

(No Model.)

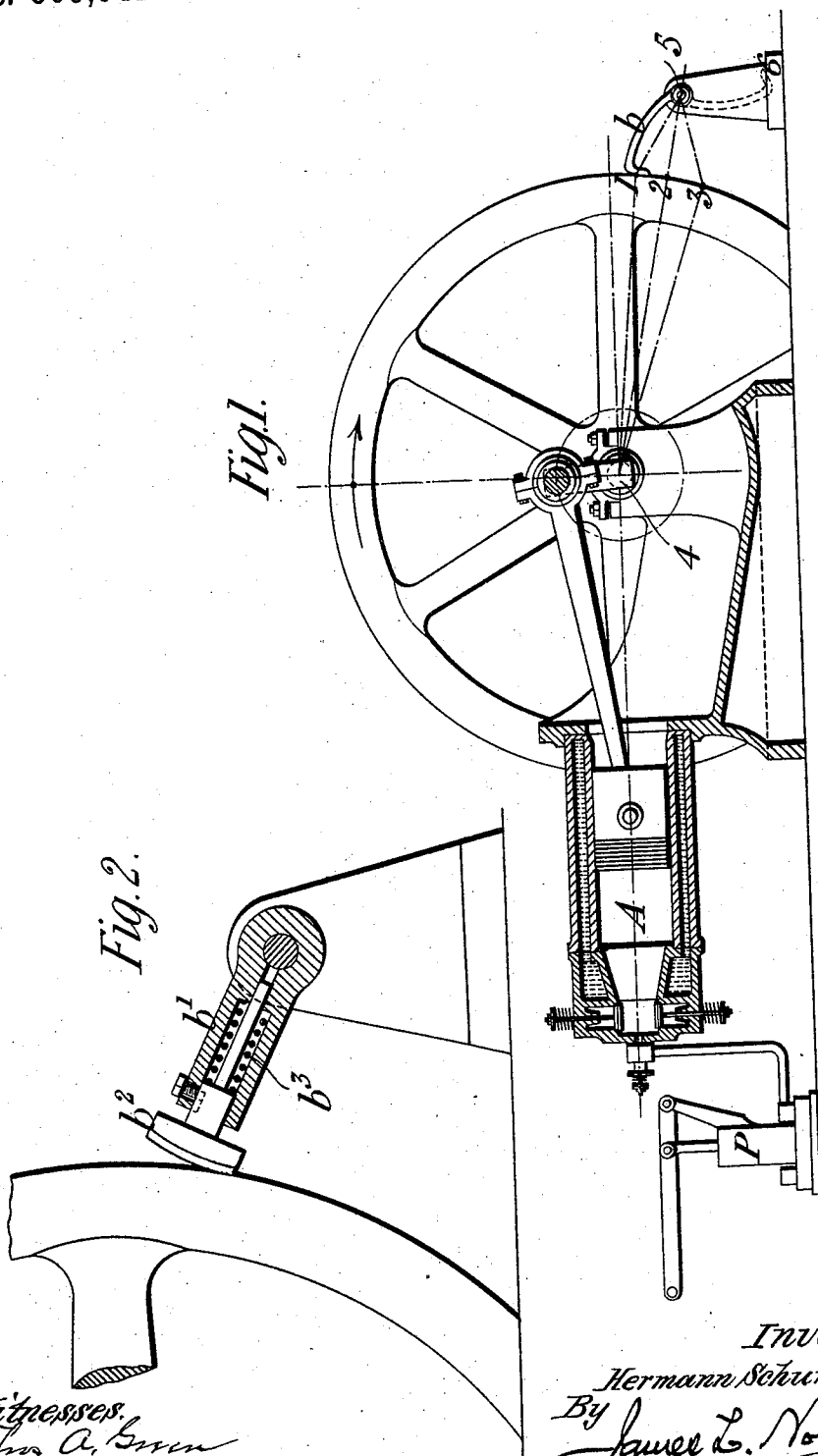
2 Sheets—Sheet 1.

