Aug. 23, 1938. B. A. PETERSON 2,127,616

WARP DRAWING MACHINE

Filed Oct. 25, 1937

Fig. 1.

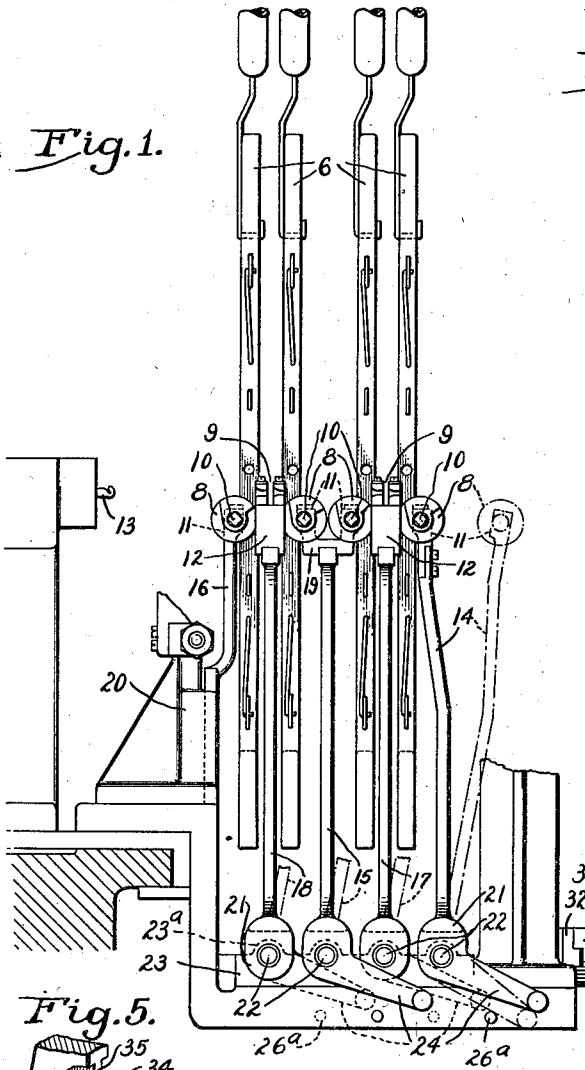


Fig. 2.

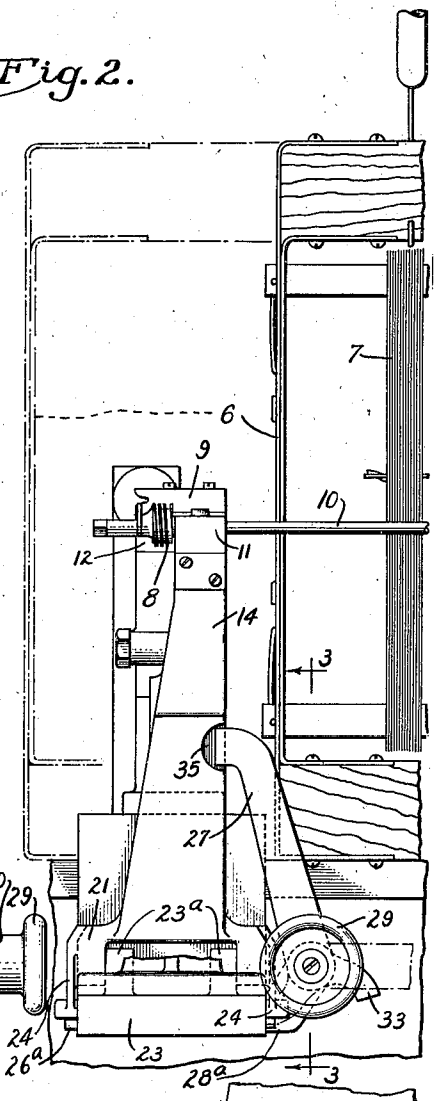


Fig. 5.

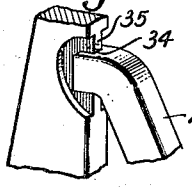


Fig. 4.

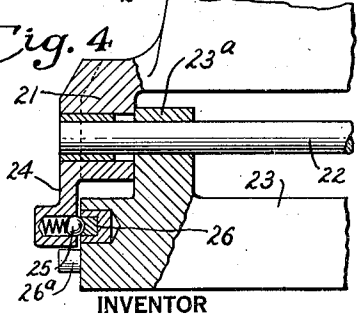
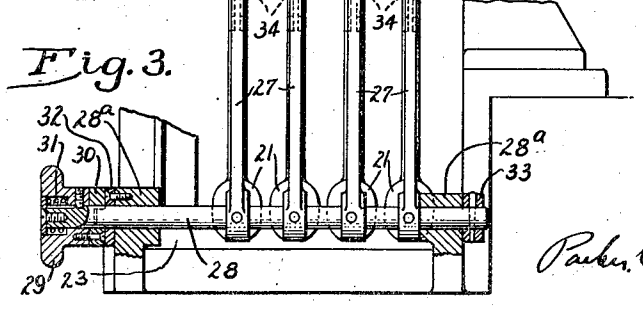


Fig. 3.



