July 25, 1939. O. V. PAYNE 2,167,052

DOBBY KNIFE GUIDE

Filed Sept. 24, 1937 2 Sheets-Sheet 1

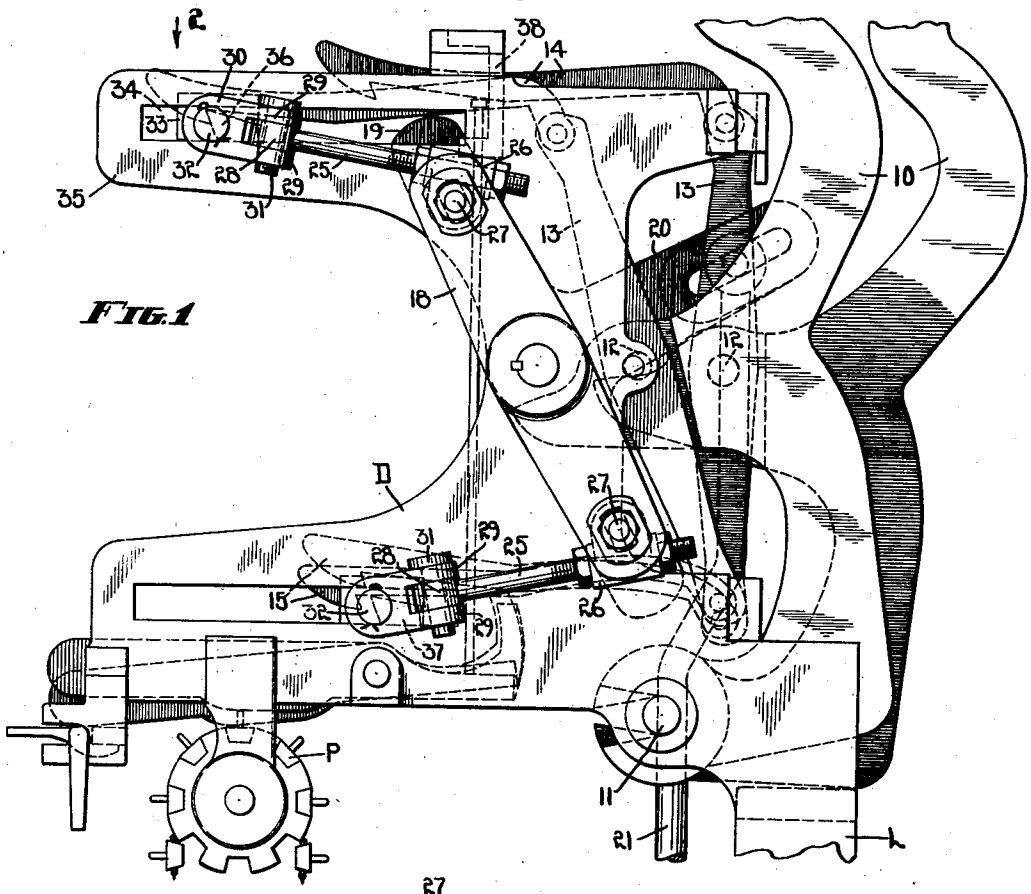


FIG. 1

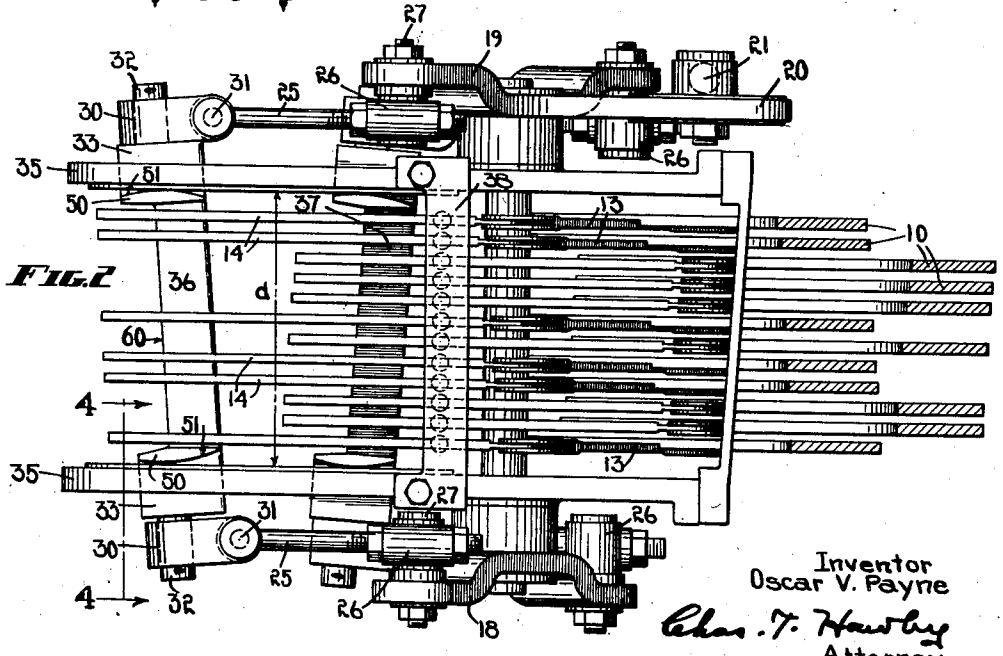


FIG. 2

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Filed Sept. 24, 1937 2 Sheets-Sheet 2

FIG. 3

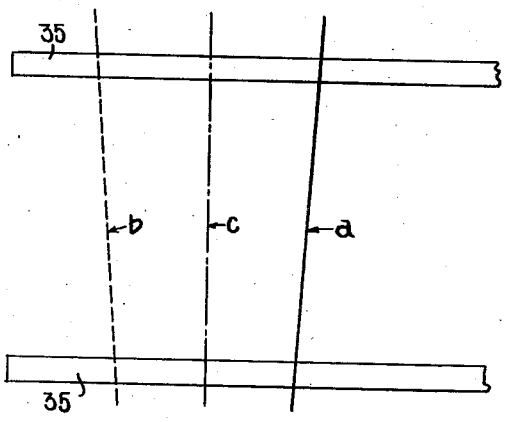


FIG. 4

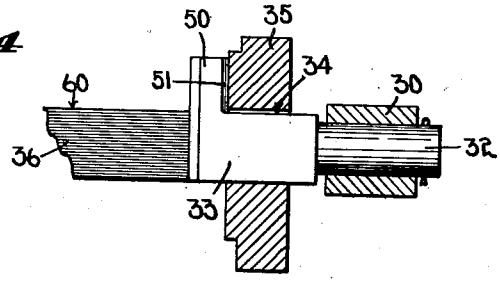
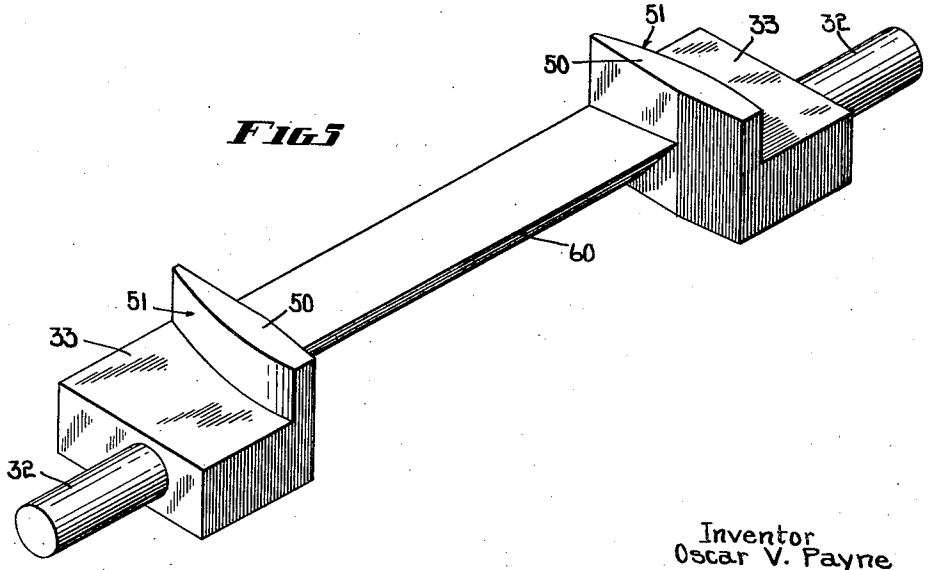


FIG. 5



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2,167,052

DOBBY KNIFE GUIDE

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Application September 24, 1937, Serial No. 165,545

5 Claims. (Cl. 139—67)

This invention relates to improvements in loom dobbies and it is the general object of the invention to provide an improved guide means for the hook engaging knives to prevent objectionable end motion thereof transverse of the hooks.

In the usual dobby loom each harness frame is lifted by a jack to which is pivoted a dobby lever having hooks connected to the upper and lower ends thereof. These hooks are indicated by the pattern mechanism and are engaged by oppositely reciprocating knives. Since the rear harnesses must be lifted more than the front harnesses the knives are driven in such a way that the rear ends thereof have a longer sweep than the front ends. By this arrangement the knife starts from a position of rest which is oblique and usually inclined rearwardly and toward the center of the loom. As the knife moves out it passes through a position which is substantially perpendicular to the length of the loom and as it continues assumes another oblique position inclined rearwardly and away from the center of the loom. The hooks are held in spaced relation with respect to each other by racks or combs fixed to the dobby frame. End motion of the knives causes rubbing of the hooks against the rack teeth, a condition which interferes with proper dobby operation.

