No. 805,514. PATENTED NOV. 28, 1905.

T. R. ALMOND.

REACTION ENGINE.

APPLICATION FILED APR. 26, 1905.

Fig. 1.

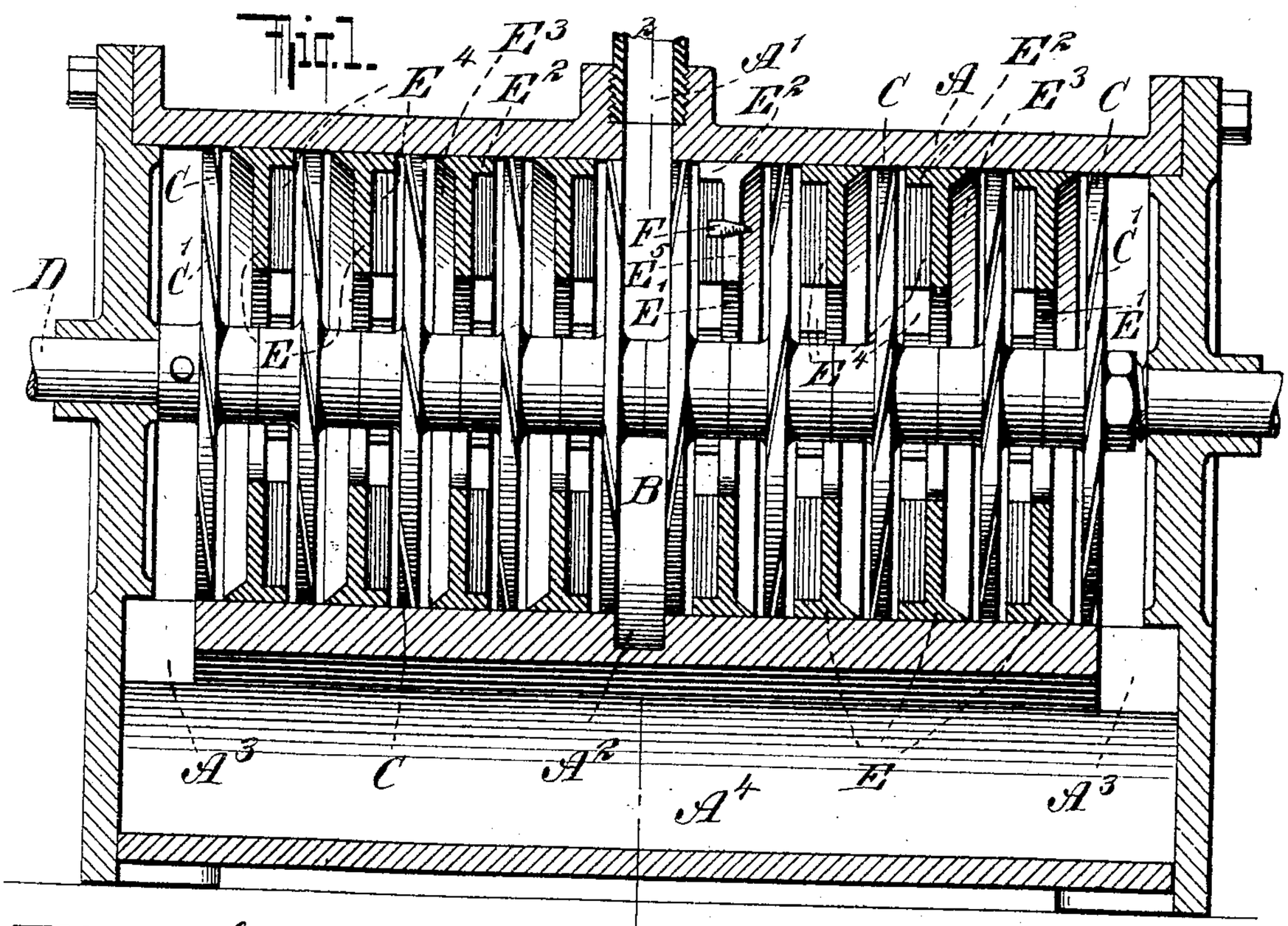


Fig. 3.

