

No. 774,554.

PATENTED NOV. 8, 1904.

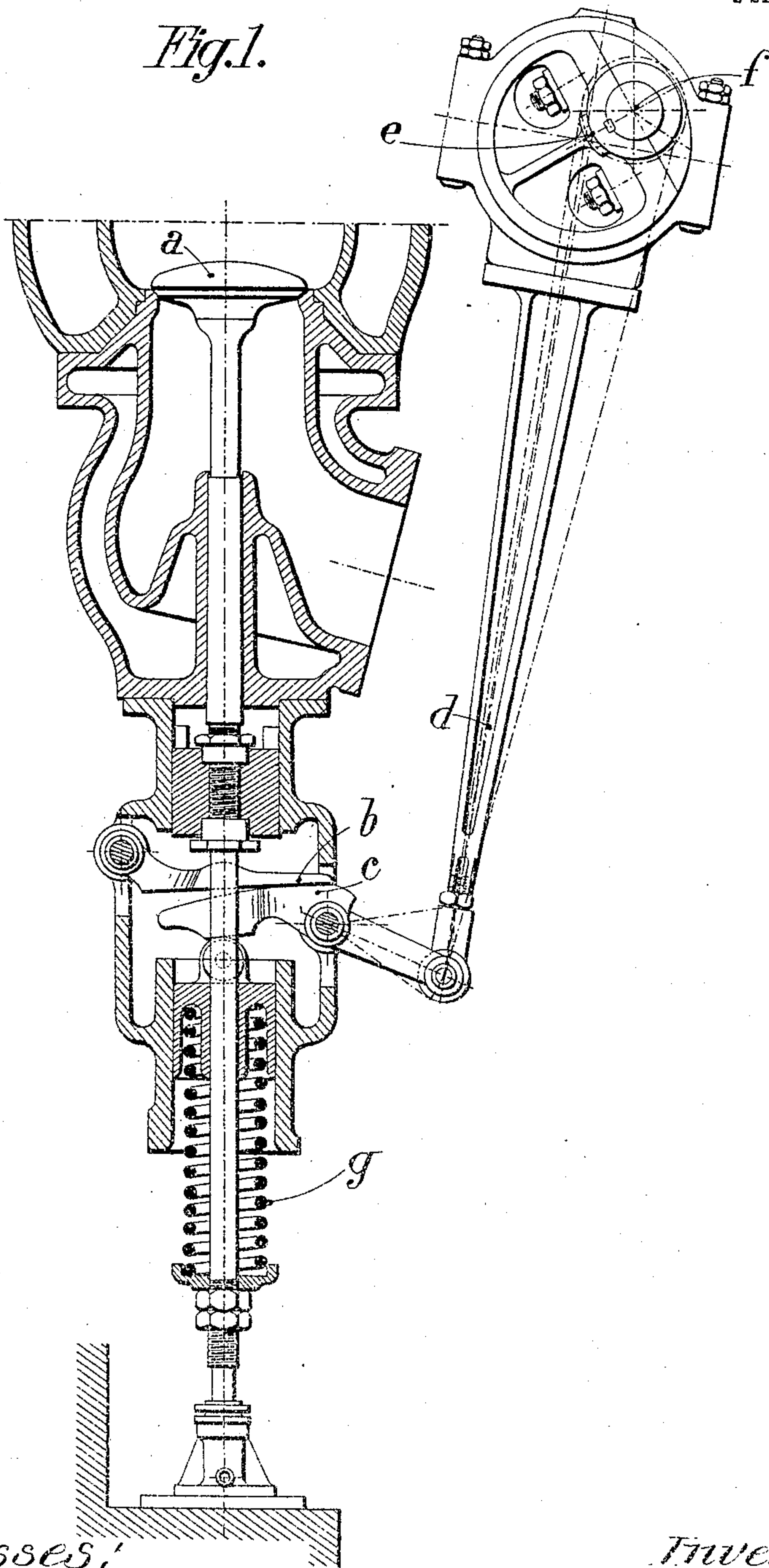
A. BOUGAULT.
VALVE GEAR FOR EXPLOSIVE ENGINES.

