Nov. 18, 1958 J. T. MacISAAC, JR., ET AL 2,860,665

PILE YARN SHOGGING MOTION FOR LOOMS

Filed Sept. 25, 1956 3 Sheets-Sheet 1

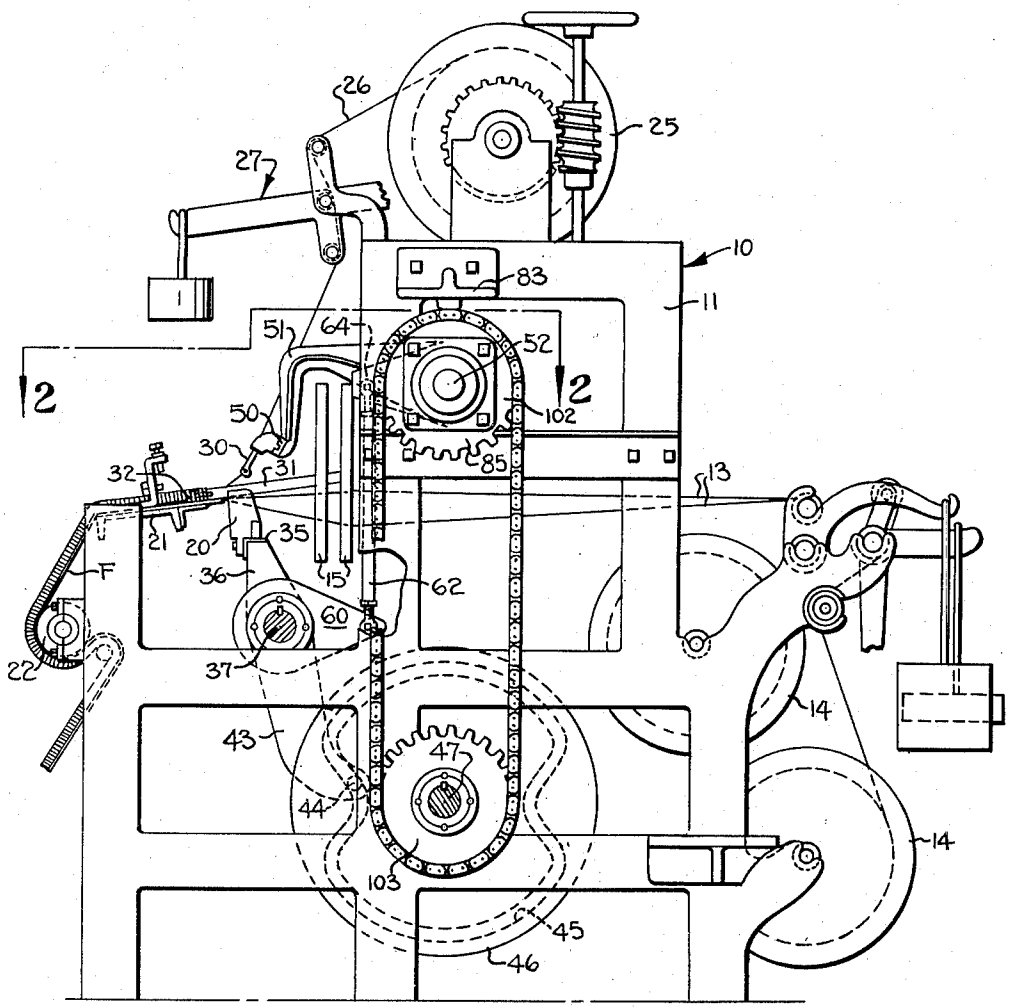


Fig-1

JOHN T. MACISAAC, JR.
and FRANK W. BREY,
INVENTORS

BY Eaton, Bell, Hunt & Seltzer

