

No. 613,124.

Patented Oct. 25, 1898.

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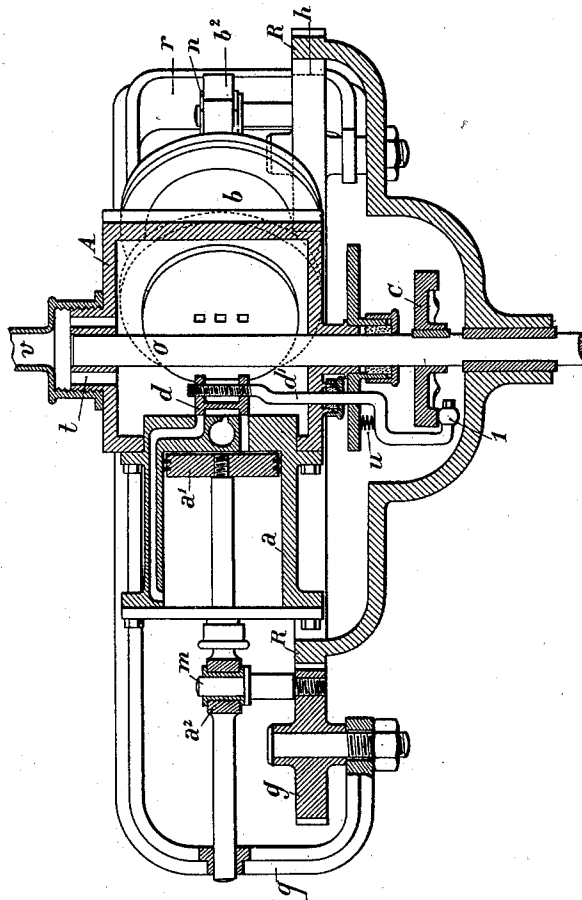
STEAM ENGINE.

(Application filed Dec. 30, 1897.)

(No Model.)

2 Sheets—Sheet 1.

FIG. 1.



WITNESSES.

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STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 613,124, dated October 25, 1898.

Application filed December 30, 1897. Serial No. 664,649. (No model.) Patented in France December 8, 1897, No. 272,936, and in England December 10, 1897, No. 29,310.

To all whom it may concern:

Be it known that we, LOUIS DALLA-DÉCIMAS, gentleman, of Courbevoie, 22 Rue St. Denis, Seine Department, ADOLPHE KÉCHEUR, machinist, 24 Avenue des Moulineaux, Billancourt, Seine Department, and AUGUSTE CHAGNAUD, merchant, Rue Traversière, Cognac, Charente Department, in the Republic of France, have invented new Improvements in Steam-Engines, (for which we have obtained Letters Patent of France for fifteen years, No. 272,936, dated December 8, 1897, and in Great Britain, No. 29,310, dated December 10, 1897;) and we do hereby declare that the following is a full and exact description thereof, reference being made to the accompanying drawings.

Our invention relates to engines having a plurality of cylinders arranged radially about a common center, and has for its object to provide a comparatively simple construction by which the power exerted will be practically uniform during the entire revolution. To this end we construct the engine substantially as hereinafter described and claimed.

In the accompanying drawings we have shown our motor as being arranged for use as a steam-motor.

In the said drawings, Figure 1 represents a sectional elevation of the motor in general, the section being made on the line 1 2 of Fig. 2; and Fig. 2 is a plan view of the same.

Our steam-motor comprises a metal casing A in the form of a prism, hollow and provided on each of its lateral faces with a wide orifice, in register with which is fitted a double-acting cylinder. The three cylinders a b c are fixed on the three faces of the main frame, which thus constitutes a steam-tight chamber which we use as a steam-chest common to the three cylinders. In the said chest work the three ordinary slide-valves, one of which, d , is shown in Fig. 1, which are actuated by the same cam C, fixedly attached to the driving-shaft o . For this purpose rods, such as d' , fixed, respectively, to the corresponding valves, pass through stuffing-boxes in the bottom of the casing and hold a spherical roller, such as l , which they carry at their outer ends against the periphery of the cam

