L. L. MELTON.

CARBURETER.

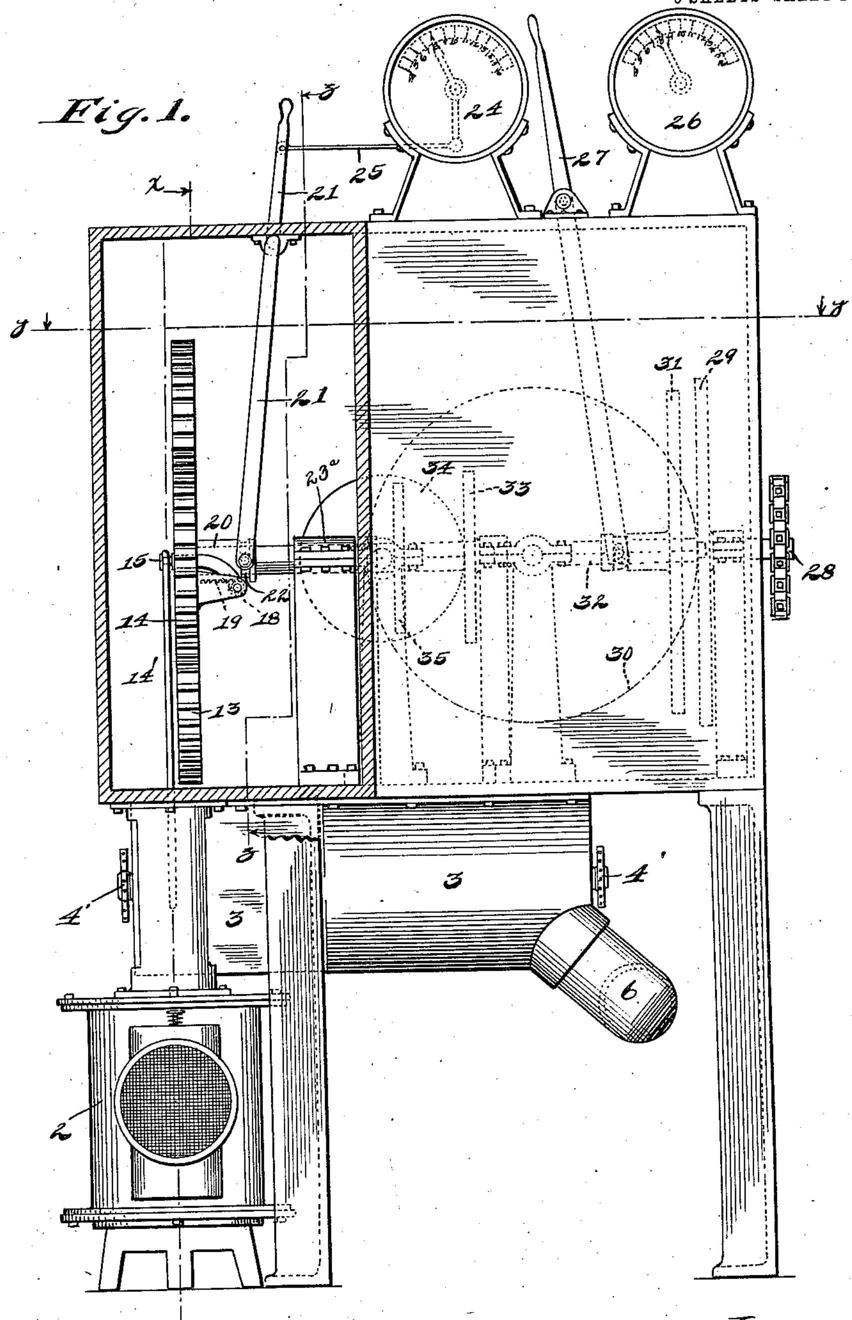
APPLICATION FILED SEPT. 3, 1910.

1,012,687.

Patented Dec. 26, 1911.

