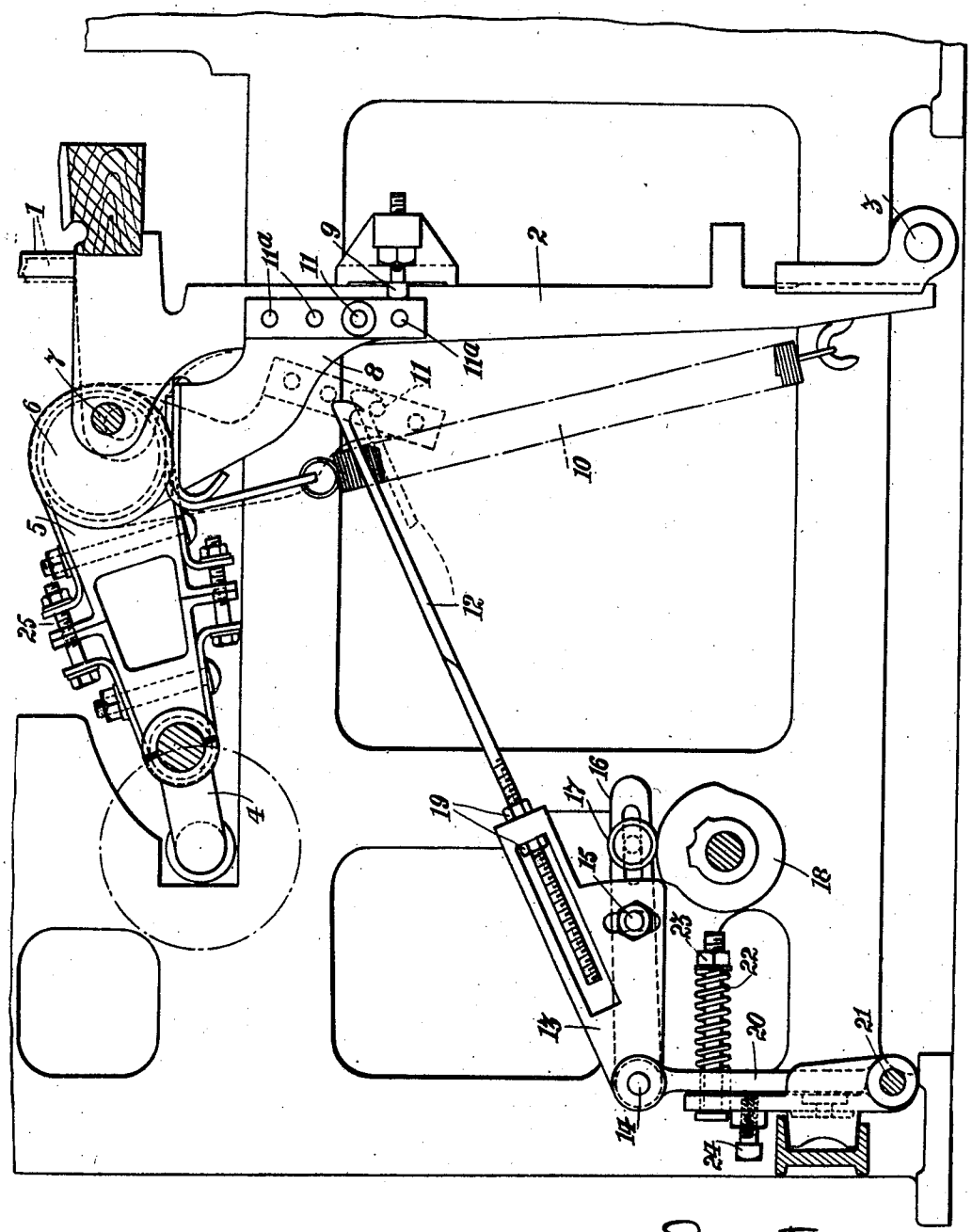
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BEATING UP MECHANISM FOR LOOMS, ESPECIALLY FOR MANUFACTURING TERRY-TOWELING

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BEATING UP MECHANISM FOR LOOMS, ESPECIALLY FOR MANUFACTURING TERRY TOWELING

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This invention relates to a beating up mechanism for looms which is adapted to effect the production of pile fabric and of the type (hereinafter and in the claims referred to as the type stated) in which the weft is only partially beaten up for a given number of picks (for example two) and then is fully beaten up on the next pick, thus beating home that pick and any previous partly beaten pick, and simultaneously producing pile loops. Primarily the invention is intended for use in the manufacture of terry toweling, but it may also be found to be suitable for the manufacture of other pile fabrics than toweling.

