

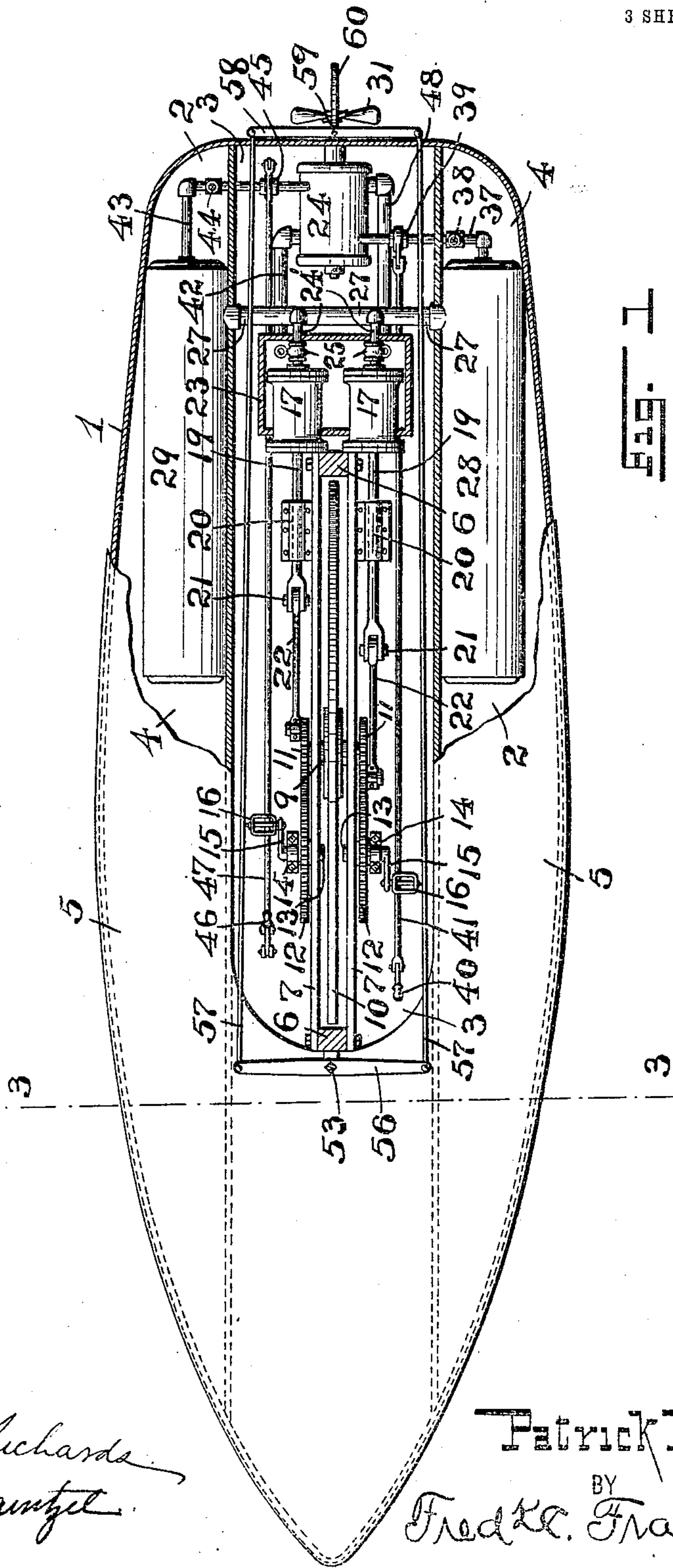
No. 808,346.

PATENTED DEC. 26, 1905.

P. E. CROWE.
BOAT PROPELLING MECHANISM.

APPLICATION FILED JUNE 20, 1905.

3 SHEETS—SHEET 1.



WITNESSES:

Geo. D. Richards
F. H. W. Fraentzel

INVENTOR:

