J. SHINN.

SHUTTLE-BOX MOTIONS FOR LOOMS.

No. 193,783. Patented July 31, 1877.

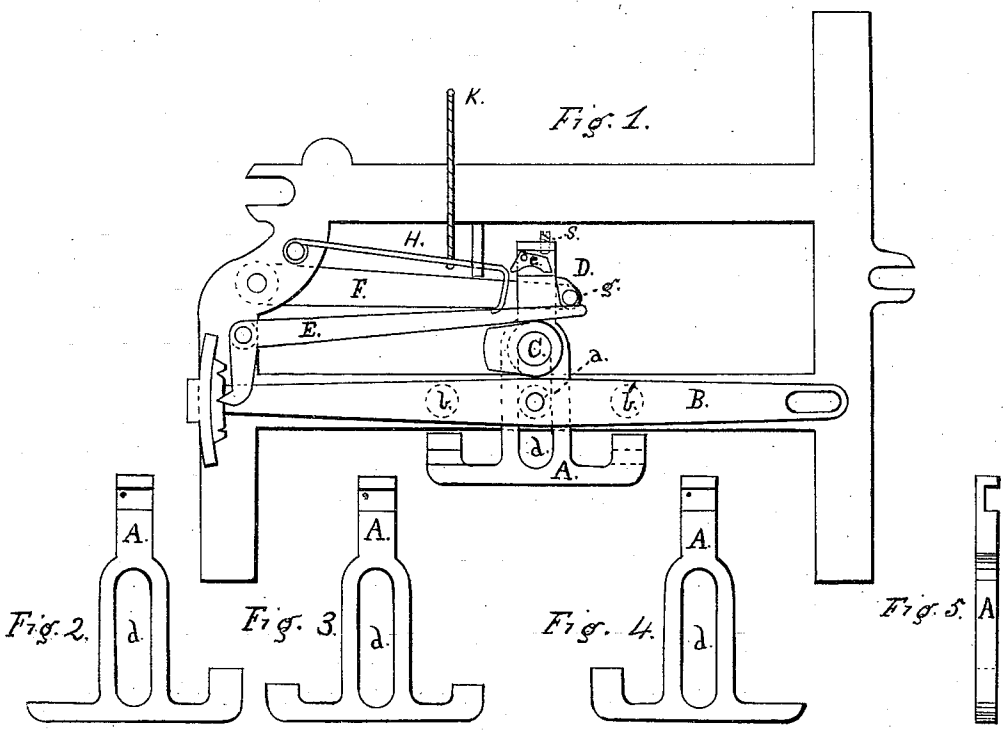

Fig. 1.

Fig. 2. Fig. 3. Fig. 4. Fig. 5.

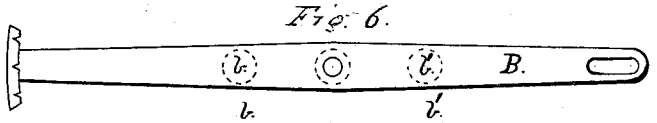

Fig. 6.

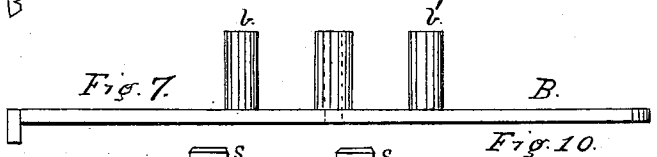

Fig. 7.

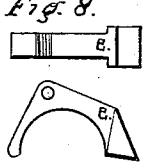

Fig. 8.

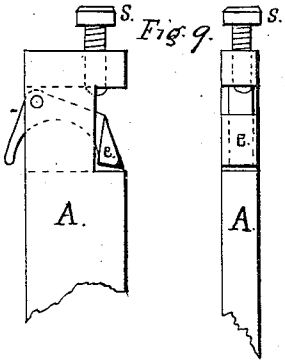

Fig. 9.

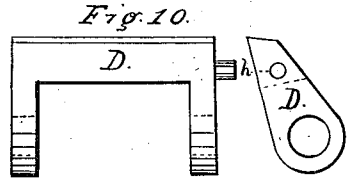

Fig. 10.

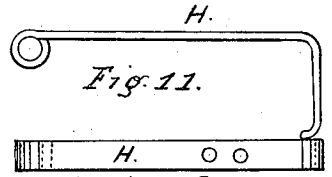

Fig. 11.

Witnesses.

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JOHN SHINN, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN SHUTTLE-BOX MOTIONS FOR LOOMS.

