April 7, 1964 M. C. MOSHER 3,127,912

BEAT-UP MEANS FOR LOOMS

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FIG. 1

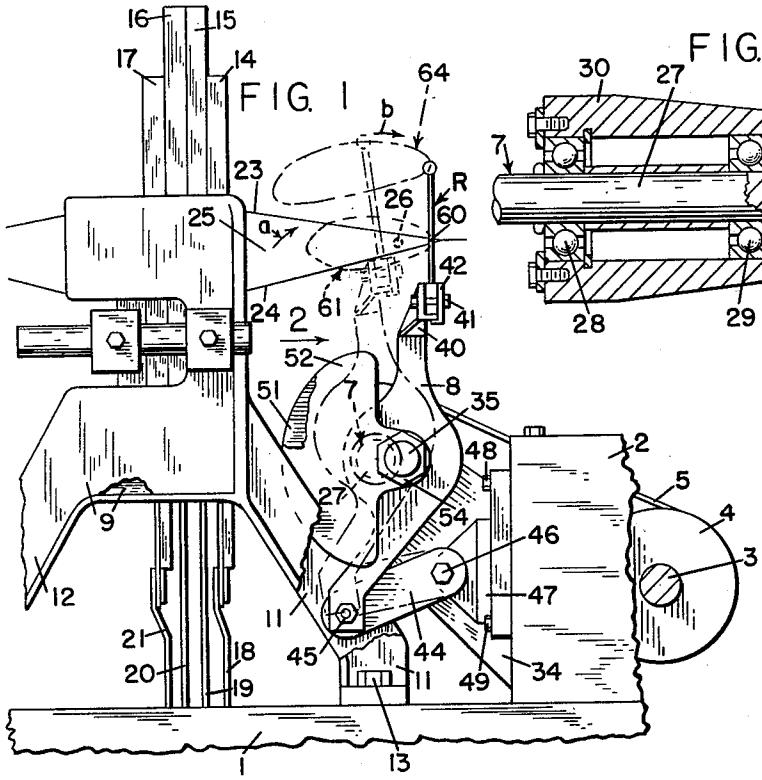


FIG. 3

FIG. 2

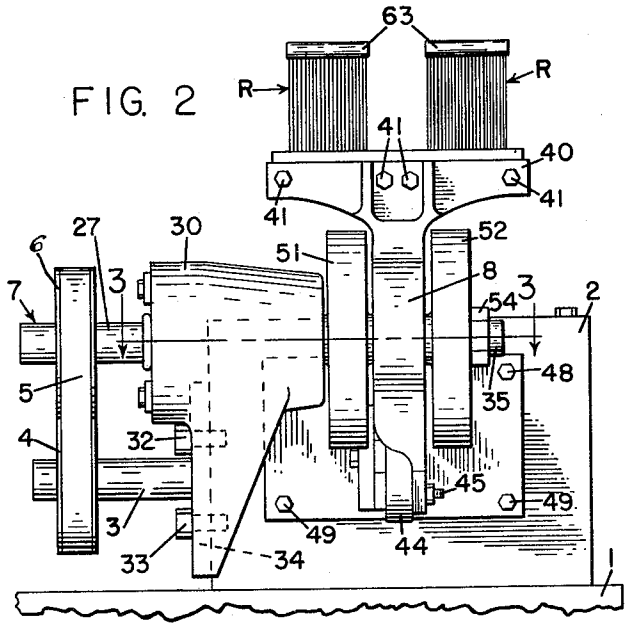
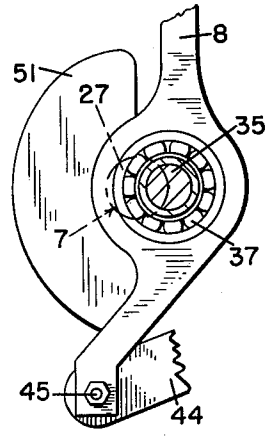


FIG. 4



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BEAT-UP MEANS FOR LOOMS

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This invention relates to looms and more particularly relates to improvements in beat-up means for looms operating at very high speeds.

One type of loom, of the class weaving ribbons or tapes, that has gone into extensive commercial use employs a rocking reed and support therefor which is pivoted at its lower end and operatively connected to a drive crank or cam remote from the reed support such that during loom operation the support is moved about its pivot along an arcuate path to its extreme forward position, whereat it momentarily stops and is then reversed to its extreme back position along the same path with the resultant disadvantage of setting up impact forces upon reversal which causes excessive vibration when attempting to operate at very high speeds.

