

No. 748,228.

PATENTED DEC. 29, 1903.

B. STEVENS.
TURBINE MOTOR.

APPLICATION FILED JULY 20, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

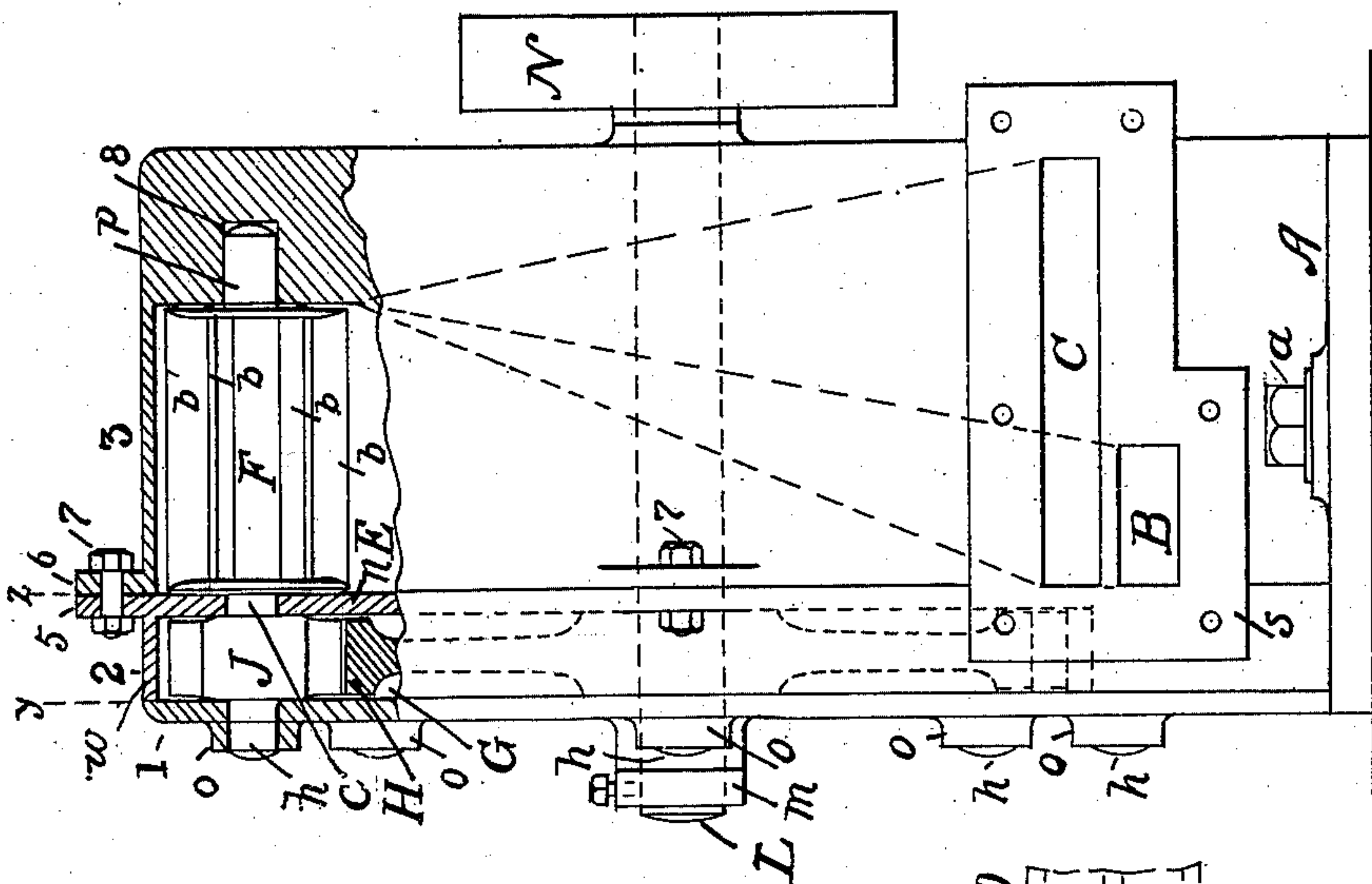


Fig. 2.

