No. 880,181. PATENTED FEB. 25, 1908.

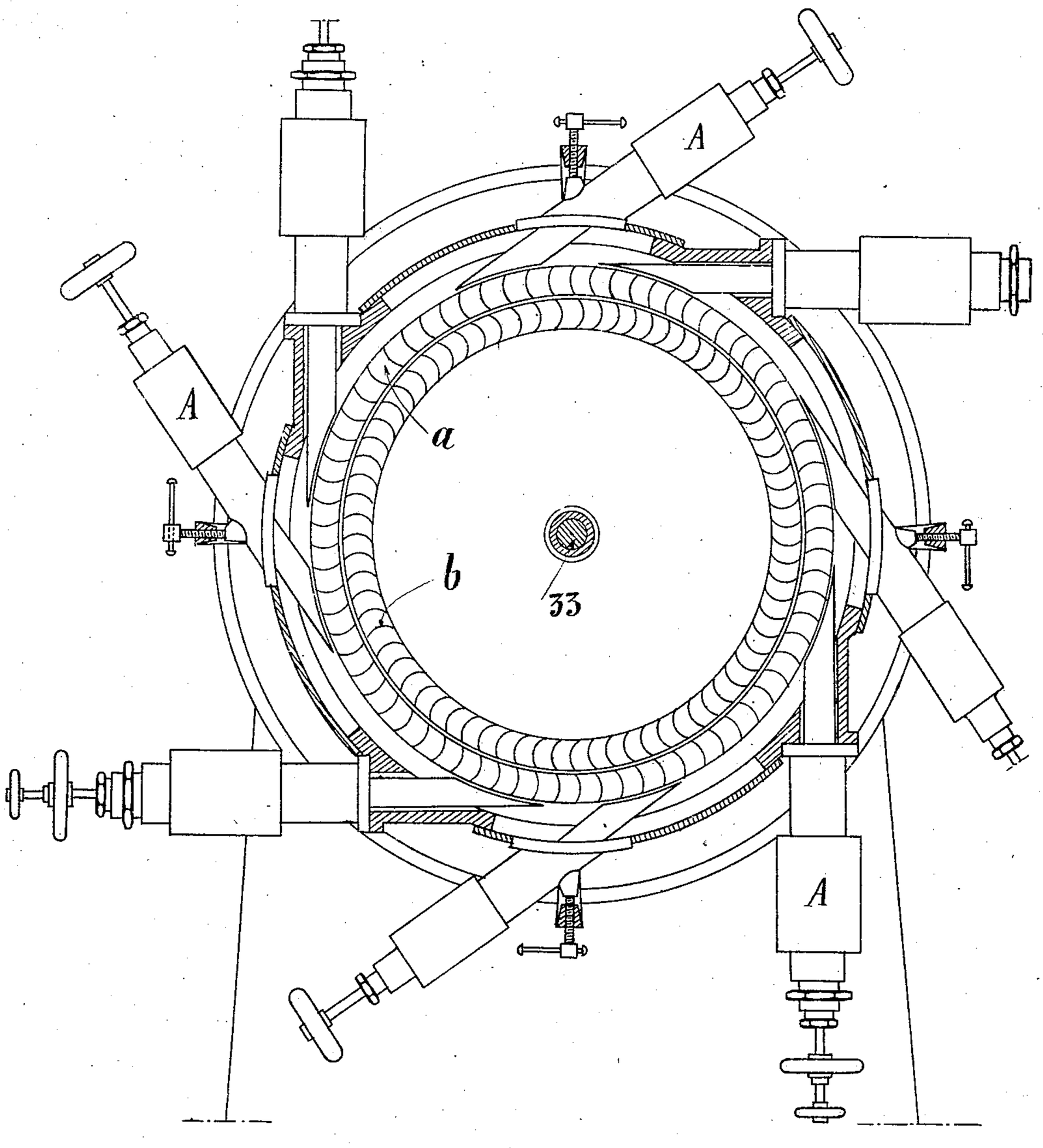
C. WEDEKIND.

