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FLAT KNITTING FRAMES

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Fig. 1

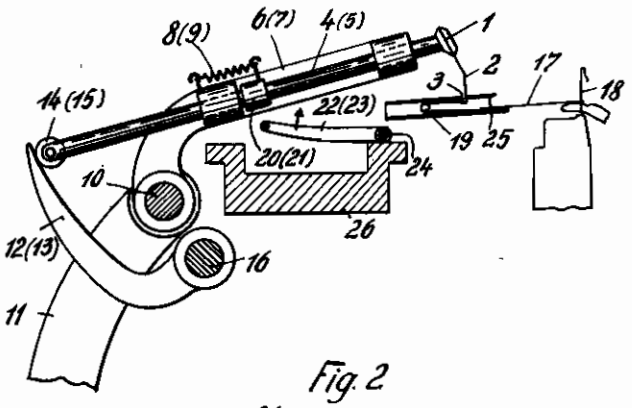
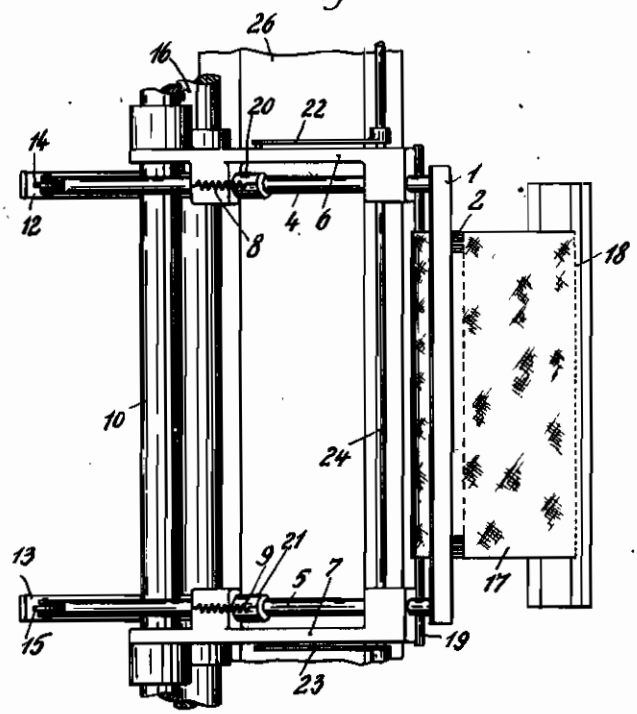


Fig. 2



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ALIEN PROPERTY CUSTODIAN

FLAT KNITTING FRAMES

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This invention relates to a fully automatic welt forming device for flat knitting frames, in which two guides extending approximately parallel to the take-up direction of the goods are provided for the welt bar above the machine table and, for lifting and lowering the welt bar, are jointly arranged on a horizontal shaft disposed in front of the table.

In a known welt forming device of this type the welt bar on being applied to the first course engages the sinker loops thereof, and special measures or arrangements are required for covering the welt. If special arrangements are to be avoided it is necessary for instance to displace the welt bar half a needle division prior to the covering of the welt or to impart a particular shape to the needles of the welt bar or to the knocking over bits or to associate the needles of the bar with special working parts. Furthermore, in the known device the knocking over bits are provided above the knocking over point with a hook which serves for temporarily holding the sinker loops of the first course hanging on the welt bar until the frame needles, coming from below, engage these loops. In order to insure fully automatic production of a welt the welt bar has to execute motions in two different directions, that is, in the drawing-off direction of the fabric and in vertical direction. This is made possible by guides of the welt bar, which for this purpose are positioned on a horizontal shaft in front of the machine table and by being moved about this shaft permit vertical motion of the welt bar through the medium of rocking levers positioned between the table and the needle bar for lifting the guides at the proper time. Additional rocking levers, also arranged between the machine table and the needle bar and in front of the first set of rocking levers, serve for displacing the welt bar in its guides for motion in take-up direction.

