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[33] Switzerland
[31] 17348/69

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122 R, 123, 124 R, 124 A, 125, 126, 127 R, 302,
303

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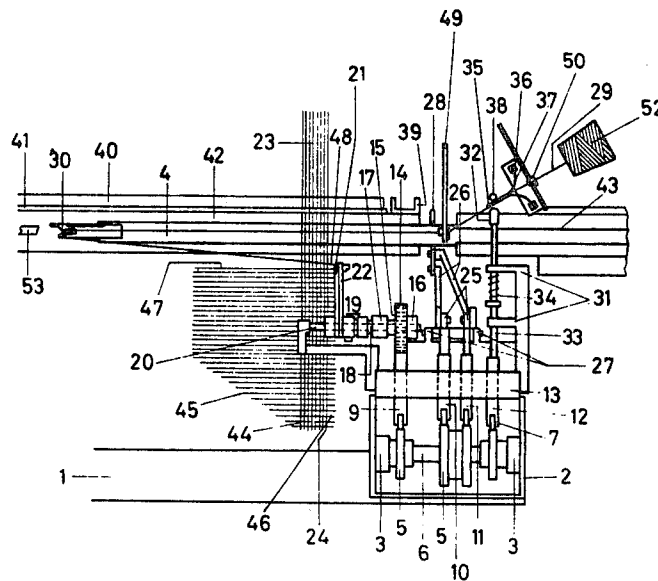
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[54] FILLING CUTTING DEVICE FOR A WEAVING
MACHINE
4 Claims, 7 Drawing Figs.

[52] U.S. Cl..... 139/122 R,
139/127 R, 139/302

[51] Int. Cl..... D03d 47/36

ABSTRACT: The invention relates to a filling cutting device on a weaving machine with filling insertion from a supply package outside of the warp shed, said filling cutting device being actuated synchronously with the movement of filling insertion members movable in relation to each other, each one provided with a cutting edge, the one of which is situated at the edge of a catching recess for the filling yarn of one cutter member and so oriented as to function with either of two types of pick insertion.