Patrick E. Crowe

BY

Fred K. Fraentzel
ATTORNEY

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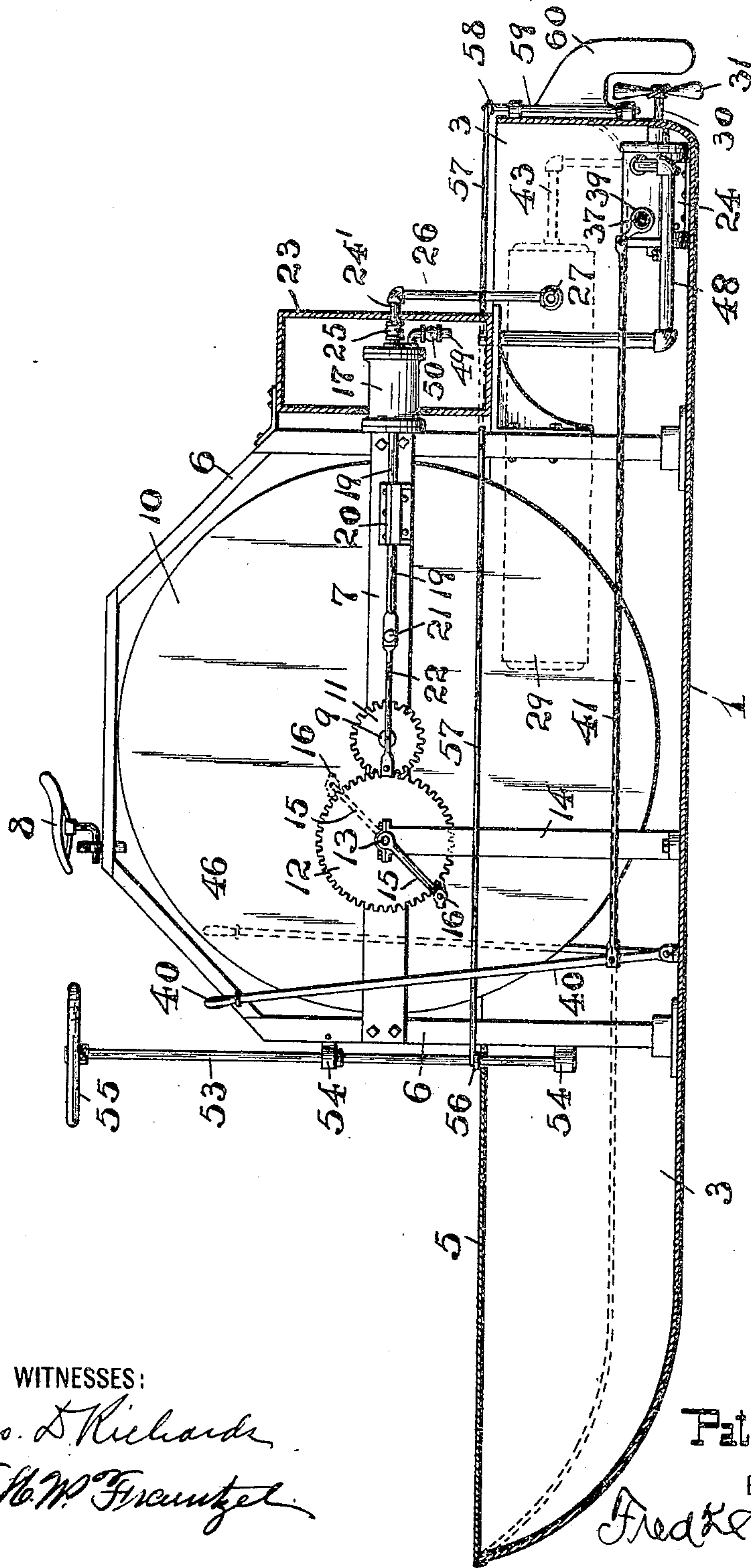


FIG. 2.

WITNESSES:

Geo. L. Richards
F. H. W. Fraentzel

INVENTOR:

Patrick E. Crowe

BY

Fred K. Fraentzel
ATTORNEY

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3 SHEETS—SHEET 3.

