No. 789,244. PATENTED MAY 9, 1905.

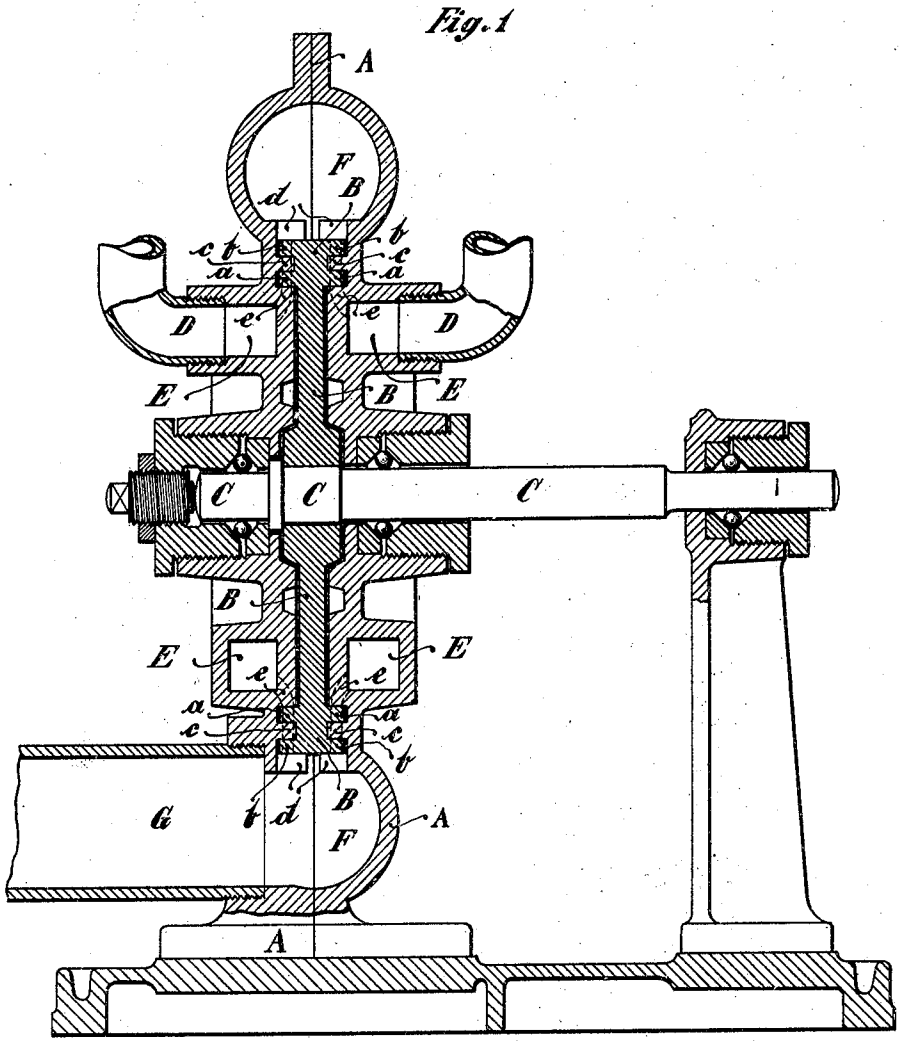
H. THORMEYER.

STEAM TURBINE.

APPLICATION FILED OCT. 1, 1902. RENEWED OCT. 26, 1904.

