

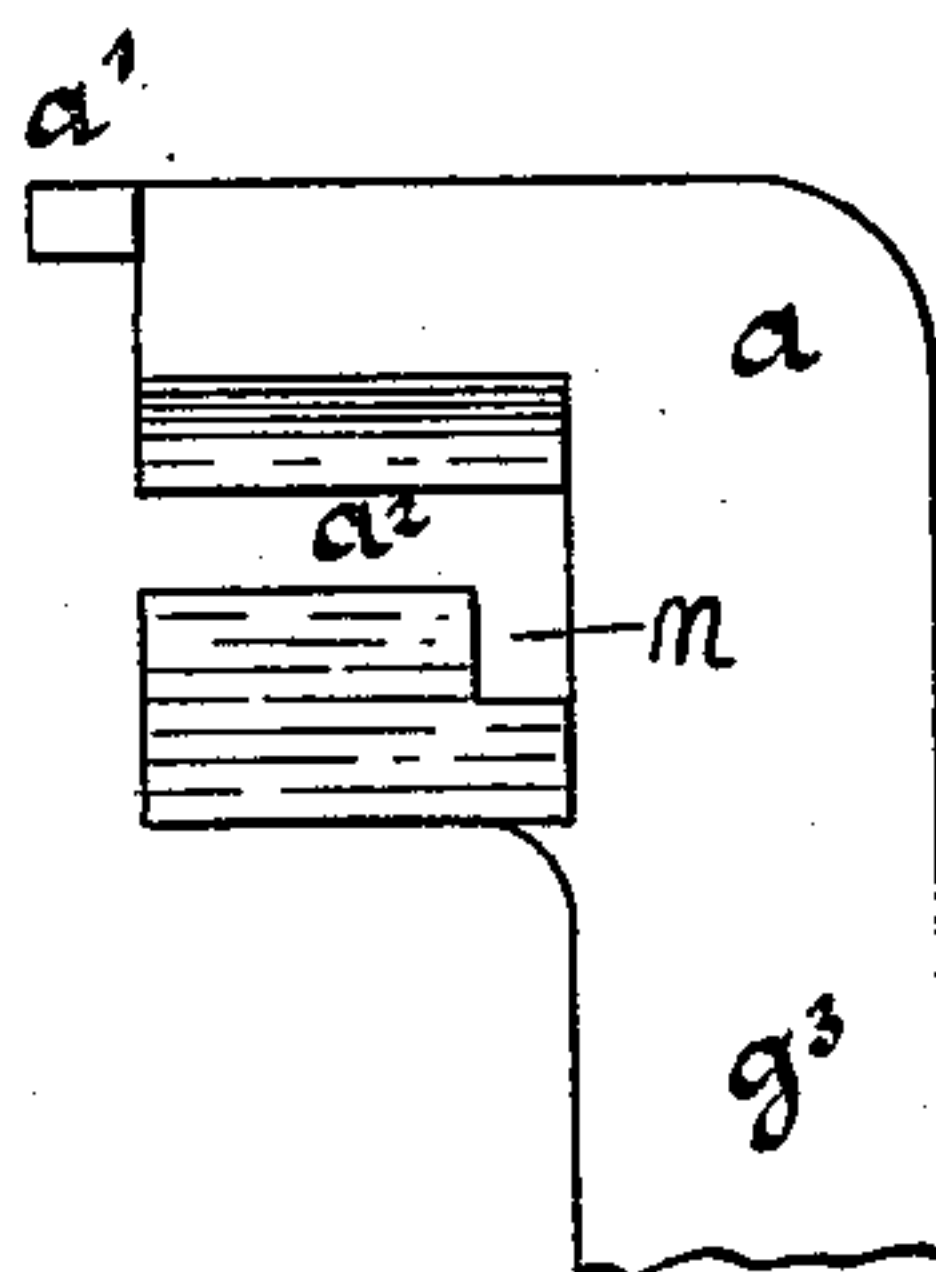
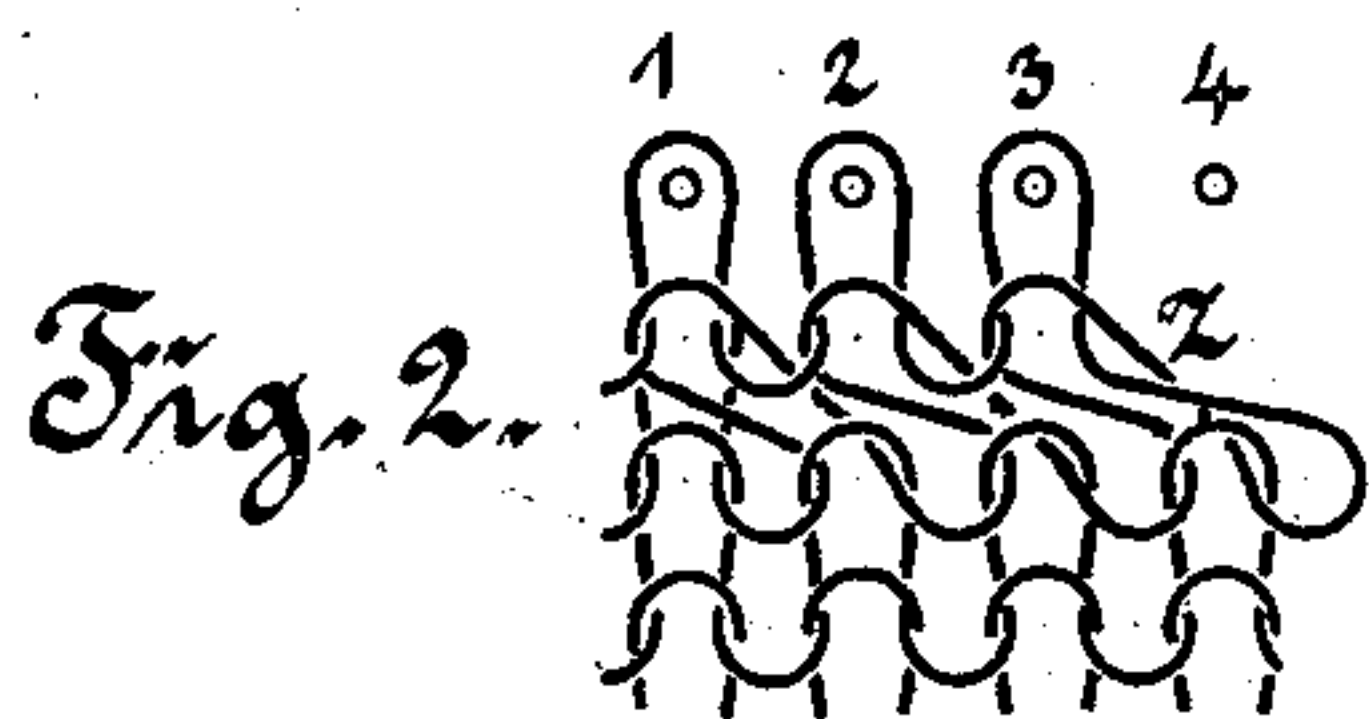
