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SHUTTLE BOX MOTION FOR LOOMS.

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949,355. Patented Feb. 15, 1910.

Fig. 1.

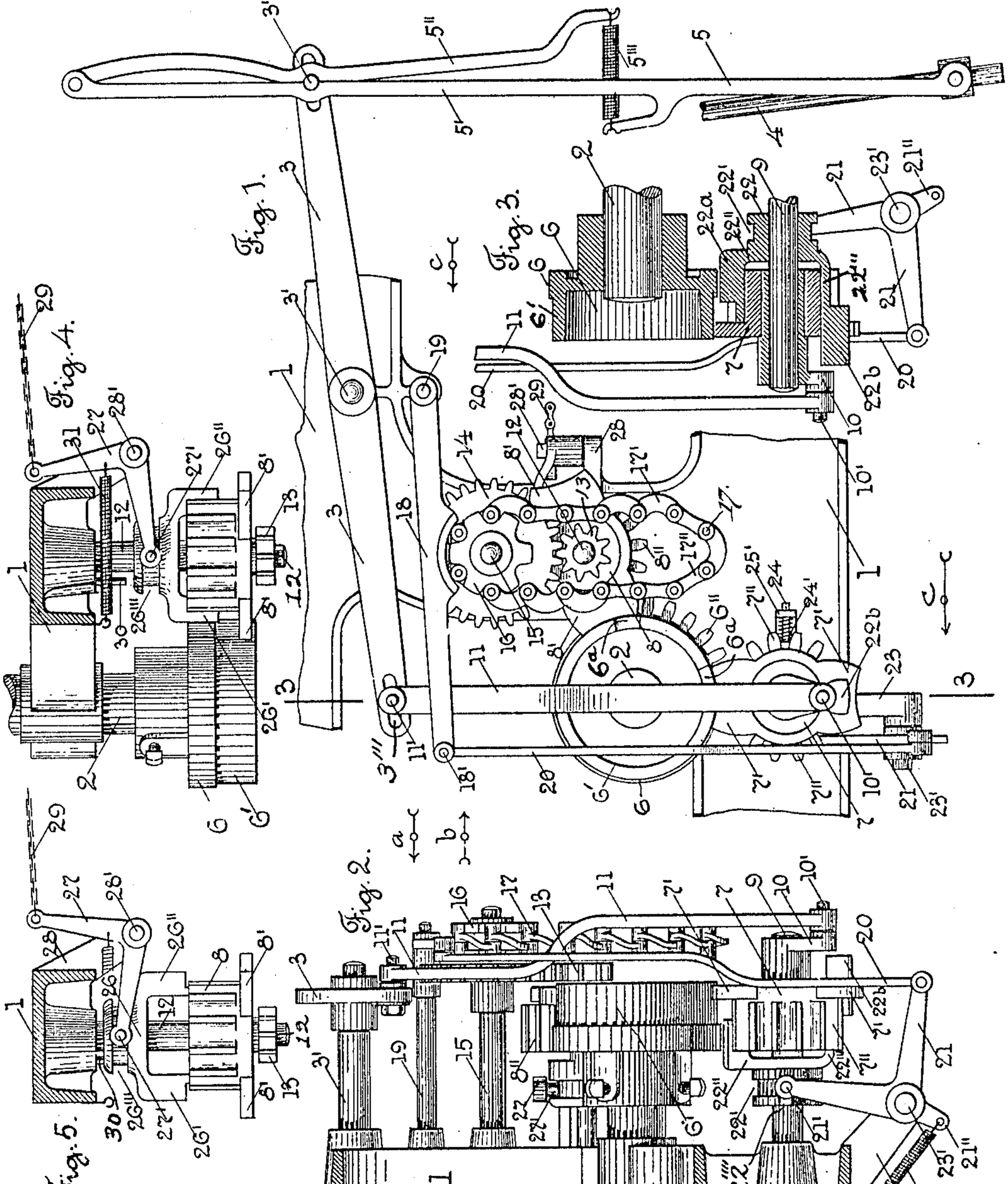


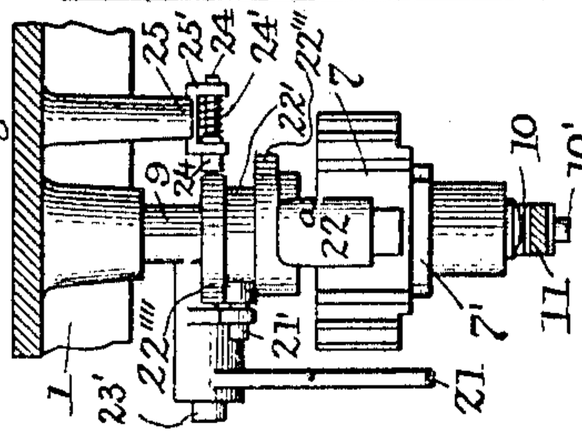
Fig. 3.

