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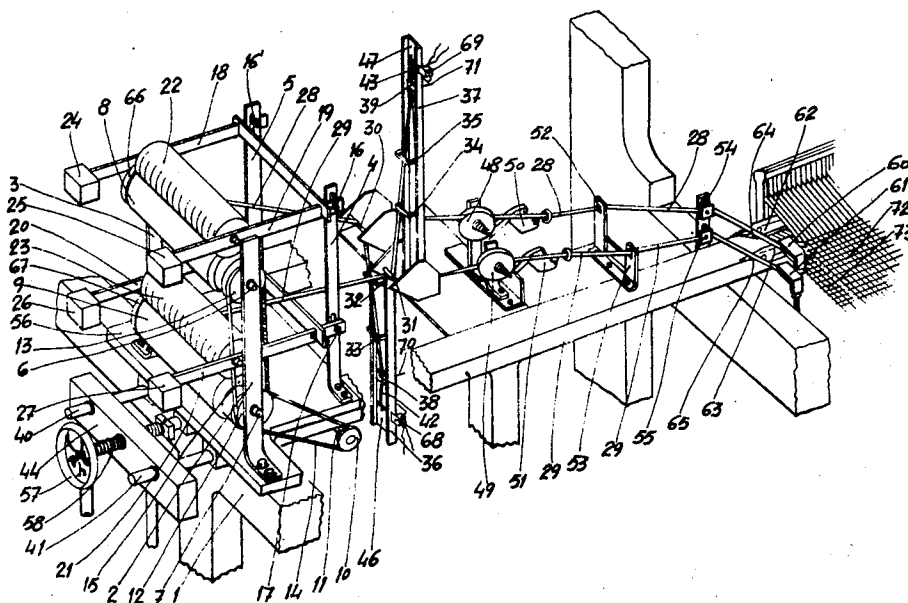
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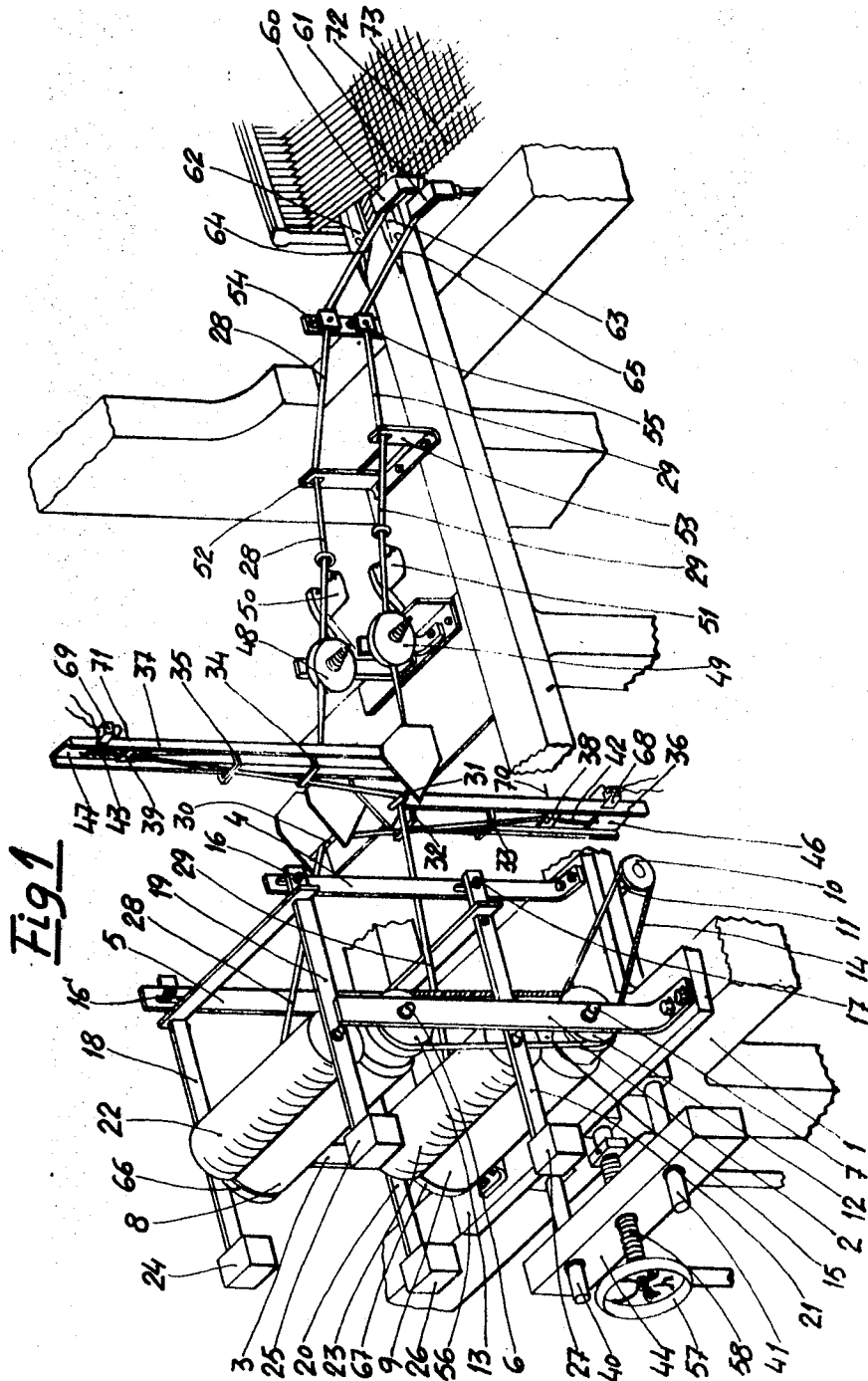
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[54] **METHOD FOR PRODUCING WOVEN FABRICS
 WITH STATIONARY WEFT TAPES**
5 Claims, 5 Drawing Figs.

