Sept. 29, 1942. P. TUCHSCHERER 2,297,263

PRODUCING WELTS

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Fig. 4

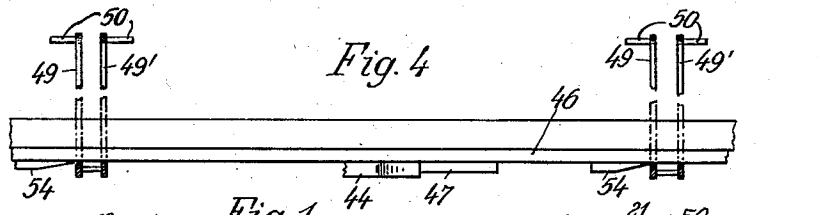
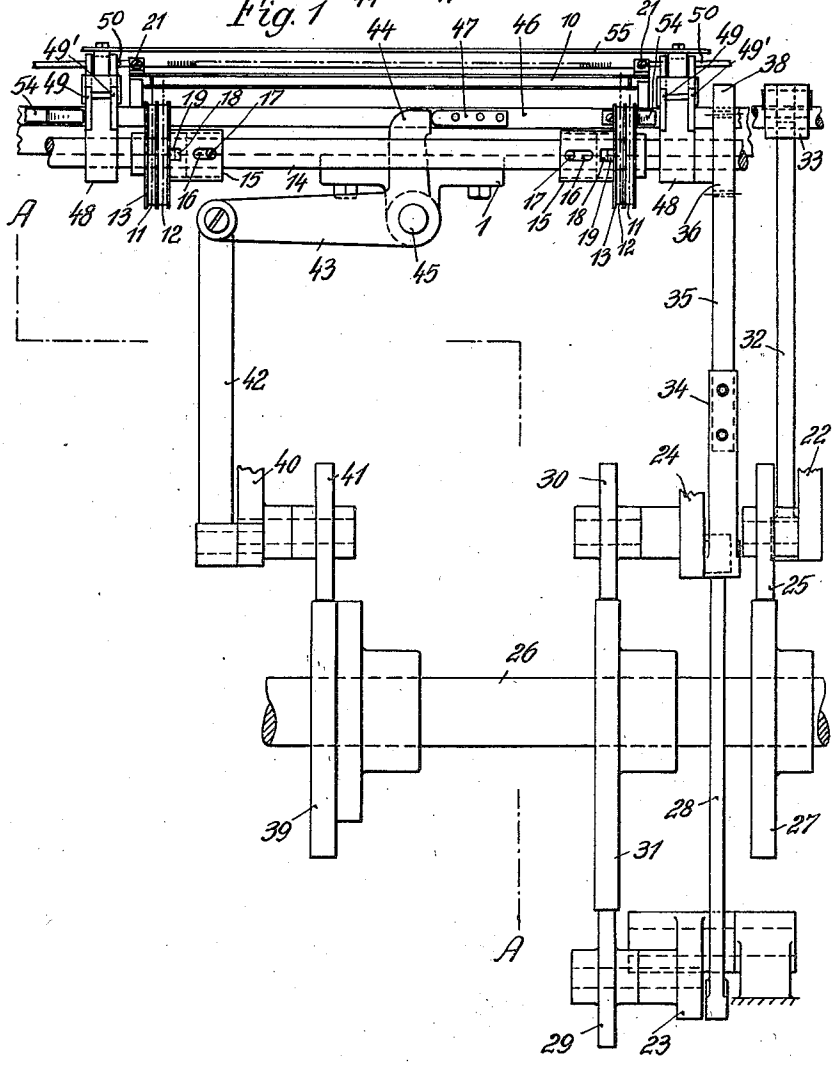