The reed or slay (hereinafter termed the reed) usually forms the beating up element of the loom, being mounted on swords adapted to oscillate to and fro to effect the beating up. The to and fro movement is usually obtained from a rotary drive, through crank and connecting rod mechanisms, the latter being connected to the swords.

It is already known to employ for the production of terry toweling a beating up mechanism having a "loose" reed which remains in its normal position relative to the reed structure when fully beating up the weft and, in order to cause partial beating up, is made to swing back relatively to the reed structure during the beating up movement. In other words, the reed structure (by which is meant herein and in the appended claims the reed and supporting structure such as the swords moving with the reed) always undergoes the same movement and the reed itself is rendered ineffective for fully beating up on predetermined picks.

The present invention provides for the control of the beating up without requiring the use of a loose reed in this manner.

One object of the invention is a beating up mechanism of the type stated for use in the production of pile fabric, characterised by the combination of a fixed reed and means adapted positively to vary the extent of the beating up movement thereof for successive picks. The expression "fixed" is used herein and in the appended claims to denote that the reed is fixed relatively to the reed structure for normal beating up and does not exclude the possibility of the reed being "loose" for some other purpose, for example as a safety measure.

A further object of the invention is a beating up mechanism characterised by means adapted positively to vary the extent of the beating up movement of the reed structure as a whole for successive picks.

Still another object of the invention is a beating up mechanism in which the beating up movement of the reed is derived from a reciprocating member, characterised by means for varying the effective stroke of said member in the beating up direction, and thus the extent of the beating up movement, for successive picks.

A further object of the invention is a beating up mechanism wherein the reed is connected to an actuating member for imparting the beating up movement thereto, by connecting means adjustable during operation of the reed to vary the extent of the beating up movement thereof.

One constructional form of the invention is illustrated by way of example in the accompanying drawing, which shows in side elevation the reed structure for one side of the loom, together with its operating and controlling means.

Referring now to the drawing, the beating up mechanism comprises a fixed reed 1 carried by each end by a sword 2 which is oscillated about a pivot 3 by a crank 4 and connecting rod 5. The connecting rod is connected to the reed structure by means of an eccentric 6 of which the peripheral bearing is in the connecting rod and the eccentric pin 7 is connected to the reed structure. This arrangement could however, be inverted and the eccentric pin in that case would be connected to the connecting rod. The eccentric 6 is provided with a depending bracket member 8, the lower end of which in the normal position of the eccentric abuts against an adjustable stop formed by a screw 9. The bracket 8 is normally held against the stop 9 by a spring 10 which, as can be seen from the drawing, tends to rotate the bracket in an anti-clockwise direction.

It will be seen that by rotating the bracket 8 the consequent rotation of the eccentric 6 will reduce or increase the effective length of the connecting rod 5 and thus the maximum extent of the forward movement of the reed structure. It will be apparent also that the limit of the maximum forward movement can be varied by adjustment of the stop 9.

To enable rotation of the eccentric to be effected automatically for certain picks the bracket is provided with a pin 11 with which co-operates a hook 12, said pin being adapted to be mounted in any one of a series of sockets 11*a*. The hook 12 is supported on an arm 13 adapted to swing about a pivot 14 and adjustably secured by a pin and slot connection 15 to a further arm 16, which carries a roller 17 acting as a follower for a cam 18 and is also mounted on the pivot 14.

The effective length of the hook 12 is ad-

justable by means of lock nuts 19 engaging on a threaded part of the hook shaft and securing it to the arm 13 whilst angular adjustment of the hook is obtained by means of the pin and slot connection 15.

In the case illustrated the pivot 14 is a floating pivot, being carried by an arm 20 supported on a fixed pivot 21 and movable against the action of a spring 22, the tension of which is adjustable by means of a nut 23. The spring 22 normally holds the arm 20 against an adjustable stop constituted by a screw 24.

The operation of the mechanism is as follows: The hook 12 is first set by adjustment of the nuts 19, stops 9, spring 22 and stop 24 so that the hook is adapted to engage with the pin 11 on the eccentric bracket 8 when the reed structure is moving towards the beating up position. The hook 12, of course, is oscillated in a vertical plane by means of the cam 18 which is so designed and timed that the hook is allowed to fall and engage the pin 11 during the forward movement of the reed for a given number of picks and then, for the next pick, is raised by the high portion of the cam so as not to engage the pin 11 and thus allow the reed to undergo a normal beating up movement. In the case illustrated, the cam is made to rotate at one third of crankshaft speed so that the hook 12 engages the pin 11 for two picks out of three, but on the third pick the hook is lifted. Thus, for two picks the bracket 8, during the beating up movement, is rotated in a clockwise direction (as shown in dotted lines) relative to the reed structure so that the effective length of the connecting rod 5 is shortened and the reed only attains a position such as that indicated in dotted lines. For the third pick however, the bracket 8 remains in the relative position illustrated in full lines in the drawing so that the reed undergoes the full beating up movement and thus not only beats up the last pick but also the two picks which previously were only partly beaten up.

