United States Patent

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[54] **DOBBY FOR LOOMS**
7 Claims, 2 Drawing Figs.

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[51] **Int. Cl.** **D03c 5/00,** D03c 13/00
[50] **Field of Search** 139/79, 55, 57, 58, 31, 32, 80

[56] **References Cited**

UNITED STATES PATENTS

734,834	7/1903	Draper	139/79
2,263,678	11/1941	Cosman	139/79
2,552,418	5/1951	Firing et al	139/58
2,980,145	4/1961	Herard, Jr. et al.	139/57 X
3,173,452	3/1965	Juillard	139/55

FOREIGN PATENTS

690,880	7/1964	Canada	139/79
639,771	7/1950	Great Britain	139/79

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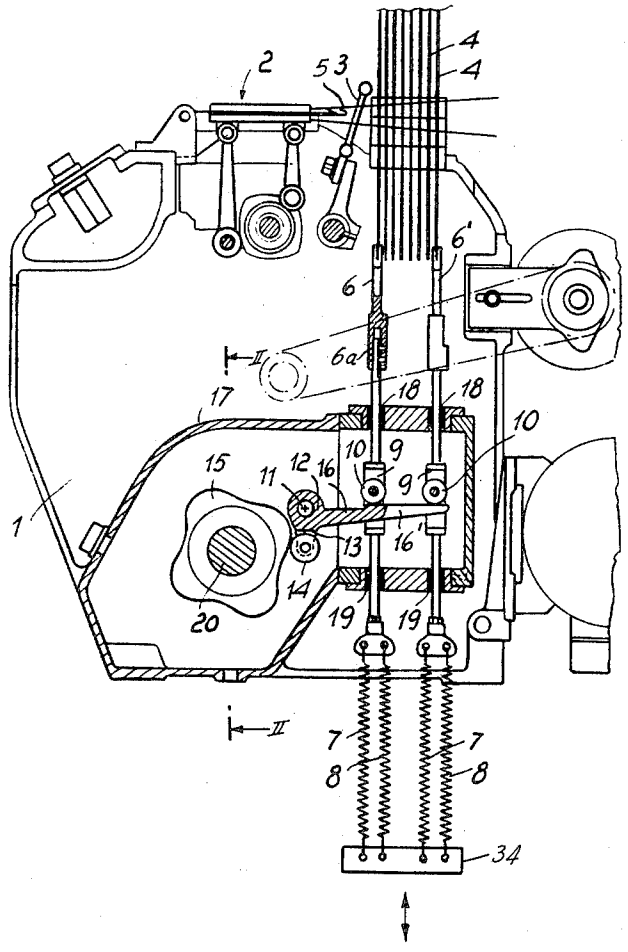
ABSTRACT: A high-speed dobby with heddles which are moved in one direction by means of a springs and in the opposite direction by means of a cam and lever assembly.



