F. WAGNER.

WARP KNITTING FRAME.

APPLICATION FILED MAY 20, 1915.

1,206,179.

Patented Nov. 28, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

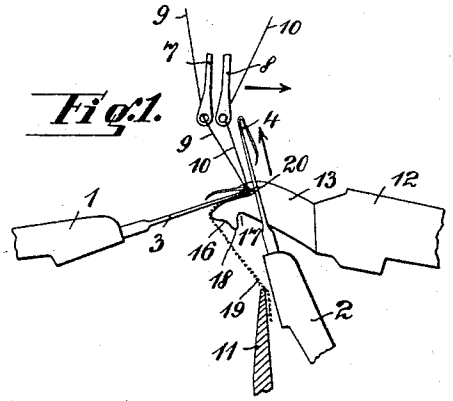


Fig. 2.

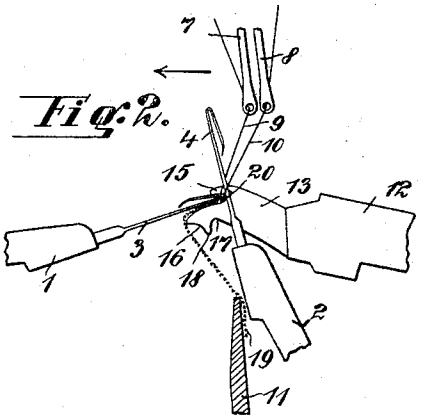


Fig. 3.

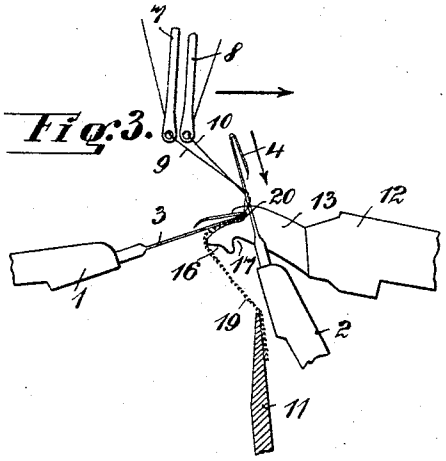


Fig. 4.

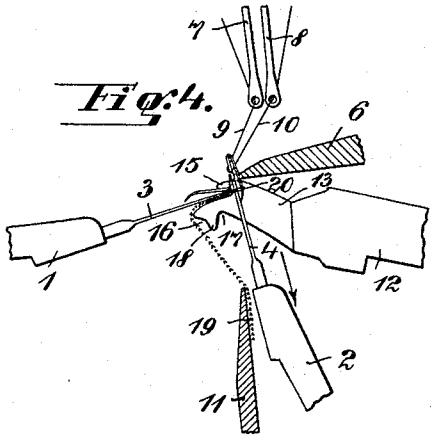


Fig. 5.

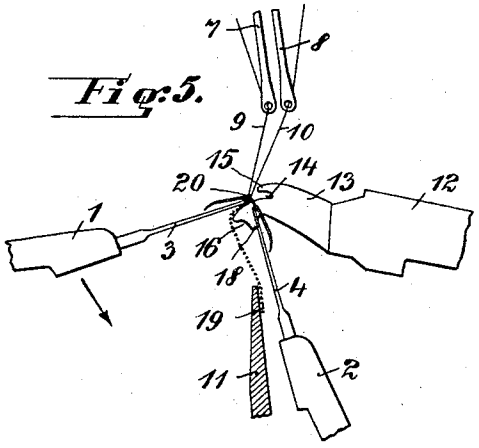
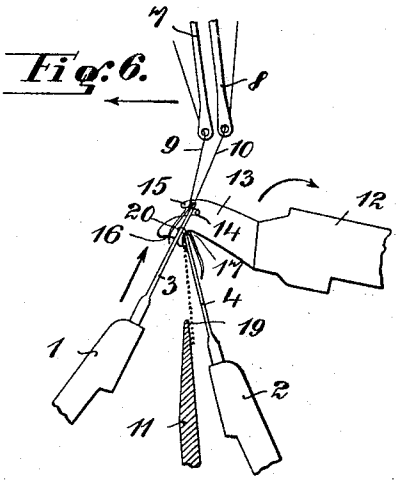


Fig. 6.



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2 SHEETS—SHEET 2.

Fig. 7.

