No. 706,719. Patented Aug. 12, 1902.

F. M. BROUN.

REVERSING MECHANISM.

(Application filed Mar. 27, 1902.)

(No Model.) 2 Sheets—Sheet 1.

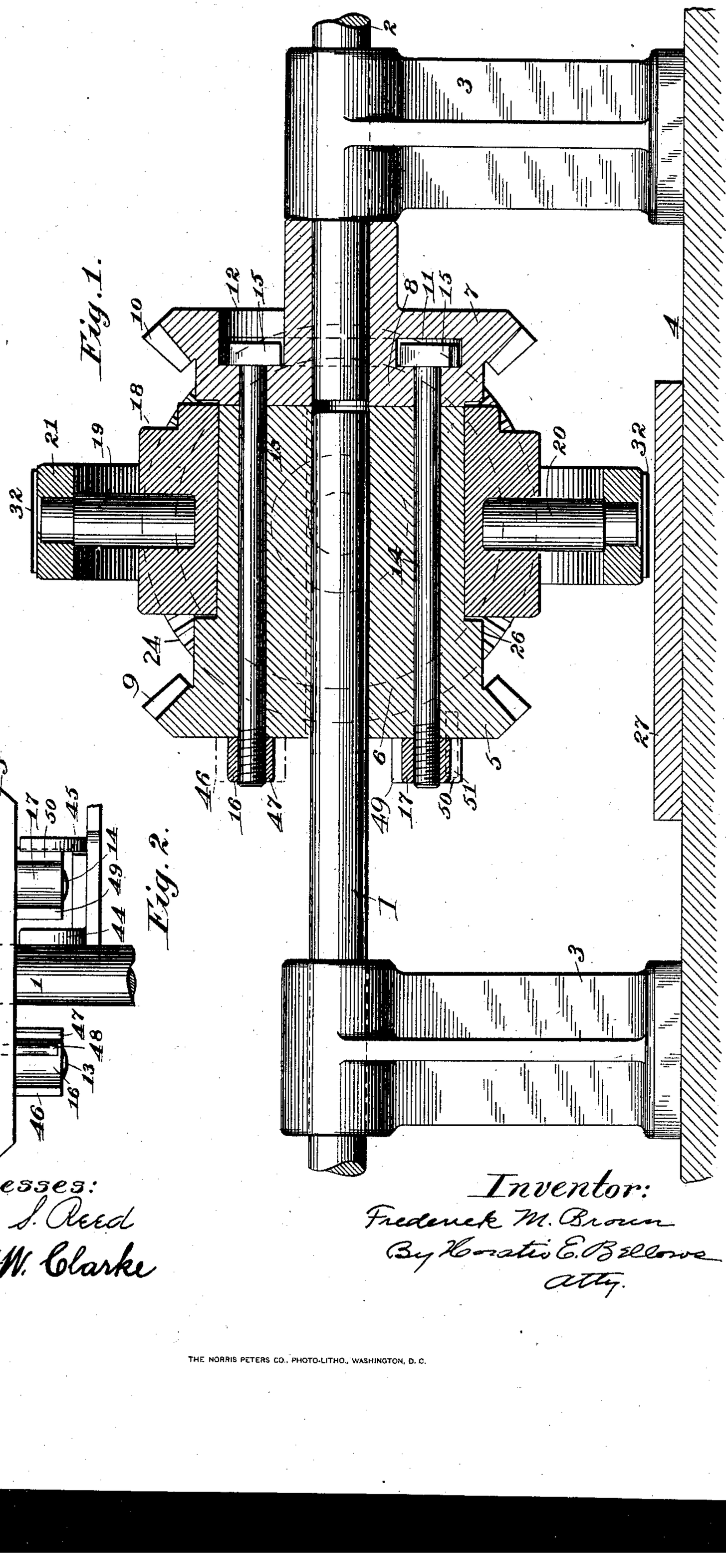


Fig. 1.

Fig. 2.

