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WARP TENSION GAUGE FOR LOOMS

Filed Jan. 6, 1928

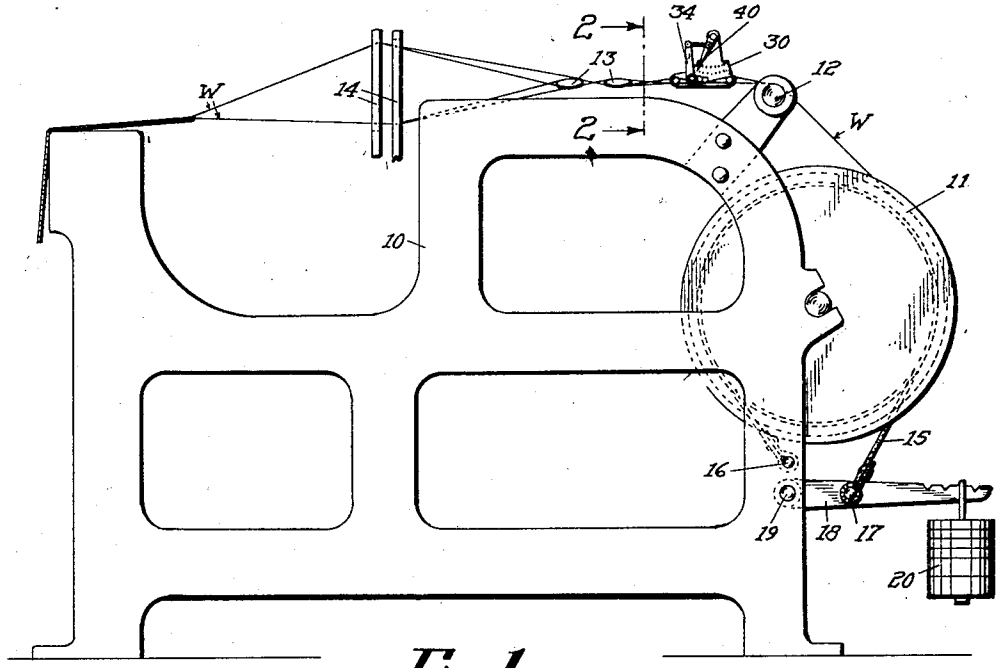


Fig. 1

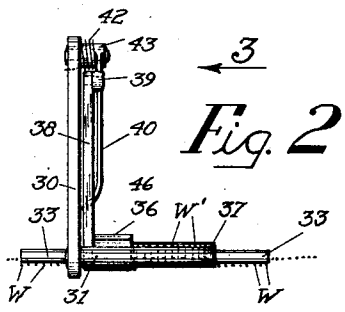


Fig. 2

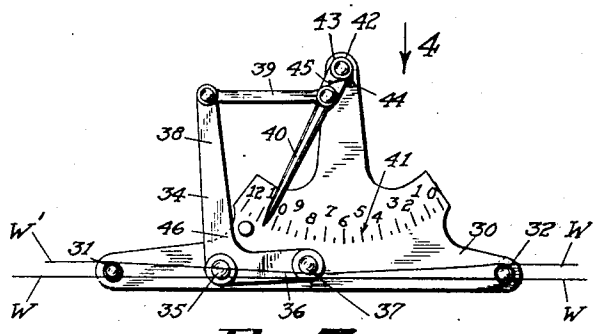


Fig. 3

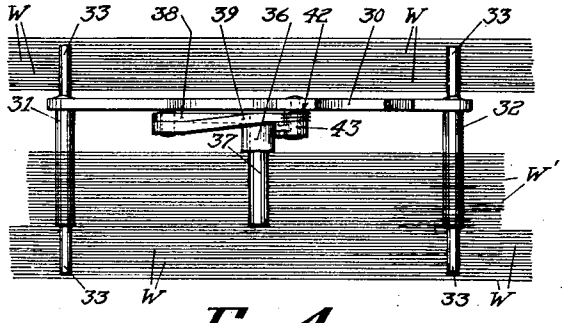


Fig. 4

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UNITED STATES PATENT OFFICE

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WARP TENSION GAUGE FOR LOOMS

Application filed January 6, 1928. Serial No. 244,955.

This invention relates to improvements in a tension gauge for the warp threads of looms and it is the general object of the invention to provide a simple device whereby the comparative tensions of the warp threads of a number of different looms may be gauged or wherein variations in the warp tensioning in a given loom may be noted.

In a loom the warp may be supplied by a creel or beam but in either instance it will move toward the harnesses and must be under proper tension. In such fabrics as silk it is necessary that the tension be rather high and that it also be uniform. The let-off motions which govern the amount of warp delivered every beat of the loom are not always uniform in their operation and are found to unwind more on one pick than on another. It is very difficult under ordinary conditions to determine the variations actually occurring in the tension of the warp and it is an important object of my present invention to provide a light and reliable means for visually indicating variations in warp tension.

