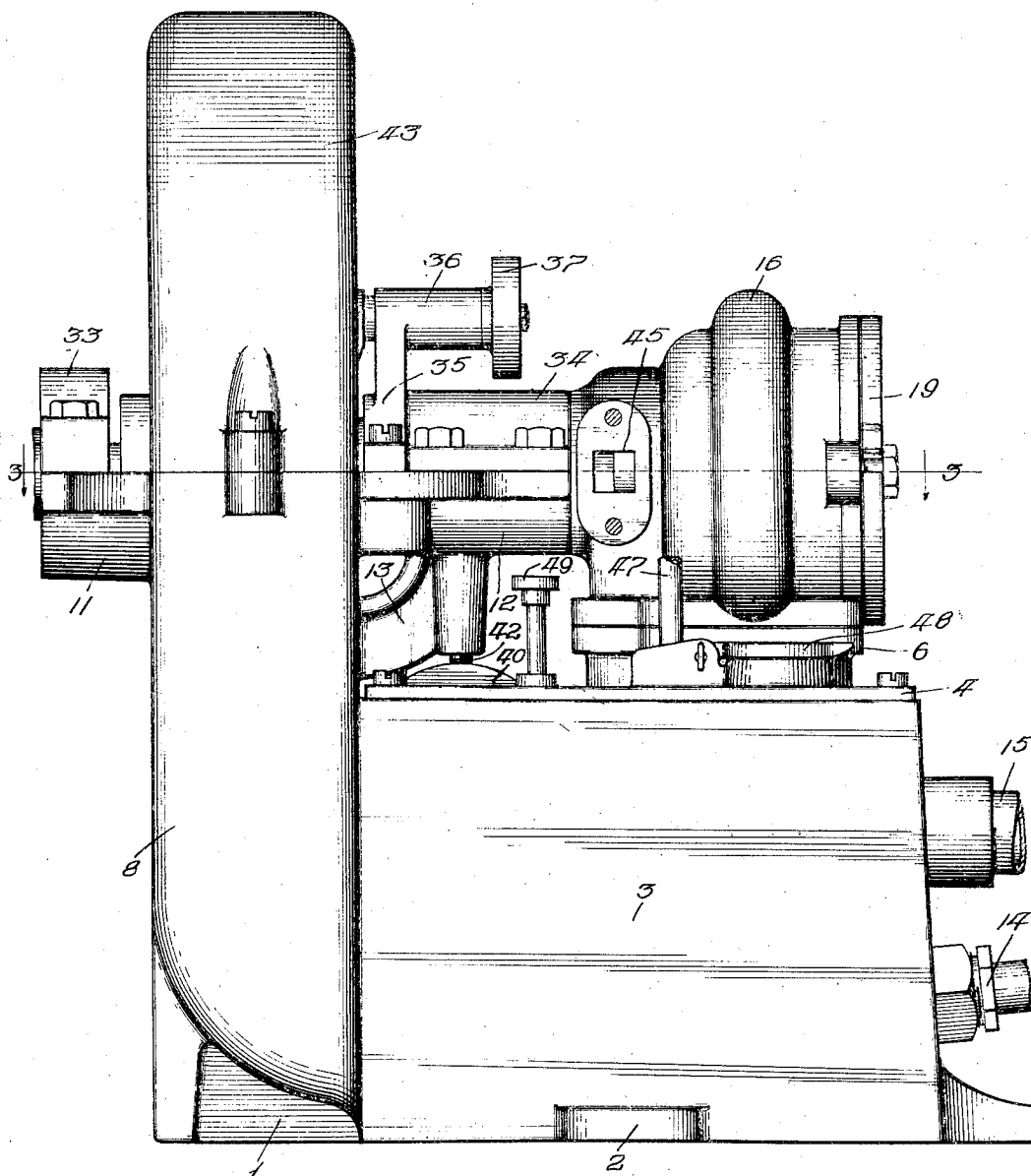


H. L. THOMPSON.
GAS ENGINE.
APPLICATION FILED NOV. 2, 1918.

1,342,977.

Patented June 8, 1920.
3 SHEETS—SHEET 1.

