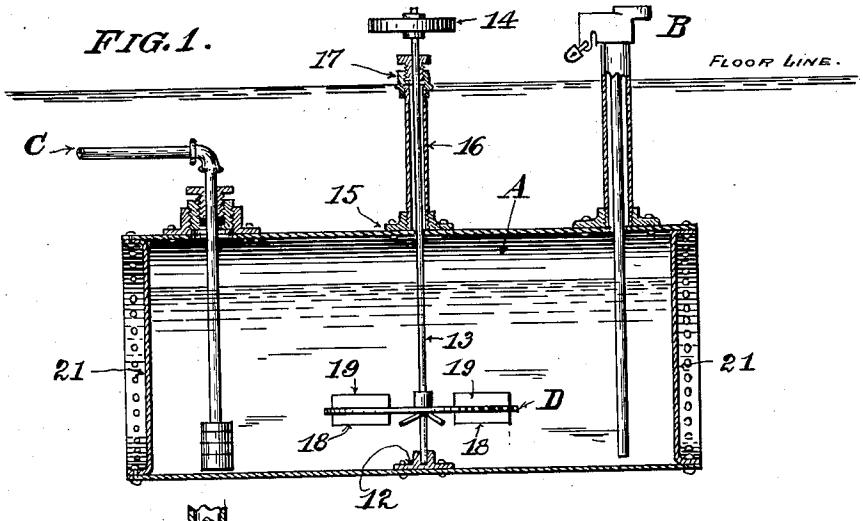
F. J. MOORE AND C. F. MERCER.

MEANS FOR PRODUCING HYDROCARBON FUEL SUITABLE FOR USE IN INTERNAL COMBUSTION ENGINES.

APPLICATION FILED OCT. 1, 1918.

1,304,349. Patented May 20, 1919.

FIG. 1.



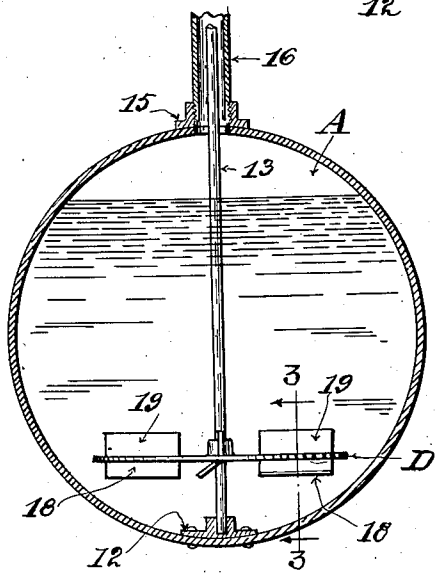


FIG. 2.

FIG. 3.

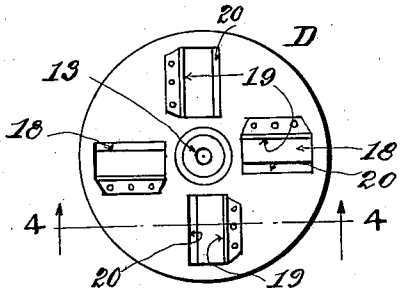
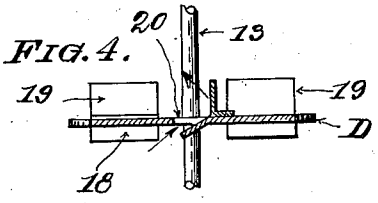


FIG. 4.



WITNESS:

INVENTORS:
FLOYD J. MOORE,
CHARLES F. MERCER,

BY Michael J. Stark & Sons,
ATTORNEYS.

UNITED STATES PATENT OFFICE.

FLOYD J. MOORE AND CHARLES F. MERCER, OF CHICAGO, ILLINOIS.

MEANS FOR PRODUCING HYDROCARBON FUEL SUITABLE FOR USE IN INTERNAL-COMBUSTION ENGINES.

1,304,349. Specification of Letters Patent. Patented May 20, 1919.

