Nov. 20, 1945. O. A. KOTTEMANN 2,389,157

LOOM PICKER AND JOINT STRUCTURE THEREFOR

Filed Nov. 25, 1943

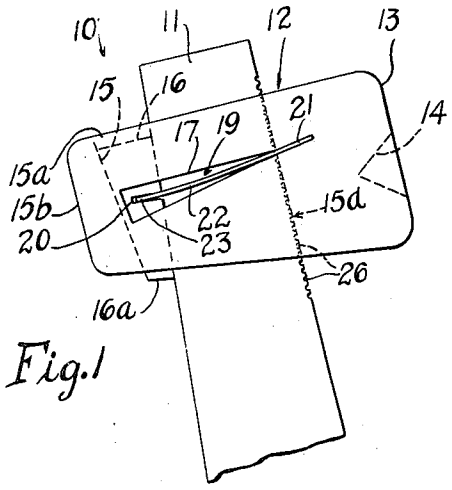


Fig. 1

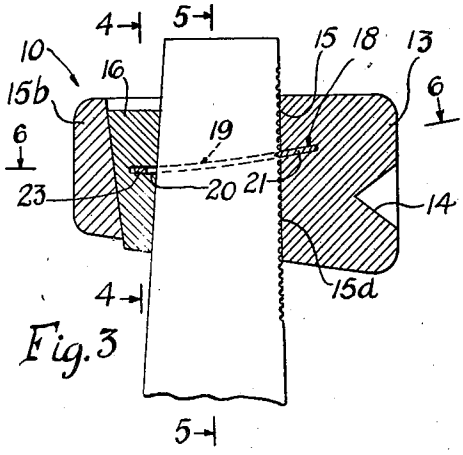


Fig. 3

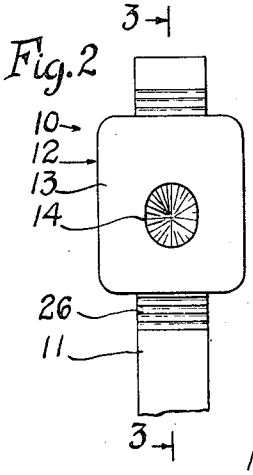


Fig. 2

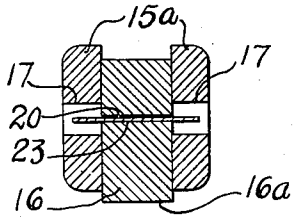


Fig. 4

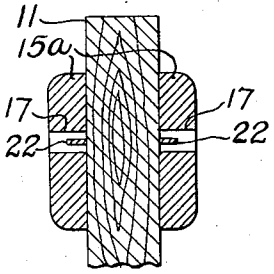


Fig. 5

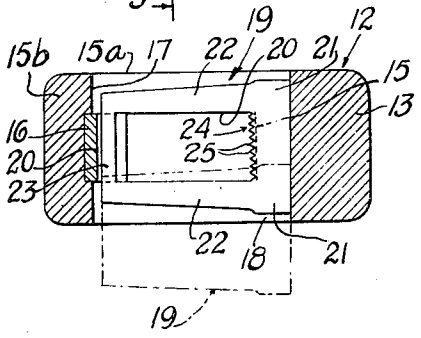


Fig. 6

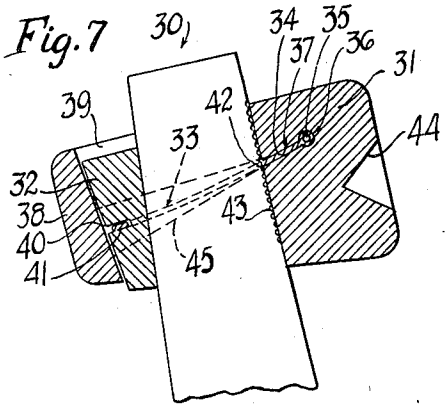


Fig. 7

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LOOM PICKER AND JOINT STRUCTURE THEREFOR

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17 Claims. (Cl. 139—159)

This invention relates to devices for automatically locking or tensioning a picker on the stick of a loom; and in a broader sense, the invention also has reference to tool holding devices, and to locking devices such as may be adapted to automatically take up slack resulting from vibration or other causes.