5 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

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W. C. Smith

Inventor:

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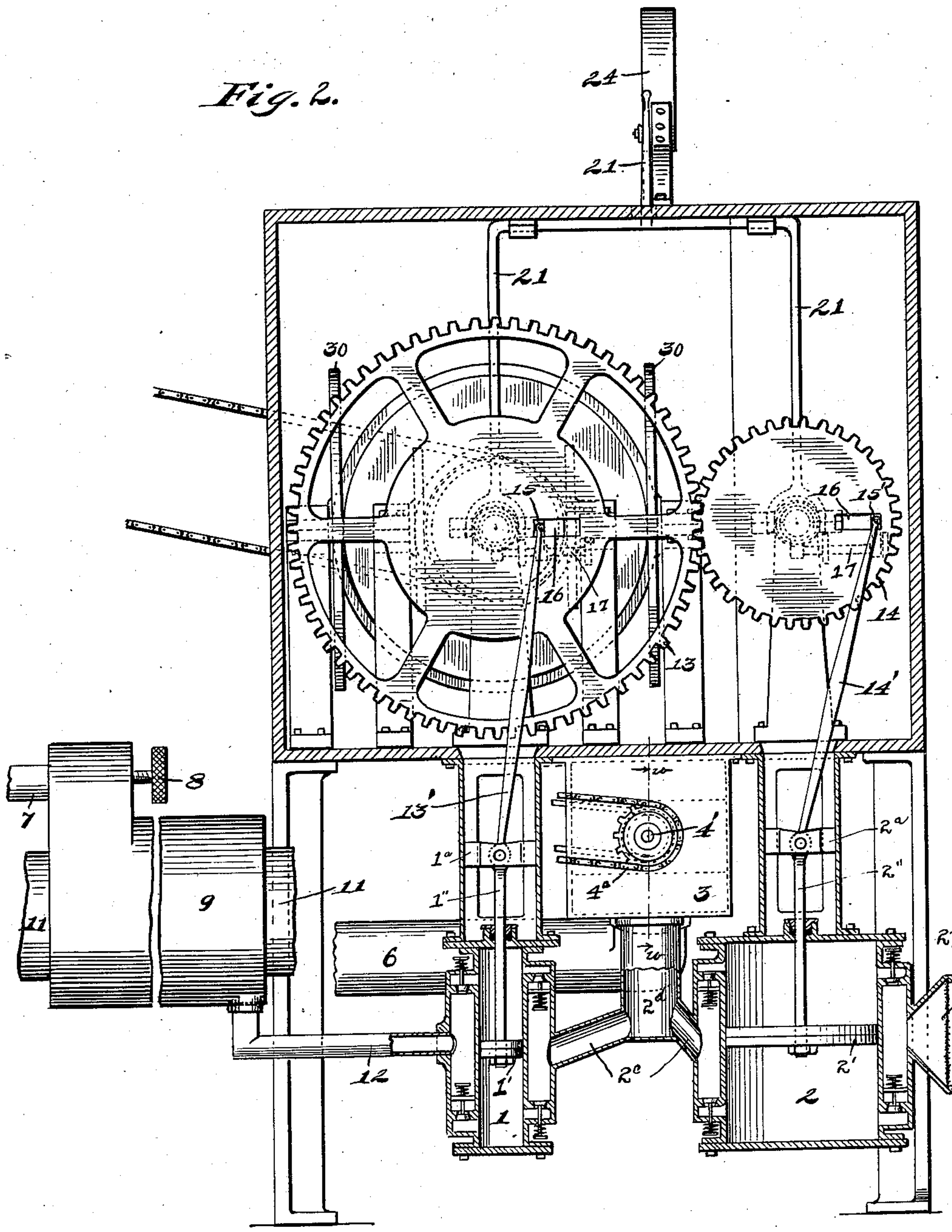
5 SHEETS—SHEET 2.

Fig. 2.



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5 SHEETS—SHEET 3.

Fig. 3.

