May 11, 1937. M. NEBEL 2,080,377

CIRCULAR KNITTING MACHINE

Filed May 23, 1934 4 Sheets-Sheet 1

Fig. 1

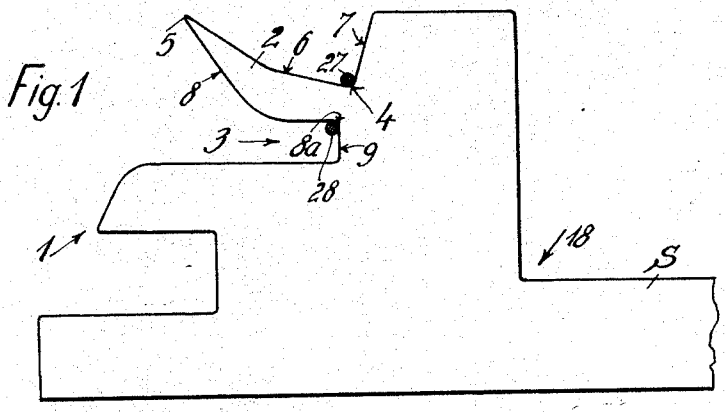


Fig. 2

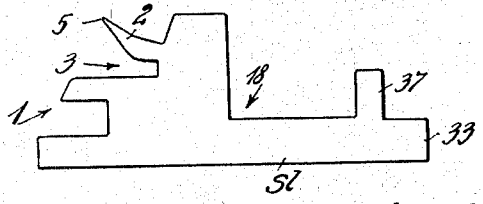


Fig. 3

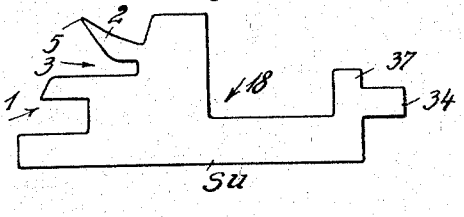


Fig. 4

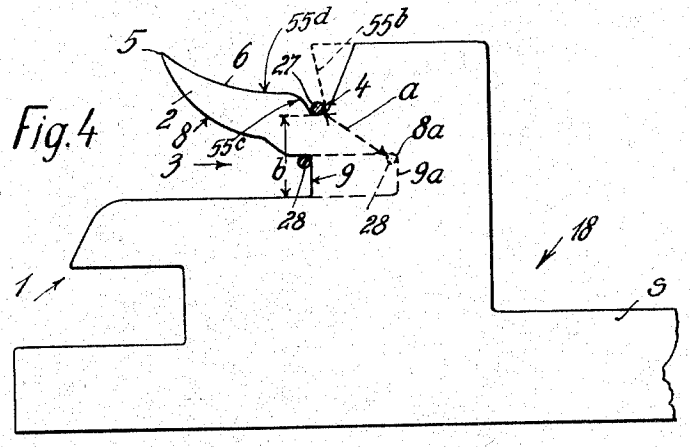
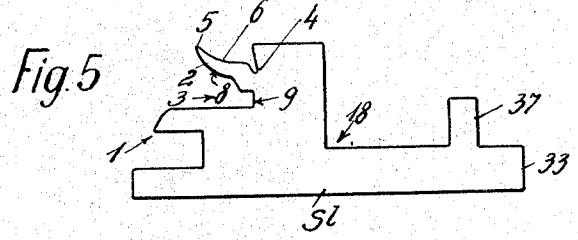