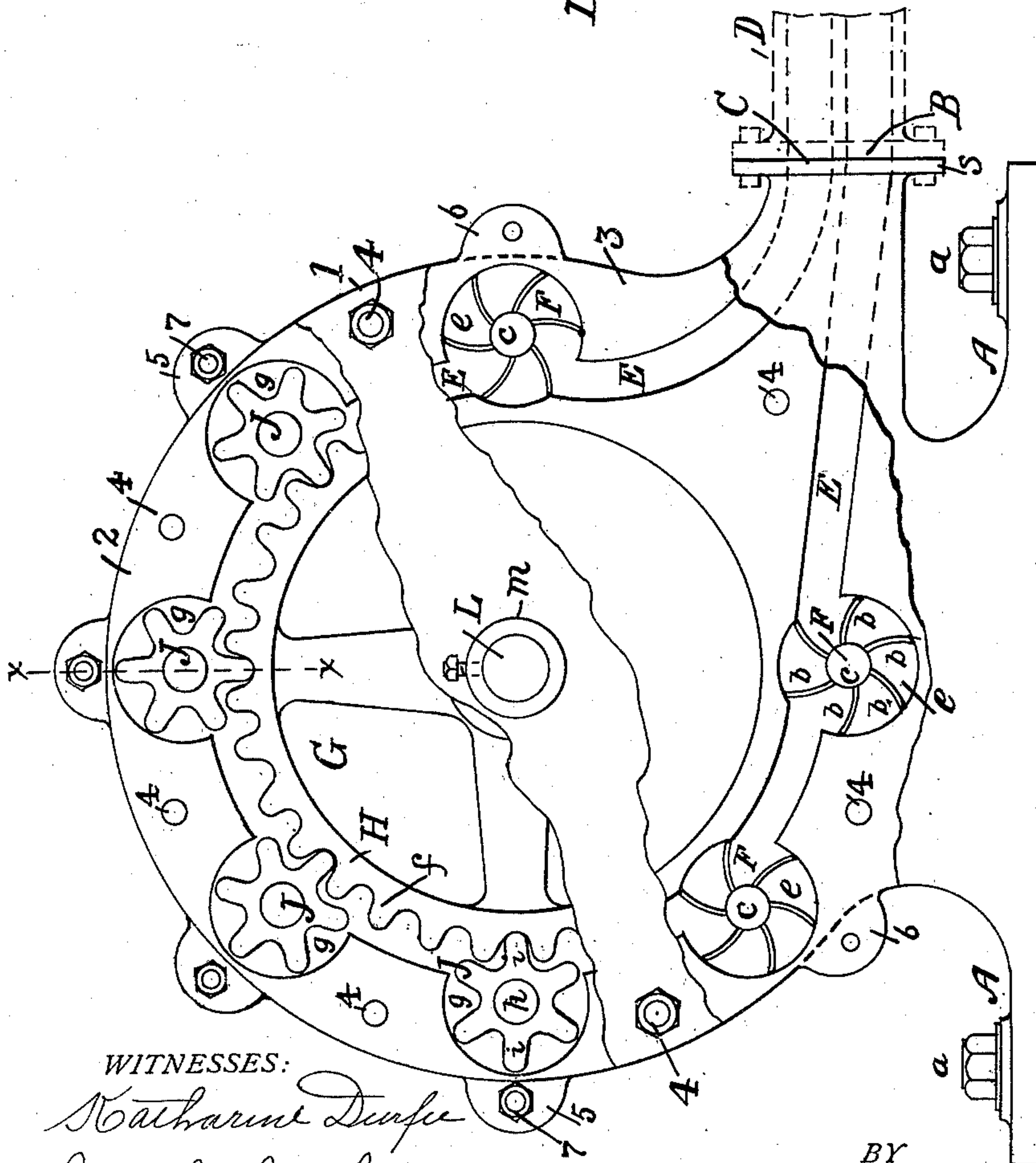


Fig. 1.