Fig. 1



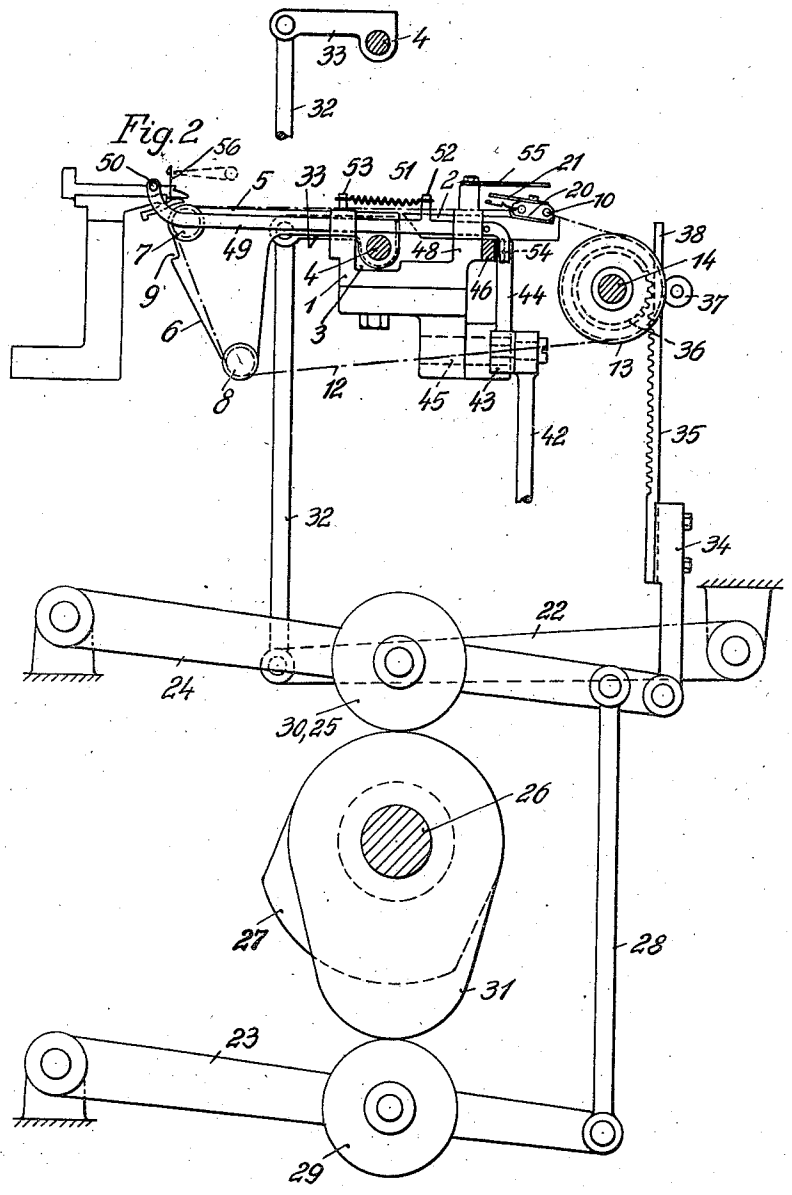
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Fig. 5



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Fig. 2a

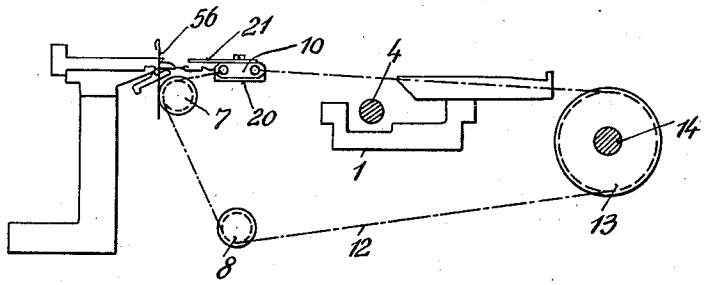
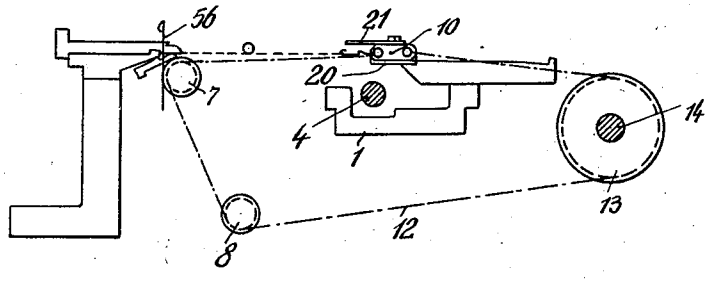


