

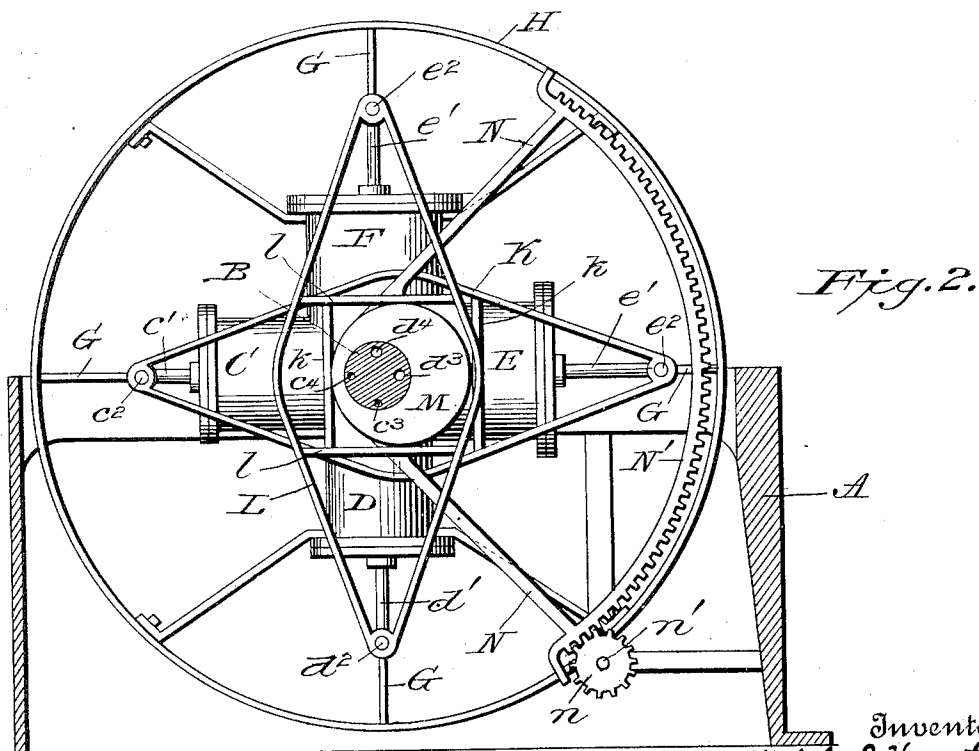
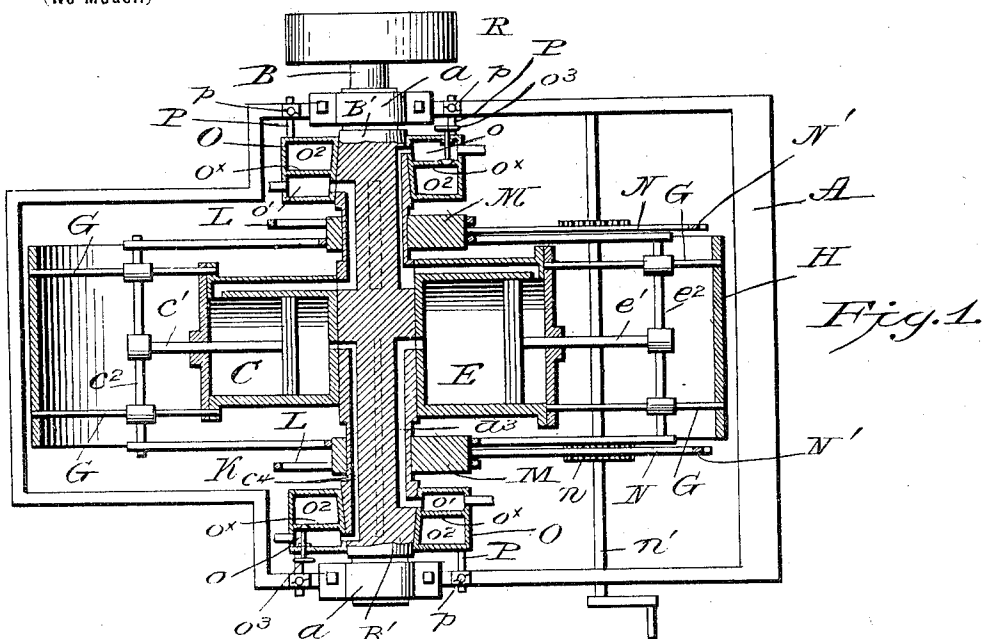
No. 674,047.

Patented May 14, 1901.

N. J. VERRET.
ENGINE.

(Application filed Apr. 19, 1900.)

(No Model.)



Witnesses

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UNITED STATES PATENT OFFICE.

NICHOLAS J. VERRET, OF LITTLE ROCK, ARKANSAS, ASSIGNOR OF TWO-THIRDS TO HENRY N. SAMSTAG AND CHARLES H. ROSS, OF SAME PLACE.

