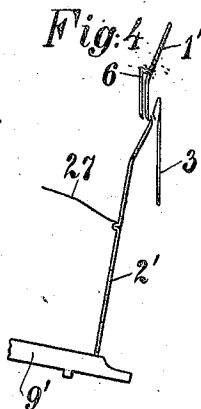
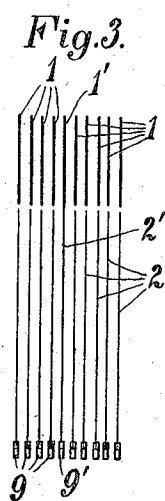
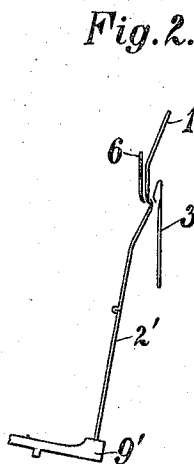
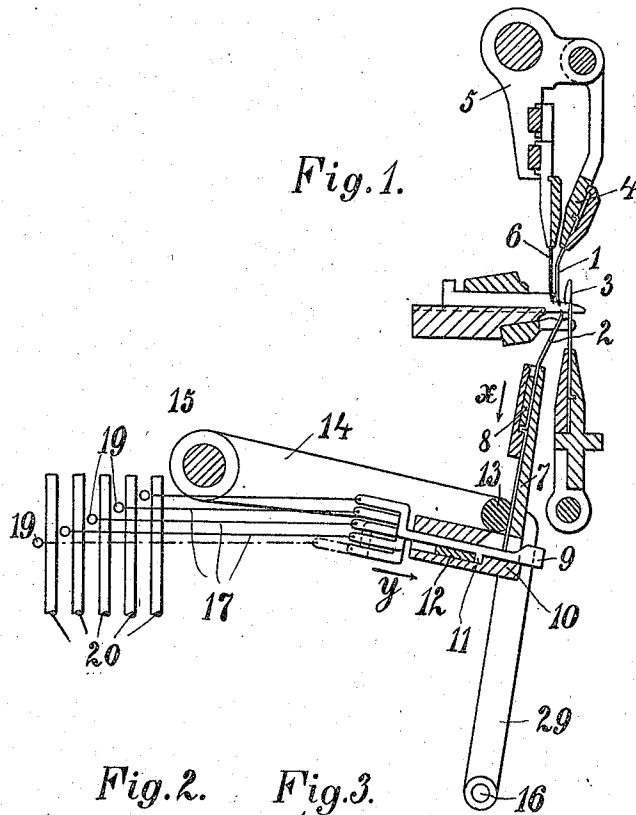


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APPLICATION FILED MAR. 25, 1907.

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Patented Nov. 9, 1909.
2 SHEETS—SHEET 1.



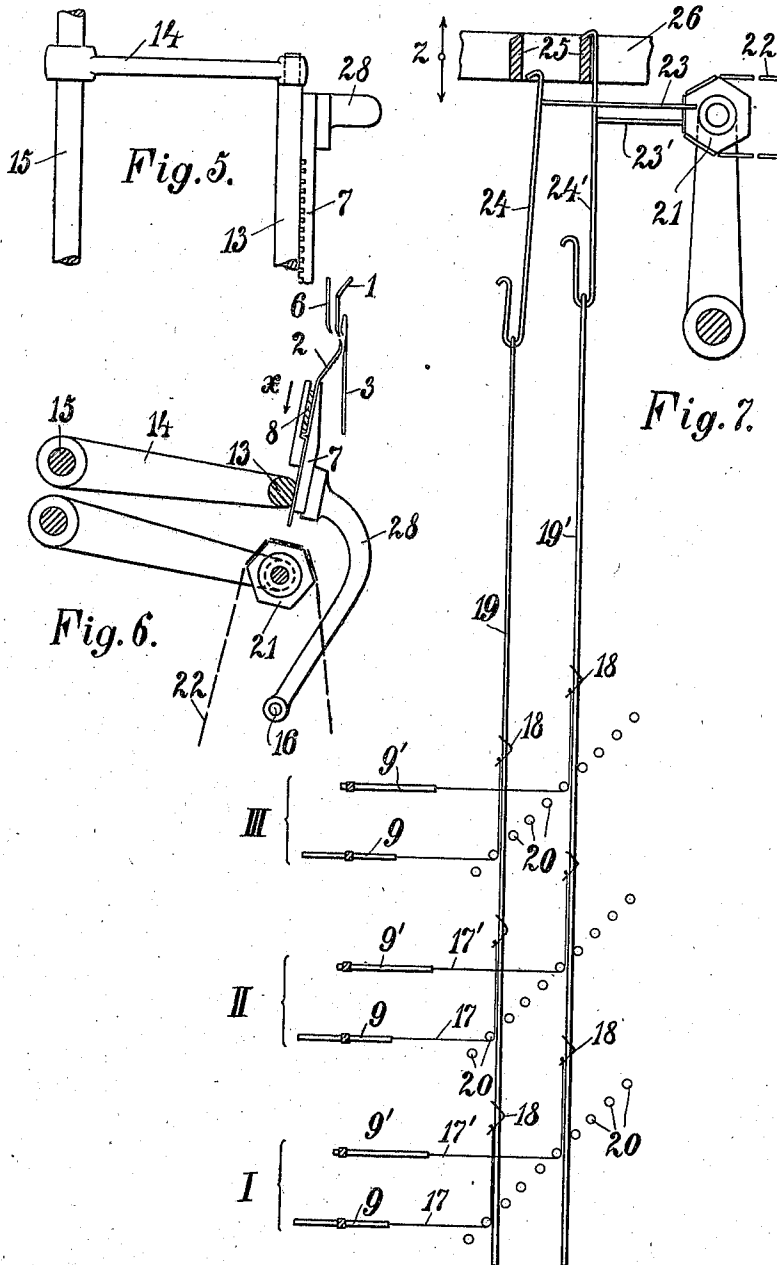
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UNITED STATES PATENT OFFICE.

