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PATENTED JULY 4, 1905.

E. SMETHURST.

MEANS FOR CONTROLLING THE SPEED OF SCREW PROPELLED SHIPS.

APPLICATION FILED APR. 13, 1904.

2 SHEETS—SHEET 1.

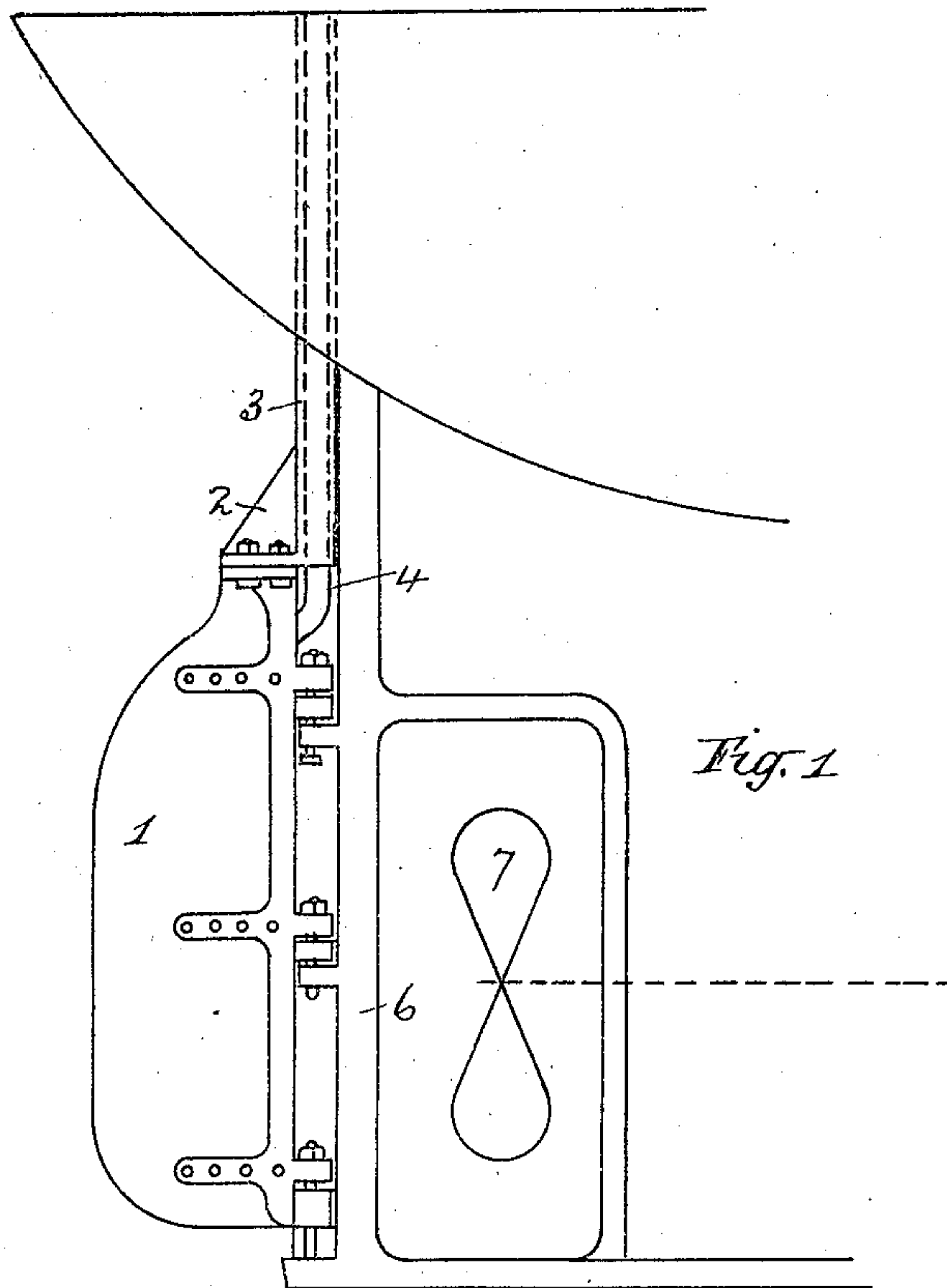


Fig. 1

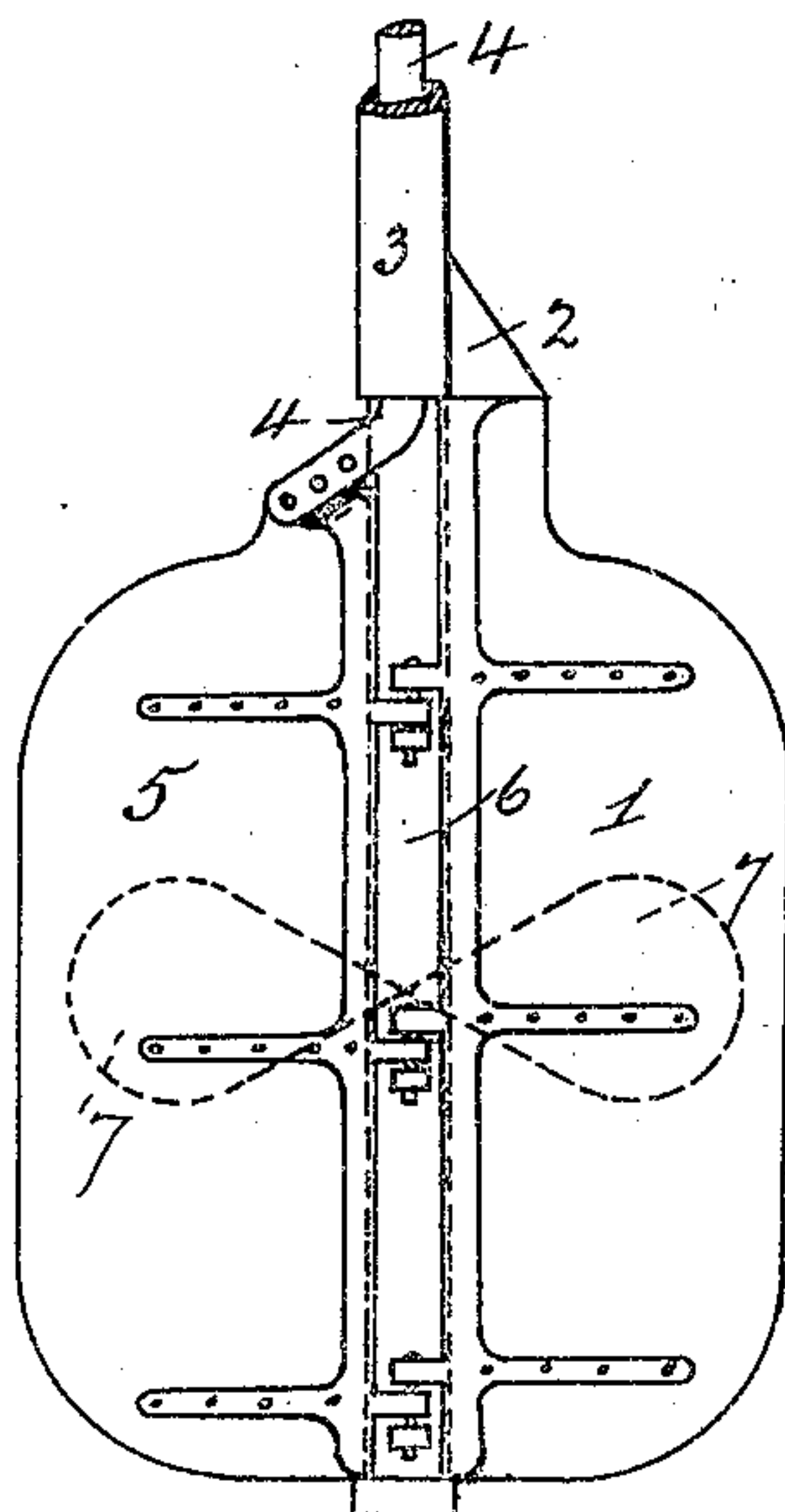


Fig. 2

WITNESSES

Wm. Kuchel
Paul Menhant.

