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SEIJI KONDO ET AL

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SHUTTLE BOX CHANGING APPARATUS IN AN AUTOMATIC LOOM

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Fig. 1.

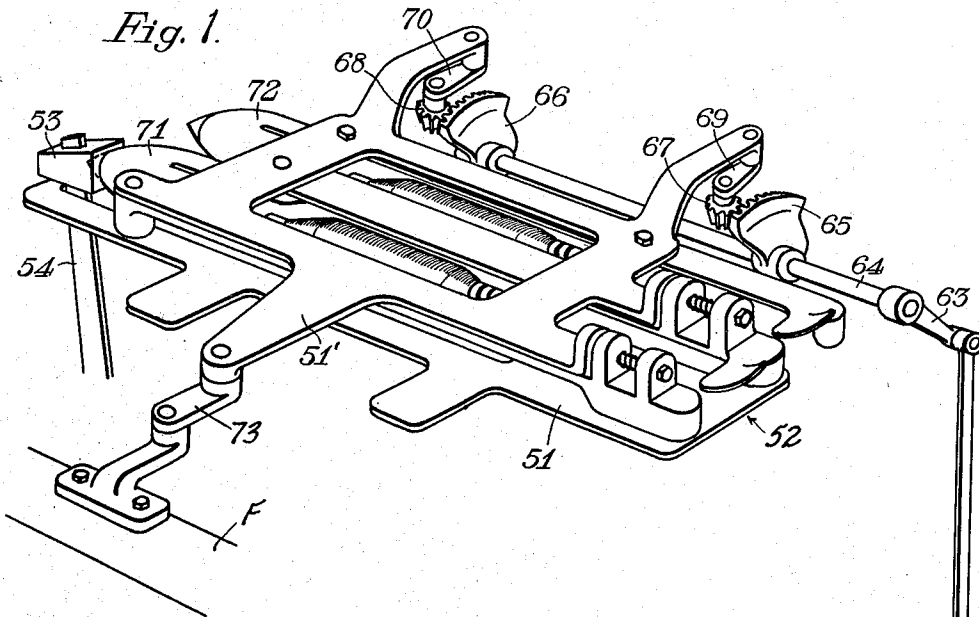
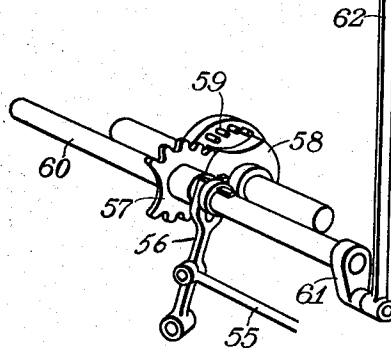
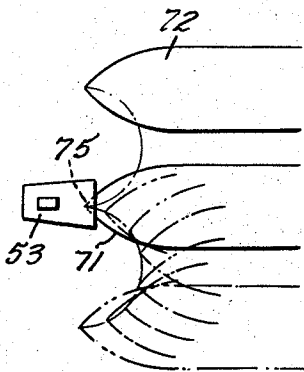


Fig. 2.



Seiji Kondo,
Rikei Nishikawa and
Masaru Yoshida,
Inventors
By Wendelock Lindbloom
Attorney

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SHUTTLE BOX CHANGING APPARATUS IN AN AUTOMATIC LOOM

Seiji Kondo and Rihei Nishikawa, Kariya, and Masaru Yoshida, Gifu, Japan, assignors to Toyoda Automatic Loom Works, Ltd., Kariya, Japan, a corporation of Japan

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4 Claims. (Cl. 139—171)

This invention relates to an automatic loom, particularly a shuttle box changing apparatus in the automatic loom.

In a conventional shuttle box changing apparatus, when the double shuttle box is to be shifted transversely the picker has to be slightly retracted in order to avoid interference with the tip of the shuttle and then again returned to the starting point after the shuttle box has been shifted, so that a special mechanism has to be provided for such movement of the picker. The object of the present invention is to dispense with the necessity of effecting such special movement of the picker.

In the apparatus according to this invention, there is provided an improved shuttle box shifting device, wherein the shuttles are shifted transversely with their tips making an arcuate motion which is in a plane substantially perpendicular to the plane of movement of the picker and picker stick while maintaining the longitudinal axis of the shuttles parallel to the direction of their paths of movement to avoid any interference with the edge of the front depression formed in the picker, so that it is unnecessary to retract the picker when shifting the shuttle boxes transversely.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiments about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

The accompanying drawing will serve to illustrate specific embodiments of our invention, in order that its utility and functioning will be thoroughly appreciated. It will be understood, however, that these are by way of illustration only and are not to be taken as limiting the invention in any way. In the drawing:

FIGURE 1 is a perspective view of an improved mechanism for shifting the shuttle boxes transversely; and

FIGURE 2 is a detail plan view of the shuttle, showing the specific movement during shifting of the shuttles by the mechanism shown in FIG. 1.

