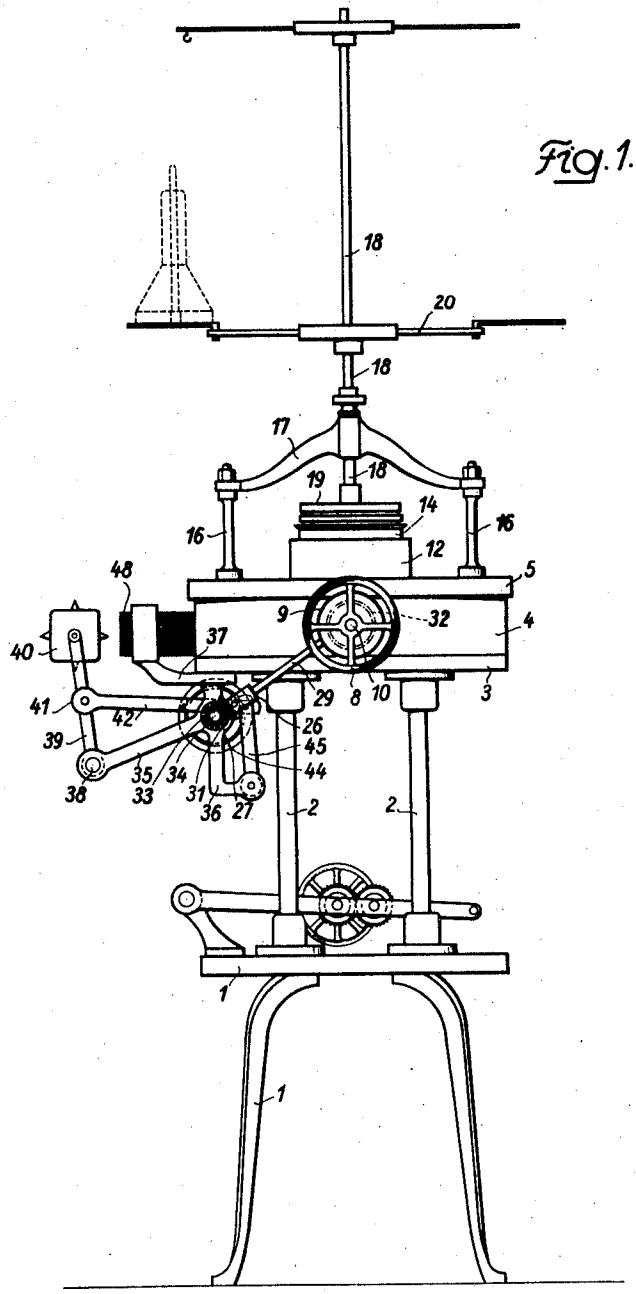
March 29, 1932. G. NOBST 1,851,863

JACQUARD APPARATUS FOR TEXTILE MACHINES WITH MOVABLE IMPLEMENTS FOR FORMING LOOPS

Filed July 31, 1930 3 Sheets-Sheet 1

Fig. 1.



Inventor:
Georg Nobst.

per Ferdinand Broder Borchardt.
Attorney.

March 29, 1932. G. NOBST 1,851,863

JACQUARD APPARATUS FOR TEXTILE MACHINES WITH MOVABLE IMPLEMENTS FOR FORMING LOOPS

Filed July 31, 1930 3 Sheets-Sheet 2

Fig. 2.

