Oct. 29, 1940. C. DARWIN 2,219,768

PNEUMATIC THREAD EXTRACTOR FOR LOOMS

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FIG. 1

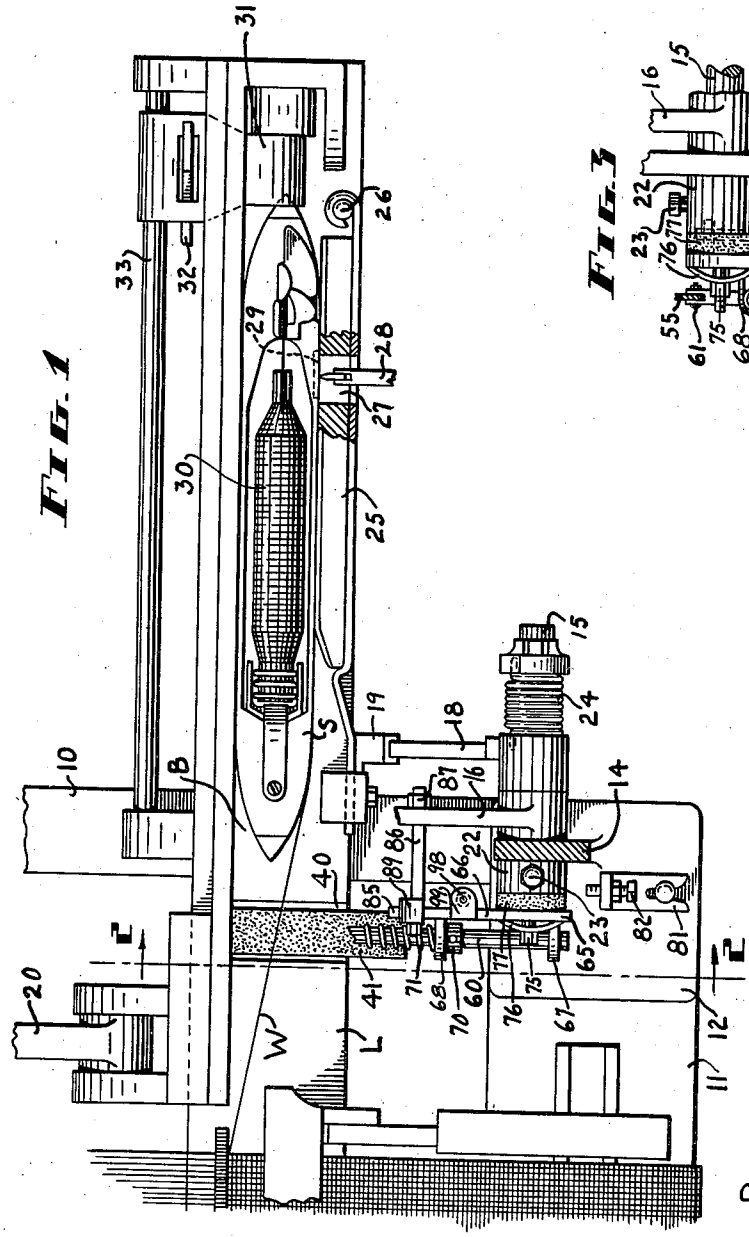


FIG. 3

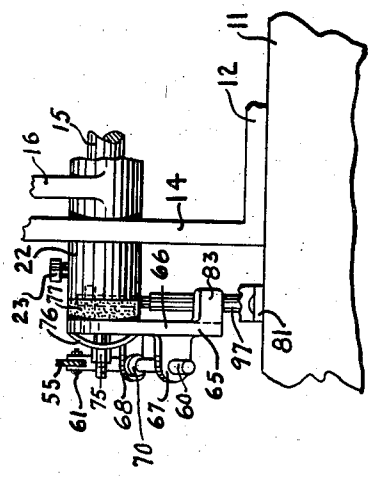
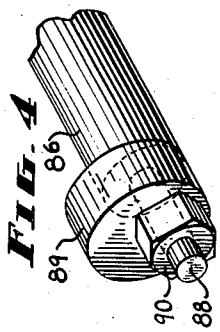


