Aug. 13, 1968 V. SCHERILLO 3,396,754

DRIVE FOR SELVEDGE FORMING MECHANISMS

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Fig.1

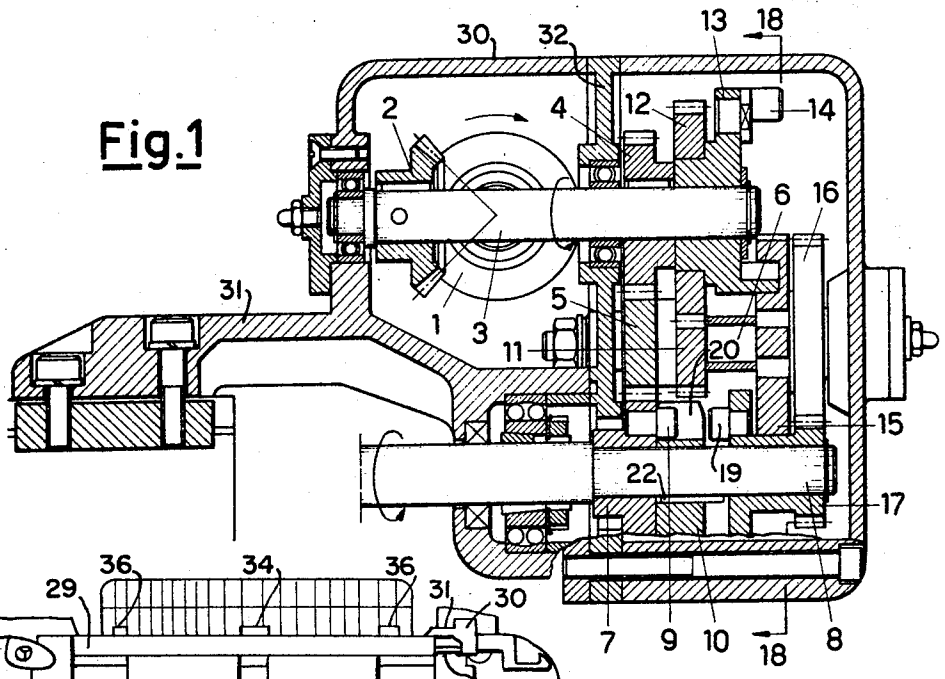
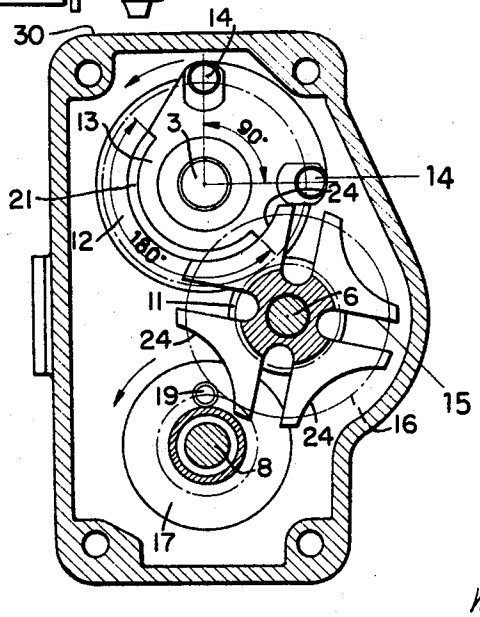


Fig.3

Fig.2



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DRIVE FOR SELVEDGE FORMING MECHANISMS

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9 Claims. (Cl. 139—54)

ABSTRACT OF THE DISCLOSURE

A control device for operating the selvedge mechanism of a shuttleless loom of the type having a crankshaft which rotates once per pick, has a drive shaft, a driven shaft which operates the selvedge mechanism each time it is rotated, a first gear train for driving said driven shaft at the same speed as said crankshaft, a Geneva drive interposed between said drive and driven shafts and operative to intermittently drive a further gear train on alternate revolutions of said crankshaft, and means for selectively coupling said driven shaft to said first and second gear trains, respectively, to insert one selvedge loop for each pick, or for each alternate pick, respectively.

This invention relates to a device for controlling mechanisms for the formation of selvedges on a shuttleless loom in which weft threads, coming out of fixed bobbins placed outside the fabric, are brought into opposite sides of the shed by inserting needles and, more particularly, to a loom fitted with weft inserting and traction needles.

To this end, an independent thread, coming out of a threads in shuttleless looms generally require that the selvedge of the fabric be strengthened so that the warp threads, which are near the selvedge, are not laterally shifted, and so that the selvedge may offer the resistance which is necessary for the subsequent processing steps.

To this end, an independnt thread, coming out of a bobbin placed outside the fabric, is inserted in the form of a loop in the open warp shed and is picked together with the weft. A binding is thus formed between the weft threads on the two sides of the fabric, this binding being such as to replace the conventional selvedge.

