April 5, 1932. E. R. HOLMES 1,852,081

SHUTTLE FOR NARROW WARE LOOMS

Filed Feb. 5, 1930

FIG. 1

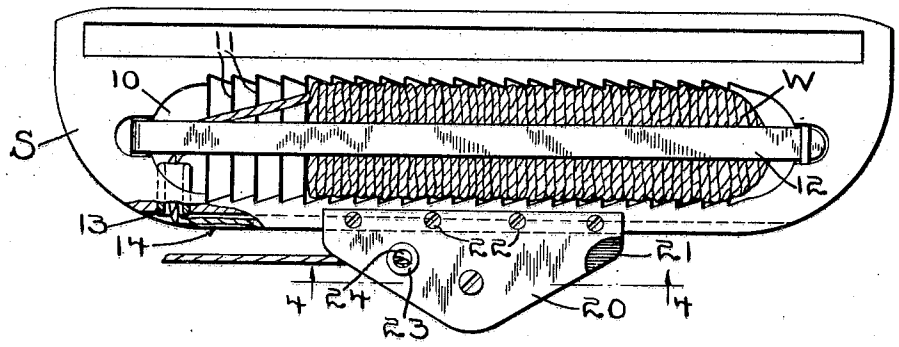


FIG. 2

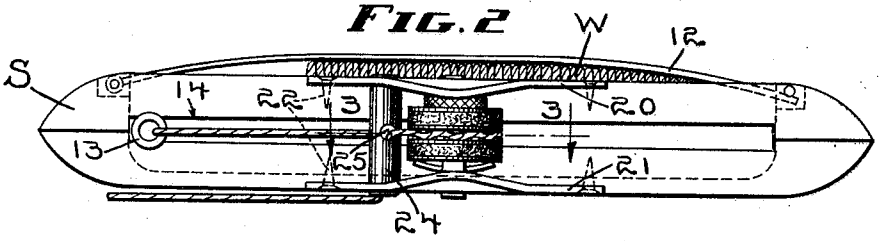


FIG. 3

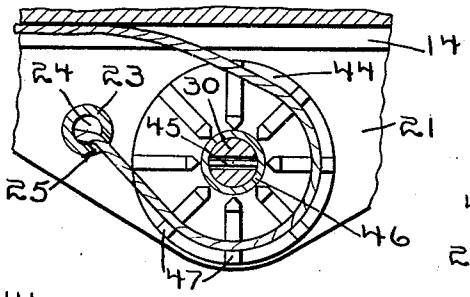
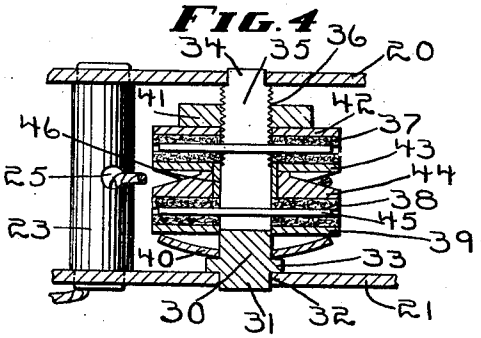


FIG. 4



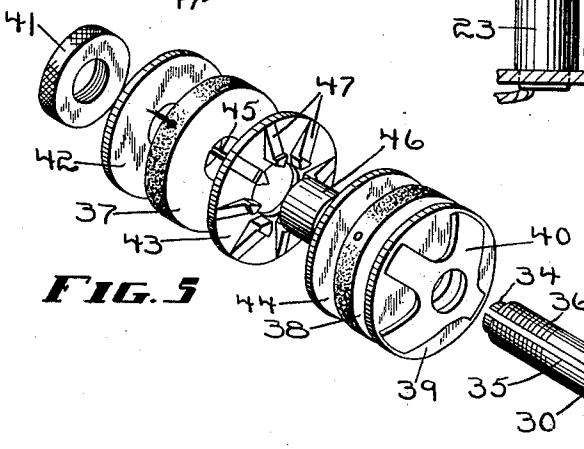


FIG. 5

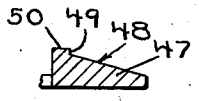


FIG. 6

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SHUTTLE FOR NARROW WARE LOOMS

Application filed February 5, 1930. Serial No. 426,129.

