

(No Model.)

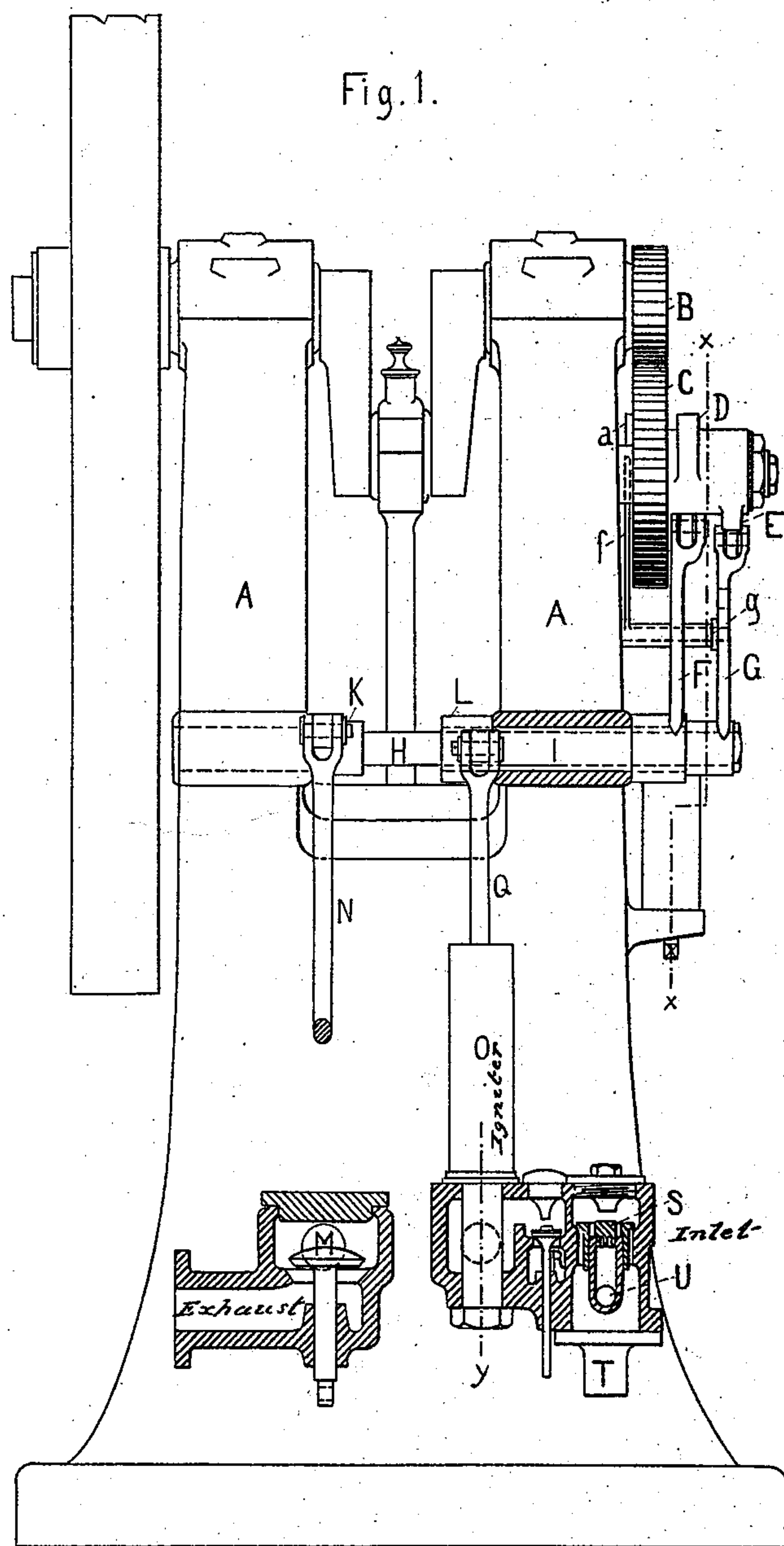
3 Sheets—Sheet 1.

