(No Model.)

M. FRÖHLICH.

MECHANICAL MOVEMENT.

No. 267,181. Patented Nov. 7, 1882.

Fig. 1.

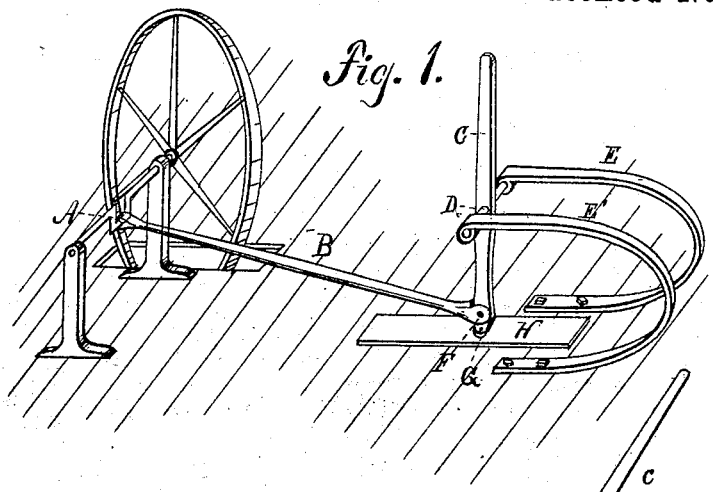


Fig. 2.

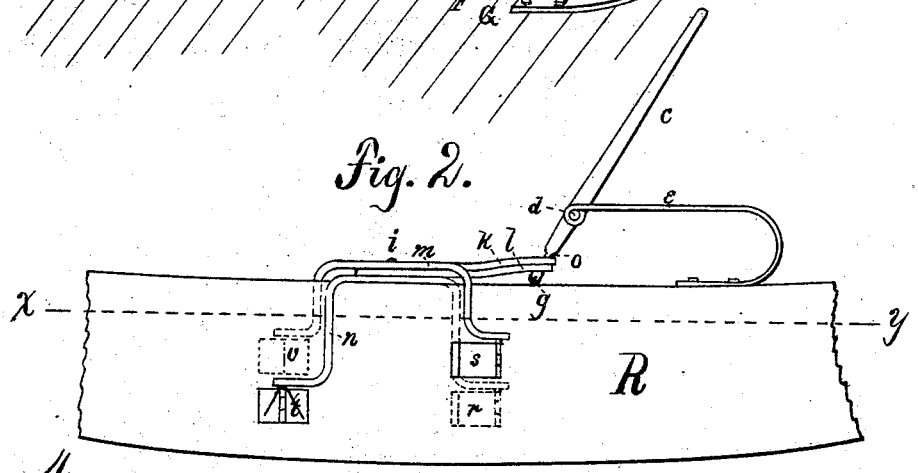


Fig. 4.

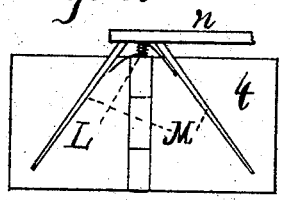
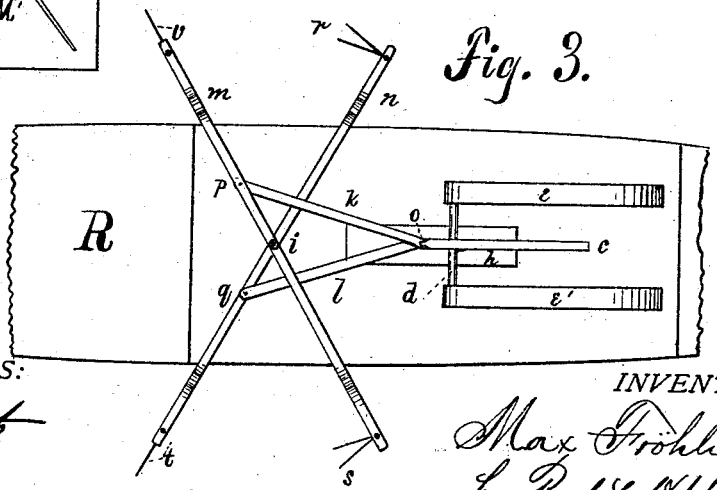


Fig. 3.



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UNITED STATES PATENT OFFICE.

MAX FRÖHLICH, OF FREEPORT, ILLINOIS.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 267,181, dated November 7, 1882.

Application filed September 25, 1882. (No model.)

