

J. SCHMITT.  
KNITTING MACHINE.

No. 580,902.

Patented Apr. 20, 1897.

Fig. 2.

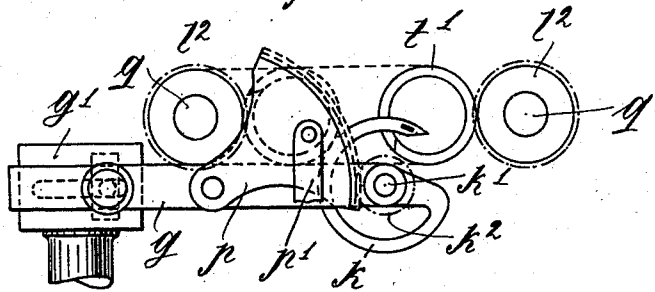


Fig. 1.

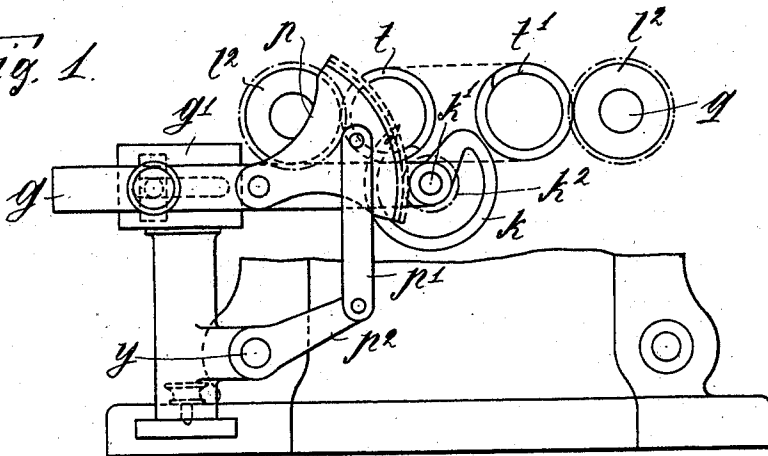


Fig. 3.

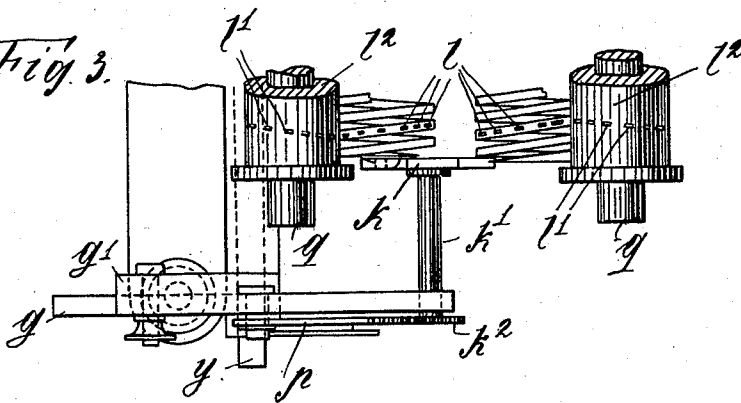
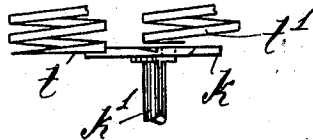


Fig. 4.



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Inventor  
Johann Schmitt  
by  
Ruediger  
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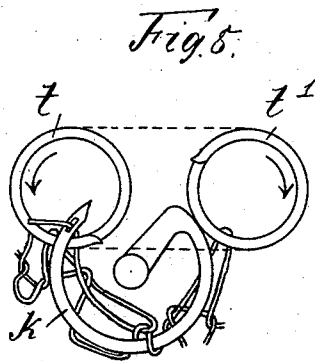
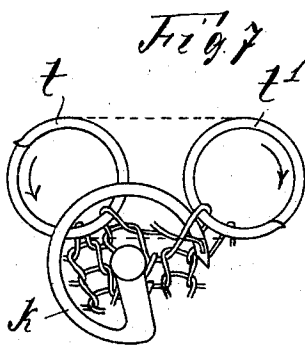
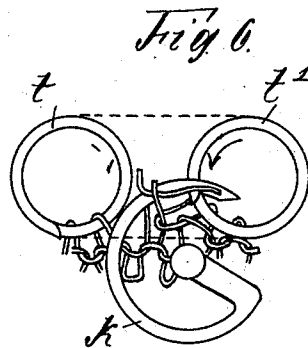
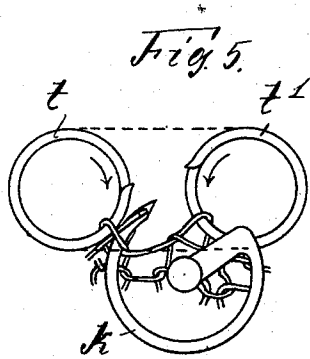
(No Model.)