E. KÖRTING.

GAS ENGINE.

No. 377,623.

Patented Feb. 7, 1888.



Attest
S. H. Knight
Emma Arthur

Inventor:
Ernst Körtling
By *[Signature]*
Attys.

(No Model.)

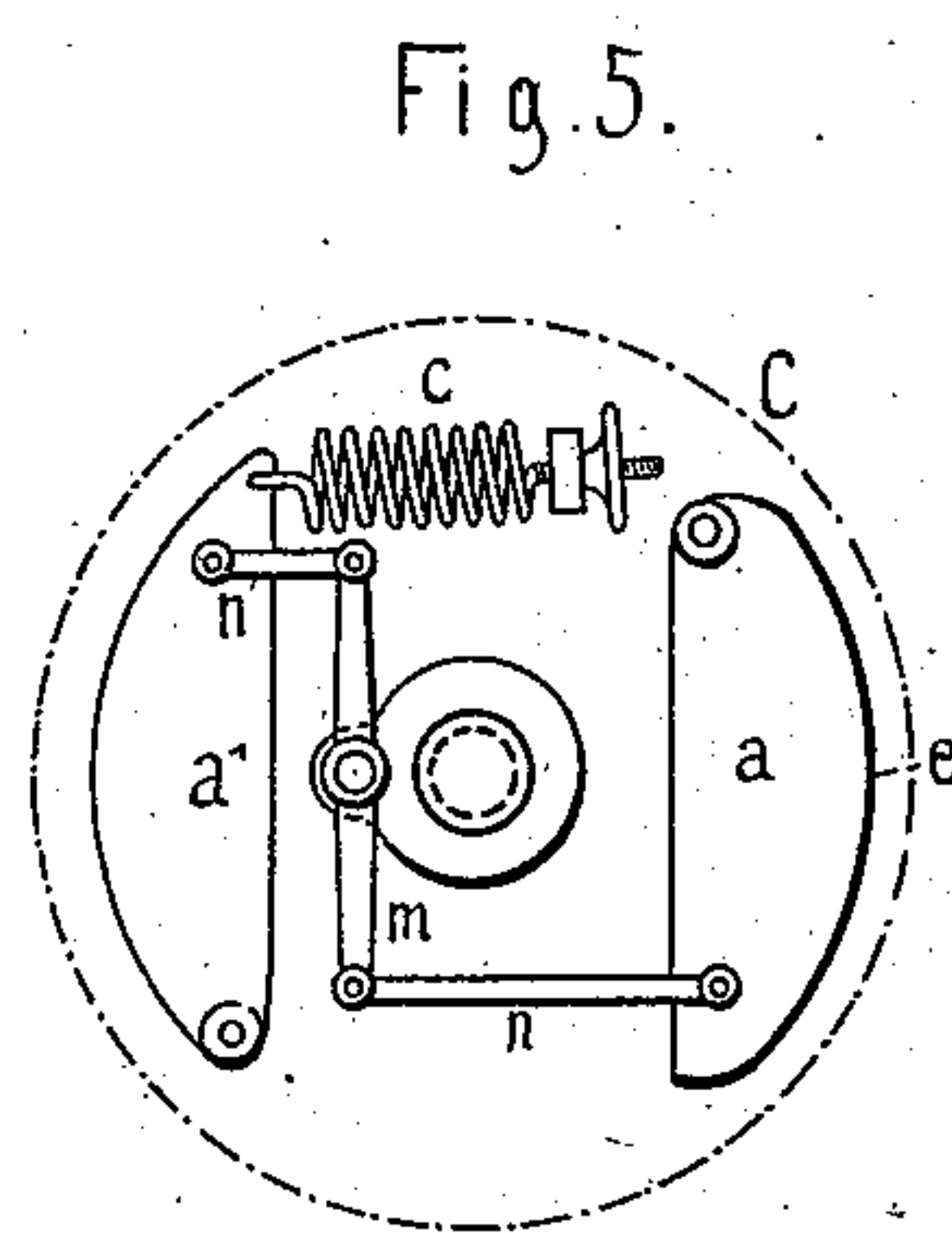
