No. 876,571. PATENTED JAN. 14, 1908.

R. D. MAYO.

POWER TRANSMITTING MECHANISM.

APPLICATION FILED APR. 3, 1907.

2 SHEETS—SHEET 1.

Fig. 2.

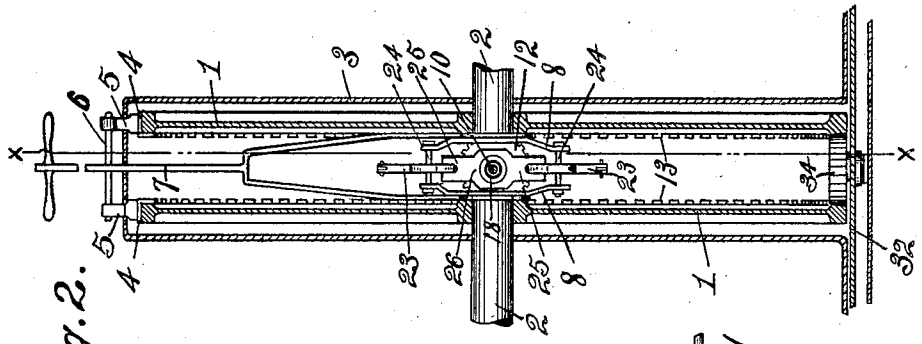
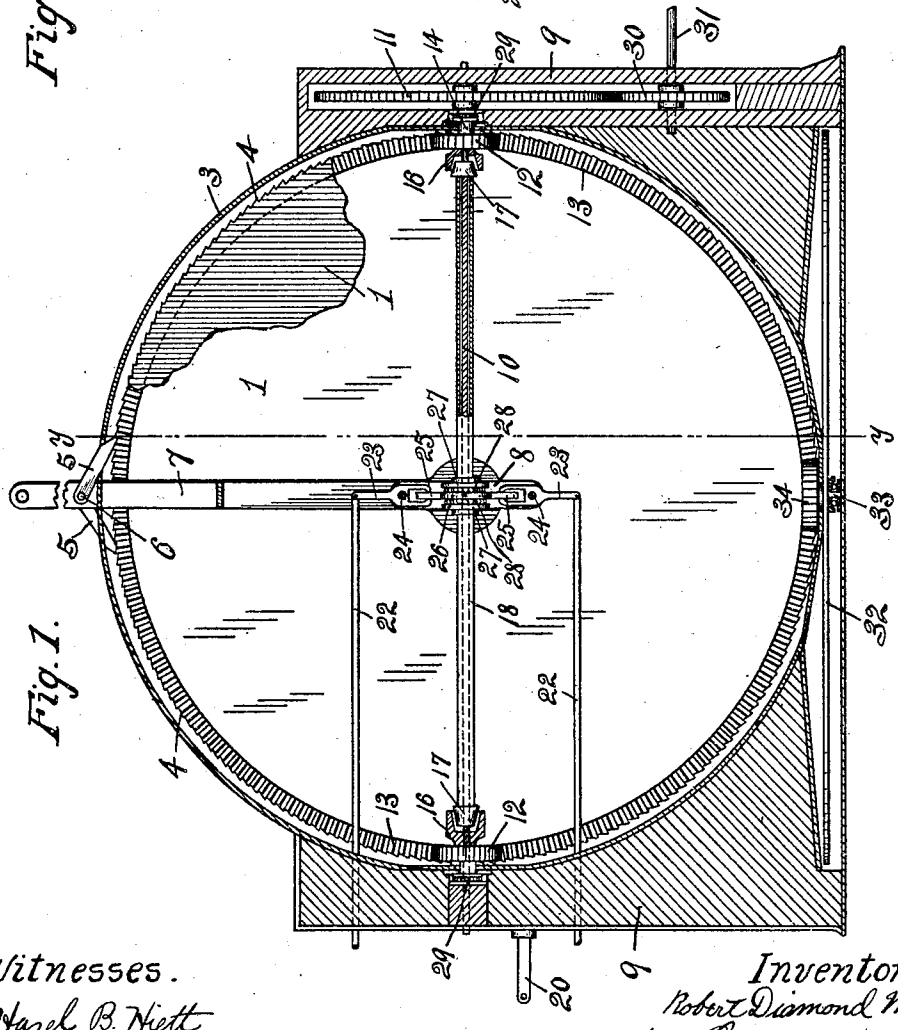


Fig. 1.