Fig. 5



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CIRCULAR KNITTING MACHINE

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Fig. 6

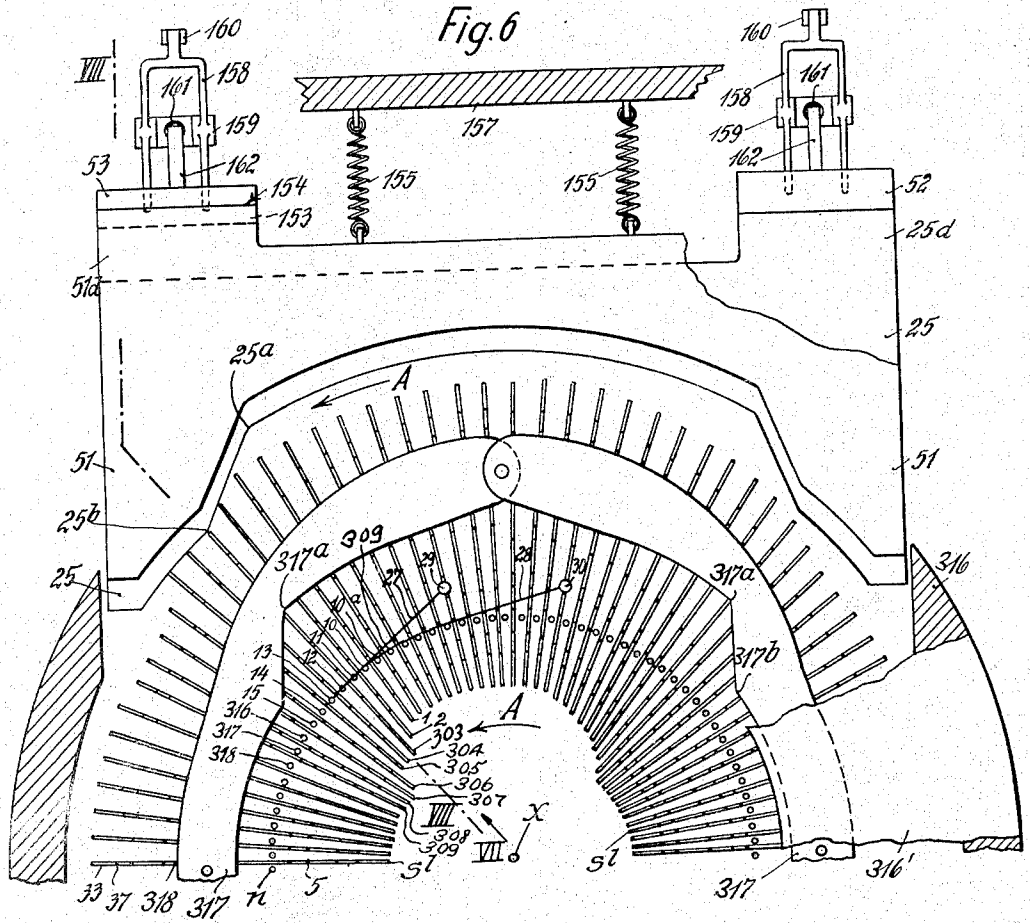


Fig. 8.