The purpose of employing a plurality of sockets for the pins 11 is, in conjunction with the various other adjustments, to enable the depth of pile produced to be varied within greater limits than would be provided by the other adjustments alone. The depth of pile is determined in general by the distance between, firstly, the last fully beaten up pick of a series and, secondly, the first of a series of partly beaten up picks. Clearly the position of the former is determined by the stop 9 and the position of the latter by the extent of the relative rotation of the eccentric 6 in a clockwise direction when engaged by the hook 12. The extent of such relative rotation in turn varies according to the position on the bracket 8 of the pin 11 engaged by the hook 12, as well as the point in the stroke of the reed structure at which such engagement takes place. It will be appreciated of course, that so far as the principle of the invention is concerned only one position need be provided for the pin 11. Moreover, a plurality of pins could be provided instead of a plurality of sockets.

The adjustable stop 9 is used to provide a fine adjustment supplementary to the adjustment provided by varying the effective length of the hook 12. The adjustment provided by the adjustable spring 22 and stop 24 is not strictly necessary, but may be found desirable where the loom frame is not sufficiently rigid. In such a case the spring 22 allows for a certain amount of frame distortion during operation. In a rigidly constructed loom however, the spring can be dispensed with and the pivot 14 thus rendered fixed, although if desired a non-resilient adjustment may be retained.

It will be readily understood that the invention in general and the above described construction in particular lends itself to permitting the same loom to be utilised for the production of terry fabrics in which the terry loops are of different lengths or heights in accordance with varying requirements. Moreover, that the arrangement is such that the motion of the reed is under substantially exact and complete mechanical control so that the beating up movement of the reed can be varied within fine degrees of adjustment if necessary. This is in contradistinction to the situation which exists with the "loose reed" mounting commonly utilised for the production of terry toweling.

Although in the example above described the hook is controlled by a tappet mechanism, it will be understood that other mechanisms, for example a Dobby or Jacquard may be employed.

The machine can, of course, be modified to vary the number of picks for which only partial beating up takes place, which is determined by the shape and speed of the above mentioned cam 18; for example the cam may be designed to provide complete beating up every fourth pick.

The actual length of the connecting rod may be adjustable in any suitable manner, for example, as in the case illustrated, by making it in two parts secured together by adjusting screws 25.

The invention has the advantage that it enables a broader loom than usual to be utilised, as the oscillating movement of the reed and supporting swords is under firmer control. The operating mechanism is normally provided at each end of the reed, but if necessary, in a broader loom a third intermediate operating mechanism may be applied midway along the length of the reed.

I claim:

1. A beating up mechanism of the type stated for use in the production of pile fabric, comprising a reed structure constituted by the reed and associated supporting parts, actuating means to impart beating up movement to the reed structure; connecting means between said actuating means and the reed structure, said connecting means including an eccentric, rotation of which is effective to vary the beating up movement of the reed; means tending to hold the eccentric in a position of maximum rotation; means for effecting rotation in one sense of said eccentric for varying the beating up movement of the reed structure on one stroke as compared with another, said means comprising abutment means on said eccentric and holding means including a retaining member controllable to engage with, and to leave free during the beating up movement, said abutment means on the eccentric; and adjusting means permitting said retaining means to be set to engage the co-operating abutment means at varying points in the angular movement of the reed structure during the beating up movement, thus permitting adjustment of the extent of the variation of the beating up movement.

2. A beating up mechanism of the type stated for use in the production of pile fabric, comprising a reed structure constituted by the reed and associated supporting parts; actuating means to impart beating up movement to the reed structure; connecting means between said

actuating means and the reed structure, said connecting means including an eccentric, rotation of which is effective to vary the beating up movement of the reed; means tending to hold the eccentric in a position of maximum rotation in one sense; and means for effecting rotation of said eccentric for varying the beating up movement of the reed structure on one stroke as compared with another, said means comprising abutment means on said eccentric and holding means, including a retaining member, controllable to engage with, and to leave free during the beating up movement, said abutment means on the eccentric; there being further provision for abutment means co-operating with the retaining member, at a plurality of positions relative to the eccentric, engagement of which abutment means at each position results in a different angular movement of the eccentric.