ATTORNEYS

Nov. 18, 1958 J. T. MacISAAC, JR., ET AL 2,860,665

PILE YARN SHOGGING MOTION FOR LOOMS

Filed Sept. 25, 1956 3 Sheets-Sheet 2

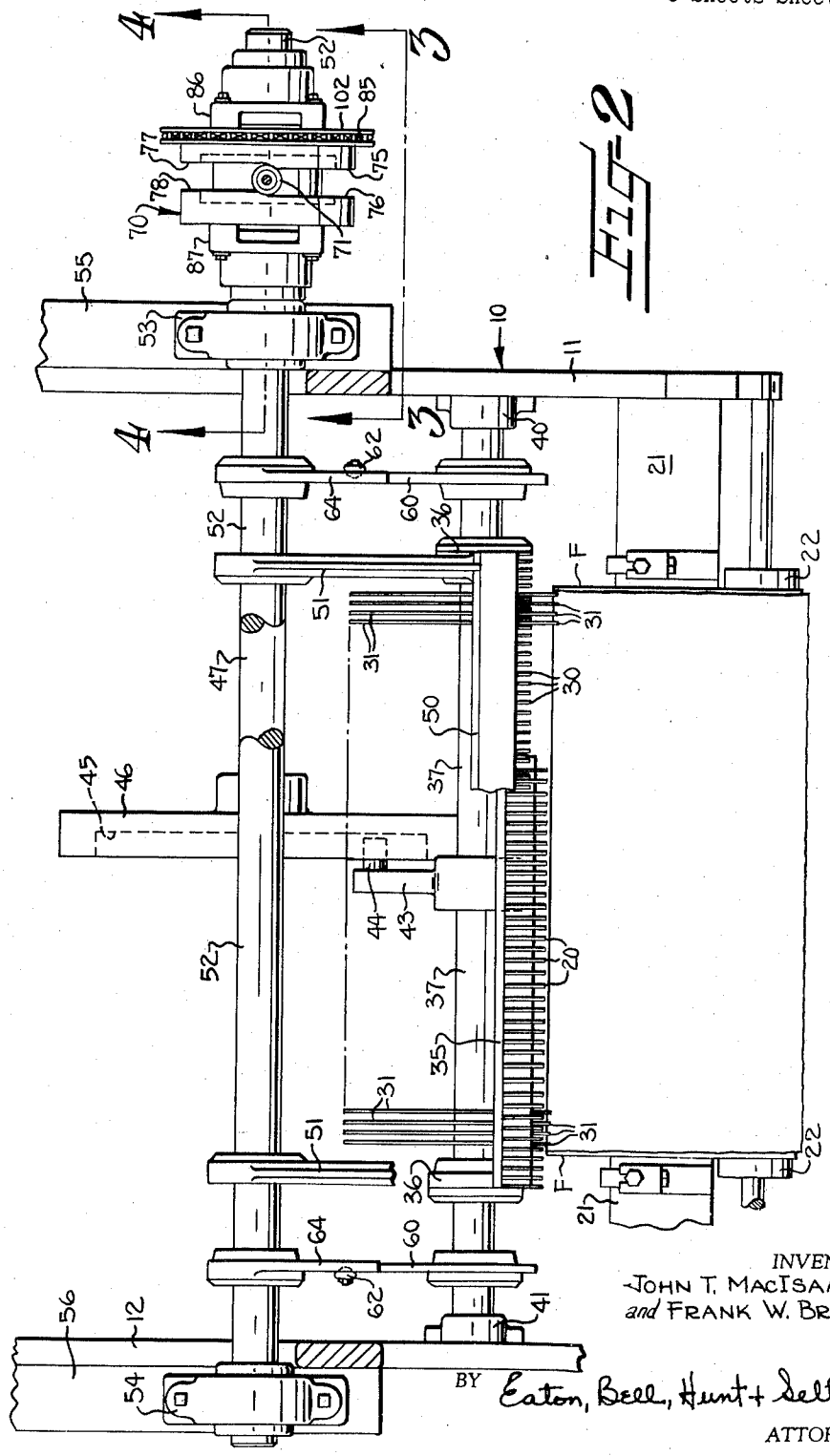


Fig. 2

INVENTORS:
JOHN T. MACISAAC, JR.
and FRANK W. BREY.