ENGINE.

SPECIFICATION forming part of Letters Patent No. 674,047, dated May 14, 1901.

Application filed April 19, 1900. Serial No. 13,506. (No model.)

To all whom it may concern:

Be it known that I, NICHOLAS J. VERRET, a citizen of the United States, and a resident of Little Rock, in the county of Pulaski and State of Arkansas, have invented an Engine, of which the following is a specification.

This invention is an improvement upon the engine shown and described in my prior application for patent filed June 14, 1899, Serial No. 720,550, patented March 27, 1900, No. 645,985.

The present invention embodies the feature of arranging a number of high and low pressure cylinders around a common shaft having steam induction and eduction ports or passages leading to and from said cylinders and connecting the pistons of the cylinders to yoke-frames which engage eccentrics to convert the reciprocating motion of the yoke-frames to a rotary motion transmitted to the shaft to which the cylinders are secured, forming a simple, strong, and compact engine requiring but a comparatively small amount of floor-space.

The following specification enters into a detail description of my improved engine, reference being had to the accompanying drawings, and to letters thereon which designate the different parts, and what I claim as new in the construction and combination is more specifically set forth in the appended claims.

In the drawings which form a part of this specification, Figure 1 is a horizontal sectional view through an engine constructed in accordance with my invention. Fig. 2 is a side elevation, partly in section, the section being taken on the line 2 2.

In the engine forming the subject-matter of my prior application, hereinbefore referred to, only a single cylinder and piston were employed to reciprocate a pair of yoke-frames working in unison, and though this style of engine operated very well it could not develop the requisite power and was likely to stop on a dead-center. These objections are fully and completely overcome in the engine of the present application by providing a plurality of cylinders which are arranged around the shaft and reciprocate a pair of yoke-frames disposed at right angles to each other, the prin-

ciples involved in the construction and operation of this engine being similar to those embodied in the engine of said prior application.

The supporting-frame of the engine consists of the rectangular frame A, upon which are mounted bearing-boxes *a* for the horizontal shaft B of the engine, said shaft supporting the mechanism, hereinafter described, by which it is rotated.

Upon the central portion of shaft B, between the supporting-standards, are mounted a plurality of cylinders, preferably four as shown, (designated by the letters C, D, E, and F,) said cylinders being arranged around the shaft, with cylinders C and E on a line with each other and cylinders D and F on a line at right angles thereto or arranged in tandem parts, as shown. Cylinders C and D are high-pressure cylinders, while cylinders E and F are low-pressure, for the purpose hereinafter explained. Working in these cylinders are pistons having rods *c*, *d*, *e*, and *f*, which pass through the outer heads and are connected to cross-heads *c*², *d*², *e*², and *f*², and these cross-heads slide upon guide-bars G, secured upon opposite sides of the cylinders and arranged in parallel pairs. The outer ends of the guide-bars are secured to a rim H, of suitable weight, forming practically a fly-wheel, of which the guide-bars are the spokes and the cylinders and shaft the hub. The rim may be, and preferably is, further braced from the cylinders, as shown. The cross-heads project laterally beyond the slides, and to the ends thereof are connected yoke-frames K and L, yoke-frame K being connected to the pistons operating in the cylinders C and E, while yoke-frame L is connected to the pistons operating in cylinders D and F. These yoke-frames consist of outwardly-curved side bars connected by cross-bars *k k* and *l l*, respectively, which bear against opposite sides of an eccentric or cam wheel M, loosely mounted on the shaft B and connected by rods N to a segment-rack N', by which it is turned. Said eccentric or cam wheel has a periphery sufficiently wide to provide a bearing for the two yoke-frames, and it will be noted that as the yoke-frames are at right angles to each other

the cross-bars k k and l l thereof are also at right angles to each other. The segment-rack N' is turned by means of a pinion n on a shaft n' , the latter being supported in the frame 5 and has a crank-handle at one end.

The major part of the shaft B is enlarged to provide for the location of steam ports or passages therein and not be weakened thereby and at its ends is still further enlarged 10 and tapered, as shown, to form conical portions B' , upon which steam-chests are mounted. Ports or steam-passages c^3 d^3 and c^4 d^4 extend from the several cylinders along the shaft in opposite directions and open out at 15 the conical portion thereof, and it will be noted that the smaller ports or passages c^3 and c^4 open out at the outer end of the conical portion of the shaft, while the larger ports d^3 and d^4 open out at the inner end of said 20 conical portions.

