(No Model.)

G. J. SCOTT.

ROTARY ENGINE.

No. 565,123. Patented Aug. 4, 1896.

Fig. 1.

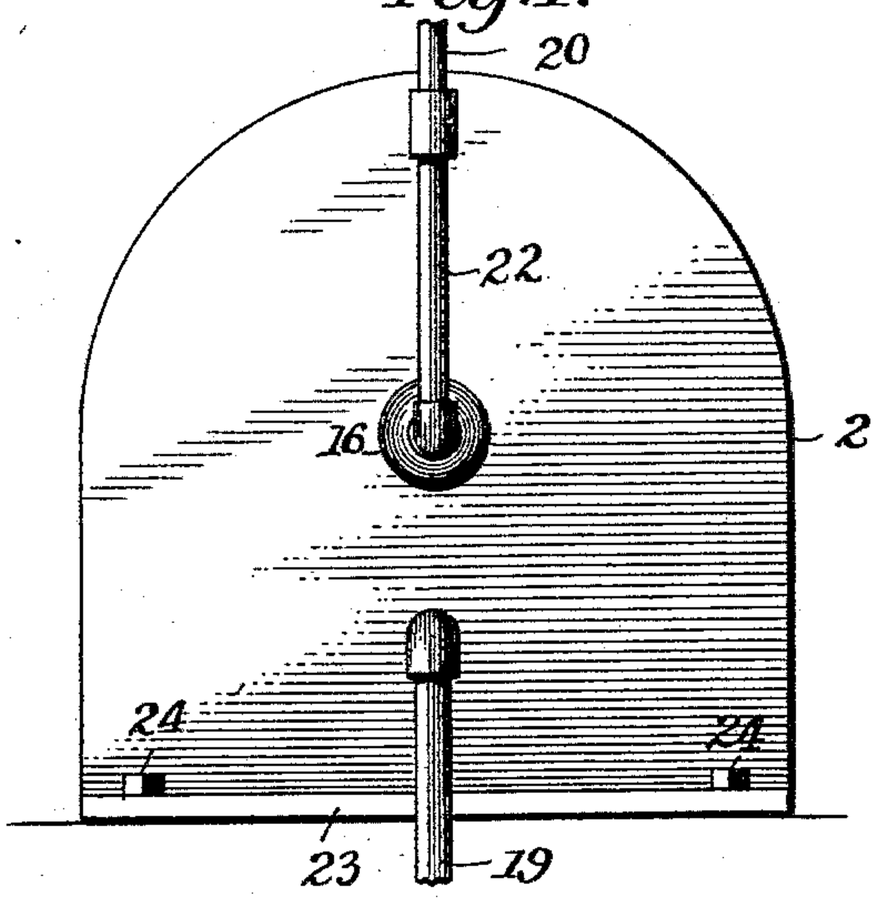


Fig. 2.