Fig. 1.



Witness:
R. L. Jamieson

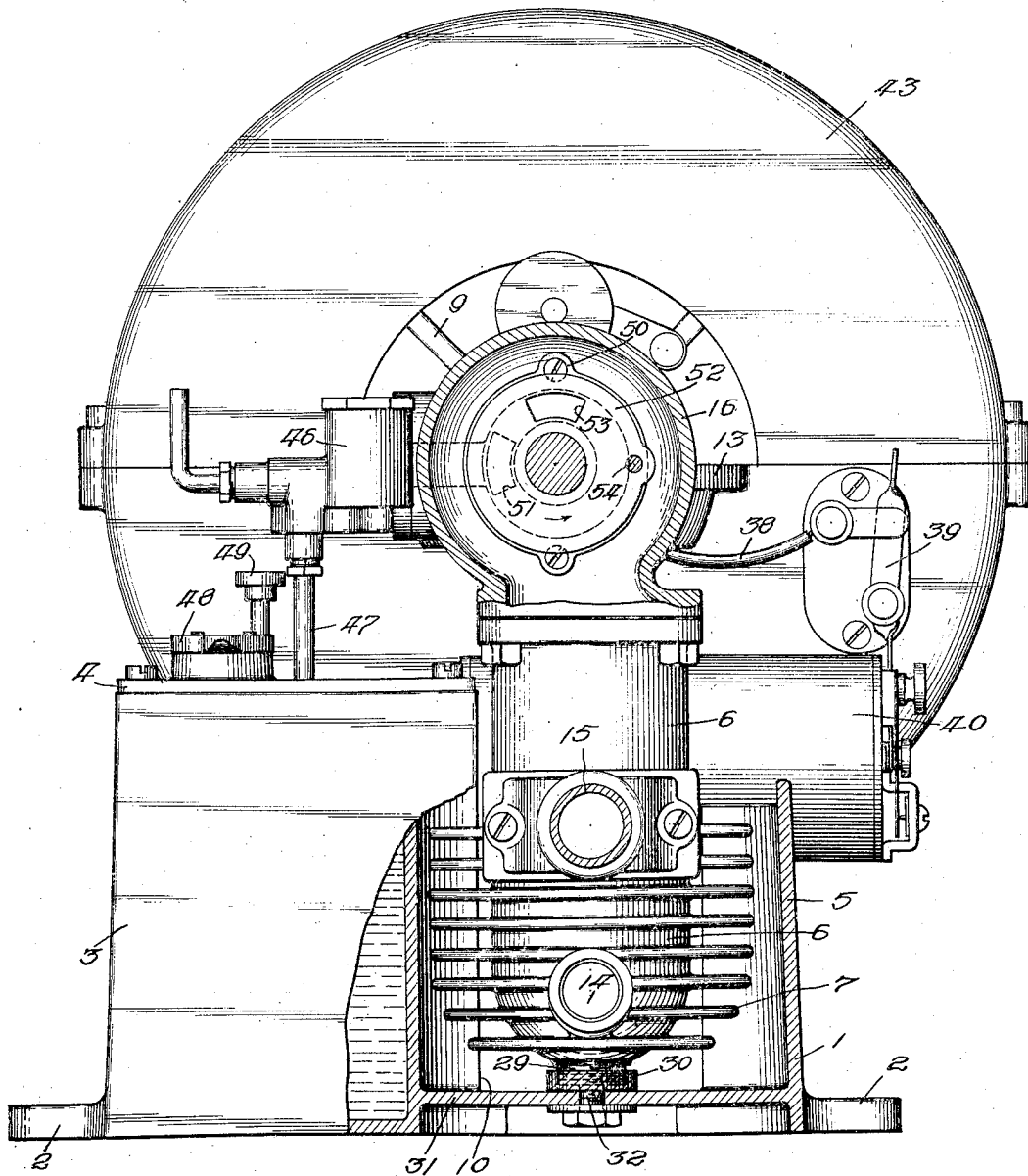
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3 SHEETS—SHEET 2.

Fig. 2.



