No. 740,903. PATENTED OCT. 6, 1903.

A. J. O'REILLY.

NEEDLE MOTION FOR PILE FABRIC LOOMS.

APPLICATION FILED JUNE 1, 1903.

NO MODEL.

Fig. 2.

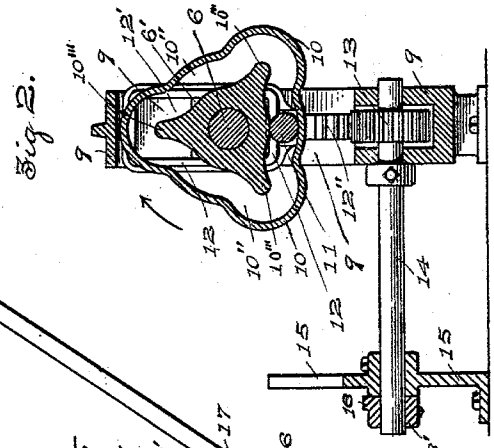


Fig. 1.

Fig. 5.

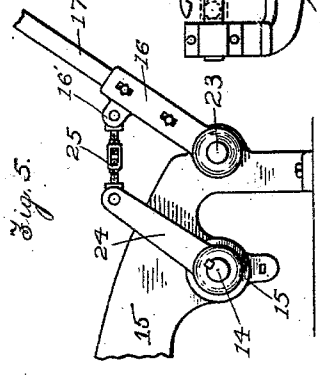


Fig. 3

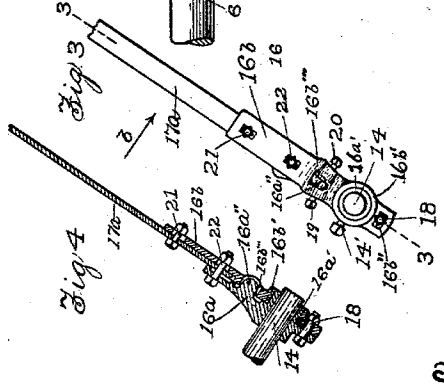


Fig. 4

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No. 740,903. Patented October 6, 1903.

UNITED STATES PATENT OFFICE.

ANTHONY J. O'REILLY, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO CROMPTON & KNOWLES LOOM WORKS, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

NEEDLE-MOTION FOR PILE-FABRIC LOOMS.

SPECIFICATION forming part of Letters Patent No. 740,903, dated October 6, 1903.

Application filed June 1, 1903. Serial No. 159,508. (No model.)

To all whom it may concern:

Be it known that I, ANTHONY J. O'REILLY, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Needle-Motions for Pile-Fabric Looms, of which the following is a specification.

My invention relates to pile-fabric looms, and more particularly to a needle-motion or mechanism for operating the needle which inserts the weft or filling-thread in the class of looms shown and described in United States Letters Patent No. 446,177.

The object of my invention is to improve upon the construction of the mechanism for operating the needle as now ordinarily made and to provide a mechanism of simple construction and effective operation and which will enable the loom to be run at greater speed, and consequently produce more of the fabric.

My invention consists in certain novel features of construction of my improvements, as will be hereinafter fully described.

Referring to the drawings, Figure 1 is a front view of the needle-motion or the mechanism for operating the needle embodying my improvements. The broken lines show the inward position of the needle-carriage and operating-arm. Fig. 2 is a vertical section on line 2 2, Fig. 1, looking in the direction of arrow *a*, same figure. The loom-frame and other parts are not shown. Fig. 3 shows a modified construction of the needle-operating arm shown in Fig. 1. Fig. 4 is a section on line 3 3, Fig. 3, looking in the direction of the arrow *b*, same figure; and Fig. 5 shows a modified construction of the mechanism for operating the needle-operating arm.

In the accompanying drawings, 1 is the loom side or frame, 2 is a bracket or stand secured to the frame 1 and having supported thereon a guide-bar 3 for the needle-carriage 4, to which is secured the outer end of the needle 5, which is used to insert the weft or filling-thread in the ordinary way.