Witnesses:
Nellie L. Reed
Louis W. Clarke

Inventor:
Frederick M. Broun
By Horatio E. Bellows
Atty.

No. 706,719. Patented Aug. 12, 1902.

F. M. BROUN.

REVERSING MECHANISM.

(Application filed Mar. 27, 1902.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 3.

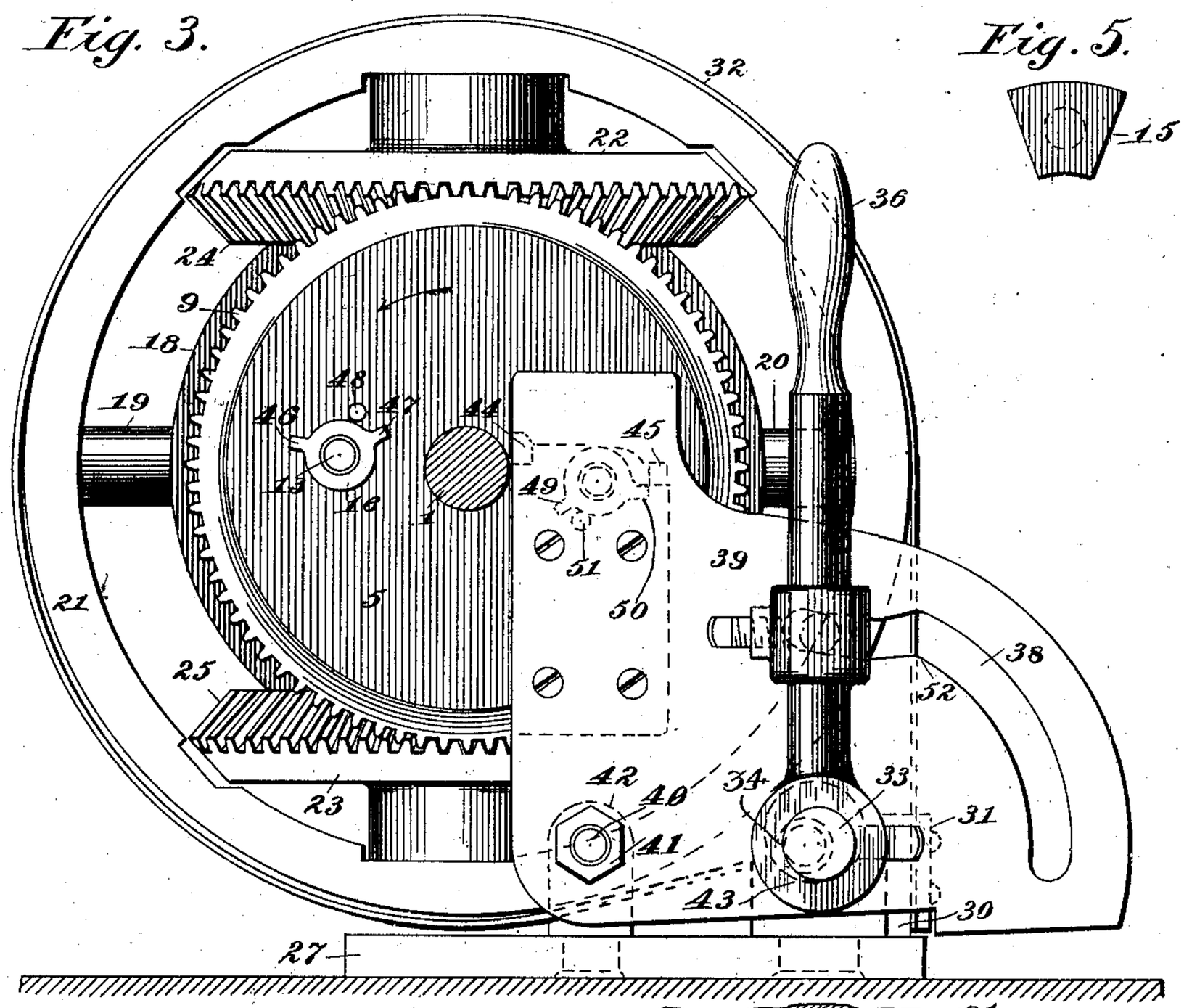
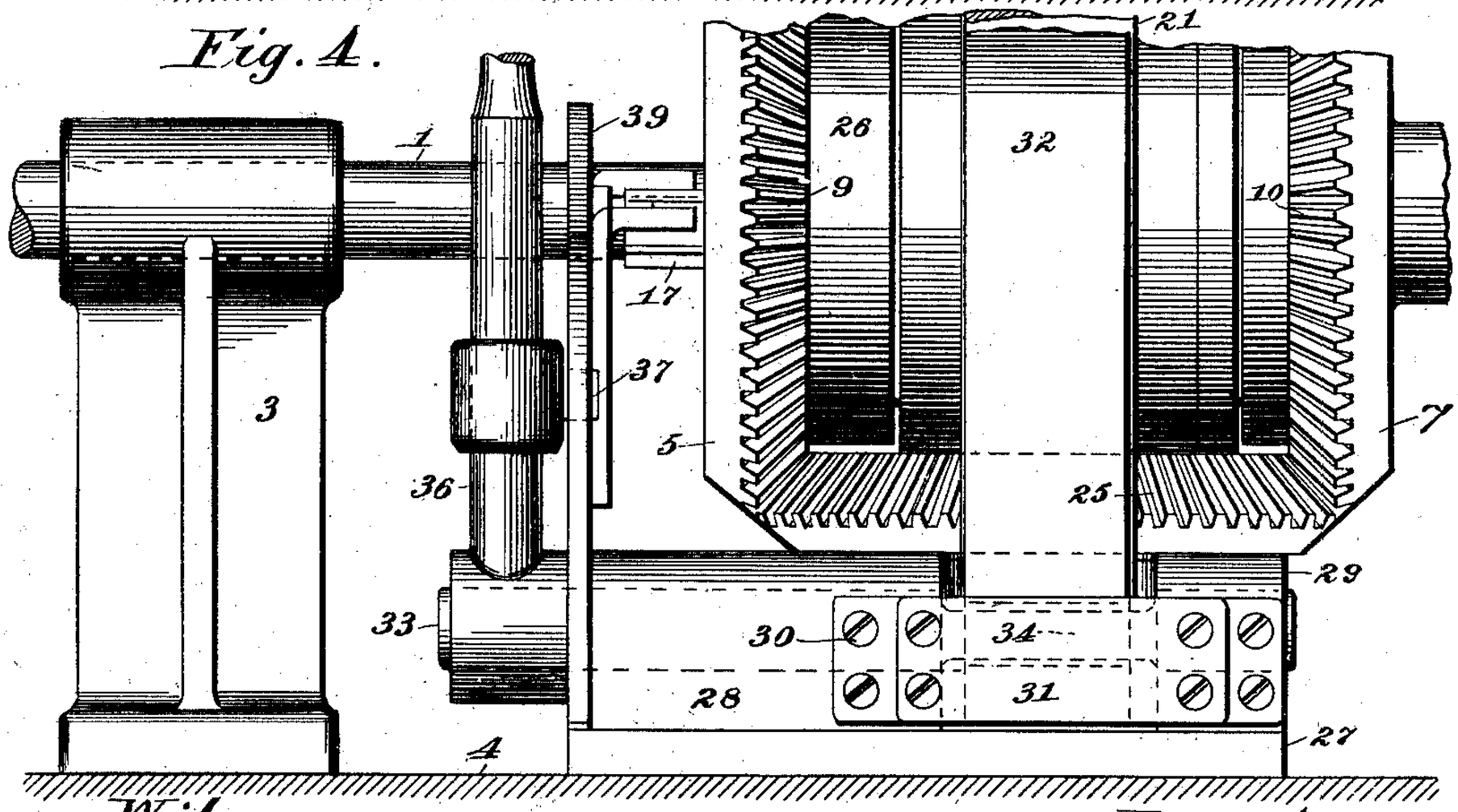


Fig. 5.

