

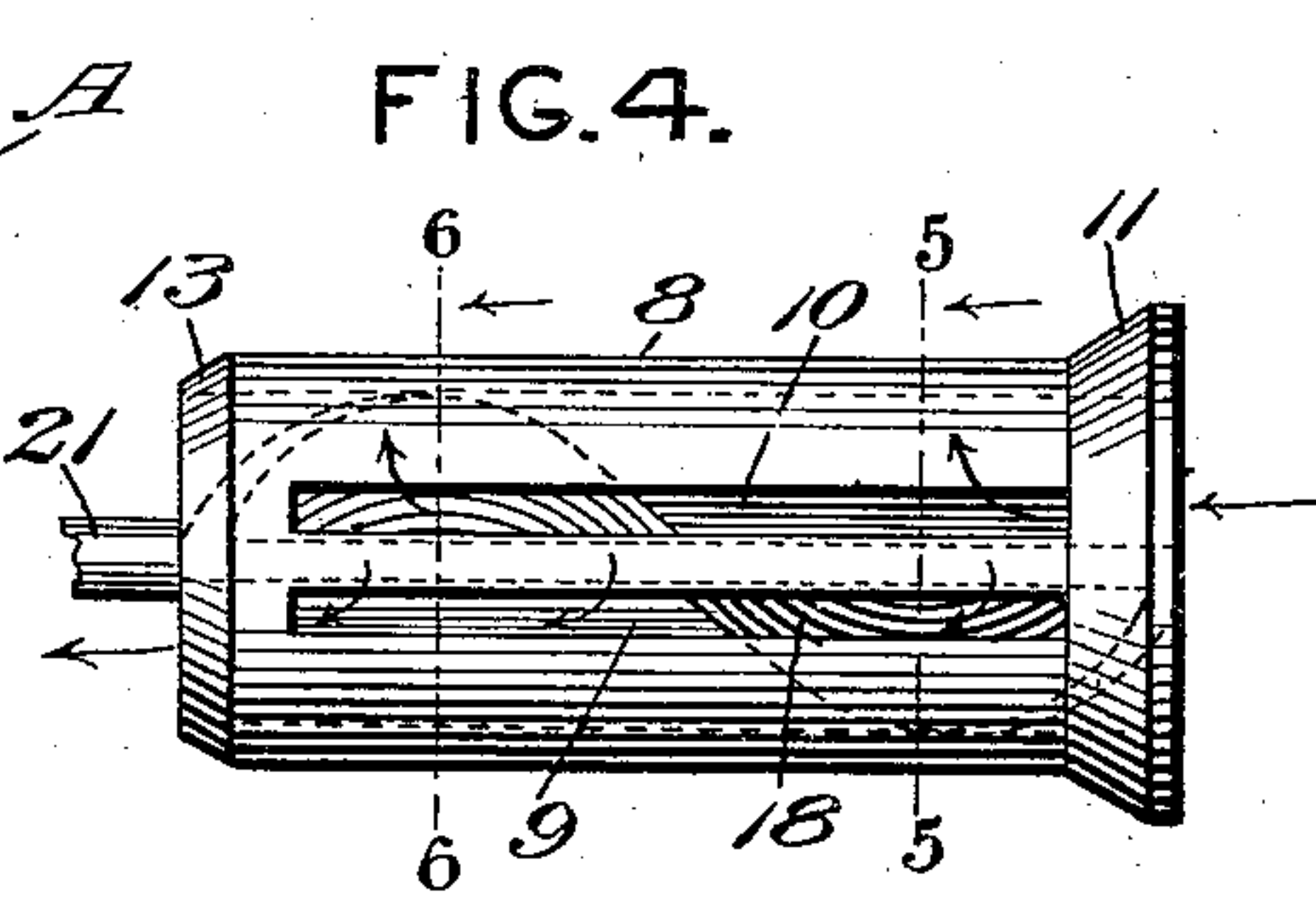
