June 3, 1930. A. A. GORDON ET AL 1,760,981

PICKING MOTION FOR LOOMS

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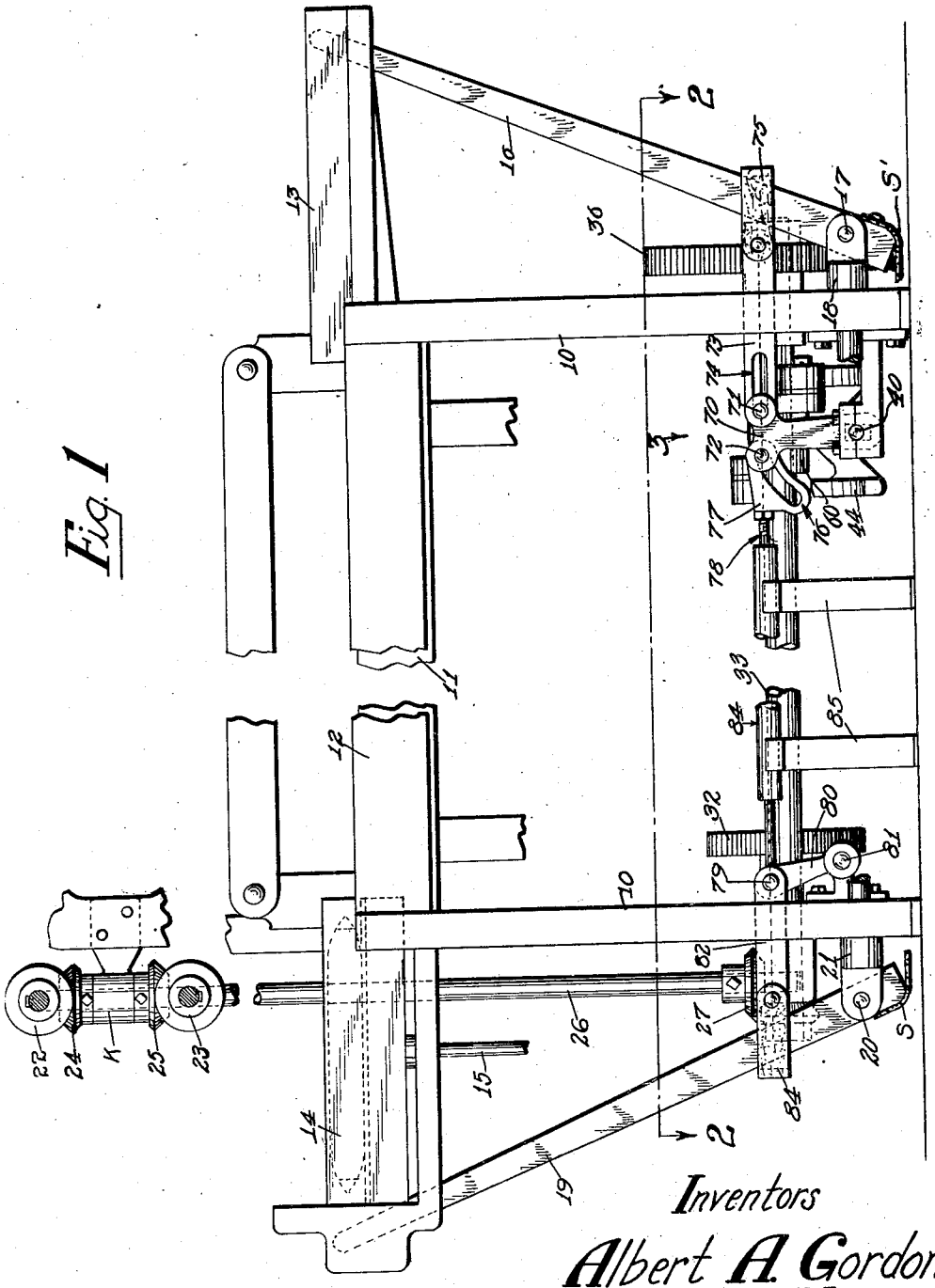