Fig. 4.



Witnesses:
Nellie S. Reed.
Louis W. Clarke

Inventor:
Frederick M. Broun
By Horatio E. Bellows
Atty

UNITED STATES PATENT OFFICE.

FREDERICK M. BROUN, OF WARREN, RHODE ISLAND, ASSIGNOR OF ONE-HALF TO EDMUND H. MATTESON, OF WARREN, RHODE ISLAND.

REVERSING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 706,719, dated August 12, 1902.

Application filed March 27, 1902. Serial No. 100,219. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK M. BROUN, a citizen of the United States, residing at Warren, in the county of Bristol and State of Rhode Island, have invented certain new and useful Improvements in Reversing Mechanism, of which the following is a specification.

My invention relates to mechanism for transmitting power, and may be employed for a variety of purposes, for example, in connection with motors for propulsion of vessels or vehicles. It has for its primary object the regulation of a secondary shaft by means of a single lever, and this by a simple, stable, and compact mechanism.

To these ends my invention consists in the novel construction and combination of parts hereinafter set forth, and illustrated in the accompanying drawings, wherein—

Figure 1 is a longitudinal central section of my new mechanism with the shaft and supports in side elevation; Fig. 2, a side elevation of a portion of the driving-gear, showing a part of the lever in conjunction with the tightening-nuts; Fig. 3, an end elevation of my mechanism; Fig. 4, an elevation of the front of the same with parts broken away, and Fig. 5 a top plan view of a bolt-head.

Like figures of reference indicate like parts throughout the views.

In the drawings, 1 is a driving-shaft, and 2 the driven shaft, each journaled in suitable supports 3, resting upon a base 4. Fixedly mounted upon the shaft 1, as a driver, is a bevel-gear 5, having a large hub 6, provided with an annular shoulder 26, and in axial alinement therewith upon shaft 2 is fixedly mounted a similar bevel-gear 7, with a hub 8, whose diameter equals the greatest diameter of the hub 6. The gear 7 has an internal annular channel 11, T-shaped in cross-section, which is accessible through an oblong opening 12 in the gear-face. One or more bolts 13 14 longitudinally traverse the hub 6 and the channel 11 of hub 8. The heads 15 of these bolts are slightly curved, Fig. 5, to facilitate their movement in the annular channel 11, wherein they travel when their inner faces are not in frictional contact with the hub 8. The opposite bolt ends are threaded and project beyond the face of gear 5. Screwed to the projecting ends are nuts 16 and 17, whose inner faces touch or nearly contact with the gear-face.

The gear-hub 6 loosely traverses a circular wheel or frame, consisting of a massive hub 18, arms 19 20, and a broad rim 21. The shoulder 26 of hub 6 abuts against the side of hub 18, which, in conjunction with the hub 8, completes a seat for the frame. Loosely mounted in this frame, intermediate its hub and rim, diametrically opposite each other and at right angles to the plane of the frame, are two horizontal bevel-gears 22 23, whose teeth 24 and 25 respectively mesh with the teeth 9 and 10 of the vertical gears described. It is evident that the frame, with its gears 22 23, is rotatable on hub 6; also, that the latter may rotate without effecting the position of the frame. Sometimes one rotating gear may be omitted.

A rectangular plate 27 is fixed to the machine-base 4 below the gearing. Upon its outer margin are fixed two blocks 28 29, to whose outer faces are screwed two overlapping plates 30 31 to clamp one end of a flat metal strap 32, which binds the rim 21. Journaled in these blocks is a lever-shaft 33, with a reduced portion 34 slightly off center, around which is fixed the other end of strap 32. A lever-handle 36 is fixed on the outer end of shaft 33 and is provided intermediate its extremities with a projection 37 to travel in an irregularly-curved slot 38 in the lever-frame 39. For about ninety degrees this slot is nearly circular. It then continues a short distance diagonally downward and then diagonally upward, forming a slight shoulder 52. The lever-frame is pivoted at its inner lower corner by a bolt 40 and nut 41 to a block 42, fixed to the base-plate 27, and has an opening 43 in its lower margin for passage therethrough of the lever-shaft 33 and sufficiently large to allow a vertical vibration of the lever-frame. Projecting from the inner face of the lever-frame are two projections 44 45, some distance apart, the first in a slightly-higher plane than the second.