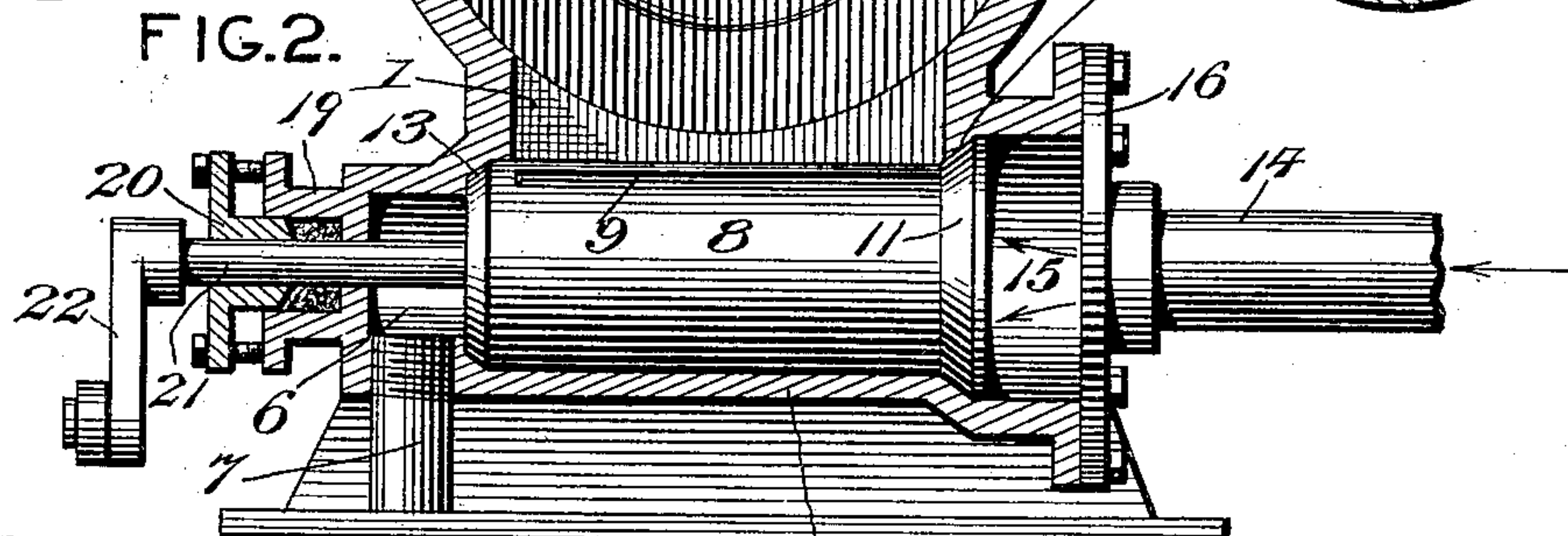
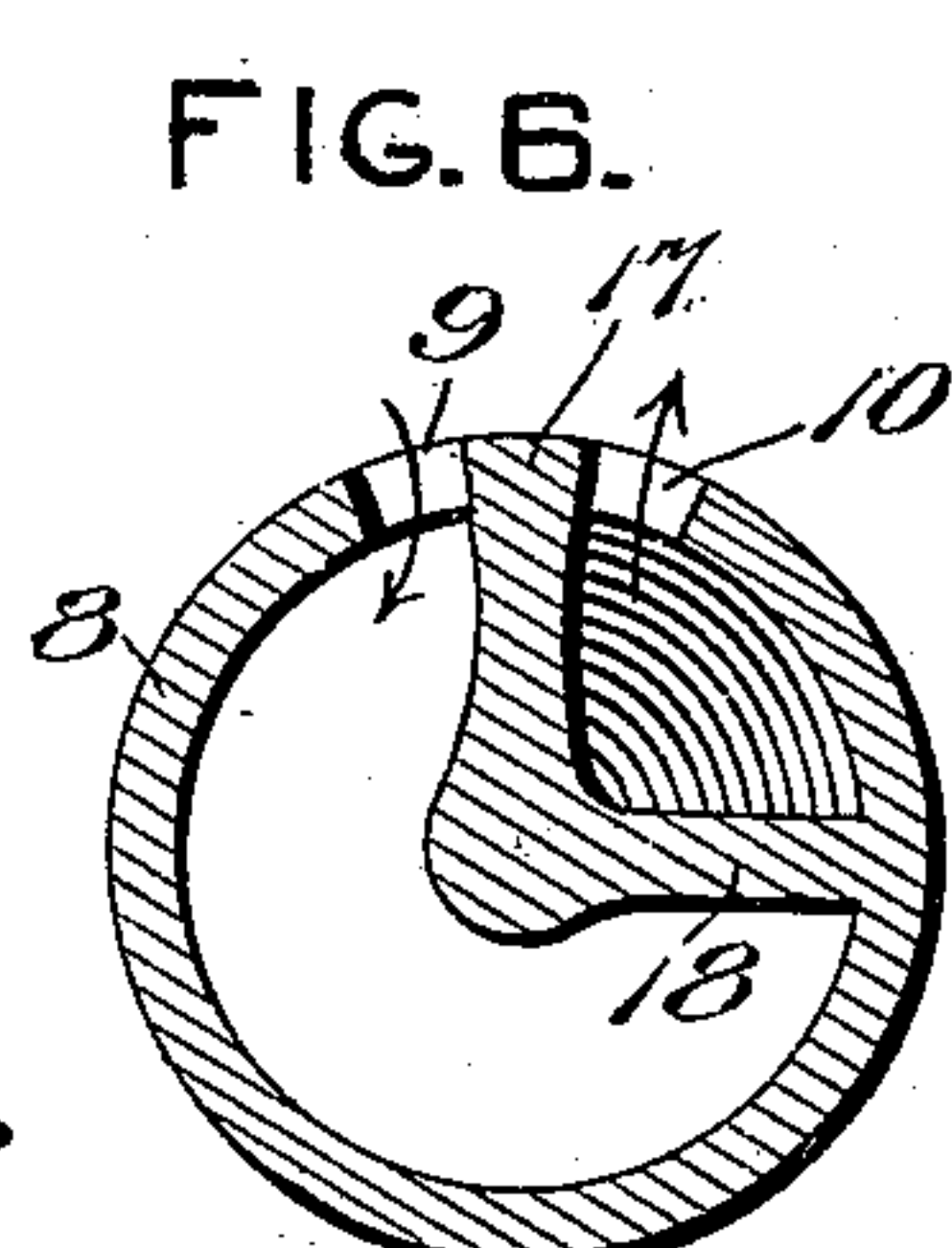
