

UNITED STATES PATENT OFFICE.

JAMES F. GORDON, OF ROCHESTER, NEW YORK.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 232,486, dated September 21, 1880.

Application filed August 9, 1880. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. GORDON, of Rochester, in the county of Monroe and State of New York, have invented certain Improvements in Mechanical Movements, of which the following is a specification.

My invention relates to mechanical movements; and it consists in a rack divided at a point between its ends into two parts, one of which is caused to move independently of the other, whereby the movement of the rack as a whole is caused to rotate the pinion with which it meshes a greater distance in one direction than in the other.

The invention consists, further, in the combination, with the divided rack and its pinion, of a solid rack and a second pinion, the arrangement being such that both pinions will be rotated positively together at the same rate of speed in one direction, while in the opposite direction one pinion may be given a greater rotation than the other, or caused to rotate faster than the other during a portion of its revolutions.

In the accompanying drawings, Figure 1 represents a perspective view of my improved mechanism with stationary rack; Fig. 2, a longitudinal vertical section of the same; Figs. 3 and 4, views of the two racks, showing the parts of the divided rack in their two positions; Fig. 5, a view of the rack-shifting device; Fig. 6, a longitudinal vertical section of the machine with a rack arranged to vibrate; Fig. 7, a perspective view of the compound vibrating rack detached from the other parts of the machine; and Fig. 8, a perspective view of the under side of the vibrating arm employed therewith.

This mechanism is designed for use in all places where it is desired to rotate a pinion at different speeds during certain periods without changing the speed of the prime motor, or to impart a like motion to two pinions at one time and different relative motions at another time, or to cause one pinion to remain at rest during certain periods, while the other revolves a greater distance.

The invention may be embodied in machines having stationary racks and traveling pinions, or in machines having stationary pinions and traveling racks, both of which forms are shown

in the drawings. The racks may be of any form—straight, curved, or angular—and the teeth may be on any desired face of the same.

I will first describe the machine represented in Figs. 1 to 5, inclusive, in which the stationary rack is shown, and then the form in which a moving rack is employed.

Referring now to Figs. 1 to 5, A represents a horizontal arm having at one end a vertical tubular neck, *a*, and B a base-frame, provided with a strong vertical post or journal, *b*, upon which the neck *a* of the arm A is mounted, so that said arm is free to vibrate in a horizontal plane, the parts being retained in position by means of a central vertical bolt, *c*, as shown.

The lower face of arm A is provided with a longitudinal slot to receive a vertical roller or crank-pin, *d*, secured upon a horizontally-rotating gear-wheel, U, as shown in Fig. 2, so that the rotation of the wheel causes the roller or crank-pin to traverse the slot, and thereby impart the vibratory motion to the swinging arm.

The wheel U is mounted on a cross-bar in the base-frame, and is driven by a pinion, D, mounted on a horizontal driving-shaft, E, sustained in bearings in the frame and receiving motion from any convenient source.

F and G represent two pinions, secured, respectively, to two concentric spindles, *g h*, one of which passes through the other, as shown, and both of which are supported in the outer end of arm A by a surrounding sleeve, *i*. The two pinions are secured firmly to the respective spindles and gear respectively into horizontal rack-bars H and I, which are curved to correspond with the path in which the pinions are carried by the vibrations of the arm A.

The two rack-bars are arranged one directly above the other, and are mounted on the base-frame B. The upper rack, H, is made in one solid piece, and is secured immovably in place, so that it imparts to the pinion F backward and forward rotations equal in number or extent one to the other. The lower rack, I, is divided, preferably at or near the middle, into two parts, in the peculiar manner represented in Figs. 3 and 4, the two adjoining ends being lapped past each other. The forward end of this rack is secured rigidly in place; but the rear end or section is secured in place by pins

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AMBROSE GRIFFIN, OF FREEPORT, MAINE.

STEERING APPARATUS FOR VESSELS.

SPECIFICATION forming part of Letters Patent No. 232,487, dated September 21, 1880.

Application filed August 11, 1880. (No model.)

To all whom it may concern:

Be it known that I, AMBROSE GRIFFIN, of Freeport, of the county of Cumberland and State of Maine, have invented a new and useful Improvement in Steering Mechanism for Navigable Vessels; and I do hereby declare the same to be described in the following specification and represented in the accompanying drawings, of which—

Figure 1 is a top view, and Fig. 2 a sectional elevation, of the after part of a vessel's hull and its rudder provided with my new and improved mechanism for operating or moving the rudder.

The object of the mechanism is to relieve the rudder post or shank of the usual torsion strain to which it is subjected when the power to turn the rudder is applied only to or near the upper end of such post.

In carrying out my invention the mechanism for turning the rudder, besides being applied to the top of the rudder-post, is also adapted to the lower part thereof, whereby, when the rudder is being turned either by its operative mechanism or suddenly by a wave of the sea, all danger of springing or twisting the rudder-post is avoided.

The nature of my invention is fully defined in the claims hereinafter presented.

In the drawings, A denotes the after portion of the hull of a navigable vessel, B being the rudder, and *a* its post. The said post, at its head and foot, is provided with two toothed segments or gears, *b c*, to engage with two other such toothed segments or gears, *d e*, fixed on a shaft, C, arranged abaft of and parallel to the rudder-post, and to extend up through and above the deck and somewhat below the counter, all being essentially as represented. The said shaft should be suitably supported in bearings to admit of it being revolved or turned by power applied to the tiller D, which projects rearward the shaft or the toothed segment at its head. The said tiller is provided with a curved rack, E, to engage with a pinion or gear, F, fixed on the shaft G of the steering-wheel H. This shaft passes through and is sustained by a support-piece, I, resting on the rudder-post. The said rudder-post is to turn in or on the support-piece,

which, while the rudder is being revolved, is stationary.

Furthermore, there is fixed to the steering-wheel shaft a windlass-barrel, K, which is to enable the tiller, in case of breakage of the rack or pinion, to be operated by such barrel and suitable tackle applied to it (the tiller) and the deck, as will be readily understood by seamen.

On turning the steering-wheel in either direction (port or starboard) the tiller will be moved so as to cause the shaft C to turn, whereby the rudder will be simultaneously turned laterally.

I claim as my invention as follows:

1. The combination of the shaft C with the rudder B and their connecting segments or gears *b c d e*, such shaft being directly in rear of and parallel to the rudder-post *a*, and two of the gears being at the upper parts, and the other two at the lower parts of such shaft and rudder-post, and all being to operate substantially as and for the purpose set forth.

2. The combination of the shaft C with the rudder B and their connecting segments or gears *b c d e*, and with the tiller D, extended from the shaft C, at its upper part, or from the gear at the head of such shaft.

3. The combination of the steering-wheel H, its shaft G, and the support-piece I of the latter with the gear F, rack E, tiller D, shaft C, rudder B, and the toothed gears or segments *b c d e*, all arranged and applied substantially in manner to operate as set forth.

4. The combination of the steering-wheel H, its shaft G, and the support-piece I of the latter with the tiller D, the rudder B, the shaft C, and the connecting-gears *b c d e*, all arranged and applied substantially in manner to operate as specified.

5. The combination of the steering-wheel H, its shaft G, and the support-piece I of the latter with the pinion F, rack E, shaft C, rudder B, and the connection-gears *b c d e*, all being adapted essentially and to operate as explained.

AMBROSE GRIFFIN.

Witnesses:

E. W. MITCHELL,
GEORGE T. GRIFFIN.