June 30, 1925. 1,544,320

A. C. HOUGH

TENSION DEVICE

Filed Nov. 28, 1924 2 Sheets-Sheet 1

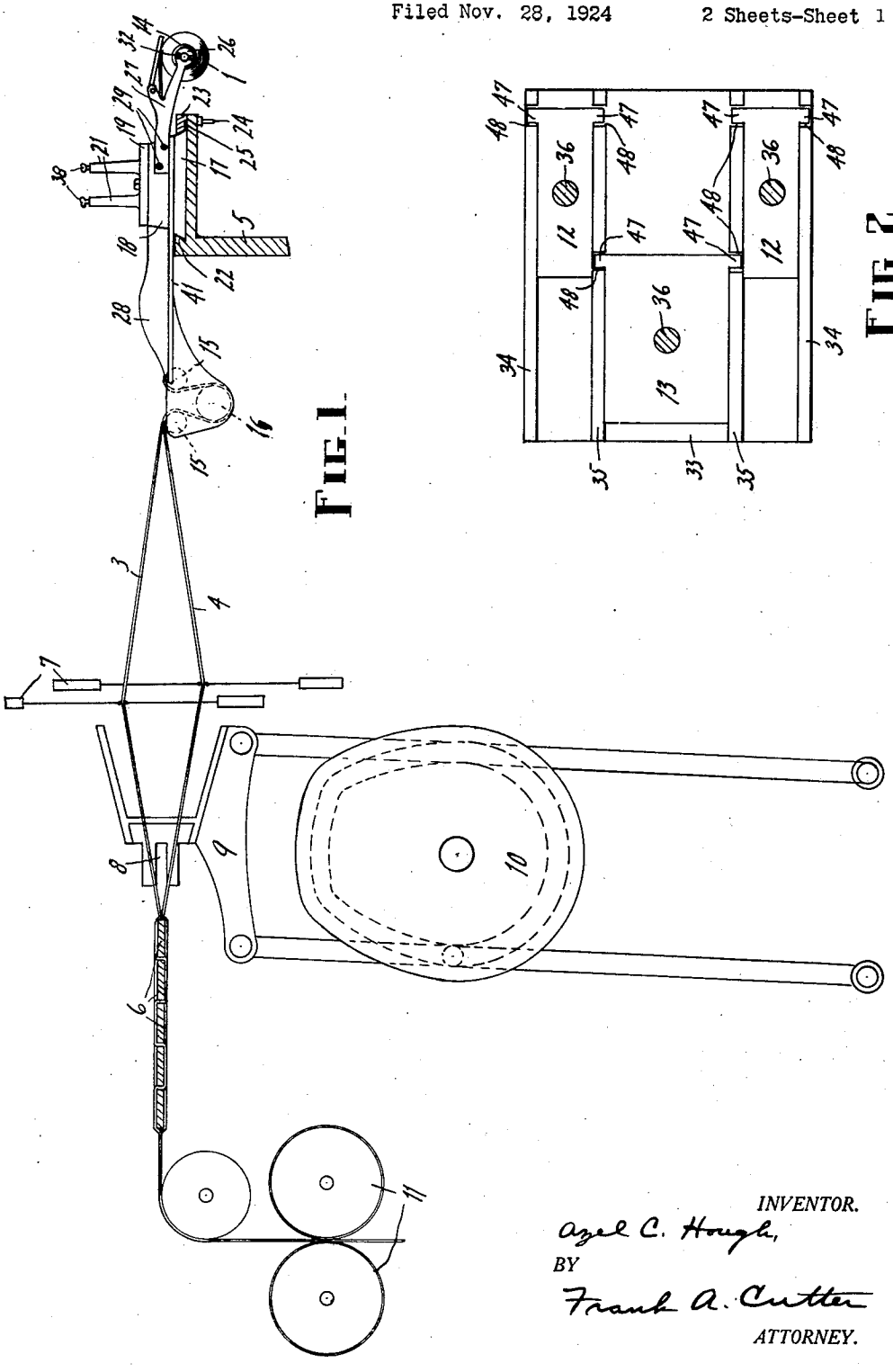


FIG. 1.

FIG. 2.

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June 30, 1925. **1,544,320**

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TENSION DEVICE

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FIG. 3.