BRUNO SALZER AND GUSTAV WALTHER, OF CHEMNITZ, GERMANY.

LACE-PATTERN MECHANISM FOR STRAIGHT-KNITTING MACHINES.

939,328.

Specification of Letters Patent.

Patented Nov. 9, 1909.

Application filed March 25, 1907. Serial No. 384,391.

To all whom it may concern:

Be it known that we, BRUNO SALZER and GUSTAV WALTHER, subjects of the German Emperor, residing at Chemnitz, in the Kingdom of Saxony and Empire of Germany, have invented certain new and useful Improvements in Lace-Pattern Mechanism for Straight-Knitting Machines, of which the following is a specification.

10 This invention relates to straight-bar knitting machines and is especially adapted in combination with a jacquard-apparatus for rapidly producing open work patterns.

15 In the annexed drawing several embodiments of our invention are illustrated.

Figure 1 is a vertical section through those parts of the machine which come into consideration in the present case. Fig. 2 shows the needles at another moment of the operation than represented by Fig. 1. Fig. 3 is a front view of Fig. 1. Fig. 4 represents a modified form of construction. Figs. 5 and 6 are respectively top-view and side-view of a further modification. Fig. 7 is a view on an enlarged scale indicating single divisions of a straight bar knitting frame.

25 In Figs. 1 to 6 of the drawings, 1 represents the point-shifting or lace needles, 2 the stop needles, 3 the frame needles, 4 the tickler, 5 the fashioning or narrowing attachment and 6 the narrowing needles; the latter are situated behind the lace needles 1 and do not contact with the frame needles 3 during the operation of the lace needles 1, but moreover move into operating position solely when a narrowing of the fabric is to take place.

30 Fig. 1 shows the movable stop needle 2 in the position in which it does not touch the lace needle 1.

The stop needles 2 are arranged in the needle bar 7 adapted to be moved singly. The bar 8 which is equal in length to the breadth of a division is adapted to be moved up and down in the stop needle bar 7 and is forced downward in the direction of the arrow *a* by means of a spring (not shown in the drawing). Consequently if some or a great number of the stop needles 2 are moved upward said bar 8 also is raised. However, when the force which lifted the needles 2 ceases to act these needles are automatically returned by the bar 8.

55 The selecting jacks 9 are singly movable in the selecting jack bar 10 and are so arranged therein that the bottom end of each stop

needle 2 touches the top edge of one jack 9. The stop needle bar 7 and the selecting jack bar 10 are integral with and arranged at right angles to each other. A projection 11 is provided on each jack 9 against which the restoring bar 12 abuts; the latter also is removed in the direction of the arrow *y* by means of springs and serves to return the selecting jacks to their initial position.

65 The stop needle bar 7 is rigidly attached to the shaft 13 journaled in the ends of the levers 14. These levers 14 are pivoted to the fixed shaft 15 on which they oscillate. Also fixed to said stop needle bar 7 is a rod 29, to the lower end of which a pin 16 is fixed adapted to be moved to and fro by well known means not shown in the drawings. Consequently this arrangement enables the bar 7 to swing up and down about the shaft 15 and to and fro about the shaft 13.

Connected to the wires 19 at 18, Fig. 7, are the selecting jacks 9 said wires 19 being movable between the guide-pins 20.

80 In Fig. 7 I, II, III &c. indicate the single divisions of a straight bar knitting frame, and in order to avoid confusion in the drawing and for the sake of better understanding only two selecting jacks 9 with their accessories are shown. However, in reality, in each division there are as many selecting jacks as frame needles and they are arranged as close to one another as said frame needles.

