J. W. PARKIN.

CARBURETER.

APPLICATION FILED APR. 2, 1909.

968,597.

Patented Aug. 30, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

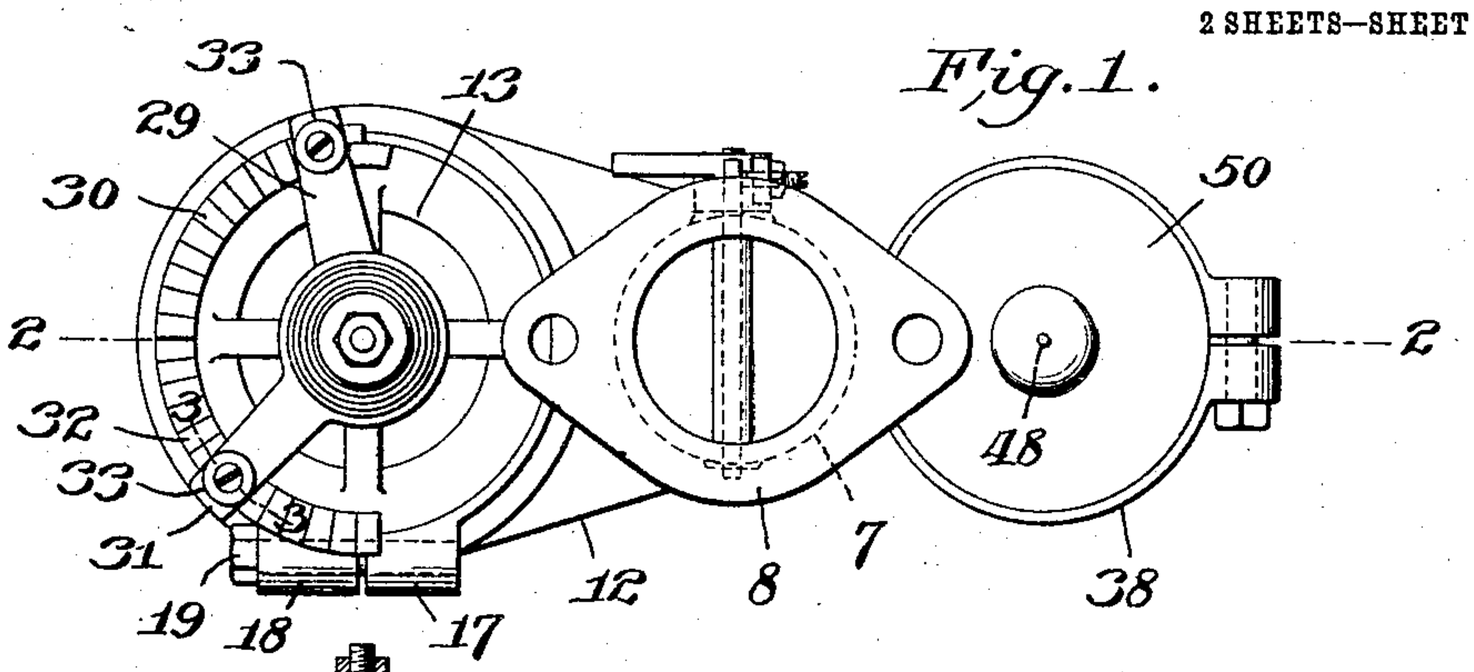
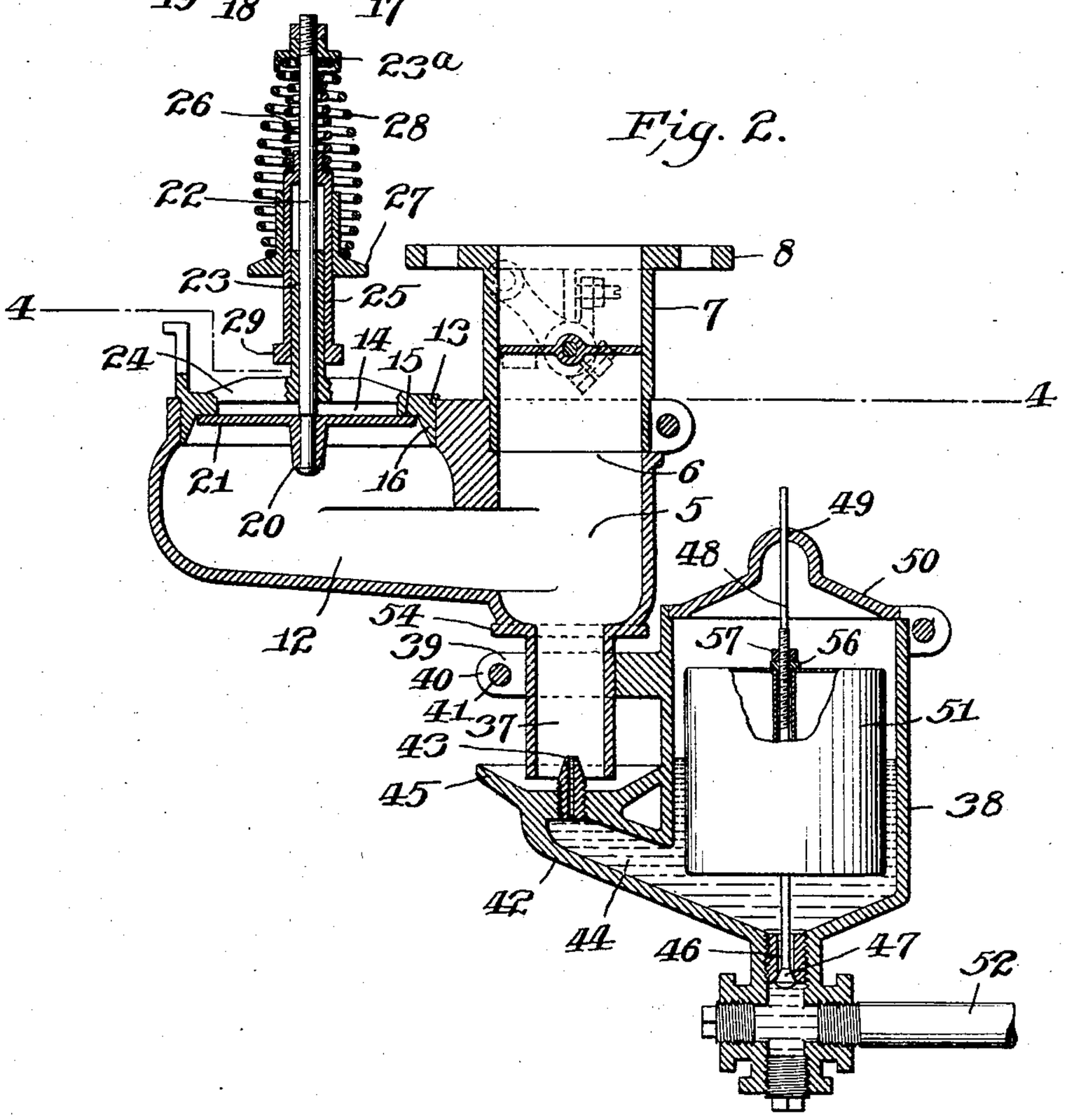



Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 4.

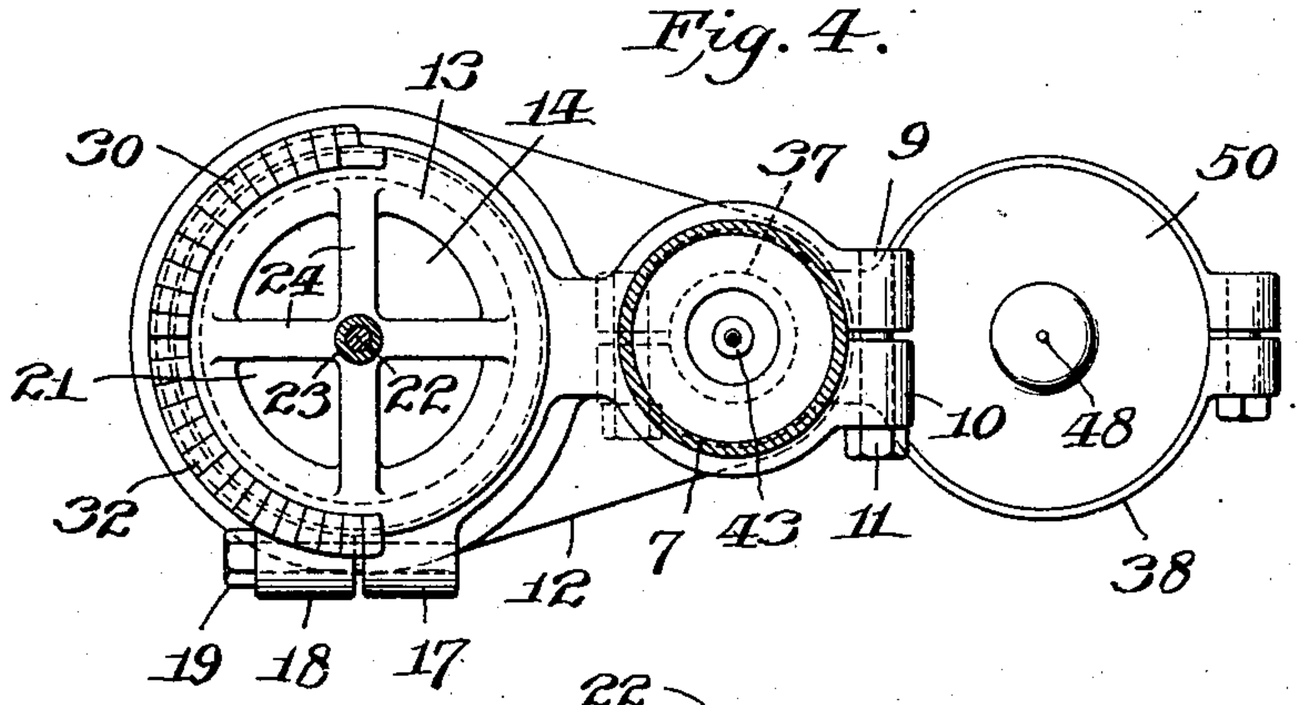



Fig. 5.

