

No. 653,219.

Patented July 10, 1900.

J. DAVENPORT.

PROPELLER.

(Application filed May 3, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

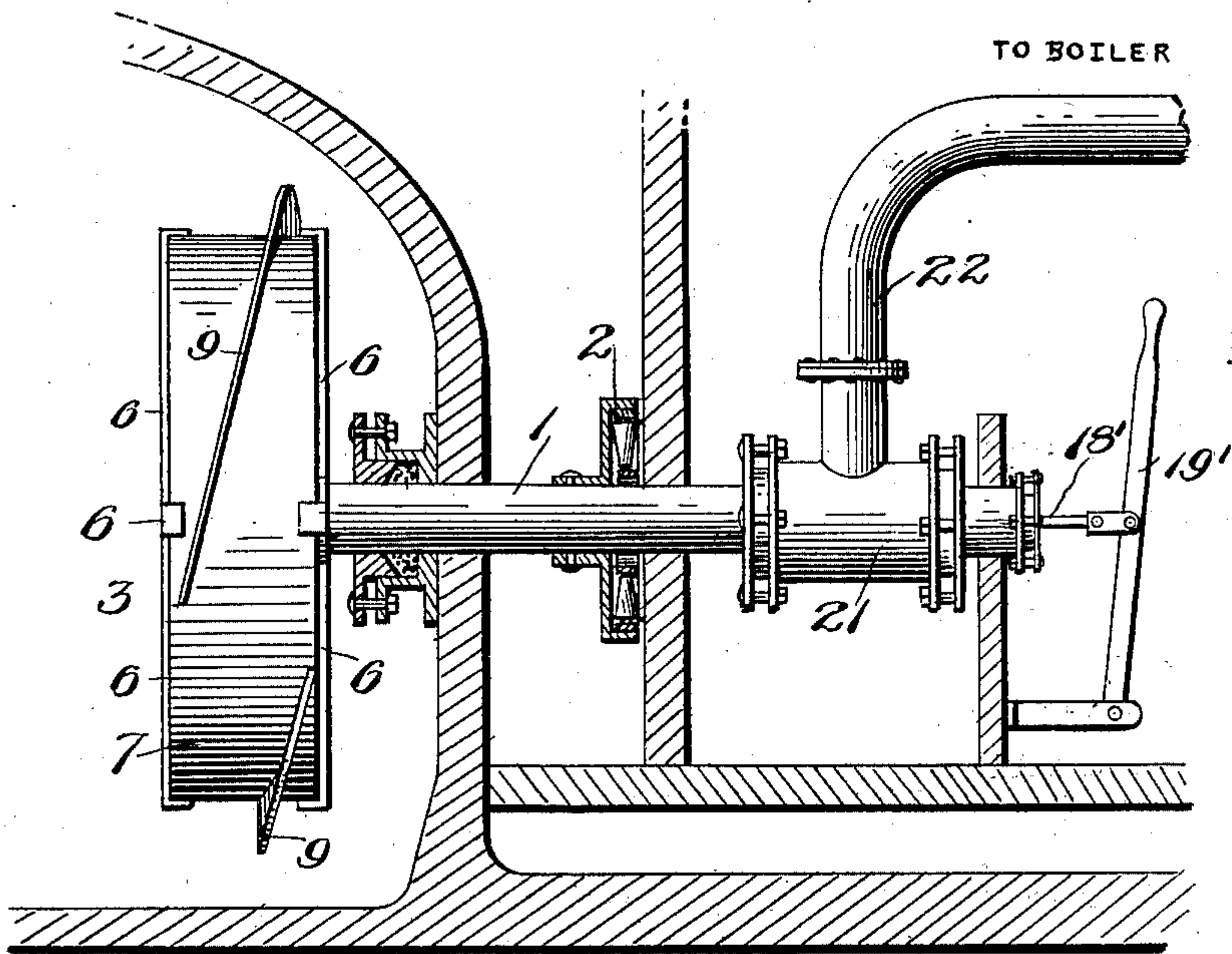
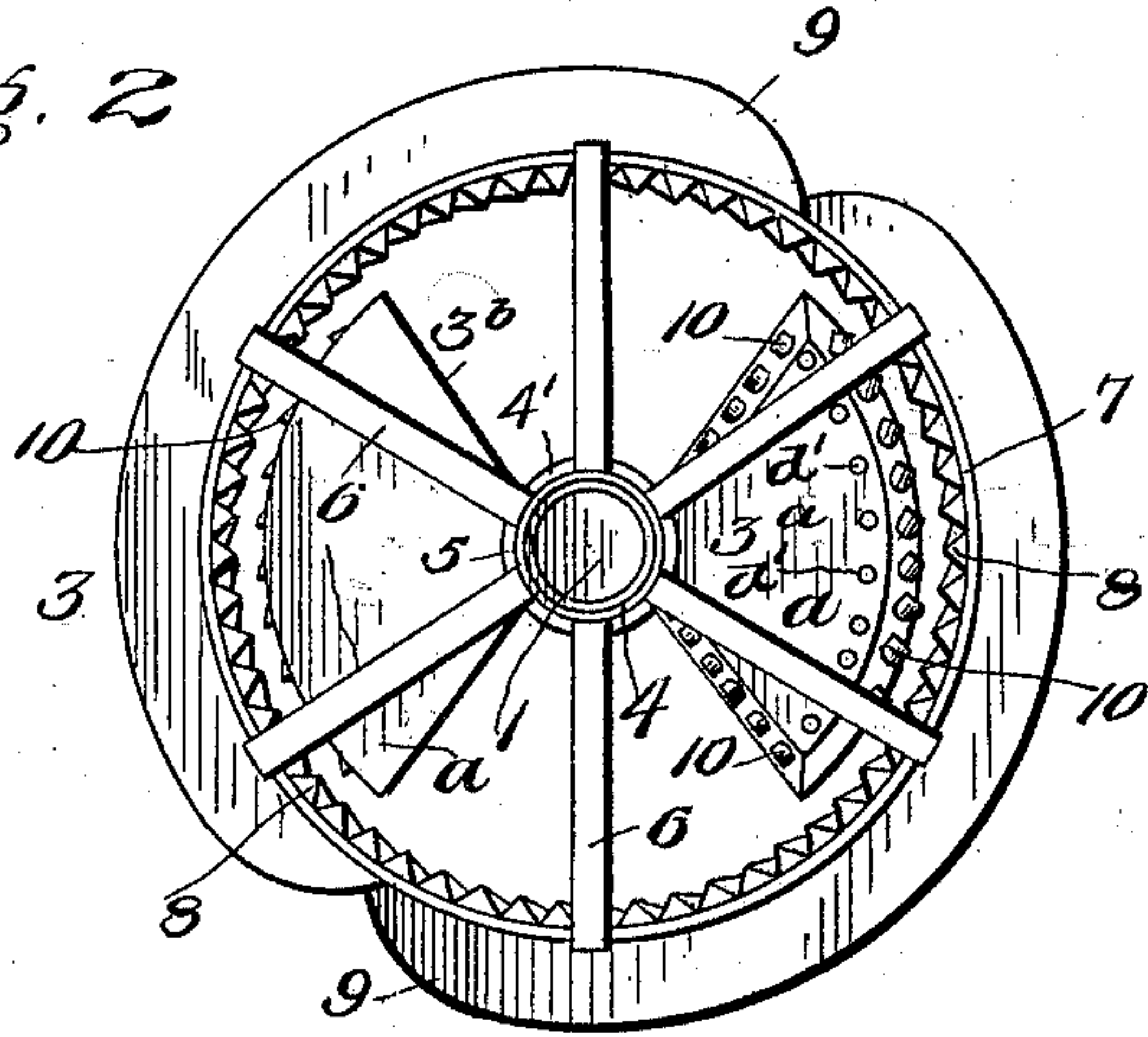