INVENTOR

Edward Smethurst

Richard

ATTORNEYS

No. 793,746.

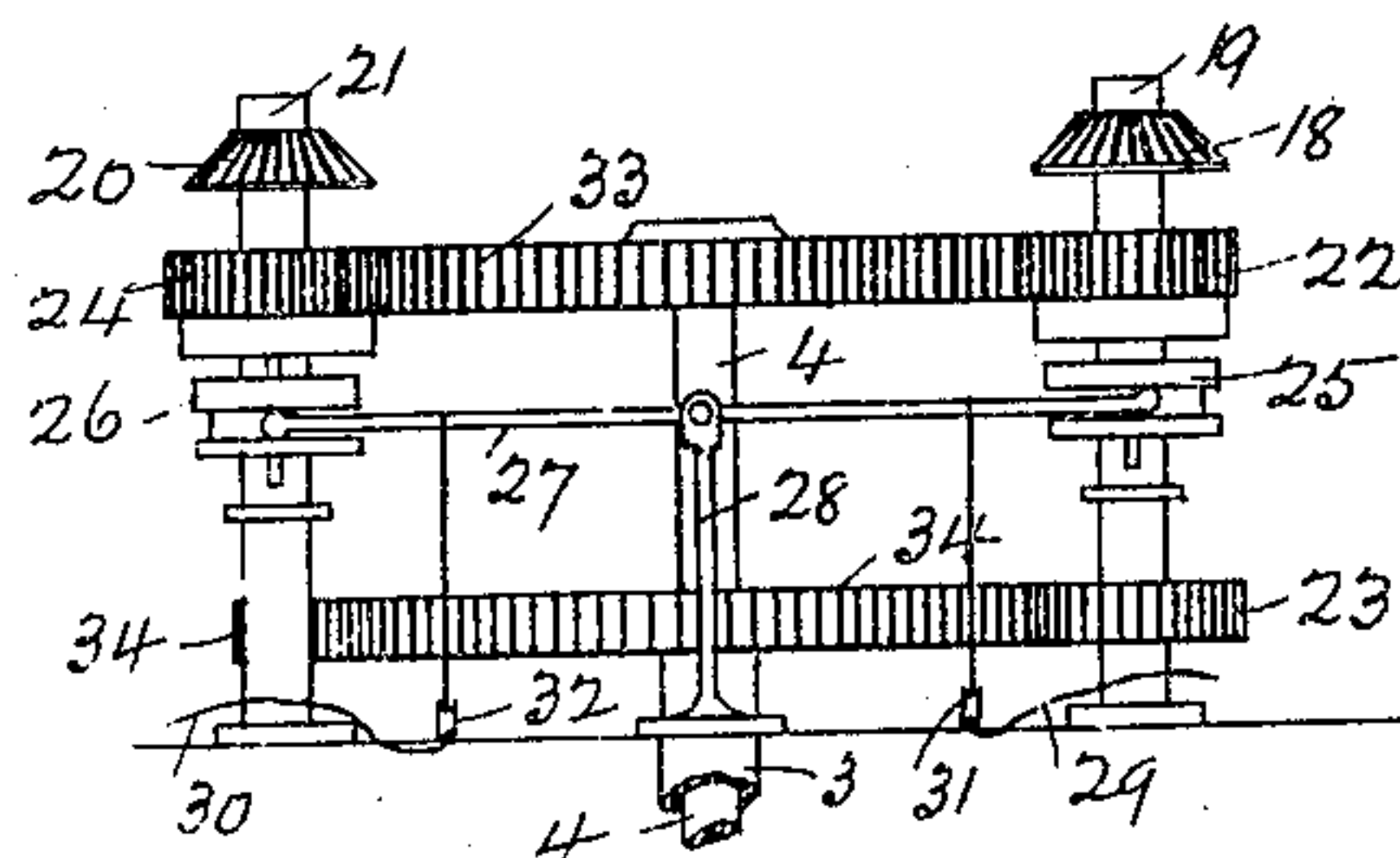