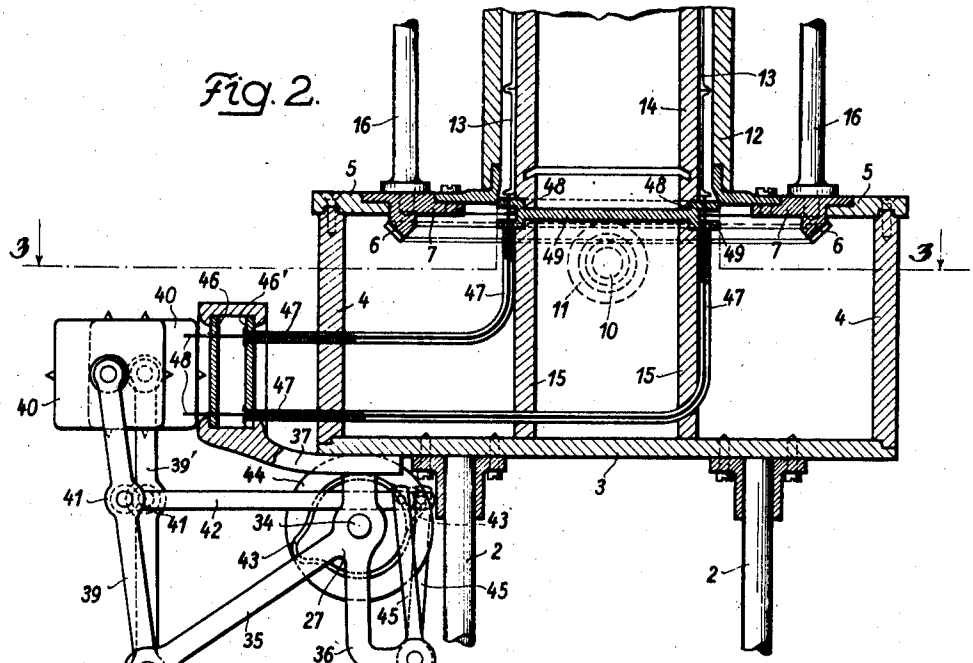
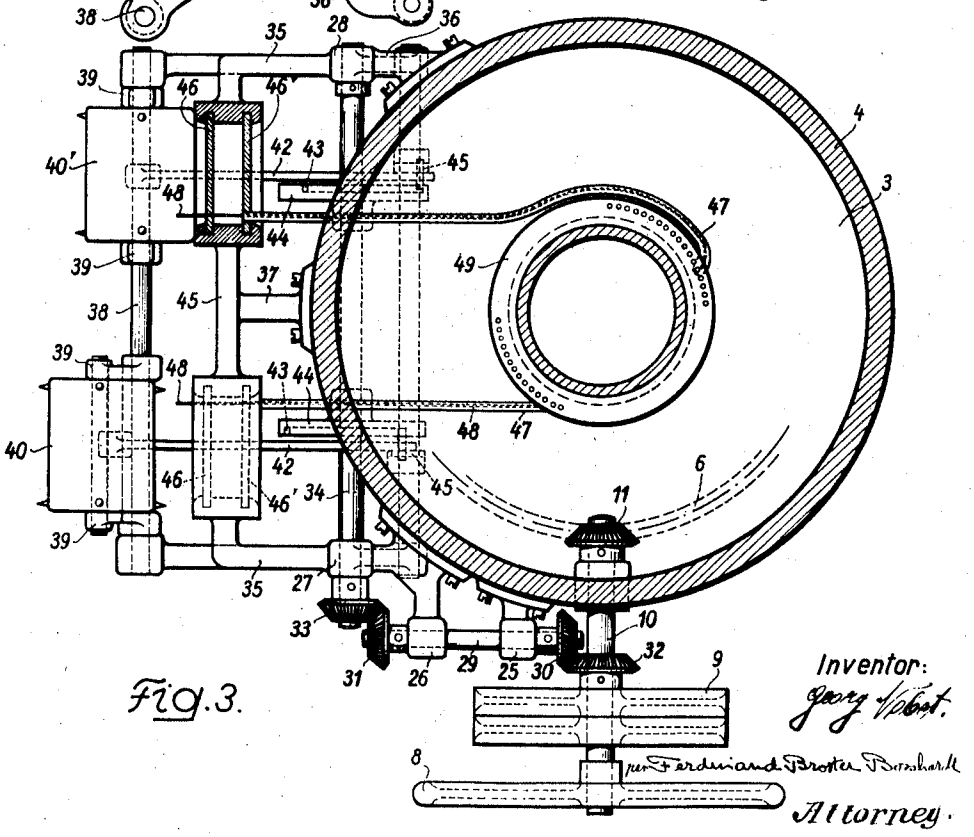


Fig. 3.



Inventor:
Gary Nobst.

