

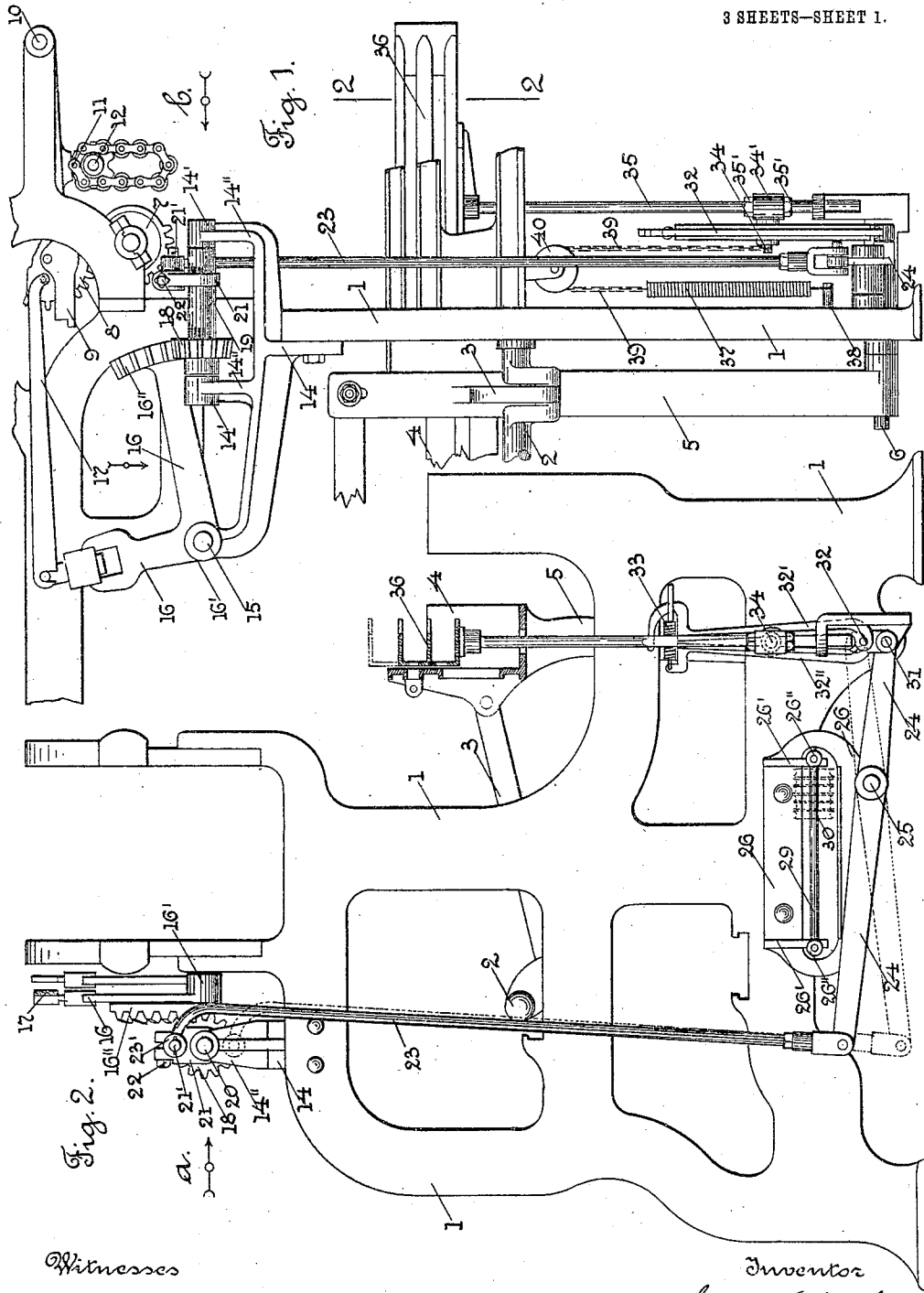
No. 868,271.

PATENTED OCT. 15, 1907.

G. F. HUTCHINS.
SHUTTLE BOX MOTION OF LOOMS.

APPLICATION FILED MAR. 24, 1905.

3 SHEETS—SHEET 1.



Witnesses
M. Bredt.
M. Heas.

