

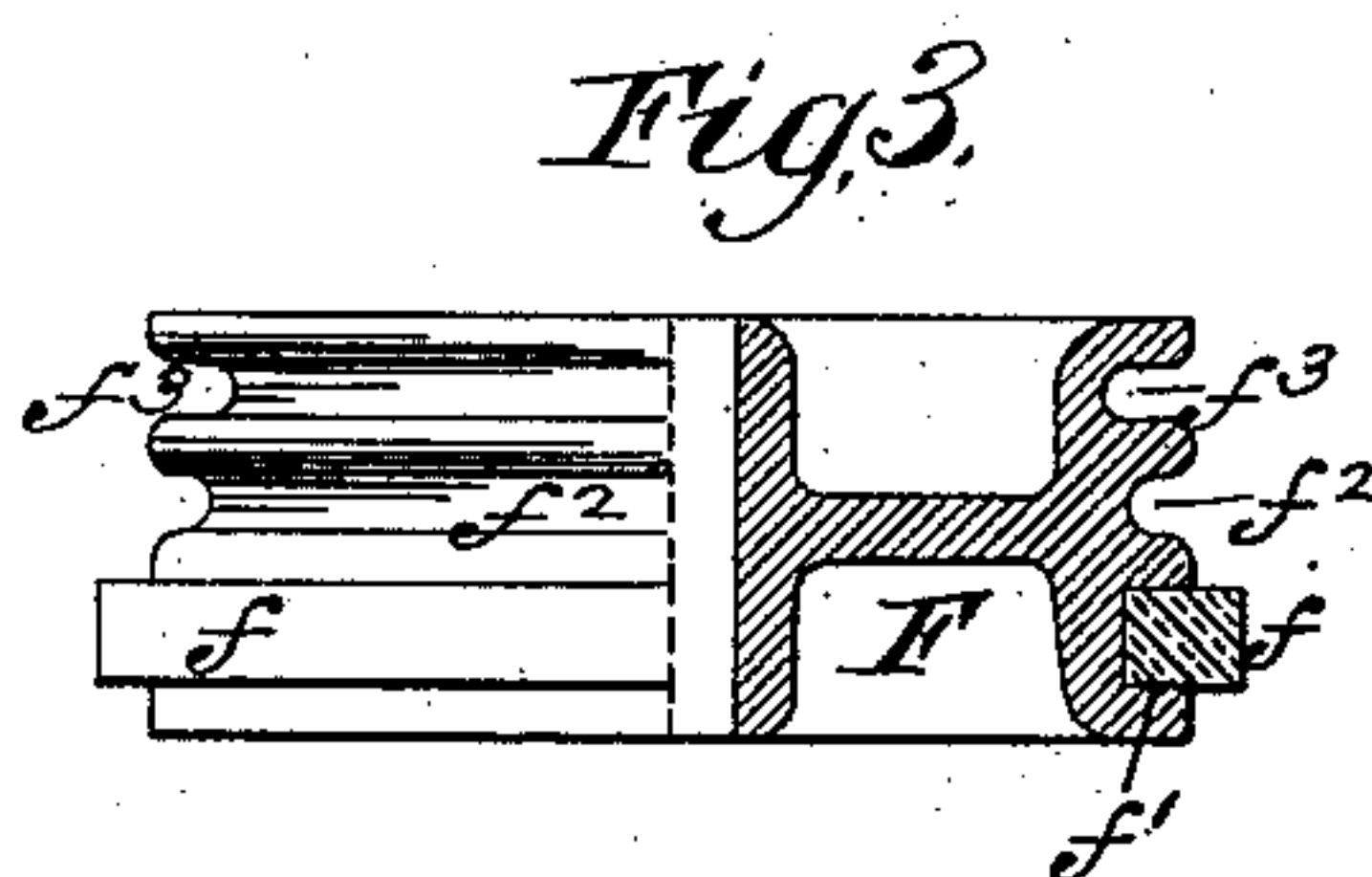
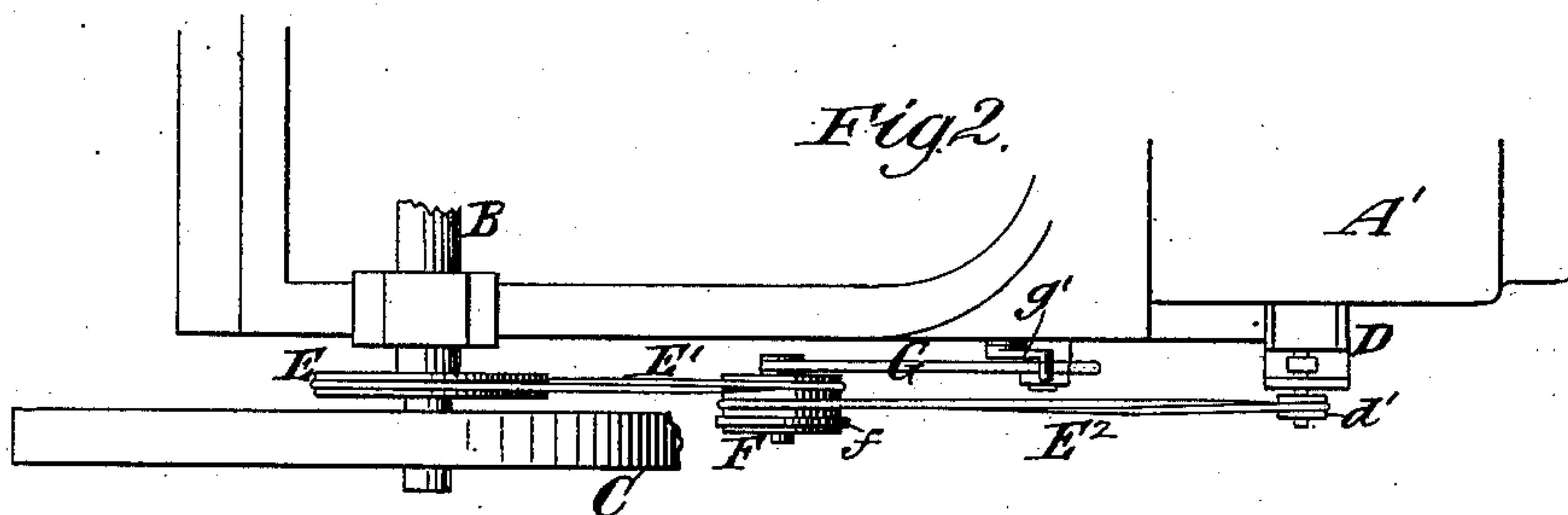
