

No. 730,626.

PATENTED JUNE 9, 1903.

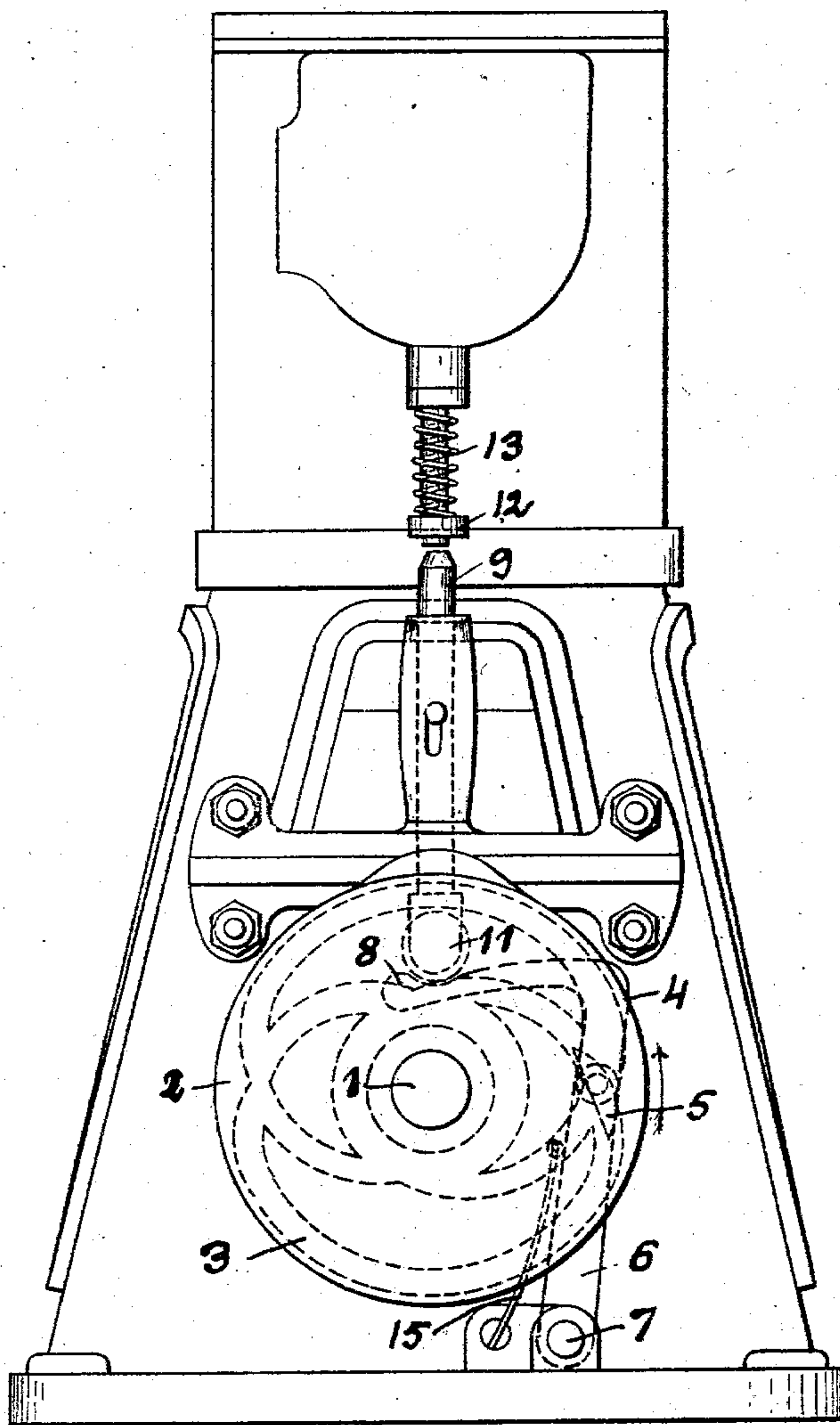
F. G. ERICSON.
INTERNAL COMBUSTION ENGINE.

