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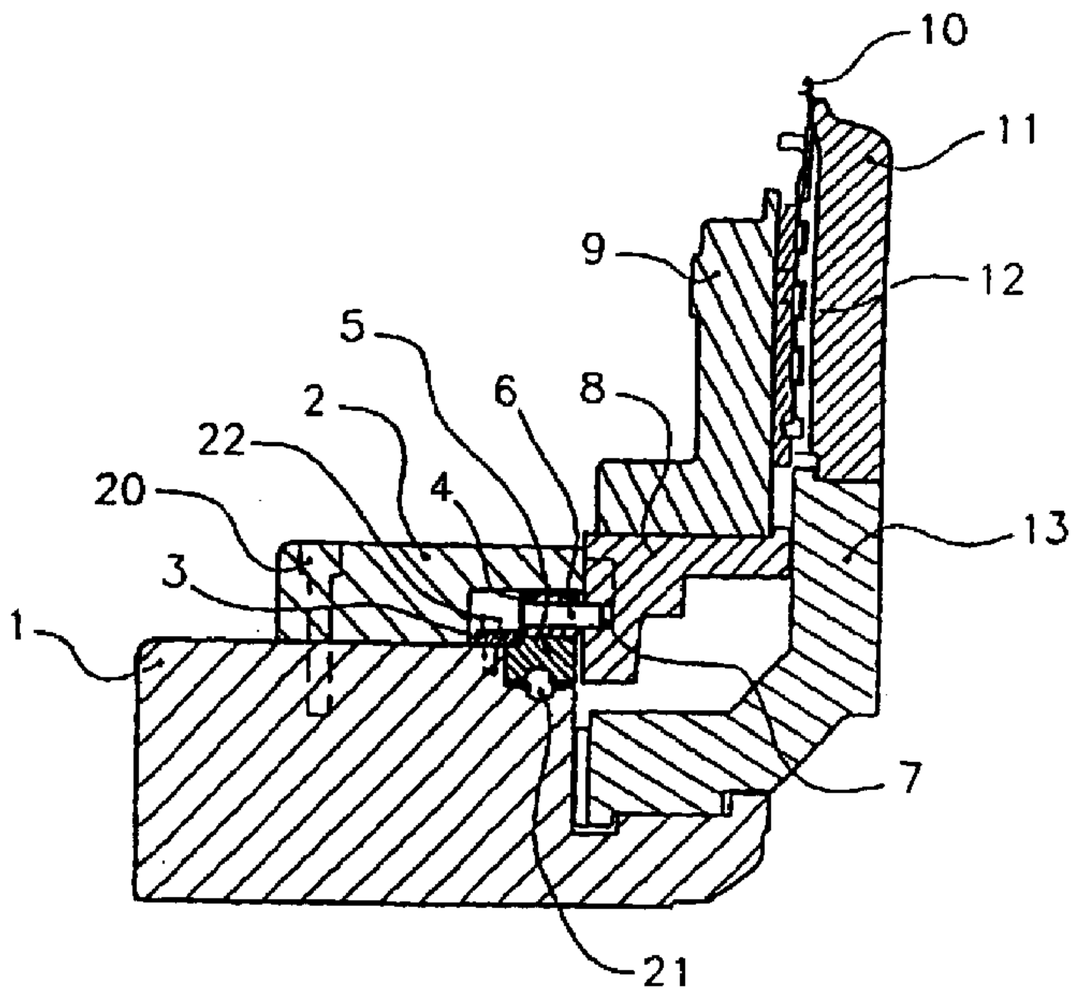
(54) **AMELIORATIONS APPORTEES A DES MACHINES A TRICOTER**

(54) **IMPROVEMENTS IN OR RELATING TO KNITTING MACHINES**



(57) L'invention porte sur un dispositif de réglage simultané de la longueur de la boucle de la maille à chaque déplacement d'une machine à tricoter circulaire à plusieurs mouvements. Les cames (12) de tricotage sont toutes soutenues par un anneau (8) de support pouvant se déplacer verticalement par rapport au plateau mobile (1) de la machine, mais ne pouvant pas effectuer de rotation par rapport à celui-ci. Pour régler la position verticale de l'anneau (8) de support, un dispositif d'actionnement se présentant sous la forme d'un pignon d'engrenage (15) est mis en rotation, rotation transmise par un engrenage à crémaillère (14) et une bague rotative (5) à une ou plusieurs broches (6) qui s'engagent dans des fentes (7) de l'anneau (8) de support. Du fait que l'anneau (8) de support (8) ne puisse pas tourner sur lui-même, le déplacement des broches (6) le long des fentes (7) oblige l'anneau (8) de support à se déplacer verticalement sous l'action des cames.

