No. 898,117. PATENTED SEPT. 8, 1908.

H. J. LEIGHTON.

INTERNAL COMBUSTION ENGINE.

APPLICATION FILED MAR. 8, 1902.

Fig. 1.

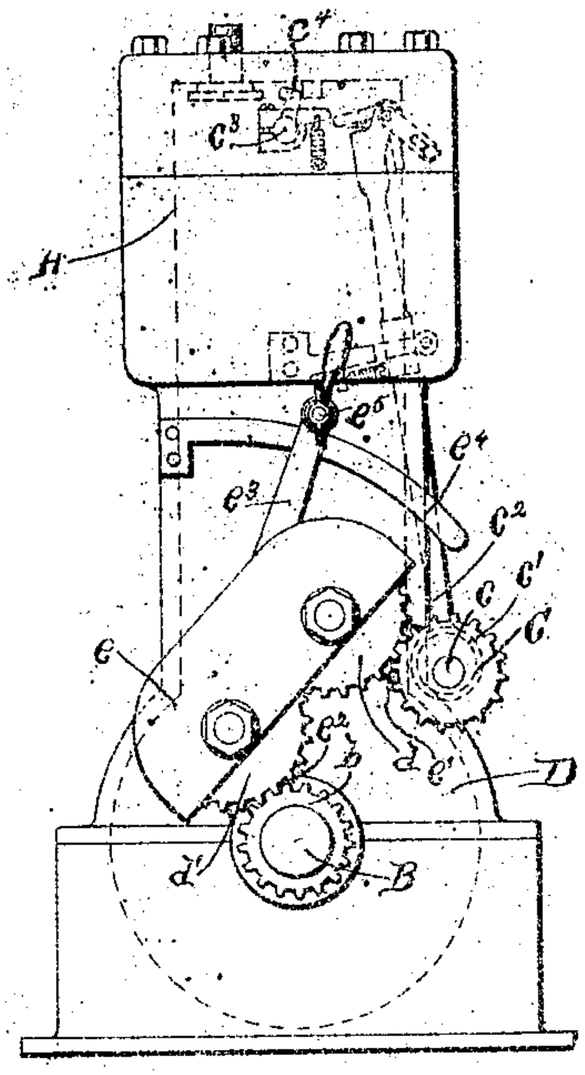


Fig. 3

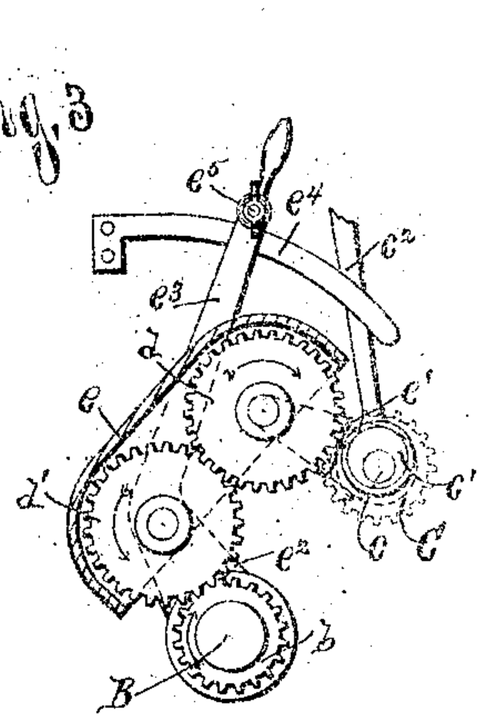


Fig. 2.

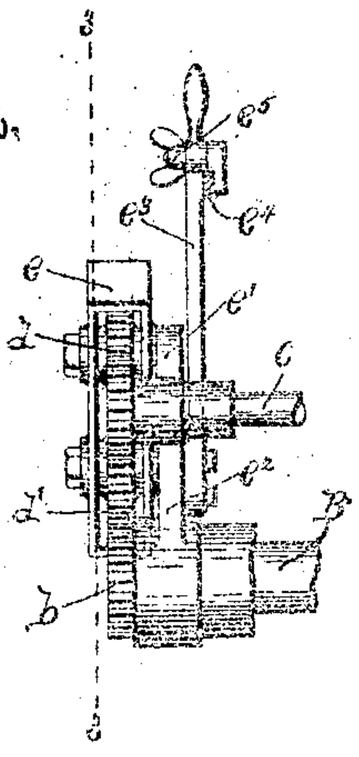
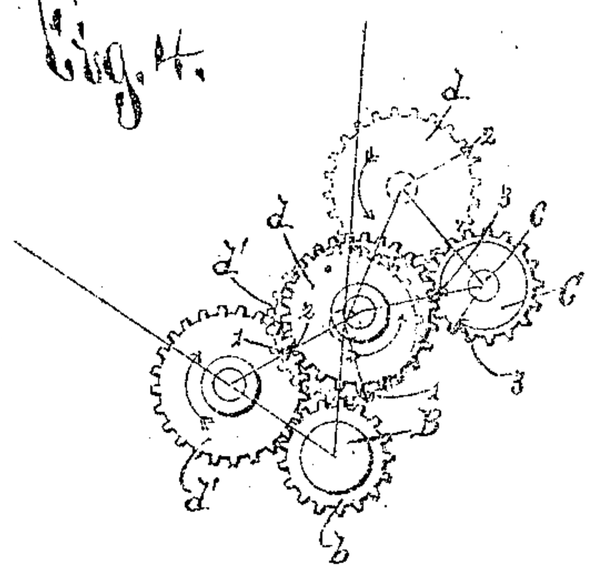


Fig. 4.



WITNESSES:

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HERBERT J. LEIGHTON, OF SYRACUSE, NEW YORK.