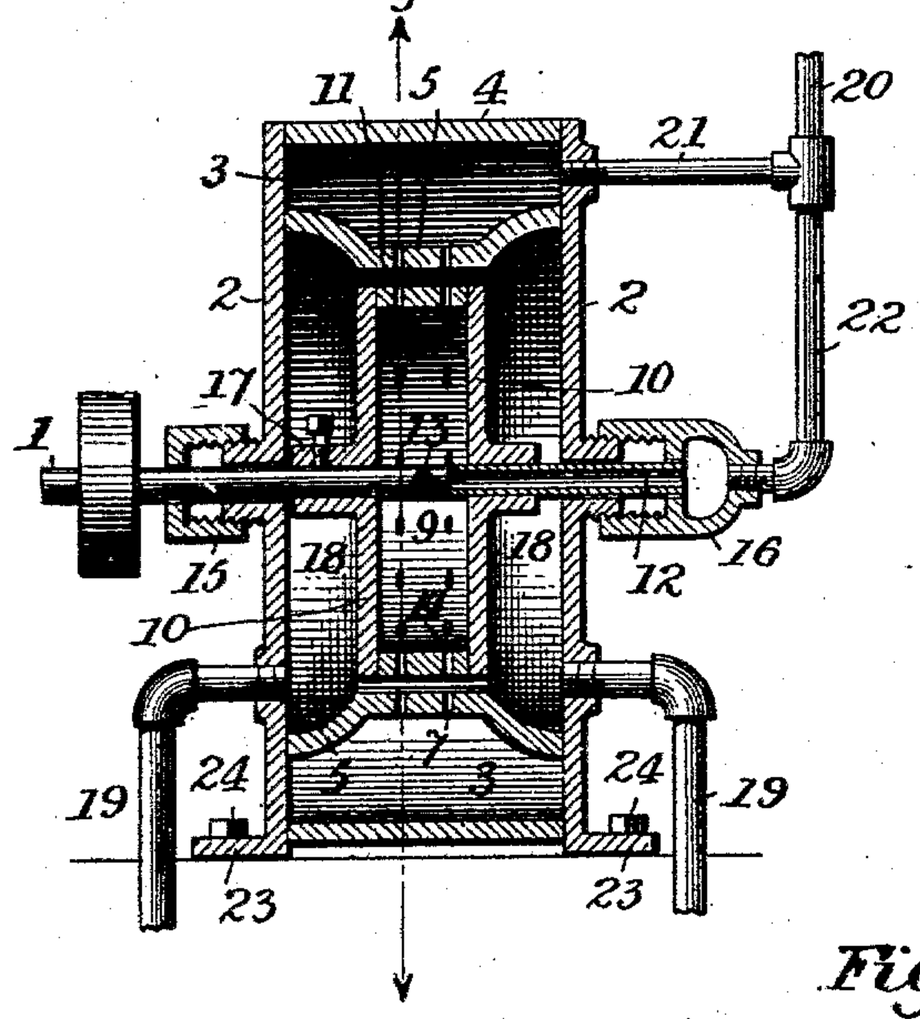


Fig. 3.

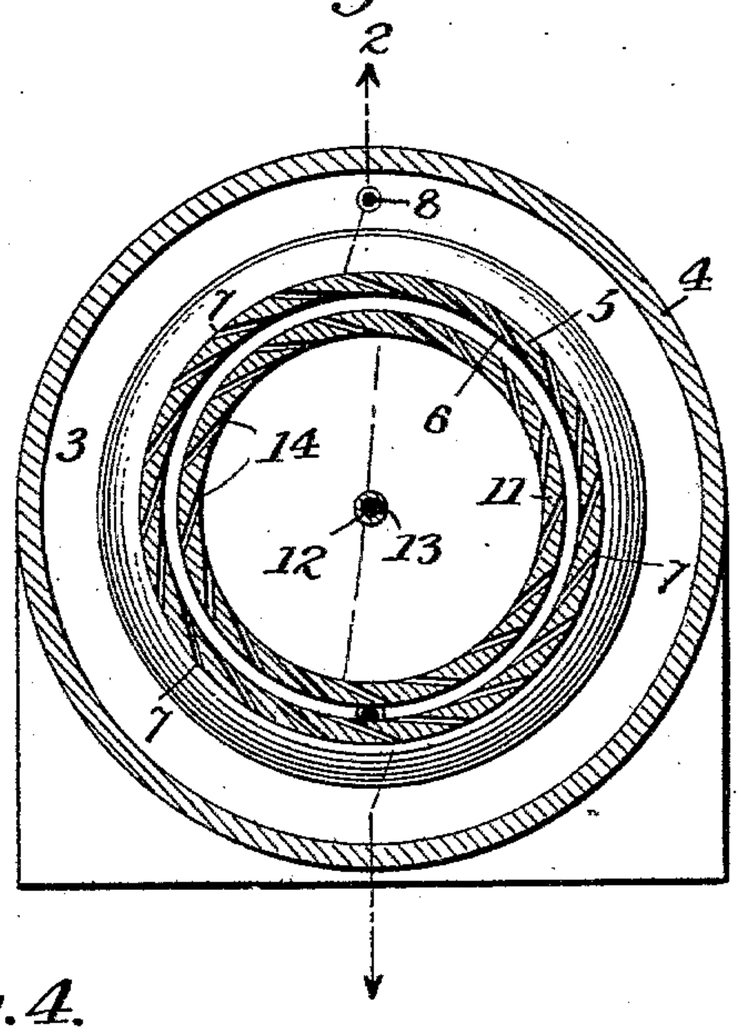
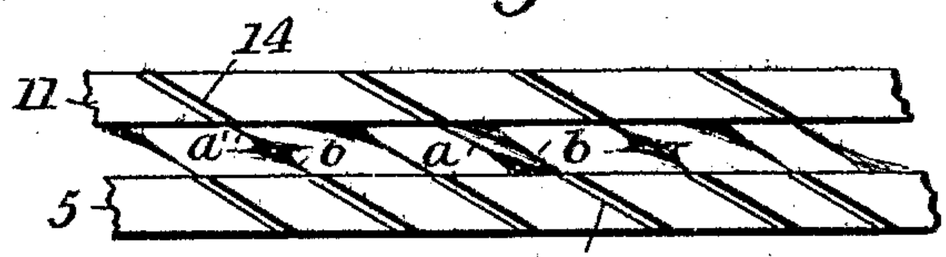


