

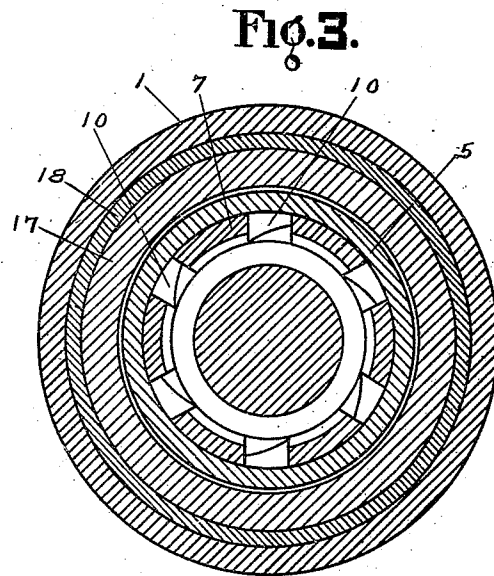
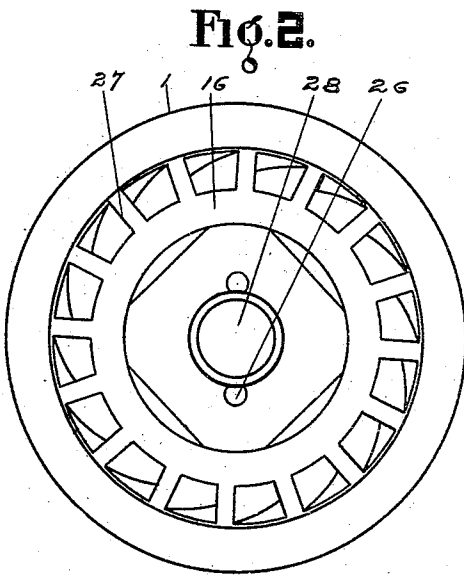
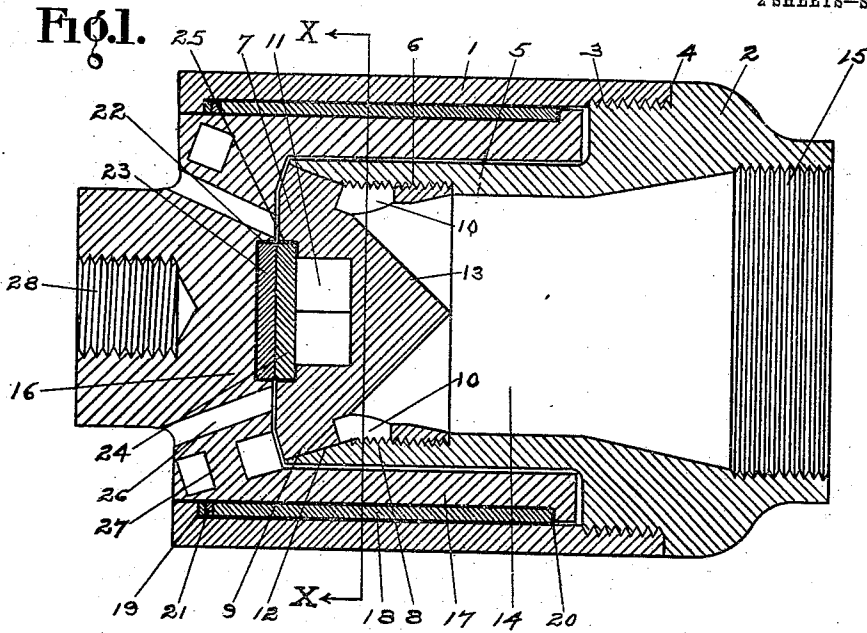
H. F. WEINLAND.  
TURBINE.

APPLICATION FILED JAN. 15, 1909.

951,164.

Patented Mar. 8, 1910.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

FIG. 4.

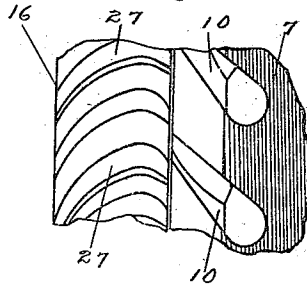


FIG. 5.

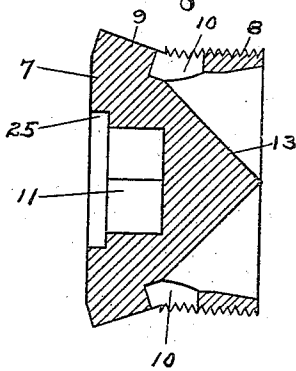


FIG. 6.