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WARP-DRAWING MACHINE

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12 Claims. (Cl. 28—44)

The invention pertains to warp-drawing machines and has particular reference to the mounting of heddle selecting or positioning worms and needle guides. The construction heretofore commonly employed for this purpose has rendered difficult the insertion and removal of the heddle frames, and the present invention has for its object the provision of an improved construction effectually overcoming such difficulty.

In the accompanying drawing,

Figure 1 is a fragmentary transverse sectional view through a warp-drawing machine showing in end elevation an improved supporting structure for the positioning worms and needle guides.

Fig. 2 is a fragmentary front elevational view of the same.

Fig. 3 is a fragmentary sectional view taken approximately in the plane of line 3 of Fig. 2.

Fig. 4 is a fragmentary sectional view showing a detail of construction.

Fig. 5 is a fragmentary perspective view showing another detail of construction.

For the purpose of illustration, the invention is shown as applied to a warp-drawing machine of a well-known type and having four heddle frames 6 each carrying a mass or pack of steel heddles 7. The drawing-in mechanism includes a pair of control elements for each heddle pack, comprising a selecting or positioning worm 8 and a needle guide 9. The worms 8 are respectively mounted on parallel shafts 10 supported in laterally spaced bearings 11, and the needle guides 9 are arranged in two pairs with each pair carried by a block 12, the general arrangement being such that the worm and needle guide associated with each of the heddle frames are disposed closely adjacent to each other and on opposite sides of the vertical plane of the frame. To the left of the heddle frames (Fig. 1) is a drawing-in needle 13 mounted in the usual way for reciprocation in a horizontal plane through the guides 9 and the eyes of the heddles as the latter are positioned by the worms 8.

As shown in Fig. 1 and in full lines in Fig. 2, the heddle frames are disposed rearwardly of the worms 8 and the needle guides 9 and in order to position the frames with their heddles in operative relation to the positioning worms and adjacent needle guides, it is necessary that the frames be advanced to the position shown in broken lines in Fig. 2. To permit of such advancing movement of the heddle frames, the present invention provides for the mounting of the worm shafts 10 with the positioning worms 8 and the needle guides 9 for relative lateral movement and for the subsequent locking of the parts in operative position.

In the preferred embodiment, pivotal supports are provided for the worm shafts 10 and the guides 9, and these supports take the form of upright standards 14, 15 and 16 carrying the worm-shaft bearings 11, and standards 17 and 18, one for each of the needle guide blocks 12. The central standard 15 serves as a common support for the bearings of the two central or intermediate worm shafts and is accordingly provided at its upper end with a U-shaped supporting block 19 providing laterally spaced members upon which the bearings 11 are mounted.

All of the standards, with the exception of the standard 16 on the side adjacent the drawing-in needle, are pivotally supported at their lower ends, the standard 16 being relatively short and stationarily mounted upon a suitable supporting bracket 20. At their lower ends the pivoted standards are in the form of yokes 21 mounted on parallel rock shafts 22 (Fig. 4) having suitable bearings 23a in a stationary frame member 23. The standards thus pivotally supported are capable of independent swinging motion so as to effect a movement of separation between a worm 8 and adjacent needle guide 9 for the passage of any given heddle frame, the shafts 10 being capable of flexing sufficiently for this purpose.

Assuming that the heddle frames occupy positions corresponding to that shown in full lines in Fig. 2, all of the pivoted standards are swung toward the right in Fig. 1, into the position shown in broken lines. Thereupon the heddle frame farthest remote from the operator is advanced through the space formed between the standards 16 and 18, and the standard 18 then swung into upright position. Similarly the other heddle frames are successively advanced through the spaces formed respectively by manipulation of the standards 18 and 15, 15 and 17, and 17 and 14.

To facilitate the manipulation of the pivoted standards in the manner above indicated, means is provided for yieldably holding each of said standards in upright position. To this end each pivoted standard has formed integral therewith an arm 24 carrying a ball detent 25 (Fig. 4) for coaction with a socket 26 in the frame member 23, the arms 24 for alternate standards being disposed for purposes of clearance at opposite sides of the standards as shown in Fig. 2. To prevent the ball detents from being carried beyond the lower edge of the frame member 23, suitable stop pins 26a are provided for coaction with the frame member.

After the standards have all been swung into their upright or operative positions they are adapted to be locked in such positions. For this purpose four arms 27 (Figs. 2 and 3) are rigidly mounted on a rock shaft 28 disposed at right angles to the pivoted axes of the standards and at one side thereof. Said shaft 28 is suitably journaled in bracket arms 28a carried by the frame member 23 and the shaft has slidably but non-rotatably mounted thereon a handle 29 (Fig. 3) having a clutch disk 30 fixed thereto and normally urged by a spring 31 into engagement with a stationary clutch disk 32 on the forward bracket arm 28a. Movement of the shaft 28 to swing the arms 27 in a direction away from the pivoted standards is limited by a stop finger 33 (Fig. 2) engageable with a part of the stationary frame. Movement in the opposite direction carries the arms into interlocking engagement with the standards. When this occurs, the clutch is automatically engaged by the spring 31 to hold the arms and thereby the pivoted standards positively against swinging motion. To provide for the interengagement of the locking arms with the standards, the former have their free ends provided with notches 34 (Fig. 5) engageable with relatively thin webs 35 formed on the standards.