This invention relates to improvements in shuttles for narrow ware looms and it is the general object of the invention to provide a shuttle tension which will resist movement of the yarn without requiring the latter to slide over the resisting medium.

In the weaving of brake bands and similar material the yarn employed ordinarily is made largely of asbestos, threads of this material being wrapped around several strands of fine copper or brass wire. When manipulated in the dry state asbestos breaks up into flakes weakening the yarn and causing dust. To avoid this the yarn is moistened so that as the warp threads are crossed due to the action of the harnesses there is a minimum of abrading action. Likewise the filling or weft is moistened so that at the time of beat-up the reed will waste as little of the material of the yarn as possible. It is found further that any tensioning means employed in a shuttle to stress the asbestos yarn will wear out very quickly, the rate of wearing being increased by the fact that the asbestos is moist. It is an important object of my present invention to provide a yarn tension for shuttles wherein the surfaces which actually resist motion of the yarn shall be removed from and out of contact with the latter, the yarn being trained over surfaces which rotate at substantially the same rate at which the yarn is fed from the shuttle during the weaving operation. In this way the surfaces which do engage the yarn move with it so that wearing is reduced to a minimum.

It is a further object of my invention to provide ready means for renewing the various elements of the friction device, the rotating parts being supported on a plate which is removable so that the yarn resisting parts may be taken away from the shuttle and renewed when necessary.

With these and other objects in view 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 set forth,

Fig. 1 is a top plan view of a shuttle made according to my present invention,

Fig. 2 is a front elevation of the shuttle shown in Fig. 1,

Fig. 3 is an enlarged horizontal section taken on line 3—3 of Fig. 2,

Fig. 4 is an enlarged vertical section taken on line 4—4 of Fig. 1,

Fig. 5 is a perspective view showing the various elements of the tension as they appear prior to assembly, and

Fig. 6 is a detail radial enlarged section of one of the friction plates through one of the lugs or teeth similar to a part of Fig. 4.

Referring to Figs. 1 and 2 I have shown a shuttle S having a weft chamber 10 which may be formed with corrugations or ribs 11 to hold the wound mass or cop of weft W. A retaining band 12 may extend over the chamber to confine the weft. One end of the shuttle is provided with the delivery eye 13 connecting the chamber 10 with an exterior groove 14. The weft travels along the latter to be acted upon by the resistance of the tension forming the subject matter of my present invention. The shuttle itself forms no part of my present invention and may be constructed in any approved manner.

In carrying my improvements into effect I provide upper and lower plates 20 and 21 which are removably secured to the body of the shuttle by means of screws 22. Extending between the plates is a delivery tube 23 having a bore 24 extending in a direction perpendicular to the planes of the plates. An eye 25 shown more particularly in Figs. 3 and 4 passes through the tube and communicates with the bore 24. It is possible to take the yarn from the tube adjacent either the upper or the lower plate, as desired.

Extending between the plates is a bearing stud 30 having a square end 31 which fits into a square hole 32 in the lower plate 21. The stud has a shoulder 33 to engage plate 21 and limit downward motion thereof. The other end of the stud may be round as at 34 and extend into the upper plate 20. A longitudinal radial slot 35 extends through a considerable length of the stud and the upper end of the latter is threaded as at 36 in Fig. 4.

Mounted on the stud are upper and lower fritcion pads 37 and 38, respectively, the lower pad resting on a washer 39 which receives the thrust of a concave leaf spring 40 through which the stud passes. The spring engages a shoulder and its degree of stress may be determined by a knurled nut 41 bearing against a washer 42 which rests against the upper friction pad 37. The pads are held in position by means of pins 45 which pass through the slot 35.