FIG. 4



INVENTOR
CLIFFORD DARWIN

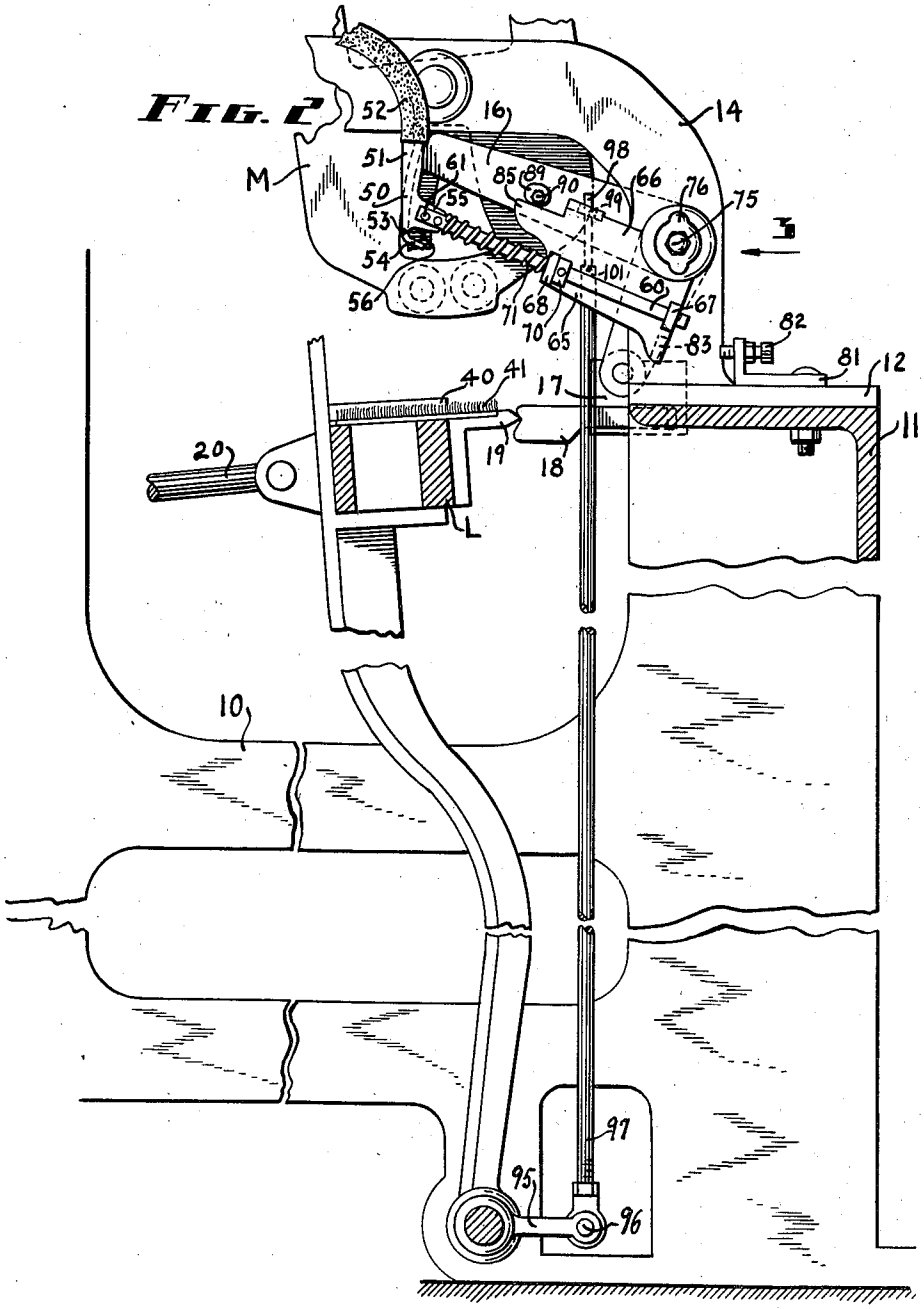
Chas. T. Hawley
ATTORNEY

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PNEUMATIC THREAD EXTRACTOR FOR LOOMS