Another type of loom utilizes a rotary reed supported on a rotating shaft below a shed formed by warp threads and must be of a certain diameter in order to remain in registry with the threads. Because of the diameter, the warp moving harness frames must be located rearwardly of the fabric woven sufficiently to clear the rotary reed with the disadvantage that the warp threads, in forming sheds, must be raised and lowered a greater distance than when the harness frames are nearer the fabric. This disadvantage increases the depth of the loom and places undue strain on the warp threads since the harness frames must move a greater distance in the same time to form the same size shed as to the present harness frames which can be located nearer the fabric because of the type of reed herein used and the manner in which it is supported.

Accordingly, therefore, it is an important object of the invention to overcome the disadvantages mentioned above by mounting the reed and its support for rotational oscillation back and forth along a continuous curvilinear path without momentarily stopping the support and without increasing the depth of the loom.

Another object of the invention is to mount the support directly on a rotating crankshaft whereby a combined rotating and oscillating motion is imparted to the reed and the reed beat-up point to effect movement of the latter in an elliptical path to beat up the weft while maintaining constant registry between the reed and the warp threads.

Another object of the invention is to provide control means between the support and a fixed part of the loom to permit vertical oscillation of the support during rotation of the crankshaft.

Still another object of the invention is to mount the support intermediate its ends on the crankshaft so that the support can move relative to the shaft during rotation thereof with the result that the beat-up point will move in a closed path other than a true circle to beat up the weft.

Another object of the invention is to impart dual motions to the reed support wherein one of the said motions is of a nature or characteristic differing from that of the other motion.

A further object of the invention is to mount the control means in such a manner that rotation of the crankshaft will effect rocking of the control means in synchronism with the crankshaft to produce rotational oscillation of the reed and its support.

A still further object of the invention is to provide a counterbalance operatively connected to the crankshaft to smooth out the rotational oscillation of the support while at the same time minimizing vibration thereof.

In order that the invention may be clearly understood reference is made to the accompanying drawings which illustrate by way of example the embodiments of the invention and in which:

FIG. 1 is a partial side elevational view of a loom having the invention applied thereto,

FIG. 2 is a rear elevation looking in the direction of arrow 2, FIG. 1,

FIG. 3 is a horizontal cross section taken on lines 3—3 of FIG. 2, and

FIG. 4 is a vertical section taken on lines 4—4, FIG. 3.

In carrying the present invention into effect, reference is made to FIGS. 1 and 2 wherein a loom frame base **1** supports a housing **2** in which a convenient drive mechanism is located but not shown. The drive mechanism is operatively connected to a jack shaft **3** which mounts a pulley **4** around which a timing chain or belt **5** is trained. Belt **5** extends rearwardly for connection with a pulley **6** on a shaft generally designated at **7** which mounts a reed support **8**, to be further described hereinafter.

The base **1** supports a pair of harness frameguides **9** each of which is provided with forward and rear legs **11** and **12** respectively, these legs being bolted to the base **1** by bolts **13**, only one of which is shown in FIG. 1. A set of harness frames **14**, **15**, **16** and **17** are guidingly mounted between guides **9** and are raised and lowered by their respective connectors **18**, **19**, **20** and **21**. These connectors may be operated for instance by cams not shown but well understood in the art. Raising and lowering of the harness frames will cause warp threads **23** and **24** to form sheds **25**, one of which is sown at FIG. 1, for the insertion of a weft thread shown in dotted lines as at **26**. It is to be understood, of course, that the warp sheds will be formed by a so-called sheet or series of warp threads equal to the width of the fabric being woven, and it is deemed sufficient here to merely show a warp thread **23** and a warp thread **24** which are indicative of the upper and lower positions the warp sheets will attain during shed forming operations. The harness frames **14–17** will be periodically raised and lowered to form successive warp sheds for the insertion of the weft thread **26** therethrough.

Referring to shaft **7**, one end **27** thereof is suitably retained in a pair of bearings **28** and **29**, see FIG. 3, properly journaled in a bearing means or stand **30** fixed to the housing **2** as by bolts **32** and **33** passing through bearing stand arm **34**, as can readily be seen in FIG. 2. The other end of shaft **7** is provided with a crank **35***a* having an offset wrist **35** which mounts a pair of bearings **36** and **37** on which support **8** is loosely mounted for rotation.

The upper end of support **8** is provided with a transverse extension **40**, see FIG. 2, which has attached thereto, as by bolts **41**, a reed holder **42** which in turn supports a vertical reed generally designated as at R. The reed terminates at a point above warp threads **23** and **24** such

that said point is constantly above the sheds formed by the warp threads. The lower end of support 8 is operatively connected to control means in the form of a rocking lever 44 having one end thereof pivoted as at 45 to support 8 and the other end pivotally mounted as at 46 to a stationary part of the loom 47 attached to the housing 2 by bolts 48 and 49.