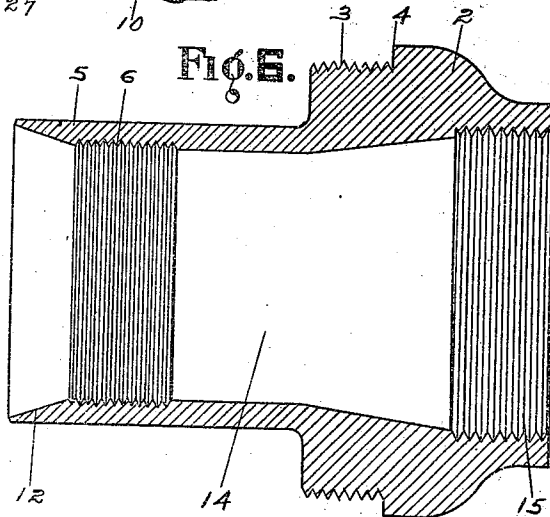
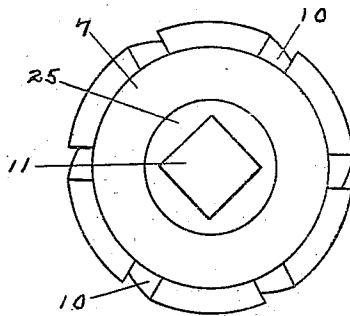


FIG. 7.



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# UNITED STATES PATENT OFFICE.

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## TURBINE.

951,164.

Specification of Letters Patent.

Patented Mar. 8, 1910.

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*To all whom it may concern:*

Be it known that I, HENRY F. WEINLAND, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Turbines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to turbines for driving tube cleaners and more particularly to a turbine that is carried through the tube with the cleaner although it may be used for other purposes.

The object of my invention is to provide an improved turbine of this class, simple in construction, strong and durable, of few parts, easily assembled and readily taken apart.

With these and other objects in view my invention consists of the constructions and combinations hereinafter described and set forth in the claims.

In the accompanying drawings Figure 1 is a longitudinal section of a turbine embodying my invention, Fig. 2 is a front end view of same, Fig. 3 is a cross section on the line X X of Fig. 1. Fig. 4 is a fragment of the ported head and runner showing the inclined ports of the head and curved buckets of the runner, Fig. 5 is a longitudinal section of the ported head, Fig. 6 is a longitudinal section of the supply head into which the ported head is secured and Fig. 7 is a front end view of the ported head.

In the drawings 1 represents a casing and 2 a supply head, said head preferably having a reduced portion 3 to which the casing is threaded with its end abutting the shoulder 4 of the head as particularly shown in Fig. 1. Said supply head is further provided with a forwardly projecting cylindrical portion 5, screw threaded at 6 to receive and secure a ported head 7. This ported head I preferably form separate from the projecting cylinder of the supply head and removably secure the same therein as shown for convenience in forming the ports in said head. The ported head has a longitudinal screw threaded portion at 8 and is outwardly inclined at 9. Ports 10 may be formed in the casting but I preferably form them by drilling radial holes or recesses from the outside in the forward end of the

screw threaded portion and cutting recesses or channels along the inclined portion 9 of the head from the front end thereof to said radial holes as particularly shown in Figs. 4, 5 and 7. In this manner the ports can be accurately machined and the head which is provided with a square recess 11 in its forward end to receive a socket wrench, can be screwed in place, the bore of the forward end of the forwardly projecting cylinder of the supply head being outwardly inclined at 12 to correspond with the inclination 9 of the ported head to form the outer wall of the ports 10; and I further preferably provide the ported head with a rearwardly extending cone shaped projection 13 which extends into the supply chamber 14 and guides the motive agent to the ports 10. The supply hose can be coupled to the screw threaded portion 15 of the supply head.

A runner 16 having a rearwardly extending cylindrical portion 17 is journaled in the casing 1, a bushing 18 being preferably employed to form the bearing therefor. Said bushing 18 is interposed between a shoulder 19 on the casing and a shoulder 20 on the cylindrical projection of the runner to form a thrust bearing to take the forward thrust of the runner, and rings or washers 21 are preferably employed between the shoulder 19 and the bushing to take up the wear. Within a recess 22 of the runner a hardened plate 23 is seated and bears against a similar plate 24 seated in a recess 25 of the ported head to take the rearward thrust of the runner; and conduits 26 through the runner relieve said bearing of any water or other motive agent that may accumulate about it. Buckets 27 extend from the rear of the runner forwardly and outwardly therethrough; and said buckets are curved and register with the ports 10 of the ported head as particularly shown in Fig. 4. A screw threaded opening 28 in the runner is adapted to secure the cleaner or tool to be driven.

Having thus described my invention I claim:

1. In a turbine the combination of a casing having an open end, a supply head and runner, said runner being journaled peripherally in the casing with a free discharge at the open end of the casing, substantially as described.

