No. 720,126. PATENTED FEB. 10, 1903.

L. A. FRAYER.

SPEED REGULATOR FOR EXPLOSIVE ENGINES.

APPLICATION FILED NOV. 10, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

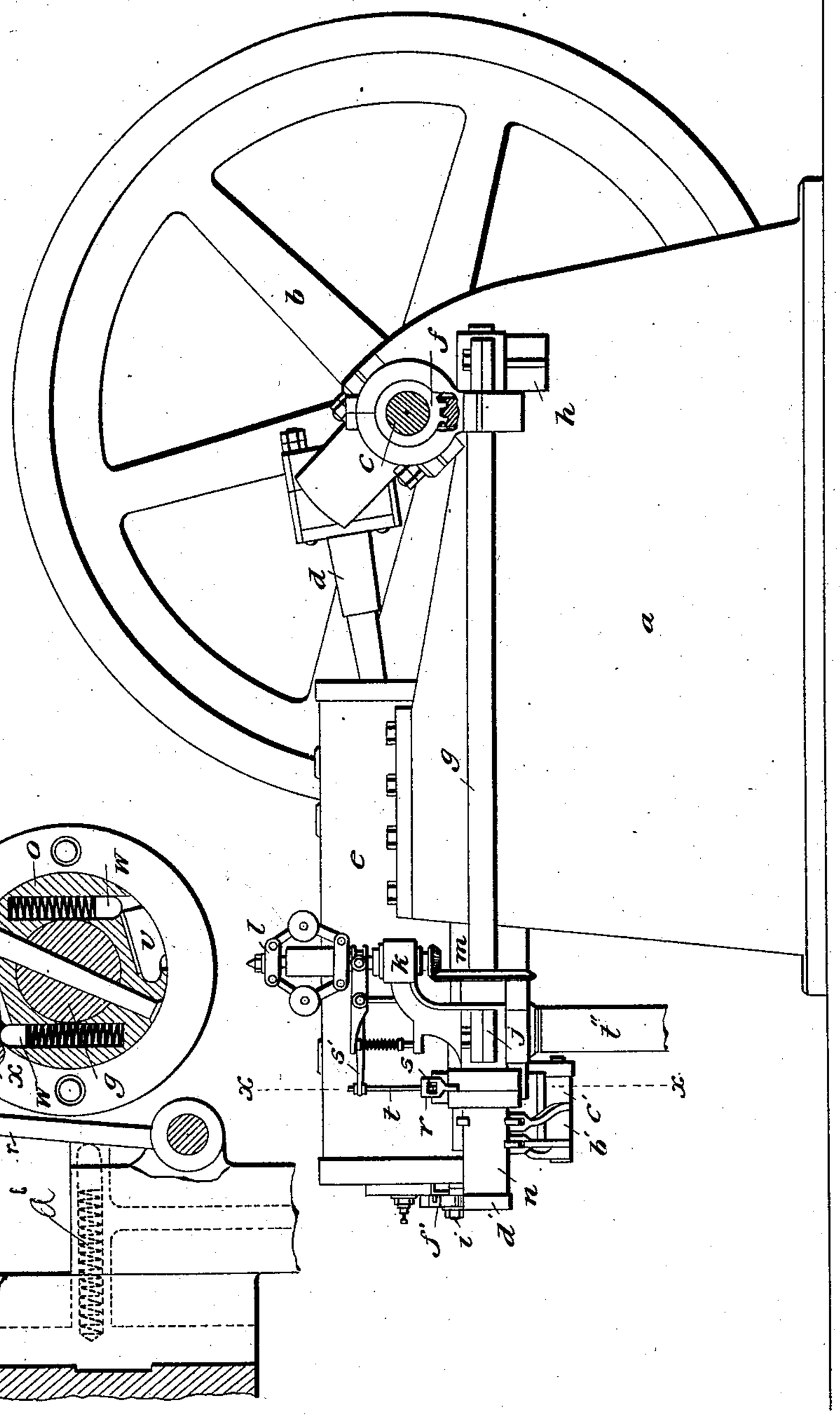

Fig. 2.

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Fig. 3.