(57) An adjustment device for simultaneously adjusting the stitch loop length at each feed of a multi-feed circular knitting machine is disclosed. The knitting cams (12) are all supported by a common seat ring (8) which is able to move vertically relative to the bedplate (1) of the machine, but which cannot rotate relative thereto. To adjust the vertical position of the seat ring (8), an actuating device in the form of a pinion gear (15) is rotated and the rotation is transmitted through a rack gear (14) and rotatable ring (5) to one or more pins (6) which engage in slots (7) in the seat ring (8). Since the seat ring (8) itself cannot rotate, movement of the pins (6) along the slots (7) forces the seat ring (8) to move vertically by cam action.

ABSTRACT

IMPROVEMENTS IN OR RELATING TO KNITTING MACHINES

An adjustment device for simultaneously adjusting the stitch loop length at each feed of a multi-feed circular knitting machine is disclosed. The knitting cams (12) are all supported by a common seat ring (8) which is able to move vertically relative to the bedplate (1) of the machine, but which cannot rotate relative thereto. To adjust the vertical position of the seat ring (8), an actuating device in the form of a pinion gear (15) is rotated and the rotation is transmitted through a rack gear (14) and rotatable ring (5) to one or more pins (6) which engage in slots (7) in the seat ring (8). Since the seat ring (8) itself cannot rotate, movement of the pins (6) along the slots (7) forces the seat ring (8) to move vertically by cam action.

IMPROVEMENTS IN OR RELATING TO KNITTING MACHINES

The present invention relates to knitting machines and in particular to an adjustment device for simultaneously varying the length of the stitch loops in a multi feed circular knitting machine.

In circular knitting machines, in order to knit fabrics of different thickness and density, it is necessary to alter the length of the stitch loops. In a conventional circular knitting machine, it is the usual practice to change the length of the stitch loops by vertically adjusting the individual stitch cams at each of the knitting stations of the operating paths of the knitting needles. This is quite a time consuming task which requires a skilled operator in order to ensure that all the knitting stations are adjusted to produce stitch loops of the same length around the circular knitting machine.

The present invention provides an adjustment device for simultaneously adjusting the stitch length at each feed of a multi feed circular knitting machine, comprising a main body and a plurality of knitting cams arranged in a circle and supported by a common support member, the support member being linearly movable relative to the body but prevented from rotating relative to the body, a rotatable actuating device, a transmission device operable to transmit movement of the actuating device to the support member, the transmission device including a conversion device to convert rotational movement of the actuating means into linear movement of the support member.

The adjustment device of the present invention thus simplifies the process of height adjustment of the knitting cams which is required for knitting fabric of different thickness and density. It eliminates the complication of adjusting the knitting cams individually.

Preferably, the transmission device comprises gear means.

It is also preferable if the conversion device comprises cam means.

In one embodiment, the actuating device comprises a first gear rotatably mounted on the body and the transmission device comprises a transmission element rotatably mounted on the body and supporting a second gear which engages with the first gear.

Conveniently, the first gear comprises a pinion, the second gear comprises a rack and the transmission element is a ring rotatably mounted on the body by means of bearings.

In one aspect, the conversion device comprises at least one projection on the transmission element which extends into a respective slot formed in the support member, wherein the slot defines part of a helical curve extending around the periphery of the support member.

The projection may comprise a pin mounted in a block secured to the transmission element.

Typically, the body comprises a bed plate and a ring plate secured thereto, the ring plate surrounding the support member, wherein locking means is disposed between

the ring plate and the support member to preclude relative rotation but to permit relative linear movement.

In such an arrangement, the actuating device may be mounted in an aperture in the ring plate.

Preferably, the actuating device defines a recess engageable by an actuating tool to facilitate rotation of the actuating device.

The present invention also provides a circular knitting machine incorporating the aforementioned type of adjustment device.

