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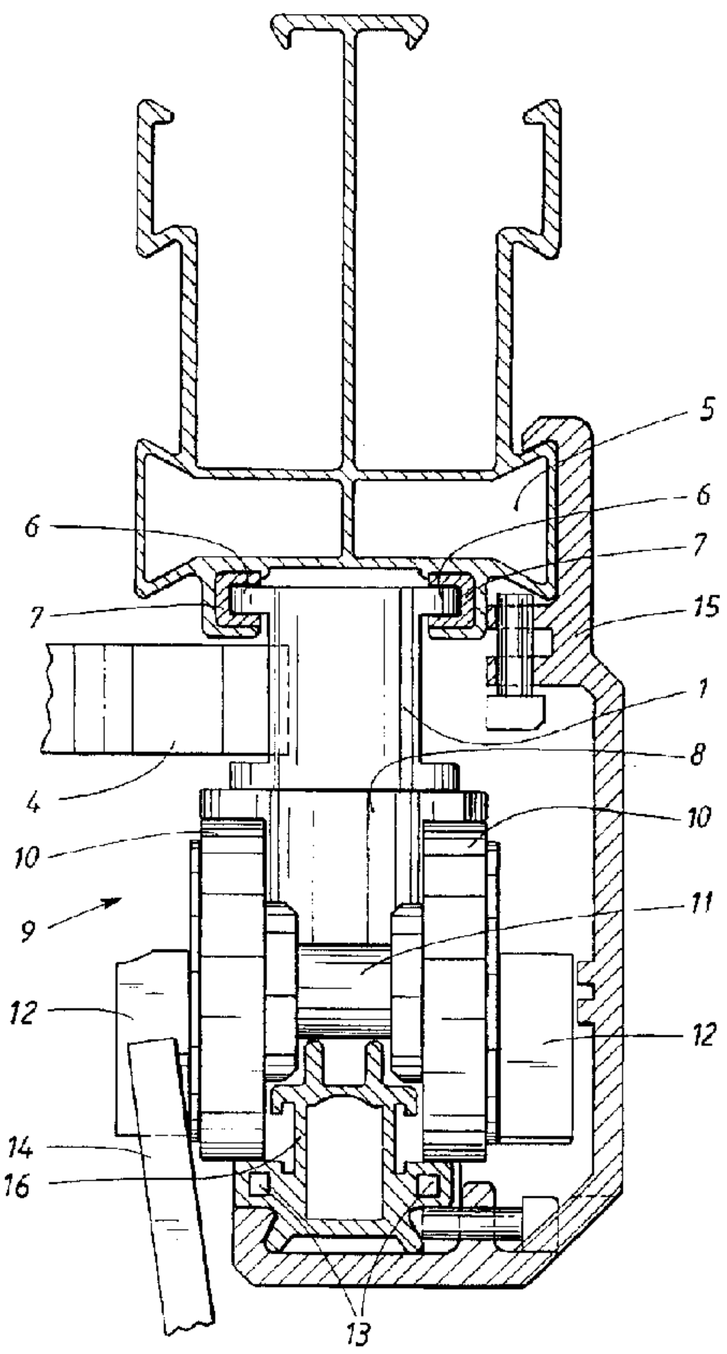
(54) **DISPOSITIF D'ALIMENTATION EN SUPPORTS DE PRODUITS PLACES MOBILES SUR UN RAIL**

(54) **ARRANGEMENT FOR FEEDING PRODUCT CARRIERS MOVEABLY ARRANGED ON A RAIL**



(57) L'invention concerne un système permettant l'alimentation en supports (9) de produits posés mobiles sur un rail principal (13) pourvu de rails d'embranchement permettant d'alimenter le rail

(57) The invention relates to an arrangement for feeding product carriers (9) which are movably resting on a main rail (13) with branching rails for feeding to and removal from the main rail (13) of product carriers (9). The

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principal (13) en supports de produits et de les faire sortir du rail principal. Le mouvement est exécuté par une bande (1) ou une chaîne sans fin. L'invention est caractérisée en ce que la bande, suspendue mobile à un second rail (5) placé au-dessus du rail principal (13), est accessible pour permettre un entraînement sur les côtés pendants vers le bas.

movement is intended to be carried out by means of an endless band (1) or chain and the invention is characterized in that the band is movably suspended in a second rail (5) above the main rail (13) and accessible for driving on the downwardly hanging sides.