2 SHEETS—SHEET 1.

Fig. 1



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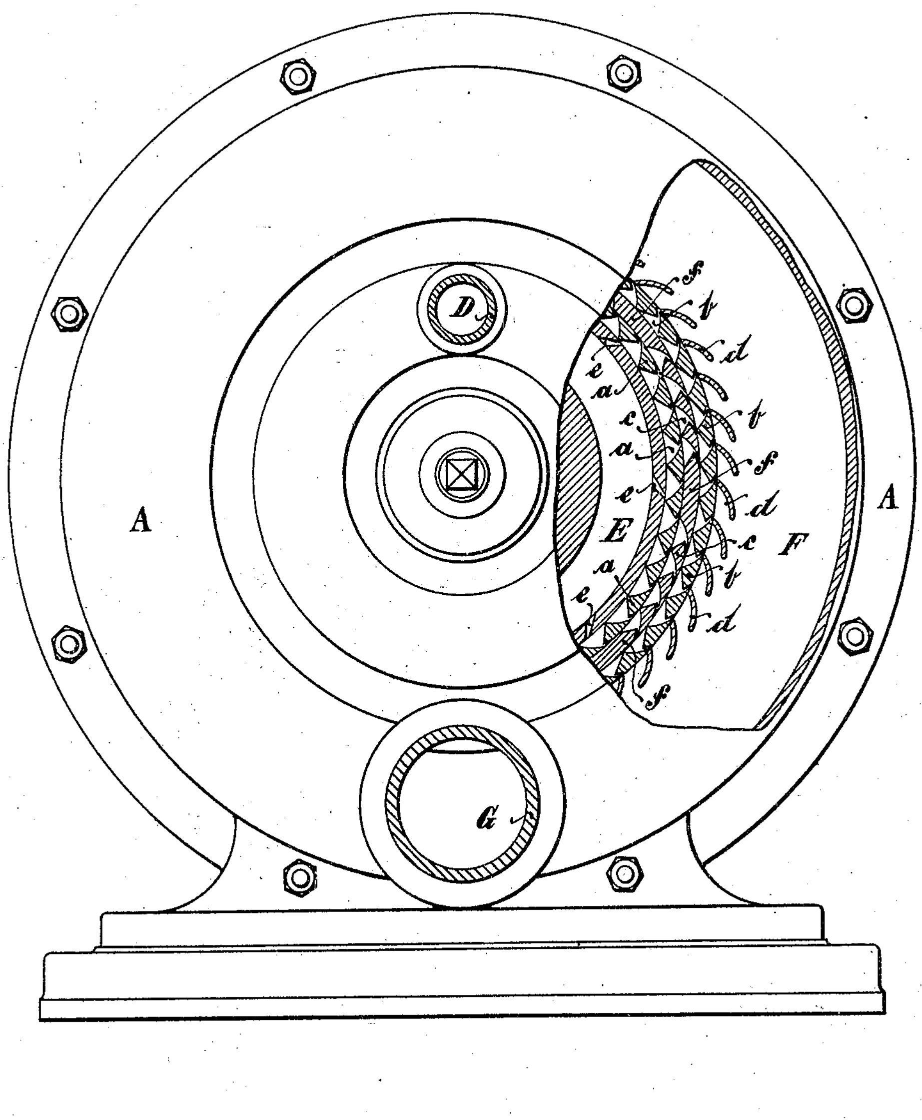
2 SHEETS—SHEET 2.

Fig. 2



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UNITED STATES PATENT OFFICE.

HANS THORMEYER, OF HALLE, GERMANY.

STEAM-TURBINE.

SPECIFICATION forming part of Letters Patent No. 789,244, dated May 9, 1905.

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To all whom it may concern:

Be it known that I, HANS THORMEYER, a subject of the King of Prussia, German Emperor, residing at Halle, in the Kingdom of Prussia, Germany, have invented a certain new and useful Improvement in Elastic-Fluid Turbines, of which the following is a specification.

My present invention relates to a steam-turbine; and it consists in so constructing and arranging the parts that the exit-openings of the cells are closed when steam is admitted, while their inlet-openings are closed after the admission. The exit-openings of the cells are so narrowed that the high-pressure steam contained in the cells after the impingement is distributed through several of the guide-cells.

In the accompanying drawings, Figure 1 is vertical section through the turbine, and Fig. 2 an elevation showing several of the cells and steam-orifices in section.

The turbine consists of the main parts—casing A and the moving-wheel B, firmly connected with the shaft C.

Steam is conducted to the turbine through the pipes D, which open out into the steam-chambers E. From the chambers E the steam passes through the orifices *e* into the inner cell series *a* of the wheel B. These cells are closed by the pieces *f* of the guide device *c*, connected to the casing, when steam is being admitted into the same, so that said cells will only receive steam until the pressure therein is equal to that in the steam-chamber E. The steam therefore cannot escape from the first series of moving cells into the guide-cells, as in turbines of known construction, but must transmit its full power to the wheel. After the cells thus filled have passed the steam-inlet orifices their outlet-orifices are opened and the inlet-orifices closed by the wall of the steam-chamber E. The inclosed high-pressure steam then enters the cells of the guide devices *c*, reacting thereon owing to its expansion. As the exit-orifices of the cells are narrow and the change from cell to cell very quick, the steam from each cell of the first series will enter several cells of the guide device *c*. In this manner the velocity of the steam is increased, so that its power can be better utilized.

In consequence of the continuous exhaust of the freshly-charged cells of the wheel B into the cells of the guide devices *c* a uniform pressure will be present in the latter cells, and this pressure will act on the second series *b* of cells of the wheel B in the same manner as the steam issuing into the cells of the first series from the steam-orifices *e*, except for the difference that the pressure of the steam owing to its distribution over several channels will be decreased. A larger area of exhaust is, however, provided.. The pressure remaining in the cells of the second series *b* is utilized by reacting on the blades *d*. From the exhaust-chamber F the steam escapes through the opening G. The breadth of the cells and the orifices is to be seen by the lines dotted through the parts *e a b c*, Fig. 1. For high pressures the number of the cell series must be increased.

Over other constructions my improved turbine possesses the advantages of consuming less steam, better utilizing the steam at low pressures, and full expansion of the steam independent of the steam-orifices. The turbine can also be operated by compressed air or gas.

