United States Patent

[11] **3,633,385**

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[32] Priority **Feb. 9, 1969**
[33] **Belgium**
[31] **728.048**

[54] **TRANSFER DEVICE FOR RIB BORDER KNITTING MACHINES**
5 Claims, 8 Drawing Figs.

[52] **U.S. Cl.** **66/148**
[51] **Int. Cl.** **D04b 9/40**
[50] **Field of Search** 66/148

[56] **References Cited**

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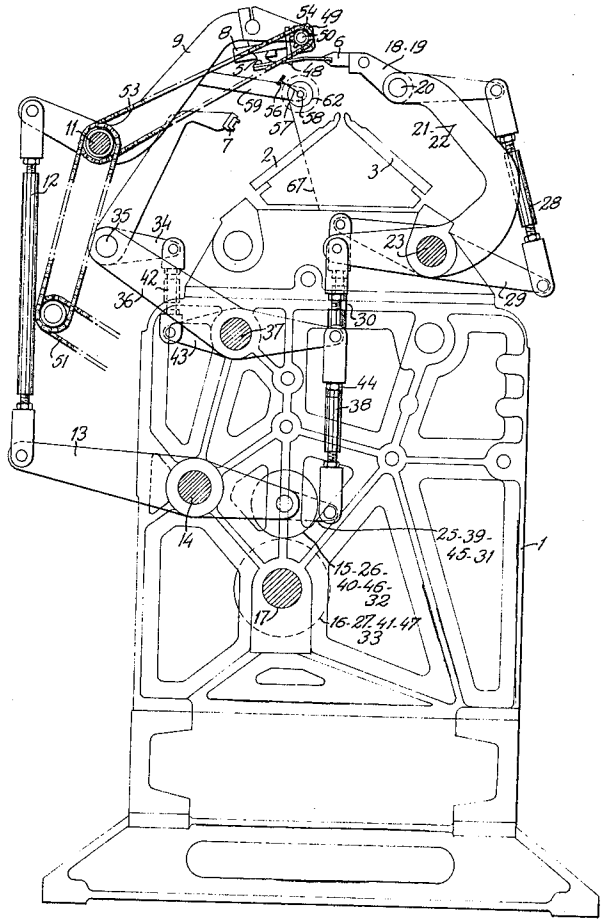
ABSTRACT: A transfer device for rib border knitting machines of the type having a sinking comb having means for imparting to the latter rotating movements about a first axis and about a second axis which may be shifted about the first axis.