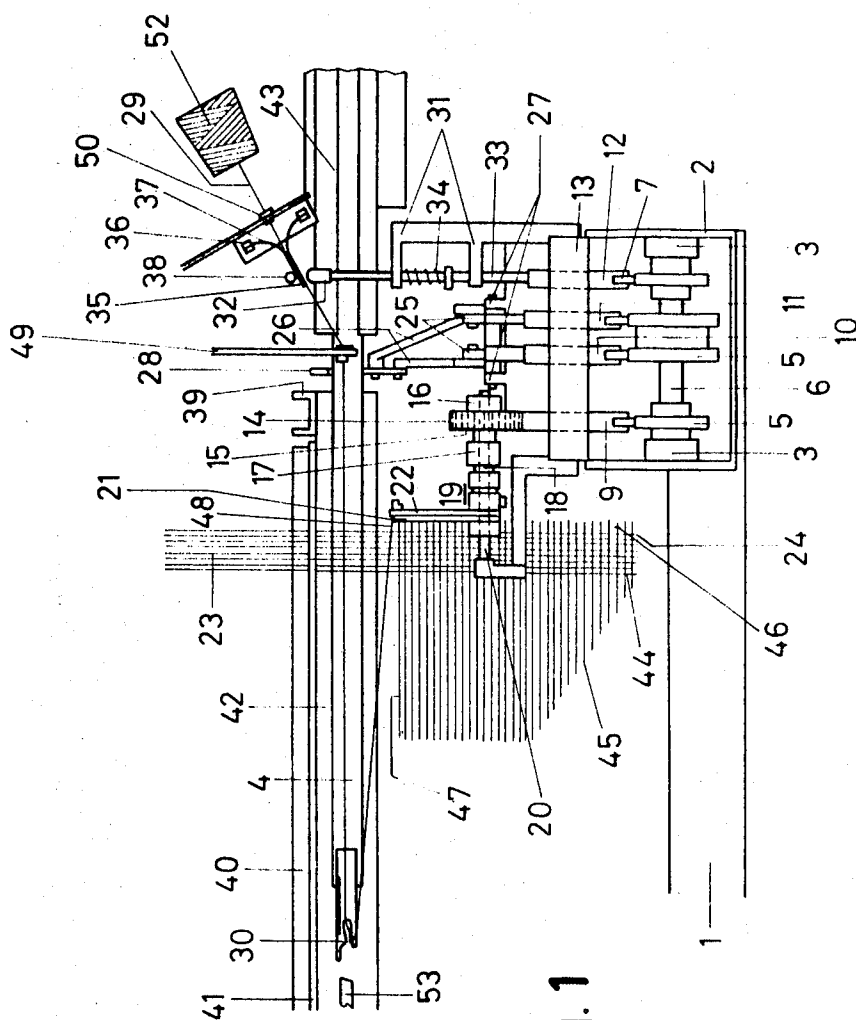


Fig. 1

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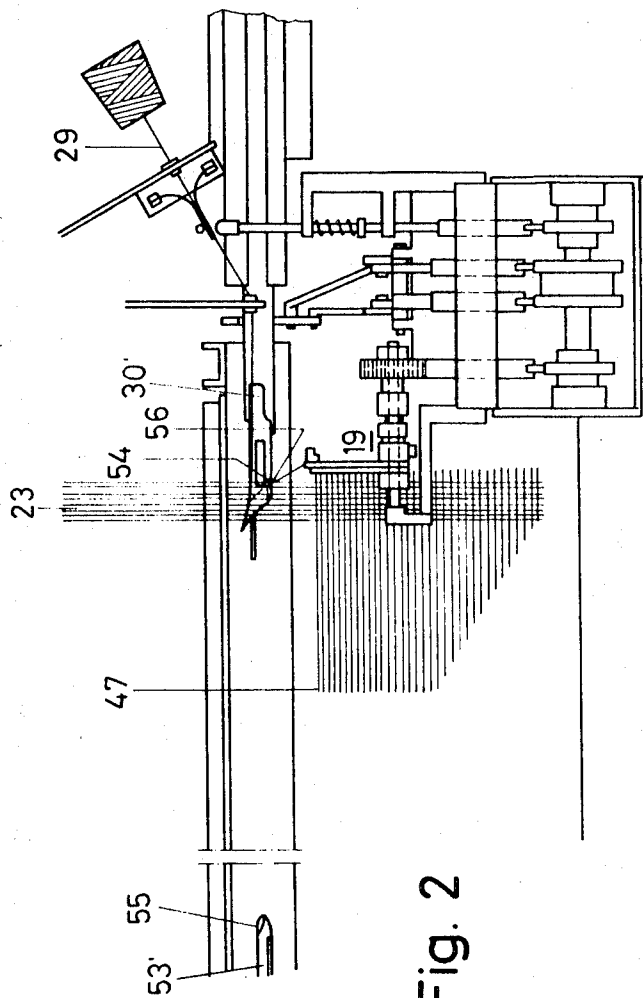