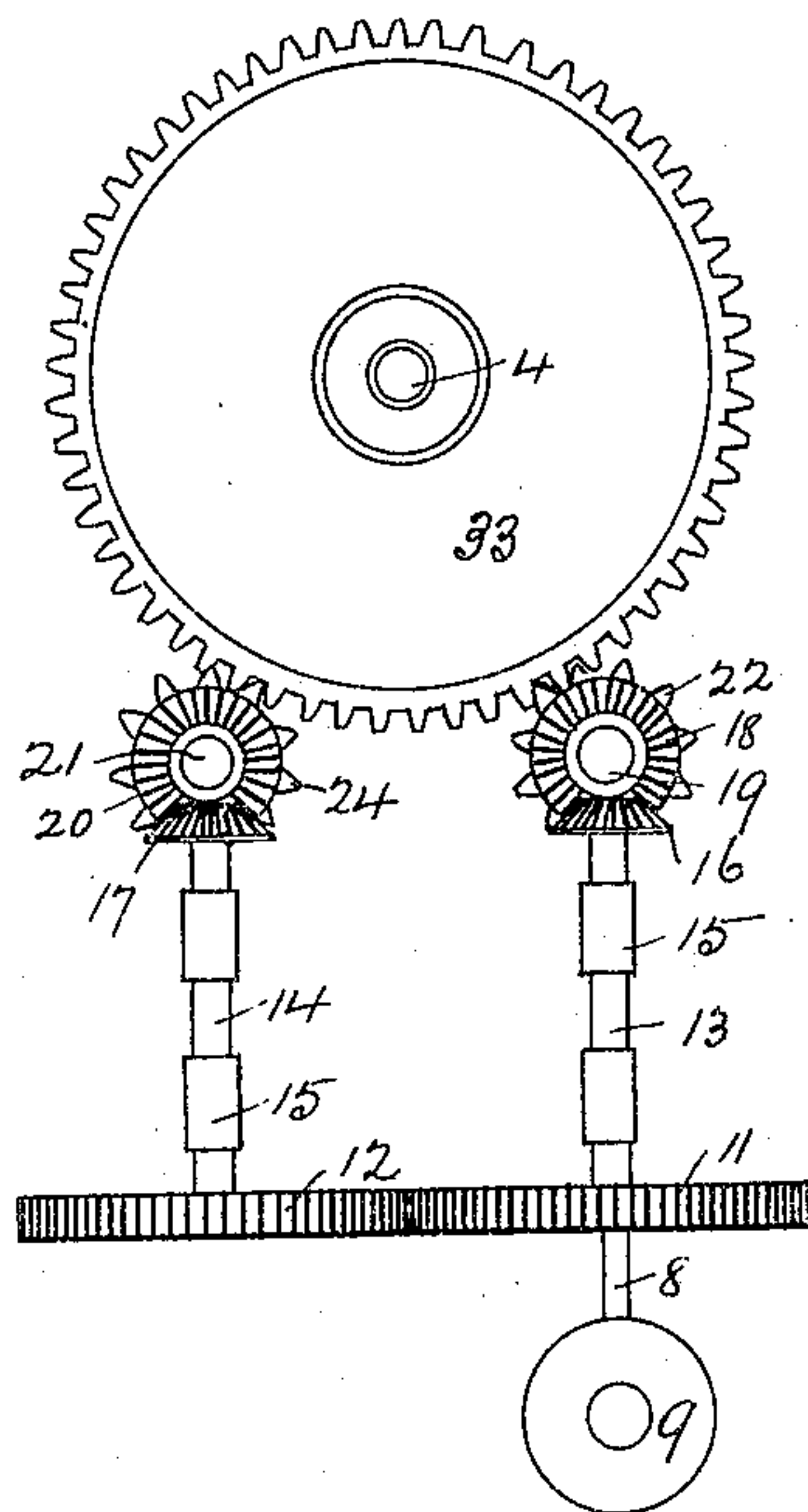
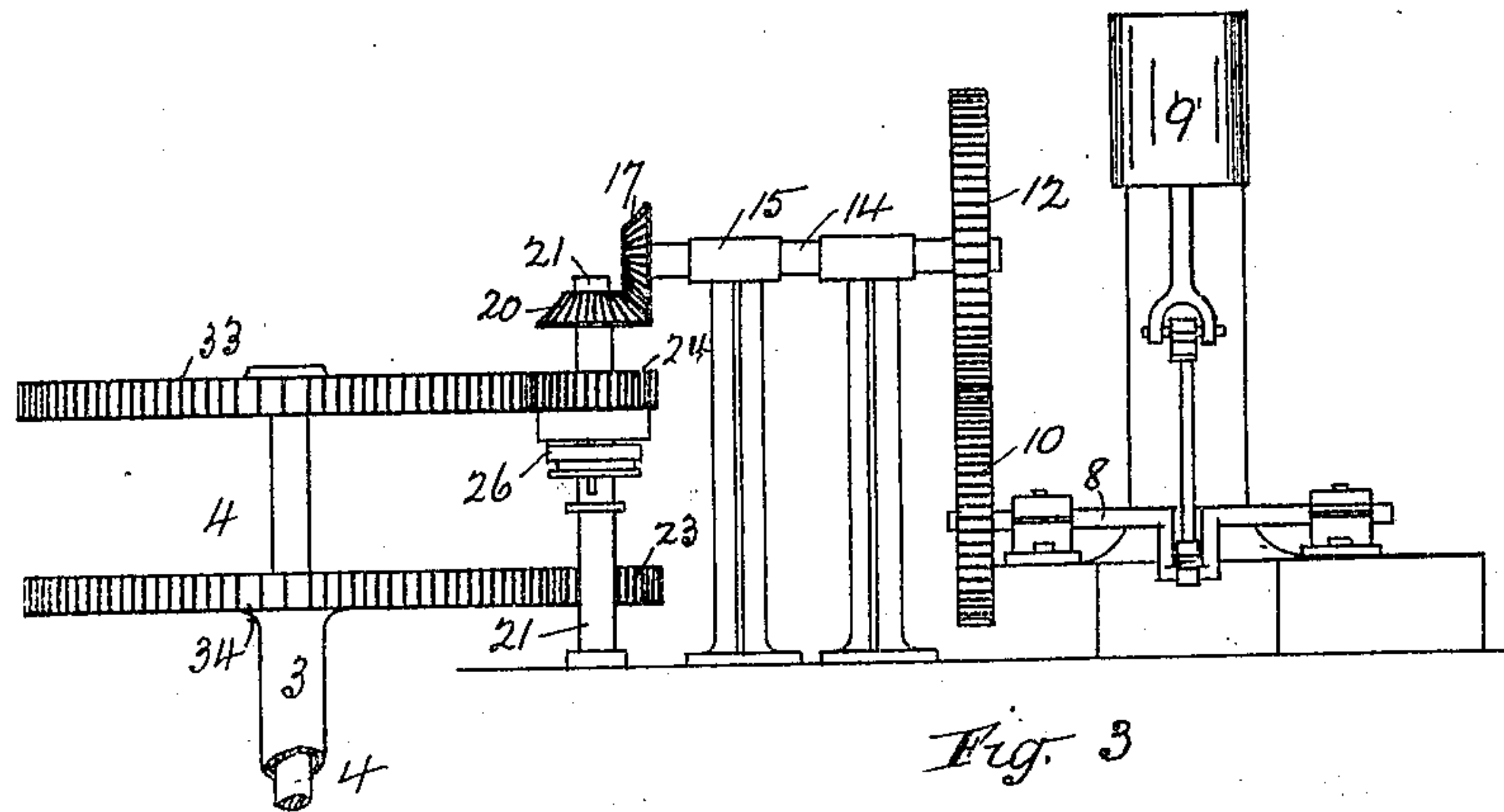
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WITNESSES

