

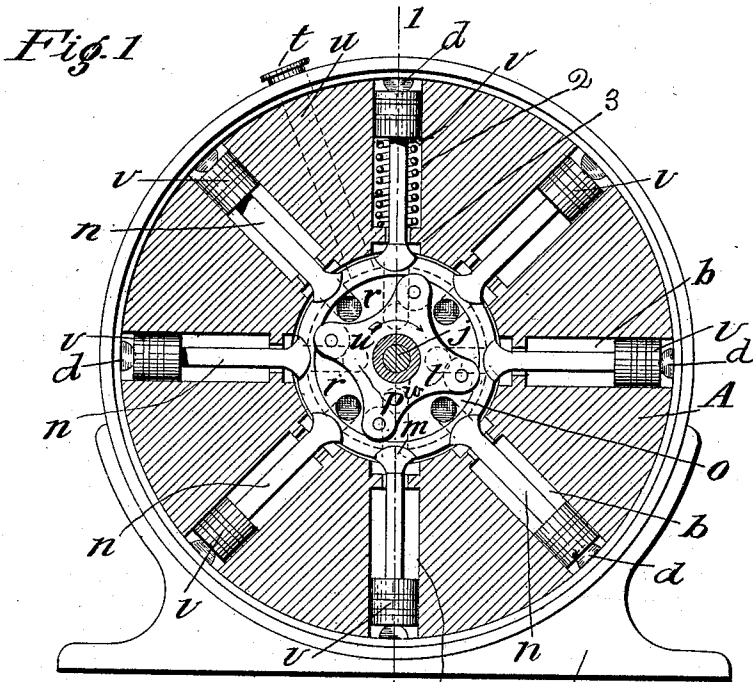
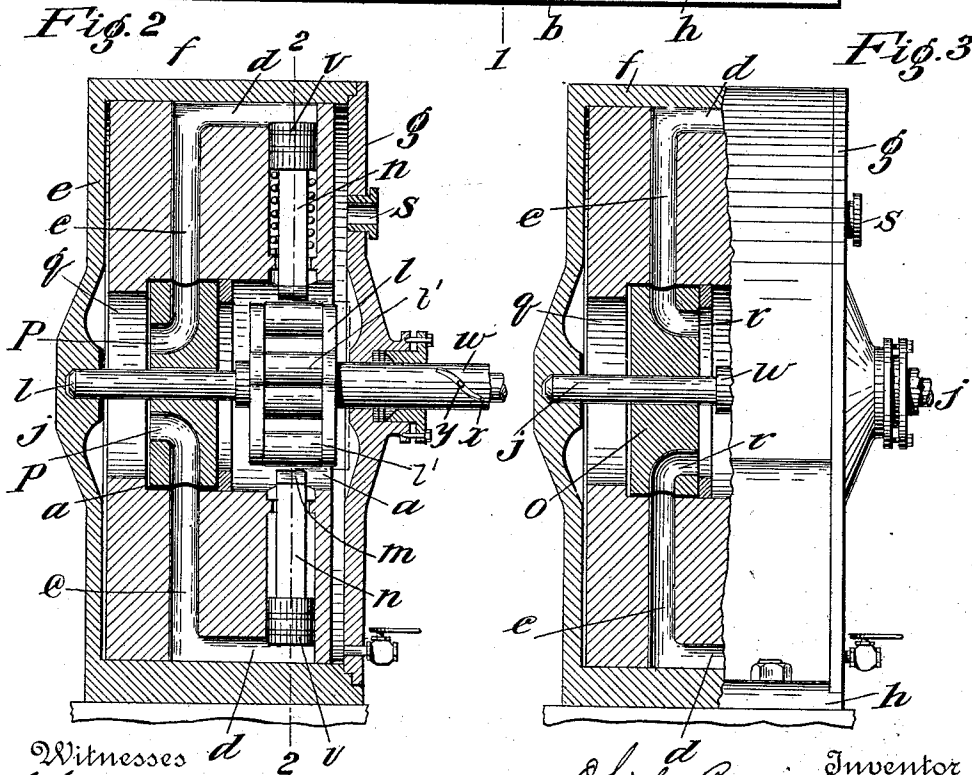
No. 717,445.

Patented Dec. 30, 1902.

O. B. NESTIUS.  
ENGINE.

(Application filed June 14, 1902.)

(No Model.)



Witnesses  
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J. M. Howard.

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# UNITED STATES PATENT OFFICE.

OLOF BOGISLAUS NESTIUS, OF STOCKHOLM, SWEDEN.

## ENGINE.

SPECIFICATION forming part of Letters Patent No. 717,445, dated December 30, 1902.

Application filed June 14, 1902. Serial No. 111,726. (No model.)