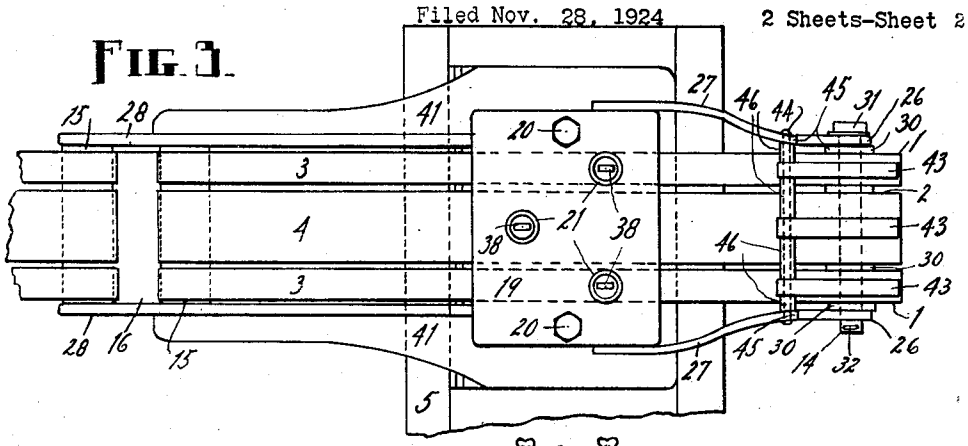


FIG. 4.

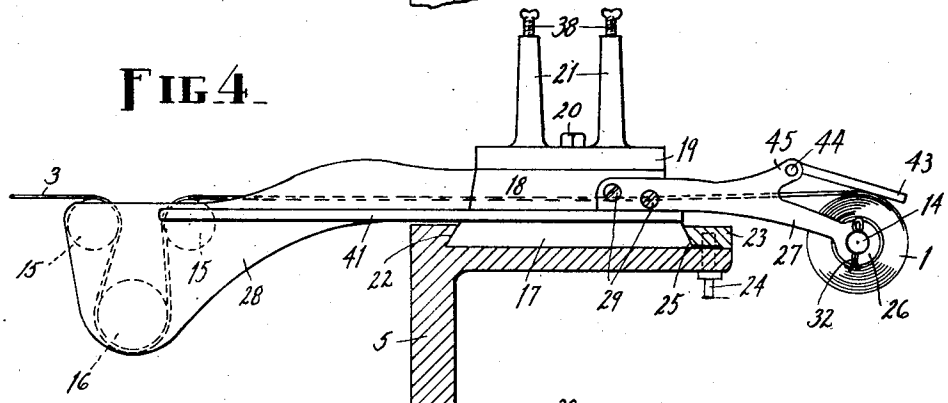


FIG. 5.

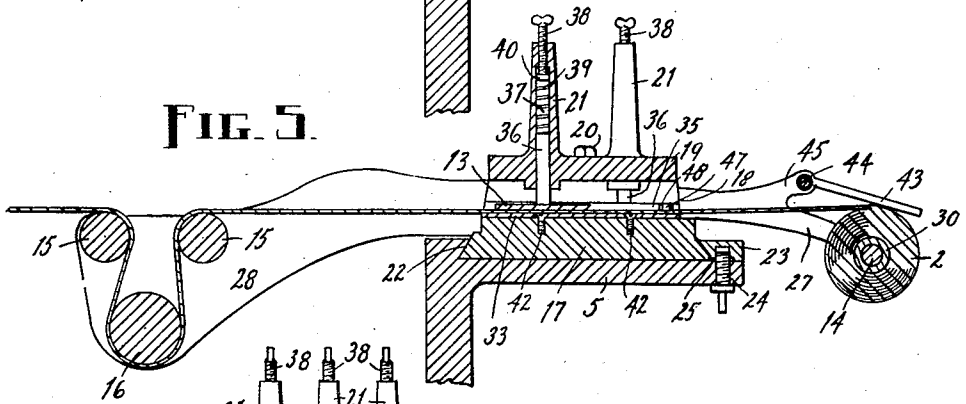
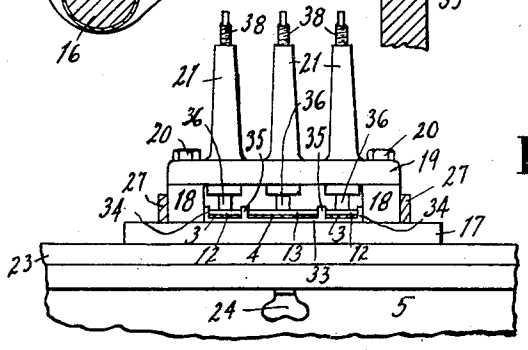


FIG. 6.