I claim—

1. In an elastic-fluid motor, a turbine-wheel having fluid-receiving cells arranged in a plurality of series, guide-cells in the turbine-casing, means for closing the outlets to such guide-cells during the reception of the motor fluid, and means for closing the inlets and uncovering the outlets as the rotation of the turbine-wheel continues.

2. In an elastic-fluid motor, a turbine-wheel having fluid-receiving cells arranged in a plurality of series, guide-cells in the turbine-casing, means for closing the outlets to such cells during the reception of the motor fluid, means for closing the inlets and uncovering the outlets as the rotation of the turbine-wheel continues, and means for directing the fluid admitted to each receiving-cell to several of the guide-cells.

3. In an elastic-fluid turbine, a casing, of a turbine-wheel consisting of a disk revolubly mounted in the casing having a plurality of fluid passages or cells adjacent only to its periphery extending from the center outward,

means for admitting the motor fluid to the fluid passages or cells at the inner side, guide-vanes carried by the casing to receive the fluid as it escapes from the wheel, means for directing the fluid to the inner end of the cells, means for closing the outlet ends of the fluid passages or cells while the motor fluid is being admitted thereto, and means for opening such outlets and closing the inlets thereof as the rotation of the wheel continues.

4. In an elastic-fluid turbine, a turbine disk wheel provided adjacent to the periphery with annular flanges extending outward parallel with the axis, a plurality of fluid passages or cells formed in and through the flanges, a casing provided with an annular pressure-fluid chamber formed in the wall thereof, inclined passages in communication with the annular pressure-fluid chamber extending toward the periphery and inward toward the central plane of rotation of the wheel in communication with the wheel-chamber at the peripheral shoulder or edge of the flange-holding portion of the wheel-chamber, guide-vanes carried by the casing lying in the annular space between the flanges of the wheel, and vanes carried by the casing arranged exterior to the disk or wheel.

5. In an elastic-fluid turbine, a turbine disk wheel provided on either side adjacent to the periphery with two annular flanges extending outward parallel with the axis, a plurality of fluid passages or cells formed in and through the flanges, a casing provided with two annular pressure-fluid chambers formed in the wall thereof on opposite sides of the wheel-chamber, inclined passages in communication with the annular pressure-fluid chamber extending toward the periphery and inward toward the central plane of rotation of the wheel in communication with the wheel-chamber at the peripheral shoulder or edge of the flange-holding portion of the wheel-chamber, guide-vanes carried by the casing lying in the annular space between the flanges of the wheel, and vanes carried by the casing arranged exterior to the disk or wheel.

6. In an elastic-fluid turbine, a turbine disk wheel provided adjacent to the periphery with annular flanges extending outward parallel with the axis, a plurality of fluid passages or cells formed in and through the flanges, a casing provided with an annular pressure-fluid chamber formed in the wall thereof, inclined passages in communication with the annular pressure-fluid chamber extending toward the periphery and inward toward the central plane of rotation of the wheel in communication with the wheel-chamber at the peripheral shoulder or edge of the flange-holding portion of the wheel-chamber, guide-vanes carried by the casing lying in the annular space between the flanges of the wheel and vanes carried by the casing arranged exterior to the disk or wheel, the inclined pressure-fluid passages being less in number than the fluid passages or cells of the flanges of the wheel.

7. In an elastic-fluid turbine, a turbine disk wheel provided on either side adjacent to the periphery with two annular flanges extending outward parallel with the axis, a plurality of fluid passages or cells formed in and through the flanges, a casing provided with two annular pressure-fluid chambers formed in the wall thereof on opposite sides of the wheel-chamber, inclined passages in communication with the annular pressure-fluid chamber extending toward the periphery and inward toward the central plane of rotation of the wheel in communication with the wheel-chamber at the peripheral shoulder or edge of the flange-holding portion of the wheel-chamber, guide-vanes carried by the casing lying in the annular space between the flanges of the wheel and vanes carried by the casing arranged exterior to the disk or wheel, the inclined pressure-fluid passages being less in number than the fluid passages or cells of the flanges of the wheel.

8. In an elastic-fluid turbine, a turbine disk wheel provided adjacent to the periphery with annular flanges extending outward parallel with the axis, a plurality of fluid passages or cells formed in and through the flanges, a casing provided with an annular pressure-fluid chamber formed in the wall thereof, inclined passages in communication with the annular pressure-fluid chamber extending toward the periphery in communication with the wheel-chamber at the peripheral shoulder or edge of the flange-holding portion of the wheel-chamber, guide-vanes carried by the casing lying in the annular space between the flanges of the wheel and vanes carried by the casing arranged exterior to the disk or wheel, the inclined pressure-fluid passages, being less in number than the fluid passages or cells of the flanges of the wheel, and the guide-cells between the two flanges of the wheel being divided into a plurality of series by solid portions of greater peripheral length than any one cell.