TURBINE.

APPLICATION FILED NOV. 20, 1906.

3 SHEETS—SHEET 1.

FIG. 1.



WITNESSES

Alvin G. White

W. P. Burke

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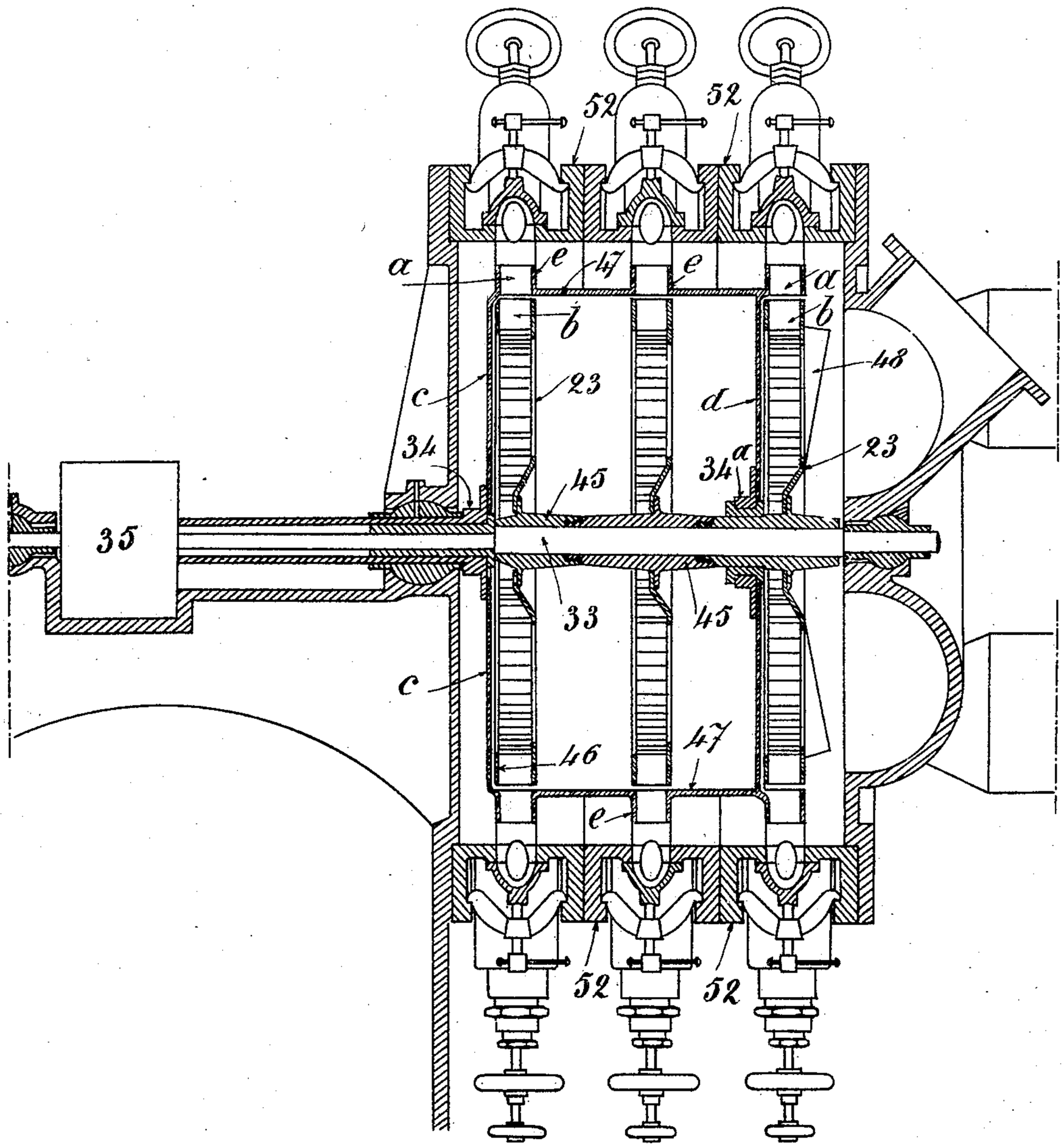
3 SHEETS—SHEET 2.