INVENTOR.

BY Azel C. Hough,

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Patented June 30, 1925. 1,544,320

UNITED STATES PATENT OFFICE.

AZEL C. HOUGH, OF JANESVILLE, WISCONSIN, ASSIGNOR TO HOUGH SHADE CORPORATION, OF JANESVILLE, WISCONSIN, A CORPORATION OF CONNECTICUT.

TENSION DEVICE.

Application filed November 28, 1924. Serial No. 752,564.

To all whom it may concern:

Be it known that I, AZEL C. HOUGH, a citizen of the United States of America, and a resident of Janesville, in the county of Rock and State of Wisconsin, have invented a new and useful Tension Device, of which the following is a specification.

My invention relates to improvements in devices designed to be attached to looms for the purpose of putting a tension on the warp, and consists generally of a body which is adapted to be mounted on a supporting member of a loom, and to be adjusted lengthwise thereof, or crosswise of the loom, said body having therethrough a passageway for the warp, retarding means to bear on said warp while being drawn through said passageway, said means being so constructed that it prevents the warp from "climbing" the sides of said passageway, fixed friction or tension members to divert the warp from a straight or direct course, and thus to impart to said warp or to place thereon tension which is governed or regulated by the drag imparted to the warp by said retarding means, such fixed tension members preferably being supported between arms that extend from said body, suitable supporting means for the spools, rolls, or coils of warp, which latter supporting means may consist of additional arms extending from said body and having journaled therein a shaft or spindle upon which said spools, rolls, or coils are mounted, and braking means for said spools, rolls, or coils, together with such other parts and members as may be necessary or desirable in order to render the device complete and serviceable in every respect, all as hereinafter set forth.

This tension device is especially adapted for application to a loom for weaving wood-slat shades having warp units of tape, or other thin, flat material, such shades as those set forth in the application of Leroy J. Steffen, for U. S. Letters Patent on slat shades, filed July 19, 1924, Serial No. 726,935, inasmuch as such warp units are so relatively thin, and it is consequently necessary to place a strong, even, and uniform tension on them, during the weaving operation; otherwise the slat weft units would not be woven sufficiently close together, and the shade would not be light-proof. The primary object of my invention is, therefore, to produce comparatively simple, both in construction and operation, and inexpensive, yet strong, durable, and highly efficient, means for applying a firm, even, and uniform tension to weft units of thin, flat material, such as tape, during the weaving operation.

The required friction might be secured by applying to the retarding, presser members force sufficient to hold back the warp to any extent required, or, in other words, to apply to the warp, which is thin and flat, the required amount of tension during the weaving operation, but if this were done there would be not only a pronounced tendency but a strong liability to abrade, wear, or otherwise injure said warp. To avoid doing this the warp is carried or caused to pass through a more or less tortuous course in contact with a plurality of fixed members, on the way from the warp roll or coil to the harness of the loom. The presser parts merely produce whatever tension or drag is required to keep the warp in close contact with the fixed tension members, while by far the greater proportion of the tension imparted to said warp is produced by the frictional contact of the same with said fixed tension members. Hence another object of my invention is to combine a resilient or yielding, pressure and friction or contact tension with a sole friction or contact tension, whereby the latter becomes the greater and is of a character which in no way can injure the warp, the former does not act on the warp in a manner to injure the same.

A further object is to provide a device of this character which can be moved or adjusted from one side of the loom to the other, or to any intermediate point, without removing the warp from said device. This is of great importance, because it would be impracticable to remove the warp from the tension device each time the position of said device was changed to accommodate it to a shade to be woven of a different width, or to a new location of the warp units to such shade.