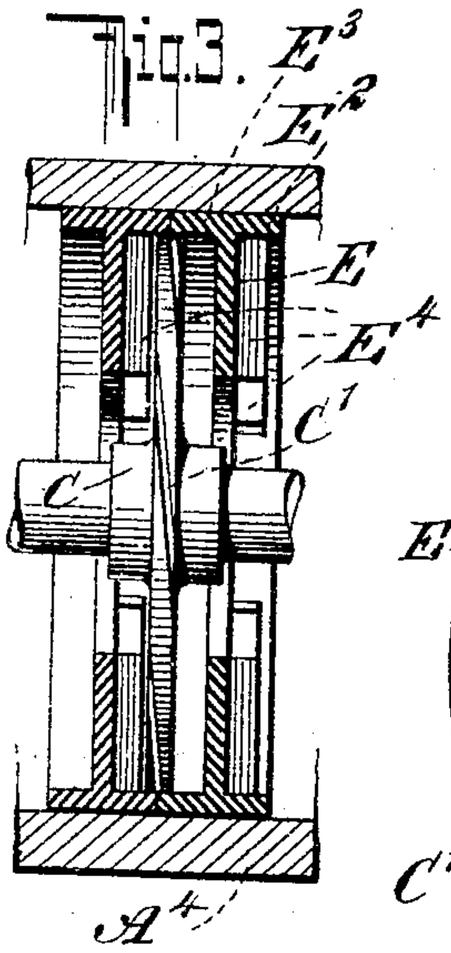


Fig. 2.