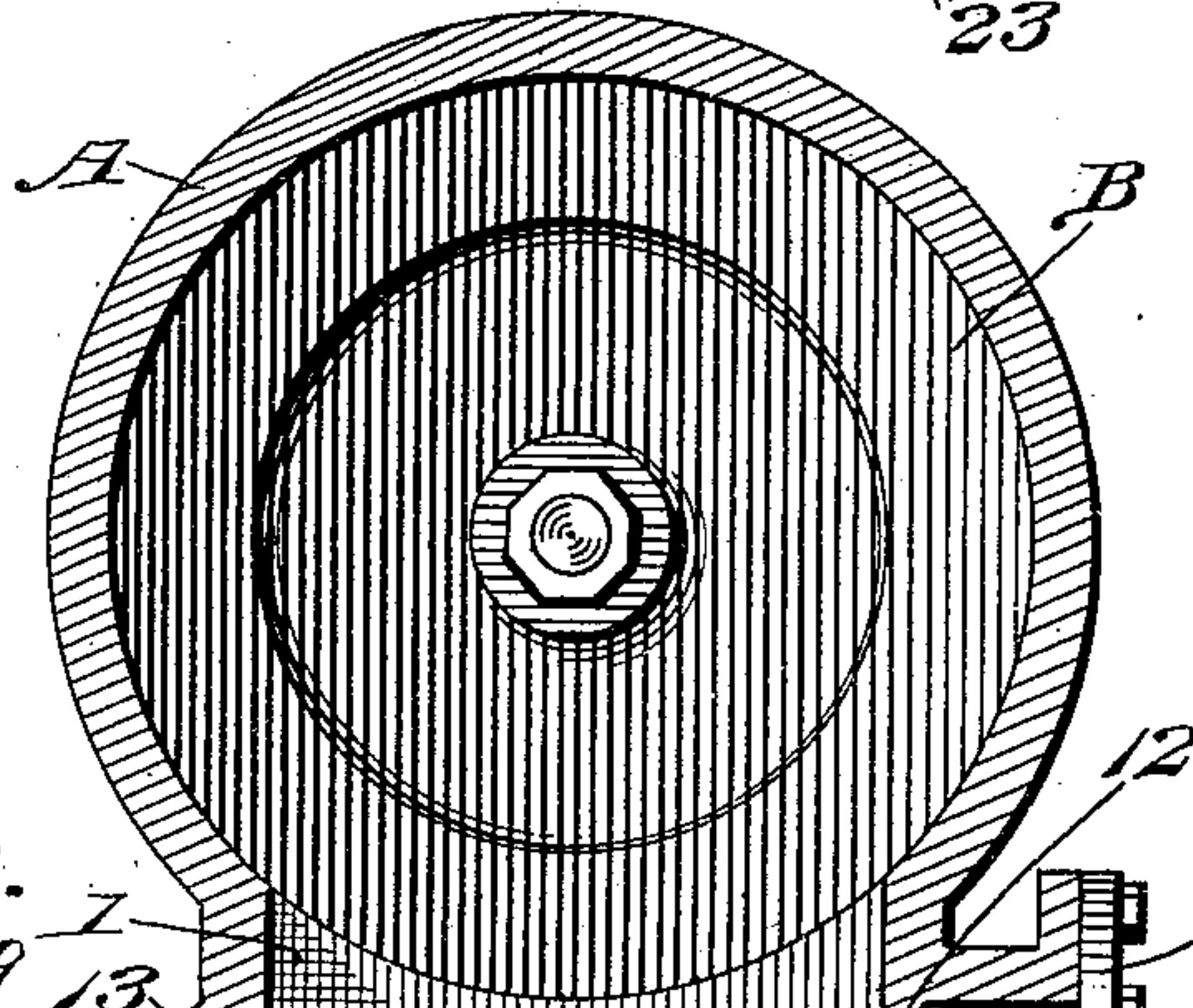