2 Sheets—Sheet 2.

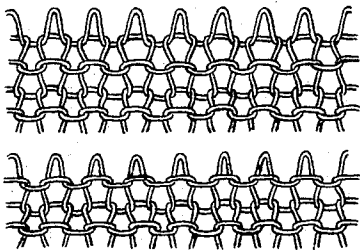
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*Fig. 9.*



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# UNITED STATES PATENT OFFICE.

JOHANN SCHMITT, OF COLOGNE, GERMANY, ASSIGNOR OF TWO-THIRDS TO  
JEAN BAPTIST COBLENZER, OF COBLENZ, GERMANY.

## KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 580,902, dated April 20, 1897.

Application filed September 25, 1896. Serial No. 606,975. (No model.) Patented in Germany June 1, 1894, No. 80,150; in Sweden June 7, 1894, No. 6,311; in France June 7, 1894, No. 239,111; in Belgium June 7, 1894, No. 110,323; in Switzerland June 27, 1894, No. 8,980; in England June 27, 1894, No. 12,424; in Italy June 27, 1894, No. 36,671, and in Denmark March 26, 1896, No. 479.

To all whom it may concern:

Be it known that I, JOHANN SCHMITT, a subject of the King of Prussia, German Emperor, and a resident of Cologne, in the Province of the Rhine, Kingdom of Prussia, German Empire, have invented an Improved Knitting-Machine with a Displaceable Circular Thread-Guide, (for which patents have been obtained in Germany, No. 80,150, dated June 1, 1894; in Sweden, No. 6,311, dated June 7, 1894; in Switzerland, No. 8,980, dated June 27, 1894; in Great Britain, No. 12,424, dated June 27, 1894; in France, No. 239,111, dated June 7, 1894; in Belgium, No. 110,323, dated June 7, 1894; in Italy, No. 36,671, dated June 27, 1894, and in Denmark, No. 479, dated March 26, 1896,) of which the following is an exact specification.

This invention refers to knitting-machines of the kind in which a horizontal horseshoe-like spiral is employed for holding and transporting the meshes or the uppermost row of meshes of the fabric respectively, and in which a thread-guide arranged in front of the ends of said spiral is employed for catching up the meshes dropped by one of said ends and for presenting fresh meshes to the other end. If in a knitting-machine of said kind an open or flat fabric is to be produced, the direction of rotation of the said spiral is to be reversed after the completion of each row of meshes, so that the function of the two ends of the spiral changes. In other words, that end of the spiral which previously dropped meshes takes meshes up and that end which took meshes up drops the same. In accordance with this change there is a double change in the position of the thread-guide in that the latter must not only be turned or reversed, so as to show its former rear side at the front side of the machine, but must also be transported from its former operating-shaft to another one. Said reverse as well as said transport of the thread-guide cause a great loss of time, and are, on the whole, inconvenient manipulations, the more, as they are to be repeated after the completion of each row of meshes. The purpose of

my invention, therefore, is to do away with said drawbacks, and I attain that object by making use of a circular thread-guide having its fulcrum in a horizontal slide and being adapted to be displaced together with said slide. The latter is provided with means for transmitting motion to said circular thread-guide in any position of the same. By making use of this arrangement I may completely dispense with reversing the two sides of the needle, and also with taking the same off one shaft and putting it upon another shaft, as has been necessary in the forms of construction of the machines in question employed up to now.

In order to make my invention more clear, I refer to the accompanying drawings, in which similar letters denote similar parts throughout the different views, and in which—

Figure 1 is a diagrammatical front view of a knitting-machine constructed according to my invention. Fig. 2 is a view similar to Fig. 1, the frame of the machine and the means for operating the sector *p* being left out, and the slide *g*, together with the thread-guide, being in another position or displaced from the left to the right, respectively. Fig. 3 is a plan of the parts shown in Fig. 2. Fig. 4 shows the two end portions of the spiral displaced one against the other in such a manner that the left-hand end portion projects beyond the right-hand one. Figs. 5 and 6 show the coöperation of the two ends of the spiral with the circular thread-guide if the latter is in its right-hand position. Figs. 7 and 8 show the coöperation of the two ends of the spiral with the thread-guide if the latter is in its left-hand position, and Fig. 9 shows the two sides of a piece of a fabric knitted upon my improved machine.

