2 Sheets-Sheet 1.

Jones & Farnum,

Rotary Steam Engine.

No. 2,896. Patented Dec. 31, 1842.

Fig. 1

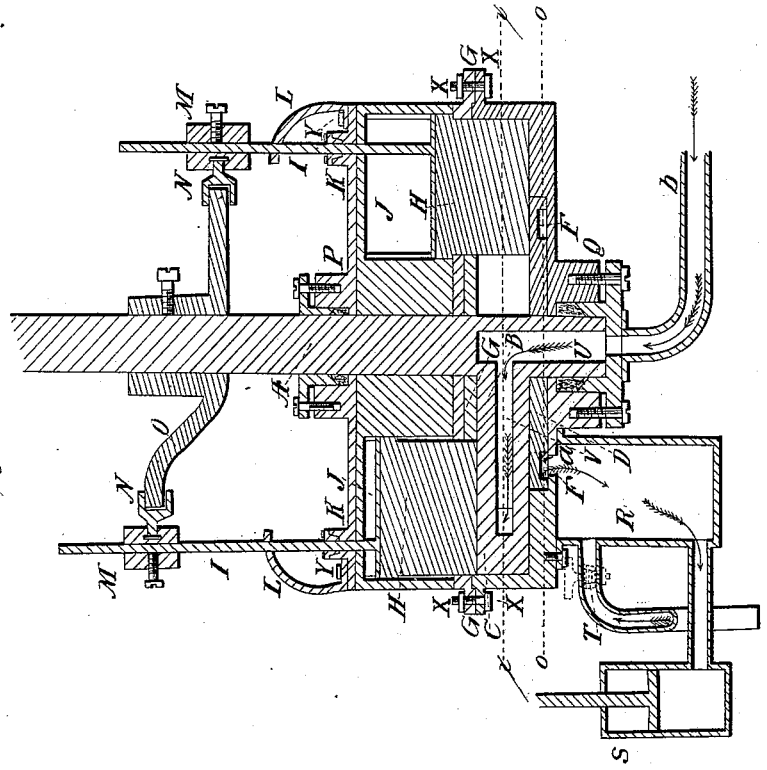
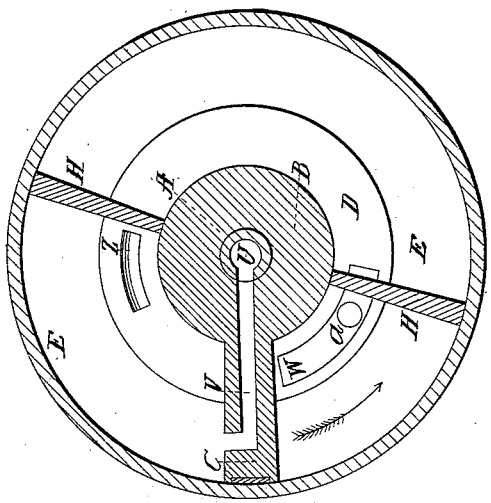


Fig. 2



2 Sheets-Sheet 2.

Jones & Farnum,

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Fig. 4

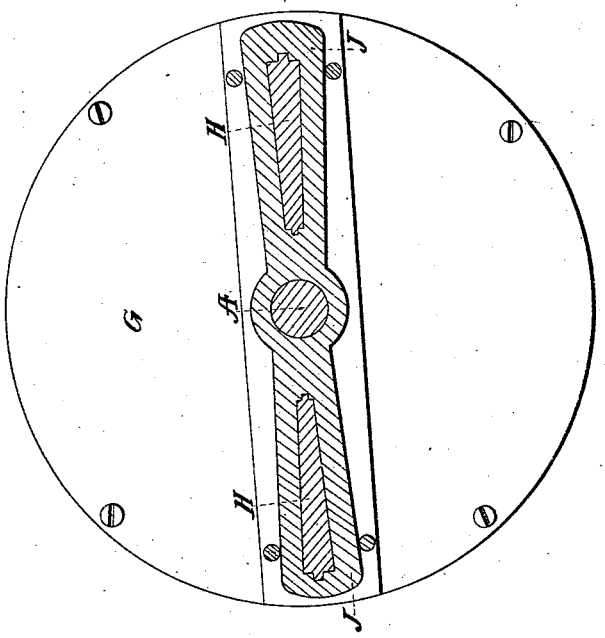
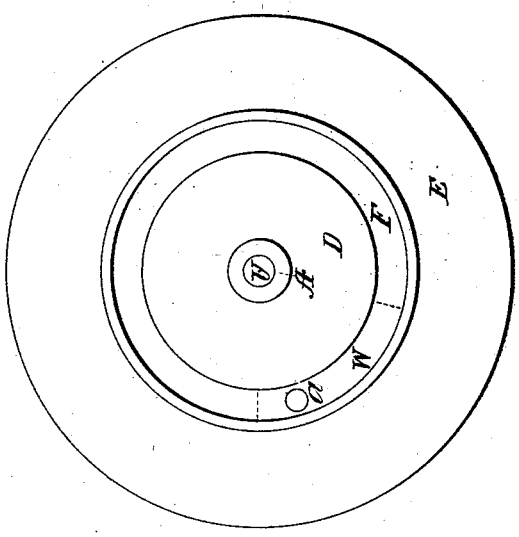


