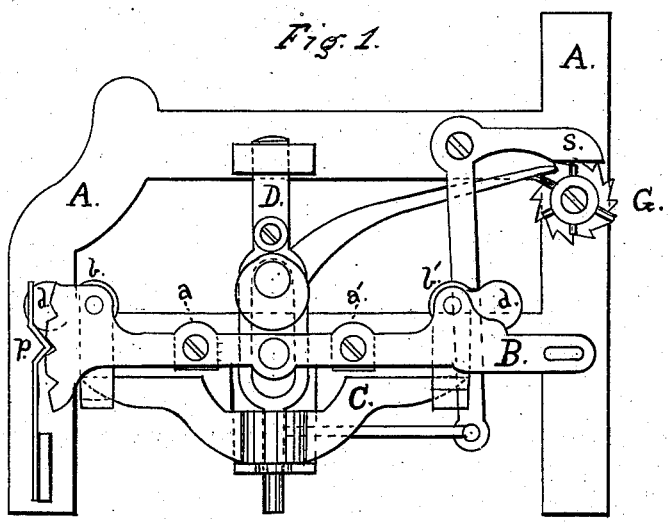
R. B. GOODYEAR.

SHUTTLE-BOX MOTIONS FOR POWER-LOOMS.

No. 194,771. Patented Sept. 4, 1877.

Fig. 1.



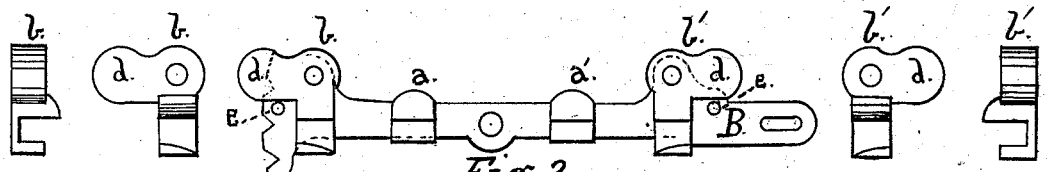


Fig. 2.

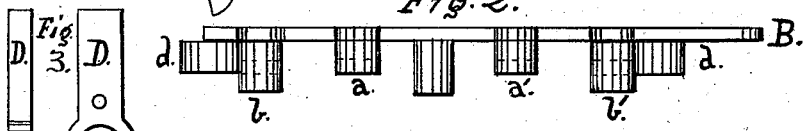
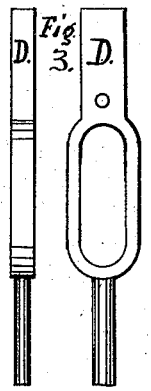


Fig. 3.



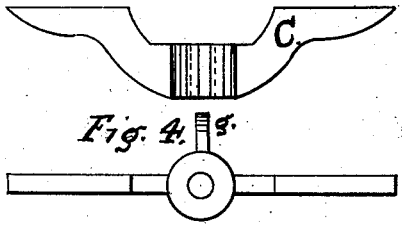


Fig. 4.

Witnesses.
W. F. Marcus.
Wm. H. Ziegler

Inventor.
Robert B. Goodyear.
by his Attorney
John Shinn.

UNITED STATES PATENT OFFICE.

ROBERT B. GOODYEAR, OF PHILADELPHIA, ASSIGNOR OF ONE-HALF HIS RIGHT TO WOLFENDEN, SHORE & CO., OF CARDINGTON, PA.

IMPROVEMENT IN SHUTTLE-BOX MOTIONS FOR POWER-LOOMS.

Specification forming part of Letters Patent No. **194,771**, dated September 4, 1877; application filed February 2, 1877.

To all whom it may concern:

Be it known that I, ROBERT BURNS GOODYEAR, of the city of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Shuttle-Box Motions for Power-Looms, which improvement is fully set forth in the following specification and accompanying drawings, in which—

Figure 1 is an end view of a loom-frame, showing my improvements. Fig. 2 is a view of the oscillating lever, and fixed and loose shoes. Fig. 3 is a view of the vertical sliding yoke. Fig. 4 is a view of the anchor-lifter.

Similar letters in the drawings refer to like parts.

The object of my invention is an improvement on the well-known "anchor shuttle-box motion," by which it is adapted to make, when desired, a full lift or drop of the shuttle-box, skipping the middle box in the upward or downward movement of the boxes; and the invention consists in the combination of two pairs of shoes or steps on the oscillating lever, one pair being fixed, and the other pair pivoted to work loosely on studs fixed to the oscillating lever, and an anchor-lifter with arms constructed to operate either pair of shoes, all as will be hereinafter described.