Fig. 2

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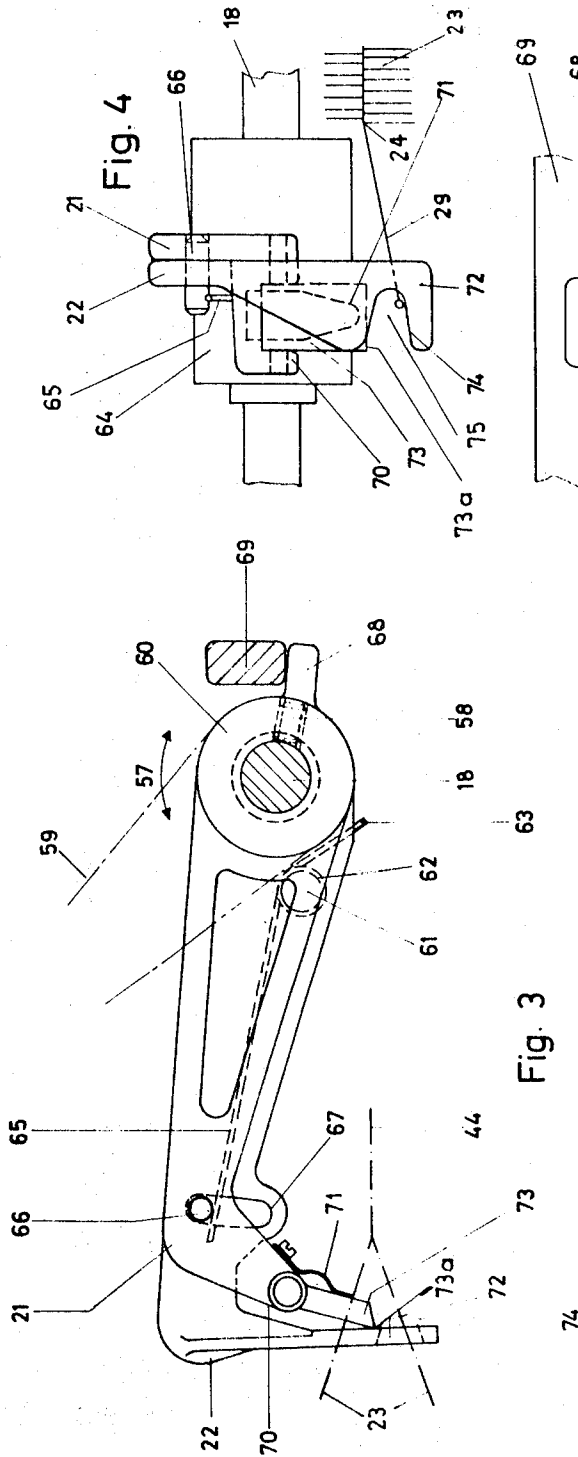