Wrist 35 carries a pair of counterbalance weights 51 and 52 closely adjacent to support 8, see FIGURE 3. As can be seen clearly in FIG. 3, weight 51 on the left side of support 8 is an integral part of wrist 35 while weight 52 on the right side of support 8 is detachably connected to the wrist by a key 53 and a nut 54 threaded onto the end of the wrist. The counterbalance weights are mounted with respect to the support 8 such that when the reed is in its extremely forward position, see FIG. 1, the weights will be in the extreme back position and, conversely, when the reed is in its back position the weights will be in their forward position.

During loom operation, jack shaft 3 will be driven to effect rotation of shaft 7 clockwise to impart rotation to wrist 35 thereby tending to rotate support 8 therewith in a true circle about the axis of shaft 7 due to the mounting of support 8 on wrist 35. Because of and during rotation of shaft 7, lever 44 will be given a rocking motion by the support 8 to reciprocate or oscillate support 8 with respect to wrist 35 during rotation thereof to modify rotation of said support in said true circle to effect a combined rotating and oscillating motion of the support in a path other than said true circle to beat up the weft. Shaft 7 is in the form of a crankshaft and may be considered as single means to effect said combined rotating and oscillating motion.

The combined rotating and oscillating motion will move the reed in a curvilinear or elliptical path and will also move the beat-up point 60 of the reed in the same path. As can be seen in FIG. 1, the beat-up point will move in the direction of the arrow *a* and a path 61 represented by dotted lines. This will be true of any point on the reed since, as can be seen in FIG. 1, the reed bar 63 will move also in a curvilinear and elliptical path in the direction of arrow *b* and as indicated by the dot and dash lines 64 in FIG. 1. It is to be understood that the direction of rotation of the beat-up point 60 may be in the opposite direction from that shown in FIG. 1 without departing from the spirit and scope of the invention. It will also be noted that during the rotational movement of the reed, it remains in registry with the warp threads while being moved substantially in upright position during loom operation. The rotational oscillation of the reed is continuous in that there is no stopping at reversal to produce impact forces as mentioned hereinbefore.

The type of loom contemplated herein will operate at very high speeds or picks per minute with a minimum of vibration due to the counterbalance weights and uninterrupted path which the beat-up point 60 follows during loom operation.

From the foregoing it will be seen that simple means have been provided to operate the reed and its support rotationally while in substantially vertical position to effect very high speed operation of the loom. Further, it will be seen that simple means have been provided to rotationally oscillate the reed and its support by use of dual motions wherein one of said motions is of a character dissimilar to the other, that is, one motion being rotational and the other oscillating with both motions operating in synchronism with each other to produce a combined rotating and oscillating reed motion without losing registry of the reed with any of the warp threads.

Further it will be seen that simple means have been provided to smooth out the combined rotating and oscillating motion and to minimize vibration of the reed and its support during loom operation.

Having now particularly described and ascertained the nature of the invention and in what manner the same is to be performed, what is claimed is:

1. In a beat-up motion for a loom operating with warp threads for insertion of weft therein a weft beat-up reed having a part extending above said threads and in constant registry therewith, a shaft formed with a wrist at one end thereon, an upright support for the reed journaled on the wrist for rotational oscillation about the axis of said shaft to a forward and back position during loom operation, rocking means between the support and a fixed part of the loom to cause oscillation of the support during rotation thereof, and counterbalance means directly on said wrist to minimize vibration of said reed and support to effect smooth operation thereof during loom operation, said part of said reed being constantly above said threads so as to maintain registry therewith.

2. The loom set forth in claim 1 wherein said counterbalance means include weight means mounted on said wrists such that when said support is in said forward position said weight means will be in back position, and conversely, when said reed is in back position said weight means will be in forward position.

3. The loom set forth in claim 1 wherein said counterbalance means includes two weights on said wrists, one weight being on one side of said support means and the other weight being on the opposite side.

4. The loom set forth in claim 3 wherein said one weight is an integral part of said wrist and said other weight is removably attached thereto.

5. In a beat-up mechanism for a loom, a weft beat-up reed, a shaft having on one of its ends a crank means including a wrist pin located below said reed, bearing means for the shaft and having one end thereof adjacent to said crank means, drive means for the shaft connected to a part of the shaft extending from the other end of said bearing means opposite said crank means, a support for the reed journaled on said wrist pin for angular movement relative thereto, rocking means pivotally connected between the support and a fixed part of the loom below said wrist pin and cooperating with the latter when the shaft rotates to reciprocate the support and reed between front and back and also between top and bottom positions, and counterbalance means near said one end of said bearing means closely adjacent to said support and fixed directly to said crank means and effective to minimize vibration caused by reciprocation of said support and reed to provide smooth operation thereof during loom operation.

6. In a mechanism as set forth in claim 5, said counterbalance means including two counterbalance weights attached to the crank means and located on opposite sides of said support and on the same side of said bearing means.

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