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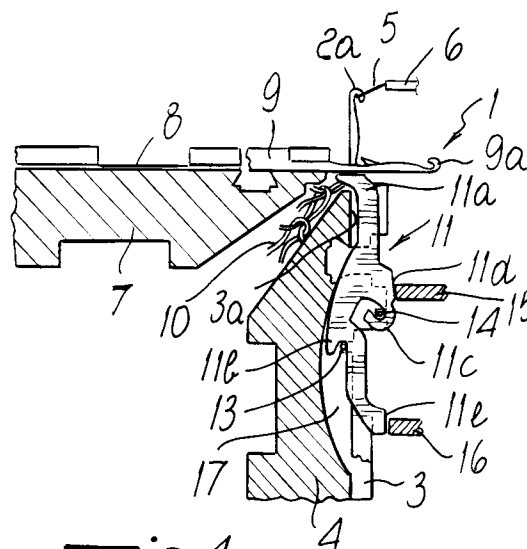
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I-20123 Milano (IT)(54) **Circular knitting machine with knitting retention sinkers.**

(57) The present invention relates to a circular knitting machine with stitch retention sinkers that comprises a plurality of needles (2), which are accommodated in slots (3) formed in at least one needle supporting element (4) and are controllably movable along the longitudinal extension of the corresponding slot (3) from an extracted position, in which the tip (2a) of the needles (2) protrudes from a longitudinal end of the corresponding slot (3) to engage at least one thread (5) fed by a thread guide (6), to a retracted position, in which the tip of the needles is retracted into the corresponding slot (3) so as to form a loop of knitting (10) with the engaged thread (5), and vice versa. The machine comprises multiple sinkers (11) that are arranged alternately between the needles (2) and are each arranged laterally with respect to a needle (2). The end of each one of the sinkers that is located proximate to the longitudinal end of the corresponding slot (3) from which the tip (2a) of the corresponding needle (2) protrudes to engage the thread (5) is provided with a beak (11a) that is directed towards the bottom of the slot (3). Each sinker is individually oscillatable, by virtue of the action of actuation means (15,16), on a plane that is substantially at right angles to the bottom of the corresponding slot (3) to move its beak from a retention position, in which the beak (11a) engages the knitting (10) formed by the corresponding needle (2), to a release position, in which the beak (11a) is disengaged from the knitting (10), and vice versa.

**Fig. 4****EP 0 683 257 A1**

The present invention relates to a circular knitting machine with knitting retention sinkers.

Circular knitting machines with two needle holders, that is to say, machines having a needle cylinder and a plate that is arranged above the needle cylinder and coaxially thereto and is also provided with needles interleaved between the needles carried by the cylinder, are known. In these machines, the knitting is generally produced by using both needle holders of the machine so that the needles of the cylinder cooperate with the needles of the plate in forming the knitting.

In some particular kinds of production, the knitting is formed by using only the cylinder needles while the needles of the plate retain the last formed row of knitting. In this case, the traction that is usually applied to the already-formed knitting by means of appropriate devices is discharged exclusively onto the row retained by the needles of the plate, while the needles of the cylinder continue to knit, producing an excess of knitting on which the traction is practically ineffective. In these kinds of production, the resulting excess knitting can easily overflow and escape from the tip of the needles of the cylinder during the formation of the stitch, causing the loss of stitches and therefore leading to the formation of a product to be rejected.

In order to solve this problem, in some circular knitting machines there are sinkers that are placed in the same slots of the cylinder that accommodate the needles. Said sinkers are controllably slideable, along a direction that is parallel to the direction along which the needles of the cylinder are actuated; said sinkers act, with their tip or beak, on the formed knitting loops to prevent the loops that are being formed from disengaging from the needles. However, these sinkers act predominantly on the knitting loops retained by the needles of the plate, and although they improve the situation, they do not fully solve the problem, since they are unable to avoid, with acceptable reliability, the loss of stitches in the knitting that is being formed.

Other anomalies in the formation of the knitting can occur in currently commercially available machines during the knitting commonly known as transfer knitting, in which no new loops are formed but one loop is simply transferred from a needle of one needle holder to a needle of the opposite needle holder. This operation can be performed by making the needles that cast off the loops protrude from the corresponding needle holder until their part, known as lifting shoulder, that is provided to raise the loop reaches a position that allows the corresponding needle of the other needle holder to enter a spring-loaded element located on one side of the casting-off needle and to engage the loop with a subsequent movement. This operation can be performed by selecting the needles that must

cast off the loops but not necessarily those that must engage them. During normal knitting, the engaging needles in fact already perform a movement that is capable of engaging the loop, provided that said loop is carried by the casting-off needle into a position in which said loop is engageable. However, since the casting-off needles are extracted from the corresponding needle holder beyond the normal knitting level in order to ensure that the loop is engaged by the needles that must engage it, said casting-off needles also drag towards the opposite needle holder the adjacent knitting, which must not be transferred. During this step, if all the needles of the opposite needle holder are made to protrude, they haphazardly also engage loops that should not be transferred, thus causing abnormal knitting.

A principal aim of the present invention is to solve the problems described above by providing a circular knitting machine with knitting retention sinkers that is capable of reliably avoiding the occurrence of anomalies in the formation of the stitches of knitting.

Within the scope of this aim, an object of the invention is to provide a circular knitting machine with knitting retention sinkers that is capable of avoiding the accidental escape of loops from the tip of the active needles, so as to safely prevent loss of stitches in the knitting being formed.

Another object of the invention is to provide a circular knitting machine with stitch retention sinkers that are simple to produce and can be installed in the machine simply and rapidly.

Another object of the invention is to provide a machine with stitch retention sinkers that are highly efficient in operation both with elastic threads and with very rigid threads.