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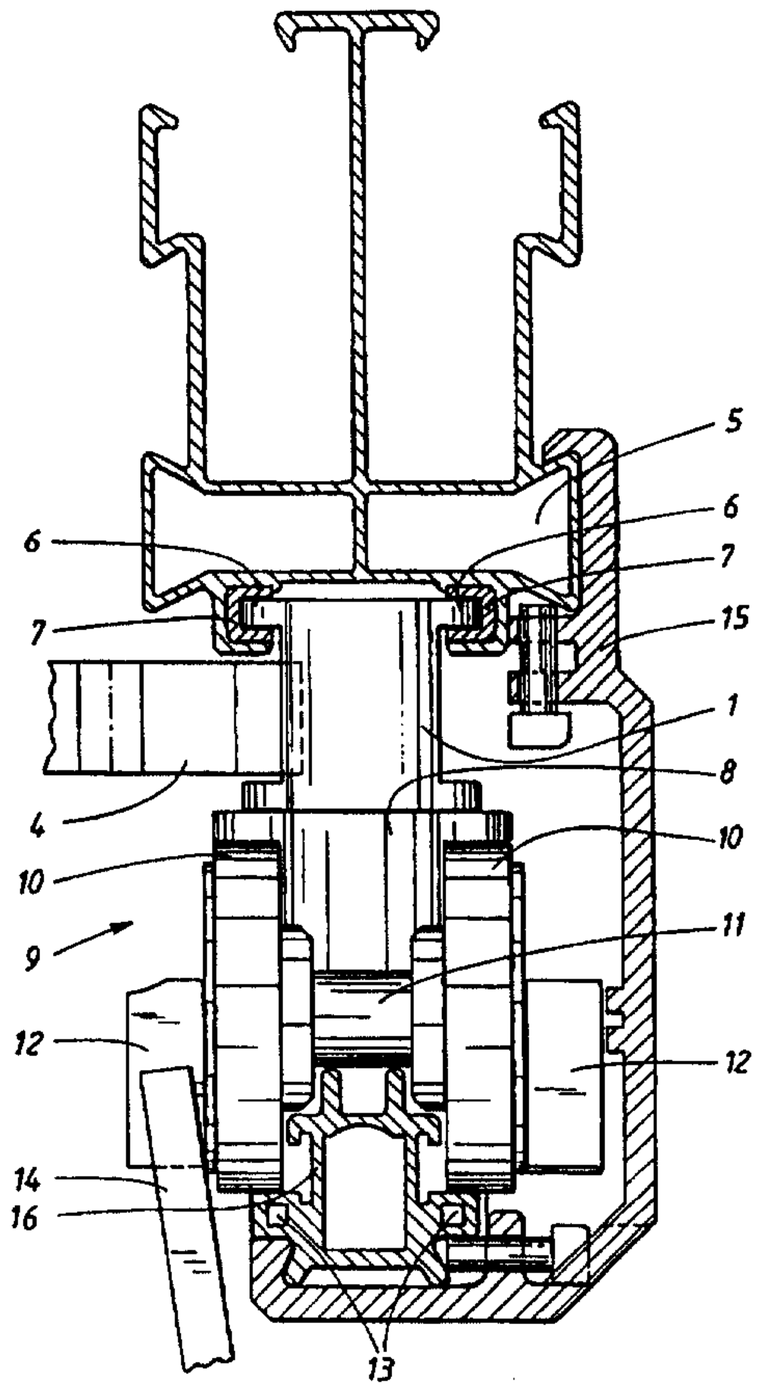
(54) Title: ARRANGEMENT FOR FEEDING PRODUCT CARRIERS MOVEABLY ARRANGED ON A RAIL

(57) Abstract

The invention relates to an arrangement for feeding product carriers (9) which are movably resting on a main rail (13) with branching rails for feeding to and removal from the main rail (13) of product carriers (9). The movement is intended to be carried out by means of an endless band (1) or chain and the invention is characterized in that the band is movably suspended in a second rail (5) above the main rail (13) and accessible for driving on the downwardly hanging sides.



TITLE:

ARRANGEMENT FOR FEEDING PRODUCT CARRIERS MOVEABLY ARRANGED ON A RAIL

TECHNICAL FIELD:

The present invention relates to an arrangement for feeding product carriers which are movably resting on a rail. Such arrangements are usually present in textile factories in connection with, for example, production of shirts wherein different cloth-pieces are suspended in a product carrier which moves on a rail to a working station, which pieces are to be sewn together at this station. The invention is however not only related to the production of shirts or the textile industry but is commonly applicable for feeding all product carriers.

PRIOR ART:

The product carriers in which, for example, the cloth pieces are to be hung if they are used within the textile industry, are usually intended to roll forward on a main rail suspended from the ceiling or at a high level in the factory space. From the main rail a number of branching rails depart into which the product carriers are fed in a certain order wherein these branching rails bring the product carrier down to a lower level at a work station, wherefrom, after the cloth piece has been subjected to a working operation, the product carrier again is lifted up and fed in onto the main rail. A computer conducts the movement of the product carriers on the main rail and the branching rails and arrangements are made for transferring the product carriers to and from the branching rails. A number of work stations and branching rails are arranged along the main rail for working with the products and finally a finished product will be conveyed on the main rail and removed therefrom. The main rail and the branching rails cooperate with endless bands for driving the product carriers.

An example of such a driving band within the textile industry is described in the British patent 2105284. This band lies in a rail and drives the product carriers lying thereon, which product carriers run on two wheels. The band is made of two folded bands lying adjacent to each other, which bands are united with each other, or it can be made in one piece. The bands can be driven by means of a driving cog-wheel which engages in the folds of the band from one side. The band is flexible; it can be bent in all directions but it has nevertheless such a high rigidity that the cog-wheel both can push it forward and pull it. To make the cog-wheel engage in the folds of the band a recess is arranged in the side of the rail. The band may be long, up to several hundred meters, but it usually has a length of about fifty metres.

TECHNICAL PROBLEM:

The feeding arrangements according to the prior art have as such worked well, but since the driving band for the main line lies in the main rail, this driving band is not accessible from the side but only at certain places where recesses for the driving motors have been made in the rail before mounting. Since the band lies in the rail and has its product carriers on the upper side, a rail which slopes downwardly towards the band has been arranged for feeding all product carriers. These are released by a barrier and are allowed to fall in and down on the main rail by means of gravity. When operational disturbances occur a product carrier may therefore be delayed and come in front of a later carrier than the one intended. It is therefore necessary to have a long distance between the carriers. It has therefore long been a desire to bring about a main line in which it is possible to make branchings and arrange driving motors anywhere along the line and have a synchronized in and out feeding of the product carriers, which should make it possible to have shorter distances

between the carriers and consequently give the whole arrangement a higher capacity.

THE SOLUTION:

To solve the above problems, an arrangement has been brought about according to the invention for feeding product carriers which are movably resting on a main rail which has branchings for supply to and removal from the main rail for product carriers, wherein the movement is intended to be carried out by means of an endless band or chain, which arrangement is characterized in that the band is movably suspended in a second rail above the main rail and is accessible for driving on the downwardly hanging sides has.

