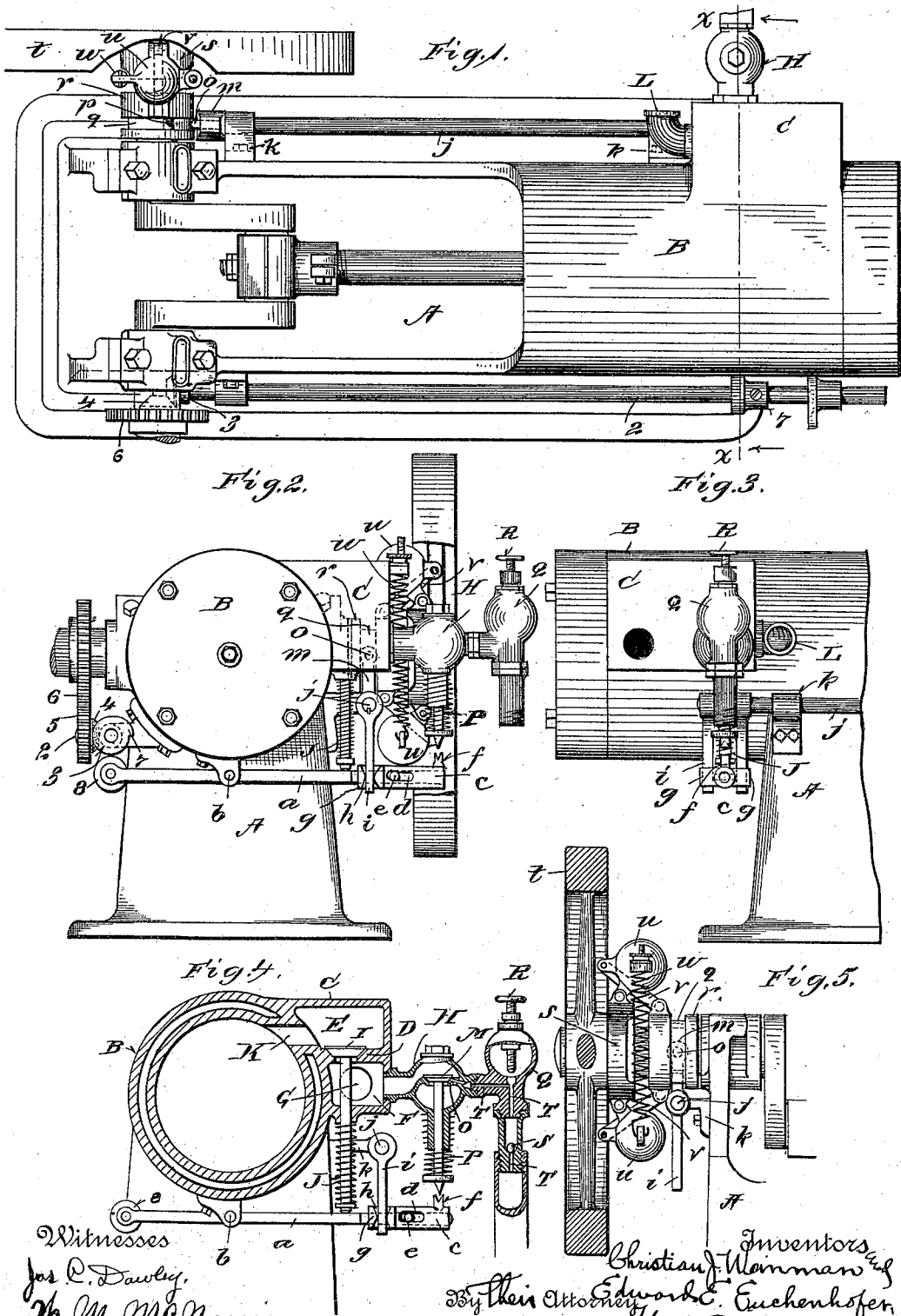


(No Model.)

C. J. WEINMAN & E. E. EUCHENHOFER.
GAS ENGINE.

No. 555,791.

Patented Mar. 3, 1896.



Witnesses
Jos. C. Dawley.
W. M. McNair.

Inventors
Christian J. Weinman &
Edward E. Euchenhofer.
By their Attorney
H. A. Pauline.

UNITED STATES PATENT OFFICE.

CHRISTIAN J. WEINMAN AND EDWARD E. EUCHENHOFER, OF DAYTON,
OHIO.

GAS-ENGINE.

SPECIFICATION forming part of Letters Patent No. 555,791, dated March 3, 1896.

Application filed May 8, 1895. Serial No. 548,499. (No model.)

To all whom it may concern:

Be it known that we, CHRISTIAN J. WEINMAN and EDWARD E. EUCHENHOFER, citizens of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Gas-Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in gas-engines.

Our improvements have reference to mechanism for opening the gas or gasoline admission valve of a gas-engine. This mechanism embodies as essentials a governor of some form, a rock-shaft which is variably rocked by means of the governor, a tappet which is made to hit or miss the gas-valve stem, according to the load and speed of the engine, by a connection with the rock-shaft, and which is given a striking motion by a suitable means.

In the accompanying drawings, on which like reference letters and numerals indicate corresponding parts, Figure 1 is a plan view of a gas-engine in so far as it is necessary to show the application of our invention; Fig. 2, a rear elevation of such engine, showing our mechanism also in elevation; Fig. 3, a side view of a portion of the engine, likewise illustrating parts of such mechanism; Fig. 4, a transverse sectional view of the engine and valve mechanism on the line *x x* of Fig. 1, looking in the direction of the arrow; and Fig. 5, a detail view of the crank-shaft, governor and balance-wheel.