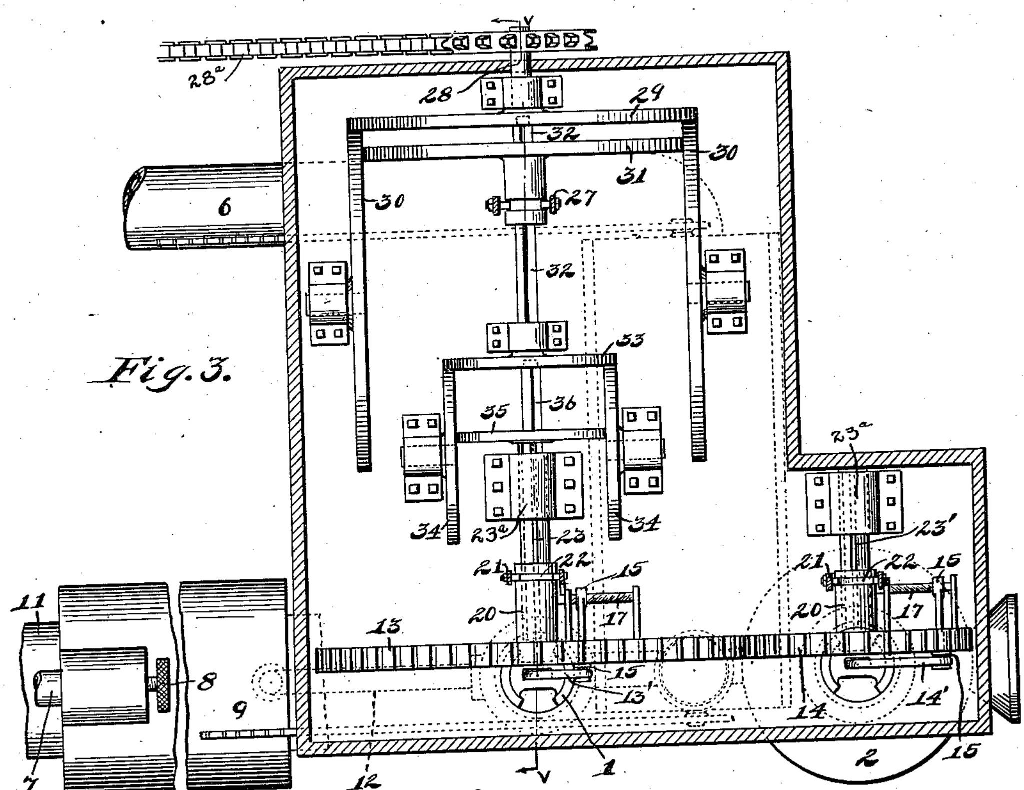
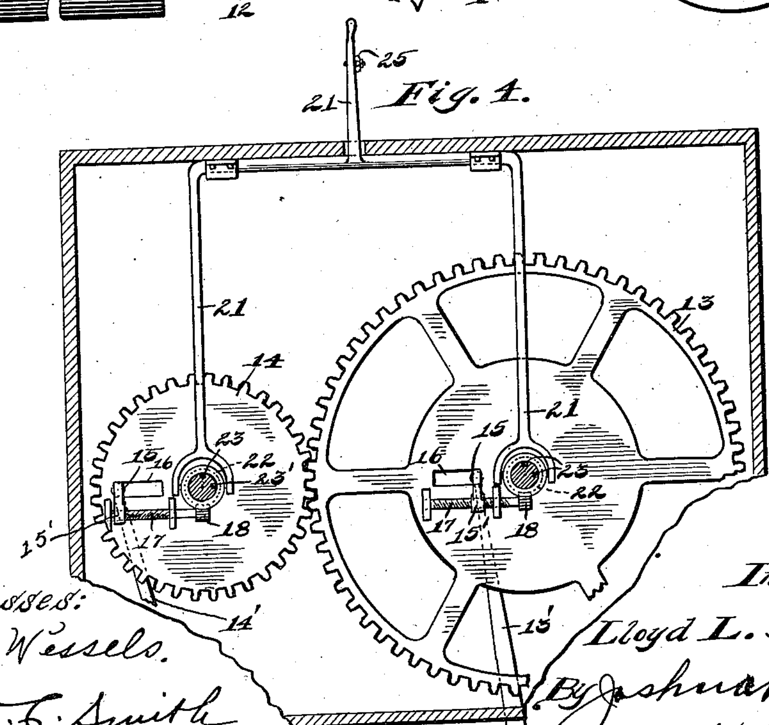


Fig. 4.



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5 SHEETS—SHEET 4.

