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DOBBY FOR LOOMS

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2 Sheets-Sheet 1

Fig. 1

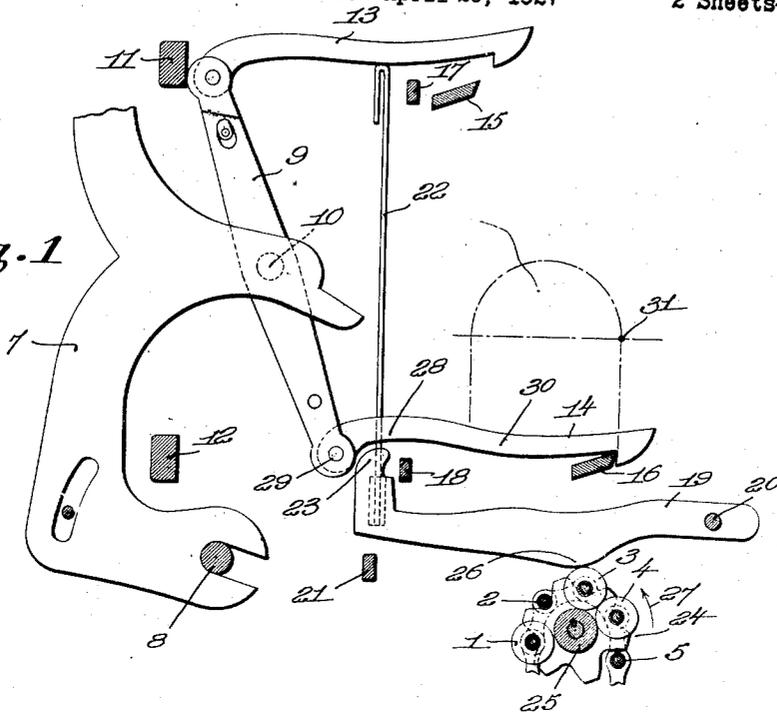
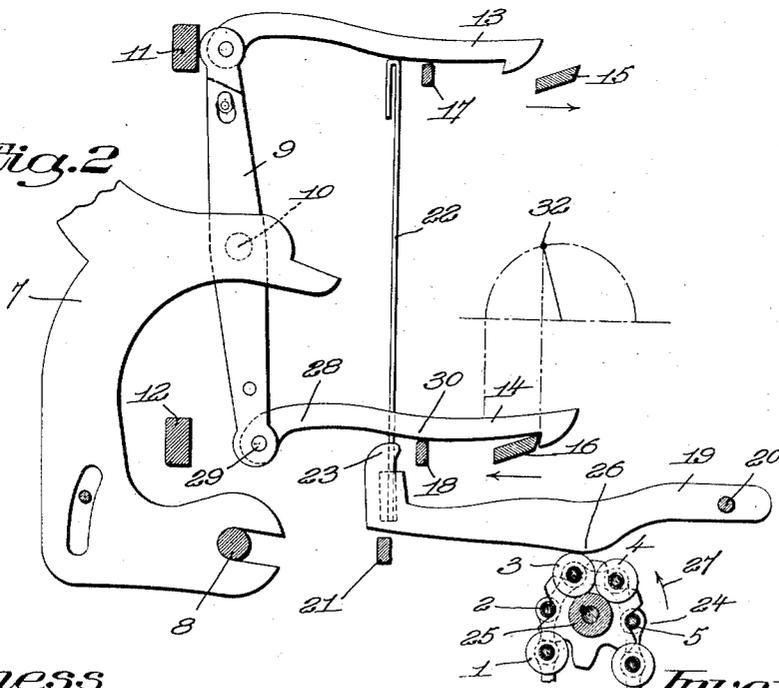


Fig. 2



Witness

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## UNITED STATES PATENT OFFICE.

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## DOBBY FOR LOOMS.

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The present invention relates to an improvement in dobbies for looms.