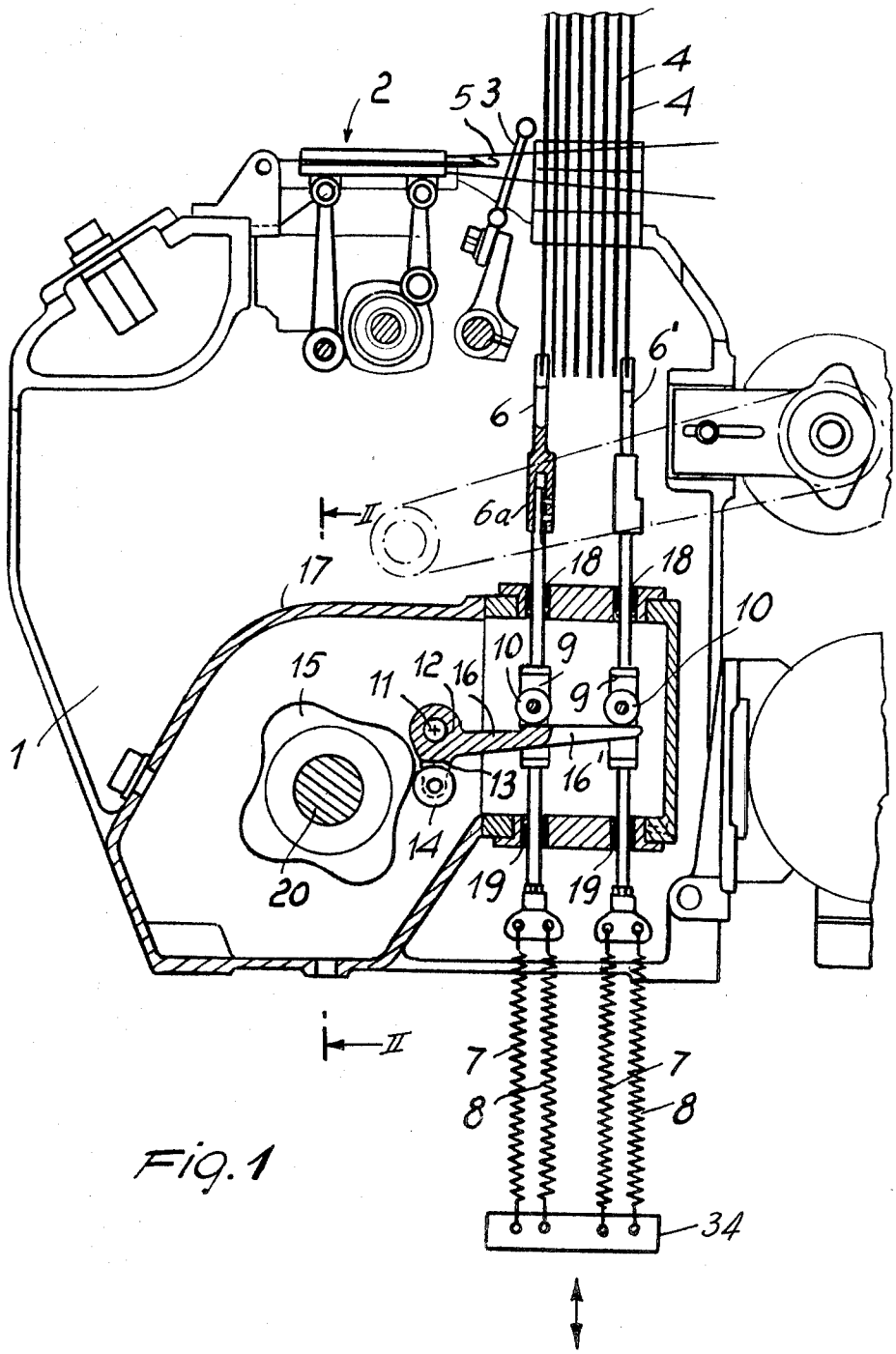


Fig. 1

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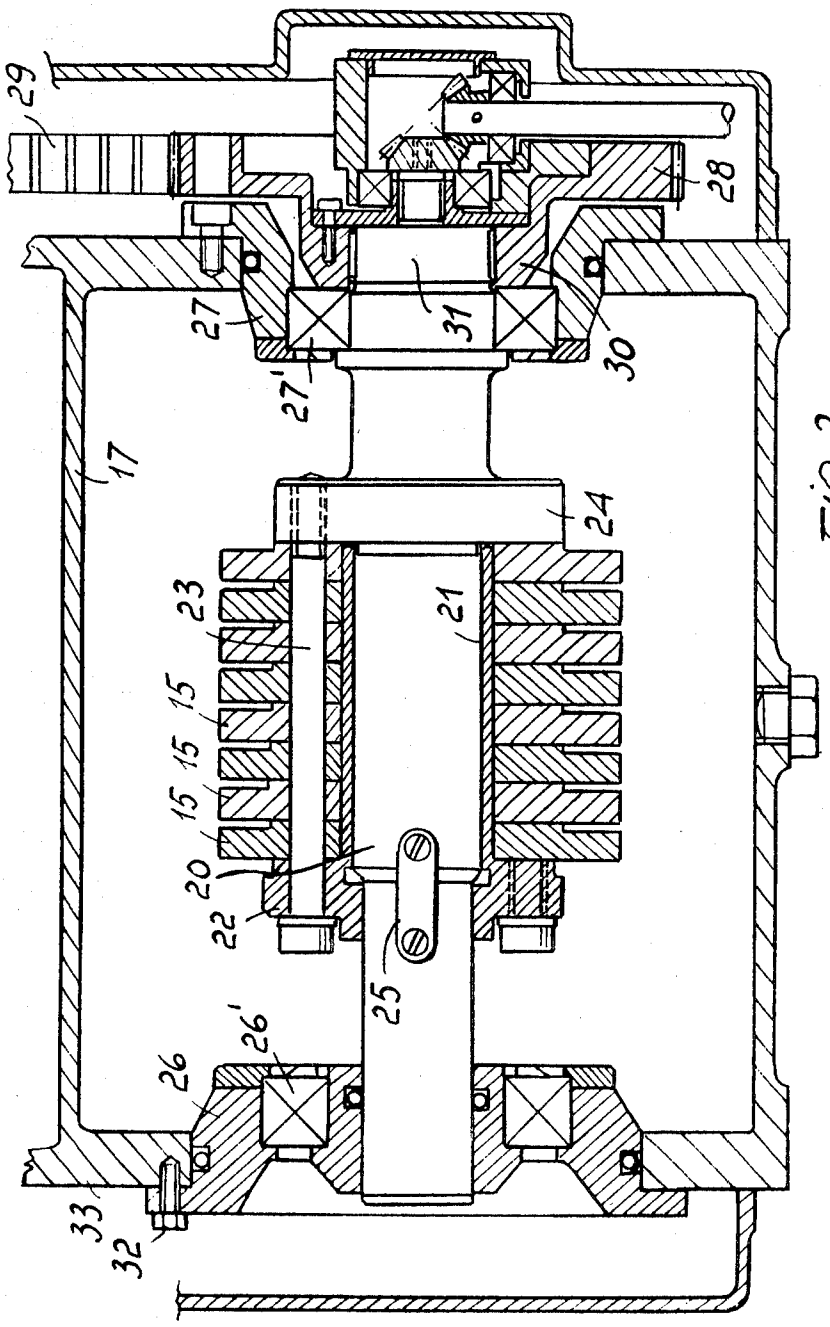

