L. S. FLATAU.

TURBINE.

APPLICATION FILED OCT. 17, 1917.

1,255,002.

Patented Jan. 29, 1918.

2 SHEETS—SHEET 1.

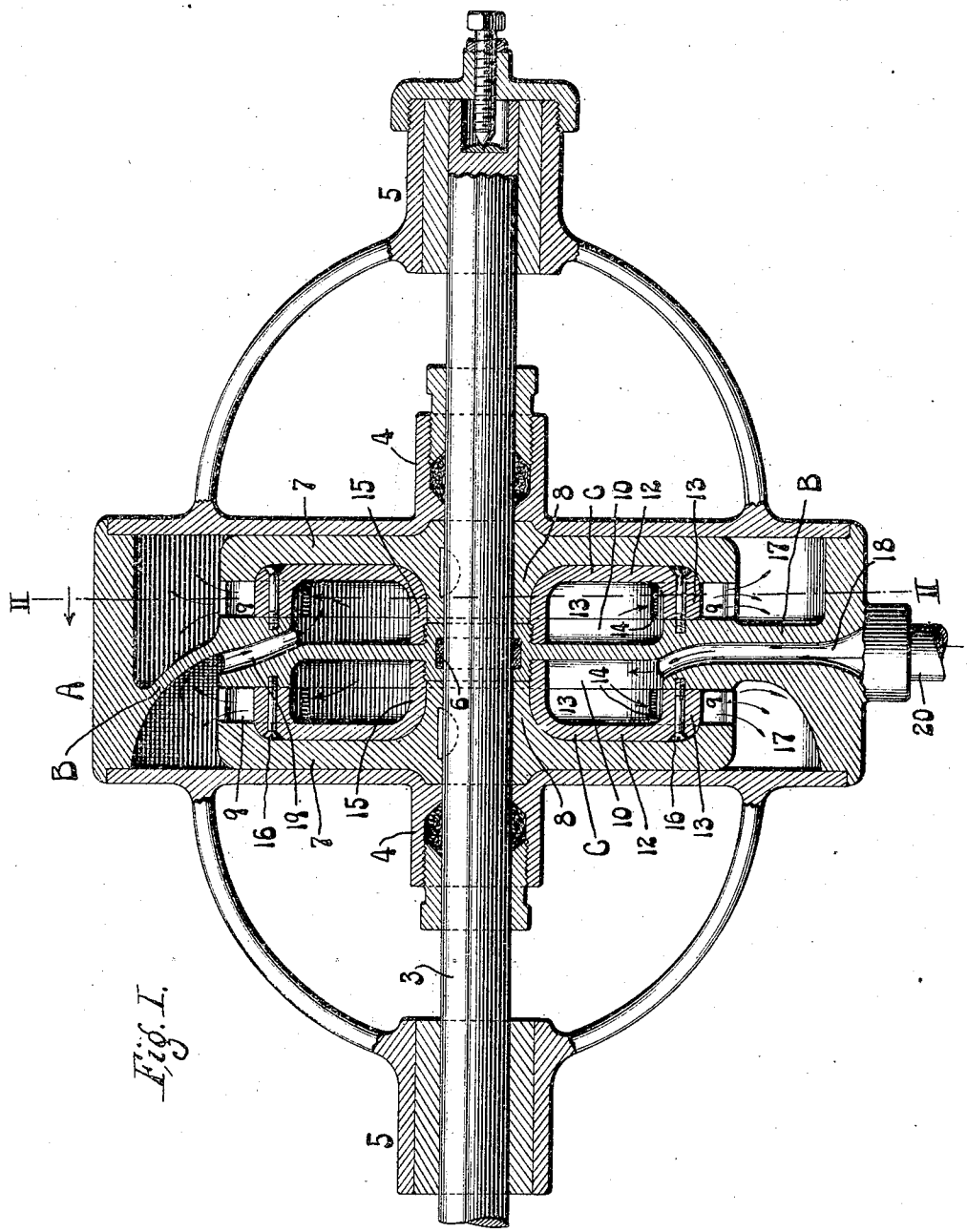


Fig. I.