3. A beating up mechanism of the type stated for use in the production of pile fabric, comprising a reed structure constituted by the reed and associated supporting parts, actuating means to impart beating up movement to the reed structure, connecting means between said actuating means and the reed structure, said connecting means including an eccentric, rotation of which is effective to vary the beating up movement of the reed structure, means for determining the maximum rotation of the eccentric in one sense, means tending to hold the eccentric in such position of maximum rotation, means operable during the beating up movement to effect rotation of said eccentric from such position of maximum rotation so as to vary said beating up movement on one stroke as compared with another, the last said means embodying abutment means on said eccentric, and holding means including a retaining member controllable to engage with, and to leave free during the beating up movement, said abutment means on the eccentric and when engaged holding said abutment means stationary so as to induce rotation of the eccentric due to a continuation of the beating up movement, said retaining member having a resilient mounting adapted to yield in the case of a pull of predetermined magnitude upon the retaining member.

4. A beating up mechanism of the type stated for use in the production of pile fabric, comprising a reed structure constituted by the reed and associated supporting parts, actuating means to impart beating up movement to the reed structure, connecting means between said actuating means and the reed structure, said connecting means including an eccentric rotation of which is effective to vary the beating up movement of the reed, an arm rigid with said eccentric, a stop on said reed structure with which said arm cooperates, resilient means tending to hold said arm against its stop, a retaining member in the form of a hook engageable with a cooperating part of said arm, means provided to oscillate said hook to and from a position at which it can engage said cooperating part of the arm upon return movement of the reed structure from beating up, according to whether a normal or a varied beat up is next required, and provision being made on the arm for cooperating parts for engagement by the retaining hook, at a plurality of positions disposed in a line extending more or less in a radial direction with respect to the pivot of the reed structure, and means for adjustment of said retaining hook to enable the engagement thereby of a cooperating part of the arm at any one position according to the depth of the pile desired.

5. A beating up mechanism of the type stated for use in the production of pile fabric, having means for varying the beating up movement of the reed structure on one stroke as compared with another, said means including an eccentric interposed between said structure and its actuating means and adapted upon rotation to effect such variation, said eccentric being rotated as required by mechanism including abutment means connected to the eccentric and moving with the reed structure, said abutment means being at varying radial distances from the center of the eccentric and the pivot of the reed structure, a retaining member adjustable for engagement during the beating up movement, with said abutment means at any of said distances, and means provided to effect relative adjustment as between said retaining member and abutment means whereby to adjust the extent of rotation imparted to said eccentric upon engagement of the abutment means by the retaining member.

6. In a loom for the production of pile fabric, beating up mechanism of the type stated connected to the reed structure at laterally spaced positions on said structure, each beating up mechanism including an eccentric interposed between said structure and an actuating member for the structure, abutment means on said eccentric, a retaining member controllable to engage with, and to leave free during the beating up movement, said abutment means and when engaged holding the same and inducing rotation of the eccentric to vary the beating up movement, said retaining member being adjustable to vary the point in the angular movement of the reed structure at which it will engage said abutment means, whereby compensation for misalinement of the loom parts when initially setting the beating up mechanism may be made.

7. In a loom for the production of pile fabric beating up mechanism of the type stated connected to the reed structure at laterally spaced positions on said structure, each mechanism comprising an eccentric interposed between said structure and an actuating member for the structure, means for rotating said eccentric comprising abutment means on said eccentric and a retaining member controllable to engage with, and to leave free during the beating up movement, said abutment means and when engaged holding the same and inducing rotation of the eccentric to vary the beating up movement, the said retaining member being adjustable to vary the point in the angular movement of the reed structure at which it will engage said abutment means, means tending to hold the eccentric in a position of maximum rotation in one sense, and means for determining the maximum rotation of the eccentric in such sense, said last-mentioned means being adjustable, whereby independent adjustment of the eccentrics may be made, there being thus two points in each beating up mechanism at which adjustment may be made to compensate for misalinement of the loom parts when initially setting up the beating mechanism.

8. In a loom for the production of pile fabric, beating up mechanism of the type stated connected to the reed structure at laterally spaced positions on said structure, each mechanism comprising an eccentric interposed between said structure and an actuating member for the structure, means for rotating said eccentric comprising abutment means on said eccentric and a re-

taining member controllable to engage with, and to leave free during the beating up movement said abutment means and when engaged holding the same and inducing rotation of the eccentric to vary the beating up movement, means tending to hold the eccentric in a position of maximum rotation in one sense, and means for determining the maximum rotation of the eccentric in such sense, said last-mentioned means being adjustable, whereby independent adjustment of the eccentrics may be made, there being provision for said abutment means at varying radial distances from the center of the eccentric and the pivot of the reed structure and for adjustment of the retaining means for engagement with the abutment means at any of said distances, whereby adjustment of the extent of rotation imparted to said eccentric may be made, the said retaining member being adjustable to vary the point in the angular movement of the reed structure at which it will engage said abutment means, whereby to provide two points in each beating up mechanism at which adjustment may be made to compensate for misalinement of loom parts when initially setting the beating up mechanism.

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