Nov. 11, 1924. 1,515,515

J. NORTHROP

SHUTTLE FEELER THREAD CUTTER

Filed June 17, 1922 3 Sheets-Sheet 1

Fig. 1.

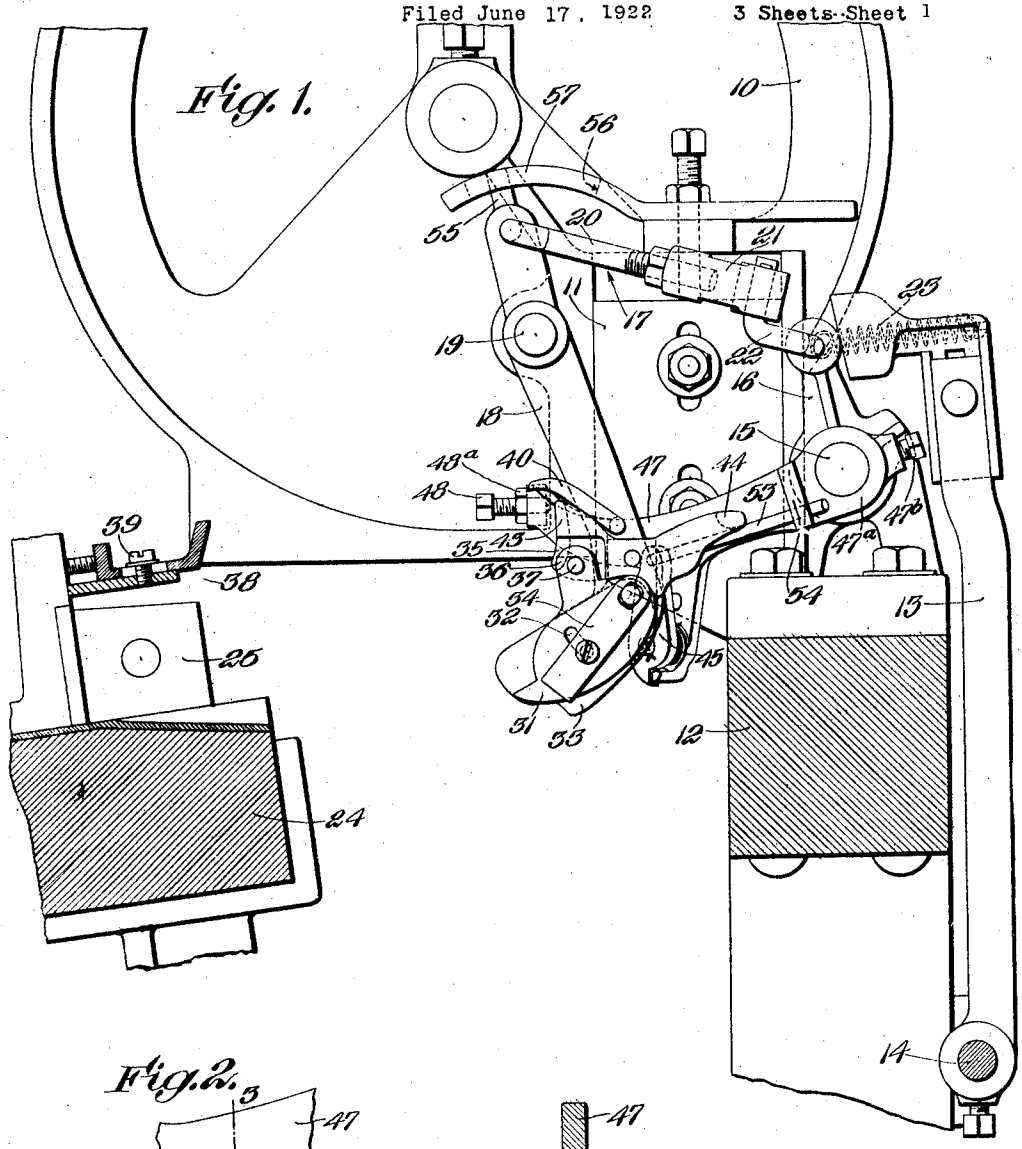
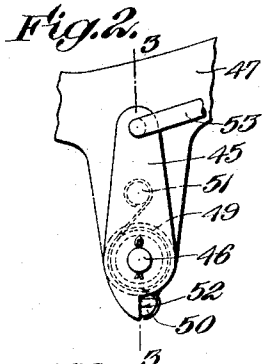


Fig. 2.



