July 8, 1952 O. DALLE 2,602,473

JACQUARDS FOR WEAVING LOOMS

Filed March 8, 1951 3 Sheets-Sheet 1

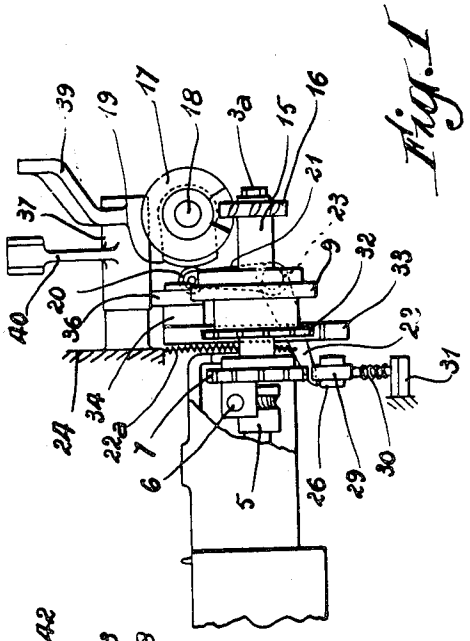

Fig. 1

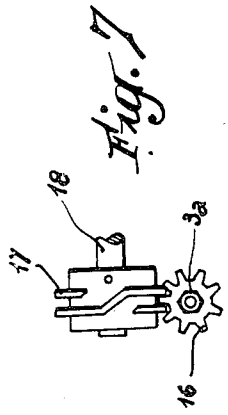