90 Fig. 7 shows the jacquard-card cylinder adapted to be moved up and down, for the purpose of shifting the perforated jacquard-card 22 controlling the jacquard-needles 23; the latter act upon the corresponding lifting wires 24 in the same manner as in the well known jacquard-machines.

The lifter-knives 25 of the jacquard-apparatus are fixed in the frame 26 in a well known manner and are adapted to be moved in the direction of the arrow *z*.

The wires 19 arranged between the guide-pins 20 are connected to the lifting wires 24.

105 In each division the knitting machine has so many lace needles 1, stop needles 2, jacks 9 and cords 17, as there are frame needles 3 in each division. However, the whole machine only contains so many primary actuating wires 19 as there are selecting jacks 9 in one division. For in each division I, II, III a jack 9 is provided and connected by means of part 18 to the com-

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mon wire 19¹. Therefore if a knitting frame has for instance eighteen divisions, then eighteen jacks 9 are fastened to the wire 19¹.

Fig. 2, as a supplement to Fig. 1, shows the selecting jacks and needles at the moment when the jack 9 by means of the cord 17 is drawn into the position 9¹. Thereby the elevated head-end of the jack has shifted the stop needle 2 into the elevated position 2¹, so that the upper hook-shaped end of the needle 2¹ is located in front of the bottom point of the lace needle 1. From the front view illustrated in Fig. 3 it will be seen that only this one stop needle 2¹ is lifted by the selecting jack 9¹ and has moved in front of the point needle 1¹, while all the other selecting jacks not operative by their cords 17 have remained in their initial position.

The operation is as follows: If the jacquard-card 22, Fig. 7, is continually fed on by the cylinder 21 and moved against the jacquard-needles 23, then those needles 23 which meet or engage a hole of the jacquard-card 22 remain in their position of rest; however, those needles 23¹ which do not meet any hole are carried along by the card 22, and with their opposite end force the lifting wire 24¹ against the knife 25. In consequence thereof the lifting wire 24¹ on the movement of the frame 26 is seized by the knife 25 and drawn into the position shown in Fig. 7. During this movement the wire 19¹ connected to 24¹ also is drawn along. This wire 19¹ pulls the selecting jacks 9¹ attached to it by means of the parts 18 and cords 17¹ backward; thereby the restoring bar 12 is moved rearwardly, and the stop needles 2¹ are lifted on the sloping part of the selecting jacks 9¹ also carrying the bar 8 along with them, Fig. 2. The single jacquard attachment 22, 23, 24, 25, 26 controls the selecting jacks and needles of all the divisions I, II, III, &c. Now when the stop needle bar 7 and the selecting jack bar 10, Fig. 1, receive the corresponding operating movements all those lace needles 1¹, Figs. 2 and 3, are kept back during the covering of the narrowing machine 5 which is situated above the stop needles 2¹ when elevated. The lace needles 1¹ kept back cannot take up the loop from the corresponding frame needle 3, and only the lace needles 1 remaining free are able to take up a loop.

In the form of construction shown in Fig. 4 the selecting jack 9 has a different shape than in Figs. 1 and 2. The operating end of the jack 9 in Fig. 2 is elevated, while in

Fig. 4 it is reduced; thereby each stop needle 2 is controlled by a spring 27 forcing it downward on the jack 9¹ being drawn backward.

The jacquard attachment above described, in the art of knitting by means of straight knitting frames represents a new improvement, wherein the single corresponding parts of all divisions uniformly are controlled by means of a single jacquard-card. Instead of this arrangement a jacquard-card for each single division could be provided in the former manner well known in straight bar knitting frames and as represented in Figs. 5 and 6. However, the jacquard-cylinder 21 swinging up and down with the card 22 acts only upon a single division of the machine, this taking place in such a manner that on the upward movement of the card-cylinder 21 the perforated card 22 directly raises the stop needles which are to keep back the lace points 1.

In Fig. 5 the shaft 15 in top-view is shown with the lever 14 and the shaft 13 rotatable therein, the stop needle bar 7 being attached thereto.

Having now explained our invention we declare that what we claim is:—

1. In a straight-bar knitting machine the combination of a jacquard-apparatus, stop needles projecting upward from below into engagement with the point-shifting needles adapted to press the latter away from the frame needles, a stop needle bar, means for independently moving certain of said stop needles in said bar, comprising a selecting jack connected to said stop needle bar and selecting jacks movably arranged in said bar and means for operating said selecting jacks from said jacquard-apparatus.

2. In a straight-bar knitting machine the combination of a plurality of divisions each including in equal numbers stop needles and selecting jacks therefor, a plurality of primary actuating members equal in number to the selecting jacks of one of said divisions and operatively connected with all of said divisions, and a single jacquard acting through said primary members and jacks to independently operate the needles of all of said divisions.

In testimony whereof we affix our signatures in presence of two witnesses.

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GUSTAV WALTHER.

Witnesses:

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