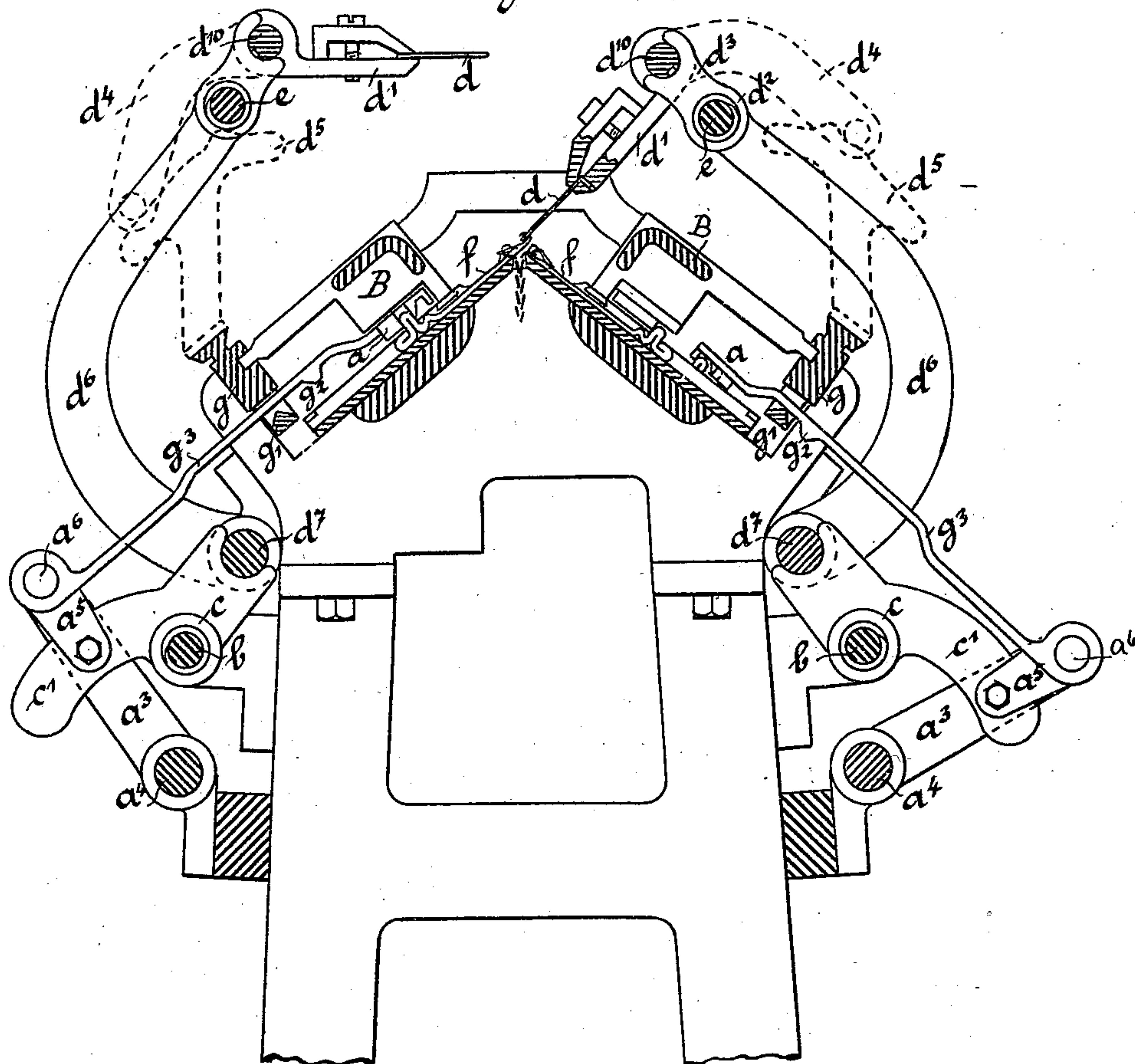
F. H. GRÄNZ.