Fig. 2.



Inventor

Joseph Davenport

Witnesses:

E. Hunt
J. Davenport

by *A. B. Wilson & Co.*

Attorneys

No. 653,219.

Patented July 10, 1900.

J. DAVENPORT.
PROPELLER.

(Application filed May 3, 1900.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 3.

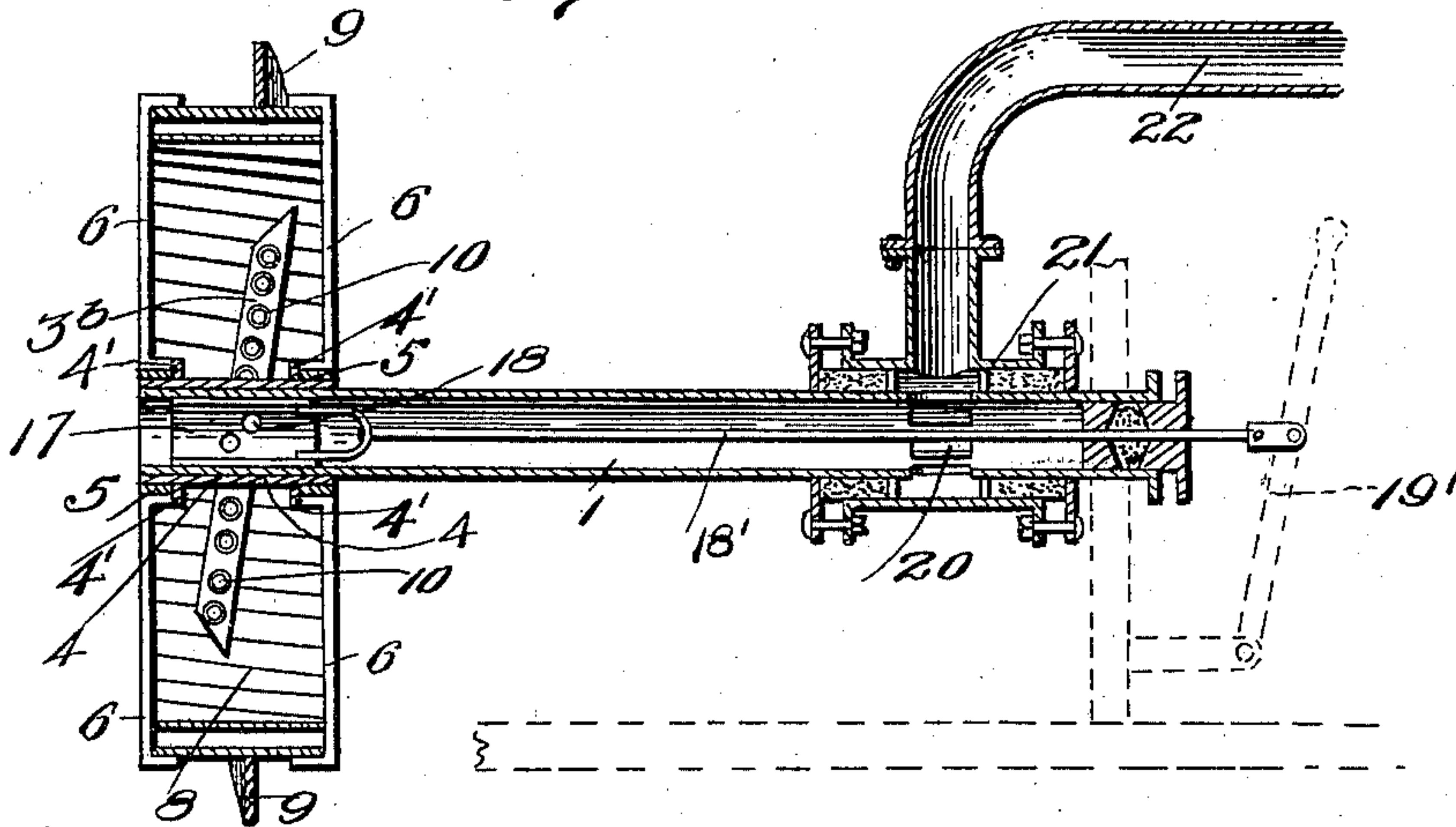


Fig. 4.