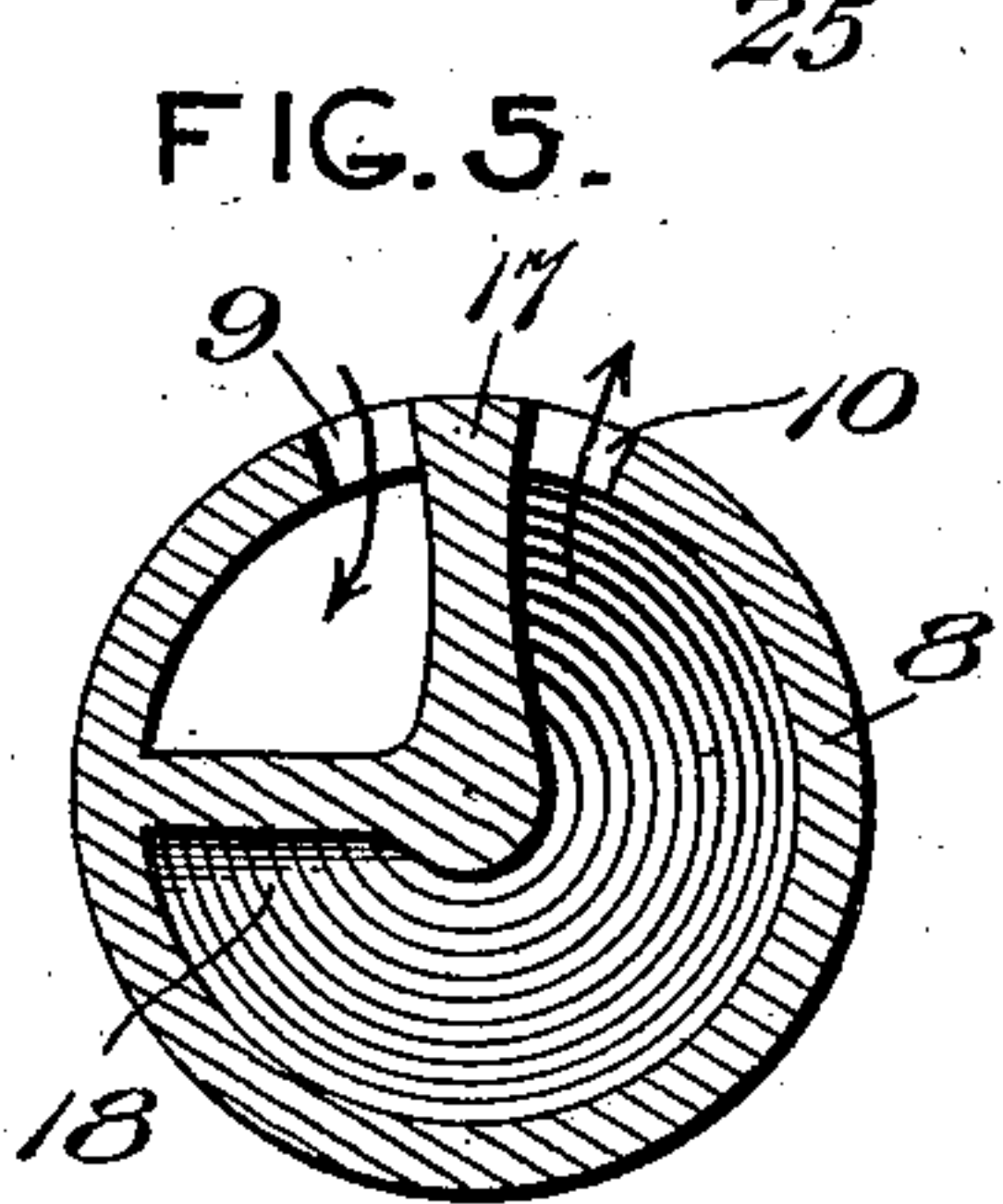
