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(71) Applicant: **Off. Meccanica Trinca Colonel Silvio & Figlio Sergio S.N.C.**
22075 Lurate Caccivio Co (IT)

(72) Inventor: **Trinca Colonel, Sergio**
22079 VILLA GUARDIA CO (IT)

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(74) Representative: **Modiano, Micaela Nadia**
Modiano & Partners (IT)
Via Meravigli, 16
20123 Milano (IT)

(54) **Selvage binding method, particularly for textile looms, and selvage binding device, particularly for textile looms**

(57) A selvage binding device (1), particularly for textile looms, which is associable with a textile loom (2) on which the warp threads (3) are stretched and with which a weft insertion rod (4) is associated which carries a weft thread (5) through the warp threads (3) held in position by a comb element (6), the device (1) further comprising a shuttle with spool (7) that is movable along a direction substantially parallel to the warp threads (3) and carries a reinforcement thread (8) which can be inserted in a loop (9) defined by the weft thread (5) supported by the weft insertion rod (4), a weft holder needle (10) being comprised which is movable independently of the shuttle with spool (7) along a direction substantially parallel to the warp threads (3) and being adapted to keep in position the weft thread (5) during the retraction of the shuttle with spool (7), in this way, the reinforcement thread (8) remains inserted into the loop (9) once the shuttle with spool (7) is retracted.

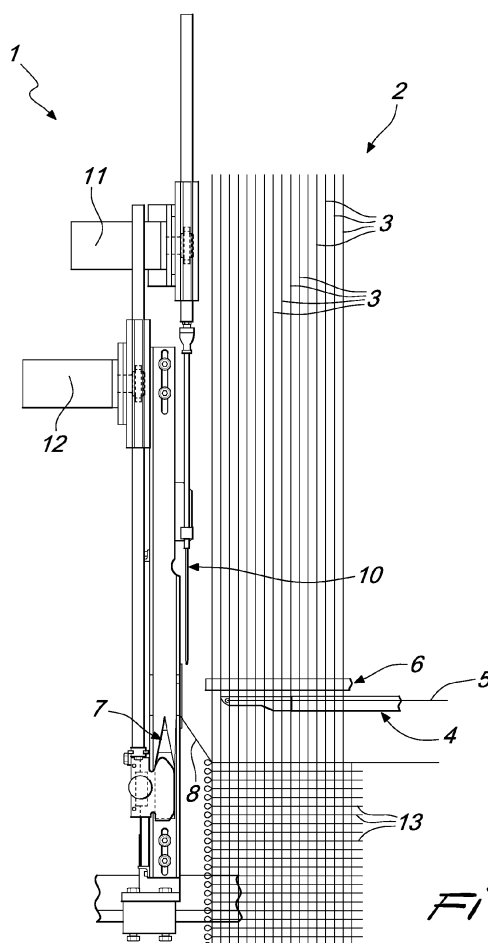


Fig. 1

Description

[0001] The present invention relates to a selvage binding method, particularly for textile looms, and a corresponding selvage binding device, which can be used in order to implement such method.

[0002] In the textiles field, the use is known of devices adapted to perform the selvage of fabrics, i.e. the stitching of the uncut edge of the fabric exiting from the textile loom on which it is worked.

[0003] More precisely, the selvage is performed on the lateral edges of a warp when the weft insertion rod, after placing the weft thread between the warp threads held in position in the textile loom by a comb element, returns to the other side.

[0004] Usually, since the edge of the fabric is the part that is most subject to mechanical strain and stress during use of the fabric, the region with the selvage is reinforced by doubling the warp threads or by inserting a further reinforcement thread parallel to the warp threads, for a space of a few centimeters in order to make the selvage sturdier.

[0005] Since it has an architecture that is different from the rest of the fabric, the selvage requires devices that are dedicated to producing it.

[0006] Such conventional devices, which can be associated with textile looms and in some cases form part thereof, are not devoid of drawbacks, including the fact that they are actuated by mechanical cam and lever systems which are difficult and expensive to make.

[0007] More precisely, such mechanisms kinematically connect all movable elements of the device and are actuated by a single motor which, in some cases, can be the same motor as the textile loom.

[0008] Because of this, such mechanisms are extremely complex and economically expensive to make, since they have to be made to very small tolerances.

[0009] Moreover, given the high complexity of such mechanisms, they must undergo ongoing maintenance operations which result in inevitable machine shutdowns.

[0010] The aim of the present invention is to solve the above mentioned technical problems, by providing an improved selvage binding device, particularly for textile looms, which is structurally simple, reliable and fast.

[0011] Within this aim, an object of the present invention is to provide a selvage binding device that is easy to make and economically competitive when compared to the known art.

[0012] Another object of the invention consists in providing a selvage binding method, particularly for textile looms, which is capable of offering the widest guarantees of reliability, quality and repeatability.

[0013] This aim and these and other objects which will become better apparent hereinafter are achieved by an improved selvage binding device, particularly for textile looms, which is associable with a textile loom on which the warp threads are stretched and with which a weft insertion rod is associated which carries a weft thread

through said warp threads held in position by a comb element, **characterized in that** it comprises a shuttle with spool that is movable along a direction substantially parallel to said warp threads and carries a reinforcement thread which can be inserted in a loop defined by the weft thread supported by said weft insertion rod, a weft holder needle being further comprised which is movable independently of said shuttle with spool along a direction substantially parallel to said weft threads and is adapted to keep in position said weft thread during the retraction of said shuttle with spool, said reinforcement thread remaining inserted in said loop once said shuttle with spool has retracted.