INTERNAL-COMBUSTION ENGINE.

No. 898,117. Specification of Letters Patent. Patented Sept. 8, 1908.

Application filed March 8, 1902. Serial No. 97,253.

To all whom it may concern:

Be it known that I, HERBERT J. LEIGHTON, of Syracuse, in he county of Onondaga and State of New York, have invented a certain new and useful Internal-Combustion Engine, of which he following is a specification.

My invention relates to internal-combustion engines and has for its object the production of an ignition-controlling mechanism for such engines which is particularly simple in construction and practical and effective in use; and to this end, it consists in the devices and combinations hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawing in which like characters designate corresponding parts in all the views.

Figure 1 is an elevation of a preferred construction of my engine, the details not pertaining to the present invention being omitted. Fig. 2 is an edge elevation of the greater portion of the ignition-controlling mechanism shown in Fig. 1, and contiguous parts of the driving shaft and a supplemental shaft of the engine. Fig. 3 is a vertical sectional view taken on line 3—3, Fig. 2, a portion of the mechanism seen in Fig. 2 being indicated by dotted lines for facilitating illustration of other parts of said mechanism. Fig. 4 is a diagrammatic view showing the movement of the driven member of said mechanism relatively to the driving member therefor.

A is a cylinder, B a driving member, C a driven member and D, the crank-casing of the illustrated preferred construction of my engine, all of which parts may be of any suitable form, size and construction. The driving member B is connected in any desirable manner to the piston of the engine, and is here shown as the driving or crank shaft of the engine, and the driven member C is here illustrated as having a toothed periphery and as mounted on a supplemental shaft *c* connected by a cam or eccentric *c'*, a vertically reciprocating arm c^2, and a rock-shaft c^3 to means, for producing the ignitions said means including a movable terminal c^4. It will be obvious, however, to those skilled in the art, that any suitable means may be used for producing the ignitions and for connecting the driven member or gear C to said means.

The driven member or gear C is preferably connected to the crank-shaft or driving member B by means for actuating said driven member and for moving the same relatively to the driving member, and thereby varying the high point of the cam or eccentric *c'* relatively to a given point on the crank-shaft, and changing the time of the ignitions with respect to the position of the piston. Said means is here shown as a pinion *b* fixed to the driving member B, a pair of gears *d d'* connected together and connected, respectively, to upper surfaces of the driven member C and the pinion *b*, and means for supporting and adjusting the gears and holding the same in their adjusted position. The driven member C, the pinion *b* and the gears *d d'* are here illustrated as relatively proportioned for causing the driven member C to rotate at the same speed as the driving member B, but it is obvious that said parts may be of such size as to cause the driven member C to make any desired predetermined movement or number of revolutions for each revolution of the driving member.

The means for supporting and adjusting the gears *d d'* and holding the same in their adjusted position, is here shown as consisting of a support *e* carrying spindles for said gears at opposite portions thereof, connecting parts or arms *e' e²* movable, respectively, relatively to the driven and driving members about the crank-shaft B and the supplemental shaft *c* and loosely journaled on the spindles; of the gears *d d'*, an arm e^3 forming a continuation of one of the connecting parts and extending upwardly along the cylinder of the engine and movable along a segment or guide e^4, fixed to the main part of the engine and fastening means e^5 for securing the arm e^3 to the segment or guide e^4. The driving and driven gears *b* and C, the interposed gears *d d'*, the shaft *c*, and the reciprocating arm c^2 are located wholly outside of the crank-casing D and the part *e* is in the form of a housing which both supports and protects the gears *d d'*. As best seen in Figs. 1 and 2 the shaft *c* is arranged parallel to, and above and at one side of the crank-shaft B, and the gears *d d'* are arranged above the crank-shaft. Such arrangement of the parts *c*, *d d'* is particularly compact and efficient and does not materially increase the size of the engine. When said arm e^3 is rocked backwardly or forwardly, the support *e*, the connecting parts *e' e²* and the gears *d d'* move relatively to the driving and driven members B C and thereby rotate said driven member relatively to the driving member a greater

distance than the gear d' is rotated relatively to said driving member, as indicated in Fig. 4, in which figure predetermined contiguous points of the parts C d' d are indicated, respectively, by the ordinals 1 2 3. The movement of the support e, just described, varies the time of the ignitions with respect to the position of the piston of the engine, and may take place during the operation of said engine or may be utilized to start or operate the engine in either direction.

The construction and operation of my internal-combustion engine will now be readily understood upon reference to the foregoing description and the accompanying drawing, and it will be obvious to those skilled in the art that more or less change may be made in the construction and arrangement of its parts, and particularly of its means for controlling the ignitions, without departing from the spirit of my invention.

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

In combination in an internal-combustion engine having a crank-casing and a crank-shaft projecting outside of said casing, an igniting mechanism including a movable electrode, a reciprocating rod, a shaft arranged outside of the crank-casing parallel to the crank-shaft, a cam on the shaft outside of the crank-casing and connected to the reciprocating rod, and means for rotating the cam from the crank-shaft and also for varying the high point of said cam relatively to a given point on the crank-shaft, said means comprising a driven gear fixed on the cam-shaft, a driving gear fixed on the projecting end of the crank-shaft, a pair of intermeshing gears meshing, respectively, with the driven and driving gears; a housing inclosing the pair of gears and having spindles for supporting the pair of gears, arms movable about the crank-shaft and the cam-shaft, and journaled, respectively, on the spindles of the pair of gears, one of said arms having an extension terminating in a handle, and means for holding said arm in its adjusted position.

In testimony whereof, I have hereunto signed my name in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 27th day of February, 1902.

HERBERT J. LEIGHTON

Witnesses:
D. LAVINE,
S. DAVIS.