One object of the invention is to provide a device of the character described having improved means for securing a head or tool on a stick without requiring the use of screws or wedges such as weaken, split or crush the wood.

Another object of the invention is the provision of a device of the nature set forth having improved means for manually adjusting and locking two elements in fixed relation to each other.

A supplemental object of the invention is the furnishing of a device of the type mentioned having improved means comprising a locking member which is normally responsive to slack in the relation of two elements to actuate the means for automatically increasing the tension of engagement between the elements.

The invention is best exemplified in a picker for a loom. Heretofore the picker consisted of leather which was used because of its toughness and cushioning action. Such a picker was sleeved tightly on a tapered picker stick and was secured in position by a wood screw. When the leather loosened up, it was necessary to shift the picker slightly, but it was difficult to form or maintain a new screw hole closely adjacent to the old. The screw was always at an edge of the stick remote from the shuttle, to avoid accidental catching of the yarn. Even so the life of the picker was relatively short; the leather was gradually smashed and became rough and tended to catch yarn and strands. In devising any new construction, the mass and size of the picker must be kept carefully within bounds to conform to the limitations imposed by the loom, and at the same time the strength of the picker must be such that it is well adapted to take the powerful impact of the shuttle.

It is, accordingly, an object of the invention to provide a picker which shall avoid the difficulties mentioned, the exposed surface of the picker device being smooth and formed to avoid accidental catching of yarn or strands.

I have discovered that it is not necessary to make a picker of a cushioning material, and it is, therefore, another object of the invention to construct an improved picker made of a rigid material such as plastic, or metal, thus having a greatly increased life.

I have further discovered that it is not necessary to shift the picker along its tapered stick for taking up slack, which movement would result in misalinement of the nose of the shuttle and the conoidal picker recess adapted to fit the same, but that tensioning may be secured by a member movable independently of the picker. To avoid loosening of such member by vibration due to the powerful shuttle impacts, the member may be securely held in position, and if spring urged, the instantaneous slack produced by successive impacts is constantly taken up by the member in successive increments, until the picker is virtually frozen onto the stick. I have perceived that this action may be aided by a point of reference afforded by an initial detachable anchorage of the picker on the stick so that the automatic tensioning can proceed without any possibility of a shift in the position of the picker.

It is, therefore, an object of the invention to provide a device which affords these advantages, and preferably one in which the normal loosening action in a joint is reversed in effect to produce increased tightness.

Another object of the invention is the provision of a device of the class alluded to, such as a picker, in which a simple locking means is substantially entirely enclosed therein and assembled with the body of the picker and with the stick in a highly ingenious manner whereby each part contributes to holding another in place.

Another object of the invention is the provision of a wedge-like spring actuated locking device, wherein a powerful wedge-like element is floatingly carried by its spring, whereby members of different sizes can be secured by the element and easily released therefrom.

Generally described, the invention, according to one phase thereof, provides a head or picker and means for securing the same on a rod or stick comprising a spring which can be deflected or tensioned manually to set the same in position to automatically accentuate the locking action in response to any slack and particularly in response to powerful vibrations or impacts to which the head or means may be subjected, the spring being otherwise preferably independent of the locking stress exerted.

Other objects and advantages of the invention will become apparent as the specification proceeds.

With the aforesaid objects in view, the invention consists in the novel combinations and arrangements of parts hereinafter described in their preferred embodiments, pointed out in the sub-

joined claims, and illustrated in the annexed drawing, wherein like parts are designated by the same reference characters throughout the several views.

In the drawing:

Figure 1 is a fragmentary view in side elevation showing in full size and in angular position a device embodying the invention.

Fig. 2 is a front view thereof in vertical position.

Fig. 3 is a sectional view taken on line 3—3 of Fig. 2.

Figs. 4 and 5 are sectional views taken respectively on lines 4—4 and 5—5 of Fig. 3.

Fig. 6 is a sectional view taken on line 6—6 of Fig. 3 so as to follow curve of the spring, a different position of a part being indicated in dot-dash lines.

Fig. 7 is an angular view of a modification according to a section like that of Fig. 3.

The advantages of the invention as here outlined are best realized when all of its features and instrumentalities are combined in one and the same structure, but, useful, devices may be produced embodying less than the whole.