[0014] Further characteristics and advantages of the invention will become better apparent from the description of a preferred, but not exclusive, embodiment of an improved selvage binding device, particularly for textile looms, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figures 1 and 2 are two plan views from above of an embodiment of an improved selvage binding device, particularly for textile looms, according to the invention, in sequence during a step of passing the weft thread between the warp threads;

Figure 3 is a plan view from above of the device, according to the invention, during a first step of advancement of the shuttle with spool simultaneously with the step of insertion of the weft holder needle into the loop defined by the weft thread;

Figure 4 is a plan view from above of the device, according to the invention, during a step of return of the weft insertion rod, after both the shuttle with spool and the weft holder needle are inserted into the loop defined by the weft thread;

Figure 5 is a plan view from above of the device, according to the invention, during a second step of advancement of the shuttle with spool simultaneously with the step of return of the weft insertion rod;

Figures 6 and 7 are two plan views from above of the device, according to the invention, in sequence during the step of repositioning the comb element along the warp threads.

[0015] With reference to the figures, an improved selvage binding device, particularly for textile looms, generally designated with the reference numeral 1, can be associated with a textile loom, generally designated with the reference numeral 2, on which warp threads 3 are stretched and with which a weft insertion rod 4 is associated which carries a weft thread 5 through the warp threads 3 held in position by a comb element 6.

[0016] According to the invention, a shuttle with spool 7 is comprised which is movable along a direction substantially parallel to the warp threads 3 and carries a reinforcement thread 8 which can be inserted in a loop 9 defined by the weft thread 5 supported by the weft insertion rod 4.

[0017] Moreover, a weft holder needle 10 is provided which is movable independently of the shuttle with spool 7 along a direction substantially parallel to the warp threads 3 and is adapted to keep in position the weft thread 5 during the retraction of the shuttle with spool 7.

[0018] More precisely, the reinforcement thread 8 remains inserted into the loop 9 once the shuttle with spool 7 is retracted.

[0019] Advantageously, the movements of the weft holder needle 10 and of the shuttle with spool 7 are obtained, respectively, by way of a first motor 11 for actuating the weft holder needle 10 and by way of a second motor 12 for actuating the shuttle with spool 7. Such motors 11 and 12 are conveniently synchronized with each other by way of adapted electronic control systems, but from the mechanical viewpoint they operate totally independently.

[0020] With the selvage binding device 1, according to the invention, it is possible to execute the following method.

[0021] With reference to Figures 1 and 2, in a step of passing, the weft thread 5 is passed through the warp threads 3 by way of the weft insertion rod 4 until the paths of the shuttle with spool 7 and of the weft holder needle 10 are crossed.

[0022] As is known, the passage of the weft thread 5 through the warp threads 3 is made possible because the latter are held in position by the comb element 6.

[0023] Subsequently, with reference to Figure 3, a first step of advancement of the shuttle with spool 7 into the loop 9 defined by the weft thread 5 supported by the weft insertion rod 4 is performed and simultaneously there is a step of insertion of the weft holder needle 10 into the same loop 9.

[0024] Once both the shuttle with spool 7 and the weft holder needle 10 are inserted into the loop 9, with reference to Figures 4 to 6, a step of return of the weft insertion rod 4 is performed in such a way that the weft thread 5 remains partially wound around the shuttle with spool 7 with its loop 9.

[0025] More precisely, the step of return of the weft insertion rod 4 occurs at three successive moments, of which the first, shown in Figure 4, occurs simultaneously with the first step of advancement of the shuttle with spool 7 into the loop 9 and with the step of insertion of the weft holder needle 10 into the same loop 9.

[0026] The second, shown in Figure 5, occurs simultaneously with a second step of advancement of the shuttle with spool 7 into the loop 9 in such a way that the reinforcement thread 8 is passed through the same loop 9.

[0027] Finally, the third, shown in Figure 6, occurs when the shuttle with spool 7 has reached the end of its stroke in the direction of the weft holder needle 10.

[0028] Once this is done, with reference to Figures 6 and 7, a step is performed of repositioning of the comb element 6 along the warp threads 3 for the placement of the weft thread 5 against the other weft threads 13 ar-

ranged previously.

[0029] More precisely, this step of repositioning of the comb element 6 occurs at two successive moments, of which the first, shown in Figure 6, occurs simultaneously with the step of return of the weft insertion rod 4 and the second, shown in Figure 7, occurs simultaneously with a step of retraction of the shuttle with spool 7 to the initial position of the first step of advancement, shown in Figure 1.

[0030] Advantageously, in this step of retraction the reinforcement thread 8 remains caught in the loop 9 so as to provide the selvage.

[0031] In practice it has been found that the improved selvage binding device, particularly for textile looms, and the selvage binding method, particularly for textile looms, obtainable by way of the selvage binding device, according to the present invention, achieve the intended aim and objects in that they make it possible to execute the selvage simply, quickly and effectively, by availing of mechanisms that are much less complex with respect to those used in the known art.

