J. L. MOORE.

TURBINE.

APPLICATION FILED MAR. 11, 1908.

917,341.

Patented Apr. 6, 1909.

3 SHEETS—SHEET 1.

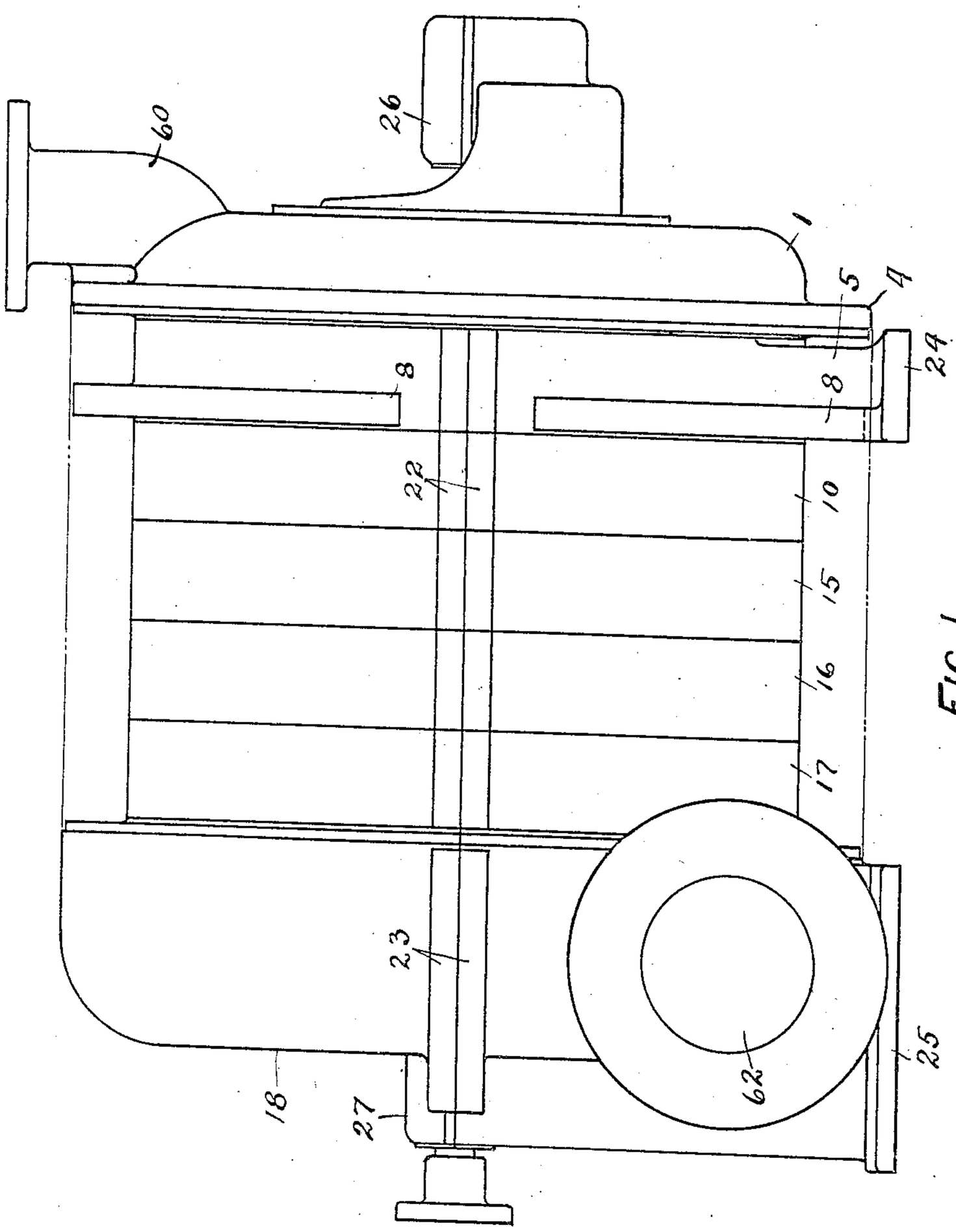

FIG. 1

WITNESSES:

Jos. G. Denny Jr.

Robt. P. Ritchie.

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James L. Moore

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3 SHEETS—SHEET 2.

