Aug. 3, 1926. 1,594,600

J. E. CARLSON

LOOM FOR WEAVING REED AND SIMILAR MATERIAL

Filed May 4, 1923 2 Sheets-Sheet 1

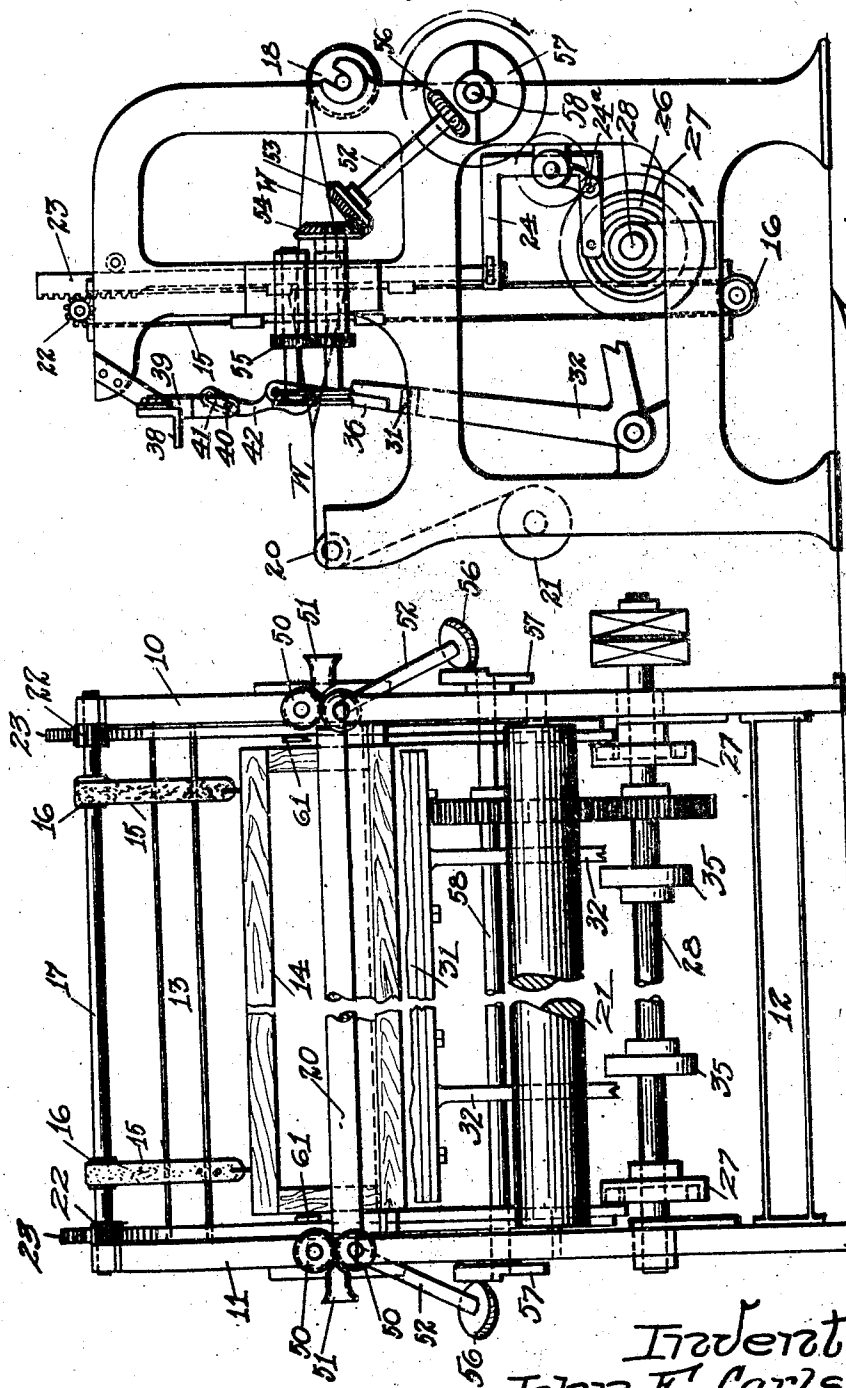


Fig. 1.