Fig. 4.

Fig. 5.

Fig. 2.

Fig. 6.



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SHUTTLE-BOX MOTION FOR LOOMS.

949,355. Specification of Letters Patent. **Patented Feb. 15, 1910.**

Application filed December 12, 1904. Serial No. 236,453.

To all whom it may concern:

Be it known that I, ALBERT A. GORDON, Jr., 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 for Looms, of which the following is a specification.

My invention relates to a shuttle box motion for looms, and particularly to that class of shuttle box motions shown and described in U. S. Letters Patent, No. 364,697, in which a driven master wheel or gear operates one or more mutilated pinions, through "sliding teeth", the movement of which is controlled by the pattern surface. The rotation of the mutilated pinions moves the shuttle boxes, in the well known way.

The object of my invention is to improve upon and simplify the shuttle box motion of the class above referred to.

In my improvements which are particularly adapted for a 2 by 1 box motion, I use two mutilated pinions, each preferably having two dwell portions thereon, adapted to engage with a plain portion on the driven master wheel or gear, to hold the mutilated pinions in their two opposite positions. The driven master wheel or gear has teeth thereon, to engage the sliding teeth, which are moved in and out between the fixed teeth in the mutilated pinions according to the indications of the pattern surface, in the way fully described in said patent, No. 364,697.

In my improvements, the master wheel or gear, which drives the mutilated pinions in a 2 by 1 box motion, also drives a second mutilated pinion, connected with the pattern cylinder carrying the pattern chain and located near the box motion, or contiguous thereto, as will be hereinafter described.

I have only shown in the drawings detached portions of a shuttle box motion of the class referred to for a two by one box motion, with my improvements applied thereto, sufficient to enable those skilled in the art to understand the construction and operation thereof.

Referring to the drawings:—Figure 1 is a side view of a two by one box motion embodying my improvements, looking in the direction of arrow *a*, Fig. 2. Fig. 2 is an edge view of some of the parts shown in Fig. 1, looking in the direction of arrow *b*, same figure. Fig. 3 is a section, on line 3, 3, Fig. 1, looking in the direction of arrow *c*, same figure. Fig. 4 is a plan view of the master wheel and the upper mutilated pinion, and sliding teeth mechanism, shown in Fig. 1, detached. Fig. 5 shows the dwell pinion shown in Fig. 4, detached, with the sliding teeth mechanism shown in the opposite position from that shown in Fig. 4. Fig. 6 shows a plan view of the lower mutilated pinion, shown in Figs. 1 and 2, detached, and its locking mechanism.

In the accompanying drawings, in Figs. 1 to 6 inclusive, 1 is a portion of a loom frame, on which is supported the several parts of the box motion.

2 is the bottom shaft of the loom.

3 is the box lever, centrally pivoted at 3′, and connected to the vertically moving box rod 4, through a give-way mechanism 5 of ordinary construction, and comprising the two parts 5′, 5″, yieldingly held together by a spring 5‴, and having recesses therein to receive a pin 3″ adjustably held in a slot in the box lever 3. The lower end of the part 5′ is secured to the vertically moving rod 4, which carries at its upper end two shuttle boxes, not shown.

On the bottom shaft 2 is secured the master wheel or gear 6, for operating the two dwell or mutilated pinions 7, and 8. The master gear 6 has a smooth portion 6′, to be engaged by the two dwell portions 7′ on the pinion 7, and the two dwell portions 8′ on the pinion 8, and has two notches or recesses 6^a in said smooth portion, to allow of the entrance of the projecting point on the dwell portions 7′, and 8′, on the pinions 7, and 8, as said pinions revolve. The master gear 6 has a toothed portion 6″ to engage the two tooth portions 7″ on the dwell pinion 7, and the two tooth portions 8″ on the dwell pinion 8, through the intervention of sliding teeth, all in the ordinary way.

The dwell pinion 7 is loosely mounted on a stud 9, and has secured upon its front side a crank 10 carrying a pin 10′, to which is pivotally connected the lower end of a connector 11. The upper end of the connector 11 is pivotally connected to a pin 11′, adjustably secured in a slot 3‴ in the shuttle box lever 3.