Specification forming part of Letters Patent No. **193,783**, dated July 31, 1877; application filed October 26, 1876.

To all whom it may concern:

Be it known that I, JOHN SHINN, of the city of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Shuttle-Box Motions for Looms, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

The object of my invention is the construction of a shuttle-box motion, in which motion each box will be controlled independently of the other, and any box may be called at will. The same may be controlled by a pattern-roller, with movable screws or pins, a roller-chain, or a pin-chain, or by cards with holes, similar to those used in the Jacquard machine.

The invention consists in the combination, with an oscillating lever, of a series of anchor-shaped lifters, one for each box, all as will be hereinafter described.

Referring to the drawings, Figure 1 represents the side of a loom, with portions of a shuttle-box motion, showing my improvements. Figs. 2, 3, 4, and 5 are views of the anchor-lifters. Figs. 6 and 7 are views of oscillating lever. Fig. 8 is an enlarged view of the anchor-lifting catches. Fig. 9 is an enlarged view of the top part of the anchor-lifter. Fig. 10 is an enlarged view of the yielding catch-lifter. Fig. 11 is an enlarged view of the finger that connects the pattern device and operates the catches in the lifting-anchors.

Similar letters of reference refer to like parts.

C is the bottom or cam shaft, B the oscillating lever. The end of this lever, to the right, has a slot. At this end the lever B is connected in the usual manner to the lifting-rod, for raising and lowering the boxes. The left or opposite end of the lever B is a friction clamp or brake, the inner side of which shows three V-shaped notches, or one for each box to be operated. Into these notches engages the heel of the lever E. The lever B is pivoted on a stud, *a*, fastened to the loom side, upon which it oscillates freely.

All of these parts of the box-motion are old, well known, and are now being extensively used in many factories in Philadelphia and other places. These parts are now also extensively used in a shuttle-box motion built by the Bridesburg Manufacturing Company of Philadelphia, and known to the trade as the "anchor shuttle-box motion."

My invention will be considered as an improvement on the same.

The lever B is constructed with two projecting arms, *b b'*, which are of equal distance from the center. The arms *b b'* and hub of lever B are of one length. (See Fig. 7.) The length of these arms and of the hub will be governed by the number of lifters used and boxes to be operated. A represents the anchor-lifters. They are plainly shown in Figs. 2, 3, 4, and 5, and they are constructed with a slot, *d*. The width of this slot is the diameter of shaft C and of the hub of lever B. The hub of lever B is set directly in line under shaft C, as shown in Fig. 1. The anchor-lifters A are placed side by side, and rest on shaft C when not in motion, and when lifted or in motion, the shaft C and hub act as guides for the lifters A. These lifters are arranged in the following order: The lifter shown in Fig. 4 is put on first, that shown in Fig. 3 next, or in the middle, and that shown in Fig. 2 outside. The horns of the anchor-lifters are made of different lengths, except when working a three-box motion, as shown in the drawings, when the horns of the lifter for the middle box are of equal lengths. (See Fig. 3.) In the top of each anchor-lifter is a catch, *e*. These catches are constructed with more weight on one side of the pin, by which they are connected to the anchors, than on the other, as is plainly shown in Figs. 8 and 9.

In the top of each lifter is a regulating-screw, S, which is screwed through the top, and the point of the screw acts as a regulating-stop for the lifting-catch *e*, and by which the lift of the anchor may be regulated, as will be hereinafter described. D is the lifter that engages the catches *e*, by which, in turn, the anchors are lifted. This lifter D is plainly shown, enlarged, in Fig. 10. It is fitted on a stud, *g*, fastened in the end of lever F. (See Fig. 1.) The opposite end of the lever F is fitted on a stud fastened to the loom side.

The lifter D is fitted loose on the stud *g*, and the stud is set from the anchors, so that the center of gravity of the lifter will be between

the stud *g* and lifters A. This will keep the lifter D always against the anchors; but if desired, a spiral spring may be used. In this case one end of the spring may be fastened to the pin *h* in lifter D, and the other end to any fixed suitable part of the loom, or it may be fastened to lever F.

The levers E and F are operated by the usual eccentric cams on the cam-shaft. These cams, when operating the boxes for pick and pick, will be constructed double, as is usual—that is, to make two lifts for each revolution of the cam-shaft. This is understood by all loom-operators, or those accustomed to pick-and-pick looms.