BY Eaton, Bell, Hunt + Seltzer
ATTORNEYS

Nov. 18, 1958 J. T. MacISAAC, JR., ET AL 2,860,665

PILE YARN SHOGGING MOTION FOR LOOMS

Filed Sept. 25, 1956 3 Sheets-Sheet 3

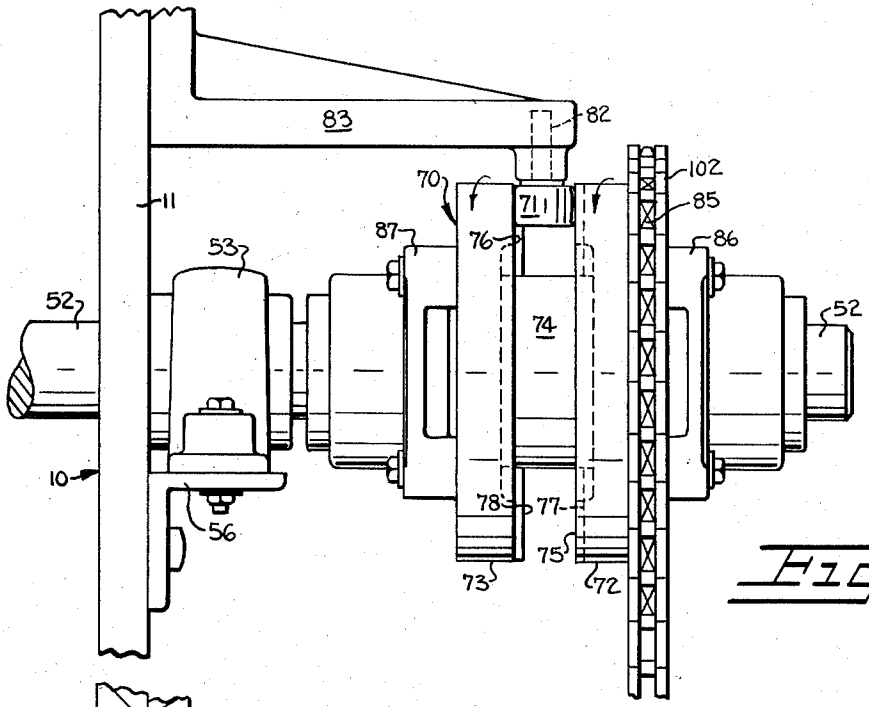


Fig-3

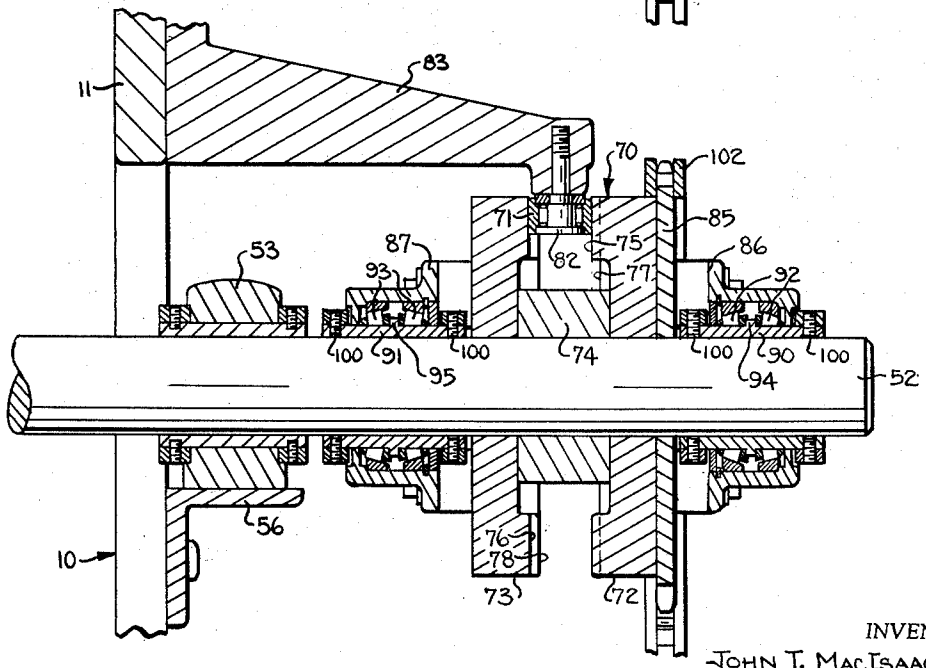


Fig-4

INVENTORS
JOHN T. MACISAAC, JR.
and FRANK W. BREY.

BY Eaton, Bell, Hunt & Seltzer

ATTORNEYS

United States Patent Office 2,860,665
Patented Nov. 18, 1958

2,860,665

PILE YARN SHOGGING MOTION FOR LOOMS

John T. MacIsaac, Jr., and Frank W. Brey, Spray, N. C., assignors, by mesne assignments, to The New York Trust Company, a corporation of New York, and John H. Baile, Saddle River, N. J., as trustees

Application September 25, 1956, Serial No. 612,015

7 Claims. (Cl. 139—46)

This invention relates to looms for weaving pile fabric used for rugs, carpets, draperies and tapestries and such as may also be used for weaving pile cloth used in the manufacture of bath towels, bath mats, and the like, wherein warpwise extending pile yarns are shogged across selected ground warp yarns or across pile wires or loop-forming fingers which extend warpwise of the loom for forming pile loops thereover.

A loom of this general character is disclosed in various patents such as U. S. Patents Nos. 2,437,378; 2,437,379 and others. Such looms are provided with series of pile yarn guides which are shogged weftwise or fillerwise, in combination with raising and lowering means therefor, for inserting pile yarns into a base fabric as it is woven from ground warp and weft yarns.

Heretofore, the apparatus of such looms used for shogging the carriage which supports the pile yarn guides has included a relatively large number of parts with a consequent relatively large number of wear points. After a short period of operation; the combined effect of the wear produced on such parts would cause misalignment of the pile yarn guides with respect to the pile wires. Such misalignment damages the loom and requires frequent maintenance.