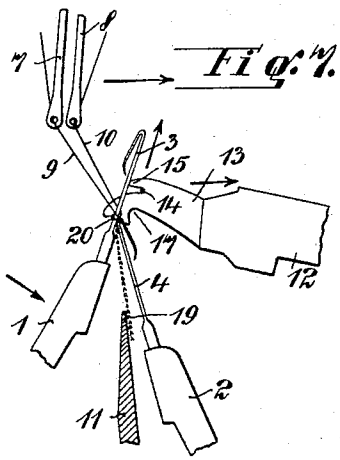


Fig. 8.

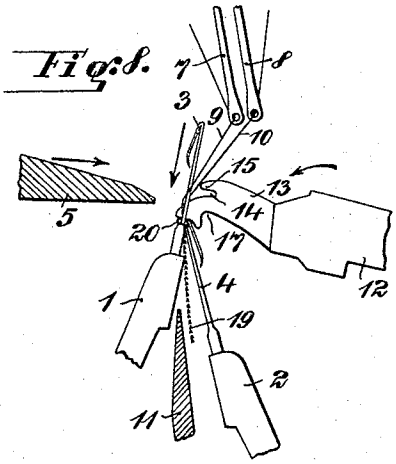


Fig. 9.

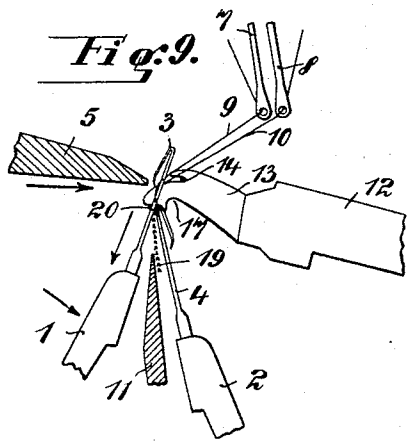


Fig. 10.

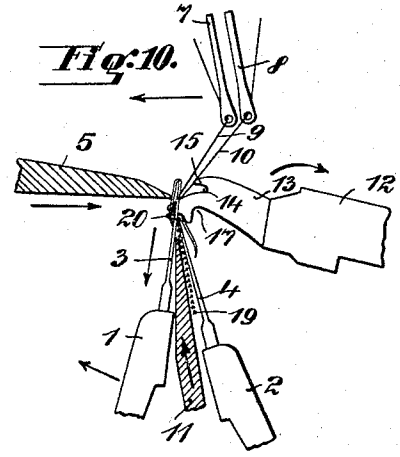


Fig. 11.

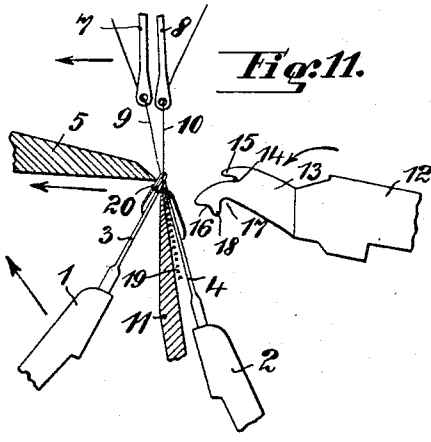
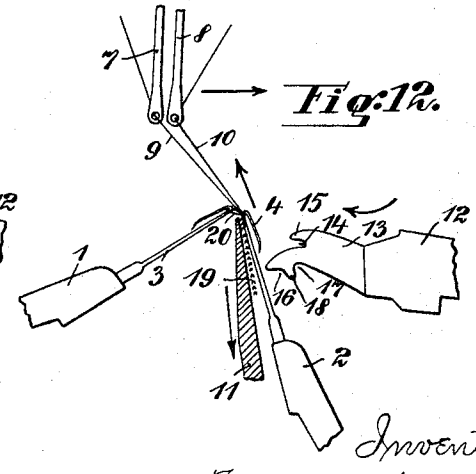


Fig. 12.



Inventor

Friedrich Wagner,

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UNITED STATES PATENT OFFICE.

FRIEDRICH WAGNER, OF RUSSDORF, GERMANY, ASSIGNOR TO THE FIRM OF SCHUBERT & SALZER MASCHINENFABRIK, AKTIENGESELLSCHAFT, OF CHEMNITZ, GERMANY.

WARP KNITTING FRAME.

1,206,179. Specification of Letters Patent. Patented Nov. 28, 1916.

Application filed May 20, 1915. Serial No. 29,333.

