

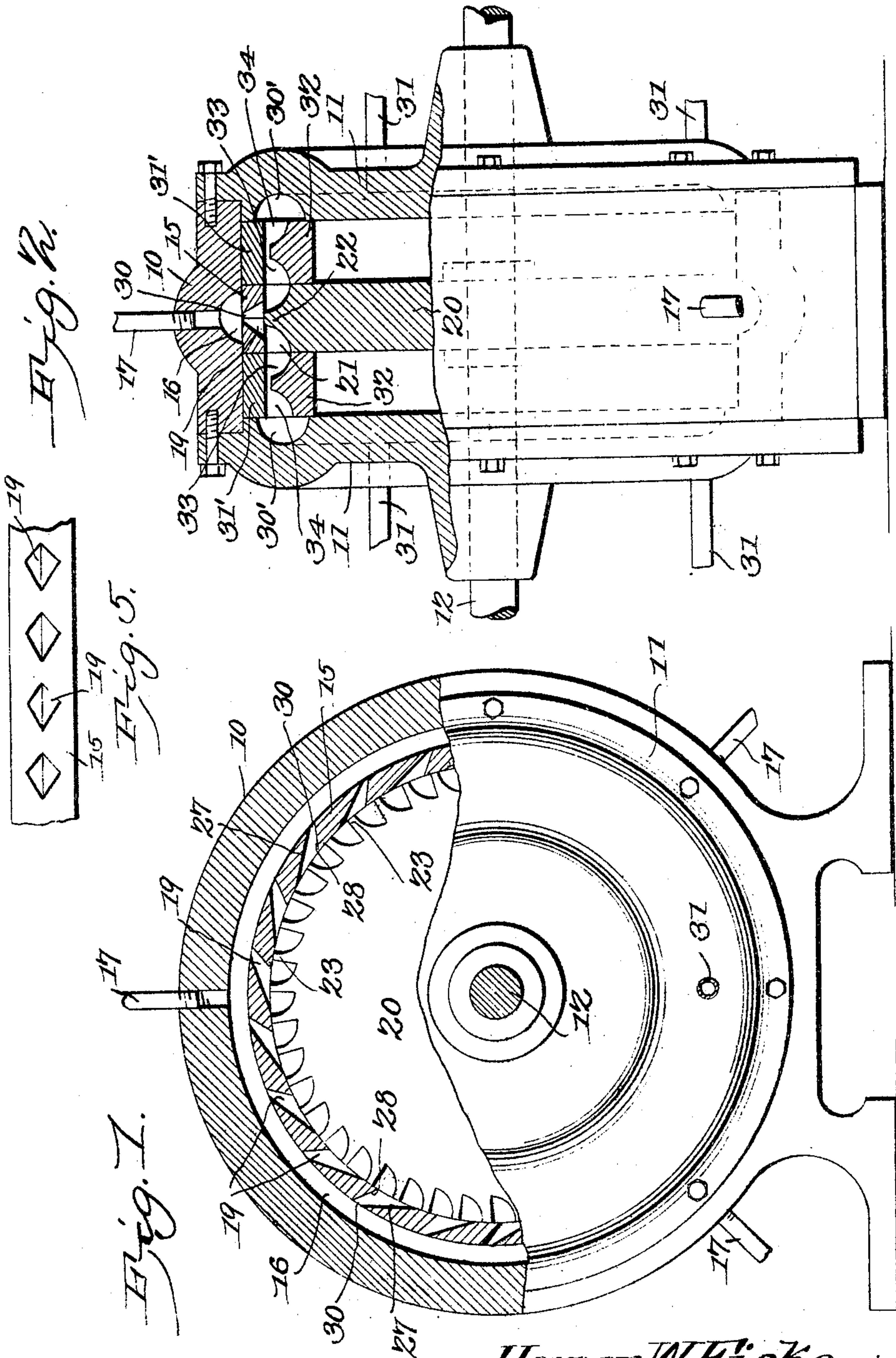
No. 798,577.

PATENTED AUG. 29, 1905.

H. W. FISKE.  
TURBINE.

APPLICATION FILED APR. 5, 1905.