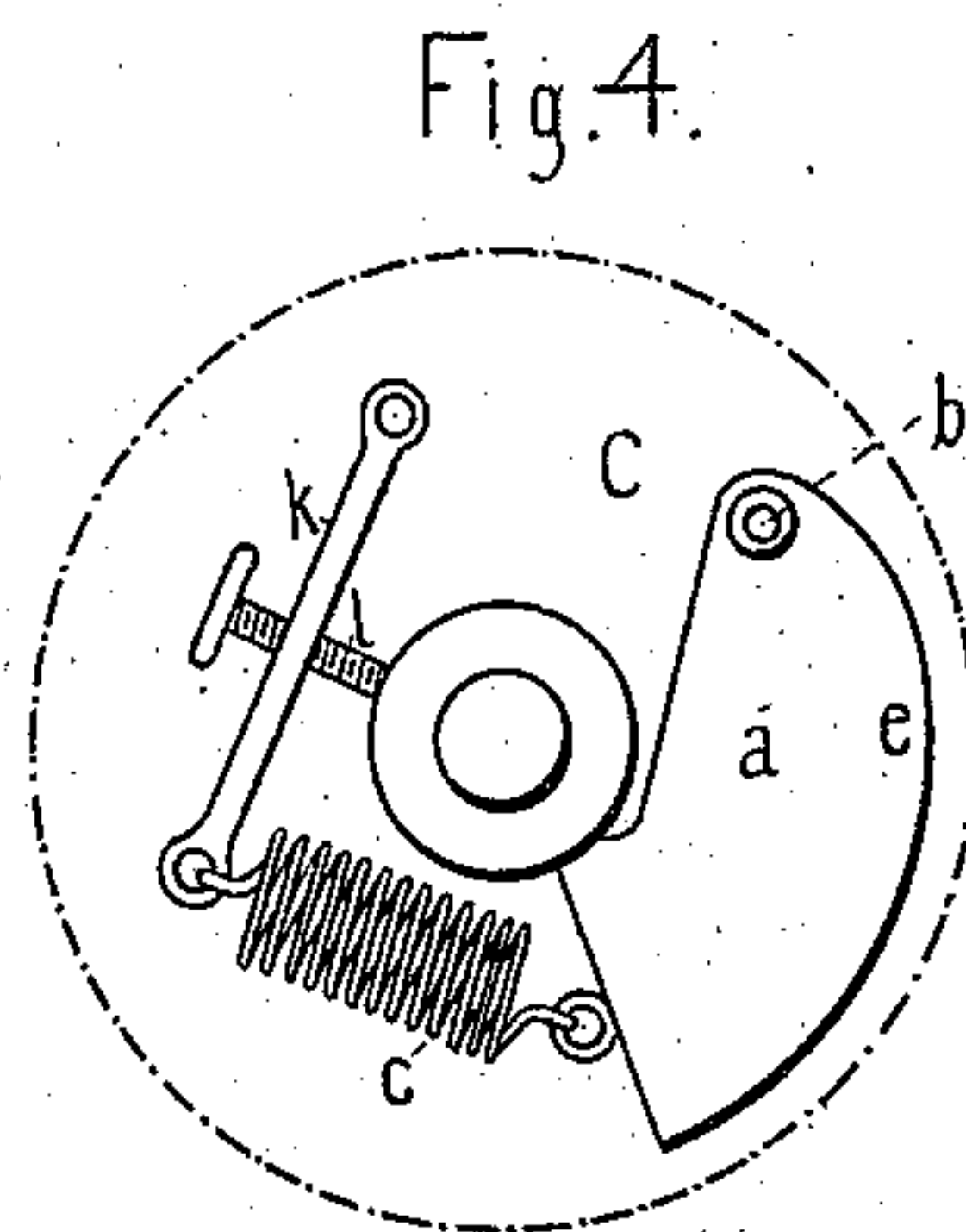
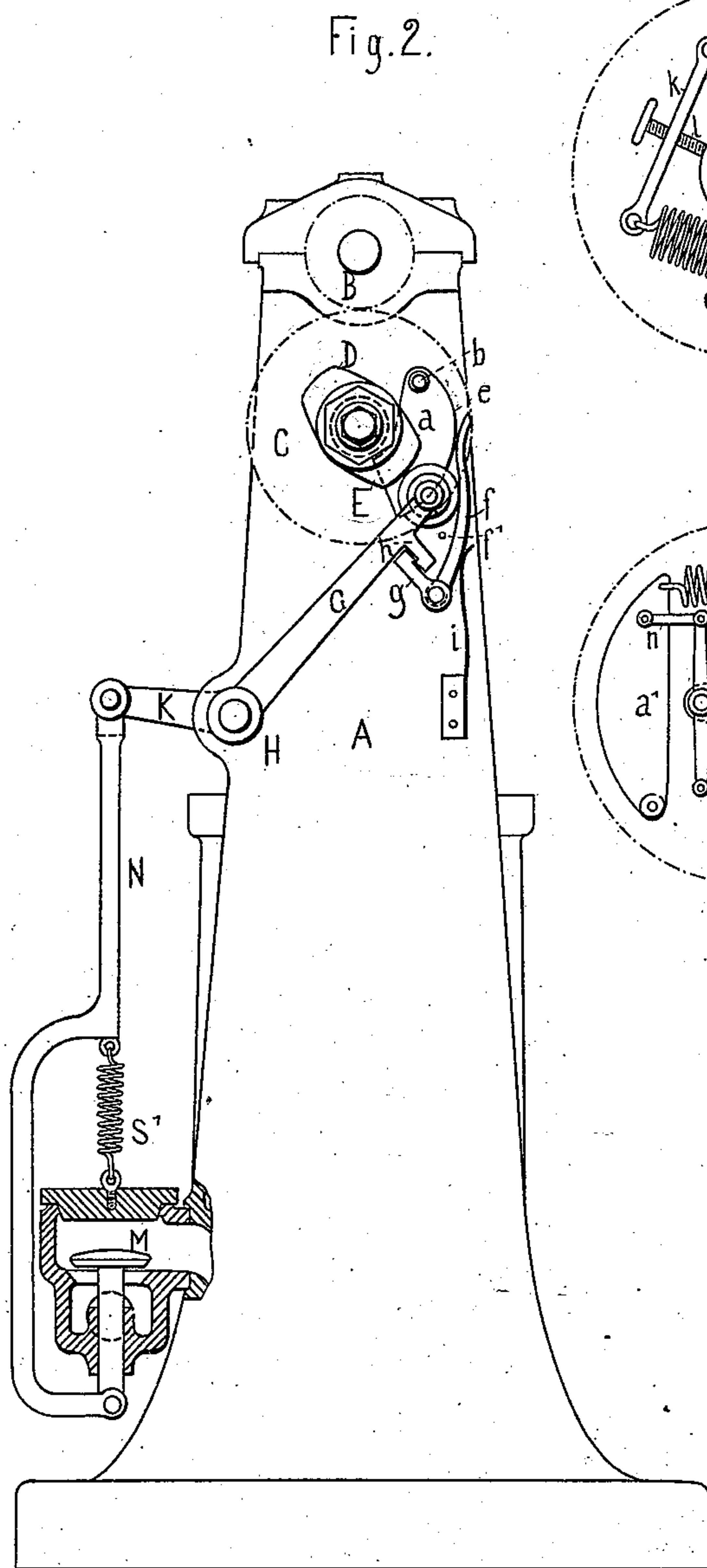
3 Sheets—Sheet 2.