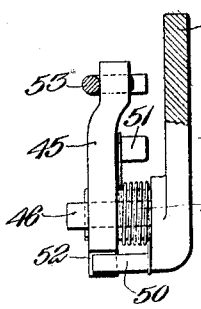


Fig. 3.

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Fig. 4.

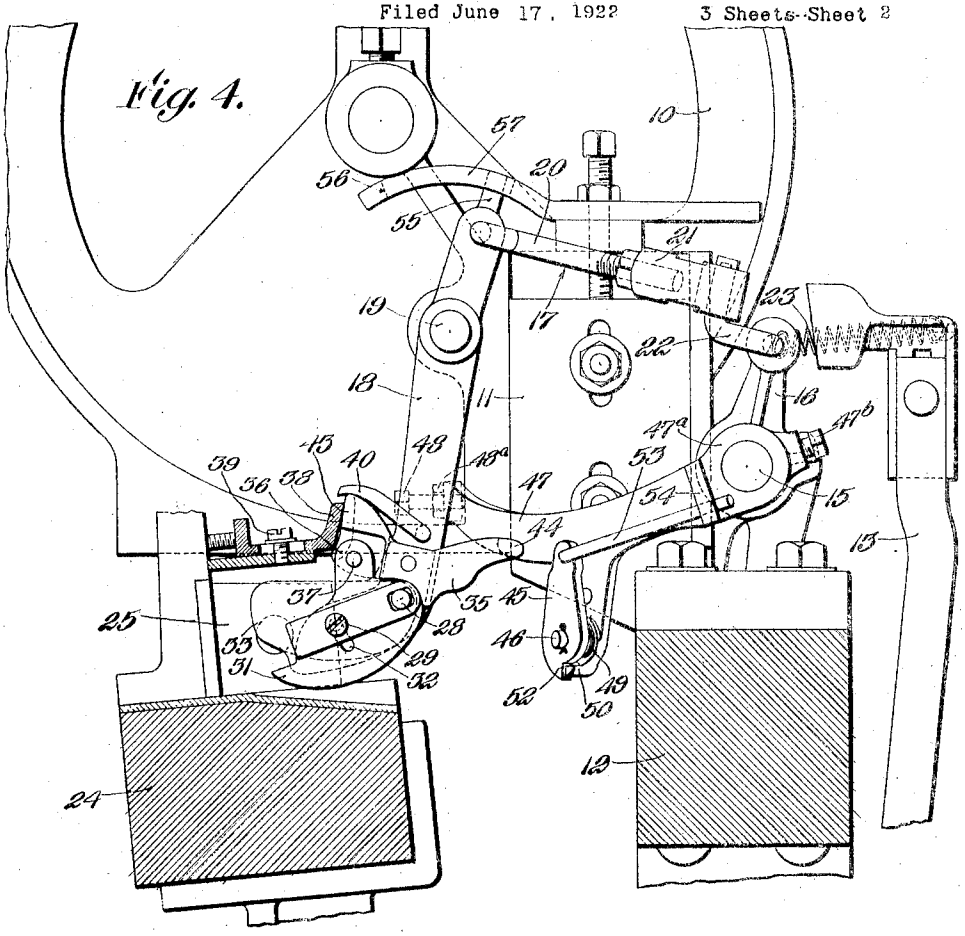
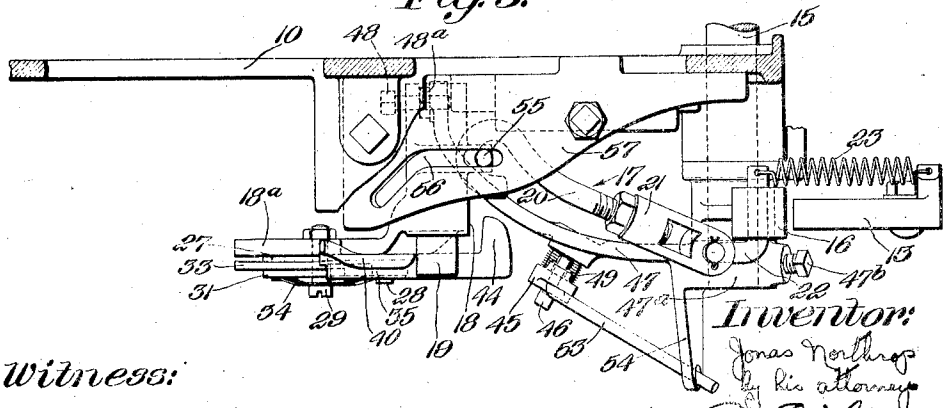