According to the invention, the band should have recesses in the sides intended to cooperate with the driving or driven cog-wheels.

According to the invention, the band shall be provided with downwardly extending carriers for movement of the product carriers in their rail.

According to the invention, change-over devices are arranged at each branching for feeding in and feeding out of the product carriers to and from the main rail, which change-over devices comprise cog-wheels which are driven by the band.

According to the invention, the cog-wheels are intended to drive an endless band for feeding or removing product carriers to and from the main rail from or to the branching rails.

According to the invention, the band is arranged close to the branching rail and comprises a plug-shaped carrier for

the product carriers, which protrudes against the branching rail.

According to the invention, for coupling of the branching rails to or from the main rail, end pieces which are swingable to or from the main rail are arranged on the branching rails and swingable intermediate pieces are arrranged on the main rail adjacent to and at a level under these end pieces.

According to the invention, it is suitable that, at the branching rail for feeding product carriers to the main rail, the endpiece or the intermediate piece is swung into the correct position by means of the passing product carrier.

According to the invention, it is also suitable that at the branching rail for removing product carriers from the main rail the endpiece is swung into a correct position by means of an adjustment device while the carrier on the main band reinstalls the direct route on the main rail for the next coming product carrier.

FIGURE DESCRIPTION:

The invention will in the following be described more in detail in connection with the attached drawings in which:

Fig 1 shows a section through the driving band according to the invention with a driving cog-wheel

Fig 2 partly in section shows a main transport line with a driving band, main rail and product carriers,

Fig 3 shows the main rail with branching chains seen from above,

Fig 4 shows the same arrangement as i Fig. 3 but with a product carrier on the way in onto the main rail,

Fig 5 also shows the same arrangement as the one in Fig. 3 but with a product carrier on the way out from the main rail,

Fig 6 shows a later stage than the one according to Fig. 5,

Fig 7 shows how branchings can be obtained on both sides of the main rail and

Fig 8 shows an example of how the carrier band for the side chain can be driven by the main band.

DETAILED DESCRIPTION:

Fig. 1 shows a section through the driving band 1 which consists of a folded band 2. The band consists suitably of a plastic material which makes the band 1 bendable in all directions and which enables the band to be pulled forward but also to be pushed forward. The Figure also shows a cog-wheel 4 which drives the band forward. This driving band is described in more detail with regard to its construction in the British patent 2105284 but in the present case is modified in that it is made in one piece and provided with heels 3 making a flange for suspending in a gliding list.

In Fig. 2 a section through the main line is shown where the band 1 is suspended in a frame 5. The band 1 is

provided with flanges 6 which are inserted in gliding lists 7 so that the band easily can be moved forwards or backwards. In the figure it is indicated how a cog-wheel 4 engages the band 1 and drives it.

As is shown in the Figure, the band hangs downwardly and carries at its lower end a number of carriers 8 arranged at even distances. These carriers 8 which are fastened to the band 1 have a box-like structure which, with its shorter side is intended to push against the product carrier 9.

The product carrier 9, which is known per se and is not part of the present invention, consists of two wheels 10 joined by a shaft 11 and having two wings 12 protruding from the hub. The wheels 10 are intended to roll on the main rail 13.

On one of the wings 12 a rod 14 is arranged, which rod has gripping organs at its lower end for gripping, for example, cloth pieces.

The carrier 8 which is attached to the driving band 1 drives the product carriers 9 by pushing them forward to abut against the wheels 10. The frame 5 which is stationary anchored to a beam or the like and which carries the driving band 1 also carries a further frame 15 which in its turn carries the main rail 13. This main rail 13 has, as is shown in the Figure, an upwardly protruding central part 16 for guidance of the wheels 10.

Fig 3 shows how the branchings to and from the main line are arranged. The main rail 13 goes in and out from a coupling station where the main rail has a swingable intermediate part 17, a stationary intermediate part 18 and further a swingable intermediary part 19. The feeding in rail to the main rail 13 is denoted by reference numeral 20

and the feeding out rails by reference numeral 21. At the end of the feeding in rail 20 a swingable endpiece 22 is arranged and at the forward end of the feeding out rail 21 a swingable endpiece 23 is arranged. A driving wheel 24 is arranged close to the main rail 13 for driving an endless band 25 which has a carrier for carrying the product carriers on the feeding in rail 20 forward to the main rail 13. The endless band 25 runs around a free wheel 26 or a gliding list.

In the position which is shown in Fig. 3 a carrier 8 is on the band 1 on its way towards the right in the Figure pushing a product carrier 9. It appears from the Figure that the carrier 8 and the product carrier 9 will take the direct route to the right since the swingable parts 22 and 23 are swung to the side and the swingable parts 17 and 19 on the main rail 13 connect both ends thereof.

Fig. 4 shows a product carrier 9 on the way in onto the main rail 13. This product carrier 9 has come from a working station, it has been held up at a (not shown) barrier and is now on the way in onto the main rail 13. This barrier which is known per se is released in a mechanical way. The whole process of transporting the product carriers is conducted electronically by a computer. When a second (not shown) electronically conducted bar is released the driving wheel 24 starts the band 25, which band 25 has another type of carrier 27 which extends in towards the feeding-in track 20 and grips one of the adjacent wings 12 of the product carrier 9. This carrier 27 also releases the first barrier. At the entrance to the main rail 13 there is an edge 28 against which the product carrier abuts which means that the product carrier 9 will guide the swingable end-piece 22 in towards an abutment on the intermediate piece 18. Thereby, the swingable piece 17 on the main rail 13 is also pushed aside and the product

carrier 9 can swing in and go forwards to the right in the Figure.

The driving wheel 24 is driven by a gear-wheel which is coupled in on the driving band 1 when the band 25 starts. This occurs simultaneously with the releasing of the above-mentioned barrier.