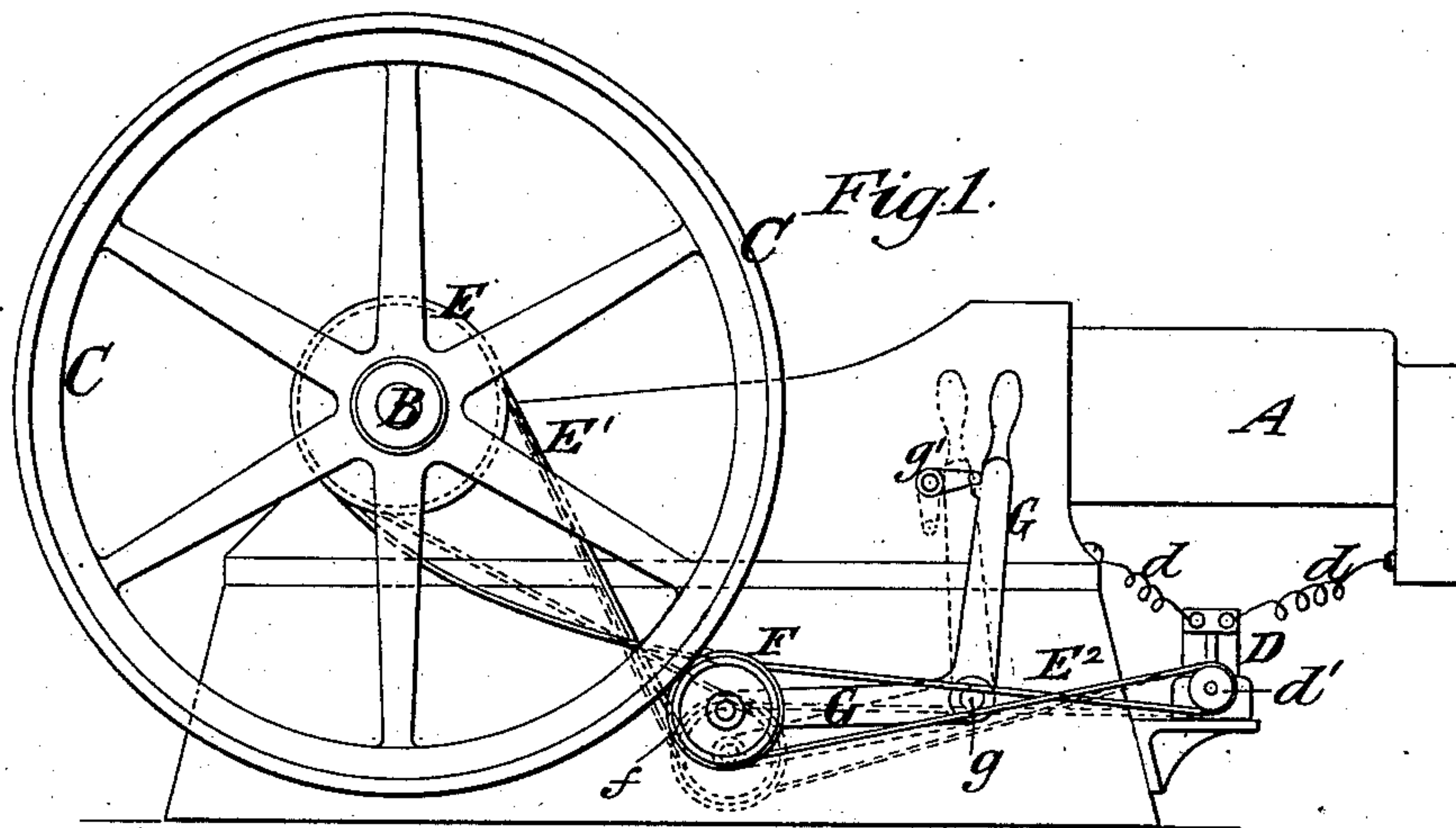
(No Model.)