The dwell pinion 8 is loosely mounted on a stud 12, and has secured upon its front side a pinion 13 which is adapted to mesh with a pinion 14 loosely mounted on a stud

15, and attached to the pattern chain cylinder or barrel 16, carrying the pattern chain 17, made up of risers 17′, and sinkers 17″, in the ordinary way. Extending over the pattern chain 17 is the pattern indicator lever 18, pivoted at one end on a stud 19, and carrying a pin 18′ at its other end to which is pivotally connected the upper end of a connector 20. The lower end of the connector 20 is pivotally connected to one arm of an angle lever 21, pivotally mounted on a pin 23′ supported in a stand 23 secured to the loom frame. The other arm of the angle lever 21 carries a pin 21′ which extends into an annular groove 22′ in the hub 22 loosely mounted and sliding on the stud 9.

The dwell pinion 7 has part of its teeth omitted at diametrically opposite points, and its hub is grooved at the points where the teeth are omitted, to receive the arms 22″, and 22‴, having teeth 22^a, and 22^b, on the sliding hub 22. The arms 22″ and 22‴ carrying the teeth 22^a and 22^b, forming the "sliding teeth", are of different length. The tooth 22^a is nearer the hub 22 than the tooth 22^b, see Fig. 3, so that when the tooth 22^a is slid into line with the teeth 6″ on the master gear 6, to cause a partial rotation of the pinion 7, the tooth 22^b will extend through an opening in one of the dwell portions 7′, on the pinion 7, and will be out of line with the teeth 6″ on the master gear 6, so that it cannot be engaged by said teeth 6″. When the sliding hub 22 is moved outwardly into its opposite position, through the movement of the angle lever 21, the tooth 22^a is moved out of line with the teeth 6″ on the master gear 6, and the tooth 22^b into line with the teeth 6″, to cause another half rotation of the pinion 7, all in the ordinary way, and as fully described in said patent, No. 364,697.

The rotary motion of the master gear 6 is communicated through the sliding teeth 22^a and 22^b, to the dwell pinion 7, to give a half rotation to said pinion 7, and cause the moving of the crank 10, from its lower position shown in Fig. 1, to its upper position, and vice versa, to move the shuttle box lever 3, and lower and raise the vertically moving shuttle box rod 4 and shuttle boxes connected therewith, all in the well known way. The movement of the hub 22, and the sliding teeth 22^a, and 22^b, to cause the dwell pinion 7 to be rotated by the master gear 6, is controlled by the pattern chain 17, through the indicator lever 18, connector 20, and angle lever 21. After the teeth 6″ on the master gear 6 have engaged one of the sliding teeth 22^a and 22^b, and meshed with the teeth 7″ on the pinion 7, to rotate it, they will run out of engagement at the blank space in the pinion 7, and leave it at rest, as will be well understood. A spring 21‴, see Fig. 2, attached to a projection 21″ on the angle lever 21, and to a stationary part of the frame, acts to hold the hub 22 in its outer position as shown in Fig. 2. The dwell portion 7′ on the pinion 7 engaging the smooth part of the master gear 6, will tend to hold or lock the pinion 7, and also the sliding teeth 22^a and 22^b, in proper position to be engaged by the teeth 6″ on the master gear 6, but I preferably provide an additional locking mechanism shown in Fig. 6, which consists of a pin 24 supported and sliding in bearings 25′ on the end of a stud 25 secured to the loom frame, see Fig. 6. Encircling the pin 24, is a spring 24′ which acts on said pin to force it inward into the path of projections, as 22‴′ (see Fig. 6) on the opposite sides of the circumferential groove 22′ in the hub 22, so as to lock the pinion 7 when the dwell portions 7′ of said pinion are in engagement with the smooth part of the master-wheel 6.

The turning of the dwell gear 8 by the master gear 6 for operating the box pattern chain cylinder 16, through pinions 13 and 14, is caused through the sliding teeth mechanism shown in Figs. 4, and 5, comprising the hub 26, loosely mounted and sliding on the stud 12, and having outwardly projecting teeth 26′ and 26″ thereon of equal length, adapted to extend in grooves in the hub of the dwell pinion 8, and in the path of the teeth 6″ of the master gear 6, as shown in Fig. 4. A pin 27′ on one arm of the angle lever 27 extends into the annular groove 26‴ in the hub 26. The angle lever 27 is pivoted on a pin 28′ on a bracket 28 secured to the loom frame. The other arm of the angle lever 27 has a chain 29 attached thereto, leading to the ordinary filling stop motion of a loom, not shown.