Fig 5 shows a product carrier 9 which is on the way out from the main rail 13 and in onto the feeding-out rail 21. This has been made possible by swinging the swingable end-piece 23 in towards the stationary intermediate piece 18 on the main rail 13. Thereby, the product carrier 9 is guided in onto the intended branch rail 21 and pulls with it the swingable intermediate piece 19. This intermediate piece 19 lies under the swingable end-piece 23.

The swingable end-piece 23 is swung in towards the main rail 13 by means of an electric signal. This electric signal which influences a not shown arrangement not shown is guided from a computer which knows when the product carrier in question is approaching.

In the present case, no endless band 25 similar to the one which is arranged at the in-feeding rail is arranged at the rail 21. This is due to the fact that the rail 21 is intended to slope downwards and thus any carrier arrangement for this rail is unneccesary. If however the rail 21 is intended to be horizontal or to rise upwards, a band similar to the one for the feeding in shown can of course be arranged.

Fig 6 shows how the product carrier 9 has advanced. At the same time the carrier 8 has also passed the coupling place and pushed aside the swingable end-piece 23. This has been possible since the carrier 8 has an oblique edge 29 which

is intended specifically for this purpose. The swingable intermediate piece 19 on the main rail 13 has its swung out position but is forced back into a position for straight forward movement to the right by the following product carrier 9 if it is programmed to pass the branching positions.

Fig 7 shows the same arrangement as in Figs. 3-6 but, as appears, feeding in to the main rail 13 and removal from the main rail 13 from both sides has been arranged. The arrangement according to Fig. 7 however works in the same way as the arrangements according to Figs. 3-6.

Finally, Fig 8 shows how the driving band 1 is arranged above the main rail 13. A cog-wheel 30 which is driven by the band 1 is engaging the band 1. This cog-wheel 30 drives the driving-wheel 24 via a coupling 31 which couples the driving-wheel 24 to the wheel 30 driven by the band 1 when the barrier for feeding into the main rail 13 is released.

By having access to the driving band 1 from both sides at any place along its long track branching rails can be arranged in an arbitrary way along the whole track. Driving of the driving band 1 may also occur with many synchronized motors which each can be weak since they together pull the band around. This is also very important for reasons of security since if something should happen and the band is held up near one motor this will stop and when this stops all motors are influenced via the security arrangements so that the whole band will stop. No unnecessary compression or extension of the band will therefore occur. This is also of importance bearing in mind that the band can be several hundred meters long.

An advantage with this open driving band is also that all branchings can be driven by this band via change-over devices as shown above.

The invention is not limited to the embodiment shown but it can be varied in different ways within the scope of the claims.

CLAIMS:

1. Arrangement for feeding product carriers (9) movably resting on a main rail (13) which has branchings (20, 21) for supplying to and removal from the main rail (13) of product carriers (9) wherein the movement is intended be performed by means of an endless band (1) or chain, c h a r a c t e r i z e d i n that the band (1) is movably suspended in a second rail above the main rail (13) and is accessible for driving on the downwardly hanging sides.

2. Arrangement according to claim 1, c h a r a c t e r i z e d i n that the band (1) has recesses in the sides intended to cooperate with the driving or driven cog-wheels 4, 30).

3. Arrangement according to any of claims 1 or 2, c h a r a c t e r i z e d i n that the band (1) is provided with downwardly extending carriers (8) for movement of the product carriers (9) in their rail (13).

4. Arrangement according to any of claims 1-3, c h a r a c t e r i z e d i n that for feeding in and feeding out of the product carriers (9) to and from the main rail (13) change-over devices are arranged at each branching (20, 21) which comprise cog-wheels (24, 30, 31) which are driven by the band (1) for synchronized driving of the feeding in and the feeding out.

5. Arrangement according to claim 4, c h a r a c t e r i z e d i n that the cog-wheels (24, 30, 31) are intended to drive an endless band (25) or a reciprocating device for feeding and/or removing product carriers (9) to and from the main rail (13) from or to the branching rails (20, 21).

6. Arrangement according to claim 5,

c h a r a c t e r i z e d i n that the band (25) is arranged close to the branching rail (20) and comprises a plug-shaped carrier (27) for the product carriers (9) which protrudes towards the branching rail.

7. Arrangement according to any of claims 1-6, c h a r a c t e r i z e d i n that for coupling of the branching rails (20, 21) to or from the main rail (13), end pieces (22,23) which are swingable to or from the main rail (13) are arranged on the branching rails (20, 21) and swingable intermediate pieces (17, 19) are arranged on the main rail (13) adjacent to and at a level under these end pieces (2, 23).

8. Arrangement according to claim 7, c h a r a c t e r i z e d i n that the branching rail (20) for supply of product carriers (9) to the main rail (13) the end-piece (22) or the intermediate piece (17) is swung into the correct position by means of the passing product carrier (9).

9. Arrangement according to claim 7, c h a r a c t e r i z e d i n that at the branching rail for removing product carriers (9) from the main rail (13) the end-piece (23) is swung into its correct position by means of an adjustment device while the carrier (8) on the main band (1) reinstalls the direct route on the main rail (13) for the next product carrier (9).

