

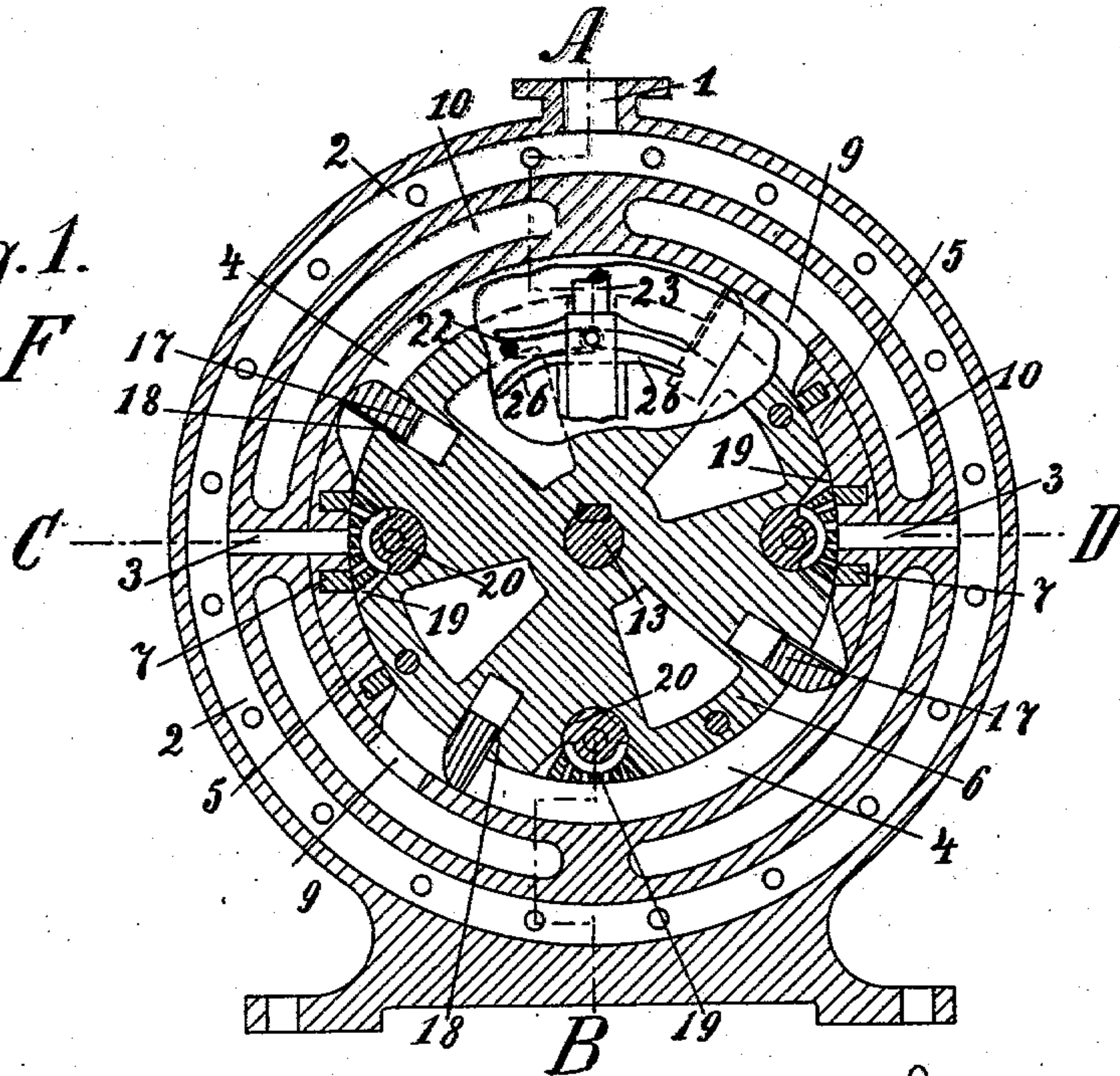