Fig. 4.



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UNITED STATES PATENT OFFICE.

GORDON JOHN SCOTT, OF PHILADELPHIA, PENNSYLVANIA.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 565,123, dated August 4, 1896.

Application filed June 6, 1896. Serial No. 594,483. (No model.)

To all whom it may concern:

Be it known that I, GORDON JOHN SCOTT, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

My invention relates to rotary motors which are operated by fluid under pressure.

In the following specification I shall describe the invention as a rotary steam-engine, it being understood, however, that the principal features of the invention are equally capable of use in other rotary motors, such as water and gas motors.

The invention consists, broadly, in two concentric rings or cylinders relatively rotatable and having in their adjacent walls oppositely-inclined openings through which the fluid under pressure is forced, the openings being as nearly tangential to the adjacent surfaces of the cylinders as possible. The adjacent surfaces of these rings or cylinders are preferably cylindrical and smooth, being unprovided with teeth or buckets, such as are commonly used in rotary engines. The jets of fluid issuing inwardly from the outer ring serve as buckets against which the jets from the inner ring play, and the jets from the inner ring serve as buckets against which the jets from the outer ring play. Either or both of the rings or cylinders may be rotatable.

The engine hereinafter described to illustrate the invention consists in a stationary outer cylinder and a rotatable inner cylinder, this being a simple embodiment of the invention.

I shall now proceed to describe the invention in detail, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation. Fig. 2 is a central section on the line 2 2 of Fig. 3. Fig. 3 is a section on the line 3 3 of Fig. 2; and Fig. 4 is an enlarged development of part of Fig. 3, illustrating the action of the machine.

Referring to the drawings, 1 indicates a shaft, which is mounted in bearings in the stationary side plates 2 of the engine. The plates 2 inclose the sides of the outer cylinder or casing 3, which, in the present instance, is stationary. This cylinder 3 has an outer wall 4 and an inner wall 5. The form of the outer wall is immaterial, but the inner wall should be circular on its inner surface 6. This inner wall is provided with one or more annular rows of inclined or tangential openings 7. The outer cylinder 3 is closed, excepting the aforesaid openings 7 and an inlet 8 for the steam. Upon the shaft 7, within the walls 2, is the inner cylinder 9, consisting of circular walls 10 and an annular or cylindrical wall 11, included between the side walls. This inner cylinder is fixed upon the shaft, and to admit steam to it a portion 12 of the shaft is tubular and provided with an opening or openings 13 within the cylinder. The peripheral wall of the cylinder is provided with tangential or inclined openings 14, said openings being inclined oppositely to the openings of the outer cylinder and disposed in annular rows in the same planes with the corresponding rows in the outer cylinder.