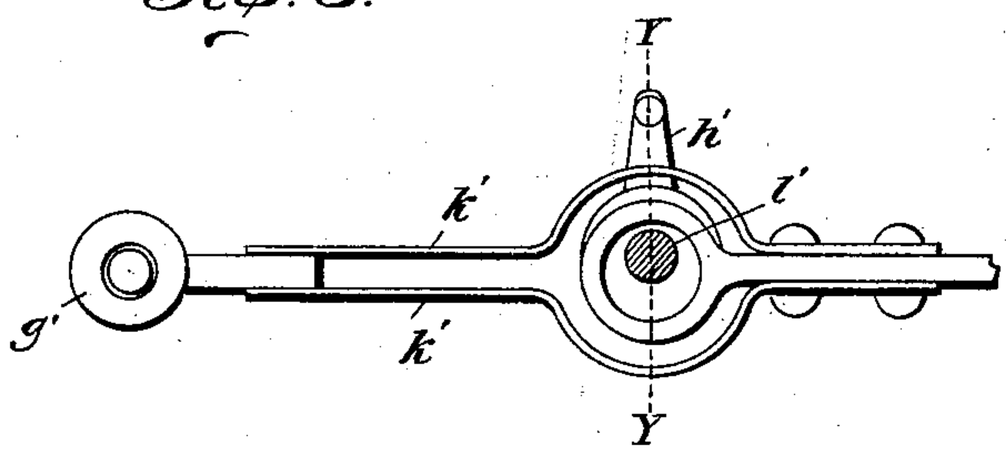


Fig. 4.

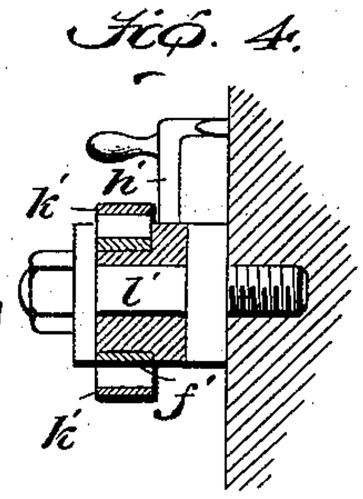


Fig. 5.

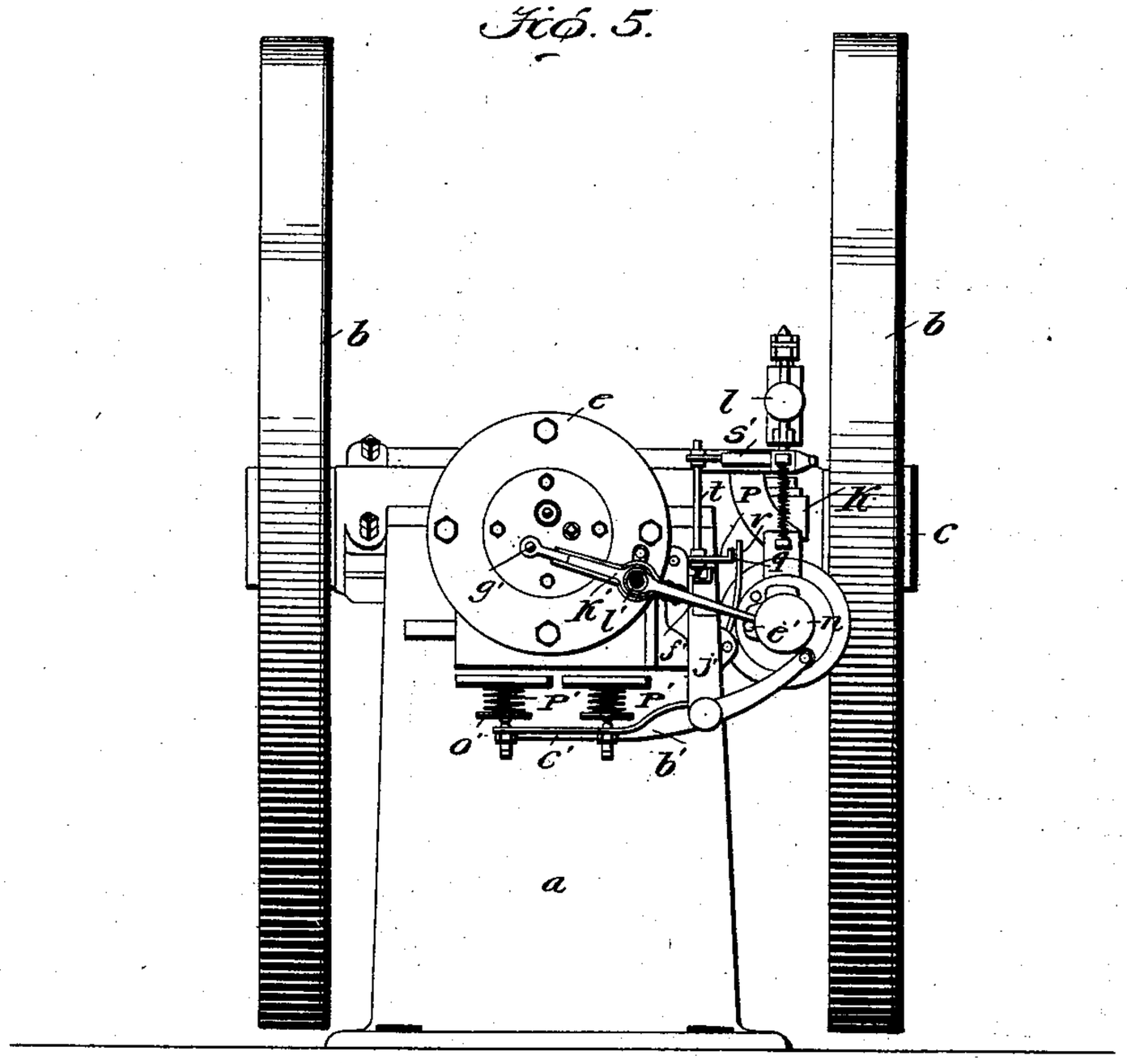
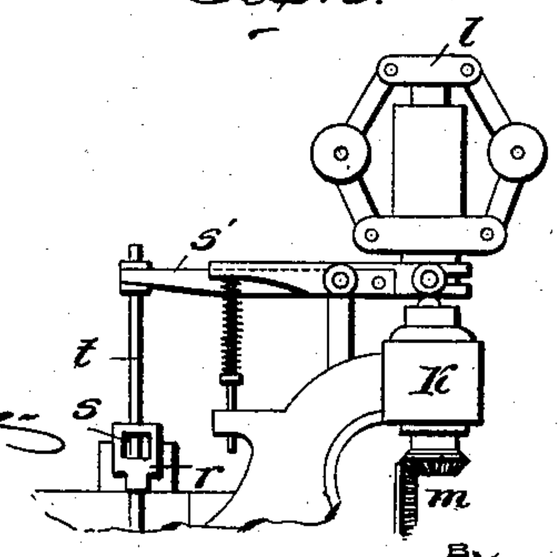