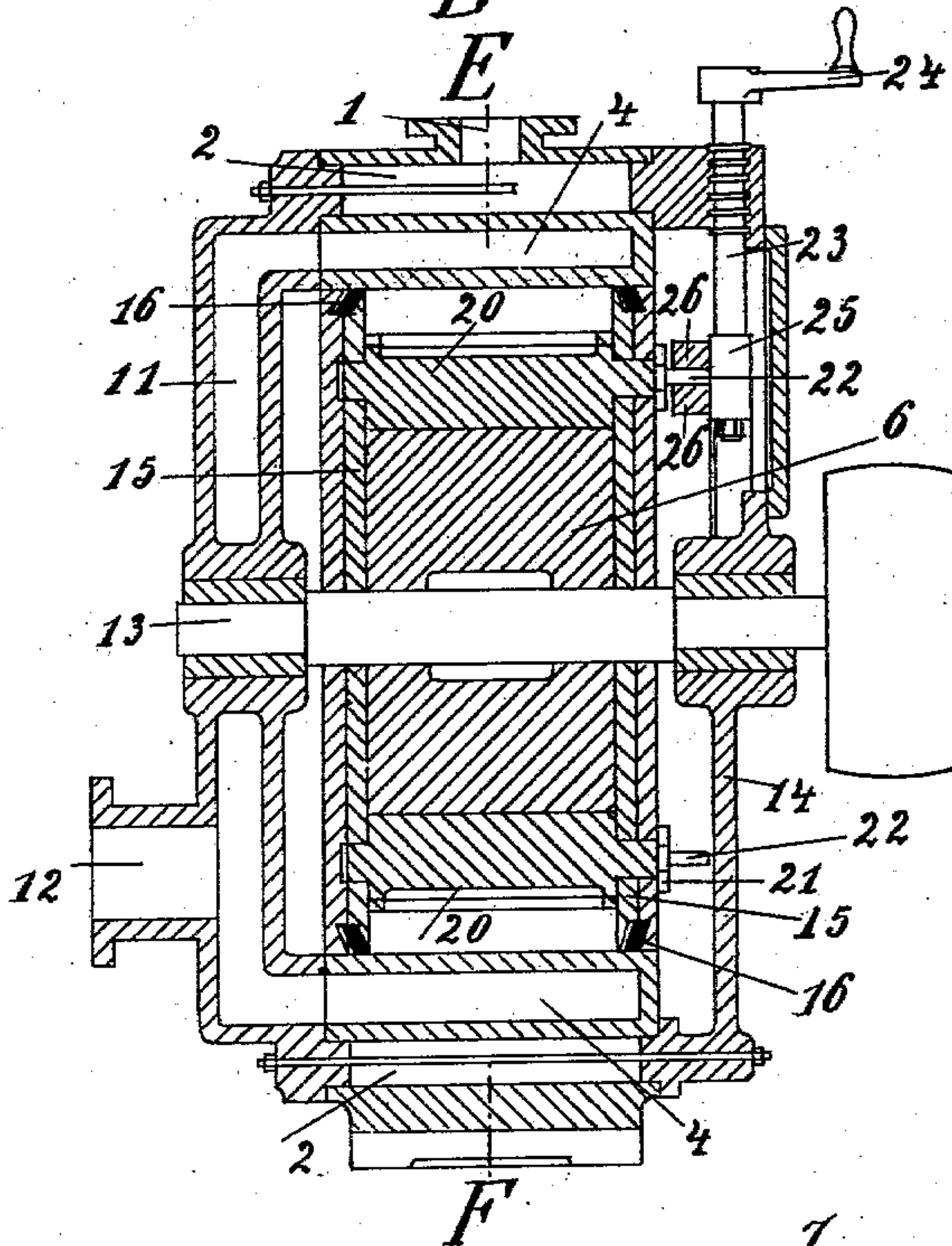
T. DUYSSENS & P. KLIJNEN.

