

PATENTED MAR. 1, 1904.

APPLICATION FILED AUG. 21, 1903.

NO MODEL.

FIG. 1.

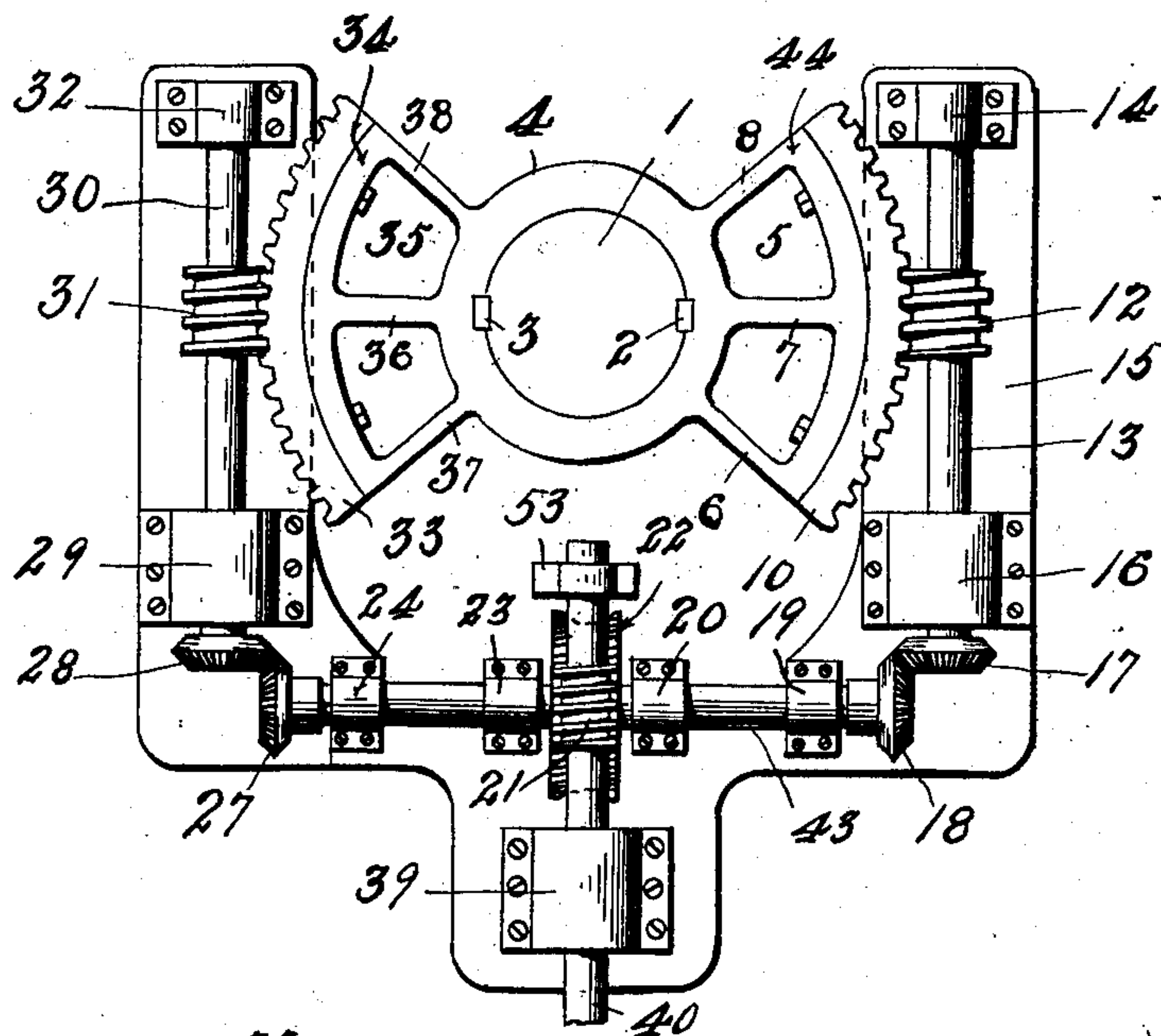


FIG. 2.