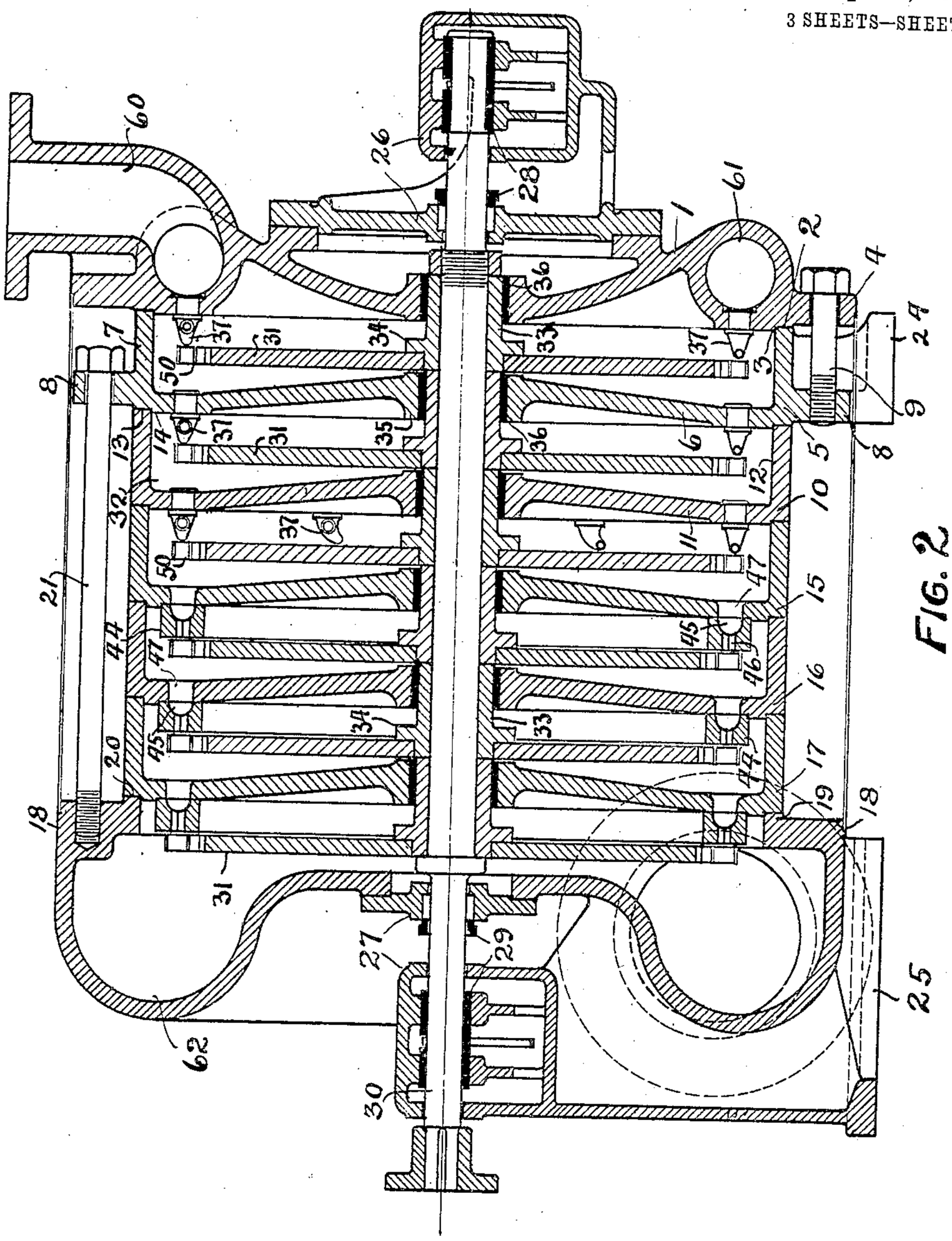

FIG. 2

WITNESSES:

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3 SHEETS—SHEET 3.