Fig. 2b



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Fig. 6

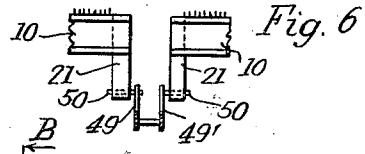
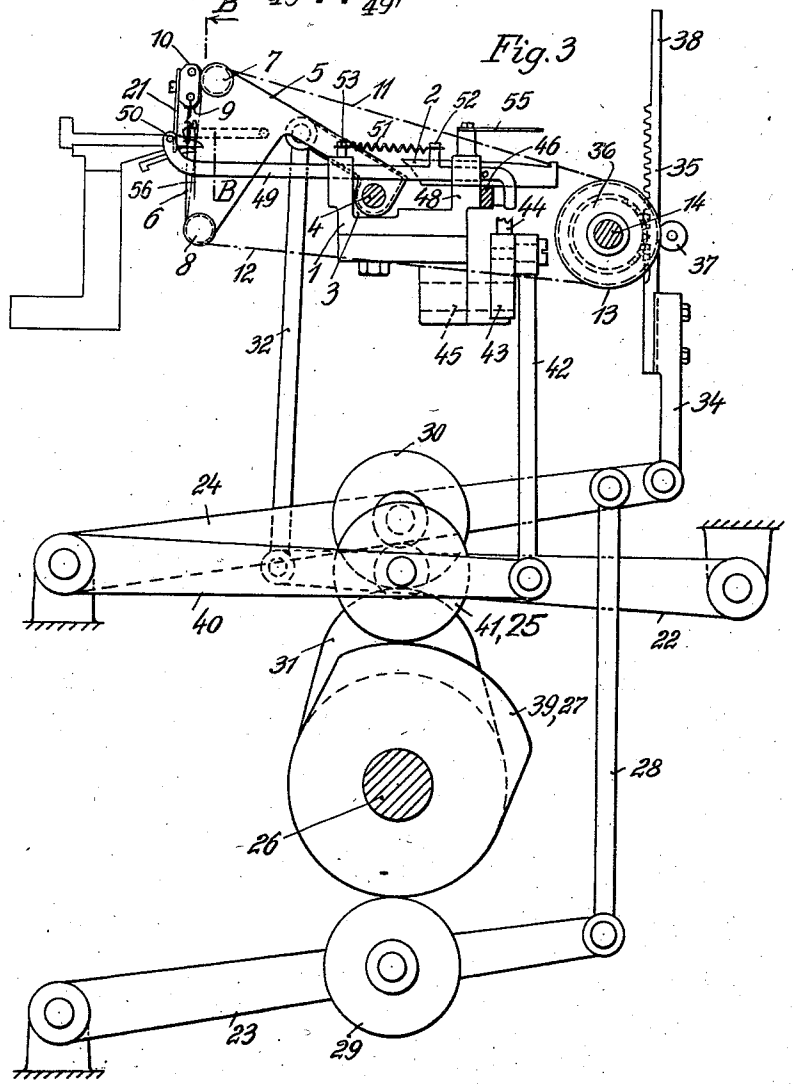