9. In an elastic-fluid turbine, a turbine disk wheel provided on either side adjacent to the periphery with two annular flanges extending outward parallel with the axis, a plurality of fluid passages or cells formed in and through the flanges, a casing provided with two annular pressure-fluid chambers formed in the wall thereof on opposite sides of the wheel-chamber, inclined passages in communication with the annular pressure-fluid chambers extending toward the periphery in communication with the wheel-chamber at the peripheral shoulder or edge of the flange-holding portion of the wheel-chamber, guide-vanes carried by the casing lying in the annular space between the flanges of the wheel, and vanes carried by the casing arranged exterior to the disk or wheel, the inclined pressure-fluid passages being less

in number than the fluid passages or cells of the flanges of the wheel, and the guide-cells between the two flanges of the wheel being divided into a plurality of series by solid portions of greater peripheral length than any one cell.

10. In an elastic-fluid turbine, a turbine disk wheel provided adjacent to the periphery with annular flanges extending outward parallel with the axis, a plurality of fluid passages or cells formed in and through the flanges, a casing provided with an annular pressure-fluid chamber formed in the wall thereof, inclined passages in communication with the annular pressure-fluid chamber extending toward the periphery in communication with the wheel-chamber at the peripheral shoulder or edge of the flange-holding portion of the wheel-chamber, guide-vanes carried by the casing lying in the annular space between the flanges of the wheel, and vanes carried by the casing arranged exterior to the disk or wheel, the inclined pressure-fluid passages being less in number than the fluid passages or cells of the flanges of the wheel, and the guide-cells between the two flanges of the wheel being divided into a plurality of series by solid portions of greater peripheral length than any one cell, and of the same peripheral length as each series of cells.

11. In an elastic-fluid turbine, a turbine disk wheel provided on either side adjacent to the periphery with two annular flanges extending outward parallel with the axis, a plurality of fluid passages or cells formed in and through the flanges, a casing provided with two annular pressure-fluid chambers formed in the wall thereof on opposite sides of the wheel-chamber, inclined passages in communication with the annular pressure-fluid chamber extending toward the periphery in communication with the wheel-chamber at the peripheral shoulder or edge of the flange-holding portion of the wheel-chamber, guide-vanes carried by the casing lying in the annular space between the flanges of the wheel, and vanes carried by the casing arranged exterior to the disk or wheel, the inclined pressure-fluid passages being less in number than the fluid passages or cells of the flanges of the wheel, and the guide-cells between the two flanges of the wheel being divided into a plurality of series by solid portions of greater peripheral length than any one cell, and of the same peripheral length as each series of cells.

12. In an elastic-fluid turbine, a turbine disk wheel provided adjacent to the periphery with annular flanges extending outward parallel with the axis, a plurality of fluid passages or cells formed in and through the flanges, passages for directing the pressure fluid to the inner opening of the fluid passages or cells of the inner flanges of the wheel at a plurality of points, guide-cells carried by the casing lying in the annular space between the flanges of the wheel, and vanes carried by the casing arranged exterior to the wheel, the pressure-fluid passages being less in number than the fluid passages or cells of the flanges of the wheel, and the peripheral distance between the outlets of any two of the fluid-pressure passages being not less than the distance between any three of the abutting inlets of the fluid passages or cells of the wheel-flanges.

13. In an elastic-fluid turbine, a turbine disk wheel provided on either side adjacent to the periphery with two annular flanges extending outward parallel with the axis, a plurality of fluid passages or cells formed in and through the flanges, passages for directing the pressure fluid to the inner opening of the fluid passages or cells of the inner flanges of the wheel at a plurality of points, guide-cells carried by the casing lying in the annular space between the flanges of the wheel, and vanes carried by the casing arranged exterior to the wheel, the pressure-fluid passages being less in number than the fluid passages or cells of the flanges of the wheel, and the peripheral distance between the outlets of any two of the fluid-pressure passages being not less than the distance between any three of the abutting inlets of the fluid passages or cells of the wheel-flanges.

14. In an elastic-fluid turbine, a turbine disk wheel provided adjacent to the periphery with annular flanges extending outward parallel with the axis, a plurality of fluid passages or cells formed in and through the flanges, passages for directing the pressure fluid to the inner opening of the fluid passages or cells of the inner flanges of the wheel at a plurality of points, guide-cells carried by the casing lying in the annular space between the flanges of the wheel, and vanes carried by the casing arranged exterior to the wheel, the pressure-fluid passages being less in number than the fluid passages or cells of the flanges of the wheel, and the guide-cells between the two flanges of the wheel being divided into a plurality of series by solid portions of greater peripheral length than any one cell.

15. In an elastic-fluid turbine, a turbine disk wheel provided on either side adjacent to the periphery with two annular flanges extending outward parallel with the axis, a plurality of fluid passages or cells formed in and through the flanges, passages for directing the pressure fluid to the inner opening of the fluid passages or cells of the inner flanges of the wheel at a plurality of points, guide-cells carried by the casing lying in the annular space between the flanges of the wheel, and vanes carried by the casing arranged exterior to the wheel, the pressure-fluid passages being less in number than the fluid passages or cells of the flanges of the wheel, and the guide-cells between the two flanges of the wheel being

divided into a plurality of series by solid portions of greater peripheral length than any one cell.