Still further objects are to "brake" the warp units as they are drawn off of their rolls or coils, to hold the latter in check and to prevent them from rotating faster than is necessary, or faster than they are naturally and normally rotated by said warp units as the same are drawn off of said rolls or coils, and this regardless of the size of the rolls

or coils, or of the variation of their sizes; and to prevent the warp units from "climbing" the sides of the guide-ways through which they pass under tension from presser members, or, in other words, to afford means for overcoming the tendency on the part of the warp units to work up between said sides and the sides of said presser members, a tendency which is always present and would be fatal to the successful operation of the device were it not for such means. The brake or drag on the rolls or coils also overcomes the tendency or removes the liability which the warp units would have, in the absence of such brake or drag, to ride up the sides of the guide-ways after leaving said rolls or coils, in the event the latter rotated too fast.

Other objects and advantages will appear in the course of the following description.

I attain the objects and secure the advantages of my invention by the means illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a tension device which embodies a practical form of my invention, showing in connection with the same in outline the parts of a loom with which said device is most closely and intimately associated; Fig. 2, a greatly enlarged top plan of the guide-way element and the presser-feet for the warp units; Fig. 3, an enlarged top plan of said tension device; Fig. 4, an enlarged side elevation of the device; Fig. 5, an enlarged, central, longitudinal, vertical section through the device, and, Fig. 6, an enlarged end elevation of the same, the warp units and the supporting arms for the warp coils being in section.

Similar reference characters designate similar parts throughout the several views.

There are shown in the several views warp rolls or coils 1 and 2, warp units or tapes 3 and 4, and an angle-iron 5, while in Fig. 1 are represented a plurality of weft units or slats 6 after they have been interwoven with the tapes. The following parts of a loom for weaving slat shades are represented in outline in Fig. 1: A harness, at 7, which is actuated by means of pitmans (not shown), a race way, at 8, where the slats 6 are introduced into the shed formed by said harness, a beater-up device, at 9, actuated by a cam 10, and take-up rolls, at 11, which are actuated by ratchet mechanism (not shown). These loom elements operate in the usual and well-known manner. The angle-iron 5 extends across the loom behind the harness 7, and is attached in any suitable manner to the frame (not shown) of the loom. My tension device is mounted on the horizontal part of the angle-iron 5, and will now be described.

The tension device comprises a body mounted on the horizontal part of the angle-iron 5, and through which the warp units or tapes 3 and 4 pass, presser-feet 12 and 13 arranged to bear on said tapes as they pass through said body, a warp-roll shaft 14, brake or drag bars 43 for the warp rolls or coils 1 and 2, and fixed tension-rods or -bars 15 and 16.

The aforesaid body is rectangular, and is longer transversely of the loom than longitudinally thereof, so that what constitutes the ends of said body are parallel with the sides of the loom. This body consists of a base 17 having integral side-pieces 18—18 adjacent to the ends of said base, and a cap-plate 19 mounted on said side-pieces and secured thereto by bolts 20—20. Rising from the cap-plate 19 are integral posts 21. The number of the presser-feet must agree with the member of the warp units, and there is a post 21 associated with each presser-foot, there being three of each of these elements in the present example.

The front and back edges of the base 17, these being the longitudinal edges thereof, incline from above downwardly and outwardly, and the horizontal part of the angle-iron 5 has an under-cut flange 22 in front, and is provided with an under-cut 23 behind, to receive and engage such inclined edges. A thumb-screw 24 is inserted in a vertical opening in the horizontal part in the angle-iron 5, near the back edge of such part, and is tapped into the bar 23 from below. Upon tightening the thumb-screw 24 the bar 23 is drawn downwardly into close engagement with the contiguous part of the base 17, which is the rear inclined edge portion thereof, and forces said base against the flange 22 and onto the angle-iron 5 below, thus securely holding said base against endwise movement. To facilitate the clamping of the base 17 in place, by means of the bar 23 and the thumb-screw 24, said bar is recessed underneath, as represented at 25. Upon loosening the thumb-screw 24, the base 17 and all other parts of the tension device may be moved in either direction laterally of the loom. After such adjustment the thumb-screw 24 is again tightened. This adjustment is necessary in order to enable the tapes 3 and 4 to be located at the required places in the shade.

In passing, it should be noted that one of these tension devices is required for each group of warp units in the shade, consequently there may be two, three, or more tension devices mounted on the angle-iron 5, according to the number of such groups, and each of these tension devices is held against movement laterally of the loom by means of the bar 23 and one of the thumb-screws (24). If a single thumb-screw 24 for each tension device be not sufficient, two or more may be employed.