2 SHEETS—SHEET 1.



Witnesses  
*E. J. Stewart*  
*Geo. Porter*

*Homer W. Fiske,* Inventor.  
by *C. A. Snow & Co.*  
Attorneys

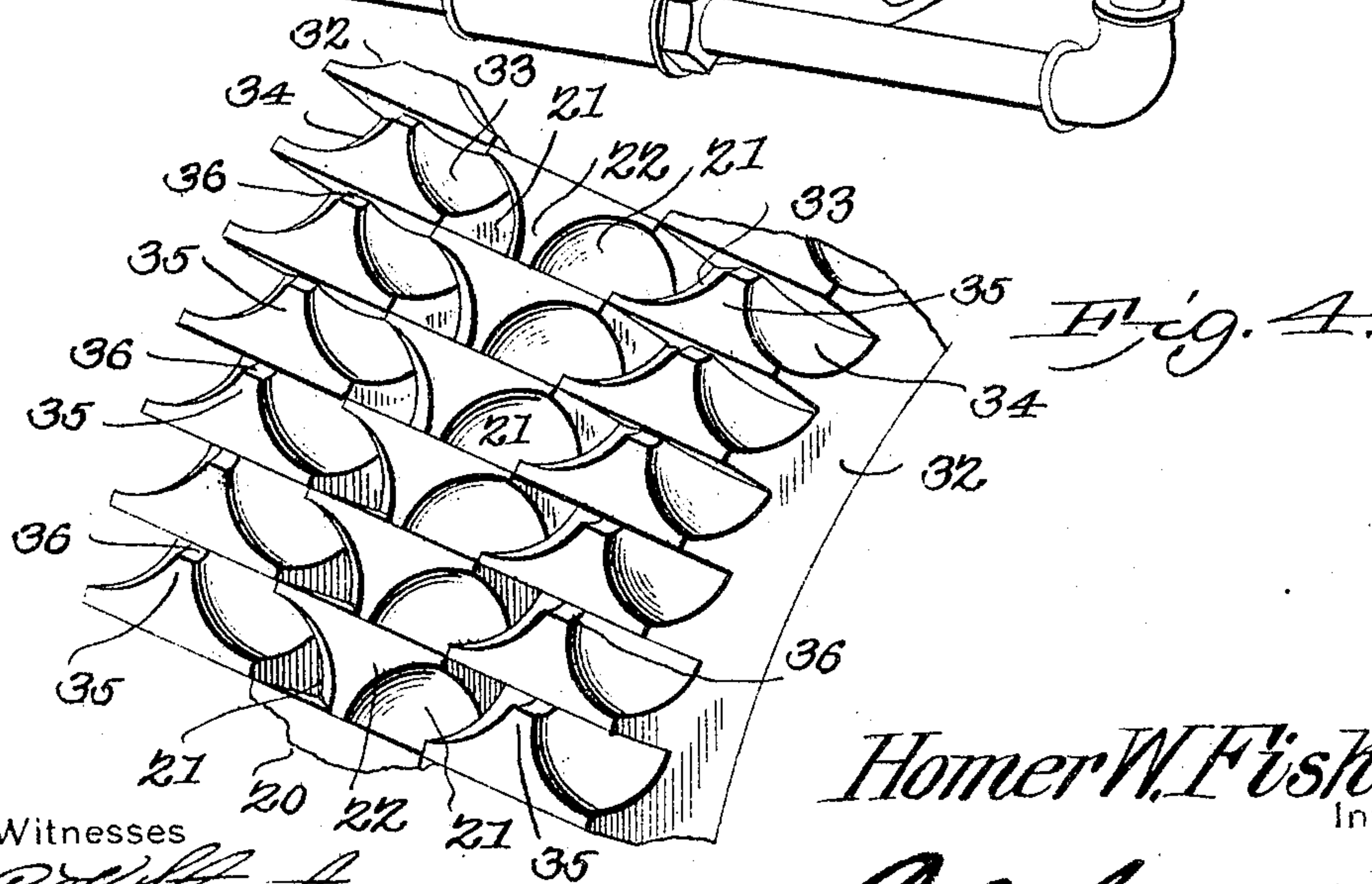
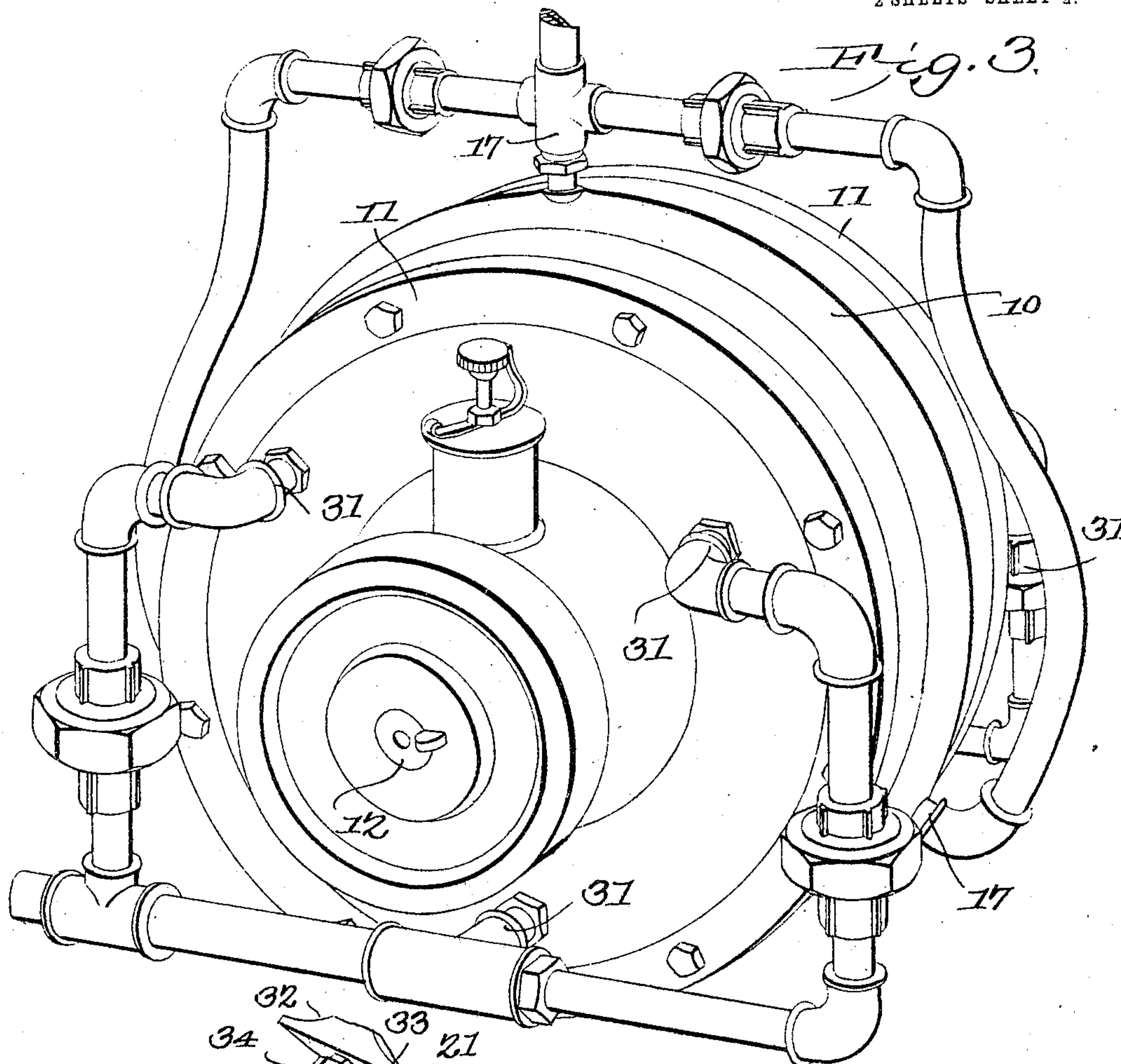
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*E. J. Stewart*  
*John Parker*