Fig. 1

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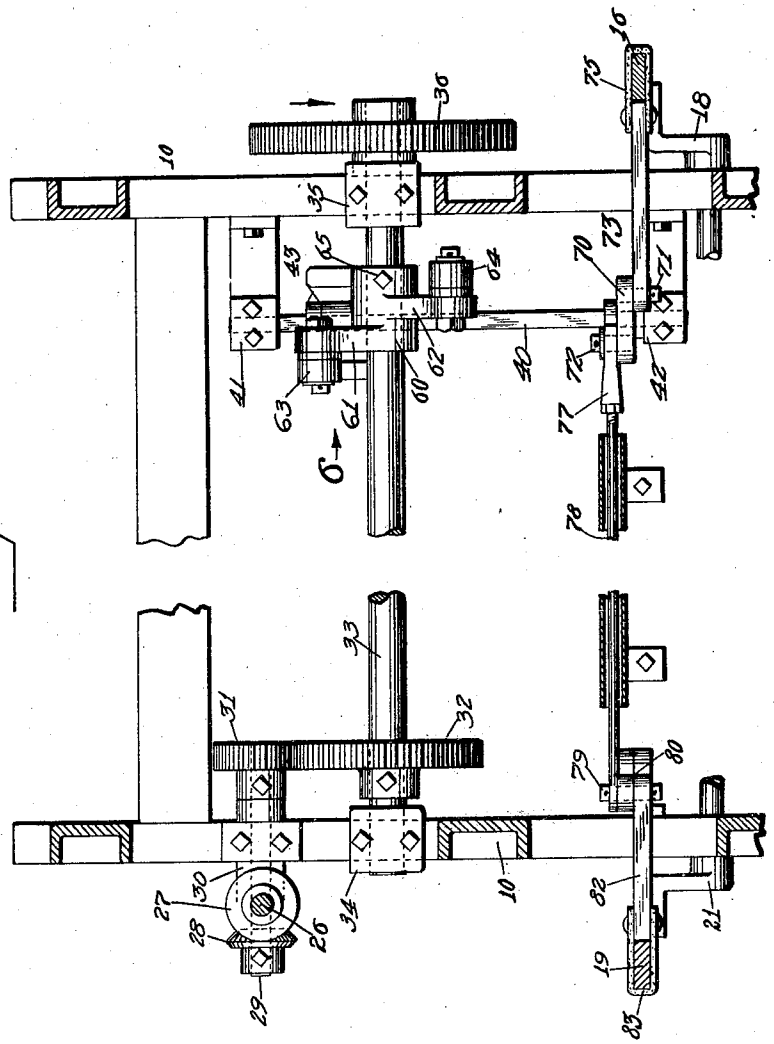
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PICKING MOTION FOR LOOMS

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Fig. 2



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PICKING MOTION FOR LOOMS

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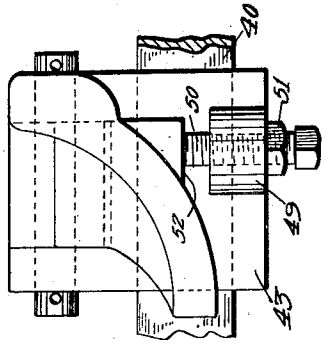


