W. H. BUTTERFIELD.

TWO-STROKE CYCLE INTERNAL COMBUSTION ENGINE.

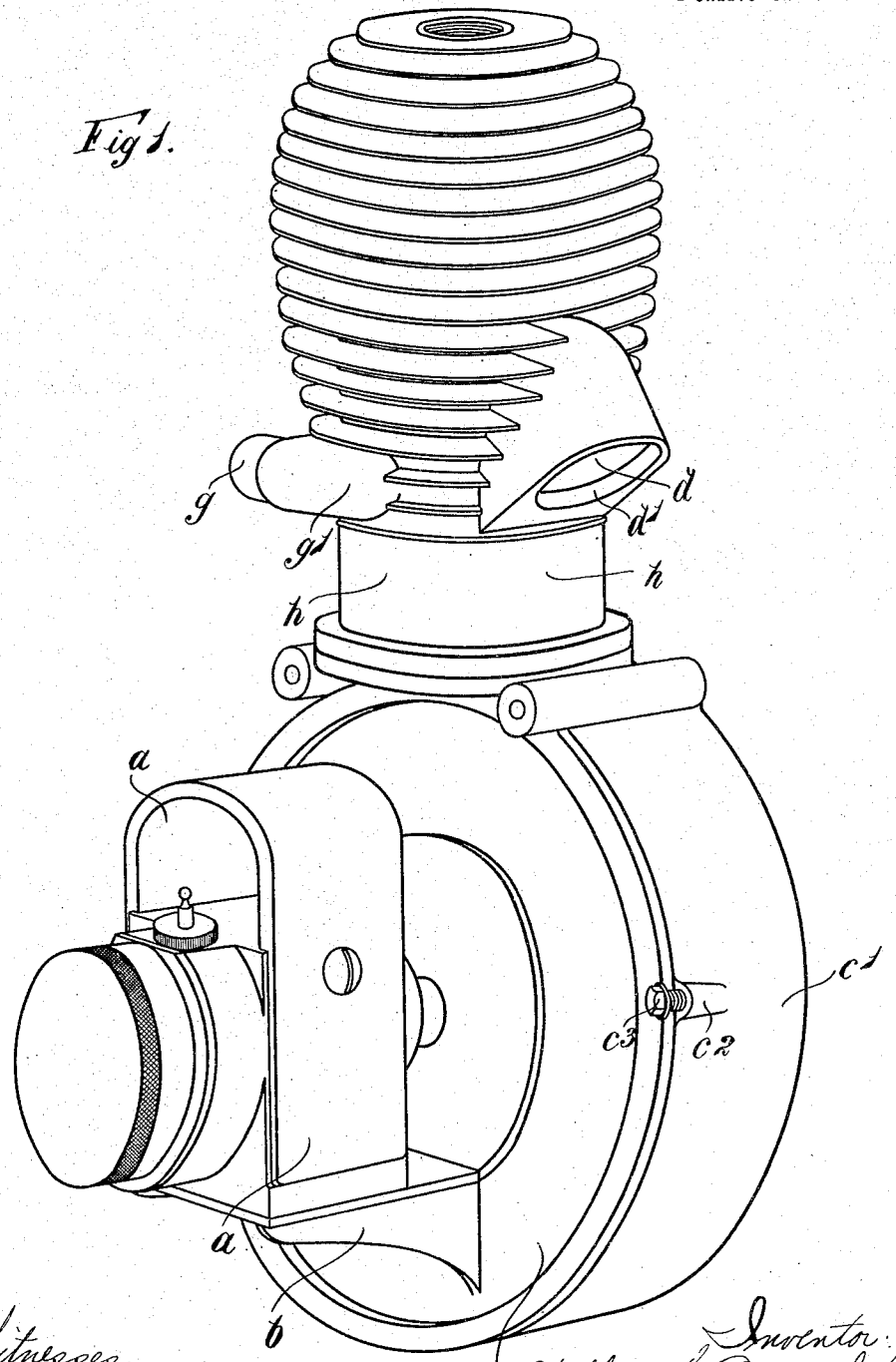
APPLICATION FILED JULY 30, 1914.

