United States Patent

Barten

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[45] **May 30, 1972**

[54] DEVICE FOR PREPARING A WEFT

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May 29, 1968 Netherlands.....6807613

[52] **U.S. Cl.**.....**139/127 P**

[51] **Int. Cl.**.....**D03d 47/28,** D03d 47/34

[58] **Field of Search**.....139/122 R, 122 S, 127 R, 127 P; 66/125

[56] **References Cited**

UNITED STATES PATENTS

3,443,603	5/1969	Van Mullekom	139/127 P
3,587,664	6/1971	Van Mullekom	139/127 P

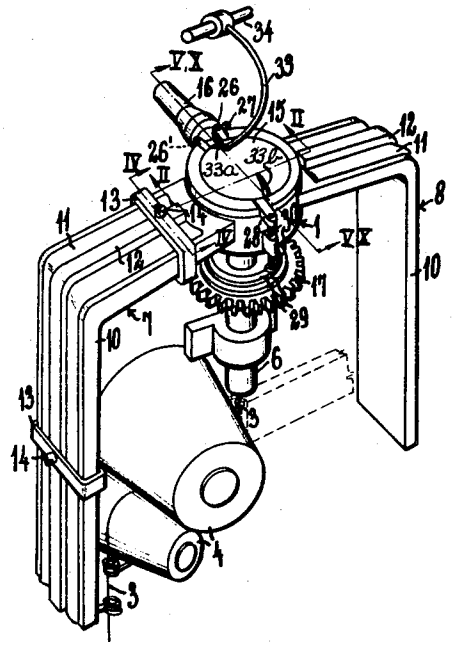
Primary Examiner—Henry S. Jaudon

Attorney—Marshall & Yeasting

[57] **ABSTRACT**

A presenting device for conducting a weft thread is rotatable on an axis and has an axial thread inlet and a thread outlet at a point spaced from the axis. A member for temporarily storing a loop in the thread has an entrance arranged adjacent to the path of rotation of the thread outlet of the presenting device, to receive a loop of thread from such outlet. A thread clamp is arranged adjacent to the entrance of the storing member for clamping one end of such loop of thread, and a weft inserting device is arranged adjacent to the path of rotation of the thread outlet of the presenting device, to receive the other end of the loop of thread from such outlet.

