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F. L. EAGER.

DRIVING MECHANISM.

APPLICATION FILED MAY 5, 1904.

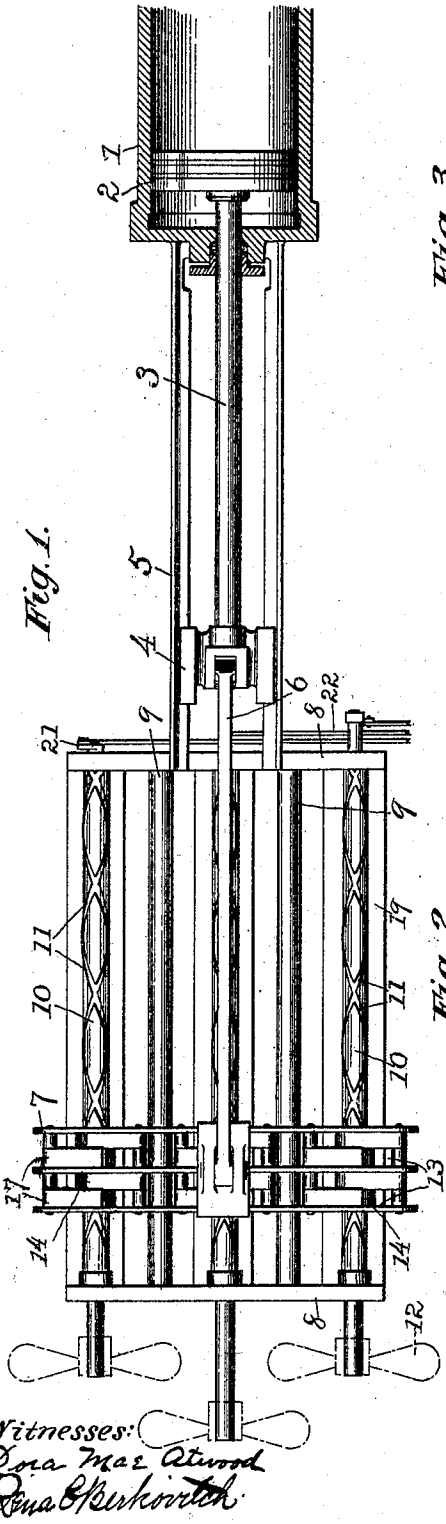


Fig. 1.

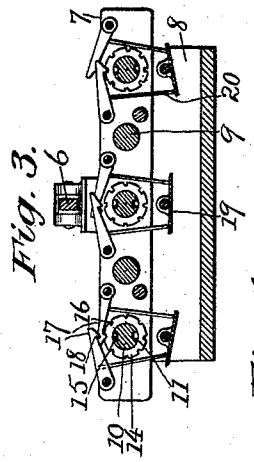


Fig. 3.

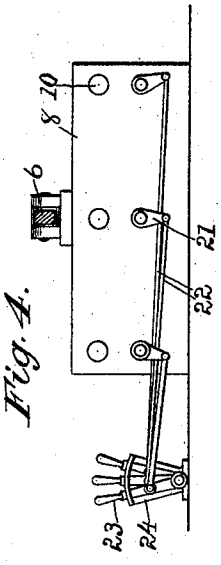


Fig. 4.

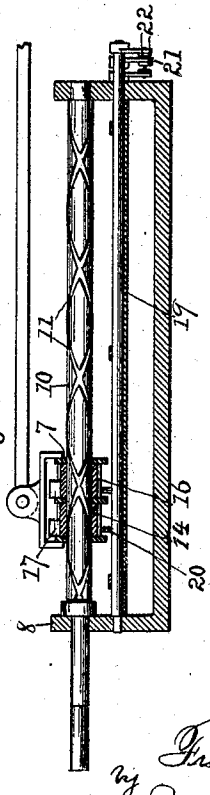


Fig. 2.

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UNITED STATES PATENT OFFICE.

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DRIVING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 783,111, dated February 21, 1905.

Application filed May 5, 1904. Serial No. 206,522.

To all whom it may concern:

Be it known that I, FRANK L. EAGER, a citizen of the United States, and a resident of Waterbury, in the county of New Haven and State of Connecticut, have invented a new and Improved Driving Mechanism, of which the following is a specification.

My invention relates more especially to that class of devices in which power is generated or produced from a fluid (as steam) under pressure; and the objects of my invention are to provide a device in which the power may be translated from a single driving element simultaneously to a number of driven elements; and a further object is to provide a means whereby each of the driven elements may be controlled as to the direction of movement; and a further object is to provide a device in which each of the driven elements may be moved in either direction without changing the direction of movement of the main driving element; and a still further object is to provide a device in which the several driven elements are independently operated as to the direction of movement of each.

