Dec. 23, 1958 E. PFARRWALLER 2,865,406

MECHANISM FOR SELECTIVE FEEDING OF WEFT THREADS IN WEAVING MACHINES

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Fig. 1

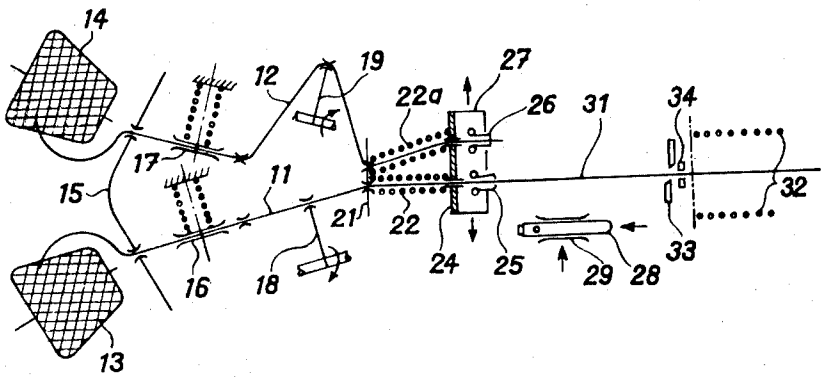

Fig. 2

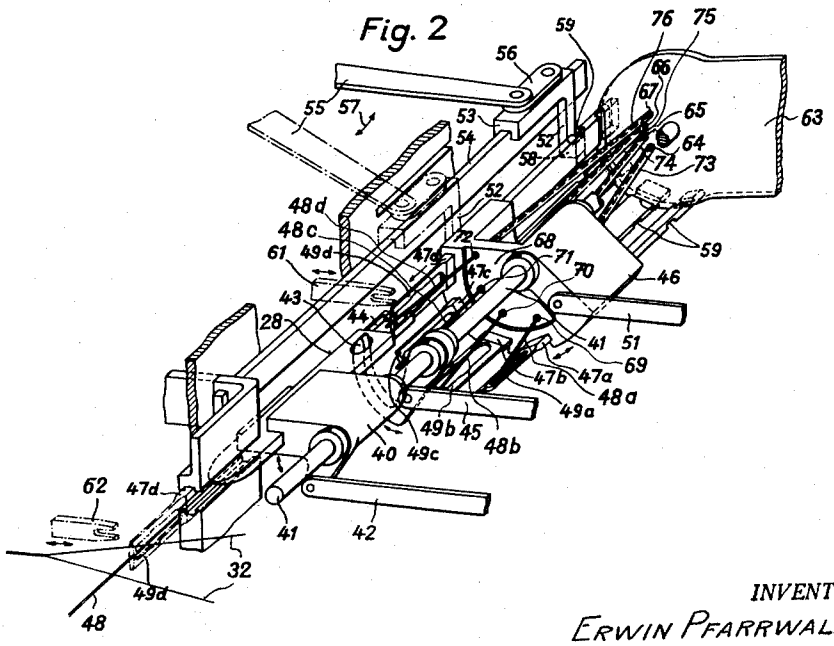

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Fig.3

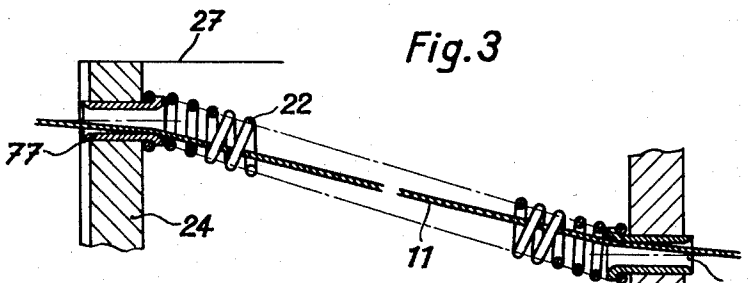

Fig.4

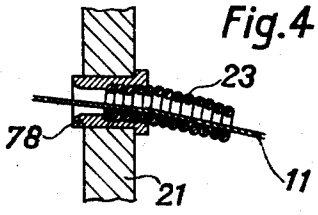

Fig.5

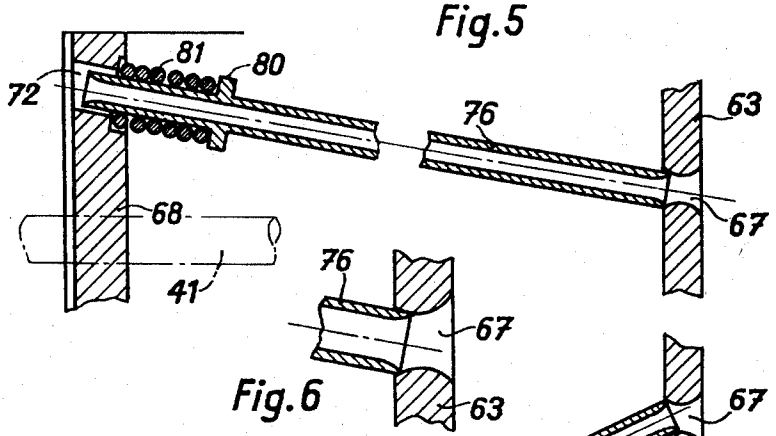

Fig.6

Fig.7

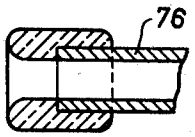

Fig. 8

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MECHANISM FOR SELECTIVE FEEDING OF WEFT THREADS IN WEAVING MACHINES

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9 Claims. (Cl. 139—126)

The present invention relates to a mechanism for selectively presenting any one of a plurality of weft or filling threads, which are individually unwound from spools or packages placed outside of the shed, to a weft inserting element by means of a feeding and gripping assembly movably supported by a carrier which can be moved to place the end of the selected thread in a position suitable for seizure by the weft inserting element.

In conventional weft selecting mechanisms the weft threads extend through stationary thread guides to the grippers of the respective thread feeding and gripping assemblies which are supported by a movable carrier. The weft or filling threads are unguided between the stationary thread guides and the grippers, i. e., for a thread length which is at least equal to the length of the thread feeding elements. Due to the frequent and quick movements of the carrier of the thread feeders the relatively long unguided parts of the weft or filling threads vibrate and are likely to become entangled.

This is avoided by the present invention according to which a thread guide is provided for each individual thread not only in a stationary part which is connected with the frame of the weaving machine, but also in the movable carrier for the thread feeders, and thread guide elements individually surrounding the weft or filling threads are interposed between the aforesaid thread guides in the stationary part and in the movable carrier.

The novel features which are considered characteristic of the invention are set forth with particularity in the appended claims. The invention itself, however, and additional objects and advantages thereof will best be understood from the following description of embodiments thereof when read in connection with the accompanying drawing in which:

Fig. 1 is a diagrammatic illustration of a weft or filling thread selecting mechanism;

Fig. 2 is a perspective view of a shuttle lifter holding a shuttle and of a mechanism for selectively feeding a weft or filling thread to the shuttle;

Fig. 3 is a part sectional view of a portion of the mechanism shown in Fig. 2;

Fig. 4 is a longitudinal sectional view of a modified thread guide according to the invention;

Figs. 5 and 7 are sectional views of another modification of a thread guide in different operating positions, Fig. 6 showing an end portion of the thread guide according to Figs. 5 and 7 on a larger scale;

Fig. 8 shows an end portion of the thread guide made of a ceramic substance.

Like parts are designated by like numerals in different figures of the drawing.

Referring more particularly to Fig. 1 of the drawing, numerals **11** and **12** designate weft threads which are unwound from spools or packages **13** and **14**, respectively, which are placed outside of a shed **32** formed by warp threads. The weft threads **11** and **12** pass through eyelets in a protecting shield **15**, thread brakes **16** and **17**, respectively, eyelets of thread tensioners **18** and **19**, apertures in a stationary thread guide **21**, and through guide elements **22** and **22***a* individually surrounding the threads **11** and **12**, respectively. The elements **22** and **22***a* are interposed between the stationary thread guide **21** and a movable thread guide **24**. The latter forms part of a carrier or slide **27** supporting thread feeders **25** and **26** which are individually provided with grippers for temporarily holding a weft thread for selective presentation to a shuttle **28** when the latter has been moved into picking position by a shuttle lifter **29** from a shuttle return position in which the shuttle is shown in Fig. 1. The member **27** can be moved transversely to the picking path **31** of the shuttle by means, not shown, so that either the thread feeder **25** or the thread feeder **26** is moved to feed the end of a selected weft thread into the shuttle. The shuttle is then picked through the shed, passing shears **33** and a thread clamp **34**, which are located at the left edge of the shed **32**.