*To all whom it may concern:*

Be it known that I, OLOF BOGISLAUS NESTIUS, a subject of the King of Sweden and Norway, and a resident of Stockholm, Sweden, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

My invention consists of an improved construction of a series of single-acting cylinders and pistons arranged radially to a common center and in fixed positions, with ram-headed piston-rods constituting steam-rams to act on the extremities of radial arms carried on a shaft in the axis of the radially-disposed rams, with a single contrivance of radially-disposed distributing-passages controlled by a rotating disk valve located in a plane parallel with the plane of the rams and the arms on which the rams act, as hereinafter described, reference being made to the accompanying drawings, in which—

Figure 1 is a vertical section of the engine on the line 2 2 of Fig. 2. Fig. 2 is a vertical section on line 1 1 of Fig. 1, showing the admission-ports. Fig. 3 is a vertical section in part showing the exhaust-ports.

A represents the cylinder-body, which in this example of my invention is represented in the form of a solid disk having an axial bore *a*, numerous radial cylinder-bores *b*, and radial and lateral steam-passages *c d* in different planes and being inclosed in a cylindrical case *e f* and a cover *g*, said case being mounted on a stationary base *h* and fitted steam-tight at the periphery in said case. The construction of the cylinder-body may, however, be modified at will in respect to its form. The shaft *i* is arranged axially in the case and cylinder-body, with suitable bearings at *j* and *k*, and carries in the plane of the cylinder-bores *b* a series of radial arms *l*, on which the ram-heads *m* of the piston-rods *n* act to rotate the shaft. In this example of my invention there are four of the driving-arms and eight of the driving-rams, and the organization is such that while one alternate series of the rams are moving forward and impelling the driving-arms the rams of the other series are retiring preparatory to effecting the next impelling action. For effecting

such operations a disk valve *o* is carried on the shaft *i* in the plane of the radial parts *c* of the steam-passages. The peripheral face of said valve fits steam-tight in the bore *a* of the steam-cylinder body and has four inlet-ports *p* on one side communicating with space *q*, which may be called the "steam-chest," and four outlet-ports *r* on the other side discharging into the space thereat, with which the exhaust-pipe connects at *s*. The live-steam pipe is connected at *t*, from which there is communication with steam-chest *q* through the passage indicated in dotted lines at *u*. The inlet and outlet ports *p* and *r* are arranged alternately with each other and alternately open and close communication with passages *c d*, which communicate with the cylinder-bores *b*, behind the pistons *v* thereon, and thus admit and exhaust the steam, so that while one series of four rams are being impelled forward to impel the arms *l* the other series are being retired preparatory to the next admission of steam to the other series of cylinders, and so on. It is to be noticed that the impelling-arms are so adjusted on the shaft in their angular relation to the valve-ports and the rams that admission begins at the moment the arms pass the radial lines of the rams far enough for the rounded ram-heads to have laterally-impelling effect on the rounded ends of arms *l*, and these arms carry friction-rollers for economizing in friction. The impelling-arms are carried on a sleeve *w*, fitted to the shaft, so that the arms may be shifted forward or backward in angular relation to the valve for reversing the motion of rotation, as common in the use of rotary valves, by various contrivances of well-known means, one form of which is indicated by the spiral slot *x* in the sleeve, radial sliding pin *y* of the shaft, and the rod *z* in the center bore of the shaft for shifting the sliding pin; but this is only shown to indicate the feasibility of such reversal and is not claimed herein. In this case I represent spirally-coiled springs *2* as the means of retiring the rams, said springs being located between the pistons *v* and shoulders *3* in the cylinder-bores, so as to be compressed when the pistons are actuated by the steam and to recoil

and retire the rams when exhaust takes place; but any other approved means of retiring the rams may be employed.

What I claim as my invention is—

5 The combination with a shaft having a series of radial impelling-arms in a transverse plane of the shaft, and a disk valve in another transverse plane thereof, said valve having a circumferential seat, inlet-ports of one side  
 10 and outlet-ports of the other side placed alternately of each other circumferentially and both inlet and outlet ports having issue through the peripheral face of the valve in one transverse plane of the shaft, of a series  
 15 of steam-rams radially disposed in the plane of the impelling-arms, and adapted to act on the extremities of said arms respectively, and

steam-passages communicating between the ram-cylinders and the valve-seat whereby through the rotation of the valve the inlet 20 and exhaust ports following each other in succession admit and exhaust the steam to and from the steam-rams in like succession, said arms having the angular advance relatively to the valve-ports whereby when contact of 25 the rams with the arms occurs they have lateral impelling effect on the arms.

Signed at Stockholm this 25th day of April, 1902.

OLOF BOGISLAUS NESTIUS.

Witnesses:

CARL C. MÖLLER,  
 ANDRU. OHNSSON.