J. A. MacMURCHY.

ELASTIC FLUID TURBINE.

APPLICATION FILED JUNE 19, 1906.

908,788.

Patented Jan. 5, 1909.

2 SHEETS—SHEET 1.

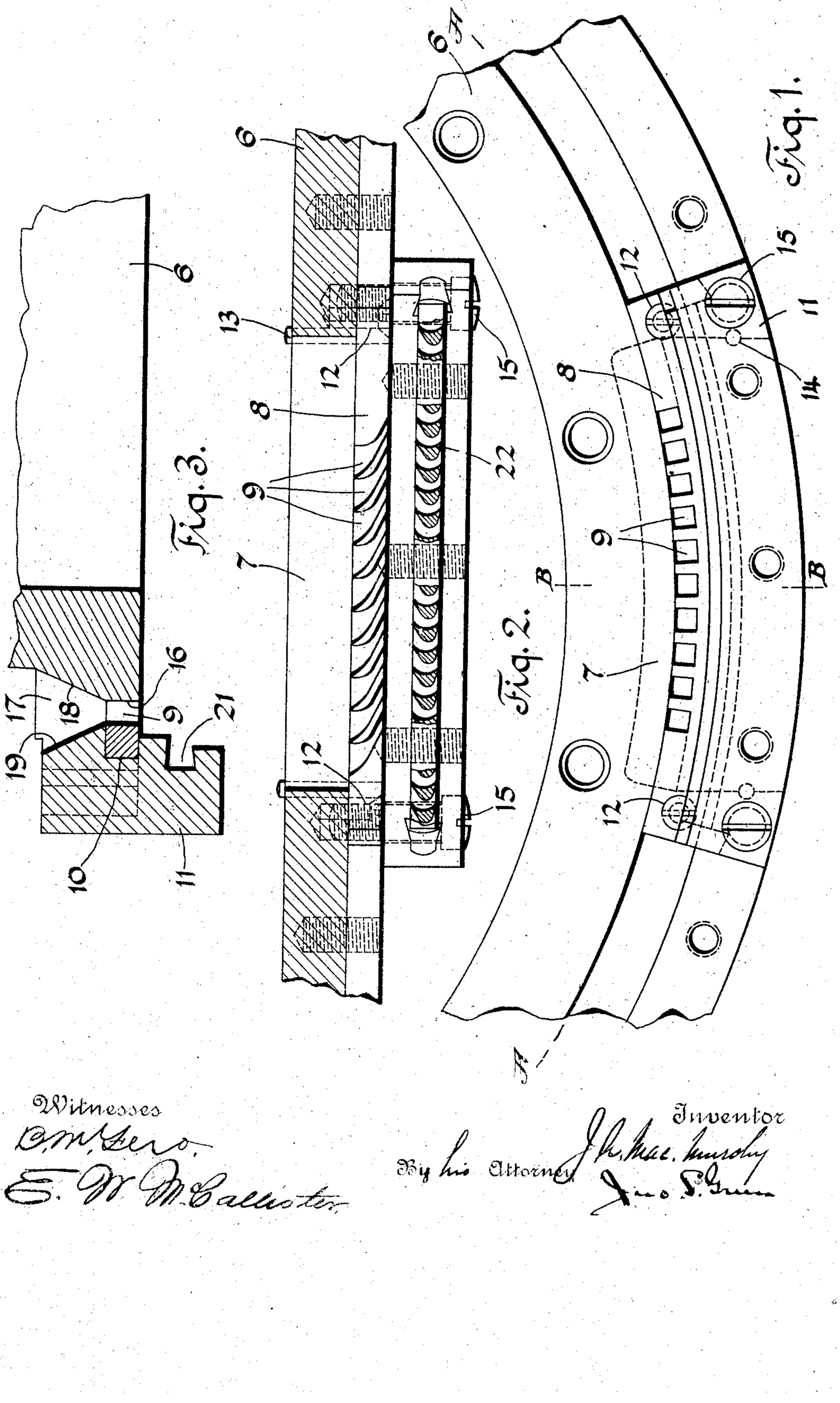

Fig. 3.

Fig. 1.

Fig. 2.

