Jan. 15, 1935. Y. NOGAMY 1,987,864

ADJUSTING DEVICE OF WARP TENSION IN AUTOMATIC LOOMS

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FIG. 1.

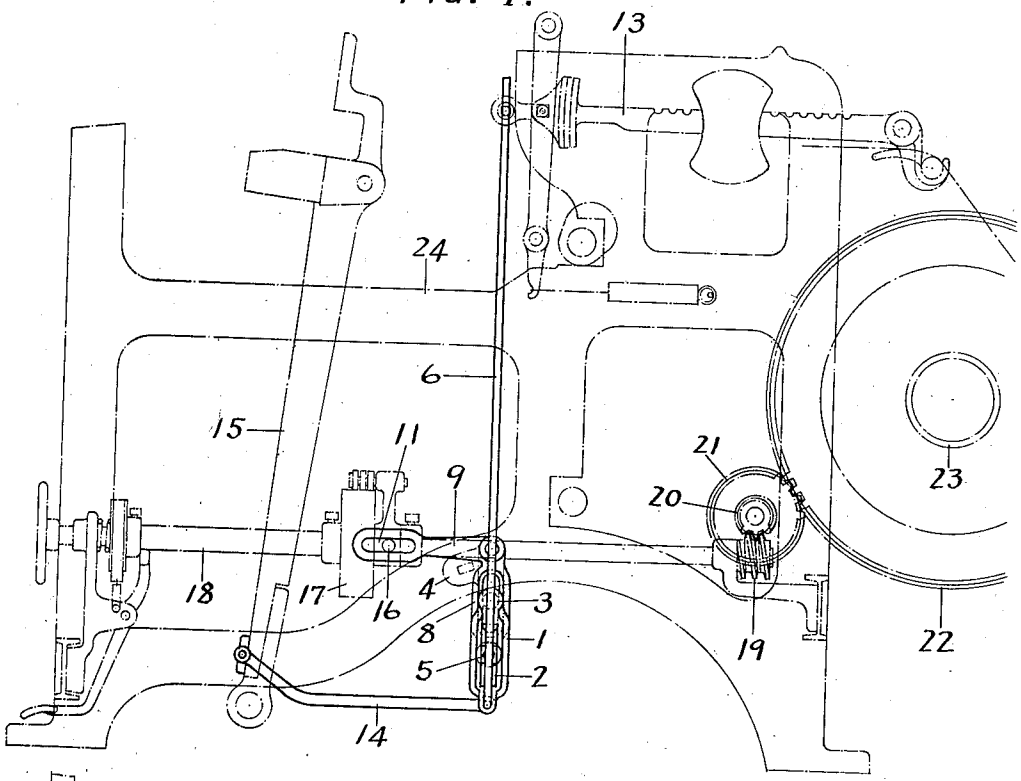
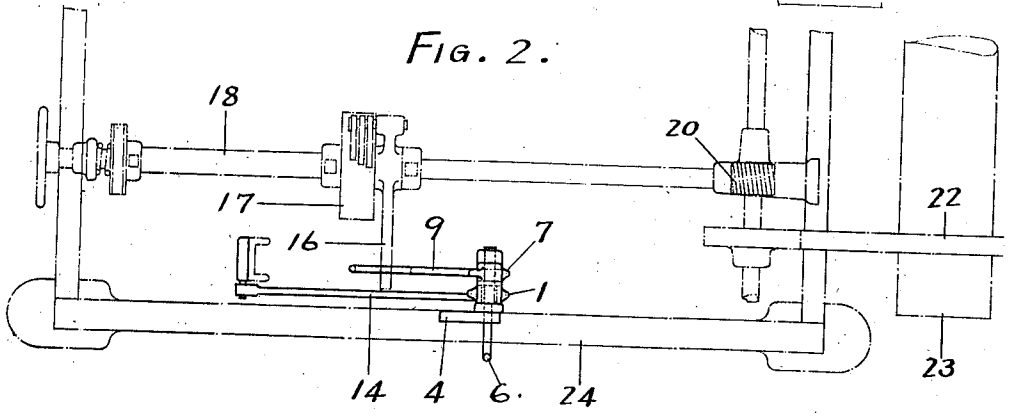


FIG. 2.