The shaft 14, upon which is mounted the

warp coils 1 and 2, is journaled in bearings 26—26 at the rear ends of arms 27—27 which project rearwardly from the body of the tension device, and the tension bars 15 and 16 are supported by arms 28—28 which project forwardly from said body. It will be clearly apparent, therefore, that the tension device can be moved from one side of the loom to the other, without removing the tapes themselves from the tension device. Each arm 27 has its forward end secured by means of two screws 29 against the outer face of one of the side-pieces 18.

The warp units may be wound on a single paper tube which is mounted on the shaft 14, or said units may be wound on individual spools, as 30, which are mounted on said shaft. The shaft 14 may have at one end a head 31 and be provided at the other end with a split-pin 32 to retain said shaft in place in the bearings 26 and enable said shaft to be withdrawn and replaced at will. Upon removing the split-pin 32, the shaft 14 may be withdrawn from the bearings 26 and the spools 30. To mount the spools 30 with their warp coils 1 and 2 on the shaft 14, such spools are placed between the bearings 26, after removing said shaft, and then the latter is thrust through the bearings and spools and secured with the split-pin 32. The middle tape 4 is wider than either of the other tapes, consequently the coil of the former is longer than either of the other coils, and the spool for this wider coil is longer than either of the other spools.

In the present example the middle tape 4 is equal in width to the combined widths of the outer tapes 3. These proportions are necessary, when the group of warp units consists of three, in order that the amount of pressure produced by the warp units or tapes 3 and 4 on both sides of each weft unit or slat 6 shall be equal. In other words, the wide tape 4 on one side of a slat 6, being equal to the combined widths of the narrow tapes 3 the other side of said slat, engages the same amount of area as do the narrow tapes, and vice versa. It is thus possible and practicable to produce a flat and smooth fabric or shade; and it is for this purpose or to this end that the widths of the warp and warp rolls or coils, and the widths of certain parts and members of the tension device, vary. Obviously, the warp groupings might be changed in number and widths of tapes, and in such event it would be necessary to make corresponding changes in the tension device, but such changes would in no way effect the general character of the invention.

For the purpose of preventing the coils 1 and 2, which are loosely mounted on the shaft 14, from rotating faster than they are actuated by the warp units 3 and 4 as drawn off from said coils, the brake or drag bars 43 are provided, one for each coil. These bars are loosely mounted at their front ends on a horizontal rod 44 that is carried by upwardly and rearwardly extending bearing lugs 45—45 on the arms 27. Normally the bars 43 rest or bear, adjacent to their rear ends, on the coils 1 and 2, and thus tend to retard the rotary motion of said coils. The coils 1 and 2 may, however, be rotated, as the tapes 3 and 4 are drawn therefrom, and by the pull of said tapes thereon. There is, therefore, no looseness or slackness in the tapes 3 and 4 between the coils and the presser-feet 12 and 13, hence said tapes do not creep or work up the sides of the passageways provided for them on their way to said presser-feet.

The drag bars 43 are swung on the rod 44 into positions forward of said rod and there left, during the time the warp coils are being placed in position in the device. When the warp coils are in place the bars 43 are swung rearwardly again and permitted to rest on said coils. The drag bars bear and exert their force on the coils regardless of the size of the same.

Spacers 46 are arranged on the rod 44 between the lugs 45 and the bars 43 to retain the latter in proper spaced relationship. In this example the end spacers are shorter than the intermediate spacers.

The drag bars 43 may all be of the same individual width, or their widths may vary.

A flooring 33 is placed on the base 17 between the sidepieces 18, and there secured by screws 42—42. The flooring 33 is divided by upstanding flanges 34—34 at the end edges and intermediate ribs 35—35 into three channels, each of the outer of said channels being of approximately the same width as one of the tapes 3, and the inner channel being of approximately the same width as the tape 4, and said tapes are passed through said channels, and are guided by the sides thereof. The two presser-feet 12 are in the narrower, outside channels and bear on the tapes 3 in said channels, while the presser-foot 13 is in the middle channel and bears on the tape 4 in said last-named channel. The presser-feet 12 and 13 force the tapes 3 and 4 against the flooring 33, and exert a certain amount of tension thereon, which tension may be varied in the manner hereinafter set forth. The presser-feet exert a drag on the tapes, and by so doing cause the same frictionally to engage the tension-bars 15 and 16, and to govern or regulate the amount of such friction or resulting tension.