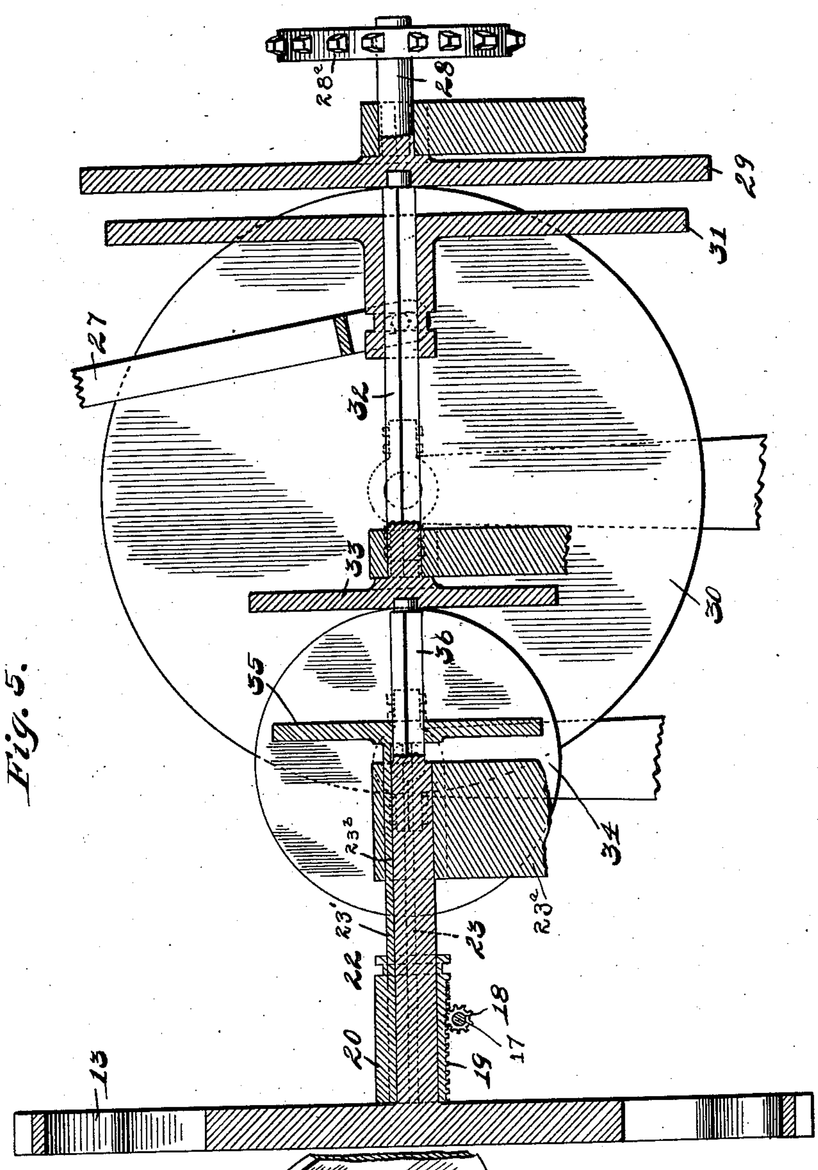

Fig. 5.

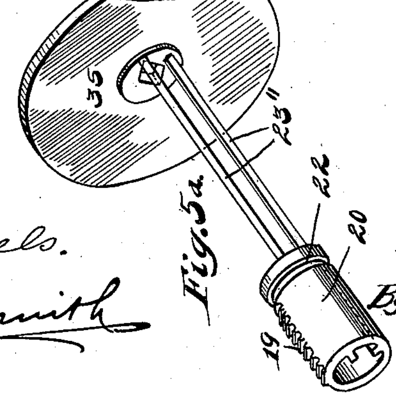

Fig. 5a.

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5 SHEETS—SHEET 5.

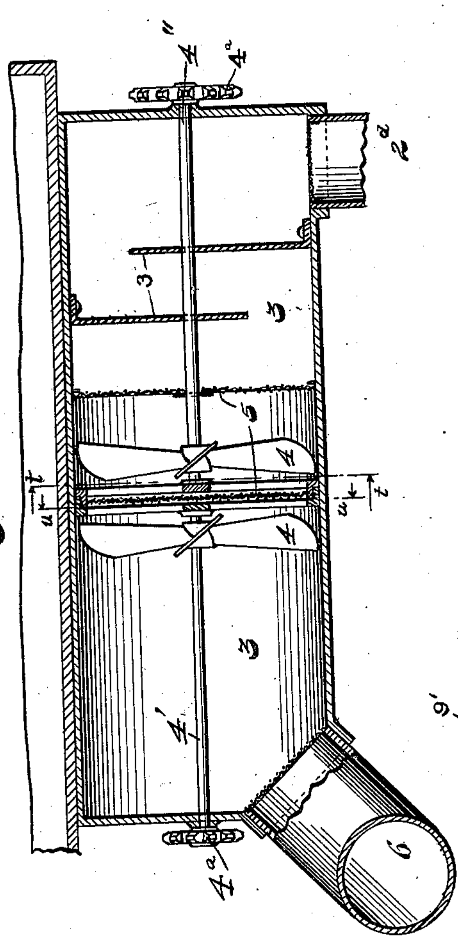

Fig. 6.