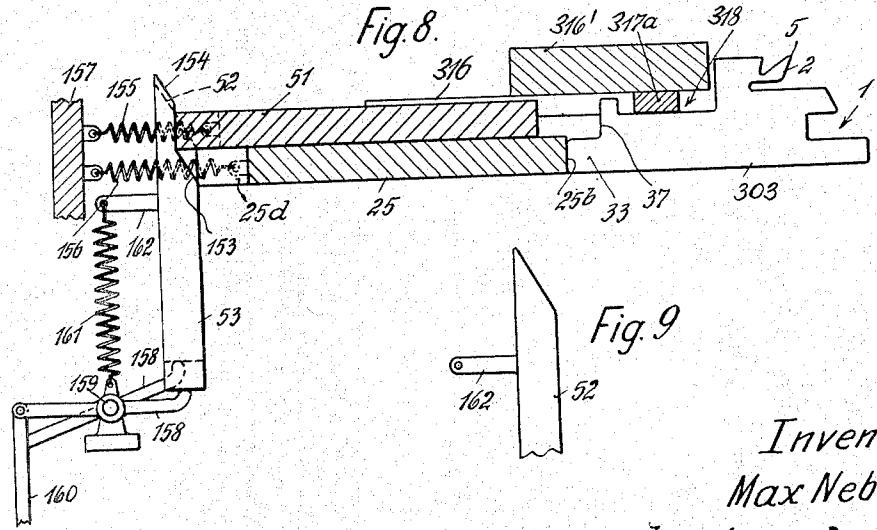


Fig. 9

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CIRCULAR KNITTING MACHINE

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Fig. 7

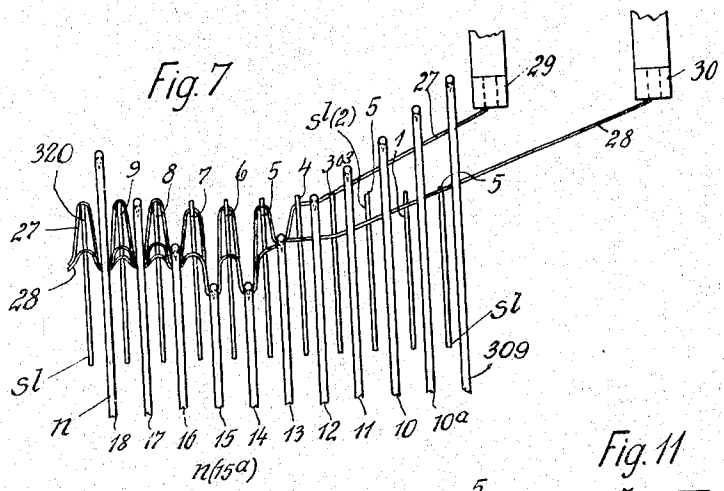


Fig. 10

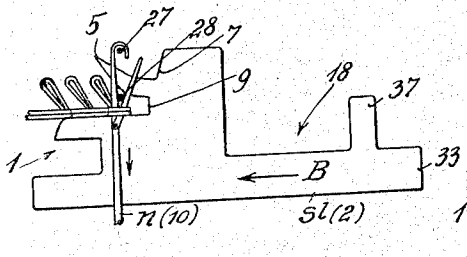


Fig. 11

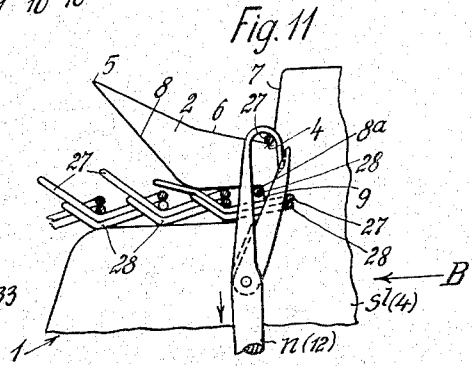


Fig. 12

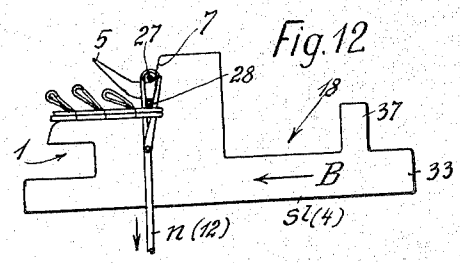


Fig. 13

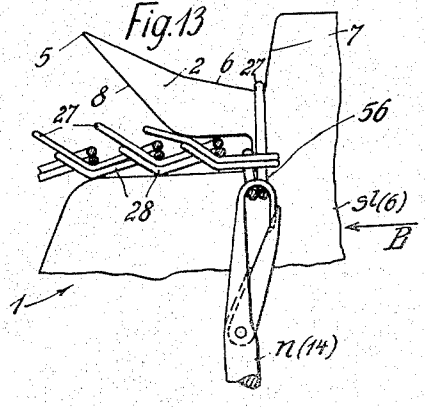


Fig. 14

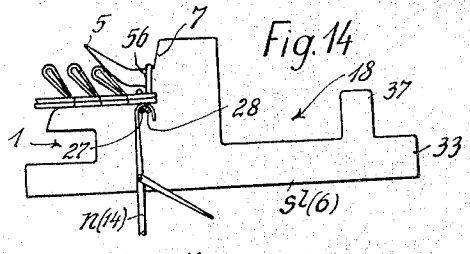
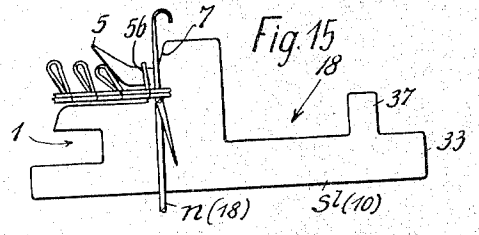


Fig. 15



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Fig. 16

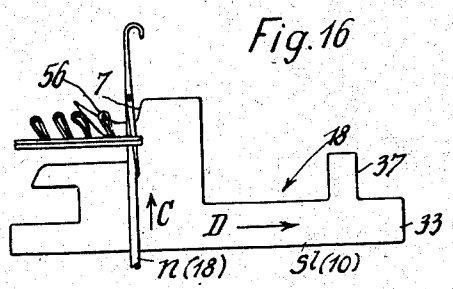


Fig. 17

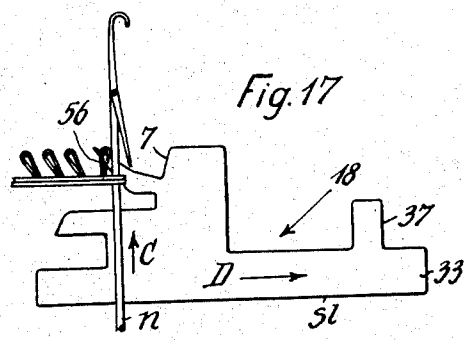


Fig. 18

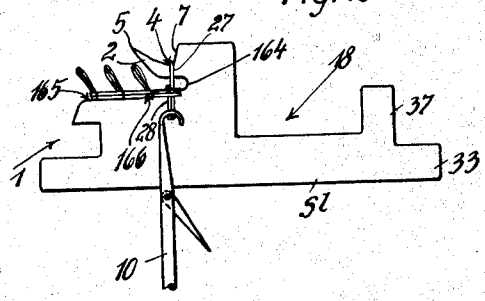


Fig. 19

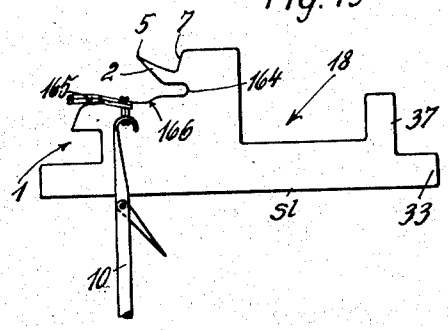


Fig. 20

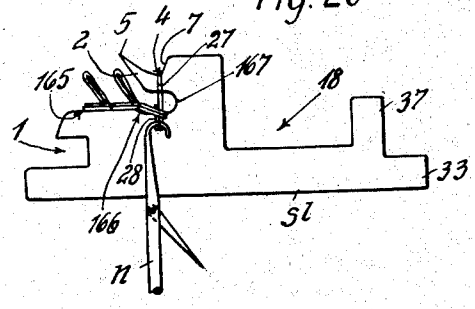
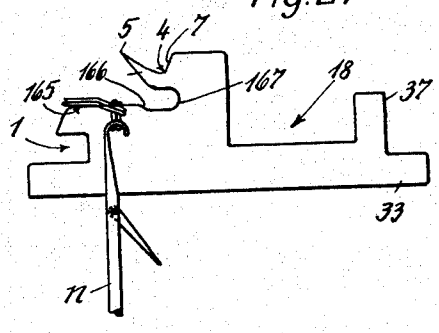


Fig. 21



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Patented May 11, 1937

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UNITED STATES PATENT OFFICE

2,080,377

CIRCULAR KNITTING MACHINE

Max Nebel, Chemnitz, Germany

Application May 23, 1934, Serial No. 727,071
In Germany May 27, 1933

10 Claims. (Cl. 66—93)

My invention relates to circular knitting machines, and more particularly to the sinkers of such machines.

It is an object of my invention to provide an improved sinker for a machine of the kind described for knitting loop-plush fabric. To this end, I arrange the usual set of needles, and sinker allotted to each needle with a nib directed toward the front side of the allotted needle, i. e., that side of the needle where the latch is provided, and I arrange a plush throat at the rear end of the nib, and a point at the front end of the nib which is at a higher level than the plush throat. A ground-thread throat is positioned substantially vertically below the plush throat. The ground-thread throat need not be in exactly vertical position below the plush throat but is preferably arranged ahead of the plush throat.