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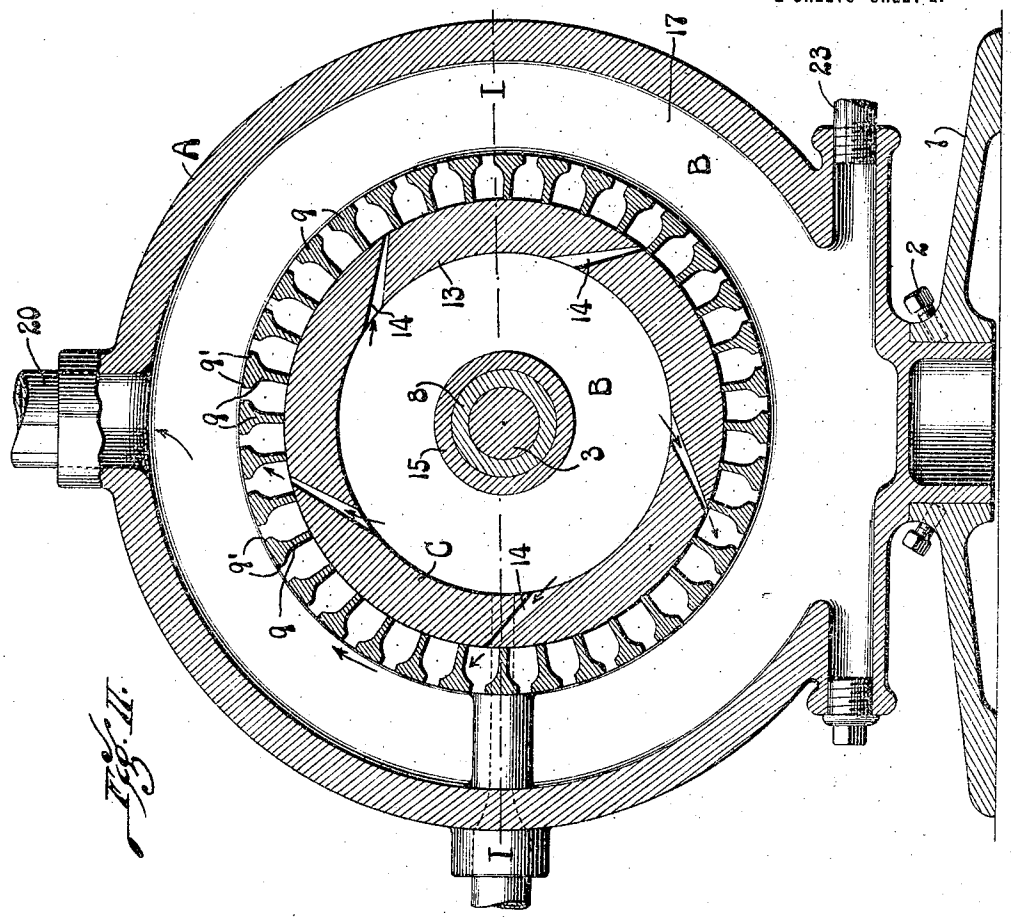


Fig. II.

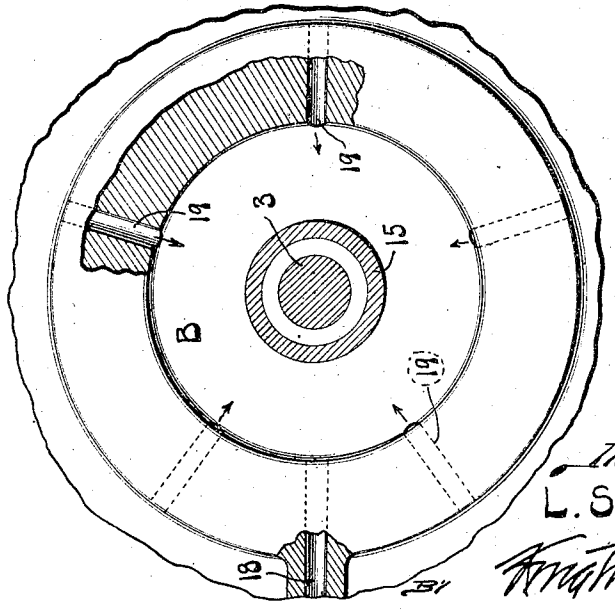


Fig. III.