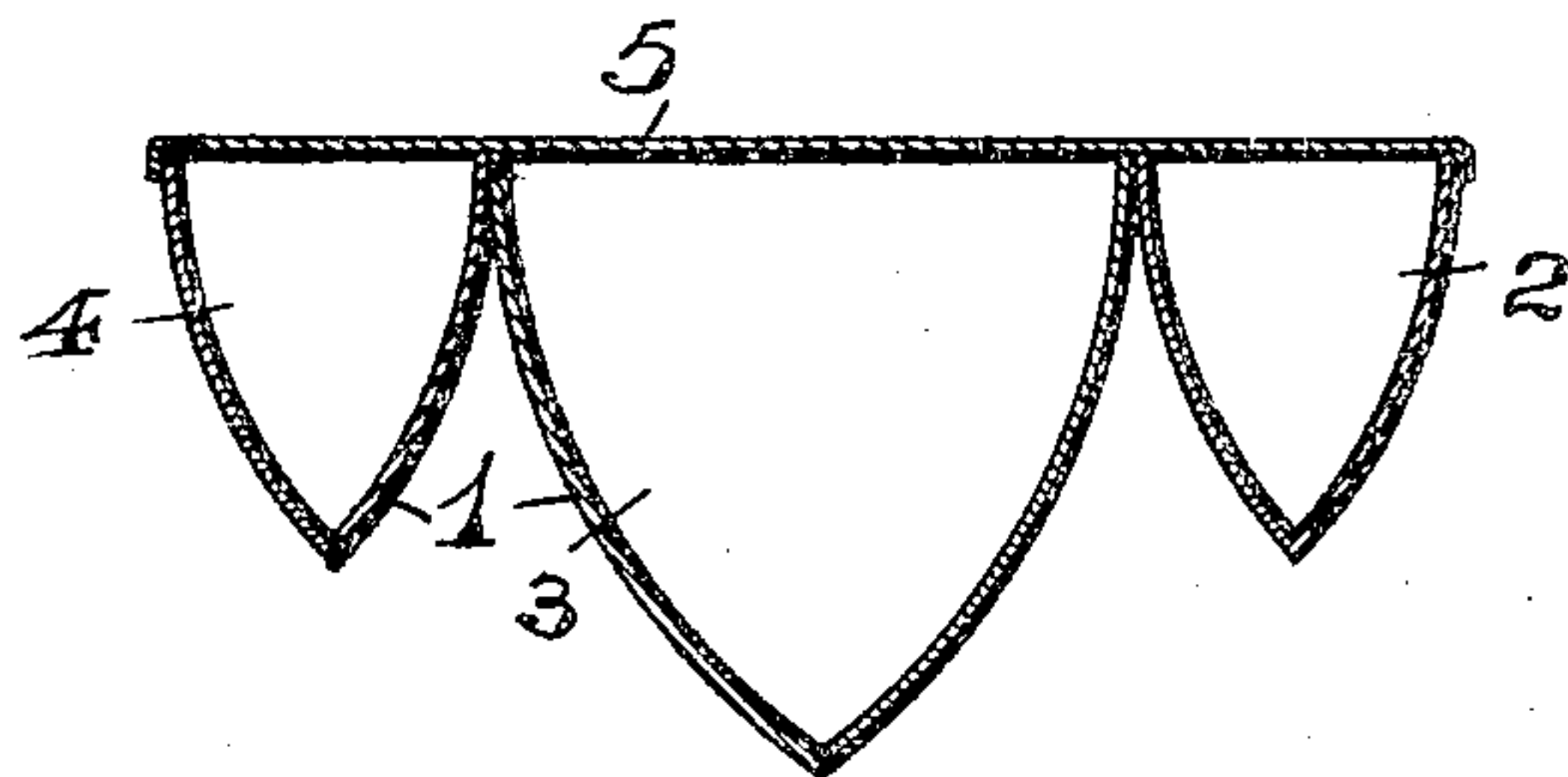


FIG. 3

FIG. 4