In order to prevent the warp units or tapes 3 and 4 from riding up the sides of the channels formed by the flanges 34 and the ribs 35 with flooring 33, and from being drawn and becoming caught between said flanges and ribs and the presser-feet 12 and

13, each presser-foot (12 and 13) is provided at its rear end with laterally extending lugs 47—47, and there is a slot 48 either in one of said flanges or in one of said ribs to receive therein each of said lugs—see Figs. 2 and 5. The lugs 47 with which the presser-feet are provided, extending as they do into oppositely-disposed slots 48 in the channel-forming flanges and ribs 34 and 35, absolutely prevent the tapes being drawn through the channels beneath said presser-feet from climbing the sides of said channels. The slots 48 open through the tops of the flanges 34 and ribs 35, and thus enable the lugs 47 to be raised in or taken out of said flanges and ribs, when the presser-feet are raised or removed for any purpose from the channels, but there is not enough clearance between said lugs and the sides of said slots to permit any part of the tapes to enter therebetween. This is a very important feature, because, in the absence of the same, it would be practically impossible to draw the tapes through the channels beneath the presser-feet, without said tapes riding up on the sides of the channels and thereby interfering with and interrupting the movement of the same through the device. It will be observed that the lugs 47 are at the rear ends of the presser-feet 12 and 13, and so are in position to prevent the tapes from making even an initial false or upward movement.

The presser-foot 13 has a stem 36 rising from the center thereof. One of the posts 21 is located directly above the center of the presser-foot 13, and said post has therein a vertical passage 37 which extends through the same and down through the cap-plate 19 to receive the stem 36. The sides of the passage 37 at the upper terminal thereof are screw-threaded to receive a thumb-screw 38, and a spring 39 and a disc 40 are interposed between the top of the stem 36 and the inner end of said thumb-screw, said disc being between said spring and the thumb-screw. The spring 39 tends constantly to force the stem 36 with the presser-foot 13 downwardly, and the amount of such pressure, or of the force exerted by said spring, may be increased by turning the thumb-screw 38 inwardly, and decreased by turning said thumb-screw outwardly. The other two posts 21 are located on and adjacent to the rear longitudinal edge of the cap-plate 19, while the first post 21 is located adjacent to the front longitudinal edge of said cap-plate. Each of the presser-feet 12 has a stem 36 which rises therefrom and extends through the cap-plate into one of the rear posts. The two rear posts are equipped with springs, thumb-screws, and discs, which correspond with the springs 39, thumb-screw 38, and disc 40 in the front post 21. All of the posts 21 might be arranged side by side, or the single post might be arranged rearwardly relative to the other two, but the present arrangement, whereby the drag on the wide tape is located a little in advance of the drag on each of the narrow tapes, is very satisfactory.

The arms 28 extend forwardly from the front ends of the side pieces 18, and said arms have on their outer faces horizontal webs 41 which extend along the outer faces of said side-pieces, such webs being merely for the purpose of strengthening the other parts of said arms. The arms 28 at their forward ends are enlarged or widened sufficiently to receive between them and properly support the tension-bars 15 and 16, which bars are rigidly secured in any suitable manner or by any suitable means to said arms.

The two tension-bars 15 are of the same size, and they are located with their peripheries at the top approximately tangent to or in the same plane with the top of the flooring 33, or with those portions of said flooring that are between the flanges 34 and ribs 35, and each of said tension-bars is smaller than the tension-bar 16. The tension-bar 16 is below the plane which is tangent to the peripheries of the tension-bars 15 at the bottom, has a diameter which is greater than the distance between the smaller tension-bars, and is located so as to extend farther beneath the front friction-bar 15 than it does beneath the rear friction-bar 15, although said friction-bar 16 does project a little beneath said rear friction-bar. The tapes 3 and 4 pass over the rear friction-bar 15 and downwardly to the friction-bar 16, under the latter and upwardly to the front friction-bar 15, and over said last-named friction-bar to the harness 7.

