No. 706,121. Patented Aug. 5, 1902.

F. R. SIMMS & R. BOSCH.

IGNITION GEAR FOR INTERNAL COMBUSTION ENGINES.

(Application filed Sept. 20, 1901.)

(No Model.) 2 Sheets—Sheet 1.

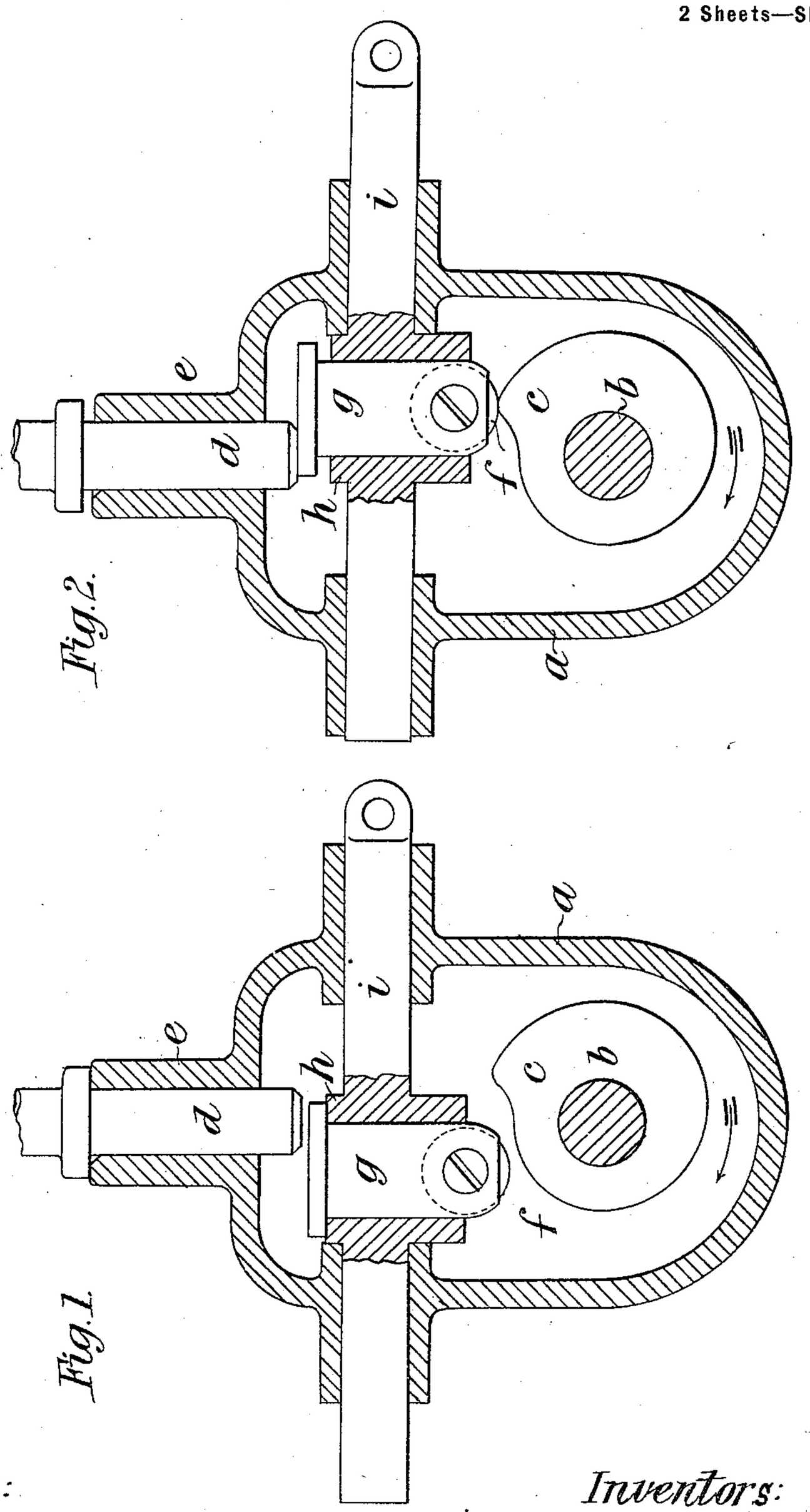

Fig. 2.