It is a further object of my invention to provide a convenient device which may be carried from one loom to another and applied to a given section of warp threads for the purpose of gauging a warp tension.

It is a more particular object of my invention to provide a device which may be supported by the warp threads in such a way that its weight does not interfere with the correct indication given by the gauge, the fixed part of the device being supported by certain of the warp threads which are not being gauged.

With these and other objects which will appear as the description proceeds, my invention resides in the combination and arrangement of parts hereinafter described and set forth in the claims.

In the accompanying drawings wherein a convenient embodiment of my invention is shown,

Fig. 1 is a side elevation of a loom having my invention applied to the warp thereof,

Fig. 2 is a front elevation on an enlarged scale taken in the direction of arrows 2—2 of Fig. 1,

Fig. 3 is an enlarged side elevation of the device looking in the direction of arrow 3, Fig. 2 and

Fig. 4 is an enlarged top plan view taken in the direction of arrow 4, Fig. 3.

Referring to Fig. 1 I have shown a loom frame 10 supporting a warp beam 11 and a whip roll 12. The warp W extends from the warp beam over the whip roll and is separated by lease rods 13 from whence it passes forwardly to the harness frames 14. Advance movement in a counter-clockwise direction as viewed in Fig. 1 of the warp beam is resisted by a flexible friction band 15 one end of which is anchored to the stud 16 and the other end of which is connected as at 17 to a lever 18. Said lever is pivoted as at 19 to the loom frame and supports a weight 20 in adjusted position so as to produce variable tension on the band 15. As the take-up (not shown) of the loom carries the warp threads forwardly the warp beam will turn against the resistance offered by the band 15 and there will be created a tension in the warp threads.

When cloth is made according to very accurate specification as to weight and number of picks of filling, it is desirable to have some means for determining the tension of the warp. The device for showing the tension of the warp threads as shown herein comprises a plate 30 from which laterally project a pair of spaced supporting tubes 31 and 32, respectively. Extending freely through said tubes are supporting rods 33 which extend on each side of the device and support the same by resting on the warp threads W. A bell crank lever 34 is pivoted as at 35 to the plate 30 and has a substantially horizontal arm 36 from which laterally projects a finger 37 which is adapted to lie over a group of warp threads W′ which pass over the tubes 31 and 32. The upwardly extending arm 38 of the lever 34 is connected by means of a link 39 to an indicator hand 40 which is positioned to sweep over a dial 41 which may be graduated as set forth more clearly in Fig. 3. A light compression spring 42

surrounds the hub 43 of the hand 40 and has one end extending into the plate as at 44 while the other end is connected as at 45 to the hand, said spring tending to move the hand to the right as viewed in Fig. 3 and tending to hold the vertical arm 38 against stop 46 carried by the plate 30.

In operation the user will select a given number of warp threads to constitute the group W′ and lift the group placing tubes 31 and 32 and rods 33 under the group and at the same time placing finger 37 on the group. The rods 33 are then lowered on the warp W to support the device independently of the group W′. The spring 42 will push the finger down on the threads W′ and produce a deflection in said threads, causing them to be bent downwardly as shown in Fig. 3. If the tension be insufficient the warp threads will be deflected a considerable amount between the tubes 31 and 32, with the result that the hand 40 will lie to the right of the dial and indicate a rather low tension. If, on the other hand, the tension be relatively high the spring 42 will be able to produce only a very slight deflection of the warp threads engaged by the tube and the finger 37 will be correspondingly high and the hand 40 will be moved to the left to indicate a higher degree of tension.

The device may be used on a loom over a given period of time to determine the variations in the warp tension which may occur in studying the various types of let-off motions. It is to be understood that the device may be used in connection with any let-off and in fact may be beneficial in determining the relative merits of different kinds of let-off motions. The device may also be used to compare the tensions on a group of looms all of which are weaving substantially the same kind of cloth which must meet the same specifications and wherein the warp tension should be the same.

From the foregoing it will be seen that I have provided a very simple device which is self supporting on the warp thread and indicates by means of the hand 40 any variations which may occur in the tension of the warp threads. It will further be seen that inasmuch as the weight of the device is supported by the rods 33 which in turn rest on the warp threads not being gauged the readings are free from any error due to the weight of the device.

Having thus described my invention it will be seen that changes and modifications may be made therein by those skilled in the art without departing from the spirit and scope of the invention and I do not wish to be limited to the details herein disclosed, but what I claim is:

1. In a gauge to be supported entirely by a sheet of warp threads the plane of which is subject to slight changes as to position, supports for the gauge to rest on certain of the warp threads, means defining a dial, a hand to move across the dial, and means acting against the tension of a group of warp threads to move said hand relatively to the dial, said dial, hand and means being movable with the supports as the sheet or warps change their position.