WITNESSES:

Nathaniel Durfee
Joseph A. Gately

INVENTOR.

Byron Stevens

BY

Samuel W. Pierce
ATTORNEY.

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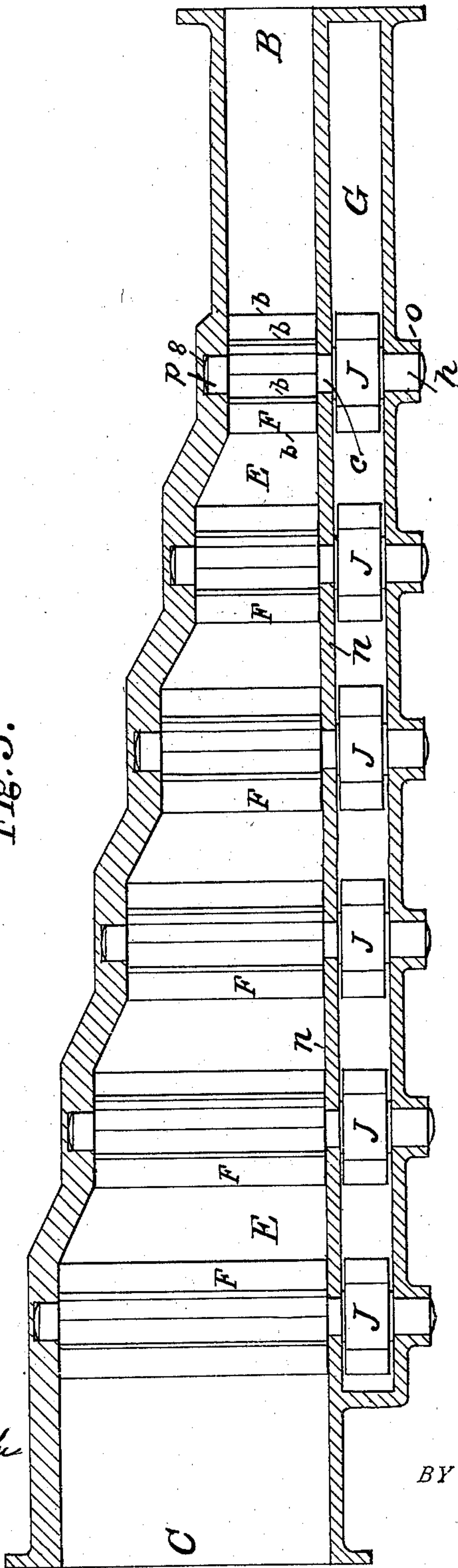
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2 SHEETS—SHEET 2.

Fig. 3.



WITNESSES:
Mathias Dufu
Joseph Algetely

INVENTOR.
Bryon Stevens
BY *Geo. Willis Price*
ATTORNEY.

UNITED STATES PATENT OFFICE.

BYRON STEVENS, OF SCHOHARIE, NEW YORK.

TURBINE-MOTOR.

SPECIFICATION forming part of Letters Patent No. 748,228, dated December 29, 1903.

Application filed July 20, 1903. Serial No. 166,280. (No model.)

To all whom it may concern:

Be it known that I, BYRON STEVENS, residing at Schoharie, in the county of Schoharie and State of New York, have invented certain Improvements in Turbine-Motors, of which the following is a specification.

The present invention relates to gas and liquid engines and motors of the turbine type, and has particular reference to such motors employing a motive power which is adapted to be used expansively.

To illustrate the invention, I have embodied the same in a motor having a main shaft extending through its central portion, the casing thereof being divided into three principal portions, one of which, in the form of a chamber, incloses a main gear splined to the shaft, engaging with a plurality of pinions each upon independent shafts, which extends into a small chamber and supports therein a turbine-wheel carrying a plurality of cups or blades. There is an inlet and an outlet for the steam joined to a circular passage which connects with the blades one side of each turbine-wheel, in *seriatim* preferably, the inlet-passage being of the lesser area which gradually enlarges toward the outlet, so that steam entering with a certain high pressure and volume gradually expands as it reaches the successive turbine-wheels, whose blades are made of increasingly larger area to correspond with the area of the passage at the points at which they are placed. The increased area of the steam-passage may be radially with the shafts of the turbine-wheels or of the main shaft, or it may be in a parallel direction thereto. In the present embodiment of the invention I have represented the increasing area of the steam-passage disposed in a direction parallel with the shafts of the turbine-wheels or of the main shaft, all of the turbine-wheels being of the same diameter.