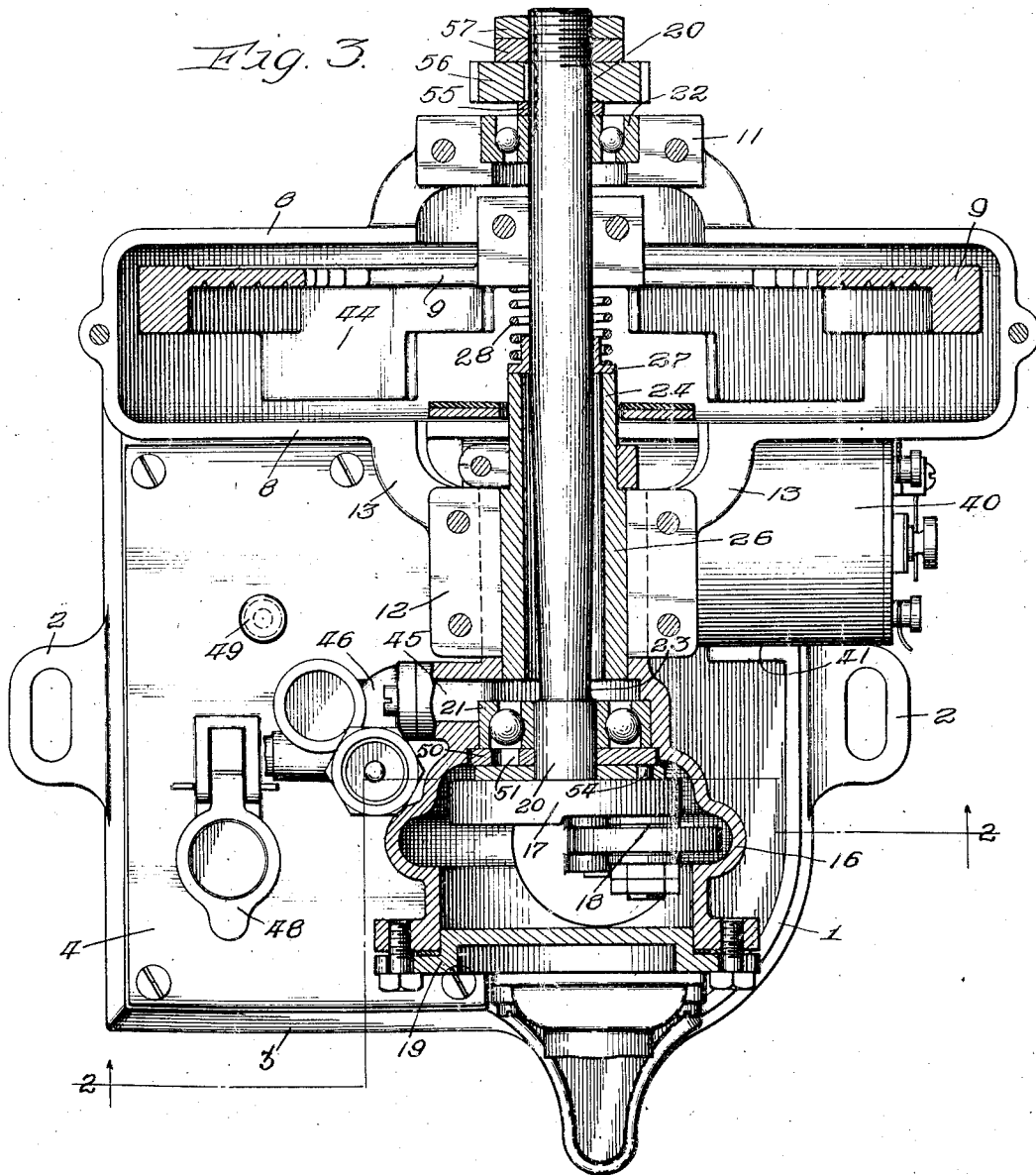
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3 SHEETS—SHEET 3.



Witness:

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UNITED STATES PATENT OFFICE.

HERBERT L. THOMPSON, OF ELGIN, ILLINOIS, ASSIGNOR TO ELGIN GAS MOTOR COMPANY, OF ELGIN, ILLINOIS, A CORPORATION OF ILLINOIS.