NARROWING APPARATUS FOR KNITTING MACHINES.

No. 551,629.

Patented Dec. 17, 1895.

Fig. 1.



Witnesses:-

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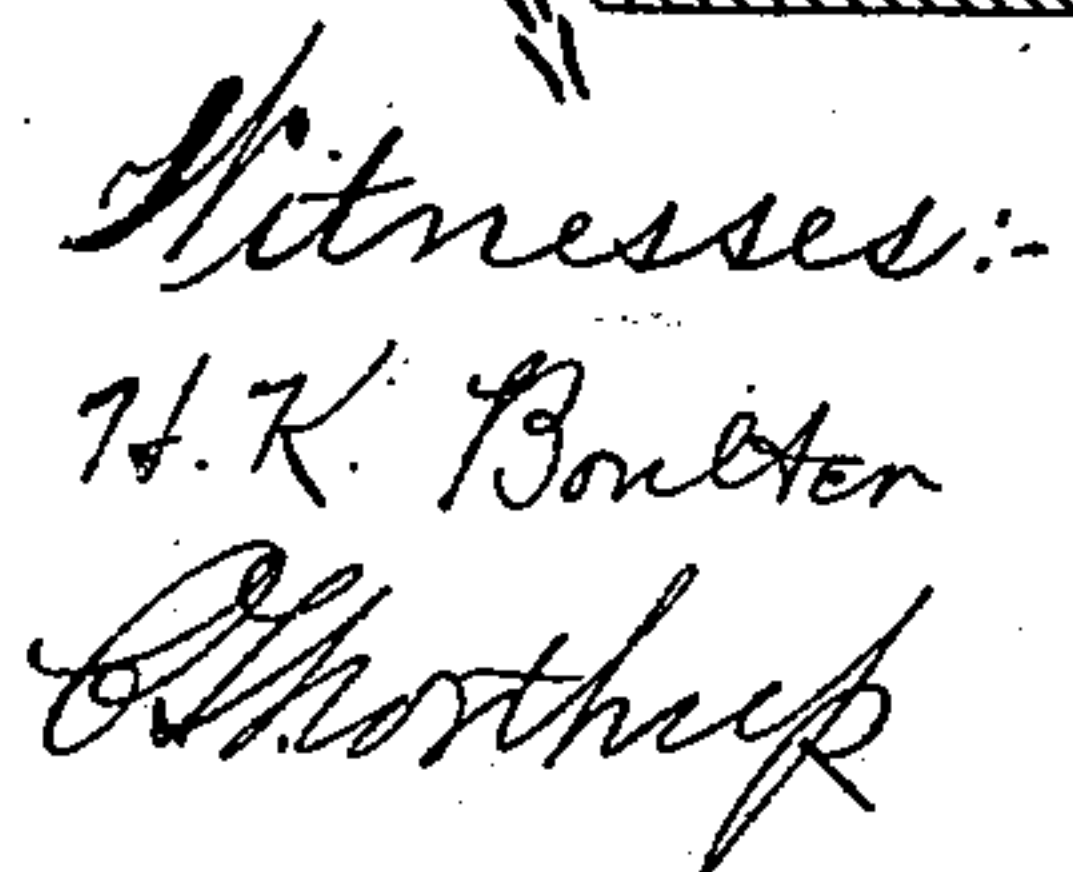
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UNITED STATES PATENT OFFICE.

