G. F. DILLON.

EXPLOSIVE ENGINE.

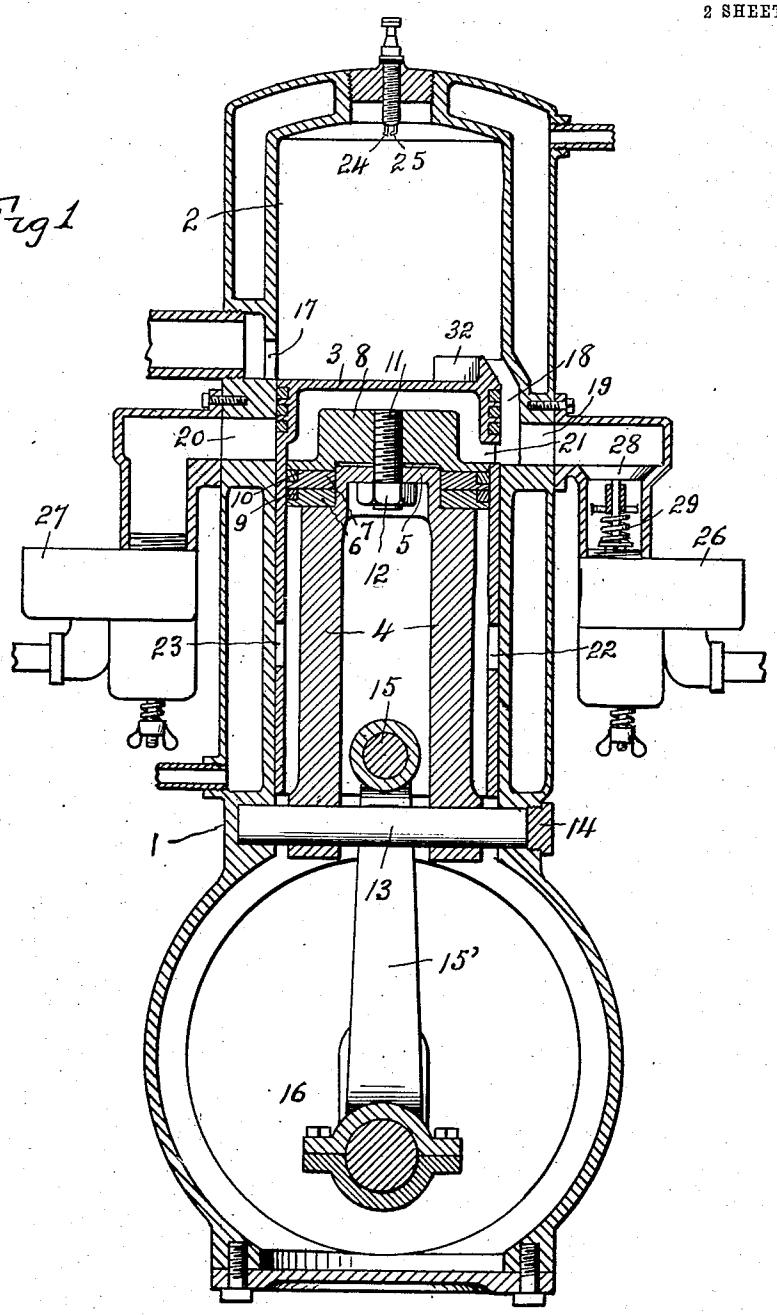
APPLICATION FILED JULY 8, 1911.

1,033,160.

Patented July 23, 1912.

2 SHEETS—SHEET 1.

Fig 1



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2 SHEETS—SHEET 2.