16. In an elastic-fluid turbine, a turbine disk wheel provided adjacent to the periphery with annular flanges extending outward parallel with the axis, a plurality of fluid passages or cells formed in and through the flanges, passages for directing the pressure fluid to the inner opening of the fluid passages or cells of the inner flanges of the wheel at a plurality of points, guide-cells carried by the casing lying in the annular space between the flanges of the wheel, vanes carried by the casing arranged exterior to the wheel, the pressure-fluid passages being less in number than the fluid passages or cells of the flanges of the wheel, and the guide-cells between the two flanges of the wheel being divided into a plurality of series by solid portions of greater peripheral length than any one cell, and of the same peripheral length as each series of cells.

17. In an elastic-fluid turbine, a turbine disk wheel provided on either side adjacent to the periphery with two annular flanges extending outward parallel with the axis, a plurality of fluid passages or cells formed in and through the flanges, passages for directing the pressure fluid to the inner opening of the fluid passages or cells of the inner flange of the wheel at a plurality of points, guide-cells carried by the casing lying in the annular space between the flanges of the wheel, and vanes carried by the casing arranged exterior to the wheel, the pressure-fluid passages being less in number than the fluid passages or cells of the flanges of the wheel, and the guide-cells between the two flanges of the wheel being divided into a plurality of series by solid portions of greater peripheral length than any one cell, and of the same peripheral length as each series of cells.

18. In an elastic-fluid motor, a casing provided with an annular pressure-fluid chamber formed in the wall thereof, inclined passages directed toward the periphery leading from the annular pressure-fluid chamber to the wheel-chamber, a turbine-wheel having fluid-receiving cells, guide-cells in the turbine-casing arranged in a plurality of series, means for closing the outlets to such guide-cells during the reception of the motor fluid, and means for closing the inlets and uncovering the outlets as the rotation of the turbine-wheel continues, substantially as shown and described.

19. In an elastic-fluid motor, a casing provided with an annular pressure-fluid chamber formed in the wall thereof, inclined passages directed toward the periphery leading from the annular pressure-fluid chamber to the wheel-chamber, a turbine-wheel having fluid-receiving cells, guide-cells in the turbine-casing arranged in a plurality of series, means for closing the outlets to the wheel-cells during the reception of the motor fluid, means for closing the inlets and uncovering the outlets as the rotation of the turbine-wheel continues, and means for directing the fluid admitted to each receiving-cell to several of the guide-cells.

20. In an elastic-fluid turbine, a casing provided with an annular pressure-fluid chamber formed in the wall thereof, inclined passages directed toward the periphery and inward toward the central plane of rotation of the wheel leading from the annular pressure-fluid chamber to the wheel-chamber, a turbine-wheel consisting of a disk revolubly mounted in the casing having a plurality of fluid passages or cells located adjacent to its periphery, extending from the center outward, means for admitting the motor fluid to the fluid passages or cells at the inner side, guide-vanes carried by the casing to receive the fluid as it escapes from the wheel-cells, and means for directing the fluid to the inner end of the cells.

21. In an elastic-fluid turbine, a casing provided with an annular pressure-fluid chamber formed in the wall thereof, inclined passages directed toward the periphery leading from the annular pressure-fluid chamber to the wheel-chamber, of a turbine-wheel consisting of a disk revolubly mounted in the casing having a plurality of fluid passages or cells at its periphery extending from the center outward, means for admitting the motor fluid to the fluid passages or cells at the inner side, guide-vanes carried by the casing to receive the fluid as it escapes from the wheel, means for directing the fluid to the inner end of the cells, means for closing the outlet ends of the fluid passages or cells while the motor fluid is being admitted thereto, and means for opening such outlets and closing the inlets thereof as the rotation of the wheel continues.

22. In an elastic-fluid motor, a casing provided with two oppositely-located annular pressure-fluid chambers formed in the side walls of the casing, inclined passages directed toward the periphery leading from such annular chambers to the wheel-chamber, a turbine-wheel having fluid-receiving cells, guide-cells in the turbine-casing arranged in a plurality of series, means for closing the outlets to the wheel-cells during the reception of the motor fluid, and means for closing the inlets and uncovering the outlets as the rotation of the wheel continues.

23. In an elastic-fluid motor, a casing provided with two oppositely-located annular pressure-fluid chambers formed in the side walls of the casing, inclined passages directed toward the periphery leading from such annular chambers to the wheel-chamber, a turbine-wheel having fluid-receiving cells, guide-cells in the turbine-casing arranged in a plurality of series, means for closing the outlets to such cells during the reception of the motor fluid, means for closing the inlets and uncovering

the outlets as the rotation of the turbine-wheel continues, and means for directing the fluid admitted to each receiving-cell to several of the guide-cells.

