Nov. 20, 1951 E. A. MASTRIANI ET AL 2,575,456

PARALLEL MOTION

Filed April 21, 1950 4 Sheets-Sheet 1

Fig. 1

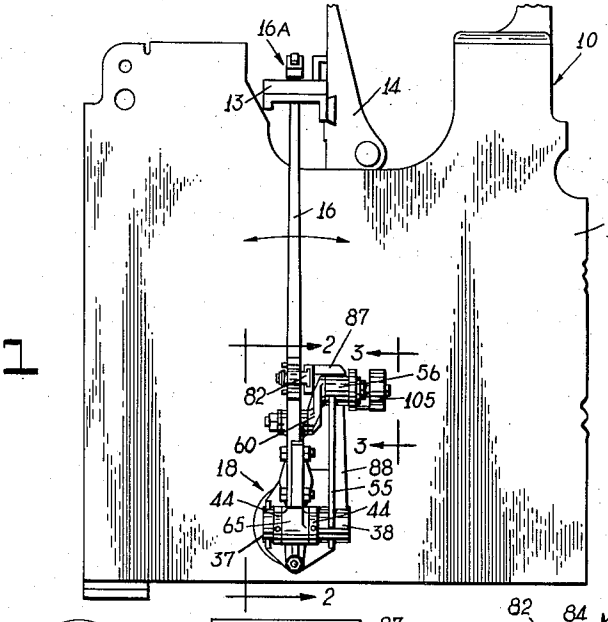
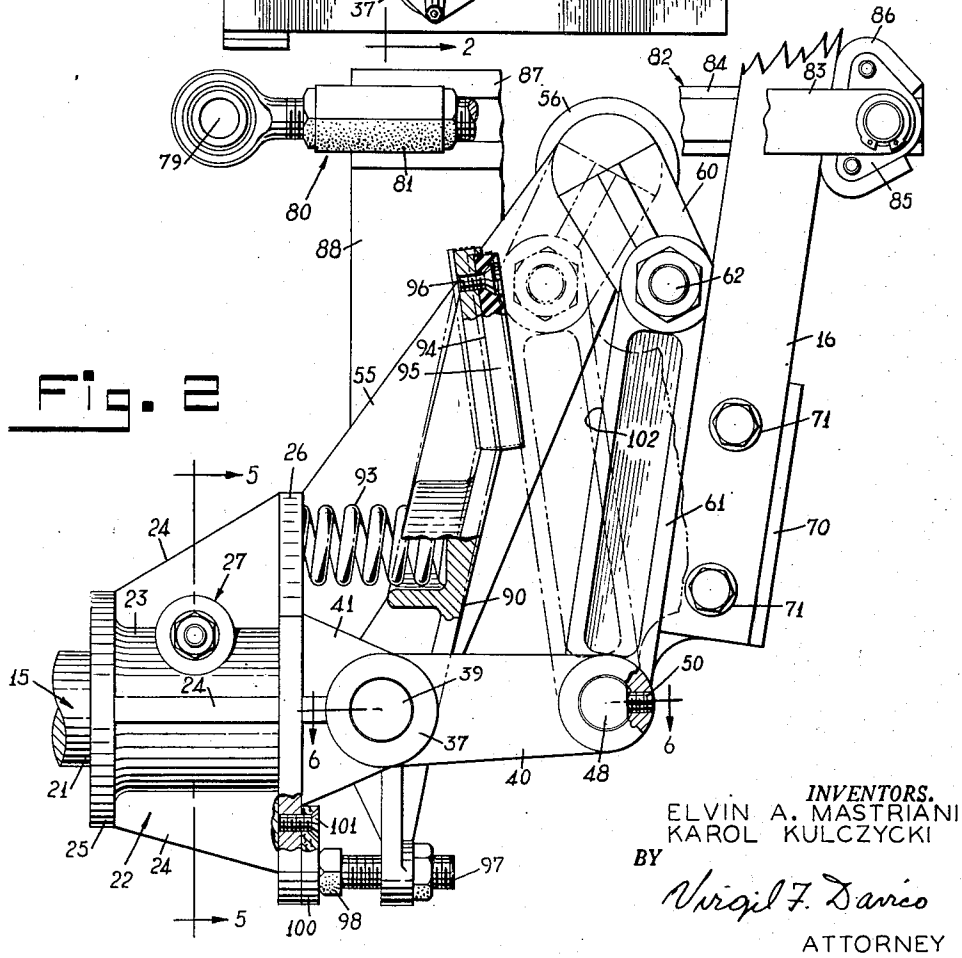