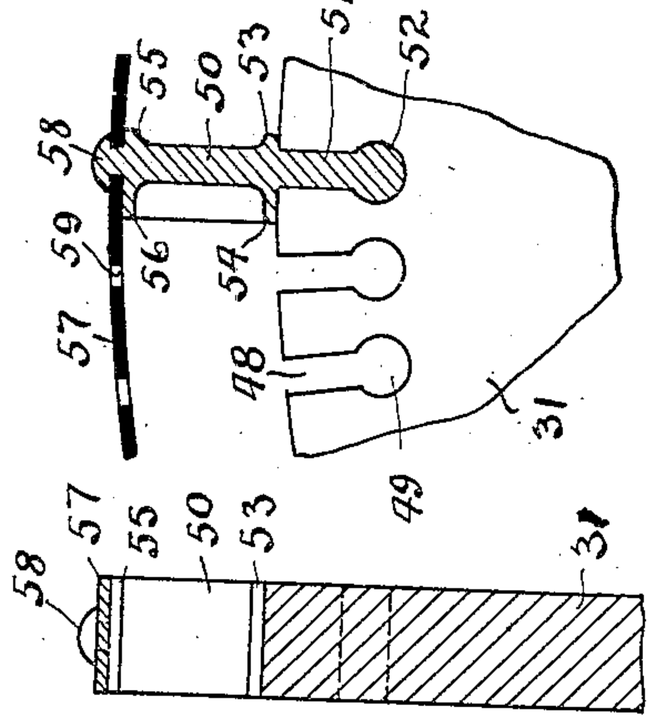

FIG. 5

FIG. 6

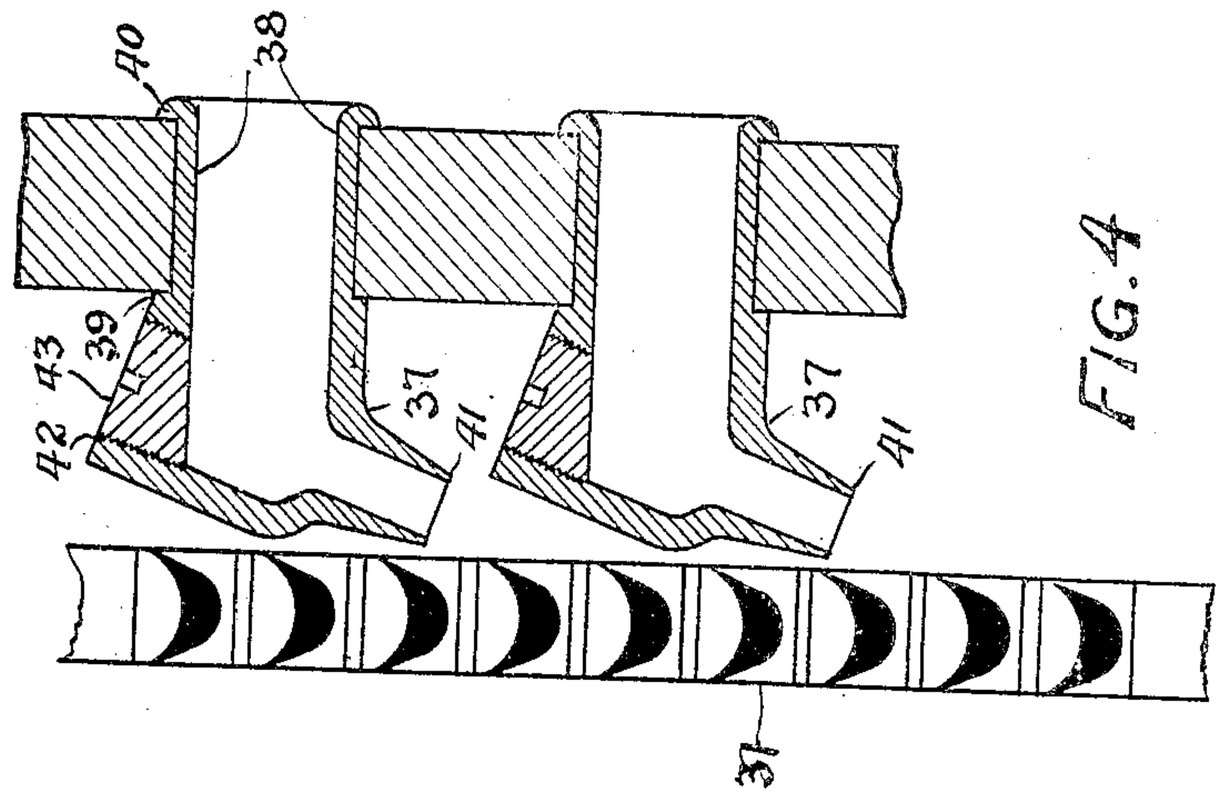

FIG. 4

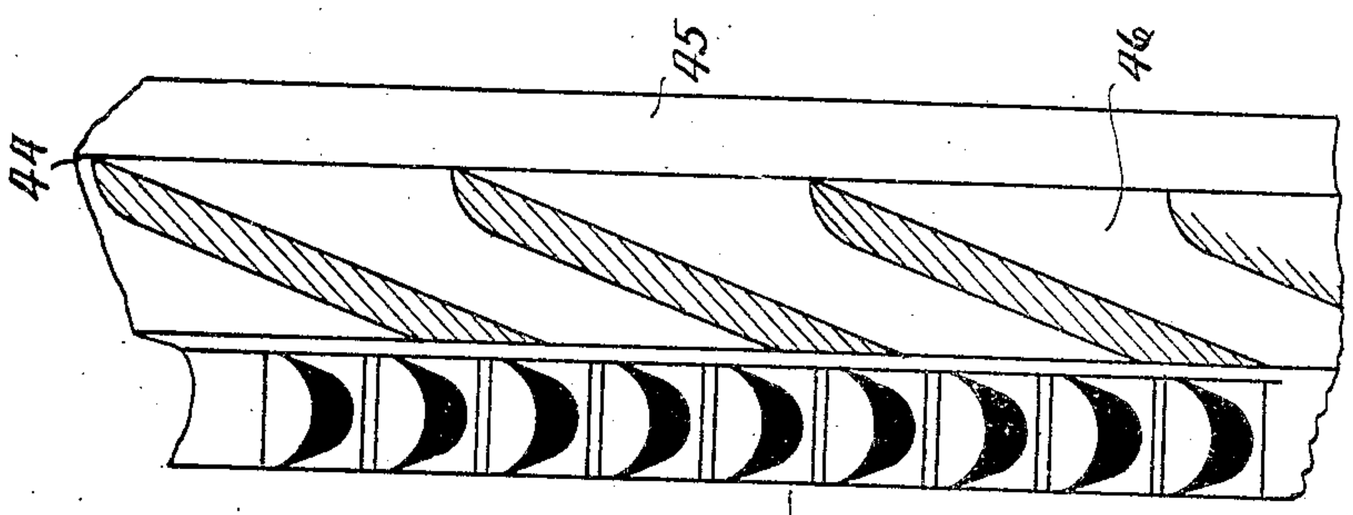

FIG. 3

WITNESSES:

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UNITED STATES PATENT OFFICE.

JAMES L. MOORE, OF BROOKLYN, NEW YORK.

TURBINE.

No. 917,341. Specification of Letters Patent. Patented April 6, 1909.

Application filed March 11, 1908. Serial No. 420,311.

To all whom it may concern:

Be it known that I, JAMES L. MOORE, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, and State of New York, have invented certain Improvements in Turbines, of which the following is a specification.

This invention is a turbine designed to simplify the operations of manufacturing, assembling and separating the parts, while securing strength, simplicity, efficiency and economy in structure and operation. A leading purpose is to produce a sectional construction, or sectional parts, readily made, joined and separated, and which will provide a tight structure suitable for use without casement.

A further object is to provide economical, durable and efficient means for directing the fluid force and receiving its impact, by peculiarly constructed and arranged nozzles, passages and vanes.

The characteristic features of the improvements will fully appear from the following description and the accompanying drawings in illustration thereof.