24. In an elastic-fluid turbine, a casing provided with two oppositely-located annular pressure-fluid chambers formed in the side walls of the casing, inclined passages directed toward the periphery and inward toward the central plane of rotation of the wheel leading from such annular chambers to the wheel-chamber, a turbine-wheel consisting of a disk revolubly mounted in the casing having a plurality of fluid passages or cells located adjacent to the periphery extending from the center outward, means for admitting the motor fluid to the fluid passages or cells at the inner side, guide-vanes carried by the casing to receive the fluid as it escapes from the wheel-cells, and means for directing the fluid to the inner end of the cells.

25. In an elastic-fluid turbine, a casing provided with two oppositely-located annular pressure-fluid chambers formed in the side walls of the casing, inclined passages directed toward the periphery leading from such annular chambers to the wheel-chamber, of a turbine-wheel consisting of a disk revolubly mounted in the casing having a plurality of fluid passages or cells at its periphery extending from the center outward, means for admitting the motor fluid to the fluid passages or cells at the inner side, guide-vanes carried by the casing to receive the fluid as it escapes from the wheel, means for directing the fluid to the inner end of the cells, means for closing the outlet ends of the fluid passages or cells while the motor fluid is being admitted thereto, and means for opening such outlets and closing the inlets thereof as the rotation of the wheel continues.

26. In an elastic-fluid motor, a casing provided with an annular pressure-fluid chamber formed in the wall thereof, inclined passages directed toward the periphery leading from the annular pressure-fluid chamber to the wheel-chamber, an annular peripheral exhaust-chamber in communication with the wheel-chamber at the periphery, a turbine-wheel having fluid-receiving cells arranged in a plurality of series, guide-cells in the turbine-casing, means for closing the outlets to such guide-cells during the reception of the motor fluid, and means for closing the inlets and uncovering the outlets as the rotation of the turbine-wheel continues.

27. In an elastic-fluid motor, a casing provided with an annular pressure-fluid chamber formed in the wall thereof, inclined passages directed toward the periphery leading from the annular pressure-fluid chamber to the wheel-chamber, an annular peripheral exhaust-chamber in communication with the wheel-chamber at the periphery, a turbine-wheel having fluid-receiving cells arranged in a plurality of series, guide-cells in the turbine-casing, means for closing the outlets to such cells during the reception of the motor fluid, means for closing the inlets and uncovering the outlets as the rotation of the turbine-wheel continues, and means for directing the fluid admitted to each receiving-cell to several of the guide-cells.

28. In an elastic-fluid turbine, a casing provided with an annular pressure-fluid chamber formed in the wall thereof, inclined passages directed toward the periphery, and inward toward the central plane of rotation of the wheel leading from the annular pressure-fluid chamber to the wheel-chamber, an annular peripheral exhaust-chamber in communication with the wheel-chamber at the periphery, a turbine-wheel consisting of a disk revolubly mounted in the casing, having a plurality of fluid passages or cells located adjacent to its periphery, extending from the center outward, means for admitting the motor fluid to the fluid passages or cells at the inner side, guide-vanes carried by the casing to receive the fluid as it escapes from the wheel-cells, and means for directing the fluid to the inner end of the cells.

29. In an elastic-fluid turbine, a casing provided with an annular pressure-fluid chamber formed in the wall thereof, inclined passages directed toward the periphery leading from the annular pressure-fluid chamber to the wheel-chamber, an annular peripheral exhaust-chamber in communication with the wheel-chamber at the periphery, of a turbine-wheel consisting of a disk revolubly mounted in the casing having a plurality of fluid passages or cells at its periphery extending from the center outward, means for admitting the motor fluid to the fluid passages or cells at the inner side, guide-vanes carried by the casing to receive the fluid as it escapes from the wheel, means for directing the fluid to the inner end of the cells, means for closing the outlet ends of the fluid passages or cells while the motor fluid is being admitted thereto, and means for opening such outlets and closing the inlets thereof as the rotation of the wheel continues.

30. In an elastic-fluid motor, a casing provided with two oppositely-located annular pressure-fluid chambers formed in the side walls of the casing, inclined passages directed toward the periphery leading from such annular chambers, to the wheel-chamber, an annular peripheral exhaust-chamber in communication with the wheel-chamber at the periphery, a turbine-wheel having fluid-receiving cells arranged in a plurality of series, guide-cells in the turbine-casing, means for closing the outlets to such guide-cells during the reception of the motor fluid, and means for closing the inlets and uncovering the outlets as the rotation of the wheel continues.