[0032] The improved selvage binding device, particularly for textile looms, and the selvage binding method, particularly for textile looms, thus conceived, are susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0033] Moreover, all the details may be substituted by other, technically equivalent elements.

[0034] In practice the materials employed, provided they are compatible with the specific use, and the contingent dimensions and shapes, may be any according to requirements.

[0035] The disclosures in Italian Patent Application No. MI2011A000875 from which this application claims priority are incorporated herein by reference.

[0036] 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

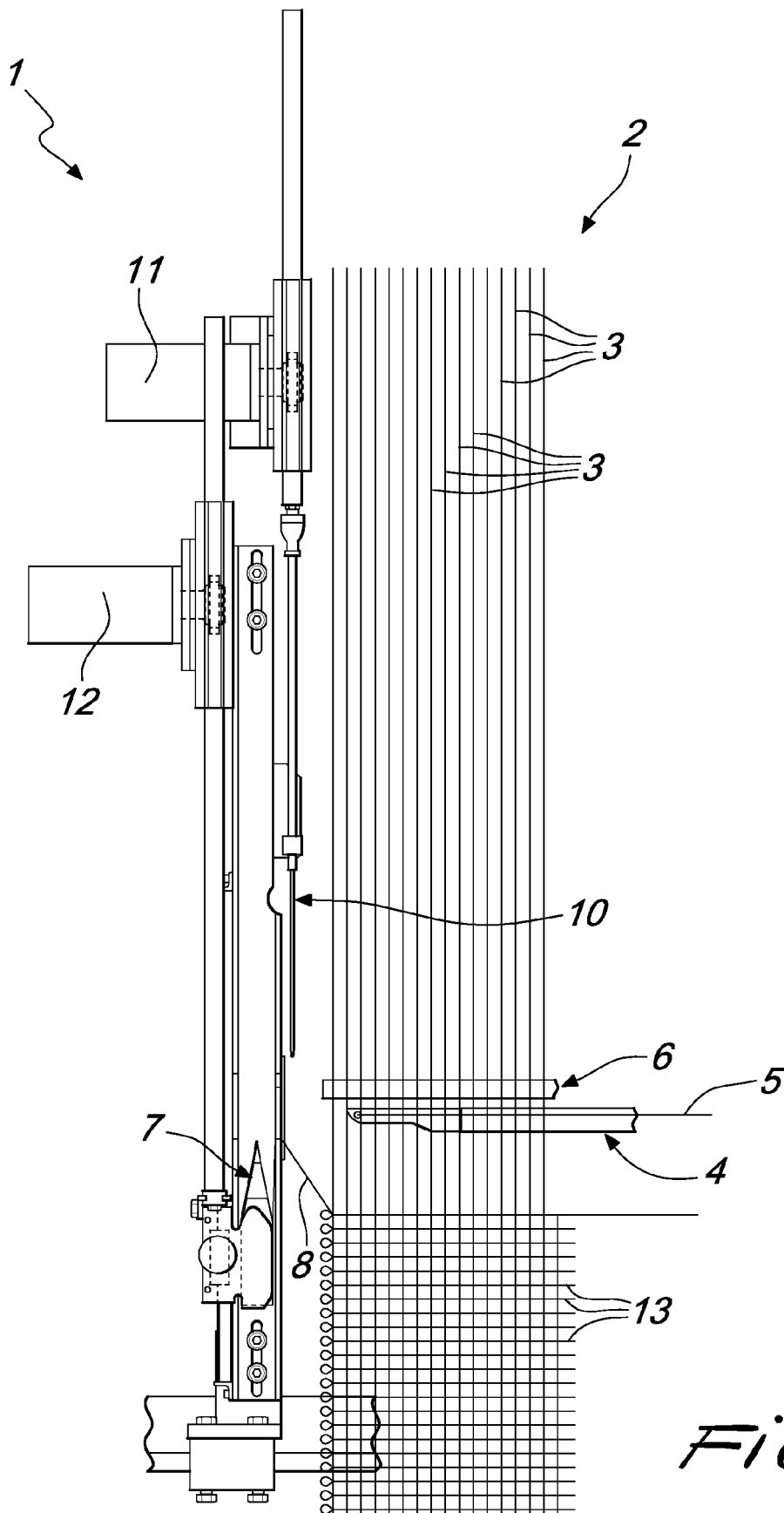
1. An improved selvage binding device (1), particularly for textile looms, which is associable with a textile loom (2) on which the warp threads (3) are stretched and with which a weft insertion rod (4) is associated which carries a weft thread (5) through said warp threads (3) held in position by a comb element (6), **characterized in that** it comprises a shuttle with spool (7) that is movable along a direction substantially parallel to said warp threads (3) and carries a reinforcement thread (8) which can be inserted in a loop (9) defined by the weft thread (5) supported by said weft insertion rod (4), a weft holder needle (10)

being further comprised which is movable independently of said shuttle with spool (7) along a direction substantially parallel to said weft threads (3) and is adapted to keep in position said weft thread (5) during the retraction of said shuttle with spool (7), said reinforcement thread (8) remaining inserted in said loop (9) once said shuttle with spool (7) has retracted.