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UNITED STATES PATENT OFFICE.

LOUIS S. FLATAU, OF ST. LOUIS, MISSOURI.

TURBINE.

1,255,002. Specification of Letters Patent. Patented Jan. 29, 1918.

Application filed October 17, 1917. Serial No. 197,086.

To all whom it may concern:

Be it known that I, LOUIS S. FLATAU, a citizen of the United States of America, a resident of the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Turbines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to improvements in turbines, one of the objects being to provide a highly efficient engine of this kind consisting of a few strong and simple elements combined with each other in such a manner that the parts can be easily manufactured and easily assembled. A further object is to produce an inexpensive compound turbine engine in which the fluid under pressure is used successively in different engine units, so as to avoid losses which would be incurred by exhausting the fluid under a high pressure.

With the foregoing and other objects in view the invention comprises the novel construction, combination and arrangement of parts hereinafter more specifically described and illustrated in the accompanying drawings wherein is shown the preferred embodiment of the invention; however, it is to be understood that the invention comprehends changes, variations and modifications which come within the scope of the claims hereunto appended.

Figure I is a horizontal section, taken approximately on the line I—I, Fig. II, and illustrating a turbine constructed in accordance with the invention.

Fig. II is a vertical section taken approximately on the line II—II, Fig. I.

Fig. III is a fragmentary view, partly in section, showing the ported partition through which the fluid is conducted from one engine unit to the other.

The structure herein shown comprises a housing A mounted upon a base 1, the lower portion of the housing being extended into the base and secured by means of screws 2, as shown in Fig. II. A partition B divides the housing into two compartments, and each of these compartments is provided with a complete engine unit, as will be hereinafter described.

3 designates a central power shaft extending through stuffing boxes 4 at opposite sides of the housing A, and mounted in bearings 5. An annular body of packing 6 is interposed between and closely fitted to the power shaft and the partition B. The partition is preferably recessed to receive the packing.

Each engine unit comprises a vane carrying disk 7 provided with a central hub 8, keyed to the power shaft, as seen in Fig. I. The outer margin of each vane carrying disk is provided with a circular row of lateral vanes 9.

Annular inlet chambers 10 are formed in the housing at opposite sides of the partition B. Hollow annular fluid receiving members C are combined with the partition to form the annular inlet chambers. Each annular member C comprises an annular web 12 provided with an annular outer flange 13 having non-radial ports, or nozzles, 14 for the discharge of fluid onto the vanes 9. Each annular member C is also provided with an annular inner flange 15 screwed onto the central portion of the partition, as shown in Fig. I. The ported annular flanges 13 are very closely fitted to the partition and secured thereto by means of screws 16. These screws prevent the annular members C from turning about the axis of the screw threads on the partition.

Annular outlet chambers 17 are formed around the vane carriers at opposite sides of the partition. It will be observed that the partition is provided with an inlet port 18, and also with ports 19 which place the outlet chamber on one side of the partition in free communication with the inlet chamber on the opposite side of the partition.

Fluid under pressure, passing from a pipe 20, flows through the port or passageway 18 to one of the annular inlet chambers 10, from which it is discharged through the ports or nozzles 14, onto the adjacent vanes 9, and thence into one of the annular outlet chambers 17. To escape from this outlet chamber, the fluid must flow through the ports 19 to the inlet chamber 10 at the opposite side of the partition. From this chamber, the fluid rushes through ports or nozzles 14 to the adjacent vanes 9 and thence into the surrounding outlet chamber 17, the latter being provided with an exhaust pipe 20, as shown in Fig. II. The fluid is thus conducted successively through the inlet and outlet chambers at one side of the partition

and thence through the inlet and outlet chambers at the opposite side of the partition.