Inventor
George F. Hutchins
By John C. Dewey,
Attorney.

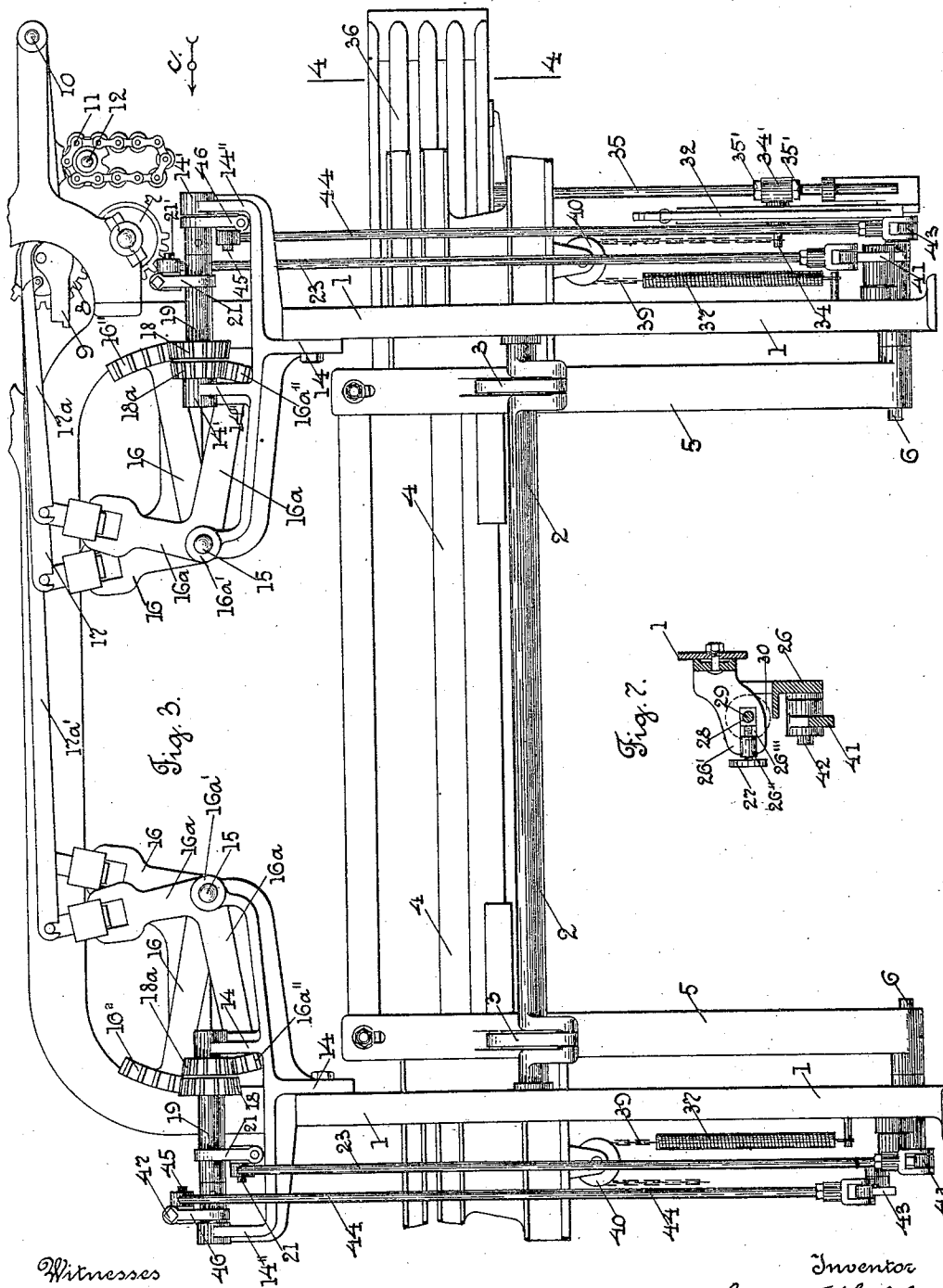
No. 868,271.

PATENTED OCT. 15, 1907.

G. F. HUTCHINS.
SHUTTLE BOX MOTION OF LOOMS.

APPLICATION FILED MAR. 24, 1905.

