

(No Model.)

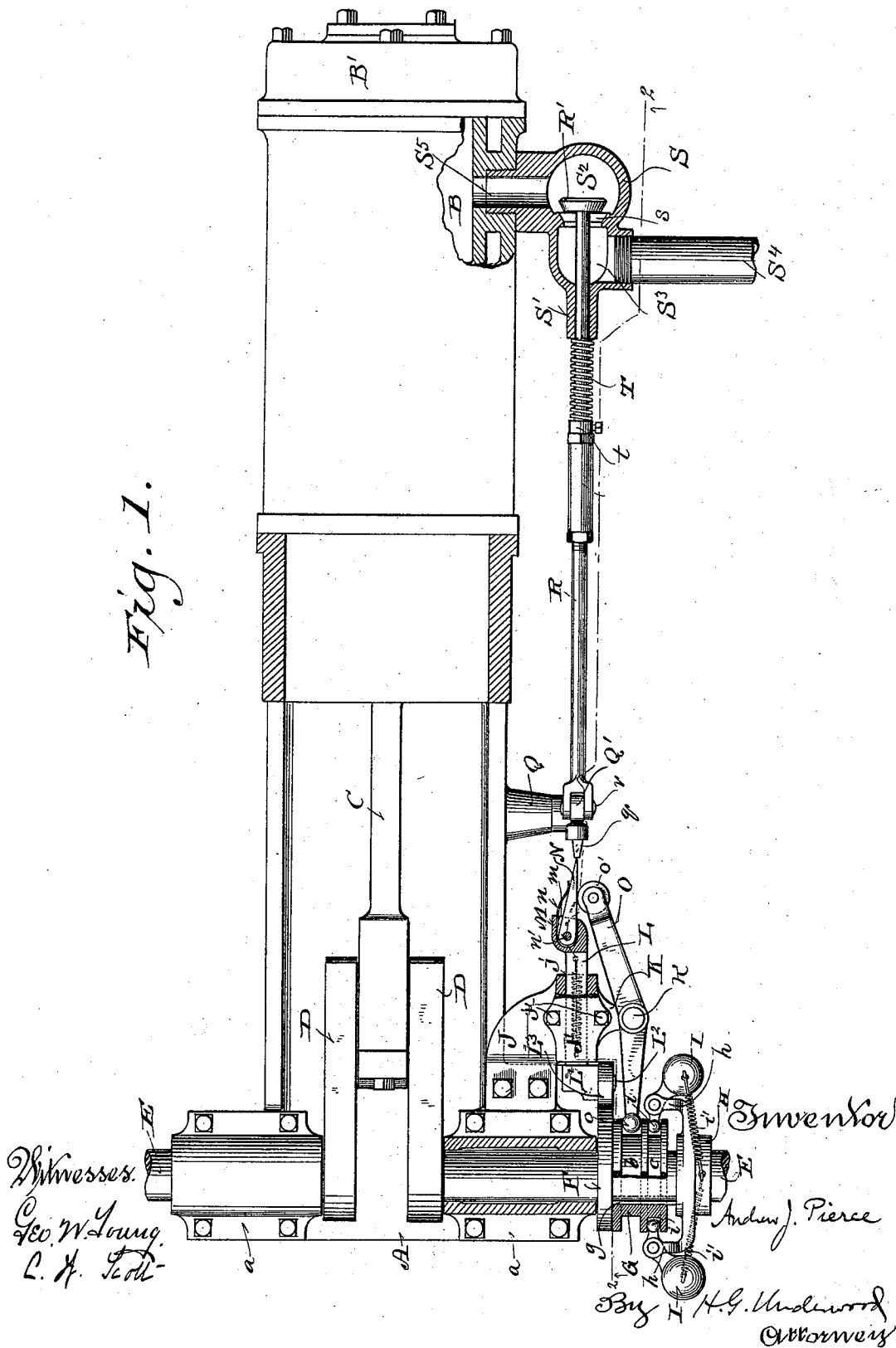
2 Sheets—Sheet 1.

A. J. PIERCE.
GOVERNOR.

No. 519,412.

Patented May 8, 1894.

Fig. 1.