This aim, these objects, and others which will become apparent hereinafter are achieved by a circular knitting machine with stitch retention sinkers that comprises: a plurality of needles, which are accommodated in slots formed in at least one needle supporting element and controllably movable along the longitudinal extension of the corresponding slot from an extracted position, in which the tip of said needles protrudes from a longitudinal end of the corresponding slot to engage at least one thread fed by a thread guide, to a retracted position, in which the tip of said needles is retracted into the corresponding slot so as to form a loop of knitting with the engaged thread, and vice versa; and a plurality of sinkers that are arranged alternately between said needles and are each arranged laterally with respect to a needle; said machine being characterized in that the end of each one of said sinkers that is located proximate to the longitudinal end of the corresponding slot from which the tip of the corresponding needle

protrudes to engage the thread is provided with a beak that is directed towards the bottom of said slot, each one of said sinkers being oscillatable individually, by virtue of the action of actuation means, on a plane that is substantially at right angles to the bottom of the corresponding slot to move its beak from a retention position, in which said beak engages the knitting formed by the corresponding needle, to a release position, in which said beak is disengaged from the knitting, and vice versa.

Further characteristics and advantages of the invention will become apparent from the following detailed description of a preferred but not exclusive embodiment of the machine according to the invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a schematic sectional view of the portion of a circular knitting machine with two needle holders, proximate to the region where the needles knit, during the completion of the retraction of the needles;

figure 2 is a schematic lateral elevation view of one of the retention sinkers and of the elements for actuating it;

figure 3 is a view, similar to figure 1, of the knitting machine with the retention sinker during its transfer from the release position to the retention position;

figure 4 is a view, similar to figures 1 and 3, of the knitting machine with the retention sinker in the retention position as the corresponding needle engages the thread;

figure 5 is a schematic plan view of the means for actuating the retention sinkers of the machine according to the invention;

figures 6 to 9 are schematic views of the assembly of one of the retention sinkers in the needle supporting element of one needle holder of the machine;

figure 10 is a schematic lateral elevation view of the machine, illustrating the operation of the retention sinkers according to the invention;

figure 11 is a sectional view, similar to figure 4, of the action of the retention sinkers during the transfer of a loop from one needle holder to the other;

figure 12 is a view, similar to figure 10, of the operating condition of figure 11.

With reference to the above figures, the machine according to the invention, generally designated by the reference numeral 1, comprises, in a per se known manner, a plurality of needles 2 that are accommodated in slots 3 formed in a needle supporting element 4 that can be constituted by the needle cylinder, as shown, or by the plate.

The needles 2 have, in a known manner, a heel, not shown for the sake of simplicity, that protrudes from the corresponding slot transversely to the longitudinal extension of said slot and engages in paths formed by a set of cams that face the needle supporting element.

Each needle, by engaging with its heel in the paths formed by the set of cams, due to the movement of said set of cams with respect to the needle supporting element transversely to the longitudinal extension of the slots 3, is moved from an extracted position, in which its tip 2a protrudes from a longitudinal end of the corresponding slot 3 to engage a thread 5 fed by an appropriately provided thread guide 6, to a retracted position, in which the tip 2a of the needles is retracted into the corresponding slot 3, so as to form a loop of knitting with the engaged thread 5 while the previously formed loop of knitting is cast off the needle.

The machine according to the invention can be of the type with a single needle holder or with two mutually facing needle holders. The various figures show a machine with two needle holders, in which the second needle holder is constituted by another needle supporting element 7, which is constituted by the plate in the case described and in which a plurality of slots 8 are formed; each slot accommodates a needle 9, the tip 9a whereof is directed towards the needle supporting element 4 of the other needle holder. In practice, the slots 3 of the first needle holder and the slots 8 of the second needle holder face each other with one of their longitudinal ends, from which the tip of the corresponding needle protrudes, so that the needles of one needle holder cooperate with the needles of the other needle holder, forming the knitting 10 that descends between the two needle holders.

The needles 9 of the second needle holder are actuated in a per se known manner by means of a set of cams that face the slots 8 of the needle supporting element 7 and form paths for the heels of the needles 9, so as to cause them to pass, like the needles of the needle supporting element 4, from an extracted position, in which their tip protrudes from the corresponding slot 8 so as to engage the thread fed by an appropriately provided thread guide, to a retracted position, in which the tip 9a of the needles 9 is retracted into the corresponding slot so as to form loops of knitting with the engaged thread, while the previously formed loops of knitting are cast off by the needles between the two needle holders.

The machine according to the invention is provided with a plurality of sinkers 11 that are arranged alternately between the needles 2; each sinker is arranged laterally to a needle 2 in the same slot 3. In each one of said sinkers 11, the

end located proximate to the longitudinal end of the corresponding slot 3 from which the tip 2a of the corresponding needle 2 protrudes to engage the thread 5 is provided with a beak 11a that is directed towards the bottom 3a of the slot 3.

Each one of the sinkers 11 is individually oscillatable, by virtue of the action of actuation means, on a plane that lies substantially at right angles to the bottom of the corresponding slot 3, so as to move the beak 11a of the sinker from a retention position, in which said beak 11a engages the knitting 10 formed by the corresponding needle 2, to a release position, in which the beak 11a is disengaged from the knitting 10, and vice versa.

More particularly, an intermediate portion of each sinker 11 is pivoted to the needle supporting element 4. Pivoting is achieved by means of a first portion 11b of the sinker that is hook-shaped and engages a wire-like element 13 that is connected to the needle supporting element 4 transversely to the longitudinal extension of the slots 3.

The sinker 11 also has, on the opposite side with respect to the one directed towards the bottom of the slot 3, a second portion 11c that is also hook-shaped but curves in the opposite direction with respect to the curve of the first portion 11b; said second portion engages another wire-like element 14 which is also connected to the needle supporting element 4 transversely to the longitudinal extension of the slots 3. In this manner, the sinker 11 is retained inside the corresponding slot 3, laterally to the needle 2, since it is retained by the coupling of the hook-shaped portions 11b and 11c that contrast its sliding in the direction for the extraction of the adjacent needle 2.