3 SHEETS—SHEET 2.



Witnesses
M. B. Redd
W. H. Hearn

Inventor
George F. Hutchins
By John C. Dewey
Attorney.

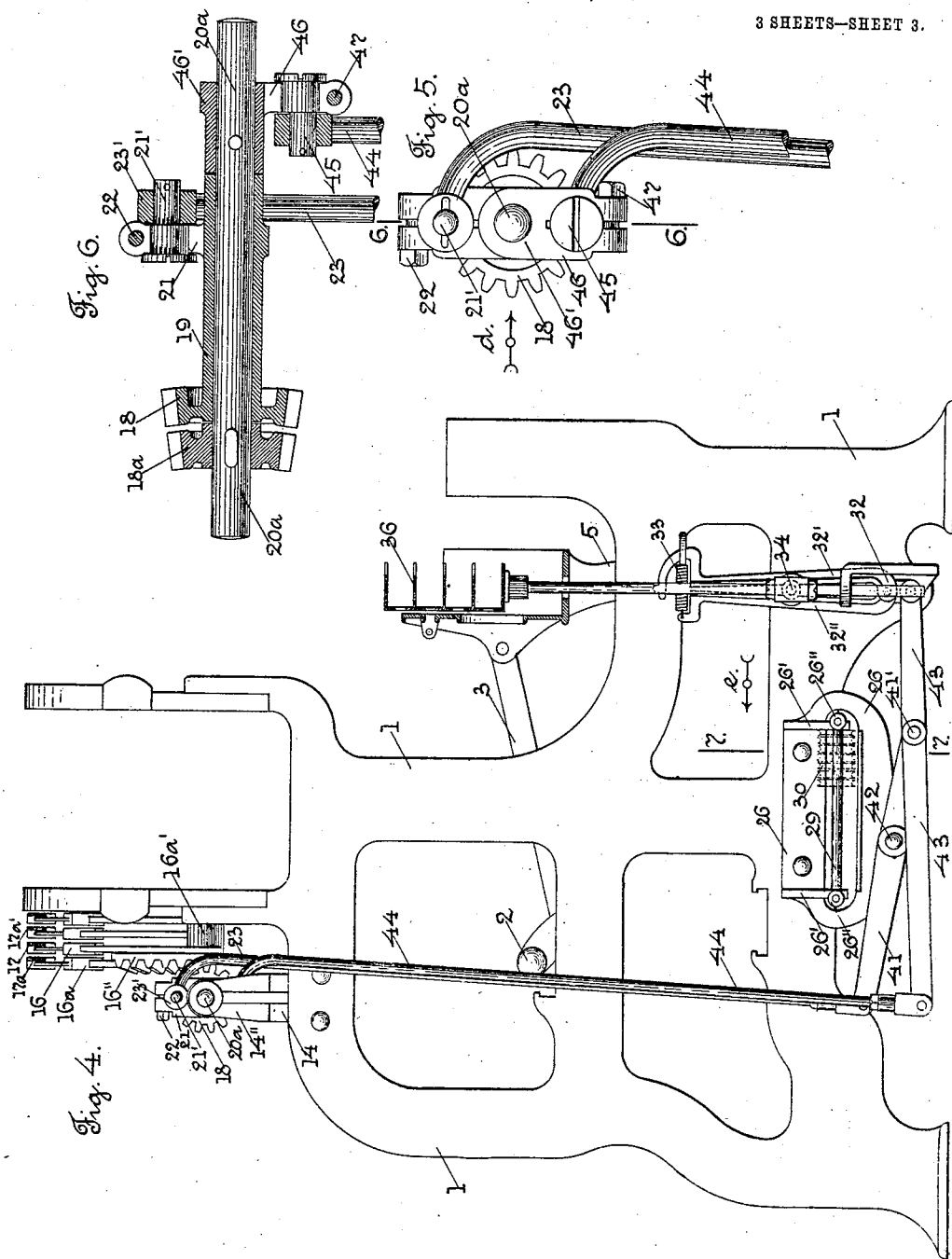
No. 868,271.

PATENTED OCT. 15, 1907.

G. F. HUTCHINS.
SHUTTLE BOX MOTION OF LOOMS.

APPLICATION FILED MAR. 24, 1905.