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FIG. 2



INVENTOR
CLIFFORD DARWIN
Chas. T. Hawley
ATTORNEY

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UNITED STATES PATENT OFFICE

2,219,768

PNEUMATIC THREAD EXTRACTOR FOR LOOMS

Clifford Darwin, Worcester, Mass., assignor to Crompton & Knowles Loom Works, Worcester, Mass., a corporation of Massachusetts

Application April 19, 1940, Serial No. 330,548

8 Claims. (Cl. 139—256)

This invention relates to improvements in pneumatic thread extractors for automatic looms.

It has been proposed heretofore to effect pneumatic removal of the thread of the outgoing bobbin at the time of weft replenishment by means of a tube pivoted to the loom frame at a point behind the lay. A connection between the transferrer arm and the tube lowers the latter on the transferring beat of the loom to place the intake mouth behind the thread, and an inrush of air into the intake mouth draws the thread away from the path of the shuttle during the backward motion of the lay.

It is an important object of my present invention to mount the pneumatic tube so that the same moves about the same axis as that around which the transferrer arm swings. By this construction I eliminate wear between the aforesaid connection and the tube which has existed in constructions heretofore employed due to a sliding contact incident to movement of the tube and transferrer arm about different centers.

It is a further object of my present invention to provide an adjustment preferably in the form of an eccentric between the transferrer arm and the tube so that the extent to which the latter is depressed may be regulated.

After the pneumatic tube has been depressed to its operating position it is desirable to restore the same to its normally inoperative position prior to the next forward beat of the lay and it is a still further object of my present invention to accomplish this result by a rod pivoted to a foot on the rocker iron of the lay and having a vertically reciprocating motion which is effective to raise the tube as the lay moves rearwardly following a transfer. The timing of the loom is such that the tube is depressed while the lay is in its forward position and at this time the rod is in low position so that it does not interfere with downward motion of the pneumatic tube.

Should the shuttle fail to reach its shuttle box it is likely to be forced against the depressed pneumatic tube by the lay. In order to prevent breakage under these circumstances it is another object of my present invention to mount the tube so that it may slide forwardly against the action of resilient means such as a compression spring. The spring is so mounted that it does not interfere with the pivotal motion of the tube toward and from operating position.

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 accompanying drawings, wherein a convenient embodiment of my invention is set forth,

Fig. 1 is a plan view of one end of a loom having my invention applied thereto,

Fig. 2 is a vertical section on line 2—2 of Fig. 1,

Fig. 3 is a detail front elevation taken in the direction of arrow 3, Fig. 2, and

Fig. 4 is a detailed perspective view of the actuator for the thread extractor.

Referring particularly to Fig. 1, I have shown a loom frame 10 having a breast beam 11 which supports the foot 12 of a reserve bobbin magazine M which may be of the type shown in prior Patent No. 2,128,974. The magazine includes an upright 14 which supports a stud 15 on which is pivotally mounted a transferrer arm 16. The latter is provided with a latch holder 17 to which is secured a latch 18 for engagement with a bunter 19 on the lay L when a weft replenishing operation of the loom is to occur. The lay moves back and forth in the usual manner by connectors one of which is shown at 20, and the lay has the usual shuttle race along which the shuttle S travels. The upright 14 has a bearing 22 through which the stud 15 passes and in which the latter is held by a set screw 23. A spring 24 acts as usual to hold the transferrer arm normally raised.

The lay is provided with a shuttle box B having a binder 25 pivoted to the lay at 26 and slotted as at 27 for the reception of a thread cutter 28. The latter cooperates with a plate 29 on the front wall of the shuttle across which the weft W from the bobbin 30 within the shuttle extends toward the adjacent selvage. The usual picker 31, picker stick 32 and picker spindle 33 for guiding the picker may be employed if desired as means for propelling the shuttle.