Fig. 1.

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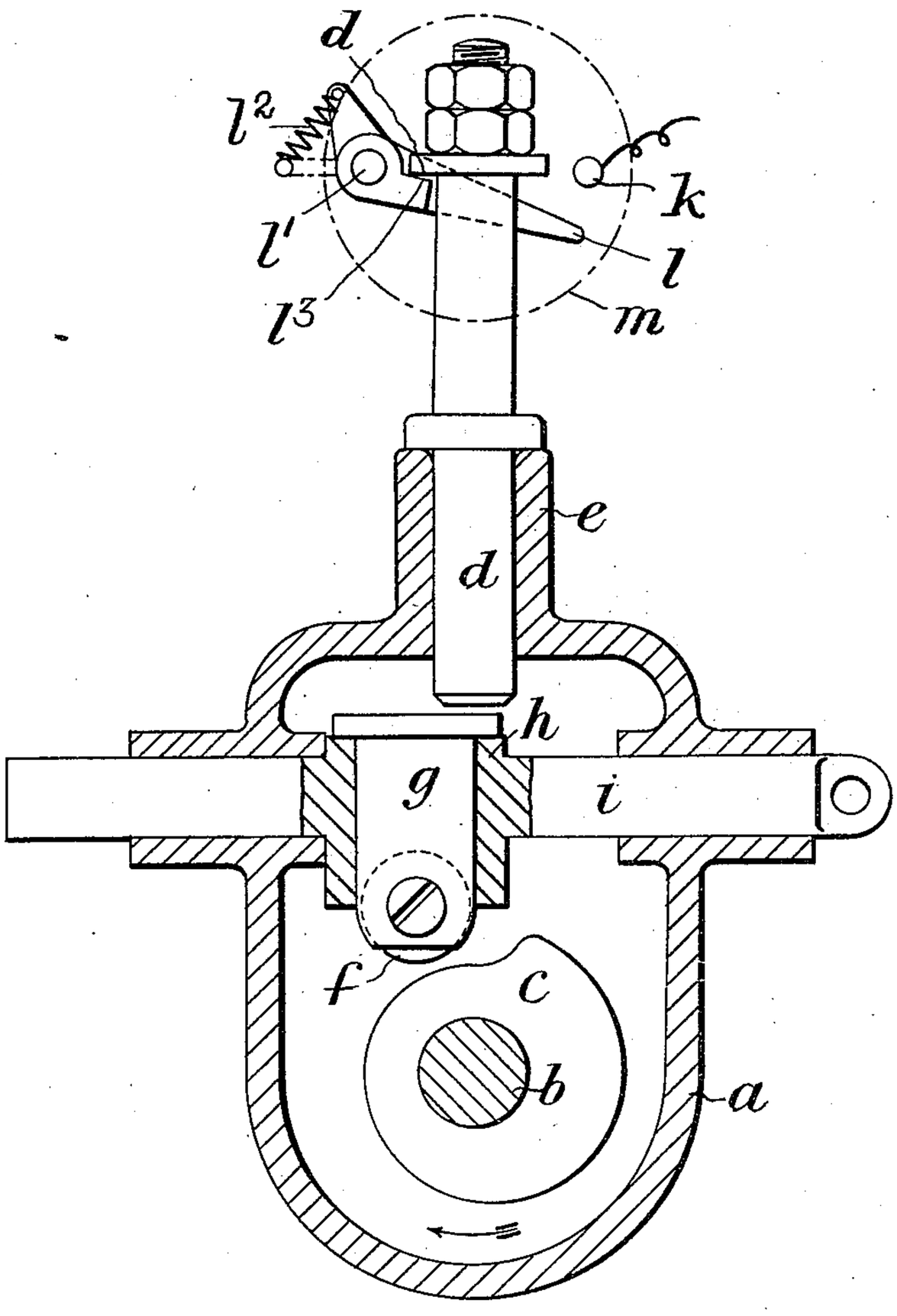
Fig. 3.



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UNITED STATES PATENT OFFICE.

FREDERICK RICHARD SIMMS, OF BERMONDSEY, ENGLAND, AND ROBERT BOSCH, OF STUTTGART, GERMANY.

IGNITION-GEAR FOR INTERNAL-COMBUSTION ENGINES.