As before stated, my invention is an improvement on the well-known anchor-box motion; and it is understood by those accustomed to operate this motion that the pattern chain or wheel is provided with movable pins of different lengths, and that when a box has been shifted by a pin of a certain length, it requires a pin of that length to hold the box in position, and the latter is changed by using a pin of a different length, or by leaving out a pin, forming a blank space; and it will be well to state and specify that all the parts for working my improvements are similar to those employed in that motion, with the exception that the oscillating lever B has two sets of shoes or steps, one set being fixed and the other set being hung loosely on studs fixed to the lever B, and the arms of the anchor-lifter are constructed so that they may engage both sets of shoes or steps on lever B.

In order that a full and clear understanding of my invention may be had, the general construction of the box-motion, as shown in the drawings, will be described.

A represents the loom-frame, which is constructed in the usual manner. B is the oscillating lever that operates the shuttle-boxes, and at the end toward the right, in which is shown a slot, it is connected to the lifting-rod of the box. In the opposite end of lever B are three notches, each notch representing a box. With these notches engages the heel of a steel spring, *p*, which holds the lever B, and it in turn holds the boxes in position during the flight of the shuttle.

On lever B are two fixed shoes, *a a'*, and two, *b b'*, that are hung loose on studs which are fixed to the lever B. These shoes are all formed with two steps. Those on the loose shoes are in form of a jaw, (see details of Fig. 2,) and the loose shoes *b b'* are each constructed with a weighted arm, *d*, which rests on the small pin *e*. (Shown on lever B, Fig. 2.) D is the vertical sliding yoke, and is fitted to work in guides fixed to the side of the loom-frame A, the slotted part working over the cam-shaft and hub of lever B. On the lower part of this yoke, and fitted to work loosely, is the anchor-lifter C. From the hub of the anchor-lifter projects an arm, *g*, by which it is connected through suitable links and levers to, and is operated by, the pattern-wheel G, provided with movable pins of different lengths, in precisely the same manner as in the beforementioned anchor motion.

Motion to the yoke D, anchor-lifter C, and pattern-wheel G is given by eccentric cams on the cam-shaft in the same manner as in the aforesaid motion.

The operation of my improved box motion is as follows: Referring to the drawings, Fig. 1 shows the lever B, with the spring *p* in the middle notch, in the left end of the lever. This position represents the middle box as in use, and while the box remains in that position the lever S will rest on one of the short pins in the wheel G, (two lengths of pins being used and shown in the drawings.) In the next move of the wheel a long pin will act on the lever S, and that will move the right-hand arm of lifter C out, and, as it is raised by the yoke D, it will press against the bottom

step of shoe *b'*. This will raise the bottom shuttle-box to its working position, and the spring *p* will be in the top notch in the end of lever B. The next move of the wheel G will present a short pin, when the lifter C will be thrown back to the position shown in the drawing, or parallel to the loom side, and the left-hand arm of lifter C will engage the upper step of shoe *b*, and lower the box to the middle one, and the spring *p* will be in the middle notch. The next move of the pattern-wheel will present also a short pin, and there will not be any change of box; but at the next move a long pin will be presented. This will raise the box, as before described, to operate the shuttle from the bottom box, and the spring *p* will be in the top notch. The next move of the pattern-wheel G will present a blank, the pin being left out, and the left-hand arm of lifter C will be forced out and under the top step into the jaw formed on shoe *b*. This will allow the lifter C to engage on shoe *a*, and this movement will drop the box a full drop, skipping the middle box, and in doing this the lifter will give the full movement by the shoe *a*, and it, being the nearest to the center of the lever B, does not travel as fast as shoe *b*, and the lifter-arm, being in the jaw of shoe *b*, would cause it or the arm of the lifter to break; but to provide against this the shoe *b* is hung loosely on a stud fixed to the lever B, and the bottom of the jaw on shoe *b* is rounded off to correspond to the point of the arm of lifter C, and this enables the shoe *b* to yield and slide off the point of the lifter, and as the lifter C drops the shoe *b* will resume its former position, the weighted arm *d* resting on the stop-pin *e* in lever B. Should the next move of the pattern-wheel G present a long pin, the arm on the right hand of lifter C will be forced out and under the top step and into the jaw formed on shoe *b'*, and the right-hand arm of lifter C will engage shoe *a'*. This will produce a full lift of the shuttle-box, skipping the middle box, as before, in the full drop, and as the lever B is raised the shoe *b'* will move on its stud, preventing breakage, as before described, in the drop.

It is understood that to make a full drop or lift, skipping a box, the lifter C acts on the fixed shoe *a* or *a'*, and to work the boxes in succession the lifter acts on the shoes *b* and *b'*, and the position and movements of the boxes are controlled by the arrangement and position of the pins in the pattern roller or chain.

Having thus described my invention, I claim—

The combination of lever B, fixed shoes *a* *a'*, loose shoes *b* *b'*, and anchor-lifter C, as shown and described, and for the purpose specified.

ROBERT B. GOODYEAR.

Witnesses:
H. R. EDMONDS,
WM. N. MARCUS.