The invention will now be described in detail, by way of example only, with reference to the accompanying drawings in which:

FIGURE 1 is a vertical sectional view through the needle ring of a circular knitting machine, taken substantially along the line 1-1 in Figure 3, and illustrating an adjustment device in accordance with the invention;

FIGURE 2 is a fragmentary vertical sectional view taken substantially along the line 2-2 in Figure 3, at an enlarged scale; and

FIGURE 3 is a fragmentary plan view of the knitting cam block seat ring and associated parts.

With reference to the Figures, a circular knitting machine incorporating an embodiment of the present invention comprises a bed plate 1 which supports a conventional drive gear 13 and an annular ring plate 2

which is held in position on the bed plate 1 by screws 20. Between the ring plate 2 and the drive gear 13 is located a knitting cam block seat ring 8. The knitting cam block seat ring 8 supports conventional cam holder blocks 9 which in turn support knitting cams 12, a needle ring 11 and knitting needles 10. The cam block seat ring 8 is prevented from rotating relative to the ring plate 2 by a number of guide pins 16 (best seen in Figures 2 and 3) which engage in opposing semi-cylindrical recesses in the ring plate 2 and knitting cam block seat ring 8 and which are secured to the latter by screws 17.

Although it is not rotatable, the knitting cam block seat ring 8 is supported inside the ring plate 2 so as to allow independent vertical movement of the seat ring 8 by means of the structure described below.

As shown in Figures 1 and 2, a rotatable ring 5 is supported on the bed plate 1 by means of ball bearings 21. A number of circumferentially spaced setting plates 3 are secured by respective screws 22 onto the bed plate 1 so as to slightly overhang the rotatable ring 5. Thus, the rotatable ring 5 is able to slide along the lower surfaces of the setting plates 3.

An arcuate toothed rack 14 is secured on the upper surface of the rotatable ring 5 by screws 23, as best seen in Figures 2 and 3. A pinion 15 is supported by a guide collar 19 which is rotatably seated in an aperture in the ring plate 2. The pinion 15 is positioned so that its teeth engage the teeth extending around the outer peripheral surface of the rack 14. Thus, rotation of the pinion 15, e.g by inserting an Allen key into a socket 18 in the top of the pinion 15, imparts rotation to the ring 5 via rack 14.

A number of support pins 6 are provided, each of which passes through a respective support block 4. The support blocks 4 are circumferentially spaced around the upper surface of the rotatable ring 5 and fixed thereto by screws 24. Each support pin 6 projects into a cam slot 7 formed in the outer peripheral surface of the knitting cam block seat ring 8. Each cam slot 7 is arcuate and follows the path of a helical curve extending around the outer peripheral surface of the knitting cam block seat ring 8.

Rotation of the pinion 15 and hence of the rotatable ring 5 as described above causes the support pins 6 to travel along the cam slots 7. However, since the knitting cam block seat ring 8 itself is unable to rotate due to the guide pins 16, a cam action results between the support pins 6 and the cam slots 7 which forces the knitting cam block seat ring 8 to move vertically relative to the ring plate 2 and bed plate 1. Depending on the direction of rotation of the pinion 15, the knitting cam block seat ring 8 is either raised or lowered.

In this way, rotation of the ring 5 imparts linear vertical adjustment to the knitting cam block seat ring 8 and thereby the height of the needle cams 12 is simultaneously vertically adjusted by the same amount at each of the knitting stations around the circular knitting machine. This ensures that all the stitch loops will be the same length and greatly speeds up the process of vertical adjustment.

It will be apparent to those skilled in the art that a number of modifications to the apparatus described above are possible while still falling within the scope

of the claims appended hereto. For example, the precise configuration of the gear and cam systems which convert rotational movement into linear movement of the knitting cams is not limited to the details described herein.

CLAIMS:

1. An adjustment device for simultaneously adjusting the stitch length at each feed of a multi feed circular knitting machine, comprising a main body and a plurality of knitting cams arranged in a circle and supported by a common support member, the support member being linearly movable relative to the body but prevented from rotating relative to the body, a rotatable actuating device, a transmission device operable to transmit movement of the actuating device to the support member, the transmission device including a conversion device to convert rotational movement of the actuating means into linear movement of the support member, wherein the conversion device comprises at least one projection on the transmission element which extends into a respective slot formed in the support member, wherein the slot defines part of a helical curve extending around the periphery of the support member, such that the at least one projection and the respective slot co-operate with a cam action to convert rotational movement of the actuating means into linear movement of the support member.