Application filed October 1, 1918. Serial No. 256,485.

To all whom it may concern:

Be it known that we, FLOYD J. MOORE and CHARLES F. MERCER, citizens of the United States, and residents of Chicago, in the county of Cook and State of Illinois, have jointly invented certain new and useful Improvements in a Means for Producing Hydrocarbon Fuel Suitable for Use in Internal-Combustion Engines; and we do hereby declare that the following description of our invention, taken in connection with the accompanying sheet of drawings, forms a full, clear, and exact specification, which will enable others skilled in the art to which our said invention appertains to make and use the same.

This invention has general reference to improvements in a means for producing a liquid fuel suitable for use in explosive motors, and it consists, essentially in the novel and peculiar steps of our process, and the means for carrying the same into effect, as first fully set forth and described, and then pointed out in the claims.

The object of our invention is the production of a liquid fuel having a perfectly uniform texture or specific gravity, which will be especially well adapted for employment in internal combustion motors, which will be a perfect substitute for commercial gasolene, and which can be produced at a cost, which under the peculiar conditions under which gasolene is marketed and its retail price controlled and fixed, will be considerably lower in cost than the market price of gasolene.

It is well known that commercial gasolene is not of uniform quality, nor is its specific gravity always such as to produce the best results when mixed with the proper quantity of air; nor does it always bear a proper relation to atmospheric thermal conditions, the humidity of the air, nor the barometric state of the atmosphere and the altitude in which it is being used, factors which influence the action of gasolene when employed for the purpose indicated. There can be no question, but that there is a critical point in the composition of hydrocarbons at which best results are obtained, and which point, having been once ascertained, and the constituents of the fluid fuel accordingly modified, will produce these results, provided that this critical point can be readily reached and maintained when the conditions under which the fuel is to be used, are known, and the composition modified accordingly.

One of the requirements to maintain this condition of the fuel is that more or less frequent tests be made of the specific gravity of the fluid; that observations of the atmospheric conditions be made, and that the fluid is more or less frequently modified to suit these conditions.

We have by frequent hydrometric tests, observed that commercial gasolene contained in a closed vessel where evaporation is practically prevented, when allowed to stand quiescent for some time, will show a difference of from two to four degrees by the Baumé scale, in its upper and lower strata, which would indicate that commercial gasolene is not a true or homogeneous fluid, but that the constituents thereof are held in suspension and will separate more or less, the heavier matter dropping to the bottom of the container.

Our invention has, therefore, a two-fold object, viz. to produce a fluid of substantially uniform quality, and then to produce this fluid at a price which is lower than the market price of gasolene.

Gasolene, especially for motor vehicle purposes is generally stored for use in underground tanks of varying capacities; and it is in connection with these tanks that we propose to practice our invention; and in the drawings hereto attached, which form a part of this specification, we illustrate such an apparatus. In these drawings—

Figure 1 is a longitudinal sectional elevation of a storage tank suitable for our purposes, and Fig. 2 is a transverse sectional elevation of the same. Fig. 3 is a plan view of an agitator installed in this tank; and Fig. 4 is a sectional view of the same on line 4—4 of Fig. 3.

A, designates a storage tank for liquid fuel, which is provided with the necessary

filling devices B, and an outlet pipe C, which is usually the suction pipe of a pump, not shown, by which the liquid is drawn from said tank, the tank being placed underground so that only the filling device extends above the floor line. In the bottom of this tank we locate a step-bearing 12, and in this step-bearing there is rotatably mounted a shaft 13, which shaft extends above the tank and the floor line, and carries at its upper end means 14, by which it can be rotated. On this tank there is a flanged fitting 15, in which there is a screw-thread-connected tube 16, which carries at its upper end a stuffing box 17; said shaft 13 passing through this tube 16 and the stuffing box 17, for obvious reasons.