Wm. K. Kline
Paul H. Kline

Fig. 5

INVENTOR

Edward Smethurst

By *Richard R. Kline*
ATTORNEYS

UNITED STATES PATENT OFFICE.

EDWARD SMETHURST, OF CHRISTCHURCH, NEW ZEALAND.

MEANS FOR CONTROLLING THE SPEED OF SCREW-PROPELLED SHIPS.

SPECIFICATION forming part of Letters Patent No. 793,746, dated July 4, 1905.

Application filed April 13, 1904. Serial No. 203,003.

To all whom it may concern:

Be it known that I, EDWARD SMETHURST, engineer, a subject of the King of Great Britain and Ireland, residing at Christchurch, in the Colony of New Zealand, have invented a new and useful Means for Controlling the Speed of Screw-Propelled Ships; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention has reference to apparatus by means of which the speed of screw-propelled ships may be controlled.

Steamships are caused to move forward by the propeller exerting a pressure upon the water. The water is displaced in the opposite direction in which it is desired to drive the ship which is thus moved forward.

I propose to place an obstruction when necessary behind the moving propeller of a ship, so that the displaced water can be prevented from taking its usual course and be deflected sidewise from the ship instead of directly astern.

The special means I employ for effecting the purpose of my invention is a pair of rudders coaxially mounted and special mechanism for operating the same. The said mechanism is such that the rudders may be normally locked together; but it will be possible for the rudders to be opened out, so as to lie athwart the propeller. When the rudders are in this position, the water displaced by the revolving screw will be prevented from escaping rearward of the ship, the forward motion of which will under the circumstances gradually cease. The ship may in turn be caused to remain stationary by placing the rudders in line, or nearly so, and then go slow ahead, half speed ahead, and full speed ahead by gradually closing them together without it being necessary to touch the throttle-valve of the main engines. When the rudders are opened out so as to be in line, they may be thus locked together and used to maneuver the vessel.

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

Figure 1 is a side elevation of a pair of rudders closed together. Fig. 2 is an end view of same, but with the rudder-blades opened

out athwart the propeller. Fig. 3 is a side elevation of apparatus for operating my rudders. Fig. 4 is a plan of same, and Fig. 5 is an elevation of the after part of the apparatus.

Similar reference-numbers refer to similar parts throughout.

A rudder 1 is bolted or otherwise attached, by means of a bracket 2, to a sleeve 3. Contained in said sleeve is a shaft 4, to which is attached a second rudder 5. Both rudders are hung in the usual way upon the stern-post 6, and the propeller 7 is likewise placed or mounted in the ordinary way. Both the sleeve 3 and the shaft 4 can be controlled from the ship's deck by toothed wheels, as hereinafter explained.

Upon the shaft 8 of a suitable engine 9 is a spur-wheel 10, which gears with another wheel 11, itself in gear with a duplicate wheel 12. The wheels 11 and 12 are mounted, respectively, upon horizontal shafts 13 and 14, which are supported in suitable bearings 15, and upon their other ends are, respectively, bevel-wheels 16 and 17. Bevel-wheel 16 gears with a bevel-wheel 18 upon a vertical shaft 19 and wheel 17 with a bevel-wheel 20 upon shaft 21. Upon vertical shaft 19 are spur-pinions 22 and 23, the latter of which is keyed to the shaft, while pinion 22 is free. On shaft 21 is one spur-pinion 24, also freely mounted, and said pinions 22 and 24 are provided, respectively, with friction-clutches 25 and 26, by means of which either one or the other of the pinions may be locked to its shaft. I do not confine myself to the use of these clutches, as any suitable device that will perform their particular function will answer my purpose. The clutches shown are thrown in and out of gear by a lever 27, pivoted upon a support 28 and operated by lines 29 and 30, passing, respectively, through pulleys 31 and 32. The pinions 22 and 24 are arranged to mesh with a toothed wheel 33, to which is keyed the rudder-shaft 4, and a second toothed wheel 34, attached to the sleeve 3, gears with the pinion 23.

By means of the arrangement described both wheels can be locked together or they may be caused to move reversely to each other, as hereinafter explained. The normal posi-

tion of the wheels is such that the rudders attached thereto shall be closed together longitudinally of the ship. From this position the pair of blades may be moved to act as a single
 5 rudder; but when it is required to use them to retard or control the ship's motion the wheels will be moved reversely to each other, thereby opening out the blades to the required extent.