Fig. 5

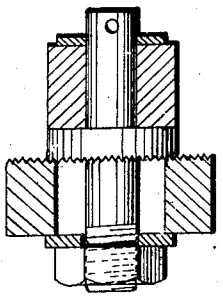


Fig. 7

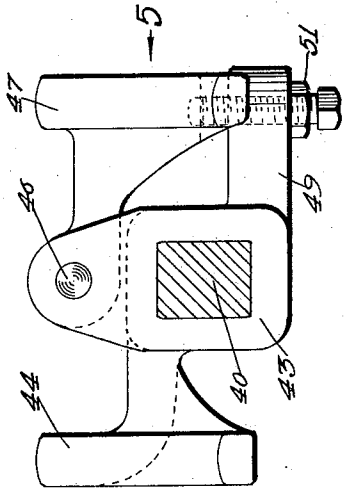


Fig. 4

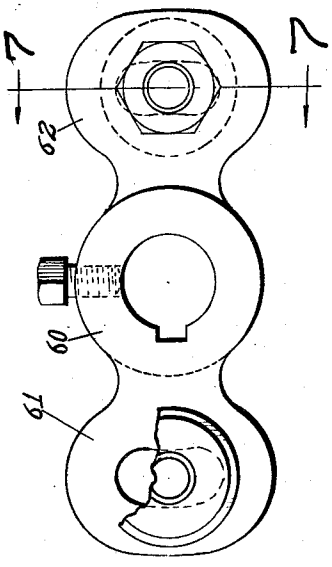


Fig. 6

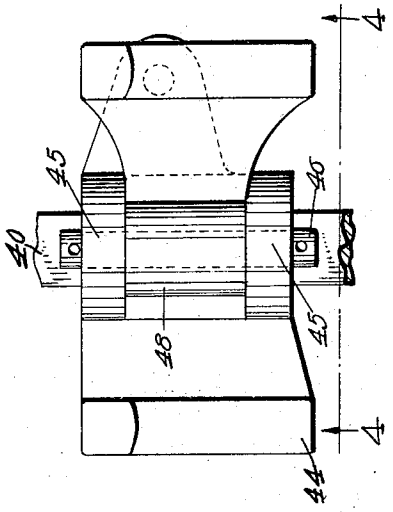


Fig. 3

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Patented June 3, 1930 1,760,981

UNITED STATES PATENT OFFICE

ALBERT A. GORDON AND IRVING H. VERRY, OF WORCESTER, MASSACHUSETTS, ASSIGNORS TO CROMPTON & KNOWLES LOOM WORKS, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS

PICKING MOTION FOR LOOMS

Application filed August 3, 1928. Serial No. 297,378.

This invention relates to improvements in picking motions for looms and it is the general object of the invention to provide a motion wherein the power which operates the picker sticks at each end of the loom may be derived from the main source of power of the loom in such a way as to relieve the pattern mechanism of undue sudden strains.

In the so-called Knowles loom an example of which is shown in patent to Knowles No. 134,992 driving mechanism for the loom is located at one side and the head or pattern and box controlling mechanism is located at the other side of the loom. The head is ordinarily operated by an upright shaft which may be connected to the bottom shaft of the loom. The bottom shaft will ordinarily have a picking arm adjacent each end thereof, one for each of the picker sticks. It is found that the picking motion which is on that end of the loom near the driving or source of power will operate ordinarily in a satisfactory manner, but when the loom is comparatively wide there is sufficient twist in the bottom shaft between the power unit and the picking motion on the opposite side of the loom to interfere with the smooth and uniform operation of the upright shaft which drives the head.

The upright and bottom shafts are geared together but when the picking arm on that side of the loom opposite the source of power engages the picking cam there will be a relative backward twist of the bottom shaft which will continue until the picking arm and its picking ball pass over the high part of the picking cam, after which, the strain of the pick being relieved, the shaft will have a quick forward motion in addition to its regular rotary motion. This quick motion is transmitted to the upright shaft and from the latter to the operating parts of the head, and it is an important object of our present invention to eliminate the twist of the shaft by deriving power which operates both picking mechanisms from that side of the loom near the source of power, thus eliminating the twist in the bottom shaft and permitting the latter to operate the upright shaft in the head without abnormal strains.

It is a further object of our present invention to employ a pair of oppositely extending picker arms on the bottom shaft which cooperate with a two part picking shoe oscillatable first in one direction and then in the other direction under influence of the picker arms.

It is another object of our invention to make the picking shoes or cams relatively movable with one shoe fixed to the picking shaft, said fixed shoe being set to cooperate with its corresponding picking ball and the movable shoe being adjusted so that the latter will cooperate with the other picking arm in the proper manner.

It is a further object of our present invention to provide a power arm which is oscillated first in one direction and then in the other and to connect said power arm with the two picker sticks by means of linkage providing lost motion so that when one picker stick is being actuated the other may remain at rest.

We find that in wide looms the link which extends from the picking motion to the opposite side of the loom is subject to some vibration and it is a further object of our present invention to provide means for arresting the vibration in the link and in further providing for lost motion in such a way as will permit oscillation of the aforesaid power arm about an axis without straining the link as the latter is held in substantially the same longitudinal position by the means which prevents its vibration.

With these and other objects in view which will appear as the description proceeds, our invention resides in the combination and arrangement of parts hereinafter described and set forth in the claims.