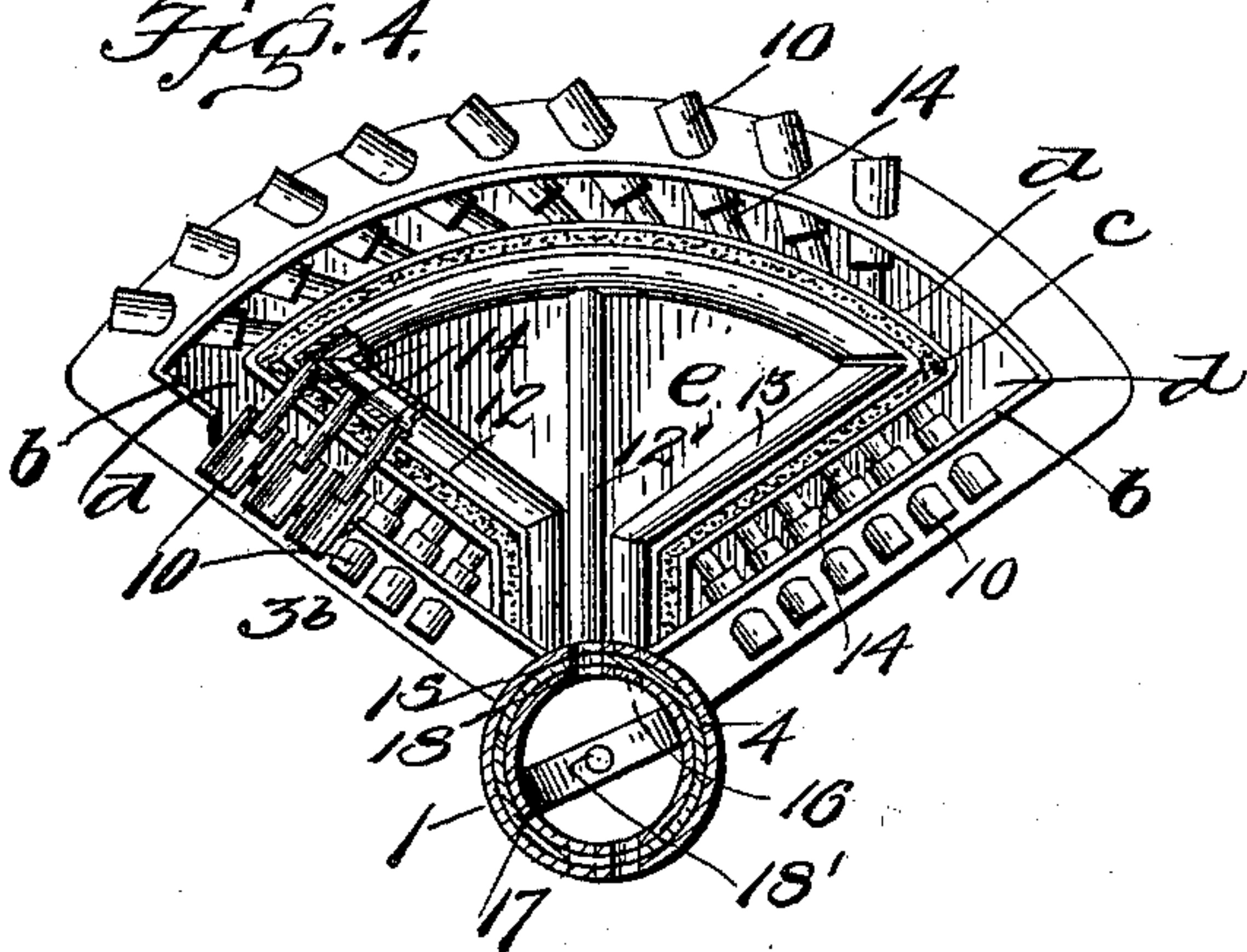


Fig. 5.

