No. 818,723. PATENTED APR. 24, 1906.

J. WILKINSON.

ELASTIC FLUID TURBINE.

APPLICATION FILED AUG. 9, 1905.

Fig. 1.

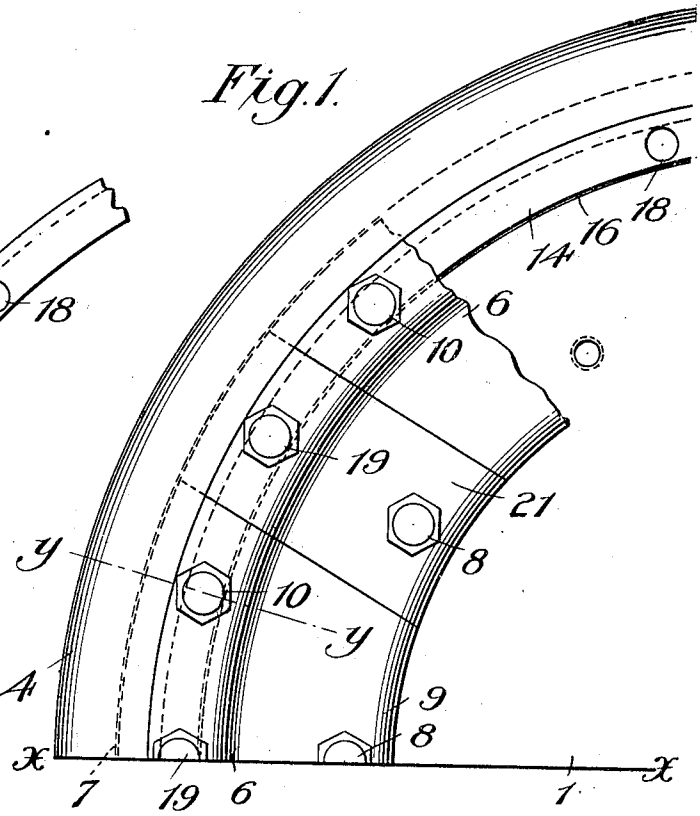


Fig. 4.

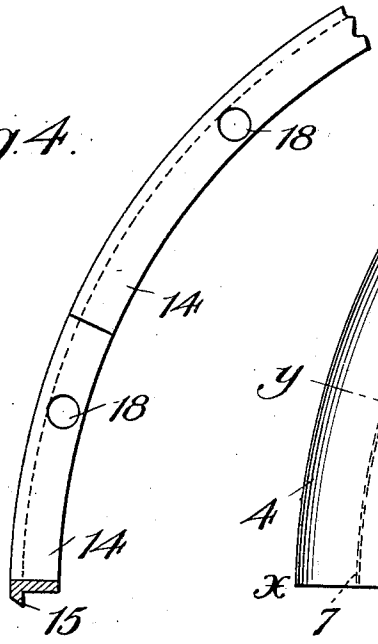


Fig. 3.

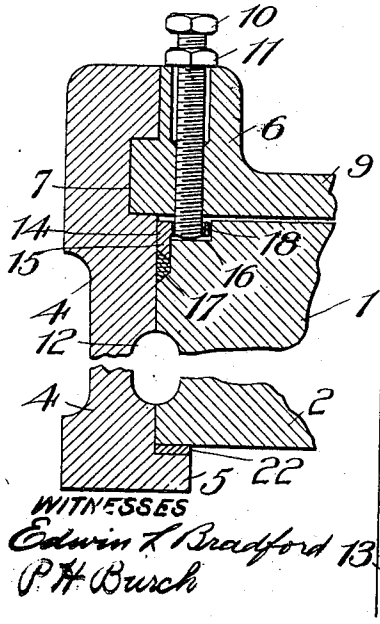
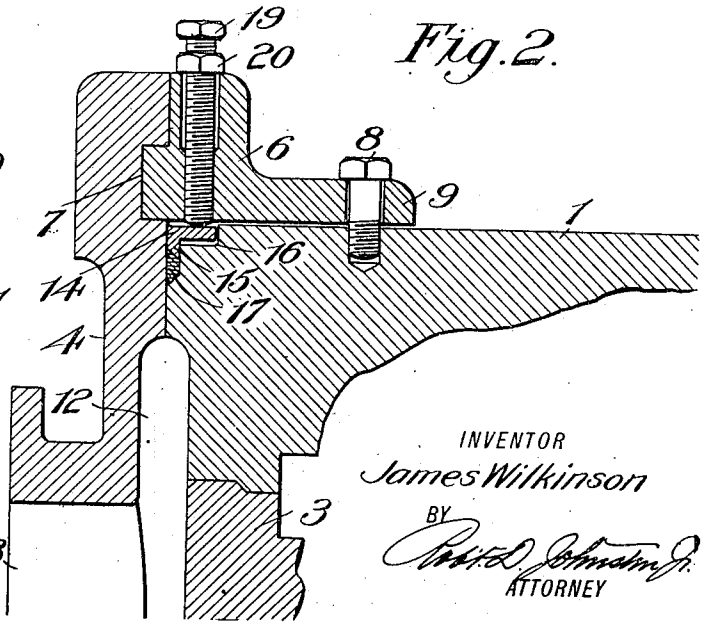


Fig. 2.



