No. 717,059. Patented Dec. 30, 1902.

S. J. WEBB.

TURBINE ENGINE.

(Application filed Apr. 3, 1901.)

(No Model.)

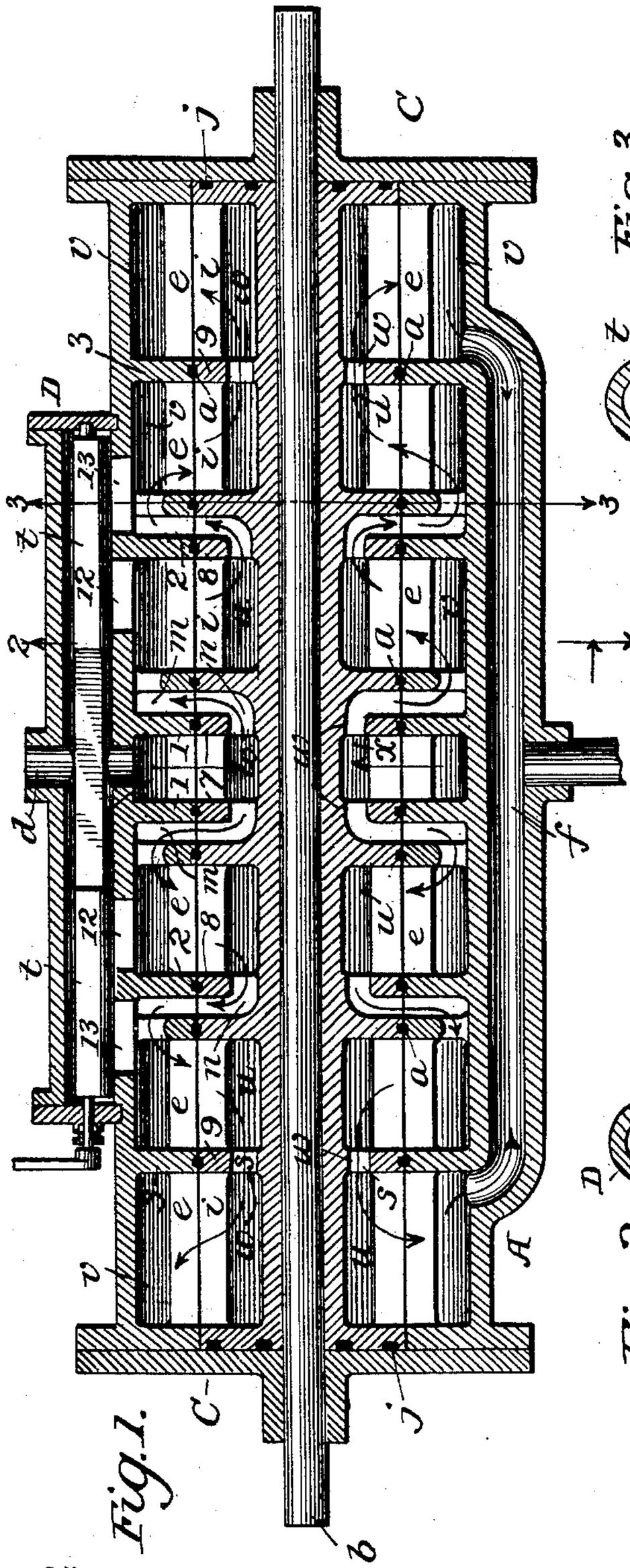

Fig. 1.