A form of device in the use of which the above objects may be attained is illustrated in the accompanying drawings, in which—

Figure 1 is a top or plan view, partly in section, of mechanism embodying my invention. Fig. 2 is a view in vertical lengthwise section through a portion of the mechanism and showing the embodiment of my invention. Fig. 3 is a view in vertical cross-section through the device, showing the embodiment of my invention. Fig. 4 is an end view of the same, showing the reversing-levers.

In the accompanying drawings the numeral 1 denotes a portion of a cylinder to be supplied with a fluid, as steam, under pressure in any desired manner well known in connection with devices of this class. This cylinder contains a piston 2, to which is connected the piston-rod 3, projecting through the cylinder-head in the usual manner and connected to a cross-head 4, supported on the guides 5 in any ordinary manner. A connecting-rod 6 is secured to the cross-head at one end and at its opposite end is connected with a driving-head 7.

The numeral 8 indicates bearings or supports, and to these bearings are secured, preferably at each end, driving-head guides 9. The driving-head 7 is supported on these guides and has a reciprocating movement thereon imparted to it by the piston 2 and the connecting mechanism above described. Driving-shafts 10, which are referred to hereinafter also as driven elements, are rotarily mounted in the supports 8. These shafts may be arranged for any desired purpose; but as the invention finds ready adaptation to shafts for driving a propeller, as of a boat, such a device has been chosen for an illustration of the working of my invention. Each of the shafts 10 have spirally-arranged grooves 11 arranged crosswise with respect to each other, and to the ends of the shafts propellers 12 are secured.

The driving-head 7 is provided with two lengthwise recesses 13, in each of which a nut 14 is located appurtenant to each shaft. These nuts are each in the form of a sleeve surrounding the shaft, each nut appurtenant to a single shaft having a tongue 15 in engagement with a groove in the shaft 10, the tongue on one of the nuts engaging one of the grooves and the tongue on the other nut engaging the opposite groove. The sleeves appurtenant to each shaft have on their outer surfaces grooves forming ratchets 16. A pair of pawls 17 are arranged appurtenant to each nut, these pawls being each pivotally mounted in the driving-head and the working end of each pawl being adapted to engage the grooves or ratchets in the nuts. The tooth on each of the pawls is preferably located on the under side thereof, the teeth 18 on each pair of pawls being beveled in opposite directions, so that in the rotation of a single sleeve 14 in one direction one of the pawls will freely disengage from the groove or ratchet, and in the rotation of said sleeve in the opposite direction the opposite pawl will readily disengage from the groove or ratchet, it being understood that one of the pawls at least of each pair is always held out of engagement with the nut by mechanism to be hereinafter described.

Pawl-operating plates 19 are pivotally supported in the bearings 8, a plate being preferably located appurtenant to each of the

shafts or driven members 10. Pawl-pins 20 extend downward from each of the pawls in position to be engaged by said plate as it is rocked in its bearings, the pawl-pins appurtenant to each pair of pawls being located on opposite sides of the pivotal support of the plate. A crank 21 is secured to each of the pivots of the plates 19 and a connecting-rod 22 extends from each of the cranks to an operating-lever 23. These levers may be properly supported in a standard 24 and employed for the purpose of rocking the plates 19 to throw the members of the pairs of pawls into or out of engagement with the nuts 14. While the operating devices or levers 23 have been shown in proximity to the plates 19, it is obvious that they may be quite remotely located therefrom, and it will be further obvious that the essence of the invention does not reside in the details illustrated and described herein, but that such details may be departed from to a considerable extent and yet embody the essential features of the invention.

In the operation of the device, the piston being set in operation in the usual manner, a reciprocating movement is imparted to the driving-head 7 through the connected mechanism shown and described. One of the levers 23 is placed in position to cause one edge of a plate 19 to be lifted and the opposite edge to be lowered, (see shaft at the left in Fig. 3 of the drawings,) and one member of each pair of pawls (those located on the left of the shaft at the left of Fig. 3) is raised from engagement with each of the nuts appurtenant to the shaft. The oppositely-located pawls of each of said pairs are permitted to engage each of the nuts 14. As the driving-head is moved in one direction the tongue in one of the nuts engages one of the grooves in the shaft and the applied force tends to rotate said nut. One of the pawls, however, engages the ratchet and prevents movement of the nut, and the shaft is therefore compelled to rotate. The tongue on the opposite nut being located in the groove transversely arranged to that groove just described, the result of the applied force is to cause said nut to move in a reverse direction from that in which the above-described nut would move if not held against rotation. The pawl appurtenant to this nut being beveled in the opposite direction from the pawl which is holding the opposite nut, it is permitted to rotate with the shaft. As the driving-head is moved in the opposite direction it will be obvious that a reversal of the operation of the nuts is caused, that nut which first acted to drive the shaft being now allowed to rotate and the nut which formerly rotated now exerting power to drive the shaft.