Fig. 2 illustrates an apparatus in which the invention is applied to a multi-weft thread feeding mechanism of the type disclosed in the United States Patent No. 2,796,084. The apparatus is shown in the position in which a shuttle **28** has been lifted by a shuttle lifter **40** into the position from which the shuttle can be fired through the shed. The shuttle lifter is swingable on a shaft **41** through, say 90°, and is actuated by a link **42** which is connected with the drive mechanism of the weaving machine, not shown, so that the movements of the shuttle lifter are coordinated to the operation of the weaving machine. The shuttle is of the type having a thread clamp **44** which, in the position shown in Fig. 2, has been opened by means of an opening wedge **43**. The latter is also swingable on the shaft **41** and actuated by a link **45** which is connected with a drive mechanism, not shown, and adapted to coordinate the movements of the wedge with the movements of the shuttle lifter **40**.

Thread feeding and gripping assemblies **47***a*, **47***b*, **47***c*, and **47***d* are longitudinally slidably supported by a carrier **46** which is swingable on the shaft **41** so that a selected thread feeder can be aligned with the path along which the shuttles are fired through the shed. Each feeder is provided with a thread clamp **49***a*, **49***b*, **49***c*, and **49***d*, respectively, which can move through the opened clamp **44** of a shuttle **28** to move a weft thread **48** held by a clamp **49** between the jaws of the clamp of a shuttle. Fig. 2 shows the device in a position in which a weft thread **48***d* is presented to a shuttle **28** and seized by the gripper **44** of the suttle when the wedge **43** is pulled out of the clamp, i. e., when the wedge is swung in counterclockwise direction. The jaws of the gripper **44** seize the thread inside of the clamp **49***d* whereupon a wedge **61** opens the clamp **49**. The shuttle can now be fired by a picking mechanism, not shown, for inserting the weft thread **48** into the shed **32**.

After the shuttle has been picked into the shed the thread feeder **47***d* is moved towards the shed **32** for reseizing the thread **48***d*. This is done by means of a slide **53** movable on a rail **54** which slide has a vertical arm **52** provided with a nose **58** which extends into a recess **59** of the feeder **47***d*. The slide **53** is moved on the rail **54** by means of a lever **55** to which it is connected by a link **56**. The lever **55** is actuated by a mechanism connected with the drive of the weaving machine, not shown. When the clamp **49***d* of the feeder **47***d* has arrived at the edge of the shed **32** the clamp **49***d* is opened by a wedge **62**. This wedge is subsequently withdrawn so that the clamp **49***d* closes on the weft thread **48**. The weft thread **48** is also gripped in the conventional manner by clamps **34** (Fig. 1) one of which is provided at either side of the shed **32** and is thereupon cut by the scissors **33**.

A thread guide **63** provided with four apertures **64** to **67** is connected with the frame of the weaving machine.

A weft thread 48 passes through each of the apertures 64 to 67. The carrier member 46 has a wall portion 68 transversely to the direction of movement of the threads and provided with four apertures 69 to 72 for individually receiving the weft threads 48*a* to 48*d*, respectively.

Thread guide elements 73 to 76 which individually surround the weft threads 48*a* to 48*d*, respectively, are interposed between the thread guide apertures 64 to 67 in the stationary element 63 and the thread guide apertures 69 to 72 in the wall 68 of the movable carrier 46. The elements 73 to 76 individually conduct the weft threads from the apertures 64 to 67 to the apertures 69 to 72.

Since each of the weft threads 11, 12 in Fig. 1, and 48*a* to 48*d* in Fig. 2 moves within one of the connecting elements 22, 22*a* in Fig. 1, and 73 to 76 in Fig. 2, entanglement of different weft threads is eliminated, even if the weaving machine is operated at a very high number of picks per minute.

A further advantage of the provision of the connecting elements is that the apertures can be conveniently, accurately and quickly threaded at any time, although the thread guides 69 to 72 move with the carrier 46 and the position of the thread guide apertures in the movable carrier 46 changes continuously relatively to the thread guide apertures in the stationary member 63. It is only necessary to insert a threading needle in the respective aperture in the stationary member 63. The needle automatically moves through the respective connecting elements 73 to 76 and into the correct aperture of the wall portion 68 of the carrier 46. This operation is also possible, if the connecting elements are made of helically wound wires, as the elements 22 and 22*a* in Fig. 1, whereby the individual windings need not be adjacent.