Fig. 5.



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Fig. 6.

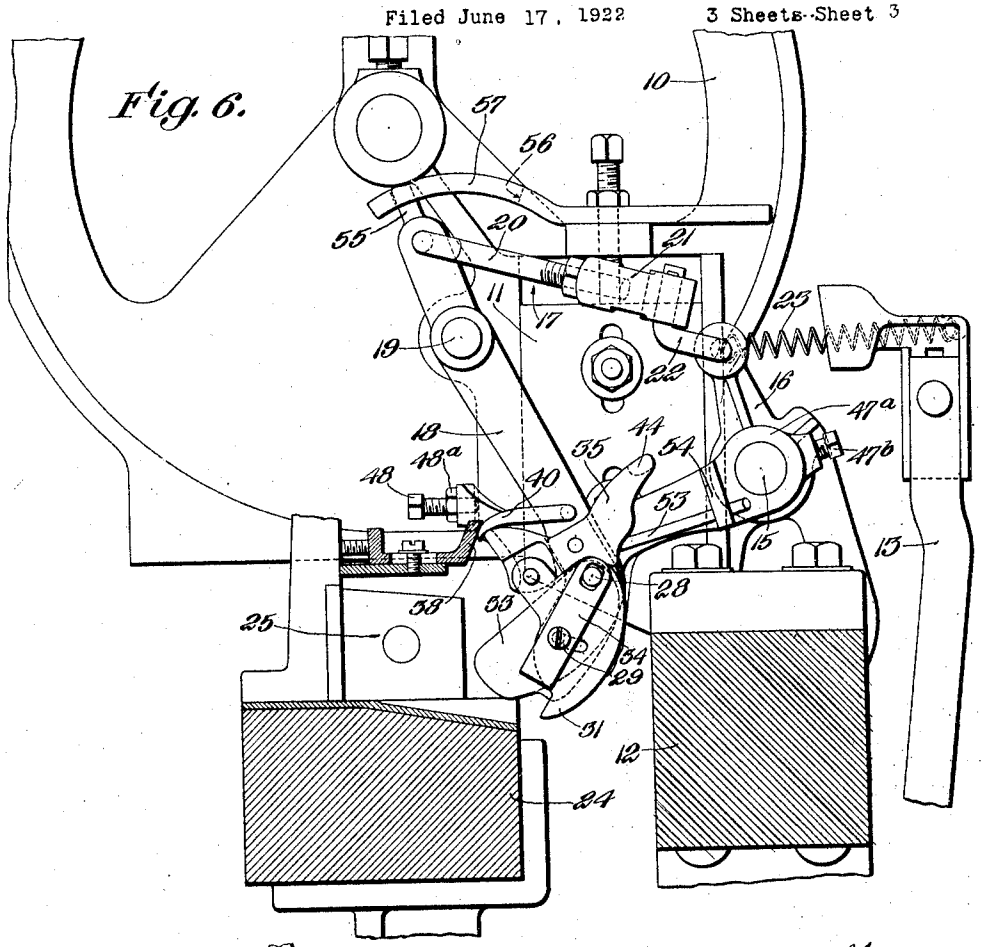


Fig. 7.