Fig. 6.



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UNITED STATES PATENT OFFICE.

LEE A. FRAYER, OF COLUMBUS, OHIO, ASSIGNOR TO COLUMBUS MACHINE CO., OF COLUMBUS, OHIO.

SPEED-REGULATOR FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 720,126, dated February 10, 1903.

Application filed November 10, 1902. Serial No. 130,783. (No model.)

To all whom it may concern:

Be it known that I, LEE A. FRAYER, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Speed-Regulators for Explosive-Engines, of which the following is a specification.

This invention relates to improvements in speed-regulators for explosive-engines; and the object which I have sought to obtain in this invention is a special construction of governor which is sensitive in its operation and simple, durable, and inexpensive in construction.

To attain the desired objects, the invention consists of a governor for gas or gasolene engines embodying novel features of construction and combination of parts, substantially as disclosed herein.

The above-referred-to features, in conjunction with other points of design and construction, will be more fully pointed out hereinafter and are illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a gas-engine with my improvement attached, one of the fly-wheels being removed to more clearly show the construction. Fig. 2 is a detail view of the cam-clutch on the side shaft and a portion of the governing mechanism, the clutch being a section taken on line x of the cam-clutch. Fig. 3 is a detail view of the igniter-arm employed with my invention. Fig. 4 is a section taken on line y y of Fig. 3. Fig. 5 is an end elevation of an engine looking at the head of the cylinder, showing my invention applied thereto. Fig. 6 is a detail view of the governor and its connections.

Similar letters refer to similar parts throughout the several views.

The crank-shaft c, with the fly-wheels b attached, are mounted in the angular bearings of the bed a in the ordinary manner with caps and either Babbitt or bronze bushed bearings. Connected with this crank-shaft by means of the worm-gear f is the side shaft g, to which it is attached at one end of the bed a by means of the bracket h, located near the worm-gears f. The other end rests in the bearing j, which is attached to the cylinder e in the location shown.