Again referring to the nuts 16 and 17, the former has two wings or lugs 46 47 radiating from its side, less than one hundred and eighty

degrees apart. A pin 48, acting as a stop, projects from the face of gear 5 above and parallel with the nut, intermediate the lugs and in their line of travel. The nut 17 also has lugs 49 50 similarly disposed with relation to a stop-pin 51, which projects from the cam-face below the nut. Both nuts have sufficient play on the bolt ends to allow nearly a complete revolution before tightening against the gear-face. If either of these nuts is turned toward the right, the opposite bolt-head 15 tends to press upon the inner face of its channel, thereby forcing into frictional engagement the gear-hubs 6 and 8 and when the friction is extreme engaging also the frame-hub 18, thus rotating the entire mechanism.

The number of transverse bolts 13 and 14 may be multiplied, if desired, when excessively heavy mechanism is sought to be driven. They should preferably be so inserted that their threaded ends project radially from the face of gear 5 and carry nuts similar to 16 and 17.

It is evident that the particular form of nut above described is not exclusive, as the lugs thereof may radiate one hundred and eighty degrees apart and a stop similar to 48 and 51 be placed both above and below the bolt end with which the nut is engaged. This arrangement locks and unlocks the nuts whatever be the direction of revolution of the driver 5.

It should further be noted that the teeth of the four gears may be replaced by frictional surfaces; but it is evident that frictional engagement would be less efficient than toothed gearing.

The mechanism is primarily regulated by the vibration of the lever-arm 36. When the latter is vertical, as in Fig. 1, the lever-frame 39 rests against the shaft 1, and the projection 45 intercepts the outer radial lugs 46 and 50 when the driver 5 makes its first rotation, thus turning the nuts 16 and 17, respectively, to the right and out of the line of further contact with the projection 45. This revolution of the nuts locks the parts of my mechanism into its extreme of frictional engagement, whereby the gears 5 and 7 being frictionally engaged to each other and to the hub 18 the said gears and the frame revolve with the driving-shaft, rotating the driven shaft 2 in the same direction. The revolution of the frame carries its gears 22 and 23; but the latter exert no influence upon the fixed gears, with which they mesh. Let the lever-handle 36 be now depressed until its projection 37 reaches the shoulder 52 of slot 38. This throws the frame 39 to the right and brings its inner projection 44 into the line of travel of lugs 49 and 47, and when the latter contact therewith the nuts 17 and 16 are respectively turned to the left and the parts of my mechanism entirely released from frictional engagement. In this position the entire frame rotates as before, together with all the gears of the mechanism except the gear 7, whose shaft 2 is practically at rest, since the loose connection of the rotating gears is not sufficient to overcome the inertia of shaft 2. Depressing the lever-handle to a horizontal position does not further effect the position of the lever-frame 39, and the nuts in their rotation are still free of the projections 44 and 45; but the rotation of the lever-shaft 33, with its eccentric 34, tightens the band 32 upon the rim 21, whereby the frame is rigidly held against rotation, while all the gears of the mechanism are working and the driven shaft 2 rotates in a direction opposite to the driving-shaft.

It will be seen that the reversal of a vessel or vehicle by my mechanism is both instantaneous and effective. The slipping of parts due to lubricant or construction now so frequent is perfectly overcome.

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

1. In a reversing mechanism, the combination with a driving-shaft of a driving-gear mounted on said shaft, a driven shaft, a gear fixedly mounted on the driven shaft, a circular frame intermediate said gears, gears mounted in said frame and meshing with the driving and driven gears, bolts traversing the driving and driven gears, and means for tightening said bolts.