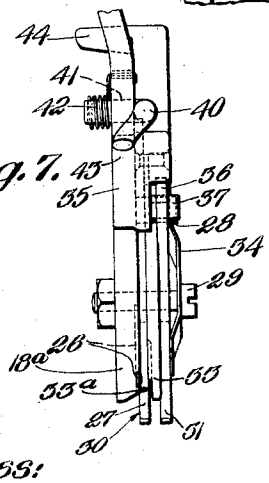
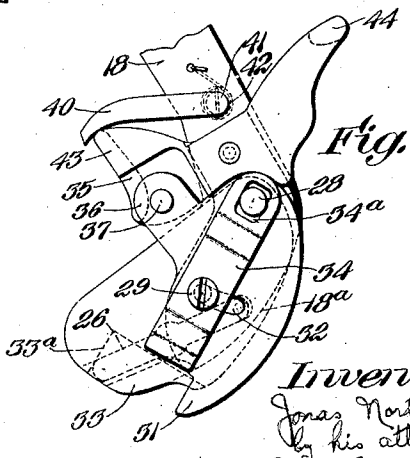


Fig. 8.



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Patented Nov. 11, 1924. 1,515,515

UNITED STATES PATENT OFFICE.

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SHUTTLE-FEELER THREAD CUTTER.

Application filed June 17, 1922. Serial No. 569,111.

To all whom it may concern:

Be it known that I, JONAS NORTHROP, a citizen of the United States, residing at Hopedale, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Shuttle-Feeler Thread Cutters; and I do hereby declare the following to be a full clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to an improvement in thread parting and clamping mechanism for weft replenishing looms. The object of the invention is to produce an improved thread parting and clamping or holding mechanism for looms, operating when the filling on the bobbin or filling carrier has been exhausted to a predetermined extent, and the bobbin or carrier is to be ejected from the shuttle. The thread parting and clamping devices, in the present instance of the invention, are mounted on the shuttle feeler and controlled by connections with the weft replenishing mechanism. The construction and arrangement is adapted for application to either new or old looms. In some aspects the present invention is an improvement upon the construction disclosed in the patent to Jonas Northrop, No. 1,482,808, dated Feb. 5, 1924.

The character of the present invention may be best understood by reference to the following description of the illustrated embodiment thereof shown in the accompanying drawings, wherein:

Figure 1 is a side elevation of the hopper and associated parts of a weft replenishing loom, showing the application of the thread parting and clamping mechanism thereto;

Fig. 2 is a detail of a portion of the actuating means for opening the thread severing and holding devices;

Fig. 3 is a section taken on line 3—3 of Fig. 2;

Fig. 4 is a side elevation similar to Fig. 1, showing the parts in position after replenishment has been indicated, and when the thread severing and clamping devices are about to begin the movements which will result in parting and holding the thread;

Fig. 5 is a plan of the construction with the parts in the position shown in Fig. 4;

Fig. 6 is a side elevation similar to Figs. 1 and 4, showing the parts in position to prevent the thread severing and holding devices from operating to part and hold the thread;

Fig. 7 is an end elevation of a portion of the shuttle feeler and the thread severing and holding devices carried thereby; and

Fig. 8 is a side elevation of the construction shown in Fig. 7.

In the illustrated embodiment of the invention, the improved thread parting and holding mechanism is shown as mounted upon a feeler controlled weft replenishing loom. The parts of the weft replenishing mechanism necessary for the operation of the thread parting and holding mechanism, comprise the hopper 10 (Figs. 1, 4 and 6) mounted on the bracket 11 secured to the breast beam 12. The usual hopper arm 13 is mounted upon the rock shaft 14 called a change shaft which extends along the front side of the loom and is connected at the other end with the filling feeler mechanism.

