

No. 648,739.

Patented May 1, 1900.

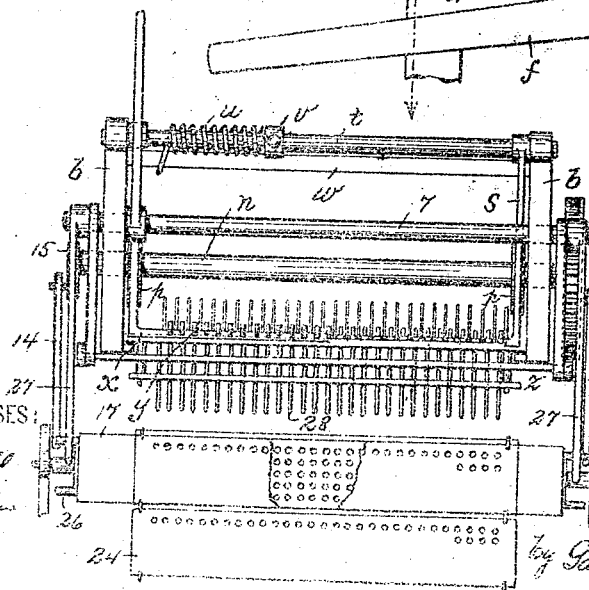
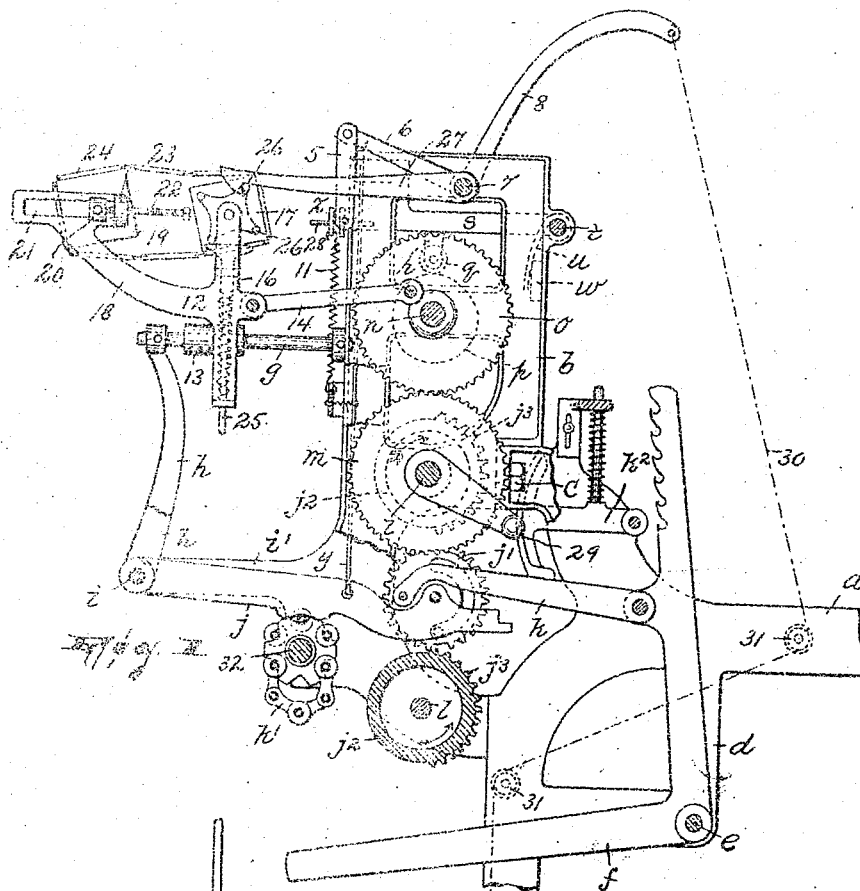
O. A. HAENICHEN, J. FULHABER & E. RIEDEL.

DORSY FOR LOCKS.

(No Model.)

(Application filed Dec. 10, 1899.)