FIG. 2.



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3 SHEETS—SHEET 3.

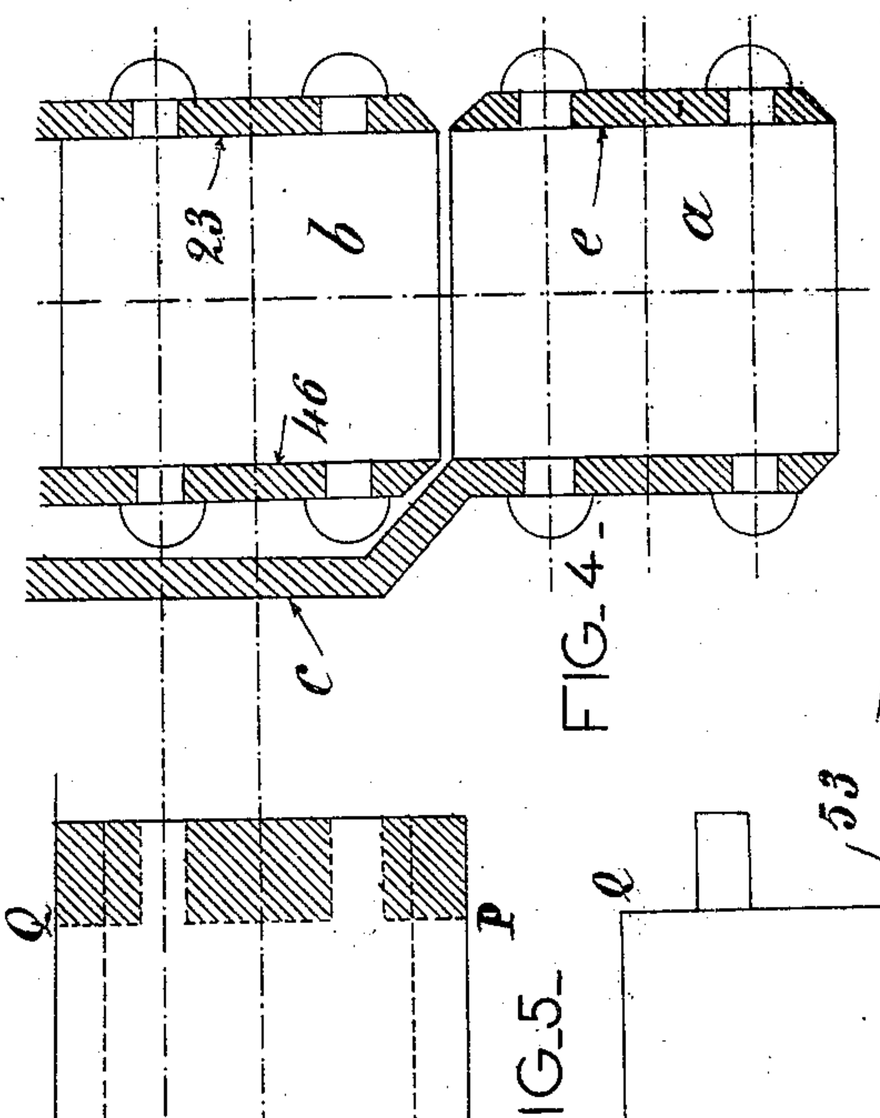


FIG. 4.