H. SKINNER.

GAS ENGINE.

No. 389,608.

Patented Sept. 18, 1888.



Witnesses
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UNITED STATES PATENT OFFICE.

HALCYON SKINNER, OF YONKERS, NEW YORK.

GAS-ENGINE.

SPECIFICATION forming part of Letters Patent No. 389,608, dated September 18, 1888.

Application filed July 5, 1887. Serial No. 243,306. (No model.)

To all whom it may concern:

Be it known that I, HALCYON SKINNER, of Yonkers, in the county of Westchester and State of New York, have invented a new and useful Improvement in Gas-Engines, of which the following is a specification.

My invention relates to that class of gas-engines in which the spark for igniting the explosive charge is produced by a dynamo electric machine operated by the engine. In starting a gas-engine it is usual to turn the crank-shaft a few times by hand in order to obtain an explosive charge in the engine, and when so turned by hand the engine, and therefore the dynamo-machine, with the ordinary arrangements for operating it, will be turned at a slow speed. Of course, if the pulleys through which motion is transmitted from the engine crank-shaft to the dynamo-machine are so proportioned as to produce in turning the engine slowly a speed of the dynamo sufficient to make an igniting-spark, the dynamo will, in the ordinary operation of the engine, be driven at a speed which will be unnecessarily great and destructive to it. Various means have been provided for overcoming this difficulty, but they have been complicated and expensive; and the object of my invention is to provide by a very simple and inexpensive mechanism for rotating the dynamo-machine at a sufficient speed to produce an igniting-spark when turning the engine by hand, and to avoid its rotation at an unnecessary and destructive speed during the normal operation of the engine.