Fig. 2



INVENTORS.
ELVIN A. MASTRIANI
KAROL KULCZYCKI
BY
Virgil F. Darico
ATTORNEY

Nov. 20, 1951 E. A. MASTRIANI ET AL 2,575,456

PARALLEL MOTION

Filed April 21, 1950 4 Sheets-Sheet 2

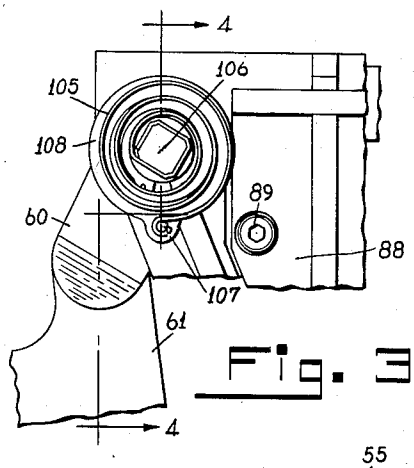


Fig. 3

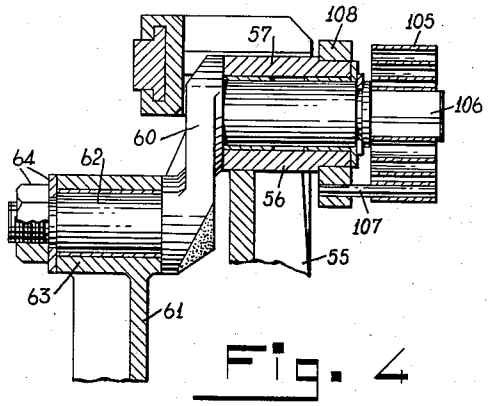


Fig. 4

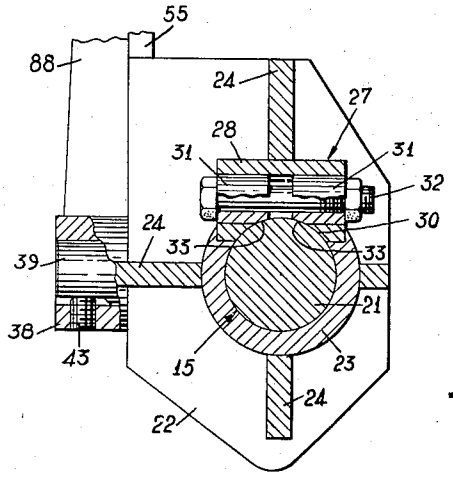


Fig. 5

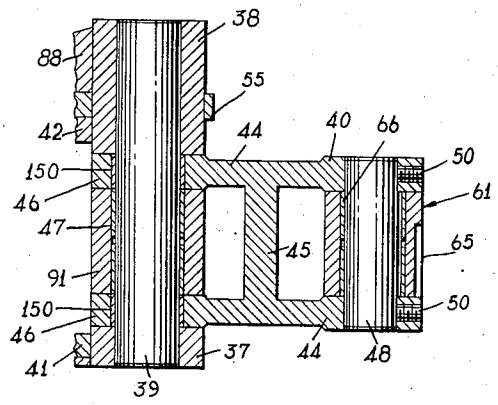


Fig. 6

INVENTORS.
ELVIN A. MASTRIANI
KAROL KULCZYCKI
BY
Virgil F. Davis
ATTORNEY

Nov. 20, 1951 E. A. MASTRIANI ET AL 2,575,456

PARALLEL MOTION

Filed April 21, 1950 4 Sheets-Sheet 3

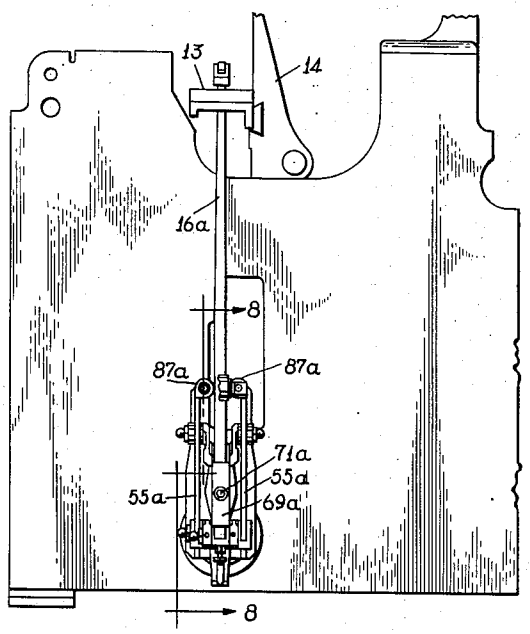


Fig. 7

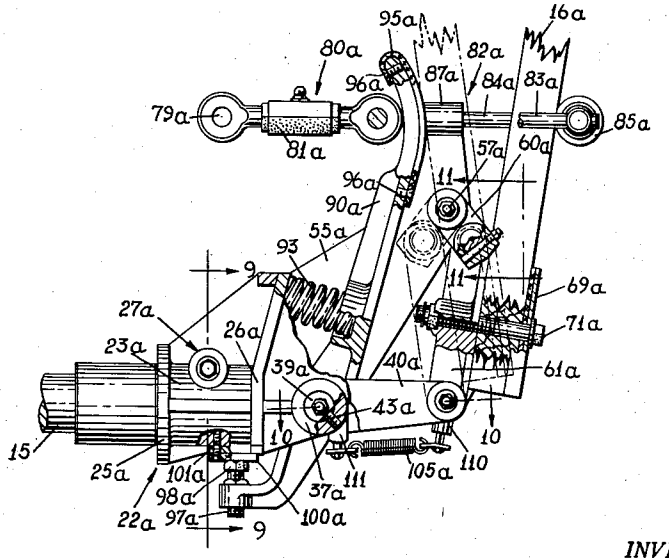


Fig. 8

INVENTORS.
ELVIN A. MASTRIANI
KAROL KULCZYCKI
BY
Virgil F. Darris
ATTORNEY

Nov. 20, 1951 E. A. MASTRIANI ET AL 2,575,456