The means for actuating the oscillation of the sinker 11 comprise at least one cam; in the illustrated embodiment, there are two cams 15 and 16 that laterally face the needle supporting element 4 and are adapted to engage two portions 11d and 11e of the sinker that protrude from the slot 3 and are spaced, in opposite regions, along the longitudinal extension of the sinker 11, with respect to the first portion 11b that is pivoted to the needle supporting element 4. More particularly, there is a first cam 15 movable with respect to the needle supporting element 4 transversely to the longitudinal extension of the slots 3 and having at least one raised portion 15a extending towards the needle supporting element 4 and engaging the region 11d of the sinker 11 that is located between the first portion 11b, pivoted to the needle supporting element 4, and the beak 11a. In this manner, the engagement of the sinker with the raised portion 15a during the movement of the first cam 15 with respect to the needle supporting element 4 causes the oscillation of the sinker 11 from the release position to the retention position.

The second cam 16 is also movable with respect to the needle supporting element 4 along a direction that is transverse to the longitudinal extension of the slots 3, and is provided with a raised portion 16a that protrudes towards the needle supporting element 4 and can engage, during the movement of the cam 16 with respect to the needle supporting element 4, the region 11e of the sinker 11 that is located proximate to the end of the sinker that lies opposite with respect to the beak 11a. The engagement of the sinker with the raised portion 16a of the second cam 16 produces the oscillation of the sinker from the retention position to the release position, as will become apparent hereinafter.

The cams 15 and 16 can be associated with the set of cams that actuate the needles 2 and are arranged with respect to the cams for actuating the needles 2 so that the raised portion 16a is located at the cams that cause the retraction of the needle in the corresponding slot 3 and so that the raised portion 15a of the first cam 15 is located at the cams that cause the protrusion of the tip of the needle from the corresponding slot 3.

Conveniently, on the bottom of the slots 3 there is a recess 17 that partially accommodates the corresponding retention sinkers 11.

A retention sinker located in one needle holder of the machine has been described for the sake of simplicity, but it is possible to provide similar sinkers on the other needle holder of the machine as well.

The operation of the circular knitting machine with the stitch retention sinkers according to the invention is as follows.

As shown in figure 1, while the needle 2, after engaging the thread 5 fed by the thread guide 6 with the tip 2a, retracts into the corresponding slot 3, forming a new loop and casting off the previously formed loop, the sinker 11 is in the release position, so as to avoid hindering the correct formation of the new loops of knitting. The sinker 11 is kept in this release position owing to the fact that the region 11e of the sinker engages the raised portion 16a of the second cam 16.

Before the tip 2a of the needle 2 protrudes again from the corresponding slot 3 to engage a new thread 5 fed by the corresponding thread guide 6 to form a new loop, the first cam 15 engages, with its raised portion 15a, against the region 11d of the sinker 11, causing its oscillation about the wire-like element 13 from the release position to the retention position, in which it engages, with its beak 11a, the previously formed knitting 10, so that said knitting does not follow the needle during its exit from the corresponding slot. It should be noted that while the region 11d of the sinker engages the raised portion 15a of the first

cam 15, the raised portion 16a is no longer present, so that the sinker can correctly oscillate from the release position to the retention position.

After the needle 2 has engaged the thread 5 and has started its retraction into the slot to form a new loop, the cam 16 again engages the raised portion 16a with the region 11e of the sinker, while the raised portion 15a of the first cam 15 is no longer present, thus achieving the transfer of the sinker from the retention position to the release position. At this point the operating cycle continues as already described.

As shown in figures 11 and 12, the retention sinker according to the invention avoids knitting anomalies also during the transfer of the loops from one needle holder to the next. As shown in said figures, the retention sinkers 11, by engaging the loops freshly formed on one needle holder with the beak 11a, prevent the adjacent loops from being raised by the needle 2 while said needle is moved so as to protrude from the corresponding needle holder until the loop to be transferred is moved into a position that allows it to be engaged by the corresponding needle 9 of the other needle holder. The needle 9 accordingly passes through a spring-loaded element 30 connected in a known manner to one side of the needle 2, engaging, during its subsequent motion, the loop to be transported with no possibility of interference with the adjacent loops, which are retained by the action of the sinkers 11.

The operation of the machine with retention sinker according to the invention has been described with reference to a single needle holder of the machine, but it is understood that it would be possible to provide sinkers on both of the needle holders of the machine with an operation that is similar to what has been described.

The fact should also be noted that the retention sinkers according to the invention also have the advantage that they make it particularly easy to form the loops when knitting begins. In machines with two needle holders, both when knitting with a single needle holder and when knitting with both needle holders, the sinusoidal shape given to the thread by the needles during loop formation can be knitted correctly into the previous one only if there is a mechanical action, applied on said previous sinusoidal shape, that stretches it towards the rear part of the needle, that is to say, the part that lies opposite to the open tip of the needle. This action is usually applied by a mechanical traction device based on rollers or with equivalent belt tensioners. When knitting begins, this traction is not present, since conventional traction devices cannot engage previously formed knitting. This circumstance occurs not only at the beginning of the production run of a machine, but also every time breakage of the

thread that is not followed by a sufficiently prompt halting of the machine causes the complete separation of the already-formed knitting from the needles of one part of the needle holder. In this case, the operator must expertly fit the disengaged fabric back onto the needles, trim the excess, and slowly restart the operation of the machine, wasting considerable time.

The presence of the retention sinkers according to the invention automatically meets with this need, since the sinkers, by penetrating between the needles, and by retaining the previously formed row of knitting in the rearward position of the needles, allow said needles to form a sinusoidal shape that is correctly knitted in with the previous one, that is to say, an actual row of knitting even without traction on the knitting itself.

Figures 6 to 9 schematically illustrate the fitting of a retention sinker 11 inside the slot 3 of the needle supporting element 4. As clearly shown, the retention sinker 11 can be fitted simply by removing a sector of the set of cams that actuate the needles and the sinkers and by inserting the retention sinker 11 between the wire-like elements 13 and 14 connected to the needle supporting element. The particular shape of the first portion 11b and of the second portion 11c achieves the correct engagement of the sinker with the wire-like elements 13 and 14 that retain the sinker inside the corresponding slot. After fitting the sinker, the previously removed cam sector is again fitted laterally with respect to the needle supporting element 4.