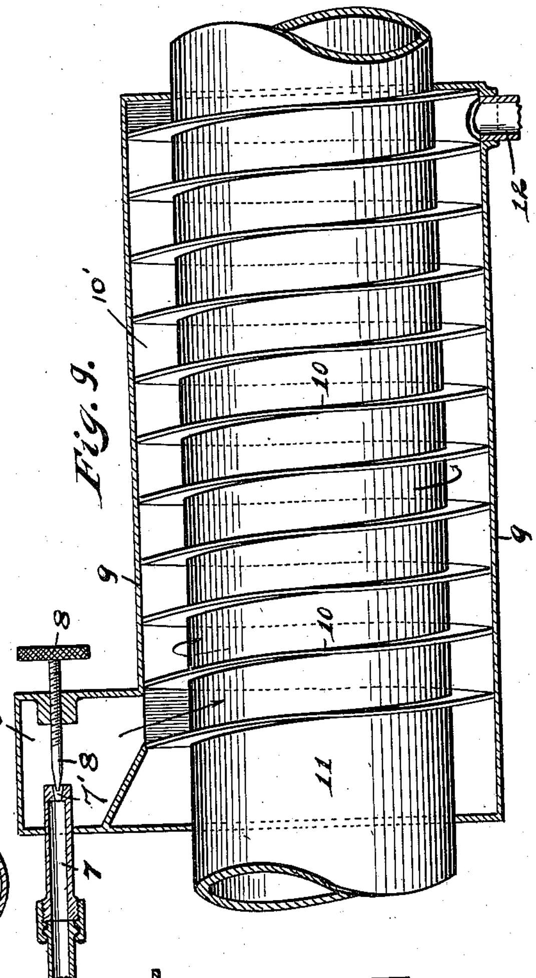

Fig. 9.

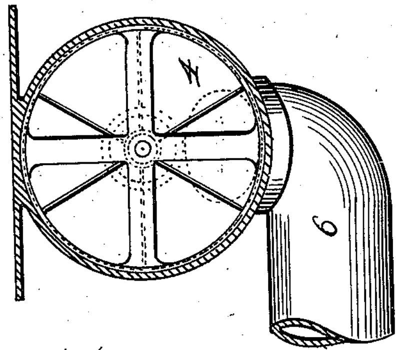

Fig. 7.

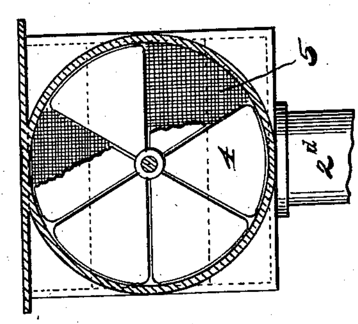

Fig. 8.

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UNITED STATES PATENT OFFICE.

LLOYD L. MELTON, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO ARTHUR C. SOULE, OF CHICAGO, ILLINOIS.

CARBURETER.

1,012,687. Specification of Letters Patent. Patented Dec. 26, 1911.

Application filed September 3, 1910. Serial No. 580,391.

To all whom it may concern:

Be it known that I, LLOYD L. MELTON, a citizen of the United States, and a resident of the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

My invention relates to improvements in carbureters for internal combustion engines and the object of my invention is to provide a carbureter of such construction as to be capable of supplying an explosive mixture of the proper strength or richness under all atmospheric conditions. It is the oxygen of the air which constitutes the active principle of the same in the explosive mixture and it is well known that the amount of oxygen in the atmosphere varies greatly with the elevation. Therefore, with an engine designed to operate at various altitudes, it is desirable to have the same provided with a carbureter which may be regulated to supply a mixture to the engine of substantially uniform strength or richness. It is of great advantage to provide such a carbureter on a touring car when traveling in mountainous countries and of especial advantage to provide the same on aeroplanes adapted for flying at great heights.

A further and particular object of my invention is to provide a carbureter which may be readily and quickly adjusted to vary the proportion of air and vapor in the mixture according to atmospheric conditions.

A further object of my invention is to provide a carbureter characterized as above mentioned which will maintain a constant volume of out-put irrespective of the change in proportions of the mixture.

A further object of my invention is to provide a carbureter as mentioned in which the volume of out-put may be regulated without changing the quality of the mixture.

Other objects will appear hereinafter.

With these objects in view my invention consists generally in a gas pump and an air pump, means for supplying hydro-carbon vapor to the former, a mixing chamber in communication with the exhaust of said pumps, means for reciprocating pistons of said pumps and simultaneously operable means for increasing the length of stroke of one pump and decreasing the stroke of the other pump whereby the strength of the mixture may be varied.

My invention further consists in a device as above mentioned in which the air pump is of greater capacity than the gas pump and a variable speed mechanism operable simultaneously with the stroke varying mechanism whereby when the stroke of the smaller pump is lengthened and that of the larger pump shortened the speed thereof will be increased, and vice versa, whereby a constant out-put of mixture is had irrespective of the proportional out-put of the two pumps.