In the accompanying drawings wherein a convenient embodiment of our invention is set forth,

Fig. 1 is a front elevation of a loom made according to our present invention,

Fig. 2 is a horizontal section taken on the line 2—2 of Fig. 1,

Fig. 3 is a detail top plan view on an enlarged scale looking in the direction of arrow 3 of Fig. 1,

Fig. 4 is a section taken on line 4—4 of Fig. 3,

Fig. 5 is an end elevation looking in the direction of arrow 5, Fig. 4,

Fig. 6 shows the two-part picking arm, looking in the direction of arrow 6, Fig. 2, which cooperates with the shoe shown in Figs. 3, 4 and 5, and

Fig. 7 is a detailed vertical section on line 7—7 of Fig. 6.

Referring to Figs. 1 and 2 we have shown a loom frame 10 and a lay 11 which is moved back and forth away from and toward the breast beam 12 by mechanism not shown but well understood. As shown herein we locate a single box 13 on one end of the lay and a plurality of boxes 14 at the other end of the lay, said boxes 14 being actuated in a vertical direction by box lifter rod 15.

The plain box 13 has associated therewith a picker stick 16 which is pivoted as at 17 to the rocker iron 18 of the lay while the shifting boxes 14 have associated therewith a second picker stick 19 which moves about its stud 20 carried by the rock iron 21.

The head motion designated herein generally at K is provided with upper and lower mutilated driving cylinders 22 and 23, respectively, which are driven by bevel gears 24 and 25, respectively, secured to the upper end of an upright shaft 26. The lower end of said shaft 26 may be provided with a bevel gear 27 meshing with a second bevel gear 28 secured to a short shaft 29 extending through a bearing 30 carried by the loomside.

The inner end of the short shaft 29 has secured thereto either an eccentric or an elliptical pinion 31 which meshes with an elliptical or eccentric gear 32 secured to the bottom shaft 33 and having twice the number of teeth on pinion 31. The latter shaft is mounted in bearings 34 and 35 which are located, respectively, at the head and driving ends of the loom. The main driving gear 36 is located adjacent the bearing 35 and is secured to the bottom shaft 33. The gear 36 may be driven in any approved manner by mechanism not shown and will ordinarily be given a constant rotation in the direction indicated by the arrow, Fig. 2.

In this way the upright shaft 26 is given a complete rotation for every half turn of the bottom shaft 33 or for each pick of the loom.

By means of connections not shown herein the head motion K determines the vertical movement of the boxes 14 and also acts to lift the warp threads not shown. The mechanism thus far described is of common construction and forms no part of our present invention.

Our present improvements relate particularly to the manner of communicating power from the driving gear 36 to the picker stick 16 and 19, and in carrying our invention into effect we provide a so-called picking shaft 40 which may be of substantially rectangular cross section as indicated in Fig. 4 and may be mounted for oscillation in front and rear bearings 42 and 41, respectively, which are fixed to the loom frame.

Secured in proper adjusted position along the length of the shaft 40 is an oscillating picking shoe support 43 which has one cam 44 fixed thereto, preferably by being cast integral therewith. Extending upwardly from the shoe support 43 is a pair of spaced ears 45 through and between which extends a stud 46. The latter affords pivotal support for the second cam element 47 which has a hub 48 located between the ears 45 and pivotally mounted on the stud 46.

As shown in Fig. 4 the shoe support 43 is provided with an arm 49 in which is secured an upwardly extending adjustable stop screw 50 held in adjusted position by check nut 51. Said screw engages a face 52 on the under side of the movable cam member 47 and acts to position the latter relatively to the shoe support 43.

A hub 60 shown particularly in Fig. 6 has a pair of operatively extending picking arms 61 and 62 on which are rotatably mounted the picking balls 63 and 64, respectively. The picking ball 63 as shown herein may cooperate with the cam 44 which is fixed with respect to the shoe support while the roll 64 may cooperate with the movable cam element 47. The hub is secured to the bottom shaft 33 in adjusted position and also in correct longitudinal position along said shaft by a set screw 65.

In the operation of the mechanism thus far described the picking arms 61 and 62 will rotate with the bottom shaft 33 and on one pick of the loom the ball 63 will engage the cam 44 to rock the shaft 40 in a counterclockwise direction as viewed in Fig. 1, while on the next pick when the bottom shaft has made a half revolution the picking ball 64 will engage the movable cam element 47 to give the picker shaft 40 an opposite rotation or a clockwise rotation as viewed in Fig. 1. In this way as the bottom shaft continues to rotate the shaft 40 will be oscillated to move first in one direction and then in the other. The screw 50 affords means for adjusting the cam faces relatively to their picking balls. The picking arm 60 is located close to the driving gear 36 and as a result there is very little twist in that portion of the shaft 33 which lies between the picking arm and the driving gear.

