March 30, 1937. C. SCHELLER 2,075,139

JACQUARD APPARATUS FOR FLAT KNITTING LOOMS

Filed Oct. 1, 1935 2 Sheets-Sheet 1

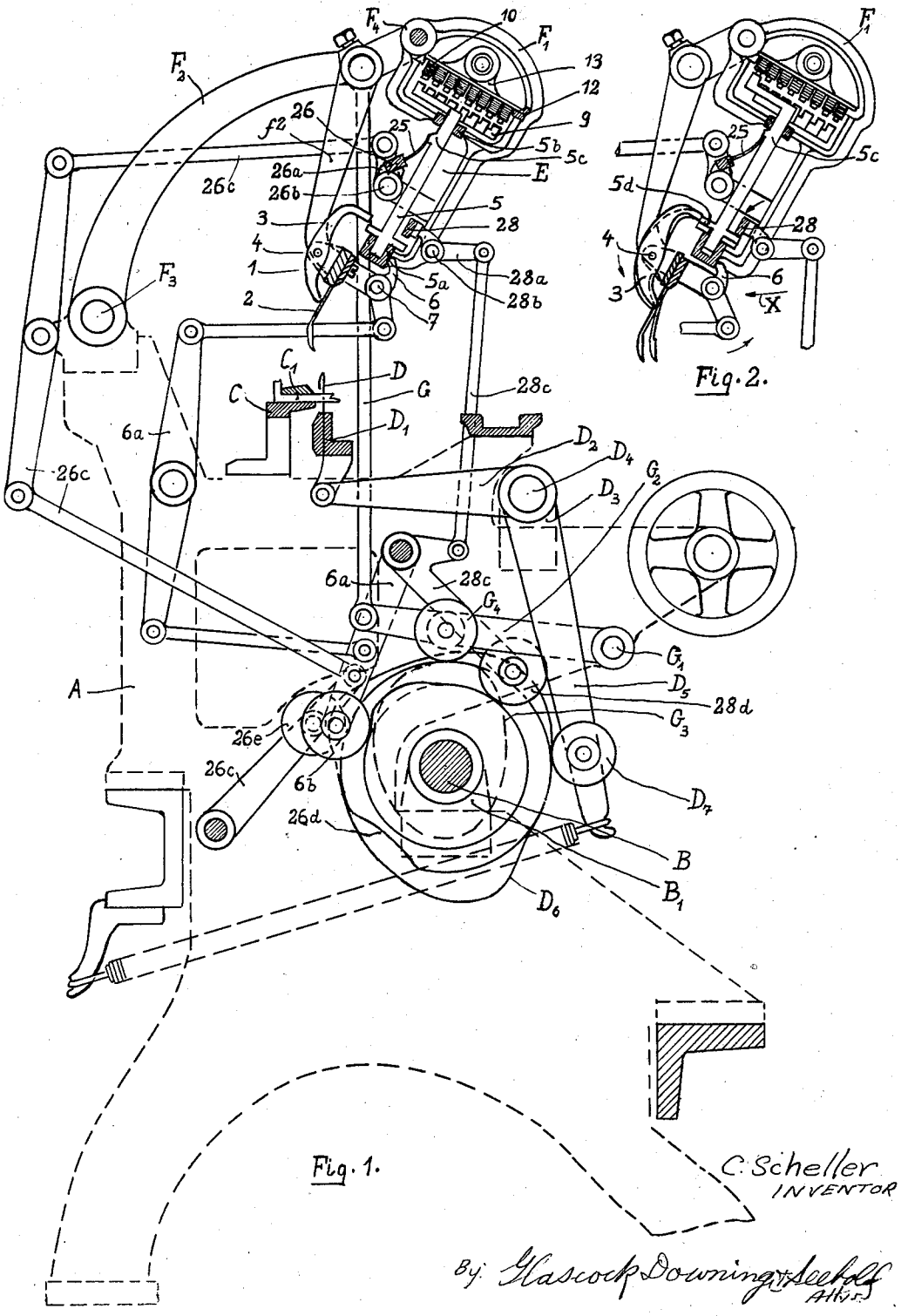


Fig. 1.