In a sinker of this type, the lower end of the throat for the plush thread is at a lower level than the point of the nib which in turn is positioned at a higher level than the throat for the ground thread, and this arrangement renders the sinker particularly suitable for separating the plush and ground threads when the sinker moves into sinking position. The plush throat above its lower end is vertical or substantially vertical and preferably inclined to the rear, and serves for reliably placing the plush thread at a lower level than the point of the nib.

The lower end of the plush throat, apart from its position with respect to the level of the sinker point, as described, and which position determines the length of the plush loops, should also, in order to accomplish reliable plating of the plush thread on the ground fabric, occupy a definite position with respect to the lower end of the plush throat horizontally, as described. In a sinker of this kind, the ground thread, during sinking, is held between the shank of the needle and the rear edge of the ground-thread throat, so that it cannot move in the, normally horizontal, direction in which the sinkers move, and therefore the ground thread may be relied on to be placed below the hook of the corresponding needle in front of the plush thread. This function is performed under the most favorable conditions if the rear edge of the ground-thread throat is slightly ahead of the plush throat.

Preferably, the plush throat is inclined to the rear as this facilitates the engagement of the plush thread.

It is another object of my invention to provide a sinker for forming plush loops of two distinct lengths. To this end, I provide a sinker in which the upper edge of the nib is stepped so that, in addition to the plush throat, a web-holding edge or step is formed in the upper edge of the nib which is at a higher level than the plush throat. In order to prevent interference with the free movement of the plush loop off the point of nib, the section of the nib is so determined by suitable arrangement of the upper and lower edges of the nib that it is a maximum at the rear end or root of the nib, as will be described.

It is still another object of my invention to provide a sinker for knitting certain portions of the fabric more closely or more loosely than others. To this end, I provide a web-holding edge on the sinker which may have a depression, and arrange the ground-thread throat at a higher or lower level than the web-holding edge, in conformity with the required closeness of knitting.

It is still another object of my invention to provide an improved knitting machine for operating the sinkers according to my invention. To this end, I provide a lock with an upper and a lower cam for cooperation with the butts of the sinkers, and means for moving the cams into active position with respect to the sinkers. The individual sinkers are equipped with butts for cooperation with one or the other cam, so that my machine requires two kinds of sinkers, one for cooperation with the upper, and one for cooperation with the lower cam.

In the drawings affixed to this specification and forming part thereof various kinds of sinkers embodying my invention, and machines in which the sinkers are used, are illustrated diagrammatically by way of example.

In the drawings

Fig. 1 is an elevation, drawn to a magnified scale of the beak end of a sinker embodying my invention and equipped with a plain upper and lower edge on its nib,

Figs. 2 and 3 show a complete sinker, at a smaller scale, designed as illustrated in Fig. 1, and equipped, respectively, with a butt for cooperation with the lower and with the upper cam referred to,

Fig. 4 is an elevation, drawn to the scale of Fig. 1, of the beak end of a sinker according to my invention, with a stepped upper edge on its nib,

Fig. 5 shows a complete sinker as illustrated in Fig. 4, drawn to the scale of Figs. 2 and 3 and equipped for cooperation with the lower cam,

Fig. 6 is a partly sectional plan view of a circular knitting machine equipped with sinkers as illustrated in Figs. 1 to 3;

Fig. 7 shows eleven sinkers and needles of this machine, flattened out and viewed in the direction of arrow VII in Fig. 6,

Fig. 8 is a section on the line VIII—VIII in Fig. 6,

Fig. 9 is an elevation showing the upper end of a slide for operating the lower cam referred to, its lower end being broken off,

Figs. 10 to 17 are diagrams, partly drawn to the scale of Fig. 1, and partly drawn to the scale of Figs. 2 and 3, illustrating the operation of the sinkers shown in Figs. 1, 2 and 3, and

Figs. 18 to 21 are diagrams illustrating sinkers of the kind shown in Figs. 1, 2 and 3, equipped with means for obtaining fabrics of various degrees of closeness.

Referring now to the drawings, and first to Figs. 1, 2 and 3, the machine is equipped with a lock having two cams for cooperation with its knocking-over sinkers, as will be described, and therefore it requires sinkers of two kinds for cooperation with the individual cams of the lock. s^l are the sinkers for cooperation with the lower, and s^u are the sinkers for cooperation with the upper cam.

Referring now to Figs. 2 and 3, both kinds of sinkers, s^l and s^u, are notched at **18** for the reception of a cam ring, as will also be described. The rear ends **37** of both kinds are vertical, and in the sinkers s^l, for cooperation with the lower cam of the lock, the lower edge of the butt **33** is flush with the lower edge of the sinker, while in the sinkers s^u, for cooperation with the upper cam, the butt **34** is placed at a higher level.