In the mechanism appurtenant to the central shaft (illustrated in Fig. 3) the plate 19 is located so that each of the pawls 17 appurtenant to each nut is lifted from engagement with the nut, and the movement of the driving-head therefore does not affect the shaft; but it remains stationary. In the location of the plate 19 as illustrated in connection with the shaft at the right of Fig. 3, the plate being oppositely arranged to that shown in connection with the shaft on the left and as above described, it will be obvious that the operation of the parts is just the reverse of that above described with regard to the shaft at the left, and the shaft at the right will thus be operated in a direction opposite to that of the shaft at the left. In other words, in the location of the parts as shown in Fig. 3 the shaft at the left will be rotated in one direction, the shaft in the center will remain stationary, and the shaft at the right will be rotated in the opposite direction. From this and the description herein given it will be seen that each of the shafts may be rotated in either direction at will or remain stationary and without in any respect affecting the direction of rotation of either of the other shafts.

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

1. In a driving mechanism, a reciprocating member, and means for driving it, a plural number of independently-operated driven members, a driving-head connected with the reciprocating member, and connections between the driving-head and driven members for operating the latter.

2. In a driving mechanism, in combination with a reciprocating member and means for driving it, a driving-head connected with the reciprocating member, a plural number of independently-operated driven members, connections between the driving-head and driven members, and means appurtenant to each driven member for controlling its direction of movement.

3. In a driving mechanism, in combination with a reciprocating member and means for driving it, a driving-head connected with the reciprocating member, a plural number of driven members, and connections appurtenant to each driven member for independently controlling the direction of movement of each driven member.

4. In a driving mechanism, in combination with a reciprocating member and means for driving it, a driving-head connected with the reciprocating member, a plural number of independently-operated driven members extending through the driving-head, and connections between the driving-head and each driven member for controlling the direction of movement of the driven member.

5. In a driving mechanism, in combination with a reciprocating member and means for driving it, a driving-head operatively connected with the reciprocating member, a plural number of independently-operated driven

members, and connections between the driving-head and each driven member for moving the latter in the same direction in the movement of the driving-head in either direction.

6. In a driving mechanism, in combination with a reciprocating member and means for driving it, a driving-head operatively connected with the reciprocating member, a plural number of independently-operated driven members, connections between the driving-head and each driven member for imparting movement to the latter in the same direction in the movement of the driving-head in opposite directions, and means for reversing the direction of movement of the driven member.

7. In a driving mechanism, in combination with a reciprocating member and means for driving it, a driving-head operatively connected with the reciprocating member, a plural number of driven members, connections between the driving-head and each driven member for moving the latter in the same direction in the movement of the head in opposite directions, and means for independently controlling the direction of movement of each of the driven members.

8. In a driving mechanism, in combination with a reciprocating member and means for operating it, a driving-head operatively connected with the reciprocating member, a plural number of driven members, each having spirally-arranged grooves crossing each other, a plural number of sleeves appurtenant to each driven member and having tongues engaging each of said grooves, means for holding a sleeve appurtenant to each driven member from rotation while permitting rotation of the opposite sleeve appurtenant to each driven member, and means for reversing the operation of the sleeves appurtenant to each driven member.

9. In a driving mechanism, in combination with a reciprocating member and means for driving it, a driving-head operatively connected with the reciprocating member, a plural number of driven members each having spirally-arranged grooves crossing each other, a plural number of sleeves appurtenant to each driven member and having tongues engaging each of said grooves, means for holding one of said sleeves appurtenant to each driven member from rotation while permitting rotation of the opposite sleeve appurtenant to each driven member, and means for independently reversing the operation of the sleeves appurtenant to each driven member.

10. In a driving mechanism, in combination with a reciprocating member and means for driving it, a driving-head, a plural number of driven members each having spirally-arranged grooves crossing each other, a pair of sleeves appurtenant to each of the driven members and having tongues engaging each of the grooves in each driven member, each of said sleeves bearing ratchets, pawls arranged to engage the ratchets in each of said sleeves, and means for operating the pawls of the sleeves appurtenant to each driven member to cause reverse movements of each of the driven members.

11. In a driving mechanism, in combination with a reciprocating member and means for driving it, a driving-head operatively connected with the reciprocating member, a number of driven members each bearing spirally-arranged grooves crossing each other, a pair of sleeves appurtenant to each driven member and connected with the driving-head, each pair of sleeves having tongues engaging each of the grooves in the driven member and bearing ratchets, a pair of pawls appurtenant to each sleeve acting in connection with each driven member, and means for operating each pair of pawls to control the direction of movement of the driven member appurtenant thereto.

12. In a driving mechanism, in combination with a reciprocating member and means for driving it, a driving-head operatively connected with the reciprocating member, a plural number of driven members each having spirally-arranged grooves crossing each other, a pair of sleeves appurtenant to each of the driven members and connected with the driving-head, each pair of sleeves bearing tongues in engagement with each of the grooves in its appurtenant driven member and bearing ratchets, a pair of pawls appurtenant to each sleeve acting in connection with each of said driven members, and means for operating the pawls in connection with each driven member to independently control the direction of movement of each of the driven members.

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