As the knives move to an oblique position there is a tendency for the hooks to slide along the knife and when the dobby is lifting a heavy warp, or when the obliquity of knife motion must be great to form a relatively large warp shed, there results an end motion of the knife.

The knives are driven generally by two levers, the lever at the front of the dobby having a relatively small throw to give the small shed of the front harnesses and the lever at the rear having a larger throw to give an increased motion to the rear harnesses. These levers are attached to the knives by connectors and it is found that the end motion of the knives has a tendency to strain and wear the connector bearings. It is an important object of my present invention to avoid this wear and strain by preventing endwise movement of the knives in a direction transverse of the hooks preferably by some simple and efficient guide such, for instance, as lugs on the knives constructed to accommodate the changing angular position of the knives while at the same time preventing substantial end motion of them.

It is a further object of my invention to cast lugs on the knives and having arcuate surfaces which are part of a circle the diameter of which is the inside distance between the knife guides on the dobby side frames. The frames are ordinarily cast with slots to receive the ends of the knives and the side frames have straight inside surfaces along which the arcuate surfaces can roll. As the angularity of the knife changes the arcuate surfaces move so that different parts thereof engage the side frames, but inasmuch as the arcuate surfaces are on a circle the center of which is located midway between the inner surfaces of the frames, the knife is held against endwise motion in a direction laterial of its outward motion.

It is desirable further to construct the knife in such a way that there will be a minimum of sliding on the part of the knife edge with respect to the hooks as the knives move angularly. This tendency can be reduced to a minimum by making the knife so that its lifting edge lies along a diameter of the circle on which the arcuate surfaces lie.

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

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

Fig. 1 is a front elevation of a dobby having the knives made according to my present invention,

Fig. 2 is a plan view in the direction of arrow 2, Fig. 1,

Fig. 3 is a diagrammatic view similar to Fig. 2 showing the effect which the arcuate surfaces have in preventing substantial endwise motion of the knives,

Fig. 4 is a section on line 4—4, Fig. 2 on an enlarged scale, and

Fig. 5 is a perspective view of the knife forming an important part of my present invention.

Referring to Figs. 1 and 2, the dobby D is secured to the upper part of a loom designated generally at L and has a series of harness lifting jacks 10 pivoted thereto as at 11. Each jack is pivoted as at 12 to a dobby jack lever 13 to the upper end of which is pivoted a hook 14 and to the lower end of which is pivoted another hook 15. Top and bottom back cross girts 16 and 17, respectively, limit the motion of the dobby jack lever 13 in the usual way. The pattern mechanism which ordinarily determines the vertical position of the hooks is shown at P and may be of the usual construction.

The jacks 10 are connected to harness frames not shown which lift the warp threads to de-

fine the warp shed and it will be understood that the jacks near the back of the loom will be given a greater angular motion around the center 11 so that their corresponding harness frames can be lifted higher than the front frames. This result is accomplished in part by two lifter levers, a short front lever 18 and a rear somewhat longer lever 19. The rear lever has an arm 20 having driving connection with the vertically reciprocating rod 21 which may be driven in any approved manner from a shaft of the loom. Ordinarily rod 21 will rise on one beat of the loom and fall on the next beat so that two successive beats are required for a complete cycle of movements of the driving levers 18 and 19.

The upper and lower ends of each of the levers 18 and 19 are attached to a connector shown more particularly in Fig. 2. These connectors may be substantially the same and include a rod 25 having a hub 26 which receives a stud 27 on one of the driving levers. The rod 25 also has a head 28 which fits between forks 29 of a bearing 30. A vertical pin 31 passing through the forks and head 28 permit the bearing 30 and rod 25 to have relative angular motions in a horizontal direction. The bearing 30 fits around and can slide along a lug 32 on the end of a knife which has slide bearings 33 moving in a slot 34 formed in the side frames 35 of the dobby. There will be a top knife 36 for the upper hooks 14 and a bottom knife 37 for the lower hooks 15.

All the structure thus far described may be of usual construction and of itself forms no part of my present invention. As the rod 21 rises and falls the knives will move in horizontal planes, the upper knife moving outwardly while the lower knife moves inwardly on one beat and on the next beat the direction of motion of the knives is reversed.