WITNESSES

Edwin L. Bradford

P. H. Busch

INVENTOR

James Wilkinson

BY

Robert D. Johnston Jr.

ATTORNEY

UNITED STATES PATENT OFFICE

JAMES WILKINSON, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO WILKINSON TURBINE COMPANY, A CORPORATION OF ALABAMA.

ELASTIC-FLUID TURBINE.

No. 818,723. Specification of Letters Patent. Patented April 24, 1906.

Application filed August 9, 1905. Serial No. 273,425.

To all whom it may concern:

Be it known that I, JAMES WILKINSON, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented new and useful Improvements in Elastic-Fluid Turbines, of which the following is a specification.

My invention relates to improvements in elastic-fluid turbines such as are shown and described in Letters Patent No. 745,270, issued to me November 24, 1903, wherein the sectional casing of a turbine is held firmly together and strengthened by the provision of an outer shell or casing which surrounds the inner casing. According to that construction the outer shell carried abutments between which the inner casing was locked against longitudinal movement, and as the shell shown was integral one of these abutments was made detachable in the form of a locking-ring which engaged within a channel in the inner face of the shell and projected over the adjacent end section of the casing. Where the shell is divided into sections on a longitudinal plane, these abutments may both be integral with the shell-sections. In turbines of this general character it is desirable that these sections of the inner casing should be held together in a manner to prevent leakage of pressure at their joints. It is also a consideration, particularly where a chamber supplied with steam is disposed between the shell and casing, that simple and effective packing means should be provided to pack the joint between the shell and casing and prevent leakage of pressure from the chamber.

It is therefore an object of my invention to provide an improved shell-packing means, such as a segmental or solid ring, which enters an annular groove in the casing and by compressing packing material therein causes it to securely pack the joint between shell and casing against fluid leakage. This ring is preferably disposed beneath the adjacent abutment or locking-ring and is forced into the packing-groove by set-screws threaded through the abutment or ring and engaging it.

According to my present invention I leave a slight clearance between one of the abutments and the adjacent end section of the casing and provide adjusting means, such as set-screws, which act between the end section and the shell or abutment to force the casing-sections firmly together.

My invention further comprises the details of construction and the arrangement of parts hereinafter more particularly described, and illustrated in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a top plan view of a portion of a turbine provided with my improvements. Fig. 2 is a partial sectional view along the line *x x*, Fig. 1. Fig. 3 is a similar view through *y y*, Fig. 1. Fig. 4 is a detail view of part of a segmental packing-ring.

Similar reference-numerals refer to similar parts throughout the drawings.

The turbine to which I have applied the improvements constituting my present invention comprises, preferably, a supply-head 1, exhaust-head 2, and one or more interposed diaphragms 3, whose peripheries interlock with each other and said heads to form the inner sectional turbine-casing. A tubular shell 4 surrounds the casing and is provided with an abutment, such as the shoulder 5, which engages the exhaust-head 2, and a detachable ring-abutment, such as 6, which serves as a stop for the supply-head. The ring 6 engages within an annular channel 7 in the shell, being held against lateral displacement by cap-screws 8, which may be screwed in or out to keep the flanged portion 9 parallel to the face of head 1. The turbine thus described corresponds with the disclosure in my Letters Patent aforesaid, where the locking-ring was relied upon to directly engage head 1 and hold the sections of the casing together. According to my present invention I propose to use adjustable devices, such as set or push screws 10, carried by the ring and provided, if desired, with lock-nuts 11, by means of which they are held in position when screwed against head 1 sufficiently to insure the casing-sections being held tightly together between the screws and shoulder 5.

I have found it desirable to heat the outer casing as much as the inner one to keep expansion of parts equal. To this end I provide a chamber 12, formed between the shell and casing and preferably surrounding the latter. To this chamber I admit fluid-pressure, such as steam, through a port 13. If

desired, this steam may constitute the supply for the turbine, flowing from the chamber 12 to nozzles (not shown) in the manner shown in my Letters Patent No. 766,921. To provide against the leakage of pressure from chamber 12, I use a packing or grooved joint at 22 and a packing-ring, such as 14, at the supply end of the shell, which ring has an angled flange 15, which has a beveled edge. The ring rests in a channel 16 around head 1, with its flange disposed so as to enter the packing-groove 17 in the side of the head; but, if desired, the ring may consist simply of the portion 15, which need not be beveled at its lower edge if the lower end of the packing-groove be beveled. As shown, the groove is beveled oppositely to the edge of ring 15, so that as the latter is forced against the packing in the groove the packing is pressed downwardly and outwardly to pack the joint between head and shell. This ring may be disposed beneath the set or push screws 10, which pass through openings 18 therein and engage the head. To press the packing-ring to its work, I use any desired number of set-screws 19, which are screwed downwardly through the locking-ring and engage the packing-ring, being held at any desired adjustment by the lock-nuts 20.