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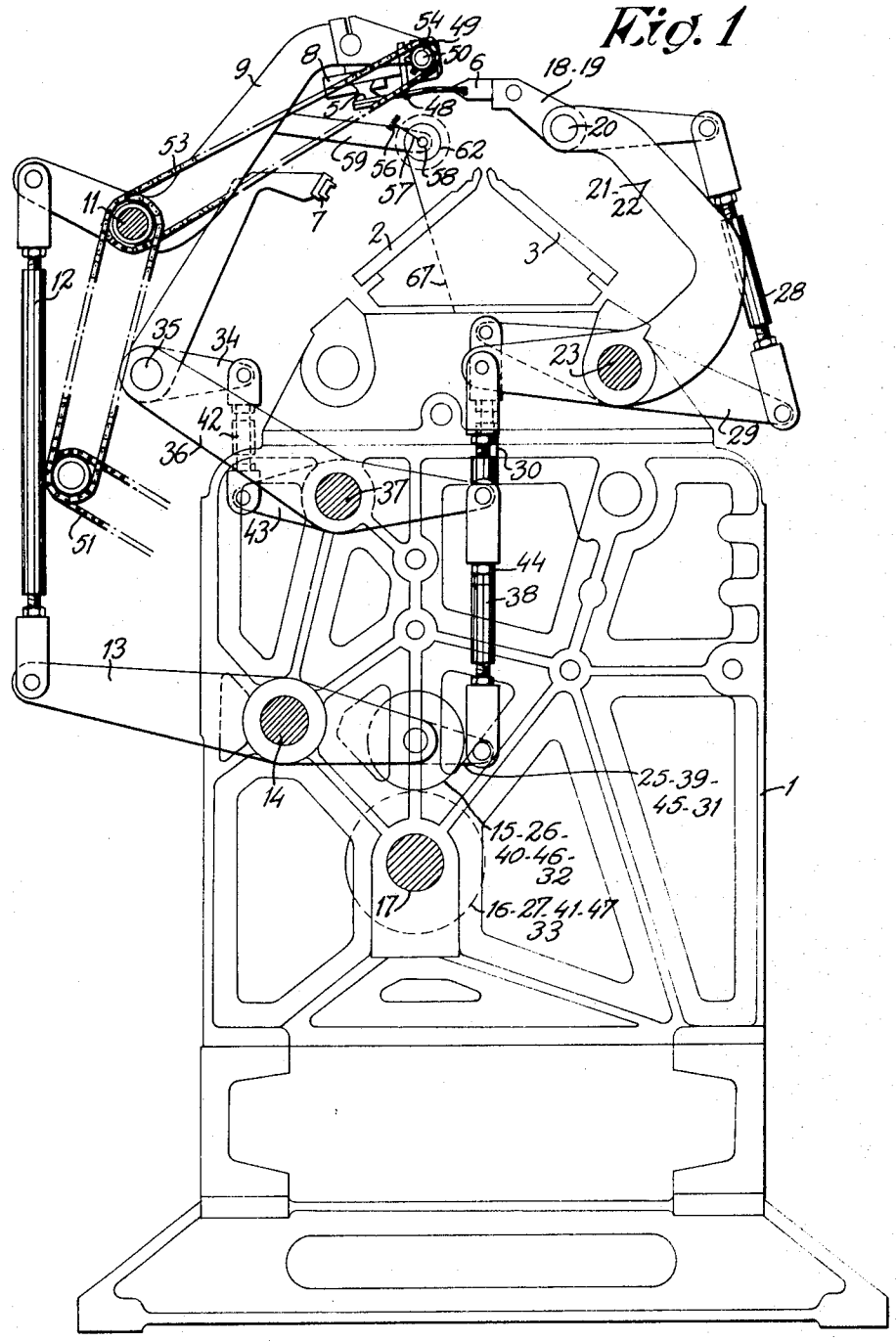
SHEET 1 OF 5

Fig. 1



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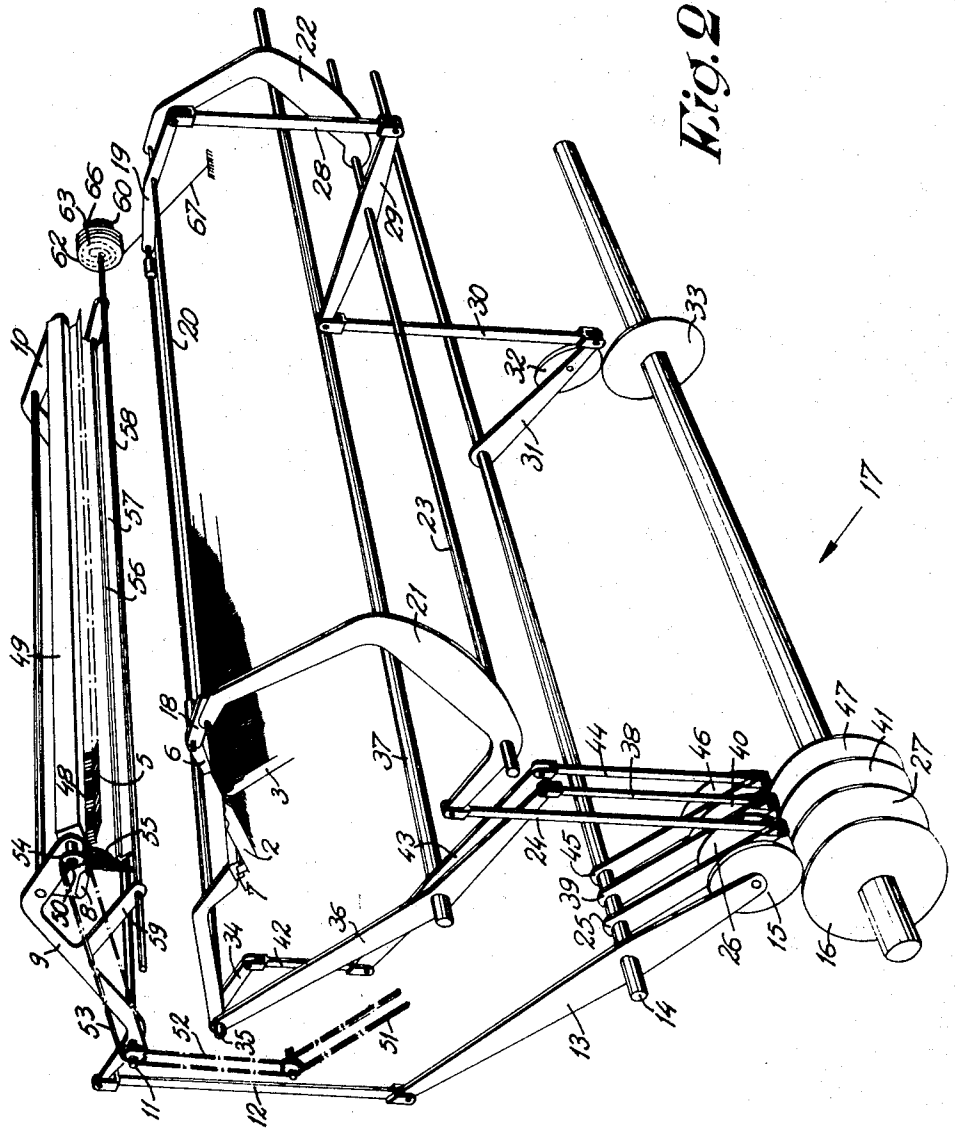