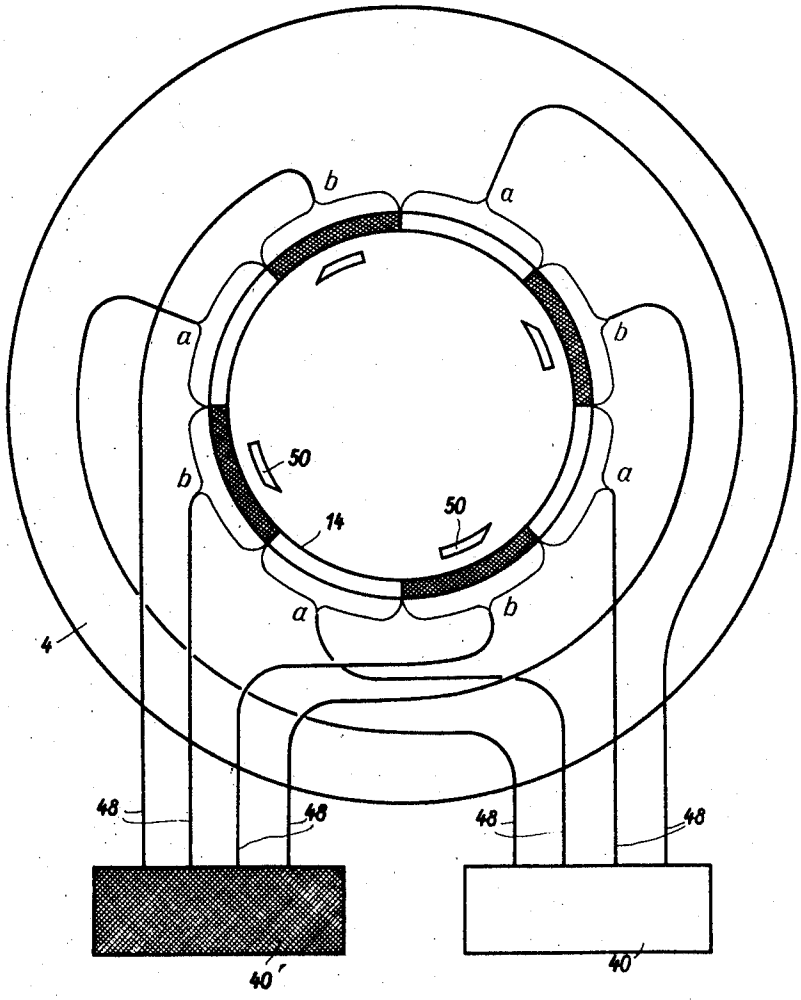
per Ferdinand Brotter Bernhardt
Attorney.

March 29, 1932. G. NOBST 1,851,863

JACQUARD APPARATUS FOR TEXTILE MACHINES WITH MOVABLE IMPLEMENTS FOR FORMING LOOPS

Filed July 31, 1930 3 Sheets-Sheet 3

Fig. 4.



Inventor:
Georg Nobst

per Ferdinand Broeder Bonhardt
Attorney

Patented Mar. 29, 1932 1,851,863

UNITED STATES PATENT OFFICE

GEORG NOBST, OF MITTWEIDA, GERMANY

JACQUARD APPARATUS FOR TEXTILE MACHINES WITH MOVABLE IMPLEMENTS FOR FORMING LOOPS

Application filed July 31, 1930, Serial No. 472,014, and in Germany June 5, 1929.

The invention relates to a jacquard apparatus for textile machines with movable implements for forming loops, more particularly for circular knitting machines. The jacquard apparatus known in connection with weaving looms has already found use in circular knitting machines. For example it is known to employ in star arrangement around the circular knitting machine, one or two jacquard apparatuses for each feeder, knitter or looper of the machine. Such machines with the jacquard apparatuses belonging thereto require a very large floor space. Furthermore the thus arranged jacquard apparatuses prevent access to the machine, with the result for example that the progress of production of the fabric can be followed only with difficulty. In other circular knitting machines one or more jacquard apparatuses are perched above the machine. In this case there are pattern apparatuses in which, as in weaving looms, the patterning needles are drawn up by them at the same time as the harness cords connected to the sinkers. Owing to the weight of these pattern apparatuses themselves it is necessary to deviate strongly from the hitherto light form of construction of the circular machine. A jacquard apparatus has also been proposed in which the sinkers for actuation of the patterning needles are arranged in the vicinity of rotary lifters and fallers. In this proposal it is proposed to employ, amongst other things, a flexible member for advancing the sinkers. The flexible member is forced by the jacquard prism against the sinker, against the pressure of a spring. But also in this case the upper needle cylinder is hidden by the sinkers and harness cords, for example in pearl machines.