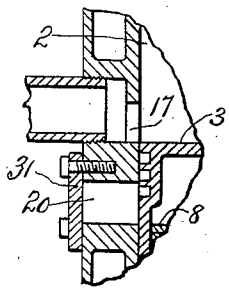

Fig 4

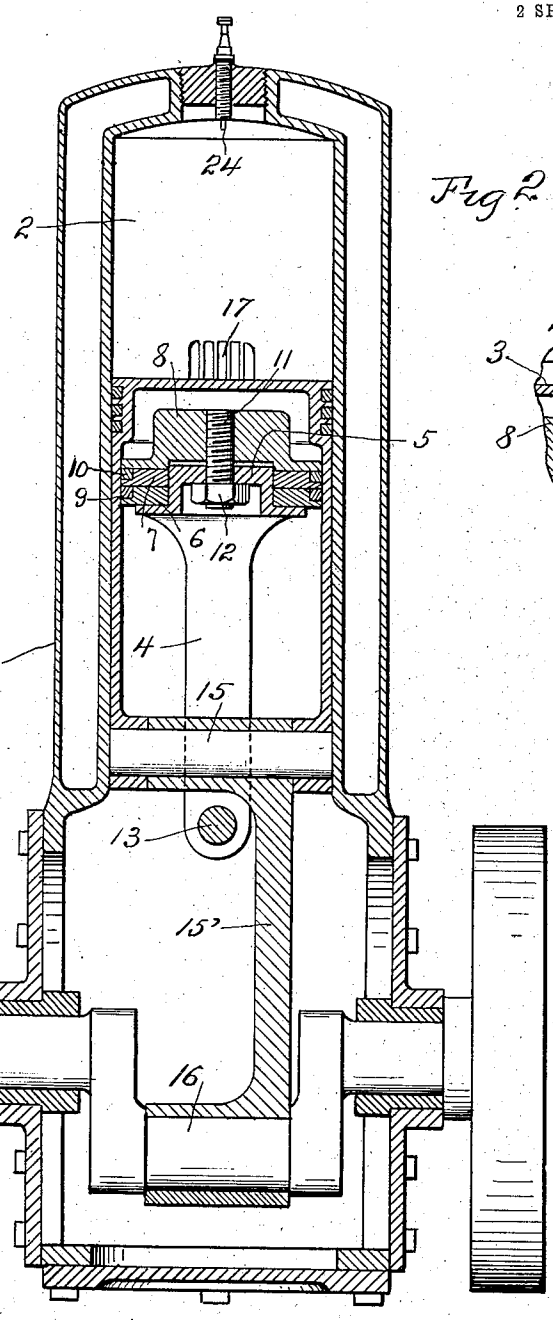

Fig 2

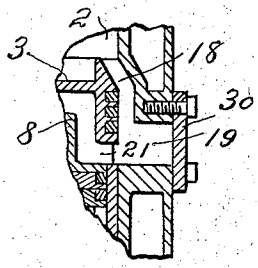

Fig 3

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UNITED STATES PATENT OFFICE.

GEORGE F. DILLON, OF KANSAS CITY, MISSOURI.

EXPLOSIVE-ENGINE.

1,033,160. Specification of Letters Patent. **Patented July 23, 1912.**

Application filed July 8, 1911. Serial No. 637,469.

To all whom it may concern:

Be it known that I, GEORGE F. DILLON, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Explosive-Engines, of which the following is a specification.

My invention relates to improvements in explosive engines.

The object of my invention is to provide an explosive engine which is simple in construction, is efficient in operation and not liable to get out of order.

My invention is particularly adapted for use in explosive engines of the two cycle type.

The novel features of my invention are hereinafter fully described and claimed.

In the accompanying drawings which illustrate one form of my invention, Figure 1 is a central vertical sectional view of an engine provided with my improvements. Fig. 2 is a view similar to that shown in Fig. 1 excepting that it is taken at right angles to that of Fig. 1. Fig. 3 is an enlarged fragmental vertical sectional view with one carbureter detached, the port with which the carbureter was connected being closed by a plate. Fig. 4 is a view similar to Fig. 3, the other carbureter being detached and the inlet port with which it was connected being closed by a plate.

Similar reference characters designate similar parts.

