No. 733,444. PATENTED JULY 14, 1903.

L. F. WASHBURNE.

CARBURETER.

APPLICATION FILED JUNE 30, 1902.

NO MODEL.

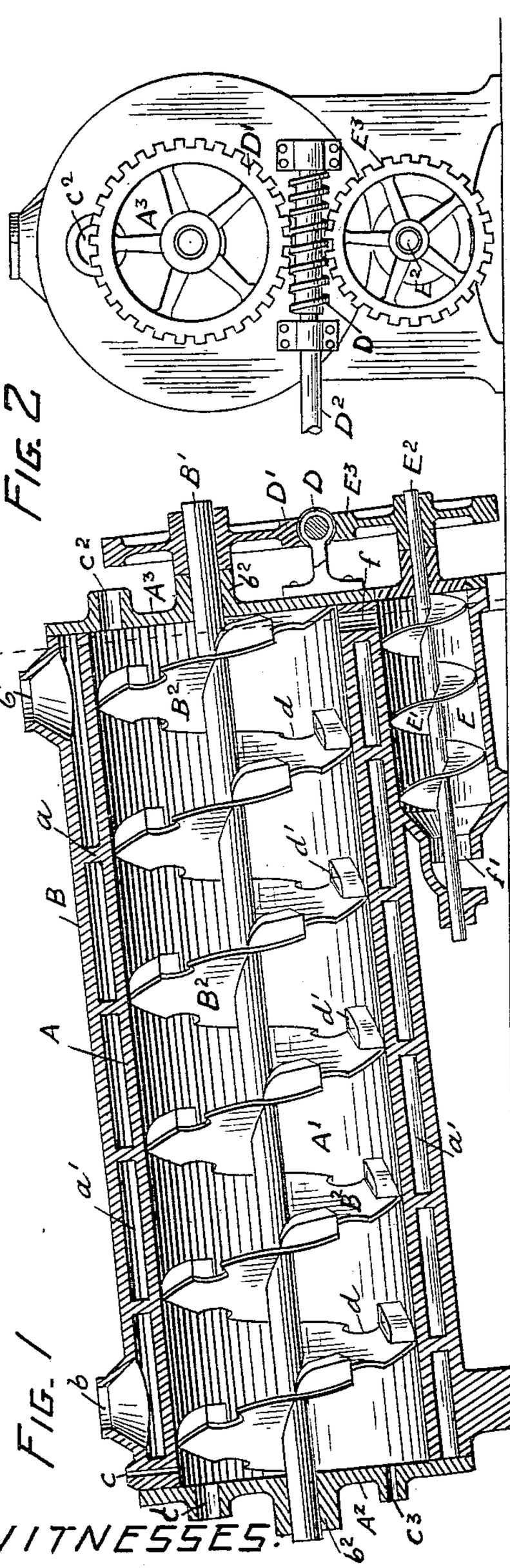

FIG. 2

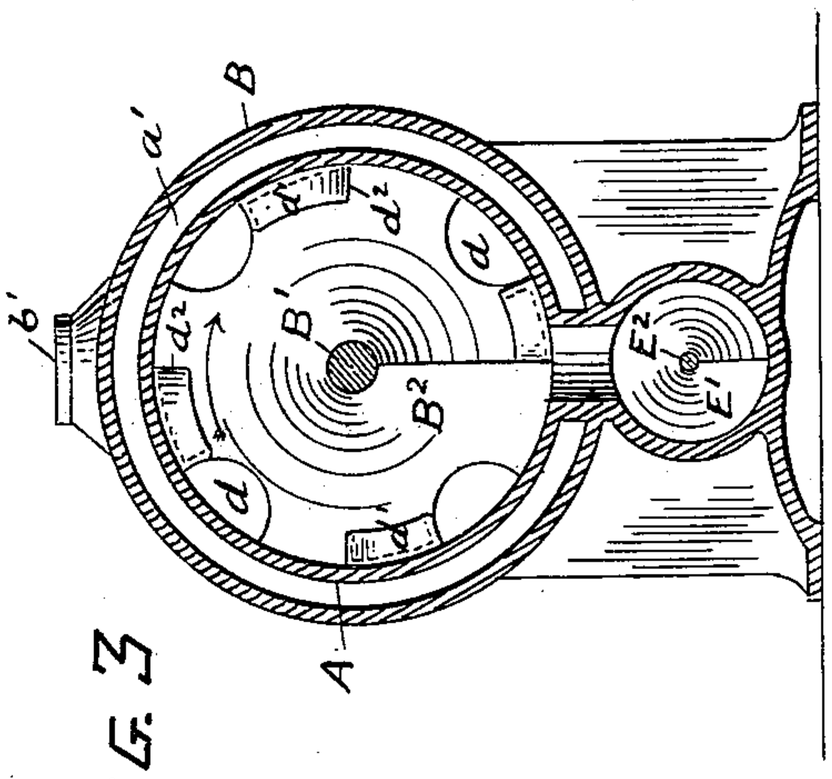