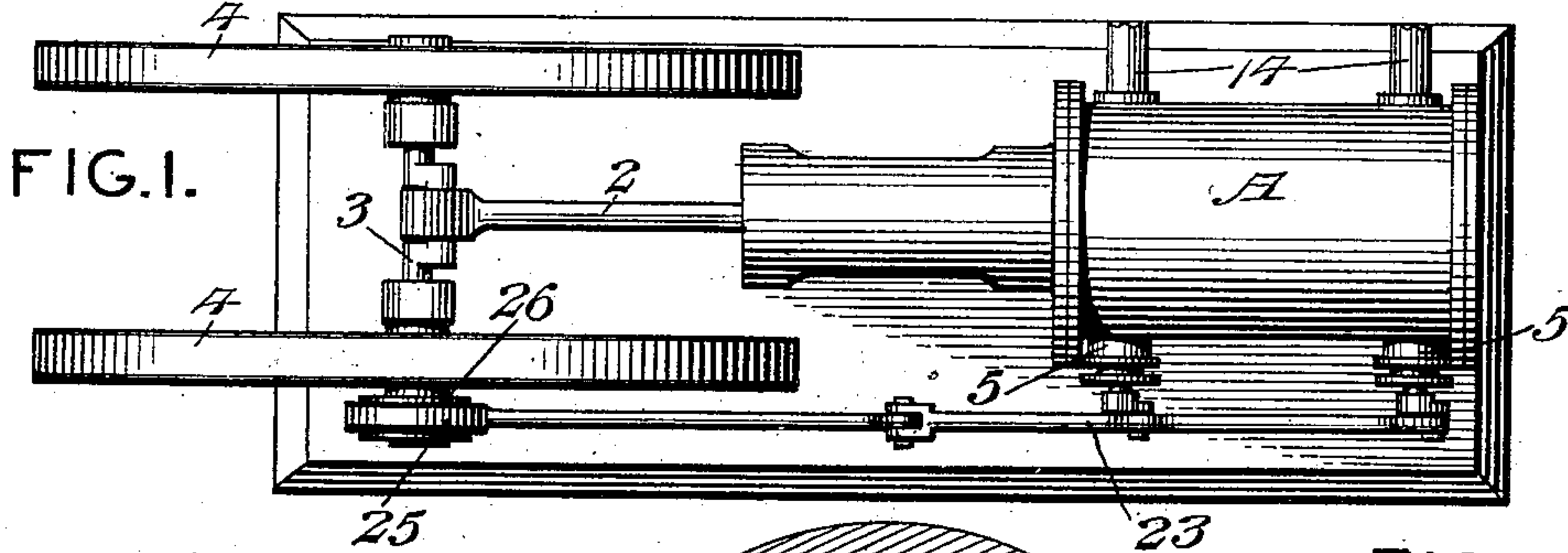
No. 712,906.