In practice, it has been observed that the circular knitting machine with knitting retention sinkers according to the invention fully achieves the intended aim, since the retention sinkers effectively contrast the rise of the knitting when the tip of the needle protrudes from the needle holder to engage the thread during the formation of a new loop of knitting. In this manner, the loss of the stitches on the part of the needles is assuredly avoided even when forming knitting that produces an excess of knitting in the needle work area.

The machine thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept; all the details may furthermore be replaced with other technically equivalent elements.

In practice, the materials employed, as well as the dimensions, may be any according to the requirements and the state of the art.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such

reference signs.

Claims

1. Circular knitting machine with stitch retention
sinker that comprises: a plurality of needles
(2), which are accommodated in slots (3)
formed in at least one needle supporting ele-
ment (4) and are controllably movable along
the longitudinal extension of the corresponding
slot from an extracted position, in which the tip
(2a) of said needles (2) protrudes from a lon-
gitudinal end of the corresponding slot (3) to
engage at least one thread (5) fed by a thread
guide (6), to a retracted position, in which the
tip (2a) of said needles (2) is retracted into the
corresponding slot (3) so as to form a loop of
knitting with the engaged thread (5), and vice
versa; and a plurality of sinkers (11) that are
arranged alternately between said needles (2)
and are each arranged laterally with respect to
a needle (2); said machine being characterized
in that the end of each one of said sinkers (11)
that is located proximate to the longitudinal
end of the corresponding slot (3) from which
the tip (2a) of the corresponding needle (2)
protrudes to engage the thread (5) is provided
with a beak (11a) that is directed towards the
bottom of said slot (3), each one of said sink-
ers (11) being oscillatable individually, by vir-
tue of the action of actuation means (15,16), on
a plane that is substantially at right angles to
the bottom of the corresponding slot (3) to
move its beak (11a) from a retention position,
in which said beak (11a) engages the knitting
(10) formed by the corresponding needle (2),
to a release position, in which said beak (11a)
is disengaged from the knitting (10), and vice
versa.
2. Machine according to claim 1, characterized in
that each one of said sinkers (11) is pivoted to
said needle supporting element (4) with an
intermediate portion, which is provided with a
first portion (11b) that is substantially hook-
shaped and engages a wire-like element (13)
that is connected to said needle holder (4)
transversely to the longitudinal extension of
said slots (3).
3. Machine according to claims 1 and 2, char-
acterized in that each one of said sinkers (11)
is accommodated inside the slot (3) that con-
tains the corresponding needle (2) and laterally
to said needle (2).
4. Machine according to one or more of the pre-
ceding claims, characterized in that it com-
prises retention means (11b,13,11c,14) that en-
gage said sinker (11) to contrast its sliding in
the direction for the extraction of said needle
(2).
5. Machine according to one or more of the pre-
ceding claims, characterized in that said reten-
tion means comprise said wire-like element
(13), which engages said hook-like first portion
(11b), and another wire-like element (14),
which is connected to said needle supporting
element (4) transversely to the longitudinal ex-
tension of said slots (3) and engages a second
hook-like portion (11c) of said sinker (11), said
second hook-like portion (11c) curving oppo-
sitely with respect to the curve of said first
hook-like portion (11b).
6. Machine according to one or more of the pre-
ceding claims, characterized in that said ac-
tuation means comprise at least one cam (15)
that faces said needle supporting element (4)
and is movable with respect to the needle
supporting element (4) along a direction that is
transverse to the longitudinal extension of said
slots (3), said cam (15) having at least one
raised portion (15a) that extends towards said
needle supporting element (4) and engages a
region (11d) of said sinkers (11) that is located
between said first hook-like portion (11b) and
said beak (11a) for the oscillation of said sink-
ers (11) from said release position to said
retention position.
7. Machine according to one or more of the pre-
ceding claims, characterized in that said ac-
tuation means comprise a first cam (15) and a
second cam (16) that face said needle support-
ing element (4) and are movable with respect
to said needle supporting element (4) along a
direction that lies transversely to the longitudi-
nal extension of said slots (3), said first cam
(15) having at least one first raised portion
(15a) that extends towards said needle sup-
porting element (4), said second cam (16) hav-
ing a second raised portion (16a) that is
spaced from said first raised portion (15a)
along the direction of the motion of said cams
(15,16) with respect to said needle supporting
element (4), said first (15a) and said second
(16a) raised portions engaging regions
(11d,11e) of said sinkers (11) that are spaced
in opposite regions with respect to the region
where the sinkers are pivoted to said needle
supporting element (4) for the oscillation of
said sinkers (11) from said release position to
said retention position and vice versa.