The bearing j on the side of the shaft g is provided with a cap k of the form shown, the object of which is to form a support and bearing for the governor l, which is operated through the medium of the bevel-gears m. On the end of the side shaft g outside of the bearing j is a clutch-cam n, the larger end or head of which is constructed in two parts and is cored to receive the collar o, Fig. 2, which is securely pinned through the side shaft g, making it rigid with it. The collar o is made with sufficient clearance to rotate freely in the head of the clutch-cam n except when operated on by the governor, as follows: When the governor is at normal speed, the latch P is in position on the stop q with its end abutting against the trip-latch r below the opening s. As the speed of the engine increases and the speed of the governor is raised above the normal the lever or arm s' raises and operates on the rod t, lifting the latch P until it releases the trip-latch r and allows the end of the latch P to move through the opening s as the trip r oscillates laterally by the action of the pawl u, passing it at each revolution of the side shaft g. When the speed again drops to normal, the latch P drops into position and holds the trip-latch r against the head of the clutch-cam n. As the pawl u attempts to pass it in turning it is crowded in, pressing the dog v against the spiral spring w, located in the collar o. This action of the pawl u causes the dog v to disengage from the pin x and rotate freely within the collar o, while the clutch-cam n is brought to a stationary position by the friction of the pawl u against the trip-latch r. As soon as the speed of the governor again falls and the trip-latch r is released by raising the latch P opposite the opening s in the trip-latch r, where the latch enters, the pawl u is in turn released and the dogs y are free under the pressure of the springs w to swing back into position to engage with the pin x, as shown in Fig. 2, thus engaging the side shaft g and collar o with the clutch-cam n, carrying it forward until the accelerated speed of the governor causes a repetition of the same operation. Either an increase above or decrease below the normal speed will operate to raise the latch P.

The trip-latch r is held against the head of

the clutch-cam n by the pressure of the spring a', which is not strong enough to cause the pawl u to operate, and is intended only to keep the trip-latch pressed forward into its normal position, thus preventing it from dropping back with the slot or opening s over the latch P and preventing it from operating under the action of the governor.

It will be observed that there are two dogs v located in the collar o, the object of which is to enable the engine after having cut out its load under the action of the governor to take it up in a shorter time instead of being obliged to wait for the completion of the cycle or two revolutions to bring the various parts into working time.

The clutch-cam n operates the exhaust-valve arm b' and the fuel-valve arm c' in such a manner and in such time with the rest of the mechanism that when the clutch-cam n is stopped by the action of the governor the fuel-valve arm c' is always holding its valve closed and the exhaust-valve arm b is holding its valve open, thus allowing the engine to continue its speed without any compression within the cylinder or without receiving fuel with which to take an explosive impulse until the governor has again released and permitted the action of the clutch-cam n and the valve-arms b' and c' to operate.

The outer or extreme end of the clutch-cam n is composed of an adjustable cap d', on the periphery of which is located the small projecting lug e', which is located so that at a given point it strikes the ends of the igniter-bar f', causing it to give a slight rotary action to the arm g', producing an electric spark within for igniting the charge which gives the impulse to the engine. The igniter-arm f' is pivoted to the head of the cylinder, with an eccentric h' for throwing the arm in or out for the purpose of changing the point of ignition. The end of the igniter-arm is provided with the springs k', which are engaged by the arm g'.

Thus it will be seen that I provide a very simple, durable, and cheap governor for gas or gasolene engines and one which is thoroughly efficient and practical in every respect.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a gas and gasolene engine, the combination of a rotating side shaft, a governor actuated by said side shaft, a trip-latch having a slotted end, a latch actuated by said governor and engaging and disengaging with said trip-latch, a clutch-cam consisting of a collar rigidly and a part loosely mounted on said side shaft, springs and oscillating dogs within said collar, a pawl carried by the loosely-mounted part of the cam for operating said dogs by the action of the trip-latch and a stop within the head of the cam for engaging the dogs and carrying the cam with the collar in its rotary motion.

2. In a gas and gasolene engine, the combination of an igniter and exhaust-valve, a rotating side shaft, a gearing carried by said shaft, a governor operated by said gearing, a trip-latch pivoted to the engine near the side shaft, a clutch-cam secured upon the side shaft opposite the trip-latch, a latch operated by the governor to release the trip-latch, and means connected with the clutch-cam for engaging and disengaging said cam with the side shaft at any half-revolution of the shaft.

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

LEE A. FRAYER.

Witnesses:
A. G. GRANT,
J. S. WALKER.