10 In order to operate my invention, the line 30 is tightened from the bridge or other convenient place, which causes the clutch 25 to engage pinion 22. Said pinion will now revolve with shaft 19 through clutch 25, said
 15 clutch being held on shaft by a feather or feathers, as shown. When pinion 22 is in gear, pinion 24 will be running free, and, as before stated, pinion 23 being always in gear, when engine 9 is caused to move vertical
 20 shaft 19, and with it the pinions 22 and 23, will be rotated, thereby causing the wheels 33 and 34 to turn together. If it is required to open out the rudders 1 and 5, they should be brought back locked to the longitudinal position. The
 25 line 29 is now pulled and the clutch 26 thrown into gear, which action releases clutch 25 and pinion 22 and locks pinion 24. Then when engine is moved its motion will be conveyed to the wheels 33 and 34 through pinions 10,
 30 11, and 12, shafts 13 and 14, bevel-wheels 16, 17, 18, and 20, and pinions 23 and 24. The horizontal shafts 13 and 14 revolve reversely to each other through the wheels 11 and 12, and consequently shafts 19 and 21 will likewise
 35 revolve in opposite directions. With pinions 23 and 24 locked the wheels will be moved reversely to each other, and likewise the rudders thereto attached. In order to cause a ship to go astern, the rudders must be
 40 opened out, so as to form an obtuse angle to each other or concavity next the propeller. The water displaced by the propeller will thus be deflected outward in a forward direction. When the rudder-blades are in line with each
 45 other, they may be locked together by again putting pinions 22 and 23 in gear and may thus be used to steer the vessel. The breadth of the rudder-blades should be such that when opened out their total width will be slightly
 50 more than the total width of the propeller.

Instead of the engine 9 the horizontal shafts may be rotated by a drum upon shaft 13 and lines upon the drum communicating with a second drum, such as is used upon the ordinary
 55 type of steering-engine for ships from five hundred and upward tons burden.

The apparatus shown in my drawings is such as could be applied to very large ships; but it may also be used in smaller ships, if necessary.

60 The admission of steam to the engine 9 is

regulated from the steering-wheel upon the bridge in the ordinary way and by means of well-known apparatus.

In applying the invention to smaller craft—such as steam-yachts, motor-launches, and the like—the rudders will be mounted in precisely
 65 the same way—that is, coaxially—and means could be easily devised whereby the helms could be locked together when the rudders are to be closed for ordinary steerage purposes.
 70

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

1. In means for controlling the speed of screw-propelled ships, a sleeve upon which is
 75 mounted a rudder and a shaft coaxially situated with and within the sleeve upon which a second rudder is mounted, and means for operating the pair of rudders either together or
 80 reversely to each other in conjunction with the revolving propeller of a ship, as specified.

2. In means for controlling the speed of screw-propelled ships, a sleeve upon which is
 85 mounted a rudder, and a shaft, coaxially situated with and within the sleeve, upon which a second rudder is mounted, and toothed wheels upon the said sleeve and shaft respectively, and means for rotating said wheels together
 90 or reversely to each other so that the rudders may be employed closed together or opened out, and when opened out in conjunction with the revolving propeller of a ship, as specified and in the manner set forth.

3. Means for operating a pair of rudders coaxially mounted consisting of a pair of horizontal
 95 shafts revolving in reverse directions through intergearing pinions upon their ends, means for revolving one of the shafts, bevel-wheels upon their other ends, a pair of vertical
 100 shafts and like wheels upon the upper ends of said shafts with which said bevel-wheels on the horizontal shafts respectively mesh, toothed wheels concentrically arranged, a
 105 sleeve upon one wheel and a shaft or rudder head upon the other each mounting a rudder, a spur-pinion keyed to one vertical shaft and a free pinion upon each of the vertical shafts, said keyed pinion gearing with said sleeve-wheel and the free pinions being capable of
 110 gearing one at a time with the other wheel, and means for locking either of the free pinions to said other wheel, substantially as described and explained.

In witness whereof I have hereunto set my
 115 hand in presence of two witnesses.

EDWARD SMETHURST.

Witnesses:

H. HUMPHRIES,

T. S. ROULSTON.