PARALLEL MOTION

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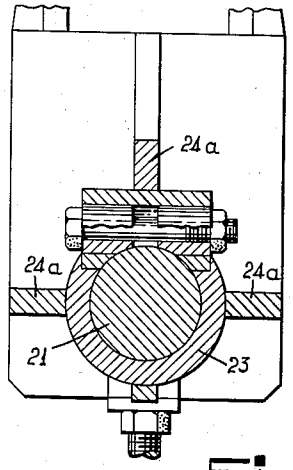


Fig. 9

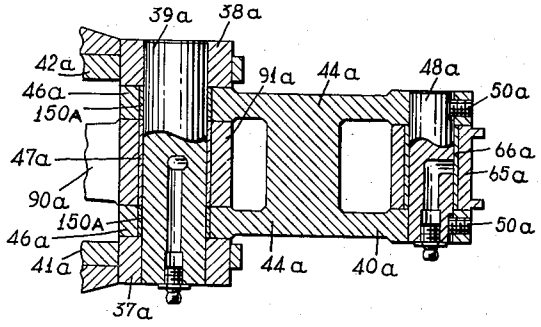


Fig. 10

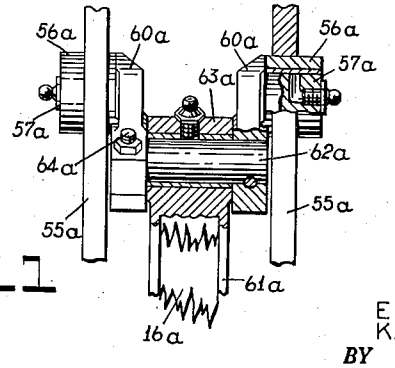


Fig. 11

INVENTORS.
ELVIN A. MASTRIANI
KAROL KULCZYCKI

BY

Virgil F. Davies

ATTORNEY

Patented Nov. 20, 1951

2,575,456

UNITED STATES PATENT OFFICE

2,575,456

PARALLEL MOTION

Elvin A. Mastriani, Cedar Grove, N. J., and Karol Kulczycki, Brooklyn, N. Y., assignors, by mesne assignments, to Steel and Alloy Tank Company, Newark, N. J., a corporation of New Jersey

Application April 21, 1950, Serial No. 157,381

5 Claims. (Cl. 139—149)

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The present invention relates to a parallel motion for a loom of the fly shuttle type.