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FIG. 3A

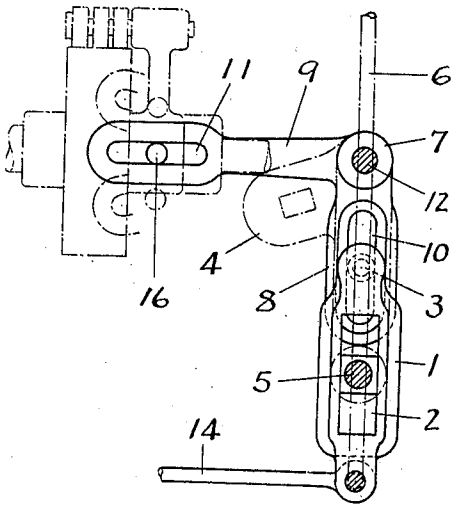


FIG. 3B

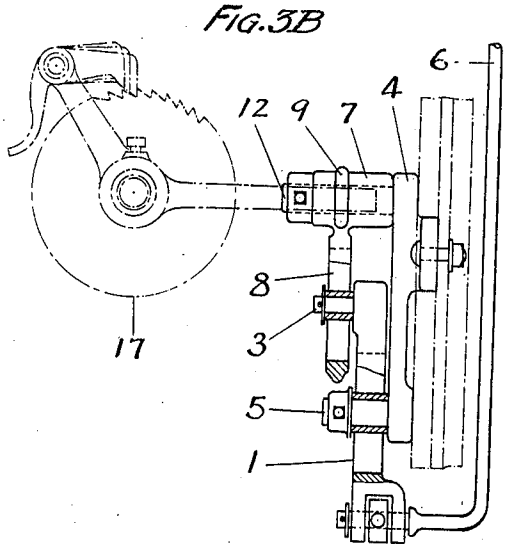


FIG. 5

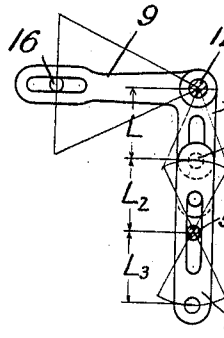
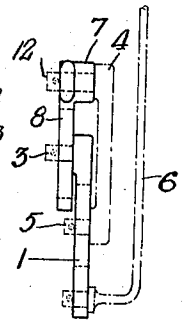


FIG. 4.



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UNITED STATES PATENT OFFICE

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ADJUSTING DEVICE OF WARP TENSION IN AUTOMATIC LOOMS

Yaejy Nogamy, Nagoya, Japan

Application May 9, 1933, Serial No. 670,129
In Japan December 2, 1932

1 Claim. (Cl. 139—110)

The present invention relates to the adjusting device of warp tension to co-operate with the let-off motion in automatic looms.

This adjusting device consists of a link lever suspended along its vertical axis combined with a bell crank provided with a slot in each arm so as to co-operate through a pin bracket having the pivots on each end.

The object of this invention is to obtain a sensitive adjustment by a simple mechanism and to reduce the deposition of cotton dust by arranging the parts in an up-right form.

The device will be described more in detail with reference to the accompanying drawings in which;

Fig. 1 is a front elevation of the device embodying this invention.

Fig. 2 is a plan view thereof.

Fig. 3A is an enlarged front view of the compound inverted lever and Fig. 3B is the side view thereof.

Figs. 4 and 5 show a front and side elevation of the lever mechanisms.

In the drawings, 1 designates a vertical link lever suspended by a rod 6 pivoted at its lower end and having a slot 2 along its longitudinal axis and a pin 3 at its upper end.

A pin 5 fixed on the lower end of the bracket 4 is inserted into the slot 2 of the link 1 and the bracket 4 has a pin 12 on the upper end.

A bell crank 7 pivoted on the pin 12 has two arms 8, 9, having slots 10, 11, respectively, and the pin 3 engages with the slot 10.

The bracket 4 having the pins 5, 12 is fixed to the loom frame 24 by bolts, thus the upper pin 12 forms the pivot of the bell-crank 7 and the lower pin 5 a fulcrum for the lever motion of the link lever 1.

The upper end of the rod 6 is connected to the tension arm 13 and the lower end of the lever 1 is connected to the lower part of the slay sword 15 by the connecting rod 14.

The device is operated by the motion of the slay sword 15, which swings at a constant speed.

When the sword 15 moves back and forth, the lever 1 swings about the pin 5 and the bell crank 7 swings on the pin 12.

A pawl engaging with the ratchet wheel 17 has an arm 16 engaging the slot 11 of the arm 9, hence the ratchet wheel 17 is operated by the swinging motion of the bell crank 7.

The rotation of the ratchet wheel 17 is transmitted to the warp beam 23 through the shaft 18, the worm 19, the worm wheel 20, the spur wheel 21 and the flange wheel 22, and the warp beam 23 is rotated in accordance with the motion of the slay sword 15.

When the warp on the warp beam 23 decreases, the tension of the warp increases and depresses the outer end of the tension arm and the rod 6 is shifted together with the link lever 1. The fulcrum pin 5 changes its position in the slot 2. When the under leverage of the link lever 1 is shortened, the amplitude of the pin 3 is increased, and the swinging motion of the bell crank 7 is increased; consequently the angular velocities of the ratchet wheel 17 and of the warp beam are increased. The amount of the warp being let off is increased to such a degree as to adjust the warp tension.

Fig. 4 explains the advantages of my device.

In prior compound levers the variation of the leverage due to the transposition of the fulcrum can be designated by the function

$$\frac{L2}{L}$$

in which L is the distance between the fulcrum and pivot of one of the component members and L2 is the distance between the fulcrum and the pivot of the other component member.

In the compound lever of this invention the variation of leverage due to the vertical transposition of the link lever 1 can be designated by the function

$$\frac{L2}{L}\times\frac{1}{L3}$$

in which (1) is the sum of L2 and L3, i. e., the distance between the upper pin and the lower pin on the link lever.

Thus, the variation of leverage of this compound inverted lever is greater than that of the compound lever hitherto used. The greater variation of leverage gives more sensitive and effective adjustment for the warp tension letting off from the beam.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

In a device for adjusting warp tension in automatic looms, a slotted link lever having an upper and a lower pin, a pivoted bell crank having a slot in which said lever is fulcrumed by means of said upper pin, a slay sword pivotedly connected with the lower pin of said lever, a bracket pivoted at one end on the pivot point of said bell

crank and having a pin near its other end engaging the notch in said lever, the variation of leverage due to the vertical transposition of the lever being the function

$$\frac{L2}{L} \times \frac{1}{L3},$$

where L is the distance between the upper pin in said lever and the pivot point of said bracket, L2 the distance between said upper pin and the pin in said other end of the bracket, L3 the distance between the last mentioned pin and the lower pin of said lever and 1 the distance between the two pins of said lever.

YAEJY NOGAMY.