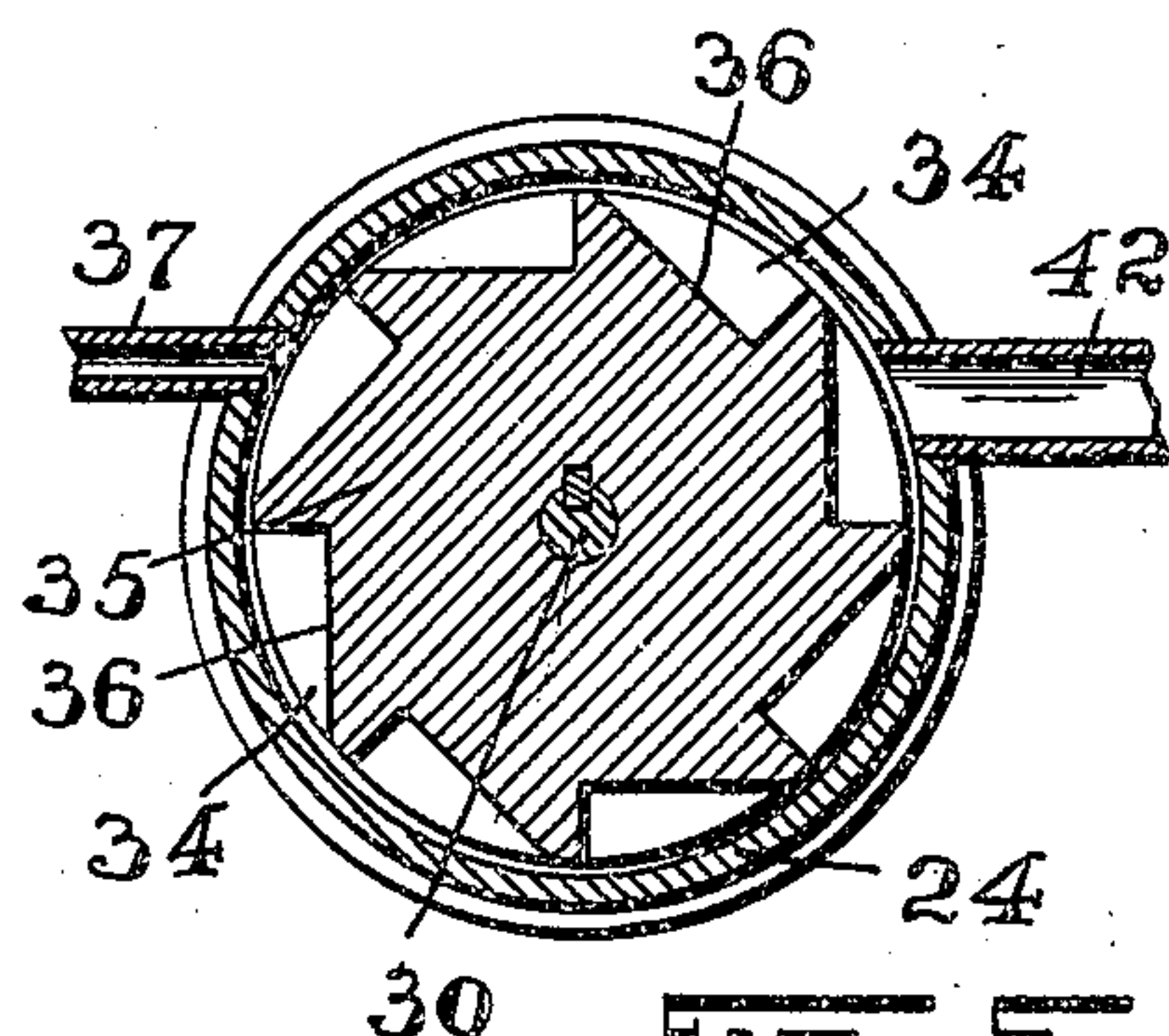
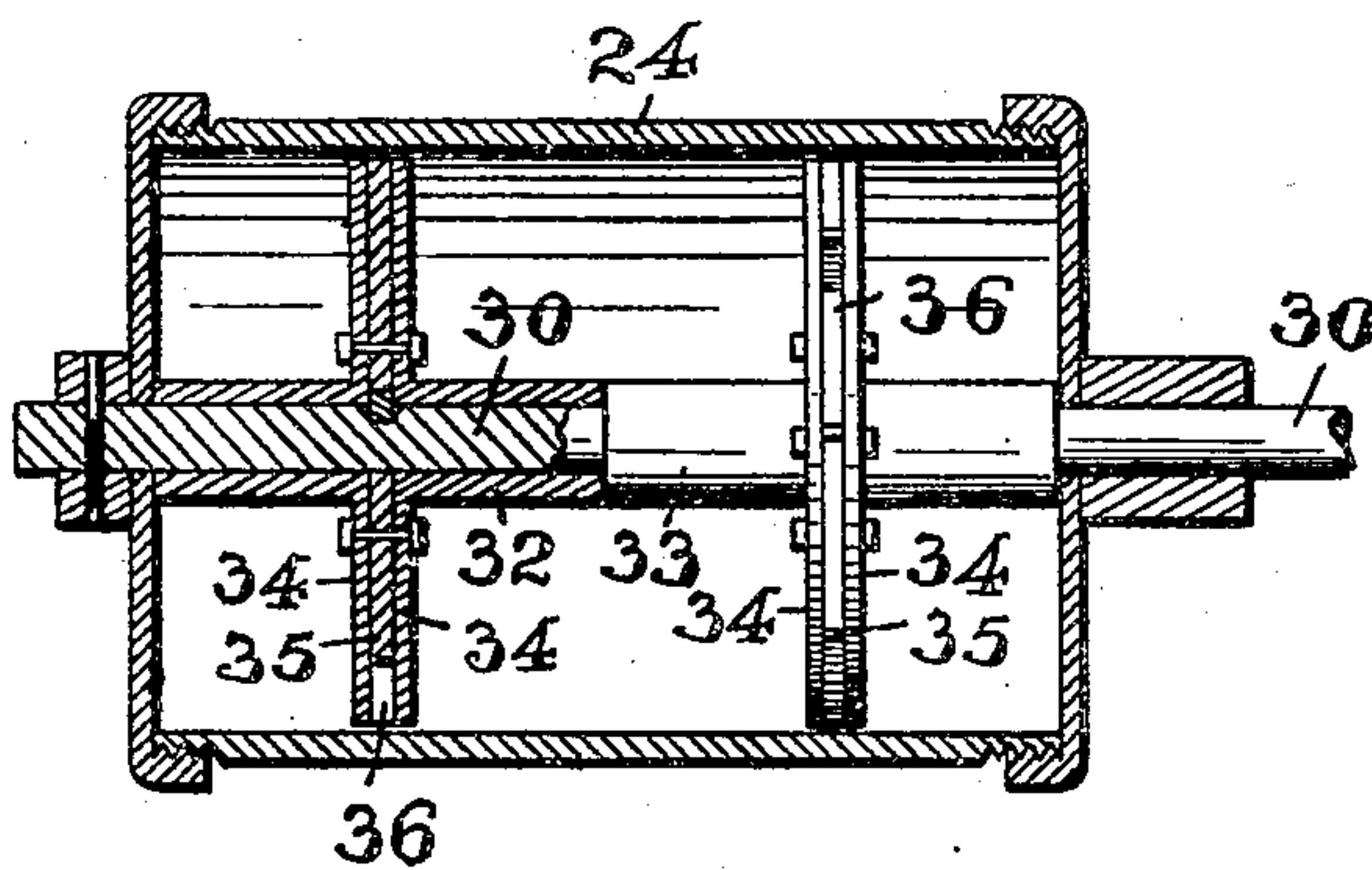