Witnesses.

Hazel B. Hiett

Odwell Schreiber

Inventor.

Robert Diamond Mayo.

By Pevin & Pevin,

His attys.

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Fig. 3.

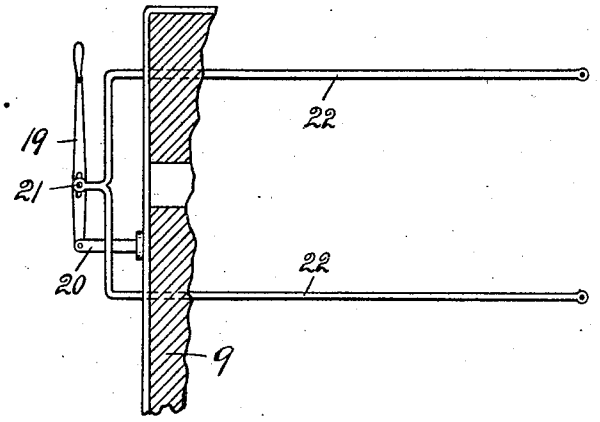


Fig. 4.

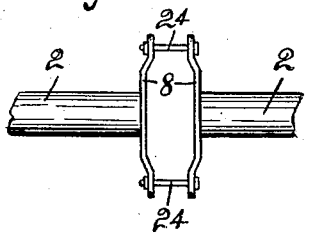


Fig. 5.

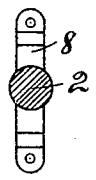
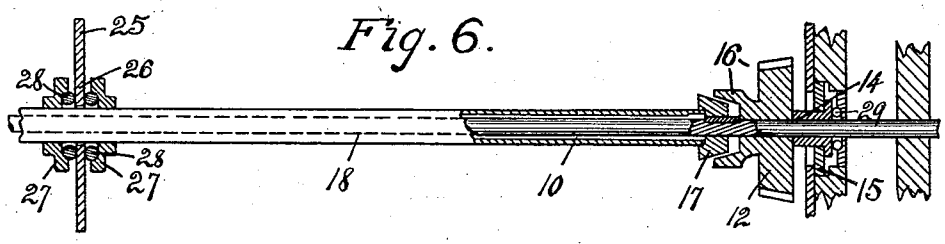


Fig. 6.



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Hazel B. Hiett
Lowell Abrenbe—

Inventor.
Robert Diamond Mayo.
By Brown & Brown
His attys

UNITED STATES PATENT OFFICE.

ROBERT DIAMOND MAYO, OF CONNEAUT, OHIO.

POWER-TRANSMITTING MECHANISM.

No. 876,571. Specification of Letters Patent. Patented Jan. 14, 1908.

Application filed April 3, 1907. Serial No. 366,098.

To all whom it may concern:

Be it known that I, ROBERT DIAMOND MAYO, a citizen of the United States, and a resident of Conneaut, in the county of Ashtabula and State of Ohio, have invented a certain new and useful Power-Transmitting 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 the figures of reference marked thereon, which form a part of this specification.

My invention relates to power-transmitting mechanism, and particularly to the class of such mechanism employed to convert a reciprocatory movement into a continuous rotary movement.

The object of my invention is the provision of a simple and highly efficient apparatus of this class, which is provided with means for reversing the direction of rotation of the driven rotary member without changing the direction of movement of the differentially revolving driving members to which movement is primarily communicated by the reciprocatory element, and which is provided with a balance-wheel that is continuously driven in one direction irrespective of the direction of rotation of the finally-driven member, thus enabling the direction of rotation of such member to be reversed while running at a high speed without danger of racking the apparatus, which would be the case were the direction of rotation of the balance-wheel to be reversed with said driven-member.

The operation, construction and arrangement of the parts of the invention are fully described in the following specification and illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of the mechanism embodying the features of my invention taken on the dotted line *x x* in Fig. 2. Fig. 2 is a vertical transverse section thereof taken on the dotted line *y y* in Fig. 1. Fig. 3 is a detail of the controlling lever and rods. Figs. 4 and 5 are different detail views of the stationary shaft ends which carry the two oppositely revolving ratchet-wheels, and Fig. 6 is an enlarged detail of a portion of the reversing mechanism.

