5 Sheets-Sheet 1.

J. Tuttle,

Rotary Steam Engine.

No. 2,015. Patented Mar. 26, 1841

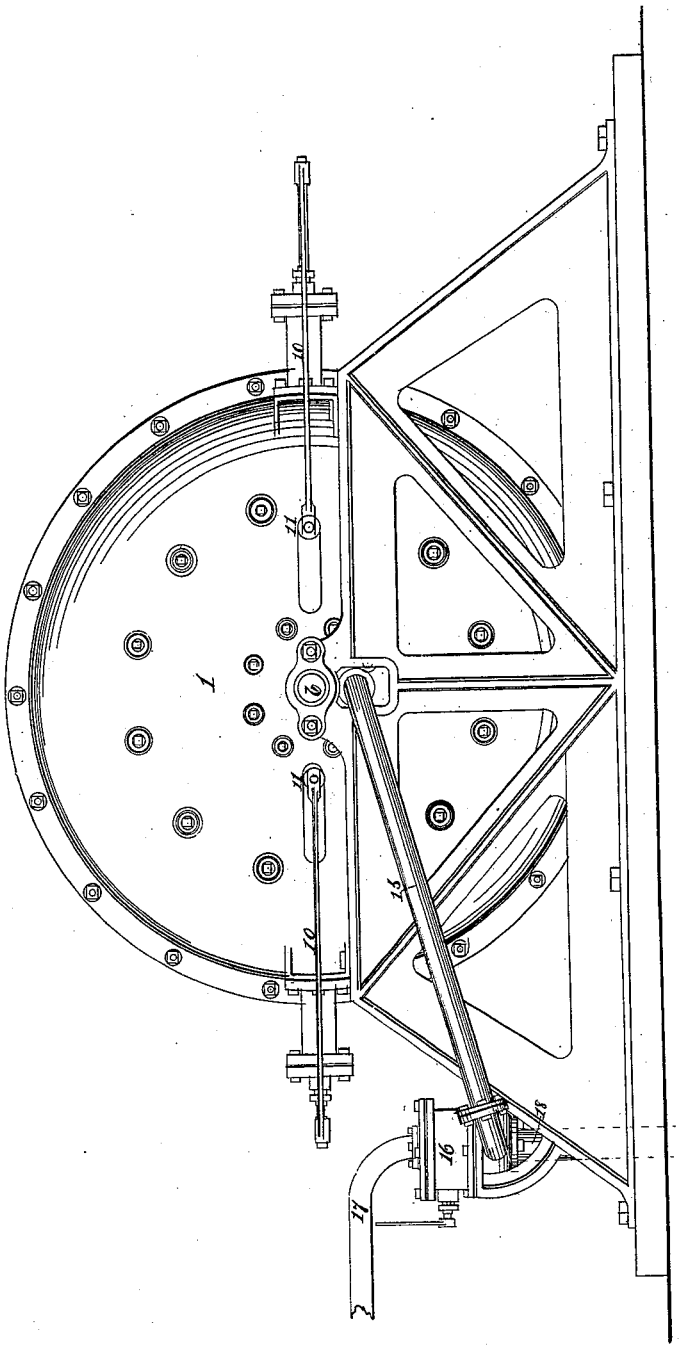