If the connecting elements are closed, i. e., have a substantially tubular configuration, fouling of the thread feeders by fly is effectively prevented.

Fig. 3 illustrates a connecting thread guide member 22 on a large scale. The element is formed by a coiled wire spring whose windings surround the weft thread 11 and are spaced from each other.

Thread guide elements 77 (Fig. 3), or 78 (Fig. 4) are preferably inserted in the wall portions 21, 24 in Fig. 1, or 63 and 68 in Fig. 2. In the illustrated embodiment the elements 77 are screwed into the wall portions 21 and 24 and are provided with flanges holding the ends of the element 22 against the wall portions.

Fig. 4 illustrates an embodiment of the invention in which the connecting or thread guide element 23 is formed by a wire helically wound around the thread 11 whereby the windings abut each other. One end of the coiled wire is screwed into a guide element 78 which is made fast on the wall 21. The same structure may be used for connecting the thread guide element 23 to the wall portions 24, 63, and 68. The wire is preferably made of hardened spring steel which has an initial tension so that the windings are pressed against each other. Use of hardened steel wire has the advantage that the fast moving weft threads do not bite into the wire. Instead of a coiled wire a flexible tube may be used.

The connecting thread guides may be in the form of substantially rigid tubes as shown in Figs. 5 to 7. Tubular elements 76 are interposed between the walls 63 and 68. The right end of the tube 76 is inserted into an hourglass-shaped aperture 67 in the member 63. This is illustrated on a larger scale in Fig. 6 which shows that the smallest diameter of the aperture 67 is smaller than the diameter of the tube 76 so that the latter cannot pass through the wall 63. The connecting tube 76 is provided with a protuberance or a flange 80 against which abuts one end of a compression spring 81, the other end of the spring abutting against the wall 68. The left end of the tubular member 76 extends freely into the thread guide aperture 72 in the wall portion 68 and the spring 81 presses the member 76 against the member 63. This structure affords convenient installation and removal of the connecting thread guide elements. It also affords free movement of the wall portion 68 of the carrier 46 relatively to the stationary member 63 whereby the distance between the apertures 67 and 72 changes. This is obvious from Figs. 5 and 7 which show the device in two extreme positions.

The tubular element 76 is preferably made of hardened steel. At least its ends may be made of a ceramic substance.

I claim:

1. In a weaving machine of the gripper shuttle type, a weft or filling thread selecting mechanism comprising a plurality of thread feeding and gripping assemblies, each assembly correlated to a separate weft or filling thread, stationary guide means for said assemblies, a carrier movably supporting said assemblies, said carrier being movable to move said assemblies to any one of a plurality of selected positions, said stationary guide means and said carrier including a thread guide means for each weft or filling thread, and a thread guide element for each weft or filling thread interposed between the respective thread guide means in said stationary guide means and the respective thread guide means in said carrier.

2. In a weaving machine as defined in claim 1 and wherein said guide elements individually surround the lengths of weft or filling thread between said thread guide means in said stationary guide means and said thread guide means in said carrier.

3. In a weaving machine according to claim 2 and wherein at least the ends of said elements are made of a ceramic substance.

4. In a weaving machine according to claim 2 and wherein at least the ends of said elements are made of hardened steel.

5. In a weaving machine according to claim 2 and wherein said guide elements consist of wire helically wound around the respective weft or filling thread.

6. In a weaving machine according to claim 5 and wherein the individual windings of said wire abut each other and are resiliently pressed against each other by the initial tension of the helically wound wire.

7. In a weaving machine according to claim 2 and wherein said guide elements are tubular and flexible.

8. In a weaving machine according to claim 2 and wherein said guide elements individually consist of a tube, one end of which movably extends into one of said guide means and the other end of which abuts against the other of said guide means, and wherein resilient means are interposed between said guide elements and the guide means into which the elements extend for pressing said elements against the guide means which are abutted by said elements.

9. In a weaving machine according to claim 8 and wherein said elements individually are provided with a protuberance, said resilient means being formed by compression springs individually wound around said elements and extending between said protuberance and the guide means into which the elements extend.

No references cited.