Referring to FIGURE 1 of the drawing, reference numeral 1 designates a shaft rotating at the same r.p.m. as a tappet shaft (not shown) of the loom. This shaft 1 has a cam 2 co-operating with a bell crank lever 3 pivoted as at 4 and having at its upper end a bent hook 5. 6 is a feeler.

Referring to FIGURES 1 and 2, the shuttle box 52 comprises a bottom frame 51 and the top frame 51'. The picker 53 has its stick 54 passing through an oblong slot formed in the bottom frame 51. The shifting of the shuttle box is controlled by a rod 55 through a shift lever 56, by which a Geneva wheel 57 is shifted. When it is shifted rightwardly, the Geneva wheel 57 slides on

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the periphery of a disc 58, so that a shaft 60 having a crank arm 61 will not be driven. The Geneva wheel 57, when shifted leftwardly, engages with a pin wheel 59 and the shaft 60 will be rotated. It is to be noted that said disc 58 and pin wheel 59 are rotating at the same r.p.m. as the tappet shaft (not shown) of the loom. The crank arm 61 is connected to a horizontal shaft 64 through a connecting rod 62 and lever 63. Said shaft 64 has two bevel gears 65 and 66, meshing with bevel gears 67 and 68, respectively. Said parts are so designed that the bevel gears 67 and 68 are rotated for 180° upon 180° rotation of the shaft 60. The axle of each of the bevel gears 67 and 68 is fixed to driving crank arms 69 and 70 respectively, both pivoted to the top frame 51'. It is to be noted that the distance between the pivot and the gear axis of each driving crank arm is equal to one half of the pitch between two shuttles 71 and 72. The top shuttle frame 51' is pivotally supported on a supporting crank arm 73 which in turn is pivotally mounted on the loom frame F. The distance between the pivotal mounting of the supporting crank arm on the shuttle frame and on the loom frame is also equal to one-half the pitch between the two shuttles 71 and 72.

When the bevel gears 67 and 68 are rotated 180°, the shuttle box 52 containing the shuttles 71 and 72 will be shifted transversely making an arcuate motion longitudinally of the length of the shuttles and transversely to the length of the shuttles so that the tips of the shuttles move along arcuate paths which lie in a plane perpendicular to the plane of movement of the picker stick 54, as shown in chain lines in FIG. 2, through the oscillating motion of the driving crank arms 69 and 70, transferring the shuttle 72 to the position which has been occupied by the other shuttle 71. FIGURE 2 shows the above mentioned movement of the shuttles. It will be seen from FIGS. 1 and 2 that during the arcuate motion of the shuttle tips each shuttle is not tilted and is always maintained parallel to the direction of the running path. As will be seen from this figure, when the shuttles are shifted the shuttle tip will retract from or enter into the front depression 75, without abutting against the edge of the depression 75. It will thus be seen that it would not be necessary that the picker be retracted from the shuttle tip when shifting the shuttle box transversely.

What we claim is:

1. A shuttle box changing apparatus for an automatic loom having a picker and a picker stick and two shuttle boxes on one side of the loom and at least one shuttle box on the other side of the loom, said apparatus comprising a shuttle box frame in which said two shuttle boxes are positioned, shuttle box frame moving means coupled to said shuttle box frame for moving said shuttle box frame in a substantially semicircular arc curving first toward the center of the loom and then away from the center of the loom, said arc lying in a plane perpendicular to the plane of movement of the picker stick with the end of one shuttle being moved out of a recess in the picker and the end of the other shuttle moved into the recess in the picker during said movement of the shuttle box frame along said arc, a detecting device on the opposite side of the loom for detecting a shortage in the cop yarn, and a controlling device coupled between said detecting device and said shuttle frame moving means

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for actuating said shuttle frame moving means when the detecting device detects a shortage of cop yarn.

2. A shuttle box changing apparatus as claimed in claim 1 in which said shuttle box frame moving means comprises a supporting crank arm means pivotally supporting said shuttle box frame, driving crank arm means pivotally connected to said shuttle box frame, said supporting crank arm means and said driving crank arm means cooperating to guide the movement of said shuttle box frame along said semi-circular arc, and driving crank arm rotating means connected to said driving crank arm means for rotating said driving crank arm means.

3. A shuttle box changing apparatus as claimed in claim 2 in which said supporting crank arm means comprises a supporting crank arm pivotally mounted on said loom and having said shuttle box frame pivotally mounted on said supporting crank arm, and said driving crank arm means comprises two driving crank arms pivotally connected to said shuttle box frame at spaced points thereon, said supporting crank arm and said driving crank arm having a length one half the distance between the shuttle positions in said shuttle boxes.

4. In an automatic loom, a combination comprising a shuttle box containing at least two shuttles, and means coupled to said shuttle box for moving said shuttle box

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longitudinally of the length of the shuttles and transversely of the length of the shuttles, so that the tip of each shuttle moves along an arcuate path while each shuttle is maintained parallel to the direction of its running path.

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RUSSELL C. MADER, *Examiner.*