The beaks of both kinds of sinkers are similar and will now be described with reference to Fig. 1 for a sinker *s* which may be designed for cooperation with the lower or upper cam of the lock at its rear end. **2** is a nib above the notch **3** at whose rear end is the ground-thread or casting-off throat **9**, and whose lower edge is the web-holding edge. The pointed end **5** of the nib **2** is at a higher level than the lower end **4** of the plush throat **7** for the plush-loop thread **27**. The upper edge **6** of the nib **2** extends in downward direction from the point **5** toward the lower end **4** of the plush throat **7** in an unbroken curve but may be stepped as will be described with reference to Figure 4. The gradient of the edge **6** toward the end **4** facilitates the introduction of the plush thread **27** from above. However, the plush throat may be inclined in forward direction, as will also be described with reference to Fig. 4. The lower edge **8** of the nib **2** is an unbroken curve, like its upper edge **6**, and extends from the point **5** of the nib **2** down to the upper end 8^a of the ground-thread throat **9** where the ground thread **28** is placed. The ground-thread throat **9** is positioned substantially vertically below the lower end **4** of the plush throat **7**. "Substantially vertically" means that the ground-thread throat need not be exactly vertically below the lower end **4** of the plush throat, and preferably it is slightly ahead thereof, as shown.

A modified sinker will now be described with reference to Fig. 4. The nib **2**, with its point **5**, is arranged above the notch **3** as described but its upper and lower edges **6** and **8** are not unbroken curves, as shown in Figs. 1 to 3, but the upper edge **8** has a substantially horizontal step 55^d ahead of the lower end **4** of the plush throat and a gradient 55^c connecting the horizontal portion 55^d to the lower end **4**. The plush throat 55^b is inclined in forward direction and the upper end of the ground-thread throat **9** is arranged at a considerable distance forwardly of the lower end **4** of the plush throat 55^b. The lower edge **8** of the nib has a gradient which is substantially parallel to the gradient 55^c of the upper edge. The two stages at 55^d and at **4** permit the sinking of plush loops of various lengths. The condition which is to be fulfilled in order that no tension is exerted on a loop which has been sunk at the lowest point **4** of the upper edge **6**, when it slides on the step 55^d which is at a higher level than the point **4**, is that the cross-sections of the nib should decrease from **4** toward its point **5**, or, in other words, that the cross-section at the root of the nib (at **4**) should be a maximum.

This sinker may be modified as shown in dotted lines by placing the ground-thread throat **9** further to the rear, at 9^a, and in this modification the distance *a* between the throats **4** and 8^a must be equal to the vertical distance *b* of throat **4** from the web-holding edge of notch **3**.

Fig. 5 shows a complete sinker of the type illustrated in Fig. 4, for cooperation with the lower cam of the lock. A sinker for the upper cam has not been illustrated, it being understood that the only distinction of this sinker is the position of its butt at **34**.

Referring now to Figs. 6 to 9, these illustrate a portion of a circular knitting machine, only those parts having been illustrated, which must be shown in order to enable a person skilled in the art to understand my invention. Thus, the sinker ring in whose tricks the sinkers s^l and s^u are guided, and the needle bed for the needles *n*, have not been shown.

316 is a lock ring from which a flange **316'** extends inwardly toward the axis *x* of the machine. **317** is a cam ring which, as shown in Fig. 6, comprises several members connected by pins for adjustment and is secured to the lower face of the flange **316'**, as shown in Fig. 8. The cam ring has camming portions, such as 317^a and 317^b, for engaging in the slots **318** of the sinkers.

25 and **51** are, respectively, the lower and upper cams, already referred to, of the lock. In the present instance, only sinkers s^l for cooperation with the lower cam **25** have been shown in the machine, and so the upper cam **51** is idle and only the sinkers s^l, with their butts **33**, are operated by the lower cam **25** for forming plush loops as will be described. Similarly, only sinkers s^u might be inserted and their butts **34** be operated by the upper cam **51**. As a rule, sinkers s^l and s^u are inserted and operated as required for the desired pattern, by moving the lower cam **25**, or the upper cam **51**, into active position. Both kinds of sinkers, s^l and s^u, may also be operated at the same time by a third cam, not shown, if required for a given pattern.

The cam **25** has camming portions, such as 25^a and 25^b, for engaging the butts **33** of the sinkers s^l. Both cams are mounted in suitable guides, not shown, and placed one upon the other for free relative displacement. Lugs 25^d and 51^d project, respectively, from the outer ends of the cams **25** and **51** at opposite sides thereof. A slide **53**, with a pair of camming faces **153** and **154** at its upper end, is mounted to slide in the frame of the machine for cooperation with the lug 51^d of cam **51**, and a similar slide **52**, with a single camming face at its upper end, is mounted for cooperation with the lug 25^d of cam **25**. Two springs **155** are provided for pulling the lug 51^d of cam **51** against its slide **53**, and similar springs **156** are provided for pulling the lug 25^d of cam

25 against the slide 52. The free ends of the springs are attached to a suitable bracket 157.

Any suitable means may be used for operating the slides 52 and 53. In the example illustrated, fork-shaped rocking levers 158 fulcrumed at 159 are provided for this purpose, and operated by connecting rods 160 from any suitable mechanism, not shown. The free ends of the rocking levers 158 bear against the lower ends of the slides 52 and 53, and springs 161 are attached to arms 162 on the slides at one end, and to the bearings 159 of levers 158 at the other end. In the position illustrated in Figs. 6 and 8, the slide 52 has been raised by its lever 158, and its cam face has pushed the lower cam 25 inwardly for cooperation with sinkers s^1.

Certain sinkers and needles have been selected for describing their cooperation with each other and with the lower cam 25 which has been moved into active position by slide 52, and these sinkers and needles have been marked with reference numerals, as indicated at the left in Fig. 6. The section line VIII—VIII in Fig. 6 extends through the sinker s^1(303) which is between the needles n(11) and n(12). As the needles and sinkers rotate about the axis x in the direction of arrow A, while the cam 25 and the cam ring 17 are stationary, the sinker s^1(303) is just going to run off the camming portion 25^a—25^b of cam 25 at the end 25^b and to run onto the subsequent camming portion. The camming ring 317 does not influence the sinker s^1(303) as its width at the camming portion 317^a is less than the width of the slot 18 in the sinker.