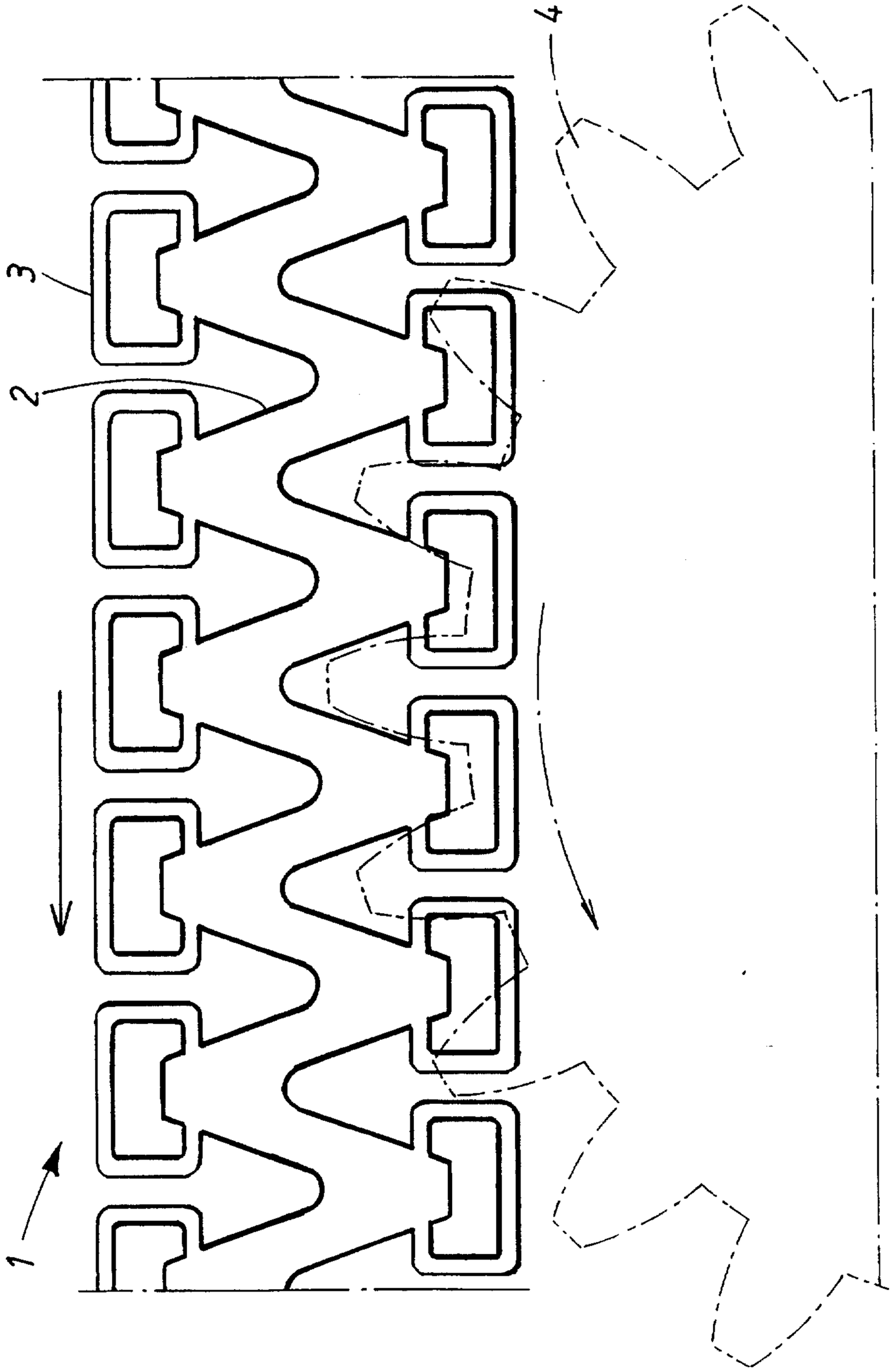


FIG.1

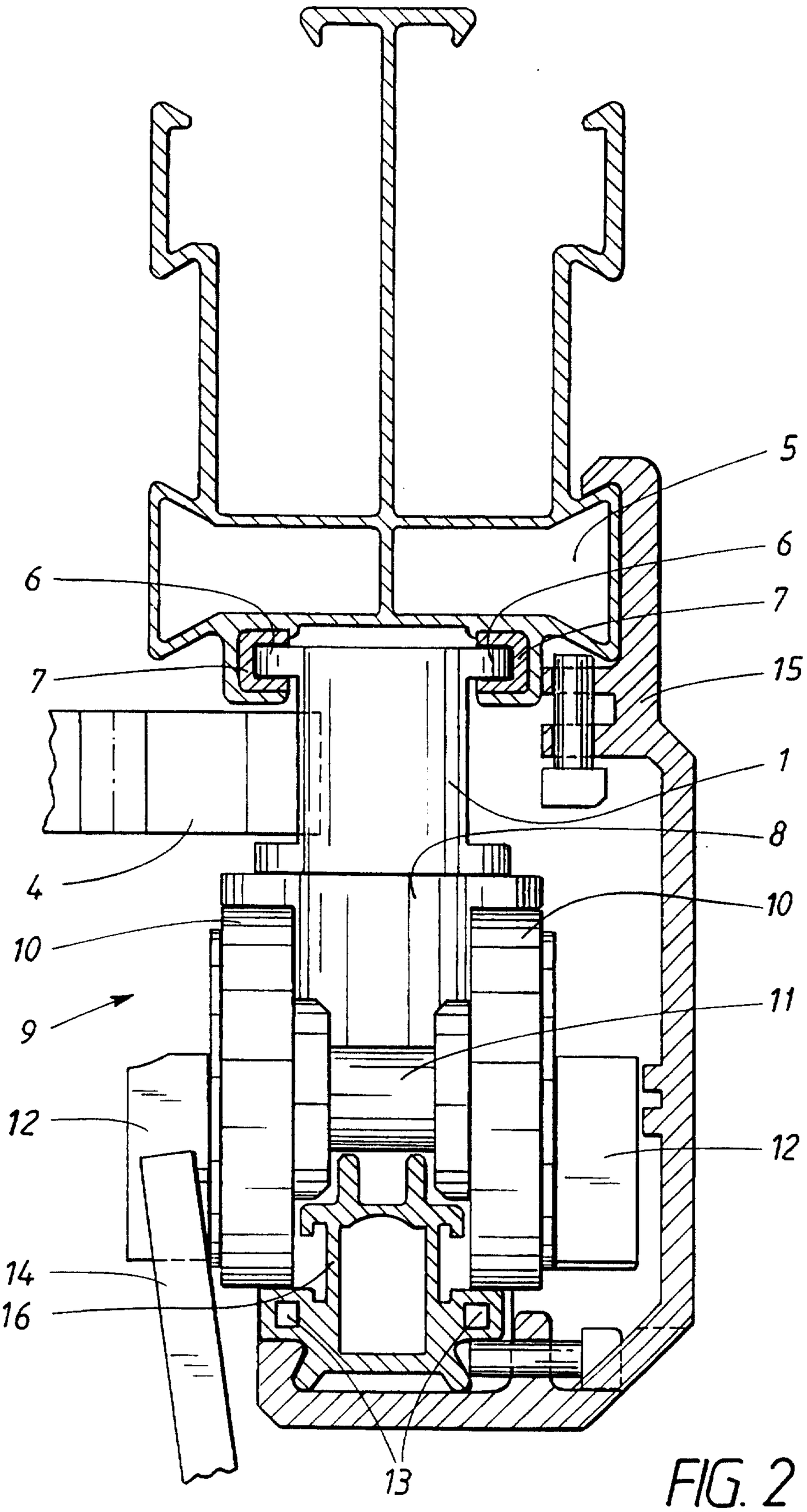