8. Machine according to one or more of the preceding claims, characterized in that a recess (17) is formed on the bottom of said slots (3) and partially accommodates said sinkers (11). 5
9. Knitting retention sinker, in circular knitting machines that have a needle supporting element (4) in which a plurality of slots (3) are formed, each slot accommodating a needle (2), said sinker (11) being characterized in that it is adapted to be accommodated in one of said slots (3) laterally to each needle (2) and in that its end to be arranged proximate to the longitudinal end of the corresponding slot (3) from which the tip of the corresponding needle (2) protrudes to engage the thread (5) is provided with a beak (11a) that is adapted to engage the formed knitting (10) to retain it when the tip (2a) of the needle (2) protrudes from the corresponding slot (3). 10 15 20
10. Retention sinker according to claim 9, characterized in that it has, on its side to be directed towards the bottom of the corresponding slot (3), a first hook-shaped portion (11b) that can engage a wire-like (13) element that is arranged transversely to the longitudinal extension of said slots (3), so as to pivot the retention sinker (11) to said needle supporting element (4). 25 30
11. Retention sinker according to claims 9 and 10, characterized in that it has, on its side to be directed away from the bottom of the corresponding slot (3), a second hook-shaped portion (11c) in which the curve is directed oppositely away from the curve of said first portion (11b), said second portion (11c) engaging a second wire-like element (14) that is associated with said needle supporting element (4) transversely to the extension of said slots (3), for the retention of the sinker (11) between said two wire-like elements (13,14) on said needle supporting element (4). 35 40 45
12. Retention sinker according to one or more of the preceding claims, characterized in that it has, on its side to be directed oppositely away from the bottom of the corresponding slot (3), a region (11d) that is spaced from said first hook-shaped portion (11b) towards one of the longitudinal ends of the sinker and is adapted to engage a sinker actuation cam (15) to make the sinker oscillate about the region where said sinker (11) is pivoted to said needle supporting element (4). 50 55
13. Retention sinker according to one or more of the preceding claims, characterized in that it has, on its side to be directed oppositely away from the bottom of the corresponding slot (3), two regions (11d,11e) that are spaced in opposite regions with respect to said first hook-shaped portion (11b) towards the longitudinal ends of the sinker (11), each one of said two regions (11d,11e) being adapted to engage a sinker actuation cam (15,16) for the oscillation of the sinker (11) about the region where said sinker is pivoted to said needle supporting element (4).

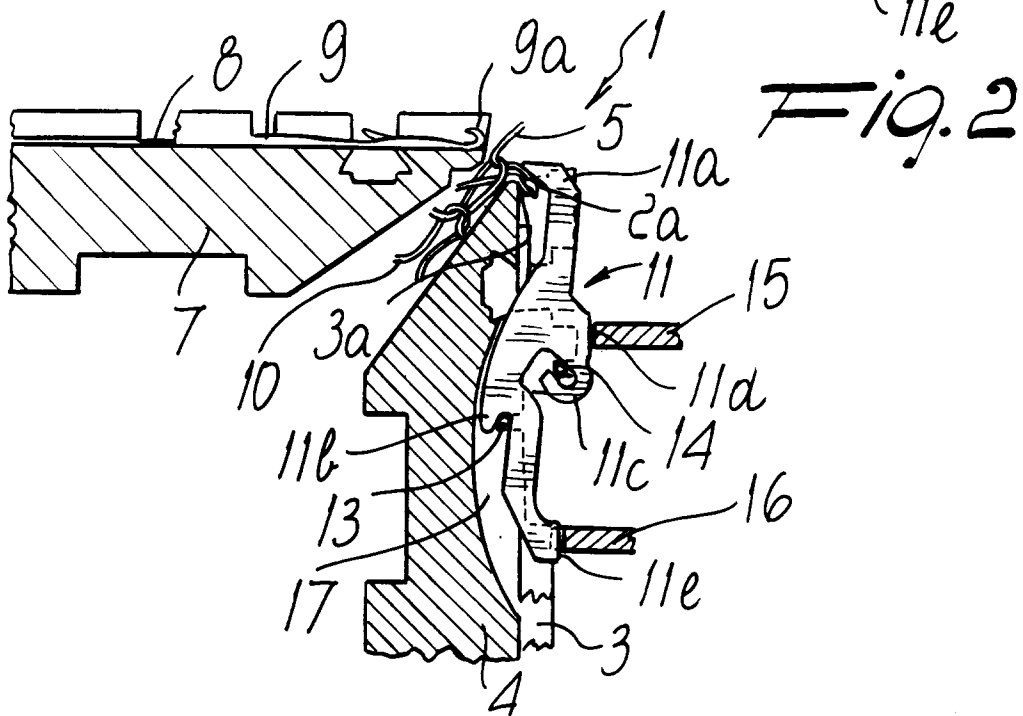
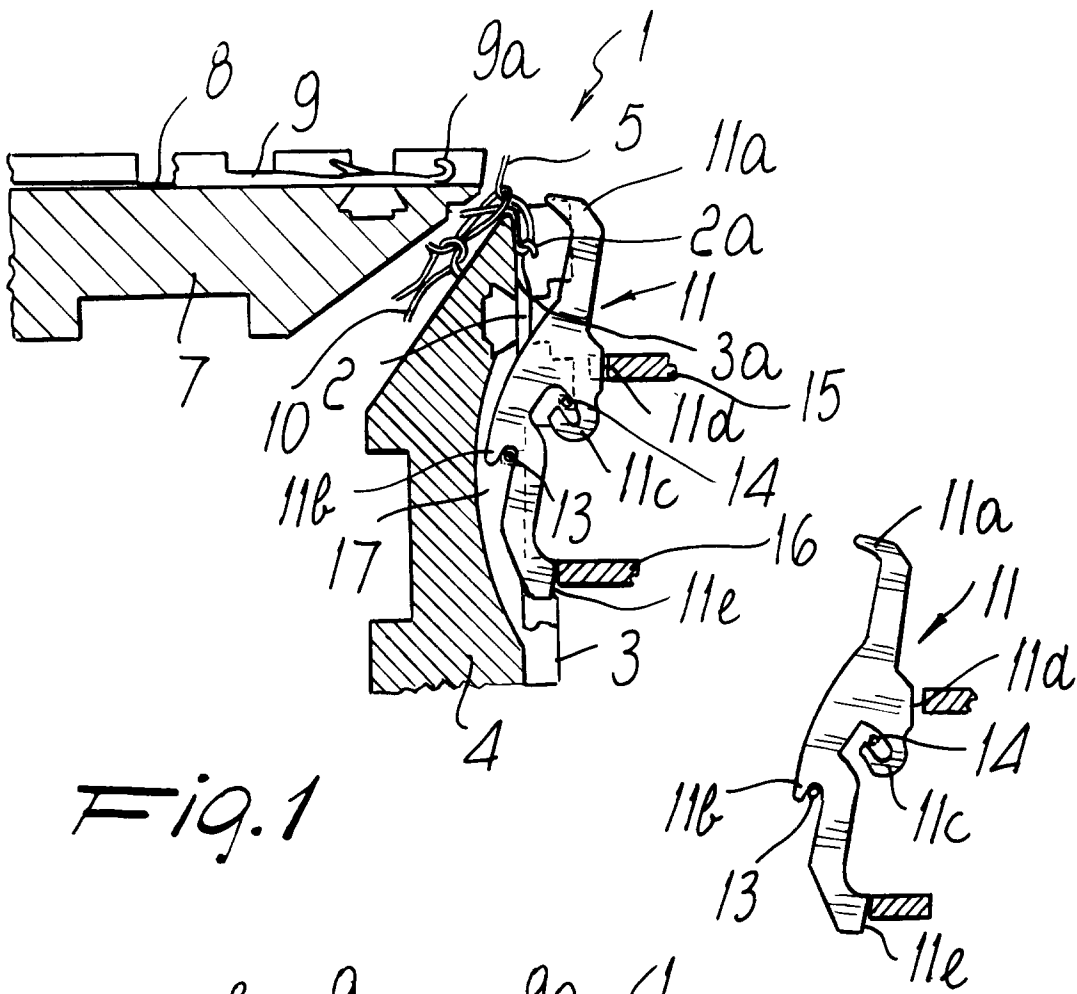