E. KÖRTING.

GAS ENGINE.

No. 377,623.

Patented Feb. 7, 1888.



Attest
S. H. Knight.
Emma Arthur

Inventor
Ernst Korting
By S. H. Knight
Atty.

(No Model.)

3 Sheets—Sheet 3.

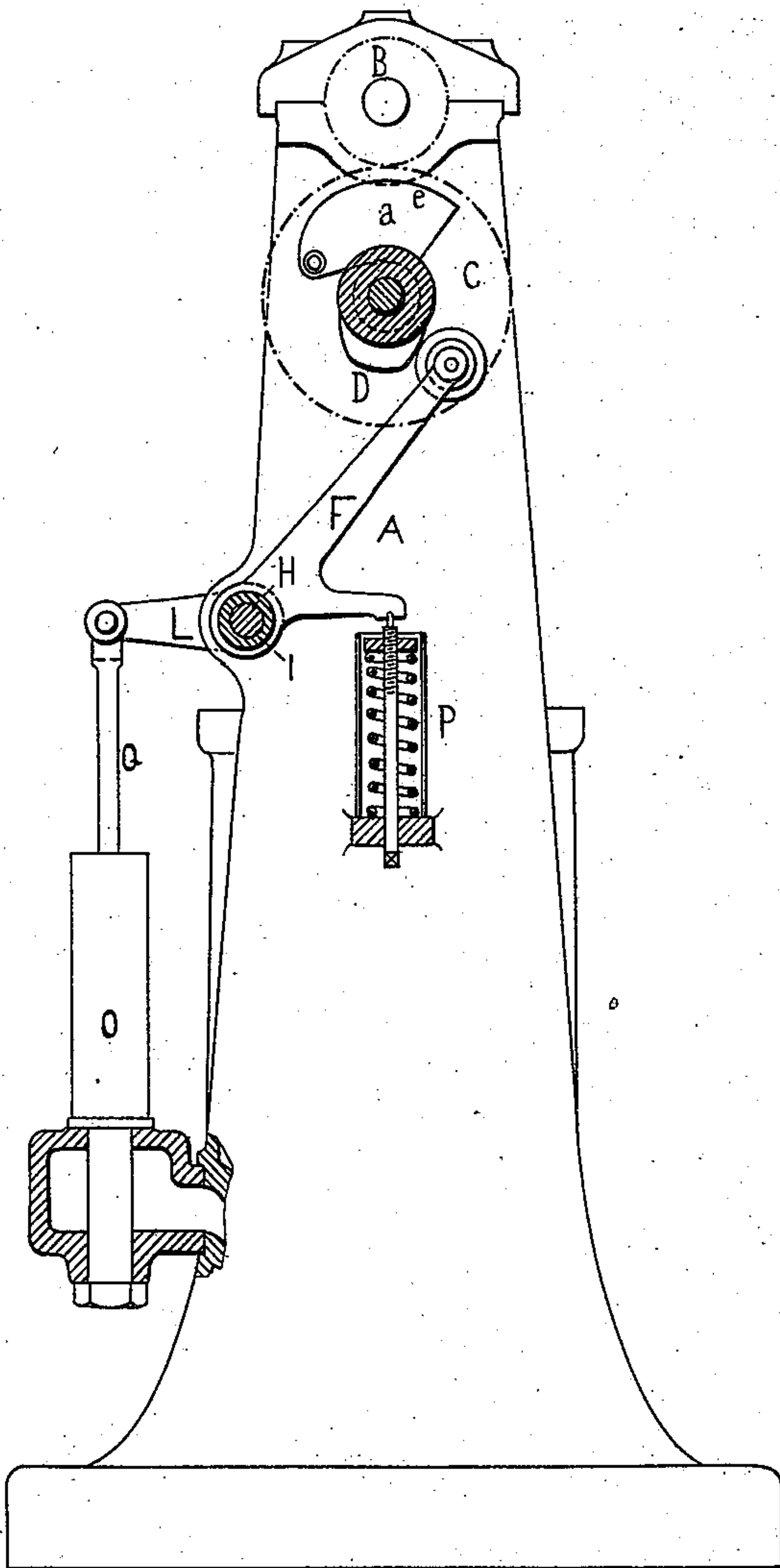
E. KÖRTING.