1 designates the engine body having a vertical cylinder 2 in which is reciprocatively mounted a piston 3 which is hollow and closed at its inner end. Within the piston 3 is slidably fitted a normally stationary abutment, which consists, preferably, of the following described parts:—An inverted U shaped member 4 is provided at its upper end with a circular portion 5 which extends through two rings 6 and 7 and into a circular recess in a circular plate 8. The rings 6 and 7 and plate 8 are slidably fitted in the piston, packing rings 9 and 10 being inserted between the two rings 6 and 7 and plate 8. A vertical bolt 11 secured at its upper end in the plate 8 extends through the portion 5 and has mounted on its lower end a nut 12 which bears against the under side of said portion 5.

The abutment above described is supported so as to be movable laterally, preferably, so that it may center itself in the piston 3. To effect this I preferably provide a horizontal bar 13 which is disposed so as to intersect the longitudinal center of the cylinder 2 at right angles. The two arms of the member 4 are pivotally and slidably mounted, preferably, on the bar 13, thereby enabling the abutment to center itself in the piston. The bar 13 extends through a hole in one side of the body 1 and into a recess provided in the other side of the body, as shown in Fig. 1. The outer end of said hole may be screw threaded and have fitted in it a screw plug 14, which will hold the bar 13 in its proper position. The piston 3 has mounted in it a horizontal pin 15 which is disposed at right angles to the bar 13 and which extends between the two arms of the member 4 above the bar 13. A connecting rod 15′, which is offset so as not to strike the bar 13 has one end pivoted to the pin 15, the other end being pivoted to the crank shaft 16 in the usual manner.

The cylinder is provided with an exhaust port 17 and a by pass 18. It is also provided with two inlet ports 19 and 20, the inlet 19 being connected with the bypass 18. The disposition of the exhaust port 17 and the by pass 18 is such that they will be closed by the piston 3 excepting when the piston is near the end of its outer stroke. At the latter time the by pass 18 is connected with the interior of the piston at the inner side of the plate 8 of the abutment by a port 21 which extends through the side of the piston 3, as shown in Fig. 1. The piston 3 is also provided with two oppositely disposed ports 22 and 23 which extend through the side of the piston, and are adapted to respectively connect the bypass 18 and inlet port 20 with the interior of the piston 3 at the inner side of the plate 8, when the piston has moved inwardly to a predetermined position in which the port 17 and by pass 18 will be closed by the piston. In the cylinder 2 above the piston 3 are two electrodes 24 and 25 between which pass the sparks which ignite the charges.

Communicating respectively with the inlet ports 19 and 20 are two carbureters 26 and 27. The carbureter 26 is preferably provided with an inwardly opening check valve 28 which is normally drawn to the closed position by a coil spring 29. The other

carbureter is designed for high speed purposes and is preferably not provided with any check valve.

The engine is adapted to be used with either or both of the carbureters 26 and 27. Two plates 30 and 31, shown respectively in Figs. 3 and 4 are provided for closing respectively the inlet ports 19 and 20 in case either of the carbureters is dispensed with.

In the operation of my invention when both carbureters are employed, the piston 3 on its upward movement first closes the bypass 18 at its upper end, at which time owing to the upward movement of the piston a partial vacuum is effected above the abutment plate 8 and a small amount of explosive fuel is drawn into the piston above the plate 8 through the carbureter 26, bypass 18 inlet port 19 and port 21. When the piston 3 has moved to a position in which the ports 22 and 23 will register with the by pass 18 and inlet port 20 respectively a partial vacuum will have been effected in the piston 3 above the abutment plate 8, due to the continued upward movement of the piston, and fuel will be drawn into the piston above the plate 8 from the carbureters 26 and 27. After this has been done, the compressed charge above the piston 3 will be ignited by the spark between the electrodes 24 and 25 and the piston will be driven downward. As the piston nears the end of its downward or outward stroke the exhaust port 17 is first uncovered after which the bypass 18 will be uncovered, at which time the charge which has been drawn into the piston above the plate 8 will pass through the port 21 and by pass 18 into the cylinder above the piston, thus driving out the burned gas and filling the cylinder above the piston. Upon the upward movement of the piston, the charge which has thus been transferred to the upper end of the piston will be compressed and ignited as described. In case that the carbureter 26 is not used, the charge will enter the piston above the plate 8 only through the port 23. The piston 3 may have at its upper end a deflector 32 opposite the by pass 18, when the piston is as shown in Fig. 1. In case the carbureter 27 is dispensed with, the charge will be taken into the piston through the ports 21 and 22 by way of the by pass 18 and inlet port 19. In either case the operation will be otherwise the same as has already been described.