Referring to Fig. 7, the needle n(309) which is the first one in the direction of arrow A, is in its topmost position. The subsequent needles are lowered into their lowermost positions, n(14) and n(15), and then raised again, beginning with $n(15^a)$. The plush-loop thread 27 and the ground thread 28 which issue from the thread guides 29 and 30, respectively, are so far apart at the point where the sinker s^1(2) is positioned, that the point 5 at the end of its nib 2 enters between the threads, as shown in Fig. 10. The nib which is directed toward the front or latch side of the needle, and in the position illustrated in Fig. 10 has moved beyond the back of the needle with its point 5, holds the plush-loop thread 27 which is in the hook of needle n(10), separate from the ground thread 28 which is in the ground-thread throat 3. The needle descends while the sinker s^1(2) moves toward the left, as indicated by the arrow B. The plush-loop thread 27 is guided toward the lower end 4 of the plush throat 7 by the upper edge 6 of the nib 2.

An intermediate position is shown in Figs. 11 and 12, Fig. 11 showing only the upper portions of the sinker s^1(4) and the needle n(12), drawn to a larger scale than Fig. 12. Here, the plush-loop thread 27 is at the lower end 4 of the plush throat 7, and the ground thread 28 is at the upper end 8^a of the ground-thread throat 9. The latch of the needle has been closed and the back of the needle shank engages the ground thread 28 in the throat 8^a. Fig. 12 shows the same operation. The needle still descends and the sinker still moves in the direction of arrow B, toward the left.

Figs. 13 and 14 show the sinking operation, in a manner similar to the showing of Figs. 11 and 12, for the needle n(14) and the sinker s^1(6).

Fig. 15 shows the casting-off. This operation is performed under particularly favorable conditions on account of the configuration of the upper edge 6 of nib 2. This configuration prevents the plush loop 56 from sliding upwards on the edge, and becoming slack.

The ground thread 28 is caught between the shank of the needle n and the throat 9, as best seen in Figs. 11 and 13, so that the ground thread 28 is locked against horizontal movement, like the plush-loop thread 27 in its throat 4, and, in the sinking position, Fig. 13, the ground thread 28 is in front of the plush-loop thread 27. It does not move from this position until the sinking movement has been finished, and consequently also during the subsequent casting-off movement. With a sinker according to my invention, the plating of plush goods is effected under absolutely reliable conditions, and this was impracticable heretofore, because the ground thread 28 had a certain freedom of movement in the space between the shank and the latch of the needle so that frequently the ground thread 28 swings in horizontal direction, and, before sinking, is placed at the rear of the, already sunk, plush-loop thread 27, instead of being in front of such thread.

After the sinking and casting-off operations have been performed, the sinkers s^1 move to the rear, as indicated by arrow D in Fig. 16 for the sinker s^1(10), and the needle n(18) moves upwards for a short distance, as indicated by arrow C, so that the plush loop 56 is no longer held taut in the plush throat 4. This movement of the sinkers and needles is continued until, after about three quarters of a revolution of the machine, the position Fig. 17 is attained. During the movement toward the final position, the plush loop 56 which is on the needle n, slides along the upper edge 6 of nib 2 and is raised at the same time, because the sinker moves in direction D. The loop becomes slacker and slacker while ascending the edge of the nib, and finally slides off the nib 5 unobstructed, when the sinker has moved far enough to the rear. In Fig. 17, the point 5 of the nib is just about to be extracted from the loop 56.

If the ground-thread throat 9 is at 9*a*, as shown in dotted lines in Fig. 4, and the distances *a* and *b* are equal, as described, *a* being the length of the plush loop 56, the tension of the loop 56 is equal to the tension of the ground thread.

If the upper edge 6 is stepped, as also shown in Fig. 4, in order to obtain plush loops 56 of various lengths (stepped edges are old in the art) the vertical cross-section of the nib 2 at the lowermost step 4 must be the largest cross-section of the nib, in order not to exert a pull on a plush loop 56 which has been formed at 4, when the loop slides along the upper edge 6 of nib 2 and the step 55^d. It will appear from Fig. 4 that the vertical sections of the nib from 4 to 5 are such that the distance from the upper edge 6 to the lower edge 8 decreases from 4 to 5.

A plush-loop throat 55^b which is inclined in forward direction, as shown, may be preferable to the rearwardly inclined throat 7, as by it the thread is positively placed below the nib, the operation of casting-off is performed reliably, and the plated goods obtained are of good quality.

Sinkers according to my invention may be designed for varying the closeness of the fabric which is knitted on a circular machine. It is known that in circular knitting machines equipped with sinkers of the usual type, it is impossible to knit a given portion of a course of loops more closely or more loosely than its other

portion. This drawback is particularly difficult if it is desired to knit certain courses with, and other courses without, plush loops. For instance, assume that in a two-threaded fabric the second thread is knitted into plush loops for splicing certain portions of the fabric, for instance, the sole of a stocking, without knitting an extra splicing thread into this portion, the plush-looped portion of the fabric becomes stronger but at the same time the structure of its ground-thread loops becomes more loose than in a two-threaded plain fabric, without plush-loops, and the plush becomes too thin. Therefore, in order to impart to the fabric, and particularly to its plush-looped portion, the required strength, the machine must be adjusted for closer knitting, but this involves the drawback that, if the ground-thread structure of the plush-looped portion is close enough, the portion without plush loops becomes too close. If a thinner thread is used for the plush-looped portion than for the plain portion without the plush loops, the plush-looped portion must be knitted more closely still than would be required if, as assumed above, the threads for both portions are of equal thickness. In such cases, the drawbacks of existing circular knitting machines are particularly apparent.