GAS ENGINE.

No. 377,623.

Patented Feb. 7, 1888.

Fig. 3.



Attest
S. H. Knight.
Emma Arthur

Inventor
Ernst Körtling
By Thugh 113003
Atty.

UNITED STATES PATENT OFFICE.

ERNST KÖRTING, OF HANOVER, PRUSSIA, GERMANY.

GAS-ENGINE.

SPECIFICATION forming part of Letters Patent No. 377,623, dated February 7, 1888.

Application filed October 18, 1887. Serial No. 252,724. (No model.)

To all whom it may concern:

Be it known that I, ERNST KÖRTING, a subject of the King of Prussia, residing at Hanover, Kingdom of Prussia, German Empire, have invented new and useful Improvements in Gas-Engines, whereof the following is a specification.

My invention relates to gas-engines; and the improvements consist in the means employed for operating the exhaust-valve and the igniting device and for regulating the speed of the engine.

On the annexed two sheets of drawings is represented a gas-engine comprising my improvements.

Figure 1 is a front elevation with some parts in section; Fig. 2, a side elevation, also with a part in section; and Fig. 3, a sectional side view, the section being partly on line *x x* and partly on line *y y*. Fig. 4 shows a part in detail, drawn to a larger scale; and Fig. 5, a modification thereof.

A is the frame of the engine, containing the power-cylinder.

M is the exhaust-valve, and O the igniting device, the interior construction of the latter not being shown on account of its not forming any part of my present invention.

S is the mixing-valve for gas and air passing in through the respective pipes U and T, and R the check-valve for gas mixture that has entered into the cylinder.

On the end of the crank-shaft of the engine is keyed the spur-wheel B, and with the same gears the spur-wheel C, having double the diameter of the former and rotating on a pin fixed to the frame A. To the wheel C is secured a boss carrying the two tappets D and E.

H and I are two shafts mounted in suitable bearings on the frame, the shaft H being passed through the shaft I, which is hollow; but these shafts may also be placed in parallel position, one above or by the side of the other. The shaft H is provided with the lever-arms K and G, the arm K being connected by the bar N to the stem of the exhaust-valve M, while the arm G, having a roller at its end, extends into the path of the tappet E. By means of a spring, S', connected to the bar N, the valve M is normally kept closed and the arm G maintained in the position in which it is acted upon by the

tappet E when rotating. On the shaft I are keyed the lever-arm L, connected by the rod Q to the igniting device, and the lever-arm F, extending with its end into the path of the tappet D, the said arm F being also provided with a roller.

T is a spring acting on a branch of the arm F, and which keeps the arm and also the igniting device in their normal positions. By these means great simplicity is attained in the construction of the mechanism serving to operate the exhaust-valve and the igniting contrivance.

For regulating the speed of the engine the spur-wheel C has attached to it a governor of particular construction, which, by acting on certain intermediate parts when the speed of the engine has become too great, causes the said parts to lock the arm G upon its being pushed outward by the tappet E, the exhaust-valve being thereby maintained open and the piston of the power-cylinder prevented from drawing in new charges. The said governor consists in a weight, *a*, forming by its edge *e* a kind of cam, and pivoted at one end upon a pin, *b*, projecting from the face of the wheel C, being opposite to the frame A. (In Figs. 2, 3, and 4 the wheel C is shown by dotted circles only, so as to be, as it were, transparent and to let the weight *a* and parts connected thereto appear in full.) The said weight, which thus rotates with the wheel, is connected at its other end by means of a spring to a lever, *k*, also pivoted to the wheel C and provided with an adjusting-screw, *l*, bearing against the boss of the wheel and serving to regulate the tension of the spring. Opposite to the path of the weight is arranged the lever-arm *f*, the hollow axle whereof, turning on a pivot, carries at its outer end a pawl, *g*, having an offset adapted to engage with an offset on the branch *h* of the arm G, operating the exhaust-valve M. *i* is a spring which presses the lever *f* toward the weight *a*, a stop, *f'*, serving to keep the lever clear of the weight while the engine runs at the normal speed. During its rotation with the wheel C the weight is acted upon by the centrifugal force due to its speed by the tension of the spring *c* and (as the axis of rotation is horizontal) by gravity, the latter force operating to draw the weight