Reference is made to the accompanying drawings, which are somewhat schematic, in order to more fully illustrate the invention, a form of construction being represented which would not in all probability be carried out in commercial use.

Figure 1 is a side elevation having parts broken away to more fully show the internal

operation. Fig. 2 is an end elevation partly in section. Fig. 3 is a development of the steam-passage.

In the drawings, 1, 2, and 3 represent three sections of the machine bolted to each other, of which 1 is a side or cover for the section 2, which consists of a chamber G, with the rim *w* and the wall or partition *n*, while the section 3, forming the main body of the machine, is secured to the section 2 by the ears 5 and 6, attached to the respective sections at points on their peripheries, through which extend the bolts 7. The cover or section 1 is secured to the section 2 by the bolts 4, which, if desired, may extend through wall *n* into the solid portions of the section 3. The machine is preferably circular in side elevation and rests upon the extended feet A A, through which pass the bolts *a a* to a suitable foundation.

A main shaft L extends through the sections central thereof and is provided with the collar *m* on one end, which bears upon a hub upon the face of the section 1, while upon the opposite end is a pulley N, by which secondary motion is conveyed from the machine. Gearing or other analogous and suitable devices may be substituted for the pulley. A main gear H is splined upon the shaft L and rotates in the chamber G.

At proper intervals around the outer face of the main gear H are located the pinions J, affixed to suitable shafts, which have bearings *h* and *c* in the hubs *o* and wall or partition *n*, respectively. These pinions mesh with the main gear and are preferably of one diameter. Within the section 3 is a passage E for entrance and exit of the gas or fluid employed to impart motion to the motor, and in this description I shall refer to steam as representing gases having expansion. I have shown the inlet B and outlet C together upon the same side of the motor, one below the other, but any other arrangement may be adopted, and have represented a flange adapted to be joined to an extension D to the steam-generator. The passage E is circular for the most part, and the inlet and outlet are tangential to its respective ends or terminals. The shafts bearing the pinions are extended

rearwardly and terminate as bearings *p* in sockets 8 in the section 3, and secured to each shaft is a turbine-wheel *F*, having a plurality of cups or blades *b*, which wheel is preferably located in a chamber *e* on the outer side of the passage *E* in such manner that the steam from the passage may come upon the blades in the most advantageous manner in *seriatim*.

- 10 Means are provided for gradually increasing the area of the turbine-wheel blades, which may be effected by enlarging their diameter and of increasing the thickness of the passage *E* radially, or, as represented, the wheel-blades may be lengthened successively from the inlet to the outlet, the passage *E* being of course gradually widened, as shown in Fig. 2 and more particularly in Fig. 3, which is a development of the passage, the pinions *J* being in the chamber *G* and the respective turbine-wheels *F* in the passage *E*.

The section 1 can be dispensed with and the main gear *H* and pinions *F* be upon the outside of the machine, if desired. It will be seen that by the invention steam which comes to the inlet *B* with a certain pressure and volume is permitted to expand and expend its power upon the increasing area of the blades with the same degree of economy and usefulness that obtains in the systems of steam-engines employing a plurality of steam-cylinders, and the resulting effects of the steam-turbine action is greatly increased.

I may employ instead of the main gear and pinions any such equivalents therefor as wheels with contiguous friction-surfaces, pulleys with ropes or belts, &c., and the turbine-wheels may be located upon the inner side of the passage *E*, or a portion of the turbine-wheels may be upon the outside and another portion upon the inner side, as may be determined.