2. The selvage binding device (1) according to claim 1, **characterized in that** it comprises a first motor (11) for actuating said weft holder needle (10).
3. The selvage binding device (1) according to claim 1 or 2, **characterized in that** it comprises a second motor (12) for actuating said shuttle with spool (7).
4. A selvage binding method, particularly for textile looms, which is obtainable by way of an improved selvage binding device (1) according to one or more of the preceding claims, **characterized in that** it comprises the steps of:
 - passing a weft thread (5) between said warp threads (3) by way of said weft insertion rod (4) until the paths of said shuttle with spool (7) and of said weft holder needle (10) are crossed, said warp threads (3) being held in position by said comb element (6),
 - advancing said shuttle with spool (7) into the loop (9) defined by said weft thread (5) carried by said weft insertion rod (4),
 - returning said weft insertion rod (4), said weft thread (5) remaining partially wound around said shuttle with spool (7) with said loop (9),
 - inserting said weft holder needle (10) in said loop (9),
 - a second step of advancing said shuttle with spool (7) in said loop (9) defined by said weft thread (5) carried by said weft insertion rod (4), in said second advancement step said reinforcement thread (8) being passed through said loop (9),
 - retracting said shuttle with spool (7) to the initial position of said first advancement step, in said step of retraction said reinforcement thread (8) remaining caught in said loop (9),
 - repositioning said comb element (6) along said weft threads (3) for the placement of said weft thread (5) against the other weft threads (13) arranged previously.
5. The selvage binding method according to claim 4, **characterized in that** said first step of advancing said shuttle with spool (7) in said loop (9) and said step of inserting said weft holder needle (10) in said loop (9) occur simultaneously.
6. The selvage binding method according to claim 4,

characterized in that said step of returning said weft insertion rod (4) occurs at three successive moments, the first occurring simultaneously with said first step of advancing said shuttle with spool (7) in said loop (9) and with said step of inserting said weft holder needle (10) in said loop (9), the second occurring simultaneously with said second step of advancing said shuttle with spool (7) in said loop (9), and the third occurring when said shuttle with spool (7) has reached the end of its stroke in the direction of said weft holder needle (10).

7. The selvage binding method according to claim 4, **characterized in that** said step of repositioning said comb element (6) occurs at two successive moments, the first occurring simultaneously with said step of returning said weft insertion rod (4) and the second occurring simultaneously with said step of retracting said shuttle with spool (7).