ROTARY STEAM ENGINE.

APPLICATION FILED JUNE 22, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.
E-FFig. 2.
A-B

Witnesses:

Fr. Schingen.
Krist. Bull.

Inventors:

Jossanus Duyssens.
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2 SHEETS—SHEET 2.

Fig. 3.
C-D

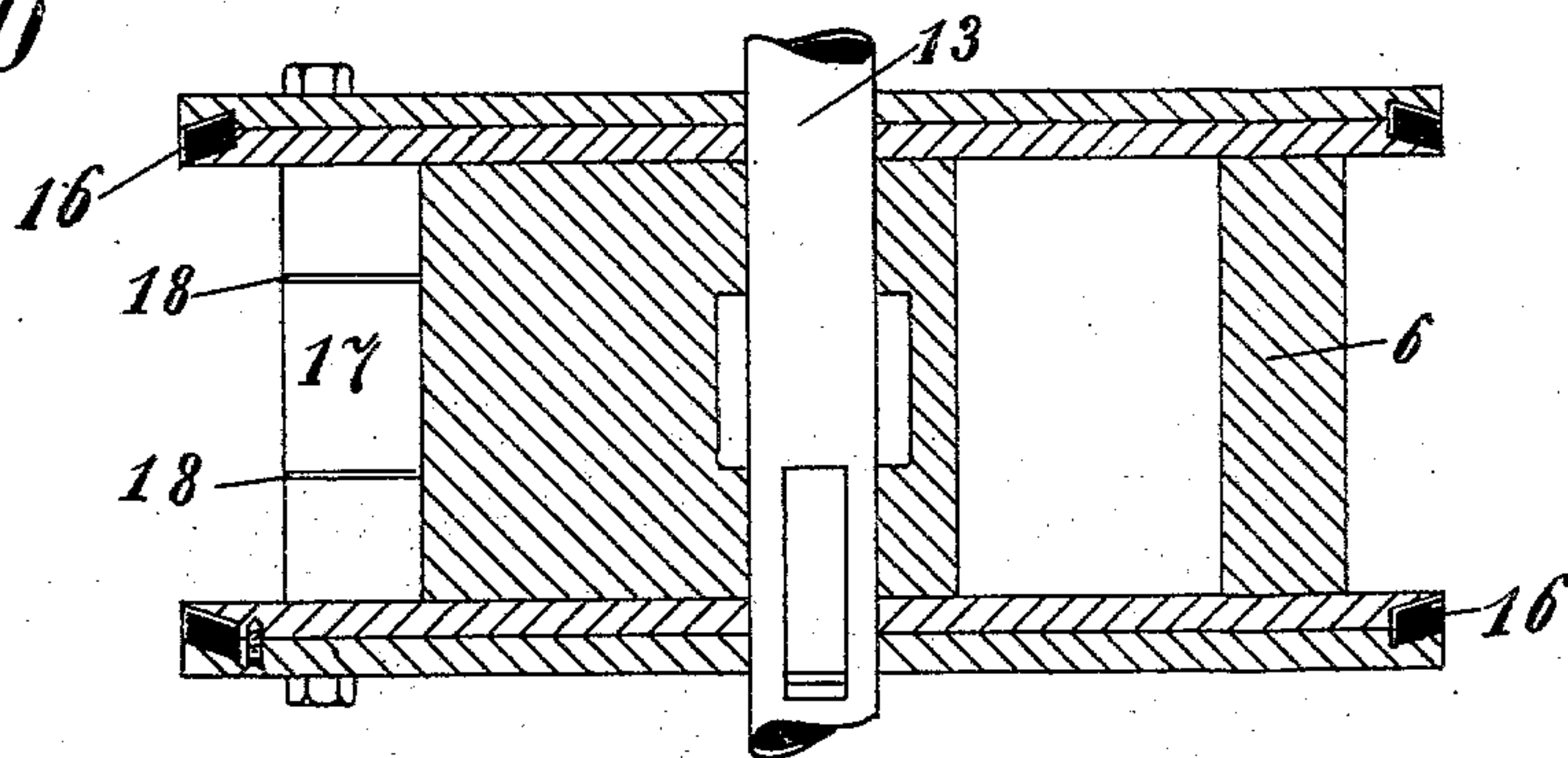


Fig. 4.