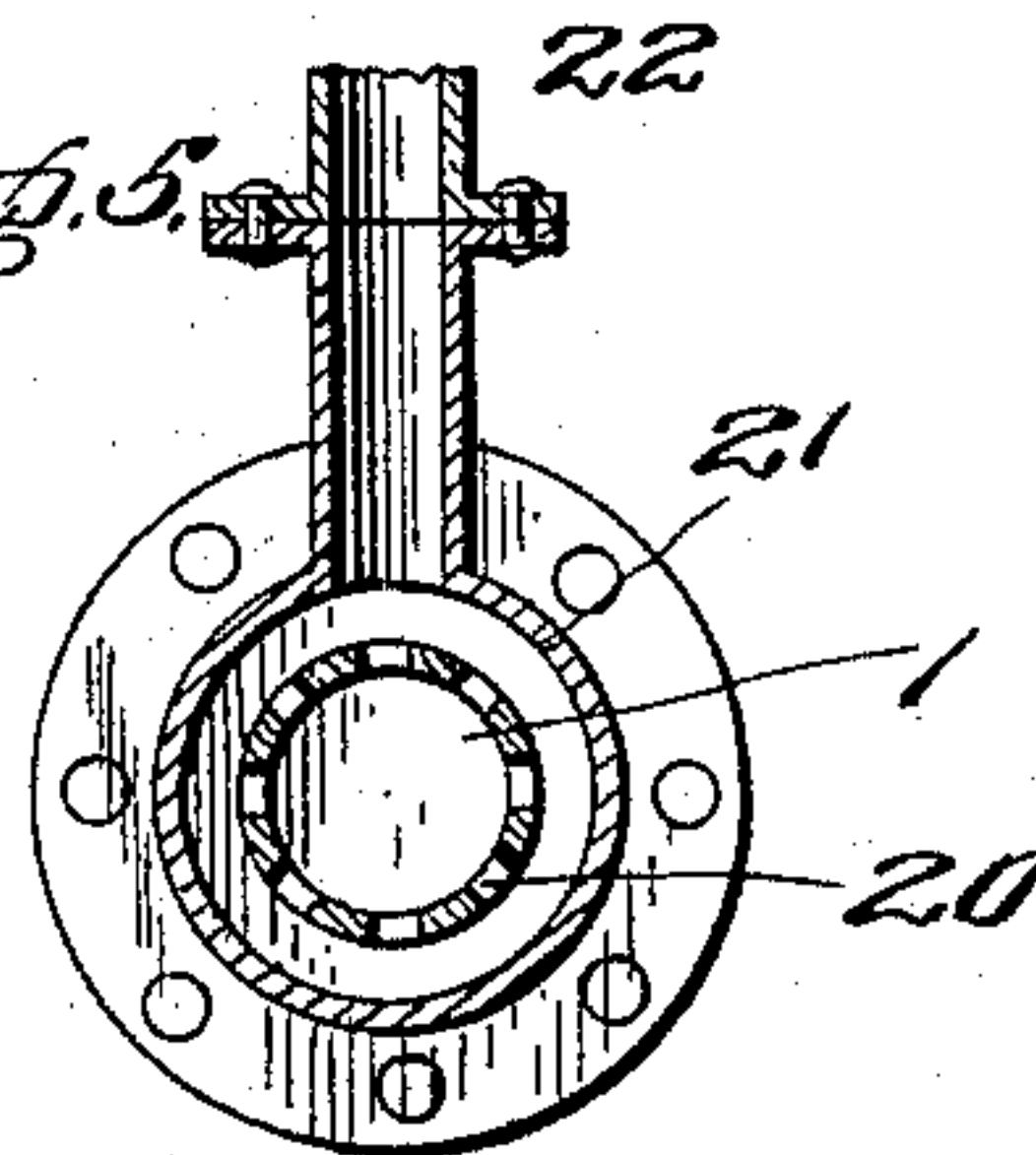


Fig. 6.

