

G. W. STAFFORD.
SHEDDING MECHANISM FOR LOOMS.

No. 406,790.

Patented July 9, 1889.

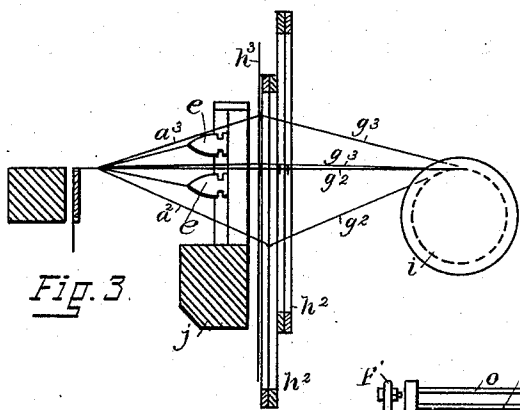


Fig. 3.

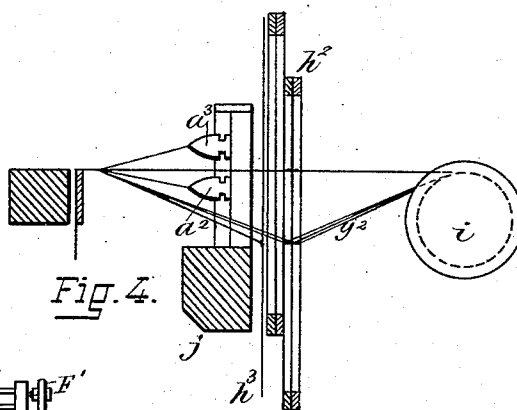


Fig. 4.

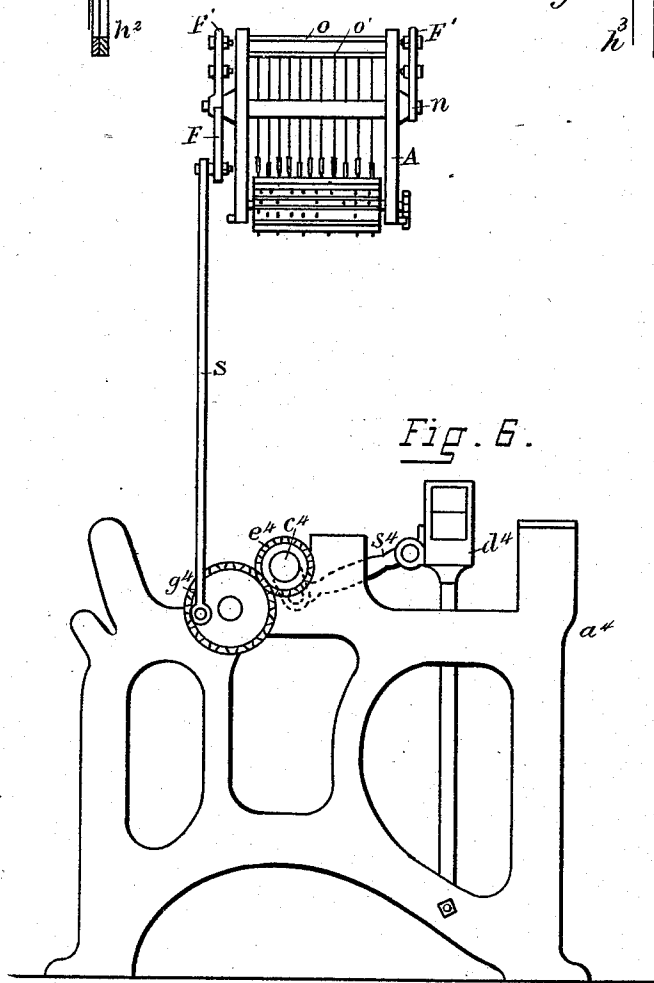


Fig. 5.

Witnesses

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SHEDDING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 406,790, dated July 9, 1889.