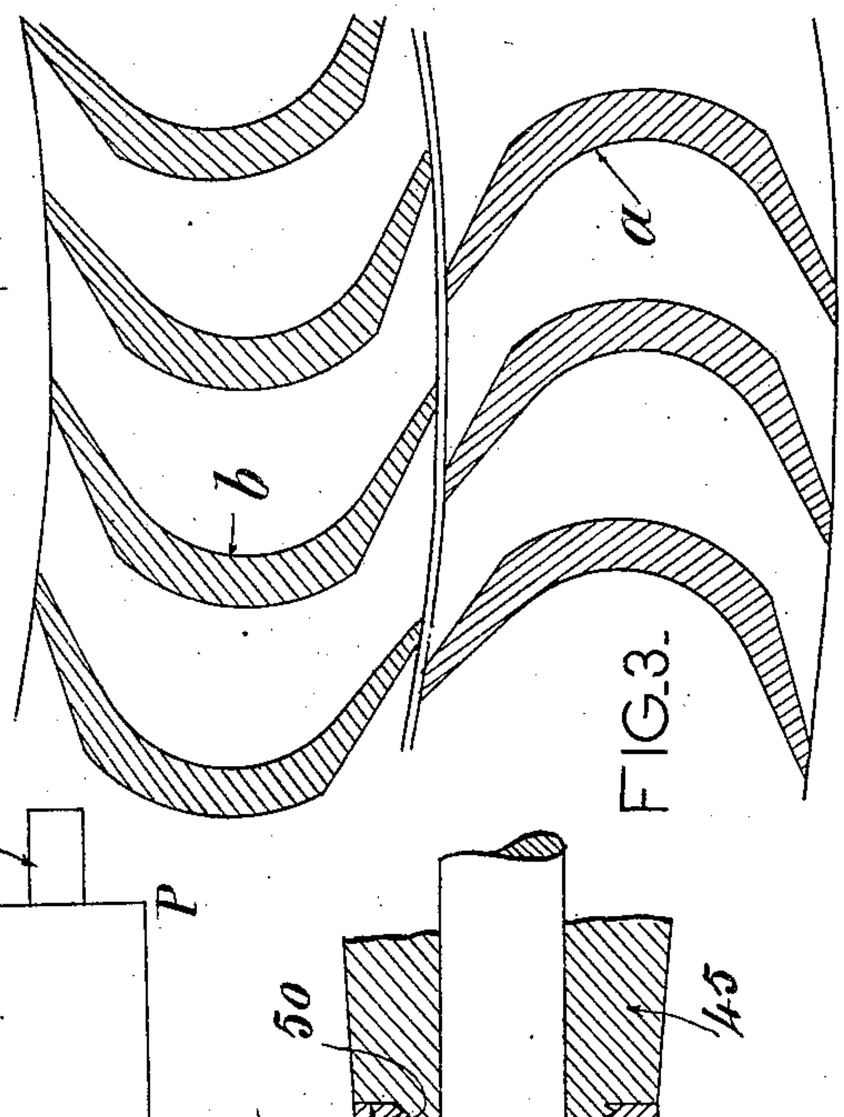


FIG. 3.

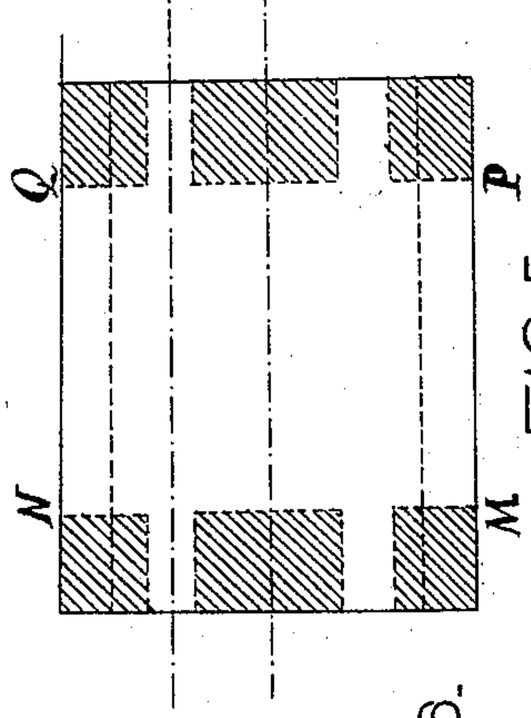


FIG. 5.