2. An adjustment device as claimed in claim 1, wherein the transmission device comprises gear means.

3. An adjustment device as claimed in any preceding claim, wherein the actuating device comprises a first gear rotatably mounted on the body and the transmission device comprises a transmission element rotatably mounted on the body and supporting a second gear which engages with the first gear.

4. An adjustment device as claimed in claim 3,

wherein the first gear comprises a pinion, the second gear comprises a rack and the transmission element is a ring rotatably mounted on the body by means of bearings.

5. An adjustment device as claimed in any preceding claim, wherein the projection comprises a pin mounted in a block secured to the transmission element.

6. An adjustment device as claimed in any preceding claim, wherein the body comprises a bed plate and a ring plate secured thereto, the ring plate surrounding the support member, wherein locking means is disposed between the ring plate and the support member to preclude relative rotation but to permit relative linear movement.

7. An adjustment device as claimed in claim 6, wherein the actuating device is mounted in an aperture in the ring plate.

8. An adjustment device as claimed in claim 7, wherein the actuating device defines a recess engageable by an actuating tool to facilitate rotation of the actuating device.

9. A circular knitting machine incorporating an adjustment device as claimed in any preceding claim.

10. An adjustment device substantially as hereinbefore described with reference to the accompanying drawings.

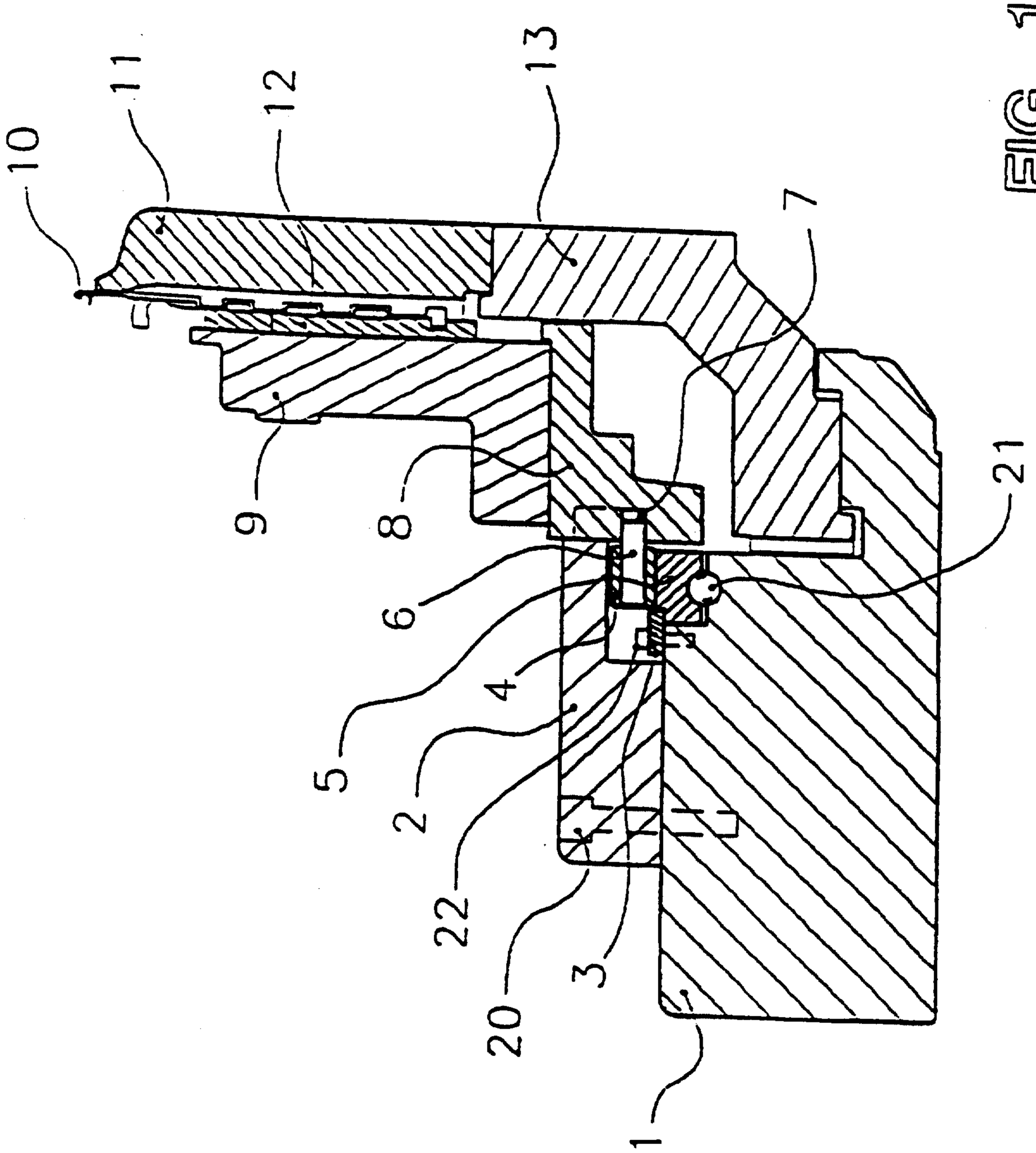


FIG. 1

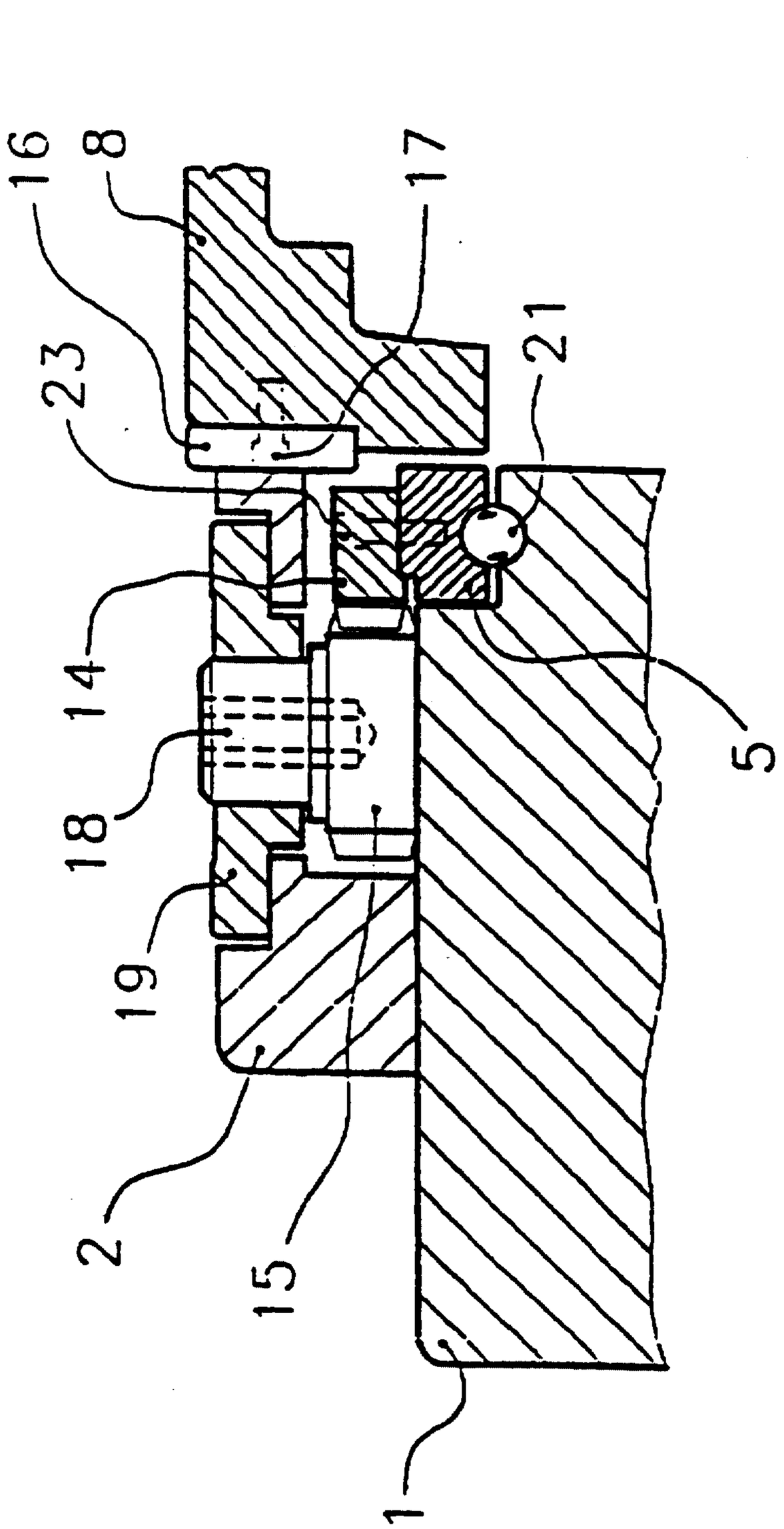


FIG 2

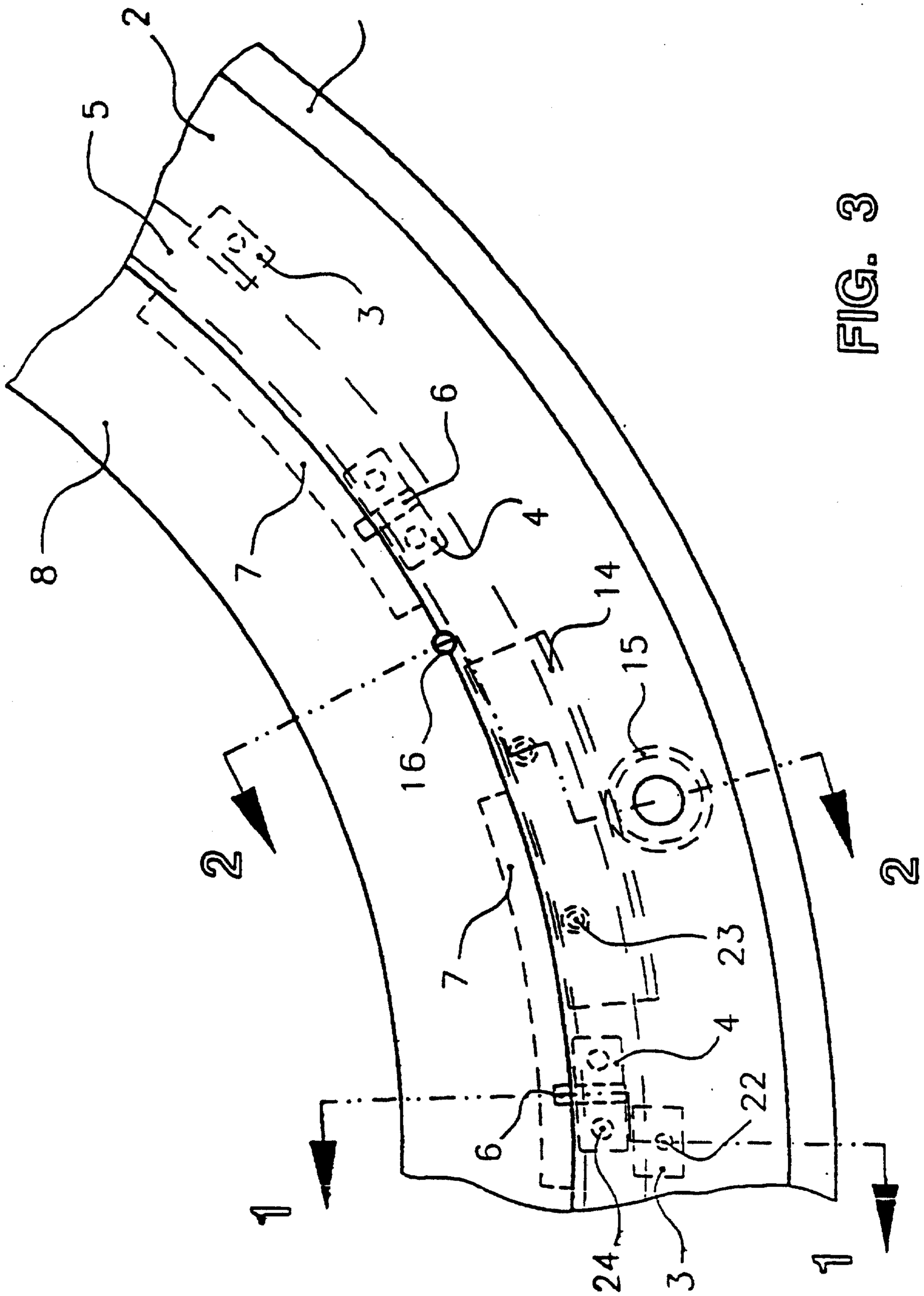
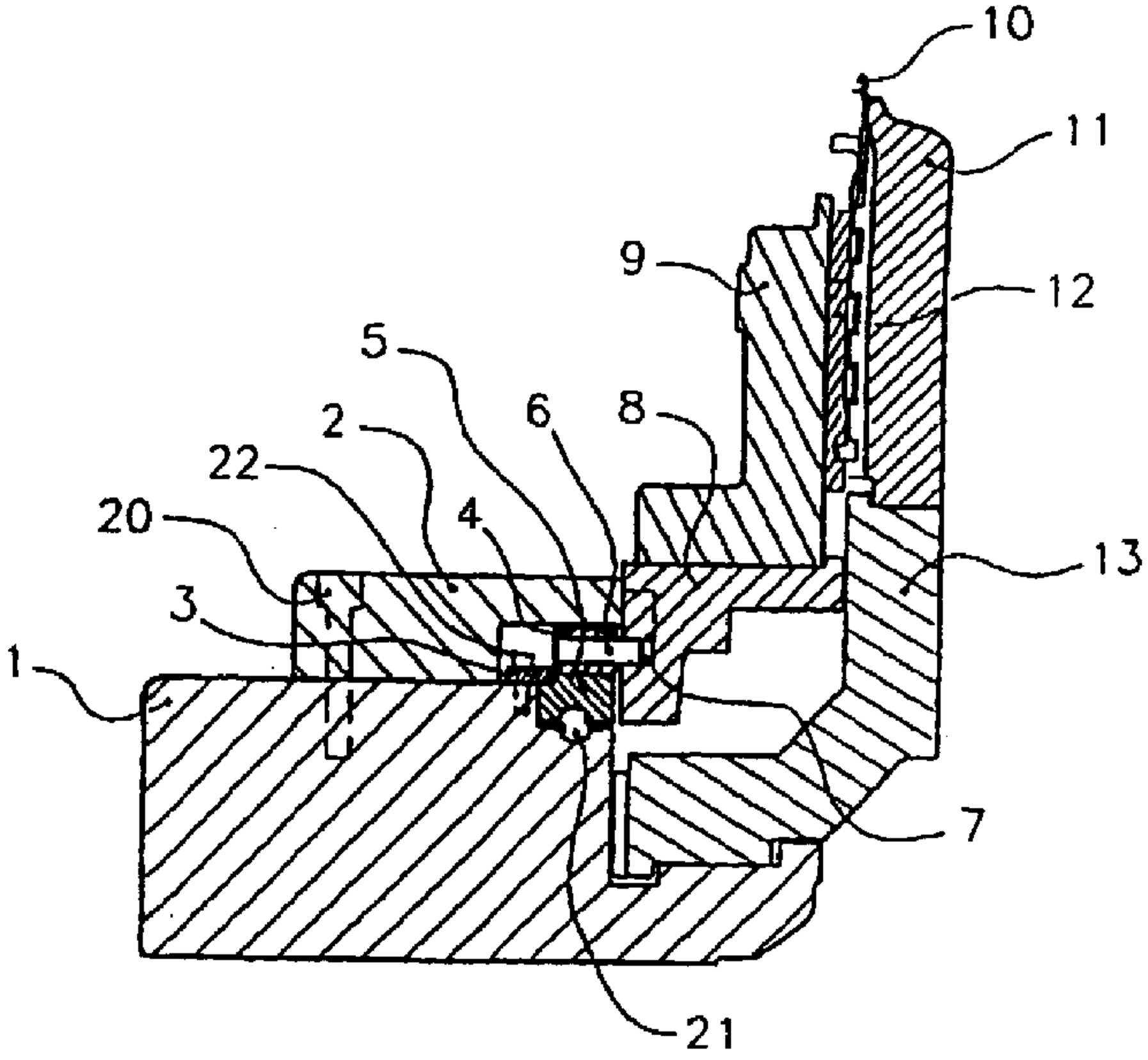


FIG. 3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