

UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN REVOLVING-CYLINDER ENGINES.

Specification forming part of Letters Patent No. 58,891, dated October 16, 1866.

To all whom it may concern:

Be it known that I, CHARLES F. RUSET, of Communipaw, in the county of Hudson and State of New Jersey, have invented a certain new and useful Improvement in Steam and other Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 represents a partly-sectional side elevation of a steam-engine constructed according to my improvement, and Fig. 2 a vertical transverse section thereof.

Like letters refer to like parts in both figures.

My improvement has reference to that class of engines propelled by steam or other vapor, gas, or fluids, which, while they may be included in the category of rotary engines, employ, in connection with an outside wheel or drum, a piston or pistons reciprocating in close cylinders within said drum, and constituting, with their appurtenances, engines of themselves, that serve by their action to revolve the drum and be rotated by or with it; and my invention consists in connecting the pistons of the cylinders which are carried by the drum to crank-shafts arranged parallel with the stationary center shaft on which the drum rotates, and carrying planet-wheels that mesh into a fixed sun-wheel or circular rack on the stationary shaft, the drum, cylinders with their pistons, crank-shafts, and planet-wheels being all revolved together round the sun-wheel as a fulcrum by the rotation of the planet-wheels through the agency of the pistons and their crank-shafts.

For the information of others whom it may concern, I will now proceed to describe my invention with reference to the accompanying drawings, in which—

A is a stationary center shaft, supported by standards B on or from a suitable foundation-plate. This stationary shaft may be solid for an intermediate portion of its length, but is otherwise formed hollow by passages *a a'* on either side of said solid portion, and which hollow extensions constitute the inlet and exhaust pipes of the engine. Hung so as to freely rotate on this stationary shaft A is a drum or wheel, C, made with hollow bosses *b b'*, that encompass apertures *c c'* opening into the pas-

sages *a a'*, and that are connected by arms *d* with the outer ring of the drum. Said bosses should be provided with suitable packing-rings or stuffing-boxes, or both, where they form end joints with or on the stationary shaft A, to preserve a steam-tight junction therewith as they rotate around it. Carried by the arms *d*, and preferably close up to the outer ring of the drum, are, say, two or more steam-cylinders, D, arranged radially to the drum, and which may either be rigidly secured to the arms *d*, or be hung by trunnions *e* therein, so as to admit of them having an oscillating character, as well as a rotary one in common with the drum. An oscillating attachment, however, of said cylinders is preferred, as enabling the rods of the pistons which work in the cylinders to be directly connected with the cranks they serve to drive, and as enabling the valves of said cylinders to be worked by a simple motion, as hereinafter explained.

Pistons E, having an ordinary reciprocating motion, are arranged within the cylinders D, and have the outer ends of their rods F connected with cranks *f*, of or on shafts G, hung so as to freely rotate in the arms *d*, and lying parallel to the stationary shaft A. It is desirable that the cranks *f* should be pitched one at half and the other at quarter stroke, where only two cylinders and pistons are used, to facilitate their passing the dead-centers and render more uniform the general power of the engine, the valves and pistons being arranged accordingly.

On the shafts G are secured spur or planet wheels H, which mesh into a circular rack, or, as it is sometimes termed, "sun-wheel" I, firmly secured to the stationary shaft A, and round which the wheels H revolve as they are rotated by the action of the cranks and their pistons, producing what is known as a "sun-and-planet motion," and causing the drum and engines connected with it all to be revolved together round the stationary shaft A and fixed sun-wheel I as a fulcrum and common center. The drum C being thus rotated may either be directly applied to any useful purpose it is adapted, or, by means of a belt, gear, or other means, power be transmitted from it to any machinery it is designed to drive. Said drum may either be left open, or covered, or boxed in at its sides.

As the requisite valve action is no special part of my present invention, and as in the adoption of oscillating cylinders revolving round a common axis an automatic valve action has before been used, it will be sufficient here to state that steam is or may be conveyed through the trunnions on one side of the cylinders to the steam and valve chests *g* by pipes *h*, connecting with one hollow boss, *b*, that encompasses the inlets *c* of the steam-pipe *a*, with boxes *j* on the outside of the inlet-cylinder trunnions, while the exhaust-steam may be similarly passed off by the trunnions on the opposite side of the cylinders, boxes *j'*, pipes *h'*, hollow boss *b'*, passages *c'*, and exhaust-pipe *a'*; or these pipes and passages on opposite sides of the cylinders may be reversed as inlets and outlets by, either permanently, or, through suitable mechanism, only temporarily, for the purpose of rotating the drum in an opposite direction, converting the steam-pipe *a* into the exhaust and the exhaust *a'* into the steam-pipe.

The valves *V* themselves may be of the vibrating description, and connected with a rock-shaft, *k*, that, by means of outside slotted arms *l* attached thereto and pins *m* connected with the drum-arms, serve, by the oscillating motion of the cylinders, to rock or shift said valves in such manner as to alternately establish communication between the cylinders, ports, or passages *n n'*, with the

steam and valve chests *g* that are connected with the steam-pipes *h* and exhaust-passages *s*, which are connected with the exhaust-pipes *h'*. Any other suitable valve motion and gear, however, may be adopted to suit the character of engines employed, or otherwise.

By varying the relative diameters of the sun and planet wheels *I* and *H H* a quicker or slower velocity of the drums relatively to the engines, or number of revolutions of the drum as compared with the engine-shafts *G*, may be obtained. These wheels may, if desired, be duplicated or repeated on opposite sides or ends of the crank-shafts *G* and solid or intermediate portion of the stationary shaft *A*. The drum and engines carried by it, when combined, constitute an engine of rotary character.

Having now described my improvement, what I claim as new and useful therein, and desire to secure by Letters Patent, is—

The combination of the wheel or drum *C*, arranged to rotate on suitable bearings, engines carried by said drum, with their revolving shafts *G* hung therein, and arranged relatively to the driving-axis as described, planet-wheels *H*, and stationary circular rack or sun-wheel *I*, substantially as shown and described.

CH. F. RUSSET.

Witnesses:

A. LECLERC,
HENRY T. BROWN.