Fig. 2.

C. Scheller
INVENTOR

By Mascock Downing & Seehold
Attys

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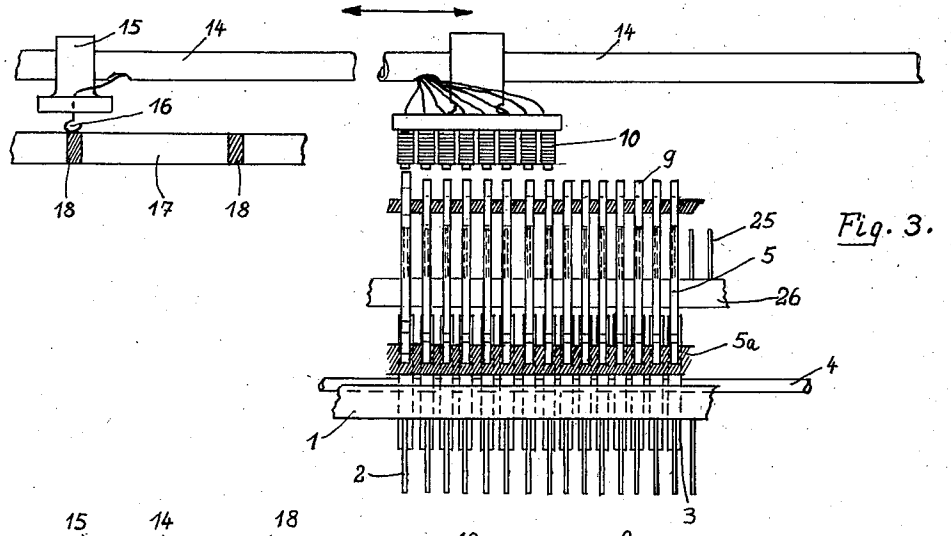


Fig. 3.

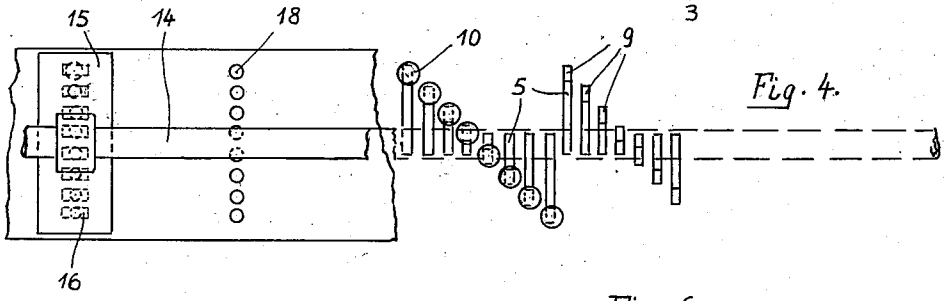
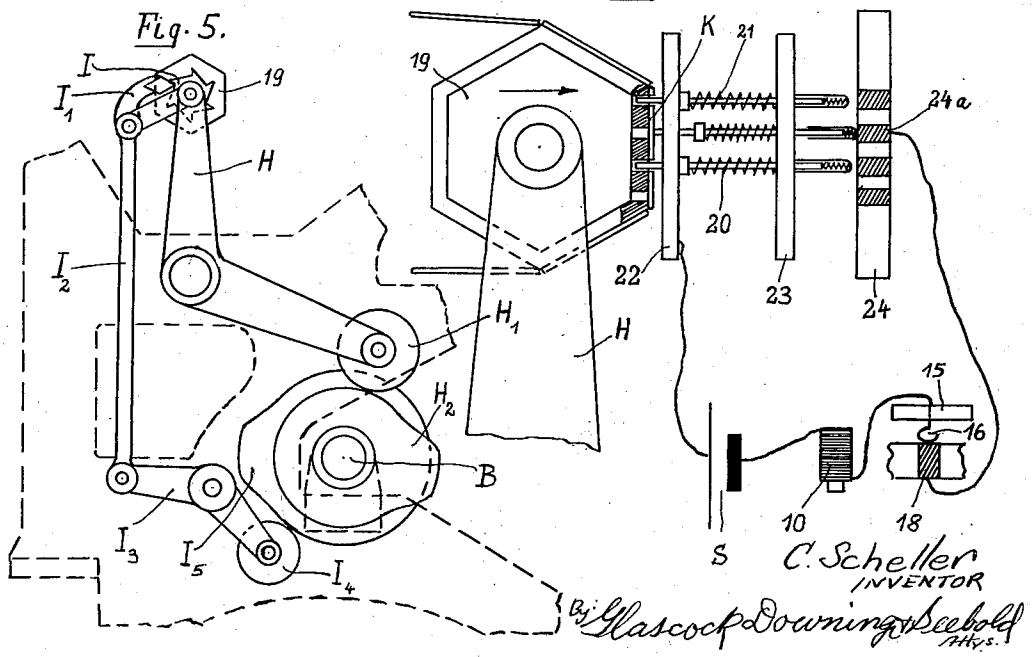