FIG. 3

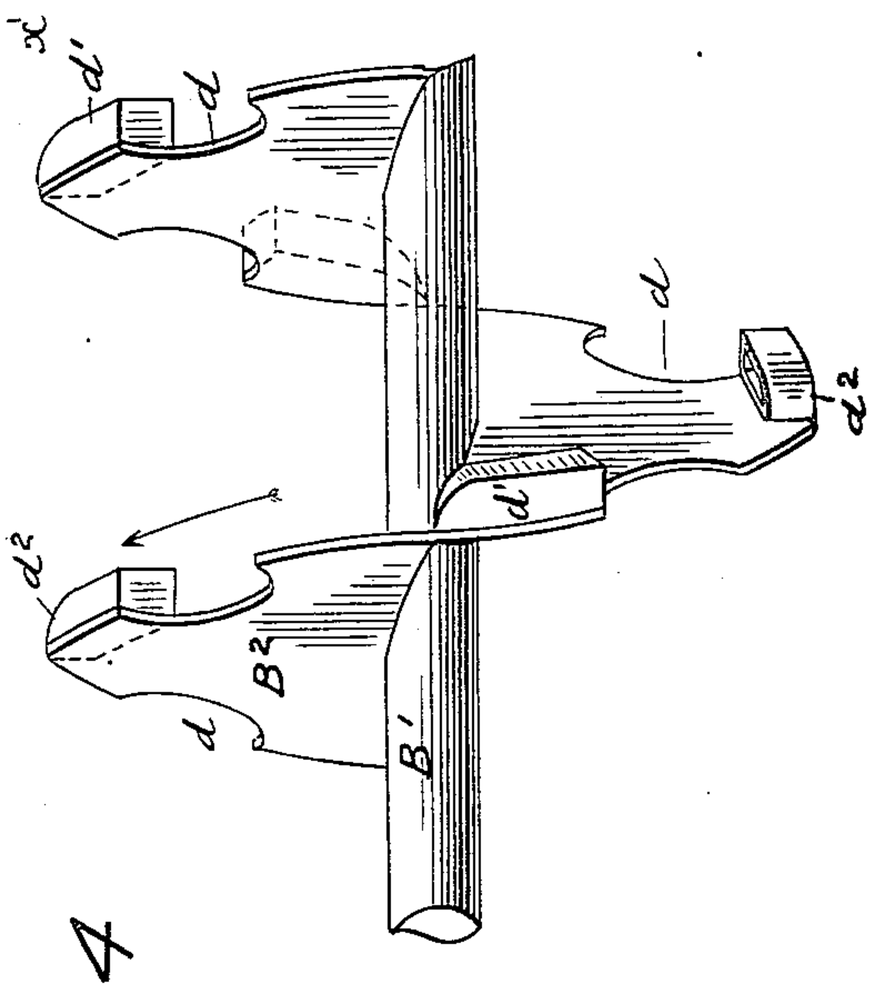

FIG. 4

FIG. 1

WITNESSES:

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No. 733,444. Patented July 14, 1903.