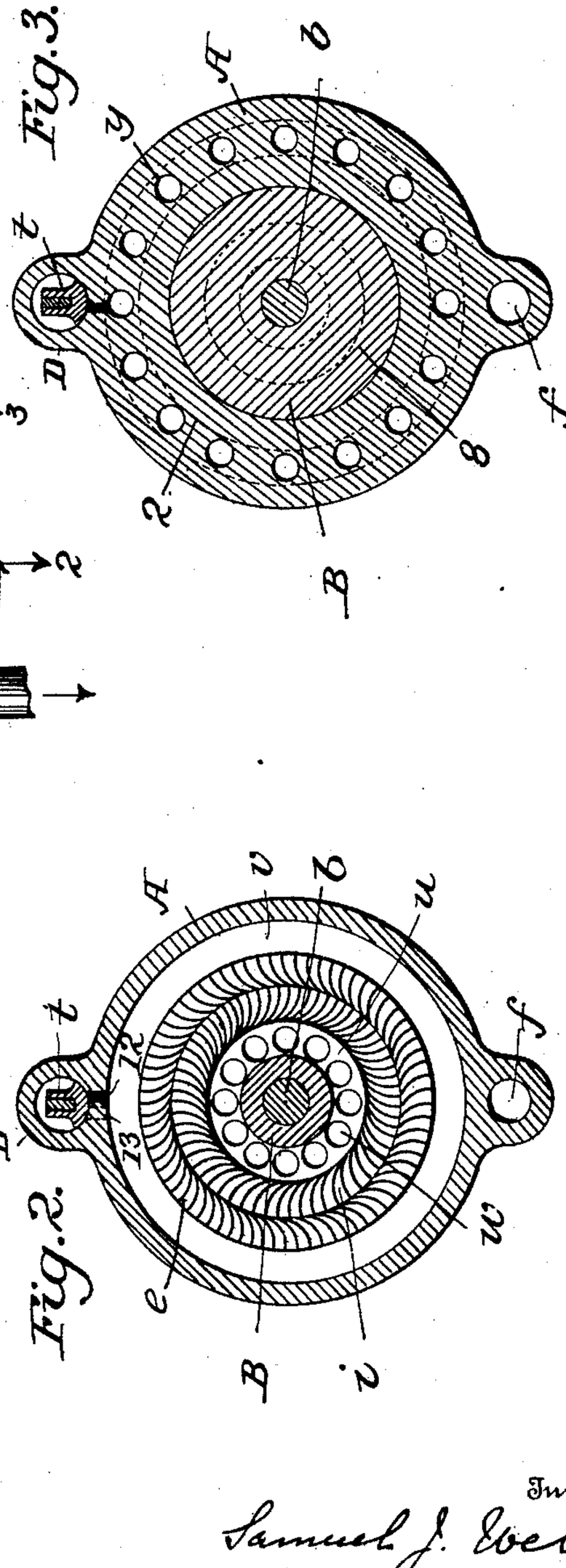

Fig. 3.

Fig. 2.

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UNITED STATES PATENT OFFICE.

SAMUEL J. WEBB, OF MINDEN, LOUISIANA.

TURBINE-ENGINE.

SPECIFICATION forming part of Letters Patent No. 717,059, dated December 30, 1902.

Application filed April 3, 1901. Serial No. 54,214. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL J. WEBB, a citizen of the United States, residing at Minden, in the parish of Webster and State of Louisiana, have invented certain new and useful Improvements in Turbine-Engines, of which the following is a specification.

My invention relates to steam-engines, and more especially to that class termed "turbine-engines;" and my invention consists in so constructing the parts as to facilitate manufacture, secure the advantages of expanding the steam, and balance the parts, as fully set forth hereinafter and as illustrated in the accompanying drawings, in—

Figure 1 is a longitudinal section of an engine embodying my improvements. Fig. 2 is a cross-section on the line 2 2, Fig. 1; and Fig. 3 is a cross-section on the line 3 3, Fig. 1.

The casing A may be either tapering or cylindrical, but as shown is cylindrical and is adapted to receive the corresponding head B, between which and the inner face of the casing are annular partitions 1 2 3, &c., of any desired number, while the head B carries a corresponding series of disks 7 or partitions 7 8 9, &c., the edges of which meet those of the case A, with suitable intervening packings *a*.

The head B is mounted on a shaft *b*, which extends through hubs of the caps C C of the casing A.

Preferably the two innermost partitions 1 1 of the casing A are arranged in close proximity to form an annular steam-receiving chamber *x*, to which steam is admitted through the inlet-pipe *d*.

Between each two adjacent partitions of the casing A are arranged a series of longitudinal blades *e*, each inclined or preferably curved to occupy a position tangential to the periphery of the head B and separated sufficiently for the passage of steam or other fluid between them, the said blades extending only part of the distance between the head B and the inner side of the casing A, so as to leave a surrounding channel *v*.

The head carries between its partitions a a series of blades *i*, arranged at an angle to the blades *e* outside channels *u*, and in all the partitions, except the terminal partitions 3 9, are channels *m n*, so arranged that the fluid admitted between the central partitions 1 1 7 7 will flow first between the blades *e* and from the latter at an angle striking the sides of the blades *i*, then to the channel 26 below the blades *i*, then up through the channels *n m* to the channel *v* ouside the next set of blades *e* and down between these blades and between and below the blades *i*, and then up through the channels *n m* of the next partition, and so on until the terminal partitions are reached, when the steam will flow through passages *s* outward and from the terminal channels *u* to an exhaust-channel *f*.