Mounted upon the transferrer stud 15 is an arm 16 connected by a link 17 with the usual shuttle feeler 18 pivotally mounted on a stud 19 secured to one of the plates of the hopper 10 referred to.

The link 17 may desirably be substantially the same as that disclosed in said patent, and comprises a member 20 having one end connected to the feeler, and its opposite end threaded into a clevis 21, which has an eye receiving one end of a member 22. The opposite end of said member extends through an eye in the arm 16, and is connected by a coil spring 23 with the hopper arm 13 referred to.

The construction is such that when a fresh supply of filling is to be inserted into the shuttle, the hopper arm moves forwardly or to the right, from its position shown in Fig. 1, to its position shown in Figs. 4 and 6, and operates through the coil spring 23, arm 16 and link 17 to rock the feeler rearwardly or toward the left to the position shown in Fig. 4. Thereupon, when the lay 24 carrying the shuttle 25 moves forward toward the breast beam, if the shuttle is incorrectly boxed, it

will engage the feeler and prevent the transferrer from inserting a bobbin into the shuttle. If, on the other hand the shuttle is properly boxed, the shuttle feeler will move past the tip of the shuttle toward the back plate of the box and allow transfer of a bobbin from the hopper into the shuttle.

The thread parting device, as stated, is mounted upon the shuttle feeler. In the present instance of the invention, this parting device comprises a steel cutting plate 26 suitably secured in the end 18[a] of the feeler arm. Cooperating with this cutting plate is a knife 27 pivoted on a pin 28 projecting from the feeler arm. A bolt 29 on said arm projects through an elongated slot in the knife, thereby admitting limited rocking movement of the knife about the pin 28 as a fulcrum. The knife has a cutting edge 30 adapted to cooperate with the steel cutting plate edge to part the thread with scissors-like action.

In my patent above referred to, a knife is disclosed which not only serves to part the thread, but also cooperates with a plate adjacent thereto to clamp the thread standing between the tip of the shuttle and the selvage of the fabric, and at a point adjacent to the tip of the shuttle.

It has been found that in some instances the knife and plate failed to clamp the thread securely, owing to the short length of the thread extending from the cutting edge of the knife to the thread clamping point.

One of the purposes of the present invention, therefore, is to provide means for clamping or holding the thread at a point sufficiently remote from the free end of the severed thread reliably to hold the thread.

This clamping means, in the present instance, comprises a clamping plate 31 which may desirably have a shape similar to that of the knife 27. This clamping plate is pivotally mounted on the fulcrum pin 28, and has an elongated slot 32 registering with the knife slot and receiving the bolt 29, thereby admitting limited rocking movement of the clamping plate.

Cooperating with the clamping plate is a companion plate 33, in the present instance, located between the knife and the clamping plate, and also serving to space the same. This companion plate is held in fixed position by the pin 28 and bolt 29 entered therethrough. The clamping plate is yieldingly urged toward its companion plate by a leaf spring 34 confined between the clamping plate and the head of the bolt 29, one end of said spring having an aperture 34[a] receiving the head of the pin 28 to prevent rocking of the spring from its proper position. The side of the clamping or spacing plate 33 may be cut away as at 33[a] to prevent the thread from being clamped between the knife and the adjacent face of the spacing plate.

The construction is such that when the knife and the clamping plate are rocked by means to be described, from their open positions shown in Figs. 4, 6 and 8, to their closed positions shown in Fig. 1, the thread portion between the shuttle tip and the selvage will be severed with scissors-like action by the cooperation of the knife edge 30 with the cutting plate 26, and the end portion of the thread will be gripped with scissors-like action between the clamping plate 31 and its companion plate 33. The spring 34 will allow the clamping plate to yield with respect to its companion plate, and exert sufficient pressure to hold the thread. The spring will also have a pressure sufficient to hold both the knife and the clamping plate to any positions to which they may be moved, but will allow the knife and the clamping plate to be moved easily under such pressure. The distance from the cutting edge 30 of the knife to the thread holding point between the clamping plate and its companion plate is sufficient to insure holding of the thread at a point a substantial distance from the free end thereof, and therefore, there is no liability of the thread slipping from the clamping device.