APPLICATION FILED AUG. 14, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1



Witnesses:

John Delmar
Karl Runeskog

Inventor:

F. G. Ericson
by Olof Dahl
his att'y

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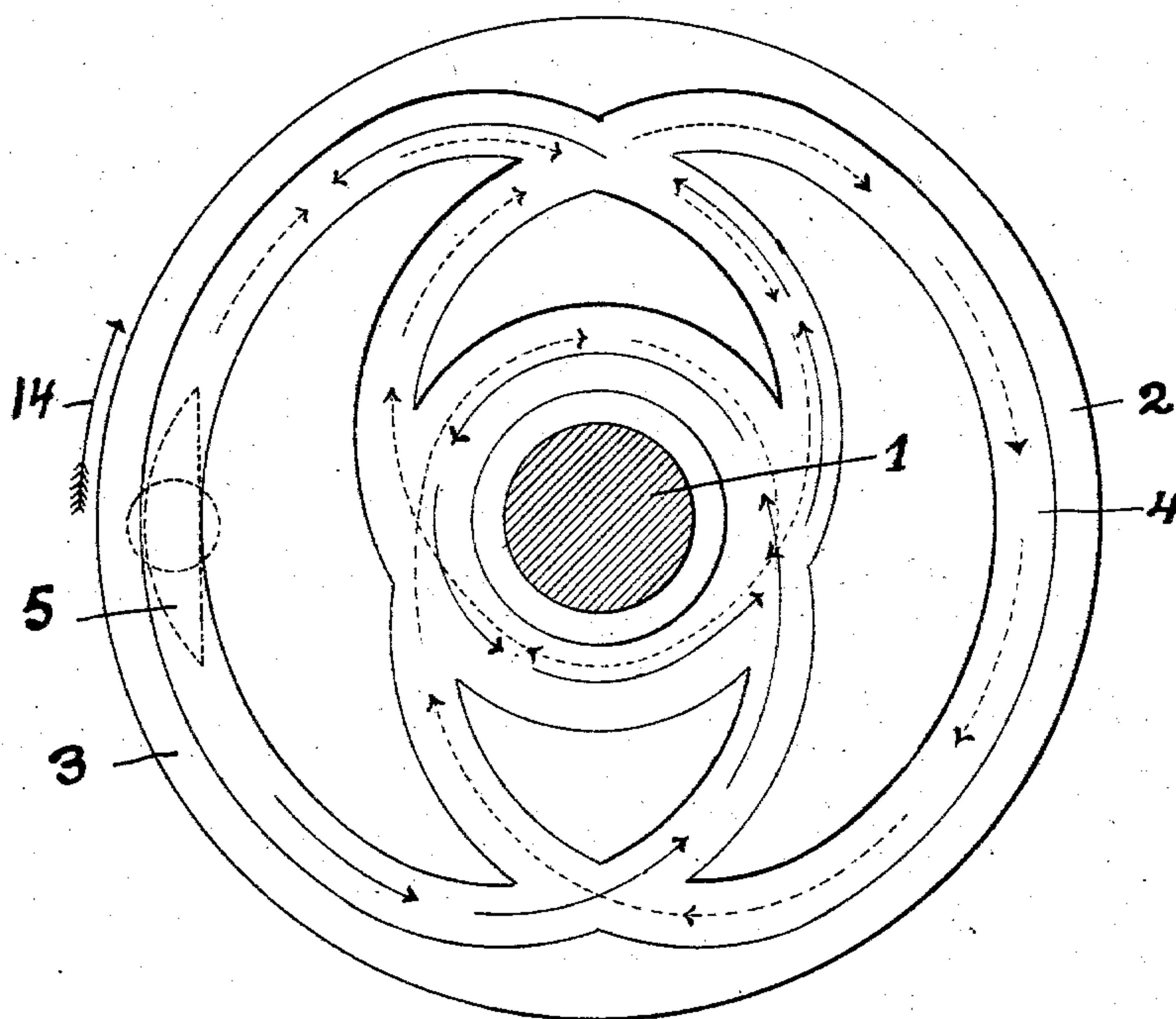
F. G. ERICSON.
INTERNAL COMBUSTION ENGINE.

APPLICATION FILED AUG. 14, 1902.

NO MODEL.

2 SHEETS—SHEET 2.

Fig. 2



Witnesses:
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UNITED STATES PATENT OFFICE.

FRITHIOF GUSTAF ERICSON, OF STOCKHOLM, SWEDEN, ASSIGNOR TO
AKTIEBOLAGET SVENSKA MOTOR-OCH NAF-FABRIKEN, OF STOCK-
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INTERNAL-COMBUSTION ENGINE.

SPECIFICATION forming part of Letters Patent No. 730,626, dated June 9, 1903.

Application filed August 14, 1902. Serial No. 119,628. (No model.)