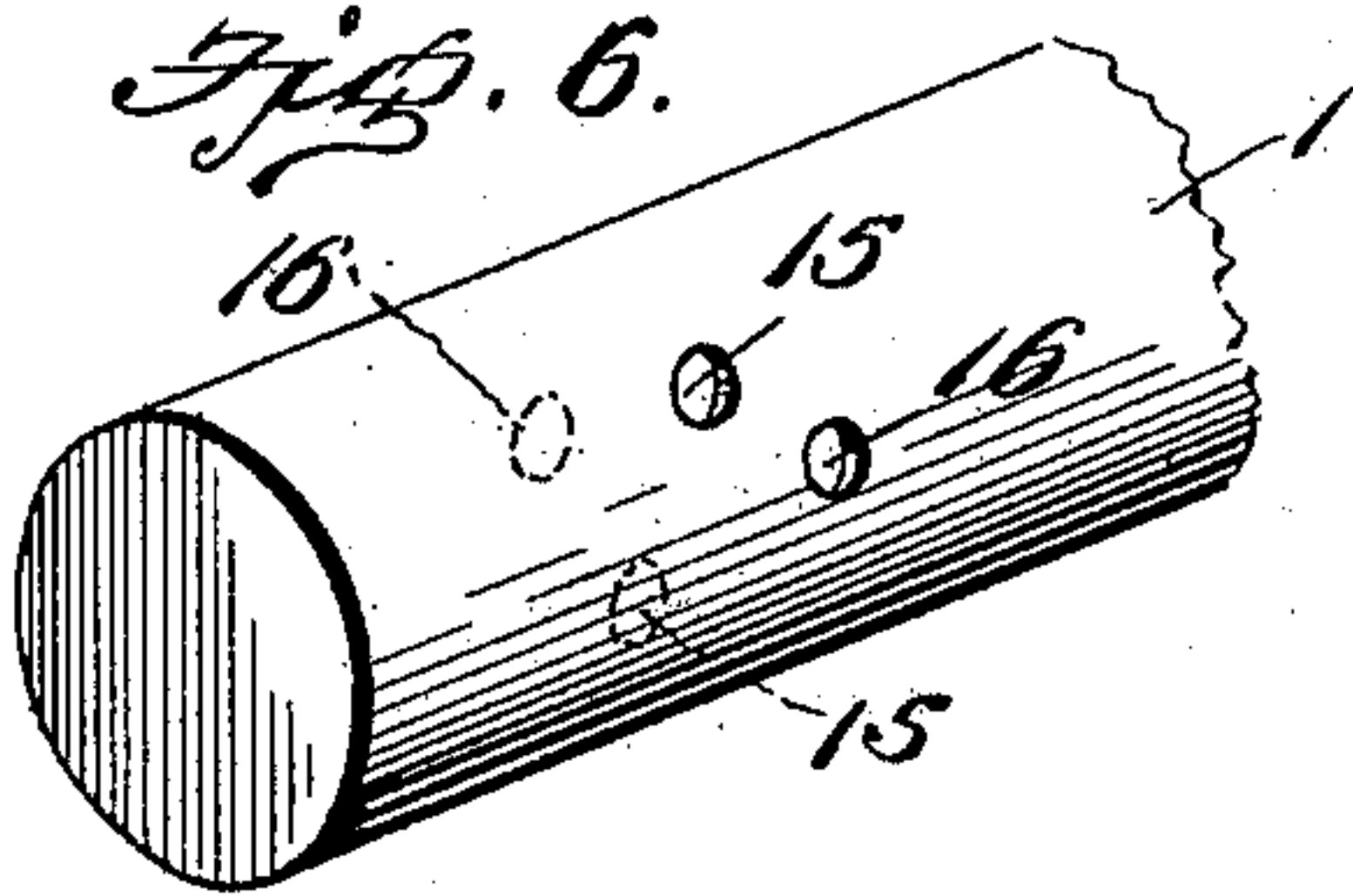
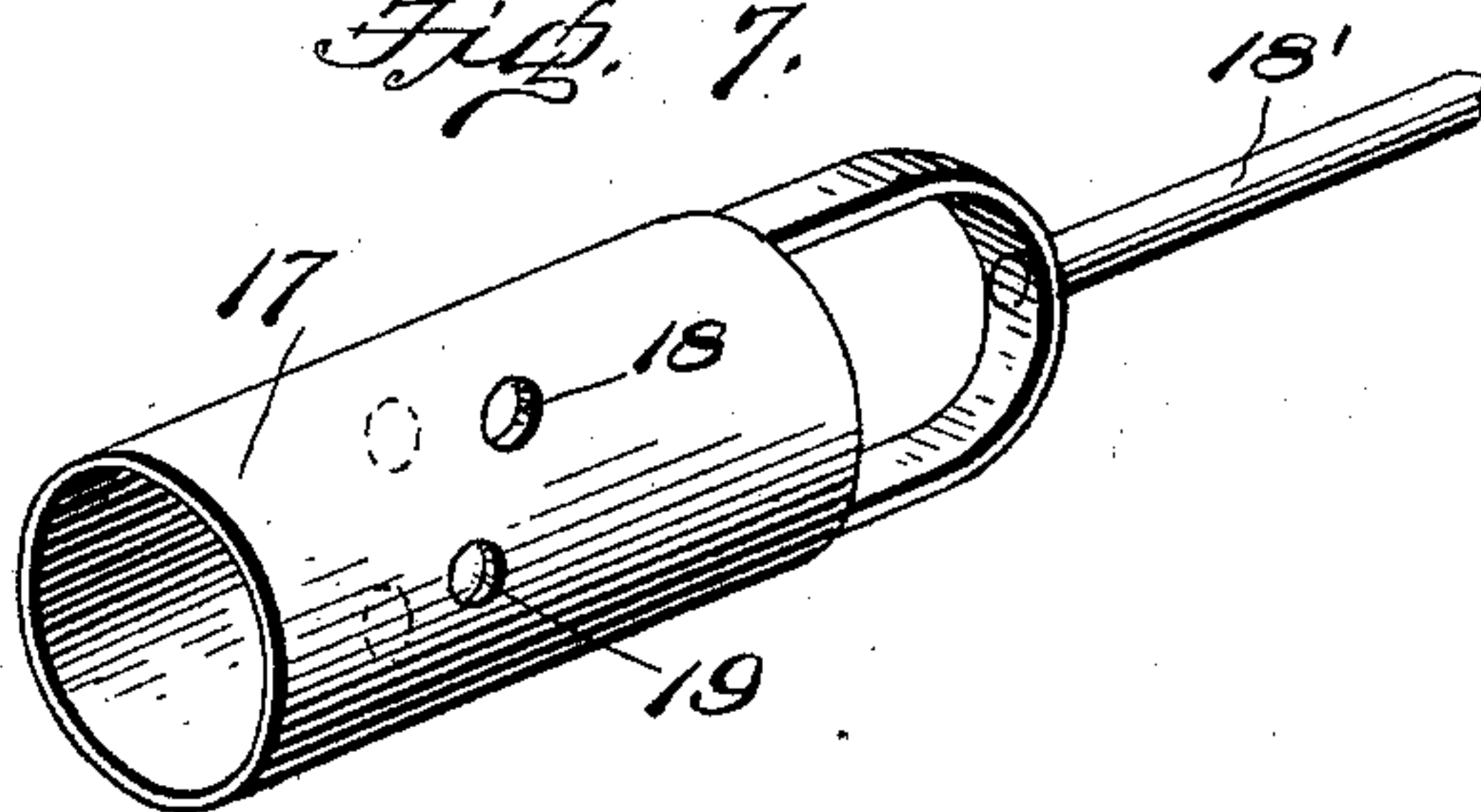