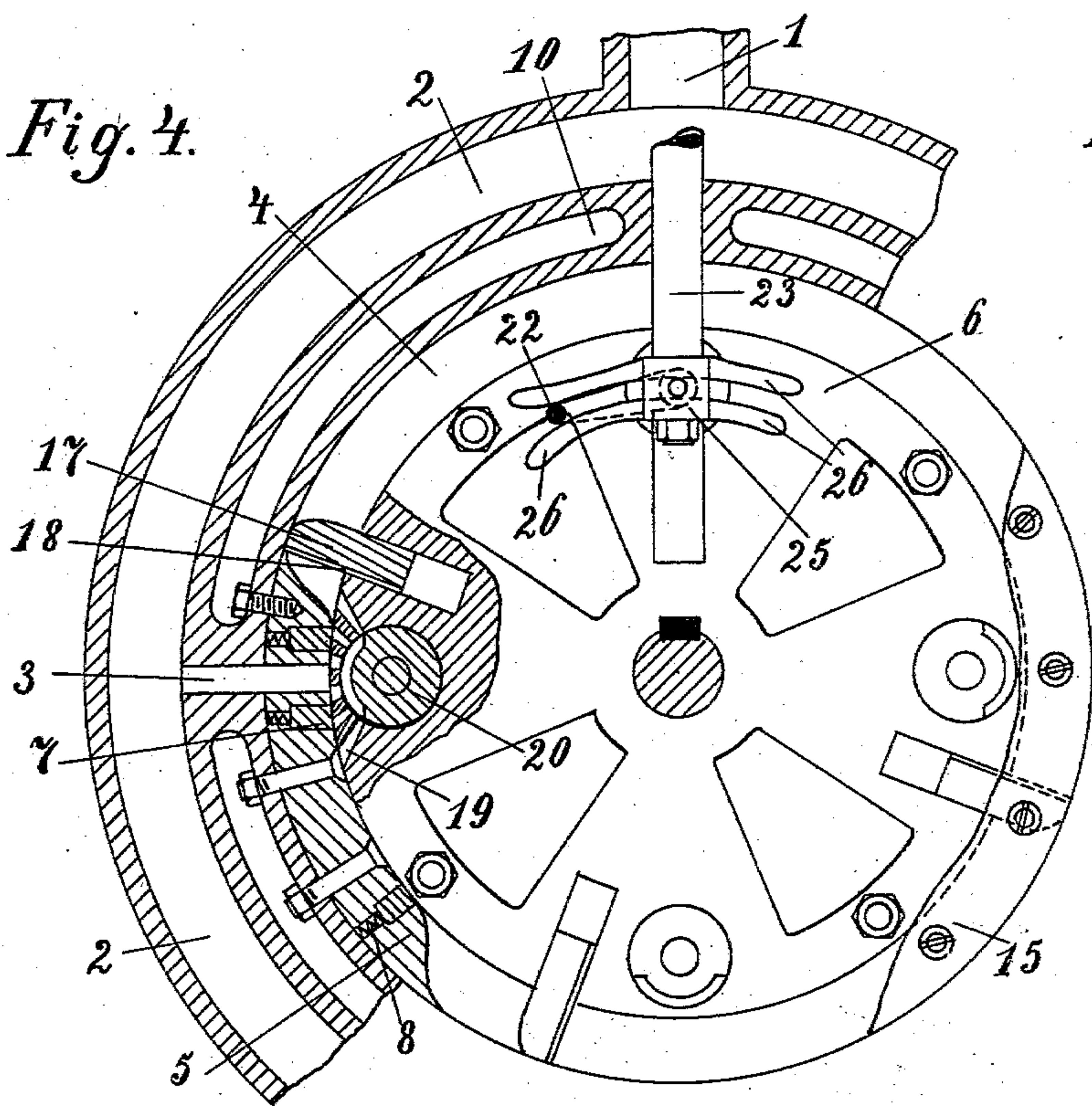
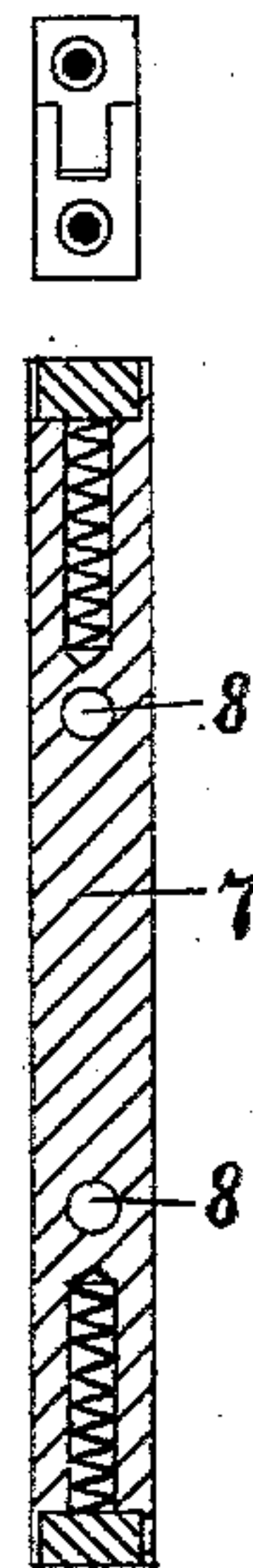


Fig. 5.