Fig. 2

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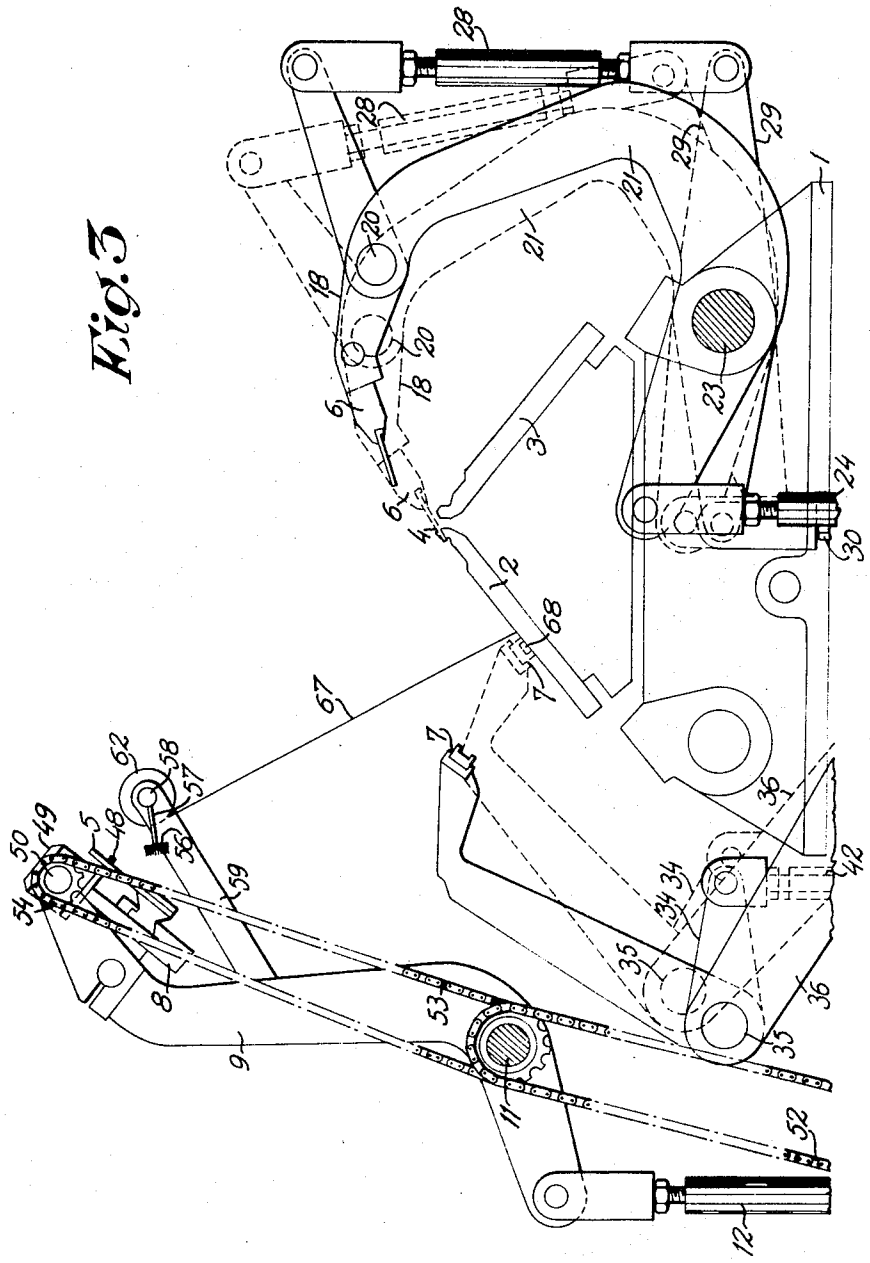
Fig. 3