respectively toward and away from its axis of rotation, according as it is above or below the said axis. Consequently, when the weight is caused to fly outward by the centrifugal force, each point thereof will move in a particular curve, which, however, remains uniform so long as there is no variation of speed. The tension of the spring *c* is so regulated that when the speed of the engine becomes excessive the weight on passing along the end of the lever *f* will push the same outward by means of its cam-edge *e*. Besides, the weight is arranged in such position relatively to the tappet *E* that any action of the weight on the lever *f* will occur simultaneously with the operation of the said tappet on the arm *G*, and that the tappet will abandon the arm *G* a little before the weight leaves free the lever *g*. By these means the result is obtained that when the pawl *g* is oscillated upward by the lever *f*, while the arm *G* is pushed outward by the cam *E*, the said pawl will drop with its offset behind the offset of the branch *h*, and that the spring *S'*, on becoming free to act, will create friction between the said offsets, whereby the parts *g* and *h* are kept in engagement with each other after the tappet *E* has passed away over the roller of the arm *G*. In consequence hereof the exhaust-valve remains open and the engine is prevented from drawing in new charges until, from the decrease of speed which is thus brought about, the weight *a* is drawn back sufficiently by the spring *c* as not to act any more on the lever *f*. As soon as thereupon the tappet *E* again touches the arm *G* and pushes the same outward a little, the friction between the offsets of the pawl *g* and the branch *h* ceases, the said pawl and the lever *f* are returned to their normal position by the spring *i*, and the valve is operated again regularly by the tappet *E*.

In view of counterbalancing the action of gravity on the weight *a* and causing it to ro-

tate in circles, instead of particular curves, as stated above, another weight, *a'*, may be pivoted to the wheel *C* on the opposite side of its center, as shown by Fig. 5, the two weights being connected together by means of a lever, *m*, and two rods, *n*, so that they will operate together, the lever *f* being, however, acted upon by the edge *e* of the weight *a* only, as in the first case.

I claim as my invention—

1. The combination, with the exhaust-valve *M* and igniting device *O*, of the rotating tappets *D* and *E*, the shafts *I* and *H*, the lever-arms *F* and *L*, fixed to the shaft *I*, the lever-arms *G* and *K*, fixed to the shaft *H*, and means for connecting the valve *M* and the igniting device *O*, respectively, with the lever-arms *K* and *L* and for closing the valve *M* and returning the igniting device to its normal position, substantially as and for the purpose specified.

2. The combination, with the exhaust-valve *M*, the rotating tappet *E*, shaft *H*, lever-arms *G* and *K*, and means for connecting the valve *M* with the lever-arm *K* and closing the valve, of the wheel *C*, the weight *a*, pivoted thereto, spring *c*, and parts operated upon by the weight *a* and adapted to lock the lever-arm *G*, substantially as and for the purpose described.

3. The combination together of the exhaust-valve *M*, the rotating tappet *E*, shaft *H*, lever-arm *K*, lever-arm *G*, having the branch *h*, provided with an offset, connecting-bar *N*, spring *S'*, wheel *C*, weight *a*, pivoted thereto, spring *c*, lever-arm *f*, pawl *g*, having an offset, and spring *i*, substantially as and for the purpose set forth.

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

ERNST KÖRTING.

Witnesses:

C. LÜTTGE,
S. GOLDSCHMIDT.