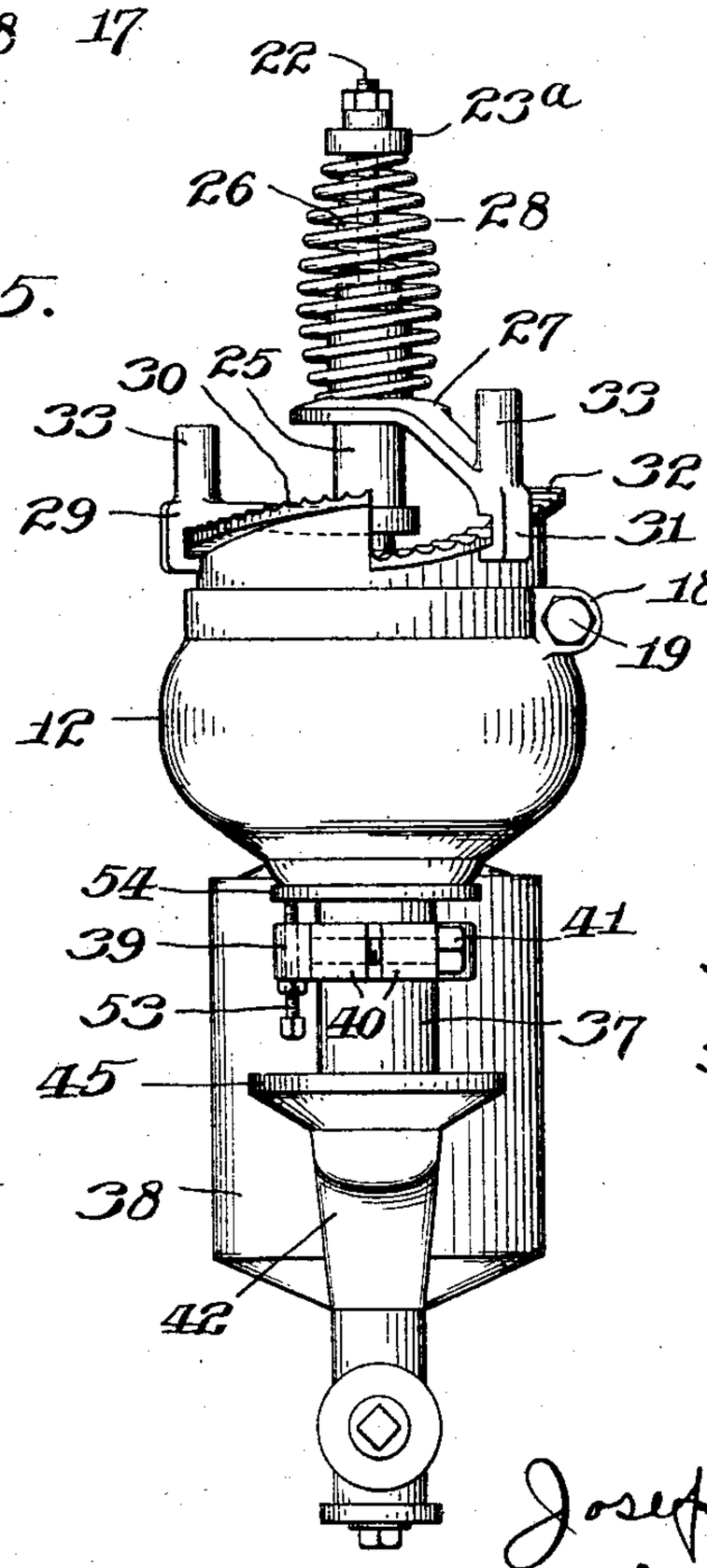
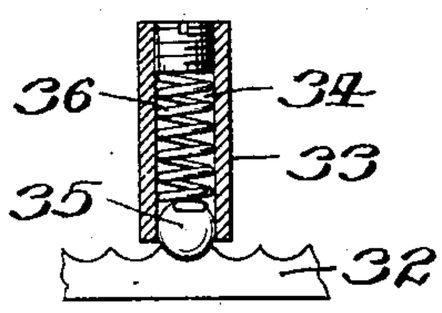



Fig. 3.

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## CARBURETER.

968,597. Specification of Letters Patent. **Patented Aug. 30, 1910.**

Application filed April 2, 1909. Serial No. 487,490.

*To all whom it may concern:*

Be it known that I, JOSEPH W. PARKIN, citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

This invention relates to carbureters for explosive engines.

The object of my invention is to provide, in a carbureter, a simple and efficient construction and organization of parts whereby oil may be vaporized and commingled with air, and the explosive mixture of vaporized oil and air supplied to the engine during the operation thereof.

The invention also includes a novel means whereby the desired quantity of air may be supplied to the explosive mixture at different speeds of the engine; a novel means of regulating the supply of vaporized oil to the explosive mixture; and various novel adjustments of the parts whereby advantages are attained, all as will be hereinafter described and particularly claimed.

In the drawings:—Figure 1 is a plan view of my improved carbureter. Fig. 2 is a vertical section thereof on line 2—2 of Fig. 1. Fig. 3 is a detail in section on line 3—3 of Fig. 1, showing the arm of one of the spring-adjusting collars and the cam with which it coöperates. Fig. 4 is a horizontal section on line 4—4 of Fig. 2. Fig. 5 is an elevation of the carbureter as seen from the left hand side of Fig. 2.

5 designates a mixing chamber in which the vaporized oil and air are commingled in forming the explosive mixture to be supplied to the engine. The mixing chamber 5 is provided with an outlet opening 6 therein into which extends the lower open end of an outlet pipe 7. The upper end of the outlet pipe 7 is provided with a flange 8 by means of which the outlet pipe may be secured to an explosive engine with the upper open end of the pipe 7 in registry with the passageway of the engine leading to the cylinder or cylinders thereof for the purpose of supplying the explosive mixture thereto.