GAS-ENGINE.

1,342,977.

Specification of Letters Patent.

Patented June 8, 1920.

Application filed November 2, 1918. Serial No. 280,841.

To all whom it may concern:

Be it known that I, HERBERT L. THOMPSON, a citizen of the United States, residing at Elgin, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Gas-Engines, of which the following is a specification.

This invention relates to internal combustion engines, and more particularly to the supporting means, including the casing, for an engine of this class.

The principal object of the invention is to provide new and improved means for supporting the operating parts of a small or portable gas engine of the air-cooled type so that air will be forced against the cooling vanes of the engine cylinder by the rotation of the fly wheel.

Another object is to simplify the supporting means and the means by which the engine is attached to the casing.

Another object is to provide inclosing portions for certain of the engine parts which coöperate therewith to form an admission valve and a compression chamber from which gas is admitted to the engine cylinder.

Other objects will appear hereinafter.

The invention consists in the novel construction, combination and arrangement of the several parts.

In the accompanying drawings—

Figure 1 is a side elevation of a gas engine and a supporting casing constructed in accordance with the principles of this invention.

Fig. 2 is an end view partly in section on line 2—2 of Fig. 3, showing also a carbureter in elevation; and

Fig. 3 is a section taken on line 3—3 of Fig. 1.

This invention is particularly designed and intended for use in connection with small two-cycle gas engines of the air-cooled type and comprises a unitary base and bearing support for the operating engine parts which has a passage therein for conducting air from the fly wheel against the vanes of the engine cylinder for cooling it. It should also be stated that the lubrication of the engine is effected by means of lubricating oil which is placed in and mixed with the liquid fuel, and means is provided for automatically lubricating the engine shaft bearing and certain of the parts with this lubricant.

Referring now more particularly to the drawings, a base member or main casting 1 is formed at opposite sides with perforated lugs 2 by means of which it may be secured to the floor, or any suitable support, and at one side of the base is a receptacle 3 for liquid fuel which is provided with a removable top plate 4. At the opposite side of the base is an upstanding wall 5 leaving a space between the wall and the fuel receptacle 3 for an engine cylinder 6 with projecting vanes 7. At one end of the base is a semi-circular hollow casing 8 in which the engine fly wheel 9 is rotated, and between the casing 8 and the space between the wall 5 and the receptacle 3 is a passage 10 through which air is driven by the fly wheel against the cooling vanes 7 of the engine cylinder 6. Extending outwardly from the upper edge of the fly wheel housing or casing 8 is the lower half of an outer bearing support 11, and extending inwardly from the opposite edge of this housing is the lower half of the main engine bearing 12 which is strengthened by one or more brackets 13 integrally connecting it at an angle, as shown in Fig. 3, with the adjacent portion of the casing 8. It should be understood that the entire base as thus described is formed in a single piece or casting, thus simplifying and materially reducing the number of parts in an engine of this class.

The engine proper comprises the vanned casing 6, which is inverted, as shown more clearly in Fig. 2, with a spark plug aperture 14 near its lower end, and an exhaust aperture 15 intermediate its ends. A housing 16 is attached to the upper end of the cylinder 6 forming a compression chamber with a by-pass leading to the cylinder 6, and in this housing is disposed a counter-weighted engine crank 17 from which a crank pin 18 projects. A piston rod and piston are of course connected to the pin 18 and reciprocable in the cylinder. The outer end of the housing 16 is provided with a removable plate 19 by means of which access may be had to the interior of the housing for adjusting the parts contained therein. Extending from the crank 17 and connected thereto is the engine shaft 20 which is mounted in an anti-friction bearing 21 secured in the housing 16, and in a similar bearing 22, supported by the outer bearing support 11, at the other end of the casing member 1, one part of each bearing being

attached, as usual, to the shaft and the other part to the support. The intermediate portion of the shaft, adjacent the bearing 21, may be formed with a reduced portion 23 which is increased in size gradually toward the other bearing 22. This intermediate portion of the shaft does not even contact with but is surrounded by a bearing sleeve 26 which is an integral extension or an attachment of the housing 16 and is fixed and mounted in the main bearing 12. The outer end of the sleeve is closed by a collar 27 slidable on the shaft 20 but making a substantially air-tight connection therewith and pressed against the end of the sleeve 26 by means of a spring 28 which bears against the fly wheel 9, thus making a substantially air-tight connection for the end of the sleeve 26.