Witnesses

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Inventor

By his Attorney J. A. MacMurchy

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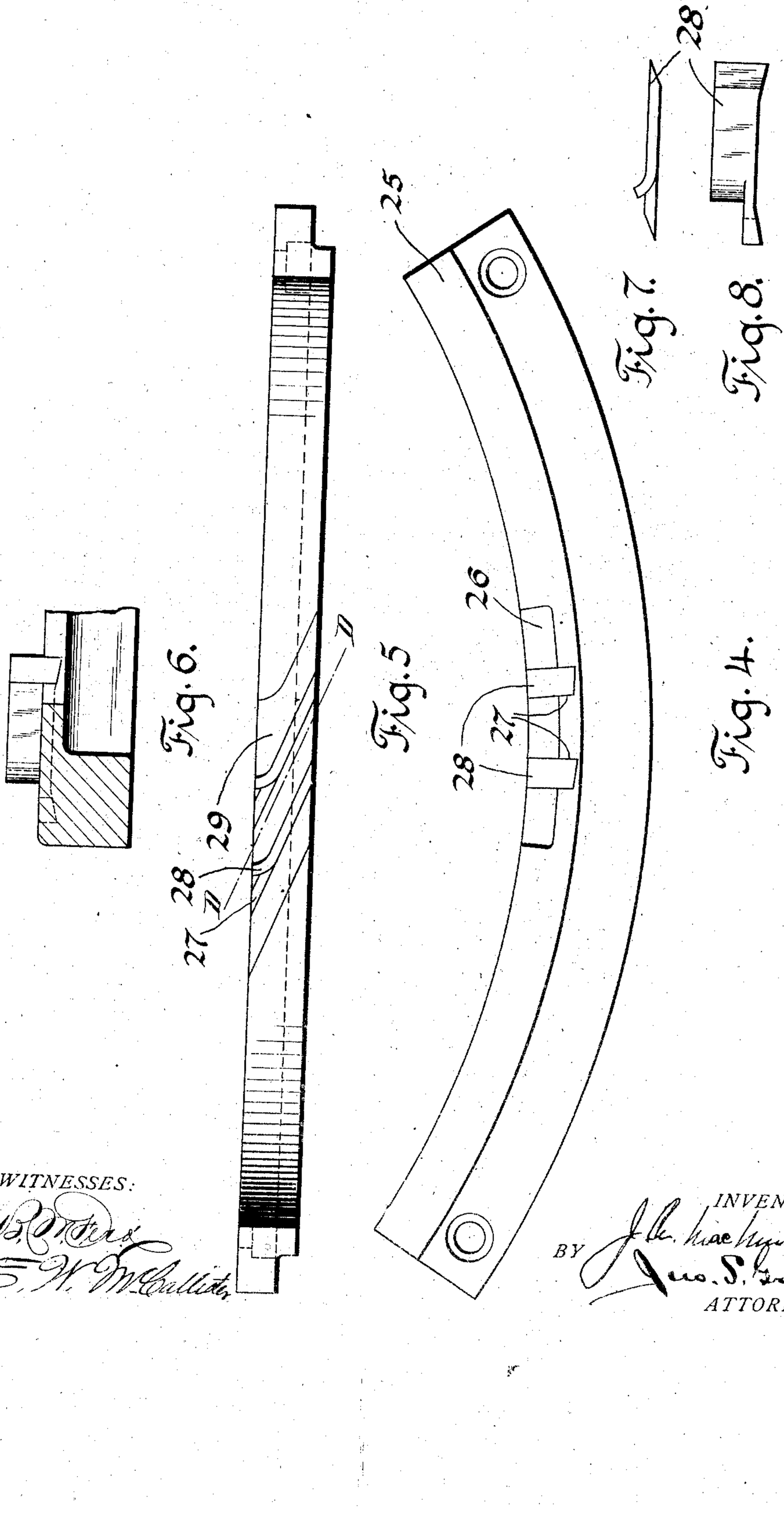

WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN A. MacMURCHY, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE MACHINE COMPANY, A CORPORATION OF PENNSYLVANIA.

ELASTIC-FLUID TURBINE.

No. 908,788. Specification of Letters Patent. Patented Jan. 5, 1909.

Application filed June 19, 1906. Serial No. 322,430.

To all whom it may concern:

Be it known that I, JOHN A. MacMURCHY, a subject of the King of Great Britain and Ireland, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, United States of America, have made a new and useful Invention in Elastic-Fluid Turbines, of which the following is a specification.

This invention relates to elastic fluid turbines, the characteristic features of the invention lying ir the construction of the nozzles or the motive fluid devices.

The object of this invention is the production of a directing device for elastic fluid turbines which is of simple construction and cheap to manufacture. This and other objects I attain with a device embodying the features herein described and illustrated.

In the drawings accompanying this application and forming a part thereof, Figure 1 is a side elevation of a device embodying my invention; Fig. 2 is a section along the line A—A of Fig. 1; Fig. 3 is a section along the line B—B of Fig. 1; Fig. 4 is a side view of a detail forming a modification of my invention; Fig. 5 is a plan view of Fig. 4; Fig. 6 is a section along the line D—D of Fig. 5; and Figs. 7 and 8 are respective side and end views of a detail of Figs 4 and 5.

A diaphragm or partition 6, formed integrally with the exterior casing of a turbine, is located between the working passages of the turbine and a motive-fluid-supply port with which the exterior casing is provided. The working passages of the turbine communicate with the motive-fluid-supply port through an opening 7, formed in the partition 6, and a nozzle block 8 is arranged to coöperate with the walls of the opening 7 to form suitable fluid-directing nozzles.

The nozzle block 8 comprises an arc-shaped piece of metal which is provided with a number of diagonally-extending slots 9 cut into the concave face and which is located in a slot 10, formed in a mounting portion 11 and secured to the partition 6 by screws 12. The mounting portion 11 is so arranged that it partially extends into the opening 7, formed in the partition 6, and is secured in place by suitable screws 15 and by taper pins 13 driven into tapered holes 14, formed partially in the lateral faces of the mounting portion 11 and partially in the adjacent face of the partition 6. The portion 11 is so located that the slotted face of the nozzle block 8 coöperates with a face 16 of the partition 6 in such a manner that the slots 9 form fluid-supply nozzles which communicate on one side with a converging supply passage 17, formed by a face 18 of the partition and a face 19 of the portion 11.