The purpose of the parallel motion is to move the picker in a direction as nearly as possible parallel to the race plate. Without some such arrangement, the picker in traveling from one end of the shuttle box to the other would describe an arc. This would give it a higher position at one part of its movement than at another and would cause thereby a very unsatisfactory pick.

The parallel motions of the prior art have involved either a rocker attached to the picker stick and cradling on a shoe or have included linear slide or slotted connections resulting in lost movements, rapid wear, defective picks and rapid destruction of the picker stick.

One object of the present invention is to provide a new and improved parallel motion substantially free from the defects of the prior art referred to.

Various objects of the invention are apparent from the following particular description and from an inspection of the accompanying drawings, in which:

Fig. 1 is a side elevation of the loom taken from its right-hand side and showing a form of parallel motion embodying the present invention;

Fig. 2 is a section of the parallel motion taken along the lines 2—2 of Fig. 1, but shown on an enlarged scale;

Fig. 3 is a section of the parallel motion taken along the lines 3—3 of Fig. 1, but shown on an enlarged scale;

Fig. 4 is a section of the parallel motion taken along the lines 4—4 of Fig. 3;

Figs. 5 and 6 are sections of the parallel motion taken along the lines 5—5 and 6—6 of Fig. 2 respectively;

Fig. 7 is a side elevation of the loom taken from its right-hand side and showing another form of parallel motion embodying the present invention;

Fig. 8 is a section of the loom taken along the lines 8—8 of Fig. 7, but shown on an enlarged scale; and

Figs. 9, 10 and 11 are sections of the loom taken on the lines 9—9, 10—10 and 11—11 of Fig. 8 respectively.

Referring to Fig. 1 of the drawings, only the parallel motion for the picker stick on the right-hand side of the loom is shown, but it must be understood that the parallel motion for the picker stick on the left-hand side of the loom is of similar construction.

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The loom is shown comprising loomsides 10, each including a pair of vertical opposed webs or plates 11 rigidly secured together by braces and cross-pieces (not shown). A lay 13 is reciprocated along the loom by lay swords 14 secured thereto and oscillated from cranks (not shown) through connecting rods (not shown) in a manner well known in the art. Each of the lay swords 14 is located between the plates 11 of the corresponding loomside 10 and is fastened at its lower end to a respective rocker-shaft 15 journalled in suitable bearings (not shown) mounted on these plates.

A picker stick 16 with a picker 16A at its upper end is provided for hurling the shuttle (not shown) across the raceway of the lay 13. The picker stick 16 is connected at its lower end to a parallel motion 18 serving to move the picker in a direction parallel to the raceway.

The form of parallel motion shown in Figs. 1–6 is mounted on a cantilever part 21 of the rocker-shaft 15 projecting outwardly from the bearing on the outer loomside plate 11 and comprises a bracket 22 secured to said shaft part in a manner to be described for rocking movement therewith. The bracket 22 has a hub 23 embracing the rocker-shaft 15 and has four reinforcing ribs 24 radiating from said hub in quadrant relationship and extending between end flanges 25 and 26.

The connection between the bracket 22 and the rocker-shaft 15 desirably comprises a tangent pin lock 27 including a sleeve 28 tangentially seated on said shaft and rigidly secured to the bracket hub 23 and to one of the ribs 24, as for example by welding. The sleeve 28 has a cut-out or slot 30 through which the rocker-shaft 15 peripherally extends and slidably receives a pair of wedges 31 through which a bolt 32 passes. The inner opposed end sections 33 of these wedges 31 are concavely bevelled for conforming engagement with the periphery of the rocker-shaft 15 where it extends through the slot 30 of the sleeve 28. Tightening of the bolt 32 draws the wedges 31 on to the rocker-shaft 15 and thereby locks the bracket 22 on to said shaft. By loosening the bolt 32, the rotative position of the bracket 22 on the rocker-shaft 15 can be adjusted.