The result of the arrangement above described is to project the steam in tangentially-inclined streams from between the blades that extend between the partitions of the head or casing at almost right angles against the faces of the opposite blades and inward and outward through the next series of blades in thin streams almost at right angles against the opposite series of blades, and so on, with a turbine-like effect that results in imparting a rotation at high speed to the head B.

When the steam is used at high pressure, it is desirable to utilize its expansion, and to this end some of the partitions are separated by increasing distances, so that as the steam gradually expands in passing toward the ends of the structure it will meet a gradually-increasing surface area upon which to exert its pressure.

It will be seen that by the construction above set forth I am enabled to construct a turbine-engine with great economy, in view of the simplicity of this construction, as the casing A and head B, with their respective partitions, may be cast each in one continuous piece, and the biades may be stamped up of sheet metal and inserted in channels milled in sides of the partitions, or in some cases the blades may be cast integral with the head and casing.

After casting or otherwise constructing the parts as described the head may be turned down in a lathe to secure a coincidence of the edges of the blades and partitions with a true cylinder, and the casing may be bored out, so that the inner edges of its partitions and blades will coincide with a true cylinder corresponding to that of the head, thus securing a very close fitting of the parts.

Annular packings *jj* are inserted in grooves of the caps C C, so as to prevent the escape of steam around the ends of the head. It will be seen, however, that it is not necessary to make provision for wear between these parts, because the steam being introduced at its center exerts an equal pressure toward the ends, whereby the head is steam-balanced.

While I have described the head and casing, with their partitions, as being cast integrally, it is of course practical to make the partitions in the form of disks or rings fitted to and secured in place upon the shaft and in the casing.

Where it is desired to increase the power of the engine, this may be done by admitting steam directly to one or more of the channels *v* in addition to the channel at the center. Any suitable valve arrangement may be employed for this purpose. As shown, there is a valve-chest D, between the steam-chamber of which and different channels *v* are ports 12 13, which are not in line, but on opposite sides of a central line, as indicated in Figs. 2 and 3. A rock-valve *t* extends over the adjacent ports and when rocked in either direction will open one valve, closing the other. Thus either the port 12 or 13 may be opened to admit steam directly.

While I have illustrated the engine as provided with an annular inlet-chamber *x* at the center, it will of course be understood that this chamber may be at one end, the steam passing gradually from that end toward the opposite end of the structure, a construction, however, which is not so desirable as that shown when the parts on each side of the center are duplicated whereby to perfectly balance the head.

Without limiting myself to the precise construction and arrangement of parts shown, I claim as my invention—

1. A turbine-engine provided with a casing having a series of internal annular partitions with intervening longitudinal inclined blades, and a head arranged within the casing and provided with a series of partitions coinciding with those of the casing and with intervening longitudinal blades arranged tangentially in the opposite direction from those of the casing, the partitions having channels for the passage of the motor fluid, substantially as set forth.

2. The combination of the casing A having internal annular channeled partitions, with intermediate longitudinal inclined blades, a rotating head provided with channeled partitions and with intermediate longitudinal blades reversely inclined to those of the casing, an inlet-port communicating with a space between two partitions of the casing and outlet-ports between the caps and adjacent partitions, substantially as set forth.

3. The combination of the casing its internal channeled partitions and longitudinal inclined blades, and rotating head with its channeled partitions, and longitudinal inclined blades, an inlet steam-chamber between the two central partitions of the casing, and an outlet-port between each cap and the adjacent partitions, substantially as set forth.

4. The combination of the casing its internal partitions and longitudinal inclined blades, and rotating head, with its partitions, and longitudinal inclined blades, a steam-chamber between the two central partitions of the casing, and an outlet-port between each cap and the adjacent partitions, the distances between partitions increasing toward the ends of the structure, substantially as set forth.

5. The combination of the casing having internally-channeled annular partitions the head turning in the casing and provided with channeled partitions, with longitudinal blades inclined in different directions carried between said partitions with channels arranged to permit the steam to pass inward between some partitions and outward between others, substantially as set forth.

6. The combination of the casing having inside annular partitions the head turning in the casing and provided with partitions, with longitudinal blades inclined in different directions carried between said partitions with channels arranged to permit the steam to pass inward between some partitions and outward between others and means whereby the steam may be admitted directly to the spaces between different partitions, substantially as set forth.

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

SAMUEL J. WEBB.

Witnesses:
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