2 Sheets--Sheet 1.



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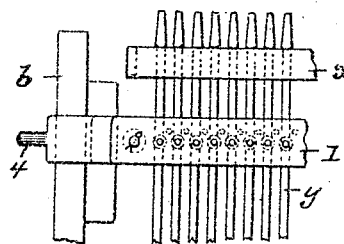
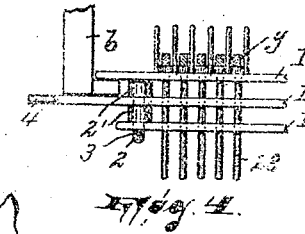
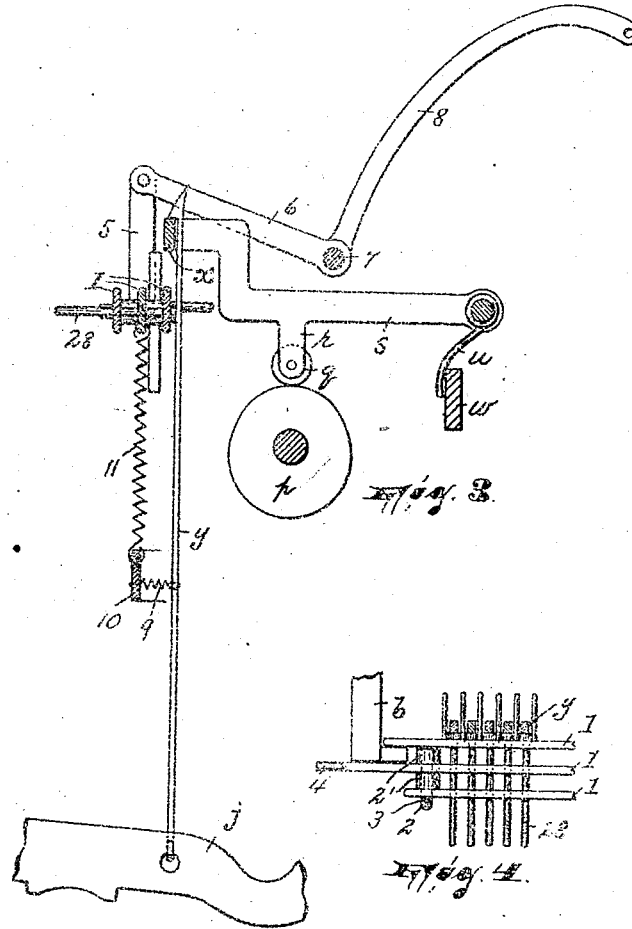
O. A. HAENICHEN, J. FULHABER & E. RIEDEL.

DOBBY FOR LOOMS.

(No Model.)

(Application filed Dec. 10, 1899.)

2 Sheets—Sheet 2.



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# UNITED STATES PATENT OFFICE.

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## DOBBY FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 648,739, dated May 1, 1900.

Application filed December 16, 1899. Serial No. 740,602. (No model.)

*To all whom it may concern:*

Be it known that we, OTTO A. HAENICHEN, JEROME FULHABER, and ERNST RIEDEL, citizens of the United States, residing in Paterson, county of Passaic, and State of New Jersey, have invented certain new and useful Improvements in Dobbies for Looms; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters and numerals of reference marked thereon, which form a part of this specification.

This invention relates to looms, and it has reference particularly to that portion of a loom comprised in its shedding mechanism.

One of the objects of the invention is to employ a card-cylinder and cards as a medium for effecting the initial selection of the harness-jacks preparatory to being vibrated by their actuating mechanism and in combination therewith needles or similar devices through which the effect of the selection made may be transmitted to the parts to which the jacks are directly or indirectly connected, said needles and the respective cards, each of which is provided with a plurality or series of perforations, being movable the one relatively to the other in such manner that any of said series of perforations may be presented to the needles.

Another object of the invention is to provide, in addition to and in combination with the aforementioned mechanism, means for effecting automatically the relative movement of parts, as above indicated.

A shedding mechanism constructed after the principles of our invention will be found to be preferable to the ordinary forms of shedding mechanism because of the fact that it does away with the use of the cumbersome and otherwise objectionable pattern-chain and accessory mechanism, and, moreover, because it is susceptible of producing a great variety of patterns without the use of extensive and complicated means for effecting this, it being only necessary to increase the number, not of the cards, but of the series of perforations thereof.

The invention consists in the improved shedding mechanism constructed substantially as hereinafter described, and finally embodied in the clauses of the claim.

Referring to the accompanying drawings, Figure 1 is a view in side elevation of our improved shedding mechanism, showing the same in operative position upon one end of a loom-frame. Fig. 2 is a top plan view of said shedding mechanism. Fig. 3 is a vertical sectional view of a portion of the machine, showing the needles, their movable carrying means, one of the hooks, the lifting means therefor, and a portion of one of certain vibrator-levers connected to said hook. Fig. 4 is an enlarged top plan view of a portion of the machine as shown in Fig. 2, and Fig. 5 is a view in front elevation of what is shown in Fig. 4.

*a* designates a portion of the loom-frame, and *b* designates the frame for our improved shedding mechanism, the frame *b* being secured to the frame *a* by bolts *c*, as usual.