The device by which motion of the picker shaft 40 is communicated to the picker stick includes an upright power arm 70 having two spaced studs 71 and 72 which are operatively connected, respectively, to the picker sticks 16 and 19. A sweep stick 73 has a slot 74 through which the stud 71 extends, said

sweep stick being connected by a lug strap 75 to the picker stick 16.

The other stud 72 extends through a slot 76 in a rod head 77 mounted on the right hand end of rod 78 as shown in Fig. 1. Said rod is connected at the left hand end thereof to a stud 79 which extends through the upper part of an arm 80 pivotally mounted on a fixed stud 81 at the opposite side of the loom. A speed stick 82 is connected to the stud 71 and by means of lug strap 83 is connected to the picker stick 19. The arm 80 serves to support the inner end of the sweep stick 82 and also the left hand end of the rod 78 as viewed in Fig. 1.

We find during the operation of the mechanism that a certain amount of vibration occurs in the rod 78 and in order to prevent this we provide a tube or pipe 84 through which the rod 78 extends, said tube being supported by fixed brackets 85. In order that the arm 70 may oscillate freely in a counter-clockwise direction as viewed in Fig. 1 without straining the rod 78 we make the slot 76 in the rod head 77 arcuate, preferably about the center of the picking shaft 40 as a center.

In operation, power is communicated as previously described from the driving gear 36 to the hub 60 to cause oscillation of the shoe support 43 first in one direction and then in the other. As the arm 70 moves to the left picker stick 16 will be given an actuating motion and stud 72 will move idly along the arcuate slot 76. On the next pick of the loom when the arm 70 moves to the right the stud 72 acting through the rod head 77 and intervening mechanism will give the picker stick 19 an actuating stroke, the stud 17 under these conditions moving idle in slot 74. In view of the shortness of the sweep stick 73 and the fact that the same is loosely connected to the picker stick in the usual manner, the downward motion of the stud 71 as the arm 70 moves to the right will be accompanied by a corresponding downward motion on the part of the sweep stick 73. It will therefore be seen that the operation of both picker sticks is brought about by mechanism which is located close to the source of power.

As the bottom shaft 33 continues to rotate it will impart motion to the upright shaft 26. This motion, while it is continuous will not necessarily be uniform, inasmuch as the pinion and gear 31 and 32, respectively, are not concentric with their respective axes but are either eccentric or elliptical. It will be apparent from an inspectiaion of Fig. 2 that the bottom shaft will not be acted upon by any force near the head end of the loom tending to create a twist or strain in said shaft and for this reason the motion which is transmitted through the upright shaft 26 will be smooth and free from the objectionable vibration and sudden strain which would exist if a picking arm were located on the bottom shaft at the head end of the loom.

The arm 70 and therefore the shaft 40 will be held in normal position by the engagement of the stud 71 and 72 with the sweep stick 73 and rod head 77, respectively. It is to be understood that each picker stick tends normally to move toward the adjacent outer end of the lay, as is usual in loom construction, this result being accomplished through mechanism not shown but connected to the straps S shown in Fig. 1.

From the foregoing it will be seen that we have provided a picking motion the driving part of which is located close to the source of power, with the result that there is practically no twist or strain imposed upon the bottom shaft other than that caused by the upright shaft 26 and the parts connected therewith. It will also be seen that the picking balls are offset with respect to each other and move in different planes perpendicular to the bottom shaft and that the picking shaft 40 lies in a vertical plane which is substantially intermediate the planes of the picking balls, so that as the bottom shaft rotates the picking shaft will be oscillated first in one direction and then in the other. By a slight longitudinal adjustment of the hub 60 along the bottom shaft we may vary the relation of the picks if it should be found that the picking on one side is stronger than that on the other side of the loom. Furthermore, it will be seen that the shoe 47 is movable relatively to the fixed cam 44 and in this way we are enabled to adjust both picking shoes relatively to their respective picking balls. It will also be noted that the rod 78 passes through a guide which acts to restrain undue vibration of said rod. Furthermore, the arcuate slot 76 permits the arm 70 to move to the left without subjecting the rod 78 to lateral strains.