Fig. 4.

Fig. 6.

Fig. 5.



C. Scheller
INVENTOR

By Glascock Downing & Seebold
Attys.

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JACQUARD APPARATUS FOR FLAT KNITTING LOOMS

Curt Scheller, Chemnitz, Germany

Application October 1, 1935, Serial No. 43,094
In Germany October 1, 1934

3 Claims. (Cl. 66—98)

This invention relates to jacquard pattern mechanisms in flat knitting frames.

It has been repeatedly proposed to provide jacquard pattern mechanisms with electromagnetically controlled pattern tools, and in one of these known devices each pattern tool is for instance controlled by a special electromagnet and the electromagnets have associated contacts which cooperate with a perforated paper strip. This construction, however, is suited only for coarser gauges, since the electromagnets cannot be accommodated in finer divisions.

In another known device the pattern tools are guided past an electromagnet while a contact provided on each pattern tool meets a countercontact connected with the field coil and the tool is lifted or remains where it is according to whether the countercontact is carrying current or not. This device is likewise suited only for coarse gauges, as with finer divisions it is not always possible to avoid unintended lifting of adjacent pattern tools and, further, because the time available does not suffice for lifting the tools.

It has further been proposed to arrange the pattern tools or the armatures secured thereto in several rows to insure wider spacing and thereby prevent accidental lifting of adjacent tools. The electromagnet is provided with a sliding contact which is passed directly over the perforated paper strip. This device, however, is also adapted only for coarse gauges for the reason that in finer gauges the perforations and the portions of paper lying between them are too small. Furthermore, a special perforated strip is required for each division which must coincide with the spacing of the holes, and the perforated paper strip is subjected to excessive wear by the contact sliding over it which, moreover, can be moved only relatively slowly to prevent it from jumping over the holes. Owing to the drawbacks mentioned, electromagnetically controlled pattern mechanisms have not been successful hitherto.

The invention aims at eliminating these defects by separating the contacts which supply the electromagnets with current from both the pattern tools and the perforated strip or the jacquard cards so as to have more space available for the contacts and to render the division of the perforated strip or of the jacquard cards independent from the needle division. For this purpose, the sliding contacts of the electromagnets appertaining to the rows of armatures are passed over a contact bank separately disposed from the pattern sinkers. The contacts of this bank are connected with corresponding auxiliary contacts influenced by the jacquard cards and are touched by the sliding contacts when the electromagnets arrive at the armature portions of the pattern sinkers of the respective contacts, the auxiliary contacts being closed by displaceable contact pins selected in known manner by means of jacquard cards. The provision of the contact bank and pins prevents any sliding of a contact member on the perforated strip or the jacquard cards, so that the strips or cards are preserved from damage.

According to the invention, the contacts cooperating with the contact pins of the jacquard attachment are arranged on a stationary contact bank, so that the numerous connections between this bank and the contact bank swept over by the sliding contacts of the electromagnets and firmly united with the frame carrying the pattern tools need be moved only as a unit to prevent trouble. The individually moved contact members like the contact pins of the jacquard attachment and the poles concerned of the windings of the electromagnets can be connected to the poles of the source of current by a single conductor.