11 Claims, 10 Drawing Figures



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3 Sheets-Sheet 1

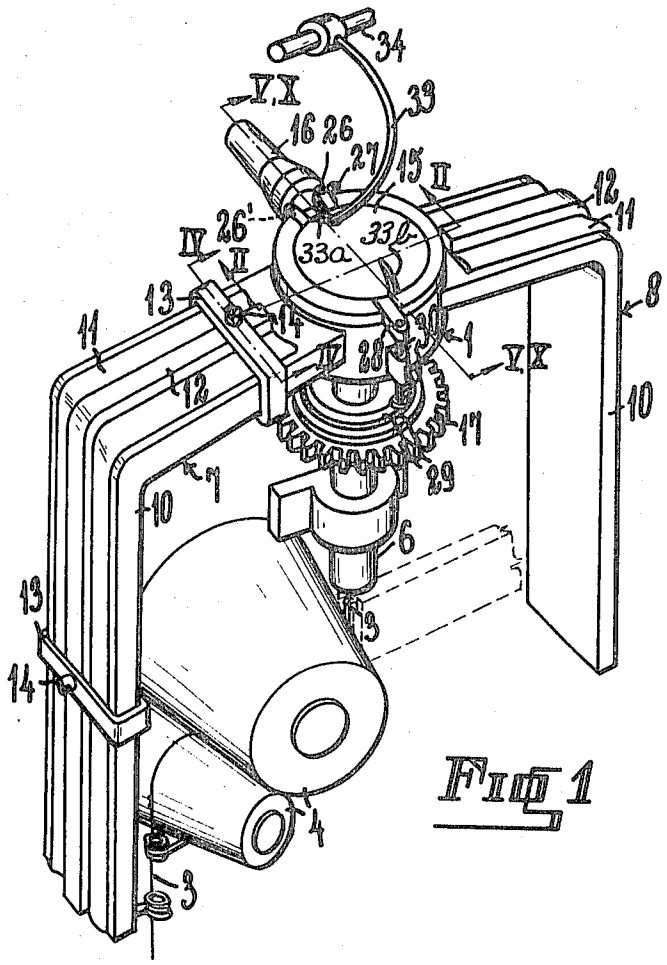


Fig 1

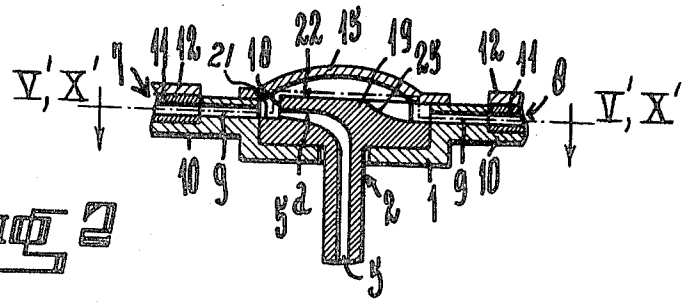


Fig 2

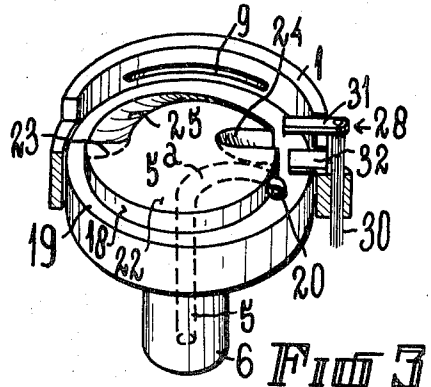


FIG 3

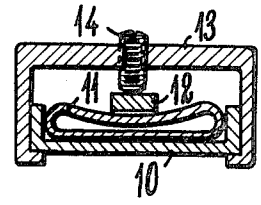
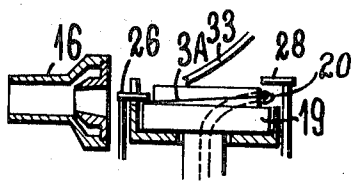


FIG 4

FIG 5



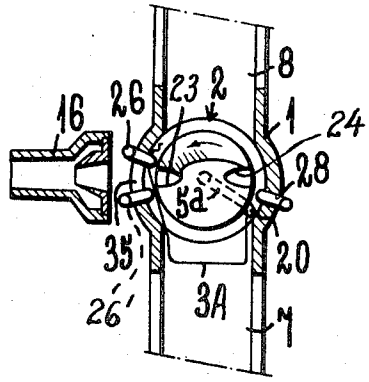
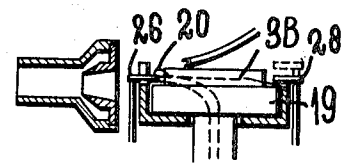


FIG 5'

FIG 6



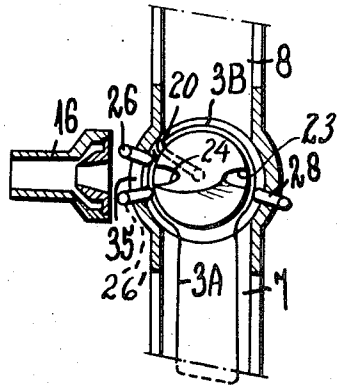
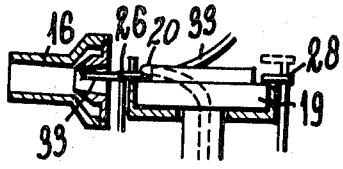


FIG 6'