Having thus described our invention it will be seen that changes and modifications may be made therein by those skilled in the art without departing from the spirit and scope of the invention and we do not wish to be limited to the details herein disclosed, but what we claim is:

1. In a loom, a loom driving element at one end of the loom, a harness controlling element at the other end of the loom, a shaft extending across the loom and operatively connecting the elements, a shuttle driving member adjacent each end of the loom, a pair of oppositely extending picking arms secured to the shaft at that end of the latter adjacent the driving element, and means operated by one of said arms to actuate the member at one end of the loom and actuated by the other arm to operate the member at the other end of the loom.

2. In a loom, a loom driving element at one

end of the loom, a harness controlling element at the other end of the loom, a shaft extending across the loom and operatively connecting the elements, a shuttle propelling member at each end of the loom, an actuating device for both propelling members connected to the shaft at one part only thereof adjacent the driving element, connectors for each picker stick to be operatively related to the actuating device the connector extending toward the member adjacent the harness controlling element being relatively long, and means to restrain vibration of said long connector.

3. In a loom, a loom driving element at one end of the loom, a harness controlling element at the other end of the loom, a shaft extending across the loom and operatively connecting the elements, a shuttle propelling member at each end of the loom, an actuating device for both propelling members connected to the shaft at one part only thereof adjacent the driving element, connectors for each picker stick to be operatively related to the actuating mechanism, the connector extending toward the member adjacent the harness controlling element being relatively long, and means to restrain vibration of said long connector, said means engaging the connector at a point intermediate its length.

4. In a loom, a loom driving element at one end of the loom, a harness controlling element at the other end of the loom, a shaft extending across the loom and operatively connecting the elements, a shuttle propelling member at each end of the loom, an actuating device for both members connected to the shaft at one part only thereof adjacent the driving element, connectors for each picker stick to be operatively related to the actuating mechanism, the connector extending toward the member adjacent the harness controlling element being relatively long, and means to restrain vibration of said long connector, said means including a tubular device through which the connector freely extends.

5. In a loom, a loom driving element at one end of the loom, a harness controlling element at the other end of the loom, a shaft extending across the loom and operatively connecting the elements, a shuttle propelling member for each end of the loom, actuating mechanism for both propelling members connected to the shaft adjacent the driving element, connectors operatively connecting each shuttle propelling member with the mechanism, and a lost motion connection between each connector and the actuating mechanism.

6. In a loom, a loom driving element at one end of the loom, a harness controlling element at the other end of the loom, a shaft extending across the loom and operatively connecting the elements, a shuttle propelling member for each end of the loom, actuating mechanism for both propelling members secured to and deriving motion from the shaft at a point adjacent the driving element, an oscillating power transmitting device forming a part of the mechanism, a connector for each member operatively connected to the device, and means defining a lost motion connection between each connector and the device, said lost motion connectings being so arranged that the device will transmit power to but one of the members when said device moves in one direction.

7. In a loom, a loom driving element at one end of the loom, a harness controlling element at the other end of the loom, a driving shaft extending across the loom and operatively connecting the element, a shuttle propelling member for each end of the loom, a picking shaft oscillatable first in one direction and then in the other, means to connect the picking shaft to both shuttle propelling members so that when said picking shaft oscillates in one direction one member is actuated and when the picking shaft oscillates in the other direction the other shuttle propelling member is actuated, and mechanism carried by the driving shaft adjacent the driving element for oscillating the picking shaft.

8. In a loom, a loom driving element at one end of the loom, a harness controlling element at the other end of the loom, a shaft extending across the loom and operatively connecting the elements, a shuttle propelling member for each end of the loom, a picking shaft operatively connected to the shuttle propelling members, means carried by the first named shaft adjacent the driving element to oscillate the picking shaft first in one direction and then in the other, and a lost motion connection between the picking shaft and each member so that one of said members will be operatively related to the picking shaft and the other will be idle relatively to the picking shaft when the latter oscillates in either direction.