Fig. 7.



Witnesses
E. Hunt.
C. H. Wilson

Inventor
Joseph Davenport
by *A. B. Wilson & Co.*
Attorneys

UNITED STATES PATENT OFFICE.

JOSEPH DAVENPORT, OF ZOAR, OHIO.

PROPELLER.

SPECIFICATION forming part of Letters Patent No. 653,219, dated July 10, 1900.

Application filed May 3, 1900. Serial No. 15,381. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH DAVENPORT, a citizen of the United States, residing at Zoar, in the county of Tuscarawas and State of Ohio, have invented certain new and useful Improvements in Propellers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to propellers, and particularly to the class of screw-propellers.

One object of the invention is to provide such a propeller which shall embody a principle from which a great amount of power may be derived and in which the use of an engine is unnecessary.

Another object is to provide means whereby the direction of the movement of the propeller may be quickly reversed when necessary.

A further object is to provide a propeller of this class which shall be strong, durable, efficient in its action, capable of being run at a high rate of speed, and the manufacture of which will be comparatively inexpensive.

With these and other objects in view my invention consists in the construction and arrangement of parts, which will be hereinafter more fully described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section through a portion of the hull, bulkhead, and one of the decks of a vessel, showing my improved propeller applied thereto. Fig. 2 is a rear elevation of the propeller. Fig. 3 is a longitudinal vertical section through the propeller-shaft. Fig. 4 is an enlarged view of one of the propeller-blades having the face-plate removed therefrom and showing the interior construction of the same. Fig. 5 is a vertical transverse section through the steam-inlet pipe and its connections with the hollow propeller-shaft. Fig. 6 is a detail view of the rear end of the propeller-shaft, showing the steam-inlet ports leading to one of the propeller-blades. Fig. 7 is a detail view of the sliding valve and the steam-ports therein.

In the drawings, 1 denotes a hollow shaft mounted in bearings formed in the bulkhead and in a standard rising from the floor of a

vessel and passing through a suitable packed opening in the stern thereof. The shaft 1 is provided with a roller thrust-bearing 2 where it passes through the bulkhead, in order to lessen the friction at that point caused by the forward thrust of the propeller and shaft.

3 denotes a screw-propeller having two or more radially-disposed triangular-shaped blades 3^a 3^b, mounted on the hub 4 at an angle to the plane of rotation and having the pitch of a screw, the blades having their outer edges formed in the arc of a circle.

4 denotes a hub rigidly mounted on the end of the shaft 1. Loosely mounted on the hub 4 on each side of the propeller-blades are collars 5, which are held in place on said hub by annular flanges 4', formed on said hub between each collar 5 and the propeller-blades.

Diverging from the collars 5 are a series of radially-disposed arms 6, connected at their outer ends to a broad circular band 7, of metal, and being of slightly-greater diameter than the circle formed by the propeller-blades and completely encircling said blades. The inner side of the band 7 has formed thereon a series of angular corrugations 8, extending entirely around the said band and running slightly diagonally across the same. On the outer side of the band 7 is formed two or more spirally-arranged ribs or blades 9, which extend in a direction the reverse of the blades 3^a and 3^b of the screw-propeller 3.

Each of the blades 3^a and 3^b consists of two flat perforated plates *a a*, one of which is slightly smaller than the other. These plates are connected together and spaced apart by a series of partitions conforming to the shape of the plates and forming a series of chambers within the blades for a purpose hereinafter to appear. The outer edges of the plates are joined by an inclined flange, thus forming a beveled edge to the blades, which will enable them to meet with less resistance when passing through the water.

b denotes the outer partition between the plates *a a*, and *c* denotes a similar but double partition arranged inside the partition *b* and forming between them a chamber or channel *d*, into which the water flows through the perforations *d'* in the plates *a a*. The double partition *c* is formed with a suitable packing

between the walls thereof, making the inner chamber or the space *e* inclosed by the said double and packed partition water-tight.

Projecting through the inclined flange and the outer partition-wall of the blades are a series of tubes 10, communicating with the channel *d* and projecting slightly therein and slightly beyond the inclined flanged edges of the blades. The short tubes 10 which occur along the curved edge of the blades are arranged obliquely thereto, while those along the straight edges of the blades project through at right angles thereto.

Within the inner space or chamber *e* and running entirely around the sides thereof are steam-pipes 12 and 13, and communicating with the pipe 12 and forming part of the same is the radially-arranged pipe 12', the open ends of these pipes 12' and 13 being arranged one slightly in advance of the other and communicating with similarly-arranged steam-inlet ports in the hub of the propeller. The pipe 13 where it joins pipe 12 is closed and has no connection with the pipe 12. These steam-pipes being in the inner chamber and protected from contact with the water by the packed partition-walls the steam in said pipes will not be allowed to cool.

14 denotes a series of short pipes or tubes arranged in a similar manner as the tubes 10 and having connection with the steam-pipes 12' and 13. These tubes pass through the packed partition-walls *c* into the outer channel *d* and project a short distance into the tubes 10. The tubes 14 being of less diameter than the tubes 10 an annular space will thereby be left between the two pipes.

Steam is admitted to the propeller-blades from the hollow shaft 1 through ports 15 and 16, arranged on diametrically-opposite sides of the said hollow shaft, said ports registering with the ports in the hub, and thereby communicating with the pipes 12' and 13 in each propeller-blade at each revolution of the same.

The admission of steam from the shaft 1 to the ports 15 and 16 therein is controlled by a sliding or throttle valve consisting of a short cylinder or tube 17, fitting closely within the hollow shaft and being provided at one end with a bail, from which extends a shifting-rod 18', passing through a stuffing-box on the inner end of the hollow shaft and connecting with a shifting-lever 19', pivoted to the supporting-standard of the shaft. The valve 17 is provided with port-holes 18 and 19, which are in line with and adapted to register when the valve is shifted with the ports 15 and 16 in the shaft 1.