APPLICATION FILED SEPT. 21, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

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C. D. Kessler

Inventor

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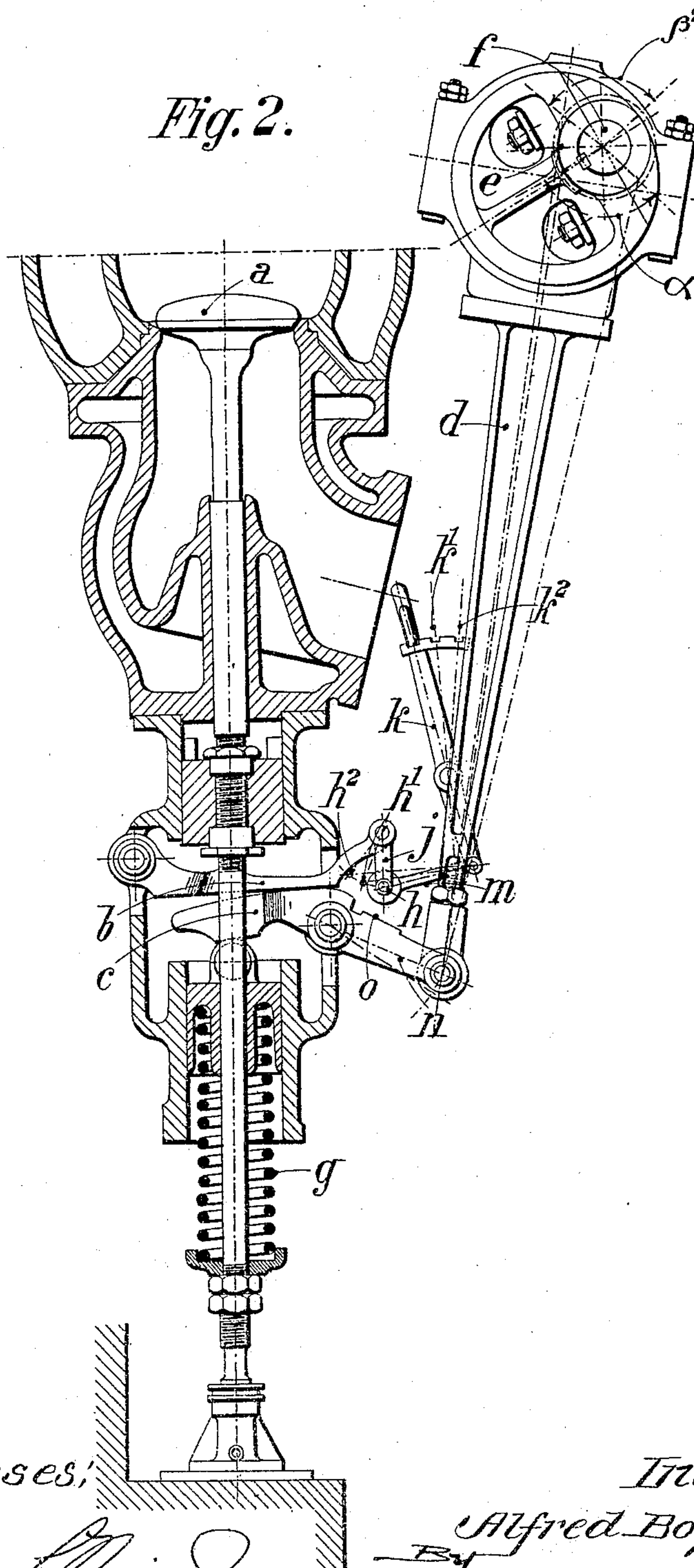
VALVE GEAR FOR EXPLOSIVE ENGINES.

APPLICATION FILED SEPT. 21, 1903.

NO MODEL.

2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

ALFRED BOUGAULT, OF PARIS, FRANCE, ASSIGNOR TO THE SOCIÉTÉ FRANCAISE DE CONSTRUCTIONS MECANIKES (ANCIENS ETABLISSEMENTS CAIL), OF PARIS, FRANCE.

VALVE-GEAR FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 774,554, dated November 8, 1904.

Application filed September 21, 1903. Serial No. 174,123. (No model.)

To all whom it may concern:

Be it known that I, ALFRED BOUGAULT, engineer, a citizen of the French Republic, residing at 21 Rue de Londres, Paris, France, have invented certain new and useful Improvements in Valve-Gear for Explosive-Engines, of which the following is a specification.

This invention has for its object to provide an improved valve-gear for explosive-engines, and is especially applicable to motors governed by varying the quantity of explosive mixture drawn in by suction.