In order to rock the knife and the clamping plate to positions for severing and holding the thread, the upper end of the knife may be provided with a striker conveniently in the form of a block 35 suitably secured thereto. The clamping plate 31 may be connected to the block by an ear 36 projecting upward from said plate and having an eye receiving a pin 37 on said block.

The lay may be provided with a suitable actuating device, in the present instance, in the form of a tappet 38 adjustably secured to the top of the shuttle box by a screw 39 entered through an elongated slot in the tappet. When the lay is moved forward or to the right, the tappet 38 will hit the striker 35 and thereby rock the cutter and clamping plate, in order that they may part and hold the thread respectively.

In the operation of a loom, failure of the shuttle to enter the shuttle box would bring the protector mechanism into operation. If the shuttle, however, partially entered the shuttle box, the protector mechanism would be inoperative, and if such incomplete boxing of the shuttle left the side of the shuttle in position to be struck by the shuttle feeler, weft replenishing would be prevented in the usual manner.

Sometimes, however, the shuttle enters the box so late in point of time that as it enters it may touch or tick the shuttle feeler, and thereby prevent replenishment, afterward entering the box so that the thread cutter will be permitted to return toward

operative position, and assume a position such that it may cut the thread. This is an unusual occurrence, and might be due to the fact that the shuttle on the opposite side of the loom had rebounded too far to get a good pick. The present invention overcomes this difficulty. If no provision were made to meet this contingency the tappet 38 would engage the striker 35, and thereby close the knife and sever the thread at a time when replenishment is prevented by the ticking of the shuttle feeler by the shuttle. Therefore, the invention contemplates the provision of means acting automatically to prevent the closing of the knife and the clamping plate under such conditions. This means, in the present instance of the invention, comprises a pawl 40 having its shank bent to present a stud 41 entered through a bore in the feeler arm. A coil spring 42 encircles this stud, and has one end fast thereon, and its opposite end anchored to the feeler arm, the tendency of said spring being to hold the pawl 40 down against the nose 43 projecting upward from the striker 35. Whenever the knife is opened in position to cut a thread, the pawl falls or moves down under the pressure of its spring and rests upon the nose 43 of the striker block 35, and if the shuttle is properly boxed, the tappet, on the forward movement of the lay, will strike the striker block and operate the knife to sever the thread. If, however, the shuttle "ticks" or just touches the shuttle feeler as it enters the shuttle box, such engagement pushes the shuttle feeler forward far enough so that the pawl 40 is engaged by the tappet 38, which thus moves the feeler arm forward without closing the knife. Thus the mere light ticking of the end of the shuttle feeler by the reduced portion of the shuttle, which primarily operates to prevent replenishment, also operates to prevent weft severance at a time when the weft should not be severed because no replenishment has taken place. In the normal operation of a loom the shuttle will be picked earlier on its next arrival at the replenishing side of the loom, and replenishment will then take place without engagement of the shuttle with the feeler, and at the same time the filling will be severed and clamped, the tappet engaging the striker block 35 and operating the knife and clamping plate in the usual manner.

The end portion of the thread extending from the selvage should be held by the clamping device until indication of the next replenishing operation. On the occurrence of this event, the hopper arm again will be rocked forwardly or toward the right, and thereupon the clamping device should be opened to release the thread portion held thereby.

The actuating device for opening the clamping device, in the present instance, comprises a finger 44 projecting from the striker block. For cooperation with this finger, an arm 45 may be provided pivotally mounted on a pin 46 projecting from a bracket 47 having a hub 47[a] on the stud 15 and secured thereto by a screw 47[b]. This bracket is curved inward toward one of the plates of the hopper, and is adjustably secured by a screw 48 held by a lock nut 48[a].