It is therefore an object of this invention to provide a novel and efficient shogging motion for the pile yarn guides of looms of the character described which includes a relatively few parts, requires a minium of maintenance, is positive in its action and the parts of which are so arranged as to have a much longer useful life than the parts of shogging mechanisms used heretofore.

It is another object of this invention to provide an improved shogging motion for a loom of the character described wherein the carriage for the pile yarn guides is fixed on a rocker shaft which is driven to oscillate, in timed relation to oscillation of the lay or reed, for dipping the pile yarn guides into and out of the shed formed of the ground warp yarns, the shogging motion comprising a constantly driven cam means rotatably mounted on the rocker shaft which supports said carriage with a stationary follower means engageable with the cam means, the cam means being so arranged as to reciprocally shog the shaft laterally of the loom and longitudinally of its axis to impart corresponding movement to the carriage and the pile yarn guides in timed relation to oscillation of the lay and to the dipping action of the pile yarn guides.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in connection with accompanying drawings, in which—

Figure 1 is a right-hand side elevation of a loom embodying our invention;

Figure 2 is a sectional plan view taken substantially along line 2—2 in Figure 1, with some of the pile yarn inserting guides and loop-forming fingers or pile wires being omitted and showing the improved pile guide shog ging and dipping means;

Figure 3 is an enlarged fragmentary elevation of the

improved shogging means taken substantially along line 3—3 in Figure 2;

Figure 4 is an enlarged vertical sectional view through the improved shogging means taken substantially along line 4—4 in Figure 2.