Referring to the drawings, 1, 1 designate two laterally spaced ratchet-wheels, which are loosely journaled on the contiguous ends of the two longitudinally spaced stationary shafts 2, 2, which pass through the contiguous sides of the housing 3 and are supported in any suitable manner, not shown. The ratchet-wheels 1, 1 have their peripheries formed with oppositely directed teeth 4, which are engaged by pawls 5, 5 carried by the pin 6 projecting in opposite directions from the operating lever 7, so that when the lever is moved in one direction one pawl will engage and impart rotation to its wheel and when moved in the other direction the other pawl will engage and impart rotation in the opposite direction to its wheel. This lever extends down between the two ratchet-wheels and has its lower end forked, as shown, and each arm thus formed fulcrumed to the inner ends of the shafts 2, 2 between the wheel hubs and the diametrically-disposed arms or members 8, which are secured to the shaft-ends. The pawls 5 and lever 7 operate in registering slots in the housing top.

Extending between the ratchet-wheels 1, 1 diametrically thereof with its opposite ends suitably journaled in the stationary frame parts 9 is a horizontal shaft 10, on one end of which without the wheels 1, 1 is keyed a gear-wheel 11. A pinion 12 is loosely carried adjacent each end of the shaft 10 in position to mesh with and be driven by the opposing annular rows of gear-teeth 13 on the inner marginal portion of each ratchet-wheel. Each of these pinions has a hub extension 14, which projects through the shaft aperture in the housing 3 and has its outer end flanged to enable a retaining collar or member 15 to be secured between it and the margin of said shaft aperture to prevent an inward movement of the pinion.

The inner hub portions of the pinions 12 are formed with female clutch-members 16 with which the conical male clutch-members 17, are adapted to frictionally coact. The movable clutch-members 17 are carried at opposite ends of a sleeve 18, which is feathered to the shaft 10 and intended to have a longitudinal movement thereon, thus enabling it to be positioned at a neutral point so that neither clutch is in engagement, or moved to engage either clutch-member 16 so that the sleeve and shaft to which it is feathered will be driven in the direction of rotation of the engaged clutch-member and its attached pinion.

The longitudinal movement of the sleeve 18 is controlled by a lever 19, (see Fig. 3),

which is fulcrumed to an arm 20 projecting from one side of the frame 9. Pivoted to this lever, as at 21, is a U-shaped frame or member 22, the arms of which are projected through the contiguous frame part 9 and between the ratchet-wheels 1, 1, and have their inner ends pivoted to the outer ends of the two shipper-levers 23, which are fulcrumed to pins 24 connecting the ends of the two opposing arms or members 8 carried at the inner ends of the two shafts 2, 2, as shown. The inner ends of the levers 23 are forked, as shown in Fig. 1, and loosely straddle ears 25, which project in opposite directions from a collar 26. This collar loosely encircles the sleeve 18 between two fixed collars 27 thereon, and when moved has its thrust against ball bearings 28, which are suitably mounted between the said loose and fixed collars. When a clutch-member 17 is thrown into engagement with its member the outward thrust of the hub end thereby occasioned is received by a series of balls 29, which are suitably mounted between the hub end and contiguous frame-bearing part.

The gear-wheel 11 is shown as meshing with a relatively smaller gear 30, which is carried by a shaft 31 and has one end mounted in the frame 9. Should the apparatus be used as the power means for the propulsion of a boat, for which purpose it is more particularly intended, a propeller, not shown, is mounted on the shaft 31. It is apparent, however, that the gear 30 and shaft 31 may be eliminated, if desired, and the propeller or other part directly driven by the shaft 10, as I claim nothing for the gearing of the shafts 10 and 31 together, it being done merely to speed the propeller.

32 designates a balance-wheel, which is mounted beneath the ratchet-wheels 1, 1 on a vertical stub-shaft 33, which is suitably journaled in the frame and housing and carries a pinion 34 positioned to mesh with and be driven by the teeth 13 of the ratchet-wheels in the same manner as the pinions 12. This balance-wheel is continuously driven in one direction during a running of the apparatus, irrespective of the direction of rotation of the shaft 31, thus obviating any unevenness in the running of the mechanism due to the pauses of the operating lever as its direction of movement is reversed.