It is now clear that, if pressure be exerted on the tapes 3 and 4, by such means as the presser-feet 12 and 13, and said tapes be drawn forwardly, they will have imparted thereto by the frictional resistance offered by the tension-bars 15 and 16 to such tapes in such movement a tension which is strong, even, and regular.

In practice, after the warp coils 1 and 2 have been placed in position, the warp units 3 and 4 therefrom are led forwardly, over the flooring 33 and beneath the presser-feet 12 and 13, to the rear tension-bar 15 and over the same down to and under the tension-bar 16, up to and over the front tension-bar 15, to the harness 7, and on to the take-up rolls 11; and the spring 39 in each of the posts 21 is adjusted by means of the associated thumb-screw 38, if necessary, to increase or decrease the amount of pressure exerted by the presser-foot below on the tape engaged by said presser-foot. Then, when the loom is set in motion and as the weaving operation continues, the tapes 3 and 4 are drawn off of their coils under the tension necessary properly to interweave with

them the slats 6, and this without injuring said tapes by any part of the tension device.

It is conceivable that the group of tension-bars might be inverted without perhaps changing the effect produced by said tension-bars on the warp, and it is very evident that more than three tensions-bars might be used, and it is possible two might be sufficient in some cases. Furthermore, the size of the tension-bars individually and relatively may be changed, and their shape also provided they present curved or arcuate surfaces for the tapes to run on or pass over. Preferably the tension-bars are cylindrical as shown. The essential thing for which the tension-bars are provided is to divert the warp from a straight course in such a manner that, when a drag is placed on said warp behind said tension-bars, the later afford the required amount of frictional resistance to the forward movement of the warp.

More or less change in the shape, size, construction, and arrangement of some or all of the parts and members of this device, in addition to those hereinbefore specifically pointed out, may be made without departing from the spirit of my invention or exceeding the scope of what is claimed.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with a fixed support of a loom, said support being undercut and provided with a bar, and tightening means for said bar, of a tension device consisting in part of a base which is mounted on said support and adapted to be held stationary thereon by said bar and tightening means, and to be released for adjustment on said support, said device being provided with retarding means for warp, and with friction tension means for said warp after it leaves said retarding means.

2. The combination, with a fixed support of a loom, said support being undercut and provided with a bar, and tightening means for said bar, of a tension device consisting in part of a base which is mounted on said support and adapted to be held stationary thereon by said bar and tightening means, and to be released for adjustment on said support, said device being provided with carrying means for a warp roll, retarding means for the warp from said roll, and friction tension means for said warp after it leaves said first-named means.

3. In a tension device, of the class described, a body having a passageway therethrough closed on four sides and provided with channel-forming members, for warp units passing side by side, and individual presser-feet in said passageway to bear on said warp units.

4. A tension device, of the class described, comprising a body having a passageway therethrough for warp units of different widths, presser-feet in said passageway for said warp units, said presser-feet in width corresponding with the warp units, and the presser-foot for a wider warp unit being in advance of the presser-foot for a narrower warp unit, and tension-bars supported from said body and arranged to cause said warp units, after leaving said presser-feet, to pass in a tortuous course in contact with said tension-bars.

5. In a tension device, of the class described, a body consisting of a base having side-pieces, and a cap-plate secured on said side-pieces, whereby is formed through said body a passageway closed on four sides, said cap-plate being provided with hollow posts which open through the cap-plate into said passageway, presser-feet in said passageway, said presser-feet having stems which extend upwardly into said posts, and springs for said stems and tension-regulating means for said springs in said posts.

6. In a tension device, of the class described, a body consisting of a base having side-pieces, and a cap-plate secured on said side-pieces, whereby a passageway is formed through said body, said cap-piece having posts on top thereof, which posts are hollow and open into said passageway, a flooring on the bottom of said passageway, said flooring having upstanding parts which assist in forming channels, presser-feet in such channels, said presser-feet having stems which extend through said cap-plate into said posts, springs in said posts above said stems, and means in said posts above said springs to regulate the tension thereof.

7. The combination in a tension device of the class described, with means to impart a drag to warp of thin material, of three non-rotary tension-bars, adapted to have said warp pass in contact with all of them, after said warp leaves said drag-imparting means, two of said tension-bars being arranged in approximately the same horizontal plane, and separated by a distance less than the diameter of the third tension-bar, and said third tension-bar being so located that the warp in passing between the same and one of the other tension-bars takes an oblique course.