Fig 7



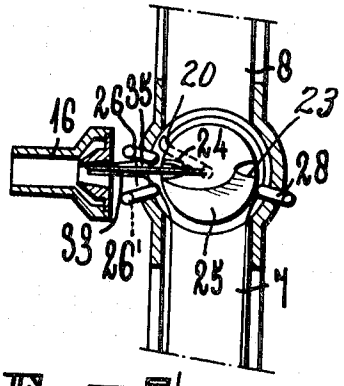
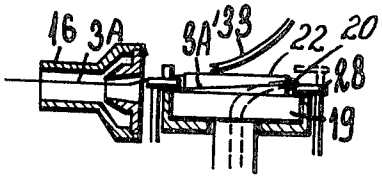


Fig 7'

Fig 8



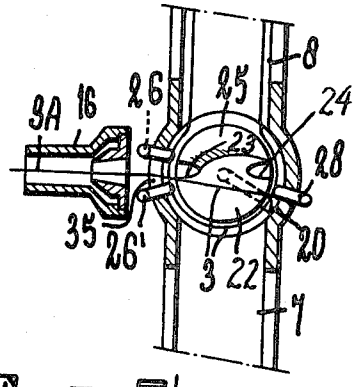
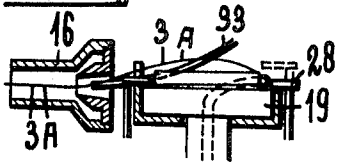


Fig 8'

Fig 9



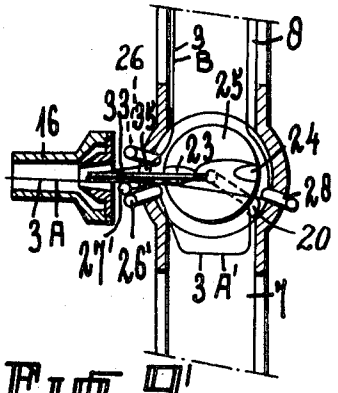
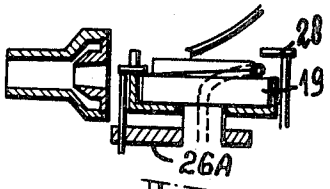


Fig 9'

Fig 10



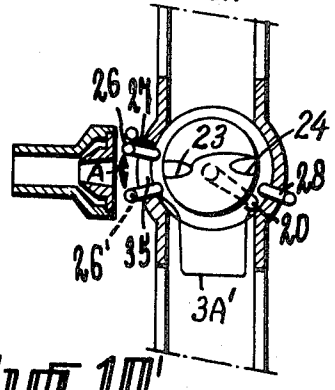


Fig 10'

DEVICE FOR PREPARING A WEFT

CROSS REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of application Ser. No. 828,291 filed May 27, 1969.

BACKGROUND OF THE INVENTION

The invention relates to a device to be used in shuttleless weaving machines, thus in weaving machines, in which the weft is to be inserted into the shed by means of a weft gripper. Such weaving machines have the advantage that they can operate with a very high weaving speed because the thread to be used for the weft can be continuously drawn from a stationary thread package. Such devices consist in general in a storing member for taking up a measured length of a thread in the shape of a loop and a presenting device comprising pushing needles to present the thread to the storing member and to the jet nozzle or gripper as quickly as possible. The paths of movement of the different pushing needles in such presenting devices can be complex.

SUMMARY OF THE INVENTION

The object of the invention is to improve a device for preparing a weft in such a manner, that the control device can perform a simple movement without any stop in the motion of the thread drawn from the thread package.

According to the invention, the device for preparing a weft is characterized in that the presenting device consists in a thread guide which rotates around an axis and which has a delivery end that remains at a distance from the axis of rotation which delivery end describes a track around the axis of rotation and in which the track of the delivery end of the thread guide passes a delivering place for the thread, comprising an entrance of the storing member for the loop of the thread and a series of thread clamps have been situated in such a manner that a thread leaving the thread guide is clamped by a thread clamp near the entrance of the storing member, which thread is taken up by the storing member in the shape of a loop whereas further the thread is moved to a delivery place by the thread guide in order to be presented to a jet nozzle or a weft gripper.