FIG. 5

FIG. 6

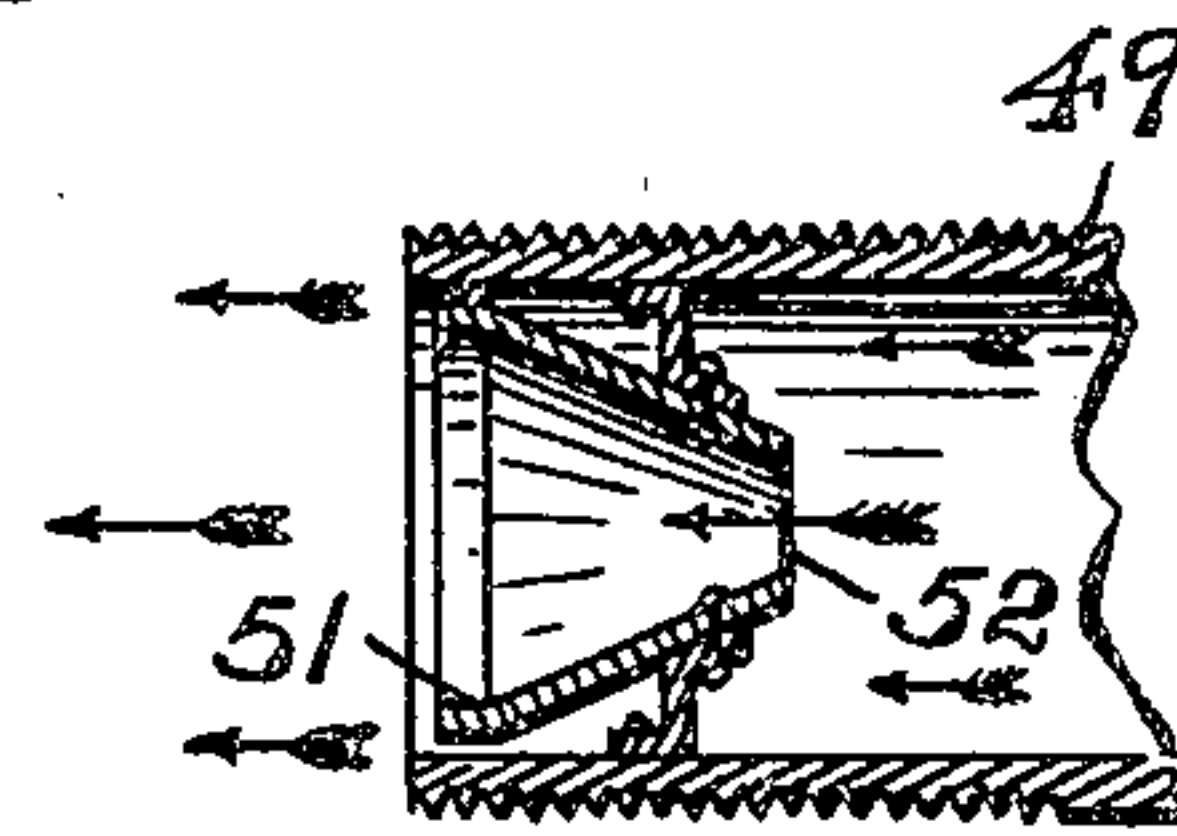
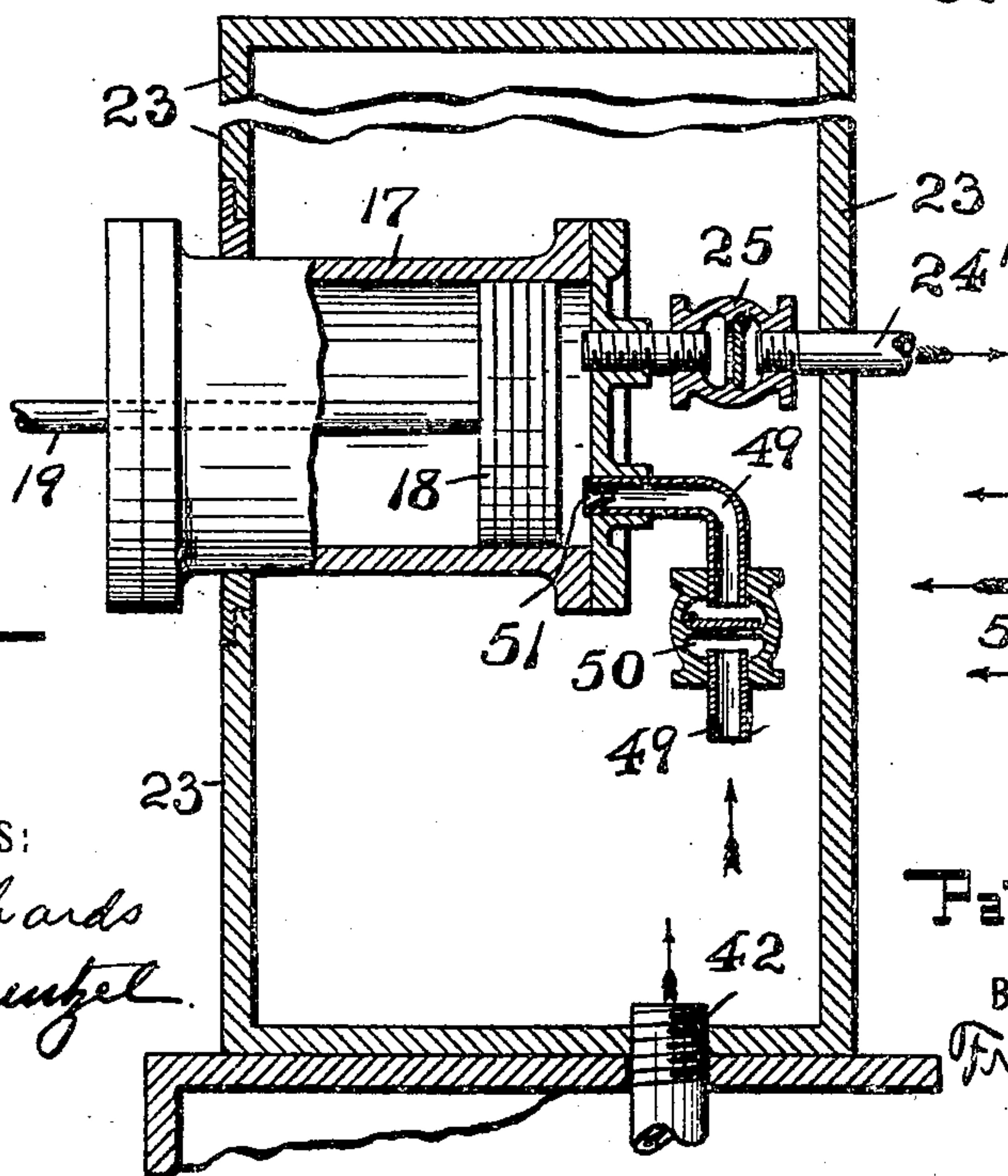


FIG. 7

WITNESSES:
Geo. S. Richards
F. H. W. Fraunzel

INVENTOR:
Patrick E. Crowe,
BY *Fred W. Fraunzel,*
ATTORNEY

UNITED STATES PATENT OFFICE.

PATRICK EDW. CROWE, OF NEWARK, NEW JERSEY.

BOAT-PROPELLING MECHANISM.

No. 808,346.

Specification of Letters Patent.

Patented Dec. 26, 1905.

Application filed June 20, 1905. Serial No. 266,125.

To all whom it may concern:

Be it known that I, PATRICK EDW. CROWE, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Boat-Propelling Mechanism; and I do hereby 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, reference being had to the accompanying drawings, and to characters of reference marked thereon, which form a part of this specification.

This invention relates generally to improvements in boats; and the invention has reference more particularly to a novel means of propulsion for boats, and means comprising, in a general way, an arrangement of an air-engine driven from compressed air, an arrangement of air receiver or receivers into which the air is to be delivered and compressed, the compressed air being conducted from said receiver or receivers, preferably two of them, to the air-engine, which is provided with a pair of turbines or wheels running independently of each other in opposite direction for the forward or backward propulsion of the boat, as may be desired, and an independently-arranged and independently-acting and preferably manually-actuated pump-operating mechanism and pump or pumps for forcing the air into said receiver or receivers.

The present invention has for its principal object to provide a novel means of propulsion for boats wherein the generation of the power which induces such propulsion is accomplished, preferably, by means of a manually-operated prime mover or mechanism without the use of fuel or other artificial means for producing power.