For the same reason this apparatus cannot be used for auxiliary cam machines for colour patterned, plain fabrics, because it would hide the necessary ribbing disc and cam plate.

According to my invention there is interposed between each two or more jacquard prisms having pattern cards and every one of the raisable and lowerable needles in the cylinder of a circular knitting or circular full fashioned machine, a flexible member which is pushed by the jacquard prism and imparts the received motion direct to its needle and thereby brings the needle into its working position. On completion of its work the needle pushes its flexible member forcibly back into its initial position whereby no special means is required for that purpose. A pattern device of this kind is particularly suitable for circular knitting machines of all kinds. In most cases, two jacquard prisms which are dependent on each other in their movements are sufficient to push the flexible members in machines of all sizes and of all kinds, the jacquard prisms carrying out their pushing action alternately. According to the last mentioned prior proposal, two jacquard prisms were intended to act alternately on flexible members. This however took place in a manner in which the jacquard prisms worked independently of each other. Both of these jacquard prisms preferably are situated at one side of the machine in close proximity to the needle cylinders so that very little room is required for them. Access to the machine and observation of the progress of the fabric accordingly is not hindered in any way, because the hitherto necessary employment of harness cords is eliminated.

Another distinctive feature of the invention consists in the peculiar formation and arrangement of the flexible members. According to this feature a wire core is provided loosely in a stationary cover and has at least one bend together with the cover. The loose arrangement of this wire core permits its easy movement between the jacquard prism and the needle, whilst the bend brakes this easy movement slightly and in such a way that the ease of movement is maintained but the movement is braked to an extent that causes the wire core to remain in any given position and not to leave such position accidentally. In consequence the needles pushed by the wire cores for patterning activities do not leave their position partly or wholly prematurely.

The accompanying drawings show the new jacquard patterning device in combination with a four feeder, knitter or looper circular

knitting machine for plain goods rib frame with auxiliary cams. In the drawings—

Figure 1 shows both parts in elevation,

Figure 2 the patterning device in longitudinal section,

Figure 3 the same in section on line 3—3 of Figure 2, regarded from above, and

Figure 4 a division diagram for two needle groups.

Referring to the drawings, four posts 2 are secured to the machine stand 1 and carry a chamber formed by a ring 4 and a cover plate 5. A disc 7 is mounted in the plate 5 and is provided at 6 with a bevel crown ring, and receives its drive through a bevel wheel 11 from a shaft 10 actuated by a hand wheel 8 or a driving pulley 9.

The disc transmits its rotary movement to the cam shroud 12 which is secured to it. The shroud 12 encircles the stationary cylinder 14 which guides the needles 13 and the stationary cylinder is secured to the base plate 3 by means of a support 15. Four posts 16 are secured to the rotary disc and carry a rod 18 by the aid of a bridge 17, the ribbing disc 19 and the bobbin stand 20 being mounted on the rod 18. The hereinbefore stated parts up to the chamber 3, 4, 5, and their manner of operation are known. Lugs 25, 26, 27 and 28 are secured to the ring 4, the lugs 25 and 26 serving as bearings for a shaft 29 on the ends of which are secured the bevel wheels 30 and 31. The bevel wheel 30 meshes with a bevel wheel 32 secured on the driving shaft 10 and transmits the rotary movement thereof through the bevel wheel 31 to a bevel wheel 33 which meshes therewith and is secured to a shaft 34 mounted in the lugs 27 and 28. The last named lugs have arms 35, 36 and there is an arm 37 mounted on the ring 4. At the ends of the arms 35 there is mounted a bolt 38 which secures the two arms together. Upwardly projecting pairs of fingers 39, 39′ are arranged on the bolt 38 and each pair carries at its ends one of the known jacquard prisms 40 and 40′ respectively. The pairs of fingers 39, 39′ have eyes 41. Rods 42 are connected pivotally at one end by means of the said eyes and the other ends of the rods engage cam slots 43 in discs 44 secured to the shaft 34. The rods are supported at their rear ends by arms 45 which are mounted rotatably on the lug arms 36. By rotation of the cam discs 44 the rods 42 and thereby the feed cylinders 40, 40′ have a to-and-fro motion imparted to them.

