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Fig. 5.

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ISAAC C. DOWNES AND HORACE DOUK, OF LEWISTON, MAINE, ASSIGNORS
TO THEMSELVES AND STEPHEN J. ABBOTT, OF SAME PLACE.

Letters Patent No. 101,110, dated March 22, 1870.

IMPROVEMENT IN DROP-WIRE SUPPORTING-BARS OR PLATES OF WARPING-MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that we, ISAAC C. DOWNES and HORACE DOUK, of Lewiston, in the county of Androscoggin and State of Maine, have invented a new and useful Improvement in Warping-Machines; and we do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings and to the letters of reference marked thereon.

This invention consists in a peculiar arrangement of bars in a drop wire box, by means of which the wires are easily inserted or removed when it is desired to make a change without taking out the bars.

In the drawings—

Figure 1 represents a plan view, with the cover of the drop-box raised and partially broken away;

Figure 2, a section through the drop-box;

Figure 3, an end elevation;

Figures 4 and 5, views of detached parts; and

Figure 6, a perspective view of a portion of one of the bars *d*.

To enable others skilled in the art to which our invention appertains to make and use the same, we will now proceed to describe fully its construction and method of operation.

A represents the frame-work of the machine, which is constructed in the usual manner.

B represents the warper-drum, which is provided with the shaft *b*, having suitable bearings in the frame A.

C represents a shaft, located above the drum B, which is provided, at one end, with the pinion C' (which latter engages with the gear-wheel B' of the shaft *b*) and the fast and loose pulleys *c c'*, and at the other end with the disk *c''*.

D represents the drop wire box.

d d d represent bars of proper thickness and width, which are held at suitable distances apart by means of the retaining-plates *d' d'* at their ends.

If desired, a slotted plate may be used instead of these bars.

The center bar, or center part of the plate, if a plate is used, is cut away underneath at the ends, as shown at *d''* in figs. 4 and 6. By this arrangement, wires may be added or taken away at will.

To remove a wire, it must be drawn along the slot to the end of the bar, and given a quarter revolution. It then can be lifted from the box through the slot in the plate or recess between the bars. To insert a wire, the reverse of this operation takes place.

In the old drop wire box, perforated plates were used, and, when it was desired to change the number of the threads, it was necessary to remove the plate, and replace it with one suited to the number of threads required. By the arrangement described, any number of wires may be used.

Having thus fully described our invention,

What we claim as new, and desire to secure by Letters Patent, is—

The arrangement, in a warping-machine, of the bars *d d d*, the center of which is provided with recesses *d''*, whereby the drop-wires may be introduced between the bars, or removed therefrom, without displacing the supporting-bars or plates, substantially as shown and described.

This specification signed and witnessed this 7th day of July, 1869.

ISAAC C. DOWNES.
HORACE DOUK.

Witnesses:

A. C. UNDERHILL,
D. HARDEN.