Because of the unequal lengths of levers 18 and 19 the knives assume an angular position when at either end of a working stroke as shown diagrammatically in Fig. 3, where the top knife 36 is illustrated. This knife will be disposed obliquely in a direction rearwardly and toward the center of the loom when at the beginning of its moving stroke, as designated at line *a* and will be oblique in a direction rearwardly and away from the center of the loom as indicated by line *b* at the end of the stroke. An intermediate position is shown in Fig. 3 at *c*. The hooks which are in engagement with the knives are therefore subjected to a lateral strain due to the obliquity of the knives and the dents of the rack or comb 38 are likely to be worn as a result of this lateral motion, or else they wear the hooks.

To prevent the aforesaid side motion I form each knife with a lug 50 adjacent the slot 34 and extending vertically beyond the slot so as to engage a part of the frame 35 along an inner surface 40 thereof. These lugs have arcuate surfaces 51 which may be considered as lying on a circle or cylinder the diameter of which is the distance between the frames 35, this distance being designated in Fig. 2 at *d*. While I have shown the knife as formed with an arcuate surface at each end thereof, yet experience shows that the more objectionable end motion of the knife is in the rearward direction, this motion occurring when the strain on the knife due to the load of the hooks is high and I may construct a knife with but one lug 50 located so as to prevent the more objectionable end motion. In other words, the lug located at the rear end of the knives may suffice, but I believe it preferable to have a lug in each end of the knife.

As the levers 18 and 19 rock to move the upper knife outwardly for instance the arcuate surfaces 51 will change with respect to the frames 35, sliding along the frames but keeping the center of said arcs moving along a line parallel to the side frames 35. This control of the knives exercised by the arcuate surfaces eliminates substantial endwise motion of the knives throughout their whole working and return strokes.

Another feature of my invention resides in the relation between the hook engaging edge of the knife and the center of the arcs. Preferably I form the hook engaging edge 60 on a line which is a diameter of the circle or cylinder on which the arcuate surfaces 51 lie. I find with this relation that there is a minimum of lateral shift of the points of engagement between the knife edge and the hooks during the angular shift of the knives. I do not wish, however, to be limited to a knife constructed in this way.

From the foregoing it will be seen that I have provided simple and effective means to prevent endwise movement of the knives, the means set forth herein comprising projections cast integral with the knife and having arcuate surfaces to engage already existing surfaces in dobbies. It will be seen that the arcuate surfaces lie on a circle or cylinder the diameter of which is substantially the same or slightly less than the distance between the side frames 35 of the dobby. It will also be seen that the forces tending to cause the knives to slip along the knife edge is reduced to a minimum by having said knife edge formed as a diameter of the arcuate surfaces 51.

Having thus described my 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 I do not wish to be limited to the details herein disclosed, but what I claim is:

1. In a loom dobby having spaced substantially parallel guides, a set of hooks, a knife for said hooks, means to move said knife in a direction parallel to said guides and at the same time move said knife angularly with respect to the hooks, and means on the knife presenting arcuate surfaces between the guides to engage the latter during motion of the knife in said direction parallel to the hooks to prevent substantial end motion of said knife in a direction transverse of the hooks, the arcuate surfaces lying on a circle the diameter of which is substantially equal to the space between said guides.

2. In a loom having dobby hooks, a dobby knife to move said hooks, means to give the knife a hook moving stroke and at the same time change the angular relation of said knife relatively to the hooks, spaced substantially parallel fixed guides extending generally in the direction in which the knife moves, and means on the knife presenting arcuate surfaces between the guides to engage the latter, said arcuate surfaces lying on a circle the diameter of which is substantially equal to the space between said parallel guides and said arcuate surfaces and guides cooperating to prevent endwise motion of the knife as the latter moves to actuate the hooks.

3. In a loom having dobby hooks, a dobby knife to move said hooks, means to give the knife a working stroke and at the same time change the angular relation of said knife relatively to the hooks, spaced guides substantially parallel to the hooks, means fixed with respect to the knife pre-

senting spaced arcuate surfaces between the guides to engage the latter, said surfaces lying on a circle the diameter of which is substantially equal to the space between said guides, and said knife having a hook engaging edge lying substantially along the diameter of said circle, said guides and arcuate surface cooperating to prevent substantial endwise motion of the knife transverse of the hooks when said means moves the knife in a direction parallel to the guide.

4. In a hook moving knife for a loom dobby having parallel spaced guides, said knife having a hook engaging edge and sliding bearings adjacent the ends thereof, and said knife having parts to be located between the guides on which are formed arcuate surfaces placed for engagement with said guides, said surfaces lying on a circle the diameter of which is substantially equal to the distance between said guides.

5. A loom dobby knife having slide bearings adjacent the ends thereof and having a hook engaging edge between the bearings, said knife having parts fixed thereto presenting arcuate surfaces between said slide bearings, said arcuate surfaces lying on a circle the diameter of which extend along said hook engaging edge and the axis of which is between said slide bearings.

OSCAR V. PAYNE.