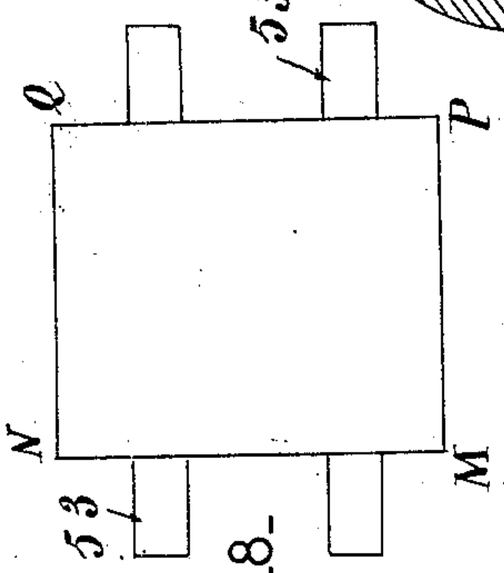


FIG. 8.

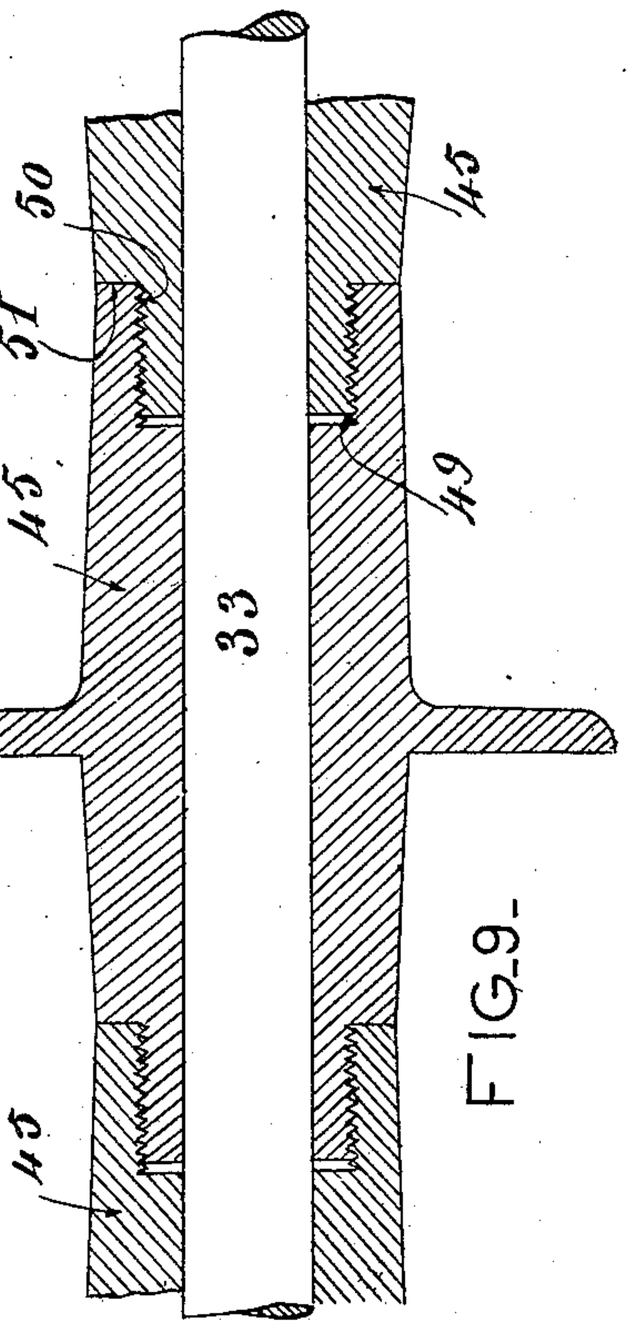


FIG. 9.

FIG. 6.