Referring more specifically to the drawings, the improved pile yarn guide shogging motion is shown in association with a loom of the type disclosed in said Clark Patent No. 2,437,378, although it is to be distinctly understood that the present invention may be applied to other types of looms. Only so much of the loom will be described as is necessary to a clear understanding of the present invention.

The loom comprises a main frame broadly designated at **10** and including right-hand and left-hand side frame members **11**, **12**. The loom as illustrated is adapted to produce a pile securely woven into a base fabric and our invention has particular reference to means for controlling pile yarn guides used for this purpose, the apparatus for weaving the base fabric or ground fabric being old in the art and forming no part of our present invention.

The base fabric, indicated at F, is woven of the usual warp and filler yarns, the warp yarns being indicated at **13** and being drawn from beams **14** mounted on the main frame **10**. The warp yarns pass through conventional heddles or harnesses **15** which are raised and lowered by conventional means, not shown, to form a shed of the warp yarns **13**. The filler or weft yarns, not shown, are projected through the shed by conventional means, not shown, and are beat up by a reed **20** to form the base fabric F, which base fabric is pulled over a breast beam **21** by a conventional take-up mechanism embodied in a roll **22** at the front end of the loom. The reed **20** may be of conventional construction and may be driven to oscillate to and fro by conventional means.

The upper ends of the side frame members **11** and **12** of the main frame **10** support a pile yarn beam **25** from whence pile yarns **26** are drawn, the pile yarns **26** extending through a conventional tensioning mechanism generally designated at **27**, and thence downwardly through the eyes of conventional pile yarn guides **30**. The tensioning mechanism **27** may be of any desired or conventional construction and is shown as being of a type disclosed in said Clark Patent No. 2,437,378. Accordingly, a detailed description thereof is deemed unnecessary.

The pile yarn guides **30** extend in a row transversely of the loom and are moved upwardly and downwardly and shogged weftwise or laterally of corresponding ground warp yarns **13**, by means peculiar to the present invention, for looping pile yarns across weft yarns and/or across selected loop-forming fingers **31**. The loop-forming fingers **31** may be individually controlled to move inwardly for forming low or high loops by means such as disclosed in the pending application of Ivar O. Moberg, Serial No. 398,287, filed December 15, 1953 and entitled Method of and Apparatus for Weaving High and Low Pile Fabrics. The loop-forming fingers or pile wires **31** may also be of the type disclosed in said Clark Patent No. 2,437,378 and may be controlled in the manner described in the latter patent. Accordingly, a detailed description of the loop-forming fingers and the means for operating the same is deemed unnecessary.

As heretofore stated, the reed **20** may be constructed and operated in the usual manner and, in this instance, the reed **20** is carried by a reed box **35** fixed on the upper ends of a pair of laterally spaced crank arms **36** whose lower ends are fixed on a reed rocker shaft **37** suitably journaled in bearing blocks **40**, **41** carried by the respective side frame members **11**, **12** of the main frame **10**. A medial portion of the reed rocker shaft **37** has a follower arm or lever **43** fixed thereon which extends downwardly and has a follower **44** thereon en-

gageable with a cam groove 45 in one side of a face cam wheel 46 fixed on a main shaft 47 which is driven to rotate one revolution to every two beat-up strokes of the reed 20 by means, not shown, well known in the art.

Now, the pile yarn guides 30 are supported on a transverse bar 50 to which they may be attached by any suitable means such as is disclosed in said Clark Patent No. 2,437,378. The bar 50 is suitably secured to the lower forward end of a pair of spaced substantially L-shaped crank arms or carriage members 51 which extend upwardly and then rearwardly and are fixed on a guide rocker shaft 52. The guide rocker shaft 52 is journaled in bearing blocks 53, 54 fixed on angle brackets 55, 56 suitably secured to the outer surfaces of the respective side frame members 11, 12 of the main frame 10. The rocker shaft 52 is also mounted for axial movement in the bearing blocks 53, 54.

