June 16, 1925. 1,542,056

M. GUY ET AL

ENGINE

Filed May 4, 1923

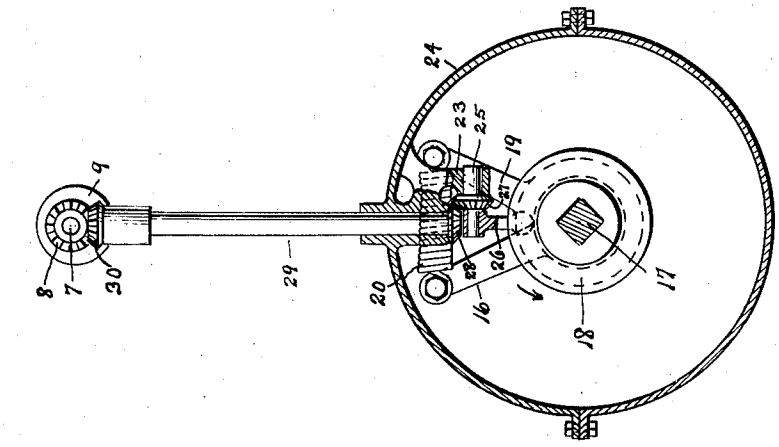


Fig. 2.

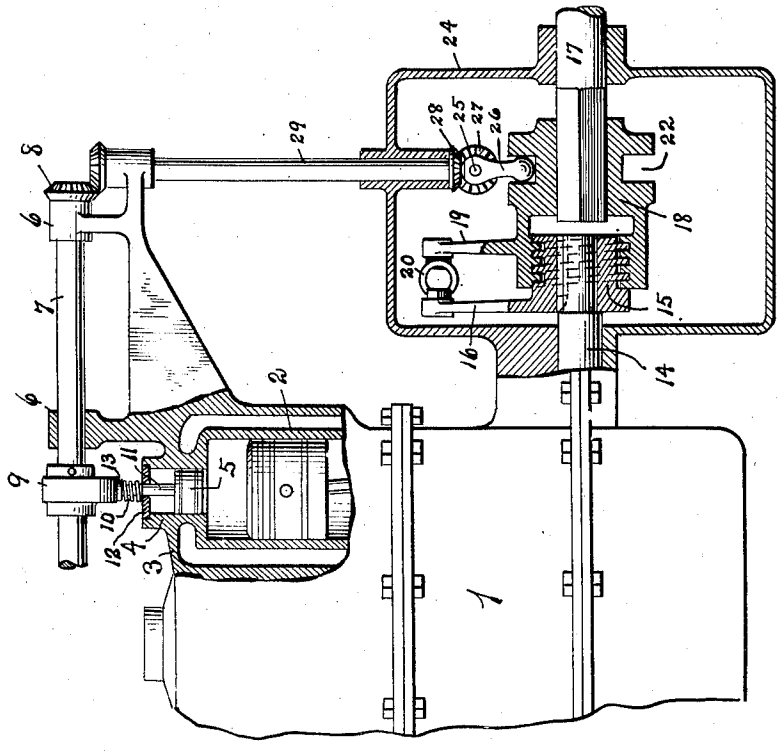


Fig. 1.

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UNITED STATES PATENT OFFICE.

MAURICE GUY AND JOSEPH J. RUIZ, OF DETROIT, MICHIGAN.

ENGINE.

Application filed May 4, 1923. Serial No. 636,572.

To all whom it may concern:

Be it known that we, MAURICE GUY and JOSEPH J. RUIZ, citizens of the United States and of Cuba, respectively, and residents of Detroit, Wayne County, Michigan, have invented a new and Improved Engine, of which the following is a specification.

This invention relates to the construction of internal combustion engines, particularly to the construction of the explosion chambers thereof, and its object is to provide means for changing the volume of the explosion space in accordance with the power developed by the engine in order to keep the pressure of the explosive mixture or fuel at the ends of the compression strokes substantially constant so as to produce the best results for the fuel consumed.

This invention consists of power transmission means and a resilient connector between said means and the crank shaft of an internal combustion engine, which connector will yield in proportion to the work performed by the engine, means to increase and decrease the explosion space of the engine, and connecting mechanism between the means for varying the explosion space and the resilient connector whereby such space will be increased or decreased as the resilient connector yields according to the work performed.

It also consists in the details of construction illustrated in the accompanying drawing and particularly pointed out in the claims.

In the drawing, Fig. 1 is a view, partly in vertical section of that portion of an internal combustion engine which embodies the present invention. Fig. 2 is a transverse section in the plane of the upright shaft shown in Fig. 1.

Similar reference characters refer to like parts throughout the several views.