Other principal objects of this invention are the peculiarly-constructed hull or body of the boat, provided with the general arrangement of the air-engine, a pair of air-receiving tanks or receivers in which the air is compressed and stored for use, a pair of air-compressing pumps, the mechanism for operating said pumps, and a system of connecting-pipes between the various parts and devices, all as hereinafter more fully set forth, and, finally, to provide, in connection with such general arrangements and combinations of the said parts and devices, a steering

mechanism for the boat and valve opening and closing devices for conveying the compressed air to either of a pair of turbines or rotatable disks within the cylinder of the air-engine, which rotate independently of each other and cause either one of said turbines or disks to be rotated to propel the boat in a forward or rearward direction, as may be desired.

Other objects of this invention not at this time more particularly specified will be clearly understood from the following detailed description of the same.

With the various objects of my present invention in view the said invention consists in the novel boat-propelling means hereinafter more particularly set forth; and, furthermore, this invention consists in the novel arrangements and combinations of the various mechanisms and devices, as well as in the details of the construction of the same, all of which will be more fully described in the following specification and then finally embodied in the clauses of the claim, which are appended to and which form an essential part of the said specification.

The invention is clearly illustrated in the accompanying drawings, in which—

Figure 1 is a part of the deck plan and part horizontal sectional representation of the hull or body of a boat and a plan view of the general arrangement of the boat-propelling mechanism; and Fig. 2 is a longitudinal vertical section taken centrally through the hull or body of the boat, showing the steering mechanism, the propelling mechanism, air-pumps, and air-engine in side elevation except the air-receivers, one of which is omitted from said figure and the position of the other receiver being indicated in dotted outline. Fig. 3 is a transverse section of the hull or body of the boat. Fig. 4 is a longitudinal vertical section of the cylinder of the air-engine, illustrating one arrangement of the two air turbines or disks, one of said turbines being shown in elevation and the other in section; and Fig. 5 is a transverse sectional representation of the air-engine cylinder and an air inlet and exhaust with one of the said turbines or rotatable disks being also shown in vertical section. Fig. 6 is a detail view showing one of the air-pumps partly in elevation and partly in section with certain pipe connections and valves also shown in section and an exhaust-air-receiving cham-

ber surrounding the said pumps, said chamber being represented in vertical section; and Fig. 7 is a detail section of a portion of the air intake or pipe and a funnel-shaped air-spreader, all made on an enlarged scale.

Similar characters of reference are employed in all of the said above-described views to indicate corresponding parts.

Referring now to the several figures of the drawings, the reference character 1 indicates the hull or body of the boat, the same being preferably made of sheet metal and formed with three longitudinally-extending compartments 2, 3, and 4, as shown in Figs. 1, 2, and 3 of the drawings, and of substantially the cross-section illustrated in said Fig. 3 of the drawings, the said compartments being covered by a deck 5, of sheet metal or any other suitable material. The reference character 6 indicates a suitable framework or support suitably secured and centrally disposed in the center or middle compartment 3. The said framework or support 6 extends above the deck-line of the hull of the boat and has a pair of connecting side pieces or beams 7 connected with the standards or uprights of said framework, as shown, and upon its upper portion the said framework 6 is provided with a suitable seat or saddle, as 8, for a person. Rotatively arranged upon a shaft 9 between the said side pieces or beams 7 is a fly-wheel 10, which is preferably of the configuration shown. A toothed pinion 11 is also secured upon each free end portion of the shaft 9, substantially as shown. In mesh with each pinion 11 is a driving-gear 12, as shown, each gear 12 being affixed to a spindle 13, rotating in bearings in the side pieces or beams 7, and vertical standards or posts 14, respectively, at the opposite sides of the said fly-wheel 10. Each spindle 13 is provided with a crank 15 and pedal 16, upon which the operator, seated upon the seat or saddle 8, places his feet to actuate, in the manner of a velocipede, the gears 12 and by means of the pinions 11 the fly-wheel 10. At the rear end of said framework 6 or in any other suitable part of the boat I have placed a pair of air compressors or pumps 17, each pump being provided with a piston 18 and stem 19. Each stem 19 is slidably arranged in a suitable guide or bearing 20, each bearing being secured upon a side piece or beam 7, and each stem 19 has a pivotal pin 21, to which is attached a connecting-rod 22. Each connecting-rod 22 is pivotally secured at its opposite end to a pinion 11, substantially in the manner illustrated in Figs. 1 and 2 of the drawings. The said various parts just described are arranged in such relation to one another that the continuous rotations of the two pinions 11 will produce alternating reciprocatory movements of the said pistons 18 in the cylinders of the respective air compressors or pumps 17. The said air compressors or pumps 17 are preferably ar-

ranged in a tank 23, (shown in Figs. 1, 2, and 6,) which tank or chamber 23 is adapted to receive the cooled air which is exhausted from the air-engine 24, substantially in the manner to be presently more fully described and for the purpose of surrounding the outer surfaces of the cylinders of the air-compressors with cold air to keep them from getting hot during the working operations of their pistons. The cylinders of said air compressors or pumps 17 have extending therefrom ducts or pipes 24', in each of which are check-valves 25, which close automatically with any back pressure from the air and are connected, by means of downwardly-extending ducts or pipes 26, with a laterally-extending pipe or header 27. Each end of the said pipe or header 27 extends into a compartment 2 and 4, as shown more particularly in Fig. 1 of the drawings, the respective ends of said pipe or header 27 being connected with an air-receiving tank, reservoir, or receiver 28 and 29 in the respective compartments 2 and 4, as shown, and in which the air is compressed and maintained under pressure. Within the cylinder of the said air-engine 24 is rotatively arranged in suitable bearings a main shaft 30, which extends through the stern of the boat and has secured upon its free end a propeller 31. Suitably secured in fixed positions upon said shaft 30 are a pair of sleeves 32 and 33, each sleeve being provided with a pair of circular disks or plates 34 of approximately the same diameter as the inner diameter of the cylinder of the air-engine 24, and between each pair of circular disks or plates 34 is arranged a disk or plate 35. Said plates 35 are provided with circumferentially-disposed cut-away portions 36, which with portions of the said disks or plates 34 provide suitable pockets, substantially as illustrated. The said cut-away portions 36 in the respective plates or disks 35 are made in opposite manner, so that although the said plates or disks 35 are fixed upon the shaft 30 only one disk or plate 35 at a time receives the impact of the compressed air in its receiving-pockets in the manner to be presently described for the purpose of producing the revolutions of the said shaft 30.