To all whom it may concern:

Be it known that I, FRIEDRICH WAGNER, a citizen of the German Empire, residing at Russdorf, in the Grand Duchy of Saxony-Altenburg, Germany, have invented certain new and useful Improvements in Warp Knitting Frames; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in warp knitting frames, and more particularly in warp knitting frames by means of which double faced goods can be knitted.

The object of the improvements is to provide a warp knitting frame in which apart from the usual pairs of needle rows, guides, and presser bars only one row of knitting sinkers is provided, which together with the operation of the needle row which is opposite to the knitting sinkers lap the threads on both rows of needles in alternate succession.

By providing a single sinker bar for both rows of needles the mechanism for making the loops is made more simple in construction and the number of the elements of the mechanism is reduced. The most important advantage of the improved construction resides in the fact, that goods of better quality are obtained. By using the same sinkers for both rows of needles the appearance of the work is exactly the same on both sides. In this respect my improved fabric is distinguished from the fabric which is made on frames of the old construction in which independent sinkers and their operating mechanisms are provided for each side. If in frames of this construction the operations do not exactly coincide or are accidentally changed in the course of the operation, the appearance of the goods is not uniform on both sides.

For the purpose of explaining the invention an example embodying the same has been shown in the accompanying drawings, in which the same letters of reference have been used in all the views to indicate corresponding parts.

In said drawings, Figures 1 to 12, are diagrammatical views, showing the needle bars with the needles mounted thereon, the thread guide, the sinker bar with the sinkers mounted thereon, the presser bars and the stripping plate, the said figures showing the elements in their successive positions.

The mechanism for operating the loop forming elements may have any known or preferred construction. As mechanism of this kind will readily suggest itself to those skilled in the art from the description of the operation of the elements and my invention relates more particularly to the said elements, I deem it not necesssary to describe the operating mechanism.

As shown in my improved frame two needle bars 1 and 2 are provided which carry frame needles 3 and 4. The needle bar 2 is adapted to be shifted only longitudinally of the needles, while the needle bar 1 has in addition thereto a rocking movement. Such rocking movement takes place with the heads of the needles located in the axis of the rocking movement, so that when rocking the needle bar only the stems of the needles change their positions.

For each of the rows of frame needles presser bars 5 and 6 respectively are provided, which are shown in Figs. 4, 8, 9, 10, and 11. Above the frame needles thread guides 7 and 8 are provided which are mounted on the rocking guide bar (not shown), and which feed the threads 9 and 10.

Between the needle bars a stripping plate 11 is located which is adapted to be reciprocated in vertical direction. Opposite the rocking needle bar 1 and above the needle bar 2, a sinker bar 12 is provided which carries sinkers 13. The said sinkers are formed with three locking in throats 14, 16 and 17, as is best shown in Fig. 12, the throats 14 being formed at the upper sides of the sinkers by noses 15, and the throats 16 and 17 being formed at the lower sides of the sinkers and one behind the other and at opposite sides of noses 18. The sinker bar is adapted to be reciprocated, and apart from this it has a rocking and a circular movement. The finished work has been indicated by the numeral 19, and the last row of loops by the numeral 20.

The figures show the successive positions assumed by the parts in the course of the manufacture of the fabric.

