Nov. 8, 1938. A. A. GOBEILLE, SR 2,136,077

CUSHIONING DEVICE

Filed Oct. 11, 1934

Fig. 1.

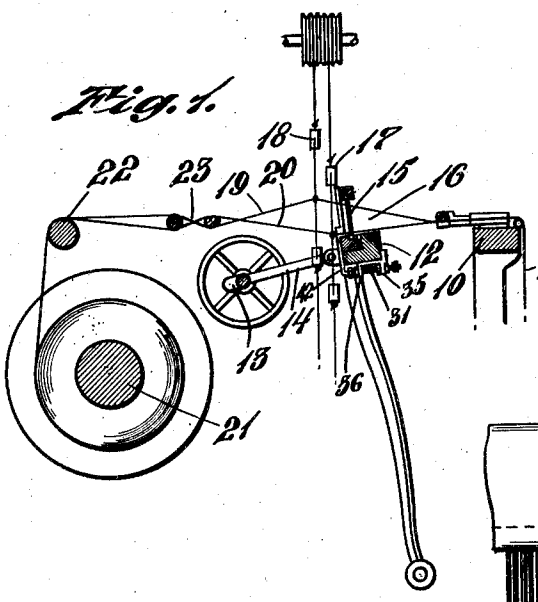


Fig. 2.

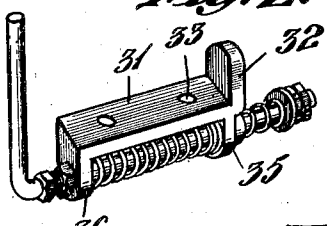


Fig. 3.

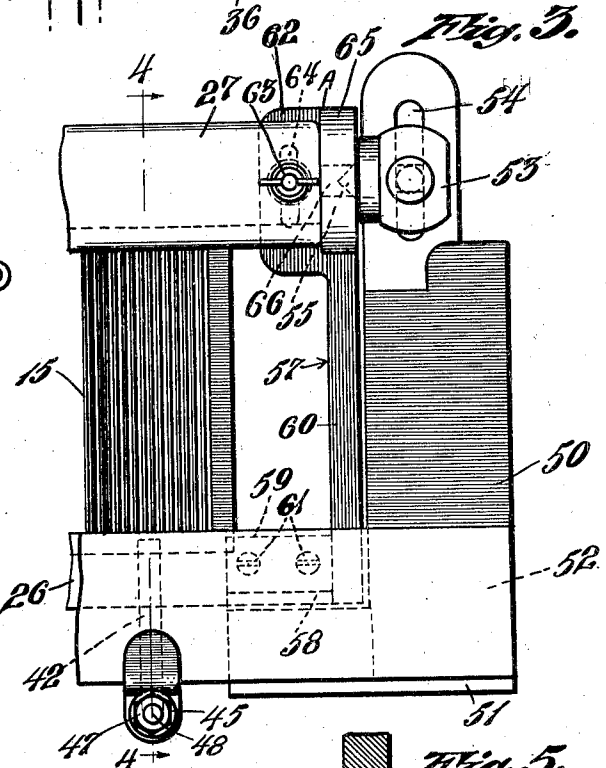


Fig. 4.

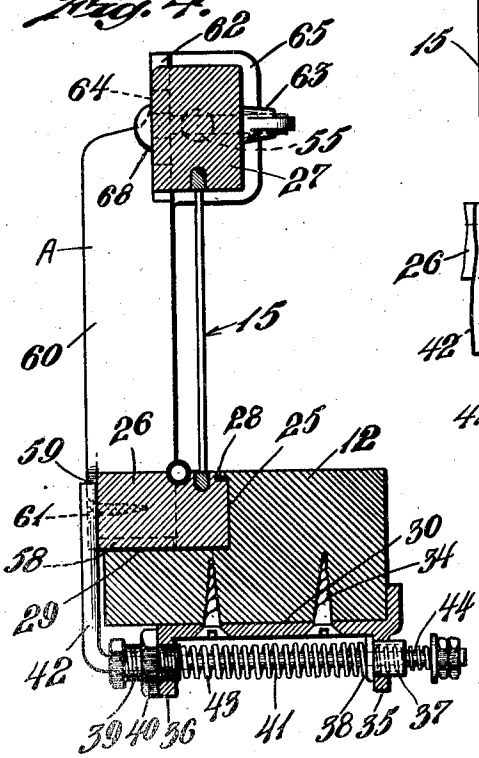
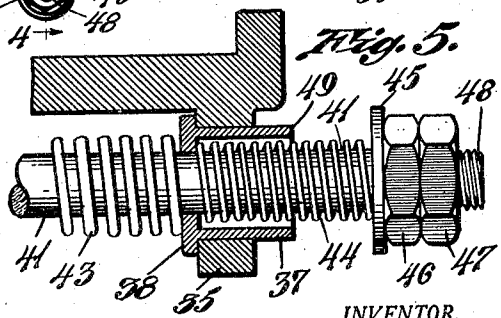