Leading from the compressed-air storing-tank or reservoir 28 is a pipe 37, in which there may be a hand-valve 38 for opening and closing said pipe 37, the other end of the said pipe terminating in an inlet in the cylinder of the air-engine and terminating in alinement with the pocket-containing edge of the turbine formed by the disks or plates 34 and 35 of the sleeve 32. A throttle or valve 39 is arranged in said pipe 37, the same being actuated by the operator from a lever 40 and connecting-rod 41. Opposite the said inlet is an exhaust-outlet, with which is connected an exhaust-pipe 42 for conducting

the exhausted air to the cold-air tank or chamber 23. Leading from the other compressed-air storing-tank or reservoir 29 is a pipe 43, in which there may be a hand-valve 5 44 for opening and closing said pipe 43, the other end of said pipe terminating in a second inlet in the cylinder of the air-engine and in alinement with the pocket-containing edge of the other turbine formed by the disks 10 or plates 34 and 35 of the second sleeve 33. A throttle or valve 45 is arranged in said pipe 43, the same being actuated by the operator from a lever 46 and connecting-rod 47. Opposite the last-mentioned inlet is another exhaust-outlet, with which is connected an exhaust-pipe 48 for conducting the exhausted 15 air from this second turbine to the cold-air tank or chamber 23. It will be understood that when the boat is to be forced through the water the hand-valves 38 and 44 in the respective pipes 37 and 43 are opened, and by moving either of the levers 40 or 46, according to the forward or backward direction in which it is intended that the boat shall travel, the 25 respective throttle or valve is opened, whereby the corresponding turbine is brought into action to cause the main shaft 30 to revolve in the desired direction. It will thus be clearly seen that according to which one of the throttles or valves 39 and 45 is opened 30 the corresponding turbine is operatively actuated, while the other turbine acts simply as an idler, and vice versa.

Referring once more to Figs. 2 and 6 of the 35 drawings, it will be seen that each air compressor or pump is provided with an air-intake in the form of a pipe 49, in which there is a suitable check-valve 50, which opens as the air is taken into the cylinder of the compressor or pump during the return stroke of 40 the piston therein, but closes automatically during each forward stroke of the piston. To spread the air as it enters the cylinders of the air compressors or pumps, each intake-pipe 45 49 may be provided with a cone-shaped or other suitably-shaped air-spreader 51, preferably of the construction shown in Fig. 7 of the drawings, which forces and spreads the air in a cone-shaped manner, as will be evident, the said funnel or cone shaped air-spreader 51 being also provided at its apex, 50 preferably, with an air-receiving opening 52, substantially as illustrated.

The steering mechanism for the boat consists, essentially, of a vertical rod 53, adapted 55 to oscillate in bearings 54 and provided with a hand-wheel 55 or its equivalent. A cross-bar 56 is secured on said rod 53, and a pair of pivoted links 57 extend from the end portions of said bar 56 to a similar cross-bar 58, which is connected with the rudder-post 59, which carries a rudder 60. The operation of the said steering mechanism will be readily understood from an inspection of Figs. 1 60 and 2 of the drawings.

Having thus described my invention, what I claim is—

1. In a boat, the combination, with the body of the boat, of an air-compressor, means for actuating the air-compressor, an air-engine 70 connected with the main shaft of the boat, and means between said air-compressor and air-engine for conducting compressed air to said engine, substantially as and for the purposes set forth. 75

2. In a boat, the combination, with the body of the boat, of an air-compressor, a manually-operated means for actuating the air-compressor, an air-engine connected with the main shaft of the boat, and means between 80 said air-compressor and air-engine for conducting compressed air to said engine, substantially as and for the purposes set forth.

3. In a boat, the combination, with the 85 body of the boat, of an air-compressor, a compressed-air-receiving tank, means for actuating the air-compressor, a means of communication between said air-compressor and said air-receiving tank, an air-engine connected 90 with the main shaft of the boat, and means between said air-receiving tank and said air-engine for conducting compressed air to said engine, substantially as and for the purposes set forth. 95

4. In a boat, the combination, with the body of the boat, of an air-compressor, a compressed-air-receiving tank, a manually-operated means for actuating the air-compressor, a means of communication between 100 said air-compressor and said air-receiving tank, an air-engine connected with the main shaft of the boat, and means between said air-receiving tank and said air-engine for conducting compressed air to said engine, 105 substantially as and for the purposes set forth.

5. In a boat, the combination, with the body of the boat, of an air-compressor, means for actuating said air-compressor consisting, 110 of a framework, a shaft and a system of gearing, pedals on said shaft for actuating the same, a piston-rod and crank actuated from said gearing, an air-engine connected with the main shaft of the boat, and means between 115 said air-compressor and air-engine for conducting compressed air to said engine, substantially as and for the purposes set forth.

6. In a boat, the combination, with the 120 body of the boat, of an air-compressor, means for actuating said air-compressor, consisting, of a framework, a shaft and a system of gearing, pedals on said shaft for actuating the same, a piston-rod and crank actuated from 125 said gearing, a compressed-air-receiving tank, a means of communication between said air-compressor and said air-receiving tank, an air-engine connected with the main shaft of the boat, and means between said 130

air-receiving tank and said air-engine for conducting compressed air to said engine, substantially as and for the purposes set forth.