In the position shown in Fig. 1 the rocking needles 3 which are located at the left are substantially horizontal, and their heads with the upper margin of the fabric placed thereon extend into the upper locking in throats 14 of the row of knitting sinkers 13, and the fabric 19 is passed downward between the needles 3 and the sinkers 13. In order to place the warp threads 9 and 10 on the right hand row of needles 4 the said row of needles which can be shifted only in the direction of the needles moves upward, until the heads of the needles are level with the eyes of the guides 7 and 8. Thereupon the latter are rocked to the right in the direction of the arrow and into the position shown in Fig. 2 where they are staggered with relation to each other, one of the rows of guides for example the row 7 being shifted longitudinally of the row a distance corresponding to two guides in one direction, while the other row is shifted the same distance in the opposite direction. Thereupon the guides 7 and 8 are rocked in the direction of the arrow shown in Fig. 2 and into initial position, as is shown in Fig. 3, so that at the front side of the needle stem 4 and above the nose 15 of the knitting sinkers 13 the threads are crossed. From the position shown in Fig. 3 the row of needles 4 moves downward, until the threads which have thus been crossed are engaged below the point of the hook of the needle. But before the point of the hook of the needle has come into position for engagement with the row of loops 20, it is pressed by the presser bar into the groove of the needle, so that when the needles are further moving downward the old loops are shifted on the back of the needle hook, as is shown in Fig. 4, and when the presser bar releases the hooks, they are knocked over near the lowermost position of the needles so as to slide downward over the needle heads and to be added as a new row of loops to the work 19. This period of the operation is shown in Fig. 5, in which however at the same time the beginning of the knitting of the left hand row of needles 3 is shown, for which purpose the knitting sinkers 12 have been shifted slightly to the right, and the row of needles 3 rocks about the heads of the needles and into a position which is nearer the vertical position. While passing from the position shown in Fig. 5 into the position shown in Fig. 6 the row of knitting sinkers 12 locks the margin of the work into the lower right hand throat 17 of the sinkers by performing a circular path in anti-clockwise direction, and the row of needles 3 rises in the direction of the arrow shown in Fig. 6, while the rows of guides 7 and 8 are again shifted relatively to each other in opposite directions and in the direction of the guide bars, so that at the rear of each needle 3 the threads are crossed. Now the rows of guides 7 and 8 are rocked to the left, the row of needles 3 rises further, and the knitting sinkers 13 describe a small semi-circular path in order to bring the lower sinker nose 18 from the left hand side of the work to the right hand one and to lock the margin of the work in the left hand lower sinker throat 16. All these operations are finished when the parts are in the positions shown in Fig. 7, and furthermore the row of guides 7 and 8 have been shifted relatively to each other in lateral direction, so that the said rows by moving to the right place crossed threads in front of the noses 3. In order that these crossed threads embrace the stems of the needles as far as possible below the points thereof, the row of needles 3 is set at a smaller angle to the vertical and the row of knitting sinkers 13 is shifted a little to the right, as is shown in Fig. 8.

From the position shown in Fig. 8 the row of needles 3 moves downward, the left hand presser bar 5 approaches the same, and the knitting sinkers 13 lock in the margin of the work in a rigid manner. When the row of needles 3 is in the position, in which the points of the needles arrive between the marginal loops 20 and the crossed threads located at the front thereof and below the needle hooks, the presser bar 5 closes the needle hooks (Fig. 10). As the needles 3 continue to move downward, the marginal loops 20 slide on the backs of the needle hooks and they are supported in the meantime by the stripping plate 11 which has moved upward. Fig. 10 shows this movement, and the arrows indicating the direction of the movements show, that the sinkers 13 rock to the right, the row of thread guides 7, 8 in the opposite direction, and the row of needles 3 into the initial horizontal position. Fig. 11 shows the parts in the positions in which the larger part of these movements has been completed, the figure showing the parts in the positions in which the presser bar 5 releases the needle hooks and slightly before the row of loops 20 is being knocked over. This knocking over is performed on the upper margin of the stripping plate 11 which is formed with an edge. The last part of the operation is a movement of a row of knitting sinkers through three quarters of a circle and over the position shown in Fig. 12 and into the position shown in Fig. 1, whereby the rows of loops which have been knocked over are locked in the upper sinker throat 14. After the row of perforated thread guides 7, 8 has again been shifted in lateral direction, the following operation is commenced.

I claim herein as my invention—

1. In a warp knitting frame, the combination with a pair of oppositely arranged needle bars, and the needles mounted

thereon, of a single sinker bar and a single row of sinkers mounted thereon adapted to coöperate with the needles of both needle bars, a pair of guide bars, and mechanism for operating said needle bars, sinker bar and guide bars.

2. In a warp knitting frame, the combination with a pair of oppositely arranged needle bars, and the needles mounted thereon, of a single sinker bar and a single row of sinkers mounted thereon having throats at their upper and lower sides for locking in and knocking over the rows of loops of both needle bars and adapted to coöperate with the needles of both needle bars, a pair of guide bars, and mechanism for operating said needle bars, sinker bar and guide bars.

3. In a warp knitting frame, the combination with a pair of oppositely arranged needle bars, and the needles mounted thereon, of a single sinker bar and a single row of sinkers mounted thereon each having one throat at its upper side and two throats at its lower side for locking in and knocking over the rows of loops of both needle bars and adapted to coöperate with the needles of both needle bars, a pair of guide bars, and mechanism for operating said needle bars, sinker bar and guide bars.