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UNITED STATES PATENT OFFICE.

TOSSANUS DUYSENS, OF MAASTRICHT, AND PIERRE KLIJNEN, OF BREDA,
NETHERLANDS.

ROTARY STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 740,544, dated October 6, 1903.

Application filed June 22, 1903. Serial No. 162,624. (No model.)

To all whom it may concern:

Be it known that we, TOSSANUS DUYSENS, residing at No. 70 Pieterstraat, Maastricht, and PIERRE KLIJNEN, residing at No. 17^A Torenstraat, Breda, Netherlands, subjects of the Queen of the Netherlands, have invented a new and useful Improvement in Rotary Steam-Engines, of which the following is a specification.

10 The present invention relates to a steam-engine with rotary piston in which the utilization of the driving-steam can, according to requirements, either be full or by adjustable and variable expansion.

15 It is well known that there are steam-engines with rotary pistons which also in a certain sense possess expansion, because the working steam exercises its pressure against the paddles until the latter pass over the outlet-orifice; but these machines work with an incomplete expansion, because this is an invariable one with relation to the determined amount of energy developed. Moreover, these machines work with a one-sided steam-pressure. By reason of this there is caused a one-sided axial pressure which forces the piston against the side wall of the casing and causes an undue friction and braking thereof. Such machines will therefore work only with a low steam-pressure and are not economical, because the energy developed is not in a satisfactory proportion to the amount of steam consumed.

35 The rotary steam-engine which forms the object of the present application avoids these drawbacks. In it the steam is allowed to act without cooling against the blade of the piston and, moreover, according to the energy required, either with a full steam-pressure or with reduced and adjustable expansion. The invention therefore obviates the sidewise braking of the piston or of its axle.

In the accompanying drawings the new rotary steam-engine is illustrated as follows:

45 Figure 1 shows a section on the line E F; Fig. 2, a section on the line A B. Fig. 3 shows a cross-section of the piston, on a larger scale, on the lines C D. Fig. 4 shows the piston also on an increased scale, with the important parts which operate the introduction of the

steam against the movable blades under full pressure or under the reduced variable expansion. Fig. 5 shows a detail of the construction.

The working steam enters through the pipe 1 into the annular space 2, with which the inlet-channels 3 communicate. In the drawings two such channels are shown opposite one another. If three or more such channels are present—for instance, in large machines—then they are placed in the annular casing 1 at equal intervals from one another. At the inlet-channels 3 there are in the innermost space 4 of the housing secured and closely attached the round pieces 5 with beveled ends, on which the inner part of the rotary piston 6 fits steam-tight with its periphery by aid of the packing 7, Figs. 4 and 5. The latter are stretched by means of the spiral springs 8, Fig. 4. The outlet-channels 9 lead from the innermost space 4 into the intermediate spaces 10, and from thence into the double cover 11 or into the outlet projections 12.

In the interior 4 of the housing the piston 6 revolves upon the axle 13. This axle bears a belt-pulley or gear-wheel and revolves in the bearings of the cover 11 and 14. The piston runs free at one side and consists of the center 6 and the two disks 15, fixed on both sides thereof, which in order to tightly close their peripheries against the casing are provided with the circular springs 16, Figs. 2 and 3. In the rotor 6 are placed steam-tight between the disks the sliding paddles 17. Against these the steam presses, and they are by means of this pressure, which enters through the cavities 18, forced from underneath against the casing. The steam-pressure against the faces of the paddles is supplied through inlet-channels and through the openings 19, which are on the periphery of the rotor-piston. In this latter are placed the steam-cocks 20, (in the drawings four of these are shown,) at whose periphery there are cavities from which the steam passes to its inlet-channels 3 and through the openings 19 against the paddles 17 at their emergence from the parts 5. The variable expansion is effected by means of these cocks. According to the adjustment thereof more or fewer steam-orifices are opened or closed. In the