When it is desired to propel the vessel forward, the valve 17 is shifted to bring the ports 18 of said valve into line with the port 15 of the shaft, thereby admitting steam to the pipes 12' and 12 and cutting out pipes 13. The steam entering pipes 12' and 12 rushes out through the small tubes 14 in communication therewith and into the tubes 10, violently

forcing the water in said tubes and the channel *d* out of the same and against the corrugations of the band 7. The force of the stream of water thrown from the tubes 10 in the blades of the screw-propellers against the corrugations of the band 7 will tend to rapidly rotate the said blades in one direction and the band or wheel 7 in the other, the said band or wheel 7 having on its periphery the spirally-arranged blades or ribs 9, which, by reason of the direction in which they run, will force the vessel forward or in the same direction as the screw-propeller, thereby forming a double propeller. To reverse the movement of the propeller to back the vessel or to quickly stop the same, the valve 17 is shifted to bring the ports 16 and 19 into line, thereby admitting steam to the pipes 13 and through them to the tubes in communication therewith on the opposite edges of the propeller-blades.

Steam is admitted to the hollow shaft 1 through a series of radially-disposed slots or ports 20 in said shaft, and around which is formed a suitably-packed steam-jacket 21, supported from the floor of the vessel by legs or standards. The jacket 21 is of somewhat-greater diameter than the shaft, thereby providing an annular space around the slotted portion or ports of the shaft, so that the steam from the jacket may enter the shaft on all sides, steam being admitted to the jacket through a pipe 22, communicating with the boiler. Thus it will be seen that I am enabled to propel a vessel with my propeller without the use of an engine, and the space on a vessel usually taken up by the same can be retained for other purposes.

From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of my improved propeller will be readily understood, and further description of the same is not deemed necessary, and it is obvious that with slight modifications my invention might be adapted as a motive power in uses other than the propulsion of vessels, and to all such modifications and uses falling within the scope and spirit of my invention I claim the exclusive right and title.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a propeller of the class described, the combination of a hollow shaft, a hub rigidly connected to said shaft, hollow propeller-blades rigidly connected to said hub and in connection with said hollow shaft, a wheel or band corrugated on its inner side surrounding said blades and loosely mounted on said hub, spirally-arranged blades fixed on the periphery of said band or wheel, means for admitting water to the said hollow blades, means for controlling the admission of steam to said blades from said hollow shaft to force said water out of said blades and against the corrugations of said band, to rotate said blades

and band in opposite directions, substantially as and for the purpose set forth.

2. In a propeller of the class described, the combination of a hollow shaft having inlet
5 and outlet ports, a hub rigidly connected to one end of said hollow shaft and having ports communicating with said shaft-ports, radially-disposed hollow blades rigidly connected to said hub, and provided with inner and outer
10 compartments for the reception of steam-pipes and the admission of water, a wheel or band corrugated on its inner side surrounding said blades and loosely mounted on said hub, means for controlling the admission of
15 steam to the said steam-pipes through the aforesaid ports, openings for allowing water to enter said water-compartments, a series of short tubes through which water is forced out of said water-compartments, a series of short
20 tubes connecting said steam-pipes with said water-tubes, to allow steam to force the water through said water-tubes from said water-compartment against the corrugations on said band or wheel to rotate said blades and band
25 in opposite directions, substantially as and for the purpose set forth.

3. In a propeller of the class described, the combination of a hollow shaft having at one
30 end a series of radially-disposed inlet-ports, a packed joint, rotatably connecting said shaft-ports with a steam-supply pipe, the op-

posite end of said hollow shaft being provided with two sets of outlet-ports, a valve sliding within said hollow shaft having ports adapted to open and close said shaft-ports, a valve rod 35 and lever for actuating said valve, a hub rigidly connected to the outlet end of said hollow shaft, radially-disposed hollow blades rigidly connected to said hub and provided with an outer annular water-channel, a steam-pipe 40 chamber, and a packed partition between said channel and chamber and having main steam-supply pipes located within said steam-pipe chamber, communicating with the steam-ports in said hub, a series of short steam-tubes pro- 45 jecting from said steam-pipes, a series of short water-tubes projecting through the outer edge walls of said propeller-blades adapted to loosely engage the ends of said steam-tubes, openings through the sides of said blades com- 50 municating with said water-channel, a band or wheel surrounding said blades and loosely supported by said hub, having corrugations on its inner side and provided with spirally-arranged blades on its periphery, substantially as and for the purpose set forth. 55

In testimony whereof I have hereunto set hand in presence of two subscribing witnesses.

JOSEPH DAVENPORT.

Witnesses:

SIMON BEITER,
EMILIE BURKHART.