In the drawings, Figure 1 is a side elevation of a turbine embodying my improvements; Fig. 2 is a vertical sectional view taken through the axis thereof; Fig. 3 is a developed sectional view representing a relation of vane wheel or disk and ports delivering thereto; Fig. 4 is a developed sectional view representing a relation of vane wheel or disk and nozzles delivering thereto; Fig. 5 is a sectional view taken radially through a vane wheel or disk, and Fig. 6 is a sectional side elevation of the same.

The front head 1 of the turbine has the machined circular seat 2 surrounding the ring 3 and the flange 4 for engaging a section 5 to be joined therewith; the section comprising the conical diaphragm 6 having the cylindrical flange 7, with its edge machined to fit the seat closely around the ring, and the exterior flange 8 engaged to the flange 4 by bolts 9, which are drawn up to secure a tight joint between the parts. A section 10, comprising the conical diaphragm 11 and the cylindrical flange 12, engages the section 5, which has the machined circular seat 13 surrounding the ring 14, the machined edge of the flange engaging the seat around the ring. In like manner the similarly formed sections 15, 16 and 17 are successively positioned, the latter being engaged by the rear head 18 having the machined ring 19 which fits the depressed machined seat 20 of the section 17. Bolts 21, passing through the flange 8 of the section 5 into the head or section 18, clamp these sections with the intermediate ones together so as to secure tight joints. The intermediate and rear sections are divided in an axial plane, on which they are joined by their flanges 22 and 23 whose bearing surfaces are machined and clamped together.