It will be obvious to those skilled in the art to which the invention appertains, that the same may be incorporated in several different constructions. The accompanying drawing, therefore, is submitted merely as showing the preferred exemplification of the invention.

Referring in detail to the drawing, 10 denotes a device embodying the invention. The same may comprise a member or support 11 such as a rod or stick, having thereon a head or loom picker 12. The latter may have an enlarged or impact portion 13 provided with a somewhat oval recess 14 as more clearly shown in Fig. 2 adapted to receive the point or nose of a shuttle. Also formed in the picker 12 is an opening 15 defined by the side walls 15*a* and the back wall 15*b*. This opening is rectangular in horizontal section and is of angular shape in longitudinal section to thereby snugly receive the tapered member 11 and the wedge element 16. Transverse to the opening mentioned are provided tapered openings 17 in the walls 15*a*, these openings 17 communicating with a slot 18 alined therewith. Accordingly, a plate spring 19 is insertable through an opening 17 and along the slot 18 as clearly indicated in dot-dash lines in Fig. 6. In thus inserting the spring, the latter simultaneously enters an open recess or groove 20 in that side of the wedge 16 which confronts the spring. The spring itself is clearly shown in Fig. 6, and is formed with an opening 20*a* of the same width as the opening 15 and alined therewith to receive the element 11. Said opening is defined by an anchor portion 21 fitted in the slot 18, side arms 22 which lie within the openings 17, and an end portion 23 for engaging in the slot 20 of the wedge. The length of the spring 19 is such that with its securing portion 21 inserted to the full depth of the slot 18, a clearance obtains between the opposite end of the spring and the inner edge of the groove 20. The thickness of the spring may be such as to afford some clearance with the groove 20 to afford a floating hinge-like engagement, but at the slot 18 the spring is held rigid so that it is adapted to be elastically deformed in an arcuate path, for which the tapered openings 17 afford the requisite space. To afford clearance for sticks 11 of varying size, the opening 20*a* is of greater length than the width of the stick, whereby the wedge 16 is movable laterally in relation to the spring. At the edge of the securing portion 21 adjacent to the opening 15, the spring 19 may have an anchor portion 24 projecting from the slot 18; this portion may consist of a series of teeth 25 adapted to bite into the element 11 to prevent relative longitudinal slippage of the element while the wedge is actuated by the spring. Preferably, the element 11 may be provided with a series of preformed transverse recesses or grooves 26 properly spaced to selectively engage the anchorage 24.

The picker 12 may consist of any suitable material such as metal, plastic or fibrous compositions; desirably its mass is nearly equal to that of the conventional leather picker in order not to upset the momentum factors in the loom; and in size it approximates that of the conventional picker to suit the clearances in the shuttle box. The various corners of the picker 12 are curved, all faces are perfectly smooth, and the securing means is housed within the picker to prevent accidental catching of a yarn or accumulation of lint which may cause entanglement of a yarn. Thus the picker 12 is a decided improvement over the ordinary leather picker which initially has or eventually develops various surface irregularities that all too often accidentally engage and break a yarn or change the tension thereof. Where plastic is used, it should preferably have a tensile strength of at least 9000 or 10,000 pounds per square inch because the stress developed by wedge 16 is considerable. By the use of the locking device disclosed, the conventional screw that secures a picker to its stick is dispensed with. Because of the continuous pounding to which a picker is subjected by the shuttle, looseness frequently occurs. This necessitates that the conventional picker be replaced in order to avoid the slack produced, and the position of the screw may have to be shifted slightly, but to an insufficient extent to form a new hole in the stick. This difficulty is aggravated by the fact that the screw hole weakens the stick at a point where its maximum strength should be maintained. According to the present invention, the picker is automatically tensioned onto the picker stick. In fact, the impact of the shuttle on the picker 12, which increases the pressure between the contacting faces of the picker and stick at 15*d*, results in movement of the wedge 16 to produce increments of wedging action until the picker is virtually frozen to the stick. This is rendered possible by the smooth sliding contact at the pressure faces of the wedge, a circumstance which is afforded especially by making the picker of a rigid material, and the latter, in turn, must have a high tensile strength to prevent breakage of the arms 15*a*. The taper of the element 11 is unimportant and may be omitted.