The carriage members 51 and bar 50 form a carriage for the pile yarn guides 30 and this carriage is raised and lowered in timed relation to the operation of the reed 20 by means of a pair of crank arms 60 fixed to and projecting rearwardly from the reed rocker shaft 37, which crank arms 60 each has the lower end of a link 62 pivotally connected thereto. The upper end of each link 62 is pivotally connected to a crank arm 64 which extends rearwardly and is fixed on the guide rocker shaft 52. Thus, with each rearward or inactive stroke of the reed 20, the pile yarn guides 30 are moved downwardly into the shed formed from the ground warp yarns 13 to position the corresponding pile yarns 26 so that a weft yarn is carried through the shed above the pile yarns by the usual weft yarn inserting needle or shuttle, not shown, and, as the reed 20 subsequently moves forwardly in an active stroke or beat-up stroke, the pile yarn guides 30 are raised above the level of the reed 20 to substantially the position shown in Figure 1.

This particular arrangement will produce a so-called single-shot fabric and, if a multiple shot fabric is to be produced, it is apparent that oscillation of the crank arms 60 may be controlled by a cam separate from the cam 46. For example, in producing a two-shot fabric, the carriage for the pile yarn guides 30 would be so controlled as to move the pile yarn guides 30 into the shed following alternate beat-up strokes of reed 20 and a three-shot fabric would be produced by moving the pile yarn guides 30 into the shed following every third beat-up stroke of the reed 20.

Now, in order to shog the pile yarn guides 30 weftwise in one direction while in raised position in the interim between alternate downward and upward movements of the pile yarn guides 30 and to shog the pile yarn guides 30 weftwise in the opposite direction in the interim between intervening downward and upward strokes of the pile yarn guides 30, an improved shogging mechanism is provided which comprises a constantly driven cam means broadly designated at 70, which cam means is loosely or rotatably mounted on the guide rocker shaft 52, but which is restrained from axial movement relative to the shaft 52. The cam means 70 is engaged by a stationary follower 71 and is so arranged that movement thereof in engagement with the follower 71 imparts axial movement to the shaft 52 while permitting the shaft 52 to be oscillated for raising and lowering the pile yarn guides 30 in the manner heretofore described.

To this end, the cam means 70 is in the form of a cylindrical cam having an irregular peripheral track therein and comprises a pair of spaced circular cams 72, 73 which may be formed integral with or suitably secured to opposite ends of a hub member 74 which maintains the cams 72, 73 in proper spaced relationship. The proximal ends of the cams 72, 73 are provided with mating spaced complementary cam surfaces 75, 76 and 77, 78 on the proximal faces of the cam wheels or cams 72, 73. Thus the surfaces 75, 77, substantially maintain the surfaces 76, 78 in engagement with follower 71, and vice versa. The cam surfaces 75 and 76 extend through an arc of approximately 180 degrees as do the cam surfaces 77, 78.

The cam surfaces 75, 76 are disposed in offset relation to the cam surfaces 77, 78 so that, as the cam surfaces 75, 76 move in engagement with opposite sides of the cam follower 71, the shaft 52 occupies one position with respect to its axis and, as the cam surfaces 77, 78 move into engagement with the follower 71, the shaft 52 is shogged axially from right to left in Figure 2 to occupy this position as the pile yarn guides 30 are moved from a raised to a lowered position and back to a raised position. Thereafter, the cam surfaces 75, 76 again engage the follower 71 to shog the shaft 52 in the opposite direction or from left to right in Figure 2 and maintain the shaft 52 in this position throughout another movement of the pile yarn guides 30 from raised position to lowered position and back to raised position to complete a cycle of the shogging and dipping motion.