31. In an elastic-fluid motor, a casing provided with two oppositely-located annular pres-

sure-fluid chambers formed in the side walls of the casing, inclined passages directed toward the periphery leading from such annular chamber to the wheel-chamber, an annular peripheral exhaust-chamber in communication with the wheel-chamber at the periphery, a turbine-wheel having fluid-receiving cells, guide-cells in the turbine-casing arranged in a plurality of series, means for closing the outlets to such cells during the reception of the motor fluid, means for closing the inlets and uncovering the outlets as the rotation of the wheel continues, and means for directing the fluid from each receiving-cell to several of the guide-cells.

32. In an elastic-fluid turbine, a casing provided with two oppositely-located annular pressure-chambers formed in the side walls of the casing, inclined passages directed toward the periphery, and inward toward the central plane of rotation of the wheel leading from such annular chamber to the wheel-chamber, an annular peripheral exhaust-chamber in communication with the wheel-chamber at the periphery, a turbine-wheel consisting of a disk revolubly mounted in the casing having a plurality of fluid passages or cells located adjacent to the periphery, extending from the center outward, means for admitting the motor fluid to the fluid passages or cells at the inner side, guide-vanes carried by the casing to receive the fluid as it escapes from the wheel-cells, and means for directing the fluid to the inner end of the cells.

33. In an elastic-fluid turbine, a casing provided with two oppositely-located annular pressure-fluid chambers formed in the side walls of the casing, inclined passages directed toward the periphery leading from such annular chambers to the wheel-chamber, an annular peripheral exhaust-chamber in communication with the wheel-chamber at the periphery, a turbine-wheel consisting of a disk revolubly mounted in the casing having a plurality of fluid passages or cells at its periphery extending from the center outward, means for admitting the motor fluid to the fluid passages or cells at the inner side, guide-vanes carried by the casing to receive the fluid as it escapes from the wheel, means for directing the fluid to the inner end of the cells, means for closing the outlet ends of the fluid passages or cells while the motor fluid is being admitted thereto, and means for opening such outlets and closing the inlets thereof as the rotation of the wheel continues.

34. In an elastic-fluid motor, a casing provided with an annular pressure-fluid chamber formed in the wall thereof, inclined passages directed toward the periphery leading from the annular pressure-fluid chamber to the wheel-chamber, an enlarged annular peripheral exhaust-chamber in communication with the wheel-chamber at the periphery, a turbine-wheel having fluid-receiving cells, guide-cells in the turbine-casing, arranged in a plurality of series, means for closing the outlets to such guide-cells during the reception of the motor fluid, and means for closing the inlets as the rotation of the wheel continues.

35. In an elastic-fluid motor, a casing provided with an annular pressure-fluid chamber formed in the wall thereof, an enlarged annular peripheral exhaust-chamber in communication with the wheel-chamber at the periphery, a turbine-wheel having fluid-receiving cells, guide-cells in the turbine-casing arranged in a plurality of series, means for closing the outlets to such cells during the reception of the motor fluid, means for closing the inlets and uncovering the outlets as the rotation of the turbine-wheel continues, and means for directing the fluid admitted to each receiving-cell to several of the guide-cells.

36. In an elastic-fluid turbine, a casing provided with an annular pressure-fluid chamber formed in the wall thereof, inclined passages directed toward the periphery, and inward toward the central plane of rotation of the wheel leading from the annular pressure-fluid chamber to the wheel-chamber, an enlarged annular peripheral exhaust-chamber in communication with the wheel-chamber at the periphery, a turbine-wheel consisting of a disk revolubly mounted in the casing having a plurality of fluid passages or cells located adjacent to its periphery extending from the center outward, means for admitting the motor fluid to the fluid passages or cells at the inner side, and guide-vanes carried by the casing to receive the fluid as it escapes from the wheel-cells.

37. In an elastic-fluid turbine, a casing provided with an annular pressure-fluid chamber formed in the wall thereof, inclined passages directed toward the periphery leading from the annular pressure-fluid chamber to the wheel-chamber, an enlarged annular exhaust-chamber in communication with the wheel-chamber at the periphery, a turbine-wheel consisting of a disk revolubly mounted in the casing having a plurality of fluid passages or cells at its periphery extending from the center outward, guide-vanes carried by the casing to receive the fluid as it escapes from the wheel, means for closing the outlet ends of the fluid passages or cells while the motor fluid is being admitted thereto, and means for opening the outlets and closing the inlets thereof as the rotation of the wheel continues.

38. In an elastic-fluid motor, a casing provided with two oppositely-located annular pressure-fluid chambers formed in the side walls of the casing, inclined passages directed toward the periphery leading from such annular chambers to the wheel-chamber, an enlarged annular peripheral exhaust-chamber in communication with the wheel-chamber at the periphery, a turbine-wheel having fluid-receiving cells, guide-cells in the turbine-casing

arranged in a plurality of series, means for closing the outlets to such guide-cells during the reception of the motor fluid, and means for closing the inlets and uncovering the outlets as the rotation of the turbine-wheel continues.