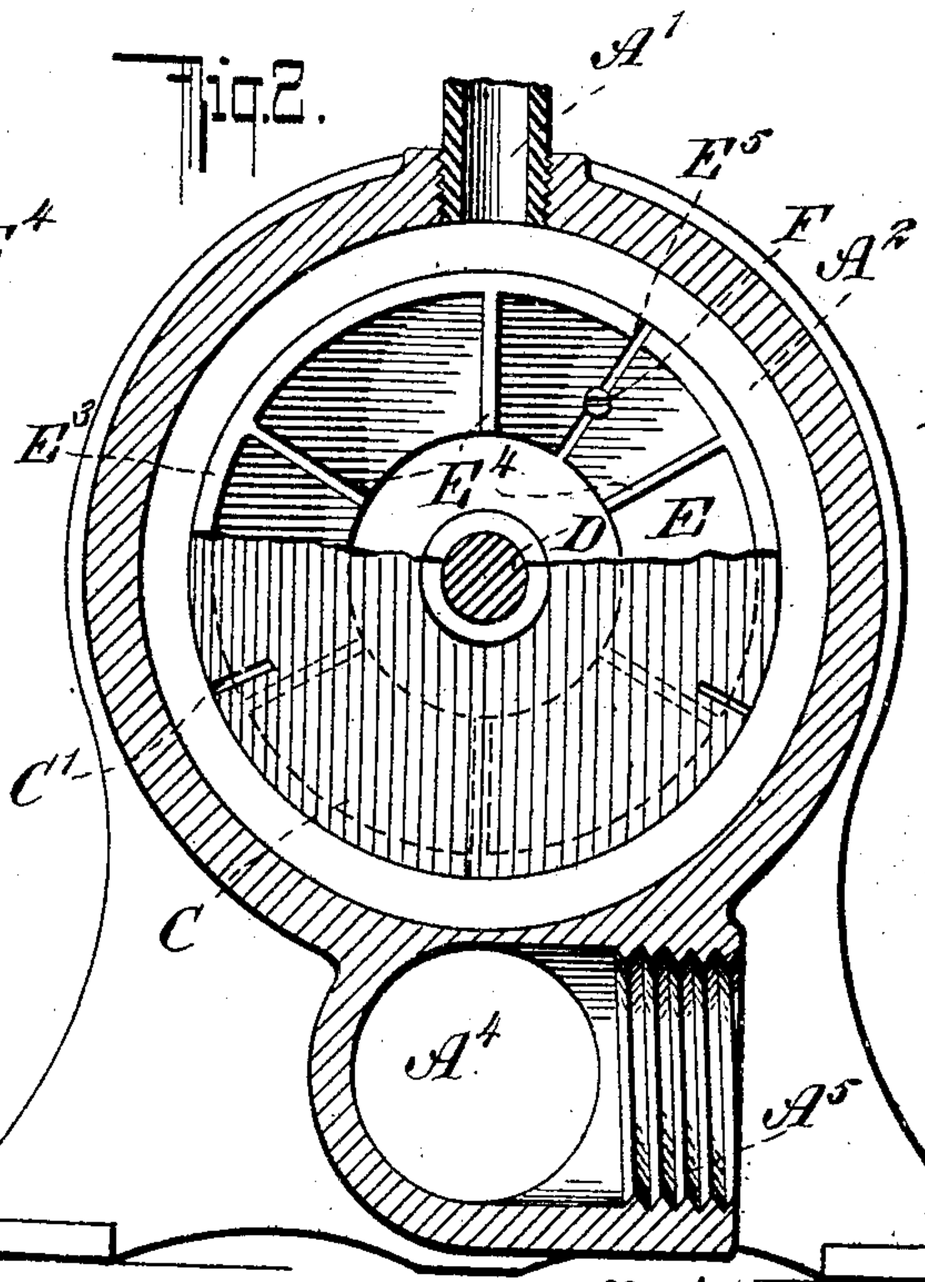
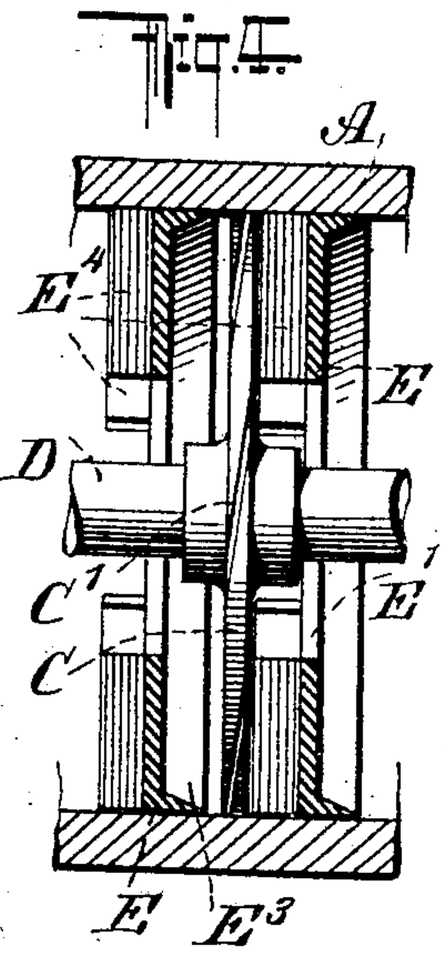


Fig. 4.



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REACTION-ENGINE.

No. 805,514. Specification of Letters Patent. Patented Nov. 28, 1905.

Application filed April 26, 1905. Serial No. 257,467.

To all whom it may concern:

Be it known that I, THOMAS R. ALMOND, a citizen of the United States, and a resident of Dunwoodie, Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Reaction-Engines, of which the following is a specification.

My invention relates to engines in which a medium under pressure, preferably of an expansive nature, is caused to travel through a movable body and to escape therefrom in such a direction as to rotate said body by a reaction effect.

The object of my invention is to considerably increase the efficiency of such reaction-engines. For this purpose I employ in connection with the rotating reaction members stationary plates or dead-plates arranged in the path of the steam or other medium which is passed through the said rotating members and constructed in a peculiar manner, as hereinafter set forth, to obstruct the whirling motion of said medium.

The invention will be fully described hereinafter and the features of novelty pointed out in the appended claims.

Reference is to be had to the accompanying drawings, in which—

Figure 1 is a longitudinal section of a reaction-engine embodying one form of my invention. Fig. 2 is a cross-section on line 2 2 of Fig. 1. Fig. 3 is a partial longitudinal section showing another form of my invention, and Fig. 4 is a similar view of still another form of construction.

