W. Goodwin,

Rotary Steam Engine.

No. 51,996. Patented Jan. 9, 1866.

Fig: 7.

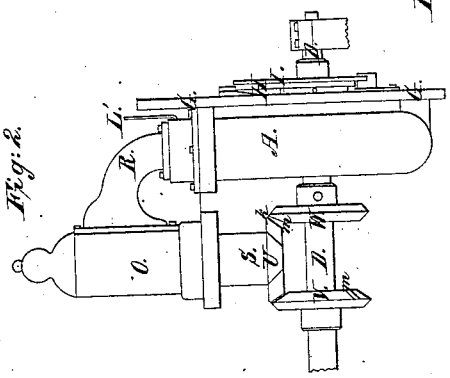


Fig: 2.

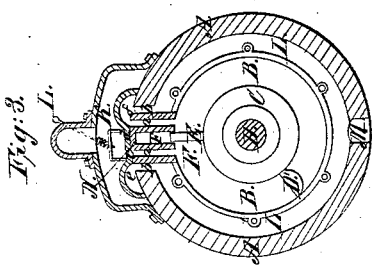


Fig: 3.

Fig: 4.

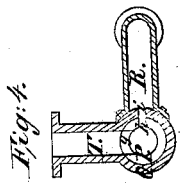


Fig: 1.

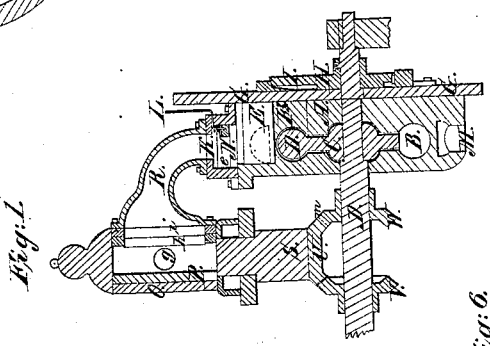


Fig: 6.

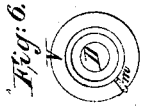
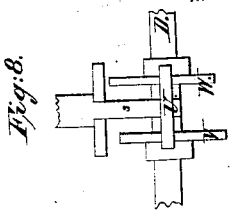


Fig: 8.



Witnesses:

Samuel N. Peters.
Frank Curtis.

Inventor:

William Goodwin
by his Attorneys,
R. H. Eddy.

UNITED STATES PATENT OFFICE.

WILLIAM GOODWIN, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO HIMSELF AND WILLIAM H. HOLLAND, OF SAME PLACE.

IMPROVEMENT IN ROTARY STEAM-ENGINES.

Specification forming part of Letters Patent No. **51,996**, dated January 9, 1866.

To all whom it may concern:

Be it known that I, WILLIAM GOODWIN, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improved Rotary Steam-Engine; and I do hereby declare the same to be fully described in the following specification and represented in the accompanying drawings, of which—

Figure 1 is a longitudinal and vertical section, and Fig. 2 a side elevation, of an engine of my improved construction. Fig. 3 is a vertical section of the said engine, the said section being taken in a plane at right angles to the main shaft of the engine.

In such drawings, A denotes the case of the engine, it being formed with an annular steam-chamber, B, and also so as to receive a disk or wheel, C, fixed on a main shaft, D, which is placed concentrically through the engine. A piston, D, to travel within the chamber B is fixed to the circumference of the disk. A gate, E, arranged in the space F opening laterally out of the case, plays across the steam-chamber B and into and out of it, such gate being attached to a slider, G, which is arranged on the outside of the case A and is moved vertically by two cams, H I, applied to the shaft D, one of the said cams serving to raise and the other to depress the slider during each entire revolution of the shaft. A valve-chest, K, is placed on the top of the case A, and is provided with two ports, *a a*, to lead from it into the annular-chamber B, the said ports being arranged on opposite sides of the gate E, in manner as represented in Fig. 3. There are also two other ports, *b b*, leading out of the steam-chamber K and alongside of the ports *a a* and into an annular eduction-passage L, formed within the case A and arranged concentrically with the annular steam-chamber B. An opening, M, arranged at the lower part of the passage L, conducts the waste steam therefrom. A reversing-valve, N, formed as shown in Fig. 3—viz., with two arched chambers, *e f*, and two steam-passages, *c d*, arranged with respect to one another, as shown in Fig. 3—is placed within the chamber K.

By moving the valve within the chamber by means of a lever, L, suitably applied to such valve we may either cause the passage *c* to open into one of the ports *a*, or the passage *d* to open into the other port *a*, in which case steam from the chest K may be introduced into either port *a*, so as to put the piston in movement, the waste steam being discharged from the other port *a*, and through one of the valve-chambers and into the passage.

The valve N is simply for the purpose of effecting a reverse motion of the piston within the annular cylinder, the valve-chest K being situated in advance of the main valve-chamber O and its valve P, and made to communicate with the chamber O by means of a conduit, R. The valve-chamber O is cylindrical, and contains a tubular valve, P, the common axis of the said valve and chamber being arranged vertically.

Fig. 4 is a horizontal section of the said valve P and its chamber, and the steam conduits T R, leading out of the same. The said valve P has a port, *h*, made through it to operate with a port, *i*, leading from the chest O into the conduit R. An opening, *g*, made through the valve P, serves to convey into the valve P steam from the induction-pipe T, which should lead from a steam-generator into the chamber O. While the gate E may be in motion and the piston D may be in the act of passing it, no steam should pass from the valve-chest O into the valve-chest K, and, therefore, during such time the passage or port *h* should be beyond the passage or port *g*, and not in conjunction with it.

The mechanism for operating the valve P—that is, for turning it a short distance in one direction and afterward or next moving it back to place, so that the ports *h i* may be in conjunction—consists of three beveled tap-wheels, U V W, the said wheel U being applied to the lower end of the shaft S of the valve P. The upper wheel, U, contains two teeth or tappets, *k l*, each of the other wheels, V W, having but one tooth or tappet *m*, the whole being as shown in Figs. 5, 6, and 7, which are side views of such tappet-wheels. The wheels V W are fastened on the main shaft D and arranged with respect to the wheel U in manner as represented, the tappets of the wheels V W being so arranged that during each revolution of the shaft they may be caused to act on the tappets *k l* in such manner as to produce the necessary opening and closing of the valve P.

I contemplate applying two of such engines,

as above described, on one shaft and with their pistons so arranged with respect to one another that each may be operated by steam, while steam is cut off from the other. In this way each engine will aid the piston of the other in passing its gate.

I do not claim the gate E, the annular cylinder B, the wheel C, and the piston D, to be combined and to operate together as a rotary engine; but

What I do claim as my invention is as follows:

1. The arrangement of the two sets of inlet and outlet ports *a b*, the annular eduction-passage L, and the reversing-valve N, with the chamber K, the annular cylinder B, the wheel C, piston D, and gate E, the whole being to operate together, substantially as hereinbefore specified.

2. The combination, as well as the arrangement of the beveled tappet-wheels U V W, and the main valve P and its chest O, with the shaft D, and the rotary engine made and applied to such shaft, substantially as above described, the two steam-chests O K being connected by a conduit, R, as explained.

WM. GOODWIN.

Witnesses:
R. H. EDDY,
F. P. HALE, Jr.