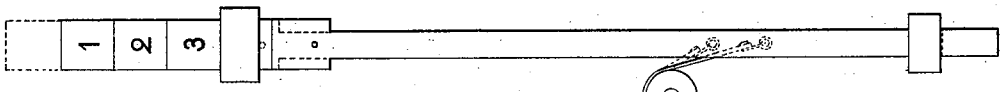
2 Sheets—Sheet 1.

H. B. RENWICK.

Shuttle-Box Mechanism for Looms.

No. 209,714. **Patented Nov. 5, 1878.**



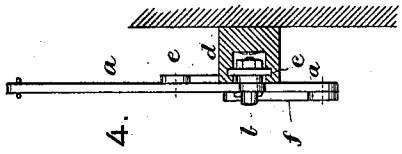


Fig: 4.

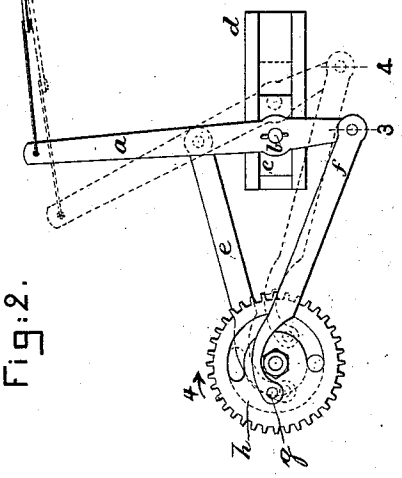


Fig: 2.

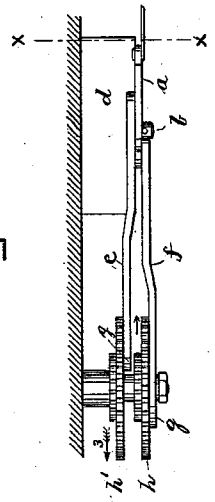


Fig: 3.

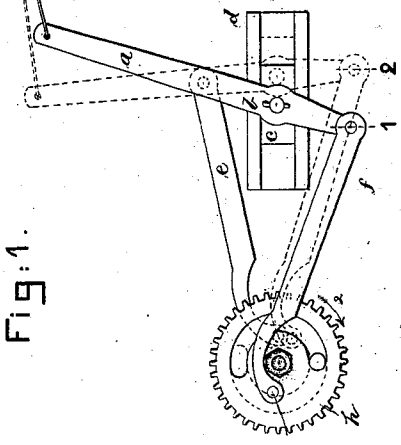


Fig: 1.

Witnesses.

L. F. Connor.

N. E. Whitney

Inventor.

Henry B. Renwick

by Crosby & Gregory Attys

2 Sheets—Sheet 2.

H. B. RENWICK.

Shuttle-Box Mechanism for Looms.