To all whom it may concern:

Be it known that I, MAX FRÖHLICH, a resident of Freeport, in the county of Stephenson and State of Illinois, have invented certain new and useful Improvements in Mechanical Movements; 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 pertains to make and use the same.

My invention is an improved device for applying power to the running of machinery through the use of a reciprocating lever. The motion of the lever may be converted into rotary motion by means of a crank, or may be applied directly to the machinery without change of form. In either case the device is equally applicable, and I have shown it in the drawings herewith presented in both forms of application.

In said drawings, Figure 1 is a view in perspective of the device as applied to the conversion of reciprocal into rotary motion, the reciprocating lever being connected with an ordinary crank-shaft; Fig. 2, a side elevation, showing the device as applied to a rowing-machine, the motion being applied directly; Fig. 3, a plan of same, and Fig. 4 an elevation showing details of paddle of rowing-machine.

As shown in the drawings, two parallel curved springs, E E′, Fig. 1, *e e′*, Figs. 2 and 3, are bolted at their lower ends to a rigid support. At their upper free ends is journaled a shaft, D *d*, and on this shaft, as a fulcrum, works a reciprocating lever, C *c*, whose normal position is parallel with the line of pressure of the springs. At the lower end of the lever is journaled a roller, G *g*, and a strip of metal or other suitable material serves as a track for the roller. It is evident that as the lever is moved back and forth the perpendicular distance between the shaft D *d* and the track on which the roller moves will be greatest at the middle of each stroke and least at the end of the stroke. In other words, as the lever approaches the middle of the stroke a certain amount of deflection of the springs will be caused and a corresponding amount of power stored up in the springs to be given out as the lever recedes from its central position and approaches the end of the stroke. As represented in Fig. 1, the lever is connected by means of a pitman, B, with an ordinary crank-shaft, A, and the length of the pitman is such that at the middle of the stroke of the lever the pitman is at right angles to the crank. By this arrangement a portion of the power applied to the lever C is stored up by the springs at that part of the stroke when the leverage on the crank is most advantageous, and the power so stored is given off at a time when the power applied to the crank is less effective. As shown in Figs. 2 and 3, the power applied to the lever is communicated by means of the pitmen *k l* to two crossed arms, *m n*, provided at their lower ends with feathering paddles, *r s t u*, and journaled at their centers on a common pivot, *i*. The length of the pitman *k l* is such that at the middle of the stroke of the lever *c* the arms *m n* are parallel, the arm *m* being directly above the arm *n*, and both being at right angles to a line joining the foot of the lever *c* and the pivot *i*. In this case, as in that of the crank-shaft, the spring is deflected at that part of the stroke of the lever when the power is applied most advantageously to the arms *m n*, and the power so stored is given off as the arms assume a position more and more oblique to the line joining their center and the foot of the lever *c*.

In the rowing device shown, the springs *e e′* and arms *m n* are attached to the deck or other stationary frame-work of a boat, R, the lever being forward of the arms. The arm *m* in all positions is above and passes over the arm *n*, both arms being bent downward at their outer ends below the water-line *x y*. At the outer end of each arm is a paddle, *t*, Fig. 4, consisting of two wings, pivoted at their line of intersection and provided with braces M M, which support the wings in their backward movement through the water. As each paddle moves toward the bow of the boat the resistance of the water folds the wings together, while on the return-stroke the wings are thrown back against the braces M M, and in a line with each other, and offer the greatest possible resisting-surface to the water.

I believe this device to be new, but make no claim to it in this application, as what I desire to cover by the present application is the use of the power-applying device in general, and

the applications shown in the drawings are only intended to illustrate its use.

It is evident that a single spring may be substituted for two parallel springs in the construction shown, or that instead of deflecting a spring of the form shown the lever may be so arranged as to lengthen or compress a coiled spring, or lift a weight, at the middle of each stroke. Any such arrangement, however, being a mechanical equivalent of the device shown, would not be a departure from the principle embodied in this invention.

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

1. In a device for applying power to the moving of machinery, the combination of a reciprocating lever and means, substantially as described, whereby a portion of the power applied to the lever may be stored up at the middle of each stroke thereof and used at the end of the stroke.

2. In a power-applying device, the combination of a reciprocating lever, a yielding fulcrum on which said lever is pivoted and means whereby said fulcrum may be deflected from its normal position at the middle of each stroke of the lever and return thereto at the end of each stroke, substantially as and for the purpose described.

3. The combination, of the springs E E′, shaft D, lever C, and roller G, substantially as and for the purpose set forth.

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

MAX FRÖHLICH.

Witnesses:
R. H. WILES,
J. A. SHUTZ.