4. In a warp knitting frame, the combination with a pair of oppositely arranged needle bars, and the needles mounted thereon, one of said needle bars being adapted to be shifted exclusively in the direction of the needles mounted thereon and the other one being adapted to be shifted in the direction of the needles mounted thereon and to be rocked into knitting position prior to the formation of the loops and back again, of a sinker bar and a row of sinkers mounted thereon adapted to cooperate with the needles of both needle bars, a pair of guide bars, and mechanism for operating said needle bars, sinker bar and guide bars.

5. In a warp knitting frame, the combination with a pair of oppositely arranged needle bars, and the needles mounted thereon, one of said needle bars being adapted to be shifted exclusively in the direction of the needles mounted thereon and the other one being adapted to be shifted in the direction of the needles mounted thereon and to be rocked into knitting position prior to the formation of the loops and back again, of a sinker bar and a row of sinkers mounted thereon each having one throat at its upper side and two throats at its lower side for locking in and knocking over the rows of loops of both needle bars and adapted to coöperate with the needles of both needle bars, a pair of guide bars, and mechanism for operating said needle bars, sinker bar and guide bars.

6. In a warp knitting frame, the combination with a pair of oppositely arranged needle bars, and the needles mounted thereon, of a single sinker bar having reciprocating, rocking and circular movements, and a single row of sinkers mounted thereon adapted to coöperate with the needles of both needle bars, a pair of guide bars, and mechanism for operating said needle bars, sinker bar and guide bars.

7. In a warp knitting frame, the combination with a pair of oppositely arranged needle bars, and the needles mounted thereon, one of said needle bars being adapted to be shifted exclusively in the direction of the needles mounted thereon and the other one being adapted to be shifted in the direction of the needles mounted thereon and to be rocked into knitting position prior to the formation of the loops and back again, of a sinker bar having reciprocating, rocking and circular movements, and the sinkers mounted thereon adapted to coöperate with the needles of both needle bars, a pair of guide bars, and mechanism for operating said needle bars, sinker bar and guide bars.

8. In a warp knitting frame, the combination with a pair of oppositely arranged needle bars, and the needles mounted thereon, one of said needle bars being adapted to be shifted exclusively in the direction of the needles mounted thereon and the other one being adapted to be shifted in the direction of the needles mounted thereon and to be rocked into knitting position prior to the formation of the loops and back again, of a sinker bar having reciprocating, rocking and circular movements, and sinkers mounted thereon each having one throat at its upper side and two throats at its lower side for locking in and knocking over the rows of loops of both needle bars and adapted to coöperate with the needles of both needle bars, a pair of guide bars, and mechanism for operating said needle bars, sinker bar and guide bars.

9. In a warp knitting frame, the combination with a pair of oppositely arranged needle bars, and the needles mounted thereon, one of said needle bars being adapted to be shifted exclusively in the direction of the needles mounted thereon and the other one being adapted to be shifted in the direction of the needles mounted thereon and to be rocked about the heads of the needles into knitting position prior to the formation of the loops and back again, of a sinker bar and sinkers mounted thereon adapted to coöperate with the needles of both needle bars, a pair of guide bars, and mechanism for operating said needle bars, sinker bar and guide bars.

10. In a warp knitting frame, the combination with a pair of oppositely arranged

needle bars, and the needles mounted thereon, one of said needle bars being adapted to be shifted exclusively in the direction of the needles mounted thereon and the other one being adapted to be shifted in the direction of the needles mounted thereon and to be rocked about the heads of the needles into knitting position prior to the formation of the loops and back again, of a sinker bar and sinkers mounted thereon each having one throat at its upper side and two throats at its lower side for locking in and knocking over the rows of loops of both needle bars and adapted to coöperate with the needles of both needle bars, a pair of guide bars, and mechanism for operating said needle bars, sinker bar and guide bars.

11. In a warp knitting frame, the combination with a pair of oppositely arranged needle bars, and the needles mounted thereon, one of said needle bars being adapted to be shifted exclusively in the direction of the needles mounted thereon and the other one being adapted to be shifted in the direction of the needles mounted thereon and to be rocked about the heads of the needles into knitting position prior to the formation of the loops and back again, of one sinker bar having reciprocating, rocking and circular movements, and sinkers mounted thereon each having one throat at its upper side and two throats at its lower side for locking in and knocking over the rows of loops of both needle bars and adapted to coöperate with the needles of both needle bars, a pair of guide bars, and mechanism for operating said needle bars, sinker bar and guide bars.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

FRIEDRICH WAGNER.

Witnesses:
WOLDEMAR HAUPT,
HENRY HASPER.