Now only one rotatable head can be used, which head will be rotated over a half of the entire revolution for each weft or each leg of a hairpin woven weft, whereas a simple reciprocally driven needle can be used for moving the thread into a jet nozzle or between the jaws of a weft gripper.

In order to facilitate a good running of a thread when presented to the storing member the device according to the invention has been adapted in such a manner, that the rotatable thread guide debouches with its delivery end outside the circumferential surface of the head which circumferential surface has its center near the axis of rotation whereas the entrance of the storing member has been adapted in accordance with the circumferential surface of the head. In a practical embodiment of the device according to the invention the rotatable thread guide has the shape of a solid of revolution provided with an axial channel, which has been deviated into a radial channel which radial channel debouches at the circumferential face of the solid of revolution.

A further practical embodiment of the device according to the invention is characterized in that the solid of revolution has been situated within a housing having a circumferential wall provided with at least one slot, which forms the entrance of at least one storing member for the thread, whereas the slot has been situated in a plane perpendicular to the axis of the solid of revolution. Further the circumferential wall of the housing has an additional slot or opening which forms the delivery place for the thread and is adapted as a passage for the thread out of the internal space of the housing to a jet nozzle or a weft gripper of the weaving machine. When the device for preparing a weft is used in a weaving machine by which the wefts are arranged in the shape of a hairpin in the woven cloth to provide a selvage the device according to the invention is

adapted in such a manner that the housing for the solid of revolution forms a connection between two storing members which are diametrically situated with respect to the solid of revolution. In such an embodiment one storing member can be used for taking up a first leg of a weft and the other storing member can be used for taking up the second leg of the weft which has to be arranged in the fabric in a hairpinlike manner. The manner in which the wefts are woven in a hairpinlike manner for making a selvage need not be discussed, because this manner of weaving is known per se.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a device for preparing a weft according to the invention;

FIG. **2** is a cross section of the presenting device according to the line II—II in FIG. **1**;

FIG. **3** is a perspective view of a presenting device in the shape of a solid of revolution;

FIG. **4** is a section according to the line IV—IV in FIG. **1**; and

FIGS. **5–10** are cross sections according to the line V, X–V, X in FIG. **1** and FIGS. **5'–10'** are cross sections according to the lines V', X'–V', X' in FIG. **2**, which show different stages in preparing a weft.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIGS. **1** and **2** the device according to the invention consists in general in a central housing **1** in which the presenting device **2** for the thread **3**, which can rotate around the central axis has been situated. The thread **3** is drawn from a stationary thread package in a known manner by means of continuously rotating rollers **4** and the thread runs to an axial channel **5** of a rotatable shaft **6** of the presenting device. When necessary an auxiliary device for taking up an excess of length in the thread can be situated between the rollers **4** and the shaft **6** as indicated with a dotted line. This auxiliary device will not be discussed here as it forms no part of the invention.

The housing **1** for the presenting device **2** forms a connection piece between two storing members **7** and **8** each adapted for taking up a measured length of the thread **3** in the shape of a loop. Such storing members are generally known and consist in a flat tube within which an airstream flowing away from the housing **1** is created by suction applied at the remote end of the storing member. By means of this airstream a loop of the thread is drawn into the tube. For clearness sake the form of such a storing member will be described with reference to the FIGS. **1**, **2** and **4**.

The housing **1** has been provided with flat slots **9**, in its circumferential wall near the storing members **7** and **8** which slots debouch into gutter-shaped supporting frames **10**. a hose **11** preferably of transparent material fits in each of the supporting frames, which hose has been flattened by means of a bar **12**. The internal space of each hose **11** can be accurately adjusted by means of adjusting screws **14** situated in clips **13**. The internal space of each hose **11** is in alignment with the slot **9** as indicated in FIG. **2**. The slots **9** form thus the entrance of the storing members **7** and **8**. The slots **9** of the storing members **7** and **8** are both thus diametrically arranged in the housing **1**. The housing can be covered by a cap **15** to exclude stray air currents. The application of a cap **15** is not necessary for a good operation of the device.