UNITED STATES PATENT OFFICE.

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CARBURETER.

SPECIFICATION forming part of Letters Patent No. 733,444, dated July 14, 1903.

Application filed June 30, 1902. Serial No. 113,835. (No model.)

To all whom it may concern:

Be it known that I, LESTER F. WASHBURNE, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented certain new and useful Improvements in Carbureters; and I do hereby declare the following to be a full, clear, and exact description of the same.

The present invention relates to an improved carbureter for the utilization of oil or its distillates as a gas-producing agent for use as an explosive charge for motor-engines, the object of the invention being to separate the heavier or worthless particles from the oil and to thoroughly intermix the air and oil during travel through and within a suitably-heated chamber or casing, the invention consisting of means whereby the oil and air are carried forward in a circuitous pathway toward an outlet for the carbureted air, through which the gas is withdrawn from the heating-chamber and by means of which the heavier or worthless particles are separated from the oil fed into the heating-chamber, which conveying and separating mechanism is so constructed that the oil is maintained in an agitated condition throughout the flow of the air through the heating-chamber, so as to cause perfect commingling of the air and oil and impregnation of the air with the volatile portion of the oil.

To comprehend the invention, reference should be had to the accompanying sheet of drawings, wherein—

Figure 1 is a longitudinal vertical sectional view of the apparatus. Fig. 2 is an end view thereof in elevation; Fig. 3, a vertical sectional end view taken on line *x x*, Fig. 1, of the drawings; and Fig. 4 is a broken plan view of the conveyer for the oil.

In the drawings the letter A is used to indicate a suitable cylinder, the interior of which forms a heating or mixing chamber A′. This cylinder is closed by the end plates A^2 A^3, Fig. 1 of the drawings. The cylinder A is inclosed within an outer shell B somewhat larger than cylinder A, so as to leave an annular space or passage-way between the walls. Within this annular space is arranged a spiral rib *a*, which forms a spiral passage-way *a′*. This passage-way is intercepted by an exhaust-inlet *b*, through which the exhaust heat from an explosive-engine is admitted into the spiral passage-way *a′* for the purpose of heating the surface of the cylinder A. The hot air or gases thus admitted into the passage-way *a′* circulate around the cylinder A its entire length until finally discharged from the exhaust-outlet *b′*. By thus retarding the travel of the hot air or gases perfect heating of the cylinder A is obtained. Through the heating-chamber extends a shaft B′, which works in bearings b^2 of the end plates of the cylinder A. This shaft is formed with or has attached thereto the spiral blade B^2, which serves as a worm conveyer for the material fed into the heating-chamber A′ of the cylinder A. In the outer edge of said spiral blade B^2 a number of notches or longitudinal grooves *d* are cut, the purpose of which will be hereinafter explained, and to the forward face of the spiral blade a number of buckets or pockets *d′* are attached, Figs. 3 and 4 of the drawings. These buckets or pockets are open ones, the outer face portion d^2 of each bucket or pocket being formed at an inward inclination from top to bottom. The bottom of the buckets or pockets is flush with the outer edge of the spiral blade or worm B^2.

Oil is admitted into the chamber A′ through oil-inlet C, and air is admitted into said chamber through air-inlet C′. At the opposite end of the cylinder A is formed an outlet C^2, through which the carbureted air escapes from the heating or vaporizing chamber A′.

The cylinder A is a stationary one and is so arranged as to stand at an inclination, there being provided in the lower end thereof an overflow or outlet opening C^3. This overflow or outlet opening is placed a given distance above the bottom of the heating or vaporizing chamber, so that the oil will flow therefrom or may be withdrawn after the oil has reached a certain level in the said chamber. Inasmuch as the cylinder A stands at an inclination, the tendency of the oil is to flow toward the lower end of the heating, mixing, or vaporizing chamber.