Fig. 5.



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CUSHIONING DEVICE

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Application October 11, 1934, Serial No. 747,852

28 Claims. (Cl. 139—188)

This invention relates to a cushioning device for use in connection with a loom reed; and has for one of its objects the provision of a comparatively soft yielding resistance followed by the usual stiffer resistance by means of which the lay moves the reed in its beat-up action.

Another object of the invention is the provision of a cushioning device which will replace the leaf springs which are used in connection with loom reeds as they exist at the present time.

Another object of the invention is the prosion of a composite spring so that on very light work one spring may be used or utilized for the cushioning effect whereas for heavier work the heavier spring may follow the lighter cushioning action and absorb the greater brunt of the thrust which is produced between the lay and the reed.

Another object of the invention is the provision of a tensioning means which will have the effect of producing a more even beat-up of a pick, whether the loom is operating by its mechanical power in an automatic manner or whether a pick is beaten up by turning the mechanism over by hand such as at the commencing of the operating of the loom so that should a break occur no line will occur across the fabric to show where the last pick and the next succeeding pick are placed at the time of starting the loom.

Another object of the invention is the provision of adjustment for each of two springs of a compound cushioning device so that nicety of control of the action of the cushioning device may be had.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompanying drawing:

Fig. 1 is a diagrammatic view illustrating the relation of the lay and the reed and the position of my cushioning means prominently shown on the lay.

Fig. 2 is a perspective view of my device.

Fig. 3 is a front elevation of a part of the lay and reed, showing my cushioning device in assembled position.

Fig. 4 is a sectional view on line 4—4 of Fig. 3.

Fig. 5 is an enlarged sectional view of a fragmental portion of the device, showing the relation of the two springs and the sleeve for transmitting movement to the larger spring.

In loom operation a movement of the reed with reference to the lay is provided for each time a pick is beaten up and a cushioning means is provided to soften such movement of the reed as it beats up the previously inserted pick and to return the reed to starting position. In practice, however, it frequently occurs that the loom setter so tensions the spring that practically no cushioning is had. Further, on very light material there is not sufficient body to the work to permit a cushioning means, which is heavy enough for heavy material, to properly operate and thus in such relation no cushioning effect is had. When this condition exists should a break occur in the weaving and after the loom is again set in operation, a line will occur across the fabric indicating where the last pick was inserted when the loom was running automatically and where the next pick is inserted upon again starting the loom. This is particularly true when a laid-in pick must be extracted and is due largely to a looseness in the crank and lack of centrifugal force throwing the crank to the same point when starting as it has just before the break and stop occurs. By the use of my cushioning device no such line occurs and further where very light fabrics are used a cushioning action is still provided; and I have accomplished these results by adding to the usual cushion, an auxiliary spring which is lighter and of less tension than the main spring and which will be absorbed or taken up prior to the main spring being actuated; and the following is a more detailed description of the present embodiment of this invention illustrating the preferred means by which these advantageous results may be accomplished:—

With reference to Fig. 1 of the drawing, 10 designates a breast beam over which the finished fabric 11 is drawn, 12 the lay which is swung by the crank 13 and crank arm 14 to move the lay with the reed 15 to beat up the previous pick placed in the shed 16 formed by the harnesses 17 and 18 which raise and lower the warps 19 and 20 drawn from the warp beam 21 across the guide 22 and thru the lease 23.