*Homer W. Fiske,*  
Inventor.

by *C. A. Snow & Co.*  
Attorneys



# UNITED STATES PATENT OFFICE.

HOMER W. FISKE, OF MILAN, OHIO.

## TURBINE.

No. 798,577.

Specification of Letters Patent.

Patented Aug. 29, 1905.

Application filed April 5, 1905. Serial No. 253,974.

*To all whom it may concern:*

Be it known that I, HOMER W. FISKE, a citizen of the United States, residing at Milan, in the county of Erie and State of Ohio, have  
5 invented a new and useful Turbine, of which the following is a specification.

This invention relates to rotary engines, and has for its principal object to provide a  
10 simple form of engine of the turbine type wherein both the impact and the expansive force of steam or other fluid under pressure may be utilized for power.

A further object of the invention is to provide a novel form of piston and piston-  
15 buckets of such nature that the steam after acting thereon by impact may be further utilized before its final escape; and in this connection a further object is to provide exhaust-ports of such construction that the  
20 steam before escaping is compelled to act upon the buckets by expansion.

A still further object of the invention is to provide a novel form of rotary engine in which a continuous annular steam-chest is  
25 arranged around the piston and is provided with a plurality of equidistantly-spaced steam-inlet ports or passages, so that the pressure of steam may be uniform throughout the whole of the chest.

30 A still further object of the invention is to balance the engine and provide against back pressure by permitting free escape of the exhaust-steam.

With these and other objects in view, as  
35 will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly  
40 pointed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing  
45 from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a transverse sectional view of an engine constructed in accordance with the invention. Fig. 2 is a longitudinal sectional elevation of  
50 the same. Fig. 3 is a perspective view of the engine. Fig. 4 is a detail perspective view illustrating the construction of the steam-pockets of the piston and the exhaust-pockets. Fig. 5 is a detail view looking from the inner face

of the bushing which surrounds the piston 55 and showing the contour of the steam-inlet ports.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the draw- 60 ings.

The body portion 10 of the cylinder is annular in form, and to its opposite sides are bolted suitable heads 11, each provided with bearings or supports for a horizontal 65 shaft 12, that may be connected by belting or gearing to any desired mechanism. Within the cylinder is secured an annular bushing 15, and between the bushing and the body of the cylinder is a continuous an- 70 nular space 16, formed by cutting a groove in the inner wall of the cylinder, and with this annular steam-chest communicate a number of steam-inlet pipes 17, three equidistantly-spaced pipes being shown in the 75 present instance and these serving to maintain a uniform pressure throughout the whole of the steam-chest. The number of pipes may, however, be increased or diminished in accordance with the size of the en- 80 gine; but in all cases the number should be sufficient to keep the pressure practically the same at all points. This bushing is provided with a large number of steam-ports 19, which serve to direct steam against the pe- 85 riphery of the revoluble piston member 20, the latter being movably secured to the shaft 12. In the periphery of the disk are formed a large number of pockets or buckets 21, these being disposed in pairs and wholly 90 separated from each other by a partition 22. One wall 23 of each bucket extends on a radial line from the center of the shaft 12, while the opposite wall thereof is curved, the pocket being preferably formed from a solid 95 disk of metal by a milling-cutter or similar tool. The curved walls of the pocket are of the peculiar shape best shown in the detail perspective view Fig. 4. When viewed in plan—that is to say, looking at the periph- 100 ery of the piston-disk—the curved wall of the pocket extends through a ninety-degree arc struck from the juncture of the outer end of the straight wall 23 and the periphery of the disk, and the curvature viewed in eleva- 105 tion is on the same arc struck from the same point, so that the jets of steam passing through the ports 19 will after striking



against the curved walls of the pockets be deflected laterally toward the exhaust; but there is no vibration or lateral strain on the piston-disk, for the reason that the pockets  
 5 on opposite sides of the disk are duplicates and the entering jets of steam or other fluid are divided and act with equal force on the pockets on opposite sides of the rib 22. The  
 10 ports 19 of the bushing have one wall 27 arranged on a line substantially tangential with the periphery of the disk and a second wall 28 at an acute angle thereto. The outlet ends of the ports are of the rhomboid or  
 15 lozenge form, and the four walls gradually converge from the discharge end toward the contracted opening 30, through which the steam passes from the chest, so that the cross-sectional area of the port gradually increases  
 20 from the inlet to the outlet end, affording some opportunity for the steam to expand, so that the volume will equal the volume of one pair of pockets and the impact will occur over practically the whole of the curved surfaces of such pair of pockets, and in  
 25 expanding the pressure of the steam, as well as the impact force, will be utilized to the best advantage.