In order that my invention may be clearly understood, I shall describe it with reference to the accompanying drawings, of which—

Figure 1 is a section of a device according to my invention. Fig. 2 is a section of the same provided with means for decreasing the compression when starting the motor.

The exhaust-valve *a* is according to this invention operated by two levers *b* *c*, acting, through the intervention of rolling surfaces, so as to decrease the power necessary to move the valve from its seat. One of the levers is operated by the rod *d* of an eccentric *e*, (keyed on the valve-gear shaft *f*,) so that the motion of the valve is invariable with that of the engine-piston. The exhaust-valve opens with a suitable lead and closes toward the end of the stroke which expels the burned gases.

One part only of the stroke of the eccentric *e* (shown on Fig. 1 beneath the lever *c*) is used to operate the valve, the remaining part of the eccentric's stroke being utilized to increase the tension of the valve-closing spring *g* during the engine-piston's suction-stroke which follows the stroke which expels the burned gases. The maximum excess of compression of the exhaust-valve spring corresponds to about the end of the suction-stroke. By this arrangement the exhaust-valve *a* is relieved of part of the pressure of the valve-closing spring at the moment it begins to rise, the tension of the said spring *g* remaining constant the whole of the time the valve is being lifted. It is possible to give the valve-spring *g* sufficient tension to prevent the valve being

unseated by the action of excessive vacuum in the cylinder.

The device may be provided with means for decreasing the compression in starting the motor, Fig. 2. The means for decreasing the compression comprise a roller *h*, carried by a rod *j*, hinged to the extended end of the lever *b*. The oscillation of the rod *j* is controlled by a lever *k*, the lower end of which is joined to the roller *h* by a rod *m*. The lever *k* can occupy the positions *k* *k'* *k''*. To these positions correspond the positions *h* *h'* *h''* of the roller. The arm *n* of the lever *c* is provided with a stop *o*, which can at stated time be brought into contact with the roller *h* in order to insure the decreasing of the compression in starting the motor when the lever is brought to the position *k*. The roller is then in the position *h*. When the great radius of the eccentric *e* travels through the angle β , corresponding to the stroke of compression, the stop *o* comes into contact with the roller *h* and raises the valve *a* through the rod *m* and the lever *b* to the height which is necessary for decreasing the compression in the cylinder. When the motor has reached the desired speed, the lever is brought to the position *k''*. The roller is then brought in the position *h''*, in which position it can no more come into contact with the stop *o*. The valve *a* is no more raised during the compression-stroke. The compression has then its normal value and the motor reaches its legitimate speed.

The lever *k*, and consequently the roller *h*, may be brought in intermediate positions in order to modify the decreasing of the compression.

Having thus described and ascertained the nature of my invention, I declare that what I claim is—

1. A controlling mechanism for exhaust-valves of internal-explosion engines, having a lever adapted to open said valve, a second lever adapted to operate the first lever, one of said levers being adapted to have a rolling contact upon the other, a valve-gear shaft

having an eccentric, a rod operable by the eccentric and serving to actuate the second lever in a direction to operate the first lever to cause the opening of said valve, and an exhaust-valve-closing spring compressible by said second lever at a predetermined time.

2. A controlling mechanism for exhaust-valves of internal-explosion engines, having a lever adapted to open said valve, a second lever adapted to operate the first lever, one of said levers being adapted to have a rolling contact upon the other, a valve-gear shaft having an eccentric, a rod operable by the eccentric and serving to actuate the second lever in a direction to operate the first lever to cause the opening of said valve, an exhaust-valve-closing spring compressible by said second lever at a predetermined time, and manually-operable means for governing the stroke of said second lever.

3. A controlling mechanism for exhaust-valves of internal-explosion engines, having a lever adapted to open said valve, a second

lever adapted to operate the first lever, one of said levers being adapted to have a rolling contact upon the other, a valve-gear shaft having an eccentric, a rod operable by the eccentric and serving to actuate the second lever in a direction to operate the first lever to cause the opening of said valve, an exhaust-valve closing a spring compressible by said second lever at a predetermined time, a rod jointed to said first lever and provided with a roller, the second lever having a stop to engage said roller, and means for shifting said second rod to thereby change the position of the roller carried thereby with respect to the second lever.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ALFRED BOUGAULT.

Witnesses:

PAUL F. PAQUET,

A. L. LEISSE.