It is now the ordinary practice in dobbie looms to provide reciprocating knives which cooperate with hooks connected with the harness jacks to form the shed. The hooks themselves are under the control of dobbie fingers which are now ordinarily gravity actuated to lift the hooks from engagement with the reciprocating knives. In recent years the demand has become more and more emphatic for looms of higher speed, and while the loom itself might be speeded up, the gravity actuation of the dobbie fingers remains the same, that is, the lack of positive actuation of the dobbie fingers has limited the speed at which a dobbie loom would be run.

It is the function of the dobbie fingers to control the dobbie hooks and determine when they shall or shall not engage their respective knives. When a dobbie knife moves inward after having formed the shed and a different shed formation is desired, it is necessary to detach the previously engaged hook from its knife, and the gravity actuation of the hooks has frequently caused uncertainty in the disengagement of the hooks from the knives. This has been emphasized in the form of dobbies heretofore employed by the fact that the lifter fingers would place the dobbie hook under stress and either cause the dobbie hook to be cammed off its associate knife or suddenly sprung from engagement therewith at the end of the knife's stroke, with the result that imperfect cloth has frequently been produced.

The object of the invention is to improve the construction of dobbies in order to render them more certain in operation and durable in construction. To these ends the invention consists in the dobbie mechanism hereinafter described and particularly defined in the claims.

An important feature of the present invention consists in effecting the disengagement of the knives and hooks by positive acting means under pattern control, and in order that the positive action may be suspended until the parts have assumed their initial position, the pattern mechanism is utilized to slightly drop the dobbie fingers as the engaged knife and hook move inwardly to thereby prevent stress upon the hook or its premature disengagement from its knife.

In the accompanying drawings illustrating

the preferred form of the invention, Fig. 1 is an elevation of the dobbie fingers, dobbie hooks, dobbie levers and harness jacks, showing the pattern chain in position with relation to the dobbie fingers; Figs. 2, 3, 4 and 5 are other similar views omitting the jacks showing the parts in different positions which they assume in operation.

The illustrated embodiment of the invention is described as follows:—The harness jacks 7 are pivotally mounted at 8 on the dobbie frame. The dobbie levers 9 are pivoted at 10 to the jacks 7 and normally rest against the lever stops 11 and 12 of the dobbie frame. These dobbie levers extend upward and downward from their pivots and at their ends have pivoted to them the top dobbie hooks 13 and bottom dobbie hooks 14. The jacks are normally held in their left hand positions by the weight of the harnesses and by the pull of the harness springs. A top actuating knife 15 and a bottom actuating knife 16 are employed in the usual manner to actuate the harnesses through the hooks, levers, jacks and usual connections. The knives 15 and 16 are reciprocated in the usual manner for these purposes. The top set of dobbie hooks 13 is provided with a top hook rest 17, the bottom set of dobbie hooks 14 is provided with the bottom hook rests 18. When the hooks are supported by their rests they occupy their lower positions and their hooks are in position to be engaged by the dobbie knives 15 and 16. The selection of the particular harness to be actuated is by means of the dobbie fingers 19 pivoted at their ends on the finger shaft 20. The dobbie fingers are adapted to be supported by a finger support 21 when not raised to elevated position. Each dobbie finger supports a push rod 22, the upper end of which is adapted to engage a top dobbie hook 13. Each dobbie finger is also provided with a bottom dobbie hook engaging portion 23 for engaging one of the bottom dobbie hooks to lift it so that the knife may pass under it without engagement therewith. The dobbie fingers normally rest upon the finger support 21 and are raised by a pattern chain which carries a series of risers and sinkers for engagement with the fingers to raise or lower them. This pattern chain is indicated in a general way by the reference character 24 and in the plane of one dobbie finger it carries a series of risers and sinkers arranged

in such order as to actuate one of the dobbie fingers in a prescribed manner to secure the desired weave pattern. Thus for the dobbie finger as shown in Fig. 1, the pattern chain is provided with a riser 1, a sinker 2, a riser 3, a riser 4, a sinker 5, and so forth, the complete series being a sinker and two risers whereupon the pattern is repeated. The dobbie chain is of the well-known form consisting of bars extending from side chain to side chain, upon which bars are carried tubular sinkers and risers or rolls, the sinkers spacing the risers and holding them in fixed position on the rods. The pattern chain passes over a barrel 25 under the series of dobbie fingers and the risers are supported by the barrel in position to lift the fingers in proper order and to the desired distance. The risers, one after the other, come in contact with the chain engaging swell 26 of the dobbie fingers 19.