Fig. 1

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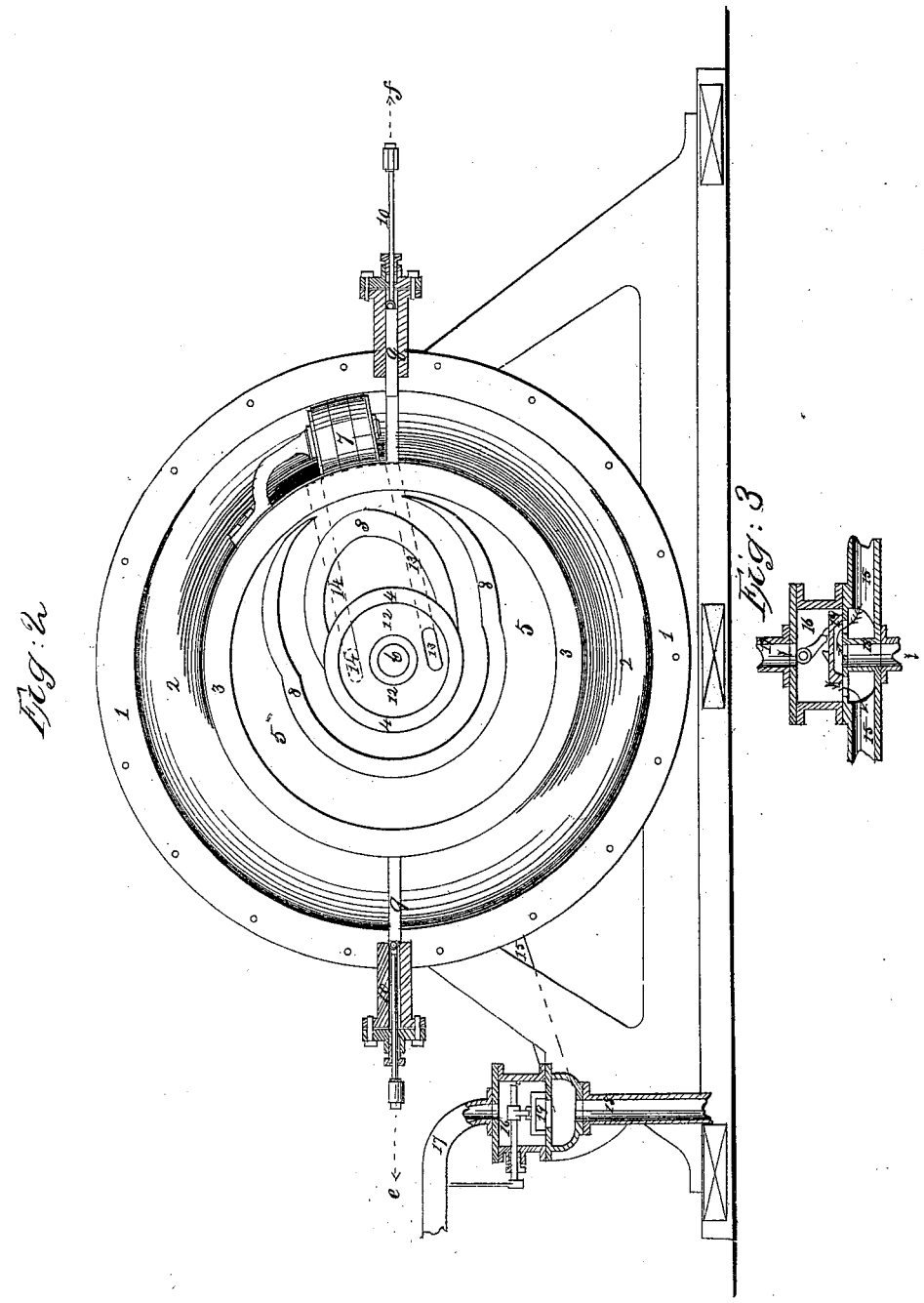