**1,174,545.**

Patented Mar. 7, 1916.

2 SHEETS—SHEET 1.

Fig 1.




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Inventor:
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THE COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C

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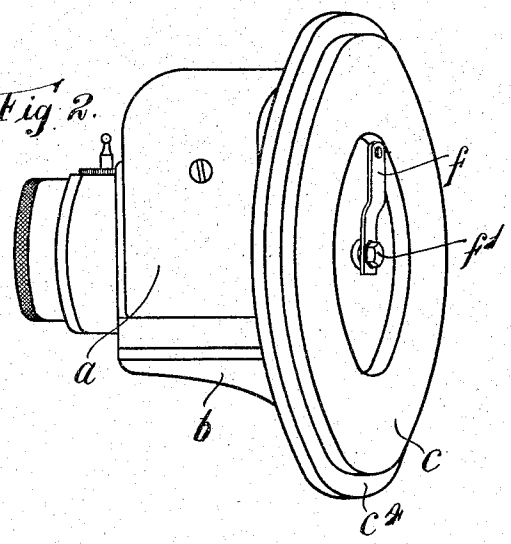
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2 SHEETS—SHEET 2.

Fig. 2.



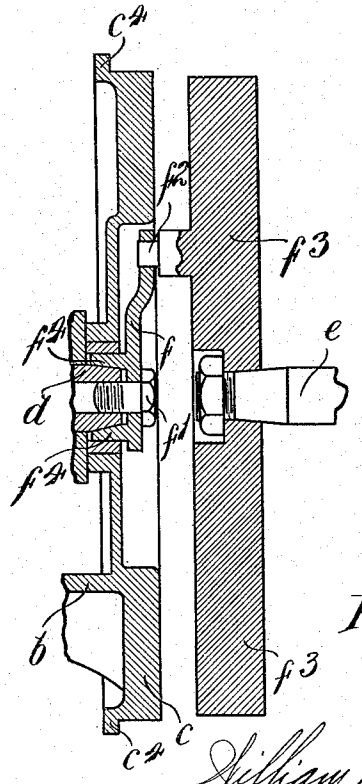




Fig 3.

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# UNITED STATES PATENT OFFICE.

WILLIAM HUGHES BUTTERFIELD, OF STECHFORD, BIRMINGHAM, ENGLAND.

## TWO-STROKE-CYCLE INTERNAL-COMBUSTION ENGINE.

1,174,545. Specification of Letters Patent. Patented Mar. 7, 1916.

Application filed July 30, 1914. Serial No. 854,133.

*To all whom it may concern:*

Be it known that I, WILLIAM HUGHES BUTTERFIELD, a subject of the King of Great Britain, and resident of Levis Motor Works, Station Road, Stechford, Birmingham, in the county of Warwick, England, have invented certain new and useful Improvements in Two-Stroke-Cycle Internal-Combustion Engines; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention comprises improvements in two stroke cycle internal combustion engines and refers more particularly to that class of such in which the under side of the piston operates as a pump for delivering the combustible mixture through the medium of the crank case and a suitable passage to the combustion space. Heretofore it has been the practice to drive the magneto in such engines by chains or spur or other gearing, but any such arrangement is inconvenient in practice and expensive to manufacture.

It is an object of the present invention to overcome these defects and to provide a simpler and more reliable magneto drive and in accordance therewith the armature of the magneto is coupled directly to the crank shaft of the engine with which it is in alinement and is directly driven thereby.

Referring to the drawings: Figure 1 is a perspective view of a motor cycle engine having my invention applied thereto. Fig. 2. illustrates one side of the crank case removed, showing the improved manner of mounting the magneto. Fig. 3. is a longitudinal section, showing the improved magneto drive.