Fig. 3

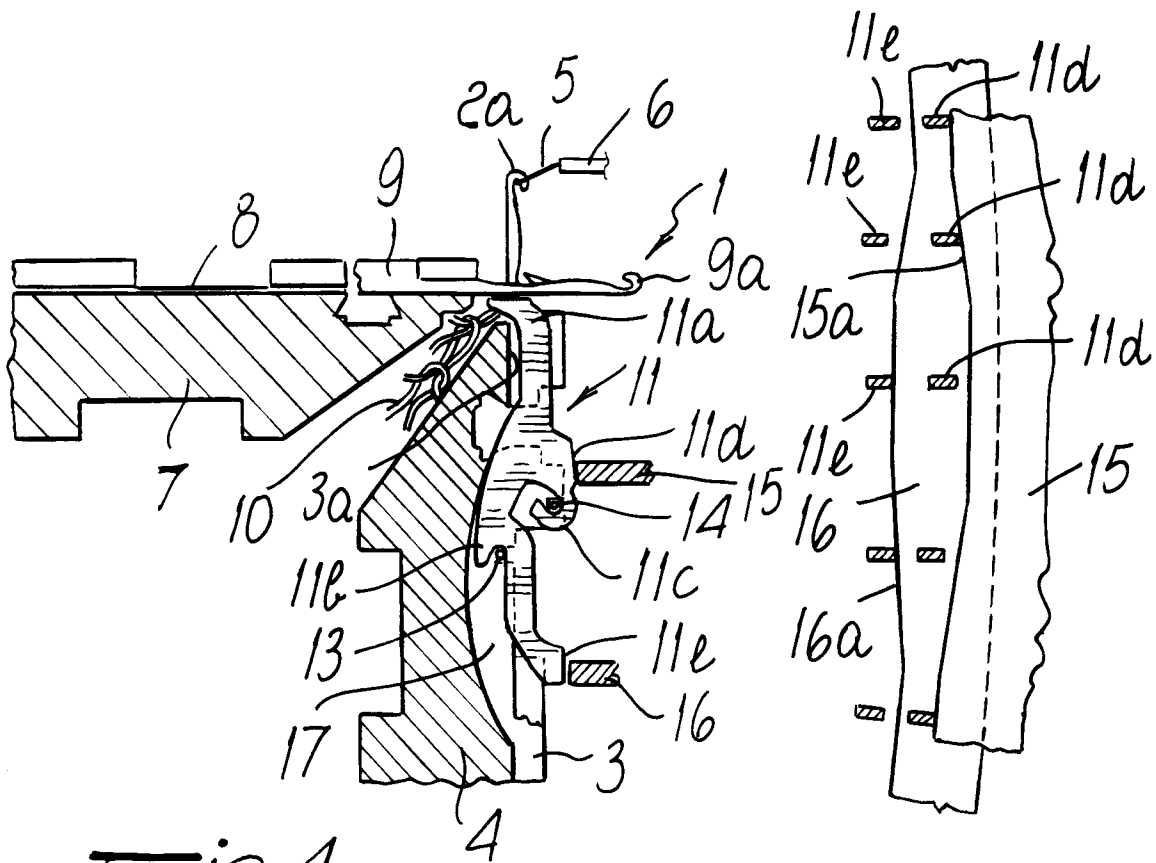


Fig. 4

Fig. 5

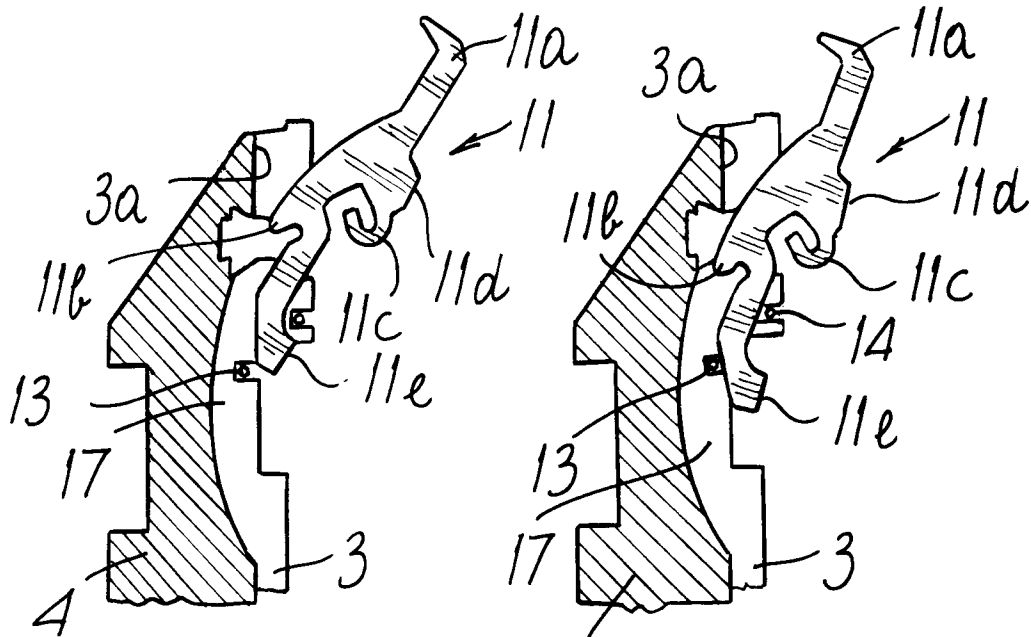


Fig. 6

Fig. 7

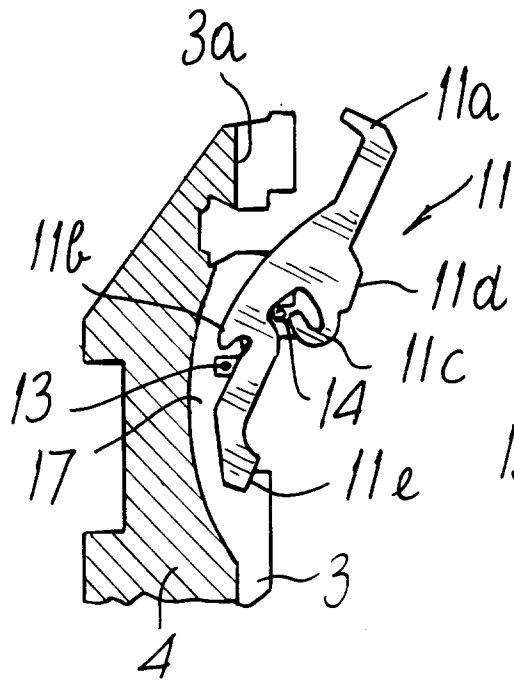


Fig. 8

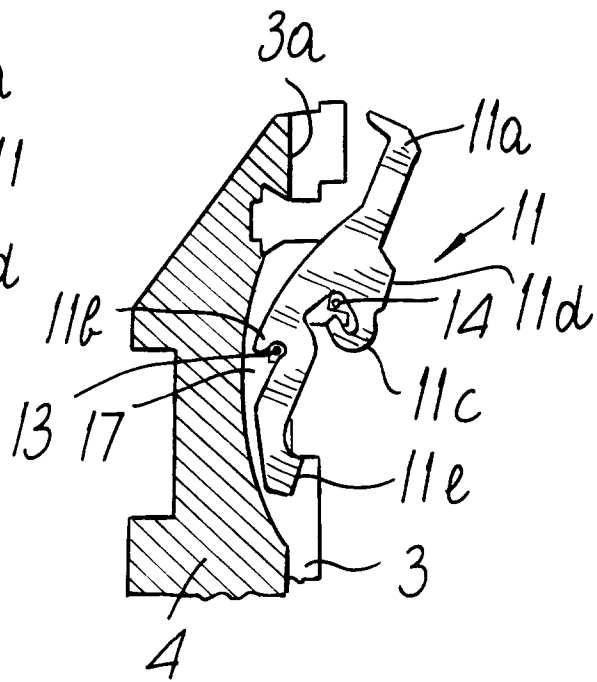


Fig. 9

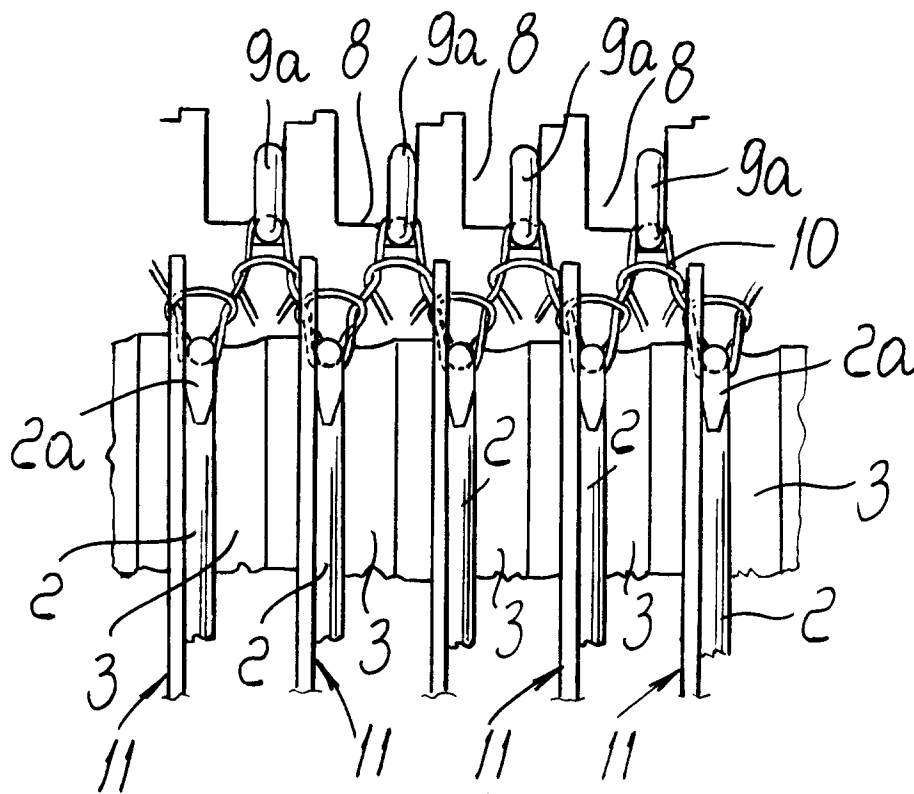
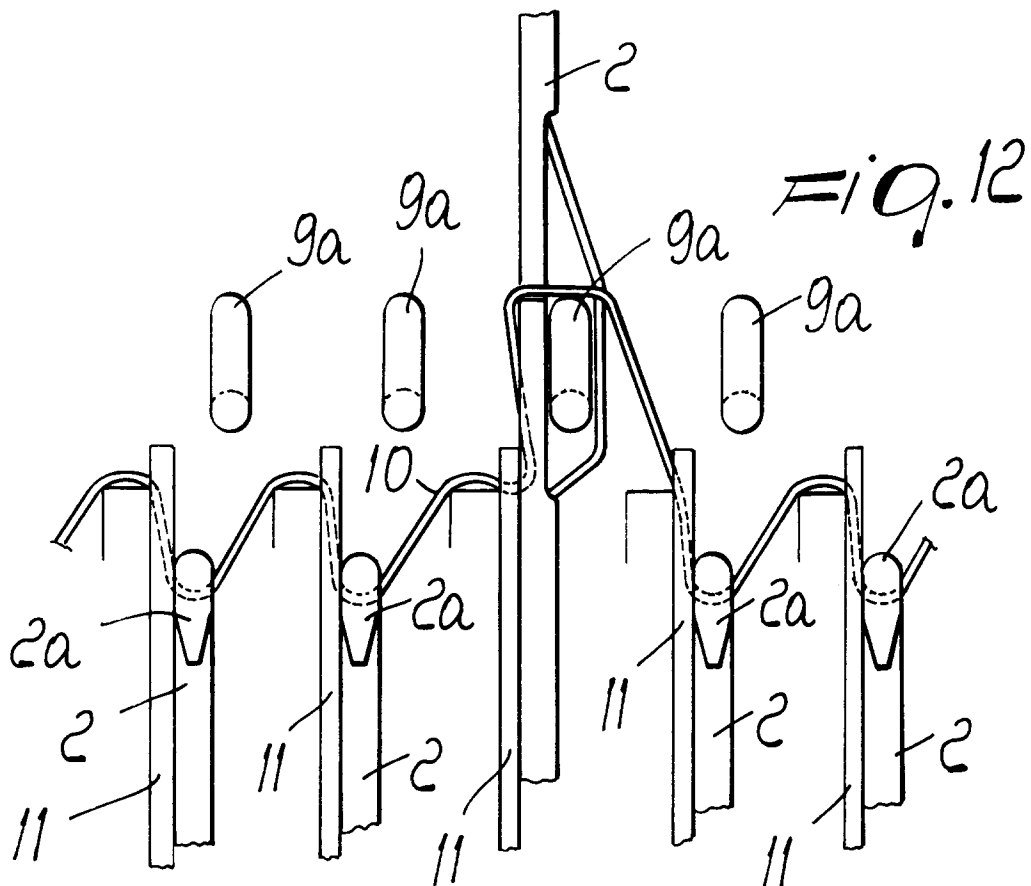
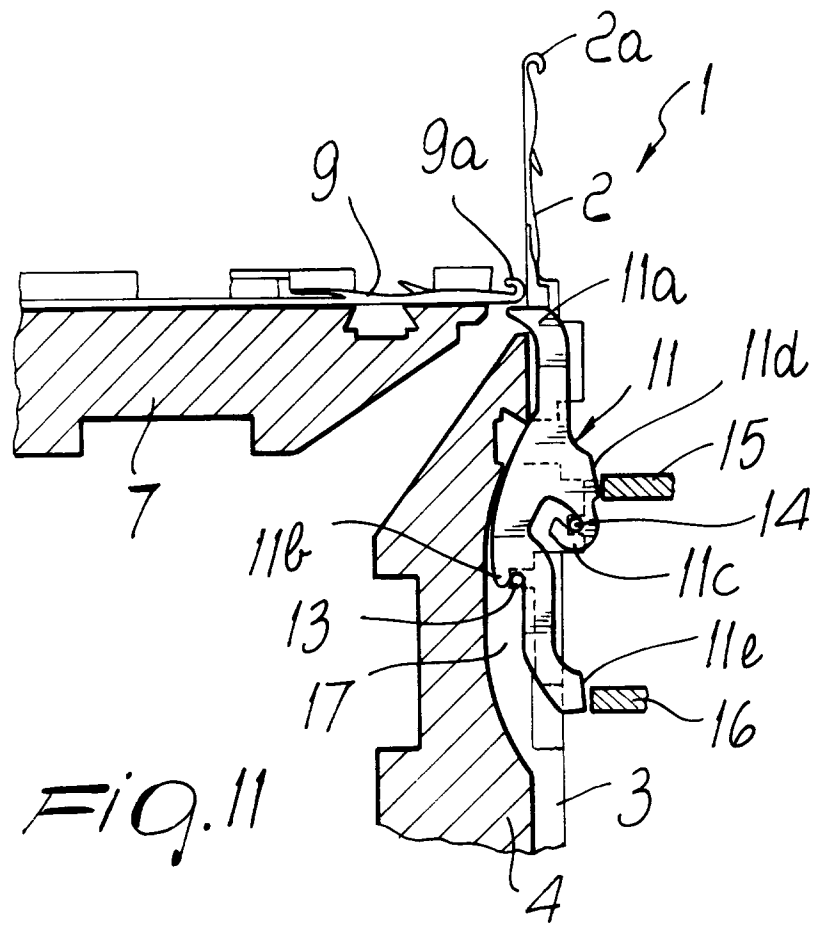


Fig. 10





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 10 6936

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	EP-A-0 421 242 (MEC-MOR) * column 3, line 55 - column 6, line 26; figures 1-10 * ---	1,3,8,9	D04B15/06
A	GB-A-2 140 829 (TERROT STRICKMASCHINEN GMBH) * page 1, line 102 - page 2, line 90; figures 1,2 * ---	1,3,4,6, 7,9,12, 13	
A	GB-A-2 164 960 (SIPRA) ---		
A	EP-A-0 567 282 (TSUDAKOMA K.K.K.) ---		
P,A	WO-A-95 07382 (E.M.M. S.R.L.) -----		
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			D04B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 29 August 1995	Examiner Van Gelder, P
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			