3 SHEETS—SHEET 3.



Witnesses
M. Bredt.
M. Heas.

Inventor
George W. Hutchins
By John C. Dewey
Attorney.

UNITED STATES PATENT OFFICE.

GEORGE F. HUTCHINS, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO CROMPTON & KNOWLES LOOM WORKS, A CORPORATION OF MASSACHUSETTS.

SHUTTLE-BOX MOTION OF LOOMS.

No. 868,271.

Specification of Letters Patent.

Patented Oct. 15, 1907.

Application filed March 24, 1905. Serial No. 251,721.

To all whom it may concern:

Be it known that I, GEORGE F. HUTCHINS, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Shuttle-Box Motions of Looms, of which the following is a specification.

My invention relates to improvements in looms, and more particularly to improvements in the shuttle box motion of looms of the class which have two or more shifting or change shuttle boxes at one, or both ends of the loom.

The object of my invention is to provide an improved construction of the connections, intermediate the pattern surface, which indicates for the movement of the shuttle box rod, and the shuttle boxes, and particularly the construction of the connections shown and described in U. S. Letters Patent No. 787,448, of April 18, 1905, in which in each set of connections, intermediate the pattern indicator lever and the vertically moving shuttle box rod, there are two cranks to obtain a double crank motion, each crank at each movement thereof, moving through an arc of substantially one hundred and eighty degrees.

In my present improvements, I preferably locate the second crank in the connections intermediate the pattern indicator lever and the vertically moving shuttle box rod, at the upper part of the loom, and I provide a stand bolted to the loom side carrying a shaft and a rotary sleeve thereon; said sleeve having a crank arm thereon and a gear which is adapted to mesh with and be driven by a segment of a gear on an angle lever pivotally mounted on said stand, as will be hereinafter fully described.

I have only shown in the drawings sufficient parts of a loom with my improvements combined therewith, to enable those skilled in the art to understand the construction and operation thereof.

Referring to the drawings:—Figure 1 is a rear view of one end of a loom frame, and parts of a loom thereon, showing two movable shuttle boxes, at said end with my improvements combined therewith, looking in the direction of arrow *a*, Fig. 2. Fig. 2 is a section, on line 2, 2, Fig. 1, looking in the direction of arrow *b*, same figure; the pattern indicating mechanism is not shown in this figure. Fig. 3 is a rear view of a loom frame, with parts of the loom thereon, showing four movable shuttle boxes at one end, with my improvements combined therewith. Fig. 4 is a section, on line 4, 4, Fig. 3, looking in the direction of arrow *c*, same figure. The pattern indicating mechanism is not shown in this figure. Fig. 5 is, on an enlarged scale, an end view of some of the parts shown at the left in Fig. 4. The stand

shown in Fig. 4 is not shown in this figure. Fig. 6 is a vertical section, on line 6, 6, Fig. 5, looking in the direction of arrow *d*, same figure. Fig. 7 is a detached section, on line 7, 7, Fig. 4, looking in the direction of arrow *e*, same figure.

In the accompanying drawings, 1 are the loom sides or frames, 2 is a crank shaft, 3 the connectors to the lay 4, carried on the lay swords 5, which are pivotally mounted at their lower ends on studs 6.

On one end of the loom at the upper part thereof, in this instance the right hand end, is located the pattern mechanism for controlling the movement of the shuttle boxes. Said pattern mechanism may be of any ordinary and well known construction, in this instance the well known Knowles type, shown and described in U. S. Reissue Letters Patent, No. 7,784, of July 3, 1877.

In the drawings I have only shown the lower cylinder gear 7, the vibrator gear 8, pivotally mounted on the vibrator lever 9, which is pivotally supported at its outer end on a rod 10, and extends over the pattern surface 11, carried on the pattern cylinder 12, and made up of rolls and tubes, in the ordinary way.

I will now describe my improvements, and first the improvements shown in Figs. 1 and 2, in which two shuttle boxes 36 are shown at one end of the loom.

