

(No Model.)

G. J. ALTHAM.

DEVICE FOR CONVERTING MOTION.

No. 273,699.

Patented Mar. 13, 1883.

Fig: 1.

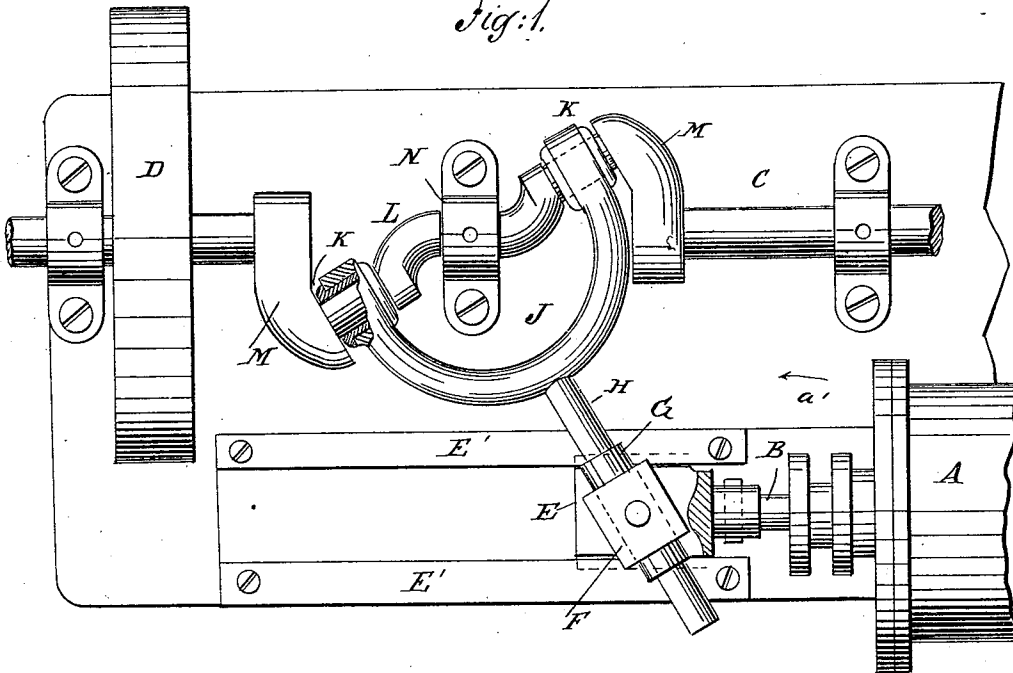


Fig: 2.

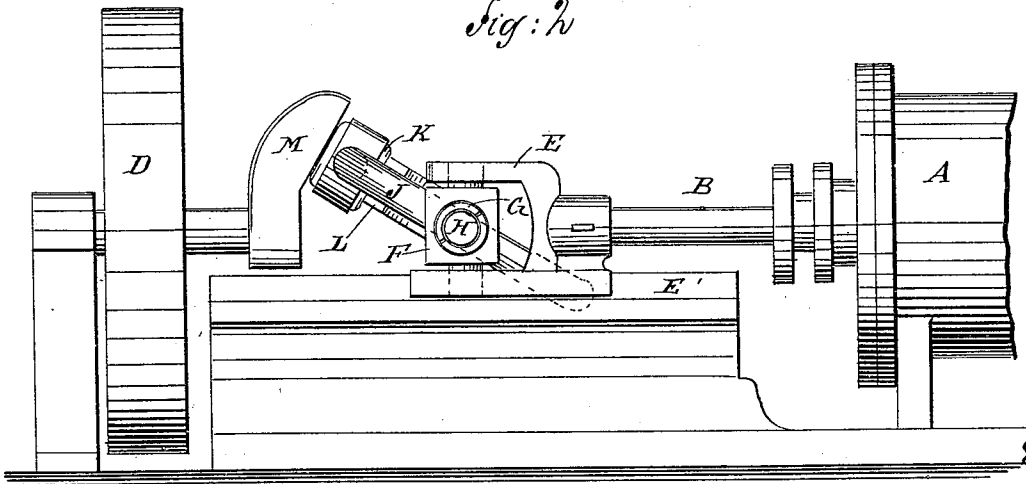
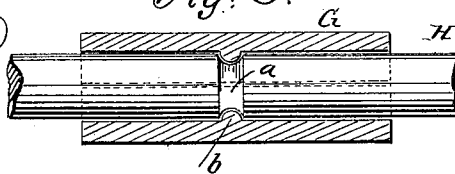


Fig: 3.



WITNESSES:

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GEORGE J. ALTHAM, OF SWANSEA, MASSACHUSETTS.

DEVICE FOR CONVERTING MOTION.

SPECIFICATION forming part of Letters Patent No. 273,699, dated March 13, 1883.

Application filed August 16, 1882. (No model.)

To all whom it may concern:

Be it known that I, GEORGE J. ALTHAM, of Swansea, in the county of Bristol and State of Massachusetts, have invented a new and Improved Device for Converting Motion, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved device for converting reciprocating into rotary motion, the reciprocating movements being parallel with the longitudinal axis of the rotary shaft to which the motion is transmitted.

The invention consists in the combination, with a shaft having opposite cranks connected by a diagonal arm, of a connecting-rod terminating in a fork having the ends of its shanks journaled on the ends of the diagonal shaft, which connecting-rod passes loosely to turn, but not to slide, within a sleeve adapted to slide in a rocking box on the end of the reciprocating piston-rod, whereby the reciprocating motion of the piston-rod will be converted into rotary motion in the shaft, as will be more fully described hereinafter.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of my improved device for converting motion. Fig. 2 is a longitudinal elevation of the same. Fig. 3 is a longitudinal sectional elevation of the sleeve of the connecting-rod.