Upon shaft 13 there is mounted an agitator, comprising, preferably, a metallic, circular, disk, D, on the under side of which there are formed a multiplicity of vanes or wings 18, and on the upper surface of which there are similar vanes or wings 19, the lower wings being at an angle to the plane of the disk, while the upper wings are, preferably, at right angles thereto. These wings or vanes may be separately formed and secured to the disk, adjacent a series of holes 20, therein, as illustrated in Figs. 3 and 4, and if desired, either the upper, or the lower wings may be punched out of the disk in a well-known manner, thereby forming, at the same time, the through-openings 20.

It is obvious that this agitator with its shaft, etc., must be installed in the tank before one or the other of its heads 21, is placed into position, and that access thereto can not be had after the tank is completed; but this does not matter, since the complete tank is buried under ground so that access thereto can not be readily had.

In carrying out our process of producing a liquid fuel suitable for use in internal combustion engines, we first make tests of the hydrocarbons which we propose to employ, to ascertain their exact specific gravity, boiling point, etc., and then compute from these tests the quantity of the lighter and the heavier fluids which we require to produce, when combined, a liquid fuel having a specific gravity of not less than 54 degrees Baumé, and not more than 68 degrees Baumé, and pour these liquids into the closed tank. We now rotate the agitator for a sufficient length of time to effect a perfect and thorough intermixing of these fluids, and then take test-samples from the tank to make certain that the fluid possesses the required density, and to correct any difference, if found, by the addition of that lighter or heavier fluid which will produce the desired result. The fuel is now ready for use; but to assure that it retains its proper qualities, occasional agitation will be required, and this can be readily effected by connecting the vertical shaft 13 to any source of motive power.

The action of the agitator D is peculiar. The lower vanes on the disk have the effect of lifting the liquid in the lower part of the tank through the openings in the disk, and thereby causing a vertical movement of the liquid. In passing through these openings the fluid strikes the upper vanes thereby deflecting the current and causing it to assume a partly horizontal direction, the resultant of these opposed movements of the liquid being the creation in the tank, of a decided vortical whirl, which effects the most intimate and perfect intermixing and combining of the constituents of the liquid. This is the essence of our invention, and can not be secured by any other agitator with which we are acquainted.

Attention is now invited to the fact that in a moist atmosphere, especially when the air is approaching saturation, a liquid fuel which, in a dry atmosphere is perfectly satisfactory, will not produce the best results when used in an internal combustion engine, and must be modified accordingly. And furthermore, when used at a high altitude where the atmosphere is lighter, or during the winter months, when a lighter product is required, our method, and means for practising this method, lends itself very readily to these changing conditions and enables us to always produce an article that is best adapted for use under these varying conditions.

We have herein described the preferred embodiment of our invention, but desire it to be understood that changes may be made in the details thereof without departing from the scope of our invention as defined in the subjoined claims.

Having thus fully described our invention, we claim as new, and desire to secure by Letters Patent of the United States—

1. In an apparatus for producing liquid fuel suitable for use in explosive engines, a stirrer, comprising a rotatable shaft, a disk mounted on said shaft, said disk having a series of through-openings radially disposed in said disk and spaced 90 degrees apart, angularly disposed vanes on the lower surface of said disk, vertically disposed vanes on the upper surface of said disk, said vanes being located at one of the edges of each through opening, and means for rotating said shaft.

2. In an apparatus for producing liquid fuel suitable for use in internal combustion engines, the combination, of a container for said fuel, and means in said container for producing therein a decided vortical whirl, said means including a rotatable shaft mounted in said container, a disk fixed to said shaft in the lower portion of said container, said

disk having a series of radially disposed through-openings, inclined vanes on the lower surface of said disk adjacent to, and parallel with, and at one edge of said through-openings, vertically disposed vanes on the upper surface of said disk in close proximity to said openings, and means for imparting rotative movement to said shaft and said disk, the vanes on the upper surface of said disk being located at the same edge of the through-opening at which the lower vanes are located.

In testimony that we claim the foregoing as our joint invention, we have hereunto set our hands.

FLOYD J. MOORE.
CHARLES F. MERCER.