The jacquard attachment and the contact bank with the sliding contacts passing over it may of course simultaneously serve for a plurality of systems producing the same goods, in which case the corresponding electromagnets of these systems are connected in series or parallel.

By way of example, one embodiment of the invention is illustrated in the accompanying drawings, in which the jacquard attachment is assumed to control a tuck pattern attachment and in which Figure 1 is a side view of the entire machine with the parts omitted not required for understanding the invention; Fig. 2 shows the tuck pattern attachment in operative position; Fig. 3 is a diagrammatic front view of the tuck pattern attachment; Fig. 4 is a top view thereof; Fig. 5 shows the drive of the jacquard attachment; and Fig. 6 is a view on an enlarged scale of the jacquard drum and adjoining parts and shows also the diagram of connections.

Referring to the drawings, in the machine frame A of a cotton frame the main shaft B is arranged in the bearings B_1. In front of the sinker bar C and the sinkers C_1 horizontally displaceable therein the needles D are secured to the needle bar D_1 which is carried by the levers D_2 attached to a shaft D_4 arranged at D_3. The shaft D_4 is controlled by means of the lever D_5 secured thereto from a cam plate D_6 on which the roll D_7 moves arranged on the lever D_8.

The tuck pattern attachment E is disposed in

the two frames F_1 and F_2 which are displaceable relative to one another and of which the frame F_2 is pivotally mounted in the bearing F_3 and having downwardly extending arms f_2, one of which is shown in the drawings and the frame F_1 swings about the shaft F_4 disposed on the frame F_2 controlled by the rod G articulated to the free end of the lever G_2 positioned on the machine frame A at G_1 and moved by means of the cam plate G_3 and the roll G_4. The parts hitherto described are known except for the tuck pattern attachment.

To the bar 1 secured to the frame F_2 the spring needles or presser points 2 are attached, and for each needle 2 a jack 3 arranged on the shaft 4 and a pattern sinker 5 sliding in the guides 5*a* and 5*b* of the frame F_1 are provided. The pattern sinkers 5 are at their upper ends constructed so as to form the armatures 9 which are uniformly distributed in rows, eight of which are shown in the drawings, so that every ninth armature will be positioned again in the same row as the first, as indicated in Fig. 4. This arrangement serves for providing sufficient spacing for the armatures swept over by an electromagnet to prevent the attraction of adjacent armatures besides the one armature of the sinker to be chosen.

Opposite the armatures 9, a carriage 13 longitudinally displaceable in the guides 12 is provided in the frame F_1. The carriage 13, which is passed along the armatures of all sinkers 5 shortly before each slur motion and whose controlling means comprising for instance a chain drive moved to and fro by a cam plate and a lever arrangement are not shown for the sake of clearness, is equipped with a number of magnets 10 corresponding to that of the rows of armatures, each magnet 10 being opposite a row. As shown in Fig. 4, the eight magnets 10 are obliquely arranged side by side so as to simultaneously face always a group of eight armatures.

The frame F_2 is provided with a bar 26 having a number of springs 25 cooperating with a notch 5c of each pattern sinker 5. The bar 26 is disposed on short levers 26*a* arranged at 26*b* and controlled by means of the rods 26*c*, the cam plate 26*d* and the roll 26*e*. The frame F_2 is further provided with a bar 28 whose carrying levers 28*a* swing about a shaft 28*b* and are driven by the rods 28*c*, the roll 28*d* and a cam plate, not shown. The frame F_1 is movable about the shaft F_4 by means of the cams 6 which swing about the shaft 7 of the frame F_2 and are driven by the rods 6*a*, the roll 6*b* and a cam plate, not shown.

The parts just described function as follows: After the requisite pattern sinkers 5 have been chosen or lifted by the magnets 10 and are held in lifted position by the springs 25, as indicated in Fig. 2, the frame F_1 is moved in the direction of the arrow X in Fig. 2 by the cams 6, so that the lifted pattern sinkers 5 engage with their extensions 5*d* the jacks 3 and shift them in the direction of the arrow. The jacks 3 thus moved press their respective spring needles into operating position, and the spring needles appertaining to the unmoved jacks and the pattern sinkers that have not been lifted remain inoperative.