Fig. 3

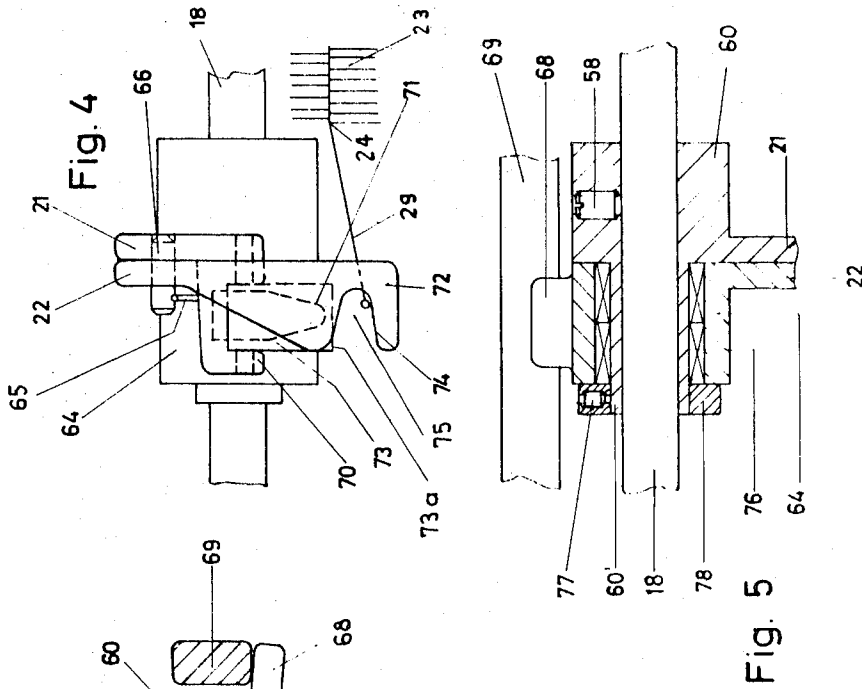


Fig. 4

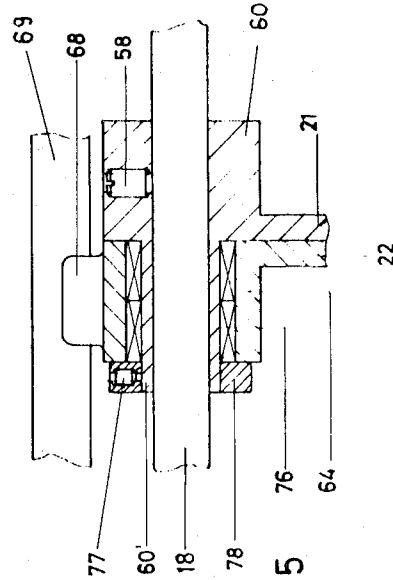


Fig. 5

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Fig. 6

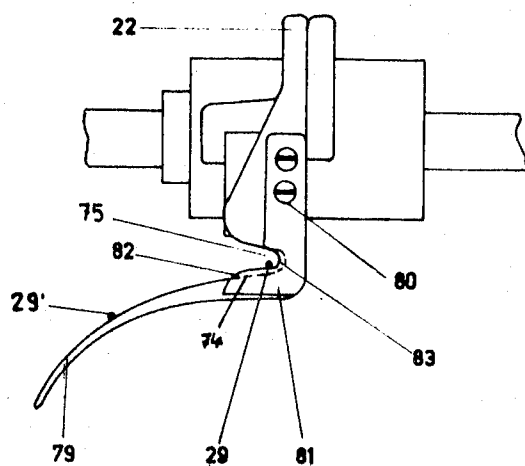
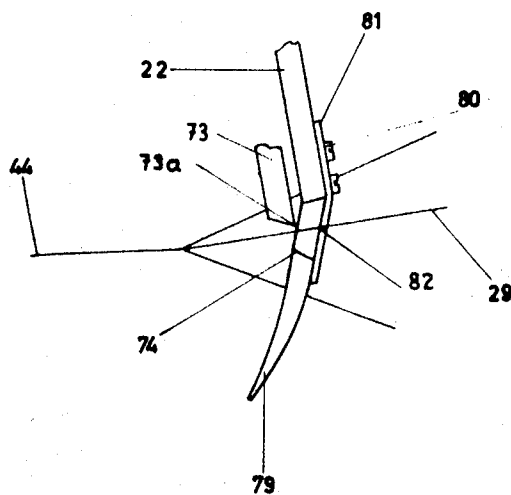


Fig. 7



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FILLING CUTTING DEVICE FOR A WEAVING MACHINE

BACKGROUND OF THE INVENTION

For weaving machines with pick and pick filling insertion, two basic insertion systems are known by which the insertion of the filling into the warp shed is effected by means of an inserting carrier and a withdrawing carrier entering the warp shed from opposite sides, meeting each other in the middle of the shed for the filling transfer and thereafter, returning to their basic position.

That one of the systems known as a loop insertion system, is based on a filling thread leading from one of the cloth selvages to a package being caught by an inserting carrier provided with guiding surfaces, which carrier extends the thread in the form of a loop which is sliding over the guiding surfaces up to the middle of the cloth, where it is taken over by the cooperating carrier. At a properly timed moment in the transfer of the loop, the filling part connected to the cloth selvage is cut at the selvage, whereupon the withdrawing carrier pulls out the cut filling over the remaining half of the cloth.

With the other system, known as tip insertion system, the filling yarn extending from the cloth selvage to the supply package is caught by an inserting carrier provided with a clamping device. The filling is cut at the selvage not later than at the moment when the inserting carrier enters the warp shed, so that the free tip of the pick is carried ahead into the shed. In the middle of the cloth the tip of the pick is transferred to and clamped by the withdrawing carrier which has entered the shed from the opposite side. On the reverse movement of the withdrawing carrier the pick is pulled out, again with its tip ahead, over the other half of the cloth.