C. The said cam C is provided with three waves—that is to say, with three higher and three lower parts—so as to control simultaneously the distribution of steam to the three cylinders. In each of the said cylinders works an ordinary segment-piston a' b' c' , the rod of which passes through a stuffing-box in the outer end of the said cylinder and is extended to form a frame or guideways a^2 , b^2 , or c^2 for a slide or crank pin m , n , or p . Each of the crank-pins belongs to a pinion g , h , or i , loosely mounted on a journal in the frame, and the three pinions gear simultaneously with a large toothed wheel R, fixedly attached to the driving-shaft o , placed centrally in the main frame.

It will be readily understood that as the rods of the pistons are longitudinally guided by the contact of the piston with the walls of the cylinder by the stuffing-box they pass through and by the metal arms q , r , and s , fixed on the frame, said piston-rods will cause the pinions g , h , and i to rotate, while the crank-pins m , n , or p move in the guideways a^2 , b^2 , or c^2 of the said rods.

The three pinions g , h , and i are of the same diameter, which is exactly one-third of that of the driven wheel R.

In order to distribute the power equally between the three cylinders, the movements are so arranged that, for instance, when piston a is at the end of its stroke toward the steam-chest piston b is at one-third of its stroke from the said steam-chest and moves in the direction of the arrow x , while piston c is at one-third of its inward stroke and moves in the direction of the arrow y . Consequently when spherical roller l , which controls the distribution in cylinder a , is at the middle of a higher part of cam C the roller controlling the admission of steam to the cylinder b is at one-third of the height of the corresponding raised part as measured from the middle of the depressed part, and the roller controlling the admission of the motive agent to the cylinder c is one-third of the height of the third raised part as measured from the summit of the latter. As the raised parts of the cam C are of the same amplitude, the result is that the rollers are not equidistant on the said

cam. Spiralsprings, such as *u*, keep the rollers constantly against the periphery of the cam and serve to raise the slide-valves.

The driving-shaft *o* passes through a stuffing-box in the bottom of the main frame and the top of the same in a properly-prepared part, in which are provided the ducts *t* for the admission of steam fed from the generator through the pipe *v*.

We reserve to ourselves the right of varying the number of cylinders and of arranging the driving-shaft either vertically, as shown in the drawings, or horizontally, as will generally be the case when our motor is applied to motor-cars.

By employing the well-known grooved cam we may dispense with the spiral springs, such as *u*.

We claim—

1. The combination of the casing having a central chamber, cylinders radiating from said chamber and each provided with two passages leading respectively from the central chamber to the inner and to the outer end of the cylinder, a valve controlling each of said passages, pistons in the cylinders, piston-rods secured to the pistons rigidly so as to have a rectilinear reciprocating motion, each of said pistons carrying at its outer end a head provided with a transverse slideway, rotatable pinions having crank-pins engaging said

slideways, a gear-wheel rotatable about the axis from which the cylinders radiate and engaging the said pinions, and means, operated by the rotation of the said gear-wheel, for controlling the motion of the said valves.

2. The combination of the casing having a central chamber, cylinders radiating from said chamber and each provided with two passages leading respectively from the central chamber to the inner and to the outer end of the cylinder, a valve controlling each of said passages, pistons in the cylinders, piston-rods secured to the pistons rigidly so as to have a rectilinear reciprocating motion, each of said pistons carrying at its outer end a head provided with a transverse slideway, rotatable pinions having crank-pins engaging said slideways, a gear-wheel rotatable about the axis from which the cylinders radiate and engaging the said pinions, and a cam rigid with said gear-wheel and having as many identical sections as there are cylinders, said cam being arranged to operate all of the said valves.

In witness whereof we have hereunto set our hands in presence of two witnesses.

LOUIS DALLA-DÉCIMAS.
ADOLPHE KÉCHEUR.
AUGUSTE CHAGNAUD.

Witnesses:

GEO. LAURENTZ,
EUG. WATTIER.