Fig. 3



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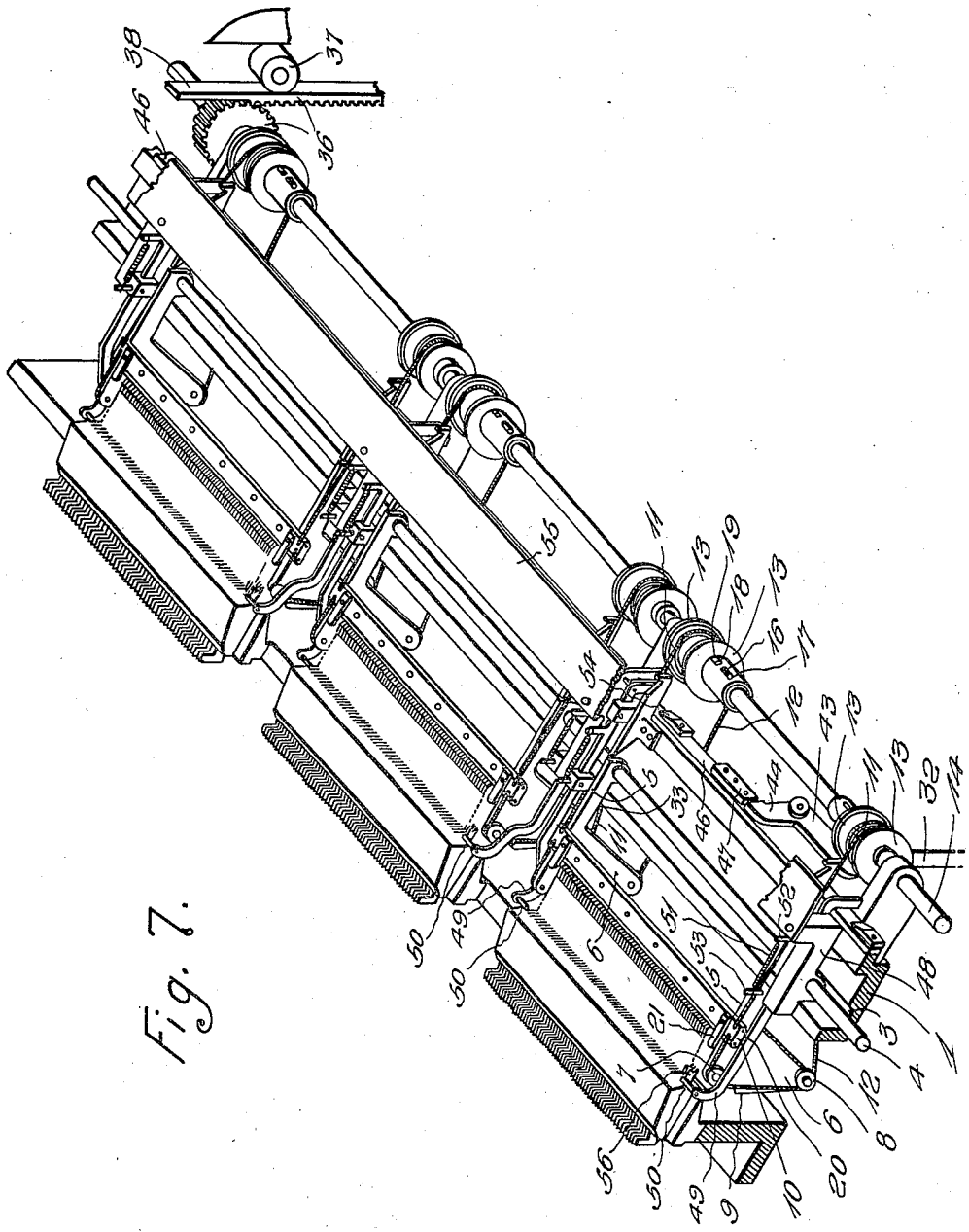


Fig. 7.

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UNITED STATES PATENT OFFICE

2,297,263

PRODUCING WELTS

Paul Tuchscherer, Chemnitz, Germany; vested in the Alien Property Custodian

Application April 8, 1939, Serial No. 266,844
In Germany April 9, 1938

12 Claims. (Cl. 66—96)

The present invention relates to a device for automatically producing welts on flat knitting machines.

Devices adapted to automatically produce welts on flat knitting machines are well known. These devices may be divided into two main groups, i. e. devices which move the welt bars or the like in a vertical position or in a horizontal position.

Each of these main groups again may be subdivided into devices provided with latch needles or with bearded needles one of such needles may be present either for each frame needle or for each second frame needle only.

The devices having loop transfer elements for each second frame needle have the drawback that, after transfer of the welt, the connecting course has another appearance than the ordinary connecting course made by hand which has a particular bad appearance in connection with stockings adapted to be worn on the wrong side.

The device in which loop transfer elements are used for each frame needle are free from the above mentioned drawbacks, but have the same drawback as the previously described devices that the upper structure of the machine, for instance the narrowing device or the like, is covered and that furthermore the machine, due to its complicated construction, does not operate in a manner free of objections.

All these drawbacks are obviated according to the present invention by the fact, that the guide members, serving to guide the welt bars and arranged outside the loop forming elements, are subdivided and consist each of a swingably mounted shaft and a guide-member fixed upon the bed or table of the machine, said guide members occupying a horizontal position during the manufacture of the welt. For the purpose of transferring the starting or beginning course of the welt the guide members facing the frame needles are commonly swung upwardly in such a manner that the welt bars, subjected to the action of auxiliary draw off means, are first moved obliquely upwardly and directly afterwards vertically downwardly until they engage with stops and that during the downward movement of the guide members the transfer of the loops of the starting or beginning course to the frame needles is commonly effected in all divisions.