After completion of the course the springs 25 are lifted out of the notches 5*c*. The bar 28 moves down in the direction of the arrow and pushes back the lifted pattern sinkers 5. Finally, the cams 6 also move back, and the frame F_1 swings back into initial position by its own weight, whereupon the cycle of operations begins again.

The means for controlling the electromagnets 10 are as follows: To the carriage 13 a tube 14 is secured which contains the leads for the electromagnets. The tube 14 carries a cross member 15 which moves along over a contact bank 17 laterally disposed with the contacts 18 on the frame F_1. To the cross member 15 eight contact members 16 are attached which cooperate with the contacts 18 and which are connected to the leads of an electromagnet. The contacts 18 are connected in turn with the auxiliary contacts 24*a* controlled by a jacquard drum and to be described below.

The jacquard drum 19 is rotatably disposed in known manner on the lever H which is moved to and fro by the roll H_1 and the cam plate H_2 secured on the main shaft B. The jacquard drum is moved in known manner by a feed wheel I and a pawl I_1 moved by the rod I_2, the lever I_3, the roll I_4 and the came plate I_5.

Opposite the jackquard drum 19 a plurality of pins 20 are pressed by the springs 21 upon the drum 19 and are guided in two metal plates 22, 23. On the other side of the group of pins 20 an auxiliary contact bank 24 is provided whose auxiliary contacts 24*a* are connected to the respective contacts 18. To the plate 22 one pole of a current source S is connected, so that all pins 20 are alive. The other pole is connected by the electromagnets 10 to the contact members 16. When the drum 19 is therefore moved in the direction of the arrow, it will press the jacquard card K against the ends of the pins 20 and brings those pins which do not meet a perforation in the card into contact with the corresponding contacts of the contact bank 24, and this contact remains until the electromagnets 10 have passed all armatures 9. As indicated in Fig. 4, the electromagnets always arrive at eight armature parts at the same time, and at the same moment the contact members 16 touch the eight contacts 18 appertaining to the eight armature parts mentioned. It is also possible of course to make provisions for causing only one armature part to be influenced at a time, but whenever an armature part is reached by its respective electromagnet the contact member 16 appurtenant to the magnet must face the contact 18 appertaining to this armature part.

If the device is to be used for several systems, it is only necessary to construct the pattern sinkers 5 of the second, third and each following system in the same way as those of the first and to provide the eight magnets whose coils, relative to those of the first working system, are connected in series or shunted and are excited like them.

I claim:—

1. In a jacquard pattern mechanism for knitting machines in combination, a plurality of pattern sinkers having magnet armatures equally distributed in several rows, a contact member having a number of contact makers corresponding to the number of said rows, a slidable member coupled with said contact member, an electromagnet slidably arranged along its armature row and influencing the same, said electro-magnets being carried by said slidable member, rows of contacts, each row corresponding to the armatures appertaining to one electro-magnet, each of said contact makers being connected with one of said electro-magnets and slidably arranged over a row of said contacts, auxiliary contacts, one connected to each of said aforementioned contacts, the auxiliary contacts having displaceable contact pins, a jacquard card and a jacquard

drum movable against said displaceable contact pins.

2. In a jacquard pattern mechanism for knitting machines in combination, a number of pattern sinkers having magnet armatures equally distributed on several rows, each armature row influenced by an electro-magnet slidably arranged along its armature row, the electromagnets carried by a slidable member coupled with a contact member having a number of contact makers corresponding to the number of said armature rows, each contact maker being connected with one of said electromagnets and slidably arranged over a row of contacts corresponding to the armatures appertaining to said one electro-magnet, the contacts being connected with an equal number of auxiliary contacts controlled by a jacquard card and a Jacquard drum movable against the displaceable contact pins of said auxiliary contacts.

3. A jacquard pattern mechanism for knitting machines as claimed in claim 2, the jacquard contacts consisting of a stationary contact bank the individual contacts of which are connected with the corresponding contacts of said contact rows, and of movable contact pins, a current source, one pole of which is connected with said contact pins and the other pole of which is connected with said electro-magnets.

CURT SCHELLER.