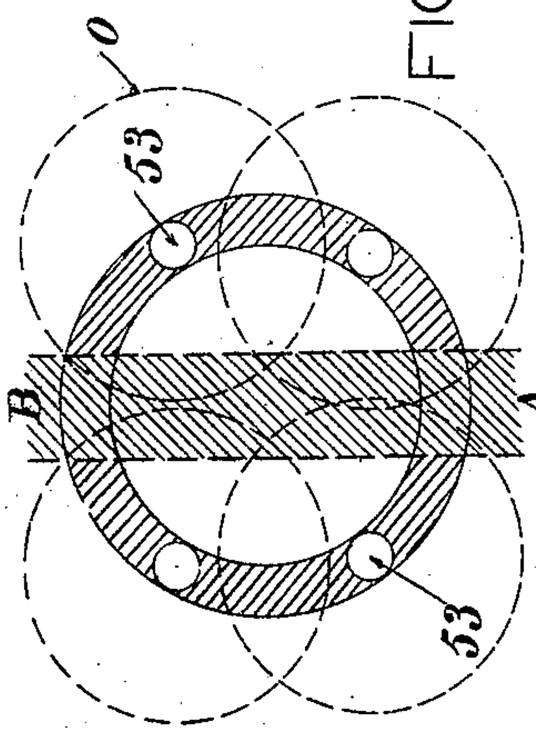
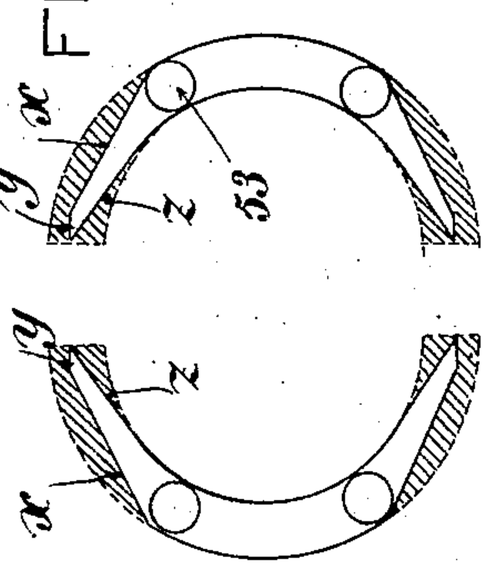


FIG. 7.



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UNITED STATES PATENT OFFICE.

CARLO WEDEKIND, OF ST. JEAN-SUR-MER, FRANCE.

TURBINE.

No. 880,181. Specification of Letters Patent. Patented Feb. 25, 1908.

Application filed November 20, 1906. Serial No. 344,251.

To all whom it may concern:

Be it known that I, CARLO WEDEKIND, civil engineer, subject of Germany, residing at St. Jean-sur-Mer, Alpes Maritimes, France, have invented new and useful Improvements in Gaseous-Fluid Turbines, of which the following is a specification.

This invention relates to improvements in gaseous fluid turbines.

In the usual turbines, the only means of increasing the power of the engine consists either in increasing the dimensions of the disks or crowns, or in increasing the number, the additions using the same gases as the first.

The last arrangement is scarcely practicable without changing all the elements of the engine because in order that these new disks may have a useful effect, it is necessary to increase the speed of the gases at the inlet of the blades of the first disk. There will necessarily result a change of the shape of the blades and nozzles. The addition to the diameter of the disk also necessitates a change in the shape of the blades. To avoid these drawbacks and to assure in the manufacture of these turbines interchangeability of parts, simplification and economy of manufacture, special arrangements have been provided for, as will be more fully described hereinafter.

In the annexed drawings, Figures 1 and 2 represent a gaseous fluid turbine embodying the improvements forming the object of the present invention, Fig. 1 being a cross sectional view and Fig. 2 a longitudinal sectional view. Figs. 3 to 9 are details to which reference will be made hereinafter.

According to the improved construction, the nozzles face the blades in the plane perpendicular to the axis of rotation, either in the centripetal direction, as shown in the drawings, or in the opposite direction, that is to say in the centrifugal direction, the generating lines of the blades having a direction parallel to the axis.

The combination of disks or crowns is divided into a certain number of groups corresponding to the number of sections of the engine. The number of these sections depends on the power of the engine. Each group has its nozzle A for the admission of gases, and is composed of two concentric crowns of blades turning in opposite directions to one another.