The cam discs 44 are so arranged on their shaft that, as can be seen in Figure 3, the front jacquard prism 40 is out of operative position when the rear jacquard prism 40′ is in operative position. Both prisms are turned 90° on their return movement in the usual way and therefore not illustrated manner, so that on the forward movement always a fresh card leaf comes into operation. The arm 37 and an arm 45 carry the pairs of plates 46, 46′.

The ends of sleeves produced from closely wound helical springs 47 are secured in the plates 46′ and in a ring 49 provided on the needle cylinder 14. These sleeves 47 each serve as a guide for a wire 48 which lies loosely therein and the wires serve as stoppers for the knitting needles 13 because they project into the needle slots in the cylinder 14 directly beneath the needles 13. Each stopper 48 commences directly in front of one of the two jacquard prisms 40 and 40′, then extends with its sleeve in a horizontal direction and then bends into the vertical.

The stoppers 48 selected according to the pattern are pushed by the card leaves lying on the jacquard prisms 40, 40′ and the movement is transmitted by the said stoppers to their needles which thereby are raised high enough to be gripped by the revolving shroud cam and brought into action.

The loose support of the stoppers 48 in the stationary sleeve 47 provides for the necessary easy movement of the stoppers 48.

The bending of these stoppers and their sleeves does not arise merely from their arrangement but has also the purpose to so restrict or brake the easy movement of the stoppers that they and the needles actuated by them do not change accidentally from the position into which they are pushed by the jacquard prisms. Consequently the needles lifted in the working of the pattern do not slide down either partly or wholly before their activities are ended and therefore the detrimental results attached to such unintended movements do not arise. The return movement of the needles and their stoppers to the initial positions takes place only when they are forcibly moved by the action of the gate parts provided for the purpose.

In the illustrated example, as can be observed from Figure 4, the needles 13 which are momentarily projected by the jacquard prism 40 lie in those parts of the needle cylinder which are indicated by the brackets *a* whilst none of the four yarn guides 50 lies opposite those parts. As soon as the yarn guides reach the parts indicated by the brackets *a*, those needles 13 which lie in the parts indicated by the brackets *b* are projected by the jacquard prism 40′.

I claim:—

1. In a jacquard apparatus for textile machines which have movable, loop-forming implements, the combination of a needle cylinder, needles which are raisable and lowerable in the needle cylinder, jacquard prisms adapted to be arranged in proximity to the machine, pattern cards riding on the jacquard prisms, flexible thrust members interposed between the jacquard prisms and each of the needles for directly transmitting motion from the jacquard prisms to the needles and thereby

advancing the needles, and means for forcibly returning the flexible thrust members to the initial position through the action of the said needles on the flexible thrust members.

2. In a jacquard apparatus for textile machines, according to claim 1, the combination of jacquard prisms arranged at one side of the machine, means carrying the said prisms, a shaft carrying the said means, needles adapted to rise and fall, and flexible thrust members arranged between the jacquard prisms and lower ends of the needles for advancing the needles and preventing a premature, undesired return of the needles.

3. In a jacquard apparatus for textile machines, according to claim 1, the combination of jacquard prisms, loop forming needles, bent flexible thrust members, and bent stationary sleeves containing the flexible thrust members loosely and braking to a small extent the free movement of the flexible thrust members in the said sleeves.

In testimony whereof, I have signed my name to this specification at Dresden, Germany, this 16th day of July, 1930.

GEORG NOBST.