In assembling, the wedge 16 is directly inserted into the opening 15, until its recess 20 is in alinement with the openings 17. Then the spring 19 is inserted through an opening 17 and its securing portion 21 forced into the slot 18, while its portion 23 engages in the recess 20 of the wedge. Now the wedge cannot be removed, unless the spring is first removed. After the picker stick 11 is inserted, the spring 19 cannot be removed. Thus the several parts cooperate to hold each other in position.

In use, the operator may adjust the position of the picker on the stick by pressing upward with a finger or tool on the bottom of the wedge at 16*a* while pressing the picker downward on the stick. Accordingly, the wedge moves upward in

the picker and deflects and tensions the spring 19. Because of the floating hinge engagement at 20, 23, the wedge moves leftward in Fig. 1 relative to the stick as well as upward. When the appropriate position is reached, the operator releases the wedge 16 whereupon the spring 19 forces it downward with considerable pressure. Now, under repeated impact of the shuttle, the wedge increases the tightness of engagement due to the continuous tension of the spring. The stress created is readily absorbed by the arms 15*a* of the picker, and it is noted that the spring is under no stress whatever other than its ordinary spring tension. Should it be desired to remove the picker, the wedge 16 is merely forced upwardly at 16*a*. Because the impact of the shuttle is along a horizontal plane at an acute angle to the stick 11, there may be a tendency to force the picker upward. To guard against any such accidental movement, the anchorage at 24, 26 is provided, the picker being initially positioned so that the portion 24 engages in a selected groove 26. The engagement thus obtained is sufficient to prevent shifting of the picker along its stick, thus maintaining the precise alinement of the recess 14 with the shuttle. It is maintained by the pressure of the wedge 16 and is released by releasing the wedge. However, satisfactory results may be obtained by omitting the anchorage at 24, 26.

In Fig. 7 is shown a device 30 illustrating a modification of the invention, which is like that at 10, except that the tension caused by the wedge is assumed by the spring instead of by the walls 15*a* of the picker. More particularly, the head or picker 31 cooperates with the wedge 32 and spring 33 for locking engagement with the element 11. This spring 33 is different in that its portion 34 is secured or pinned to the picker as by the provision of a reinforced bead 35 at its free edge, this bead being fitted in a correspondingly enlarged portion 36 of the slot 37. Accordingly, the picker 31 is different only in the provision of the enlarged opening 36, although the rear wall 38 of the opening 39 may be omitted, as will be presently apparent. The element 32 may be of any suitable form and need not be wedge shaped as shown; its groove 40 for engagement with the portion 41 of the spring may be at an outer face, so that the element 32 as well as the picker stick 11 is received in an opening of the spring like that shown at 20*a*. The longitudinal anchorage like that at 24, 26 may also be provided as indicated at 42, 43. As in the device 10, the spring 33 slopes downwardly toward the rear of the picker to tend to counteract the upward component of force caused by the shuttle impact, and the openings 36, 37 are spaced above the recess 44 in order not to weaken that section of the picker. The device 30 is assembled by first inserting the spring 33 through the lateral openings 45 and then inserting the element 32, but the latter will be free to fall out of the picker until the stick 11 has been applied.

In use the device 30 will function in a manner somewhat similar to that of the device 10 but with important differences. It will be appreciated that the wedging action is slight and limited in range according to the taper of the picker stick itself. The picker 31 cannot be applied to or removed from the stick as readily as the picker 12, because the range of lateral movement of the wedge-like element 32 is limited by the opening in the spring 33. Some clearance for the stick occurs when the wedging element 32 is pushed upward to deflect the spring but this clearance is rather small. Finally, while it may be an advantage to have the tension due to the wedging stress assumed by the metallic spring instead of by plastic side walls of the picker, yet the spring may twist or buckle under substantial load, and the localized stress at 35 may produce some yield.

Alternatively, in the device 30, the wedging action between the element 32 and the wall 38 may be relied upon, which result can be attained by providing sufficient clearance between the spring portion 41 and the inner face of the groove 40, so that the spring 33 shall be relieved of tension and act like the spring 19.