To this end my invention consists in the combination, with a gas-engine and a dynamo-electric machine for producing an igniting-spark, of a counter-shaft provided with a friction-wheel and with pulleys, which are connected by belts both with the engine-shaft and the driving-pulley of the dynamo, and a movable bearing for the counter-shaft, by which said friction-wheel may be moved into and out of frictional contact with the fly-wheel or large pulley of the engine. During the ordinary operation of the engine the friction-wheel is out of contact with the fly-wheel or large pulley, and the dynamo is driven through the belts from the crank-shaft of the engine; but in starting the engine the friction-wheel is pressed against the fly-wheel or large pulley

of the engine, thereby driving the dynamo through such frictional contact and the belt which connects the counter-shaft with the dynamo, while the belt which connects the crank-shaft of the engine with the counter-shaft is slackened.

In the accompanying drawings, Figure 1 is a side view of an engine embodying my invention. Fig. 2 is a plan of certain parts thereof; and Fig. 3 is a partly-sectional plan of a compound pulley having a friction-face, which is pressed against the fly-wheel or large pulley of the engine.

Similar letters of reference designate corresponding parts in the several figures.

Referring now to Figs. 1 and 2, A designates the cylinder of a gas-engine. B is the crank-shaft, and C is a fly-wheel or large pulley thereon. D designates a dynamo-electric machine, from which wires *d* lead to the spark-producing points, and on the armature-shaft of this machine is a small pulley, *d'*. No particular description of the individual construction of either the gas-engine or the dynamo-machine is necessary to a clear understanding of my invention.

In the ordinary operation of the engine the dynamo-machine is operated from a pulley, E, on the crank-shaft of the engine through belts E' E² and the compound pulley or wheel F, which receives both belts, and in the present example of my invention is grooved for the reception of round belts. The compound pulley or wheel F has a friction-face, which may be formed by the introduction of a strip of rubber, *f*, into a circumferential groove, *f'*, formed in the pulley, as shown in Fig. 3, and *f*² *f*³ designate grooves for the belts E² E'.

The pulley F is not mounted in a stationary bearing, but is on the counter-shaft or pin, which has its bearing in one arm of a lever, G, fulcrumed at *g*, and the other arm of which is constructed to form a handle, as shown in Fig. 1. By means of this lever the pulley may be moved from the position shown by full lines in Fig. 1 into that shown by dotted lines, and when in the position shown by full lines the pulley F is held with its friction-face *f* pressed against the fly-wheel or large pulley C of the engine by a lock or pivoted stop, *g'*, which engages with the lever G, as shown by full lines

in Fig. 1, or may be swung down out of the way, as shown by dotted lines in said figure.

In starting the engine the crank-shaft and fly-wheel or pulley C are rotated a few times by hand, and necessarily at a slow speed, and when the engine is to be started I may have to secure the lever G, so as to hold the friction-face of the compound pulley F in frictional engagement with the face of the fly-wheel or large pulley C, and, owing to the difference in diameter of the wheels F C, the wheel or compound pulley F is rotated at a very high speed, and transmits a corresponding high speed to the armature of the dynamo-electric machine D. The same movement which brings the wheel or pulley F into frictional engagement with the fly-wheel or pulley C slackens the belt E', and therefore leaves the pulley F free to receive from the wheel or pulley C a rate of speed which is proportioned to their difference in size. When the lever G is released and the pulley F moves into the position shown by dotted lines in Fig. 1, the belt E' is tightened and the parts are maintained in proper relation for the driving of the pulley F by the belt E'.

It will be seen that my invention is very simple and inexpensive, and the pulleys are so proportioned that when the pulley F is held in

frictional engagement with the wheel or pulley C the armature of the dynamo-machine D will receive a sufficient speed to produce a spark, while when the pulley is dropped away from the pulley or wheel C and is driven through the belt E' the armature of the machine will not receive a speed which is unnecessarily great.

It will be seen that the compound pulley F, with its friction-face and the pin on which it rotates, constitutes in effect a counter-shaft provided with a friction-wheel and pulleys for the belts E' E".

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

The combination, with a gas-engine and a dynamo-machine for producing an igniting spark, of a counter-shaft provided with a friction-wheel and with pulleys, which are connected by belts both with the engine-shaft and with the pulley of the dynamo-machine, and a movable bearing for said counter-shaft, whereby its friction-wheel may be moved into and out of frictional contact with the fly-wheel or large pulley of the engine, substantially as herein described.

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