Upon a base *A* is mounted a cylinder *B*, having cast with it or secured to it a valve-chest *C*, divided by a partition *D* into chambers *E* and *F*. An air-port *G* opens into the chamber *F*, and a gas or gasoline valve *H* also opens into it. An admission-valve *I* is seated on the partition *D* by a spring *J* acting downwardly on its stem. The chamber *E* opens through a port *K* into the cylinder. A pipe *L* (see Figs. 1 and 3) opens into the opening *G* for the introduction of air.

The valve *H* has a valve proper, *M*, held down on its seat *O* by a spring *P*, acting downward against its stem. A gas or gasoline regulator forms the remainder of the gas or gasoline valve, such regulator consisting of the case *Q*,

screwed to the valve *H* and having a screw-threaded needle-valve *R* and a check or ball valve *S*, by which the orifice *T* is controlled as to the quantity of gas or gasoline that passes through it to the valve proper, *M*. This valve and regulator form no part of the present invention in themselves, the same being shown and described in our application, Serial No. 496,456, filed January 11, 1894, for improvements in gas-engines, and made the subject of a claim therein.

Referring now more directly to the subject of the present improvements, the letter *a* designates a lever pivoted at *b* and arranged to lift upon the lower end of the stem of the valve *I*, and having fitted to it a sleeve *c*, adapted to reciprocate on it, with a slot *d*, in which is a pin *e*, projecting from the lever to limit the movement of the sleeve. This sleeve we term the "tappet-sleeve," as it carries the tappet *f*, adapted to strike the stem of the valve proper, *M*, and lift this gas or gasoline valve. The sleeve *c* has a projection *g* on either side, with a slot *h*, inclined as shown in Figs. 2 and 4. A bifurcated arm *i* fits the slots *h* and reciprocates the tappet-sleeve so that the tappet *f* is shifted to and from the plane of the stem of the valve *M*. The arm *i* is mounted on the rock-shaft *j*, supported in brackets *k k*, and having an actuating-arm *m*, in which is mounted the stud *o* of the yoke *p*, fitted to the groove *q* in the reciprocating collar *r* of the governor. By this means the rock-shaft *j* is rocked and the arm *i* vibrated.

The collar *r* of the governor is fitted to slide on the main shaft, while a fixed collar *s*, forming, if desired, a part of the hub of the balance-wheel *t*, has pivoted to it the governor-balls *u*, connected to the collar *r* by links *v* and interconnected by a spring *w*. The governor may be of this type or any other desired form of governor so long as the shaft *r* is rocked and controlled by the governor so that the tappet-sleeve will reciprocate in and out of the plane of the valve-stem it actuates.

The lever *a* is vibrated so as to give the tappet a striking motion by means of a rotary shaft 2, geared to the engine-shaft, as by a miter-pinion 3 on the shaft 2, meshing with a pinion 4, mounted beneath the engine-shaft

and rotated by a spur-pinion 5, meshing with a spur-gear 6 on the engine-shaft. A cam 7 on the shaft 2 engages with the lever *a* through the antifriction-roller 8. The parts 5 are so timed that the lever is thus vibrated at the proper time to make the striker strike the stem of the gas or gasoline valve at the moment when it should be opened to permit gas or gasoline to enter the chamber F and mix 10 with the air, and then pass into the chamber E when the valve I is raised, and thence into the cylinder through the port K.

Having thus fully described our invention, what we claim as new, and desire to secure by 15 Letters Patent, is—

1. In a gas-engine, the combination with a governor, and a rock-shaft operated and controlled thereby, of a reciprocating tappet-sleeve connected with the rock-shaft and having a tappet proper, a valve and its stem operated by said tappet proper, and a lever on which the sleeve is mounted, and means to actuate the lever to impart a striking motion to the tappet.

25 2. In a gas-engine, the combination with a governor, and a rock-shaft having an arm at one end engaged by the governor, and an arm at the other end, of a reciprocating tappet-sleeve engaged by the latter arm and having 30 a tappet proper, and means to impart a striking motion to the tappet-sleeve, and a valve-stem adapted to be struck or missed by the tappet proper.

35 3. In a gas-engine, the combination with a governor, and a rock-shaft having an arm at

one end engaged with the governor, and an arm at the other end, of a reciprocating tappet-sleeve engaged by the latter arm, a lever on which the sleeve is mounted, and means to vibrate the lever, the tappet proper on the sleeve, and the valve-stem adapted to be 40 struck or missed thereby.

4. In a gas-engine, the combination with the governor and rock-shaft, an arm on one end of it engaged by the governor, and a bifurcated arm on the other end, of a reciprocating sleeve with slotted lugs receiving the bifurcated arm, a lever on which the sleeve is mounted, and a rotary shaft receiving motion from the engine-shaft and having a cam 50 which vibrates the said lever, a tappet proper on the sleeve, and a valve-stem adapted to be struck or missed by said tappet.

5. In a gas-engine, the combination with a rock-shaft operated by a governor, and a rotary shaft operated by the engine-shaft, of a gas or gasoline valve and an admission-valve, a pivoted lever operated by the rotary shaft and acting to lift the admission-valve, a sleeve on said lever with a tappet adapted to strike 60 the gas or gasoline valve, and an arm on the rock-shaft engaging with said sleeve.

In testimony whereof we affix our signatures in presence of two witnesses.

CHRISTIAN J. WEINMAN.
EDWARD E. EUCHENHOFER.

Witnesses:

E. J. FINKE,
C. M. WOOD.