Fig. 7

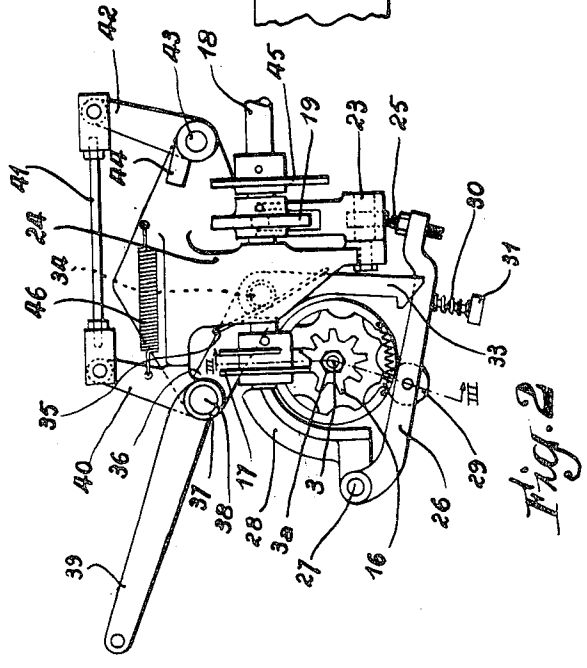

Fig. 2

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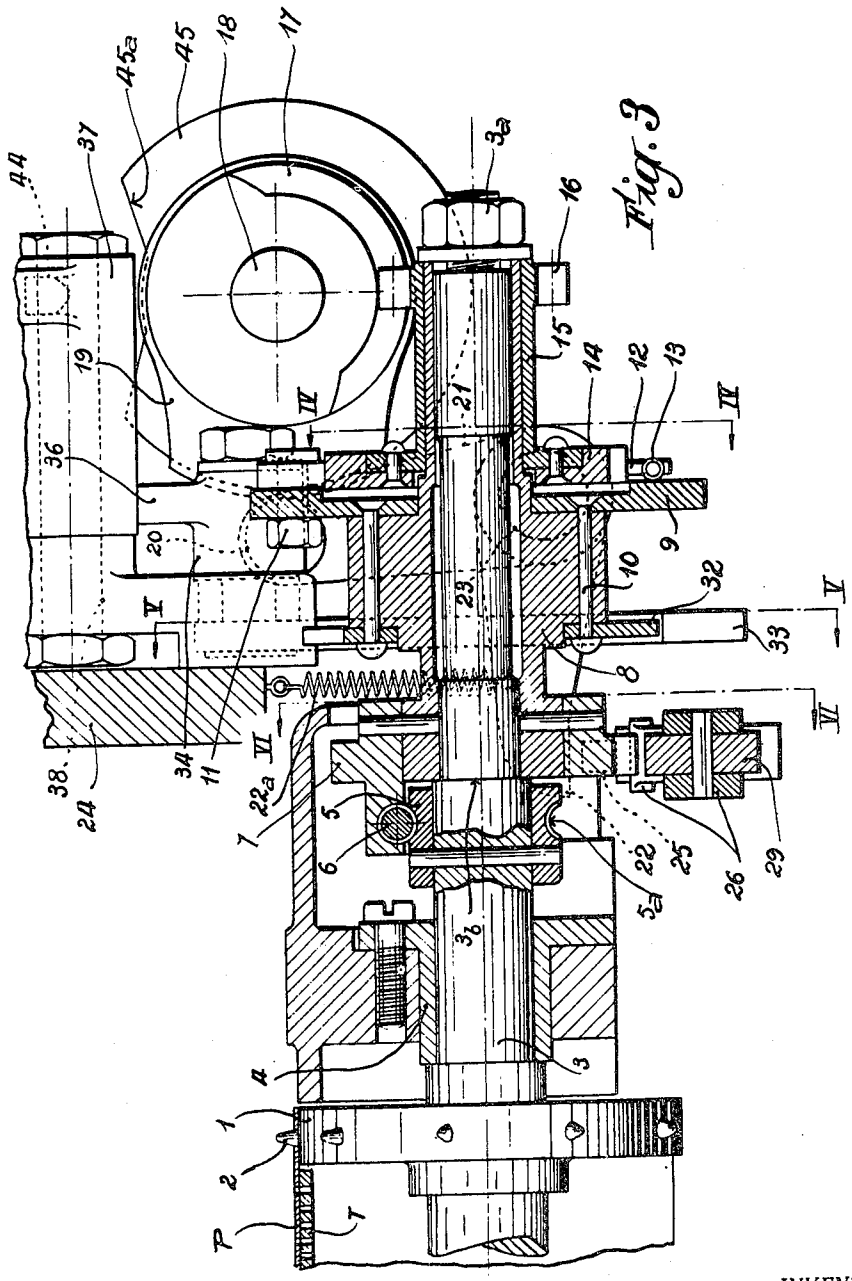