The welt bars may carry bearded needles one arranged opposite each frame needle or each second frame needle.

In the accompanying drawings a device according to the invention is shown by way of example.

In these drawings:

Fig. 1 is a front view of a device adapted for the manufacture of a welt,

Fig. 2 represents a side elevation of the device shown in Fig. 1 illustrating the welt bar in its position of rest, and the front guide member for the welt bar in section on the line A—A of Fig. 1,

Fig. 2*a* illustrates the taking over position of the welt bar,

Fig. 2*b* shows the position of the welt bar after insertion of the welt rod,

Fig. 3 is a side elevation of the welt bars and the front guide members for the welt bars in the operative position,

Figs. 4–6 show details, and

Fig. 7 is a detail perspective view of several divisions of a flat knitting machine having the invention applied thereto.

The invention relates, as has already been indicated above, to flat knitting machines which, as is well known, are always provided with a larger number of divisions but, for the purpose of simplicity, one division thereof in accordance with the present invention is described.

On the bed or table 1 of the machine horizontal guide members 2, adapted to guide the welt bars, are fixed in all divisions. These guide members 2 are further provided, in a known manner, with lateral guide elements, not shown in the drawings, so that the welt bars guided by the members 2 are prevented from shifting. A shaft 4 extending over the entire length of the machine is rotatably arranged in a recess 3 of the table 1. Guide members 5 also serving for guiding the welt bars are fixed on the shaft 4 adjacent the fixed guide members 2 in the plane of the latter. The back of each guide member 5 is provided with a downwardly directed bracket having an inclined projection 6. Rollers 7 are provided at the free ends of the horizontally arranged portions of the guide members 5, whereas other rollers 8 are provided at the ends of the downwardly directed brackets provided with inclined projections 6. Stops 9 for the welt bars are provided between the rollers 7 and 8. The inclined projections 6 of the downwardly directed brackets of the guide members 5 occupy a nearly vertical position when said guide members are swung upwardly. At the sides of each of the divisions, tension springs or the like 11 and 12 respectively, are connected to the welt

bars. Each of the tension springs 11 is directly connected to an auxiliary draw off drum 13, whereas each of the tension springs 12 is guided over rollers 7 and 8 and connected to said auxiliary draw off drum.

The auxiliary draw off drums are freely rotatable upon an auxiliary draw off shaft 14 which, in a well known manner, is connected to a draw off weight, not shown in the drawings, and serving to effect rotation of said draw off shaft. The latter extends over the entire length of the machine and carries slidably mounted thereon sleeves 15. Elongated holes 16 are provided in these sleeves and into these holes pins 17 extend which are mounted upon the auxiliary draw off shaft 14. The sleeves 15 are also provided with slots 18 into which engage claws 19 fixed on the auxiliary draw off drums 13, whereby the latter are coupled to the shaft 14. In the range of the guide members, the welt bars carry steel shoes 20 and, moreover, are provided with extended or enlarged operative surfaces 21. If the auxiliary drums are coupled to the shaft the welt bars may be moved by this shaft into both directions.

Mounted in the machine frame are levers 22, 23 and 24. The lever 22 carries a roller 25 which may be actuated by a cam 27 fixed upon the displaceable main cam shaft 26. A link 28 connects the levers 23 and 24 in parallel. The levers 23 and 24 carry rollers 29 and 30 respectively, which are actuated by another cam 31 mounted upon the main cam shaft 26.

A link 32 pivoted to the lever 22 is connected to a lever 33 fixed upon the shaft 4. Pivoted to the lever 24 is a joint member 34 which carries a toothed rack 35. A gear wheel 36, fixed upon the auxiliary draw off shaft 14, may engage said toothed rack. A roller 37 serves the purpose of guiding the toothed rack 35. The toothed rack 35 has a reduced upper end 38, not provided with teeth. The main cam shaft 26 also carries a cam 39 which actuates a roller 41 provided at a lever 40 journalled in the machine frame. By means of a link 42 connected to the lever 40, the latter is connected to the arm 43 of a bell crank lever 43, 44 mounted upon a pivot 45 of the table 1. Displaceably arranged upon the latter is a wedge bar 46 to which a stop 47 is fixed. The arm 44 of the bell crank lever 43, 44 acts upon the stop 47.