5 7. In a boat, the combination, with the body of the boat, of a cooling-tank, an air-compressor in said tank, means for actuating the air-compressor, an air-engine connected
10 between said air-compressor and air-engine for conducting compressed air to said engine, substantially as and for the purposes set forth.

8. In a boat, the combination, with the body of the boat, of a cooling-tank, an air-
15 compressor in said tank, a manually-operated means for actuating the air-compressor, an air-engine connected with the main shaft of the boat, and means between said air-compressor and air-engine for conducting com-
20 pressed air to said engine, substantially as and for the purposes set forth.

9. In a boat, the combination, with the body of the boat, of a cooling-tank, an air-compressor in said tank, a compressed-air-re-
25 ceiving tank, means for actuating the air-compressor, a means of communication between said air-compressor and said air-receiving tank, an air-engine connected with the main shaft of the boat, and means be-
30 tween said air-receiving tank and said air-engine for conducting compressed air to said engine, substantially as and for the purposes set forth.

10. In a boat, the combination, with the
35 body of the boat, of a cooling-tank, an air-compressor in said tank, a compressed-air-receiving tank, a manually-operated means for actuating the air-compressor, a means of communication between said air-compressor
40 and said air-receiving tank, an air-engine connected with the main shaft of the boat, and means between said air-receiving tank and said air-engine for conducting compressed air to said engine, substantially as and for
45 the purposes set forth.

11. In a boat, the combination, with the body of the boat, of a cooling-tank, an air-compressor in said tank, means for actuating
50 said air-compressor, consisting of a framework, a shaft, and a system of gearing, pedals on said shaft for actuating the same, a piston-rod and crank actuated from said gear-
55 ing, an air-engine connected with the main shaft of the boat, and means between said air-compressor and said air-engine, for conducting compressed air to said engine, sub-
stantially as and for the purposes set forth.

12. In a boat, the combination, with the body of the boat, of a cooling-tank, an air-
60 compressor in said tank, means for actuating said air-compressor, consisting of a framework, a shaft, and a system of gearing, pedals on said shaft for actuating the same, a piston-rod and crank actuated from said gearing, a
65 compressed-air-receiving tank, a means of

communication between said air-compressor and said air-receiving tank, an air-engine connected with the main shaft of the boat, and means between said air-receiving tank and said air-engine for conducting compressed
70 air to said engine, substantially as and for the purposes set forth.

13. In a boat, the combination, with the body of the boat, of a framework in said boat, a fly-wheel supported in said framework, a
75 pair of air-compressors, means for actuating the same consisting of two sets of gearing, pedals for actuating the same, and piston-rods and cranks actuated from said sets of gearing, a pair of compressed-air-receiving
80 tanks, a means of communication between each air-compressor and an air-receiving tank, an air-engine provided with a pair of turbines connected with the main shaft of the boat, and means connected with the respec-
85 tive compressed-air-receiving tanks for conducting compressed air to either of said turbines, substantially as and for the purposes set forth.

14. In a boat, the combination, with the
90 body of the boat, of a framework in said boat, a fly-wheel supported in said framework, a pair of air-compressors, means for actuating the same consisting of two sets of gearing, pedals for actuating the same, and piston-
95 rods and cranks actuated from said sets of gearing, a pair of compressed-air-receiving tanks, a means of communication between each air-compressor and an air-receiving tank, an air-engine provided with a pair of
100 turbines connected with the main shaft of the boat, and means connected with the respective compressed-air-receiving tanks for conducting compressed air to either of said tur-
105 bines, a cooling-tank surrounding the said air-compressors, and exhaust-air-conducting means between the said air-engine and said cooling-tank, substantially as and for the purposes set forth.

15. In a boat, the combination, with the
110 body of the boat, of a framework in said boat, a fly-wheel supported in said framework, a pair of air-compressors, means for actuating the same consisting of two sets of gearing, pedals for actuating the same, and piston-
115 rods and cranks actuated from said sets of gearing, a pair of compressed-air-receiving tanks, a means for communication between each air-compressor and an air-receiving tank, an air-engine provided with a pair of
120 turbines connected with the main shaft of the boat, air-conducting pipes leading from the respective compressed-air-receiving tanks to said air-engine and terminating in front of the respective turbines of said en-
125 gine, and a throttle in each pipe, substantially as and for the purposes set forth.

16. In a boat, the combination, with the body of the boat, of a framework in said boat, a fly-wheel supported in said framework, a
130

pair of air-compressors, means for actuating
the same consisting of two sets of gearing,
pedals for actuating the same, and piston-
rods and cranks actuated from said sets of
5 gearing, a pair of compressed-air-receiving
tanks, a means of communication between
each air-compressor and an air-receiving
tank, an air-engine provided with a pair of
turbines connected with the main shaft of
10 the boat, air-conducting pipes leading from
the respective compressed-air-receiving
tanks to said air-engine and terminating in
front of the respective turbines of said en-
gine, a throttle in each pipe, and means for
15 opening and closing said throttles, consist-
ing of two hand-levers, and a connecting-rod
between each lever and each throttle, sub-
stantially as and for the purposes set forth.

17. A boat having a hull comprising three
longitudinally-extending compartments, the 20
middle compartment being of greater depth
than the two side compartments, an air-en-
gine in said middle compartment, a com-
pressed-air-receiving tank in each side com-
partment, and means for conducting com- 25
pressed air from said compressed-air-receiv-
ing tanks to said air-engine, substantially as
and for the purposes set forth.

In testimony that I claim the invention
set forth above I have hereunto set my hand 30
this 19th day of June, 1905.

PATRICK EDW. CROWE.

Witnesses:

FREDK. C. FRAENTZEL
F. H. W. FRAENTZEL.