Fig. 3

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Fig. 6

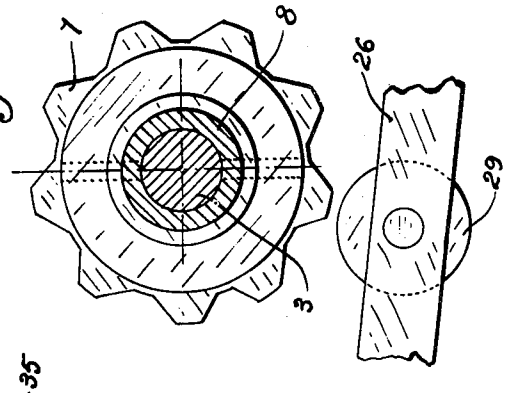


Fig. 5

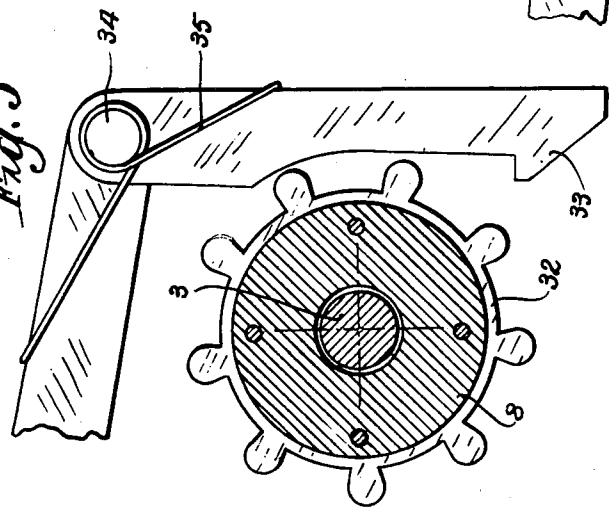
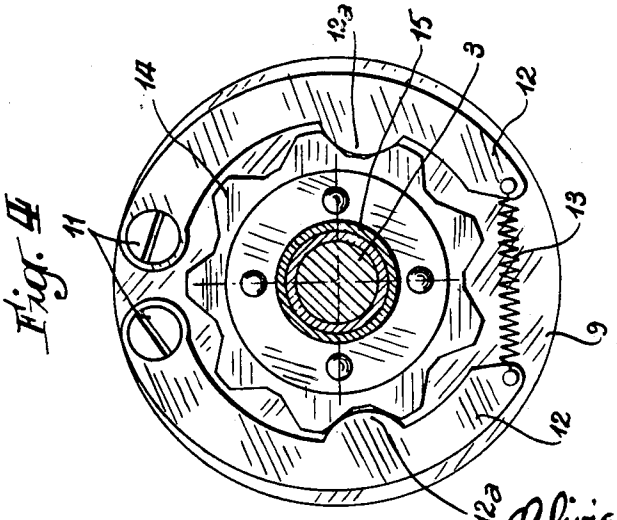


Fig. 4



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JACQUARDS FOR WEAVING LOOMS

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In France March 8, 1950

8 Claims. (Cl. 139—329)

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This invention relates to Jacquards for weaving looms, of the Verdol type and the like, wherein the pattern cards are in the form of a continuous band of paper. This band is intermittently fed by means of pin wheels and it is passed on a perforated selector plate or table wherein it is felt by feeler needles which control the hooks of the Jacquard. Owing to the thin character of the paper the band is liable to become torn when it is not quite free to move under the action of the pin wheels. This is particularly the case when the successive lengths of paper forming the band are defectively assembled with each other, or when the zones in which they are glued with each other are too rigid. The band then becomes wholly or in part jammed and the pin wheels tear the paper. It may also occur that a feeler needle does not clear the band in time and remains engaged through a hole thereof.

Such accidents could of course be avoided by driving the band through the medium of a clutch adapted to slip under such a reduced torque that when the band becomes jammed no tearing of the paper could occur. But in the known constructions this is quite impossible to obtain since the shaft carrying the pin wheels has also to actuate the spring pressed member which maintains the said shaft during the feeling operation to ensure the correct positioning of the band, and the torque required for operating this member is much higher than the limit which the paper could safely support.

A first object of my invention is to provide a Jacquard for weaving looms, of the Verdol type or the like, wherein the driving torque imparted to the pin wheels adapted to feed the band is insufficient to damage the band if the latter becomes jammed for any reason, without the correct positioning of the band being impaired in normal operation.

A further object of my invention is to provide a Jacquard for weaving looms wherein the feed gear for the band is operated through the medium of a torque limiting clutch, while the spring-pressed member adapted to ensure the correct positioning of the band is positively raised by a cam or the like carried by the continuously rotating driving shaft before each feed period of the band.

It will be appreciated that with such an arrangement the spring pressed member is first raised while the pin wheels adapted to feed the band are still at rest, then the said wheels are driven through the torque limiting clutch without the latter having to operate the said member, and when the feed period is finished the spring-pressed member is again released whereby the band is accurately positioned. The torque limiting clutch may thus be so adjusted that the paper cannot be damaged, should the band become jammed for any reason.