A coil spring 49 encircles the stud 46, and has one end secured to a stop 50 projecting from the bracket 47, and its opposite end secured to a pin 51 projecting inward from the arm 45. This coil spring tends to rock the arm in a contraclockwise direction until limited by engagement of a shoulder 52 on said arm with the stop 50. A wire or member 53 has an inturned end entered through a hole in the upper end of the arm 45, and the opposite end of said wire is entered freely through a hole in an arm 54 projecting laterally from the bracket 47.

The construction is such that when the feeler is rocked forwardly or toward the right, the finger 44 will engage the upper end of the actuating arm 45 and rock the latter in a clockwise direction against the resistance of the coil spring 49, and will move the arm shoulder 52 away from the stop 50. Further movement of the finger will cause the same to wipe over the upper end of the arm 45 and into engagement with the wire 53. Thereafter, the coil spring 49 will become effective to rock the actuating arm 45 in a contra-clockwise direction until limited by engagement of its shoulder 52 with the stop 50. During this forward movement of the feeler, the clamping device will remain in closed position and retain the thread portion held thereby.

When the feeler is next rocked rearwardly or to the left, the finger 44 will wipe along the wire 53 and come into engagement with the upper end of the actuating arm, which is positively held against movement in a contra-clockwise direction by engagement of its shoulder 52 with the stop 50. This rocking movement of the feeler will press the finger 44 down against the wire 53 which will rock the knife and clamping plate into open position in readiness respectively to sever and hold the thread on the forward beat of the lay.

The shuttle feeler is mounted on the stud 19, so that it may slide longitudinally thereof, as described in said patent. The feeler is provided with an upwardly extending arm 55 entered into an angular slot 56 in a bracket 57 supported by the hopper plate.

When the feeler is standing in its normal position, as shown in Fig. 1, the arm 55 occupies a position at the rear end of the slot 56. When the shuttle feeler swings rearwardly into the position shown in Fig. 4,

ready to engage a misplaced shuttle, or to sever the thread from a correctly boxed shuttle, the arm 55 occupies the position shown in Fig. 4 at the front end of the slot 56.

The composite rocking and sliding movement of the feeler causes the latter to move in a path such that the filling thread held thereby is relaxed or relieved from excessive tension when the thread severing and clamping devices move forward to the position shown in Fig. 1. The consequence is that danger of breaking the thread is eliminated, and the thread is held out of the path of the lay, so that the loose thread portion held by the clamping device cannot be caught up and woven into the cloth. The loose thread portion is thus held by the clamping device until the knife and clamping device are again opened on the succeeding operation of the weft replenishing mechanism.

It will be noted that the wire 53 of the actuating device is oblique with respect to the plane of the hopper plate, and therefore, it is in proper position to engage the knife and clamping plate actuating finger as the feeler moves with its composite rocking and sliding movement.

The operation of the mechanism will be readily understood from the foregoing description without further explanation.

It will be understood that the invention is not limited to the specific embodiment shown, and that various deviations may be made therefrom without departing from the spirit and scope of the appended claims.

What is claimed is:—

1. A shuttle feeler thread cutter having, in combination, a feeler arm, a knife having relatively movable members on the feeler arm, a clamping plate, a spacing plate between the knife and the clamping plate co-operating with the latter to hold the thread and having a portion cut away adjacent to the knife to prevent clamping between the knife and the spacing plate, and means for actuating the knife and the clamping plate respectively to cut and hold the thread.

2. A weft replenishing loom having, in combination, bobbin transfer mechanism, a shuttle feeler provided with a thread severing device, a lay, an actuating device on the lay for causing the severing device to cut the thread, and means co-operating with the actuating device, but independent of the transfer mechanism, for automatically preventing the severing device from severing the thread on abnormal engagement of the feeler with the shuttle.