Patented Nov. 4, 1902.

E. S. CHAPPELL.
STEAM ENGINE VALVE.
(Application filed Mar. 24, 1902.)

(No Model.)

2 Sheets—Sheet I.



Witnesses
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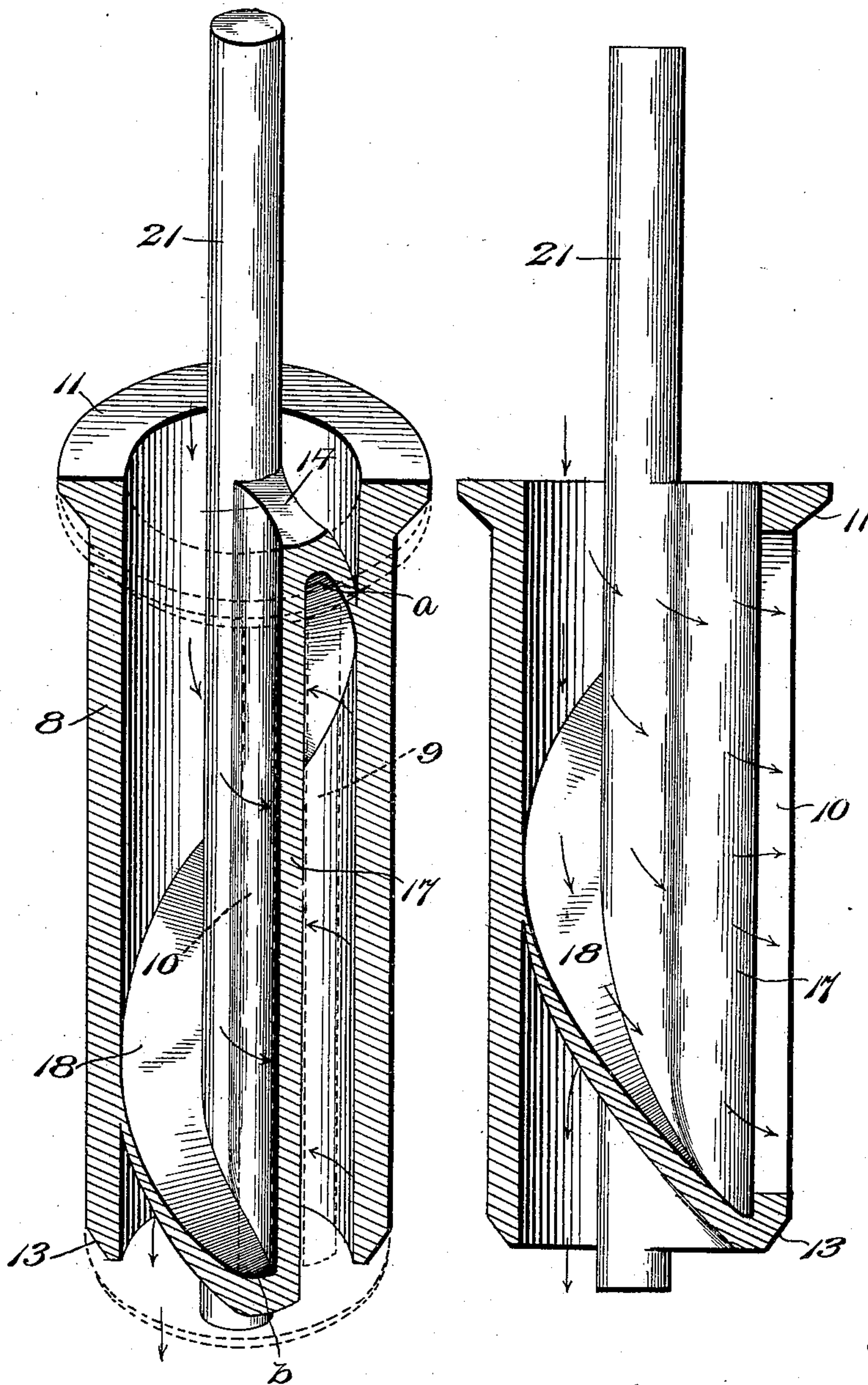
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2 Sheets—Sheet 2.

FIG. 7.

FIG. 8.



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UNITED STATES PATENT OFFICE.

ELISHA S. CHAPPELL, OF DORCHESTER, MASSACHUSETTS.