The cam follower 71 is maintained in fixed relation to the main frame 10 and, to this end, the follower 71 is shown in the form of a roller or bearing journaled on a stud 82 projecting from a stationary bracket 83 which, in this instance, projects inwardly from the cam follower 71 and is suitably secured to or formed integral with the side frame member 11 (Figures 1, 3 and 4). Since the guide rocker shaft 52 and the parts carried thereby are relatively heavy, it is preferable that the cam wheels 72, 73 are mounted on the shaft 52 by means of combination radial and axial thrust anti-friction bearings.

The outer end of the outer cam wheel 72 has a sprocket wheel 85 suitably secured thereto or formed integral therewith and the distal surfaces of the sprocket wheel 85 and the cam wheel 73 have respective bearing housings 86, 87 fixed thereto which are freely rotatable about respective inner races or sleeves 90, 91 preferably by means of respective pairs of tapered roller bearings 92, 93. The roller bearings 92, 93 are restrained from axial movement relative to the housings 86, 87 and the respective inner races 90, 91 by means of annular shoulders 94, 95 provided on medial portions of the respective inner races 90, 91, which annular shoulders are disposed between the respective pairs of anti-friction or roller bearings 92, 93. The inner races or sleeves 90, 91 are suitably secured to the shaft 52, as by set screws 100.

It is thus seen that the cam wheels 72, 73 and the hub 74 may rotate freely about the shaft 52 and, when axial movement is imparted to the cam wheels 72, 73 due to the alternate engagement of the cam surface 75, 76 and 77, 78 with the stationary cam follower 71, the shaft 52 is caused to move with the cam wheels 72, 73 to shog the pile yarn guides 30 in timed relation to the dipping action of the pile yarn guides 30. In this instance, the cam means 70 is shown mounted adjacent one end of the shaft 52. However, it is to be distinctly understood that the cam means 70 may be positioned in any desired location axially of the shaft 52, with the follower 71 being suitably supported in proper relationship to the cam means 70.

In order to drive the cam wheels 72, 73 in accurately timed relation to operation of the reed 20, the sprocket wheel 85 is engaged by a sprocket chain 102 which extends downwardly in Figure 1 and is mounted on a sprocket wheel 103 fixed on the main shaft 47. Since the apparatus disclosed in Figures 1 and 2 is particularly devised for producing a one-shot or single-shot fabric, the cam means 70 is driven to rotate at the same speed as the main drive shaft 47. However, when a multiple shot fabric is to be produced, it is apparent that the cam means 70 is then rotated at a slower speed than the main drive shaft 47. For example, when a double-shot fabric is to be produced, the sprocket wheel 85 may be twice the diameter of the sprocket wheel 103 so the pile yarn guides 30 would be shogged in one direction with alternate pairs of beat-up strokes of the reed 20 and would be

shogged in the opposite direction with intervening pairs of beat-up strokes of the reed 20. Of course, it is apparent that the ratio between the main drive shaft 47 and the guide rocker shaft 52 should be such that the main drive shaft 47 will rotate three revolutions with each single revolution of the cam means 70 when producing a three-shot fabric.

It is thus seen that we have provided a simple and efficient apparatus for shogging the pile yarn guides weftwise of the loom in accurately timed relation to operation of the loom reed and to the dipping action of the pile yarn guides, which apparatus has a minimum of wearing surfaces to thereby insure that the pile yarn guides are shogged in accurate relation to the ground warp yarns and the loop-forming fingers and will operate in this manner over long periods of time with a minimum of adjustment of the various parts thereof and with a minimum of maintenance being required.

In the drawings and specification there has been set forth a preferred embodiment of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being defined in the claims.