In each of the cylinder-heads 11 is formed an annular escape-channel 30, from which  
 30 lead three or more exhaust-pipes 31, the number of pipes being sufficient and of such diameter as to convey the steam away without causing back pressure. Between each cylinder-head and the adjacent vertical face of  
 35 the piston is rigidly secured a ring 31, and within said ring is a second exhaust-ring 32, also rigidly secured in place, and while said rings may be integral it is preferred to make them separately for convenience in forming  
 40 the exhaust-passages 33 and 34, which are cut by milling or similar tools. The pockets or ports 33 and 34 are practically of the same shape and size as the pockets of the piston, but they are arranged in a direction the reverse of the piston-pockets, so that in operation the curved wall of a piston-pocket will be opposite to each of the curved walls of the  
 45 escape-passage 33 as the piston rotates, and if the piston-pocket is filled with steam it has an opportunity to expand into the pocket 33, and the reaction gives additional impulse to the piston and assists in rotating the same. The ribs 35, that separate the two pockets 33 and 34, are slightly cut away and form comparatively contracted escape-ports 36, so that  
 55 there will be a tendency to retard the escape of steam at this point, and each of the pockets 33 will be more or less filled with the acting fluid, and in receiving large volumes of steam from the passing pockets on the piston-disk the expansive force may be utilized to better advantage than if the escape-ports were of such nature as to permit of the free and uninterrupted passage of the fluid. The  
 60 steam passes from the pockets 34 into the

annular escape-passages 30 and from thence is conveyed away by the exhaust-pipes.

It is found in practice that an engine of this character may be driven at a very high rate of speed without any vibration, and as  
 70 there is no limit to the diameter of the piston and the area of the piston-pockets the engine may be employed for driving machinery of any character.

Having thus described the invention, what  
 75 is claimed is—

1. A turbine-disk having a plurality of peripheral pockets, the impact-walls of which are arranged on curved lines leading toward the sides of the disk, and stationary members  
 80 having pockets provided with curved walls that coact with the similar walls of the disk-pockets to form expansion-chambers, and contracted exhaust-passages leading from the pockets of said stationary members. 85

2. In combination, a turbine-disk having peripherally-disposed twin pockets, the impact-walls of which are arranged on curved lines leading, respectively, in opposite directions from the center portion of the disk to  
 90 the opposite sides thereof, and stationary members having contracted exhaust-passages also provided with curved walls arranged in opposition to those of the escapes, and forming in connection therewith expansion-chambers for the operating fluid. 95

3. The combination with a turbine-disk having peripheral pockets leading from the central portion to the opposite sides of the disk, and stationary members arranged one  
 100 on each side of the disk and provided with exhaust-passages, the cross-sectional areas of which are gradually reduced from the inlet end.

4. In a rotary engine, a cylinder having an  
 105 annular groove forming a continuous steam-chest, a bushing arranged within the cylinder and provided with a plurality of ports leading from the steam-chest to the inner face of said bushing, each port being of gradually-increasing cross-sectional area from the  
 110 outer to the inner face of the bushing, and at the latter point being substantially rhomboid in contour, and a turbine-disk fitting within the bushing and provided with twin  
 115 pockets spaced from each other by a central rib and leading from the rib outward to the opposite sides of the disk.

5. The combination in a rotary engine, of a cylinder comprising a body portion having  
 120 an annular groove forming a steam-chest, a plurality of steam-inlets leading thereto, cylinder-heads each provided with an annular steam-escape passage, exhaust-pipes connected thereto, a ported bushing disposed  
 125 within the cylinder and forming the inner wall of the steam-chest, a shaft extending through bearing-openings in the cylinder-heads, a turbine-disk mounted on the shaft and provided with peripheral pockets, and 130

stationary rings secured within the cylinder  
on opposite sides of the disk and provided  
with ports or passages for the escape of the  
steam, the walls of said ports or passages co-  
5 acting with the pockets of the turbine-disk to  
form expansion-chambers.

In testimony that I claim the foregoing as

my own I have hereto affixed my signature  
in the presence of two witnesses.

HOMER W. FISKE.

Witnesses:

F. ALBERT WALKER,

EVERTON GEORGE RUGGLES.