The mechanism is supported by the feet 24 and 25 and has the journal bearings 26 and 27 fixed to the respective heads, the latter containing the packings 28 and 29. A shaft 30, journaled in the bearings 26 and 27, passes through the sections, including the heads, and carries the vane wheels or disks 31 revolving in chambers 32 formed by the sections. These wheels are fixed on the respective sleeves 33 against the flanges 34 thereof. The sleeves are fixed on and incase the shaft 30, abut against each other, and respectively extend through the hollow hubs 35 of the preceding diaphragms, suitable packings 36 surrounding the sleeves within the hubs. The first sections, including the front head, have set in their diaphragms the nozzles 37. Each of the nozzles has the tubular body part 38 passing through the corresponding diaphragm, such body having the hub 39 originally formed and the flange 40 turned in place for fixing it securely to the diaphragm. Each of the nozzle bodies has the angularly disposed contracted terminus 41, of reduced bore, and in line with the passage through such terminus is a threaded opening 42 which receives a plug 43. Sections succeeding the first have fixed to the rear thereof rings 44 each containing a circular channel 45 and passages 46 inclined to the channel, the forward parts of such passages being reduced with relation to their inlets. The channels 45 register with passages 47 through the diaphragms. The vane wheels or disks 31 have the radially disposed peripheral sockets 48 with the enlarged circular bottoms 49. The vanes or blades 50 are provided with the depending parts 51 with enlarged cylindrical terminals 52 which are forced into the corresponding recesses of the disks; the vanes having the bearing parts or flanges 53 and 54 which closely engage the periphery of the corresponding disks. The tops of the buckets are provided with the bearing parts or flanges 55 and 56 which

support the cylindrical band 57, the band being secured on such bearings by the studs 58 on the buckets which pass through the holes 59 and are riveted.

The head or first section 1 has the inlet passage 60 and the communicating circular channel 61 from which fluid admitted thereto is discharged through the nozzles 37, set in its inner wall or diaphragm, against the vanes of the first disk 31 and into the first chamber 32; and thence the fluid passes by the succeeding nozzles, vanes, chambers and passages to the circular outlet 62 in the rear head or section 18; the passages being gradually increased in capacity to correspond with the expansion of the fluid used.

Having described my invention, I claim:

1. In a turbine, a plurality of separable sections fitted together to form chambers, each section comprising a conical diaphragm and a peripheral flange containing a seat for letting in an adjacent flange, a head having a circular channel, said head being fitted to a flange of an adjacent section and thereby forming a chamber, vanes revolving in said chambers, and nozzles set in said head and diaphragms so as to direct a fluid passing therethrough against said vanes.

2. In a turbine, a plurality of sections each comprising a conical diaphragm with a peripheral cylinder having a reduced portion forming a seat for an adjacent cylinder, said sections being fitted together to form chambers, a revoluble shaft extending through said diaphragms, vane wheels on said shaft and in said chambers, a head fitted to a cylinder of one of said sections thereby forming a chamber, and nozzles set in said head and diaphragms in positions to direct fluid discharged therethrough against the vanes of said wheels.

3. In a turbine, a plurality of separable sections fitted together to form a chamber or chambers, one of said sections having a cylindrical ring with a cylindrical seat surrounding it and another of said sections having a cylindrical part fitting said seat around said ring, means for clamping said sections together, vane wheels revolving in said chambers, and nozzles each having obtusely arranged members, one of said members passing through a wall of a section and the other extending in the direction of vanes of said wheels.

4. In a turbine, a diaphragm and a nozzle fixed to said diaphragm, said nozzle having an angular passage therethrough, an aperture in its wall in line with its terminal passage and means for closing said aperture.

5. In a turbine, a wheel having sockets each with an enlarged circular section, vanes each having a depending part with an enlarged circular section engaged in said sockets, and a flange or flanges bearing on the wheel's periphery, said vanes having studs thereon, and a peripheral band engaged by said studs, said studs being riveted to fix said band.

6. In a turbine, a plurality of separable sections fitted together to form chambers, each of said sections comprising a diaphragm and a cylindrical flange divided on an axial plane, vane wheels revolving in said chambers, a shaft, and flanged sleeves fixed on said shaft, one end of each sleeve being journaled in a diaphragm and the other end having a wheel fixed thereon.

In witness whereof I have hereunto set my name this fourth day of March, A. D. 1908, in the presence of the subscribing witnesses.

J. L. MOORE.

Witnesses:
A. P. COLE,
A. P. ALLING.