It will be seen that the construction provided facilitates the operation of positioning the heddle frames relative to the control elements of the drawing-in mechanism, namely, the worms 8 and needle guides 9, in order that the heddles may be presented successively to the positioning worms and the guides 9 positioned properly with respect to the drawing-in needle 13. The pivoted standards are readily releasable for movement merely by exerting a pull on the handle 31 of the locking device and then swinging the locking arms out of engagement with the standards. After the heddle frames have been properly positioned and the standards restored to their normal relative positions, they are yieldably held in such positions by the ball detent 25, 26 until positively locked in such positions by the interengagement of the clutch disks 30, 32 as an incident to the rocking of the shaft into position to carry the locking arms into holding engagement with the pivoted standards.

I claim as my invention:

1. A warp-drawing machine comprising, in combination with a plurality of endwise movable heddle frames and a drawing-in mechanism including a plurality of control elements with a pair of such elements associated with each of said frames and arranged in closely spaced relation, a series of supports for said control elements, and means for mounting said supports for relative swinging movement whereby to effect a movement of separation between the elements of each pair and permit movement of the associated heddle frame between the pairs of elements.

2. A warp-drawing machine comprising, in combination with a plurality of endwise movable heddle frames and a drawing-in mechanism including a plurality of control elements with a pair of such elements associated with each of said frames and arranged in closely spaced relation, a series of supports for said control elements, a series of standards respectively supporting said elements, and means for pivotally supporting all but one end standard of the series for swinging motion in a direction to permit separation of the elements of each pair and permit movement of the associated heddle frame between such separate pair of elements.

3. A warp-drawing machine comprising, in combination with a plurality of endwise movement heddle frames and a drawing-in mechanism including a series of control elements arranged in closely spaced relation with a pair of such elements associated with each of said frames, means for supporting said elements for relative lateral movement including a plurality of pivotally mounted standards, and means retaining said standards in their operative positions.

4. A warp-drawing machine comprising, in combination with a plurality of endwise movement heddle frames and a drawing-in mechanism including a series of control elements arranged in closely spaced relation with a pair of such elements associated with each of said frames, means for supporting said elements for relative lateral movement including a plurality of movable supports, a plurality of locking elements one for each support, and a common operator for said elements.

5. A warp-drawing machine comprising, in combination with a plurality of endwise movement heddle frames and a drawing-in mechanism including a series of control elements arranged in closely spaced relation with a pair of such elements associated with each of said frames, means for supporting said elements for relative lateral movement including a plurality of pivotally mounted standards, means yieldably holding said standards in their operative positions, and means for positively locking said standards against pivotal movement.

6. A warp-drawing machine comprising, in combination with an endwise movement heddle frame and a drawing-in mechanism including a pair of control elements arranged in closely spaced relation, a support for each of said elements, one of said supports being mounted for lateral movement relative to the other support whereby to effect a movement of separation between the control elements so as to form a passage therebetween for said heddle frame.

7. In a warp-drawing machine, the combination with a plurality of heddle frames, a positioning worm and a needle guide associated with each of said frames, of standards carrying said worms and guides respectively, means pivotally supporting said standards for relative swinging movement, and means for holding the standards in normal operative positions.

8. In a warp-drawing machine, a worm supporting standard, a needle guide supporting standard, means supporting said standards for relative swinging motion comprising a pair of parallel rock shafts, means for yieldably holding said standards normally in predetermined positions, and means for locking said standards positively in said positions.

9. In a warp-drawing machine, a drawing-in mechanism comprising a pair of closely spaced control elements, supports for said elements mounted for relative movement whereby to effect the separation of the elements for the passage therebetween of a heddle frame, and a locking device for said supports movable into interengaging relation therewith in a direction substantially perpendicular to the direction of movement of the supports.

10. In a warp-drawing machine having a drawing-in mechanism including a pair of closely spaced control elements, a standard for supporting each of said elements, means supporting said standards for relative movement to effect separation of the elements for the passage of a hed-

dle frame therebetween, and a locking device for said standards including locking means engageable with said standards and a pivotal support for said locking means disposed at an angle perpendicular to the axes of the standards.

11. In a warp-drawing machine having a pair of control elements, a pair of standards for supporting said elements mounted for relative movement, and locking means for said standards comprising a rock shaft disposed substantially perpendicular to the direction of movement of said supports, a stationary clutch element and a clutch element rotatable with said shaft, said clutch elements being engageable as an incident to the movement of the locking means into engagement with said standards.

12. In a warp-drawing machine having a pair of control elements, a pair of standards for supporting said elements, at least one of said standards being mounted to swing on a horizontal axis, a rock shaft disposed substantially perpendicular to said axis, standard-locking means on said shaft, and a clutch device operative as an incident to the movement of the locking means into operative position to lock said shaft positively against turning.

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