9. In a loom, a rotating element, a pair of actuating members carried by said element and located in different planes parallel to the axis of the element, a picking shaft to be operatively related to one of said members on one pick of the loom and to the other member on the next pick of the loom to give said picking shaft a motion in two different directions, and a shuttle propelling device at each end of the loom operatively connected to the picking shaft on alternate picks of the loom so that when one of the members actuates the picking shaft one of the shuttle propelling devices will be operative, and when the other member actuates the picking shaft to give the latter a motion in another direction so that the other shuttle propelling device will be operative.

10. In a loom, a single picking shaft, a shuttle propelling member at each end of the loom, means to oscillate said picking shaft

so that the latter moves in one direction on one pick of the loom and in the opposite direction on the next pick of the loom, and connections between said picking shaft and the members to render the latter alternately operative as the picking shaft moves first in one direction and then in the other.

11. In a loom, a rotating shaft, a pair of oppositely extending arms secured to the shaft and offset from each other with respect to the axis of the shaft, a picking shaft, shuttle propelling members one for each end of the loom operatively connected to the picking shaft, and means secured to said shaft to be engaged by the arms as the first named shaft rotates to oscillate the picking shaft first in one directon and then in the other.

12. In a loom, a rotating shaft, a pair of oppositely extending arms secured to the shaft and offset from each other with respect to the axis of the shaft, a picking shaft, shuttle propelling members one for each end of the loom operatively connected to the picking shaft, and means secured to said shaft to be engaged by the arms as the first named shaft rotates to oscillate the picking shaft first in one direction and then in the other, said means including a shoe for each side of the picking shaft, one shoe being for one arm and the other shoe being for the other arm.

13. In a loom, a rotating shaft, a pair of oppositely extending picking arms offset from each other with respect to the axis of the shaft, a picking shaft extending transversely of the first named shaft, a pair of shoes secured to said picking shaft, one shoe lying on one side and the other shoe lying on the other side of the axis of the picking shafts, one shoe being in the path of movement of one of the arms and the other shoe being in the path of movement of the other arm so that as the first named shaft rotates the picking shaft will be rocked first in one direction and then in the other direction, and shuttle propelling means located at each end of the loom operatively connected to the picking shaft, the shoes being relatively movable wth respect to each other.

14. In a loom, a rotating shaft, a pair of oppositely extending picking arms offset from each other with respect to the axis of the shaft, a picking shaft extending transversely of the first named shaft, a pair of shoes secured to said picking shaft, one shoe lying one side and the other shoe lying on the other side of the axis of the picking shafts, one shoe being in the path of movement of the other arm so that as the first named shaft rotates the picking shaft will be rocked first in one direction and then in the other direction, and shuttle propelling means located at each end of the loom operatively connected to the picking shaft one of said shoes being relatively movable with respect to the picking shaft.

15. In a loom, a rotating shaft, oppositely extending picking arms secured to the shaft, said arms being offset from each other with respect to the axis of the shaft, a picking shaft extending substantially perpendicular to the first named shaft and having the axis thereof intermediate the picking arms with respect to a plane perpendicular to the axis of the first named shaft, a picking shoe for each side of the picking shaft and the corresponding arms, one of said arms engaging its corresponding shoe when the first named shaft is in one angular position and the other picking arm engaging the other shoe when the first named shaft is in another position to oscillate said picking shaft.

16. A picking shoe for loom picking mechanism having a body through which extends an opening to receive a picking shaft, and a pair of picking cams, one cam located on each side of the axis of the opening through the body, each cam forming part of the shoe and arranged to be engaged by an operating part of the loom.

17. In a loom, a driving element oscillatable about an axis, a shuttle propelling member at each end of the loom, a connector for each member to be operatively related to the device, a guide for one of said connectors through which the latter connector moves with a substantially longitudinal motion, and means defining a lost motion connection between said device and the rod extending through the guide, said lost motion means including a rod head having a slot which is substantially concentric with the axis of the device.

18. A picking shoe for loom picking mechanism having a body through which extends an opening to receive a picking shaft, and a pair of picking cams to be engaged by the operating part of the loom, a cam located on each side of the axis of the opening through the body, one of said cams being movable with respect to the body to assume a plurality of positions with respect to the latter, said cams forming part of the shoe.

In testimony whereof we have hereunto affixed our signatures.

ALBERT A. GORDON.
IRVING H. VERRY.