We claim:

1. In a loom for weaving pile fabrics having means whereby a base fabric is woven from warp and weft yarns, a series of fingers extending warpwise of the loom and in spaced relationship weftwise of the loom, pile yarn guides vertically movable into and out of the shed of the loom between the fingers for inserting pile yarns below the path of travel of the weft yarn inserting means, and a carriage for said guides; the combination of a shaft journaled for axial and oscillatable movement on the loom above and rearwardly of said guides and on which said carriage is secured, a cylindrical cam having a peripheral track of predetermined irregular configuration thereon and being rotatable on said shaft but restrained from axial movement relative to the shaft, follower means fixed to said loom and engaging said track, means to drive said cam in timed relation to said first-named means, and said track being so shaped as to shog the pile yarns laterally over the fingers when the guides are out of the shed.

2. A structure according to claim 1 wherein said cylindrical cam comprises a pair of cam wheels, the track being defined by spaced complementary proximal cam surfaces on the cam wheels, and said follower means being positioned between said wheels and engageable with said cam surfaces.

3. A structure according to claim 2 wherein said pile yarn guides are vertically movable by cam controlled means for oscillating said shaft to lower and then raise the pile yarn guides in the interim between successive shogging movements of the shaft.

4. In a loom having means for weaving a base fabric from ground warp yarns and weft yarns and a series of spaced substantially rigid pile yarn feeding guides extending transversely of the loom and normally spaced substantially above the fell of the ground fabric being woven and through which guides strands of pile yarn are threaded, said loom also having means for moving said guides into and out of the warp in timed relation to the means for weaving the ground fabric; the combination therewith

of means for repeatedly shogging the pile yarn feeding guides transversely of the loom first in one direction and then the other comprising a shaft journaled in the loom for axial and oscillatory movement, a carriage fixed to said shaft and supporting said pile yarn feeding guides, cam means mounted for rotation relative to and on said shaft and being restrained from axial movement relative to said shaft, means for rotating said cam means in timed relation to the means for weaving the base fabric, and a follower means carried by said loom and being engageable with said cam means, said cam means being so formed as to impart axial movement to said shaft in opposite directions as it moves in engagement with said follower means.

5. A structure according to claim 4 wherein said cam means comprises a pair of cam wheels having spaced complementary proximal cam surfaces thereon of predetermined configuration, and said follower means being engageable with said cam surfaces.

6. In a loom having means for weaving a base fabric from ground warp yarns and weft yarns and a series of spaced substantially rigid pile yarn feeding guides extending transversely of the loom and normally spaced substantially above the fell of the ground fabric being woven and through which guides strands of pile yarn are threaded, said loom also having means for moving said guides into and out of the shed formed from the warp yarns in timed relation to the means for weaving the ground fabric; the combination therewith of means for shogging the pile yarn feeding guides transversely of the loom comprising a shaft journaled in the loom for axial and oscillatory movement, a carriage fixed to said shaft and supporting said pile yarn feeding guides, cam means mounted for rotation relative to and on said shaft and being restrained from axial movement relative to said shaft, means for rotating said cam means in timed relation to the means for weaving the base fabric, follower means carried by said loom and being engageable with said cam means, and said cam means being so formed as to impart axial movement to said shaft in one direction, as it moves in engagement with said follower means, during alternate intervals in which the guides are above the shed and to impart axial movement to said shaft in the opposite direction during intervening intervals in which the guides are above the shed.

7. Means for shogging a series of pile yarn guides on a loom for weaving pile fabrics comprising a carriage supporting said guides, means pivotally connecting said carriage to the loom frame rearwardly of and above said guides including a shaft journaled on the frame, at least one cam wheel journaled on said shaft, means restraining said cam wheel from axial movement relative to said shaft, said cam wheel having an irregular cam surface on either of its end faces, a follower carried by said frame, means to drive said cam wheel in timed relation to the operation of the loom, and means maintaining the cam wheel in engagement with the follower.

References Cited in the file of this patent

UNITED STATES PATENTS

2,087,449	Rice et al.	June 20, 1937
2,437,378	Clark	Mar. 9, 1948