FRIEDRICH HERMANN GRÄNZ, OF CHEMNITZ, GERMANY, ASSIGNOR TO
FRIEDRICH RABE, OF SAME PLACE.

NARROWING APPARATUS FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 551,629, dated December 17, 1895.

Application filed June 5, 1894. Serial No. 513,579. (No model.) Patented in Switzerland February 5, 1894, No. 8,037; in France February 24, 1894, No. 236,537; in England June 15, 1894, No. 11,626, and in Austria July 25, 1894, No. 44/797.

To all whom it may concern:

Be it known that I, FRIEDRICH HERMANN GRÄNZ, a subject of the King of Saxony, residing at Chemnitz, Saxony, Germany, have
5 invented certain new and useful Improvements in Narrowing Apparatus for Knitting-Machines, (for which Letters Patent have been obtained in Switzerland, dated February 5, 1894, No. 8,037; in France, dated February
10 24, 1894, No. 236,537; in Great Britain, dated June 15, 1894, No. 11,626, and in Austria, dated July 25, 1894, No. 44/797,) of which the following is a specification.

The subject of the present invention is a
15 narrowing apparatus for Lamb's knitting-machine, such as is shown in United States Patents Nos. 50,369, 262,299, and 309,471 and others of a similar character, for the purpose of automatically decreasing or narrowing the
20 width of the knitted goods. For this purpose a number of end stitches are taken off the tumbler-needles by the so-called "covering-points" and are transferred to neighboring tumbler-needles. The covering-points used
25 are similar to the well-known needles with eyes which are used when narrowing by hand, and have, therefore, no groove. They differ from the latter, however, inasmuch as the eye is considerably longer. (See Figures 4
30 to 6.) The eye is prolonged so as to enable the hooks of the tumbler-needles, which cannot all be brought into a perfectly-uniform position during the rapid working of the machine, to be caught and covered without fail.
35 The eye can be made of any desired length, as in the narrowing-machine herein described the covering-points are not required to both draw and push the tumbler-needles, the covering-points as well as the tumbler-needles
40 receiving their narrowing motion independently of each other.

In the accompanying drawings, Fig. 1 is a vertical sectional view of a narrowing apparatus for knitting-machines embodying my
45 invention. Fig. 2 is a detail view of the stitch produced. Fig. 3 is a rear view of a portion of the needle-slide. Figs. 4 to 10 are sectional views illustrating the manner of transferring stitches.

50 Three or more such covering-points d , Fig.

1, are held by a clamp d' , which can be shifted or moved sidewise longitudinally on the shaft d^{10} by means of a groove and spline. This shaft is carried by an arm d^6 , the pivot d^7 of which is acted upon by a cam or eccentric. 55 An arm d^4 is secured to the shaft d^{10} and is adapted to bear against a curved piece or cam d^5 . When the arm d^6 sinks, the covering-points d come into contact with the tumbler-needles. The arm d^6 is also provided
60 with a screw e , the nut d^2 of which is connected with the clamp and effects a step-by-step lateral or sidewise motion of the latter during the transfer of the stitches.

A needle-slide serves to shift or displace the 65 tumbler-needles, one needle-slide working conjointly with each clamp. The needle-slide consists of a plate a , a bottom or rear view of which is shown in Fig. 3, with an angularly-shaped recess a^2 , which catches the heels of 70 the tumbler-needles and is as deep as the number of tumbler-needles, plus one needle, which have to be freed of the stitches, four needles being the number shown in the drawings. This one needle (see 1 in Fig. 4) drops into the 75 notch n at the end of the recess, so that when the needle-slide a rises it is only raised to such a height that its stitch remains on the tumbler of this needle, whereas in the case of the
80 other needles the stitches pass behind the tumblers. This slight raising of the needle is necessary in order to insure the opening of the needle-tumbler so as to enable the stitch to be transferred. When the needle-slide is
85 lowered all the needles that have been caught are drawn down to an equal distance in consequence of the upper straight side of the recess a^2 . Besides the angularly-shaped recess
90 the needle-slide also carries a small projection a' , which extends over a needle lying outside the recess and stops the action of the needle which has been freed from stitches or uncovered by engaging its heel and drawing it down.