The bracket 22 carries supports 37 and 38 for a pin or axle 39 transverse to the rocker-shaft 15 and pivotally mounting a substantially horizontal arm 40, in a manner to be described. These supports are rigidly secured to the bracket flange 26 by webs 41 and 42 integral as shown or otherwise rigid with said flange and the axle

39 is fixed in said supports, as for example by set screws 43.

The arm 40 is of skeletonized construction and comprises two parallel facing webs 44 rigidly connected together into a unit by a cross-piece 45 integral therewith as shown or otherwise rigidly connected thereto. The webs 44 terminate at one end in respective hubs 46 embracing bushings 150 on the axle 39 with a rotative fit for pivotal movement thereon. At the other end, the arm webs 44 rigidly carry a pin 48 held in position thereon by set screws 50 and forming part of a linkage for supporting and guiding the picker stick 16, as will hereinafter be more fully described.

Integral as shown or otherwise rigid with the bracket flange 26 and extending upwardly from the bracket 22 is a frame plate 55 mounting rigid therewith a bearing 56 for a pivot or crank shaft 57 parallel to the axle 39. Secured to the pivot shaft 57 is an arm 60 in the form of a simple crank shorter than the arm 40 and suspended downwardly from the bearing 56. The crank 60 is pivotally connected to the upper end of an upstanding link or connecting rod 61, as for example by means of a pin 62 integral or otherwise rigid with said crank and journalled in an end bearing 63 on said link. The pin 62 is retained in the link bearing 63 against axial displacement by a nut and washer connection 64. The lower end of the link 61 is pivotally connected to the outer end of the arm 40 and for that purpose, a bearing 65 on said link embraces with a rotative fit a bushing 66 on the pin 48 between the webs 44 of said arm.

The link 61 has a side extension 70 for securing the lower end of the picker stick 16 thereto and alongside thereof through bolts 71. The picker stick 16 thereby follows the movement of the link 61, which in turn follows a guided course through the constraining action of the arm 40 and the crank 60 pivotally supporting said link. The upper end of the picker stick 16 is thereby made to follow a course parallel to the raceway of the lay 13 as it is drawn inwardly towards the loom by the pick motion.

The pick motion per se forms no part of the present invention and may be of any suitable form. The specific form of pick motion shown is the subject matter of a copending application Serial No. 157,382, filed April 21, 1950, and comprises a lug connection 80 between the outer end of a picking-shaft arm (not shown) and the picker stick 16, for transmitting the movement of this shaft arm to said picker stick and for thereby applying to the shuttle (not shown) sufficient force to send it across the loom and into the opposite box. The lug connection 80 comprises a rigid lug stick 81 connected to the outer end of the picking-shaft arm by a self-aligning bearing 79 and a rigid lug strap 82 connected to said lug stick by a self-aligning bearing (not shown) and engaging the picker stick 16. The lug strap 82 comprises a pair of rigid bars 83 and 84 flanking the picker stick 16 and projecting at their outer ends beyond said stick. A catch 85 provided with a cushioning pad 86 and pivotally supported between the strap bars 83 and 84 engages the outer edge of the picker stick 16.

The lug strap 82 is guided for endwise movement as it is operated from the pick cam. For that purpose, there is provided a guide 87 integral as shown or otherwise rigid with the upper end of a bracket frame plate 88 rigidly secured to the bracket frame plate 55, as for example, by

bolts 89. The guide 87 has a T-slot and the strap bar 84 is of corresponding formation to fit in said slot with a guide fit.

The pick motion described operates to drive the picker stick 16 inwardly towards the loom for shuttle hurling operations. To check the picker stick 16 after the shuttle has left the picker thereon, there is provided a bumper device in the form of an upstanding bumper bar 90 mounted for pivotal movement about the axle 39 and having for that purpose a hub 91 between the hubs 46 of the arm 40 embracing the bushing 47 on said axle with a rotative fit. A coil spring 93 between the bracket flange 26 and the bumper bar 90 urges said bar about the axle 39 into the position shown in Fig. 2. The upper end of the bumper bar 90 has a flat impact surface 94 covered with a pad 95 of cushioning material, such as leather or rubber secured to said bar by screws 96 and disposed in the path of movement of the link 61.