FIG. 2

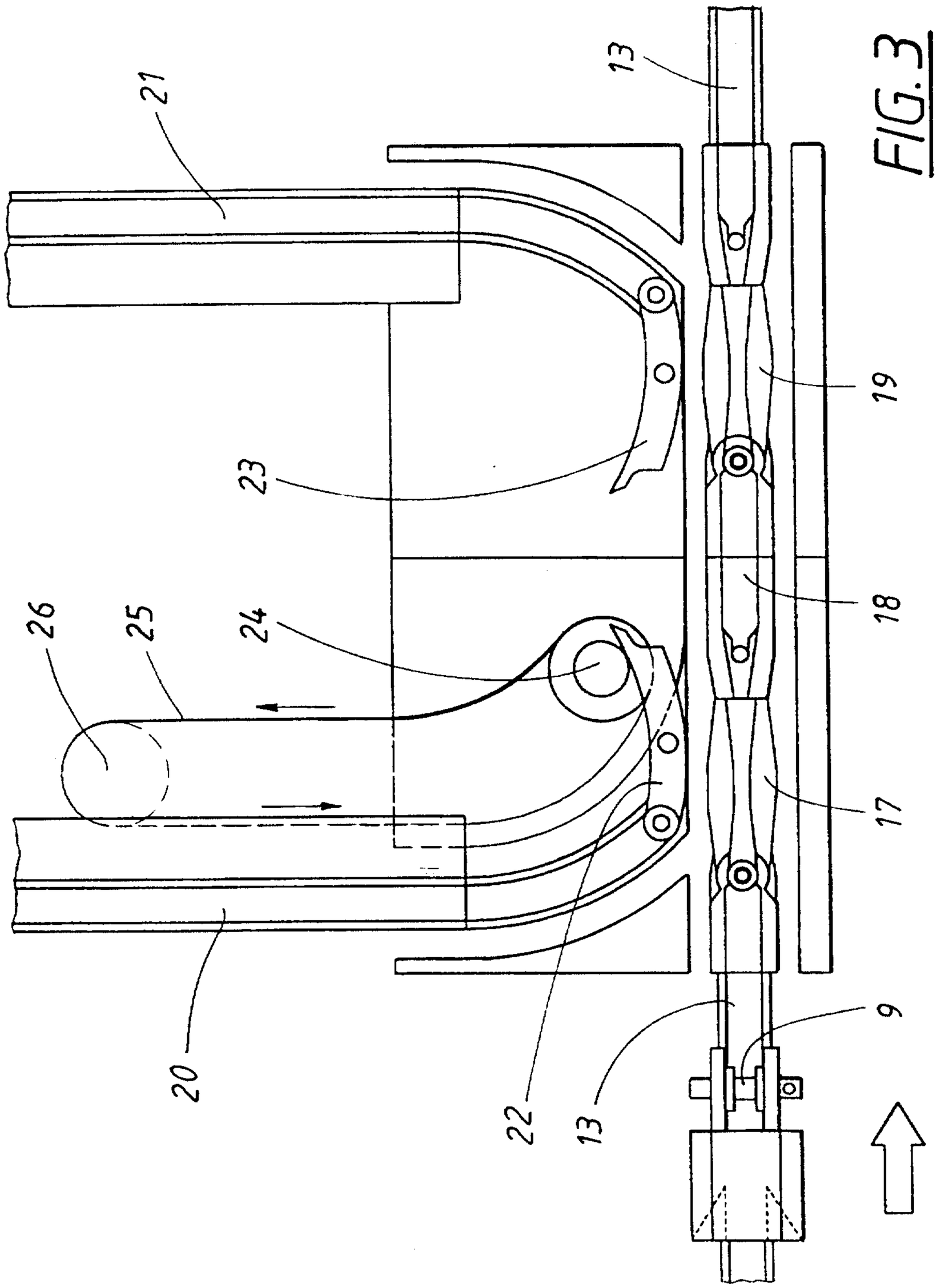


FIG. 3

