R. M. FRANKLIN.

Mechanical Movements.

No. 150,556. Patented May 5, 1874.

Fig. 1

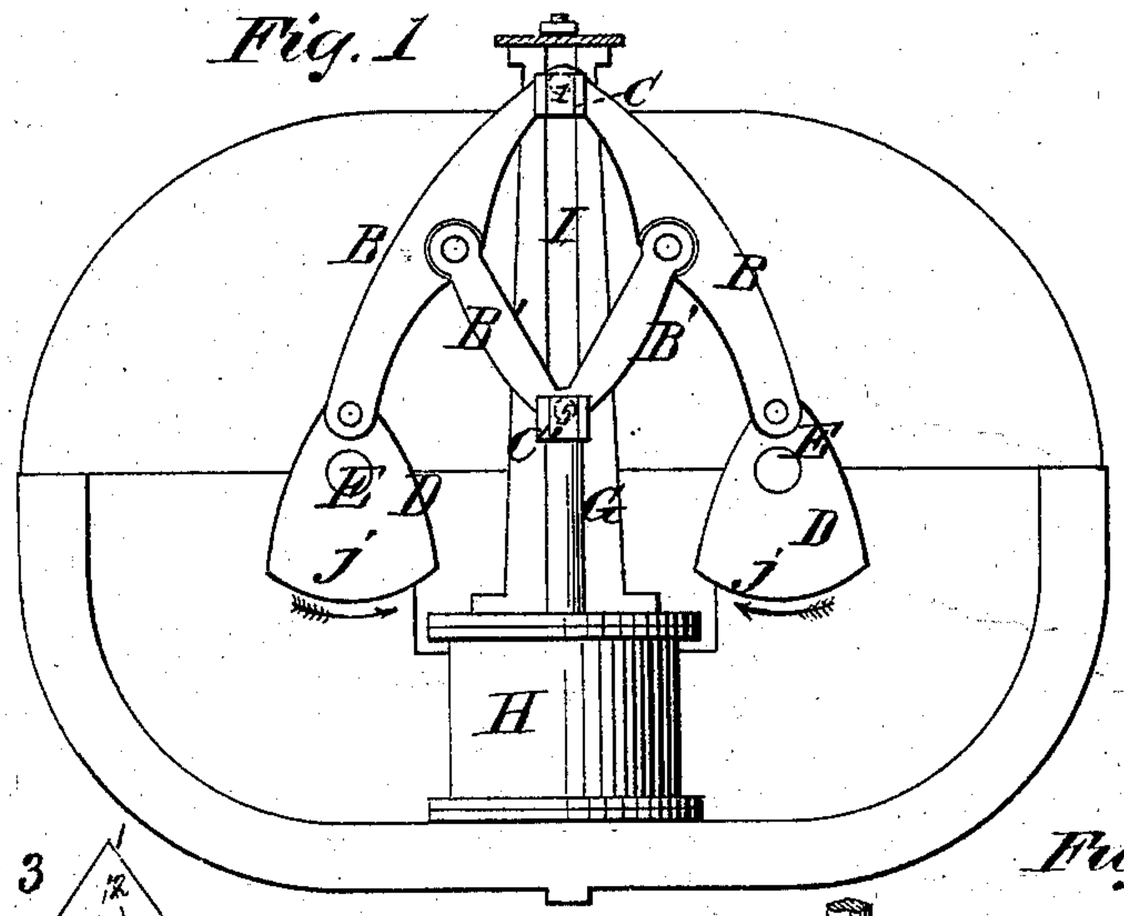


Fig. 3

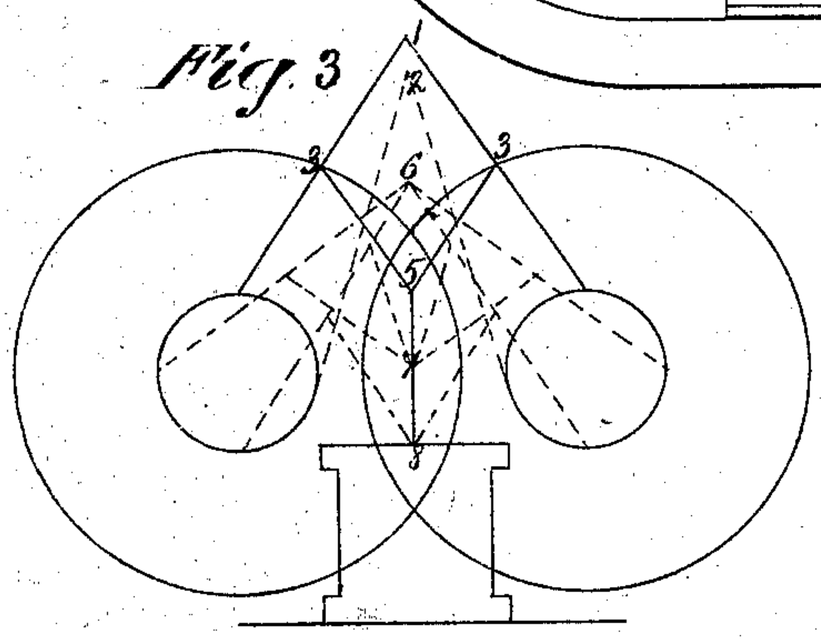
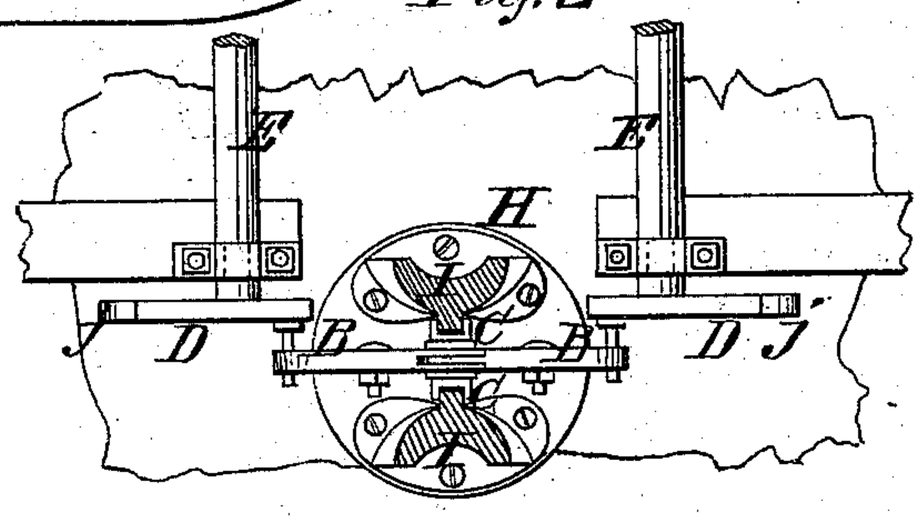


Fig. 2



Witnesses.
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UNITED STATES PATENT OFFICE.

ROBERT M. FRANKLIN, OF GALVESTON, TEXAS.

IMPROVEMENT IN MECHANICAL MOVEMENTS.

Specification forming part of Letters Patent No. **150,556**, dated May 5, 1874; application filed November 12, 1873.

To all whom it may concern:

Be it known that I, ROBERT M. FRANKLIN, of Galveston, in the county of Galveston and State of Texas, have invented a new and useful Mechanical Movement; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings making part of this specification, in which—

Figure 1 is a vertical section, showing my improved mechanical movement applied to a boat for driving the two propellers thereof in opposite directions. Fig. 2 is a horizontal section of the same. Fig. 3 is a diagram illustrating the motions of the mechanical movement.