2. In a reversing mechanism, the combination with a frame of a driving-shaft, a driving-gear mounted on said shaft, a driven shaft, a gear fixedly mounted on the driven shaft, gears mounted in the frame and meshing with the driving and driven gears, bolts provided with threads traversing the driving and driven gears and projecting beyond the face of the driving-gear, nuts provided with lugs engaged with said threads, and means for turning said nuts.

3. In a reversing mechanism, the combination with a frame of a driving-shaft a driving-gear mounted on said shaft, a driven shaft, a gear fixedly mounted on the driven shaft, gears mounted in the frame and meshing with the driving and driven gears, bolts provided with threads traversing the driving and driven gears, and projecting beyond the face of the driving-gear, nuts provided with lugs engaged with said threads, stops upon the driving-gear to limit excessive rotation of the nuts, and means for turning said nuts.

4. In a reversing mechanism, the combination with a driving-shaft of a driving-gear mounted on said shaft, a driven shaft, a channeled gear fixedly mounted on the driven shaft, bolts traversing the driving and driven gears, whose heads are adapted to travel in said channeled driven gear, and means upon the opposite bolt extremities for tightening said bolts.

5. In a reversing mechanism, the combination with a driving-shaft of a driving-gear, mounted on said shaft, a driven shaft, a chan-

neled gear fixedly mounted on the driven shaft, bolts provided with threads traversing the driving and driven gear, and whose heads are adapted to travel in the channel of the driven gear, nuts provided with lugs engaging the threaded bolts, and means contacting with said lugs for turning the nuts.

6. In a reversing mechanism, the combination with a gang of quadrilaterally-arranged gears, of a revoluble frame carrying two of the gears, a metallic band encircling the frame means for permanently holding one end of said band, an eccentric lever-shaft for carrying the other end of the band, and a lever-arm for rotating said shaft.

7. In a reversing mechanism, the combination with a driving-shaft of a driving-gear mounted on said shaft, a driven shaft, a gear fixedly mounted on the driven shaft, bolts provided with threads traversing the driving and driven gears, nuts engaging said threads and protruding from the face of the driving-gear, a frame lying in a plane paralled to that of the driving-gear face pivoted at its base, inwardly-directed projections upon the inner face of said frame adapted to contact with said nuts when the frame is vibrated, and means for vibrating the frame upon its pivot.

8. In a reversing mechanism, the combination with the driving mechanism of an upright slotted frame pivoted at its lower inner corner, projections upon its inner face for contacting with the driving mechanism, a lever-shaft, a lever-arm mounted on said shaft adjacent the outer face of the slotted frame, and a pin mounted on the lever-arm traveling in said slotted frame.

9. In a reversing mechanism, the combination with a driving-shaft of a beveled friction-wheel mounted on said shaft, a driven shaft, a beveled friction-wheel fixedly mounted on the driven shaft, a circular frame intermediate said wheels, beveled friction-wheels mounted in said frame and contacting with the driving and driven wheels, bolts traversing the driving and driven wheels, and means for tightening said bolts.

10. In a reversing mechanism, the combination with a driving-shaft of a driving-gear mounted on said shaft, a driven shaft, a channeled gear fixedly mounted on the driven shaft, bolts provided with curved heads and threaded ends engaging the driving-gear and the channeled gear, and nuts engaging the ends of the bolts.

11. In a reversing mechanism, the combination with a driving-shaft of a driving-gear mounted on said shaft, a driven shaft a gear fixedly mounted on the driven shaft, a rotatable frame intermediate said gears, gearing carried in said frame, bolts traversing the driving and driven gears, and means for tightening said bolts.

12. In a reversing mechanism, the combination with a driving-shaft of a driving-gear fixedly mounted thereon, a driven shaft, a gear fixedly mounted thereon, a rotatable frame intermediate said gears, gearing carried in said frame and meshing with the driving and driven gears, and means operated by the driving mechanism for locking the said gears.

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

FREDERICK M. BROUN.

Witnesses:

HORATIO E. BELLOWS,

EDMUND H. MATTESON.