My invention further consists in a device characterized as above in combination with a constantly driven shaft and a second variable speed mechanism interposed between said shaft and the first mentioned variable speed mechanism whereby the volume of out-put may be regulated without varying the strength of the mixture.

My invention further consists in an improved vaporizer, an improved mixer, and in various details of construction and arrangements of parts all as will be fully described hereinafter and particularly pointed out in the claims.

My invention will be more readily understood by reference to the accompanying drawings forming a part of this specification and in which—

Figure 1 is a view partially in section and partially in elevation of my improved carbureter in its preferred form, Fig. 2 is a vertical section taken on line *x—x* of Fig. 1, Fig. 3 is a longitudinal section taken on line *y—y* of Fig. 1, Fig. 4 is a section taken on line *z—z* of Fig. 1, Fig. 5 is an enlarged vertical section taken on line *v—v* of Fig. 3, Fig. 5[a] is a detail perspective view, Fig. 6 is an enlarged vertical section taken on line *w—w* of Fig. 2, Fig. 7 is a vertical section taken on line *u—u* of Fig. 6, Fig. 8 is a vertical section taken on line *t—t* of Fig. 6, and Fig. 9 is an enlarged view showing a vaporizer employed in connection with the exhaust pipe of an engine.

Referring now to the drawings 1 indicates a gas pump or vapor pump and 2 an air pump. As a larger supply of air is required than of vapor, the air pump is of larger capacity than the vapor pump, preferably of larger diameter.

1′ and 2′ indicate the pistons of the respective pumps which are connected by piston rods 1′′ and 2′′ to cross heads 1^a and 2^a respectively.

13 and 14 indicate crank disks provided with crank pins 15 and 15′ respectively which are connected by connecting rods 13′ and 14′ to the cross heads 1^a and 2^a. The crank disks are driven in a manner hereinafter described. The disks 13 and 14 are operatively connected and to this end said disks preferably constitute intermeshing gears as illustrated in the drawings. The gear 13 is preferably larger than the gear 14 in order that the output of the air pump shall be sufficiently greater than that of the vapor pump without unduly increasing the dimensions of the former. Vapor is supplied to the pump 1 through a pipe 12 from a vaporizer hereinafter described, and air is supplied to the air pump through a screened opening 2^b from the atmosphere. The exhaust of the pumps 1 and 2 communicate through branch pipes 2^c with a common pipe 2^d leading to a mixing chamber 3 which will be described hereinafter.

In vaporizing the liquid hydro-carbon fuel the heat of the engine exhaust is utilized and to this end the vaporizer is arranged about the engine exhaust pipe.

11 indicates the exhaust pipe from the engine. Arranged about the exhaust pipe 11 is a cylindrical shell 9 of larger diameter than said pipe and between said pipe and said shell is arranged a helical member 10 forming a helical passageway around the pipe 11 between its several convolutions.

9′ indicates a small chamber in communication with one end of the helical passageway 10′ and extending into said chamber is a fuel supply pipe 7, the end of which is provided with a small aperture 7′ controlled by a needle valve 8 threaded through the opposite wall of the chamber 9′. By means of the valve 8 the quantity of fuel supplied to the vaporizer may be nicely regulated and the fuel in passing through the helical passage way 10′ about the hot exhaust pipe 11 is thoroughly vaporized. The opposite end of the passage way 10′ communicates with the pipe 12 leading to the vapor pump.

The mixer comprises a chamber 3 into which the pipe 2^d discharges at one end, a plurality of baffle plates screens and agitators. 3′ indicate the baffle plates which extend alternately from opposite walls of the chamber 3 and 5 indicate the screens which form partitions across the chamber. The gas in passing around the baffle plates and through the screens, with the air, is well mixed with the latter, but to insure a perfectly uniform and homogeneous mixture an agitator is provided which consists of a pair of fans 4 rotatably mounted upon opposite sides of one of the screens 5.

4′ and 4′′ indicate a pair of alined shafts extending through the casing 3 and upon which the fans 4 are mounted. The shafts are driven in opposite directions by sprocket gearing 4^a.

6 indicates a pipe leading from the mixing chamber to the engine.

It is obvious that with the device above described a uniform gas mixture will be supplied to the engine providing air uniformly rich in oxygen is supplied to the air pump. However, atmospheric conditions, especially in regard to the quantity of oxygen, vary greatly particularly with changes in altitude, and it is the primary object of my invention to provide a device of the character under consideration whereby when once regulated to give the proper mixture under given atmospheric conditions it may be readily adjusted under varying conditions to give an absolute uniformity to the resultant mixture. To this end I provide means whereby the output of the two pumps may be varied to suit the change of condition and also means for automatically maintaining a uniform quantity of output with the change in relative output of the pumps.