When a weft replenishing operation of the loom is initiated latch 18 is raised from its normally down position into the path of the bunter 19 as the lay approaches front center, or moves to the right as viewed in Fig. 2. When the latch 18 is moved forwardly by the lay it rocks the transferrer arm 16 in a counter-clockwise direction as viewed in Fig. 2 around the fixed stud 15 to move a reserve bobbin from the magazine into the shuttle. At the same time the thread cutter 28 moves rearwardly against the plate 29 to cut the thread at a point adjacent to the shuttle eye, as will be understood from Fig. 1.

These operations occur when the shuttle is on the magazine side of the lay and the latter is in its front center position. Prior patent to Payne No. 1,881,290 may be referred to for a more detailed description of the structure and operation of the thread cutter 28.

The lay is provided with a transverse slot 40 which receives a mass of deformable material 41 such as plush which lies for the most part below the path of the shuttle but extends upwardly far enough to have frictional contact with the weft thread W as suggested in Fig. 1.

The matter thus far described may be of the usual construction and reference may be had to the previously mentioned patents and also to Patent No. 2,199,296 for a further understanding of the parts already described.

In carrying my present invention into effect I provide a pneumatic thread extractor designated generally at 50 having a vertical tube 51 which enters a preferably elastic or rubber tube 52 leading to a source of sub-atmospheric pressures not shown herein but similar to that set forth in the aforesaid Patent No. 2,199,296. It is thought sufficient for present purposes to state that sub-atmospheric pressures will exist in the tubes 51 and 52 to induce a draft of air into an intake mouth 53 preferably during rearward motion of the lay subsequent to a transferring operation of the loom. A lip 54 extends downwardly and forwardly from the intake mouth 53, while a plate 55 is secured to the tube 51 and projects forwardly from the latter to present a bottom edge 56.

In order to provide a mounting for the thread extractor 50 I provide a rod 60 the rear end of which is slotted to receive the plate 55, rivets 61 being provided to secure the rear end of the rod to the plate 55. The rod 60 is mounted on a carrier 65 made preferably of sheet metal and stamped in the form shown in Figs. 2 and 3. This carrier has a body 66 from which are struck front and rear guides 67 and 68, respectively, through which the rod 60 slides. A stop collar 70 adjustably secured to the rod 60 in front of the rear guide 68 limits rearward movement of the rod 60 under the action of a compression spring 71 interposed between the rear guide 68 and the plate 55. Under normal conditions the rod 60 is held yieldingly in rear position but can move forwardly if necessary by sliding in the guides 67 and 68.

The body of the carrier is supported by the previously described stud 15 to which it is held by the bolt 75 which, as shown in Fig. 3, extends through a leaf spring 76, the carrier body 66, a disk of friction material 77, and into the stud 15. The spring 76 forces the carrier 65 against the friction material and also forces the latter against the bearing 22 of the stand 14, thus affording means by which the carrier may be held in any angular position to which it can be moved. Adjustment of the pressure of the spring is obtained by means of bolt 75. The carrier turns on the bolt 75, and since the latter is concentric with the axis of stud 15 the carrier and transferrer arm turn in effect about the same center.

A small stand 81 secured to the breast beam carries an adjusting stop screw 82 for engagement with a wing 83 formed as part of the carrier 65 to limit movement of the latter in a left hand direction as viewed in Fig. 2, thereby restricting the downward motion of the rod 60.

The carrier 65 is provided with a rearwardly extending finger 85 over which projects a placer comprising a stud 86 held to the transferrer arm by a nut 87 and having a reduced end 88 on which is mounted an eccentric 89. A nut 90 threaded on the reduced end 88 forces the eccentric against the adjacent end of the stud 86 to hold said eccentric in any desired angular position. The eccentric lies over the finger 85 to engage and depress the latter whenever the transferrer arm descends. By adjusting the setting of the eccentric the extent of motion of the carrier and therefore of the rod 60 may be altered within limits determined by the eccentricity of the part 89.