Referring again to FIG. **1** the device for preparing a weft cooperates with a main jet nozzle **16** of a weaving machine in which the weft is to be inserted into the shed by means of jet action of a fluid.

The presenting device **2** situated in the housing is rotated in cycles as hereinafter described in synchronism with the operation of the loom by its shaft **6** which is driven by any desired mechanism, only one gear **17** of which has been indicated in FIG. **1**. Preferably the driving is such, that the rotation of the presenting device is performed step by step each time over a half of a turn of the presenting device **2**.

Referring now to FIGS. 2 and 3 the axial channel 5 possesses a part 5a which runs in a radial direction and which further debouches in the circumferential surface 18 of a head 19 of the presenting device 2. Preferably the mouth of the part 5a of the channel has been provided with a spout 20 (shown in FIG. 3 but not shown in FIG. 2) for a purpose which will be described later. The ledge 21 or step has been provided beneath the circumferential surface 18. The endface 22 possesses two rounded slot-like notches 23 and 24 as shown in FIG. 3 whereas one side of the endface 22 has a bevel 25 which tapers from a wide bevel adjacent to the notch 23 to a narrow bevel near the notch 24. The circumferential wall of the housing 1 has been provided with thread clamps 26 and 28. The thread clamps can be controlled, for instance by means of cam tracks 29 on the gear wheel 17. Other control means for the thread clamps 26 and 28 are also possible. The thread clamp 28 in FIG. 3 has been indicated in detail and consists in a pushing rod 30 with an upper jaw 31, which pushing rod cooperates with a cam track 29. The thread clamp possesses a stationary jaw 32, which has been mounted on the wall of the housing 1. A presenting needle 33 has been situated above the housing, which presenting needle can be tilted by rotating an axis 34 so that it works in a notch 33a in the cap 15. This notch and the notch 33b admit air which forms part of the air streams that flow into the storing members 7 and 8 as hereinbefore described. The purpose of the needle 33 is to bring the thread from the housing 1 into the jet nozzle 16. The driving of the shaft 34 will be performed in the moment when the thread is to be placed from the housing 1 into the jet nozzle 16.

Referring now to the FIGS. 5–10 and 5'–10' the operation of the device will be described step by step.

In each pair of FIGS. 5—5 to 10—10 two cross sections have been indicated as the cross section according to the line V, X – V, X in FIG. 1 and the cross section according to the line V', X' – V', X' in FIG. 2.

Assuming that the presenting device 2 rotates in a counter clockwise direction, as indicated by the arrow in FIG. 5', and that the leading end of the thread has been clamped in the thread clamp 26, that part of the thread leaving the spout 20 is held down by the clamp 26 so that the thread is at first wound around the non-bevelled part of the circumferential surface 18 and comes in front of the slot 9 of the storing member 7. By the action of the stream of air which has been created in the interior of the storing member the thread will come into the shape of a loop as has been indicated in FIG. 5'. By means of the stream of air which flows through the channel 5 the supplying of the thread will be facilitated. The airstream leaving the spout 20 will be helpful in forming a loop within the storing member 7 as the stream of air has been directed towards the interior of the storing member in the direction of that leg of the loop of the thread which leaves the spout. After the loop has been formed the airstream in the channel 5 can be interrupted and the thread which will be further supplied by the rollers 4 would have an excess of length which excess can be taken up by the auxiliary storing device indicated by the dotted line. As soon as the loop has attained its exact length within the storing member 7, that is to say that the thread has sufficient length to be extended over the entire width of the shed of the weaving machine, the stream of air in the channel 5 and out of the spout 20 is interrupted and the presenting device rotates further owing to which the spout 20 passes the thread clamp 28. When the device is used in a high speed weaving machine the interruption of the stream of air through the channel 5 and out of the spout 20 is not necessary. The thread clamp 28 will now clamp the thread and thus hold it down so that when the presenting device rotates further the thread is initially wound around the surface 18 until the spout comes into a position, which has been indicated in FIG. 6'. A new loop can be formed now in the slot of the storing member 8. At the same time the point of the presenting needle 33 moves through an opening or notch 35 in the wall of the housing 1 in order to place the thread in the blowing nozzle 16 as shown in FIGS. 7 and 7'. This is possible because the presenting needle 33 moves through a notch 24 of the head 19 and engages the thread which runs from the thread clamp 26 to the storing member 7. By means of a notch at the point of the needle 33 the thread will be caught and pushed through the opening 35 until it comes into the interior of the blowing nozzle 16, after which the clamping action of the thread clamp 26 is released and the blowing nozzle becomes operative. By the operation of the blowing nozzle 16 the thread will be launched into the shed and the loop will be entirely drawn out of the storing member 7 until the thread touches the presenting device on its bevelled side and thus slides over the bevelled surface 25 of the head 19 after which the thread is entirely stretched between the thread clamp 28 and the blowing nozzle 16. When the blowing nozzle becomes operative the needle 33 will be retracted and comes into a position outside of the notch 24. During the formation of the loop in the thread in the storing member 8 air will stream out of the spout 20. After the loop in the storing member 8 has attained its exact length the presenting device will rotate further and then the airstream out of the spout 20 can be interrupted again until the spout passes the thread clamp 26, which has been moved to a new position 26' as hereinafter described. At this point the thread clamp will clamp the thread leaving the spout. Further the presenting device rotates into a position which has been indicated in FIG. 8' and a new loop can be formed in the storing member 7.