O O designate the steam-chests, which are mounted upon the conical or tapered portions of the shaft and are supported by arms P, which are adjustably secured to the frame 25 by set-screws p to provide for adjusting the steam-chests upon the conical portions of the shaft to take up wear. The steam-chests are each provided with a partition o^x , forming a steam-chamber o , exhaust-chamber o' , and an 30 intermediate chamber o^2 , communication between the steam and intermediate chambers being provided for by means of a valve o^3 . It will be noted that the steam-supply chamber only communicates with the ports which 35 lead to the high-pressure cylinders when the valve is closed and that said high-pressure cylinders exhaust into the intermediate chamber and the exhaust-steam is conveyed to the low-pressure cylinders and that the latter ex- 40 haust the steam into the exhaust-chamber of the steam-chest. By opening the valve live steam is also admitted directly to the low-pressure cylinders.

Upon one end of the shaft B is attached a 45 pulley R, by which the power of the engine may be transmitted for running machinery or for other purposes.

The operation of the engine herein shown and described is similar to the operation of 50 the engine forming the subject-matter of my prior application for patent, for it will be understood that as the axis of the wheel M is to one side of the axis of shaft B, forming an eccentric of said wheel, the longitudinal center 55 of the yoke-frames will be near the periphery of the eccentric wheel during a part of the rotation of the engine, and in this position of a yoke-frame the longitudinal movement imparted to it by the pistons to which 60 it is connected will serve to swing said yoke-frame around the eccentric, carrying the cylinders and shaft with it; but as this operation of the yoke-frame occurs during only a small part of the rotation of the same the two 65 yoke-frames K and L by operating alternately will keep up a constant rotation and overcome a dead-center. The position of the ec-

centric is such with relation to the location of the chambers in the steam-chest and corresponding location of the cylinders that the 70 yoke-frames will be in proper position to swing around said eccentric upon receiving a stroke from the pistons to which they are connected, and it will be noted that during each revolution of a yoke-frame its longitudinal center 75 is first at one side of the eccentric and then at the other and that therefore during each revolution of a yoke-frame two impulses are given to it, one by a high-pressure cylinder and the other by a low-pressure cylinder. 80

It will be readily seen that an engine constructed as herein shown and described will require but a comparatively small amount of floor-space, for the cylinders and parts for driving the shaft are arranged as compactly 85 as possible. It is also apparent that the arrangement of the operative parts permits of the power from the reciprocating pistons to be applied directly to the shaft and also permits a simple and effective valve connection 90 with the steam-chests.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an engine of the character described, 95 the combination, of a shaft having a conical portion and ports extending from opposite ends of said conical portion along the shaft, a plurality of high and low pressure cylinders arranged around the shaft and communicating 100 with the ports, yoke-frames connected at their ends to pistons working in opposite cylinders, and an eccentric around which the yoke-frames revolve; together with a steam-chest mounted upon the conical portion of 105 the shaft and having a chamber connecting with the ports leading to the high-pressure cylinders and a chamber connecting with the ports of the high and low pressure cylinders, substantially as shown and for the purpose 110 set forth.

2. In an engine of the character described, the combination, of a shaft having a conical portion and ports extending therefrom along 115 the shaft, a plurality of cylinders arranged around the shaft and communicating with the ports, yoke-frames connected to the pistons working in the cylinders, and an eccentric around which the yoke-frames revolve; together with a steam-chest mounted upon 120 the conical portion of the shaft and having chambers communicating with the ports, substantially as shown and for the purpose set forth.

3. In an engine of the character described, 125 the combination, of a shaft having a conical portion and ports extending therefrom along the shaft, a plurality of cylinders arranged around the shaft and communicating with the ports, yoke-frames connected to the pis- 130 tons working in the cylinders, and an eccentric around which the yoke-frames revolve; together with a steam-chest mounted upon the conical portion of the shaft and having

chambers communicating with the ports, and means for adjusting the steam-chest upon the conical portion of the shaft, substantially as shown and described.

5 4. In an engine of the character described, the combination, of a shaft having a conical portion and ports extending therefrom along the shaft, a plurality of cylinders arranged around the shaft, guide-bars extending from
10 the cylinders and connected by a rim, cross-heads sliding upon the guide-bars and connected to the pistons in the cylinders, yoke-frames connected at their ends to the cross-heads, and an eccentric around which the
15 yoke-frames revolve; together with a steam-chest mounted on the conical portion of the shaft and having chambers communicating with the ports, substantially as shown and described.

20 5. In an engine of the character described,

the combination, of a shaft having a conical portion and ports or passages extending therefrom along the shaft, a plurality of high and low pressure cylinders arranged around the shaft, the low-pressure cylinders being opposite the high-pressure cylinders, guide-bars extending beyond the cylinders and connected by a rim, cross-heads sliding upon the guide-bars and connected to the pistons in the cylinders, yoke-frames connected at their
25 ends to the cross-heads, and an eccentric around which the yoke-frames revolve; together with a steam-chest mounted on the conical portion of the shaft and having chambers communicating with the ports, substantially as shown. 35

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Witnesses:

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