2. In a turbine the combination of a supply head having a forwardly projecting cylindrical portion with a closed end and ports therethrough, a runner with a rearwardly extending cylindrical portion and a casing forming an elongated bearing for said runner, substantially as described.

3. In a turbine the combination of a supply head having a forwardly projecting reduced cylindrical portion with a closed end and ports therethrough, a runner with a rearwardly extending cylindrical portion and a casing forming an elongated bearing for said runner, said casing being secured to the supply head, substantially as described.

4. In a turbine the combination of a supply head having a forwardly projecting cylindrical portion with a transverse wall and ports therethrough, a runner with a rearwardly extending cylindrical portion and a casing forming a bearing for said runner, substantially as described.

5. In a turbine the combination of a casing, a runner and a supply head having a supply opening therethrough with a removable ported portion peripherally secured therein to supply the motive agent to the runner, the ports being formed from the outside in said portion and the wall of said opening forming the outer walls of said ports, substantially as described.

6. In a turbine the combination of a casing, a runner and a supply head having an integral hollow projecting cylindrical portion with a removable ported portion peripherally secured therein to supply the motive agent to the runner, the ports being formed from the outside thereof and the cylindrical portion forming the outer walls of said ports, substantially as described.

7. In a turbine the combination of a supply head having a forwardly extending cylindrical portion, a ported head removably secured in said cylindrical portion, a runner with a rearwardly extending cylindrical portion and a casing forming a bearing for said runner, substantially as described.

8. In a turbine the combination of a supply head having a forwardly projecting cylindrical portion, a ported head secured in said cylindrical portion, the ports being formed from the outside in said head, the outer walls of said ports being closed by said cylindrical portion of the supply head, a runner with a rearwardly extending cylindrical portion and a casing forming a bearing for said runner, substantially as described.

9. In a turbine the combination of a supply head having a forwardly projecting cylindrical portion, a ported head secured in said cylindrical portion, the ports being machined in said head from the outside at an inclination to the axis of the turbine, the outer sides of said ports being closed by the

forwardly projecting cylindrical portion of the supply head, a runner with a rearwardly extending cylindrical portion and a casing forming an elongated peripheral bearing for said runner, substantially as described.

10. In a turbine the combination of a casing, a runner and a supply head having an integral hollow projecting cylindrical portion forming a supply chamber with a removable ported portion peripherally secured therein having a projection extending into said chamber adapted to guide the motive agent to said ports, the ports being formed from the outside of said ported portion and the cylindrical portion forming the outer wall of said ports, substantially as described.

11. In a turbine the combination of a supply head having a forwardly projecting cylindrical portion forming a supply chamber, a ported head secured in said cylindrical portion, the ports being machined in said head from the outside at an inclination to the axis of the turbine, the outer sides of said ports being closed by the cylindrical portion of the supply head, said ported head further having a cone shaped projection extending into the supply chamber adapted to guide the motive agent to the ports in said head, a runner with a rearwardly extending cylindrical portion and a casing forming an elongated peripheral bearing for said runner, said casing being secured to the supply head, substantially as described.

12. In a turbine the combination of a supply head having a forwardly projecting cylindrical portion with a closed end and ports therethrough, a runner with a rearwardly extending cylindrical portion and a casing with a bushing therein forming an elongated bearing for said runner, substantially as described.

13. In a turbine the combination of a supply head having a forwardly projecting cylindrical portion with a closed end and ports therethrough, a runner with a rearwardly extending cylindrical portion and a casing with a bushing therein forming an elongated bearing for said runner, said casing and runner each having a shoulder between which said bushing is interposed to form a thrust bearing, substantially as described.

14. In a turbine the combination of a supply head having a forwardly projecting cylindrical portion with a closed end and ports therethrough, a runner with a rearwardly extending cylindrical portion, a casing forming an elongated bearing for said runner and a thrust bearing located between said runner and supply head, substantially as described.

15. In a turbine the combination of a casing, a runner journaled peripherally in said casing, said runner having inclined buckets arranged to discharge in a circle of greater diameter than the circle of the re-

ceiving ends and a supply head having ports opening to said buckets, substantially as described.

16. In a turbine the combination of a  
5 casing, a runner journaled peripherally in said casing, said runner having inclined buckets arranged to discharge in a circle of greater diameter than the circle of their receiving ends and a supply head having ports  
10 opening to said buckets, said ports discharging in a circle of greater diameter than the circle of their receiving ends, substantially as described.

17. In a turbine the combination of a supply head having a forwardly projecting cy-

lindrical portion with a closed end and ports therethrough, a runner with a rearwardly extending cylindrical portion, a casing forming an elongated bearing for said runner, a thrust bearing located between said runner  
20 and supply head and relief conduits extending from said bearing through said runner, substantially as described.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses. 25

HENRY F. WEINLAND.

Witnesses:

GROVER ALGEN,  
CARL CASKEY.