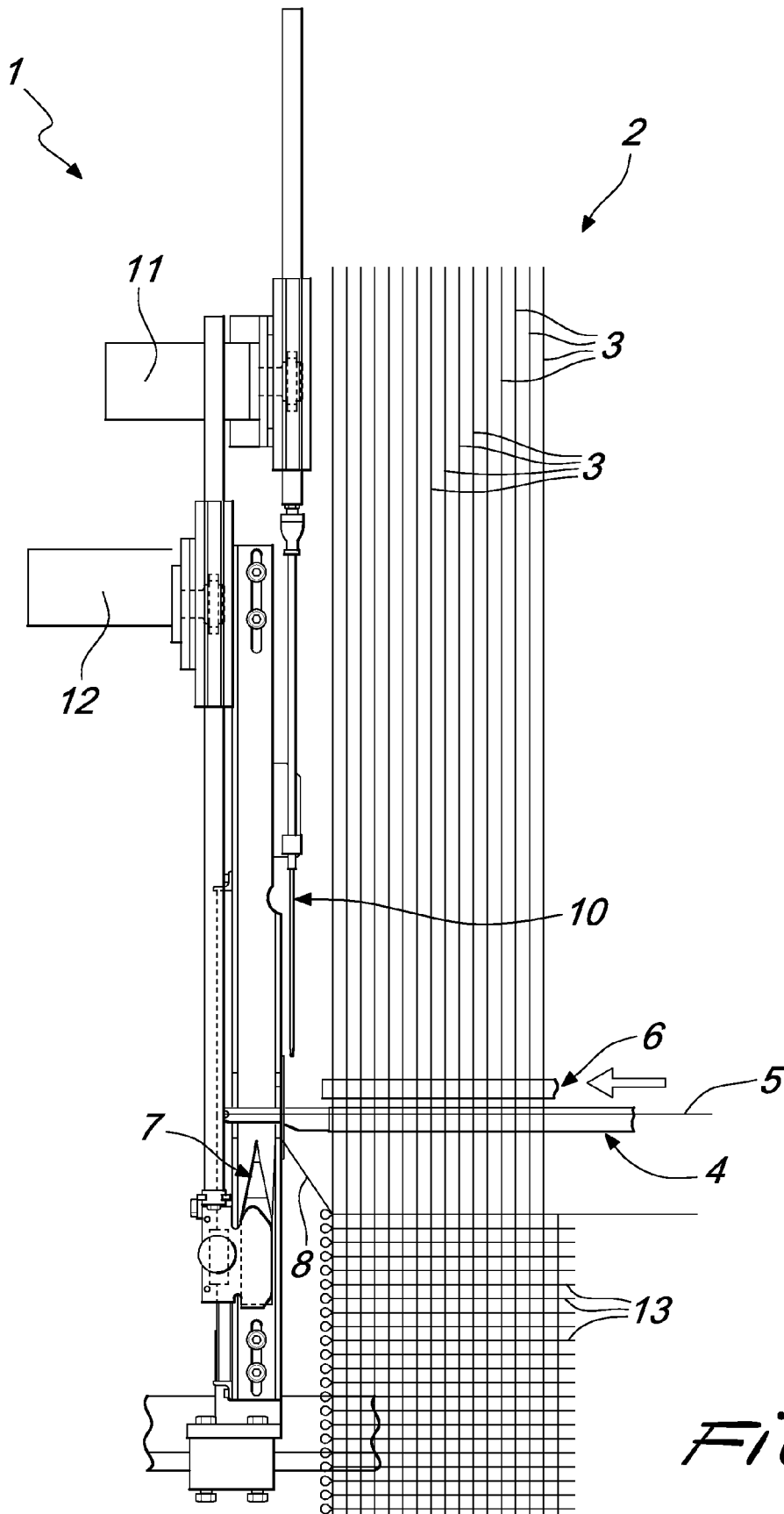


Fig. 2

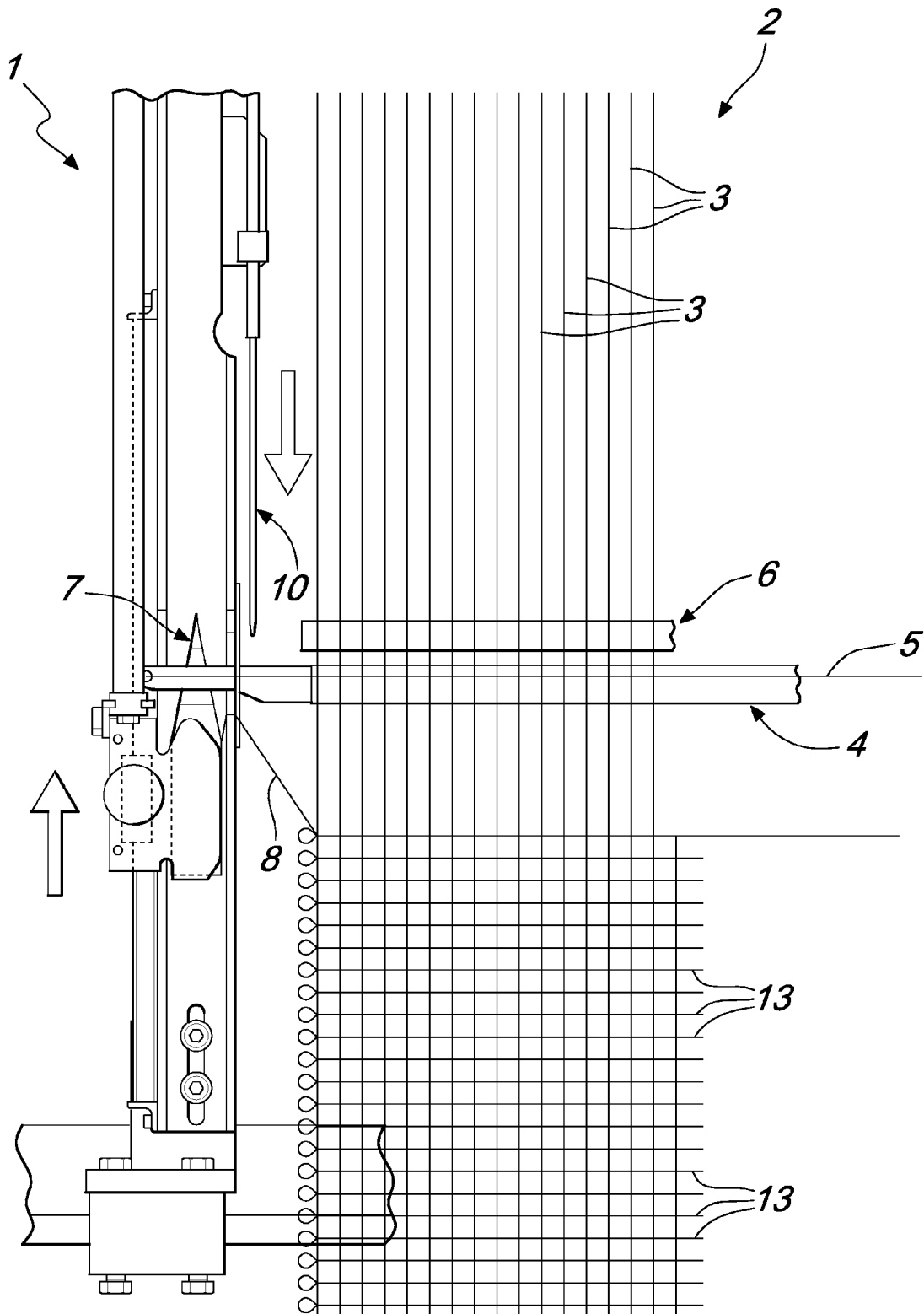


Fig. 3