The cylinder A is so located that its piston-rod B will be parallel with the shaft C, to which the converted motion of the reciprocating piston-rod B is to be transmitted. The shaft C may be provided with a fly-wheel, D; or a propeller may be mounted on the end of the same, or devices may be mounted on the same for transmitting the motion to another shaft. A cross-head, E, sliding on tracks E' in the usual manner, but parallel with the shaft C, is attached to the outer end of the piston-rod B and contains a pivoted box, F, which is adapted to oscillate or turn in a horizontal plane—that is, it is pivoted at the top and bottom. The said box F is provided with a transverse aperture adapted to receive a sliding sleeve, G,

through which the connecting-rod H passes, which is provided with an annular groove, a, into which an annular internal ridge, b, of the sleeve G passes, whereby the connecting-rod H cannot move longitudinally in the sleeve G, but can turn in the same. The connecting-rod H is provided at one end with a fork, J, the shanks of which terminate in eyes holding journal-boxes K, through which the ends of a diagonal shaft, L, pass, which diagonal shaft connects two opposite arms or cranks, M, of the shaft C, which arms have the outer ends of their inner surfaces beveled parallel with each other, so that the ends of the diagonal shaft L will be at right angles to the inner surfaces of the cranks M, to which they are rigidly secured. The middle of the diagonal shaft L is made parallel with the shafts C, so that the middle of the said shaft L can be supported by a journal-box, N, resting on a suitable stand-ard or support.

The operation is as follows: If the cranks M are in position shown in Fig. 1, and the piston-rod B moves in the direction of the arrow a', that arm of the fork J nearest the fly-wheel D will press on the arm M nearest the fly-wheel D, and that shank of the fork J farthest from the fly-wheel D will draw on the arm M farthest from the fly-wheel. The pressure of the end of the shank of the fork J cannot exert itself parallel with the shaft C, but presses the arm M upward or downward until the same has described half a circle, the movement of which is at right angles to the shaft C, and the other shank of the fork J draws on the other arm, M, of the shaft C, and turns the same either upward or downward in a half-circle at right angles to the shaft B. Then it completes the circle during the return movement of the piston-rod B in the inverse direction of the arrow a'. That shank of the fork J that formerly pushed now pulls, and the one that pulled now pushes. In this manner the reciprocating motion of the piston-rod B is changed into a rotary motion in the shaft C. A continuation of the connecting-rod H in all cases would strike the middle of the diagonal shaft L, and the connecting-rod H will oscillate forward and backward in a horizontal plane, the middle of the diagonal shaft L form-

ing the center on which the connecting-rod H swings. As the said connecting-rod H always swings in a horizontal plane, and as the ends of the shanks of the fork are alternately on opposite sides of the shaft C, the free end of the connecting-rod H will move in the arc of a circle; and as the ends of the shanks of the fork J are alternately above and below the shaft C, the connecting-rod H will be oscillated on its longitudinal axis. For these reasons the connecting-rod H must be adapted to turn in the sleeve G, and the said sleeve G must be adapted to slide in the box F, which is pivoted so that it can adapt itself to the different inclinations of the connecting-rod H in relation to the shaft C. I have shown but one piston combined with the shaft C; but two can be combined with it as well—one on each side—and the above-described device for converting motion may be connected with any kind of engine. It is especially adapted for use in screw-propeller vessels, as the pistons will then occupy but very little space, for they can be placed parallel with the shaft C and very close to the same.

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

1. The combination, with a shaft having opposite cranks connected by a diagonal shaft, of a connecting-rod terminating in a fork journaled on the ends of the diagonal shaft, substantially as herein shown and described, whereby reciprocating motion applied on the connecting-rod will be converted into rotary motion in the shaft, as set forth.

2. The combination, with a shaft having opposite cranks connected by a diagonal shaft, of a connecting-rod terminating in a fork having its ends journaled on the ends of the diagonal shaft, and of a rocking box held in the cross-head of the connecting-rod and adapted to receive the free end of the connecting-rod, substantially as herein shown and described, and for the purpose set forth.

3. The combination, with the shaft C, provided with the opposite cranks M, connected by the diagonal shaft L, of the connecting-rod H, terminating in the fork J, having its ends journaled on the ends of the diagonal shaft L, the rocking box F on the cross-head E, and the sliding sleeve G in the cross-head, which sleeve surrounds the connecting-rod H, substantially as herein shown and described, and for the purpose set forth.

4. The combination, with the shaft C, provided with the opposite cranks M, connected by the diagonal shaft L, of the rod H, terminating in the fork J, having its ends journaled on the ends of the diagonal shaft L, the rocking box F on the cross-head E, and the sliding sleeve G, provided with an annular internal ridge, *b*, passing into an annular groove, *a*, in the connecting-rod H, substantially as herein shown and described, and for the purpose set forth.

5. The combination, with the shaft C, of the crank-arms M, having their inner surfaces diagonal to the shaft C, the diagonal shaft L, having its ends attached to the inner surface of the cranks M, at the ends of the same, the connecting-rod H, terminating in the fork J, journaled on the shaft L, and of devices for reciprocating the end of the connecting-rod H, substantially as herein shown and described, and for the purpose set forth.

6. The combination, with the shaft C, provided with opposite cranks M, connected by the diagonal shaft L, of the connecting rod H, terminating in the fork J, journaled on the ends of the shaft L, the devices for reciprocating the free end of the rod H, and of the journal box or bearing N, supporting the middle of the diagonal shaft L, substantially as herein shown and described, and for the purpose set forth.

GEORGE J. ALTHAM.

Witnesses:

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