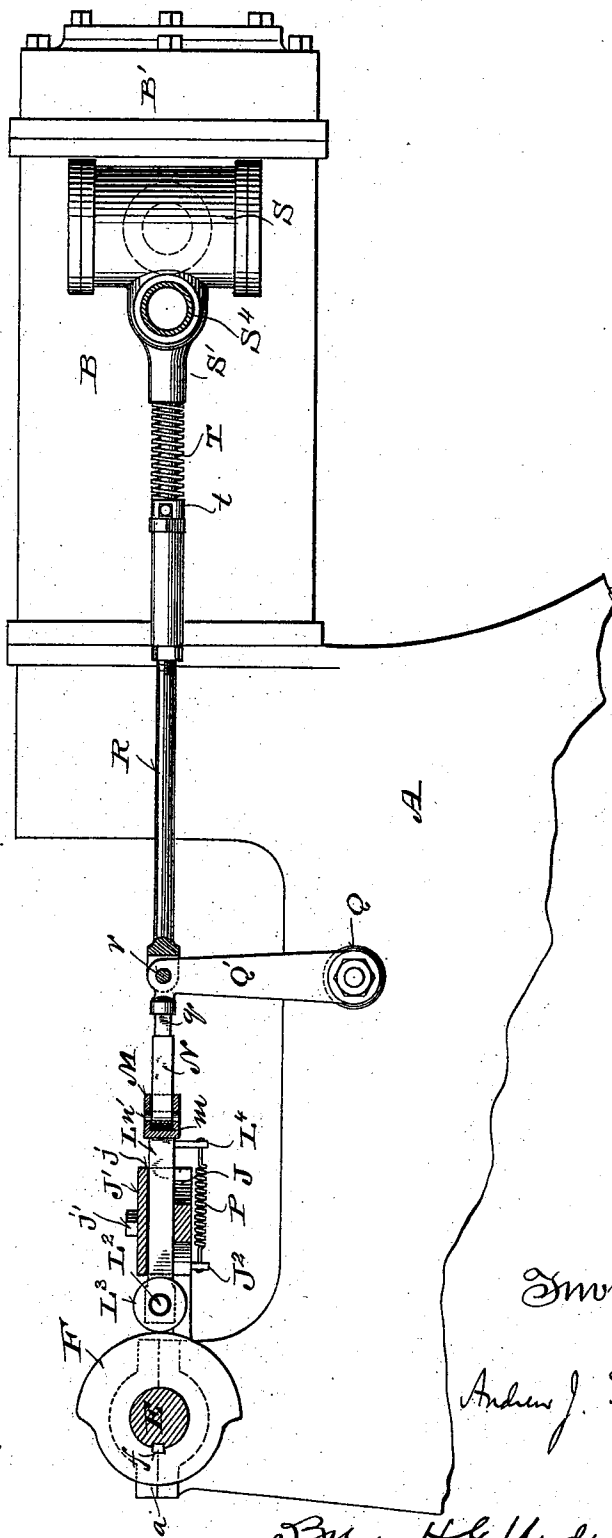
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2 Sheets—Sheet 2.

A. J. PIERCE.
GOVERNOR.

No. 519,412.

Patented May 8, 1894.



Witnesses.
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UNITED STATES PATENT OFFICE.

ANDREW J. PIERCE, OF RACINE, WISCONSIN, ASSIGNOR TO THE PIERCE
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GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 519,412, dated May 8, 1894.

Application filed June 19, 1893. Serial No. 478,096. (No model.)

To all whom it may concern:

Be it known that I, ANDREW J. PIERCE, a citizen of the United States, and a resident of Racine, in the county of Racine, and in the State of Wisconsin, have invented certain new and useful Improvements in Governors; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to governors especially designed for use in connection with gas engines, and to that end consists in certain peculiarities of construction and combination of parts as will be hereinafter fully set forth and subsequently claimed.

In the drawings Figure 1 is a plan view of my improved device applied to a gas-engine, partially broken away or in section to better illustrate details of construction. Fig. 2 is a longitudinal vertical section on the line 2—2 of Fig. 1.

Only so much of the engine is shown as is necessary to illustrate my present invention.

A designates part of the engine frame, B is the cylinder.

C is the piston-rod.

D D is the crank.

E E is the crank-shaft supported in suitable bearings *a a* on the frame A.

F is a cam-wheel, secured by a key *f*, or otherwise, to the crank-shaft E, so as to be fast with it.

G is a grooved sleeve, secured to the shaft E by means of a spline *g*, and having two circumferential grooves *b, c*.

H is the governor collar, secured to the shaft E, having arms *h h* to which are pivoted the shanks of the governor balls I I, the inner ends of said shanks terminating in knobs *i i* fitting within the groove *c* of the sleeve G, there being springs *i' i'* connecting the balls I I with the collar H to normally keep the sleeve G in toward the cam-wheel F.

J is a bracket projecting from the frame A, terminating in an arm K, which arm projects transversely to the line of the engine, and back of this arm said bracket is provided with a recess *j*, covered by a cap *J'* secured to the said bracket, as by bolts *j' j'*. This recess *j* is parallel to the length of the engine, and line of the piston-rod C, and is fitted with a slide L, formed with two heads *L'* and

M. The head *L'* is provided with a forward projecting stud or arbor *L²* on which is journaled a wheel *L³*, in line with the described cam-wheel F. The head M is formed with a recess *m* in which one end of a finger N is secured by a pivot-pin *n'*, the inner end of a spring *n* being also secured within said recess *m*, the outer end of this spring bearing against the free end of the finger N. On the described bracket-arm K there is pivoted a bent lever O, at about the center of said lever, as shown at *k*, the inner arm of this lever terminating in a knob *o*, fitting within the described groove *b* of the sleeve G while the outer arm of said lever carries a wheel *o'* which bears against the finger N on the side opposite the spring *n*. A lug *J²* projects from the under side of the bracket J and a similar lug *L⁴* projects from the under side of the slide L, the said lugs being connected by a spring P.

Q is a stud projecting from the side of the frame A, on which stud there is pivoted the lower end of an arm Q', the upper end of this arm carrying a tapered lug *q*, the end of which is flat, and which normally bears against the point of the finger N.