Fig: 2

Fig: 3

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Fig. 5

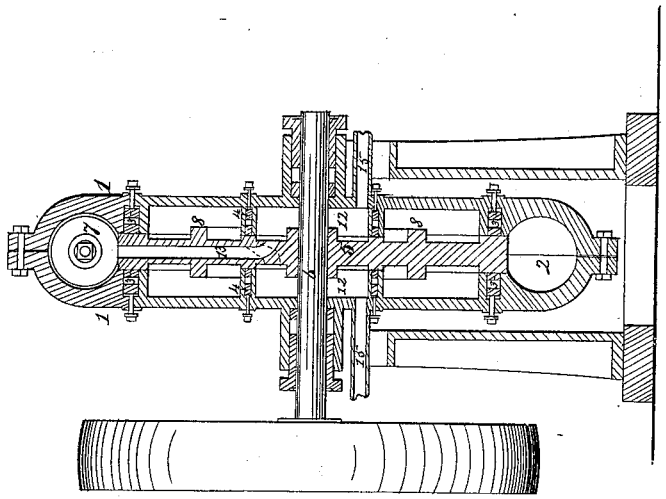

Fig. 4

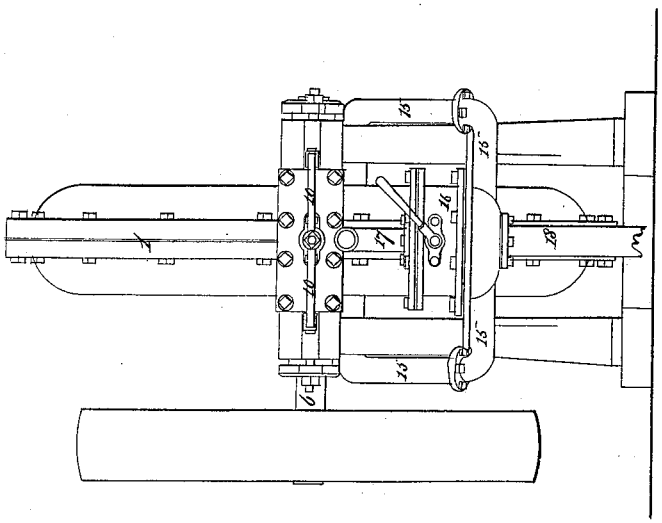

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Fig: 6

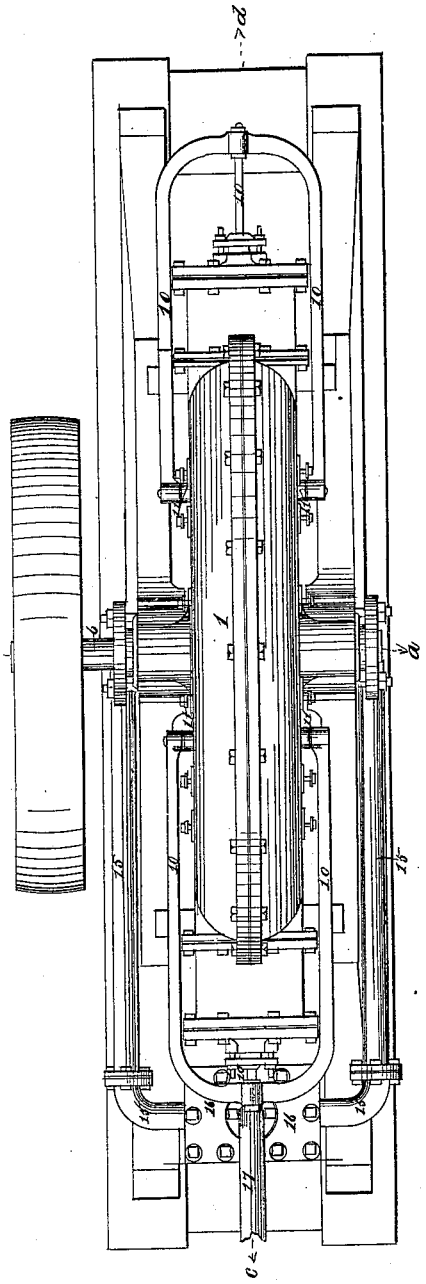
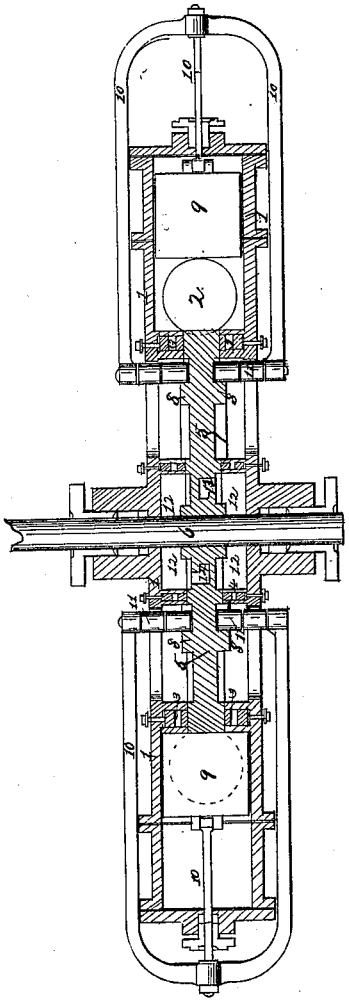