Concerning the means for holding and rotating the spiral I refer to my United States Letters Patent No. 421,516, dated February 2, 1890, and I confine myself in this specification to explain that a winding of each end of the spiral is provided with a series of holes *l*, Fig. 3, into which take correspondingly arranged projections *l'*, provided upon rota-

table boxes  $h$ . The latter are fixed to horizontal shafts  $g$ , that are driven in opposite directions by any suitable means—for instance, such as shown in the United States Letters Patent aforementioned.

The direction of rotation of the spiral or of the two ends  $t t'$ , Figs. 5 to 8, respectively, is changed after the completion of each row of meshes, and simultaneously with said change of rotation the relative position of the two ends of the spiral with regard to each other is also changed. In other words, if the direction of rotation is such that the left-hand end of the spiral drops the meshes and the right-hand end of the spiral therefore takes meshes up, the left-hand end must project beyond the right-hand one, as shown in Fig. 4. If, however, meshes are dropped by the right-hand end of the spiral and are taken up by the left-hand one of the same, then the right-hand end must project beyond the left-hand one, as shown in Fig. 3. The position of the ends of the spiral as shown in Fig. 3 corresponds to Figs. 7 and 8, whereas the position of the spiral ends as shown in Fig. 4 corresponds to Figs. 5 and 6.

The circular thread-guide  $k$ , Figs. 1 to 8, is secured to a short horizontal shaft  $k'$ , extending parallel to the shafts  $g$  aforementioned and having its bearing in a horizontal slide  $g$ , Figs. 1 to 3, held by the guide  $g'$ . The shaft  $k'$  projects beyond the front side of the slide  $g$  and is at said projecting end provided with a cog-wheel  $k^2$ . The latter meshes with a cogged sector  $p$ , attached to the slide  $g$  and connected by means of a link  $p'$  with a crank-arm  $p^2$ , secured to a shaft  $y$ . The latter extends to the rear side of the machine and is caused to oscillate by any suitable means—for instance, such as shown in the United States Letters Patent mentioned. If, therefore, the shaft  $y$  is caused to oscillate, the cogged sector  $p$ , too, will be oscillated by the mediation of the crank  $p^2$  and the link  $p'$ , and the thread-guide  $k$  will thus be caused to reciprocate in one and the other direction by the mediation of the cog-wheel  $k^2$  and the shaft  $k'$ . This will occur in either position of the slide  $g$  or of the thread-guide  $k$ , respectively, as will be clear without any further explanation.

Suppose the parts  $g$  and  $k$  just mentioned be in the position shown in Figs. 1, 3, 7, and 8. The meshes will be dropped by the end  $t'$  of the spiral, and the loops formed out of the thread by carrying this latter through the mesh next to be dropped by said spiral end  $t'$  will be seized by the spiral end  $t$  and turned thus into meshes. I think it well to call special attention to the fact that the point of

the thread-guide  $k$  in carrying the thread through the mesh next to be dropped and in carrying the fresh loop to the spiral end  $t$  does not move from the position shown in Fig. 7 to that shown in Fig. 8, but the direction of motion is exactly the same as the direction of the hands of a clock. The point proper of the thread-guide moves through the lower portion of the circle represented by the circular thread-guide. If, however, the slide  $g$  and the thread-guide  $k$  have been displaced to the right, as shown in Figs. 2, 4, 5, and 6, then the point proper of the thread-guide moves through the upper portion of said circle, and in doing so it receives the meshes dropped by the spiral end  $t$  and carries the loops formed previously thereto by carrying the thread to the mesh next to be dropped to the spiral end  $t'$ .

The fabric produced by the novel arrangement aforescribed shows the same appearance on both sides, as is distinctly to be seen from Fig. 9.

Having thus fully described the nature of this invention, what I desire to secure by Letters Patent of the United States is—

1. In a knitting-machine having a rotatable horseshoe-like spiral for holding and transporting the meshes, and an oscillating thread-guide arranged in front of the ends of said spiral, the combination with said thread-guide, of a slide carrying the latter, and adapted to displace the same from one end to the other end of the spiral, and of means for imparting motion to the said thread-guide in either position of said slide; the thread-guide being circular, for the purpose as described.

2. In a knitting-machine having a rotatable horseshoe-like spiral for holding and transporting the meshes, and an oscillating thread-guide arranged in front of the ends of said spiral, the combination with said thread-guide, of a slide carrying the latter, and adapted to displace the same from one end to the other end of the spiral; the thread-guide being circular and provided with a cog-wheel, and the slide being provided with a cogged sector meshing with said cog-wheel; and means for imparting motion to said sector in either position of said slide, for the purpose as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JOHANN SCHMITT.

Witnesses:

SOPHIE NAGEL,  
WILLIAM H. MADDEN.