Between the friction pads I place a pair of disks or plates, the upper disk 43 having a substantially flat top surface to engage the pad 37, and the lower disk 44 having a similar flat surface to engage the pad 38. As shown particularly in Figs. 3, 4 and 5 the plates or disks are mounted on and secured to a tube 46 so that said disks and tube may be considered as a unit freely rotatable upon the stud. The adjacent faces of the disks are provided with lugs or teeth 47 having surfaces 48 inclined slightly with respect to the horizontal adjacent face of the disk, or the axis of the stud. As shown in Fig. 6 the inclined surface may terminate in a slight shoulder 49 having an abutting surface 50 radial with respect to the stud. The distance between adjacent teeth or lugs 47 is equal to the width of the shoulder 50, and when the parts are assembled as shown in Fig. 4 the corrugations of one disk will be staggered with respect to and lie between the lugs of the other disk. Fig. 4 suggests that the inclined surfaces 48 of the disks form V-shaped notches for the weft. When the parts are assembled as shown in Figs. 2 and 4 the weft which lies in the groove 14 will be passed between the disks into the V-shaped notches and through the eye 25 being led either upwardly or downwardly through the bore 29, as desired.

During the weaving operation the weft will be drawn through the eye 23 and by engagement with the lugs or teeth 47 will cause rotation of the disks 43 and 44 against the action of the friction pads 37 and 38. The feeding of the yarn, however, causes very little relative sliding motion of the weft over the inclined surfaces 48, and as a result wearing of these surfaces is slow.

If it be desired to renew any of the parts of the mechanism the upper plate 20 can be removed and the nut 41 unscrewed so that the disks, and friction pads or the washers may be replaced. During the removal of the pads the pins 45 will slide through the slot 35 and no matter what the longitudinal position of these pins along the stud 30 they and the friction pads will always be held against angular movement relatively to the stud.

From the foregoing it will be seen that I have provided a simple form of shuttle tension to resist feeding of weft in such a way as to reduce to a minimum relative movement between the weft and the surfaces in direct engagement therewith by permitting said surfaces to rotate against the action of friction elements which are out of contact with the weft. It will further be seen that the disks are provided with lugs or teeth which serve the purpose of forming V-shaped notches into which the weft is crowded. It will also be seen that the tube 23 is so disposed that the weft may be delivered through either the top or the bottom of the shuttle, but the receiving eye 25 retains its relation with the disks. Also, it will be seen that adjustment of the tension may be varied by changing the position of the nut 41 and that by removal of the latter and the top plate 20 the parts may be taken apart for purposes of repair or renewal.

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 weft tension for shuttles having a mass of weft, a support fixed to the shuttle, a pair of plates rotatable about the support and movable therealong, means on said plates defining notches to receive the weft, and friction pads mounted on and movable along the support into engagement with the plates, said pads being spaced from the notch forming means and out of contact with the weft, said notch forming means establishing positive driving connections between the plates and causing the plates to rotate in unison against the action of the friction pads as the weft moves between said plates.

2. In a weft tension for shuttles having a mass of weft, a support fixed to the shuttle, a unitary weft engaging member movable about the axis of the support and having V-shaped notches in which the weft lies, said member having a plurality of yarn engaging surfaces spaced angularly about the axis of the support and each of said surfaces extending beyond the adjacent surfaces in the direction of said axis, friction pads movable along the axis to have engagement with the member to resist movement thereof about the axis of the support, said pads being spaced from the V-shaped notches and out of contact with the weft, the member rotating with the weft as

the latter moves about the axis of the support so that relative motion between the weft and that part of the member engaging the weft is substantially absent.

3. In a weft tension for shuttles having a mass of weft, a support fixed to the shuttle, a pair of friction plates mounted on the support and movable about the axis thereof, each plate having formed thereon a plurality of spaced elements having weft engaging surfaces which are oblique with respect to the axis of the support, the elements of one plate being staggered with respect to and lying between the elements of the other plate so as to define V-shaped notches for the weft, and means spaced from said elements and out of contact with the weft to resist rotation of the the plates around the axis of the support, the inclined surfaces in contact with the weft moving at substantially the same rate about the axis of the support as the weft in engagement with the plates.