In carrying this invention into practice as illustrated upon the accompanying drawings, the magneto $a$ is mounted upon a bracket $b$ cast integral with the side $c$ of the crank case, the magneto being disposed with its armature shaft $d$ in alinement with the crank shaft $e$. The end of the armature spindle is drilled and tapped, and to this is secured a small crank $f$ by a screw $f^1$, this crank being connected to a part $f^2$, projecting from the fly wheel $f^3$, and being provided with an internally tapered gripping part $f^4$ which engages with the correspondingly tapered extremity of the armature spindle. The magneto drive, it will be seen, is therefore direct as the part $f^2$ rotates with the fly wheel, and carries around with it the crank $f$ and armature spindle. By shifting the crank case side $c$ relatively to the crank case $c^1$ by giving it a slight rotary movement, it will be obvious that the field magnets may be moved relatively to the crank shaft and armature, and set forward or back for a few degrees as desired, in order to advance or retard the ignition. Instead of dividing the crank case into two parts along its middle plane, the whole of the annular wall portion is shown as being integral with the pulley side, the face carrying the magneto bracket being a simple disk adapted to enter the said annular wall and having an over-hanging lip $c^4$ for positioning same. The annular wall is provided with two or more lugs $c^2$ which receive screws $c^3$, the heads of which are adapted to frictionally engage with the said disk to hold same in position to permit the disk, and with it the magneto to be given a slight rotary movement in order to vary the timing of the magneto as desired.

What I claim then is:—

1. In an internal combustion engine of the two stroke cycle type, the combination of a cylinder, a crank case, a magneto for supplying the ignition to said cylinder, said magneto having a field and an armature shaft supporting an armature within said field, an annular wall to said crank case, a bracket upon said annular wall adapted to support the field of said magneto, and means for holding said annular wall in frictional engagement with said crank case, so arranged that the said wall may be rotated relatively to said crank case for the purpose of advancing or retarding ignition.

2. In an internal combustion engine of the two stroke cycle type, the combination of a cylinder, a crank case, a magneto for supplying the ignition to said cylinder, said magneto having a field and an armature shaft supporting an armature within said field, and a rotatable wall to said crank case supporting the field of said magneto.

3. In an internal combustion engine of the two stroke cycle type, the combination of a cylinder, a crank case, a crank shaft, a magneto for supplying the ignition to said cylinder, said magneto having a field and an armature shaft supporting an armature within said field, a rotatable wall to said crank case supporting said magneto with the armature shaft in line with said crank shaft, and means whereby said armature shaft is directly driven by said crank shaft.

4. In an internal combustion engine of the two stroke cycle type, the combination of a cylinder, a crank shaft for said cylinder, a crank case surrounding said shaft, a magneto for supplying ignition to said cylinder and having a magneto armature shaft, said shaft being provided with a tapered end adjacent to and in a line with the crank shaft, a crank arm having an internally tapered portion fitted upon and carried by said magneto armature shaft, a fly wheel carried by the crank shaft, and means for connecting said crank arm to the fly wheel in such manner that the armature shaft is rotated by the crank shaft.

5. In an internal combustion engine of the two stroke cycle type, the combination of a cylinder, a crank case, a crank shaft for said cylinder arranged in said case, a magneto for supplying the ignition for said cylinder, said magneto having a field and an armature shaft supporting an armature within the field, a detachable side to said crank case, a bracket upon the detachable side of the said crank case, said bracket supporting the magneto including both field and armature with its armature shaft in alinement with the crank shaft, and means for rigidly connecting the magneto armature shaft and crank shaft, said means being adapted to permit angular adjustment between the armature shaft and crank shaft for the purpose of advancing or retarding the spark.

6. In an internal combustion engine of the two stroke cycle type, the combination of a cylinder, a crank case, a crank shaft having a tapered extremity within said case, a magneto for supplying the ignition for said cylinder, said magneto having a field and an armature, a magneto armature shaft having a tapered extremity, a bracket upon one face of the crank case and carrying the complete magneto with its armature shaft in alinement with the crank shaft, and means for positively connecting the tapered extremity of the crank shaft to the tapered extremity of the armature shaft in such manner that the armature shaft is rotated by the crank shaft in fixed relation thereto but permitting angular adjustment between the armature shaft and crank shaft for the purpose of advancing and retarding the spark.

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

WILLIAM HUGHES BUTTERFIELD.

Witnesses:

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HERBERT J. O. BARTON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."