The provision and arrangement of these rocking levers in the known welt forming device involve, however, a serious drawback for the reason that the space between the machine table and the needle bar in flat knitting frames is too small to accommodate two sets of rocking levers either side by side or one behind the other. This explains why this known proposal has not been generally adopted.

It is the object of the invention to overcome this drawback and to provide also other advantages by applying the invention to a fully automatic welt forming device in which the welt bar engages the needle loops instead of the sinker loops when placed in the initial course. A welt forming device of this class, compared with one whose welt bar engages the sinker loops, affords for instance the advantage that shifting of the bar during covering of the welt can be dispensed with and no special construction of the knocking over bits and of the needles of the welt bar or particular equipment of the latter is required.

In a welt forming device according to the invention the welt bar is disposed at the rear end of two rods displaceably positioned in the guides and extending with their front end up to the table where they are in engagement with driving means on a second horizontal shaft, which impart to the welt bar motion in the take-up direction of the goods, both the horizontal shaft supporting the guides and the horizontal shaft for the driving means being oscillated from the main shaft to effect motion of the welt bar in the two directions mentioned.

The invention is illustrated by way of example in the accompanying drawing, in which

Figure 1 is a side view of a welt forming device according to the invention in end position, and

Fig. 2 is a top view thereof.

The device comprises a welt bar 1 which is inserted in the needle loops of the initial course by means of needles 2 having a forwardly extending hook 3 provided with a groove for closing the frame needles which hold the needle meshes to be engaged. The welt bar 1, 2, 3 is disposed at the rear end of two rods 4, 5 displaceably arranged in guides 6, 7 which extend above the machine table 26 approximately parallel to the take-up direction of the fabric. The guides 6, 7 are firmly mounted on a horizontal shaft 10 in front of the table 26. The shaft 10 is moved in pendulum fashion from the main machine shaft, not shown, to impart to the welt bar 1, 2, 3 the vertical motions required for forming a welt in a fully automatic manner. With their front end the rods 4, 5 extend up to the table 26 and are there in engagement with fingerlike members 12, 13 which are instrumental in imparting to the bar 1, 2, 3 motion in the take-up direction of the goods.

The members 12, 13 are firmly mounted on a second horizontal shaft 16 located in front of the table 26 and receiving oscillatory motion from the main shaft. The rods 4, 5 are fitted at their front ends with rolls 14, 15 to reduce frictional resistance. Oscillatory motion is imparted to the shafts 10, 16 from an eccentric main shaft through eccentric levers, one of which designated 11 and intended for the shaft 10 is shown in Fig. 1 which indicates a position of the welt forming

device at which the welt is almost completed. The last course of the welt 17 is still on the needle bar 18, and the initial course is placed on the needles 2, 3 of the welt bar 1, so that the fabric 17 forms about a welt rod 19 a loop located in front of the hooks 3 of the needles 2 to facilitate the returning of the initial course to the frame needles 18 for covering the welt. The welt bar 1, 2, 3 is drawn up to the position shown in Fig. 1 by springs 8, 9, and the members 20, 21 limit the motions of the rods 4, 5. When the welt fabric begins to form a loop it is drawn off by means of the rod 19 which for this purpose is attached to the take-up in known manner.

The welt bar 1, 2, 3 is preferably detachably connected with the rods 4, 5 so as to permit its removal after the covering of the welt and full exposure of the section until completion of a stocking. The welt rod 19 is inserted by means of levers 22, 23 which swing about a horizontal shaft 24 on the machine table and at the free ends of which the rod 19 can be easily detachably held. The rod 19 positioned between the levers 22, 23 is during motion of the levers in the direction of the arrow over the rear end of the guides 25 placed on the welt portion 17. The rod 19 is inserted during the knitting of the welt portion, for which purpose the levers 22, 23 are first brought into upright position. The shaft 24 extends through the entire machine, and the levers 22, 23 are firmly connected with the shaft 24, so that during motion of the shaft all rods 19 are inserted at once.

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