

(No Model.)

E. E. MILLER.

DEVICE FOR CONVERTING MOTION.

No. 261,866.

Patented Aug. 1, 1882.

Fig. 1

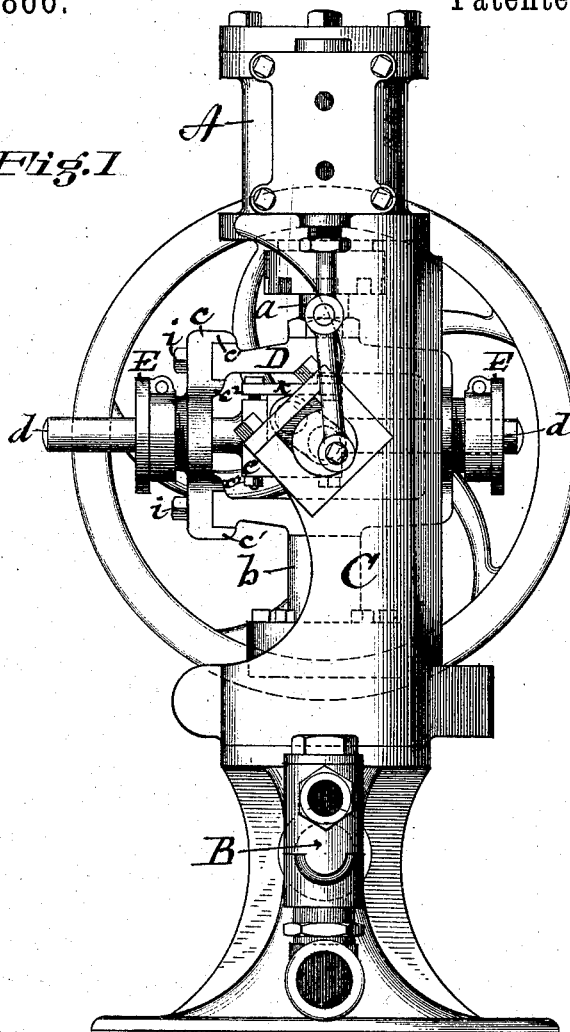
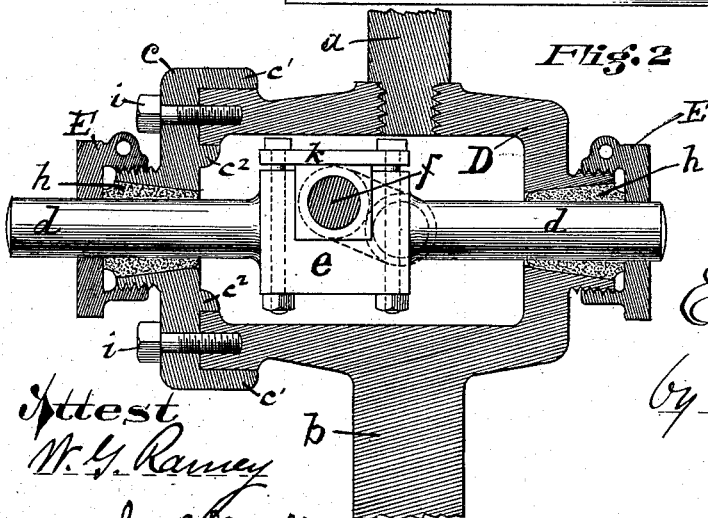


Fig. 2



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DEVICE FOR CONVERTING MOTION.

SPECIFICATION forming part of Letters Patent No. 261,866, dated August 1, 1882.

Application filed May 17, 1882. (No model.)

To all whom it may concern:

Be it known that I, EDGAR E. MILLER, a citizen of the United States, residing at Canton, Ohio, have invented new and useful Improvements in Devices for Converting Motion, of which the following is a specification.

My invention relates to devices for interconverting reciprocatory and rotary motion, and more particularly to that form of mechanism for this purpose commonly known as the "Scotch yoke." As ordinarily constructed and used, this consists of a yoke interposed between and connecting two pistons in the same straight line, said yoke embracing a slot with parallel faces extended at right angles with the axes of the pistons, and a sliding box or roller constituting the bearing for the crank-pin arranged to reciprocate laterally between the slot-faces as guides.

The reciprocation of the piston is transmitted into the rotation of the shaft through the medium of the yoke, the sliding box or roller, and the crank.

In practical operation this device is subject to certain disadvantages, among which are the unequal wear upon the slot-faces of the yoke, due to inequality of pressure at different positions of the crank, the excessive friction, (particularly in the sliding-box device,) due to the above-mentioned cause, and the tendency to lateral displacement out of the true plane of motion, which is greatly aggravated by lost motion in the working parts. Besides this, in the device as thus ordinarily constructed, it is difficult and expensive to repair the wear of use.