2. In a gauge for measuring the tension of warp threads, a frame, a pair of spaced members secured to the frame to engage the under sides of a group of warp threads to be gauged, a movable finger supported by the frame to engage the upper side of the same warp threads, resilient means tending to move the movable finger relatively to the spaced members against the tension of the warp threads, means defining a dial carried by the frame, an indicating hand operatively connected to the movable finger and movable across the dial to indicate the amount by which the resilient means moves the movable finger against the tension of the warp threads, and means to support said gauge on warp threads other than those the tension of which is being measured.

3. In a gauge for measuring the tension of warp threads, a frame, a pair of spaced members rigid with the frame and adapted to lie on the same side of a group of warp threads to be gauged, a movable member supported by the frame adapted to engage the other side of the group of warp threads tending normally to cause deflection of the warp threads of the group, an indicator connected to said movable member to indicate the amount by which the warp threads are deflected by the movable member, and means to support said gauge on warp threads other than those the tension of which is being measured.

4. In a gauge for measuring the tension of warp threads, a frame, a pair of spaced members fixed to the frame engaging the same side of a group of warp threads, a movable member supported by the frame adapted for engagement with the other side of the group of warp threads, means tending to move the movable member out of alignment with the fixed members, such movement being resisted by the tension of the warp threads in engagement with the members, indicating mechanism to indicate visually the amounts by which the movable member is out of alignment with the spaced members, and means to support said gauge on warp threads other than those the tension of which is being measured.

5. In a gauge for measuring the tension of warp threads, a frame, a pair of spaced members secured to the frame and adapted to extend under a group of warp threads, a movable member supported by the frame to engage the upper side of the group of warp threads, means tending to depress the mov-

able member to a position below the members fixed relatively to the frame, an indicating device connected to the movable member to indicate the amounts by which the movable member moves below a line joining the fixed members, such movement of the indicating member being resisted by the tension of the warp threads, and means to support said gauge on warp threads other than those the tension of which is being measured.

6. In a gauge for measuring the tension of warp threads, a frame, a pair of spaced members to engage and lie on the same side of a group of warp threads, a movable finger between said members to engage the other side of the group of warp threads, resilient means tending to move the finger out of alignment with the members, such movement of the member being resisted by the tension of the warp thread, indicating mechanism to show the extent by which the resilient means moves the finger out of alignment with the members against the tension of the group of warp threads, and means to support said gauge on warp threads other than those the tension of which is being measured.

7. In a gauge for measuring the tension of warp threads, means defining a dial, a hand to move across the dial, a frame to support the dial and hand, a pair of spaced members rigid with the frame and adapted to lie on the same side of a group of warp threads to be gauged, means acting against the tension of said group of warp threads to move the group out of alignment with the said spaced members and operatively connected to the hand to move the same relatively to the dial, and means to support said gauge on warp threads other than those the tension of which is being measured.

8. In a gauge for measuring the tension of warp threads, a frame, a pair of spaced members rigid with the frame and adapted to lie on the same side of a group of warp threads, said group extending across the members, means intermediate the members tending to produce a deflection on said group of warp threads, said means being opposed by the tension of the warp threads, a visual device operatively connected to the means to indicate the amount of deflection of the warp threads, and means to support said gauge on warp threads other than those the tension of which is being measured.

9. In a gauge, a frame, tubular members extending from the frame, supporting rods extending through the members and engaging the warps at spaced points to support the frame, a movable device mounted on the frame to engage a group of warp threads other than those on which the rods rest and tending to cause deflection of the warp threads extending between the tubes, and a visual indicator to show the amount of deflection of said group of warp threads, the rods transmitting the weight of the device to the warp threads out of engagement with the device.

10. In a warp tension gauge for a sheet of warp threads, an indicating device operatively connected to a selected group of the sheet of warp threads and capable of indicating the condition of tension in the group, and means to support said device on threads of the sheet other than those contained in the selected group.

11. In a warp tension gauge for a sheet of warp threads subject to variations in tension and the plane of which is subject to slight changes as to position, an indicating device supported by certain of the threads and having operative engagement with other of the threads to indicate the tension in said other threads.

12. In a warp tension gauge for a sheet of warp threads, a pair of spaced members each to engage a group of threads, said members normally determining the plane of said group between the members, means to engage the group between said members and deflect the latter out of the plane normally determined by said members, said means being opposed by the tension of the group, an indicator operatively connected to the means to indicate the amount of deflection which the means is capable of producing against the tension of the warp, and means to support the gauge on threads of the sheet other than those which are being gauged.

In testimony whereof I have hereunto affixed my signature.

OSCAR V. PAYNE.