Conversely, it may occur that a single thread, or several threads, are used for the plush loops which thread, or threads, is so thick that the ground fabric in the plush-looped portion must be knitted more loosely than the plain portion without the plush loops, in order that the splicing by the plush loops does not become too hard, and the too taut knitting does not cause undesirable consequences during the formation of the loops. This operation is also impracticable in existing circular knitting machines, and particularly, it cannot be performed if only a portion of the courses is to be knitted with plush loops.

It is another object of my invention to eliminate the aforesaid drawbacks. The problem is, in fabrics knitted on circular knitting machines, to knit more closely or more loosely, as may be required, the ground fabric of the portion which has plush loops, than the plain portion without the plush loops, in such manner that the length of the plush loops is the same for the more closely and for the more loosely knitted ground fabric of the plush-looped portion. I solve this problem by sinking the loops of the ground fabric for the plush-looped portion shorter than for the plain fabric, if the structure of the ground fabric for the plush-looped portion is to be closer than for the plain portion without the plush loops; and by sinking the loops of the ground fabric for the plush-looped portion longer than for the plain fabric, if the structure of the ground fabric for the plush-looped portion is to be looser than for the plain portion without the plush loops.

In order to obtain uniform length of the plush loops in both cases, the position of the plush-loop throat 7 is the same as to its level with respect to the needles, while the position of the ground-thread throat 8^a with respect to the plush-loop throat 7 is varied as required for closer or looser knitting of the plush-looped portion than the plain portion without the plush loops, the ground-thread throat being positioned at a higher level for longer, and at a lower level for shorter, ground-thread loops in the plush-looped portion.

I suggest to solve this problem by providing sinkers in which the web-holding edge for the ground thread is arranged at two distinct levels, the front portion being arranged at the normal level with respect to the hooks of the needles for sinking normal plain fabric, at normal closeness, while below the plush throat 7 where the plush loops are sunk, the web-holding edge is arranged at a level above or below its front portion. The distance at which the last-mentioned portion of the web-holding edge is above or below the front portion, corresponds to the knitting of the ground-thread loops in the plush-looped portion of the fabric longer or shorter than the loops in the other portions of the ground fabric.

Referring now to the drawings, and first to Figs. 18 and 19, this sinker which has been shown as a sinker s^l for cooperation with the lower cam 25, but may obviously be a sinker s^u for cooperation with the upper cam 51 as well, serves for knitting the ground fabric more loosely for the plush-looped portions than for the plain portions, and therefore its ground-thread throat 164 is arranged at a higher level than the front portion 165 of the web-holding edge.

It is known that for knitting fabric with plush loops the sinkers are advanced earlier and for a longer distance with respect to the needles n than for knitting plain fabric. Fig. 18 shows the position of the sinker in which plush loops are knitted. In this position, the point where the ground thread 28 is sunk by the needle n, is just below the plush throat 4. At this point, the web-holding edge is raised to form the ground-thread throat 164 at a higher level than the front portion 165.

Fig. 19 shows the position of the sinker for knitting plain fabric, without plush loops. For this operation the sinker remains in its initial position, and the point where the needle n sinks the ground thread, is now on the web-holding edge, at some distance to the rear from its front portion 165, where a depression or step is provided at 166. The loops of the ground thread 28 are longer in Fig. 18 than in Fig. 19.

Figs. 20 and 21 show the same positions of the sinker as in Figs. 18 and 19, but for knitting a fabric whose ground fabric is knitted more closely in the portions having plush loops, than in the plain portions. In this sinker, the ground-thread throat 167 is arranged at a lower level than the front portion 165 of the web-holding edge. The loops of the ground thread 28 are shorter in Fig. 20 than in Fig. 21.

It is not necessary to adjust the machine for closer or looser knitting while knitting a course, all that is required being to use sinkers with a high-level ground-thread throat 164 for a loose ground fabric in the plush-looped portions, and to use sinkers with a low-level throat 167 for a close ground fabric in such portions.

Sinkers of the kind described may also be used for knitting a portion, or portions, of a course more closely, or more loosely, than its other portion, or portions, without knitting plush loops in the course. In this case, the sinkers may be without the plush throat 7 and only equipped with the ground-thread throat 164 or 167 at a lower or higher level than the front portion 165 of the web-holding edge.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described for obvious modifications will occur to a person, skilled in the art.

In the claims affixed to this specification no selection of any particular modification of the invention is intended to the exclusion of other modifications thereof and the right to subsequently make claim to any modification not covered by these claims is expressly reserved.

I claim:

1. In a circular knitting machine, a set of needles, a sinker allotted to each needle for knitting loop-plush fabric comprising a nib directed toward the front side of the allotted needle, a plush throat at the rear end of the nib, a point at the front end of said nib which is at a higher level than said plush throat, a web-holding edge, and a ground-thread throat positioned substantially vertically below the lower end of said plush throat at the rear end of said web-holding edge, the bottom edge of said ground thread throat being arranged to act as the sinking edge for the ground threads when these threads are sunk in the axial direction of said needles.