As shown in Figs. 1 and 2, I employ a cylindrical casing A, having a peripheral steam-inlet A′, which leads to a central chamber B. A groove A^2 may be made in the casing, so as to admit the steam from the inlet A′ to all portions of the chamber B. This chamber is bounded by two reaction members C, consisting of disks or plates mounted upon a shaft D and having their edges fitted closely to the inner surface of the casing A, so as to form as nearly as possible a steam-tight fit without, however, rubbing against the casing. The said disks or plates C are provided with reaction-passages C′, which, as shown, consist of channels or notches cut obliquely into the edges of said disks. A series of such disks are secured at intervals on the shaft D, the disks on one side of the central chamber B having their reaction-passages C′ disposed with a slant in the opposite direction to those on the other side of the central chamber B. I have shown the disks C of each set evenly spaced; but this is not necessary. The number of channels or slots C′ may increase from disk to disk toward the outlet. Thus the two innermost disks may have three passages each and the succeeding disks four, five, six, and so on; but I desire it understood that I do not restrict myself to any particular ratio of increase. It will be understood that each two disks form a chamber, together with the casing, and the purpose of increasing the number of the passages C′ is to afford a total passage of increased area from one chamber to the next as the outlet is approached. Instead of increasing the number of passages C′, I might increase their size, or both expedients might be employed together. The steam which has passed through the outermost disk C travels through ports A^3 into a chamber A^4, having an exhaust-passage A^5; but, if desired, the ports A^3 may open directly into the atmosphere. Between each two disks of the same set I arrange a dead-plate or baffle-plate, the object of which is to obstruct the tendency of the steam to whirl around in the casing after its issue from one of the rotating reaction members C. As shown in Figs. 1 and 2, each of the dead-plates comprises a web E, having a central opening E′ for the passage of the steam and connected at its outer edge with a cylindrical member fitting the inside of the casing A and secured thereto. This cylindrical member forms two flanges, one of which, E^2, projects forwardly—that is, toward the side from which the steam comes—while the other, E^3, projects rearwardly—that is, toward the outlet. On the forward side of the web E are located ribs E^4, extending inwardly from the flange E^2, the inner ends of said ribs being preferably flush with the edges of the opening E′, as shown.

The operation is as follows: Steam passing into the central chamber B from the inlet A′ travels through both sets of reaction members C. The steam issuing at the back of any one of the disks C strikes the ribs E^4, which form an obstruction, preventing or checking the whirling motion of the steam, which results from the fact that such steam issues at high velocity from a rotating member. The steam then passes through the opening E′ chiefly under the influence of the reduced pressure which prevails on the exhaust side of the succeeding disk C. The same operation occurs at each of the disks, the pressure of the steam diminishing gradually from chamber to chamber until

the steam exhausts through the ports A^3. If desired, dead-plates, such as hereinbefore described, may be arranged on the exhaust side of the last or outermost disks C; but I do not consider this necessary.

The manner of fastening the dead-plates between the rotating reaction members may be varied. In Fig. 2 I have shown a dead-plate having a radial slot E^5, into which a screw F may be inserted to spread the periphery of the dead-plate until it tightly engages the inner surface of the casing at all points. I prefer to bevel the flanges E^3, so that they will flare toward the next disk C, thus facilitating the access of the steam to the reaction-passages C'.

In the construction illustrated by Figs. 1 and 2 the outer edges of the reaction-disks C project between the flanges of the dead-plates. In Fig. 3 I have shown a somewhat different construction in which the cylindrical outer portions of adjacent dead-plates are in contact with each other, so as to form a continuous lining for the casing A, and the reaction-disks C are of a relatively smaller diameter and are disposed in registry with the abutting surfaces of said dead-plates. In other respects the construction and operation are the same as hereinbefore described. Inasmuch as the peripheral portions of the dead-plates form a continuous cylinder in the construction illustrated by Fig. 3, the casing A might be dispensed with in this instance.

While in the two forms of construction illustrated by Figs. 1, 2, and 3 the cylindrical outer portions of the dead-plates extend to both sides of the web E, in Fig. 4 the cylindrical flange E^3 alone is employed, the ribs E^4 having no flange at their outer ends. These ribs may extend into contact with the inner surface of the casing. In other respects, as well as in its operation, this form of construction does not differ from the one shown in Figs. 1 and 2. If desired, both flanges E^2 and E^3 may be omitted. The ribs E^4 not only arrest the whirling motion of the steam, but cause it to travel radially inward to the openings E'.