As shown in Fig. 2, the lay carries a forwardly extending arm 95 to which is pivoted at 96 the lower end of an upright rod 97 the top of which is reduced as at 98 to pass through a substantially horizontal fin 99 struck from the carrier 65. The rod 97 rises while the lay is moving rearwardly and descends while the lay is moving forwardly. The rod is therefore in low position when the bunter 19 engages the latch 18 and offers no resistance to downward motion of the carrier during transfer. The rod 97, however, is provided with a shoulder 101 adapted for engagement with the under side of the fin 99 when the rod moves upwardly.

In the operation of my invention the carrier and rod 60 will be held frictionally in the normally raised position indicated in full lines in Fig. 2 and reciprocation of the lay will cause the rod 97 to rise and fall without affecting the position of the carrier 65. The thread extractor 50 will therefore be held above the path of the shuttle. When a weft replenishing operation of the loom occurs the transferrer arm 16 will descend as already set forth, at which time the eccentric 89 will exert a downward force on the finger 85 to rock the carrier 65 about its axis against the frictional resistance offered by the spring 76 and the friction disk 77. As the transferrer arm reaches the bottom of its stroke the tongue 54 will be embedded in the mass of deformable material 41, and the bottom edge 56 of the plate 55 will lie over the weft thread W and hold it against said material. When the thread is cut at the plate 29 incident to transfer it will be free to move toward the thread extractor but will be held against the plush so long as the rod 60 is in down position.

The transferring operation is completed while the lay is on front center position and as it starts rearwardly the shuttle and weft will move away from the breast beam and the thread W will be moved toward the intake mouth 53 to be drawn into the latter by an inrush of air induced as already set forth. The rod 97, down during transfer, now moves up and engages the fin 99 to rock the carrier 65 in a clockwise direction as viewed in Fig. 2 to restore the same to normal raised position. Upward motion of the carrier, the rod 60, and the thread extractor 50 will be complete when the lay reaches its extreme rearward position.

If the shuttle should fail to be boxed properly while the rod 60 is in low position it will engage the thread extractor 50 and move the same together with the rod forwardly against the action of spring 71, the rod sliding in the guides 67 and 68. Any tendency of the rod 60 to move to a lower position at this time and imbed the tongue 54 too deeply into the material 41 is prevented by the stop screw 82. The latter also serves to prevent the tube 60 from descending

too low should the spring 76 fail for any reason to hold the carrier in proper position with respect to the lay. Stop screw 82 will ordinarily be so placed as not to be engaged by the wing 83 when the carrier is moved downwardly by the eccentric 89. If it is desired to cause the intake mouth to move to a lower position than usual the eccentric will be turned and a corresponding forward adjustment will be given to screw 82.

From the foregoing it will be seen that I have provided a simple mounting for the pneumatic thread extractor 50 including a carrier which moves concentrically with the transferrer arm so that no substantial sliding motion exists between the eccentric 89 and the finger 85. It will further be seen that the rod 60 is mounted so that it can yield forwardly if engaged by a misplaced shuttle, and that stop screw 82 under this condition will prevent the tongue 54 from moving downwardly too far with respect to the lay. It will also be seen that the rod 79 is so controlled that it is in low position when the carrier moves down to effect placing of the intake mouth behind the thread, and that the rod rises during backward motion of the lay to restore the carrier and thread extractor to normal raised position. It will also be seen that the eccentric 89 affords a convenient means of adjusting the lowest position to be assumed by the rod 60. Furthermore, the relation between the rod 60 and its spring 71 and also the carrier 65 is such that the rod can move forwardly with respect to the carrier in any angular position of the latter.