STEAM-ENGINE VALVE.

SPECIFICATION forming part of Letters Patent No. 712,906, dated November 4, 1902.

Application filed March 24, 1902. Serial No. 99,719. (No model.)

To all whom it may concern:

Be it known that I, ELISHA S. CHAPPELL, a citizen of the United States, residing at Dorchester, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Steam-Engine Valves, of which the following is a specification.

This invention has relation to improvements in steam-engine valves; and the objects are to provide an improved oscillating steam-valve of simplified construction and whereby the steam will be readily admitted to the steam-cylinder and with equal readiness, celerity, and certainty will present its exhaust-port for the escape of the steam when the direction of the piston is reversed.

With these objects in view the invention consists in the novel construction of parts and their arrangement and aggroupment in operative combination, as will be hereinafter fully specified and particularly pointed out and distinctly claimed.

I have fully and clearly illustrated the improvements in the accompanying drawings, to be taken as a part hereof, and wherein—

Figure 1 is a plan view of a steam piston-cylinder having a crank-shaft connected to the pitman and having my improved oscillating valves applied and suitably connected up to an eccentric on the crank-shaft. Fig. 2 is a vertical cross-section through the steam-cylinder, showing the piston and the port leading into the cylinder and a side elevation of the valve disposed in the valve-chamber. Fig. 3 is a detail longitudinal vertical section of a portion of the steam-cylinder, showing the piston therein and a cross-section of the valve. Fig. 4 is a plan view of the valve-casing, showing the steam-inlet port and the exhaust-port, the spiral flange of the valve being indicated in dotted lines. Fig. 5 is a transverse section through the valve, taken on the line 5 5 of Fig. 4. Fig. 6 is a transverse section through the valve, taken on the line 6 6 of Fig. 4. Fig. 7 is a longitudinal section through the valve, showing the straight partition and the spiral. Fig. 8 is a longitudinal section through the valve, showing a wall of one of the ports, the spiral flange, and the straight partition.

It will be premised that my improved valves are arranged at opposite ends of the piston-cylinder and with their axes at right angles to the longitudinal axis of the piston-cyl-

der and with the spirals in reverse order— that is, the spiral of one turns to the right and that of the other turns to the left, so that a uniform action of the valves will give opposite results in the admission and exhaust of the steam at the opposite ends of the piston-cylinder.

Referring to the drawings, A designates a piston-cylinder, which in general may be of any preferred construction and of any desired capacity. At each end of the piston-cylinder, at the inner side, is formed or made a port 1, through which the steam is alternately fed and exhausted. These ports 1 reach well across the piston-cylinder, as shown in Fig. 2 of the drawings, and coincide in length to the length of the ports in the valves.

B designates the piston, having its rod connected to a pitman 2 in any suitable way, the pitman being in turn connected to the wrist of a crank-shaft 3, on which may be mounted one or more fly-wheels 4. The mechanism, so far as the pitman, crank-shaft, and fly-wheel are concerned, is conventionally shown, the purpose being to illustrate a means for operating the eccentric's connection to the valve-stem.

5 5 designate the valve-chambers, duplicated in construction, disposed at each end of the piston-cylinder and under the same. They may be integral with the piston-cylinder, as shown in Fig. 2 of the drawings, or they may be formed separately and secured to the cylinder in any well-known manner. The interior of the valve-chambers is formed coincident to the exterior contour of the valve, except that at one end a chamber 6 is formed constituting the exhaust-chamber, which opens into an exhaust-pipe 7. In the valve-chambers are placed the valves 8, fitted therein so as to oscillate on their axes a determined distance. The valves are duplicates in construction and exterior conformation, and the interior is the same, except that the spiral of one is in reverse to the other in order that opposite actions in alternation may take place. The exterior of the valves is made up of a cylindrical casing formed with elongated slots 9 10, constituting, respectively, the steam-port and the exhaust-port. These ports in alternation register with the single port leading into and from the piston-cylinder. The outer end of the valve is enlarged and formed with a tapering shoulder 11, which