Moreover, at the sides of the divisions small blocks 48 are fixed upon the table 1 and in each small block two rails or bars 49, 49' are displaceably mounted which carry pins 50 acting upon the extended or enlarged operative surface 21 of the welt bars 10 to withdraw the latter from the loops of the beginning course, as clearly explained later on. The rails or bars 49, 49' are subjected to the action of tension springs 51 which are fixed on the one hand to projections 52 of the rails or bars 49, 49' and on the other hand by pins 53 fixed on the table 1. The shifting of the rails or bars 49, 49' is effected by wedges 54 fixed to the wedge bar 46. Rails or bars 55 serve the purpose of protecting the welt bars in their position of rest. The frame needles are designated with 56.

By means of a mechanism, not shown in the drawings, the shaft 4 and with the latter the swingable guide members 5 and the welt bars 10 respectively are laterally moved over half a needle pitch.

The operation of the device is as follows:

After the beginning or starting course has been produced upon the frame needles, the needles of the welt bars of all divisions, occupying the position of rest, are, for the purpose of receiving the nooses of the sinker loops of the beginning course (Fig. 2a), commonly moved in the horizontal guide members 2 and 5 between the frame needles. This movement is caused by the springs 11 and 12 which in turn are moved by manually rotating the auxiliary draw off shaft 14. Thereupon the manufacture of the welt is effected under the action of the auxiliary draw off shaft 14 which is actuated by the draw off mechanism. If the welts have a certain length, the connection of the draw off rods to the main draw off mechanism is effected commonly for all divisions after the welt bars have been inserted (Fig. 2b), whereupon the manufacture of the welt is continued under the action of the main draw off mechanism until the desired length of the welt is obtained. The draw off rods may be inserted in any suitable manner and this insertion of the draw off rods forms no part of the present invention.

A displacement of the main cam shaft 26 causes the rollers 25, 29 and 30, 41 to be brought into the path of the cams 27, 31 and 39. The lever 22, raised by the cam 27 effects lifting of the levers 33 by the link 32, whereby the front guide members 5, mounted upon the levers 33, are swung upwardly (Fig. 3). A device, not shown in the drawings, simultaneously causes in a well known manner a lateral rack of the guide member for half a needle pitch.

A further action of the cam 31 upon the roller 30 causes lifting of the rack 35 due to an upward movement of the lever 24 by means of the joint member 34. The auxiliary draw off shaft 14 is rotated by the gear wheel 36 engaging the toothed rack 35, whereby, due to the tension springs 11 and 12, the welt bars 10 first are moved obliquely upwardly as far as to the guide roller 7, whereupon they are moved vertically downwardly along the inclined projection 6 until the stops 9 have been reached (Fig. 3). The guide members are swung upwardly to such a height that the welt bars are positioned above the frame needles so that, for the purpose of transferring the starting or beginning course, the needles of the welt bar occupy a position beside the frame needles. The loop transfer in all divisions is commonly effected in the same manner as the transfer of loops by tickler combs extending over the entire division.

On further rotation of the main cam shaft 26 the roller 25 again leaves the operative point of the cam 27 and causes a downward movement of the guide members 5, whereby the hooks of the welt bars 10 occupy a position in front of the beards of the needles 56 as is clearly shown in Fig. 3. Herein all divisions of the machine at the beginning course of loops are simultaneously transferred to the frame needles 56.

In the moment of transfer, the cam 39 moves into contact with the roller 41 of the lever 40. Due to the upward movement of the lever 40, the bell crank lever 43, 44 is oscillated by means of the link 42. The wedge bar 46 is shifted by the arm 44 lying against the stop 47. In this manner, the wedges 54 fixed to the rail or bar 46 also are displaced and tend to engage between the rails or bars 49, 49', journalled at the small blocks 48, causing a movement of the said rails 49, 49' against the tension of the springs 51 (Fig. 3). The pins 50 fixed to the rails or bars 49, 49' press against the elongated opera-

tive surfaces 21 of the welt bars which are oscillated, so that hereby under simultaneous rack towards the rear to the space between the needles disengagement of the welt bars from the loops of the beginning course is possible in a manner free of objection. For reasons of safety against damages caused by the advanced sinkers, another movement of the welt bars over half a needle towards the frame needles is effected.