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 pneumatic thread removing mechanism for a loom having a lay along which a shuttle travels in a given path, and from which a thread extends along the lay to the adjacent selvage, the loom having weft replenishing mechanism including a support, a transferrer arm, and a pivotal mounting for the transferrer arm fixed with respect to the support, and the loom having also provision for cutting the thread adjacent to the shuttle on weft replenishing beats of the loom, that improvement comprising a carrier mounted for pivotal movement about the axis of the transferrer arm, a member extending transversely of the lay and mounted on the carrier to move angularly therewith, a pneumatic thread extractor mounted on the rear of the member and having an intake mouth, friction means to hold the carrier and member in any angular position to which they are moved, said member being normally raised to hold the thread extractor above said given path, and means connecting the transferrer arm with the carrier to move the latter angularly at the time of a weft replenishing operation of the loom to move the pneumatic thread extractor in a direction toward the lay and place the mouth adjacent to the thread for cooperation therewith.

2. In a pneumatic thread removing mechanism for a loom having a lay along which a shuttle travels in a given path, and from which a thread extends along the lay to the adjacent selvage, the loom having weft replenishing mechanism including a support, a transferrer arm, and a pivotal mounting for the transferrer arm fixed with respect to the support, and the loom also having provision for cutting the thread adjacent to the shuttle on weft replenishing beats of the loom, that improvement comprising a carrier supported by the mounting for pivotal movement concentrically with the transferrer arm, friction means to hold the carrier yieldingly in any angular position to which it may be moved, a penumatic thread remover element supported by and moving angularly with the carrier and having an intake mouth, said carrier and element normally being in raised position to hold the thread remover above said given path, and connections between the transferrer arm and the carrier to rock the latter angularly on a weft replenishing beat of the loom in a direction to move said element downwardly and place the intake mouth thereof behind the thread.

3. In a pneumatic thread removing mechanism for a loom having a lay along which a shuttle travels in a given path, and from which a thread extends along the lay to the adjacent selvage, the loom having weft replenishing mechanism including a support, a transferrer arm, and a pivotal mounting for the transferrer arm fixed with respect to the support, and the loom also having provision for cutting the thread adjacent to the shuttle on weft replenishing beats of the loom, that improvement comprising a carrier supported by the pivotal mounting for pivotal movement concentrically with the transferrer arm, friction means to hold the carrier yieldingly in any angular position to which it is moved, a pneumatic thread remover supported by and moving angularly with the carrier and having an intake mouth, said carrier and remover normally being in raised position above said given path, and connections between the transferrer arm and the carrier to rock the latter angularly on a weft replenishing beat of the loom in a direction to move said element downwardly and place the intake mouth thereof behind the thread, said means including an eccentric member supported by the transferrer arm in position to engage the carrier, and means to hold the eccentric member in any one of a plurality of angular positions with respect to the transferrer arm.

4. In a pneumatic thread removing mechanism for a loom having a lay along which a shuttle travels in a given path, and from which a thread extends along the lay to the adjacent selvage, the loom having weft replenishing mechanism including a support, a transferrer arm, and a pivotal mounting for the transferrer arm fixed with respect to the support, and the loom also having provision for cutting the thread adjacent to the shuttle on weft replenishing beats of the loom, that improvement comprising a carrier mounted for angular movement in a plane transverse of the lay, a pneumatic thread extractor element having an intake mouth, means to cause the carrier to move concentrically with the transferrer arm when the loom has a weft replenishing operation to move said element downwardly and place the intake mouth behind the thread, and stop means independent of the transferrer arm to limit the extent of downward motion of the element.

5. In a pneumatic thread removing mechanism for a loom having a lay along which a shuttle travels in a given path, and from which a thread extends along the lay to the adjacent selvage, the loom having weft replenishing mechanism including a support, a transferrer arm, and a pivotal mounting for the transferrer arm fixed with

respect to the support, and the loom also having provision for cutting the thread adjacent to the shuttle on weft replenishing beats of the loom, that improvement comprising a carrier mounted for angular movement in a plane transverse of the lay and concentric with the transferrer arm, a pneumatic thread extractor element extending transversely of the lay and slidably mounted on the carrier and having an intake mouth for the thread, means to hold the carrier and element normally in raised position with the intake mouth above the path of the shuttle, yielding means to hold the element rearwardly with respect to the carrier, means to limit the extent of rearward motion of the element as induced by the yielding means, means to cause the transferrer arm to rock the carrier and element angularly about the axis of the transferrer arm when the latter descends on a weft replenishing beat of the loom to place the intake mouth behind the thread, a stop to limit downward motion of the carrier and element, said element slidable relatively to the carrier along a line below the axis of said carrier, and the stop preventing downward motion of the element toward the lay when said element is caused to slide forwardly relatively to the carrier by a misplaced shuttle.