when the valve is seated in its chamber abuts a corresponding shoulder 12 in the valve-chamber. The inner end of the valve is tapered off, as at 13, and abuts against a coincident shoulder formed in the valve-chamber, as shown in Fig. 2 of the drawings. The valve is thus held from end thrust or end movement in the direction of the force. Steam is let into the valve through a steam-pipe 14, which opens into a chamber 15 at the head of the valve, which chamber is closed by a head-plate 16, secured in place by any usual means. The interior of the valve is divided into approximately equal parts or apartments by a flat straight partition, plate, or web 17, extending substantially the length of the valve and formed with a spiral flange 18, starting at one end of the web 17, as at *a*, on one side and extending under said web and upward on the other side and terminating at the inner end of said web at a point opposite to the starting-point, as at *b*, the construction forming a decreasing space on the steam end communicating with one port and a constantly-increasing space connecting with the other port for the exhaust. The live steam is admitted to the front end of the valve and exhausted at the other end, the openings being of equal capacity. As steam is admitted to the inside of the valve it is thereby balanced, except as to end pressure, for which the inclined shoulders at both ends are provided.

To actuate the valves in alternate inlet and exhaust relation, any suitable mechanism may be utilized. For instance, in use of the device on locomotives or on marine engines the well-known link and eccentrics would be used to give the valves their requisite oscillating or rocking movement to present the ports alternately to the ports in the cylinder. In the accompanying drawings I have illustrated a mechanism for the purpose of operating the valves in alternation, as follows: The end of each valve cylinder or casing is extended, as at 19, and provided with a stuffing-box 20, and through these the stem 21 of the respective valves is projected and provided with a rocking arm 22, the ends of the rocking arms being pivotally connected to a rod 23, the connections being so arranged that the action of the valves will be opposite in alternation—that is to say, when the steam-port in one valve is open that in the other valve will be closed and the exhaust-port thereof be open. The inner end of the rod 23 is jointed to an eccentric-rod 24, as indicated, which rod is connected to the eccentric-strap 25, mounted on an eccentric on the end of the crank-shaft 3, as shown in Fig. 1 of the drawings. It will thus be perceived that when steam is admitted to the right-hand valve of Fig. 1 it will drive the piston to the other end of the piston-cylinder. At the same time the valve at the other end of the piston-cylinder will be actuated to rock the valve to bring the exhaust-port in

alinement with the cylinder-port to permit the steam to escape. After this the valves are reversed, the steam-port of the left-hand valve being brought into alinement with the port in the cylinder and the reverse movement of the piston takes place.

It may be stated that the valve-stems may project from the head of the valves, if desired.

Having thus fully described the invention, what is claimed as new is—

1. An oscillating valve for a steam-engine, consisting of a cylindrical casing provided with a steam-port and an exhaust-port, and a spiral partition extending through the casing.

2. An oscillating valve for a steam-engine consisting of a cylindrical casing provided with a steam-port and an exhaust-port, and a straight partition extending through the casing formed with a spiral flange extending the length thereof and terminating at each end on opposite sides of the straight partition.

3. An oscillating valve for a steam-engine, consisting of a cylindrical casing provided with parallel steam and exhaust ports, extending substantially the length of the casing and provided with a longitudinal partition having a spiral flange terminating at the ends of the partition on opposite sides thereof.

4. The combination with a piston-cylinder provided with a port at each end, and the piston therein, of valve-chambers located at each end of the piston-cylinder and having cylindrical interiors, oscillating valves disposed in the valve-chambers provided with parallel steam and exhaust ports, and a stem, a partition in the valve-casing formed with a spiral flange terminating on opposite sides of the partition at the ends thereof, said valves being disposed with their spirals in opposite relation, and means to oscillate the valves in alternation.

5. The combination with the piston-cylinder formed with a steam-port at each end and a piston therein, of cylindrical valve-chambers located at each end of the piston-cylinder and formed with tapering shoulders at each end of the chambers, oscillating cylindrical valves disposed in the valve-chambers formed with coincident tapers to fit the tapered shoulders of the chambers, and elongated steam and exhaust ports parallel with each other and arranged to alternately register with the ports in the cylinder, and a stem, and formed with a straight interior partition, provided with a spiral flange terminating at the ends on opposite sides of the partition, said valves being disposed with their spirals in opposite relation, and means to oscillate the valves in alternation.

In testimony whereof I affix my signature in presence of two witnesses.

ELISHA S. CHAPPELL.

Witnesses:

REVERE CHAPPELL,
RICHARD CHAPPELL.