Each of the disks 13 and 14 is provided with a radially disposed slot 16 and the crank pins 15 are slidably mounted in the respective slots and provided with extensions upon the opposite or rear face of the disks. Parallel with the slots, and mounted in suitable bearings on the disks are rods 17 which are threaded through the extensions, so that by turning the rods the crank pins are moved toward or from the center of the disks thereby shortening or increasing the length of the stroke of the pump pistons as the case may be. The rods are preferably oppositely threaded so that by turning the two rods in the same direction the crank pins will be moved in opposite direction, so that as the stroke of one pump is increased the stroke of the other pump will be decreased and vice versa. The disks 13 and 14 are mounted on shafts 23 and 23′ respectively having bearings 23^a. The shaft 23 is power driven and the shaft 23′ is driven through the medium of the gears 13 and 14. Slidably mounted on the shafts 23 and 23′ are sleeves 20 provided with longitudinal racks 19 which mesh with pinions 18 fixed to the rod 17. It is obvious that by moving the sleeves 20 longitudinally of the shafts the rods 17 will be turned and the crank pins 15 shifted.

21 indicates a three armed lever, one arm of which constitutes a handle or operating arm and the other two arms extending to the sleeves 20, the ends being bifurcated to receive the sleeves. The sleeves are provided with peripheral grooves 22 to receive

the ends of the lever 21. By moving the lever the sleeves, and consequently the crank pins are shifted simultaneously. The lever 21 is manually operated, but in order that the regulation of the device may be governed according to atmospheric conditions, I provide a barometer 26 from which the atmospheric conditions may be ascertained. Adjacent the barometer I provide an indicator having a scale similar to that of the barometer and connect the indicator with the lever.

24 indicates the indicator and 25 the rod connecting the frame with the lever 21. The parts are so proportioned that when the indicator hand is positioned to correspond with the barometer the pumps will give the correct mixture. With any change in the atmospheric condition as recorded by the barometer, the lever 21 is shifted to make the indicator correspond with the barometer thus maintaining a uniform quality or strength of gas mixture. However as the stroke of the two pumps is varied to maintain the quality of the mixture, the quantity of mixture will vary on account of the differences in dimensions of the pumps. Accordingly I provide means for maintaining a constant output as well as a uniform quality of gas, and I accomplish this by varying the speed of rotation of the crank disks 13 and 14.

Longitudinally slidable on the shaft 23 is a disk 35. This is fixed against rotation on the shaft and to this end the shaft is preferably provided with a squared portion 36. Mounted upon opposite sides of the disk 35 is a pair of disks 34, the periphery of the disk 35 engaging the faces of the disks 34.

33 indicates a disk lying parallel with the disk 35 and having its face engaging the peripheries of the disks 34. The disk 33 is power driven as will be hereinafter described, and when rotated imparts motion to the shaft 23 through the medium of the friction disks 34 and 35. As the disk 35 is moved on the shaft 23 its periphery engages faces of the disks 34 nearer to or farther from the center as the case may be. It is therefore obvious that when the disk 33 is driven at a uniform speed or velocity, the speed of the shaft 23 and disk 13 may be varied by shifting the disk 35, the nearer the disk 35 approaches the center of the disks 34 the slower the speed of the shaft 23 and the nearer it approaches the periphery of said disks the greater the speed. In order that this change of speed may be made automatically as the stroke of the pumps is varied, I connect the disk 35 with the sleeve 20 on the shaft 23. 23″ indicate a pair of rods connecting the sleeve and the disk, and extending longitudinally of the shaft 23, said shaft being provided with longitudinal grooves 23^b to receive them. The rods 23′ also serve as keys or feathers to secure the sleeve 20 against rotation on the shaft.