Rotation is imparted to the spiral blade or worm B^2 by means of the shaft B′, which shaft is driven through the medium of worm D, meshing with gear D′, secured to end of shaft B′, projecting beyond end or head A^3 of

the cylinder A. Worm D is secured to a power-shaft D^2, which shaft in the present case is designed to be driven from the motor-engine. The spiral blade or worm B^2 in diameter is of such size as to fit snugly within the casing A.

While the present invention is designed for use in connection with any of the oils or distillates, it is especially applicable for the utilization of asphaltic petroleum, bitumen, or other heavy oils.

In operation the oil is delivered into the heating-chamber A′ through inlet C, while air is drawn in through inlet C′. During the rotation of the worm or spiral blade B^2 the oil is carried around within the heating-chamber and gradually volatilized by coming in contact with the hot wall of cylinder A, which is heated by the hot products passing through spiral passage-way a', surrounding the said cylinder. During the rotation of the worm B^2 the oil in the bottom of the heating-chamber is picked up by the pockets or buckets d' and elevated. As the buckets or pockets are carried over the oil drops therefrom toward the bottom of the chamber. This continued raising and lowering of the oil within the heating-chamber permits of the indrawn air thoroughly commingling therewith, causing the air as sucked through the heating-chamber to absorb and become fully charged with all volatile parts thrown off from the oil. Inasmuch as the oil is maintained in an agitated condition, perfect and efficient separation of the volatile portion thereof results. This "breaking up," so to speak, of the oil permits of a heavier supply of oil being economically utilized than where the volatilization is dependent upon the oil being distributed in a film over a heated flat spiral surface. As the volatile portions of the oil are taken up by the inflowing air the heavier or valueless particles settle toward the bottom of the heating-chamber, being gradually forced forward toward end A^3 by the action of the worm B^2. It will be understood that the density of the oil increases as the same is propelled from the feed end of the heating-chamber toward the discharge end thereof. Consequently by the time the material being treated has reached the said discharge end of the heating-chamber it will be of the nature of a heavy residue. This is due to the fact that the lighter portions thereof have been thrown off by the heat of the said chamber. In case of asphaltic petroleum the residue will be an asphaltum base. This as carried forward is gradually compressed against the wall of the heating-chamber, so as to free the same of all oil, which as squeezed therefrom escapes through the notches or grooves d in the edge of the spiral or worm and runs toward the lower end of the chamber, from whence it escapes when the level of overflow C^3 is reached. In this manner the oil or lighter portion is forced toward the lower end of the heating-chamber. However, the heavier portion or the residuum is gradually carried forward toward the outer or upper end of the heating-chamber, due to the action of the worm or spiral conveyer. When this end of the chamber is reached, the base or residue is forced through an outlet-opening f into an auxiliary chamber E, arranged below the cylinder A, Fig. 1 of the drawings. Within this auxiliary chamber is located a worm E′, secured to shaft E^2. This worm receives the residue and forces the same through the chamber E and out of outlet-opening f'. This outlet is somewhat contracted, so that the material as forced therethrough is compressed, thus maintaining the outlet f' of the auxiliary chamber closed. Air is prevented from being drawn through said contracted outlet-opening into said auxiliary chamber and from said auxiliary chamber into the cylinder A as the same discharges the generated gases. The worm E′ has rotation imparted thereto from the power-shaft D^2 through the medium of worm D, meshing with gear E^3, secured to the projecting end of the shaft E^2. By reason of the inclination given to the outer portion of the pockets or buckets d' the same will cut through the body of asphaltum or the residue being forced toward the upper end of the heating-chamber, thereby preventing clogging, while at the same time serving and tending to force the material forward.