It will be perceived that the invention is capable of general application as a holder for a tool or head, and may be embodied in a hammer. The invention may also be employed as a joint in machinery, furniture and other arts, as the head 12 may represent part of a frame member and the stick 11 may represent another part or frame member, such use being especially advantageous where the structure or mechanism involved is subject to shock. Still another possible application is in the art of tensioning devices such as bolts and nuts, as the element 11 may represent a tie rod or tension element, and the head 12 may take the place of a holding pin or nut; if so used, the wedge element need not project from the head at 16*a* but may be otherwise manipulated for upward releasing movement, as by causing the upper end of the wedge to project from the head or by inserting a releasing tool through an opening 17 to upwardly move the wedge; and the teeth at 26 may be enlarged or deepened to suit, while the serration 25 may be omitted with the part 24 forming a single straight or curved tooth as may be required to fit the shape of the rod 11 employed.

Within the scope of the claims various modifications may be made. Thus the spring 19 might be secured to the element 11; this spring may in some cases extend through an opening in element 11 so that the openings 17 may be closed; and of course, the spring 19 may be arranged to be slidable in the slot 18, by suitable clearance with the element 11, whereby the engagement at 20, 23 may have a fixed hinge-like axis and need not provide for lateral movement between the wedge and spring. These and other changes may be made, but the specific device 10 appears to represent the ideal disclosure.

I claim:

1. A device for a loom comprising a head having a portion provided with an opening for receiving a stick with said portion extending continuously around the stick, the head consisting of rigid material, means having an opening for receiving the stick, said means having its opening substantially alined with that on the head, said means having a spring portion, and an element in engagement with the spring portion to tension the head against the stick, said spring portion being connected to the head and movable angularly relative to the head and stick for urging the element against the stick.

2. A device comprising a securing means including a spring having an opening for receiving a stick, a head having a first portion provided with an opening to receive the stick and a second portion for receiving an impact of a shuttle, the said openings being alined with each other, the spring being engaged with the second portion so as to lie at an angle to the axis of said openings, said means having an engaging portion adapted

to lie at a side of the openings opposite to that of said second portion, said engaging portion being adapted to engage the stick with a wedge-like engagement under the continuous pressure of the spring.

3. A device including a head, and means for securing the same to a stick, said means including a strip spring having an opening for receiving said stick, said means having at one end a portion connected to the spring for movably bearing against an edge of the stick, the spring being connected at its other end to the head, the head having a face adapted to bear on the opposite edge of the stick whereby the latter is clampingly engaged between the head and said portion, said portion being movable to retracted position in which it releases the stick and to projected position in which it engages the stick, and the spring being held by the head at such an angle to said portion as to urge the said portion to projected position for a wedge-like engagement between said portion and the stick to tighten the head on the latter.

4. A device including a stick, means having an opening to receive the latter, said means having a portion having detachable toothed lateral engagement with the stick, said means including a head adapted to be secured by said portion against movement longitudinally of the stick, and other means for smooth wedge-like engagement between the head and the stick to laterally clamp the head to the stick, the first mentioned means including a resilient element movable at least in part longitudinally of the stick for moving the said other means to render said portion operative.

5. A device including a head member having a wall defining an opening, a stick member in said opening, actuator means including a wedge-like element in said opening, said wall having a lateral opening communicating with the first mentioned opening, and spring actuator means for said element, the latter having a groove and the head member having a groove, the spring means having opposite end portions engaged in the grooves, said grooves communicating at an end with the lateral opening.

6. A device including a head having an impact end, a first means adjacent to the impact end of the head for detachably laterally engaging a head stick at different points therealong to prevent longitudinal movement of the head along the stick, and a second means spring pressed for detachable wedge-like engagement between the head and stick at the other end of the head to laterally clamp the head to the stick, the first means serving to prevent the head from slipping along the stick while the second means is in action, and the first means being detachable from the head only upon release of the second means.

7. A device including a loom picker having an opening whereby the picker is sleeved over a picker stick, and means for securing the picker to the stick comprising a plurality of elements, said opening being sufficiently large to house one of the elements as well as the picker stick, said picker having a different opening for receiving the other element, whereby said means is substantially entirely housed within the picker to avoid projecting parts for accidentally catching a yarn, the element within the picker stick opening being actuable by the other element to clamp the picker to the stick.