R is a valve-rod, one end of which is forked to straddle the upper end of the arm Q' to which it is pivoted, as shown at *r*, the other end of said rod carrying a valve R' for engagement with the valve-seats within a valve casing S.

T is a coiled spring surrounding the valve-rod R between the sleeved end S' of said valve-casing and a collar, *t*, upon the rod. This valve-casing has two chambers S² S³, a gas-supply pipe S⁴ leading into the chamber S³ and a passage S⁵ leading from the chamber S² into the cylinder B.

B' is the cylinder head containing the igniting chamber and suitable gas passages and igniting devices, not shown.

The operation of my invention will be readily understood from the foregoing description of its construction, taken in connection with the accompanying drawings. When the parts are in their normal positions, illustrated in the said drawings, with every revolution of the crank-shaft E, the large part of the cam-wheel F bearing against the wheel *L³* on the slide L will force said slide

forward, and the finger N carried by said slide will press against the tapered lug *q* of the arm Q' and thereby force the valve-rod R forward, also, thus pushing the valve R' from its seat and opening the passage way in the valve casing S, thereby admitting gas from the pipe S⁴ into the interior of the cylinder B. As the shaft E and cam-wheel F complete a half revolution, the small part of said cam-wheel is in contact with the wheel L³ on slide L and the spring P instantly retracts said slide, the spring T, at the same time, retracting the rod R, and closing the valve opening *s* by the valve R', this operation of opening and closing the passage in the valve-casing S, and the consequent periodic admission of gas to the cylinder being repeated with each revolution of the said crank-shaft so long as the said parts remain in the original normal positions illustrated. Should, however, the rate of speed of said revolutions increase, then it is not desirable to have the gas supplied to the cylinder more rapidly than before, and the proper admission of gas is regulated by the described governor device. As the speed increases, the balls I I fly away from the shaft against the force of the springs *h h* and the knobs *i i* on the inner ends of the shanks of said balls, being in the groove *c* of the sleeve G, will draw said sleeve away from the cam-wheel F, and simultaneously, by reason of the knob *o* of the centrally-pivoted lever O being in the groove *b* of said sleeve, this will draw said knob *o* outward, and consequently force the other end of the lever O inward, the wheel *o'* on said end of the lever pressing against the finger N, and carrying its point beyond the end of the tapered lug *q*, so that, as the large part of the cam-wheel F by its contact with the slide wheel L³ forces the slide L forward, the said finger N will slip along the tapered inner side of the lug *q*, and consequently the valve-rod R will not be moved, at this time, and the valve R' will remain in the closed position. As the speed relaxes, the governor balls I I will retract, aided by the springs *h h*, thereby forcing the slide G back to the position shown in the drawings, and the first described operation of the cam-wheel, slide and valve-rod will recommence.

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

1. In an engine, the combination with a suitable frame, and a valve-casing, valve and valve-rod supported thereon, and an arm pivoted to said frame and to said valve-rod, and carrying a tapered lug, of a revolving shaft, a cam-wheel fast thereon and a grooved sleeve

splined thereon, a governor on said shaft connected to said grooved sleeve, a slide carrying a wheel in engagement with said cam-wheel and provided with a pivoted finger normally in engagement with the said tapered lug, and a pivoted lever in engagement with said grooved wheel and said finger, substantially as set forth.

2. In an engine, the combination with a suitable frame, and a valve-casing, valve and valve-rod supported thereon, of a revolving shaft, a cam-wheel fast thereon and a grooved sleeve splined thereon, a governor on said shaft, the shanks of the governor balls fitting in one of the grooves of said sleeve, a bracket projecting from said frame, and provided with a recess, a slide movable in said recess and carrying a wheel at one end in line with said cam-wheel, and a pivoted finger at its other end, an arm pivoted to the frame and to the valve-rod, and carrying a tapered lug normally in line with the said finger, and a lever pivoted to said bracket, and having two arms, one in engagement with the described grooved sleeve, and the other bearing against the said finger, substantially as set forth.

3. In an engine, the combination with a suitable frame, and a valve-casing, valve and valve-rod supported thereon, and an arm pivoted to said frame, and to said valve-rod and carrying a tapered lug, of a revolving shaft, a cam-wheel fast thereon and a double grooved sleeve splined thereon, a governor on said shaft comprising a collar with arms, balls having shanks pivoted to said arms and terminating in knobs fitting in one of the grooves of said sleeve, and retracting springs connecting said collar and balls, a bracket on the frame provided with a recess, and a depending lug, a slide in said recess, provided with a head at each end and a depending lug, a spring connecting the said depending lugs, a wheel on one of the slide-heads, and a spring-controlled pivoted finger on the other head, a lever pivoted about midway on the said bracket and carrying a knob at one end fitting within the other groove of the said sleeve, and a wheel at its other end impinging against the said finger, and a retracting spring on the said valve-rod, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand, at Racine, in the county of Racine and State of Wisconsin, in the presence of two witnesses.

ANDREW J. PIERCE.

Witnesses:

JOHN W. OWEN,
MABEL DAVEY.