To limit the rotative position of the bumper bar 90 about the axle 39 against the expansive action of the coil spring 93, the lower end of said bar carries a screw 97 threaded therein and having a head 98 adapted in limiting position to engage a pad 100 of cushioning material such as leather or rubber affixed to the bracket flange 26 by screws 101. The screw 97 is adjusted in the bumper bar 90 in position to extend the surface of the impact pad 95 in a direction parallel to the inner edge 102 of the link 61 at the instant said link reaches said pad, so that the impact of said link from the picker stick 16 is transmitted to said pad across its full height, as shown in dot and dash lines in Fig. 2. Further movement of the picker stick 16 is checked by the counteraction of the spring 93 until said stick is stopped. Stopping of the picker stick 16 is thereby accomplished with minimum of shock.

After the picker stick 16 is stopped in inward position, it is returned outwardly by the expansive action of the spring 93, until the bumper bar 90 reaches the limiting position shown in full lines in Fig. 2. Further outward movement of the picker stick 16 towards the position shown in full lines in Fig. 2 is effected through the action of a spiral return spring 105 acting on the pivot or crank shaft 57. For mounting the spring 105, the crank shaft 57 has an axial end extension 106 of substantially square cross-section. The spring 105 is wound around the crank shaft extension 106 and has its inner end conformably wrapped for anchorage around said shaft extension and has its outer end looped around and thereby anchored to a pin 107 affixed to a collar 108 on the bearing 56. A set screw (not shown) in the collar 108 and impinging on the bearing 56 holds said collar in adjusted position according to the tension stress on the spring 105 desired.

In the operation of the parallel motion described, as the lay 13 moves along the loom by the action of the crank operated lay swords 14, the rocker-shaft 15 secured to the lower end of each of said lay swords is oscillated and this causes the parallel motion on said shaft to rock and the picker stick 16 carried by said motion to move with the lay along the loom.

While the picker stick 16 is in the outer inactive position shown in Fig. 2, the picking-shaft arm (not shown) operated through the picking cam (not shown) draws the picker stick 16 forcibly inwardly towards the loom through the lug connection 80. The picker stick 16 during its pick-

ing movement moves angularly about the pin 48 carried by the arm 40 at its outer end. This angular movement of the picker stick 16 transferred to the link 61 causes the crank 60 to rotate clockwise (Fig. 2) about the axis of the pivot shaft 57 and the link to move downwardly substantially endwise. This moves the picker stick 16 substantially endwise, so that the upper picker end of said stick instead of following an arcuate course during picking movement of said stick follows a substantially straight course parallel to the raceway on the lay 13.

The bumper bar 90 comes into play near the end of the picking stroke of the picker stick 16 to check the stick and to initiate its return and the spring 105 completes the return of the picker stick to the outer inactive position shown in Fig. 2.

Figs. 7–11 show a modified form of parallel motion comprising a bracket 22_a secured by the tangent pin lock 27_a to the cantilever part 21 of the rocker-shaft 15 and having a hub 23_a embracing the rocker shaft 15 and four ribs 24_a radiating from said hub in quadrant relationship and extending between end flanges 25_a and 26_a.

The bracket 22_a carries the supports 37_a and 38_a for the axle 39_a pivotally mounting a crank arm 40_a. These supports are rigidly secured to the bracket flange 26_a by webs 41_a and 42_a integral as shown or otherwise rigid with said flange and the axle 39_a is fixed in said supports, as for example, by set screws 43_a.

The arm 40_a has webs 44_a terminating at one end in respective hubs 46_a embracing the bushings 150_a on the axle 39_a with a rotative fit. At the other end, the arm webs 44_a rigidly carry a pin 48_a held thereon by set screws 50_a.

Integral as shown or otherwise rigid with the bracket flange 26_a and extending upwardly from the bracket 22_a is a pair of parallel opposed plates 55_a mounting rigid therewith respective coaxial bearings 56_a for respective pivot or crank shafts 57_a. Secured to respective pivot shafts 57_a are the inner ends of arms 60_a in the form of cranks pivotally connected to the upper end of the upstanding link or connecting rod 61_a. The outer ends of the cranks 60_a are rigidly secured by tapered pin bolts 64_a to the ends respectively of a pin 62_a journalled in an end bearing 63_a on the link 61_a. The pin 62_a forms with the cranks 60_a a double crank unit and constitutes the wrist-pin for said crank unit.

The lower end of the link 61_a is pivotally connected to the outer end of the arm 40_a by a bearing 65_a on said link embracing with a rotative fit a bushing 66_a on the pin 48_a between the webs 44_a of said arm.