The device for the formation of such a selvedge consists of a mechanism comprising two needles, one which carries the selvedge sewing thread into the fabric shed, and is called the inserting needle, and the other which holds said thread so as to form a loop until the weft is beaten up and a loop is thus permanently formed. The latter needle is called the takeup needle.

The formation of such a selvedge, performed by inserting an additional thread, thus involves the necessity of providing a mechanism to form a selvedge loop for each principal weft, or for each two principal wefts, consistently with the articles being woven. Such mechanism might suit either method, bearing in mind, above all, the necessity of avoiding any thickening of the fabric edges.

Said mechanism must thus be such as to cause the inserting and takeup needles to enter action at every pick or every two picks of the loom. An object of the present invention is to provide a device for controlling the introduction, either continuous or alternate, of the binding thread into the selvedge by a mechanism which allows either a continuous or alternate movement of the two inserting and takeup needles, also permitting a rapid change between the two kinds of insertion.

The inventive device is detailedly illustrated in the accompanying drawings which show but an exemplary embodiment thereof. Mechanical equivalents, adapted to

produce the movements and the gearing of said device lie within the scope of this invention.

FIGURE 1 is a fragmentary lengthwise sectional view of the control device made according to one embodiment of this invention.

FIGURE 2 is a cross-sectional view taken along the line 18—18 of the device shown FIG. 1.

FIG. 3 is a front elevational view illustrating schmatically and fragmentarily one type of loom with which this invention is particularly adapted to be used.

The device comprises a housing **30** having an integral bracket **31** for bolting or otherwise securing the housing to the breast beam of a shuttleless loom adjacent one end thereof. Journaled in a conventional manner in housing **30** to rotate about an axis parallel to the loom breast beam is a rotatable shaft **3**, one end of which extends through a central partition **32** in housing **33**. Shaft **3** is actuated by the loom's crankshaft, not shown in the drawing, by means of a couple of intermeshed bevel gears **1** and **2**, solid with said crankshaft, and with shaft **3**, respectively. The shaft **3** rotates in turn, the gear **4**, which is keyed to the shaft **3**. From the gear **4** the drive is transferred to the planetary gear **5**, which is keyed to the shaft **6**, and, therefrom, to the gear **7**, which is idly mounted on the shaft **8**. Shaft **8** is rotatably journaled at one end in housing **30** beneath shaft **3**, and extends at its opposite end along the loom breast beam **29**.

The gear **7** carries the pin **9**, which is engaged in the slot **20** in the entraining ring **10** which is keyed to the shaft **8** by means of a key **22** for rotation with shaft **8**, and for limited axial reciprocation thereon. The shaft **8**, which is passed through the inside of the breast beam, controls, via conventional gearing, selvedge-forming mechanisms **34** and **36** (FIG. 3), which may be of the type shown, respectively in my copending applications Ser. Nos. 548,942, filed May 10, 1966 and 558,185, filed May 6, 1966; and since shaft **3** is rotated once each time a weft is picked, and since the number of teeth on the gears **4**, **5** and **7** are identical, then by means of the transfer arrangement just now described wherein pin **9** is in slot **20** of ring **10**, the shaft **8** will make a complete revolution at every pick of the loom.

In the case where alternate selvedge loop insertion is desired, wherein the selvedge mechanisms are to be actuated on alternate picks of the loom, the drive of the gear **4** is transferred gear **5** to the gear **11**, the latter gear being solidly affixed to the planetary gear **5**. The gear **11** transfers its own drive to the spur gear **12**, which has a number of teeth twice that of the gear **11** and is idle on the shaft **3**. The gear **12** is solid with the hub of a wheel **13**, also rotatably mounted on the shaft **3**. Wheel **13** carries two pins **14** that are angularly spaced apart 90 degrees from one another.

The portion of the wheel **21** between opposite the pins **14** is a 180-degree half circle, which forms the motion-locking member for the Geneva wheel or Maltese cross **15**.

Said wheel **13** will be rotated at a speed which is one half of that of the shaft **3**. On the shaft **6** is rotatably mounted the four-slot Maltese cross **15** onto which the gear **16** is keyed.

In its movement, the gear **13** brings the pins **14** successively in conventional manner into driving engagement with the slots of the Maltese cross **15** thus causing the latter to be rotated through 180 degrees for each revolution of the gear **13**. During the other half-revolution, the semi-circular portion **21** of the gear **13** slides in conventional manner over one of the four circular arcuate recesses **24** formed in the Maltese cross, and prevents any motion thereof during the 180 degree path in which the pins **14** do not engage the slots, thus maintaining an exact positioning of the slots of the Maltese cross so that,

at the subsequent revolution, the pins 14 are enabled exactly to meet said slots.

The gear 16, which rotates with the Maltese cross, transfers its own drive to the gear 17, which has half the number of teeth of 16 and which is rotated idly on the shaft 8 for controlling the selvedge-forming mechanisms. Gear 17 carries a pin 19. When ring 10 is shifted axially on shaft 8 to the right from the position shown in FIG. 1, pin 9 is disengaged from the slot 20 and pin 19 is engaged with this slot. Ring 10, in such instance, is then rotated by pin 19 one revolution on each alternate revolution of the loom crank shaft. Manual or any suitable means may be employed to shift the ring 10 axially from one to the other of its positions on shaft 8.