Both aforementioned systems require for their accomplishment different means of filling control. Correspondingly, different filling cutting devices have been used so far. It is a purpose of this invention therefore, to develop a filling cutting device which can be used for both the loop insertion system and for the tip insertion systems.

Filling cutting devices of the prior art are known (such as, e.g., Swiss Pat. No. 464,106) on which the cutting edges stand vertical and normal to the direction of filling insertion. A disadvantage in the case of the tip insertion system is that the filling thread which leads from the cloth selvage to the supply package can only get between the cutting edges when the inserting carrier has already entered the shed over a considerable distance, as only then is the filling part near the selvage at right angles to the cutting edges. Furthermore, considerable cost and effort are involved to achieve a perfect and lasting cutting quality because the cutting faces standing opposite to each other must be hollow ground to obtain a three-point contact.

SUMMARY OF THE INVENTION

With a view to accomplishing these desired results and to the elimination of the aforementioned disadvantages, the filling cutter according to the inventive idea is so designed that a catching recess can be turned away from the warp shed with its thread receiving opening pointing to the side of the filling insertion and that the two cutting edges are situated in a plane virtually parallel to the filling insertion movement.

The drawings show by way of example one configuration of the inventive object wherein:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of a filling control motion to illustrate the function of the inventive filling cutting device for a loop insertion system,

FIG. 2 is a plan view of a filling control motion to illustrate the function of the inventive filling cutting device for a tip insertion system,

FIG. 3 is a side view of the filling cutting device seen from the side of the cloth, showing the device in the position ready to cut,

FIG. 4 is a front view of the cutting part of the filling cutting device in a position to cut,

FIG. 5 is a horizontal section across the bearing of the filling cutter,

FIG. 6 is a front view of the cutting part of an alternative means applicable to the filling cutting device incorporating a thread guide, and

FIG. 7 is a side view of the cutting part of the filling cutting device shown in FIG. 6, seen from the opposite side to FIG. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 shows a plan view of a filling control motion of a shuttleless weaving machine for single pick insertion by means of an inserting carrier and a withdrawing carrier with a schematic view of the filling cutting device as employed for the loop insertion system. Among parts shown is a girt 1 of the loom which is not shown in detail, on which is mounted a control housing 2 with a control shaft 6 borne in two bearings 3. The control shaft 6 is driven by means (not shown) synchronously with the movements of the reciprocating insertion members 4 and is equipped with a plurality of cams 5.

The control movements of the rotating cams 5 are transferred to pushing rods 9, 10, 11 and 12 which are each provided with a cam following roller 7, said pushing rods being horizontally movable in guides in a bar 13. The pushing rod 9 is provided with teeth 14 which mesh with a pinion 15 mounted on a pinion shaft 18 which is borne in bearings 16 and 17. This pinion shaft 18 operatively supports the filling cutting device which as a whole is identified with numeral 19. An extension 20 of the pinion shaft 18 pointing toward the cloth, allows setting the filling cutting device 19 to the required cloth width. The filling cutting device 19 is arranged on the pinion shaft 18 so that its cutter members 21 and 22 can move up and down outside the warp ends 23 of the ground cloth, i.e., adjacent to the cloth selvage 24.

The pushing rods 10, 11 act upon a filling depressor 28 via double lever 26 provided with rollers 25 and linked in bearings 27, the purpose of said filling depressor 28 being to bring the filling yarn 29 from a horizontal position into an approximately vertical position which is suitable for the inserting carrier 30 of the filling insertion member 4 for taking over the filling. The rollers 25 are pressed against the pushing rods 10 and 11, respectively, by traction springs (not shown).

The further pushing rod 12 is in contact with a rod 33 being movable in guides 31, provided with a presser 32 and spring loaded against the pushing rod 12 by means of the compression spring 34. The presser 32 acts upon a filling clamp 35, consisting of two flat springs 37 fixed in two studs 36 and of a counter stud 38.