In the drawing, 1 is an engine embodying a cylinder 2 having a head 3 provided with a cylindrical extension 4 in which a piston 5 is longitudinally slidable to vary the explosion space at the upper end of the cylinder. When the piston 5 is moved outwardly this space is increased, while the space is decreased to its smallest volume when the piston is at its innermost position.

Mounted in the bearings 6 is a shaft 7 having a bevel gear 8 at one end and carrying a cam 9 for each cylinder of the engine. A stem 11 extends up from the piston 5 through the head 12 and a spring 10 above this head and below the enlargement 13 at the upper end of this stem pushes the piston upward.

Secured to the crank shaft 14 of the engine is a threaded hub 15 from which an arm 16 extends. A driven shaft 17 has slidable thereon a hub 18 whose inner end screws onto the hub 15 and also has an arm 19 connected to the arm 16 by means of a spring 20. The torque of the crank shaft is transmitted to the driven shaft 17 by means of the arms 16 and 19 and the spring 20, and the angle between the arms will vary with the power transmitted. As the two hubs are connected by screw threads, the endwise movement of the hub 18 and the circumferential groove 22 therein will also depend upon the power transmitted.

A bracket 23 carried by a case 24 supports the short shaft 25 on which the arm 26 and bevel gear 27 are mounted. The arm 26 extends into the groove 22 and swings substantially in proportion to the longitudinal movement of the hub 18 and to the power transmitted. The gear 27 meshes with the bevel gear 28 on the upright shaft 29 at whose upper end is the bevel gear 30 which meshes with the gear 8 on the shaft 7. The cam 9 is therefore turned in proportion to the longitudinal movement of the hub 18 and to the work performed by the engine and the explosion space will therefore also change with the work.

The fuel burned in an internal combustion engine should vary approximately with the work performed when the engine is running at constant speed, but this is only approximately as the power delivered by the engine varies because the compression of the fuel is anything but constant. When fuel charges vary in amount, the terminal pressures also vary, and as the explosive force of each fuel is apparently greatest when the fuel is at a certain pressure, depending upon the fuel, it is evident that this terminal pressure should be constant irrespective of the volume of the charge. Our present invention is therefore of value as it changed the explosion space with the volume of the charge so that the terminal pressures of the charges are practically constant.

Mechanisms for determining the amount of fuel in each charge are well known and any one of these devices may be employed in connection with our present invention

which insures these charges being so compressed that the pressure of the fuel at the time of the explosions shall be substantially the same and that pressure at which the fuel will produce the best results.

The details of construction, however, and the proportions of the parts may all be changed by those skilled in the art without departing from the spirit of our invention as set forth in the following claims.

We claim:—

1. In an internal combustion engine, an explosion chamber, means to vary the volume thereof, a crank shaft and a driven member, a resilient connection between them comprising two relatively movable members and a spring to transmit the torque of the crank shaft from one to the other, an arm movable by one of said members according to the relative movement between said members, and connecting mechanism between said arm and said means for varying the volume of the explosion chamber by changing the position of said means according to the torque of the crank shaft.

2. In an internal combustion engine, an explosion chamber, a piston to vary the volume thereof, a crank shaft and a driven member, a connecting device comprising parts connected to the crank shaft and to the driven member respectively, a spring to transmit force from one of said parts to the other, one of said parts being laterally movable according to the force transmitted, and means connecting said laterally movable part to said piston to cause the explosion space to vary with the force transmitted.

3. In an internal combustion engine, an explosion chamber, a piston to vary the volume thereof, a rotatable cam to move the piston, a crank shaft and a power transmitting device attached thereto comprising a driving and a driven part and a spring between them, said driven part being rotatable relative to the driving part in proportion to the force transmitted, and means connected to the driven part and to the cam to rotate the cam in proportion to the force transmitted and so vary the volume of the explosion chamber.

4. In an internal combustion engine, an explosion chamber, a piston to vary the volume thereof, a rotatable cam to position the piston, a crank shaft and a driven shaft, a pair of hubs rotatable with said shafts and arms extending therefrom, one of said hubs being screw threaded on the other so that relative rotation between them will cause one to move longitudinally of said shafts, a spring connecting said arms and yieldable according to the force transmitted, and means actuated by the longitudinally movable hub to turn said cam to vary the explosion space with the work performed.

5. In an internal combustion engine, an explosion chamber, a working piston therein and a crank shaft connected to the piston, resilient means to transmit the power of the engine from the crank shaft and adapted to yield according to the power transmitted, and mechanism positioned by said resilient means according to the power transmitted and independent of said piston for varying the volume of the explosion chamber of the engine according to the yielding of said resilient means.

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