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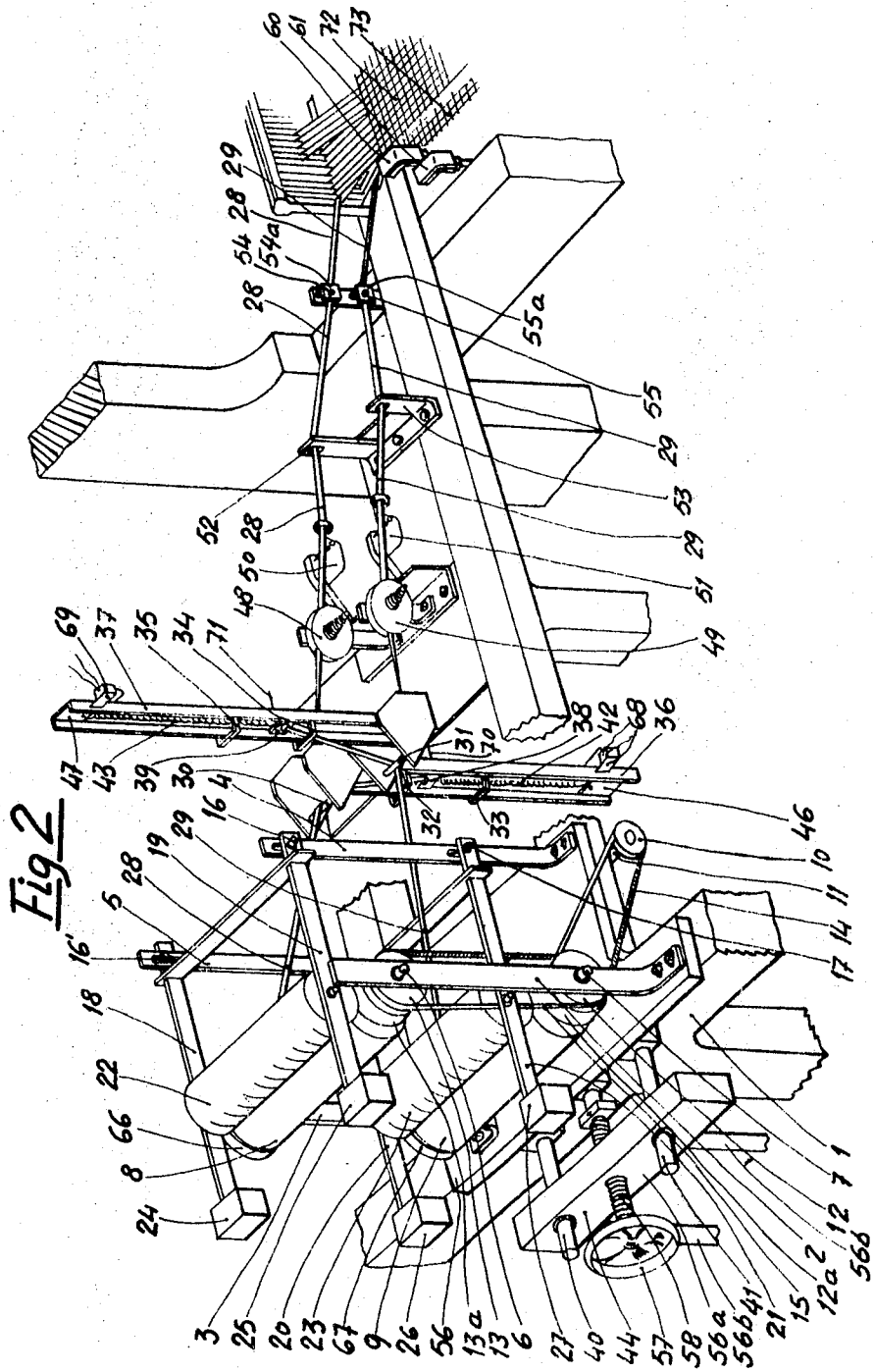
ABSTRACT: Apparatus for inserting flat weft strands in weaving looms wherein a movable strand storage guide collects the correct length of weft strand for each insertion from a continuously moving supply.