39. In an elastic-fluid motor, a casing provided with two oppositely-located annular pressure-fluid chambers formed in the side walls of the casing, inclined passages directed toward the periphery leading from such annular chambers to the wheel-chamber, an enlarged annular peripheral exhaust-chamber in communication with the wheel-chamber at the periphery, a turbine-wheel having fluid-receiving cells arranged in a plurality of series, guide-cells in the turbine-casing, means for closing the outlets to such cells during the reception of the motor fluid, means for closing the inlets and uncovering the outlets as the rotation of the turbine-wheel continues, and means for directing the fluid of each receiving-cell to several of the guide-cells.

40. In an elastic-fluid turbine, a casing provided with two oppositely-located annular pressure-chambers formed in the side walls of the casing, inclined passages directed toward the periphery and inward toward the central plane of rotation of the wheel leading from such annular chambers to the wheel-chamber, an enlarged annular peripheral exhaust-chamber in communication with the wheel-chamber at the periphery, a turbine-wheel consisting of a disk revolubly mounted in the casing having a plurality of fluid passages or cells located adjacent to the periphery extending from the center outward, means for admitting the motor fluid to such passages or cells at the inner side, guide-vanes carried by the casing to receive the fluid as it escapes from the wheel-cells, and means for directing the fluid to the inner end of the cells.

41. In an elastic-fluid motor, a casing provided with two oppositely-located annular pressure-fluid chambers formed in the side walls of the casing, an enlarged annular peripheral exhaust-chamber in communication with the wheel-chamber at the periphery, of a turbine-wheel consisting of a disk revolubly mounted in the casing having a plurality of fluid passages or cells at its periphery extending from the center outward, means for admitting the motor fluid to the fluid passages or cells at the inner side, guide-vanes carried by the casing to receive the fluid as it escapes from the wheel to the exhaust-chamber, means for directing the fluid to the inner end of the cells, means for closing the outlet ends of the fluid passages or cells while the motor fluid is being admitted thereto, and means for opening such outlets and closing the inlets thereof as the rotation of the wheel continues.

42. In an elastic-fluid turbine, a turbine disk wheel provided adjacent to the periphery with annular flanges extending outward parallel with the axis, a plurality of fluid passages or cells formed in and through the flanges, passages for directing the pressure fluid to the inner opening of the fluid passages or cells of the inner flanges of the wheel at a plurality of points, guide-cells carried by the casing lying in the annular space between the flanges of the wheel, and vanes carried by the casing arranged exterior to the wheel, the construction being such that the peripheral distance between any two of the pressure-fluid-directing passages is such that a greater number of the fluid-passages of the wheel will be cut off from the fluid-pressure supply, than are in communication therewith, the pressure-fluid passages being less in number than the fluid passages or cells of the flanges of the wheel, and the peripheral distance between the outlets of any two of the fluid-pressure passages being not less than the distance between any three of the abutting inlets of the fluid passages or cells of the wheel-flanges.

43. In an elastic-fluid turbine, a turbine disk wheel, provided adjacent to the periphery with annular flanges extending outward parallel with the axis, a plurality of fluid passages or cells formed in and through the flanges, passages for directing the pressure fluid to the inner opening of the fluid passages or cells of the inner flanges of the wheel at a plurality of points, guide-cells carried by the casing lying in the annular space between the flanges of the wheel, and vanes carried by the casing arranged exterior to the wheel, the construction being such that the peripheral distance between any two of the pressure-fluid-directing passages is such that a greater number of the fluid-passages of the wheel will be cut off from the fluid-pressure supply, than are in communication therewith, and that one-half of the fluid passages or cells of the outer flange of the wheel will always be cut off from the fluid-pressure supply, the pressure-fluid passages being less in number than the fluid passages or cells of the flanges of the wheel, and the peripheral distance between the outlets of any two of the fluid-pressure passages being not less than the distance between any three of the abutting inlets of the fluid passages or cells of the wheel-flanges.

44. In an elastic-fluid turbine, a turbine disk wheel provided adjacent to the periphery with annular flanges extending outward parallel with the axis, a plurality of fluid passages or cells formed in and through the flanges, passages for directing the pressure fluid to the inner opening of the fluid passages or cells of the inner flanges of the wheel at a plurality of points, guide-cells carried by the casing lying in the annular space between the flanges of the wheel, and vanes carried by the casing arranged exterior to the wheel, the construction being such that the peripheral distance between any two of the pressure-fluid-directing passages is such that a greater number of

the fluid-passages of the wheel will be cut off from the fluid-pressure supply, than are in communication therewith, and that one-half of the fluid passages or cells of the outer flange of the wheel will always be cut off from the fluid-pressure supply, in series of three, the pressure-fluid passages being less in number than the fluid passages or cells of the flanges of the wheel, and the peripheral distance between the outlets of any two of the fluid-pressure passages being not less than the distance between any three of the abutting inlets of the fluid passages or cells of the wheel-flanges.

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

HANS THORMEYER.

Witnesses:
WOLDEMAR HAUPT,
HENRY HASPER.