The mounting portion 11 is arranged to extend beyond the diaphragm 6 into the working passage of the turbine and is provided with a slot 21 in which a row of directing vanes 22 are mounted. An annular row of working blades, carried by the turbine rotor, and not shown, operates between the vanes 22 and the diaphragm 6 and receives motive fluid from the supply nozzles or slots 9. The motive fluid discharged from the row of moving blades is received by the directing vanes 22 and re-directed and delivered to the next row of moving blades.

The nozzle block may be utilized between the separate stages of a multi-stage turbine just as effectively as in connection with the initial supply port, and in such a construction would be located in the diaphragm that separates the stages.

In assembling the device, the nozzle block 8 is first secured to the partition 6 by the screws 12 and then the mounting portion 11, into which the blades 22 have been calked, is slipped into place and secured by the pins 13 and screws 15.

A modification of this invention is shown on Sheet 2 of the drawings. An arc-shaped piece of metal 25, which is arranged to take the place of the nozzle block 8 and fit into the slot 10, is provided with a diagonally-extending groove 26. Diagonally-extending slots 27 are cut across the inner face of the groove 26 and separate partition pieces 28 are secured therein. The partition pieces 28 are made of brass or phosphor bronze, or other metal, and are cut and shaped to form the fluid-supply passages 29, which correspond to the passages formed by the slots 9 in Fig. 2. The pieces 28 are either calked or pressed into place and, when the mounting portion 11 is in place, are held rigidly by the face 16.

It is apparent that other means may be utilized for forming the slots and, while I have said that the slots 9 are cut into the concave side of the nozzle block 8, it will be

apparent to those skilled in the art that the slots may be cut on the convex side if the arrangement of the turbine requires it.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other means.

What I claim, is:

1. In an elastic fluid turbine in combination with a motive-fluid-supply passage, a sectional nozzle, comprising a nozzle-supporting member mounted on the casing of the turbine, a slotted block secured to said supporting member and coöperating with a face of the turbine casing to form a plurality of supply passages.

2. In an elastic fluid turbine, a nozzle block, and a supporting member for said block provided with a row of stationary vanes.

3. In combination, a nozzle block support member provided with two parallel slots, a nozzle block located in one of said slots and supported by said member and a plurality of stationary directing vanes secured to said member by means of one of said slots.

4. In combination, a nozzle block support member provided with a longitudinally-extending slot, a nozzle block located in said slot and a plurality of stationary vanes carried by and secured to said member.

5. In combination, a nozzle block support member provided with a longitudinally-extending slot, a nozzle block provided with a plurality of fluid directing nozzles secured to said member and a plurality of fluid directing vanes mounted in said slot.

6. In an elastic fluid turbine, in combination with a fluid supply passage, a nozzle supporting member mounted on the casing of said turbine, a block secured to said member, slots cut in said block to form fluid directing vanes, which coöperate with a face of the turbine casing to form a plurality of fluid discharge nozzles.

7. In an elastic fluid turbine, a nozzle block supporting member provided with two parallel slots, a nozzle block located within one of said slots and stationary directing vanes located in the other slot and secured to said supporting member.

8. In combination in an elastic fluid turbine, a diaphragm, a nozzle block provided with a fluid passage and a plurality of partitions located in said passage and coöperating with a face of said diaphragm to form fluid discharge nozzles.

9. In combination in an elastic fluid turbine, a diaphragm provided with a fluid passage, a nozzle block located in said passage, a supporting member for said block secured to said diaphragm and provided with a row of stationary vanes.

10. In an elastic fluid turbine, a fluid directing device comprising a diaphragm provided with a fluid passage, a nozzle block located within said passage and coöperating with said diaphragm to form fluid nozzles, and a support member for said block secured to said diaphragm and provided with a plurality of fluid directing vanes.

11. In combination with a nozzle block supporting member, a nozzle block secured in place on said member and a plurality of fluid directing vanes mounted on said member.

12. In an elastic fluid turbine, a diaphragm, a nozzle block supporting member provided with a slot, a nozzle block provided with a plurality of transversely extending slots and located in the slot of said member and coöperating with the face of said diaphragm to form fluid discharge nozzles.

13. In combination with the stationary element of a turbine provided with a fluid delivery passage, a nozzle block located in said passage, a nozzle-block supporting member for said block and secured to said element, and a row of stationary directing vanes secured to said member.

14. In an elastic fluid turbine in combination with the stationary element of the turbine, a fluid supply passage, a nozzle-block supporting member mounted on said element, a block secured to said member, transversely extending slots provided in said block and adapted to form fluid directing vanes, which coöperate with said face of turbine element to form a plurality of fluid discharge nozzles.

In testimony whereof I have hereunto subscribed my name this 16th day of June, 1906.

J. A. MacMURCHY.

Witnesses:

CHARLES W. McGHEE,

E. W. McCALLISTER.