A great advantage of my construction as compared with engines of the two cycle type which have crank case compression, is the very short distance through which the charge must be transferred when passing through the bypass 18. Another advantage lies in the facility with which the stationary abutment may center itself in the piston.

The crank case of the body 1 may be filled or partly filled with oil. With the parts as constructed all the moving parts of the piston and the parts with which they contact will be well lubricated. Another advantage of my construction is that packing boxes for moving parts are eliminated.

I do not limit my invention to the structure shown and described, as many modifications, within the scope of the appended claims, may be made without departing from the spirit of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:—

1. In an explosive engine, a cylinder, a hollow piston reciprocative therein and having a closed end, an abutment slidably fitted in the piston, and supporting means on which the abutment can move laterally to center itself in the piston.

2. In an explosive engine, a cylinder, a hollow piston reciprocative therein and having a closed end, an abutment slidably fitted in the piston, and supporting means on which the abutment can move laterally in directions at right angles to each other to center itself in the piston.

3. In an explosive engine, a cylinder, a hollow piston reciprocative therein and having a closed end, an abutment slidably fitted in the piston, and supporting means on which the abutment can slide laterally in one direction and swing laterally in another direction to center itself in the piston.

4. In an explosive engine, an engine body including a cylinder, a hollow piston reciprocative in the cylinder and having a closed end, a bar supported by the body transversely to the longitudinal center of the cylinder, and an abutment slidably mounted on the bar and slidably fitted in the piston.

5. In an explosive engine, an engine body including a cylinder, a hollow piston reciprocative in the cylinder and having a closed end, a bar supported by the body transversely to the longitudinal center of the cylinder, and an abutment slidably mounted in the piston and pivoted to said bar.

6. In an explosive engine, an engine body including a cylinder, a hollow piston reciprocative in the cylinder and having a closed end, a bar supported by the body transversely to the longitudinal center of the cylinder, and an abutment pivotally and slidably mounted on the bar and slidably fitted in the piston.

7. In an explosive engine, a cylinder, a hollow piston reciprocative therein and having a closed inner end, and a laterally movable abutment slidably fitted in the piston, the cylinder having an inlet port, an exhaust port and a bypass, the exhaust port and by pass being closed by the piston excepting when the piston is adjacent to the end of its outstroke, the piston having a port which when the piston is adjacent the end

of its outstroke communicates with the by-pass and with the interior of the piston at the inner side of said abutment, the piston having another port which, when the piston has moved inwardly to a predetermined position connects the inlet port with the interior of the piston at the inner side of the abutment.

8. In an explosive engine, a cylinder having a by pass, an exhaust port and two inlet ports one of which connects with the by pass, a hollow piston reciprocatively mounted in the cylinder and having a closed inner end and three ports, and an abutment slidably fitted in the piston, the piston when near the end of its outstroke having one of its ports connecting the bypass with the interior of the piston at the inner side of the abutment, the other two ports of the piston respectively connecting the by pass and one of the inlet ports with the interior of the piston at the inner side of the abutment when the piston has moved inwardly to a predetermined position.

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

GEORGE F. DILLON.

Witnesses:
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FLORENCE M. VENDIG.