The vanes 9 are so formed that the rotary vane carrying members can be made exactly alike. To accomplish this, the vanes are approximately T-shaped in cross-section, each vane comprising a radial rib provided with lugs, or extensions, 9′ at its outer end. The vanes are thus enlarged at their outer ends, and if a radial center line is drawn through a vane, the elements on opposite sides of the line will be symmetrical with each other. Each vane is provided with two symmetrical fluid receiving abutments, or pockets, and the fluid under pressure can be discharged into either of these abutments. In other words, the fluid can be discharged onto either side of the symmetrical vanes. Therefore, the rotary vane carriers will interchange with each other, and they can be made exactly alike. Furthermore, vanes of the kind herein shown can be formed very easily, and they perform their functions most effectively.

It will be observed that all of the parts of the engine are quite simple, they can be easily manufactured, and when combined with each other as herein shown, they produce a strong and efficient compound turbine engine.

The condensate formed in the housing can be drained through a pipe 23 leading from the lower portion of the housing.

I claim:—

1. A turbine engine comprising a housing provided with a partition, rotary vane carrying members at opposite sides of said partition, hollow annular fluid-receiving members secured to opposite sides of said partition to form inlet chambers for the fluid under pressure, said annular inlet chambers and partition being between said rotary vane carrying members, and annular outlet chambers being formed around the vane carrying members at opposite sides of said partition.

2. A compound turbine engine comprising a stationary housing provided with a stationary partition, rotary vane carrying members arranged in said housing at opposite sides of said partition, hollow annular fluid-receiving members secured to opposite sides of said partition to form inlet chambers for the fluid under pressure, said partition and inlet chambers being between said rotary vane carrying members, a power shaft extending through said partition and annular inlet chambers and fixed to said rotary vane carrying members, annular outlet chambers being formed around the vane carrying members at opposite sides of the partition, and said partition being ported to place one of said annular outlet chambers in free communication with the annular inlet chamber on the opposite side of the partition, thereby permitting the fluid under pressure to flow successively through the inlet and outlet chambers at one side of said partition and then through the inlet and outlet chambers at the opposite side of the partition.

3. A compound turbine engine comprising a stationary housing provided with a stationary partition whereby it is divided into two compartments, rotary vane carrying members arranged in the compartments at opposite sides of said partition, each of said rotary vane carrying members comprising a disk provided with a circular row of vanes extending laterally from its outer margin, a power shaft connecting said rotary vane carrying members, hollow annular inlet members arranged at opposite sides of said partition and surrounded by the circular rows of vanes, each of said annular inlet members comprising a web having an inner annular flange screwed to the partition, and an outer annular flange closely fitted to said partition, the last mentioned annular flange having ports for the discharge of fluid onto the adjacent vanes, annular outlet chambers being formed around the vanes at opposite sides of the partition, and said partition being ported to place the outlet chamber at one side of the partition in free communication with the hollow inlet member at the opposite side of the partition, thereby permitting the fluid under pressure to flow successively through the inlet and outlet chamber at one side of said partition and then through the inlet and outlet chambers at the opposite side of said partition.

4. A turbine engine comprising a housing provided with a partition whereby it is divided into two compartments, a power shaft extending through said partition, an annular body of packing interposed between and closely fitted to said partition and power shaft, rotary vane carriers arranged in said compartments and secured to said power shaft, each of said vane carriers being provided with a circular row of vanes, inlet chambers formed at opposite sides of said partition and surrounded by said vanes, outlet chambers being formed around the vanes at opposite sides of the partition, and said partition being ported to provide for the flow of fluid from the outlet chamber at one side of the partition to the inlet chamber at the opposite side of the partition.

In testimony that I claim the foregoing I hereunto affix my signature.

LOUIS S. FLATAU.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."