The crowns of the exterior blades *a* are all riveted on kinds of fellies 47 of stamped sheet metal which keep said crowns the right distance apart and connect them together. These fellies 47 are carried at their two ends by sheet metal disks *c* and *d* and are solid with sheet metal crowns *e* which serve to maintain the blades at their proper distance and in axial position. The disk *c* is secured on a hollow hub 34 concentric with the shaft 33, and the motion of said hub is redressed by a gearing 35, so as to rotate in opposite direction with shaft 33. The disk *d* is secured on a hub 34^a which rotates freely about the shaft 33.

The crowns of the interior blades *b* are riveted on the one hand to sheet metal disks 23 secured to the hubs 45 keyed on the shaft 33 and on the other hand to a crown 46 of sheet metal which serves to maintain these blades at their proper distance and in axial position. The disk 23 at the side of the exhaust collector carries the small fan-blades 48 to assist the exhaust of the gases of combustion.

The blades *a* and *b* are shown in section in Fig. 3, and from Fig. 4 may be seen the manner in which they are respectively riveted to the disks *c* and 23 as well as to the crowns 46 and *e*.

As to Fig. 9, it shows the manner in which the hubs 45 carrying the disks 23 are connected together. The first of the hubs is fixed as conveniently as possible on the shaft, and may even be forged with it. This hub is provided with an internal screw-thread 49 of a certain pitch corresponding to a shorter external screw-thread 50 on the adjacent hub, the latter being screwed into the first abutting against it at its edge 51. The second hub is provided at its other end with an internal screw-thread for screwing on a third and so on. All the hubs screwed thus one within the other form a sort of hollow shaft in which the shaft 33 will not be more than a support.

The nozzles A are fixed on the cast iron or other metal rings 52 similar to one another and disposed symmetrically relative to the plane through which pass the axes of nozzles. These rings, their nozzles, and the corre-

sponding crowns of blades, constitute the successive sections of the engine.

The arrangement of blades economical to manufacture which also constitute one of the features of the invention are represented in Figs. 5 to 8. The section of these blades is such that it is twice inscribed in the section of a tube having as internal radius that of the curved part of the blade and as external radius the curved exterior of the blade.

For manufacturing two blades at a time, a length of tube is taken having for length the breadth of the blade (that is to say the distance of a joint to the other of the crown of blades) plus twice the length of the lugs 53.

Commencing by disengaging the lugs 53, the two faces M N and P Q are dressed and on each end of the piece of tubing are effected (1) four cuts with a cutter or tool loose at its center following the diameter of the lug and of an external diameter limited by the distance between the lugs and represented in Fig. 6 by the circle O. (2) If there remains material matter to the left of the line M N and to the right of the line P Q which these cutters have not removed, their exterior diameter being limited, a cut is made as shown in cross hatching by the band A B. The tube is then mounted on a mandrel and the faces x y and z dressed by a suitable cutter. The tube is then cut into two equal parts and the two faces of each blade are dressed at the same time by a beveled cutter working on their two faces. The lugs 53 serve to fix the blades in the engine.

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

1. In a gaseous fluid turbine the combination of a plurality of sections formed of double concentric crowns adapted to turn in opposite directions, blades carried by said crowns, and nozzles for the admission of the gases leading opposite the blades of the crowns and arranged for each section in a plane perpendicular to the axis of the turbine, substantially as described and for the purpose set forth.

2. In a gaseous fluid turbine the combination of a plurality of sections formed of double concentric crowns adapted to turn in opposite directions, blades carried by said crowns, disks carrying the interior crowns of blades and provided with hubs screwed into each other, fellies of stamped sheet metal on which are riveted the exterior crowns of blades, and nozzles for the admission of the gases leading opposite the blades of the crowns and arranged for each section in a plane perpendicular to the axis of the turbine, substantially as described and for the purpose set forth.

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

CARLO WEDEKIND.

Witnesses:
JOSEPH GAUTIER,
J. COUCKE.