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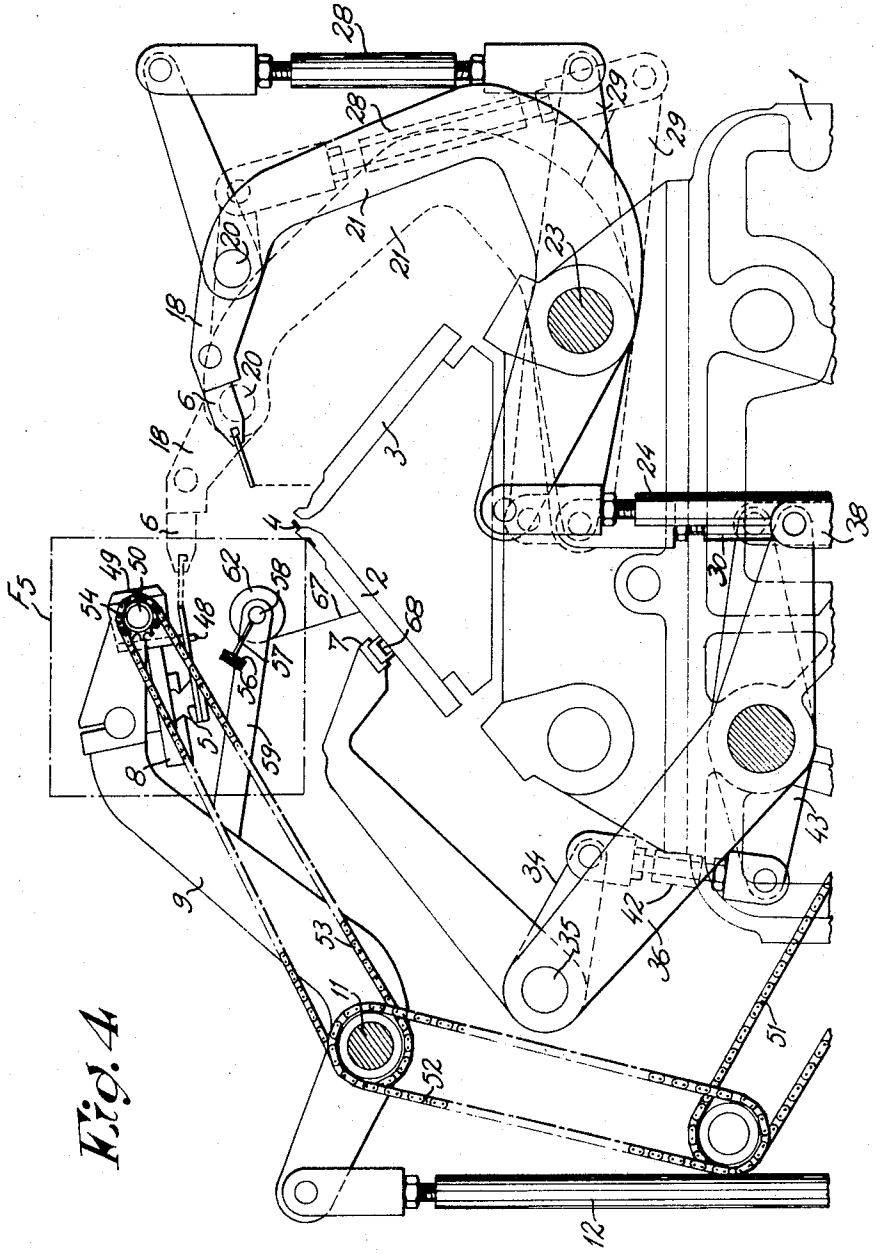