A stand 14, preferably made of the shape shown in Fig. 1, is bolted to the upper part of the loom frame, at the rear part thereof, as shown in Fig. 2. The stand 14 carries a stud 15 on which is pivotally mounted the hub 16' of an angle lever 16. One arm of the angle lever 16 is connected at one end with the vibrator connector 17, and the other end of the vibrator connector 17 is pivotally connected with the vibrator gear 8 of the pattern mechanism, in the usual way. The other arm of the angle lever 16 has thereon, at its outer end, and preferably integral therewith, teeth, or a segment of a gear 16'' which meshes with a bevel gear 18, on a sleeve 19, which may be fast on a shaft 20, rotatively mounted in bearings 14' on uprights 14'' on the stand 14, or may be loose on said shaft 20, to rotate independently thereof.

The sleeve 19 has a crank arm 21 thereon, which has a crank pin 21', secured in a slot in said arm by a bolt 22, see Fig. 2. On the crank pin 21' is pivotally mounted a hub 23' on the upper end of a connector 23. The upper end of the connector 23 is preferably bent as shown in Fig. 2, to prevent the connector engaging with the stand 14. The lower end of the connector 23 is connected to one end of a box lever 24, which is pivotally mounted on a stud 25. The stud 25 is preferably carried on the lower front face of a bracket or sheave stand 26 bolted to the outside of the lower part of the loom frame. The bracket 26 has in this instance two out-

wardly extending arms 26' thereon, with bosses 26'' at the outer ends of said arms having threaded openings therein, which receive the thumb screws 27, see Fig. 7.

The arms 26' have openings 26''' therein, in each of which are supported and adapted to move in a horizontal plane, blocks 28, which are secured on the ends of a rod 29, on which are loosely mounted sheaves 30, around which the cords from the harness jacks, not shown, to the harnesses, pass.

The end of the box lever 24, opposite from the end connected to the lower end of the connector 23, carries a pin 31, on which is pivotally mounted the lower end of a give-way mechanism 32, which in this instance consists of two arms 32' and 32'', which are pivotally connected at their lower ends, and yieldingly held together by a spring 33 at their upper ends, in the well known way. The inner edges of the arms 32' and 32'' are recessed to receive a stud 34, in the usual way.

The stud 34 has a hub 34' thereon, see Fig. 1, through which the lower end of the box rod 35 extends, and which is held in the hub 34' by nuts 35' in the ordinary way. On the upper end of the box rod 35 are carried two shuttle boxes 36, shown in Figs. 1 and 2.

A balance spring 37 is preferably used in connection with the shuttle boxes 36, in the usual way; said spring 37 is attached at one end to a stud 38 on the loom frame, and at its other end to one end of a chain or flexible connection 39, passing over a pulley 40. The other end of the flexible connection 39 is attached to the stud 34.

The operation of the shuttle box motion, shown in Figs. 1 and 2, at one end of the loom, will be readily understood by those skilled in the art. The movement of the vibrator gear or crank 8, from the position shown in Fig. 1, through an arc of substantially one hundred and eighty degrees, will, through vibrator connector 17, move the angle arm 16, and the segment of the gear 16'' thereon, in the direction of the arrow Fig. 1. The movement of the segment of the gear 16'', in mesh with the bevel gear 18, will rotate said gear and the sleeve 19, and the crank arm 21, to cause said crank arm 21 to move to its opposite position, through an arc of substantially one hundred and eighty degrees. The movement of the crank arm 21 will, through connector 23, move the box lever 24, and box rod 35, to change the position of the shuttle boxes, all as indicated by broken lines in Fig. 2.

In Figs. 3 and 4, I have shown my improvements in shuttle box motion connections, adapted to be applied to four movable shuttle boxes at each end of the loom. In said Figs. 3 and 4, the connections shown in Figs. 1 and 2 are duplicated at each end of the loom, and two long vibrator connectors 17^a extend back of the loom frame to the shuttle box motion connections on the opposite end of the loom.

The same letters of reference are used in Figs. 3 to 6 inclusive, for the parts similar to the parts shown in Figs. 1 and 2.

I will now describe the additional parts shown in Figs. 4 to 6, inclusive.