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Fig 3

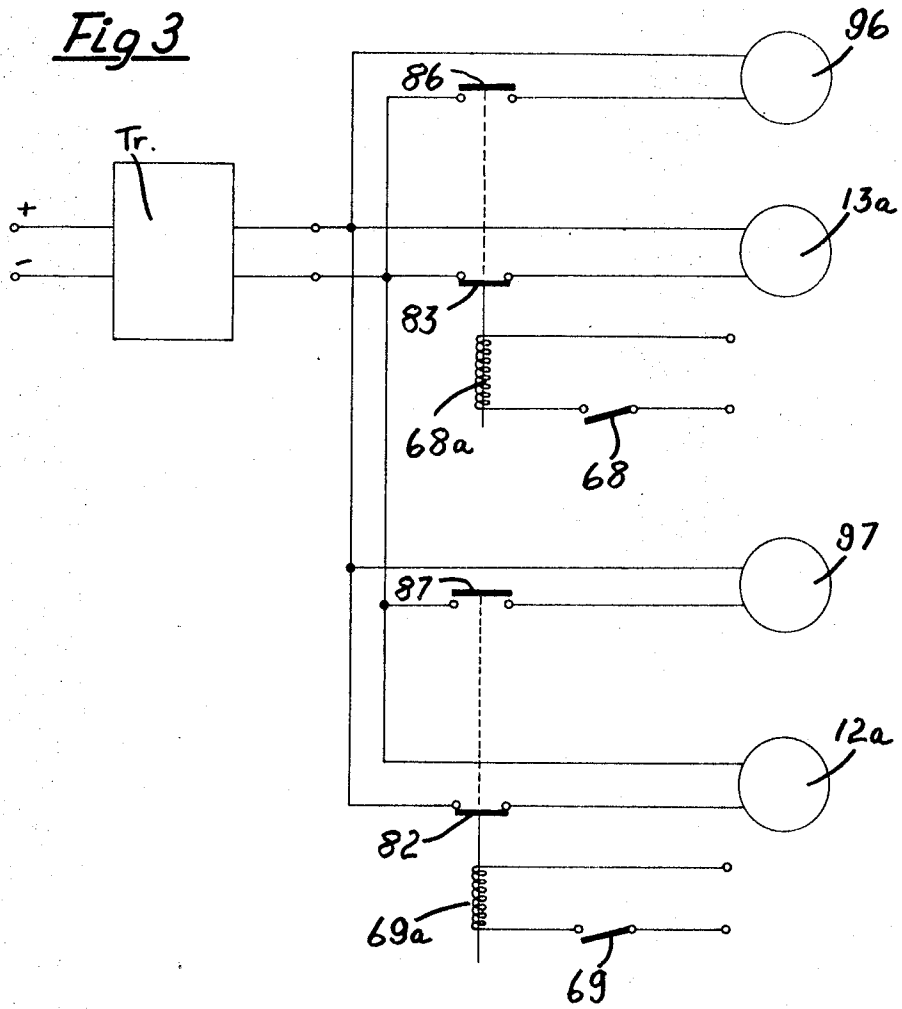


Fig 4

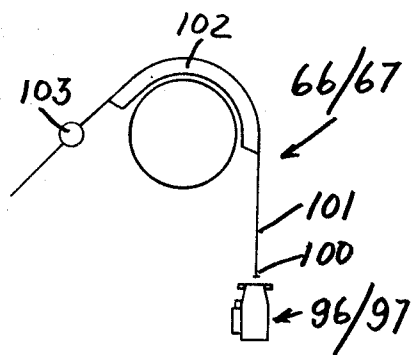
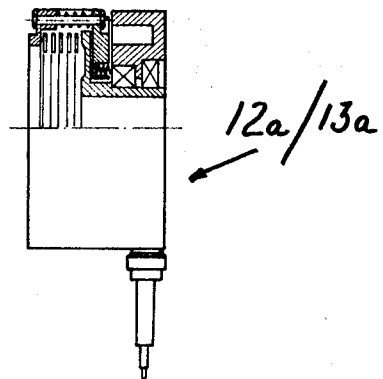


Fig 5



METHOD FOR PRODUCING WOVEN FABRICS WITH STATIONARY WEFT TAPES

The present invention relates to apparatus for the production of fabrics with flat weft strands, wherein these strands are inserted and beat up flat and without twisting in the shed formed by the warp threads, in order thereby to be able to produce perfect fabrics on looms with a fixed weft, and wherein the weft strands especially retain their flat structure also when relatively wide strands are used for the weft and likewise relatively wide strands are used also for the warp, in order to produce fabrics with few strands per unit on measure. Thereby a significant increase in production can be obtained, especially when these fabrics are produced on modern weaving machines that produce two parallel fabrics simultaneously, so that production, which is already large in its own right, is doubled, whereby the process according to the invention is easy to carry out and also is suited for looms with fixed weft, which are intended for the production of only one fabric.

In order to assure that the weft strands remain perfectly flat during their insertion in the shed and are not subjected to any twisting, unwinding rollers for the weft strands are provided according to the invention, on which rolls the strand supply cheese is supported and held in contact with the rollers by counterweights. These unwinding rollers are driven by any driven shaft on the loom through a speed regulator of known construction, so that for each weft insertion a length of the flat weft strand is pulled from the cheese corresponding to the width of the fabric to be produced, whereby this length serves to correspond with the path that is to be traversed by the weft insertion element through the shed. Thereby the risk of breaking a strand is avoided. The advanced strands on their way to the weft inserting device are carried over special tension and guide devices and held at the edge of the fabric by clamps, which deliver the flat strands to the weft insertion element to be inserted and beat up in the shed by the latter so that the fabric is formed by the repetition of this operation. The tension devices are thereby equipped with a weft stop motion to detect immediately the failing or breaking of a weft strand, and putting the strand in ready position again for the next passage after each beating up of the weft.