It has been remarked that the device shown in the drawing has been adapted for preparing a weft in a weaving machine in which the weft is situated in the shape of a hairpin in the just woven cloth in order to form a selvage. That is to say first one leg of the hairpin shaped weft, which will be called the A-thread is to be launched into the shed in the shape of a complete weft, whereas a next leg of the hairpin shaped weft which will be called the B-thread will be launched into the shed later as a complete weft. The storing member 7 has been provided for taking up a measured length from which the A-thread is to be formed and the storing member 8 has been provided for taking up a loop of measured length from which the B-thread is to be formed. This means that the A-thread and B-thread must be formed from one single length of thread. FIG. 7 shows the A-thread being presented to the nozzle 16 by the needle 33, and FIG. 7' shows the B-thread about to be drawn into the storing member 8. FIG. 8' shows the A-thread drawn out and extending over the face 22, and shows the end of the B-thread clamped at 26'. The A-thread just inserted into the shed, thus runs from the cloth through the blowing nozzle 16, through the opening 35 over the endface 22 of the presenting device 2 to the thread clamp 28 whereas the part 3A' beyond the B-thread, from which a new loop in the thread is to be formed in the storing device 7 is initially wound around the non-bevelled part of the surface 18 and thus runs below the endface 22 as shown in FIG. 8 and passes under the A-thread 3A. This phase has been indicated in FIG. 8 and 8'.

The B-thread can now be supplied to the blowing nozzle 16 by means of the needle 33. This step has been shown in FIG. 9'. The needle 33 moves through the notch 23 in the endface 22 of the presenting device and pushes the thread 3B through the opening 35 into the interior of the blowing nozzle 16 adjacent to the already inserted thread 3B. In the meantime a new loop 3A' is to be formed in the storing member 7 after cutting the thread, which cutting action will be described later. When the blowing nozzle 16 becomes operative and the needle 33 is retracted the loop 3B will be drawn entirely out of the storing member 8 until the thread passes the bevelled surface 25 and extends over the endface 22 to the thread clamp 28. The clamping action of the thread clamp 28 will now be released and the remaining loop from which the bight was in the thread clamp will entirely disappear out of the housing 1 by the action of the blowing nozzle 16 during the insertion of the B-thread into the shed. A new cycle of operation can be started now, however, one step in the operation needs to be clarified.