Fig. 3



UNITED STATES PATENT OFFICE.

WILLIAM JONES AND ROSWELL FARNUM, OF BRADFORD, VERMONT.

ROTARY STEAM-ENGINE.

Specification of Letters Patent No. 2,896, dated December 31, 1842.

To all whom it may concern:

Be it known that we, WILLIAM JONES and ROSWELL FARNUM, of Bradford, in the county of Orange and State of Vermont, have invented a new and useful Improvement in Rotary Steam-Engines, which is described as follows, reference being had to the annexed drawings of the same making part of this specification.

Figure 1 is a vertical section through the center of the engine the axle being perpendicular. Fig. 2 is a horizontal section of the engine on the line *x x* of Fig. 1 showing the hub and radiating piston. Fig. 3 is a horizontal section on the line *o o* of Fig. 1, showing the grooved steam way or channel in the hub. Fig. 4 is a view of the top plate.

A is the revolving shaft arranged in a vertical position. This shaft may be placed horizontally. B is the hub fixed to and revolving with the shaft; C, the piston radiating from the hub B and revolving with it. This piston is hollow in the center forming a steam way communicating with a steam way in the center of the shaft; D, the grooved part of the hub. This is made of greater diameter than the part of the hub from which the piston radiates. The groove or channel F is circular of sufficient depth to form a steam way for the escape of steam, a segment of which *w* extends entirely through grooved part of the hub to permit the steam to pass from the steam cylinder into said circular steam way which is on the under side of the hub E, the steam chamber in which the piston revolves. This is a circular plate reamed out forming the steam chamber the center of which being of the diameter of the grooved part of the hub and of sufficient depth to receive the same. It is perforated in the center for the hollow end of the shaft to pass through and near the center for the escape of the steam into the condenser which is placed over the aperture. This plate is called the bottom plate and has a circular flange perforated for screw bolts which fasten the top plate to it; G, top plate of the steam chamber made of the same diameter perforated in the center with a round aperture for the shaft and two oblong apertures for the valves to work through; H H, sliding or reciprocating valves. These are made rectangular like others in use. I I valve rods attached to the valves made in the usual manner. J J valve chamber fixed to the outside of the steam chamber and in which the valves move made in the usual maner, with grooves in the ends thereof for the ends of the valves to slide in K K stuffing boxes through which the valve rods move fixed to the outside of the valve chambers L L guides of the valve rods M M adjustable heads fixed to the valve rods by screws so as to be raised or lowered on said rods at pleasure for accommodating the swivels to the position of the cam wheel N N the swivels attached to the adjustable heads and in which the cam wheel revolves said swivels having round stems or shanks inserted in thea heads loosely so that they wll allow them to turn and accommodate themselves to the cam wheel O the cam wheel for moving the valves secured to the revolving shaft by a hub and made adjustable thereon by an adjustable screw passed through the same. This cam wheel is circular in the plan and winding or spiral in its side elevation, for raising and lowering the valves alternately as it turns horizontally P the stuffing box of the shaft secured to the top of the valve boxes in the center thereof. Q a stuffing box of the shaft fixed to the under side of the bottom plate of the steam chamber. R is the condenser secured to the under side of the bottom plate of the steam chamber over the escape aperture therein. S pump for exhausting the condenser. T tube for supplying the condenser with cold water furnished with a stop cock for regulating the supply. V aperture in the shaft for the admission of steam which is conducted from the boiler through the tube *b*. N aperture in the piston communicating with the aperture *v* in the shaft for conducting the steam to the chamber. This aperture extends from the center of the shaft horizontally through the hub and through the radiating piston nearly to the outer extremity of the piston it then turns at right angles and passes out at one side thereof in the manner of the "Avery steam engine." W the aperture in the hub for the discharge of the steam. This aperture extends entirely through the hub nearly a quarter of the circumference of the circular steam way in the hub with which it communicates and with the steam chamber as before described. X screw bolt, for securing the top plates of the steam chamber to the flanged rim of the bottom plate. V screw bolts for securing the plates of the

valve chambers to the top plate of the steam chamber.