What I claim as my invention is—

1. The combination in a turbine-motor, of a main shaft connected with a main wheel, of a plurality of smaller wheels communicating motion to the main wheel, provided with means for communicating secondary motion, each small wheel connected with a turbine-wheel, with a passage connecting with each turbine-wheel in *seriatim*, having an inlet and an outlet.

2. The combination in a turbine-motor, of a main shaft connected with a main wheel, of a plurality of smaller wheels communicating motion to the main wheel, provided with means for communicating secondary motion, each small wheel connected with a turbine-wheel in a chamber, with a passage connecting with each turbine-wheel chamber in *seriatim*, having an inlet and an outlet.

3. The combination in a turbine-motor, a main shaft connected with a main gear and provided with means for communicating secondary motion, of a plurality of pinions engaging the main gear, each pinion connected with a turbine-wheel, with a passage com-

municating with each turbine-wheel in *seriatim* having an inlet and an outlet.

4. The combination in a turbine-motor, of a main shaft connected with a main gear and provided with means for communicating secondary motion, of a plurality of pinions engaging the main gear, each pinion connected with a turbine-wheel in a chamber, with a passage connecting with each turbine-wheel chamber in *seriatim*, having an inlet and an outlet.

5. The combination in a turbine-motor, of a main shaft connected with a main wheel, of a plurality of smaller wheels communicating motion to the main wheel, provided with means for communicating secondary motion, each small wheel connected with a turbine-wheel, with a passage connecting with each turbine-wheel in *seriatim* whose area increases from its inlet to its outlet.

6. The combination in a turbine-motor, of a main shaft connected with a main wheel, a plurality of smaller wheels communicating motion to the main wheel, provided with means for communicating secondary motion, each small wheel connected with a turbine-wheel, with a passage connecting with each turbine-wheel whose area increases in a direction parallel with the main shaft from its inlet to its outlet.

7. The combination in a turbine-motor, of a main shaft engaging with a main gear and provided with means for communicating secondary motion, of a plurality of pinions engaging the main gear, each pinion connected with a turbine-wheel with a passage connecting with each turbine-wheel whose area increases from its inlet to its outlet.

8. The combination in a turbine-motor, of a main shaft engaging with a main gear and provided with means for communicating secondary motion, of a plurality of pinions engaging the main gear, each pinion connected with a turbine-wheel with a passage connecting with each turbine-wheel whose area increases in a direction parallel with the main shaft from its inlet to its outlet.

9. In a turbine-motor, several sections bolted together, a main shaft engaging with a main gear in or upon one of the sections and provided with means for communicating secondary motion, of a plurality of pinions meshing with the main gear and in the same section therewith, each pinion connected with a turbine-wheel in another section having a plurality of cups, with a passage communicating with each turbine-wheel having an inlet and an outlet, as set forth.

10. The combination in a turbine-motor, several sections bolted together, a main shaft engaging with a main gear in or upon one of the sections and provided with means for communicating secondary motion, of a plurality of pinions meshing with the main gear and in the same section therewith, each pinion connected with a turbine-wheel in another section having a plurality of cups, with a pas-

sage communicating with each turbine-wheel whose area increases from its inlet to its outlet, as set forth.

11. The combination in a turbine-motor, 5 several sections bolted together, a main shaft engaging with a main gear in or upon one of thesections and provided with means for communicating secondary motion, of a plurality of pinions meshing with the main gear and 10 in the same section therewith, each pinion connected with a turbine-wheel in another section having a plurality of cups, with a passage communicating with each turbine-wheel whose area increases in a direction parallel 15 with the main shaft from its inlet to its outlet, as set forth.

12. The combination in a turbine-motor, of a main shaft, carrying a main wheel, a passage whose area increases from its inlet to its outlet, a series of turbine-wheels adjacent to 20 said passage, with means for conveying motion from the turbine-wheels to said main wheel.

In testimony whereof I have signed my name to this specification, in the presence of 25 two subscribing witnesses, this 17th day of July, 1903.

BYRON STEVENS.

Witnesses:

ESTELLA TAYLOR,

WILLIAM WALLACE TAYLOR.