It has been described how the richness of the mixture may be varied without changing the volume of output of the device and how it may be regulated to maintain a constant quality and constant quantity of output under various atmospheric conditions. It remains to be described how the volume of output may be varied to suit requirements without changing the quality of the gas. The disk 33 is formed upon a shaft 32, a portion of said shaft being squared, and upon the squared portion of said shaft is mounted a disk 31 of greater diameter than the disk 33. The disk is adapted to slide longitudinally of the shaft and a lever 27 is provided for shifting the same. Arranged upon either side of the disk 31 with the faces thereof engaging the periphery of said disk is a pair of disks 30. Parallel with the disk 31 is a disk 29 whose face adjacent its periphery engages the peripheries of the disks 30. The disk 29 is mounted upon a shaft 28 and is adapted to rotate independently of the disk 31 except through the medium of the intermediate disks 30. The shaft 28 and disk 29 is constantly driven by the sprocket gearing 28^a. The disk 29 and disks 30 being constantly driven, it is obvious that the speed of the shaft 32 and disk 33 may be varied by shifting the disk 31, and it is also obvious that an initial speed as determined by the position of the disk 31 with relation to the disks 30, the richness of the mixture may be varied or maintained constant under changing atmospheric conditions without changing the initial output.

Having described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a device of the class described, a vapor pump and an air pump, a pair of driven crank disks, a crank pin on each of said disks, pitmen connecting said crank pins with the respective pumps and means for simultaneously adjusting said crank pins on said disks to increase the stroke of one pump and decrease the stroke of the other.

2. In a device of the class described, a vapor pump and an air pump, a pair of driven crank disks said disks being provided with radial slots, a crank pin slidably mounted in the slot of each of said disks and means for simultaneously moving one of said crank pins toward the center of the respective disk and the other toward the periphery of its respective disk, substantially as described.

3. In a device of the class described, a vapor pump and an air pump of greater capacity than the vapor pump, means for simultaneously increasing the stroke of one pump and decreasing the stroke of the other and means for automatically varying

the speed of the pumps as their strokes are varied to maintain a constant aggregate output, substantially as described.

4. In a device of the class described, a vapor pump and an air pump, a pair of shafts, a pair of crank disks on said shafts each of said disks being provided with a radial slot, a crank pin slidably mounted in each of said slots, pitmen connecting said crank pins with the respective pumps, an extension on each of said pins, a rod parallel with each of said slots and rotatably mounted in bearings on the respective disks, said rods being threaded through the extensions of the respective pins, a pinion on each of said rods, a sleeve slidably mounted on each of said shafts, a rack on each of said sleeves meshing with said pinions and means for simultaneously shifting said sleeves on said shaft.

5. In a device of the class described, a vapor pump and an air pump, a pair of crank disks, a shaft for each of said disks, one of said shafts being driven from the other, each of said disks being provided with a radial slot, a crank pin slidably mounted in each of said slots, pitmen connecting said crank pins with the respective pumps, an extension on each of said pins, a threaded rod rotatably mounted on each of said disks and engaging said extensions, a pinion on each of said rods, a sleeve on each of said shafts, a rack on each of said sleeves meshing with said pinions, means for shifting said sleeves simultaneously, a disk slidably mounted on one of said shafts, a pair of disks engaging the periphery of the first said disks, a driven disk engaging the periphery of the last said disk and means for shifting the first said disk, substantially as described.

6. In a device of the class described, a vapor pump and an air pump, a pair of crank disks, a shaft for each of said disks, one of said shafts being driven from the other, each of said disks being provided with a radial slot, a crank pin slidably mounted in each of said slots, pitmen connecting said crank pins with the respective pumps, an extension on each of said pins, a threaded rod rotatably mounted on each of said disks and engaging said extensions, a pinion on each of said rods, a sleeve on each of said shafts, a rack on each of said sleeves meshing with said pinions, means for shifting said sleeves simultaneously, a disk slidably mounted on one of said shafts, a pair of disks engaging the periphery of the first said disk, a driven disk engaging the periphery of the last said disk and a rigid connection between the first said disk and the sleeve on the same shaft therewith.

7. In a device of the class described, a gas pump and an air pump the capacity of the gas pump being less than that of the air pump and the latter being normally driven at greater speed than the former, means for simultaneously increasing the stroke of one pump and decreasing the stroke of the other and a variable speed mechanism automatically operable with the last said means for varying the speed of the pumps to maintain a constant output, substantially as described.

8. In a device of the class described, a vapor pump and an air pump, a pair of shafts a crank disk on each of said shafts each of said disks being provided with a radial slot a crank pin slidably mounted in each of said slots, means for shifting said pins toward or from the center of the repective disks, a lever adapted to actuate the last said means simultaneously for shifting one of said pins inwardly as the other is shifted outwardly, a barometer having a dial, an indicator having a dial similar to the barometer and means connecting said lever with the indicator whereby the lever may be shifted according to indications of the barometer, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesse.

LLOYD L. MELTON.

Witnesses;
FLORENCE E. LILLIS,
JOSHUA R. H. POTTS.