It will be seen, therefore, that the main engine support is the bearing member 12 which forms a part of the main casing 1, and in order to compensate for the difference in the sizes of the parts, and also to secure the engine firmly in the base, the lower end of the cylinder 6 is provided with a threaded portion 29 and a collar 30 threaded thereon which bears against a lower raised wall 31 of the casing member 1, as shown more clearly in Fig. 2. The adjustment of this collar 30 will move it in contact with the wall 31, and in order to hold the cylinder firmly in this position a bolt 32 is inserted through the end of the wall 31 into the adjacent end of the cylinder, and when drawn up tightly it acts as a lock nut for holding the collar 30 in the position in which it is set. Of course, the bearing supports 11 and 12 are provided with cap plates 33 and 34, respectively, for holding the shaft bearings in proper place.

Longitudinally slidable on the end of the bearing sleeve 26 where it projects beyond the bearing support 12, as shown in Figs. 1 and 3, is a clamping ring 35 which has a support 36 for a speed adjusting device which has an adjusting screw 37, and is connected by means of a conductor 38, with a switch 39 connected in turn through a coil 40, and the casing member 1 is formed with a portion 41 between the engine cylinder 6 and the fly wheel casing 8 below the bearing portion 12 for seating or containing the coil 40. A member 42, as shown in Fig. 1, may also be threaded through one of the brackets for the bearing 12, from the inside thereof, to bear against the coil 40 and thereby hold it in place.

An upper semi-circular casing 43 is attached to the lower casing 8 to cover the fly wheel 9, but around the center of both of the casing portions 8 and 43 is an aperture for admitting air which is driven out of the casing through the passage 10 against the cooling vanes 7 of the cylinder by the ro-

tation of the fly wheel due to vanes 44 thereof, and the lower portion of the casing 8 is curved inwardly, as shown in Fig. 1, to direct the air into the passage 10 against the engine cylinder.

At the inner end of the housing 16 is a projection with a perforation 45 to which a carbureter, designated generally by the reference number 46, is applied. This carbureter has a suction pipe 47 extending downwardly into the fuel receptacle 3 through the top 4 thereof. A spring-pressed door 48 is provided for covering a filling aperture in the top plate 4, and the knob 49 of a priming device for the carbureter also extends through the top. Secured in the housing 16 at the side of the bearing 21, opposite the carbureter opening 45, is a plate 50 having a port 51 therein which communicates with that portion of the carbureter inlet surrounding the reduced portion 23 of the shaft 20 through the anti-friction bearing 21, which is preferably a ball-bearing, and carried by the shaft 20 directly in contact with the fixed plate 50 is a valved plate 52 having a valve opening 53 adapted to be moved to register with the port 51 by the rotation of this plate 52 which is connected to rotate with the crank 17 which it abuts on the side opposite the plate 50 by means of a pin 54 projecting from the crank into a suitable opening in the plate 52. It is obvious that the rotation of the shaft 20, and consequently of the plate 52 causes the port 53 to register with the port 51, drawing the fuel charged with lubricant through the anti-friction bearing 21. The anti-friction bearing 22 at the outer end of the shaft 20 is easily accessible and lubricated.

In order to take up wear of the bearings 21 and 22 the outer end of the shaft 20 is threaded, and a washer 55 abuts that portion of bearing 22 which is keyed to the shaft 20. On the outer side of the washer is a driving member or gear 56 and on the threaded end of the shaft are nuts 57 which may be drawn up to move the shaft longitudinally, thus tightening the bearings 21 and 22.