H. SCHUMM.

APPLIANCE FOR STARTING GAS AND OIL MOTOR ENGINES.

No. 569,942.

Patented Oct. 20, 1896.



Witnesses.
Thos. A. Green
Robert Corbett

Inventor.
Hermann Schumm.
By James L. Norris.
Atty.

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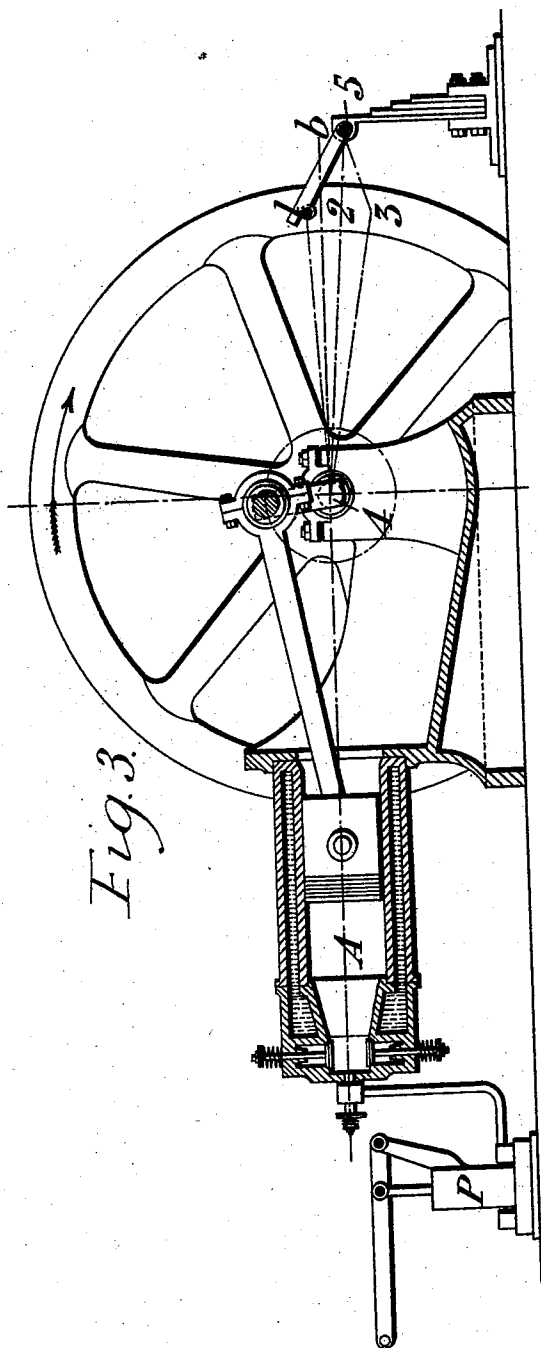


Fig. 3.

Witnesses.

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UNITED STATES PATENT OFFICE.

HERMANN SCHUMM, OF COLOGNE, GERMANY, ASSIGNOR TO THE GAS-MOTOREN-FABRIK-DEUTZ, OF COLOGNE-DEUTZ, GERMANY.

APPLIANCE FOR STARTING GAS AND OIL MOTOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 569,942, dated October 20, 1896.

Application filed July 7, 1896. Serial No. 598,285. (No model.)

To all whom it may concern:

Be it known that I, HERMANN SCHUMM, a citizen of Switzerland, residing at Cologne, in the Empire of Germany, have invented a certain new and useful Appliance Employed in Starting Gas and Oil Motor Engines, of which the following is a specification.

This invention relates to the known method of starting gas and oil motor engines, which consists in bringing the piston to about half-stroke position and after holding it there by suitable means forcing an explosive mixture of gas and air under pressure into the cylinder and then igniting it, the holding device being at the same time released, so that the force of the explosion can start the engine.

The present invention relates to the employment of an elastic frictional device applied to the fly-wheel for locking or holding the piston at or about the middle position, such device having, in combination with the fly-wheel, a kind of toggle-joint action which will yield automatically to the force of the explosion of the compressed charge. The said elastic frictional device can be constructed in various ways. On the accompanying drawings are shown two arrangements thereof.