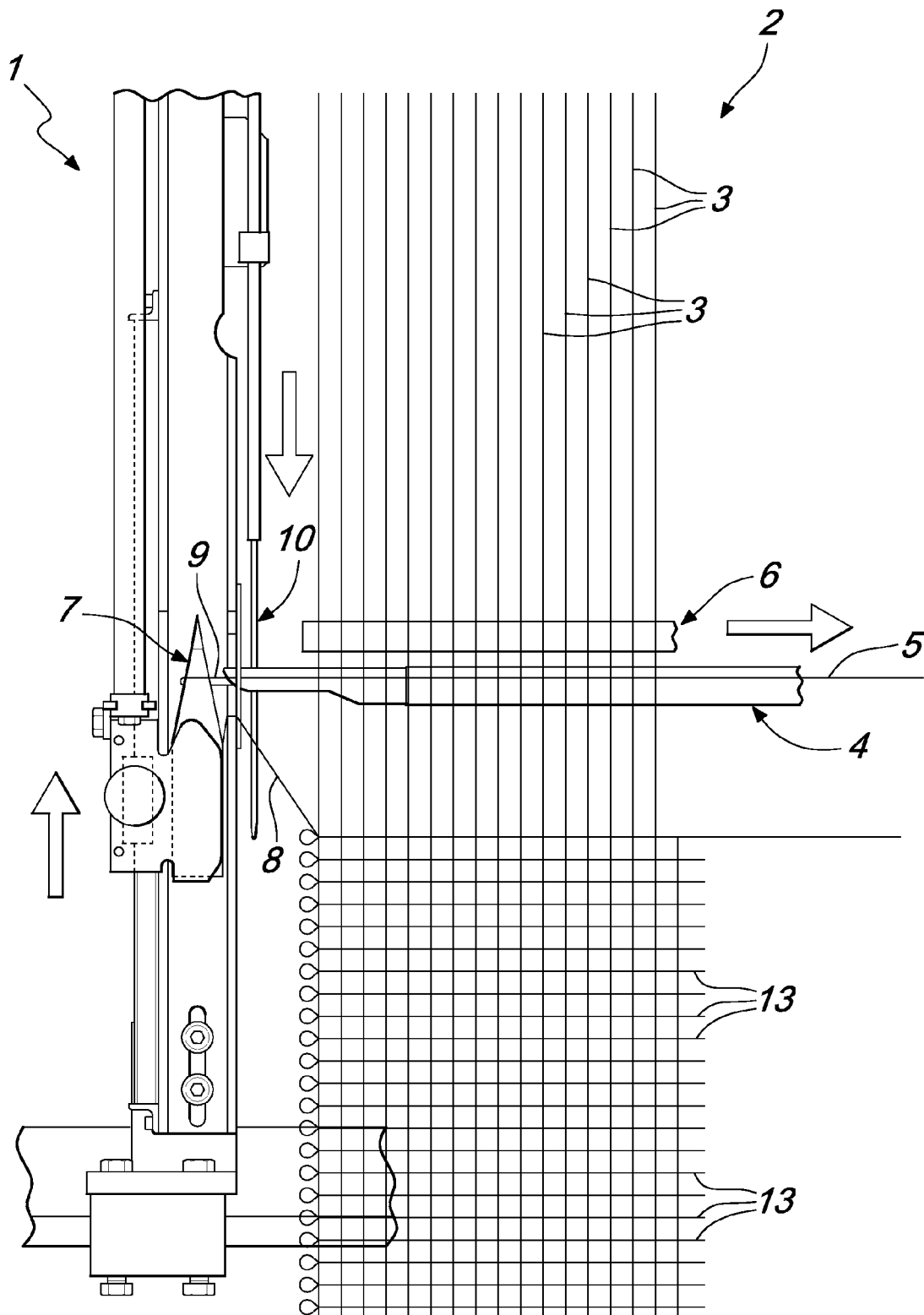


Fig. 4

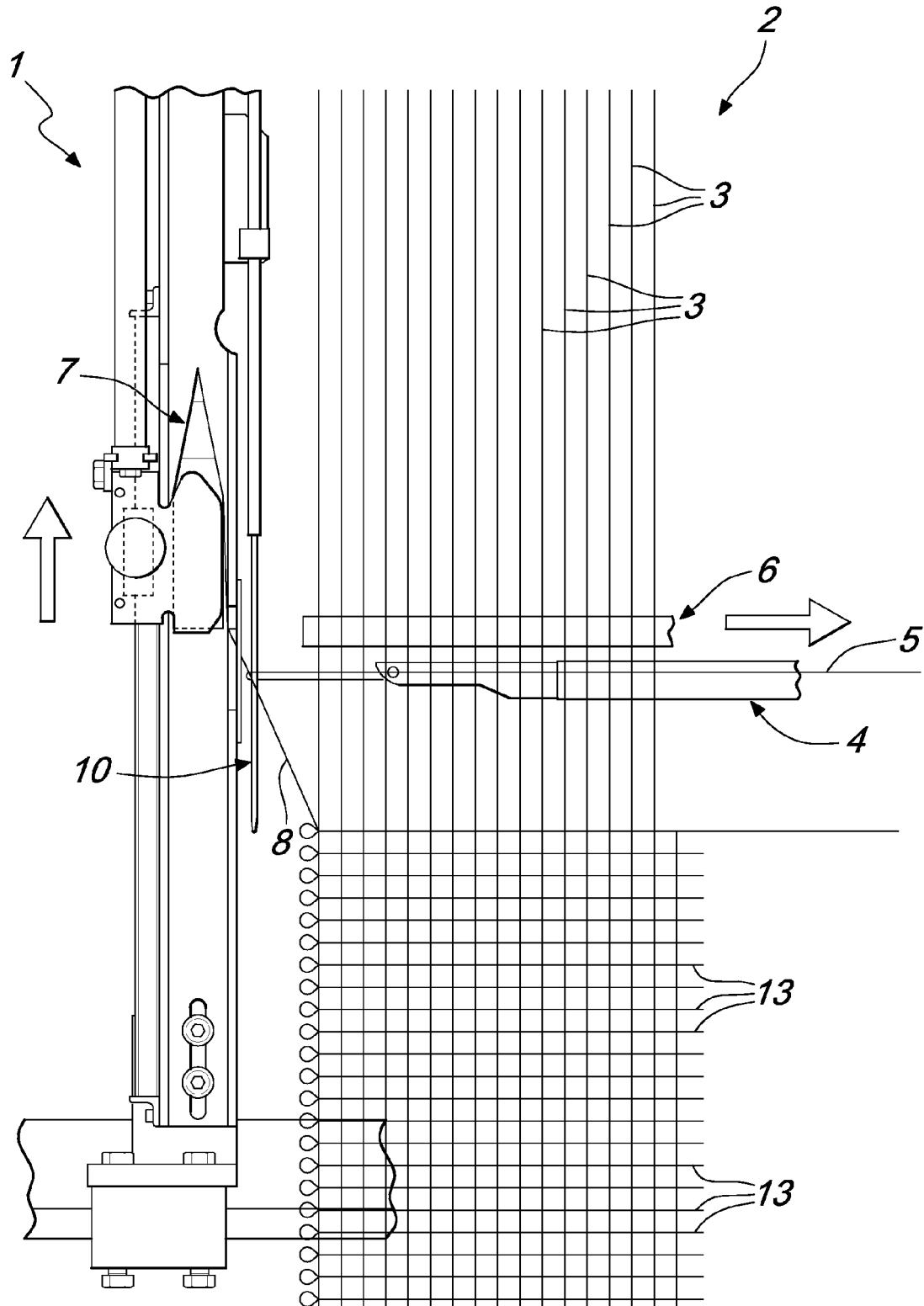