The lower end of the picker stick 16_a is secured to the link 61_a by a bolt 71_a bearing against a backing plate 69_a on the outer edge of the picker stick and passing through said stick and said link.

The form of pick motion shown in Figs. 7 and 8 is described and covered per se in the aforesaid copending application and comprises a lug connection 80_a between the outer end of the picking-shaft arm (not shown) and the picker stick 16_a for transmitting the movement of this shaft arm to said picker stick. This lug connection comprises a rigid lug stick 81_a connected to the outer end of the picking-shaft arm by a self-aligning bearing and a rigid lug strap 82_a connected to said lug stick by a self-aligning bearing 79_a and engaging the picker stick. The lug strap 82_a comprises a pair of rigid bars 83_a and 84_a flanking the picker stick 16_a and projecting at their outer ends beyond said stick. A catch 85_a in the form of a resilient roller is rotatively supported between the strap bars 83_a and 84_a and engages the outer edge of the picker stick 16_a.

The lug strap 82_a is guided for endwise movement by a pair of tubular guides 87_a integral as shown or otherwise rigid with the upper ends of the bracket plates 55_a. These guides embrace the lug bars 83_a and 84_a respectively with a snug slide fit.

The bumper device for checking the picker stick 16_a after the shuttle has left the picker thereon, comprises an upstanding bumper bar 90_a mounted for pivotal movement about the axle 39_a and having for that purpose a hub 91_a between the hubs 46_a of the arm 40_a embracing the bushing 47_a on said axle with a rotative fit. A coil spring 93_a between the bracket flange 26_a and the bumper bar 90_a urges said bar about the axle 39_a in the position shown in Fig. 8. The upper end of the bumper bar 90_a is curved to present a convex surface to the picker stick 16_a and extends between the lugs bars 83_a and 84_a. The impact surface of this bumper bar is covered with a pad 95_a of cushioning material, such as leather or rubber secured to said bar by screws 96_a.

To limit the rotative position of the bumper bar 90_a about the axle 39_a against the expansive action of the coil spring 93_a, the lower end section of said bar is offset to extend along the bottom of the bracket 22_a and adjustably carries a screw 97_a threaded therein and having a head 98_a adapted in limiting position to engage a pad 100_a of cushioning material such as leather or rubber affixed to the lower side of said bracket by screws 101_a.

The return of the picker stick 16_a into outward position shown in Fig. 8 is effected by a spring 105_a between a lower extension 110 of the link 61_a and a lug 111 rigid with the bracket 22_a.

While the invention has been described with particular reference to specific embodiments, it is to be understood that it is not to be limited thereto, but is to be construed broadly and restricted solely by the scope of the appended claims.

What is claimed is:

1. In a loom, the combination comprising a picker stick, a parallel motion for said picker stick having a rockable bracket, a frame rigid with said bracket for rocking movement therewith, and a pick motion for said picker stick comprising a rigid lug strap, and means mounted on said frame for supporting and guiding said lug strap in its endwise picking movement.

2. In a loom, the combination comprising a picker stick, a parallel motion for said picker stick having a rockable bracket, a frame secured to said bracket for rocking movement therewith, and a pick motion for said picker stick comprising a pair of rigid parallel lug bars flanking the picker stick and connected together as a unit to form a lug strap, and means secured to said bracket for guiding and supporting one of said lug bars for endwise movement.

3. In a loom, the combination as described in claim 2, said guiding means consisting of a single channel member having a guide slot, one of said lug bars extending in said slot with a snug slide fit.

4. In a loom, the combination as described in claim 2, said guiding means comprising a channel member having a T-slot, one of said lug bars hav-

ing a corresponding cross-section and extending in said slot with a snug slide fit.

5. In a loom, the combination comprising a picker stick, a parallel motion for said picker stick having a rockable bracket, a pair of opposed parallel frame plates secured to said bracket for rocking movement therewith and upstanding therefrom, and a pick motion for said picker stick comprising a pair of rigid parallel lug bars flanking the picker stick and connected together as a unit to form a lug strap, and a pair of guides for said bars respectively secured to the upper ends of said frame plates respectively.

ELVIN A. MASTRIANI.
KAROL KULCZYCKI.

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