During the operation of the engine, the piston in the cylinder thereof is reciprocated, and at certain intervals communication is established between the pipe 7 and the cylinder of the engine whereby, during the movement of the piston within the cylinder, a charge of the explosive mixture is drawn from the mixing chamber 6 into the engine cylinder and is thereafter ignited to effect the operation of the engine.

The construction of an explosive engine and its operation in drawing an explosive mixture from a carbureter is common and well known, and no detailed description of the construction or operation thereof is deemed necessary herein.

The upper portion of the mixing chamber 5 surrounds the outlet pipe 7 and is provided with projecting lugs 9 and 10 having a space therebetween; and forming a clamp embracing the pipe 7. Extending through the lug 10 and screwed into the lug 9 is a screw 11 having a head engaging the lug 10 by means of which the lugs 9 and 10 may be drawn toward each other and the clamp tightened upon the pipe 7.

The mixing chamber 5 is provided with a lateral extension 12 having a circular opening in the upper portion thereof into which is fitted a ring 13 within which a valve opening 14 is formed to afford communication between the mixing chamber 5 and the open air. The ring 13 is provided with a valve seat 15 and a circular flange 16 having a tapering inner wall which extends downwardly and outwardly from the valve seat 15. The upper portion of the extension 12 of the mixing chamber is provided with projecting lugs 17 and 18 having a space therebetween and through which extends a screw 19 by means of which the lugs 17 and 18 may be drawn toward each other to clamp the ring 13 within the upper portion of the extension 12. Thus the ring 13 forms in effect a part of said extension.

Closing the valve opening 14 is an inwardly opening valve 20 comprising a disk 21 fitted to the valve seat 15, an upwardly projecting stem 22 and a head $23^a$ on the upper end of the stem 22. The stem 22 is fitted to a guide tube 23 which projects upwardly from arms 24 formed on and extending inwardly from the ring 13. Thus the stem 22 is guided by the tube 23 to maintain the disk 21 in line with the valve seat 15 and permit it to be moved into and from engagement therewith. Surrounding the tube 20 and valve stem 22 is a collar 25, and interposed between the upper end of the collar 25 and the head $23^a$ on the valve stem is a spring 26 which encircles said stem. Surrounding the stem 22, the tube 23, and

the collar 25 is a collar 27 between which and the head 23[a] is interposed a spring 28 which encircles the spring 26 and the valve stem 22.

Projecting outwardly from the collar 25 is an arm 29 which extends over and engages an inclined cam 30, the upper face of which is socketed and extends around a portion of the ring 13. It will thus be seen that by turning the arm 29 about the axis of the valve stem 22 the collar 25 may be adjusted longitudinally of the stem toward and from the head 23[a] thereon.

Projecting outwardly from the collar 27 is an arm 31 which extends over and engages an inclined cam 32, the upper face of which is serrated and extends around a portion of the ring 13. It will thus be seen that by turning the arm 31 about the axis of the valve stem 22 the collar 27 may be adjusted longitudinally of the stem toward and from the head 23[a] thereon. In order to hold the arm 29 in engagement with the cam 30 and the arm 31 in engagement with the cam 32, I provide each arm with a boss or vertical extension 33 having an opening 34 therein in which is arranged a ball 35 which is pressed downwardly into engagement with the serrations in the underlying cam by the action of a spring 36 arranged within the opening 34. When the arm 29 is in engagement with the lower portion of the cam 30, the upper end of the spring 26 is below the head 23[a]; and in any position of the arm 31 with respect to the cam 32, the spring 28 is acting between the collar 27 and head 23[a] to maintain the valve 20 normally in the closed position from which it may be moved to open the valve against the action of the spring 28. By adjusting the arm 31 upon the cam 32, the collar 27 may be moved toward and from the head 23 in a manner to regulate or vary the pressure of the spring 28 for a purpose hereinafter explained. By adjusting the arm 29 upon the cam 30, the collar 25 may be moved toward and from the head 23[a] in a manner to move the spring 26 into engagement with the head 23[a] and also to vary the pressure of the spring 26 against the head 23[a] after it has been moved into engagement therewith for a purpose hereinafter described.