Fig: 7



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J. Tuttle

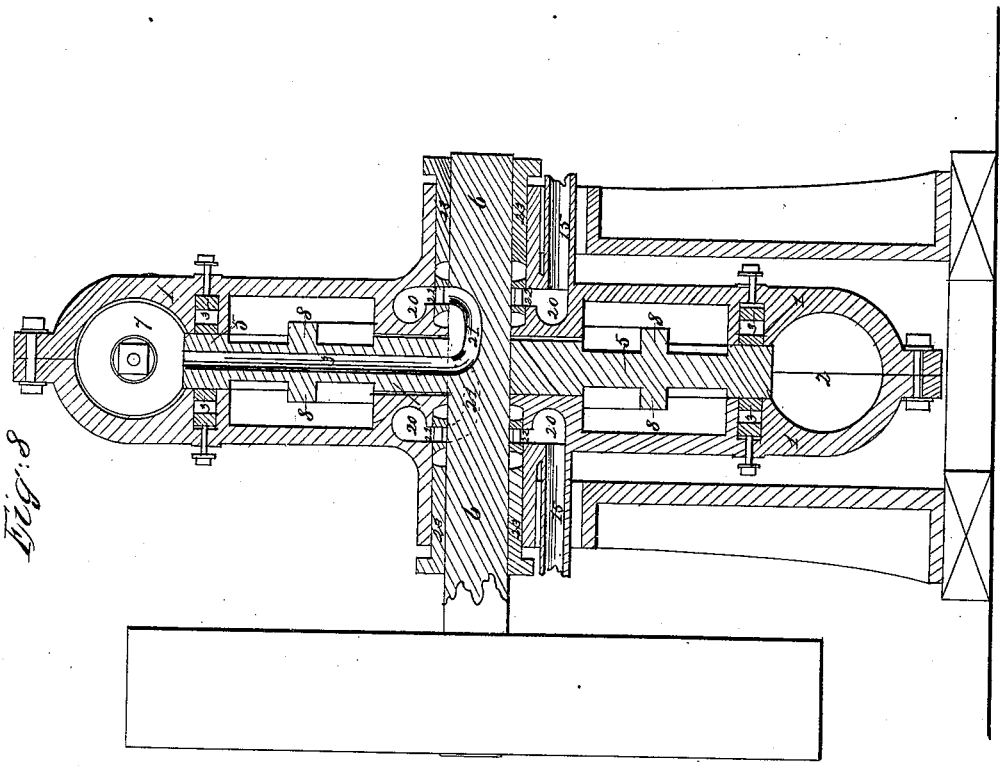
Rotary Steam Engine

No. 2,015. Patented Mar. 26, 1841.

Fig: 9

Fig: 10

Fig: 8



UNITED STATES PATENT OFFICE.

JESSE TUTTLE, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN ROTARY STEAM-ENGINES.

Specification forming part of Letters Patent No. **2,015**, dated March 26, 1841.

To all whom it may concern:

Be it known that I, JESSE TUTTLE, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Rotatory Steam-Engines, called "Jesse Tuttle's Patent Rotatory Engine," of which the following is a full and exact description.

Reference is had to the drawings which are annexed and made a part of this specification, the same numbers being fixed to corresponding parts in all the drawings and figures.