figures shown in the drawings they are all shown open. By means of the turning of each cock and the partial shutting off of the steam-openings 19 thereby obviously the steam-supply against the paddles will be made greater or smaller, and thereby, also, the subsequent expansion will be altered. The turning of the cocks is effected during the operation of the machine. They are fitted at both sides steam-tight in the piston-disks 15. At each side the axle passes through the disks 15, and each possesses also a guiding-lever 21, which has at its free end a round pin 22. At this side of the rotary piston there is placed the screw-spindle 23. This stands sidewise to the casing and bears at its upper end the crank 24. On the lower end it bears in side guides on the cover 14 a projection 25, capable of being pushed up or down, which latter has on its inner surface the tongues 26, between which the pins 22 of the steam-cock lever 21 pass as the piston rotates.

It will be obvious that according to the adjustment of the screw-spindle 23 higher or lower, and consequently of the piece 25, a different turning of the cocks as their projections pass between the tongues 26 will be effected, and consequently, also, the opening or closing of the steam-orifices upon the periphery of the piston-core. Thereby the alteration of the steam expansion will follow. It is not necessary that this expansion-adjustment mechanism should be placed vertical, as in the drawings. It could equally well be arranged horizontally.

Let us now again consider the utilization of the steam. Fresh steam passes through the nozzle 1 into the outer casing 2 and from thence through the inlet-channels 3 and the steam-ports 19 by means of the cavity in the cocks 20 against the paddles standing in the front of each cock. As soon as each such paddle, which on the passing beneath a projection was forced back into the piston, again springs out upon passing over the same it receives again the steam-pressure from the uncovered steam-orifices of the next following cock, Fig. 4. This volume of steam is controlled by the position of the cock according to the number of the orifices not covered thereby. This position of the cock depends, moreover, upon the position of the tongues 27 and that in turning upon the raising or the lowering of the screw-spindle 23. The steam-pressure drives each paddle until it has passed over one of the outlet-openings 9. Up to that point, however, it is only operated by the fixed expansion. The machine works without any danger of a one-sided friction. Stuffing-boxes or other parts which are difficult to make steam-tight are avoided. The

piston is steam-tight against the casing all around and runs free sidewise.

This machine works as well as expansion steam-engines with reciprocating pistons and will, moreover, better effect the work of transmitting, because it needs neither a controlling mechanism nor a fly-wheel.

What we claim is—

1. In a rotary steam-engine a stationary hollow casing, a steam-inlet into the space within said casing, internal channels communicating with said space, projections surrounding said channels, a revolving member, a plurality of ports in said revolving member adapted to be wholly or partly closed by mechanism, and means for rendering the revolving member steam-tight in relation to the internal periphery of the stationary casing, substantially as set forth.

2. In a rotary steam-engine a stationary hollow casing, a doubly-divided annular space within said casing, a steam-inlet delivering into the outer annulus of said casing, channels communicating with said outer annulus and with the interior of the motor, bosses on the internal walls of the inner stationary casing surrounding the orifices of said channels spring-pistons on said bosses, a cylindrical rotary member in frictional contact with said bosses, steam-ports plurally grouped on the circumference of said rotary member, rotary adjustable valve-cocks adapted wholly or partly to close or open said steam-ports spring-projected paddles on the periphery of said rotary member, escape-channels for exhaust-steam from the internal cavity of said stationary casing, means for controlling the opening and closing of the rotary steam-cocks, and means for transmitting the rotary energy of the revolving member, substantially as set forth.

3. In a rotary steam-engine an outer stationary casing, a double inner casing means for admitting steam to the interior of said inner casing, a rotary member in said inner casing in frictional contact therewith at given points, steam-impelled paddles on said rotary member, the steam-cocks 20 in said rotary member, the levers 21 projecting from the ends of said cocks and the spindle 23 and tongues 26 adapted to control the opening or closing of said cocks, substantially as described.

In witness whereof we have signed our names to this specification in the presence of two subscribing witnesses.

TOSSANUS DUYSSENS.
PIERRE KLIJNEN.

Witnesses:

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JOHANNES D. FÜHRING.