In brackets *d* is arranged a horizontal shaft *e*, and upon this shaft are fulcrumed the harness-jacks *f*, which are of the bell-crank-lever pattern. The means for actuating the harness-jacks, which we have shown in the accompanying drawings for the purposes of illustration merely, is substantially like that shown and described, for instance, in the patent to Cornelius Falvey, No. 490,106, dated January 17, 1893, and so we will only briefly refer to said mechanism.

*g* represents stationary shafts which project outwardly from the frame *b* and the ends of which are braced by brackets *h*. Said brackets *h* are supported at their lower ends by a shaft *i*, connecting integral arms *i'* of the frame, and on this shaft is fulcrumed a series of vibrator-levers *j*, which project in the direction of the harness-jacks. According to the mode of actuating the harness-jacks above referred to each of the vibrator-levers *j* carries a gear *j'*, each gear being movable into engagement, according as the vibrator-lever is in its upper or lower limit of movement, with either of a pair of cylinders *j''*, disposed the one above and the other below said gears and each having a portion *j'''* of its surface fluted, while the remainder thereof is plain.

Each harness-jack is connected to its corresponding gear at an eccentric point thereon by means of a pitman *k*. (Shown in Fig. 1.) This pitman is controlled by a spring-actuated presser-lever *k*<sup>2</sup>. By any suitable driving means the fluted cylinders are rotated continuously in opposite directions. By moving the vibrator-levers so as to bring the gears into engagement with the fluted cylinders said gears may be made to rotate in opposite directions, and thus the raising and lowering or the lowering and raising of the heddles which the harness-jacks control can be produced at will.

Whether the jacks are provided with the actuating mechanism above described or with any of the other well-known mechanisms the train of elements comprised in the vibrator-levers, gears, and pitmen or other devices corresponding to said train of elements have heretofore been selected by means of pattern-chains—such as, for instance, that shown at *k* in Fig. 1. It is this pattern-chain which our invention, now particularly to be described, is intended to supersede.

Upon preferably the upper one of two shafts *l*, which shafts carry the two fluted cylinders above referred to and are journaled in the frame *b*, is secured at one end a gear *m*, and upon another shaft *n*, also journaled in the frame *b* above the shaft *l*, is secured another gear *o*, which is in mesh with the gear *m*. Upon the shaft *n* is also secured a pair of cams *p*, (outlined in dotted lines in Fig. 1 and in full lines in Fig. 3,) upon each of which cams bears a roller *q*, that is journaled in a downwardly-extending projection *r* of one of a pair of arms *s*, which are secured to a rock-shaft *t*, journaled in the upper rear part of the frame *b*. In addition to the effect which gravity tends to have in keeping the cylinders in contact with the cams a spiral spring *u* is employed, the same being coiled about the rock-shaft *t*, one of its ends being secured to a collar *v*, fast on the rock-shaft, and the other of its ends engaging a bar *w* of said frame.

*x* is a knife which connects the free ends of the arms *s*. This knife is adapted to engage and thus lift a series of hooks *y*, which are pivotally connected to the vibrator-levers *j* at their lower ends, being disposed vertically, as best seen in Fig. 3.

*z* is a frame consisting of three elongated plates *1*, disposed in parallel arrangement and secured together near their ends by pins *2*, which project from one of said plates and penetrate the others, said pins carrying collars *2'* for spacing the plates and cotter-pins *3* for keeping the plates in position. The ends of the middle plate extend beyond the ends of other plates and are reduced to form trunnions *4*, to which pitmen *5* are pivotally connected, said pitmen being also pivotally connected to arms *6*, which project from a rock-shaft *7*, that has bearings in the upper part of the frame *b* and from which also projects

a lever *8*. The frame *z* is guided by virtue of the fact that the extended portions of its middle plate bear with their rear faces against the front edges of the uprights of the frame *b*. Spiral springs *9*, connected to a bar *10*, that extends across the front of the frame *b* and to the several hooks *y*, tend to keep said hooks in contact with the rearmost plate *1*. Thus as the tops of said hooks are beveled off said hooks will be in such a position and will so act that when the knife descends those which it did not engage and lift in its previous elevation will yield to it preparatory to the next elevation of said knife.

*11* represents spiral springs which connect the bar *9* and one of the plates of the frame *z*, thus normally acting to return the latter to its lowermost position.

Upon the stationary shafts *g* is reciprocatingly arranged a pair of brackets *12*, each bracket having a sleeve *13*, which receives the corresponding shaft and acts as a bearing for said bracket. The brackets have an eccentric connection with the shafts *n* through the medium of pitmen *14*, the pitman on one side of the machine being pivotally connected to the gear *o* and the pitman on the other side of the machine being pivotally connected to a disk *15*, carried on said shaft *n*. Said pitmen are of course pivotally connected to the brackets. The brackets *12* may be secured together and braced in any desired manner.