To all whom it may concern:

Be it known that I, FRITHIOF GUSTAF ERICSON, a subject of the King of Sweden and Norway, and a resident of 6, Teatergatan, Stockholm, Sweden, have invented new and useful Improvements in Internal-Combustion Engines, of which the following is a specification, reference being had to the drawings accompanying and forming a part hereof.

The present invention relates to improvements in cam-disks for operating the exhaust-valve in four-stroke internal-combustion engines.

Reversing devices for internal-combustion engines—gas-engines, petroleum-engines, or the like—in which "Otto's" cycle is employed, heretofore known are generally constructed in such manner that part or parts of the engine operating the exhaust-valve must be adjusted in a certain manner each time the engine is to be reversed, and in the most cases the said adjustment cannot be made without stopping the engine, which, as easily understood, essentially limits the use of the engines of the said kind.

The object of the present invention is to provide a cam-disk for operating the exhaust-valve of the engine, which cam-disk will allow the engine to run in both directions without adjusting any part or parts of the same.

The invention consists, briefly, in providing on a cam-disk a cam-slot having two symmetrically-arranged parts, each of which is capable of guiding suitable devices, so that the exhaust-valve of the engine will be opened once for every two revolutions of the crank-shaft of the engine.

In the accompanying drawings I have illustrated a suitable constructional form of the present invention.

Figure 1 shows in side elevation an internal-combustion engine provided with a cam-disk constructed in accordance with my present invention. Fig. 2 shows on an enlarged scale an end view of said cam-disk.

Referring to the drawings, the cam-disk 2 is rigidly fixed to the crank-shaft 1 of the engine, the said cam-disk 2 being provided on the one of its end surfaces with a cam-slot

having two symmetrical parts 3 and 4, the shape of which is more clearly illustrated in Fig. 2. The arrangements by means of which the said cam-disk operates the exhaust-valve may be carried out in any convenient manner and consists according to the drawings of a sliding piece 5, running in the said cam-slot 3 4 and pivotally fixed to an arm 6, which by means of a pin 7 may be pivotally connected to the frame of the engine. A roller 11, fixed to a rod 9, which in well-known manner actuates the stem 12 of the exhaust-valve, is adapted to run on a curved part 10 of the said arm 6 and to be lifted by an eccentric part 8 of the same when the said arm 6 is in the one of its end positions, so as to open the exhaust-valve. The stem of the latter may, as usual, be provided with a spring 13, which tends to hold the exhaust-valve in closed position.

Referring to Fig. 2, the arrows shown by full lines in the part 3 of the cam-slot show the way of the sliding piece 5 when the cam-disk rotates in the direction of the arrow 14, while the arrows shown by dotted lines in the part 4 of the said cam-slot shows the way of the said sliding piece 5 when the cam-disk rotates in the opposite direction. If either of the said ways be traced, it will be seen that the said sliding piece 5 passes the outer part of the way 3 or 4 one time for every two revolutions of the cam-disk, thereby turning the arm 6 into the right end position in Fig. 1, so as to effect the opening of the exhaust-valve. In order to prevent the sliding piece from passing over from the way 3 into 4, or vice versa, when the cam-disk rotates in one and the same direction, the said arm 6 may be actuated by a spring 15, as illustrated in Fig. 1. If the sliding piece 5, as shown by full lines in Fig. 2, runs in the part 3 of the cam-slot and the direction of rotation of the cam-disk 2 be reversed, the sliding piece 5 will run in the direction of the dotted arrows in said part 3 of the cam-slot and pass into the central part of the latter and thereupon into the part 4 of the same, from which it cannot return unless the direction of rotation of the cam-disk is again changed.

Obviously the cam-disk 2 need not be fixed

to the crank-shaft of the engine. It is only necessary that the cam-disk is driven at the same speed as said shaft and may thus be arranged at any suitable place in the engine
5 and be driven in any convenient manner.

Having now described my invention and in what manner the same may be performed, what I claim as new, and desire to secure by Letters Patent, is—

10 The combination with a four-stroke internal-combustion engine, of a cam-disk provided on the one of its side faces with a cam-slot consisting of two symmetrically-arranged

parts the one of which operates the exhaust-valve at the right time when the engine runs 15 in the one direction, while the other part operates the exhaust-valve at the right time when the engine runs in the opposite direction, substantially as and for the purpose set forth.

In testimony whereof I have signed my 20 name to this specification in the presence of two subscribing witnesses.

FRITHIOF GUSTAF ERICSON.

Witnesses:

GERDA LINDKVIST,
JOHN DELMAR.