The nature of my invention consists, first, in the combination of the piston of a single-cylinder engine with two revolving shafts by means of a pair of toggle-levers of equal dimensions pivoted to a sliding cross-head which is rigidly attached to the end of a piston-rod, a pair of connecting rods or levers pivoted by their ends to a second sliding cross-head joined by their other extremities to wrist-pins of balanced cranks on the revolving shafts, and pivoted at points equidistant from their extremities to the pair of toggle-levers which are joined to the piston, the said rods and levers being connected together to form toggle-joint levers, and also connected to rigid pivots of the sliding cross-heads which work in suitable guides in the median line of a plane at a right angle to the plane of the shafts, said rods and levers being all joined and proportioned and attached as hereinafter described; second, it consists in the combination of a pair of toggle-levers pivoted together at one end, a pair of connecting rods or levers pivoted together at one end, and two sliding cross-heads, proportioned and attached as will be hereinafter explained.

B B are two long levers, pivoted by their upper ends to a sliding cross-head, C, and by their lower ends to two cranks, D D, which are loaded, as at *j j*, so as to act as balance-wheels. These cranks are on the inner ends of shafts E E, which, in this instance, are extended to the stern of a boat, and have the wheels A A applied upon their extremities. B′ B′ are two levers—say, as the best proportion, just one-half as long as the levers B B. These are pivoted by their upper ends to the long levers at points midway of the length of said levers, and by their lower ends to a cross-head, C′, which is attached to the rod G of a piston, which works in the single steam or other cylinder H, as represented. I I are guides for the grooved sliding cross-heads to move up and down between. The short levers should, I think, be just one-half the length of the long levers, and their upper ends must be pivoted exactly midway of the long levers to make the travel of the piston uniform. Other proportions of the rods may be varied somewhat to suit various lengths of cranks, sizes of cylinder, and other circumstances.

By reference to the diagram, Fig. 3, it will be seen that the distance between the points 1, 3, 3, and 5 is exactly equal, thus forming a figure which is equilateral, and whose angles vary at different points in the strokes of the piston, but the distance between whose angles always remains the same; thus the piston will travel over equal spaces in equal times. The variations in the crank travel are transferred to the pivot 1. This pivot is rigidly fixed to the cross-heads, and travels from 1 to 2, thence to 6, where it remains stationary while the crank-pin travels one fraction of its circle. The lower pivot 5 is rigidly attached to the piston-rod and to the lower cross-head, and moves to the points 5, 7, and 8, and returns in equal times. The pivots being rigidly attached to the slides is a matter of importance in this mechanical movement.

By this mechanism the cranks are made to travel with nearly, if not quite, a uniform velocity; and, further, a very direct application of power is obtained, and the advantage of having the power of two steam-cylinders united in a single cylinder secured, and at the same time with one cylinder two shafts are uniformly revolved, or nearly so, in opposite directions throughout the stroke of the piston.

In practice double-disk cranks may be substituted for the single-disk cranks, and I think such cranks would give better balance and additional room for eccentrics, thrust-bearings, and journals.

I have thus described my mechanical movement as applied for transmitting motion

from a piston, for which I think it peculiarly adapted; but I do not wish to be confined to this application, because it is obvious that this device may be useful wherever two shafts are to be revolved in opposite directions at the same time, and that the motion may be imparted by means of any of the usual appliances, and particularly by a lever, bell crank lever, and rack and pinion, and in their applications, if uniformity of motion is not indispensable, the proportions of the levers may be more varied, provided the connecting-rods are of equal length, and the toggle-levers are equal and pivoted equidistant from the cross-head of the said rods.

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

1. The combination of the piston of a single-cylinder engine with two shafts by means of a pair of connecting rods or levers, B B, pivoted to a sliding cross-head, a pair of toggle-levers, B′ B′, pivoted to a second sliding cross-head, and attached to and proportioned with the connecting-rods, as specified, and the balanced cranks D D, substantially in the manner and for the purpose described.

2. The combination of a pair of connecting rods or levers, B B, and a pair of toggle-levers, B′ B′, attached as described, with sliding cross-heads, substantially as and for the purposes set forth.

ROBERT MORRIS FRANKLIN.

Witnesses:

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