8. A device including a head member, a supporting member on which the head member is sleeved, a plate spring element having an opening to receive the supporting member, said element being secured to the head member at one side of the supporting member and having a portion to engage in a notch of the supporting member at said side, a wedge element, the head member having an opening to receive the wedge element to laterally bear on the opposite side of the supporting member, the spring element having a second portion at said opposite side engaging the wedge element and cooperative therewith to actuate the wedge element to cause the members to be pressed together at the first mentioned side.

9. A device according to claim 8 wherein the wedge element is provided with a recess confronting the spring element to detachably engage the second portion, the head element having an opening sufficiently large to receive the wedge element as well as the supporting element, whereby the wedge element is laterally as well as longitudinally movable for disengagement of the members from each other.

10. A device according to claim 8 wherein the wedge element is received in the opening of the spring element so that the latter exerts tension for drawing the wedge element toward the first mentioned side, while moving the wedge element longitudinally.

11. A device including an impact head having an opening for receiving a supporting member, a spring having an opening to receive the supporting member, said spring being engaged with the head at one side of the opening, a wedge in the opening of the head at the opposite side, the wedge having a recess confronting the spring, the latter having a portion movably engaged in said recess, whereby the spring serves to actuate the wedge and to hold it in place.

12. A device including a head having an opening, a spring having an opening of the same width as the opening in the head, said openings being adapted to receive a supporting member for the head in said openings, a wedge in said opening, said spring being engaged at one end with said head to position the spring, the latter being engaged at its other end with the wedge, the wedge having an open recess confronting the spring and receiving a portion thereof to afford the said engagement, said head having openings transverse to the first mentioned openings and being in alinement with the recess in the wedge and with the point of engagement between the spring and the head whereby the spring can be inserted into place, with the spring being movable in the transverse openings to actuate the wedge for longitudinal movement.

13. A device including a head having a first opening whereby the head is sleeved over a stick, and means for securing the head to the stick comprising a first element and a second element, said opening being sufficiently large to slidably house the first element as well as the stick, said first element so cooperating with the stick and the opening in the head as to be adapted for wedging clamping engagement between the head and the stick, said head having a second opening for receiving the second element, whereby said means is substantially entirely housed within the head to avoid projecting parts, the second element being resilient and engaging the first element to clamp the head to the stick, said openings being in communication with each other, and the first element having a groove communicating with the openings whereby the second element is operatively engaged with the first ele-

ment and is assembled by insertion of the second element through the second opening into engagement with said groove.

14. A device according to claim 13 wherein the head is provided with a groove communicating with the openings so that the second element is engageable with the head in the groove thereof upon the said insertion of the second element.

15. A device including a head having an opening for a stick, and actuator means for locking the head on the stick, the actuator means including a first portion fixedly mounted on the head at one side of the opening, a second portion at the opposite side of the opening for clamping engagement with the stick, and a third spring portion intermediate of the first and second portions for actuating the second portion, the second portion cooperating with the head and with the third portion for angular movement in the general direction of the said opening to thus produce a wedging engagement with the stick.

16. A device including a head having an opening for a stick, and actuator means for locking the head on the stick, the actuator means comprising a first portion and a second portion, the first portion constituting a plate spring having an opening registering with the first mentioned opening, the head having a groove at one side of its opening, the spring being secured in said groove at one end portion thereof, said end portion of the spring having a toothed edge portion projecting into the head opening, for engaging the stick at one side thereof, the second portion being so related to the head and stick as to be adapted for sliding wedging engagement therebetween, the second portion having movable engagement with the first portion, the second portion lying in the head opening and being actuated by the spring for clamping, wedge-like engagement with the stick.

17. A device including an elongated support, a head element having an enlargement portion at one side of the support, a wedging element at an opposite side of the support, a plate spring, means fixedly securing the spring at one end to the enlargement portion, the spring extending laterally from the enlargement portion and having an opening slidably receiving the support and the wedging element, the spring being biased to tend to move laterally in such relation to the elements as to cause movement of the wedging element for increasing the wedging relation between the latter and the support, means for movably interengaging the spring and the wedging element for operatively mounting the latter.

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