No. 209,714. **Patented Nov. 5, 1878.**

Fig: 5

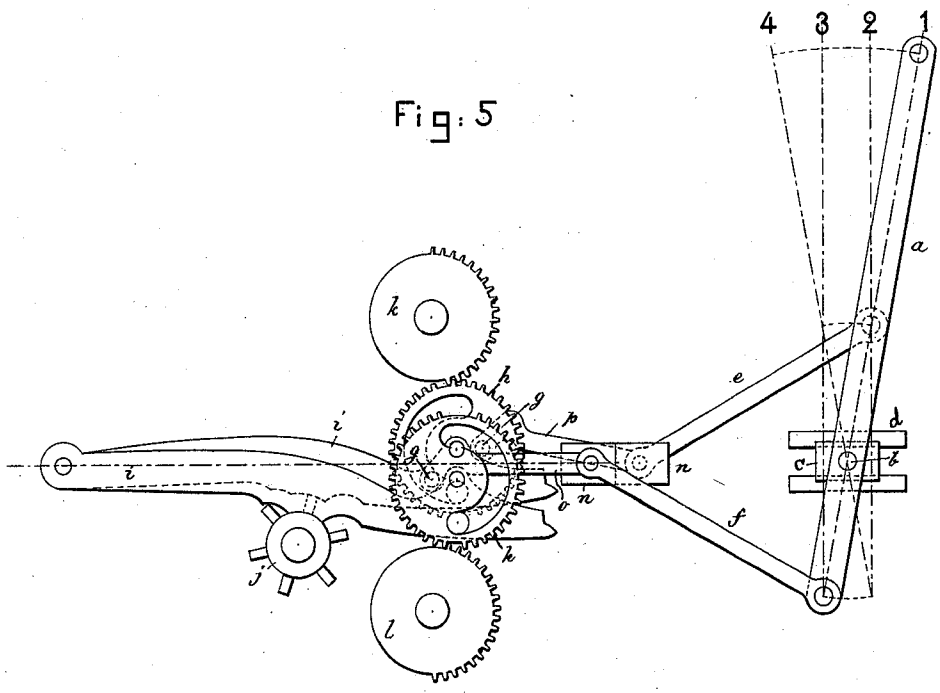
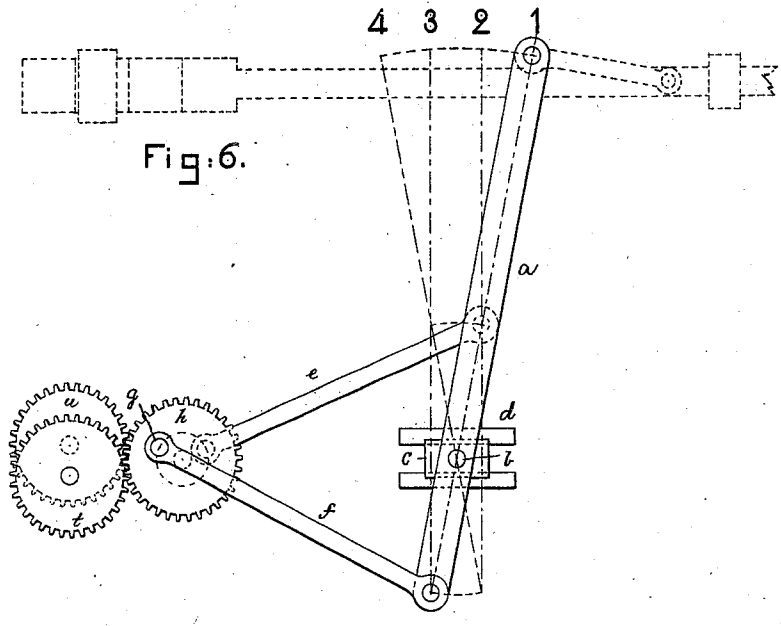


Fig: 6.



Witnesses.

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by Crosby & Gregory Attys

UNITED STATES PATENT OFFICE.

HENRY B. RENWICK, OF NEW YORK, N. Y., ASSIGNOR TO GEORGE CROMPTON, OF WORCESTER, MASS.

IMPROVEMENT IN SHUTTLE-BOX MECHANISMS FOR LOOMS.

Specification forming part of Letters Patent No. **209,714**, dated November 5, 1878; application filed April 22, 1878.

To all whom it may concern:

Be it known that I, HENRY B. RENWICK, of the city, county, and State of New York, have invented an Improved Contrivance for Shifting the Shuttle-Boxes of Looms; and that the following, taken in connection with the drawings, is a full, clear, and exact description thereof.

In the drawings, Figure 1 represents, in side elevation, a sufficient portion of a loom to illustrate one embodiment of my invention, it showing a shuttle-box lever connected by connecting-rods with gears such as are common to the Knowles loom, in one position by full and another by dotted lines, such gears being commonly held in such manner as to both turn on their axes and vibrate with their axes, so as to be in gear with either of two constantly-revolving toothed surfaces. Fig. 2 is a side elevation, showing the same devices in two other different positions, so as by the full and dotted lines of both Figs. 1 and 2 to show the four positions in which the shuttle-boxes may be placed by the single lever. Fig. 3 is a top view of Fig. 1, the boxes being omitted. Fig. 4 is a cross-section taken on the lines *x x*, Fig. 3, to show the slide which carries the lever. Fig. 5 shows, in elevation, the contrivance applied to the parts of a Knowles loom. Fig. 6 is an elevation of a modified form of the contrivance, wherein the cranks are mounted on gears which have only a motion of revolution or a turning motion on their axes.

In my contrivance a single lever only is employed, actuated by cranks moving through half a revolution, or thereabout, and by means of this lever a series of either three or four shuttle-boxes may be properly shifted under the direction of an ordinary pattern chain or barrel.

In all the drawings this lever is represented at *a*, and is provided with a pivot or steadying pin, *b*, which is mounted on a slide, *c*, which is free to move in proper guides *d*, as the cross-head of a steam-engine or pump moves in its guides. At two points on this lever there are attached to it by proper joints connecting-rods *e f*, and these connecting-rods are at their other ends attached to crank-pins *g*, mounted on a shaft in such a manner that the crank-pins may either oscillate through a half-revolution, or a little more, or may rotate in the same direction from one dead-center to the other, or vice versa.