Fig. 2.

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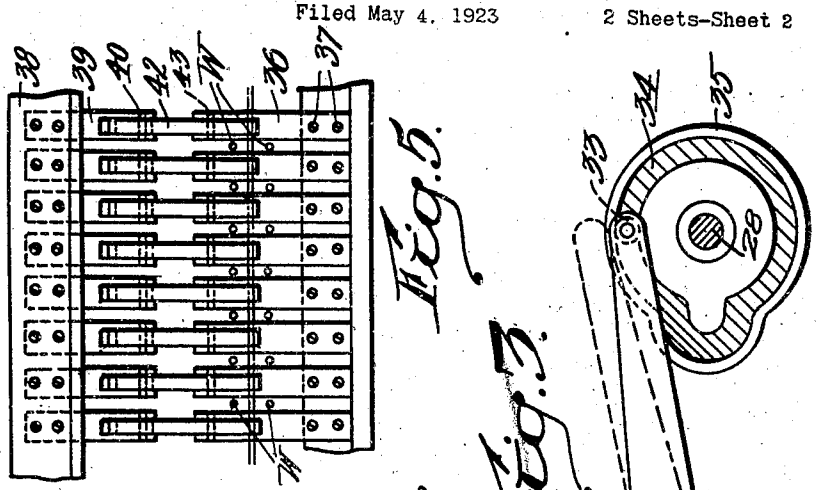


Fig. 5.

Fig. 3.

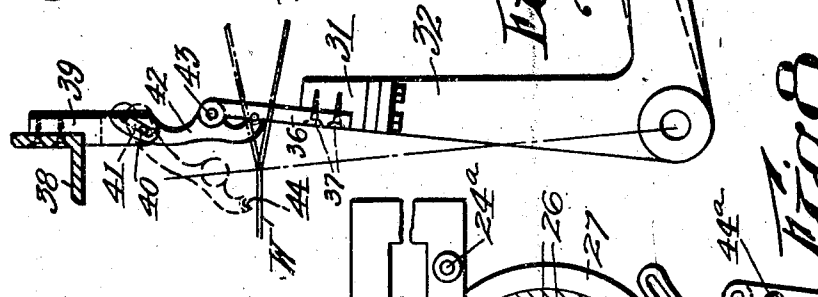


Fig. 8.

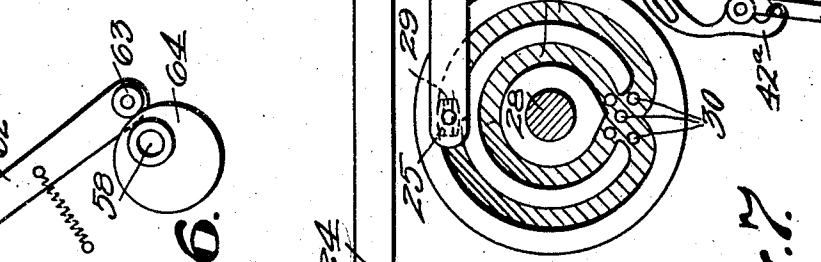


Fig. 6.

Fig. 7.

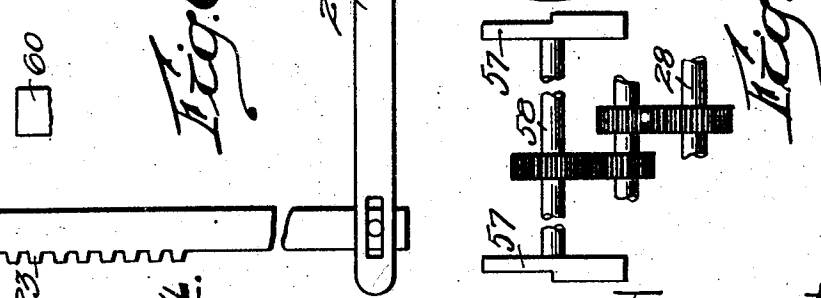


Fig. 4.