The bearing for the solid end of the shaft is provided with a stuffing-box 15, and upon this end a gear or pulley for transmitting power may be mounted. The tubular end of the shaft is mounted in a similar bearing and provided with a stuffing-box 16, through the outer end of which steam is admitted to the tubular shaft. The reaction of the steam creates a longitudinal thrust upon the shaft, and suitable means are provided for receiving this thrust. As shown, a hub 17 is cast upon the side of the inner cylinder and permitted to bear against the side plate 2 of the frame. After performing its work the steam exhausts into chambers 18 and then passes away through exhaust-pipes 19. The steam may be supplied to the inner and outer cylinders through a common pipe 20 and branches 21 and 22. The side plates or frames are provided with flanges or feet 23, which may be secured to the foundation or floor by the bolts 24.

In Fig. 4 I have shown portions of the adjacent walls of the inner and outer cylinders enlarged and developed. It will be seen that the steam issuing from the perforations 7 in the wall 5 forms what may be termed a "series of fluid-buckets" for the steam issuing from the perforations 14 of the wall 11,

and vice versa. Thus the jet *a* passes into the angular recess or bucket formed by the jet *b*, and the jet *b* passes into the bucket formed by the jet *a*, in which case the direct action of the jet *a* and the reaction of the jet *b* both tend to drive the inner cylinder 9. In other positions the jets are directly opposed to each other, as shown in the case of the jets *a'* and *b'* in Fig. 4. The effect here is practically the same as before, giving to the rotating cylinder the energy due to the reaction of one jet and the direct action of the other. Thus at all relative positions of the jets the engine is very efficient.

In operation the steam is admitted through the pipe 20 into the stationary outer cylinder and the rotatable inner cylinder, and it issues in opposing jets from the opposite rows of inclined openings in the adjacent walls of the cylinders. After performing its work, as above described, the steam exhausts into the chambers 18 and thence into the pipes 19. It will be evident that it is entirely immaterial, so far as the principle of my invention is concerned, whether the inner cylinder or the outer cylinder, or both, rotate. For simplicity and convenience of construction I prefer to have a stationary outer cylinder and a rotatable inner cylinder.

It will be evident that there are no buckets or other obstructions upon the periphery of the moving part of my improved engine, and therefore the inner and outer cylinders can be brought close together and the highest possible effect obtained from the steam or other fluid.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a rotary engine, the combination of inner and outer concentric cylinders relatively rotatable and provided on their adjacent surfaces with oppositely-inclined or tangential openings through which the motor fluid is permitted to pass into the intervening space, substantially as described.

2. In a rotary engine, the combination of inner and outer concentric cylinders relatively rotatable and provided on their adjacent surfaces with one or more annular rows of tangential or inclined openings, the corresponding rows in the two cylinders being located in the same transverse planes, substantially as described.

3. In a rotary engine, the combination of an inner cylinder having a circular peripheral wall with a smooth exterior surface and provided with inclined or tangential openings therein, of an outer cylinder having its inner wall close to and concentric with the periphery of the inner cylinder, said wall being provided with oppositely-inclined or tangential openings, said cylinders being relatively rotatable and arranged to receive motor fluid and discharge it through said openings into the annular intervening space, substantially as described.

4. In a rotary engine, the combination of inner and outer concentric cylinders relatively rotatable and provided on their adjacent surfaces with one or more annular rows of tangential or inclined openings, means for introducing motor fluid into both of said cylinders and exhaust-chambers for receiving the steam from the annular space between the cylinders, substantially as described.

5. In a rotary engine, the combination of the stationary side walls or standards, the stationary outer cylinder included between said walls, the shaft having bearings in said walls provided with stuffing-boxes, the inner cylinder rigidly connected with the shaft and having its periphery concentric with the inner wall of the stationary cylinder, the tubular opening having its inlet at the end of the shaft and its outlet within the inner cylinder, the exhaust-chambers opposite the annular space between the cylinders, inclined tangential openings in the adjacent walls of said cylinders, and supply and discharge pipes for the motor fluid, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

GORDON JOHN SCOTT.

Witnesses:

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