I have shown a double engine in Fig. 1, with two sets of reaction members between the central inlet-chamber B and the two outlets A^3. In this case the oblique reaction-passages C' should of course slant in opposite directions in the two sets. The invention is also applicable to engines having only one outlet and a single set of reaction members.

While a cylindrical casing has been shown in the drawings, I desire it to be understood that the shape of the casing may be varied considerably as long as the peripheries of the reaction members have the proper fit.

Various modifications may be made without departing from the nature of my invention.

I claim—

1. A reaction-engine comprising a casing, a plurality of reaction members held to rotate in unison and having a running fit with a stationary part at their outer edges, said reaction members being spaced from each other so as to divide the casing into a series of chambers, and having reaction-passages connecting one chamber with the next, and stationary baffle members located between said reaction members and forming barriers to check the whirling of the driving medium issuing from said reaction-passages.

2. A reaction-engine comprising a casing, a plurality of reaction members held to rotate in unison and having a running fit with a stationary part at their outer edges, said reaction members being spaced from each other so as to divide the casing into a series of chambers, and having reaction-passages connecting one chamber with the next, and stationary baffle members disposed radially between said reaction members to check the whirling of the driving medium issuing from said reaction-passages.

3. A reaction-engine comprising a casing, a plurality of reaction members held to rotate in unison and having a running fit with a stationary part at their outer edges, said reaction members being spaced from each other so as to divide the casing into a series of chambers, and having reaction-passages connecting one chamber with the next, and stationary baffle members located between said reaction members and extending inward from points adjacent to the peripheries of the reaction members, to check the whirling of the driving medium issuing from said reaction-passages.

4. A reaction-engine comprising a casing, a reaction member held to rotate in the casing and provided with a reaction-passage extending from one of its faces to the other, said rotary member having a running fit with a stationary part at its outer edge, and a stationary baffle member located on the outlet side of the reaction member to check the whirling of the driving medium issuing from said reaction-passage.

5. A reaction-engine comprising a casing, a reaction member held to rotate in the casing and provided with a reaction-passage extending from one of its faces to the other, said rotary member having a running fit with a stationary part at its outer edge, and a stationary baffle member located on the outlet side of the reaction member, and disposed across the path of the whirling motion of the driving medium issuing from said reaction-passage, to check such whirling motion.

6. A reaction-engine comprising a casing, a reaction member held to rotate in the casing and provided with a reaction-passage extending from one of its faces to the other, said rotary member having a running fit with a stationary part at its outer edge, and a stationary baffle member located on the outlet side of the reaction member, and extending in-

wardly from a point adjacent to the periphery of said reaction member.

7. A reaction-engine comprising a casing, a reaction member held to rotate in the casing and provided with a reaction-passage extending from one of its faces to the other, said rotary member having a running fit with a stationary part at its outer edge, and a stationary baffle member located on the outlet side of the reaction member, and comprising an apertured web, and inwardly-extending ribs on that side of said web which faces the outlet side of the said reaction member.

8. A reaction-engine comprising a casing, a plurality of reaction members held to rotate in unison and having a running fit with a stationary part at their outer edges, said reaction members being spaced from each other so as to divide the casing into a series of chambers, and having reaction-passages connecting one chamber with the next, and stationary baffle members located between adjacent reaction members, each of said baffle members comprising an apertured web and inwardly-extending ribs on that side of said web which faces the outlet side of the adjacent reaction member.

9. A reaction-engine comprising a casing, a reaction member held to rotate in the casing and provided with a reaction-passage extending from one of its faces to the other, said rotary member having a running fit with a stationary part at its outer edge, and a stationary baffle member located on the outlet side of the reaction member and having inwardly-extending ribs or ledges forming barriers to check the whirling of the driving medium issuing from said reaction member.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THOMAS R. ALMOND.

Witnesses:
JOHN A. KEHLENBECK,
JOHN LOTKA.