The construction of the needle-slides, as set forth in the present specification as well as in 95 the drawings, is for the transfer of the stitch a distance of one needle only. If the stitches are to be transferred a distance of two or more needles the notch n of the recess a^2 of the needle-slide as well as the length of the pro- 100

jection a' , is enlarged to the extent of two or more needle divisions. A cam or eccentric causes the raising and lowering of the needle-slide, and acts upon the shaft a^4 , Fig. 1, upon the arms a^3 of which is mounted a rod or bar a^6 , which is connected to the needle-slides by rods g^3 . When the needle-slide rises a projection g^2 of the rod g^3 bears upon a rail g' , which effects the lifting of the needle-slide from the needle ends. The lateral displacement of the needle-slide is effected by the screw b and screw-nut c , the arm c' of which is connected to the arm a^5 of the needle-slide bar or rod g^3 . The needle-slide therefore performs a triple movement. It is moved up and down in the direction of the needles, it is shifted or moved sidewise, and is lifted from the said needles.

The operation is as follows: The slide-motion B (comprising the knitting-cams usually found in knitting-machines of this type and whose function is well understood by persons skilled in this art) having been first thrown out of gear and the cam or eccentric shaft for narrowing into gear, the tumbler-needles f are moved upward by the needle-slides a , Fig. 4, so that on the first needle to the left the stitch still remains on the needle-tumbler, whereas the rest of the stitches have been transferred to the back of the tumblers. The covering-points d have in the meantime sunk somewhat onto the tumbler-needles. The needle-slides a and covering-points d then descend, but the needle-slide draws the tumbler-needles f down somewhat more rapidly than the covering-points d , so that the hooks descend to the bottoms of the eyes of the points, as shown in Fig. 5. The tumblers are closed by the stitches. It is only the tumbler of the first needle, from which the stitch is not to be removed at this time, that remains open. The needle-slide a draws the tumbler-needles down farther still, whereby the covering-points are also caused to follow and the stitches are transferred to the covering-points, as shown in Fig. 6. The needle-slide a and therefore also the tumbler-needles f stop. The covering-points d , however, move farther downward and are at the same time lifted off the tumbler-needles f , Fig. 7. The lateral displacement of the covering-points to the extent of one needle now takes place and the stitches, as shown at Z in Fig. 2, now occupy a slanting position. The covering-points d

are again depressed, being at the same time moved toward the tumbler-needles and thereby brought into contact with the latter, as shown in Fig. 8. The needle-slide now begins to ascend, which causes the stitches to be transferred to the tumbler-needles lying beneath the points. When the transfer or uncovering of the stitches has been effected, the needle-slide a moves somewhat quicker upward than the covering-points d , so that the needle-hooks of the tumbler-needles are freed and the covering-points can be taken off or lifted, as shown in Fig. 9. When the covering-points return, the needle-slide moves downward. When the tumbler-needles 1 2 3, Fig. 10, have been brought into their operative position, the needle-slide a is somewhat lifted by the cams $g' g^2$ from the needle-bed, so that the needle-heels are released. The needle-slide descends still farther and again rests upon the needle-bed. The projection a' of the needle-slide now engages the heel of the freed needle 4, Fig. 10, and draws it out of the reach of the lock. At the same time the needle-slide a has moved so far that, as shown at the right in Fig. 1, it cannot again come into contact with the lock. At the next half-turn of the cam or eccentric shaft the narrowing on the other side of the knitting-machine takes place. The pitch-chain has in the meanwhile been shifted so that the slide motion (hereinbefore referred to) is thrown into gear again and the narrowing apparatus thrown out of gear.

The stitch formed is shown in Fig. 2, from which it can be seen that the knitted article is narrowed to the extent of one stitch and that needle 4 is out of action.

I claim—

In an automatic narrowing apparatus for knitting machines of the described type, the combination of the covering points and tumbler-needles, of needle-slides adapted to operate as described, and comprising a plate having a recess and a notch, and a small projection, and for the purpose specified.

In testimony whereof I have hereto set my hand in the presence of the two subscribing witnesses.

FRIEDRICH HERMANN GRÄNZ.

Witnesses:

JOH. PETER VITS,
MAX EUGEN HERRMANN.