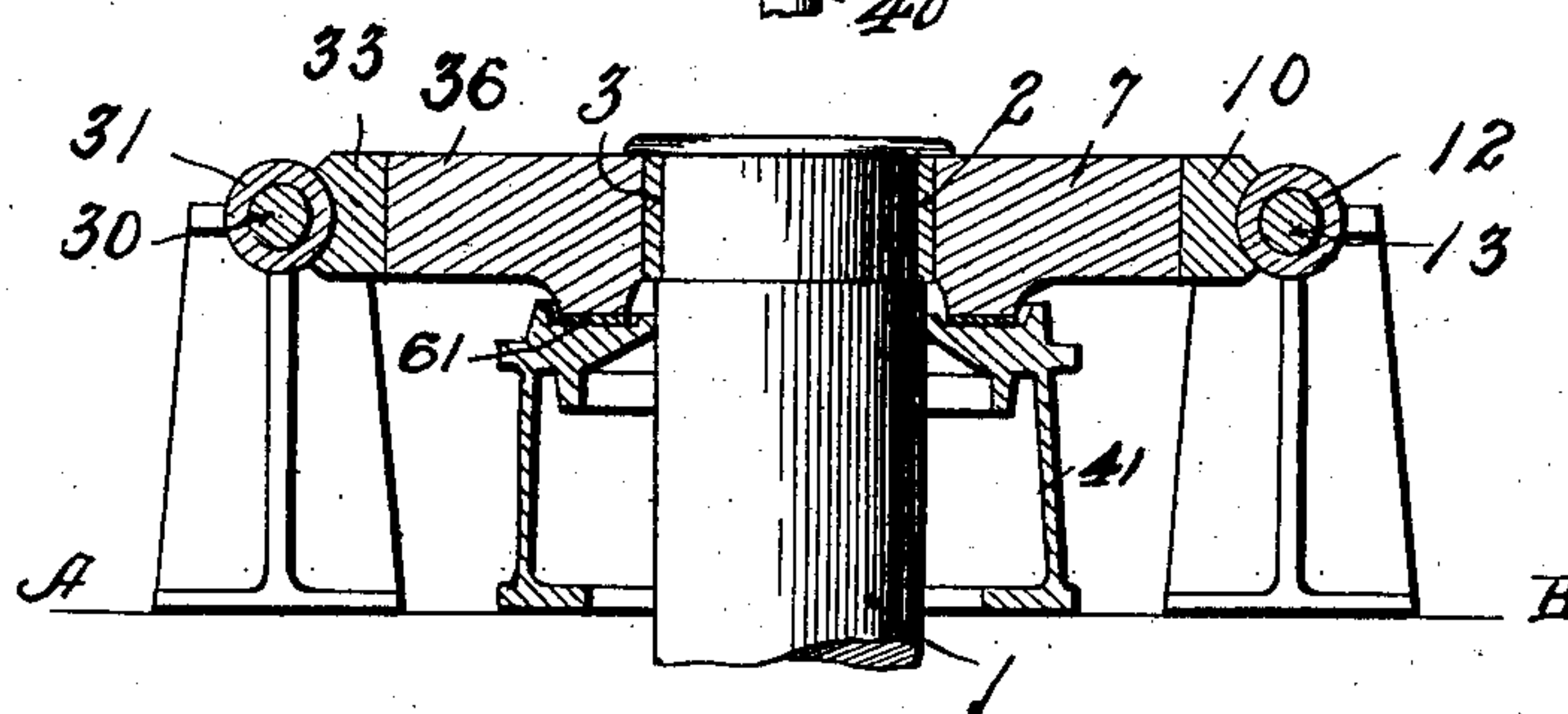
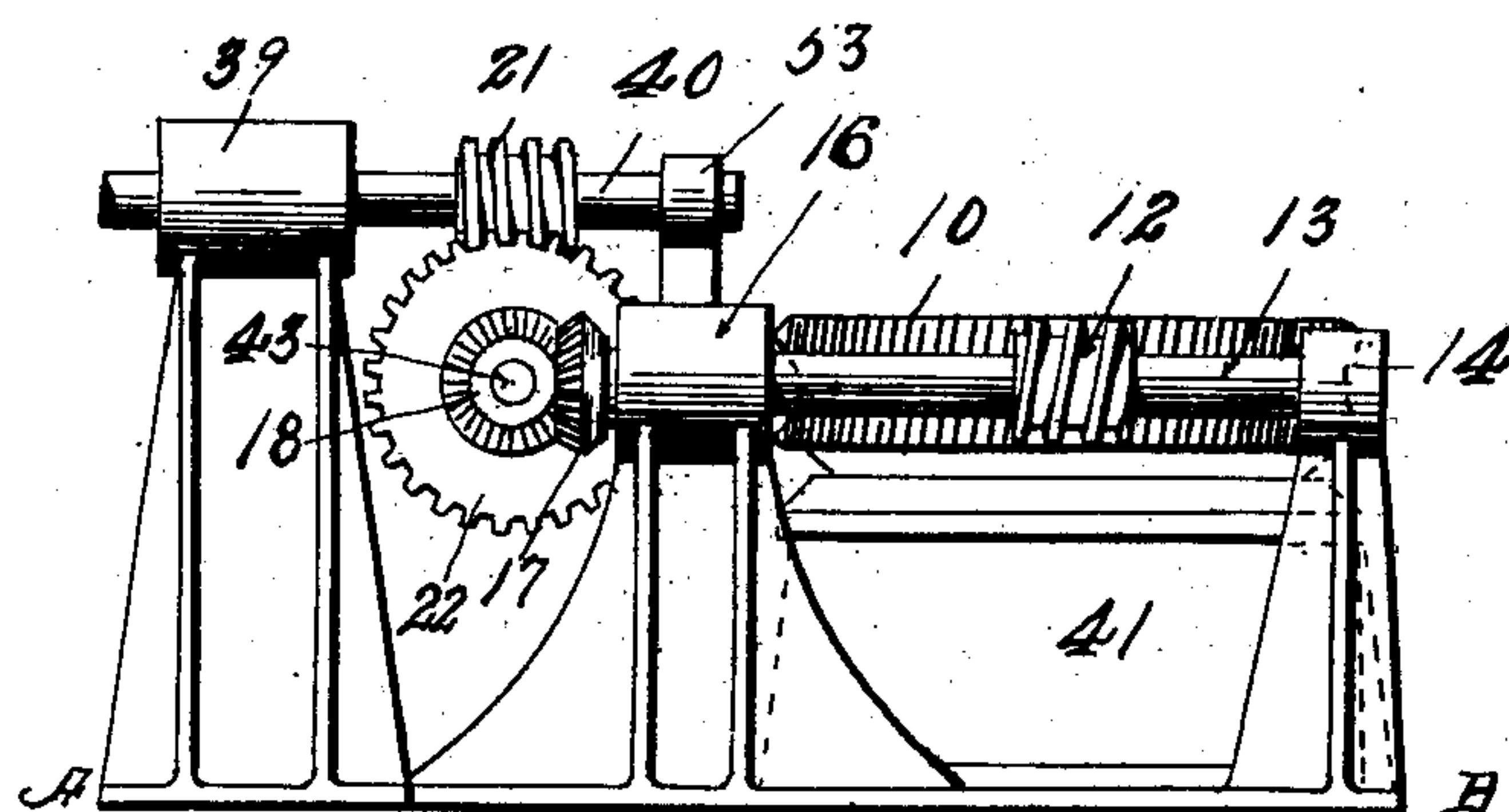