The head of the lay 12 is provided with an upstanding post 50 having an L-shaped foot portion 51 extending along the bottom of the lay and a portion 52 extending along the back of the lay to secure it firmly thereto. At the upper end of this post a pivot block 53 is adjustably mounted in a slot 54 with a cone projection 55 for pivotally mounting the reed. The reed 15 is mounted in the upper and lower mounting bars 27 and 26 grooved to receive the reed. A bracket 57 is provided with an L-shaped foot having a portion 58 set into the lower surface of the bar

26 and a portion 59 extending along the back thereof while the upstanding portion 60 is at the end thereof. The bracket is secured in place on the lower mounting bars by screws 61. At the upper end the bracket is provided with an enlarged surface 62 to which the upper mounting bar 27 is secured by a thumb nut 63 in bolt 68 extending thru a slot 64. This bracket is also provided with an ear 65 having an opening 66 to receive the cone pivot 55.

The lay 12 is cut out as at 25 so that the lower reed mounting bar 26 rests in this cut out portion 25 of the lay with a portion 28 overhanging the lower bar 26 which is permitted to move rearwardly over the surface 29 of the cut out 25 of the lay altho it is desired that a movement of the reed over this surface 29 take place under a controlled cushioning action at each beat of the pick.

In order to accomplish this controlled cushioning action I have mounted a plurality of units, usually four, such as are shown in perspective in Fig. 2 along the bottom surface 30 of the lay, these being suitably spaced across the lay and taking the place of the usual leaf spring which engages the reed in the usual construction of loom.

Each of these devices consists of a body 31 having a flange 32 at one end to engage the front edge of the lay 12 while it is provided with holes 33 for the reception of screws 34 to hold this body snugly against the bottom surface 30 of the lay and in fixed position thereon. Two lugs 35 and 36 extend downwardly from the body 31 and are provided with openings extending axially in line with each other. In the lug 35 I have provided a slidable sleeve 37 having a flange 38 to engage the inner surface of the lug 35 to limit its movement in one direction altho the sleeve may be slidable in the opening in the lug in the opposite direction. In the lug 36 I have provided a threaded sleeve 39 which is threaded thru the lug 36 to a suitable extent to tension the spring to be described, and there locked in position by a check nut 40, which by reason of its threading up against the outer surface of the lug 36 locks the threaded sleeve 39 in a position which it is desired that the same will assume.

A rod 41 is slidable thru the sleeves 37 and 39 and is turned up into somewhat of an L-shape as at 42 so as to engage the lower bar 26 which mounts the reed 15. Encircling this rod 41 and abutting the flange 38 and the end of the threaded sleeve 39 there is a helical spring 43 while another helical spring 44 engages the opposite side of the flange 38, as best shown in Fig. 5, and encircles the end portion of the rod 41. This spring 44 is held under tension by engagement with a washer 45 which may be moved by means of a nut 46 and held in position by a check nut 47 to maintain the spring under desired tension. The action which is accomplished in the loom is as follows:—

As the lay swings to beat up an inserted pick and the reed encounters resistance it will swing or pivot 55 and move over the surface 29 moving the rod 41 thru the L-shaped portion 42, the rod 41 slides thru its sleeves 37 and 39 and causes the abutment washer 45 to compress the spring 44 which is of a comparatively light tension. This action occurs until the washer 45 abuts the end 49 of the sleeve 37 or when the spring is tightly compressed, whereupon further movement of the rod will then commence to compress the spring 43 by sliding the sleeve 37 thru the opening in lug 35. This spring is comparatively heavy and exerts a stronger tension and one sufficient to cause the pick to be properly beaten up according to preconceived adjustment. Altho the washer 45 may abut the lug 35 after the cushioning action is effected, it is intended that the throw will be only so far and the tension so adjusted that a direct and positive movement in this fashion shall occur, if at all, only to a slight extent. Adjustment of the heavy spring is had by movement of the sleeve 39 in the lug 36 while adjustment of the lighter spring is had by the nuts 46 and 47.

This arrangement of a light spring in conjunction with a heavy spring enables weaving of very light fabrics on the loom such as voiles in which weaving the light spring only will be brought into play in the beating of a pick and yet for heavier fabrics the action of the reed will be better controlled and a more even fabric will be obtained thru the operation of such units on the lay. Adjustments are readily and easily had by a loom fixer.

The foregoing description is directed solely towards the construction illustrated, but I desire it to be understood that I reserve the privilege of resorting to all the mechanical changes to which the device is susceptible, the invention being defined and limited only by the terms of the appended claims.