All of the above parts may be of the usual and well-known construction in the class of looms referred to.

The rotary shaft 6 is journaled in bearings 7 on the loom-frame 1 and has in this instance a gear 8 fast thereon, which is in mesh with and driven by a gear or pinion (not shown) on some driven shaft of the loom. (Not shown.)

The outer end of the shaft 6 has bearings 9' in the stand 9 bolted to the floor, and on said shaft 6 is fast the hub 10' of a cam 10, which has a cam-groove 10'' therein, into which extends and travels as the cam 10 revolves with the shaft 6 a stud or roll 11, extending out from and secured to a vertically-moving rack-bar 12, which has a slot 12' in its upper end above the stud or roll 11 to receive a square collar or bushing 6', loosely mounted on the shaft 6. (See Fig. 2.) The bushing 6' acts to guide the rack-bar 12 in its vertical reciprocating movement and to hold it in its proper vertical position. The lower part of the rack-bar 12, below the stud or roll 11, has teeth 12'' thereon, which are in mesh with a pinion 13, fast on the end of a rock-shaft 14, journaled in bearings on the stand 9 and in a bracket or stand 15, secured to the loom-frame 1 and to the floor.

The cam 10 has in this instance three cam surfaces or projections 10''', each one of which, through its action on the stud or roll 11 as the cam 10 revolves, causes the needle to be inserted into and withdrawn from the shed, so that a complete revolution of the cam 10 causes three insertions and three withdrawals of the needle. The surface intermediate the projections 10''' allows the dwell or stationary period of the needle when the lay beats up. Instead of three projections 10''', as shown, only two may be used in an oblong-shaped cam.

Fast on the outer end of the rock-shaft 14 is the hub 16' of an arm 16, to which is bolted the lower end of a lever or rocking arm 17, the upper end of said arm 17 being connected by a link or connector 18 with the needle-carriage 4.

In Figs. 3 and 4 is shown a modified construction of the arm 16 and the lever or arm 17. In said figures the supporting-arm 16 is made in two parts—namely, 16^a, having a hub $16^{a'}$, which is secured on the shaft 14 by

a set-screw 14′, and 16^b, which has a hub $16^{b'}$ loosely mounted on the hub $16^{a'}$. A bolt 18 in an extension on the hub $16^{a'}$ extends through a slot $16^{b''}$ in an extension on the hub $16^{b'}$ of the arm 16^b. The arm 16^b has an opening therethrough, $16^{b'''}$, to receive loosely a projection $16^{a''}$ on the arm 16^a, and two set-screws 19 and 20 turn in threaded holes in projections on the arm 16^b on opposite sides of the projection $16^{a''}$ and are adapted to engage at their inner ends said projection. The arm 17^a is connected with the arm 16^b by a bolt 21, which extends through an elongated slot in the arm 16^b, and also by a second bolt, 22, which extends loosely through a horizontal slot in the arm 16^a and through the lower part of the arm 17^a and through an elongated opening in the arm 16^b, as shown in Fig. 4.

By means of the construction shown in Figs. 3 and 4 I am enabled to adjust the arm 17^a relatively to the supporting-arms 16^a 16^b to vary the position of the upper end of the arm 17^a and the movement of the needle-carriage 4 and the needle 5.

In order to adjust the movement of the needle-carriage 4 and the needle 5, I loosen the bolts 18 and 22 and turn out the set-screw 19 and turn in the set-screw 20, or vice versa, to move the arm 16^b on the hub $16^{a'}$ of the arm 16^a, and thus adjust the position of the arm 16^b and the arm 17^a relatively to the arm 16^a to vary the position of the upper end of the arm 17^a in Fig. 1, and consequently the movement of travel of the needle-carriage 4 and the needle 5.