FIG. 3.



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UNITED STATES PATENT OFFICE.

HERBERT W. HOOVER, OF NEWPORT NEWS, VIRGINIA.

STEERING-GEAR.

SPECIFICATION forming part of Letters Patent No. 753,576, dated March 1, 1904.

Application filed August 21, 1903. Serial No. 170,333. (No model.)

To all whom it may concern:

Be it known that I, HERBERT W. HOOVER, a citizen of the United States, residing at Newport News, in the county of Warwick and State of Virginia, have invented certain new and useful Improvements in Steering-Gear, of which the following is a specification.

My invention relates to steering-gear for ships. While it will apply to small ships as well as large ones, it is especially adapted and designed to apply to large ships, both of the merchant marine and of the navy. It is especially useful where the space around the rudder-stock is restricted, as in the case of under-water steering-gear used in naval vessels and those merchant ships designed to be transformed into auxiliary cruisers in time of war. The features which I have endeavored to introduce into the invention are compactness, lightness, strength, simplicity of construction and operation, and sureness of action. The form of gear used at present for this purpose consists of a shaft threaded in two directions from the center, two nuts attached to sleeves on guide-rods traveling on the screw-shaft, and two connecting-rods pinned to the sleeves and taking hold of the ends of a yoke keyed to the rudder-stock. There are several objectionable points in this form of gear outside of its cost and the trouble of lining it up and assembling it, among them being the necessity for a large steering-engine and the fact that owing to the angularity of the connecting-rods one of the rods has to bear the whole load over a considerable portion of the travel of the rudder, thus necessitating making the rods doubly heavy. In the form which I have invented I have avoided these objectionable features and have not sacrificed compactness. Moreover, with my form I may use a comparatively-small high-speed steering-engine, and I am enabled to save considerable length in the fore-and-aft direction. The driving of the rudder is perfectly even throughout its whole range, and the parts of the apparatus exposed to wear are easy of access and renewal.