The mixing chamber 5 is provided with a downwardly extending tubular portion 37 having an open bottom which affords communication between the mixing chamber 5 and the open air. Arranged laterally of the tubular portion 37 is an oil chamber 38 provided with a clamp 39 which embraces the tubular portion 37 of the mixing chamber and is clamped thereon. The clamp 39 comprises a pair of arms 40 which are engaged by a suitable screw 41 in a manner to draw the arms 40 toward each other to tighten the clamp upon the tubular portion 37. By loosening the screw 41 the clamp 39 and therewith the oil chamber 38 may be adjusted circularly about the tubular portion 37 and also longitudinally thereof. In order to limit the extent of the forward adjustment of the clamp 39 longitudinally of the tubular portion 37, I provide the clamp 39 with an adjustable screw 53 which is arranged to engage a flange 54 on the mixing chamber 5.

The oil chamber 38 is provided with a lateral extension 42 which extends to and occupies a position directly beneath the open bottom of the tubular portion 37. Screwed into the extension 42 is a nozzle 43, the upper discharge end of which extends into the end portion of the tubular portion 37. The lower end of the nozzle 43 opens into a passageway 44 leading through the extension 42 and opening into the interior of the lower portion of the oil chamber 38, thus establishing communication between the nozzle 43 and the oil chamber 38. Formed on the extension 42 of the oil chamber 38 is an outwardly and upwardly extending flange 45 forming a cup which surrounds the nozzle 43 for a purpose hereinafter explained. The oil chamber 38 is provided with an oil inlet opening 46 arranged to be closed by a valve head 47 provided with a stem 48 which extends upwardly through the oil chamber 38 and out through a guide opening 49 in the cap or cover 50 for the oil chamber 38. A portion of the stem 48 is screw-threaded, and screwed on to this portion of the stem is a head 56 carrying a suitable float 51 which surrounds the stem 48 within the chamber 38. By turning the float 51 it may be adjusted vertically upon the stem 48. A suitable jam nut 57 is screwed on to the stem 48 and is adapted to engage the head 56 to lock the float 51 in positions of adjustment.

The oil is supplied to the inlet opening 46 through a suitable pipe 52 which leads to any suitable source of oil supply, and a constant head of oil is maintained at the inlet opening 46 from said source of supply, and a predetermined level of oil is maintained within the chamber 38 and nozzle 43 by the automatic action of the float 51 rising and falling within the chamber and closing the inlet opening 46 the instant the oil within the chamber 38 reaches the desired level, and opening the inlet opening 46 the instant the oil within the chamber 38 drops below the desired level. Thus a constant level of oil is maintained within the chamber 38, which level is directly below the discharge end of the nozzle 43, and therefore a constant level of oil is maintained at the discharge end of the nozzle 43. By adjusting the float 51 upon the stem 48 the parts may be set to maintain any desired oil level within the chamber 38 and nozzle 43.

The operation of the carbureter is as follows:—As the explosive engine draws a charge of the explosive mixture from the mixing chamber 5 by the action of the piston in the cylinder of the engine tending to create a vacuum therein, a quantity of air is drawn into the mixing chamber through the lower open end of the tubular extension 37 thereof, and at the same time a quantity of oil is drawn into the mixing chamber 5 from the discharge end of the nozzle 43 and is at the same time vaporized by the action of the air entering the mixing chamber. While the air and oil are being drawn into the mixing chamber 5 as just described, additional air is being drawn into the chamber 5 through the valve opening 14, the action of the piston in tending to create a vacuum in the cylinder drawing the disk 21 of the valve 20 away from its seat against the action of one or both of the springs 26 and 28. Thus the required explosive mixture of vaporized oil and air is supplied to the engine during the operation thereof.