Fig. 4

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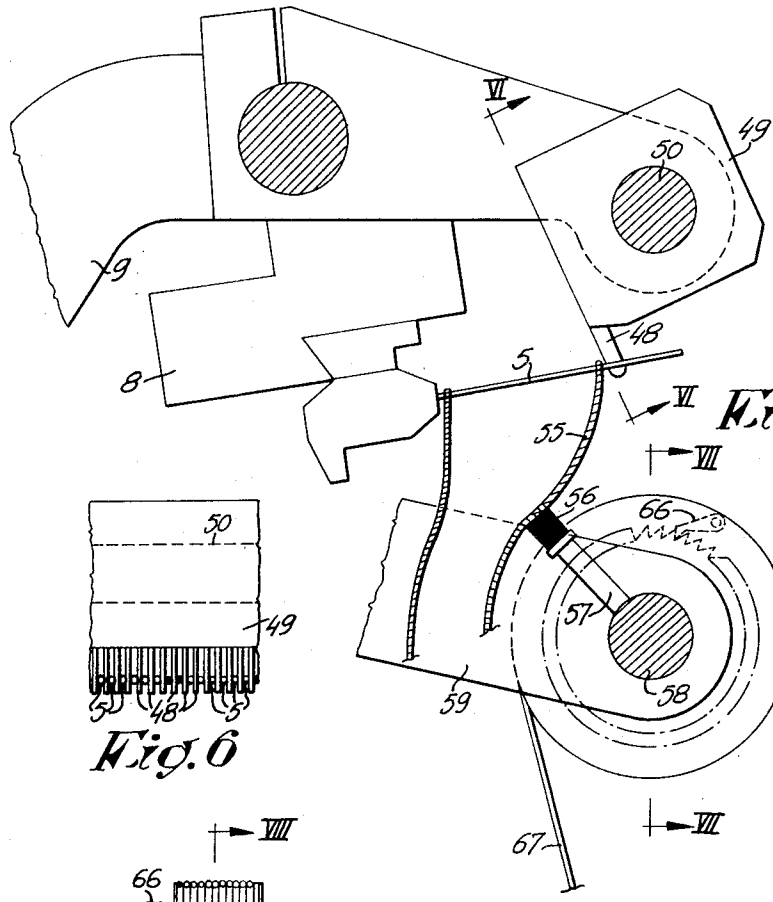

Fig. 5

Fig. 6

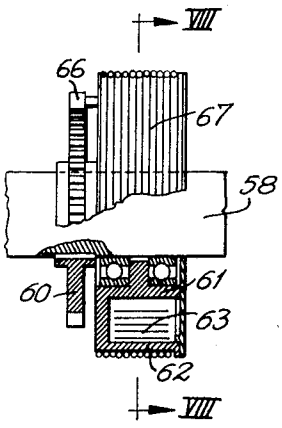

Fig. 7

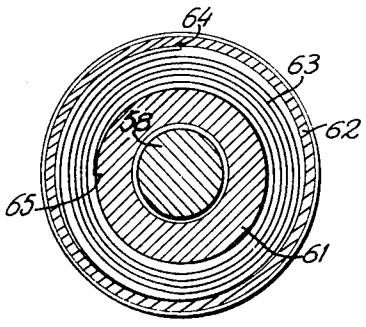

Fig. 8

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TRANSFER DEVICE FOR RIB BORDER KNITTING MACHINES

This invention relates to a transfer device for rib border knitting machines. In hosiery, it is customary to knit rib borders on two needle bed knitting machines especially intended therefor and then to transfer the so knitted rib borders by means of magazine-combs on a jersey machine, e.g., of the Cotton type.

Devices have already been proposed for automatically sinking the rib borders knitted on said two needle bed machine to bring them in waiting position on one or several magazine-combs. Such devices may be classified into two groups according as the magazine-comb itself effects the sinking or, contrarily, said magazine-comb is held momentarily stationary, the sinking feeding the magazine-comb. In a known device of this second group including also the device according to the present invention, the shifting of said sinking comb was effected through suitable rotating and traversing control means. In accordance with very extensive studies of the applicant, it has been found that such shifting of the sinking comb could cause difficulties as regards to adjustment and accordingly a workability subjected to some variations.

Consequently, a primary object of the invention is to provide a transfer device of the intended type through which the above shortcoming is avoided.