Fig. 5

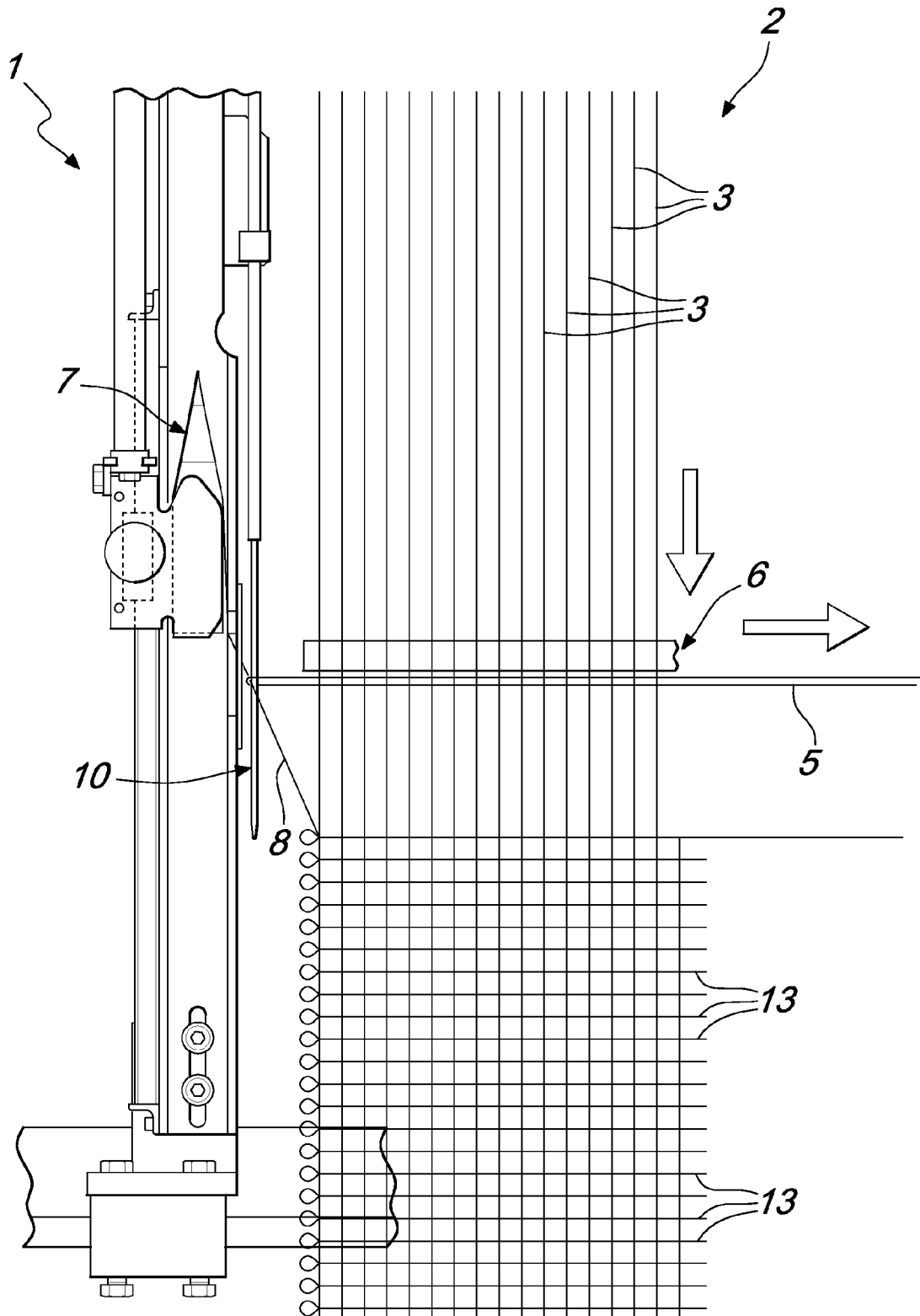


Fig. 6

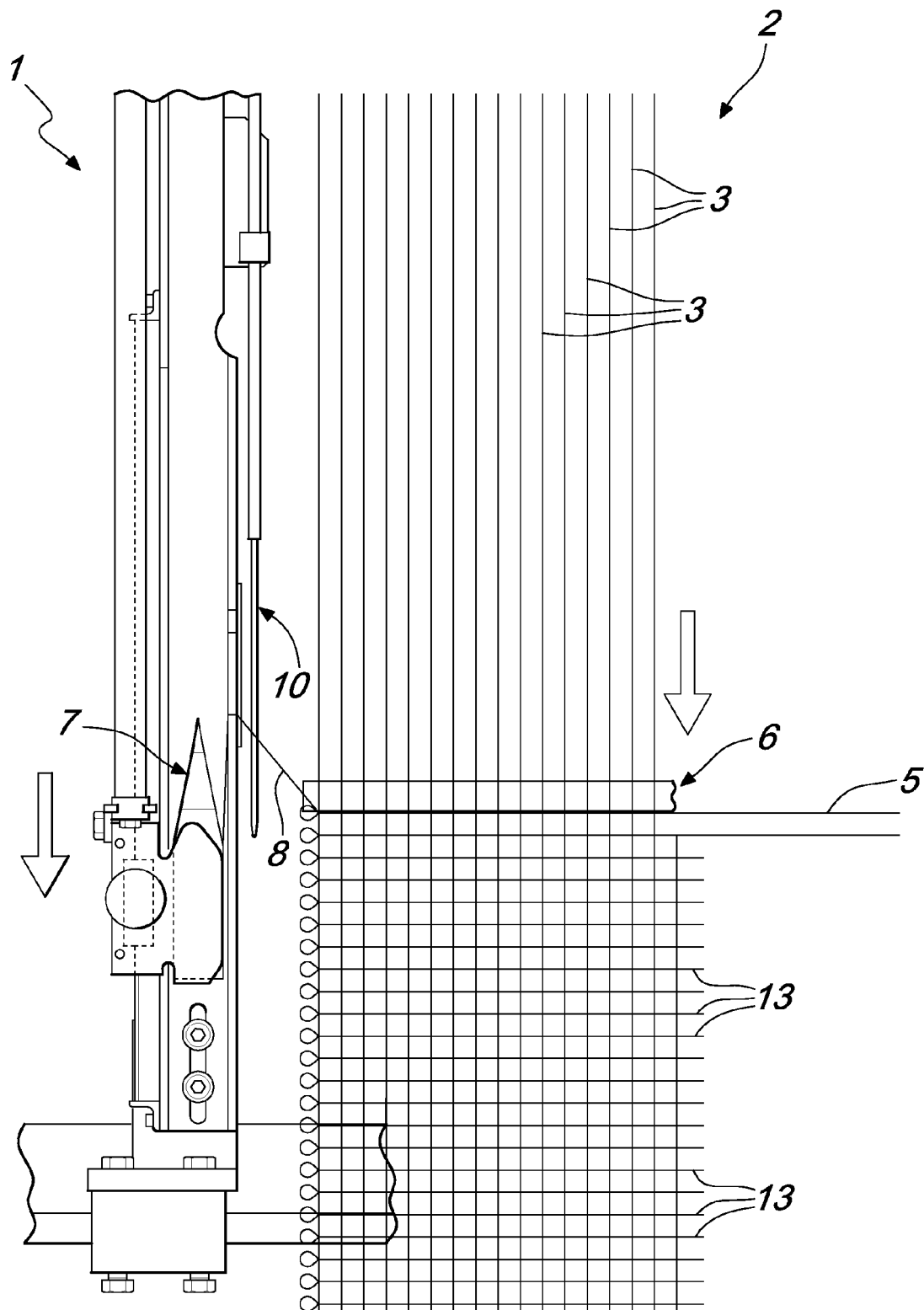


Fig. 7

REFERENCES CITED IN THE DESCRIPTION

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