In vertical arms *16* of the brackets is journaled a card-cylinder *17*, and in rearwardly and upwardly projecting arms *18* of said brackets is journaled an auxiliary card-cylinder *19*, its trunnions being set in blocks *20*, arranged in horizontal slots *21* of said arms and adapted to be adjusted in said slots by means of set-screws *22*, which engage the blocks at their ends and work in ears *23*, projecting from the brackets. Over the cylinders *17* and *19* extends a card-chain *24*. At one end of the card-cylinder *17* is disposed a spring-actuated nogger *25*, which is adapted to bear against pairs of pins *26*, projecting from said cylinder, so as to hold the latter firmly in any position to which it is turned.

*27* represents hook-levers which are loosely fulcrumed on the shaft *7* and which are adapted to engage the pins *26*, so as to rotate the cylinders in an obvious and well-known manner as the brackets carrying said cylinders are reciprocated on the shafts *g*.

*28* is a series of horizontal needles carried by and longitudinally movable in the plates of the frame *z*, said needles being connected to the several hooks *y* and adapted to be actuated by the perforated cards *24* as the same are brought into engagement with their outer ends.

Upon the shaft *7* is carried at one end thereof a crank and handle *29* for manually operating the various parts of the machine after the necessary disconnection from the power driving means has been effected.

It should be remarked that the frame *z* is

adapted to be elevated into any of several positions, the number of which may be arbitrarily chosen. The cards should be provided with series of perforations corresponding in number to the number of positions into which the needles 28 are to be moved by the frame carrying them.

To the free end of the lever 8 is secured one end of a flexible connection 30, which extends over pulleys 31 and which is connected at its other end to suitable mechanism, whereby the selection of the various positions into which the frame *z* is movable is automatically determined. For instance, this flexible connection may be connected to the box-motion of the loom, and then it is only necessary to set the multiplier for actuating this box-motion so that it will actuate the needle-carrying frame *z* in such a way that the needles may properly coact with the cards which have been arranged and perforated according to a definite pattern of goods to be woven.

As in the case of the patented mechanism of Falvey above referred to the multiplier involves the use of a chain (not shown) which is caused to advance by means of a revoluble shaft 32, which is journaled in the frame *b* and which in the machine which our invention supersedes is the one that carries the chain *k'*, being operatively connected to the lower one of the fluted cylinders, so as to be continuously rotated thereby.

The machine operates as follows: The cards of the card-chain being perforated and arranged so as to properly coact with the needles, the multiplier mechanism for operating which has already been set in accordance with a predetermined pattern, some of said needles will be pushed back by the opposing card while the rest remain idle each time the pattern-card-selecting mechanism is reciprocated, this being effected through the medium of the pitmen 14, which are connected to the rotating gear *o*. As the selecting mechanism is reciprocated the cylinders are of course turned by the hooks 27 in the usual manner, so as to advance the cards. The movement of some of the needles disengages the corresponding hooks to which they are connected from the knife, and as the latter is vibrated under actuation of the cams *p* the remainder of said hooks will be elevated. The rotation of the gear *o* in order to effect the reciprocation of the pattern-card-selecting mechanism and the vibration of the knife is of course transferred from the gear *n*, with which said gear *o* meshes.

The raising of certain of the hooks *y* and the non-actuation of others of said hooks produce a raising of some of the trains of elements, respectively, comprising parts *j* and *k* and the intermediate gear *j'*, and the inaction of other of said trains of elements. The movement of the frame *z*, carrying the needles, occurs after each changing of the shed—that is to say, if said frame is to be moved—this being effected through the medium of the mul-

tiplier mechanism, the flexible connection 30, the lever 8, arms 6, and links 5.

Where the actuating means which engages the trains of elements above referred to, so as to operate the harness-jacks in opposite directions, consists of the oppositely-rotated fluted cylinders hereinbefore described, the above-described operation, whereby the selection of said trains of elements is effected, is carried on while the plain portions of the fluted cylinders are opposite the gears in said trains of elements. Therefore said trains of elements will be in position to be operated by the cylinders as soon as their fluted portions again approach the gears, the consequence being that the upper fluted cylinder will act through the elevated trains of elements to throw the corresponding harness-jacks in one direction, while the lower fluted cylinder will act through the depressed trains of elements to throw the remaining harness-jacks in the other direction. Further operation of the machine is practically a repetition of that above described.