In order to obtain four different positions for the four different cells of the shuttle boxes shown in Fig. 4, I preferably use the form of compound box lever shown in Fig. 4. The main lever 41, Fig. 4, is cen-

trally pivoted on a stud 42 on the casting 26, and on the forward end of said lever 41, on a stud 41', is pivoted a second lever 43, one end of which is connected to the lower end of the give-way mechanism of the shuttle box motion, and the other end is pivotally connected to the lower end of a connector 44. The upper end of the connector 44 is pivotally connected to a crank pin 45, secured in the slotted crank arm 46, see Fig. 6, by a bolt 47. The hub 46' of the crank arm 46 is fast on a shaft 20^a which corresponds to the shaft 20, in Fig. 2, and is similarly mounted in bearings 14', on uprights 14'' on the stand 14, see Fig. 3.

On the inner end of the shaft 20^a is fast a bevel gear 18^a, which meshes with a segment of a gear 16^{a''} on one arm of an angle lever 16^a, having a hub 16^{a'} pivotally mounted on the stud 15 on the stand 14. The other arm of the angle lever 16^a is connected to the vibrator connector 17^a, which is connected with the vibrator gear 8.

The connections, between the rear end of the box lever 41 and the vibrator connector 17, in Fig. 3, correspond exactly with the connections between the box lever 24, and the vibrator connector 17, in Figs. 1 and 2, and the same letters of reference are used to designate the same parts, and said parts do not need to be again described.

On the opposite end of the loom, or the end away from the box pattern mechanism, in case shifting shuttle boxes are used on said end of the loom, the same connections, intermediate the vertically moving box rod of the shuttle boxes and the vibrator gear, are used as above described, and the same figures of reference are used to indicate the same parts, shown in Fig. 3 of the drawings.

In order to operate the shuttle boxes on the end of the loom away from the pattern mechanism, so that the same pattern mechanism will operate both sets of shuttle boxes from one end of the loom, the vibrator connectors are lengthened, so that they will reach across the loom at the rear of the arch, as shown in Fig. 3.

In the operation of the loom, the movement of the pattern surface will move one of the vibrator levers to bring a vibrator gear into engagement with the upper or lower cylinder gear in the usual way, and the rotary motion of the vibrator gear will, through a vibrator connector and an angle lever connected therewith, and the segment gear on said angle lever, communicate a rotary motion to one of the gears 18, or 18^a, to operate one of the cranks 21, or 46, and through a connector to the compound box lever, raise or lower the vertically moving box rod, and the boxes thereon, to the desired position relative to the race-way of the lay, according to the indications of the pattern surface, in the ordinary and well known way.

In each set of connections, intermediate the vibrator lever and the shuttle boxes in the 4 x 4 box loom are two cranks, each moving through an arc of substantially one hundred and eighty degrees, to obtain a double crank motion for moving the shuttle boxes.

It will be understood that the details of construction of my improvements will be readily understood by those skilled in the art.

The bracket, forming the support for the box lever,

and also the support for the guide sheaves, shown in the drawing, and above described, is not claimed herein, as the same forms the subject-matter of another application, Serial No. 366,111, a division of this application.

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

10 1. In a shuttle box motion of a loom, a pivotally mounted box lever, connections therefrom to a crank, and said crank, a gear connected with and operating said crank, a pivoted lever having thereon teeth or a gear segment operating said gear, a connection from said lever to a second crank, and said second crank forming a part of the pattern mechanism.

15 2. In a shuttle box motion of a loom, the combination with a pivotally mounted box lever, and a vibrator lever, of intermediate connections, comprising therein a pivoted lever, having thereon teeth meshing with a gear, and said

gear connected with and operating a crank, and said crank, and connections therefrom to the box lever.

3. In a shuttle box motion of a loom, a pivoted lever, having on one side thereof teeth adapted to mesh with and operate a gear and move a crank connected with said gear through an arc of substantially one hundred and eighty degrees and said gear and crank.

4. In a shuttle box motion of a loom, a stand bolted to the loom frame, a lever pivotally mounted on said stand, and having teeth thereon, and connected with the pattern indicating mechanism, and said pattern indicating mechanism, and a shaft mounted on said stand, a gear on said shaft in mesh with the teeth on said lever, a crank on said shaft operated by said gear, and connections from said crank to the box lever, and said box lever.

GEORGE F. HUTCHINS.

Witnesses:

J. C. DEWEY,
M. HAAS.