I claim:

1. In a loom, a lay, a reed mounted on said lay for movement therealong as it beats up a pick, a rod, rod engaging means movable with said reed to move upon movement of said reed on the lay and in turn move said rod, a plurality of springs for initially resisting the movement of said rod and reed, said springs being of different tensions, and means to cause action of the stronger tensioned spring after action of the weaker tensioned spring.

2. In a loom, a lay, a reed mounted on said lay for sliding movement therealong as it beats up a pick, a rod engaging means movable with said reed to move upon movement of said reed on the lay, a plurality of springs for initially resisting the movement of said rod, a member providing spaced bearings mounted on said lay, a sleeve slidable in one of said bearings, a rod slidable in said sleeve and other bearing and engaging the reed to move upon movement of the reed on the lay, a spring acting between said sleeve and other bearing and a weaker spring acting between the end of the rod and said sleeve whereby movement of the rod will first compress the weaker spring and then move the sleeve to compress the spring of greater tension.

3. In a loom, a lay, a reed mounted on said lay for sliding movement therealong as it beats up a pick, a rod engaging means movable with said reed to move upon movement of said reed on the lay, a plurality of springs for initially resisting the movement of said rod, a member providing spaced bearings mounted on said lay, a sleeve slidable in one of said bearings, a rod slidable in said sleeve and other bearing, an abutment on said rod to engage said sleeve, and a spring between said abutment and sleeve weaker than the first said spring to offer resistance to the initial movement of said rod.

4. In a loom, a lay, a reed mounted on said lay for sliding movement therealong as it beats up a pick, a rod engaging means movable with said reed to move upon movement of said reed on the lay, a plurality of springs for initially

resisting the movement of said rod, a member providing spaced bearings mounted on said lay, a sleeve slidable in one of said bearings, a rod slidable in said sleeve and other bearing, an abutment on said rod to engage said sleeve and a spring between said abutment and sleeve weaker than the first said spring to offer resistance to the initial movement of said rod, said abutment engaging said sleeve to compress the stronger spring.

5. In a loom, a lay, a reed movably mounted thereon, and means including a pair of springs of different tensions which are applied successively in two stages by one spring through the other to act upon the reed so as to offer resistance to movement of said reed on the lay as it beats up a pick of filling against the fell of cloth.

6. In a loom for weaving fabric, a lay, a reed movably mounted thereon, and means for cushioning the reaction of the reed to fabric resistance incident to beating up each pick, said means comprising a pair of springs of different tension capacities that act successively, the spring of lesser capacity first acting upon the reed, the other spring next acting to augment the action of said first spring to increase the elastic pressure upon the reed during its beating up movement.

7. In a loom through which passes a fabric structure comprising, in continuity, woven fabric and unwoven warp, the combination with the lay of a reed carried by said lay and movable with respect to the same, means to operatively move the lay and with it the reed to beat up against the woven fabric each pick of filling as laid, a plurality of springs acting upon the reed to hold it toward the woven fabric, means whereby said springs are brought successively into action upon recession of the reed upon encounter of the woven fabric by the newly laid pick, each succeeding spring augmenting the reed pressure upon the pick.

8. In a loom for fabricating cloth, a lay, a reed for beating up a filling movably mounted on said lay, and cushioning devices for resisting movement of the reed on the lay comprising springs arranged to act in sequence for supplying, in successive stages, increasing reaction to the resistance of the woven cloth as each pick is beaten into place in the fabrication of the cloth.

9. In a loom, a lay, a reed movably mounted on said lay, and means including a plurality of springs to cushion the effect of the reed when beating up a pick, said springs being of different tensions, arranged to act successively, the spring of lightest tension acting first upon the reed to be followed by the other springs in the order of their strength, to initiate the beat-up of the pick with the lightest pressure and by graduated stages of increased pressure to complete the beat up.

10. In a loom, the combination of a lay, reed, reed holder and means to pendulously mount the reed holder on the lay, means to limit the movement of the reed holder in one direction by the lay, of a member to press the reed holder toward the lay, and elastic means connected with said member and re-acting therethrough with initially moderate pressure that is abruptly stepped up in intensity as the reed approaches its limit of movement in beating up the pick.

