Jan. 19, 1937. H. S. HORROCKS 2,068,179

KNITTING MACHINE

Filed Aug. 25, 1932

Fig. 1.

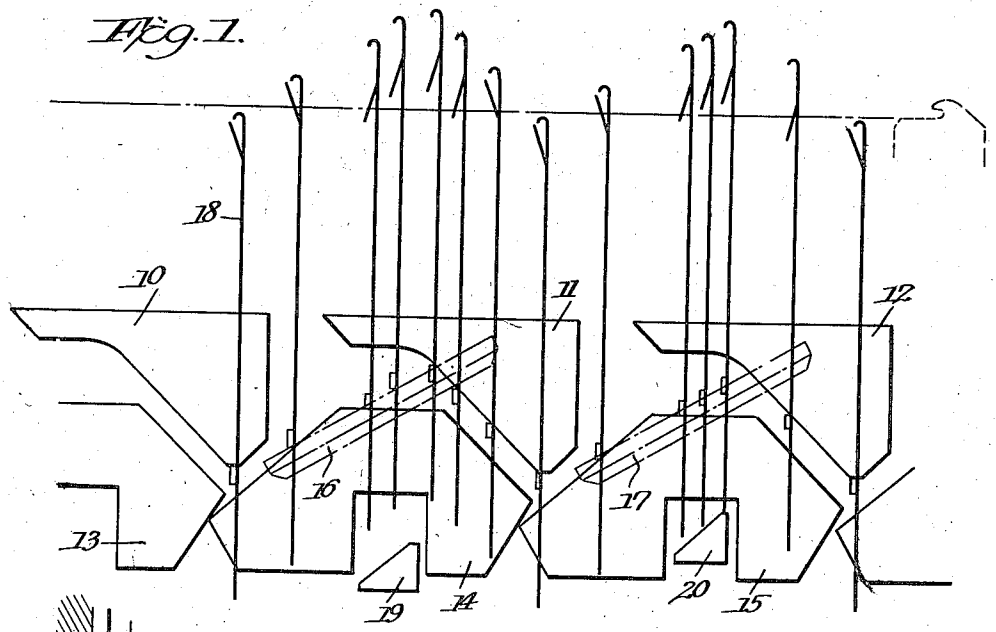
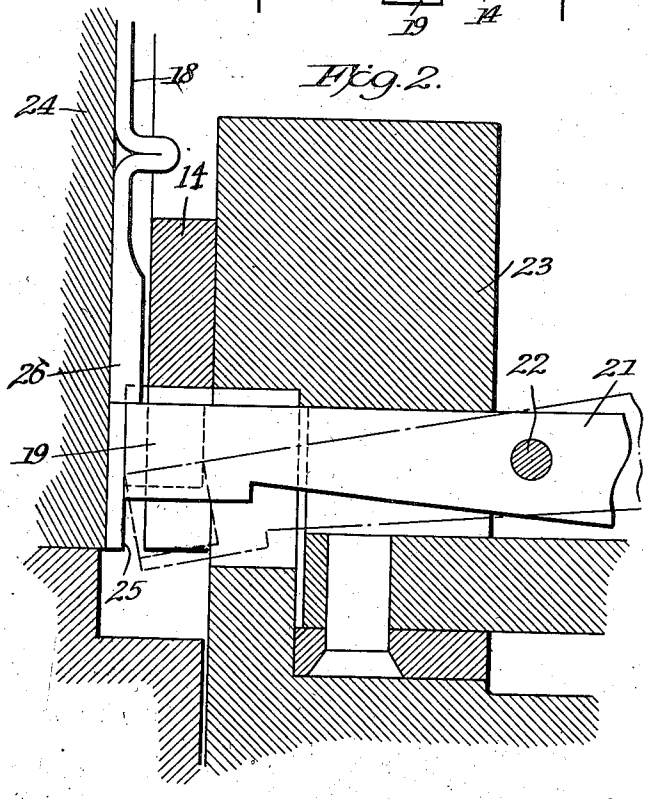


Fig. 2.



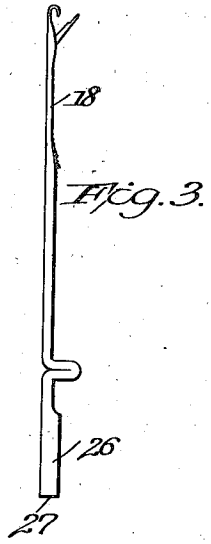


Fig. 3.

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UNITED STATES PATENT OFFICE

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KNITTING MACHINE

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Application August 25, 1932, Serial No. 630,461

1 Claim. (Cl. 66—50)

My invention relates to a knitting machine of the type in which needles are selectively elevated while other needles remain at a lower level. For example, certain needles may remain at the tuck level while other needles are elevated to knitting level but I do not limit myself to such a function as the needles may be split for various other purposes.