FIG. 2

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DOBBY FOR LOOMS

BACKGROUND OF THE INVENTION

This invention relates to looms, in particular dobby looms.

Small looms for the production of ribbon fabrics comprising small units equipped with a few wefting devices arranged side by side for the parallel production of ribbon fabrics are known to those skilled in the art. Small looms are preferred because they can be operated at high speeds, for example, 1,000 to 1,500 beats per minute. It has not been possible to increase the operating speed of small looms beyond 1,500 beats per minute. This is attributable to the fact that the dobby heddles are moved in two directions by means of grooved cylinder cams cooperating with rollers which impart motion through articulated levers. The action of the articulated levers through the clearance between rollers and cam grooves causes flopping of the levers, noise, and a corresponding surface wear on the cams, thus limiting the operating speed of the dobby and requiring replacement of moving parts after short periods of operation.

SUMMARY OF THE INVENTION

It is an object of this invention to overcome the speed limitation present in a conventional dobby loom through the use of simple easily installed mechanisms.

Another object of the invention is to reduce the frequency of replacement of certain movable parts in a dobby loom.

Another object of the invention is to reduce the surface wear of cams in dobby looms and thereby increase their useful life.

Another object of the invention is to reduce the noise now present in a dobby loom.

Another object is to simplify the operations required to modify or change a fabric pattern produced by a dobby loom.

Another object is to provide a motion transmission member which can be adjusted to compensate for wear or for varying initial positions of heddles.

The invention resides in the provision of a loom, particularly a dobby loom, which comprises a plurality of movable heddles, guide means for restricting the heddles to reciprocatory motion, and drive means for reciprocating the heddles. The drive means comprises a biasing means for yieldably urging the heddles in one direction, and positive displacement means for intermittently moving the heddles in the opposite direction against the resistance of the biasing means.

The novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The improved apparatus itself, however, both as to its construction and its mode of operation, together with additional features and advantages thereof, will be best understood upon perusal of the following detailed description of certain specific embodiments with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic sectional view of a small loom with certain parts shown in elevation into which an embodiment of the invention has been incorporated; and

FIG. 2 is an enlarged sectional view as seen along line II—II of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to the drawings, FIG. 1 shows a small loom for the fabrication of ribbon fabrics comprising a frame 1, equipped with a pair of weaving devices 2 and a weft beating reed 3. A pack of heddles 4 behind reed 3 moves warp 5.

The heddles 4 are supported and guided by motion-transmitting rods, two of which are shown at 6 and 6'. The lower ends of the rods are connected to biasing means here shown as

including pairs of helical expansion springs 7 and 8. The lower ends of the springs are anchored in a retainer 34 which is adjustable in either of the directions indicated by the double-headed arrow in FIG. 1 to thereby select the initial spring bias. Helical expansion springs 7 and 8 are so located that they provide at last a component of the bias axially directed as the corresponding rods 6 or 6'.

The rods are adjustable as shown at 6a, in order to vary the initial positions of heddles 4, or to compensate for wear on the movable parts, herein later described in detail. Rods 6 and 6' have seats 9 fitted about their midportion, onto which lightweight follower rollers 10 of small diameter are fitted.