This dobbie is of the single index type, each finger actuating both a top and a bottom hook. The pattern chain moves in the direction of the arrow 27 and it moves the dobbie finger to raise it and to permit it to fall as determined by the risers and sinkers of the chain. When the pattern chain moves a riser out from under the dobbie finger and a sinker is next presented, as in moving the riser 1 out from under the swell 26, it causes the finger to fall by reason of the presentation thereto of a sinker as a result of which both hooks controlled by this finger are lowered. One of these hooks will be in position to be engaged by its actuating knife but the other will not be in position to be engaged by its actuating knife because the knife only comes into engagement with a hook in its inward position. When the pattern chain moves the sinker 2 out from under the finger, the riser 3 engages the finger and lifts it. The movement of the pattern chain is so timed with respect to the movement of the knives that the sinker permits the bottom knife to engage the bottom dobbie hook. Then as the bottom knife moves outward (to the right as shown in the figures of the drawing) it carries the bottom dobbie hook with it and lifts the corresponding harness. When the bottom knife has reached its extreme outward throw, the top dobbie knife will have reached its extreme inward position and by this time the pattern chain will have advanced so that the riser 3 will have lifted the dobbie finger 19 and through the push rod 22 it will have lifted its top dobbie hook 13 see Fig. 1 and will hold it lifted until the top knife 15 has moved outward beyond the top hook controlled by this dobbie finger. The bottom hook engaging portion 23 of the dobbie finger 19 does not engage the bottom dobbie hook at this time because of the curve or bend in the dobbie hook at 28. Each bottom dobbie hook 14 is of the form shown in the drawings. From

its pivot 29 at the lower end of the lever 9 it rises upward and extends to the right above the extreme uppermost position of the dobbie hook engaging portion 23 of the dobbie finger 19. Thus the bottom dobbie hook is prevented from being engaged by the dobbie finger while the lower knife is engaged by such dobbie hook. (See Fig. 1.) The dobbie hook from the bend 28 extends outward and downward to the point 30 where it bends again slightly upward and extends in this direction to its extremity where the hook is located. When the bottom knife 16 is moving inwardly the hook engaging portion of the dobbie finger is lowered slightly as shown in Fig. 2, so as to prevent it from camming the hook off the knife. Thus when the riser 3 passes out from under the dobbie finger the latter is lowered slightly before the next riser 4 when the pattern chain engages the dobbie finger. (See Fig. 2.) In the position of the parts shown in this figure, the bottom knife 16 is moving inwardly, the top knife 15 is moving outwardly. In Fig. 3, the riser 4 is shown as having reached the dobbie finger and in position about to engage it for the purpose of lifting the lower dobbie hook 14. When the bottom knife 16 reaches its extreme inward position as shown in Fig. 4, the riser 4 has started to engage and lift the dobbie finger 19 so as to prevent the knife 16 from engaging the hook 14 upon the next outward movement of the bottom knife. This riser 4 not only lifts the bottom hook 14 but through the push rod 22 it also lifts the top hook 13, but at this time the top knife 15 is out and consequently the lift of the top hook is ineffective to produce any action or inaction of the parts. After the riser 4 passes out from under the swell on the bottom of the dobbie finger 19, that is, when the riser 4 passes from the position shown in Fig. 5 beyond its active position, then the sinker 5 is brought under the dobbie finger and the latter remains in its lowered position with both hooks 13 and 14 down. This position will be maintained until after the top knife 15 has made its movement to the left to the position shown in Fig. 1, whereupon the sinker being under the dobbie finger, the top hook will be engaged by the top knife and actuated to lift the harness through the means described. In the pattern arrangement shown in the next inward movement of the lower knife 16, the hook 14 will be caught by the knife and the cycle of operations described will be repeated. It is to be observed that the pattern chain advances a distance on each reciprocation of a knife corresponding to the spacing between successive bars carrying the risers and sinkers. On Fig. 1 is a diagram which indicates the timing of parts. Thus, in Fig. 1 the diagram shows the time of one complete revolution of the loom crank as the arc of movement of 180°