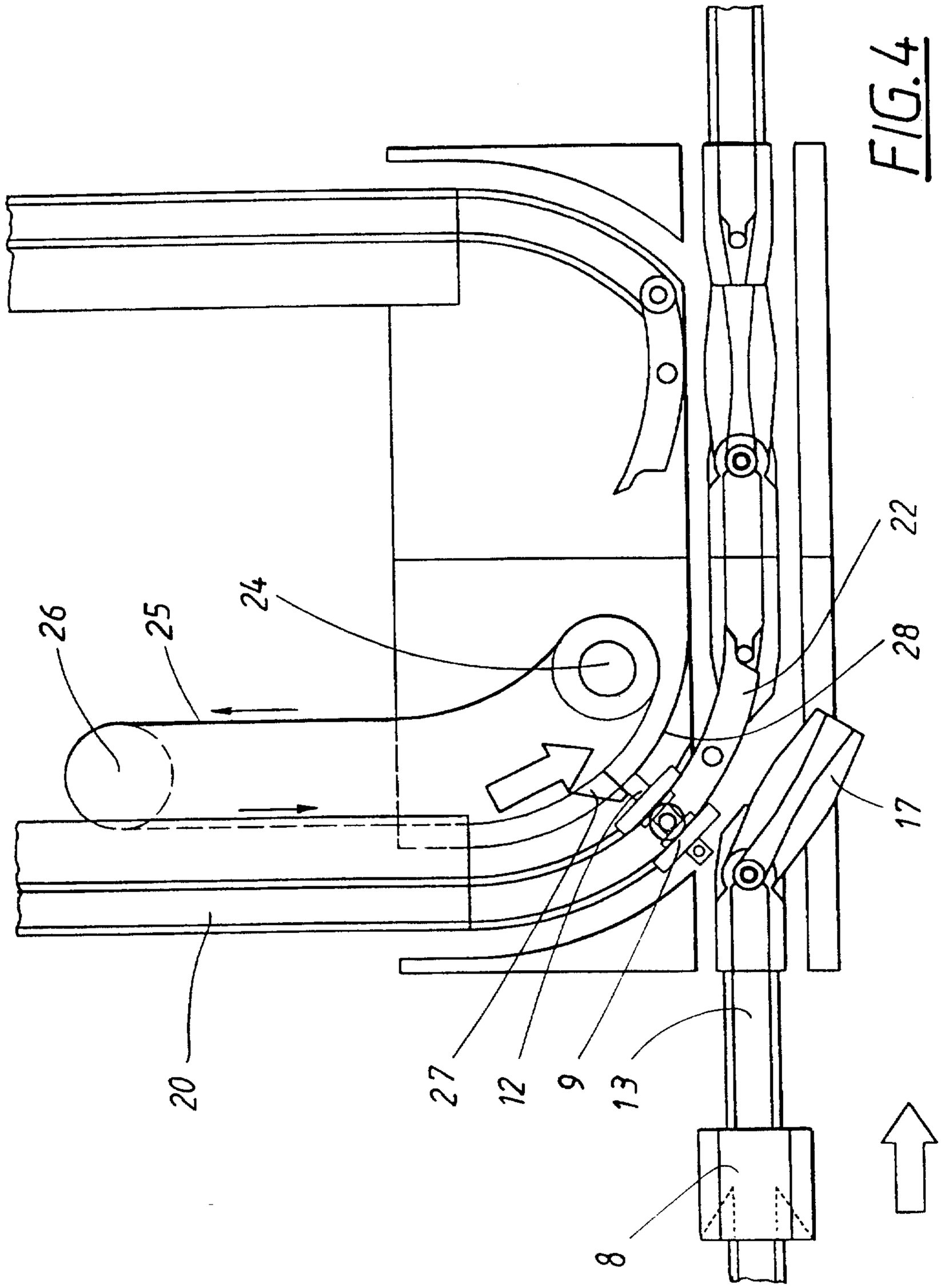


FIG.4

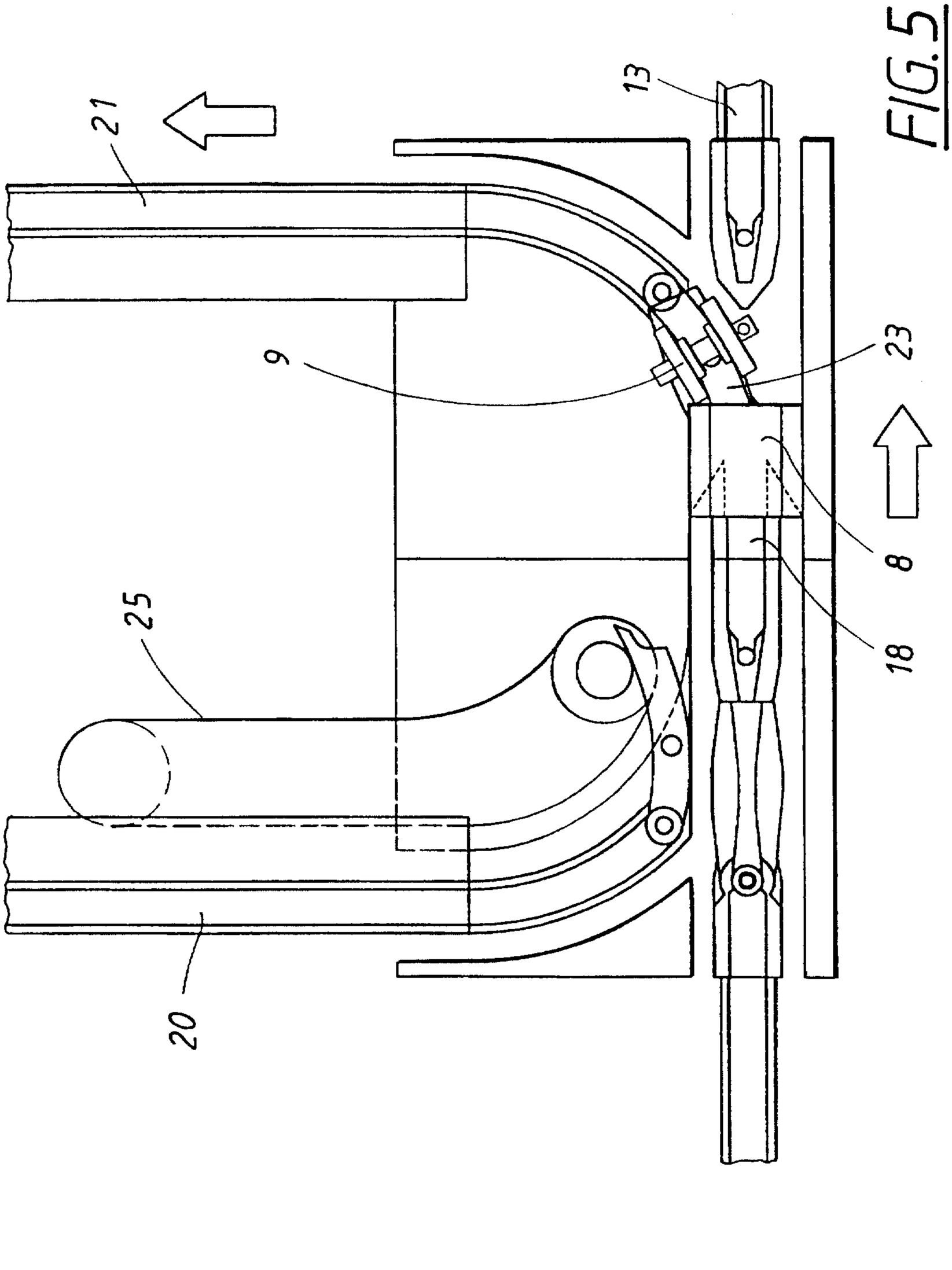