In combination with such means there is provided nullifying means whereby all the needles may be raised to the high position. Needles of special form are also provided for cooperating with said nullifying means. It is an object of the invention to provide a special form of needle and needle cylinder for coaction with special nullifying means, whereby the needles are simplified and the need for special butts on the needles is done away with, while the needles are of such form that they will not tip or tilt in the needle slots but will move up and down in proper manner in said slots.

Referring to the drawing, which is made a part of this application and in which similar reference characters indicate similar parts:

Fig. 1 is an elevation of needle actuating means, illustrating the various positions assumed by the needles,

Fig. 2, a vertical section, and

Fig. 3, a side elevation of a needle.

In the drawing, reference characters 10, 11 and 12 indicate stitch cams at each of a series of feeds and the coacting needle elevating cams are indicated at 13, 14, and 15. Design wheels 16 and 17 are shown at two of the feeds, it being understood that other means for splitting or separating the needles may be used, whereby the needles 18 may be selectively elevated in any desired sequence.

Nullifying cams 19 and 20 are shown as being formed at the inner ends of tuck bars such as illustrated at 21, the tuck bars being pivoted as at 22 so that the nullifying cams may move from the full-line position in Fig. 2 to the dotted line position, the first position being an active position whereas the other is an idle position. These nullifying cams extend through openings in the needle elevating cams 14 and 15, the cam 19 in Fig. 1 being shown as at the idle position whereas the cam 20 is at the active position. Preferably each nullifying cam is mounted on a sectional unit 23 of the cam ring which unit also carries a stitch cam, and the design wheel, the elevating cams 13, 14, 15 being on the gear ring but not on the removable sections. It will be noted that the design wheel is positioned immediately above the nullifying cam in such manner that the axis of rotation of the design wheel stands directly over the nullifying cam. In this way it is possible to increase the number of feeds in a machine over such arrangements as previously used to the extent that there may be 32 feeds on a 24 in. machine whereas previously it was not possible to use more than 18 feeds.

The needle cylinder 24 is essentially of conventional character with the usual slots for the needles 18 but the outside diameter of the needle cylinder is reduced at the lower end, forming a step portion or annular recess into which the nullifying cams extend. The needles 18 are provided at their lower ends with solid shanks 26 preferably of such width that they fill the needle slots, or approximately so, where the needle cylinder is of the full diameter, and the lower ends of the shanks extend beyond the needle slots at the step portion where the diameter of the cylinder is reduced whereby the nullifying cams may engage the feet of the needles for elevating them, the needles being provided at their foot ends with flat transverse faces 27 for engagement by the nullifying cams. It will be understood that needles of the conventional type are too narrow at their foot ends for a good end contact with nullifying cams for the purposes in question.

In the operation of my device the needles may be taken as passing from left to right in Fig. 1, it being immaterial whether the needle bed moves past the cams or vice versa, and the needles are elevated by such a cam as shown at 14 to a level which may be a tuck level, after which they pass along the top of the cam. The needles whose butts register with peripheral notches in design wheel will not be elevated whereas the other needles will be engaged and lifted by the design wheel to a level which may be the knitting level. Thereafter the butts of the elevated needles engage the stitch cam 11 and are drawn down to knit while the needles at the tuck level will also be depressed but without having cleared their latches so that they may form tuck stitches at another feed where the latches are cleared. If it is desired to make plain fabric instead of tuck fabric the nullifying cam is elevated to the position at 20 in Fig. 1, thus causing the needles not lifted by the design wheel to maintain their position in the needle wave and take the yarn at the knitting level in the same manner as the other needles.

It will be obvious to those skilled in the art

that the arrangement shown may be used for other purposes from that described and that the needle will be useful in other situations than that herein set forth; therefore, I do not limit myself to what is shown in the drawing or as described in the specification but only as indicated in the appended claim.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent is:

In a knitting machine, a slotted needle cylinder, needles in the slots of said cylinder, said needles having butts, a set of needle cams including a stitch cam, a cam for elevating the needles, a design wheel approximately parallel to the needle raising edge of said needle elevating cam for selectively elevating needles by engagement with said butts, a nullifying cam movable up and down directly below said wheel, the shanks of the needles being solid from the bottom end nearly to said butts and being enlarged so as substantially to fill the needle slots and thus to provide a wide flat bottom face on a needle for engagement by said nullifying cam, and the walls of the needle slots being radially reduced in the zone of operation of said nullifying cam.

HARRY S. HORROCKS.