on the diagram. The point 31 is the position occupied by the loom crank when the knife 16 is at the position shown, that is, when it is out. In Fig. 2 the crank will have advanced to the position shown at 32 in that figure. In Fig. 3 the crank is shown as having advanced still farther, and as having arrived at the position 33 at which the knife is about to disengage from the hook. In Fig. 4 the point 34 represents the position of the knife at the end of one complete revolution of the loom crank. In Fig. 5 the point 35 is shown at the position which it occupies when the knife has moved outward to a position in which it is about to pass the hook. Thus, Figs. 1, 2, 3 and 4 show the movement of the parts through one revolution of the loom crank, and Fig. 5 shows the first position thereafter assumed by the parts.

Having thus described the invention, what is claimed is:—

1. A single index dobbie for looms having, in combination, harness jacks, dobbie levers connected thereto, top and bottom dobbie hooks attached to the dobbie levers, top and bottom hook actuating knives, dobbie fingers pivoted at one end and directly engaging the bottom dobbie hooks to positively raise them, push rods connecting the fingers with the top dobbie hooks to positively raise them and a pattern chain having risers and sinkers, said bottom hooks and fingers being so shaped that a top hook may be raised by the lifting of a finger without engagement of the latter with a bottom hook to prevent camming the bottom hook from its knife as the latter moves from its outer to its inner position.

2. A single index dobbie for looms having, in combination, harness jacks, dobbie levers connected thereto, top and bottom hooks attached to the dobbie levers, top and bottom hook actuating knives, dobbie fingers pivotally mounted at their outer ends and directly engageable by their non-pivotal ends with the bottom dobbie hooks to positively raise them, push rods actuated by the non-pivotal ends of the fingers to positively lift the top dobbie hooks, a pattern chain having risers and sinkers for acting directly on the dobbie fingers between the pivot mounting and the

dobbie hook lifting ends, and concaved lower faces formed on the dobbie hooks adjacent their pivotal connection with the dobbie levers to clear the dobbie hooks from engagement by the lifting ends of the fingers when the latter are under control of a pattern riser.

3. A single index dobbie for looms having, in combination, a harness jack, a dobbie lever connected thereto, top and bottom hook actuating knives, a dobbie finger pivoted at its outer end, a bottom hook attached to the dobbie lever and directly engageable by the free end of the dobbie finger to positively raise the bottom hook, a top hook attached to the dobbie lever, a push rod mounted on the non-pivotal end of the dobbie finger and directly engageable with the top dobbie hook to positively raise it, concaved lower faces formed on the dobbie hooks, and a pattern chain having riser rolls for positively lifting the dobbie finger and then permitting the dobbie finger to be slightly lowered while still engaged by the riser that the hooks may not be cammed upward by the dobbie finger as the dobbie hook moves inwardly in connection with its hook actuating knife.

4. A single index dobbie for looms having, in combination, harness jacks, dobbie levers connected thereto, top and bottom hooks attached to the dobbie levers, top and bottom hook actuating knives, dobbie fingers pivotally mounted at their outer ends and extending inwardly to a position between the ends of the dobbie hooks and directly engageable by their non-pivotal ends with the bottom dobbie hooks to positively raise them, push rods actuated by the non-pivotal ends of the dobbie fingers to positively lift the top dobbie hooks, a pattern acting on the dobbie fingers to effect positive lifting movements of the dobbie hooks, and concaved lower faces formed on the dobbie hooks adjacent their pivotal connection with the dobbie levers to clear the dobbie hooks from engagement by the lifting ends of the dobbie fingers and push rods when the latter are in raised position by the pattern chain as the dobbie hooks move inwardly.

In testimony whereof I have signed my name to this specification.

JAMES T. MALLOY.