8. The combination in a tension device of the class described, with means to impart a drag to warp of thin material, of three non-rotary tension-bars adapted to have said warp pass in contact with all of them, after said warp leaves said drag-imparting means, two of said tension-bars being arranged in approximately the same horizontal plane, and separated by a distance less than the diameter of the third tension-bar, and the latter being so located, relative to said first-named tension-bars, that the warp, in passing to said third tension-bar from one of the first-named tension-bars and thence to

the other of said first-named tension-bars, takes an oblique direction in each instance.

9. The combination, in a tension device of the class described, with means to impart a drag to warp of thin material, of three non-rotary tension-bars adapted to have said warp pass in contact with all of them, after said warp leaves said drag-imparting means, two of said tension-bars being arranged in approximately the same horizontal plane, separated by a distance less than the diameter of the third tension-bar, and each smaller in diameter than the third, and the latter being so located that the warp, in passing between the same and another of said tension-bars, takes an oblique course.

10. A tension device, of the class described, comprising a body having a passageway therethrough for warp, said passageway having sides which said warp must be prevented from climbing, a presser-foot arranged to bear on said warp in said passageway, and means to prevent the warp moving through said passageway beneath said presser-foot from climbing either of said sides.

11. A tension device, of the class described, comprising a body having a passageway therethrough for warp, said passageway having sides which said warp must be prevented from climbing, a presser-foot arranged to bear on said warp in said passageway, means to prevent the warp passing through said passageway beneath said presser foot from climbing either of said sides and tension-bars supported from said body and arranged to cause said warp, after being drawn through said passageway beneath said presser-foot, to pass in a tortuous course in contact with said tension-bars.

12. A tension device, of the class described, comprising a body having a passageway therethrough with upstanding parts on the bottom to form a channel for the passage of warp, such upstanding parts having slots therein, and a presser-foot in such channel, said presser-foot being provided with lugs which extend into said slots.

13. A tension device, of the class described, comprising a body having a passageway therethrough with upstanding parts on the bottom of such passageway to form a channel for the warp, such parts having slots therein, a presser-foot in such channel, said presser-foot being provided with lugs which extend into said slots, and tension bars supported from said body and arranged to cause said warp, after being drawn through said channel beneath said presser-foot, to pass in a tortuous course in contact with said tension bars.

14. A tension device, of the class described, comprising a body having a passageway therethrough, a flooring on the bottom of said passageway, said flooring having upstanding parts to form channels for the passage therethrough of warp units, which upstanding parts are slotted, and presser-feet in said channels, said presser-feet being provided with projections which extend into said slots.

15. A tension device, of the class described, comprising a body having a passageway therethrough, a flooring on the bottom of said passageway, said flooring having upstanding parts to form channels for the passage therethrough of warp units, which upstanding parts are slotted, presser-feet in such channels, said presser-feet being provided with projections which extend into said slots, and tension-bars supported from said body and arranged to cause said warp units, after being drawn through said channels beneath said presser-feet, to pass in a tortuous course in contact with said tension-bars.

16. In a tension device, of the class described, a body having a passageway therethrough for warp, said passageway having sides which said warp must be prevented from climbing, a presser member in said passageway to bear on the warp therein, and means to prevent the warp in said passageway from climbing either side thereof.

17. In a tension device, of the class described, a body having a passageway therethrough for warp, a presser-foot arranged to bear on the warp in said passageway, said presser-foot having parts which extend beyond the sides of said passageway to prevent the warp from climbing such sides.

18. In a tension device, of the class described, a body having a channel-forming member with slotted sides therein, and a presser-foot adapted to bear on warp in the channel, and provided with projecting parts which extend into said slots.

19. In a tension device, of the class described, a supporting and guiding member for warp, said member having sides which said warp must be prevented from climbing, and a presser member for the warp passing in contact with said first-named member, and between said sides, said second-named member being supported from above, and having parts the free ends of which extend beyond the edges of said warp.

20. In a tension device, of the class described, a channel-forming member having recessed sides, and a presser member adapted to bear on warp in the channel, said presser member having parts that extend into the side recesses.

AZEL C. HOUGH.

Witnesses:
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HAZEL T. WEIRICH.