6. In a pneumatic thread removing mechanism for a loom having a lay along which a shuttle travels in a given path, and from which a thread extends along the lay to the adjacent selvage, the loom having weft replenishing mechanism including a support, a transferrer arm, and a pivotal mounting for the transferrer arm fixed with respect to the support, and the loom also having provision for cutting the thread adjacent to the shuttle on weft replenishing beats of the loom, that improvement comprising a carrier mounted for angular motion in a plane transverse of the lay and about the center of the transferrer arm, yielding means to hold the carrier normally in raised position, a pneumatic thread extractor element mounted on and movable angularly with the carrier and normally located above the path of the shuttle, said element having an intake mouth for the thread, means operative on a weft replenishing beat of the loom to establish a driving connection between the transferrer arm and the carrier to rock the carrier and element by a force derived from the transferrer arm on a weft replenishing beat of the loom to place the intake mouth behind the thread, said driving connection including an adjustable member to vary the lowest position to which the carrier can be moved by the transferrer arm.

7. In a pneumatic thread removing mechanism for a loom having a lay along which a shuttle travels in a given path, and from which a thread extends along the lay to the adjacent selvage, the loom having weft replenishing mechanism including a support, a transferrer arm, and a pivotal mounting for the transferrer arm fixed with respect to the support, and the loom also having provision for cutting the thread adjacent to the shuttle on weft replenishing beats of the loom, that improvement comprising a carrier mounted for angular motion in a plane transverse of the lay and about the center of the transferrer arm, yielding means to hold the carrier normally in raised position, a pneumatic thread extractor element mounted on and movable angularly with the carrier and normally located above the path of the shuttle, said element having an intake mouth for the thread, means operative on a weft replenishing beat of the loom to establish a connection between the transferrer arm and the carrier to lower the carrier and element by a force derived from the transferrer arm on a weft replenishing beat of the loom to place the intake mouth behind the thread, said connection including an adjustable member to vary the lowest position to which the carrier can be moved by the transferrer arm, and an adjustable stop to limit downward motion of the carrier, said stop being adjusted to various positions to hold the carrier in any of the different positions to which said carrier can be moved by the aforesaid connection.

8. In a pneumatic thread extractor mechanism for a loom having a lay movable backwardly and forwardly between front and back center positions and operating with a shuttle movable along the lay in a given path, said shuttle to have a thread extending therefrom to the adjacent selvage which is cut at a point adjacent to the shuttle on a weft replenishing operation of the loom, said loom having a reserve bobbin magazine, a transferrer arm, and a stud supported by the magazine and affording pivotal support for the transferrer arm, that improvement comprising a vertical rod, connections between the rod and the lay to cause said rod to descend when the lay is moving forwardly and cause said rod to rise when the lay is moving rearwardly, a carrier mounted for angular motion in a plane transverse of the lay about the axis of the transferrer arm, a pneumatic thread extractor mounted on and moving with the carrier and having an intake mouth, means to hold the carrier and thread extractor normally in raised position with the intake mouth above said given path of the shuttle, means to transmit a force from the transferrer arm to the carrier to move said carrier and thread extractor downwardly on a weft replenishing beat of the loom as the lay moves forwardly toward front center position to place the intake mouth behind the thread, and means to connect the rod and carrier to cause the latter and the thread extractor to be moved upwardly to normal position by a force derived from the rod during motion of the lay toward back center position.

CLIFFORD DARWIN.