11. In a loom, the combination of a lay, reed, reed holder and means to pendulously mount said reed holder on the lay, means to limit the movement of the reed holder in one direction, of a member to resist movement of the reed holder in the opposite direction, and elastic means connected with said member to effect such resistance and acting through said member with a pressure that initially is relatively light at the start of the beat up and stepped up to extreme intensity as the beat up action is completed.

12. In a loom, a lay, a reed movably mounted on said lay to yield while beating up a pick, a rod, rod engaging means movable with said reed upon movement of said reed on the lay, and a plurality of springs, the tensions of which are applied successively at the time of a single beat up of the pick to resist the yielding of the reed and the rod.

13. In a loom, a lay, a reed movably mounted thereon, and means including a plurality of resilient members of different tensions which are applied successively during the beat up action of the reed, succeeding members acting to intensify the action of preceding members in beating up the pick.

14. In a loom, a lay, a reed movably mounted thereon, and means comprising a pair of springs which are applied successively during the beating up of the pick to intensify the reed pressure from the time of encountering the pick to its final beat up.

15. In a loom, a lay, a reed movably mounted thereon, and means to elastically resist movement of the reed with respect to the lay, said means comprising two springs, one of light tension with respect to the other, the spring of light tension being limited in its extent of distortion and the heavier spring being brought into action through exhaustion of the distortion limit of the spring of light tension.

16. In a loom, its lay, a reed movably mounted thereon and means including a plurality of resilient members, each succeeding member automatically coming into action upon exhaustion of the action of the next preceding member, to build up the intensity of elastic resistance to movement of said reed.

17. In a loom, its lay, a reed movably mounted thereon, and means to build up the intensity of resistance of said reed to movement, said means including a plurality of resilient members acting successively, each succeeding member brought into action through exhaustion of the action of the next preceding member.

18. In a loom, a lay, a reed movably mounted thereon and means to resist, with increasing intensity, movement of said reed, said means comprising two springs of different degrees of tension, one succeeding the other in action, the succeeding spring being brought into action through exhaustion of the action of the preceding spring.

19. In a loom, a lay, a reed movably mounted thereon, and means including a plurality of resilient members of different tensions which are applied successively at the time of a single beat-up of the pick to resist movement of said reed.

20. In a loom, a lay, a reed movably mounted thereon, and means comprising a pair of springs of different tensions which are applied successively at the time of a single beat-up of the pick to offer resistance to the movement of said reed.

21. In a loom, a lay, a reed, and means including a rod slidably mounted on said lay and engaging means therefor movable with said reed, and a plurality of resilient means of different

tensions on the same axis which are applied successively for controlling the movement of said reed.

22. In a loom, a lay, a reed movably mounted thereon, and means comprising a pair of springs on the same axis of different tensions which are applied successively to resist movement of the reed on the lay, one spring resisting the initial movement thereon and further movement being resisted by an additional spring.

23. In a loom, a lay, a reed movably mounted thereon, cushioning means carried by said lay and connected to said reed so as to cushion the beating up action of the reed comprising a main cushioning spring and an auxiliary cushioning spring of less tension and coupled therewith, and means to cause the auxiliary spring to act prior to the action of the main cushioning spring for initially resisting the movement of said reed.

24. In a loom, a lay, a reed movably mounted thereon, and means including a composite spring having on the same axis a plurality of separate springs the tensions of which are applied successively at the time of a single beat-up of the pick to offer resistance to the movement of said reed.

25. In a loom, a lay, a reed movably mounted on said lay, and means cushioning the movement of the reed comprising a plurality of individual resilient members arranged to operate successively at the time of a single beat-up of a pick to increase the pressure on the reed.

26. In a loom, a lay, a reed movably mounted on said lay, means cushioning the movement of the reed comprising a plurality of individual members arranged to operate successively and cumulatively at the time of a single beat-up of the pick to increase the pressure of the reed.

27. In a loom, a lay, a reed movably mounted on said lay, means cushioning the movement of the reed comprising a plurality of individual members arranged to operate successively and cumulatively at the time of a single beat-up of the pick to increase the pressure of the reed and reaching maximum pressure just prior to the termination of pressure at the fell of the cloth.

28. In a loom, a lay, a reed movably mounted thereon, means resisting movement of the reed, and means for applying at the time of a single beat-up of the pick an accelerated intensity of resistance to the movement of the reed relative to the lay at a predetermined point in the movement of said reed.

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