The packing-ring 14 may be sectional or integral, as desired. Ring 6 may be integral where the shell is sectional; but, preferably, the latter is integral for high-pressure turbines, in which case I remove sections of the ring, such as 21, which can be inserted and locked in place after the ring has been slipped into the channel 7. To remove the ring and open up the turbine, it is only necessary to detach the sections, such as 21, slip the ring out of the channel, and slip the shell toward the exhaust end of the turbine. To remove the ring, it will be necessary also to loosen the set-screws 10 and 19 and cap-screws 8.

The screws used for adjusting the packing-ring may be much smaller than screws 10.

Packing 22 may be placed between the exhaust-head 2 and shoulder 5 to prevent leakage at this end of the shell, or this joint may be made fluid-tight by grinding its surfaces. If desired, locking and packing rings could also be used to this end, in which case the shell could be removed in either direction.

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

1. An elastic-fluid turbine having a sectional casing, in combination with a shell or jacket surrounding said casing, elements projecting inwardly from said shell and disposed so as to hold the casing between them, and means to force the sections of said casing together.

2. An elastic-fluid turbine having a sectional casing, in combination with a shell or jacket surrounding said casing, abutments carried by said shell and adapted to engage the end sections of the casing, and adjustable means to force the sections of the casing together between said abutments.

3. An elastic-fluid turbine having a sectional casing, a shell or jacket surrounding said casing, means carried by said shell which engages one end of said casing, a detachable abutment connected to said shell and overhanging the other end of said casing, adjustable devices such as screws carried by said abutment and adapted to be forced against said casing to hold its parts in position.

4. An elastic-fluid turbine having end sections, a tubular shell or jacket provided with abutments adapted to engage said end sections, one of said abutments being removable, and adjustable means carried by an abutment and adapted to engage the adjacent end section.

5. An elastic-fluid turbine having a sectional casing, in combination with a shell or jacket surrounding said casing and provided with an abutment adapted to engage one end of said casing, a channel or groove in said shell, a locking-ring seated in said channel and projecting therefrom, means to prevent the disengagement of said ring from said channel, and screws carried by said ring and adapted to be screwed against the adjacent end of said casing to force the latter against said abutment.

6. An elastic-fluid turbine having an inner casing and an outer shell or jacket, a chamber formed between said shell and casing, a packing-chamber between said shell and casing, and a movable element adapted to enter said chamber and act upon the packing therein to pack the joint between said shell and casing.

7. An elastic-fluid turbine having an inner casing and an outer shell or jacket, a steam-chamber formed between said casing and shell, an annular packing-chamber formed between an end of said casing and said shell, a packing-ring, and adjustable means to force said ring into said packing-chamber.

8. An elastic-fluid turbine having an inner casing and an outer shell or jacket, locking-abutments in said shell between which said inner casing is disposed, means to hold said casing in place between said abutments, a fluid-pressure chamber between said shell and casing, and means to prevent leakage from said chamber comprising an annular packing-chamber near an end of the casing, a segmental ring adapted to enter said chamber, and screw means to force said ring into said chamber.

9. An elastic-fluid turbine having a sectional casing, in combination with a shell or jacket surrounding said casing and provided with means adapted to engage one end of said casing, a detachable abutment carried by said shell near the other end of said casing.

an annular packing-chamber between said shell and casing adjacent to said abutment, a packing-ring adapted to enter said packing-chamber, and set-screws carried by said abutment and adapted some of them to engage said ring and some the adjacent end of the casing, substantially as described.

10. A turbine comprising an inner sectional casing, an outer shell, a fluid-pressure chamber between said parts, an annular packing-chamber between the shell and casing near an end of the latter, and an annular element adapted to enter said chamber, packing for said chamber between the oppositely-disposed faces of said element and chamber, said faces being so inclined relatively to each other as to force said packing outwardly against the shell when moved together to compress it.

11. In an elastic-fluid turbine, an inner casing, an outer shell or jacket surrounding said casing, and means connecting the inner casing to the shell which comprise an element projecting inwardly from the shell and overhanging an end of the casing, and adjustable devices interposed between said element and casing.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JAMES WILKINSON.

Witnesses:
JOHN J. CORBETT,
JAMES H. NOLAN.