The operation of the pattern-chain for working the multiplier mechanism being effected by the shaft 32, which is constantly revolving, effects, through said multiplier mechanism and the flexible connection 30, the vibration of the lever 8 and the consequent raising to various elevations of the needles 28.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is:

1. In a harness-controlling mechanism for looms, the combination of a frame, harness-jacks, a revoluble shaft, means for rotating said shaft, a reciprocating pattern-card-selecting mechanism disposed parallel to said shaft, stationary shafts projecting from said frame and disposed at right angles to said shaft and the selecting mechanism, the latter being guided thereby, pitmen connecting said selecting mechanism and the shaft and having eccentric connection with the latter, hooks projecting between the selecting mechanism and the shaft, operative connection between said jacks and the hooks engaging the latter at one end, a reciprocating knife adapted to engage the other ends of said hooks, operative connection between said knife and the shaft, a frame movable in the main frame between the selecting mechanism and the hooks, needles carried by said last-named frame and adapted to engage the hooks, and means for actuating said last-named frame, substantially as described.

2. In a harness-controlling mechanism for looms, the combination of a frame, harness-jacks, a revoluble cam-carrying shaft, means for rotating said shaft, a reciprocating pattern-card-selecting mechanism disposed parallel to said shaft, stationary shafts projecting from said frame and disposed at right angles to said shaft and the selecting mechanism, the latter being guided thereby, pitmen connecting said selecting mechanism and the

shaft and having eccentric connection with the latter, hooks projecting between the selecting mechanism and the shaft, operative connection between said jacks and the hooks  
 5 engaging the latter at one end, a fulcrumed knife-carrying frame engaging the cams on said shaft and adapted to engage the other ends of said hooks, a frame movable in the main frame between the selecting mechanism  
 10 and the hooks, needles carried by said last-named frame and adapted to engage the hooks, and means for actuating said last-named frame, substantially as described.

3. In a harness-controlling mechanism for  
 15 looms, the combination of a frame, a reciprocating pattern-card-selecting mechanism, means for reciprocating said pattern-card-selecting mechanism, hooks, devices controlled  
 20 by said hooks, a suitably-guided frame movable rectilinearly between said selecting mechanism and the hooks, springs connecting said movable frame and the main frame, needles  
 25 carried by said frame, a rock-shaft journaled in the frame, connecting means between said rock-shaft and the needle-carrying frame for reciprocating the latter, and means for actuating said rock-shaft, substantially as described.

4. In a harness-controlling mechanism for looms, the combination of a frame, harness-  
 30 jacks, fluted cylinders, vibrator-gears disposed between said cylinders and adapted to respectively engage them, operative connection between said gears and the jacks, fulcrumed vibrator-levers carrying said gears, a  
 35 cam-carrying shaft journaled in said frame above said cylinders, gearing connecting one of said cylinders and the shaft, a reciprocating pattern-card-selecting mechanism disposed parallel to said shaft, a disk and a gear  
 40 mounted on said shaft, said gear forming a portion of the gearing, pitmen connecting said selecting mechanism and the gear and disk, vertical hooks projecting between the selecting mechanism and the shaft and connected  
 45 to said vibrator-levers at their lower ends, a

fulcrumed knife-carrying frame resting on the cams on said shafts and adapted to engage the upper ends of said hooks, a vertically-movable frame disposed in the main frame between the selecting mechanism and  
 50 the hooks, needles carried by said last-named frame and adapted to engage the hooks, and means for actuating said last-named frame, substantially as described.

5. In a harness-controlling mechanism for  
 55 looms, the combination with a frame, of a suitably-guided reciprocating pattern-card-selecting mechanism, means for actuating said pattern-card-selecting mechanism, a suitably-guided frame movable at right angles to  
 60 the movement of the reciprocating pattern-card-selecting mechanism, needles carried by said movable frame, links pivotally connected to said movable frame, and means, pivotally connected to said links, for reciprocating said  
 65 needle-carrying frame, substantially as and for the purposes described.

6. In a harness-controlling mechanism for looms, the combination with a frame, of a  
 70 suitably-guided reciprocating pattern-card-selecting mechanism, means for actuating said pattern-card-selecting mechanism, a suitably-guided frame movable at right angles to the movement of the reciprocating pattern-card-selecting mechanism, springs connecting  
 75 said movable frame and the main frame, needles carried by said movable frame and movable at right angles to the movement thereof, means for reciprocating the needle-carrying frame, substantially as described.  
 80

In testimony that we claim the foregoing we have hereunto set our hands this 1st day of December, 1899.

OTTO A. HAENICHEN.  
 JEROME FULHABER.  
 ERNST RIEDEL.

Witnesses:

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