It is thus apparent that I have provided a simple and efficient power transmission mechanism which may be operated by simply working the lever 7 backward and forward so that the wheels 1, 1 will be driven in opposite directions by the altenate engagement of the pawls 5, 5 therewith, and that the shaft 10 may be allowed to remain quiet during a running of the wheels 1 by positioning the clutch sleeve 18 in neutral relation to the pinions 12 and their clutch-members, or driven in the desired direction by moving the controlling lever 19 so as to throw the sleeve into engagement with one or the other of the oppositely revolving clutch-members 16, thereby communicating the requisite motion to the shaft 31.

I wish it understood that I do not restrict myself to the details of construction and arrangement of the parts shown and described, for obvious modifications will occur to persons skilled in the art.

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

1. A power transmission mechanism, comprising oppositely revolving members having coaxial series of teeth formed on their contiguous surfaces, an oscillatory element movable to impart simultaneous reverse rotations to said members, a shaft disposed between said members, a loose pinion carried by said shaft in position to engage the teeth on said members, a sleeve feathered to the shaft, coöperating clutch-members carried by the pinion and sleeve whereby the same may be thrown into and out of engagement by a movement of the sleeve, and means for controlling the movement of the sleeve.

2. A power transmission mechanism comprising two spaced rotary members having coaxial series of teeth on their inner surfaces, means for driving said members in opposite directions, a shaft disposed between said members, a pinion loosely carried by the shaft and meshing with the teeth on both members, clutch means for throwing the shaft into or out of fixed connection with the pinion, a second pinion meshing with said teeth, and a balance-wheel axially fixed to said latter pinion to revolve therewith.

3. A power transmission mechanism comprising two spaced rotary members having their inner surfaces formed with coaxial series of teeth, means for revolving said members in opposite directions, a shaft mounted between said members, two pinions loose on said shaft and meshing with the teeth on both members at opposite sides of its axis and having their inner hub ends formed with clutch surfaces, a sleeve feathered to said shaft and having its ends formed with clutch-surfaces, and means for moving the sleeve to engage the clutch surface on either pinion whereby to rotate the sleeve and shaft therewith.

4. A power transmission mechanism comprising spaced rotary members having their contiguous faces formed with coaxial series of teeth, oscillatory means for revolving said members in opposite directions, a shaft mounted between said members, two pinions loosely carried by the shaft and engaging the teeth on both members at opposite sides of its axis whereby the pinions are oppositely rotated, said pinions having inner clutch parts, a sleeve feathered to the shaft and having its

ends fashioned to engage the clutch parts on the pinions, means for moving the sleeve for its ends to engage the clutch part of either pinion or to remain neutral thereto, a second pinion meshing with said two sets of teeth, and a balance-wheel axially fixed to said latter pinion to revolve therewith.

5. In combination, two laterally spaced ratchet-wheels having their inner surfaces formed with coaxial rows of teeth, a lever having a common axis with said wheels, pawls carried by the lever for communicating opposite rotation to the two wheels from an oscillatory movement of the lever, a shaft disposed between the wheels, two pinions loosely carried by the shaft and engaging the teeth on both wheels on opposite sides of their axis, a clutch member fixed to each pinion, a sleeve feathered to the shaft intermediate the pinions, a clutch-member carried at each end of the sleeve to coact with the clutch of the contiguous pinion, means for moving the sleeve to throw either clutch into engagement whereby to revolve the shaft in either direction, and a balance-wheel connected to and continuously driven in one direction by the ratchet-wheels.

6. In combination, two laterally spaced rotary members having coaxial rows of teeth formed on their contiguous surfaces, oscillatory means for revolving said members in opposite directions, a shaft interposed between said members, two pinions loosely carried by the shaft in constant mesh with the teeth on said members on opposite sides of their axis; and manually controlled mechanism carried by the shaft for communicating rotary motion thereto from either pinion.

7. In combination, two laterally spaced rotary members having coaxial rows of teeth, oscillatory means for simultaneously revolving said members in opposite directions, a shaft interposed between said members, two pinions loosely carried by said shaft in constant mesh with the teeth on both said members, one on each side of the axis of said members, manually controlled mechanism carried by the shaft for communicating rotary motion thereto from either pinion, and a balance-wheel connected to and continuously driven in one direction by said members.

In testimony whereof I have hereunto signed my name to this specification in the presence of two subscribing witnesses.

ROBERT DIAMOND MAYO.

Witnesses:

C. W. Owen,

Hazel B Hiett.