Furthermore, there are a sley sword 39, a sley 40 with a reed 41 and a race board 42 to support the warp ends 23 and the flexible-type tape filling insertion member 4 running in the tape guide 43. The insertion member 4 has fixed at its end an inserting carrier of known form. Also, an opposed and similar withdrawing tape member (not shown) has fixed at its end a withdrawing carrier, these also being known in the art.

The filling threads 45 which together with the warp ends 23 form the cloth 44, have free ends 46 at the cloth selvage 24. The pick 47 which has last been beaten up by the reed 41 runs in a loop 48 formed by the filling yarn 29 and leads from the cloth selvage 24 via the filling cutting device 19, the inserting carrier 30, the filling positioner 49, the filling clamp 35 and the eyelet 50 in the protection shield to the filling yarn supply package 52.

The cutting of the filling yarn 29 by the cutting device 19 takes place at the moment when a withdrawing carrier 53 upon entering the inserting carrier 30 in the middle of the cloth 44 has taken over the filling yarn 29. This timing is given by the setting of the cam 5 controlling the pushing rod 9. The loop is then straightened out extending the cut end to the other side of the cloth.

FIG. 2 is a plan view showing a corresponding filling control motion with a similar filling cutting device 19 in function with the tip insertion system. The general arrangement is identical with FIG. 1 except for an appropriately shaped inserting carri-

er 30' with thread end clamping device 54 and a withdrawing carrier 53' with a thread end holding device 55.

The cutting of the filling yarn 29 connected with the last beaten-up pick 47, leading around the filling cutting device 19 and being clamped in the thread clamping device 54 of the inserting carrier 30', takes place at the moment shown in FIG. 2, i.e., when the thread clamping point 56 just enters the shed, or in other words, has reached the outermost warp ends 23. This timing is given by the setting of the cam 5 actuating the cutting device which is changed as compared with the setting of the cam as per FIG. 1 (loop insertion system).

FIGS. 3, 4 and 5 demonstrate the construction of the filling cutting device 19 shown in the position ready to cut. The cutter member 21 is firmly mounted on the shaft 18 by means of screw 58 located in the cutter member hub 60. The shaft 18 is situated above the cloth 44 and can be oscillated in directions of the arrow 57 by a pinion drive as shown in FIG. 1 or by other suitable means (not shown or described here). By oscillating in the direction of the arrow 57, the filling cutting device 19 can take a position ready to cut as drawn in full lines, or a rest position as indicated by the dot and dash line 59, FIG. 3. Another cutter member 22 is rotatably borne on a sleeve 60', adjacent to the cutter member 21. The hub 64 of the cutter member 22 is radially guided by means of needle bearings 76 on sleeve 60' which extends laterally from the hub 60. An adjusting collar 78 clamped on the sleeve 60' by means of a set screw 77 secures the hub 64 and also the cutter member 22, against axial displacement. When the screw 58 is loosened the whole filling cutting device 19 can be moved along the shaft 18.

The cutter member 22 is provided with a stud 61 on which is mounted a torsion spring 62, the one end 63 of which is rested against the hub 64 of the cutter member 22. The other end 65 of the spring presses against stud 66 which is firmly connected with the cutter member 21 and which extends through a slot 67 in the cutter member 22, whereby the cutter member 21 takes an upper position in relation to the cutter member 22 determined by the stop position of the stud 66 in the upper end of the slot 67.

By lowering the filling cutting device 19 from the rest position 59 into the drawn or full line position ready to cut, a nose 68 on the hub 64 of the cutter member 22 comes to rest against a stationary stop 69 and prevents a further downward movement of the cutter member 22. By further turning of the shaft 18 a cutting blade 73 with a cutting edge 73' is moved downwards against the cutting edge 74 and past it, said cutting blade 73 being rotatably borne in a fork 70 of the cutter member 21 and being pressed against the cutter part 72 of the cutter member 22 by means of a flat spring 71. Thus the cutting process of the filling cutting device 19 is carried out.