z is a segment groove in the hub to allow the steam to pass from one side of the valve to the other as the valve descends to equalize the pressure of the steam on both sides of it until the valve is entirely down upon the bottom of the steam chamber to prevent any impingement of the valve in the straight grooves. This segment groove is upon the top of the hub opposite the escape aperture *w* of sufficient depth to allow the steam to pass from one side of the valve to the other, as the hub revolves and as this groove passes the valve the passage of the steam is cut off and a tight chamber is then formed which will cause the steam to have complete action against the piston. This segment groove may be in the side of the smaller diameter of the hub in any convenient part of the hub. The circular steam chamber E in this modification is represented in a horizontal position in which the two circular plates become top and bottom plates; but as before stated the shaft may be in a horizontal position and the chamber be vertical or placed edgewise in which modification the circular plates become end plates.

The valves are arranged on the radius of the steam chamber on oposite sides of the shaft and in a direct line. The piston radiates from the hub in a direct line, arranged vertically under the highest part of the cam wheel therefore when these are in a direct line with the line of the valves the valve will be raised or be withdrawn from the chamber so as to allow the piston to pass it without obstruction. The steam is conducted to the interior of the steam chamber E through the hollow shaft A and piston *c* and acts against the piston at right angles and propel it around in the circular steam chamber by its elasticity, being confined by the valves H which are pushed into the steam chamber and withdrawn therefrom alternately so as to allow of the action of the steam and the escape of the same at the required periods of time to keep up the rotary motion of the shaft desired by means of the aforesaid cam wheel *o* which is adjusted on the revolving shaft to produce that result. The steam is caused to escape at every semi revolution of the hub and at the moment of withdrawal of the valve from the chamber which has the effect of reducing the friction against the sides of the valves which would be produced by the pressure of the steam if the steam were not let off simultaneously with the receding of the valve.

The impingement which would be produced by the pressure of the steam against the valves as they enter the steam chamber is removed by allowing the steam to pass from one side of the valve to the other along the segment groove in the upper side of the hub for equalizing the pressure of the steam on both sides of the valve until the valve reaches the bottom of the steam chamber where a perfect stop or head is produced for the action of the steam by the flat or plain part of the hub being brought under the edge of the valve. The steam begins to escape as soon as the eduction slot *w* in the hub passes the valve; the steam passes into the circular groove or channel F in the hub D, from whence it passes through the aperture *a* in the bottom plate of the steam chamber into the condenser R where it is condensed. The water in the condenser, which is partly heated by the steam and the condenser steam, is drawn off by the pumps to supply the boiler. This will produce a partial vacuum in the condenser which will cause the cold water to flow therein through the supply tube T which is provided with a cock for regulating the supply of cold water. It will thus be seen that from the before described construction and arrangement of the several parts of the engine that at every semi revolution of the cam wheel and shaft one of the valves will be withdrawn from the circular steam chamber and the opposite valve pushed into it while a continual column of steam passes from the boiler into the said chamber where it acts on the piston constantly and against the valves alternately and is let off alternately on opposite sides of the chamber into the steam way leading to the condenser in which there will be formed a partial vacuum, as before stated, causing the steam to pass instantaneously from the side of the piston opposite to that on which the steam presses, which will give this engine the properties of the low pressure engine.

What we claim as our invention and which we desire to secure by Letters Patent is—

The revolving circular valve or hub constructed with the slot on one side, grooved or channeled on the other end an aperture passing through it, placed in a grooved or circular recess in the bottom of the cylinder and operated by the piston by the means described the whole being constructed and operating in manner substantially as described and in combination there with the arrangement of the condenser as set forth.

WM. JONES.
ROSWELL FARNUM.

Witnesses:
WM. P. ELLIOT,
A. E. JOHNSON.