2. In a circular knitting machine, a set of needles, a sinker allotted to each needle for knitting loop-plush fabric comprising a nib, a plush throat at the rear end of the nib, a point at the front end of said nib which is at a higher level than said plush throat, a web-holding edge, and a ground-thread throat positioned substantially vertically below but ahead of the lower end of said plush throat at the rear end of said web-holding edge, the bottom edge of said ground thread throat being arranged to act as the sinking edge for the ground threads when these threads are sunk in the axial direction of said needles.

3. In a circular knitting machine, a set of needles, a sinker allotted to each needle for knitting loop-plush fabric comprising a nib directed toward the front side of the allotted needle, a rearwardly inclined plush throat at the rear end of the nib, a point at the front end of said nib which is at a higher level than said plush throat, a web-holding edge, and a ground-thread throat positioned substantially vertically below the lower end of said plush throat at the rear end of said web-holding edge, the bottom edge of said ground thread throat being arranged to act as the sinking edge for the ground threads when these threads are sunk in the axial direction of said needles.

4. In a circular knitting machine, a set of needles, a sinker allotted to each needle for knitting loop-plush fabric comprising a nib directed toward the front side of the allotted needle, a plush throat at the rear end of the nib, a point at the front end of said nib which is at a higher level than said plush throat, an upper edge on said nib which extends down to said plush throat from the point of the nib at an unbroken curve, a web holding edge, and a ground-thread throat positioned substantially vertically below the lower end of said plush throat at the rear end of said web-holding edge, the bottom edge of said ground thread throat being arranged to act as the sinking edge for the ground threads when these threads are sunk in the axial direction of said needles.

5. In a circular knitting machine, a set of needles, a sinker allotted to each needle for knitting loop-plush fabric comprising a nib directed toward the front side of the allotted needle, a plush throat at the rear end of the nib, a point at the front end of said nib which is at a higher level than said plush throat, an upper edge on said nib which at its lower end is at a higher level than the lower end of said plush throat, an elevated step in said edge intermediate said point and said plush throat, a web-holding edge, and a ground-thread throat positioned substantially vertically below the lower end of said plush throat at the rear end of said web-holding edge, the bottom edge of said ground thread throat being arranged to act as the sinking edge for the ground threads when these threads are sunk in the axial direction of said needles.

6. In a circular knitting machine, a set of needles, a sinker allotted to each needle for knitting loop-plush fabric comprising a nib directed toward the front side of the allotted needle, a plush throat at the rear end of the nib, a point at the front end of said nib which is at a higher level than said plush throat, an upper edge on said nib which at its lower end is at a higher level than the lower end of said plush throat, an elevated step in said edge intermediate said point and said plush throat, the cross-section of said nib being a maximum at the root of the nib where the lower end of said plush throat is positioned, a web-holding edge, and a ground-thread throat positioned substantially vertically below the lower end of said plush throat at the rear end of said web-holding edge, the bottom edge of said ground thread throat being arranged to act as the sinking edge for the ground threads when these threads are sunk in the axial direction of said needles.

7. In a circular knitting machine, a set of needles, a sinker allotted to each needle for knitting loop-plush fabric comprising a nib directed toward the front side of the allotted needle, a plush throat at the rear end of the nib, a point at the front end of said nib which is at a higher level than said plush throat and a web-holding edge, the front portion of which extends at a higher level than the rear portion below said plush throat, and a ground-thread throat positioned substantially vertically below the lower end of said plush throat at the rear end of said web-holding edge, the bottom edge of said ground thread throat being arranged to act as the sinking edge for the ground threads when these threads are sunk in the axial direction of said needles.

8. In a circular knitting machine, a set of needles, a sinker allotted to each needle for knitting loop-plush fabric comprising a nib directed toward the front side of the allotted needle, a plush throat at the rear end of the nib, a point at the front end of said nib which is at a higher level than said plush-throat and a web-holding edge, the front portion of which extends at a lower level than the rear portion below said plush throat and a ground-thread throat positioned substantially vertically below the lower end of said plush throat at the rear end of said web-holding edge, the bottom edge of said ground thread throat being arranged to act as the sinking edge for the ground threads when these threads are sunk in the axial direction of said needles.

9. In a circular knitting machine, a set of needles, a sinker allotted to each needle for knitting loop-plush fabric comprising a nib directed toward the front side of the allotted needle, a plush throat at the rear end of the nib, a point at the front end of said nib which is at a higher level than said plush throat, a web-holding edge, and a ground-thread throat positioned at a distance

from the lower end of said plush throat which is equal to the vertical distance of said lower end from said web-holding edge, the bottom edge of said ground thread throat being arranged to act as the sinking edge for the ground threads when these threads are sunk in the axial direction of said needles.

10. In a circular knitting machine, a set of needles, a lock including a pair of cams, a set of sinkers for cooperation with one of said cams, a set of sinkers for cooperation with the other cam, a sinker in each set being allotted to each needle, for knitting loop-plush fabric, every sinker comprising a nib directed toward the front side of the allotted needle, a plush throat at the rear end of the nib, a point at the front end of said nib which is at a higher level than said plush throat, a web-holding edge, and a ground-thread throat positioned substantially vertically below the lower end of said plush throat at the rear end of said web-holding edge, the bottom edge of said ground thread throat being arranged to act as the sinking edge for the ground threads when these threads are sunk in the axial direction of said needles; and means for moving said cams into and out of active position with respect to the sinkers of the individual sets.

MAX NEBEL.