The chief novelty in this engine consists in the simple construction and the facility of assembling the parts: the shaft is simply inserted into the sleeve 26 and housing 16, the bearings, flywheel, crank, etc., attached; the housing is bolted to the cylinder 6; the sleeve 26 is laid in the main support 12, and the cap plates 33 and 34 are attached; the lower end of the cylinder is attached to the casing 1; the carbureter, spark coil, speed control, spark plug, etc., are applied, and the engine is ready for use. One bearing 21 is self-lubricating and the other bearing 22 is easily lubricated, and there are only a few movable parts and they are not

liable to get out of order. The engine is thus made as nearly accident-proof as possible, and the provision of a single base member not only reduces the number of parts, but it also provides means for preventing the operating engine parts from getting out of line after they have once been properly set, which reduces to a minimum the source of greatest difficulty in portable engines of this type.

I claim:

1. The combination with a gas engine having a cylinder with cooling vanes and a fan-bladed fly wheel, of a supporting base therefor with a transverse passageway in which said cylinder is disposed, a portion of the base partially inclosing the fly wheel and connected with the passageway to direct air from the fan blades therethrough against the cooling vanes of the cylinder.

2. The combination with a supporting base having a passageway therethrough, of an engine cylinder disposed in the passageway and a fan-bladed fly wheel for the engine, and means partially inclosing the fly wheel at one end of the passageway and connected thereto for directing air from the fan blades into the passageway.

3. A gas engine comprising an inverted cylinder and a fly wheel; a supporting base therefor; means for securing the cylinder to the base; and a bracket forming a support for the engine between the fly wheel and the cylinder.

4. In an air-cooled gas engine, a vaned cylinder and a fan-bladed fly wheel; supporting means therefor comprising a casing with a passageway in which the engine cylinder is situated and a portion of the passageway partially inclosing the fly wheel so that in operation the air therefrom is directed through the passageway against the vanes of the cylinder.

5. In a gas engine, the combination with a cylinder and a rotatable shaft, of bearings in which the shaft is rotatable, and a supporting base to which the inverted lowermost end of the cylinder is attachable with a supporting portion of the base in which said bearings are mounted constituting in effect a two-point support for the engine.

6. In a gas engine, the combination with a tubular bearing member, of a vaned engine cylinder having a shaft rotatable in the bearing member, a fan-bladed fly wheel carried by the shaft, and a unitary base having a passageway in which the engine cylinder is disposed in inverted position with a portion at one end of the passageway for partially inclosing the fly wheel so that the air from the blades thereof will be directed against the vanes of the cylinder, the base also comprising a bearing support for the bearing member disposed between the fly wheel and the engine cylinder.

7. A gas engine supporting casing comprising a fuel chamber and a wall spaced therefrom forming a passageway open at one end and having a semi-circular containing portion connected with the passageway at the other end.

8. A unitary casing for supporting a gas engine comprising means forming a transverse passageway with a semicircular fly wheel containing portion at one end of the passageway connected thereto by a curved portion and with bearing supports extending from the upper edges of the said semicircular portion in which an engine shaft can be mounted.

9. The combination with a gas engine comprising a vaned cylinder, a rotatable shaft, and a fly wheel secured to the shaft at a distance from the cylinder, of a single unitary casing for supporting the engine comprising a passageway in which the engine cylinder is disposed in inverted position, and a semi-circular containing housing at one end of the passageway in which the fly wheel is rotatable with a connected bearing support for the shaft extending from one edge of the fly wheel casing between the fly wheel and the engine cylinder.

10. The combination with a gas engine comprising an engine cylinder, a rotatable shaft, and a fly wheel mounted on the shaft; of a unitary supporting casing therefor having a passageway in which the engine cylinder is disposed in inverted position, a connected semi-circular casing at one end of the passage in which the fly wheel is rotatable, and an integral bearing support at the inner edge of the fly wheel casing between the fly wheel and the cylinder, means forming a bearing for the shaft supported and held in place by the said bearing support; and an adjustable connection between the lower end of the engine cylinder and the adjacent bottom wall of the casing for accommodating any variation of the height of the engine cylinder with respect to the said bearing support.