An embodiment of a device for carrying out the process according to the invention is represented in the enclosed drawing. It shows the following:

FIG. 1 is a schematic perspective view of this device, which is placed on the weft supply side of a shuttleless loom for the simultaneous production of two parallel fabrics, whereby the weft insertion elements are represented in the position in which they grasp the weft strands.

FIG. 2 is a schematic perspective view as in FIG. 1, but where the weft strands are shown inserted in the respective sheds.

FIG. 3 is the wiring diagram of the electrically actuated clutch and brake means of the driving rollers and their control means.

FIG. 4 is a schematic side elevational view of the electrically actuated brake means.

FIG. 5 is a schematic side elevational view, partially in section, of the electromagnetic clutch means.

In these figures, 1 designates a part of the frame of the loom, on which four support elements 2, 3, 4 and 5 are disposed. These support elements are attached to a baseplate 56 which is movable, mounted on guide rails 40 and 41, whereby the movement results from turning a threaded spindle 58 provided with a handwheel 57, which spindle is guided in the female thread of a stationary crosspiece 56a, supported on uprights 56b, attached to a portion of the loom frame. The shafts 6 and 7 of two rollers 8 and 9 are rotatably supported in support elements 2 and 3 (the bearings of support element 2 only are visible) which rollers are provided with electromagnetically activated friction brakes 66 and 67 of well known construction, connected with support element 3. One embodiment of such a friction brake is shown diagrammatically in FIG. 4, in which the brake means, designated in general by numerals 66/67, comprises a flexible band 101 having a friction liner 102

which partially surrounds the driving roller 8/9, one end 100 of the said band being controlled by an electromagnet 96/97, while the other end thereof is secured to a stationary point of the loom as at 103. The lower roller 9 receives its rotary motion from a small pulley 10 mounted on a turning shaft 11 of the loom via a transmission belt 14 and an conventional electromagnetic clutch 12a coupled to pulley 12, from which the rotary motion is transmitted by means of a transmission belt 15, to the likewise conventional electromagnetic clutch 13a coupled to pulley 13 of the upper roller. One embodiment of a conventional electromagnetic clutch is shown in FIG. 5, and is sold in Europe by Fag Espanol as type Lko or Lkt.

The ends of support arms 18, 19 and 20, 21 are pivotally attached to the support elements 4 and 5 at 16, 17 and 16', 17' (17' is located opposite to 17 and is not visible), said support arms carrying strand supply cheeses 22 and 23 pivotally attached thereto at about the mid point of the length of the support arms. These cheeses lie on the rollers 8 and 9 and to the end that they be in permanent contact with the latter, counterweights 24, 25 and 26, 27 are disposed at the free ends of the said support arms.

Cheeses 22 and 23 of the flat weft strands 28 and 29 are caused to rotate by their contact with rollers 8 and 9, and in opposite direction to the respective rollers, whereby the released strands on their way to the weft inserting devices move via guide rods 30 and 31 to strand storage devices formed by movable strand guides 38 and 39 slidably held by support rails 36 and 37 which have vertical paths and which at their ends 46 and 47 each carries a microswitch 68 and 69. Strand guides 38 and 39 are slidably mounted in the sliding paths of rails 36 and 37, these strand guides being equipped with projecting contact pins 70 and 71 for activating the microswitches. One end of each guide 38 and 39 is fastened by vertically disposed helical springs 42 and 43 respectively, whereby the other ends of these springs are attached to the ends 46 and 47 respectively of support rails 36 and 37.