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The torque limiting clutch is preferably in the form of a notched wheel cooperating with spring-pressed levers adapted to engage the successive notches, the angular pitch of the notches corresponding to the angular pitch of the pin wheels which ensure the feed of the paper band. With such an arrangement it will be appreciated that when the clutch slips, the paper band remains properly timed with respect to the perforated selector plate.

In the annexed drawings:

Fig. 1 is a partial elevation showing a Jacquard of the Verdol type according to my invention.

Fig. 2 is the corresponding end view.

Fig. 3 is a partial enlarged longitudinal section taken along line III—III of Fig. 2.

Figs. 4, 5 and 6 are transverse sections taken along lines IV—IV, V—V and VI—VI of Fig. 3.

Fig. 7 is a partial end view showing the step-by-step mechanism of the Jacquard at a position different from the position illustrated in Fig. 2.

The Jacquard illustrated is of the Verdol type comprising feed wheels 1 (Fig. 3) provided with pins 2 adapted to engage the successive perforations of a pattern paper band such as P (Fig. 3). Wheels 1 are carried by a common shaft 3 supported by appropriate bearings such as 4.

On shaft 3 there is keyed a ring 5 (Fig. 3) provided with a toothed portion 5a in meshing engagement with a worm screw 6 supported by a wheel 7 having trapezoidal teeth (Fig. 6). Wheel 7 is in turn keyed on a sleeve 8 loose on shaft 3.

Sleeve 8 carries a plate 9 (Fig. 3) which is secured thereto by rivets 10 and plate 9 supports two gudgeons 11 (Fig. 4) on which are pivoted two arcuate jaws 12 urged towards each other by a spring 13. As clearly shown in Fig. 4, gudgeons 11 are disposed in the vicinity of the periphery of plate 9 at a small distance from each other. Between jaws 12 there is disposed a wheel 14 provided with trapezoidal teeth similar to the teeth of wheel 7 of Fig. 6. Jaws 12 are besides provided with inner bosses 12a adapted to cooperate with the spaces between the successive teeth of wheel 14 under the action of spring 13. As illustrated wheels 7 and 14 have the same number of teeth.

Wheel 14 is secured to a sleeve 15 (Fig. 3) loose

on sleeve 8 and sleeve 15 is formed at its outer end with a gear wheel 16 adapted to cooperate with a step-by-step driving cam 17 keyed on the driving shaft 18 of the Jacquard, which driving cam is disposed at right angles to shaft 3 as in the conventional constructions.

Shaft 18 rotates at a uniform speed, cam 17 being so formed as to impart to wheel 16 a jerked or step-by-step movement. Fig. 7 diagrammatically illustrates the operation of this kind of mechanism which is besides well-known in Jacquards in general. It should moreover be understood that any other step-by-step mechanism could also be used, such as for instance the conventional Maltese cross gear which is generally employed in Jacquards operating with pattern cards made of cardboard.

Shaft 18 also carries a cam 19 (Figs. 2 and 3) adapted to actuate a roller 20 (Fig. 1) supported at the end of a two-armed lever 21—22 pivoted at 23 (Fig. 2) on the Jacquard frame 24. The lever arm 22 of this lever acts on an adjustable pusher screw 25 carried at the outer end of a lever 26 pivoted at 27 on an arm 28 fixed to the frame of the Jacquard (or to the auxiliary openable frame in the case of a Jacquard wherein the paper driving gear may be swung aside from the fixed frame proper). Lever 26 carries a roller 29 (Figs. 1, 2 and 3) adapted to engage the teeth of wheel 7. A relatively strong compression spring 30 which rests against an abutment 31 (Figs. 1 and 2) of the main frame (or auxiliary openable frame) of the Jacquard urges lever 26 to maintain roller 29 pressed against wheel 7. Lever 21—22 is also loaded by a spring 22a adapted to maintain roller 20 against cam 19 (more particularly in the case of a Jacquard with openable frame wherein lever 26 is swung aside with the paper driving mechanism).