Application filed December 18, 1888. Serial No. 294,002. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. STAFFORD, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Shedding Mechanism for Looms; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in doobby mechanism to be used instead of a Jacquard apparatus in producing woven figured goods called "face-work," in which the figures appear only on one side or face of the fabric and a body warp and filling on the other side or back. In this arrangement the warp-threads that form the body of the fabric are raised and lowered by two or more sets of harnesses, which are operated by means of treadles and cams, as in looms for ordinary plain weaving, excepting in this particular, that the warp-threads are carried below the normal level of the fabric to form a shed for the lower shuttle that carries the body-filling thread to pass through, while the warp-threads that, with the filling-thread in the upper shuttle, constitute the face and figures of the fabric are raised and lowered by a doobby apparatus controlled by a pattern-chain mechanism.

Figure 1 shows a vertical longitudinal section of the mechanism shown in Fig. 2, taken on line 11 of said figure. Fig. 2 is a top view of the doobby, showing the lifters and their connections at the ends and their positions at each extreme of their motions, and showing only a portion of the harness levers and latches. Fig. 3 is a vertical longitudinal section of the two warps, harnesses controlling the body-warp, heddles for the face-warp, the lathe with the upper and lower shuttles, and the yarn-beam and breast-beam, the position of the warps being that when the face is raised and both shuttles are thrown. Fig. 4 shows the same section of the parts shown in Fig. 3, with the warps in the position when only the lower shuttle is thrown. Fig. 5 presents two

views of a latch *h*, with its supporting-wire *z*. Fig. 6 represents an end view of the loom and doobby.

The doobby mechanism is held between two vertical frames, one only of which is shown in Fig. 1, the other frame being similar to that shown. A series of horizontal harness-levers *d* are supported on a shaft or rod *a*, which has bearings at its ends in the doobby-frames A. These levers project over the looms and have notches in their end to receive the harness-cords *t*. The office of these levers *d* is to raise the warp-threads only, their descent being accomplished by means of weights below, connected in the usual way. A curved arm *e* extends up from each lever *d* from near its bearing on the rod *a*, and to the arms *e* jack-levers *b* are pivoted by means of studs passing through the middle of each jack-lever. To the upper end of each jack-lever a horizontal latch *h* is pivoted, having at its free end an arrow-shaped head, which forms hooks on the upper and lower sides of the latch. A shaft *n*, having bearings in the frames A, extends through each of the frames and has a knee-lever *f*, made fast on one end outside the frame A, and a lever *f'*, corresponding to the upper arm of the knee-lever *f*, is attached to the other end of the shaft *n* outside its adjacent frame. Two horizontal slots *g g'* are made in the upper bar of each frame A, one slot above the other, and two horizontal lifter-bars *o o'* extend across the doobby and slide one in each of the slots *g g'*. These lifter-bars *o o'* receive a forward and backward motion in the slots by means of rods *p p'*, which are pivoted at one end to the upper arms of the levers *f f'* and at the other end to the ends of the lifter-bars *o o'*, that extend out through the frames A.

One of the rods *p* is connected to the outer end of the arm that moves it and the other rod *p'* is pivoted near the middle of the same moving arm. By this arrangement the lifter-bar *o'* is moved nearly twice the distance in its slot by its rod *p* that the lifter-bar *o* is by its rod *p'*, which is pivoted to the arm nearer its center of motion. The same arrangements are made at each end of the lifter-bars *o o'* to move them.

The outer arm of the knee-lever f is connected by the rod s and mechanism below to the main shaft of the loom, whereby it receives an upward movement at one beat of the lathe and a downward movement at the next pick, and so on.

In Fig. 6, a^4 is the end frame of the loom. c^4 is the crank-shaft; d^4 , the lathe; s^4 , the connecting-bar between the lathe and crank; e^4 , a small gear-pinion on the crank-shaft; g^4 , a gear-wheel of twice the diameter of the gear-pinion e^4 , and s is the connecting-rod between a stud in the gear-wheel g^4 and the knee-lever F of the dobby A above the loom. (See Fig. 1.) At each revolution of the crank-shaft c^4 , or one pick of the loom, the pinion e^4 will make a whole revolution and the gear-wheel g^4 will make a half-revolution, carrying the rod s and the arm of the lever F in one direction—as, for example, up. At the next revolution of the crank-shaft or pick of the loom the gear-wheel g^4 will make the other half of its revolution and draw the rod s and the arm of the lever F down. In this way the dobby-heddles will be raised at each alternate pick of the loom.