When pin 19 is engaged with ring 10, the gear 17 will remain at standstill for a revolution of the loom crankshaft whereas it will go through a complete revolution of 360 degrees during the next revolution of the crankshaft.

Thus, whenever an alternate introduction in the selvedge-forming mechanism is required, the entraining ring 10 only needs be displaced so to cause the slot 20, formed in the ring 10, to come into registry with the pin 19 jutting from the extension of the gear 17.

Summing up, the displacement of the entraining ring 10 gives rise to the desired type of selvedge weft insertion. Applicant's novel drive device thus forms an extremely compact and relatively inexpensive drive for operating the several selvedge devices 34 and 36, that are driven from the single shaft 8. This considerably reduces the overall cost of a loom of the type illustrated in FIG. 3; and also this device eases the selection of different types of selvedges.

The type of alternate insertion indicated above can also be obtained with mechanisms which are equivalent to those indicated. For example, the entraining ring could be a suitably shaped sleeve. In the case of an alternate insertion, the device affords the advantage, which is remarkable, that the needles need not be actuated during the revolution of the shaft in which the selvedge is not to be sewn.

By so doing, unnecessary stresses are avoided for the selvedge threads and broken threads, or displacement of previously inserted thread introduced in the form of a loop in the weft picked with the receding stroke, are also avoided.

The adoption of the Maltese cross further permits movements devoid of sudden accelerations and decelerations for the rotation of the transfer shaft 8, thus avoiding breakage of the selvedge binding threads.

Having thus described my invention, what I claim is:

1. A control device for the selvedge-forming mechanism of a shuttleless loom of the type having a crankshaft, which rotates one revolution for each pick of the loom, comprising

a drive shaft,

a driven shaft,

means for driving said driven shaft from said drive shaft continuously at the same speed as the drive shaft,

means for intermittently driving said driven shaft from said drive shaft, and

means for selectively coupling said two drive means to said driven shaft.

2. A control device as defined in claim 1, wherein

said drive shaft is connected to said crankshaft for rotation thereby one revolution per revolution of said crankshaft,

said driven shaft is operative each time it is rotated one revolution to actuate said selvedge-forming mechanism,

an idler shaft is interposed between said drive and driven shafts,

said driving means comprises a pair of rotatable members on said driven shaft, and including

first means connecting one of said members to said drive shaft for rotation thereby at the same speed as said drive shaft,

second means connecting the other of said members to said drive shaft for rotation thereby intermittently during rotation of said drive shaft, and

said coupling means includes means for releasably and selectively securing one of said members to said driven shaft selectively to drive said driven shaft intermittently and non-intermittently.

3. A control device as defined in claim 2, wherein

a first gear is secured on said drive shaft,

a second gear is secured on said idler shaft and meshing with said first gear,

said one member is a third gear rotatable on said driven shaft and meshing with said second gear to be rotated thereby during rotation of said drive shaft,

a fourth gear is rotatable on said idler shaft,

means is interposed between said drive and idler shafts intermittently to rotate said fourth gear, and

said other member is a fifth gear rotatable on said driven shaft and meshing with said fourth gear for intermittent rotation thereby.

4. A control device as defined in claim 3, wherein said means between said drive and idler shafts comprises

a slotted Geneva wheel rotatable on said idler shaft and fixed to said fourth gear,

a cooperating wheel rotatable on said drive shaft and having thereon a plurality of angularly spaced pins drivingly engageable with slots in said Geneva wheel intermittenly to rotate the latter,

a sixth gear secured to said cooperating wheel, and

a seventh gear secured to said idler shaft and meshing with said sixth gear to transfer the rotation of said drive shaft to said further wheel.

5. A control device as defined in claim 3, wherein said coupling means comprises

a pair of pins which are secured to the confronting ends of said third and fifth gears, respectively, and

a ring mounted on said driven shaft for rotation therewith, and for axial reciprocation between said third and fifth gears, between a first position in which one of said pins is engaged in a slot in said ring to couple its associated gear thereto, and a second position in which the other of said pins is engaged in said slot.

6. A control device as defined in claim 3, wherein said first, second and third gears have the same number of teeth.

7. A control device as defined in claim 4, wherein said fifth and seventh gears, respectively, have one half the number of teeth of said fourth and sixth gears, respectively.

8. A control device as defined in claim 4, wherein

said Geneva wheel has therein four of said slots equiangularly spaced from one another, and

said cooperating wheel has thereon two of said pins angularly spaced 90° from one another.

9. A control device as defined in claim 4 wherein

said Geneva wheel has in its periphery a plurality of arcuate concave recesses, and

said cooperating wheel has thereon an axially extending, arcuate flange slidable in said recesses intermittently to secure said Geneva wheel against rotation.

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HENRY S. JAUDON, *Primary Examiner.*