The rivets 10 (Figs. 3 and 5) which secure plate 9 onto sleeve 8 also secure to the said sleeve a wheel 32 provided with teeth with rounded tips. This wheel cooperates with a pawl 33 (Figs. 2 and 5) loose on a pin 34 and urged by a spring 35 against the said wheel 32. Pin 34 (Figs. 1 and 2) is carried by an arm 36 in one with a sleeve 37 loose on a shaft 38 fixed to the Jacquard frame 24. Sleeve 37 is also formed with another arm 39 adapted to be actuated by the conventional string by means of which the Jacquard may be manually rotated backwards, and with a third arm 40 (Fig. 2) connected by a rod 41 with a lever 42 loose on a pin 43 carried by the Jacquard frame 24. Lever 42 has a lateral lug 44 which moves above a plate 45 keyed on shaft 18. As shown in Fig. 3, plate 45 is formed with a notch 45a on a portion of its periphery, and it is so timed on shaft 18 that notch 45a is below lug 44 when the feeler needles have cleared the pattern paper P on the perforated selector plate or table T (Fig. 3). Lever 40 is returned by a spring 46 (Fig. 2).

The outer end of shaft 3 is screw-threaded and it receives a nut 3a (Fig. 3) by means of which sleeve 8 may be locked against a shoulder 3b of the said shaft when proper angular timing has been obtained by means of screw 6.

The operation is as follows:

As above indicated shaft 18 is continuously rotated at a uniform speed while cam 17 imparts a step-by-step movement to wheel 16. Wheel 16 drives sleeve 8 through the spring-loaded gear or clutch 9—12—14 and sleeve 8 in turn drives shaft 3, on which it is locked by the end nut 3a. To each revolution of shaft 18 there corresponds an angular movement of shaft 3 which ensures the advance of the paper band P from one pattern card to the next one on the selector plate or table T of Fig. 3.

During a part of each revolution of shaft 18 cam 19 actuates roller 20 and causes roller 29 to move downwards and to clear wheel 7. Cam 19 is so timed, on shaft 18, that this lowering of roller 29 begins just before wheel 16 is advanced by cam 17. In this manner the torque which wheel 16 has to transmit to shaft 3 through the spring-pressed clutch 9—12—14 is limited to the torque necessary to rotate the said shaft 3 in its bearings and to advance the paper band. Such a torque is of course very small and therefore the spring 13 of clutch 9—12—14 may be extremely light. As soon as wheel 16 has completed its angular movement, cam 19 releases roller 20 whereby roller 29 is urged upwards by spring 30 into engagement with wheel 7, thus positioning the latter accurately. The paper band P is therefore itself accurately positioned on the selector plate or table T. But the action of roller 29 cannot load the spring-pressed clutch 9—12—14, since shaft 3 is at standstill when the said roller engages wheel 7; on the contrary the said shaft 3 would be positively stopped against the action of inertia forces, if this were necessary, thus preventing any slip of the said clutch.

It will thus be understood that spring 13 may freely be so adjusted that clutch 9—12—14 will slip if the paper band becomes jammed in the paper advancing mechanism, or if a feeler needle is not raised in due time from the selector table. When this occurs, the Jacquard remains properly timed, since the number of teeth of wheel 7 is equal to the number of teeth of wheel 14. The operator only has to turn the loom backwards until the pattern card on the selector table corresponds to the next weft thread. The paper band itself is undamaged.

When the Jacquard has to be turned backwards, the operator actuates the string attached to lever 39. Pawl 33 is thus reciprocated and it drives wheel 32 step by step. The said wheel having the same number of teeth as wheel 7, the paper band is returned step by step. Owing to plate 45 this operation can only be performed when the feeler needles have cleared the paper band since notch 45a only permits downward movement of lug 44 when shaft 18 is at standstill at the correct position. When such is not the case, lug 44 bears against the periphery of plate 45 whereby levers 42 and 40 are prevented from moving towards the left of Fig. 2.