When in the operation of the loom the filling is broken or exhausted and the filling stop motion operated, through the chain 29 and angle lever 27, the hub 26 and teeth 26′ and 26″, will be moved outwardly, to be out of line with the teeth 6″ on the master gear 6, as shown in Fig. 5, to leave the dwell pinion 8 and the pattern cylinder 16 at rest. A pin 30, secured at its inner end to the loom frame, is adapted to enter a hole in the hub 26, when the hub is moved outwardly, as shown in Fig. 5, to hold the hub 26, and through the projecting ends of the teeth 26′ and 26″, extending into the grooves in the hub of the dwell pinion 8, hold said pinion and lock the same in position. A spring 31 secured at one end to the angle lever 27, and at its other end to the loom frame, acts to hold the hub 26 in its inner position, as shown in Fig. 4.

From the foregoing it will be understood that the cylinder 16, which operates the pattern chain, 17, will be rotated from the master-wheel 6 through the pinions 8, 13 and 14, and that the said pattern chain will in-

termittingly connect the mutilated or dwell pinion 7 with the toothed portion of the master-wheel through the medium of the lever 18, connecting rod 20, angle lever 21, and sliding teeth 22^a, 22^b connected with the hub 22 operated by said angle lever. Thus the said pinion 7 will intermittingly rotate the crank 10 connected by the rod 11 with the shuttle box lever 3 so that the said lever will, at proper intervals, raise and lower the shuttle-box rod 4 operatively joined to said lever by the connecting rod 5. If, in the operation of the loom, the filling is broken the filling stop-motion device, connected by the chain 29 with the angle lever 27, will cause the hub 26 carrying the sliding teeth 26′ and 26″, to be moved to the inoperative position shown in Fig. 5, so as to disconnect the master-wheel from the pattern chain mechanism, as hereinbefore stated; and when said hub is moved to the position just referred to it will be locked from rotation by means of the pin 30 which enters a hole in the flange of said hub; the dwell portions 8′ of said pinion 8 being at this time in engagement with the smooth portion of the master-wheel.

It will be understood that the details of construction of my improvements may be varied if desired.

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

1. In a shuttle box motion for looms, the combination with a shuttle box lever and a pattern mechanism, of a master-gear having a toothed and a smooth portion, two mutilated pinions both having dwell portions to engage the smooth portion of said master-gear, a crank operated by one of said pinions, said crank being connected with said shuttle box lever, a set of sliding teeth for connecting each of said pinions with the toothed portion of said master-gear, connections between said pattern mechanism and one set of said sliding teeth whereby one of said pinions may be operatively connected at intervals with said master-gear, and connections between the other of said pinions and said pattern mechanism whereby the latter may be operated.

2. In a shuttle box motion for looms, the combination with a shuttle box lever and a pattern mechanism, of a master-gear having a toothed and a smooth portion, two mutilated pinions both having dwell portions to engage the smooth portion of said master-gear, a crank operated by one of said pinions, said crank being connected with said shuttle box lever, a set of sliding teeth for connecting each of said pinions with the toothed portion of said master gear, connections between said pattern mechanism and one set of said sliding teeth whereby one of said pinions may be operatively connected at intervals with said master-gear, connections between the other of said pinions and said pattern mechanism whereby the latter may be operated, and means, independent of said master gear, for locking said pinions when their dwell portions are moving into engagement with the smooth portion of said master gear.

3. In a shuttle box motion for looms, the combination with a shuttle box lever and a pattern mechanism, of a master-gear having a smooth and a toothed portion, a mutilated pinion having plain portions to engage the smooth portion of said master-gear, a crank operated by said pinion and connected to said shuttle box lever, sliding teeth for operatively connecting said pinion with the toothed portion of said master wheel, connections between said pattern mechanism and said sliding teeth whereby the latter will be caused to operatively connect said pinion with said master wheel, at intervals, to effect the intermittent rotation of said crank, and means for locking said pinion when its plain portion is moving into engagement with the smooth portion of said master gear and when said pinion is to remain stationary.

4. In a shuttle box motion for looms, the combination with a shuttle box lever and a pattern chain, of a master-gear having a toothed and a smooth portion, a dwell pinion operatively connected with said shuttle box lever, a second dwell pinion connected with said pattern chain to operate the same, sliding teeth for intermittingly connecting said pinions with said master-gear, and means for locking the hubs carrying said sliding teeth.

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