A series of plate-levers v are supported on a rod r , extending from one frame A to the other, and a pattern-chain cylinder m is placed in bearings under the plate-levers, so that pins in the pattern-chain y , as they pass over the cylinder m , will raise the outer ends of the levers v .

The inner ends of the levers v support a series of vertical wires z , the upper ends of which support the latches h , so that when a pin in the pattern-chain y raises the outer end of one of the levers v the inner end of the lever is depressed, letting down the wire z and the latch h , supported by it, into position to be caught by its under hook on the lifter-bar o' in its outward movement.

It is not considered necessary to describe here the mechanism to move the pattern cylinder and chain, as its construction may be like that shown in United States Letters Patent No. 388,318, dated August 21, 1888.

In Figs. 3 and 4, i is the yarn-beam; j , the lathe; a^2 , the lower or body-filling shuttle; a^3 , the upper or face-filling shuttle. g^2 are the body warp-threads, and h^2 the harnesses by which they are controlled. g^3 are the face warp-threads, and h^3 the heddles by which they are operated. The lower shed of body warp-threads is made by the ordinary loom harness and mechanism, and the lower shuttle is thrown at every beat of the lathe, while the upper shed is formed by the heddles h^3 , controlled by the dobby mechanism, and the upper shuttle is thrown only at each alternate beat of the lathe.

The way in which the dobby mechanism operates the upper warp-threads and in which the face and figures on the fabric are produced is as follows: Taking as a starting-point the time when the long arm of the knee-

lever f is up and both lifter-bars $o o'$ are at the inner ends of their slots, all the upper warp-threads controlled by the dobby are at the lowest point, as shown in Fig. 4. At the next beat of the lathe the arm of the knee-lever f will be depressed and the lifter-bars $o o'$ will be drawn out toward the outer ends of their slots, the bar o and the latches on it will be drawn about one-half the length of the slot, and the harnesses on the ends of levers d , to which those latches are connected by jack-levers, will only raise their warp-threads up to the level of the fabric or top of the lower shed, while the latches that have dropped by reason of pins in the pattern-chain y passing under the outer ends of the plate-levers v are caught by their under hooks on the lifter-bar o' and carried to the outer ends of the slots, raising the harnesses connecting them up to form the shed for the upper shuttle to pass through. The threads that form the upper shed that bind the upper shuttle-thread are those that form the figures on the fabric, and, as will be seen by the foregoing description, are those selected by the pattern mechanism, all the other warp-threads being raised only to the level of the lower shed by the lifter o having the least extent of motion. At the next beat of the lathe the long arm of the knee-lever f is depressed, allowing all the face-warp heddles to be drawn down, and it is at the latter part of this motion that the pattern-chain moves and makes a selection according to the pins in it of the latches and warp-threads to be raised at the next beat of the lathe for the purpose of binding the upper filling-thread to produce the figure. By this arrangement of giving the lower lifter-bar the longest motion and making the normal position of the latches to be up, and because of the comparatively small portion of the upper warp-threads that require to be raised to form binder-threads to the shuttle "float" thread that constitute the figure on the fabric, the number of the pins in the pattern-chain can be greatly reduced, in some cases dispensing with seventy-five per cent. of what would be required if the rods $p p'$ were not crossed and the normal position of the latches were down instead of up.

Having thus described my improvements, what I claim as my invention is—

1. The combination, with the series of horizontal heddle-levers d , having curved arms extending up with jack-levers pivoted to them, of double-hooked latches pivoted to the upper ends of said jack-levers, two lifter-bars placed one above and the other below the said hooked latches, and means for moving said lifter-bars simultaneously in toward the loom side at one beat of the lathe and outward at the succeeding beat, the outward movement imparted to one of the lifter-bars being greater than that imparted to the other, substantially as described.

2. The combination of the heddle-levers having arms with jack-levers pivoted thereto, with double-hooked latches pivoted to the upper ends of said jack-levers, two lifter-bars placed one above and the other below said
5 hooked latches, links $p p'$, connected to the lifter-bars, and the lever f , to one arm of

which the said bars are pivoted at different distances from its center of motion, substantially as described.

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