In referring to FIG. 5 it was assumed that the leading end of the thread remains in the thread clamp 26. A cutting device 27 for the thread cooperates with the thread clamp 26 to cut the thread at the point where the thread 3B enters the clamp 26, as soon as the needle 33 (FIG. 9) pushes the thread into the blowing nozzle 16. The cutting device 27 moves with the thread clamp 26 between the position shown in FIG. 10' and the position 27' shown in FIG. 9'. The cutting device 27 comprises a knife edge which cooperates with a side of a jaw of the thread clamp 26 as indicated in FIG. 9'. As indicated in FIGS. 10 and 10', both the clamp 26 and the cutting blade 27 are mounted on stems which must be moved axially in order to actuate the clamp 26 or the cutting blade 27. Since the clamp 26 and the cutting blade 27 are movable arcuately between two positions as indicated in FIG. 10', the stems of the clamp 26 and the cutting blade 27 cannot be movable axially in a fixed support like the stem 30 in FIG. 3, but must be axially movable in a support 26A which pivots about the axis of the shaft 6.

For clearness sake the thread clamp 26 is indicated by the reference number 26 in one end position, whereas by the reference number 26' the other end position of the same thread clamp has been indicated. Thus the thread clamp 26 and the cutting device 27 can perform a reciprocal movement along the housing 1 in the direction of the arrow A depending on the position which the presenting device 2 will have. The driving mechanism for the reciprocal movement need not be described as driving or control mechanisms for a reciprocal movement of a member are well known. Cam tracks such as the cam tracks 29 can be used for driving thread clamp 26 axially as hereinbefore described.

The reciprocal movement of the thread clamp is such that when the new loop 3A' in the thread is being formed in the storing member 7 the thread clamp moves with the cutting device 27 from its position 26' to its position 26 as has been indicated in FIG. 10'. The cutting member 27 thus performs its cutting operation on the thread during the step which has been indicated in FIG. 9'.

In the above described manner the continuous cycle of preparing a weft has been obtained and the device is suitable to be provided in weaving machines having a very high operation speed.

I claim:

1. A device for preparing successive weft threads for insertion into the successive sheds in a loom comprising a weft thread-presenting device which is rotatable on an axis, and which has an axial thread inlet and has a thread outlet at a point spaced from the axis, two members for temporarily storing loops of thread, each having an entrance arranged adjacent to the path of rotation of the thread outlet of the presenting device, to hold a loop of the thread issuing from such outlet, two thread clamps arranged on opposite sides of the presenting device for clamping the thread between the storing members, a thread-cutting device arranged adjacent to one of the thread clamps, and a weft inserting device arranged adjacent to the path of rotation of the thread outlet of the presenting device, for inserting successive weft threads into the successive sheds.

2. A device according to claim 1 wherein the presenting device is rotatably mounted in a housing that forms a connection between two storing members which are diametrically arranged on opposite sides of the housing.

3. A device according to claim 1 wherein the presenting device is in the shape of a solid of revolution, and has a thread inlet in the form of an axial channel leading to a thread outlet in the form of a radial channel.

4. A device according to claim 3 wherein the axial channel is connected to a source of fluid under pressure for propelling the thread through the presenting device.

5. A device according to claim 1 wherein the presenting device is rotatably mounted in a housing having slots which lie substantially in the path of rotation of the thread outlet of the presenting device and which form the entrances of the storing members.

6. A device according to claim 5 wherein the housing has an additional opening leading to the weft inserting device.

7. A device according to claim 6 wherein a thread clamp is provided adjacent to the opening leading to the weft inserting device.

8. A device according to claim 1 wherein the presenting device has a cylindrical surface that is penetrated by the thread outlet, and the entrance of each storing member conforms to and is closely spaced from such cylindrical surface.

9. A device according to claim 8 wherein the cylindrical surface extends around substantially one-half of the circumference of the presenting device, between two notches extending radially inward from the cylindrical surface.

10. A device according to claim 8 wherein the presenting device is provided with a step extending outward below the cylindrical surface.

11. A device according to claim 10 wherein a portion of the cylindrical surface is bevelled inward from the step.

* * * * *