During the operation of the engine, the greater the speed thereof, the greater is the tendency of the piston to create a vacuum in the cylinder in drawing in the explosive charge, and therefore, in order to preserve as nearly as possible the proper proportion of mixture of vaporized oil and air, the two springs 26 and 28 are provided, which may be adjusted to vary the spring pressure acting upon the valve 20 to hold it against its seat. That is to say, if it be desired to run the engine at a slow speed, the arm 29 will be adjusted to the low part of the cam 30 to move the spring 26 out of engagement with the head 23 and the arm 29 will be adjusted upon the cam 32 to a position in which it will cause the spring 28 to exert the proper amount of pressure upon the valve 20 to produce the proper explosive mixture for the desired speed of the engine. When, however, it is desired to run the engine at high speed, the arm 29 is adjusted in respect to the cam 30 not only to bring the spring 26 into engagement with the head $23^a$ but also to bring it into engagement with the head with sufficient pressure, which, in conjunction with the pressure of the spring 28, will resist the tendency to open the valve 20 sufficiently to prevent the engine at high speed from drawing an excess amount of air into the explosive mixture through the valve opening 14. It will thus be seen that by the employment of the springs 26 and 28, and their co-acting parts, a wide range of adjustment of the pressure against the valve 20 is obtained, and that the arm 29 may be adjusted upon the cam 30 to provide the required pressure for the desired high speed, and the arm 31 adjusted in respect to the cam 32 to produce the required pressure for the desired low speed.

The quantity of air drawn into the open bottom of the tubular extension 35 of the mixing chamber 5 controls the amount of oil that is drawn from the nozzle 43 into each explosive charge; or, in other words, it controls the richness of the mixture of vaporized oil and air. It will thus be seen that by loosening the screw 41 of the clamp 39, the oil chamber 38 and therewith the extension 44 may be adjusted to move said extension toward or from the open bottom of the tubular portion 37. Thus the carbureter may be nicely adjusted to regulate the quantity of oil drawn into the explosive mixture.

After the extension 44 has been properly adjusted with respect to the open bottom of the tubular portion 37, the screw 53 is adjusted into engagement with the flange 54, thus insuring a proper setting of the oil chamber 38 after it has been removed from the tubular portion 37. In other words, by loosening the clamp 39, the oil chamber 38 may be removed from the tubular portion 37 of the mixing chamber for any desired purpose, and when it is re-applied thereto the screw 53 coming into engagement with the flange 54 insures the proper adjustment of the extension 44 of the oil chamber with relation to the open bottom of the tubular portion 37.

In priming the explosive engine, the valve stem 48 may be raised by hand until a quantity of oil flows from the nozzle 43 into the cup 45, from which it may be vaporized and drawn into the mixing chamber 5 until the engine gets under way or automatically draws the required quantity of oil from the nozzle 43 by the drawing of air into and through the tubular portion 37.

In order that my improved carbureter may be applied to explosive engines not originally designed to receive a carbureter of this particular type, the adjustment of the mixing chamber 5 circularly about the outlet pipe 7, and the adjustment of the oil chamber 38 circularly about the tubular portion 37 of the mixing chamber 5, enables me first to secure the outlet pipe 7 to the explosive engine, and then to so adjust the mixing chamber 5 with relation to the pipe 7 and oil chamber 38 as to clear any other parts of the engine in the vicinity of the pipe 7.

I claim:—

1. In a carbureter the combination of a mixing chamber having an outlet opening therein and provided with a portion having a valve opening therein affording communication between the open air and the chamber, an inwardly opening valve closing said valve opening, a spring arranged to press said valve against its seat, a second spring surrounding the first named spring arranged to press said valve against its seat, means for adjusting the pressure of said

springs independently of each other, and an oil supply nozzle having communication with said chamber.

2. In a carbureter the combination of a mixing chamber having an outlet opening therein and provided with a portion having a valve opening therein affording communication between the open air and the chamber, an inwardly opening valve closing said valve opening, a spring arranged to press said valve against its seat, a second spring surrounding the first named spring normally out of engagement with said valve and positioned to be engaged by said valve when said valve is opened to a predetermined position, means for adjusting said second spring into engagement with said valve without adjusting the first named spring, and an oil supply nozzle having communication with said chamber.

3. In a carbureter, the combination of a mixing chamber having an outlet opening therein and provided with a portion having a valve opening therein affording communication between the open air and the chamber; an inwardly opening valve closing said valve opening, said valve including a stem projecting through and above said opening; a spring above said opening and arranged to press said valve toward its seat; a second spring above said opening and arranged to press said valve toward its seat; means above said opening for adjusting the pressure of said springs independently of each other; and an oil supply nozzle having communication with said chamber.