3. A weft replenishing loom having, in combination, a lay, a shuttle feeler provided with a thread severing device, an actuating device on the lay for operating the severing device normally to cut the thread, and means co-operating with the actuating device for pushing the shuttle feeler forwardly without operating the severing device on abnormal engagement of the feeler with the shuttle.

4. A weft replenishing loom having, in combination, a shuttle feeler provided with a thread severing device, a lay, a fixed actuating device on the lay for causing the severing device to sever the thread, and means co-operating with the actuating device and severing device automatically to prevent the severing device from parting the thread on abnormal engagement of the feeler with the shuttle.

5. A weft replenishing loom having, in combination, a shuttle feeler provided with a thread severing device, a lay having an actuating device for causing the severing device to part the thread, and a spring-pressed pawl on the feeler for cooperation with the actuating device and severing device automatically to prevent the latter from parting the thread on abnormal engagement of the feeler with the shuttle.

6. A weft replenishing loom having, in combination, a shuttle feeler having a thread severing knife pivotally mounted thereon, a striker for said knife, a lay having an actuating device for engagement with the striker to rock the knife to part the thread, and means on the feeler cooperating with the actuating device to prevent engagement of the striker with the actuating device and rocking of the knife on abnormal engagement of the feeler with the shuttle.

7. A weft replenishing loom having, in combination, a shuttle feeler provided with a thread severing device and a thread holding device, a lay having an actuating device for causing the severing device and the holding device respectively to part and hold the thread, and means mounted on the feeler for preventing operation of the severing and holding devices by the actuating device on abnormal engagement of the feeler with the shuttle.

8. A weft replenishing loom having, in combination, a shuttle feeler provided with a thread severing knife having a striker, a lay having an actuating element for engagement with the striker to cause the knife to part the thread, and a member on the feeler normally out of the path of the actuating element, but brought into position to be engaged by said element and prevent the latter from engaging the striker on abnormal contact of the feeler with the shuttle.

9. A weft replenishing loom having, in combination, a shuttle feeler provided with a thread clamping device having an operating finger, a support, an actuating arm pivotally mounted on said support, a stop, a spring tending to hold said arm in engagement with said stop, and a member piv-

otally connected with said arm and having sliding engagement with said support, said member being disposed for engagement with said finger to open the thread clamping device on rearward movement of the feeler.

10. A weft replenishing loom having, in combination, weft replenishing mechanism including a shuttle feeler provided with a thread cutter and holder, consisting of a stationary blade, a movable blade cooperating with the stationary blade, a movable knife cooperating with the stationary knife, a stationary holder adjacent the movable knife and provided with a cut-away portion on its side next the movable knife to prevent the filling being held between it and the movable knife, and a movable holder cooperating with the stationary holder.

11. A weft replenishing loom having, in combination, weft replenishing mechanism including a shuttle feeler, a thread cutting and holding device mounted on the feeler comprising a stationary knife and a movable knife arranged to cooperate to sever the thread, and a stationary holder and a movable holder arranged alongside of the knives, the side of the holder adjacent the knife being cut away to prevent the clamping of the thread between the knife and holder.

12. A weft replenishing loom having, in combination, weft replenishing mechanism including a shuttle feeler provided with a thread cutter and holder, the cutter being provided with a striker for opening and closing it, a pivoted arm and slide rod adapted to cooperate with the striker, the rod being adapted on the rearward movement of the feeler to open the knife, and the arm being adapted on the forward movement of the feeler to permit the knife to pass without opening.

13. A weft replenishing loom having, in combination, a shuttle feeler provided with a thread cutter, means for imparting a movement transversely of the loom to the feeler when moved forwardly or rearwardly, an operating striker on the cutter, a pivoted arm adapted to be engaged by the striker, a slide rod connected with the arm and arranged in the path of motion of the striker, the rod being adapted to co-operate with the striker to open the knife on rearward movement of the feeler and the arm being adapted to permit the striker to pass without opening the knife on forward movement of the feeler.

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