SPECIFICATION forming part of Letters Patent No. 706,121, dated August 5, 1902.

Application filed September 20, 1901. Serial No. 75,862. (No model.)

To all whom it may concern:

Be it known that we, FREDERICK RICHARD SIMMS, a subject of the King of Great Britain, residing at 55ª Southwark Park road, Bermondsey, in the county of London, England, and ROBERT BOSCH, a subject of the Emperor of Germany, residing at 11 Hoppenlaustrasse, Stuttgart, in the German Empire, have invented new and useful Improvements in and Connected with Ignition-Gear for Internal-Combustion Engines, of which the following is a specification.

Our invention relates to improvements in ignition-gear for internal-combustion engines and to that class of such gear wherein a sparking device is operated from a counter-shaft through the medium of a cam which operates upon one end of a rod, the other end of which is connected to the sparking device. Hitherto in order to vary the point of ignition it has been necessary either to move the end of the shaft against which the cam operates in a lateral direction relatively with the shaft or to rotate the cam more or less relatively with the shaft.

The object of our present invention is to provide means for varying the speed without adopting either of the above-mentioned arrangements, both of which present certain disadvantages in practice.

According to our invention the operating-cam is located in an inclosed box, and the trip-rod, through the medium of which the sparking device is operated, is guided in the said box. Between the cam and the trip-rod we arrange a sliding push-piece, which serves to transmit the motion of the cam to the trip-rod, the position of which push-piece determines the point at which the trip-rod is acted upon by the cam.

To enable our invention to be fully understood, we will describe the same by reference to the accompanying drawings.

Figure 1 is a sectional view illustrating the arrangement wherein the push-piece is employed between the cam and the trip-rod; and Fig. 2 is a view similar to Fig. 1, but showing the parts in a different position. Fig. 3 is a view of our improved device in connection with an electric igniter or sparker.

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

a is the box or casing. *b* is the half-speed or counter shaft, which extends through the said box. *c* is the cam, fitted upon the said counter-shaft, and *d* is the trip-rod, by means of which the sparking device is operated and which is designed to move in a guide *e*, formed on the said box.

f is the roller against which the cam works. As shown in the drawings, this roller *f* is carried on the lower end of the push-piece *g*, which is carried in a socket *h*, formed in a bar *i*, which extends through and has bearings in the walls of the box *a* and which is adapted to be moved from the exterior of the said box by any suitable means for the purpose of varying the position of the said push-piece relatively with the cam and trip-rod. It will be obvious, assuming that the cam *c* is rotating in the direction of the arrow, Fig. 1, and the push-piece *g* occupies the extreme position to the left, as shown in the said figure, that the roller *f* will be acted upon by the cam much earlier in the stroke than if the said push-piece were to be moved to the extreme right hand of the box, as shown in Fig. 2, and that any point of ignition between these two extremes can be obtained by the proper adjustment of the rod *i*. In this arrangement the peak of the cam is parallel with the axis of the shaft *b*.

One arrangement for connecting the trip-rod *d* with an electric sparker or igniter is illustrated in Fig. 3, in which *k* represents the stationary contact, and *l* the movable contact, pivoted at *l'* to the support—for example, the usual igniter-plug *m*. (Indicated by dotted lines.) The movable contact *l* is provided with a spring l^2 for forcing it into contact with the stationary contact, and said movable contact is provided with an arm or shoulder l^3, adapted to be struck by a shoulder *d'* on the push-rod *d* when the roller *f* of the push-piece *g* slips off of the peak of cam *c*, thus separating the contacts abruptly and

causing the spark. As the trip-rod is raised gradually through the instrumentality of the cam *c* and push-piece *g*, the movable contact *l* is moved into engagement with the stationary contact and the operation is repeated.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

1. The combination with igniting devices provided with a movable member, of an igniter-operating cam, a slide, a push-piece carried by said slide and movable with respect thereto, said push-piece being interposed between the said cam and said movable member of the igniting devices, substantially as described.

2. The combination with the igniting devices provided with a movable member, of an igniter-operating cam, a slide adapted to be adjusted transversely with respect to the shaft of said cam, and provided with a socket, a push-piece movably engaging said socket and having a part to engage said movable member, and a part to engage said cam, substantially as described.

FREDERICK RICHARD SIMMS.
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