Figure 1 shows a longitudinal section of a gas-motor engine with one arrangement applied thereto. Fig. 2 shows a section of a modified construction; and Fig. 3 is a view similar to Fig. 1, showing another modification of the invention.

A is the working cylinder, and P a band force-pump for charging it with explosive mixture when the piston has been brought to about the middle position shown. *b* is the elastic frictional locking or holding device for holding the fly-wheel in the said position. It consists of a curved spring-arm turning on a pivot at 5 and bearing with a frictional surface against the rim of the fly-wheel, so as to act as a frictional pawl in preventing its forward rotation in the direction of the arrow. The explosive mixture can consequently be forced into the cylinder under considerable pressure without forcing the piston forward. The radius of the fly-wheel thus forms, with the point of contact 1 of the arm *b* and with the pivot 5 thereof, a kind of toggle-joint 4 1 5 with spring action, the position of the arm *b*

and the degree of elasticity thereof being so arranged that on the ignition of the compressed charge the sudden generation of considerable force acting on the crank causes the fly-wheel to bend the toggle-joint downward through the central position 5 2 to the position 5 3, the spring action of the arm allowing it to yield. The arm then falls into the position 5 6, leaving the fly-wheel free to be rotated by the force of the explosion.

The above-described locking or holding device has the following advantages: First, the energy which is expended by the motor at the moment of explosion for forcing the toggle-joint through its middle position is regained immediately afterward, (with the exception of the loss by friction,) inasmuch as the spring-arm *b*, after being compressed during the motion from 1 to 2, will, in expanding after point 2 has been passed, give off an equivalent amount of energy to the fly-wheel in accelerating its motion while moving from 2 to 3; second, in replacing the spring-arm *b* from its position of rest at 6 to the position 1, for again starting the engine, it is not requisite to put any initial compression on the spring-arm, as such compression is effected entirely automatically by the compression and explosion of the preliminary charge, as above described; third, the position adopted for the piston for the above-described starting action is quite optional, which is of considerable importance, as with different descriptions of combustible gases the most advantageous position for the piston will vary.

It will be obvious that the spring-arm *b* may be variously constructed for carrying out the above-described function. Thus it may be constructed of two separate rigid pieces *b'* *b''*, as shown at Fig. 2, with an intervening spring *b'''* of the required strength to resist the force exercised by the piston during the compression of the charge, but to yield to the force of the explosion; or again, the entire arm may be rigid and the required spring action be provided by arranging the pivot 5 to yield in compressing a spring, as shown at Fig. 3, in which the arm *b* is pivoted to a spring-support *d*. In this arrangement the free end of the arm, instead of bearing with frictional contact against the

periphery of the fly-wheel, is made to bear in the position 4 1 5 against a stud *c*, projecting from the side thereof, or it might enter a shallow notch in the periphery of the wheel, constituting a positive abutment instead of frictional contact. The toggle action is, however, precisely the same as in the first-described construction, namely, on the explosion of the charge the fly-wheel in turning will force backward the spring-support of the arm *b* in causing the free end thereof to pass successively through the positions 4 1 5, 4 2 5, and 4 3 5, when the arm *b* will be free and fall down.

15 Having thus described the nature of my invention and the best means I know for carrying the same into practical effect, I claim—

Appliance for starting gas and oil motor engines consisting in a pivoted arm having spring action, which arm is adapted to bear against a peripheral part of the fly-wheel in

such manner as to lie at an obtuse angle to the meeting radius thereof such as to resist its rotation when a charge is being pumped into the engine-cylinder, while on an impulse being given to the fly-wheel on the explosion of the charge, the latter will compress or force back the arm against its spring action and will at the same time force it downward through the radial position, after which the spring action of the arm will tend to accelerate the rotation of the fly-wheel, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 9th day of June, A. D. 1896.

HERMANN SCHUMM.

Witnesses:

SOPHIE NAGEL,
WILLIAM H. MADDEN.