4. In a carbureter the combination of a mixing chamber having an outlet opening therein and provided with a portion having a valve opening therein affording communication between the open air and the chamber, an inwardly opening valve closing said valve opening, said valve including a stem having a head thereon, a collar surrounding said stem, a spring interposed between said head and said collar, a second collar surrounding said stem, a spring interposed between said head and said second collar, means for adjusting said collars longitudinally of the stem independently of each other, and an oil supply nozzle having communication with said chamber.

5. In a carbureter, the combination of a mixing chamber having an outlet opening therein and provided with a portion having a valve opening therein affording communication between the open air and the chamber, an inwardly opening valve closing said valve opening, said valve including a stem having a head thereon, a guide-tube for said stem, a collar surrounding said tube, a spring interposed between said head and said collar, a second collar surrounding the first named collar, a spring interposed between said head and said second collar, means for adjusting said collars longitudinally of the stem independently of each other, and an oil supply nozzle having communication with said chamber.

6. In a carbureter the combination of a mixing chamber having an outlet opening therein and provided with a portion having a valve opening therein affording communication between the open air and the chamber, an inwardly opening valve closing said valve opening, said valve including a stem having a head thereon, a collar surrounding said stem, a spring interposed between said head and said collar, an inclined, serrated cam, an arm projecting from said collar and engaged with said cam, and an oil supply nozzle having communication with said chamber.

7. In a carbureter the combination of a mixing chamber having an outlet opening therein and provided with a portion having a valve opening therein affording communication between the open air and the chamber, an inwardly opening valve closing said valve opening, said valve including a stem having a head thereon, a collar surrounding said stem, a spring interposed between said head and said collar, an inclined serrated cam, an arm projecting from said collar and engaged with said cam, a second collar surrounding said stem, a spring interposed between said head and said second collar, a second inclined, serrated cam, an arm projecting from said second collar and engaged with said second cam, and an oil supply nozzle having communication with said chamber.

8. In a carbureter the combination of a mixing chamber having an outlet opening therein and provided with a portion having a valve opening therein affording communication between the open air and the chamber, an inwardly opening valve closing said valve opening, said valve including a stem having a head thereon, a collar surrounding said stem, a spring interposed between said head and said collar, an inclined, serrated cam, an arm projecting from said collar and having an opening therein, a ball within said opening and engaged with said cam, a spring pressing said ball against said cam, and an oil supply nozzle having communication with said chamber.

9. In a carbureter the combination of a mixing chamber having an outlet opening therein and provided with a tubular portion having an open bottom affording communication between said chamber and the open air, an oil chamber having a part extending to a position below the open bottom of said tubular portion, said chamber having an oil inlet opening therein, means for adjusting said chamber longitudinally of said tubular portion, an oil supply nozzle opening into said tubular portion and communicating

with said oil chamber, and means for controlling the supply of oil to said nozzle.

10. In a carbureter the combination of a mixing chamber having an outlet opening therein and provided with a tubular portion having an open bottom affording communication between said chamber and the open air, an oil chamber having a part extending to a position below the open bottom of said tubular portion, said chamber having an oil inlet opening therein, means for adjusting said chamber longitudinally of and circularly about said tubular portion, an oil supply nozzle opening into said tubular portion and communicating with said oil chamber, and means for controlling the supply of oil to said nozzle.

11. In a carbureter the combination of a mixing chamber having an outlet opening therein and provided with a tubular portion having an open bottom affording communication between said chamber and the open air, an oil chamber having a part extending to a position below the open bottom of said tubular portion, said chamber having an oil inlet opening therein and being provided with a clamp embracing said tubular portion, an oil supply nozzle opening into said tubular portion in a manner to permit said chamber to be adjusted longitudinally of said tubular portion and communicating with said oil chamber, and means for controlling the supply of oil to said nozzle.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH W. PARKIN.

Witnesses:
S. I. HARPER,
E. M. WARE.