6 represents the driving-shaft, which is made solid of wrought or cast iron, except in Fig. 8, Drawing 5, which will be hereinafter described. On this shaft is firmly keyed or otherwise firmly secured the cast-plate 5, which I denominate the "rotating plate." On the rim or circumference of this plate I fix a piston 7 by means of a rod passing through its center and bending down to the plate, to which it is firmly bolted. This piston is of the kind denominated "metallic," having expanding rings of brass or other metal to fit the form of the chamber in which it revolves. This rotating plate 5, with the piston 7 attached, revolves in the metal shell or case 1, which is firmly bolted to a wood or metal frame. The case or shell 1 is made in two parts, and is secured together by means of bolts and flanges at its circumference. Each half of the shell or case 1 is turned out on its inside to fit accurately to and correspond with the shape of the piston 7 and the rim of the rotating plate 5, so that the shaft 6, with its rotating plate 5 and piston 7, can turn freely inside the shell or case, the chamber 2, in which the piston 7 revolves, being annular and of the shape and size of the piston 7, which may be round or square or otherwise. The journals for the shaft to turn in are formed in the center of each half of the shell or case 1, and are made steam-tight by means of stuffing-boxes. In order to prevent leakage from the annular chamber 2, where the rim of the rotating plate 5 fits it, I turn out in each half of the shell, opposite to each side of the rim of the rotating plate, a deep groove. Into these grooves I fit rings of metal 3, with hemp or other elastic packing between them, grinding the edges of the rim and the rings of metal 3 next them together, setting up the packing against the rim by means of set-screws, the heads of which are on the outside of the shell or case 1. On each half of the shell or case around where the shaft 6 enters or turns in it I cast a projecting ring to correspond to a similar projecting ring on each side of the rotating plate 5. I make these rings turn steam-tight together by means of similar rings and packing 4 to the ones before described at the rim of the wheel, thus forming the two steam-tight chambers 12 around the shaft 6, one on each side of the rotating plate 5. I then form a communication with each of these steam-chambers and the annular chamber by means of two ways or passages 13 14 cast in the rotating plate 5, one passage 13 leading from one steam-chamber 12 through the rotating plate in the direction of its radii to one end of the piston 7, the other passage 14 leading in a similar manner from the other or opposite steam-chamber 12 to the opposite end of the piston 7. I connect these two steam-chambers 12 12 with the steam-chest 16 by means of the two branch or side pipes 15. These pipes open into the bottom of the steam-chest 16 by means of two ports, which are placed at a sufficient distance apart to admit of the eduction-port 18 being placed between them. A slide-valve 19, similar to the ones used in high-pressure engines, is made to slide on these three ports, so that one will be left open, the other two connected together by means of a hollow in the valve, so that by sliding the valve 19 by means of its handle either of the pipes 15 is made the eduction, the other pipe being then the induction.

The steam enters the steam-chest by the pipe 17.

Having now described the communication of either side of the piston 7 with the steam-chamber 12 by means of the side pipes 15, steam-chambers 12, and the ways or passages 13 14 in the rotating plate 5, I will describe the construction of the valves 9, which form the abutment for the steam in the annular chamber 2. These valves 9 are placed opposite to each other in a line drawn through the center of the annular chamber 2. They are flat plates of metal, rather wider than the chamber, being faced perfectly smooth and true upon their faces and edges. They slide in two chambers or cases made fast to

the shell or case and in slots or grooves in the sides of the annular chamber 2 up to the rim of the rotating plate 5.

Each valve 9 has a rod or stem moving steam-tight through stuffing-boxes in the ends of their chambers. Each rod or stem has a branched or fork piece 10 embracing the outer shell or case 1. To each arm of these forked or branch pieces is fixed a pin projecting inward toward the rotating plate 5, having a steel roll 11 upon it, which fits into the cam-shaped groove 8, formed upon the side of the rotating plate 5, so that as the rotating plate 5 revolves the valves 9 are moved at times according to the shape of the groove 8, being guided in a horizontal line by the slots in the side of the shell or case, into which the rolls 11 fit likewise. The extreme point of the cam part of the groove is in a line drawn from the center of the piston 7 to the center of the rotating plate 5, the center of the circular part of the groove being the center of the shaft 6 and the rotating plate 5. While the rolls 11 are in this part of the groove of course the valves 9 are stationary. The cam part is so shaped that a little while before the piston 7 reaches the valve 9 it begins to act upon that valve's rolls 11 and push it into its case out of the way, the remaining part of the cam 8 drawing it back into its former position when the piston 7 has passed it.