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UNITED STATES PATENT OFFICE.

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LOOM FOR WEAVING REED AND SIMILAR MATERIAL.

Application filed May 4, 1923. Serial No. 636,682.

This invention relates to a loom for weaving reed, fibre, and other similar material which is of substantial stiffness.

It is the object of my invention to provide a loom for such purposes which is of a much simplified construction and which is particularly adapted to insert a reed or other stiff material as filling or weft in a fabric, without the use of a shuttle or carrier for the filling.

A further object is to provide a loom in which reed or similar filling may be alternately fed from both sides of the loom, thus greatly increasing the output of the loom.

An important feature of my invention relates to the provision of an improved and simplified driving mechanism by the use of which the usual harness cam shaft may be omitted.

My invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawings in which—

Fig. 1 is a side elevation of the loom embodying my improvements;

Fig. 2 is a front elevation thereof;

Fig. 3 is an enlarged side elevation of the lay and certain parts associated therewith;

Fig. 4 is an enlarged side elevation of the harness actuating mechanism;

Fig. 5 is a detail front elevation of a portion of the lay;

Fig. 6 is a side elevation of mechanism for cutting the filling;

Fig. 7 shows a modified arrangement of driving mechanism, and

Fig. 8 shows another slight modification.

Referring to the drawings, my improved loom comprises the usual frame having loom sides 10 and 11 and cross girts 12 and 13. Two or more harnesses 14 may be supported in any usual manner, as by straps 15 and pulleys 16, on a harness shaft 17 rotatably mounted at the top of the loom sides 10 and 11.

The warp threads W are supplied from the usual warp beam rotatably mounted at the back of the loom and provided with the usual let-off mechanism (not shown). The woven fabric may be guided around a roll 20 at the front of the loom and may be wound on a roll 21 intermittently rotated by any usual type of take-up mechanism (not shown).

The harnesses may be actuated in any convenient manner but I have shown herein a desirable construction by which harnesses of any desired width may be easily operated. For this purpose I provide one or more pinions 22 on the harness shaft 17, these pinions being engaged by vertically movable rack bars 23 each having a pin and slot connection at its lower end to a bent lever 24, mounted on a stud 24^a and having an elongated cam follower 25 pivoted thereon.

The cam follower 25 is positioned in the double groove 26 of a cam 27 which is preferably fixed direct to the main driving shaft 28 of the loom. The follower 25 has a groove 29 in its outer face and the cam 27 has a plurality of pins or studs 30 mounted as indicated at the intersection of the inner and outer grooves of the cam. With this construction, the cam follower 25 will shift alternately between the inner and the outer grooves, thus producing a two-revolution effect from a single revolution cam and avoiding the necessity of providing the usual harness cam shaft operated at one half the speed of the driving shaft.

A lay 31 is mounted on bent levers 32 having rolls or studs 33 at their rear ends, each positioned in the groove or track 34 of a cam 35 on the driving shaft 28. By these connections the lay is moved positively in both directions and it will be evident that it remains in rearward position for the greater portion of each revolution of the driving shaft. The cams 27 and 35 are so timed that the harnesses are shifted as the lay beats up.

The lay 31 is of special construction and is provided with a series of vertically disposed plates 36 secured to the lay in spaced relation by screws 37. The plates 36 are of substantial width and form the equivalent of the reed or comb commonly used in weaving. The plates hold the warp threads W in properly spaced relation and also serve to beat up or press the filling into place in the fabric as the shed is changed.

A rail or cross bar 38 is mounted on the loom frame and extends across the loom above the lay 31 and plates 36. This bar 38 supports a series of upper plates 39 each having a stud 40 which extends through a slot 41 in the upper end of a guide arm 42. Each guide arm is pivoted at 43 to the upper end of a plate 36, the arms corresponding to the plates in number and transverse po-

sition. Each guide arm is notched or recessed at 44 on its rear face and the ends of each recess are preferably beveled or countersunk to facilitate the entrance of a reed into the recess.