The flat weft strands 28 and 29 pass through the corresponding strand storage device in a V-shaped path and leave the same over guide rod (not shown) on the opposite side of the vertical rails and at the level with the above mentioned guide rods 30 and 31, thereupon to pass each through a disc tension device 48 and 49 respectively, in which the strands 28 and 29 are twisted in a 90° turn so that they are placed in a vertical or upright position.

To each of these tension devices there is connected a weft stop motion 50 and 51 of known kind. After this the weft strands each passes through a strand guide 52 and 53 respectively, which are provided to maintain the upright position of the strands together with tension devices 54 and 55, equipped with small spring-loaded plates, 54, 54a, 55 and 55a between which the strands passing through are pressed and held in their upright position. Finally, the weft strands 28 and 29 are held frictionally by clamps 60 and 61 in a horizontal position.

The operation is as follows:

The weft strand 28 is released from the strand supply cheese 22 and passes successively over guide rod 30, strand guides 32 and 33 of the lower strand storage device and the slidable strand storage guide 38 of this device, by which one length of the strand is stored, which preferably corresponds to the width of the fabric to be produced. After this the strand passes over the second, not visible, guide rod disposed opposite to guide rod 30 and then passes successively through the disc tension device 48, which places it in upright position, the weft stop motion 50, strand guide 52 and tension device 54, which again holds the strand in upright position, and is finally held fast in horizontal position by clamp 60 which is disposed at the edge of the upper fabric 72.

In analogous manner weft strand 29 is released from strand cheese 23 and passes successively over guide rod 31, strand guides 34 and 35 of the upper strand storage device and the slidable strand guide 39 of the device, by which a length of the strand is stored which preferably corresponds to the width of the fabric to be produced. After this the strand passes succes-

sively through disc tension device 49, which places it in upright position, the weft stop motion 51, strand guide 53 and tension divide 55, which again holds the strand in upright position, and is finally held fast in horizontal position by clamp 61 which is disposed at the edge of the lower fabric 73.

From these latter positions the weft strands 28 and 29 are presented to the weft inserting elements 62 and 63 to be gripped by these, to be inserted in perfectly horizontal position, and without twisting, into the corresponding sheds. During the passage of the gripping mechanisms 64 and 65 of the weft inserting elements 62 and 63 in the course of their forward movement under the weft strands 28 and 29 while being held in horizontal position by clamps 60 and 61, these strands glide over the said gripping mechanisms and in the reverse movement of the weft inserting elements these strands are carried along in horizontal position and retain this position during their passage through the sheds, since the latter have been closed beforehand at the selvage threads on the corresponding weft strand supply side of the loom.

By actuation of the handwheel 57 an acceleration or retardation of the conveying speed of rollers 8 and 9 can be obtained by means of a speed regulator (not shown) whereby the length of weft strands 28 and 29 pulled off at any time can be adjusted to the different widths of fabric, as well as to different kinds of weft strand.

Independently of this the pulling off of the weft strands 28 and 29 is automatically regulated to neutralize a possibly occurring slippage and the diminishing weight of the strand cheeses 22 and 23. This regulation takes place as described below:

The slidable strand guides 38 and 39 of the strand storage device execute an upward and downward movement during the weaving process and if any error occurs in the pulling off of the strand the microswitches 68 and 69 of the strand supply device will be actuated by the contact pins 70 and 71 of the strand guides 38 and 39. Thereby two effects are achieved, namely on the one hand the rollers 8 and 9 are disconnected from their shafts 6 and 7 by the electromagnetically coupled pulleys 12 and 13 by the clutches 12a and 13a, whereby these rollers are no longer driven, and on the other hand the electromagnetic friction brakes 66 and 67 are actuated, whereby rollers 8 and 9, and consequently the strand cheeses 22 and 23, are braked.