A set of bent levers 12, one for each rod, is rotatable around a pivot 11. Each lever 12 has an arm 13 at the end of which a follower roller 14 contacts the external profile of a cam 15, the contact pressure being a function of the bias provided by springs 7 and 8. At the other end of each lever 12 a flattened arm 16 or 16' contacts a roller 10 on rod 6 or 6'. The length of arms 16 and 16' is dependent upon the distance of rods 6 and 6' from the pivot 11; thus arm 16 which contacts roller 10 on rod 6 is shorter than arm 16' which extends to rod 6'. A constant contact pressure between rollers 10 and the ends of arms 16 and 16' is maintained by the bias of springs 7 and 8. As shown in FIG. 1, motion is transmitted from the cams 15 by means of the levers 12 to rods 6 and 6'. Interposed between these elements are rollers 14 and 10 which contact the corresponding cam 15 and arms 16 and 16' respectively. The contact pressure of these rollers against their respective contact elements remains constant because of the bias of springs 7 and 8, thereby eliminating clearances between the rollers and their contact elements. Thus impact, shock or vibration which might affect the motion of rods 6 and 6' is reduced, thereby lessening the wear on the operating and contact elements. In addition, the noise of the operating elements is also reduced.

Cams 15, levers 12 and those portions of the rods which support rollers 10 are enclosed by an oil-bath housing 17.

Rods 6 and 6' are guided in housing 17 by means of sealing rings 18 and 19 which are mounted in the upper and lower walls of the housing.

As shown in FIG. 2, cams 15 are assembled on an internal sleeve 21 which is mounted on shaft 20. Sleeve 21 has a flange 22 which permits tightening of the stack of cams by means of screws 23 against a second flange 24 which is fixed to the shaft 20.

Sleeve 21 is secured to shaft 20 at one end by means of one or more keys 25.

Shaft 20 is supported at its ends by means of supports 26 and 27 with interposed ball or roller bearings 26' and 27' respectively.

Transmission of motion from an external prime mover (not shown) to shaft 20 is by means of a gear 28 which meshes with a toothed belt 29. An internally fluted hub 30 on gear 28 receives the externally splined end 31 of shaft 20 in such a manner that the shaft can be driven out axially and removed from its housing 17.

Support 26 is secured to the lateral sides 33 of housing 17 by means of screws 32. When it is desired to change the fabric pattern, the lubricant is drained from housing 17 and screws 32 are removed from the sides 33 of the housing. After removing the support 26, shaft 20 with its stack of cams can be withdrawn. Another shaft with cams of a different external profile can then be rapidly installed, and a new fabric pattern can be produced.

The same result can be achieved if the stack of cams 15 on shaft 20 is replaced with cams of a different external profile.

The improved apparatus is susceptible of many modifications without departing from the spirit of this invention. For example, each rod 6 or 6' can be biased by a single spring. It is also possible to employ other types of wefting devices and/or other fastening means for the cams. It is further possible to use other types of biasing means in addition to, or as a substitute for springs 7 and 8.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features which fairly constitute essential characteristics of the generic and specific aspects of the above-described contribution to the art.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended:

1. In a loom, particularly a dobby loom, in combination, a plurality of movable elongated heddles; guide means for guiding said heddles for reciprocating movement in longitudinal direction and comprising a housing and a plurality of motion-transmitting rods respectively axially aligned with and connected to said heddles and being reciprocally guided in said housing; and drive means cooperating with said motion-transmitting rods for reciprocating the latter and the heddles connected thereto, said drive means comprising biassing means for yieldably urging said rods in one direction and positive displacement means comprising follower means mounted on said rods, rotary cam means and means for transmitting motion from said cam means to said follower means for intermittently moving said follower means in the opposite direction against the resistance of said biassing means.

2. A structure as defined in claim 1, wherein said cam means comprises a plurality of relatively discrete cams.

3. A structure as defined in claim 1, wherein said positive displacement means further comprises a rotary support for said cam means and means for separably connecting said cam means to said support.

4. A structure as defined in claim 1, wherein said means for transmitting motion from said cam means to said follower means comprises lever means pivotable about a single predetermined axis, said lever means having first arm means engaging said follower means, and second arm means provided with second follower means tracking said cam means.

5. A structure as defined in claim 1, wherein said biasing means comprises a plurality of spring means.

6. A structure as defined in claim 5, wherein said spring means are helical expansion springs.

7. A structure as defined in claim 1, wherein said housing at least partially encloses said positive displacement means and further comprising a supply of lubricant in said housing.