When the lay is in its rearward position, the shed is open and the guide arms 42 are in the position shown in full lines in Figs. 1 and 3. Forward movement of the lay causes the arms 42 to swing forward and upward to the position shown in dotted lines in Fig. 3, the lower ends of the arms being then above the warp W and permitting the inserted filling to be beaten into the fabrics.

The slots 41 may be long enough to permit any desired forward movement and the rapidity of the swinging movement of the arm is determined by the angular position of the slots. The provision of separate plates 36 and 39 greatly facilitates repairs and replacement in case of accident to one of the arms 42.

Obviously, the notches or recesses 44^a may be formed in the plates 36^a instead of in the arms 42^a, as indicated in Fig. 8.

For feeding the filling, I provide a pair of feed rolls 50 at one side of the loom and a guide tube 51 which facilitates the presentation of the pieces of reed or other filling to the rolls 50. The filling is suitably guided by the rolls 50 to the recess 44 of the first guide arm 42, the arm being then in operative position adjacent the corresponding plate 36 which closes the back side of the recess. As the reed is advanced by the rolls 50, it is guided by the successive openings or recesses 44 and is thus inserted in the open shed of the warp threads W. When weaving with reed, the reed is commonly provided in lengths substantially corresponding to the width of the fabric.

Any convenient driving mechanism may be provided for intermittently rotating the feed rolls 50. In the drawings, I have shown an intermediate shaft 52 connected by bevel gears 53 and 54 to a shaft on which the lower feed roll 50 is mounted, the upper and lower rolls being connected by a pair of gears 55. At its lower end, the shaft 52 has a friction roll 56 engaging a disc 57 on a shaft 58 geared to rotate in unison with the driving shaft 28. The disc 57 has its driving surface cut away so that the friction roll 56 is engaged and rotated during a portion only of each revolution of the shaft 58, the parts being timed so that the rolls 50 are actuated and the reed or other material is inserted while the lay is in its rearward position and the guide arms 42 are in raised position.

The shaft 58 extends across the loom and the feed rolls and their driving mechanism are preferably duplicated at the opposite side of the loom, so that filling or weft may be fed to the loom from either side, or alternately, first from one side and then from the other. The latter arrangement is very desirable when using reed, as it is necessary to present each separate reed manually to the guide tube 51 and rolls 50 and the speed of operation of the loom is limited to the number of reeds which can thus be presented. By alternately feeding the reeds from opposite sides, the production of the loom is substantially doubled.

As shown in the drawings, each pair of rolls will be actuated at each revolution of the driving shaft 28 and of the feed shaft 58. It is obvious that by a slight change in the ratio of the gearing and in the relative setting of the discs 57, the shaft 58 may be caused to rotate one half as fast as the shaft 28 and each pair of feed rolls may be given a feeding movement once for each two revolutions of the shaft 28. An arrangement by which this may be accomplished is indicated in Fig. 7.

Having described the construction of my improved loom, the method of operation thereof is as follows: The warp threads, which are commonly of heavy fibre wound on the warp beam 18, are led therefrom through the harnesses 14 and through the openings between the plates 36 to the front of the loom where they pass around the guide roll 20 to the takeup roll 21. Commonly one pair of warp threads is placed between each pair of plates 36.

The loom is then started and a reed is presented to the feed rolls 50, which advance it through the shed while the lay is in its rearmost position, the reed being guided through the recesses formed between the arms 42 and the plates 36. The shed opening and harness motion is much less than in the usual loom, as no shuttle or other weft carrier passes through the shed. As soon as the reed is fully inserted, the lay moves forward to beat up the inserted reed and the arms 42 are simultaneously swung upward out of the path of the advancing reed. The harnesses are simultaneously shifted and the lay moves back for the insertion of another reed in the new shed.

This second reed may desirably be inserted from the opposite side of the loom, during which feeding operation the first operator is presenting another reed to the feed rolls 50. In this way each operator is required to feed only once for each two beats of the lay and the loom can be correspondingly speeded up to greatly increase production.