The microswitches 68 and 69 are connected in circuits as shown in FIG. 3, each of which comprises a relay 68a and 69a, respectively. These relays control respective microswitches 83, 86, and 82, 87 inserted in the circuits of the respective clutch means 13a and 12a and the respective electromagnets 96 and 97 controlling the friction brakes 66 and 67. During normal operation of the loom, the microswitches 68, 69 are open and, consequently, the relays 68a, 69a remain in their rest position in which the switches 83 and 82 are maintained in closed position and the switches 86 and 87 are maintained in open position, as shown in FIG. 3. In consequence, the clutch means 13a and 12a are activated, whereby the rollers 8 and 9 are driven, and the brake means 66 and 67 are deactivated. On the contrary, upon actuation of the microswitches 68 and 69 by the contact pins 70 and 71, the relays 68a and 69a will be energized and consequently the microswitches 83 and 82 will disconnect the clutch means 13a and 12a, and the microswitches 86 and 87 will close the energizing circuit of the electromagnets 96 and 97, so that the flexible band 101 of the brake means 66 and 67 will be actuated, whereby the rollers 8 and 9 are instantaneously braked. Devices of this type are sold under the trademark Sator.

As soon as the contact pins 70 and 71 of the strand guides

38 and 39 no longer act on microswitches 68 and 69, the pulleys 12 and 13 again become coupled to shafts 6 and 7 of rollers 8 and 9, and the action of brakes 66 and 67 is terminated, whereby the strand guides 38 and 39 resume their upward and downward movement and the strands are advanced in the correct length. The actuation of the described couplings takes effect instantaneously, without the loom having to be shut down thereby.

The strand storage devices are intended to compensate for the fact that, while the driving rollers are unwinding the supply cheeses at a substantially constant rate, the inserting means are pulling the strands into the sheds intermittently. The amount of strand released from the cheeses between successive actions of the inserting means will be dependent on the relative distance from the supply cheeses to the inserting means and this can be regulated by turning the handwheel 57.

It will be understood that modifications and improvements in the invention may be made which would come within the scope of the annexed claims.

I claim:

1. In apparatus for weft strand feeding and measuring for use on a loom of the type having at least one rotating member, a frame, reciprocatory beating means and weft inserting means for carrying weft strands from a fixed weft supply through the warp shed between cycles of the beating means, the combination including means for mounting a driving roller and a weft supply cheese on the frame of a loom for adjustable positioning of the supply cheese at variable distances from the inserting means, said mounting including means to support the supply cheese in constant frictional peripheral driven contact with the driving roller, strand storage means to be mounted on the frame between the supply cheese and the weft inserting means, rotation transmitting means including clutch means for connecting the driving roller with the rotating member of a loom, braking means for stopping rotation of the driving roller, said strand storage means including control means responsive to an excessive length of strand released from the supply cheese to disconnect the clutch means and activate the brake means to stop the driving roller and to connect the clutch means and deactivate the brake means when the excess strand has been withdrawn by the inserting means.

2. The invention defined in claim 1 wherein said strand storage means includes a guide element for the strand movable on a rail, said clutch means and brake means are electromagnetically operated, and said control means includes microswitch means to be actuated by the guide element when moved a predetermined amount in one direction on the rail to respectively energize and deenergize the clutch and brake means, and spring means to urge the guide element in said one direction.

3. The invention defined in claim 1 wherein said means for supporting the driving roller and supply cheese includes a base member and a pair of uprights to hold the driving roller in horizontal position.

4. The invention defined in claim 3 wherein the means for supporting the weft strand supply cheese include pivotally attached arms having counterweights at their free ends for urging the cheese into contact with the driving roller.

5. The invention defined in claim 1, wherein the weft inserting means of the loom include gripping elements for engagement with strands held by the clamping means in horizontal positions, said loom including means for closing a portion of the selvage threads of the shed adjacent the weft supply side of the loom for maintaining the weft strands horizontal while the inserting means draw the strands through the remainder of the shed.