H is the finger through which the pattern-roller or other pattern device controls the catches in the anchors. A finger is required for each box to be operated. They are placed side by side in same order as the lifters A, each finger being operated by a cord, K, which connects it to the pattern device. This may be of any well-known form—a roller with movable pins or screws, the well-known roller-chain, a lag or link chain with movable pins or screws, or the cards of the well-known Jacquard machine, it being understood that a screw, pin, roll, or hole, one for each box operated, is required in each lag or link of chain.

The pattern roller or chain for operating the shuttle-boxes, if desired, may be placed on the same shaft, and operate with the pattern device which works the harness; but this is not so desirable except when operating shuttle-boxes on both ends of the lay, and working pick and pick, or when the harness is operated by a Jacquard machine.

When operating a box-motion on one end only of the lay, I propose to operate the box-chain on the side of the loom, and shall use the same chain as is now used on the well-known anchor-box motion; but for my improvements I shall require a hole in lag or link for each box operated. For a three-box motion, three holes in each lag or link are required. For a four-box motion, four holes in each lag or link are required, and the screws or pins all of one length; and a pin or screw put in any hole of a lag will command the box represented by the hole in which the screw is placed. A screw or pin will not be required in the chain until a change of boxes is wanted, when a pin is screwed in the hole representing the box wanted, and it will be called at the next move of the lifter D.

In using the well-known roller-chain the shifting of the rolls on the chain will act in the same manner as movable pins and screws, and also the punching of holes in the cards of the Jacquard machine.

The operation of my improved shuttle-box motion is as follows: As before stated, the anchor-lifters A rest side by side on the shaft C. Fig. 1 shows the lever B on a level with the heel of lever E in the center V-notch, which holds the box-motion in position for the center or middle shuttle-box. It is now desired to call the top shuttle. The cord K connecting the inside finger, being drawn, will raise it, and it, in turn, will press the heel of catch *e* in the anchor-lifter nearest to the loom-frame, and which corresponds to the one shown in Fig. 4; and as the catch *e* is forced out it engages with the lifter D, which, as before stated, is lifted by a cam on shaft C. The raising of the lifter A, Fig. 4, (the horn on the left being the longer,) will cause this horn to engage the arm *b* on lever B and the left end of the lever will be raised and the right end of the lever lowered. This will lower the shuttle-box, and the top shuttle will be brought into use; and if, at the next move, the bottom shuttle is wanted, and the middle shuttle skipped, the cord K, operating the outside finger H, is drawn, which presses out the catch *e* in lifter A, Fig. 2. This lifter, having the long horn on the right, will raise the right end of the lever B a full lift, skipping the middle shuttle, and the box will be in position for using the bottom shuttle, and the heel of the lever E will engage the top V-notch, and hold the box in position to use that shuttle until changed by one of the other lifters being raised, it being understood that lifter A, Fig. 2, controls the bottom box, Fig. 3 the middle, and Fig. 4 the top box; and either of the lifters may be called at will, commanding the box represented by that lifter.

The fingers H, as soon as relieved by the pattern device, drop at the end which operates the catches *e*, and as the anchor-lifters are lowered the catches *e* will recede into the lifter A, they being made heavy on the catch side for that purpose, and the lifter D will raise without any of the lifters until they are called by the pattern device, as before described.

Should it be desirable to operate the pattern device immediately after the box has moved, and before the lifter D has passed in the downward move below the catches *e*, and one of the catches has been forced out before the lifter D has passed, the lifter will be pressed away from the anchors, and when below and past the catch will resume its position against the anchors, and be in position to engage the catch which is out for a lift.

At the top of each lifter A is a regulating-screw, S, the point *t* of which acts as a stop for the lifting-catch *e*, and by it the height of the lift may be regulated. In some cases it may be desirable to put on the screw S a lock-nut. This will not be required unless the screw gets loose.

The cam for working or lifting the lever F, to which the stud for lifter D is fixed, is not shown in the drawings, as it is understood that devices for operating levers E and F and lifter D in my improvement are the same as is now used in operating the well-known anchor-box motion, (before referred to,) and all these parts are well known.

As before stated, a lifter, A, is used for each

shuttle-box in the series, and each lifter is adapted to operate such one of the boxes as may be demanded. The series may be extended to operate as many boxes as is desired.

With my improvement six boxes may be operated conveniently, and more for slow-running looms, and each box will be at the command of the pattern device, as before described.

I claim—

In a shuttle-box motion for looms, a series of lifters, A, one for each box, in combination with the oscillating lever B, having projections *b b'*, as shown and described, and for the purpose specified.

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Witnesses:
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