By turning the shaft 18 or the filling cutting device 19, respectively, clockwise (FIG. 3) the cutter is brought back from its cutting position in the drawn position, ready to cut, and thereafter, again back to rest position 59.

As can be seen particularly from FIG. 4, the cutter part 72 is provided on a part of the cutter member 22 which is at right angles to the longitudinal direction of the cutter members 21, 22 or parallel to the direction of filling insertion, respectively. The cutter part 72 is provided with an approximately U-shaped catching recess 75 with its closed part against the cloth and its open part pointing toward the filling supply side, into which the filling thread 29 held back by the selvage 24 is guided soon after it has been caught by the inserting carrier 30 or 30'. The cutting edge 74 at the lower end of the catching

recess 75 and the cutting edge 73a at the lower end of the cutting part 73 are approximately parallel to the direction of filling insertion. This above-described arrangement allows by way of choice, effective cutting of the filling thread in the position of the inserting carrier as in FIG. 1 in the case of loop insertion, or in the position of the inserting carrier 30' as in FIG. 2 in the case of tip insertion.

As an alternative the cutting part of the filling cutting device 19 shown in FIGS. 6 and 7 is provided with a thread guide 79. This thread guide 79 extends from the cutting edge 74 and is tilted downwards. Its purpose is to guide heavy and sagging filling 29 safely into the catching recess 75 of the filling cutting device 19, as indicated by 29' in FIG. 6. Furthermore, a plate 81 can be fastened by means of screws 80 to the cutter member 22 opposite the cutting part 73 and provided with a recess similar to the catching recess 75, however, with its lower edge 82 and side edge 83 projecting over the cutting edge 74. This is a particular advantage when using certain delicate filling yarns 29, as it prevents the filling yarn from contacting the cutting edge 74 prior to the actual cutting process. It is also possible to have the plate 81 and the thread guide 79 made in one piece.

This disclosure of a preferred embodiment of the invention is to be interpreted as illustrative of forms the invention may take and modifications will readily occur to those skilled in the art. The invention is not to be restricted except by the scope of the appended claims wherein the novel features desired to be protected by Letters Patent are set forth.

What is claimed is:

1. A filling cutting device for a weaving machine in which filling is inserted from a stationary source of filling located outside the shed of a fabric being woven and in which weaving machine reciprocable filling carriers are provided to draw filling from the supply and to insert it as single picks in a warp shed as the fabric is being woven, characterized in that, the cutter comprises two members, an oscillatable shaft on which said members are carried, one said member being fixed for oscillation with the shaft and the other being mounted for restricted rotation relative to the shaft, connecting means between the two members imparting movement of the member fixed to the shaft to the other member through a limited angular extent, that member also having a yarn-catching recess at its end adjacent the point where filling is picked up by a carrier and at which the carrier and filling enter the shed, said recess being closed on the side of the warp thread and open toward that direction from which the filling is drawn, a cutting edge at one half of the yarn recess, the first member fixed to the shaft having a cutter blade and means for urging that blade into a cutting engagement with the cutting edge of the recess, cutting edges of both blade and recess lying in a plane parallel to the direction of pick insertion.

2. A filling cutting device according to claim 1, characterized by a thread guide (79) arranged at the catching recess (75) in extension of the cutting edge (74).

3. A filling cutting device according to claim 1, characterized in that a plate (81) is fastened to the cutter member (22) in the range of the catching recess (75) having a guiding edge (82, 83) projecting over the cutting edge (74).

4. A filling cutting device according to claim 1, characterized in that a cutting part (73) is pivotably borne at the one cutter member (21) and is provided with a cutting edge (73a) and pressed by a spring (71) against the other cutter member (22) provided with a catching recess (75), whereby the pivoting axis of the cutting part (73) is parallel to the shaft (18).

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