In Fig. 5 is shown a modified construction of the mechanism for operating the needle-operating arm 17. In order to bring the stand 9, supporting the projecting end of the shaft 6, and other parts nearer the loom side or frame 1 without changing the position of the pivotal support of the needle-operating arm 17, I provide an additional stud 23, Fig. 5, as a pivotal support for the arm 16 and arm 17, located in the same position as the rock-shaft 14, Fig. 1.

The rock-shaft 14 is moved in nearer the loom frame or side 1 and has bearings on the stand 15 (see Fig. 5) and is operated by the same mechanism shown in Fig. 1.

On the rock-shaft 14, Fig. 5, is fast an arm 24, the upper end of which is adjustably connected by an adjustable link or connector 25 to an ear or lug 16′ on the arm 16. By means of the link or connector 25 the position of the needle-operating arm 17 at its upper end may be adjusted to vary the movement or travel of the needle-carriage 4 and needle 5.

The operation of my improvements in needle motion or mechanism for operating the needle will be readily understood by those skilled in the art.

The revolution of the shaft 6 and the cam 10, fast thereon, communicates, through the stud or roll 11 on the rack-bar 12, which travels in the cam-groove 10″ of the cam 10, a vertical reciprocating motion to the rack-bar 12, and through the teeth 12″ thereon, engaging the pinion 13, fast on the rock-shaft 14, a rotary motion to said shaft, first in one direction and then in the other, to cause the arm 17, through link 18, to move the needle-carriage 4 to the position shown by broken lines in Fig. 1 and cause the needle 5 to be inserted into and withdrawn from the shed at regular intervals.

The shape of the cam-groove 10″ is such that an easy and quick motion is given to the needle-carriage 4, through the intermediate connections, to insert and withdraw the needle 5.

It will be understood that the details of construction of my improvements may be varied, if desired, and they may be adapted to be used on any loom in which a needle is used to put in the wefts or filling-threads.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a needle-motion of a loom, the combination with a needle, a rock-shaft, and intermediate connections, and means for rocking said shaft, first in one direction and then in the other, to communicate a reciprocating movement of the needle, said means comprising a driven shaft, a cam fast thereon having a cam-groove therein, a reciprocating rack-bar having an elongated slot therein to receive a bushing loose on the driven shaft, and said bushing, said bar also having a roll thereon traveling in said cam-groove, and rack-teeth engaging and operating a pinion fast on said rock-shaft, and said pinion, substantially as shown and described.

2. In a needle-motion of a loom, the combination with a needle, a rock-shaft and intermediate connections, and means for rocking said shaft, first in one direction and then in the other, to communicate a reciprocating movement to the needle, said means comprising a driven shaft, a cam fast thereon having a cam-groove therein, a reciprocating rack-bar having an elongated slot therein to receive a non-circular bushing loose on the driven shaft, and said bushing, said bar also having a roll thereon traveling in said cam-groove, and rack-teeth engaging and operating a pinion fast on said rock-shaft, and said pinion, substantially as shown and described.

3. In a needle-motion of a loom, the combination with a needle, a needle-carriage, a link or connector to a rocking arm, and said arm, a support for said arm pivotally mounted, and means for adjusting the position of said support, to regulate the movement of the needle, of means for moving said rocking arm first in one direction and then in the other, to communicate a reciprocating movement to the needle, substantially as shown and described.

4. In a needle-motion of a loom, the combination with a needle, a rock-shaft, and intermediate connections, of means for rocking said shaft, first in one direction and then in the other, to communicate a reciprocating movement to the needle, said means compris-

ing a driven cam, a reciprocating rack-bar operated by said cam, and a pinion operated by said rack-bar, substantially as shown and described.

5. In a needle-motion of a loom, the combination with a needle, a rock-shaft, and intermediate connections, of means for rocking said shaft, first in one direction and then in the other, to communicate a reciprocating movement to the needle, said means comprising a driven shaft, a cam fast thereon having a cam-groove therein, a reciprocating rack-bar having a stud or roll thereon traveling in said cam-groove, and rack-teeth engaging and operating a pinion fast on said rock-shaft, and said pinion, substantially as shown and described.

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