4. In a weft tension for shuttles having a mass of weft, a support fixed to the shuttle, a pair of friction plates movable about the axis of the support, each plate having a plurality of spaced lugs having surfaces oblique with respect to the axis of the support, the lugs of one plate being staggered with respect to and lying between the lugs of the other plate to cause said plates to move together as a unit about the axis of the support, the oblique surfaces defining notches for the weft, and means to resist movement of the plates about the axis of the support, the weft by frictional contact with the lugs causing the latter to move at substantially the same rate as the weft.

5. In a weft tension for shuttles having a mass of weft, a support fixed with respect to the shuttle, a pair of plates rotatable about the axis of the support, a plurality of spaced lugs on each plate, each lug having a surface which is oblique with respect to the axis of the support and having also an abutting surface spaced from the body of the corresponding plate, the lugs of one plate being staggered with respect to and lying between the lugs of the other plate, the abutting surfaces of the lugs of one plate engaging the other plate to hold said plates in spaced relation, the oblique surfaces defining notches for the weft and causing said plates to move about the axis of the support as the weft is fed during the weaving operation, and means to resist rotation of the plates about the axis of the support.

6. In a weft tension for shuttles having a mass of weft, a stud fixed with respect to the shuttle and having a longitudinal radial slot therein, a weft engaging member to be rotated about the axis of the stud by the weft as the latter is fed during the weaving operation, said member being slidable along the stud, a friction pad to engage and resist motion of the member, and means fixed with respect to the friction pad extending through said slot, said pad being movable along the stud to vary the resistance offered to the member, and said means having operative contact with the sides of the slot in all longitudinal positions of the pad to resist relative angular movement between the pad and stud.

7. In a weft tension for shuttles having a mass of weft, a stud fixed with respect to the shuttle and having a longitudinally radial slot therein, a weft engaging friction member rotatable about and slidable along the stud and having provision for engaging the weft and moving with the latter during the weaving operation, a pair of friction pads slidable along the stud, one on each side of the member, means associated with each friction pad to extend through the slot, said pads movable longitudinally on the stud to vary the resistance offered to the motion of the member, and said means being in operative engagement with the slot for all longitudinal positions of the pads to prevent relative angular movement between the pads and the stud.

8. In a weft tension for shuttles having a mass of weft, a stud fixed with respect to the shuttle and having a longitudinal radial slot therein, a weft engaging member to be rotated about the axis of the stud by the weft as the latter is fed during the weaving operation, said member being slidable along the stud, a friction pad to engage and resist motion of the member and movable along the stud to vary the resistance offered to the member, means fixed with respect to the friction pad extending through said slot, said means having operative contact with the sides of the slot in all longitudinal positions of the pad along the stud to resist relative angular movement between the pad and stud, and an adjusting element threaded on the stud to vary the longitudinal position of the pad along the stud.

9. In a weft tension for shuttles having a mass of weft, a pair of supporting plates secured to the shuttle one of which is removable, a stud extending between and supported by the plates and held against rotation about the axis thereof by one of said plates, and friction means mounted on the stud to engage the weft as the latter is fed during the weaving operation, said removable plate when disconnected from the shuttle freeing one end of the stud, and the friction element being slidable along the stud so as to be removable from the latter while the other plate is secured to the shuttle.

10. In a weft tension for a shuttle having a mass of weft, a pair of geared weft engaging members which are driven by the weft as the same is unwound, and friction means operatively connected to the members and

out of contact with the weft to resist movement of the members.

11. In a weft tension for a shuttle having a mass of weft, a pair of interengaging weft tensioning members which are driven by the weft as the same is unwound, and friction means operatively connected to the members and out of contact with the weft to resist movement of the members.

In testimony whereof I have hereunto affixed my signature,

ELBRIDGE R. HOLMES.