The roller 29 also runs off the operative points of the cam 31 and causes by way of the rack gear 35, 36 actuated hereby a return movement of the welt bars into the position of rest. By rotating the auxiliary draw off shaft 14, all the welt bars are returned into the position of rest. By shifting the main cam shaft all the cams are moved out of the path of the rollers carried by the levers.

If a damaged frame needle is to be exchanged the sleeves 15 only are to be displaced in the respective division. Hereby the corresponding auxiliary draw off drums 13 are released. In this division then a return movement of the welt bar is possible to release the needle bar.

According to the length of the machine a plurality of lever groups are provided for the individual actuations of the device.

Instead of the tension springs 11, 12 tension wires, chains or the like also may be used.

Due to the horizontal arrangement of the guides for the welt bars outside the loop forming elements, no parts of the machine are covered or concealed and the machine as a whole is not badly constructed or built.

What I claim is:

1. In a device for the manufacture of welts upon a flat knitting machine of the Cotton type, comprising a machine bed, a plurality of divisions, loop forming elements including frame needles provided in each division, a shaft extending over the entire length of the machine, welt bars and guide members for said welt bars arranged outside said loop forming elements provided in each of the divisions, each of said guide members comprising two parts one of which, facing said frame needles, being swingably arranged upon said shaft, while the other part is fixed to said machine bed, both parts being capable of cooperating in such a manner that during the manufacture of the welt both parts remain in a horizontal position, whereas, for transferring the beginning course of the welt upon said frame needles, said guide members facing said frame needles are jointly swung in an upward direction in such a manner that said welt bars, subjected to the action of an auxiliary draw off mechanism, are first moved obliquely upwardly and directly afterwards vertically downwardly until they engage with stops, and that during the downward movement of said guide members the transfer of the loops of the beginning course to said frame needles is jointly effected in all divisions.

2. A device as set forth in claim 1 in which the movable parts of said guide members are fixed upon said rotatable shaft extending over the entire length of the machine and are provided at their lower surface with brackets which extend obliquely rearwardly and carry said stops.

3. A device as set forth in claim 1 in which said welt bars are fixed to tension springs which run over guide rollers of said movable guide members and said brackets and are connected to auxiliary draw off drums which are rotatably mounted upon, but adapted to be coupled to said auxiliary draw off shaft.

4. A device as set forth in claim 1 in which racks controlled by cams mounted upon the main cam shaft actuate gear wheels mounted upon said auxiliary draw off shaft.

5. A device as set forth in claim 1 in which auxiliary draw off drums are adapted to be individually connected to and disconnected from the said auxiliary draw off shaft.

6. A device as set forth in claim 1 in which besides auxiliary draw off drums sleeves provided with elongated slots are arranged into which pins carried by said auxiliary draw off shaft may engage and in which at the ends of said sleeves facing said auxiliary draw off drums other slots are provided into which members carried by said auxiliary drums may engage.

7. A device as set forth in claim 1 in which below said welt bars steel shoes are provided in the range of said guide members.

8. A device as set forth in claim 1 in which said welt bars are provided with extended operative surfaces in the range of said guide members.

9. A device as set forth in claim 1 in which pins, adapted to actuate extended surfaces of said welt bars are mounted upon rails movably arranged in blocks on the bed of the machine at the side of said guide members and extend into the range of said welt bars.

10. A device as set forth in claim 1 in which a wedge rail controlling rails mounted in blocks is controlled by cams on a main cam shaft extending over the entire length of the machine and journalled in the bed of the machine.

11. A device as set forth in claim 1 in which a shiftable rail carrying wedges carries a stop upon which acts one arm of a bell crank lever mounted in the machine frame the other arm of said bell crank lever being influenced by way of a link from a lever actuated by the main cam shaft.

12. A device as set forth in claim 1 in which rails attached to the body of the machine cover said welt bars and thereby protect the latter in their position of rest.

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