The object of my invention is to remedy these and other disadvantages, and provide a mechanism for practical use which shall relieve the unequal wear referred to, lessen friction, and consequently increase the available power, and also enable all lost motion to be easily and effectually taken up.

To these ends my invention consists in dispensing with the features of a sliding box or roller moving upon parallel interior surfaces of the yoke, and substituting therefor a block or bearing for the wrist-pin of the crank, carried in or upon a rod which I term a "traverse-rod," arranged to reciprocate horizontally in bearings arranged upon the ends of the yoke.

For convenience of illustration I have shown in the drawings hereto attached a reciprocating steam-pump or boiler-feeder, to which my invention is applied.

Figure 1 is a vertical elevation of the pump complete, with the parts constituting my invention partly shown and partly indicated by dotted lines; and Fig. 2 is a transverse longitudinal section of the yoke, shown detached, with the traverse-rod and box in position.

In the drawings, A, B, and C designate the steam-cylinder, water-cylinder, and connecting-frame, respectively, of the steam-pump to which my invention is applied. The pump is of an ordinary type of direct-acting pumps in which a fly-wheel is employed to secure steadiness of motion in the working parts.

The steam piston-rod *a* and the pump-plunger *b* are connected in the same straight line by a yoke, D, which may be cast or otherwise formed in any convenient shape. I do not limit myself to any particular form or construction of the yoke, as these may be varied in many ways without departing from the spirit of my invention. It being necessary, however, to provide a means of removing at will the traverse-rod hereinafter described, I prefer to construct the yoke with a detachable end, *c*, normally held to its position by set-screws or bolts *i* passing through into the ends of the yoke D. The part *c* is cast or formed with flanges or abutments *c'* *c''*, between which the ends of the yoke D rest and are secured as in sockets, by which construction any accidental displacement of the parts is prevented. The detachable end piece, *c*, and the opposite short end of the yoke are suitably provided for the bearings of the traverse-rod, which consists substantially of a rod, *d*, of convenient strength, enlarged at the center into a block, *e*, in which is a rectangular opening to receive the "brasses" constituting the immediate bearings of the crank-wrist. These bearing-brasses are constructed in the usual manner and require no detailed description.

A cap, *k*, secured to the block *e* by set-screws, holds the brasses in position and enables any lost motion to be taken up. The parts are proportioned and arranged to maintain the axis of the crank-pin *f* in the axial plane of traverse-rod, the latter reciprocating longi-

tudinally in its bearings in the yoke as the crank-shaft rotates.

The bearings in the traverse-rod in the yoke may be constructed in various ways. A simple depression in the sides of the yoke in which the traverse-rod may rest in bearing-brasses of the ordinary construction, and be secured by a covering-cap held by set-screws, will in many cases answer the purpose. In such case the yoke need not be constructed with a detachable end piece, as I have described. I prefer, however, to construct the bearings as shown in the drawings, but which I need not particularly describe herein, as I intend making the same the subject of a separate application for Letters Patent, and therefore do not claim such construction herein.

The operation of the device is somewhat similar to that of the Scotch yoke. As the piston rod *a* and the plunger *b*, with the intervening yoke or connecting-piece *D*, reciprocate vertically, the revolution of the crank causes the block *c* to reciprocate horizontally with its traverse-rod *d* in the bearings or bushings *h*.

Among the advantages arising from the use of my invention it may be mentioned that it entirely obviates the binding tendency usually experienced in the sliding-box construction, and preserves the proper alignment of parts perfectly.

The traverse-rod also possesses the function of an equalizing-bar, and distributes the strains due to unequal pressure at different parts of the stroke equally upon the bearings of the rod. This reduces the friction materially and renders it a simple and inexpensive matter to take up any lost motion due to wear.

It will also be observed that this construction makes practically a universal joint in respect to the crank-pin connection, whereby the crank-pin bearing is enabled to accommodate itself to an imperfect alignment of the fly-wheel shafts.

Having described my invention, I claim and desire to secure by Letters Patent—

1. The device for converting reciprocating into rotary motion, embodying the combination of a reciprocating traverse-rod carrying a box or bearing for the crank-pin and a yoke or equivalent support for the bearings of the traverse-rod, substantially as set forth.

2. In a Scotch yoke for converting motion, a reciprocating box or bearing for the crank-pin, provided with extensions at opposite sides adapted to move in bearings in or upon the ends of the yoke, substantially as set forth.

3. In a yoke device for converting reciprocating into rotary motion, the yoke *D*, adapted to receive a reciprocating rod, *d*, carrying the crank-wrist bearing, substantially as specified.

4. In a yoke device for converting reciprocating into rotary motion, the yoke *D*, provided with a detachable end or head, *c*, in combination with the traverse-rod *d* and crank-wrist bearing, substantially as set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

EDGAR E. MILLER.

Witnesses:

H. A. SOLIDAY,
JAS. A. RAYNOLDS.