I will now describe the construction of Fig. 8, Drawing 5. In this modification I construct the steam-chambers 20 independently of the rotating plate 5, in the body of the shell or outer case 1, either by casting it out or bolting it on. The steamways or passages in Fig. 8 are continued through the shaft 6, at 21, as well as the rotating plate 5, opening by means of two orifices into the steam-chambers 20. In order to allow the shaft 6 to to turn steam-tight in these chambers 20 and still not to obstruct the orifices for the passage of the steam, I pack it in a novel manner. I turn out in each chamber where the shaft passes through it a circular groove around the shaft to receive the brass collar 22 or gland. This gland 22 is connected to another of the same shape and size by four short bolts or studs. I first slip over the shaft 6 a ring of hemp or other elastic material, then slip the double rings or glands 22 into the steam-chambers 20, pushing the hemp before it until it is in the groove. I then slip another ring of hemp over the shaft against the outer ring or gland 22 and then slip in the follower 23, screwing it up by two bolts, forcing the packing which is between it and the outer gland 22 against the shaft 6, the outer gland 22 forcing the inner gland 22 (by means of the bolts connecting them together) against the inner ring of hemp, which is forced against the shaft 6, thus rendering the shaft 6 steam-tight on each side of the steam-chamber 20, the steam finding its way into the orifice in the shaft between the bolts. The object of this arrangement is to prevent the friction of the packing 4 in the chamber 12, which is connected with the eduction 18, caused by the pressure of the steam against the rotating plate that forms one side of the opposite chamber 12, that is connected with the induction 17.

I will now describe the operation of the engine. The steam having been admitted into the steam-chest 16, the slide-valve 19 is moved by means of its handle so as to open the port of the side pipe 15, which communicates with the end of the piston 7 opposite to the direction in which the piston 7 is required to rotate, and connecting the port of the side pipe 15 (which communicates with the other end of the piston 7) with the eduction-pipe 18. The steam then rushes through its port into the open side pipe 15, thence into the steam-chamber 12 connected with that pipe, then through the steamway 13 in the rotary plate 5 into the annular chamber 2, filling the space in the chamber 2 between the valve 9 and the piston 7, which it forces round in a continuous rotary motion, the steam escaping by the opposite steamway 14, chamber 12, and side pipe 15 into the eduction-pipe 18 by shifting the valve 19, the side pipe 15, and way 13, which admitted the steam, is connected with the eduction 18, when the piston 7, rotating plate 5, and driving-shaft 6 will be rotated in the opposite direction. The driving-shaft 6 is connected by gearing or immediately to the work to be done.

What I claim, and desire to have secured by Letters Patent of the United States, is—

The improvement of rotary engines by a combination not heretofore known, the said combination consisting of the method of operating the abutment-valves 9 by means of the branched or forked connecting-rods 10, having at each of their extremities a pin projecting at right angles into the outer shell or case 1, said pin working in a slot in the side of the case and operated upon by the cam 8 upon the side of the rotating plate 5, as herein set forth, and the constructing of the steam-chambers 12 and 20 on each side of the rotating plate 5, as described, connected with apertures 13 14 in said rotating plate 5 and shaft 6, at 21, Fig. 5, for conducting the steam to and from the piston 7, in combination with the side pipes 15 and slide-valve 19, the whole being combined, constructed, and arranged as herein set forth.

In testimony whereof I, the said JESSE TUTTLE, have hereunto subscribed my name this 24th day of February, 1841.

JESSE TUTTLE.

Witnesses:

A. MOORE,

W. H. WHITELEY.