My invention consists in certain novel constructions and arrangements and combinations

of parts, as hereinafter pointed out and claimed.

Having thus outlined my invention, I will proceed to describe it in detail, reference being had to the accompanying drawings, which form part of this specification, and in which—

Figure 1 is a plan view of the gear, showing the rudder-stock, yoke, bed-plate, and gears; Fig. 2, a 'thwartships vertical section through the axis of the rudder-stock, showing the yoke, driving-worms, and bearing-foundation; and Fig. 3 is an elevation of the port side looking inboard.

Referring to the drawings, the numeral 1 indicates the rudder-stock, which has secured to it by the keys 2 and 3 the yoke 4 5 35, said yoke being furnished with the vertical ribs 6 7 8 36 37 38, and which has at its outer extremities the circular rims 34 and 44, to which are bolted the worm-wheel sections 10 and 33 of bronze. Meshing with the worm-wheel sections 10 and 33 are the worms 12 and 31, carried, respectively, on shafts 13 and 30, the shafts being supported by end-bearings 14 and 32, and the thrust of the worms being taken by the collar-bearings 16 and 29, each furnished with several collars to afford ample bearing area, and thus avoid excessive friction.

At the forward ends of the shafts 13 and 30 are the miter-gears 17 and 28, meshing with the gears 18 and 27, carried on the transverse shaft 43, which shaft is supported by steady-bearings 19, 20, 23, and 24. Carried on and keyed to the shaft 43 is the worm-wheel 22, which is driven by the worm 21. The worm 21 is keyed to the shaft 40, which is supported by end bearings 53, and whose thrust is taken by collar-bearing 39, furnished with a series of collars to diminish friction. The shaft 40 is directly connected to the steering-engine and is driven by it, although in case of disablement of the engine hand-gear may be thrown in and the ship thus maneuvered.

The bed-plate is Y-shaped in order to save weight and carries the various steady and thrust bearings, ribbed foundations being carried up to the necessary height for this purpose, as shown. The weight of the rudder is carried by the independent foundation 41,

seated on the deck or flat A Band furnished on its upper surface with a bearing-ring 61 of composition on which the yoke bears. If preferred, the composition ring 61 may be carried by the yoke 4, &c. The detail of stuffing-box for the rudder is omitted, as it does not form part of the gear.

It may be noted that in smaller vessels, where the power required in the engine is comparatively small, the large gear of the steering-engine may be mounted direct on the transverse shaft 43. In case the worm-wheel sections 10 and 33, the worms 12 and 31, the gears 17, 18, 27, and 28, the worm 21, or the wheel 22 become worn they may be readily renewed, being accessible and not too large to handle conveniently. It is intended to carry spars for this purpose. The length of the worm-wheel sections 10 and 33 is determined by the angular motion of the rudder, the extent shown in the drawings being that adapted to the helm-angles in current use in the navy.

I do not wish to be understood as limiting myself to the details or proportions shown in the drawings, but I reserve the right to make any alterations in these particulars which will enable me to adapt my invention to the particular needs of the case, either by adding minor features or by omitting some of those shown.

What I claim, and desire to secure by Letters Patent, is—

1. The combination with the rudder-stock, the toothed gear secured thereto and composed of sections as described, the foundation or support and bearing-ring for said gear, shafts provided with worm-wheels, said worm-wheels engaging said toothed gear, gear-wheels on said shafts engaging similar wheels on a transverse shaft, a gear-wheel on the transverse shaft, and a shaft, provided with a worm-wheel engaging said last-mentioned gear-wheel; and means for driving said shaft, substantially as described.

2. In a steering-gear, the combination of a frame or support, a rudder-stock mounted therein, a yoke secured to the rudder-stock, a bearing foundation and an antifriction-ring interposed between said foundation and said yoke, a pair of segmental racks secured to said yoke, a pair of worms meshing with said segmental racks, a pair of longitudinal shafts carrying said worms, bevel-pinions on one end of the shafts, a transverse shaft carrying bevel-pinions meshing with said pinions on the pair of shafts, a worm-wheel on said transverse shaft and a driving-shaft carrying a worm meshing with said worm-wheel.

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

HERBERT W. HOOVER.

Witnesses:

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