I claim:

1. In a Jacquard for weaving looms of the Verdol type operating with a perforated paper band advanced step by step on a perforated selector table whereon it is felt by feeler needles, a driving shaft adapted to rotate at a substantially uniform speed; an intermittent motion gearing embodying a driving member carried by said driving shaft and a driven member adapted to receive a step-by-step rotary motion from said driving member; paper advancing means embodying an intermittently rotating shaft; spring-pressed means to position said intermittently rotating shaft during each feeling period of said paper band; a torque-limiting clutch to connect said intermittently rotating shaft with said driven member, whereby said intermittently rotating shaft is imparted a step-by-step rotary

motion; and releasing means actuated by said driving shaft to render said spring-pressed means inoperative during each period of movement of said intermittently rotating shaft.

2. In a Jacquard as claimed in claim 1, said spring-pressed means comprising a toothed wheel on said intermittently rotating shaft and an engaging member elastically urged against said toothed wheel; and said releasing means being adapted to disengage said engaging member from said toothed wheel to permit free movement of said wheel.

3. In a Jacquard as claimed in claim 1, said torque-limiting clutch embodying a toothed wheel forming one element of the clutch; a plate co-axial to the said wheel and forming the second element of the clutch; members pivoted to said plate and adapted to engage the toothed periphery of said wheel and spring means to urge said members against said wheel; said wheel and said members being so formed that under the action of a torque exceeding a safe limit, said wheel may rotate, its teeth raising said members; and said wheel having a number of teeth equal to the number of successive impulses of said intermittently rotating shaft during a full revolution thereof.

4. In a Jacquard as claimed in claim 1, said releasing means comprising a cam on said driving shaft, and means actuated by said cam and in turn acting on said spring-pressed means to render same inoperative during each period of movement of said intermittently rotating shaft.

5. In a Jacquard for weaving looms of the Verdol type operating with a perforated paper band advanced step by step on a perforated selector table whereon it is felt by feeler needles, feed wheels adapted to drive said paper band; an intermittently rotating shaft on which said feed wheels are keyed; a driving shaft adapted to rotate at a substantially uniform speed; an intermittent motion gearing embodying a driving member carried by said driving shaft and a driven member loose on said intermittently rotating shaft, said driven member being adapted to receive a step-by-step rotary motion from said driving member; a torque-limiting clutch interposed between said driven member and said intermittently rotating shaft to impart same a

step-by-step rotary motion to advance said paper band from one pattern card to the next one on said selector table; spring-pressed means to position said intermittently rotating shaft during each feeling period of said paper band; and releasing means actuated by said driving shaft to render said spring-pressed means inoperative during each period of movement of said intermittently rotating shaft.

6. In a Jacquard as claimed in claim 5, said spring-pressed means comprising a toothed wheel on said intermittently rotating shaft and an engaging member elastically urged against said toothed wheel; and said releasing means being adapted to disengage said engaging member from said toothed wheel to permit free movement of said intermittently rotating shaft.

7. In a Jacquard as claimed in claim 5, said torque-limiting clutch embodying a toothed wheel loose on said intermittently rotating shaft and fast to the driven member of said intermittent motion gearing; a plate carried by said intermittently rotating shaft; members pivoted to said plate and adapted to engage the toothed periphery of said wheel; and spring means to urge said members against said wheel; said wheel and said members being so formed that under the action of a torque exceeding a safe limit, said wheel may rotate, its teeth raising said members; and said wheel having a number of teeth equal to the number of successive impulses of said intermittently rotating shaft during a full revolution thereof.

8. In a Jacquard as claimed in claim 5, said releasing means comprising a cam on said driving shaft, and means actuated by said cam and in turn acting on said spring-pressed means to render same inoperative during each period of movement of said intermittently rotating shaft.

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