11. The combination with a gas engine comprising an inverted cylinder, a rotatable shaft, and a fly wheel mounted on the shaft intermediate the ends thereof, of a unitary supporting casing for the engine having a passageway in which the cylinder is disposed and a casing portion connected at one end of the passageway in which the fly wheel is rotatable with bearing supports for the shaft extending outwardly from the upper edges of the fly wheel casing portion; and means forming a bearing for the shaft on each side of the fly wheel, said means being upheld by the said bearing supports.

12. The combination with a gas engine comprising a cylinder and rotatable shaft with a fly wheel mounted on the shaft intermediate the ends thereof, of a unitary sup-

porting base therefor comprising a passageway in which the cylinder is disposed in inverted position, a casing portion connected with the passageway in which the fly wheel
 5 is rotatable and a bearing support for the shaft at both upper edges of the said fly wheel casing; means forming bearings for the shaft upheld by both of the said supports; and an adjustable connection between
 10 the lower end of the cylinder and the adjacent bottom of the casing, said connection also holding the engine cylinder in place.

13. The combination with a gas engine having a cylinder, a rotatable shaft, and a
 15 fly wheel, of a single unitary supporting casing therefor comprising a passageway in which the cylinder is positioned, a casing portion in which the fly wheel is rotatable, and a bearing support for the shaft extending
 20 from the upper edge of the fly wheel casing; and an upper cap portion for the fly wheel casing which extends over and covers the fly wheel leaving an air admission opening around the center thereof free
 25 so that the rotation of the fly wheel will induce a current of air in the passageway against the engine cylinder.

14. In a casing and support for a gas engine, a base member having a transverse
 30 passageway with a fly wheel casing portion connected thereto at one end, with a bearing bracket extending inwardly from the upper edge of the fly wheel casing portion, and with a recess below this bearing bracket for
 35 containing an ignition coil, in combination with means extending from said bracket for engaging a coil located in said recess for holding it in connection with the base.

15. In a gas engine, the combination with
 40 a rotatable shaft and a fly wheel near one end, of a cylinder and a piston therefor connected to the shaft, means forming a compression chamber inclosing the connected end of the shaft and an extension free of the
 45 shaft toward the fly wheel, a fuel supply connection for the chamber at one side of the shaft, and means to close the end of said extension around the shaft against the admission of air.

50 16. The combination with a base having a casing for containing a flywheel and a bearing support on each side thereof, of a gas engine including a shaft, a flywheel and a housing extending over one end of the
 55 shaft and toward the flywheel and having

this portion seated in one of said bearing supports; and anti-friction bearings for the shaft, one in the other bearing support and one in said housing.

17. The combination with an engine com- 60
 prising a shaft and a crank at one end; a base having a bearing support; a housing for the crank and an extension around the shaft; a fuel connection communicating with the housing; and a spring pressed clo- 65
 sure for the extension fitting tightly around the shaft.

18. In a gas engine, a shaft, a crank and piston attached thereto, a cylinder, a housing connected to the cylinder inclosing 70
 the crank and the end of the shaft with a sleeve portion extending along but free from the shaft, valved means for admitting fuel to the housing, and means around the shaft at the end of the sleeve to form an air tight 75
 connection.

19. In a gas engine, a base having spaced bearing supports, a rotatable shaft threaded at one end, a housing for the other end of the shaft with a sleeve extending along the 80
 shaft and secured in one of said supports, an anti-friction bearing having one portion attached to the shaft and another to said housing, another anti-friction bearing hav- 85
 ing one portion attached to the other support and another portion keyed to the shaft, a spring pressed collar around the shaft closing the end of said sleeve, and means including a member threaded on the end of the shaft and operative to draw the shaft end- 90
 wise to tighten the bearings without disturbing the connection for the end of said sleeve.

20. A gas engine comprising a cylinder, a crank case connected with the cylinder and having a bearing opening therein, a bearing 95
 including spaced annular members disposed in said bearing opening, a piston in the cylinder, a crank shaft in the crank case and mounted in said bearing, a connection between the crank shaft and piston, and a 100
 source of fuel and lubrication supply connected with the space between said bearing members so that movements of the piston draws fuel and oil through said space and lubricates said bearing. 105

In testimony whereof I have signed my name to this specification on this 29th day of October, A. D. 1918.

HERBERT L. THOMPSON.