Another object of the invention is to provide means allowing to perfectly control the rib borders stored on the magazine-comb until the latter is removed. In fact, it has been observed that some difficulties could arise from the resilient nature of the rib borders and the stresses introduced therein when they were knitted. According to this invention, these objects are reached by a transfer device of the disclosed type and characterized in that it is provided with means imparting, in due time, to said transfer comb, rotating movements about a first axis and a second axis which may be also shifted about the first axis. Preferably, said means comprise two levers keyed on the first axis and supporting the second axis, the shiftings of the sinking comb being driven from a cam shaft through at least one set of levers one of which is integral with the first axis, while another, bearing said transfer comb, is pivoted on the second axis.

In a preferred embodiment of the invention, the transfer device comprises additionally and in association with said magazine-comb, a rotating transfer means which is brought between the teeth of the magazine-comb and also those of the sinking comb when the latter is brought in front of the former. In addition, it will be advantageous to provide an angularly shiftable member associated with said magazine-comb and driving back the rib borders transferred on the magazine-comb towards the bottom thereof, while holding them therein.

These and other features of the invention will be more clearly apparent from the detailed description of an embodiment disclosed hereafter by way of illustration and without any limitation, reference being made to the attached drawings wherein:

FIG. 1 is a diagrammatic vertical section of a knitting machine provided with the transfer device according to the invention;

FIG. 2 is a diagrammatic perspective view of the main elements of the transfer device according to FIG. 1, together with the driving means thereof:

FIG. 3 is a view, on an enlarged scale, of the upper portion of the device shown in FIG. 1 in one of its characteristic positions;

FIG. 4 is a view similar to that of FIG. 3, the device being in another characteristic disposition;

FIG. 5 is a view, on an enlarged scale, of the members represented by the dash-dot line F5 on FIG. 4;

FIGS. 6 and 7 are respectively sections on the lines VI—VI and VII—VII of FIG. 5;

FIG. 8 is a section on the line VIII—VIII of FIG. 7.

The illustrated machine comprises a frame 1 supporting two needle beds inclined towards each other and represented respectively in 2 and 3, each of said needle beds comprising needles actuated by conventional locks (not shown).

The transfer device comprises principally a magazine-comb 5 supplied with rib borders by a sinking comb 6, the latter sinking the last loop course suspended from needles 4 of bed 2, said needles being, for this purpose, brought into high position by a control bar 7.

The magazine-comb 5 is momentarily keyed on a support 8 carried by two bent levers 9 and 10, the latter being respectively pivoted about an axis 11. The levers 9 and 10 may be angularly shifted about the axis 11 through a set of articulated levers 12 and 13, said set being pivoted near its middle portion about an axis 14, the other end of said lever 13 carrying a roller 15 sliding on the profile of a cam 16 of the camshaft 17.

The sinking comb 6 is supported by the ends of two bent levers 18 and 19 pivoting each near their middle areas about an axis 20. The latter is carried by the ends of two profiled levers 21–22 which are integral with an axis 23. An angular shifting of levers 21 and 22 may be controlled by a suitable rotation of axis 23, namely by means of a set of levers 24–25, the lever 25, pivoted on axis 14, carrying a roller 26 sliding on a cam 27 of the camshaft 17. An additional angular movement of the sinking comb 6 about axis 20 may be controlled by a set of levers 28–29–30–31, the latter being pivoted on a shaft 14 and carrying a roller 32 sliding on a cam 33 of the camshaft 17.

The control member 7 of needles 4 comprises a U-shaped profile carried at the end of a bent lever 34 pivoted about an axis 35. The latter is carried at the end of a bent lever 36 pivoted about an axis 37. An angular shifting may be imparted to lever 36 by means of a set of levers 38 and 39, the latter carrying a roller 40 sliding on a cam 41 of the camshaft 17. Similarly, an angular shifting about axis 35 may be imparted to lever 34 by means of a set of levers 42, 43, 44 and 45, the latter carrying a roller 46 sliding on a cam 47 of the camshaft 17.