When weaving reeds, the reed is commonly cut in lengths only slightly greater than the width of the fabric but when weaving fibre or other continuous material which is supplied from spools or other convenient storage, the feeding may be done automatically from one side only of the loom, the feed rolls operating at each change of the shed.

It is necessary in using continuous fibre

to provide means for cutting the fibre after each insertion thereof. For this purpose I have indicated one form of cutting mechanism in Fig. 6, the mechanism comprising a fixed knife 60 and a movable knife 61 mounted on a bent lever 62 having a roll 63 engaging a cam 64 on the shaft 58. At each revolution of the shaft 58, the knife 61 descends to sever the fibre just before the lay moves forward. My improved loom is thus equally well adapted for operating upon continuous fibre or upon reed which is supplied in separate pieces.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed otherwise than as set forth in the claims, but what I claim is:—

1. A loom for weaving reed and similar material having, in combination, a lay having a plurality of elements thereon adapted to separate and guide the warp threads, means to move the lay to beat in the filling, a plurality of filling guide arms each pivotally mounted on the frame of the loom and adapted to approach and co-operate with one of said lay elements to form a guideway for the filling, and means to move said arms alternately to guiding and inoperative position in timed relation to the movements of the lay.

2. A loom for weaving reed and similar material having, in combination, a lay, a reed on said lay formed of a series of plates each of substantial width, a plurality of filling guide arms, each pivotally mounted on one of said plates and on the frame of the loom and cooperating with the plates to guide the filling, and means to move said arms to and from operative position in timed relation to the movement of the lay.

3. A loom for weaving reed and similar material having in combination, a lay, a series of plates mounted on said lay and adapted to separate and guide the warp threads, means to move the lay to beat in the filling, a plurality of filling guide arms each pivotally mounted on the frame of the loom and on said plates and adapted to approach and cooperate with one of said lay elements to form a guide way for the filling, and means to move said arms alternately to guiding and inoperative position in timed relation to the movements of the lay.

4. A loom for weaving reed and similar material having in combination a lay, a series of plates of substantial width extending upwardly from said lay, a series of plates extending downwardly from the frame of the loom, a plurality of filling guide arms each pivotally mounted on one of said upwardly extending plates and cooperating therewith to guide the filling, said guide arms being provided with a slot in an upward extension of said arm and a stud for each arm mounted in fixed position on the downwardly extending plates and extending through said slot, to move said arms to and from operative position in timed relation to the movement of the lay.

5. A loom for weaving reed and similar material having in combination, a lay, means on said lay effective to separate and vertically guide the warp threads to form a shed, said lay having a plurality of elements thereon adapted to separate and guide the warp threads, a plurality of filling guide arms each pivotally mounted on the frame of the loom and adapted to cooperate with one of said elements to form a guide way for the filling, means to move said arms alternately to guiding and inoperative positions in timed relation to the movements of the lay, means to feed a stiff filling into the shed, said feeding means comprising a separate feeding device at each side of the loom and means to render said device alternately operative to insert filling alternately from opposite sides of the loom.

6. A loom for weaving reed and similar material having in combination, a lay, means on said lay effective to separate and vertically guide the warp threads to form a shed, said lay having a plurality of elements thereon adapted to separate and guide the warp threads, a plurality of filling guide arms each pivotally mounted on the frame of the loom and adapted to cooperate with one of said elements to form a guide way for the filling, means to move said arms alternately to guiding and inoperative positions in timed relation to the movements of the lay, means to feed a stiff filling into the shed, said feeding means comprising a pair of feed rolls on each side of the loom and means to intermittently and alternately rotate said feed rolls to permit insertion of the filling alternately from opposite sides of the loom.

7. A loom for weaving reed and similar material having, in combination, a lay, a reed on said lay formed of a series of plates each of substantial width, a plurality of filling guide arms each pivotally mounted on one of said plates and cooperating therewith to guide the filling, and means to move said arms to and from operative position in timed relation to the movement of the lay, said means comprising a stud for each arm mounted in fixed position and extending through a slot in an upward extension of said arm.

In testimony whereof I have hereunto affixed my signature.

JOHN E. CARLSON.