The present invention not only answers to provide an efficient and simple vaporizer, but at the same time causes a separation of the heavy material from the lighter or non-volatile portions of the oil delivered into the heating or mixing chamber.

Having thus described my invention, what I claim as new, and desire to protect by Letters Patent, is—

1. A carbureter comprising a heating-chamber wherein the oil and air are intermixed, external means for heating said chamber, an oil-inlet and an air-inlet communicating with the heating-chamber, a worm conveyer arranged within said chamber, means for imparting rotation thereto, and an outlet for the carbureted air leading from the heating-chamber.

2. In a carbureter, the combination with the heating-chamber wherein the oil and gas are intermixed, an air-inlet and an oil-inlet communicating therewith, of rotating means arranged within the said chamber for maintaining the oil in an agitated condition, an outlet for the carbureted air leading from the heating-chamber, and a spiral heat-flue surrounding the outer wall of the heating-chamber.

3. In a carbureter for explosive-engines, the combination with a heating-cylinder, the interior of said cylinder forming a heating-chamber wherein the oil and air are intermixed, of a heat-flue surrounding the cylinder, an oil-inlet and an air-inlet communicating with the heating-chamber, a worm conveyer located within the heating-chamber, a series of

notches or grooves in the outer edge of said worm conveyer, through which the lighter separated oil escapes toward the lower end portion of the chamber, of means for imparting rotation to the worm conveyer, an outlet for the carbureted air leading from the heating-chamber, and an outlet or overflow in the lower end of the cylinder through which the oil from the heating-chamber escapes after a given level has been reached.

4. In a carbureter, the combination with a stationary cylinder the interior of which forms a heating-chamber, of a heat-flue surrounding the cylinder, an air-inlet and oil-inlet communicating with the heating-chamber, a worm conveyer arranged within the said chamber, means for imparting rotation to the conveyer, a series of elevating buckets or pockets secured to and carried by the conveyer, and an outlet for the carbureted air leading from the heating-chamber.

5. In a carbureter for explosive-engines, the combination with a stationary cylinder, of an outer shell surrounding the same, a spiral heat-flue interposed between the outer shell and the cylinder, means for supplying air and means for supplying oil to the interior of the cylinder, rotating means located within the cylinder for intermixing the air and oil, and an outlet for the carbureted air leading from the interior of the cylinder.

6. In a carbureter for the manufacture of gas from a liquid hydrocarbon, the combination with a stationary cylinder, of means arranged on the outside thereof for heating the interior of the cylinder, an inlet for the hydrocarbon and an inlet for air communicating with the interior of the cylinder, of a rotating conveyer arranged within the cylinder, said conveyer serving to maintain the hydrocarbon in an agitated condition and to separate and force through the cylinder the heavy residue of the hydrocarbon, means for removing the residue, and an outlet for the carbureted air leading from the interior of the cylinder.

7. In a carbureter, the combination with a cylinder, of means for heating the same, an air-inlet and an oil-inlet communicating with the interior of the cylinder, a worm conveyer arranged within the cylinder, means for imparting rotation to the worm conveyer, an auxiliary chamber located below the cylinder for receiving the residue of the oil, communication between said chamber and the interior of the cylinder, and means whereby the material fed into the auxiliary chamber is forced therefrom.

8. The combination with the inclined cylinder, of means for heating the same, an oil-inlet and an air-inlet communicating with the interior of the cylinder, a spiral conveyer arranged within the interior of the cylinder, a series of buckets or pockets secured to the blade of the conveyer, grooves or notches cut in the edge of the blade for the escape of oil, an overflow-outlet for the oil, means for imparting rotation to the conveyer, a supplemental chamber arranged below the cylinder for receiving the residue of the oil, communication between the interior of the cylinder and the chamber, and means whereby the material fed into said chamber is forced therefrom.

In witness whereof I have hereunto set my hand.

LESTER F. WASHBURNE.

Witnesses:

ALLEN C. WRIGHT,

N. A. ACKER.