The contrivance therefore consists, essentially, of a lever, of two connecting-rods, of a steadying-pin, and of a slide on which the steadying-pin is mounted, and two crank-pins.

In Figs. 1, 2, and 3 the crank-pins are represented as secured to gear-wheels *h h'*, which in practice will be mounted upon radius-bars, such as shown at *i*, Fig. 5, whose positions are regulated by a pattern barrel, *j*, or chain, so that either gear-wheel *h* or *h'* may be in gear with one or the other of two constantly-revolving toothed surfaces, *k l*, or so that either or both gear-wheels may be out of gear with both the toothed surfaces, as in the well-known Knowles loom.

In the modification shown in Fig. 5, the connecting-rods *e f*, instead of being directly attached at one of their ends to the crank-pins of the gears *h*, are attached to intermediate slides *n*, fitted to move in suitable guides, such as employed for slide *c*, which slides *n* are connected to the crank-pins by secondary connecting-rods *o p*.

Referring to Fig. 1 of the drawing, the full lines show the lever *a* connected by a cord or chain to the rod *r* of a series of four shuttle-boxes, and in the position it will occupy when No. 1 shuttle-box is at the level of the race; but such lever may, however, be connected with the rod *r*, or directly with the series of boxes, and by other devices than a cord or chain, as by a link, as in dotted lines, Fig. 6, or by a slot and pin.

By moving the crank-pin *g* of the gear-wheel *h*, in the operation of the loom, through half a revolution, or through a little more than half a revolution, as in the Knowles loom, in the direction of arrow 2 in Fig. 1, the connecting-rod *f* will be moved to place lever *a* and slide *c* in the position shown in dotted lines in such figure, thereby bringing the No. 2 shuttle-box in position.

Viewing Figs. 1 and 3, by rotating gear-wheel *h'* in the direction of arrow 3 through half a revolution, (see Fig. 3,) leaving the gear-wheel *h* stationary, the connecting-rod *e*,

joined with the wheel *h'*, will move the lever *a* and slide *n* from the position shown in full lines, Fig. 1, to the position shown in full lines, Fig. 2, thus placing No. 3 shuttle-box at the level of the race.

To reach No. 4 box, the lever, as shown in full lines, Fig. 2, is moved by the semi-rotation of gear-wheel *h* in the direction of arrow 4, it moving the lower end of lever *a*, through the connecting-rod *f*, to the position shown in dotted lines, Fig. 2.

It is obvious from this explanation that any one of four shuttle-boxes may be located and held opposite the race.

In Fig. 6 the contrivance is represented as having the gear-wheels upon which the crank-pins are mounted provided with non-vibrating axes, and actuated by two other gear-wheels, *t u*, which may be caused to oscillate and revolve under the direction of a pattern-chain by mounting them on radius-bars and causing them to gear with either of two constantly-revolving toothed surfaces, (not represented in this figure,) or to stand out of gear with these toothed surfaces, as described of the parts *k l*, Fig. 5.

In this modification there would be two gear-wheels to support the crank-pins, two others on vibrating axes always gearing with those carrying the crank-pins, and two toothed surfaces, like those shown at *l k* in Fig. 5.

I also intend to move the gears carrying the cranks by large gear-wheels, provided with laterally-projecting pins, acted upon by pawls moved by a shaft in the loom and governed by a pattern-chain, such devices being shown in English Patent No. 1,455, June 14, 1860.

In fact, the means for moving the crank-pins are unimportant, so long as such means will move them through a half or about half a revolution when it becomes necessary.

When the contrivance is to be applied to shift a tier of only three shuttle-boxes, then the crank nearest that end of the lever from which the motion to move the box-rod is taken should have its throw reduced, and the end of the lever will then, under a proper proportion of the throw of the cranks and length of lever, assume only three positions. The steadying-pin and slide may be shifted toward one or the other end of the lever.

I claim—

The herein-described combination of two crank-pins, mechanism to operate them, a single lever mounted upon a slide, two connecting-rods joining the crank-pins with the said lever each side its pivotal point upon the slide, and a connection, substantially such as is described, between the said lever and a tier of shuttle-boxes, whereby said lever will operate a tier of shuttle-boxes, substantially as set forth.

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

HENRY B. RENWICK.

Witnesses:
G. W. GREGORY,
N. E. WHITNEY.