With the magazine-comb 5, is associated a transfer member comprising a comb 48 carried by a support 49 which may rotate about an axis 50 carried by the support 49. The rotation of the support 49 about axis 50 is controlled by a series of endless chains or belts 51, 52, 53, the latter driving a pulley 54 integral with the axis 50. The sizes of said members are such that, when the support 49 is rotated, the teeth of comb 48 are between the teeth of sinking comb 6 which is brought in front of the magazine-comb 5 to drive back the loops carried by the comb 6 on the teeth of said comb 5. The comb 48 is in a waiting position in which the points or the needles of the magazine-comb are kept in their position defined by the gauge so that the sinking comb is applied correctly upon the points.

With the view of retaining the so transferred rib borders 55, there is provided a rotating member comprising a brush 56 mounted at the end of a support 57 integral with an axis 58 carried at the end of an arm 59 integral with the support 49.

A pinion 60 is keyed on axis 58. Near said pinion, the axis 58 carries a hub 61 surrounded with a casing 62 housing a coil spring 63 one end 64 of which is integral with said casing, the other end 65 being hooked up in a groove provided therefor in said hub 61. A pawl 66 pivoted on a side face of said casing 62 may cooperate with the teeth of said pinion 60. A cord 67 fastened at one of its ends on the casing 62 is wound about the latter and it is fastened at its other end to a stationary portion of the machine.

The above-described device operates substantially as follows: When the knitting of a rib border is completed, the programming device of the machine drives the camshaft 17, thereby bringing member 7 in active position, i.e., a position in which the profiled bar is covering butts 68 provided therefor on the needles 4. The member 7 is then shifted upwardly to bring the needles 4 in high position. Simultaneously, the sinking comb 6 comes near the needles 4, thereby sinking the loops suspended therefrom. The needles 4 are then lowered, while the comb 6 raises and is directed towards the magazine-comb 5. The latter is brought in a substantially horizontal position to receive the rib border carried by the sinking comb, the transfer of said rib border of one comb to the other being effected by the rotation of said transfer comb 48. Through the

shifting of levers **9**, a rotation is imparted to axis **58**, thus also to brush **56** which is brought behind the rib border during the transfer relative to the magazine-comb.

By means of this arrangement, the device operates perfectly, whereby, the stored rib borders are not likely to interfere with the operation of the other members of the common device or the machine.

It is apparent that the above-described device may be modified in various ways without departing from the scope of the invention as defined in the appended claims.

What I claim is:

1. A transfer device for rib border knitting machines of the type wherein a sinking comb is shifted for sinking upon the needles of one bed, the last loop course of a rib border being then brought in front of a magazine comb, the rib border being then transferred from said sinking comb to said magazine comb, the device comprising means imparting to said sinking comb rotating movements about a first axle and a second axle which may be shifted about the first axle, said means comprising two levers keyed on said first axle and carrying said second axle, a camshaft and at least one set of levers, one of the last-mentioned levers being integral with said first axle, another one of the last-mentioned levers being pivoted on said second axle and carrying the sinking comb, the shiftings of the sinking comb being controlled from said camshaft through said set of levers.

2. A transfer device according to claim **1**, characterized in that it comprises additionally and in association with said magazine-comb, a rotating means, namely, a transfer comb brought between the teeth or the points of the magazine-comb and also those of the sinking comb, when the latter is brought in front of the former.

3. A device according to claim **1**, characterized in that it comprises additionally and in association with said magazine-comb, an angularly shiftable member provided for driving back the rib borders transferred on said magazine-comb towards the bottom thereof for holding them therein.

4. A device according to claim **1**, characterized in that it comprises additionally a member bringing the needles of one bed in high position prior to the sinking operation of said sinking comb, said device being driven by a lever set from said camshaft.

5. A transfer device for rib border knitting machines of the type wherein a sinking comb is shifted for sinking upon the needles of one bed, the last loop course of a rib border being then brought in front of a magazine comb, the rib border being then transferred from said sinking comb to said magazine comb, the device comprising means imparting to said sinking comb rotating movements about a first axle and a second axle which may be shifted about the first axle, an angularly shiftable member associated with the magazine comb for driving back the rib borders transferred on said magazine comb toward the bottom thereof for holding them therein, said member comprising a brush; a shifting control system, resilient means cooperating with said shifting control system, and an axle integral with said brush and rotated by the shifting of the magazine comb through the intermediary of said resilient means.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,633,385 Dated January 11, 1972

Inventor(s) Karel Bernard Marie Bruelemans

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

On the cover sheet [32] the priority date "February 9, 1969" should read -- February 7, 1969 --.

Signed and sealed this 7th day of November 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

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