FIG.5

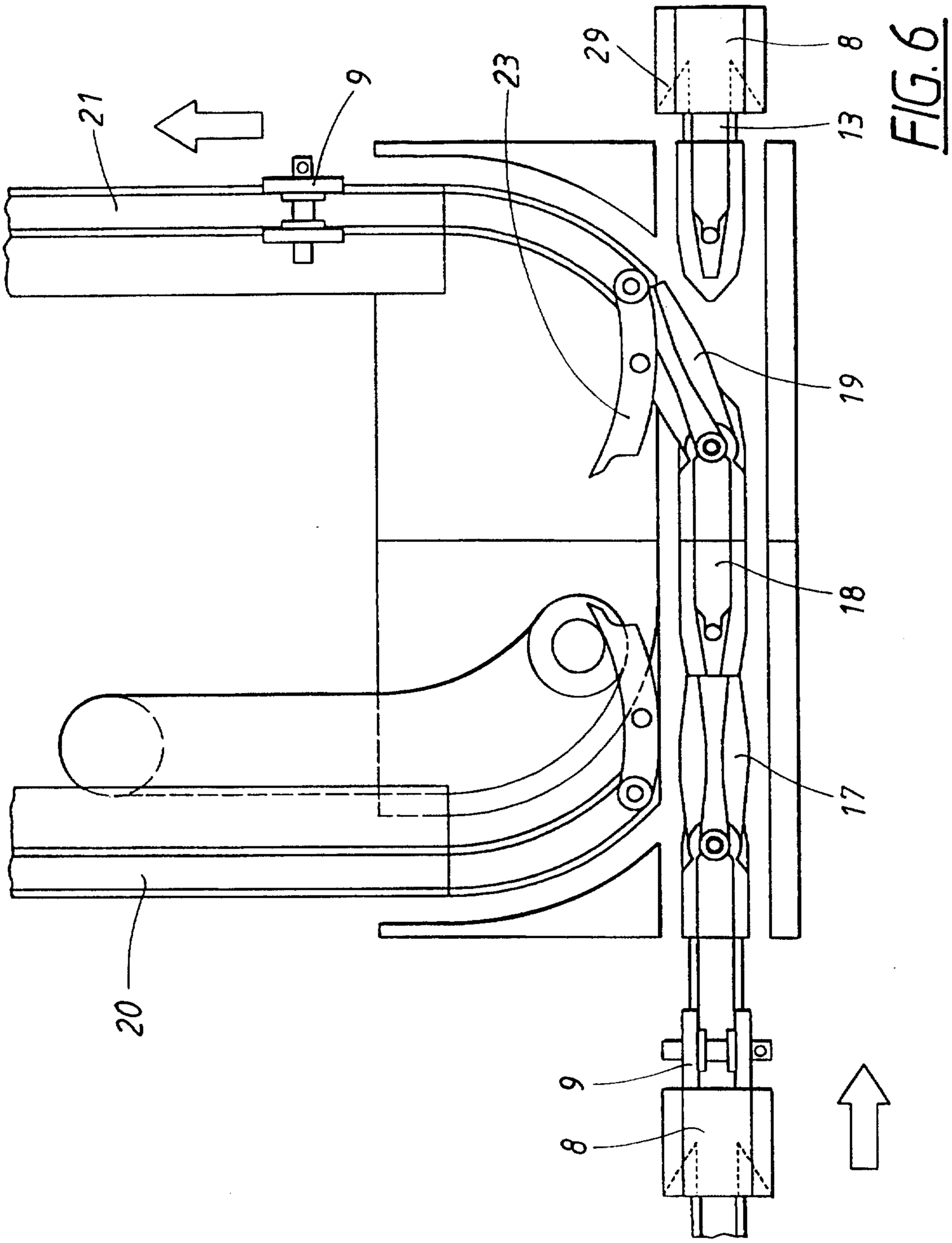


FIG.6

FIG. 7

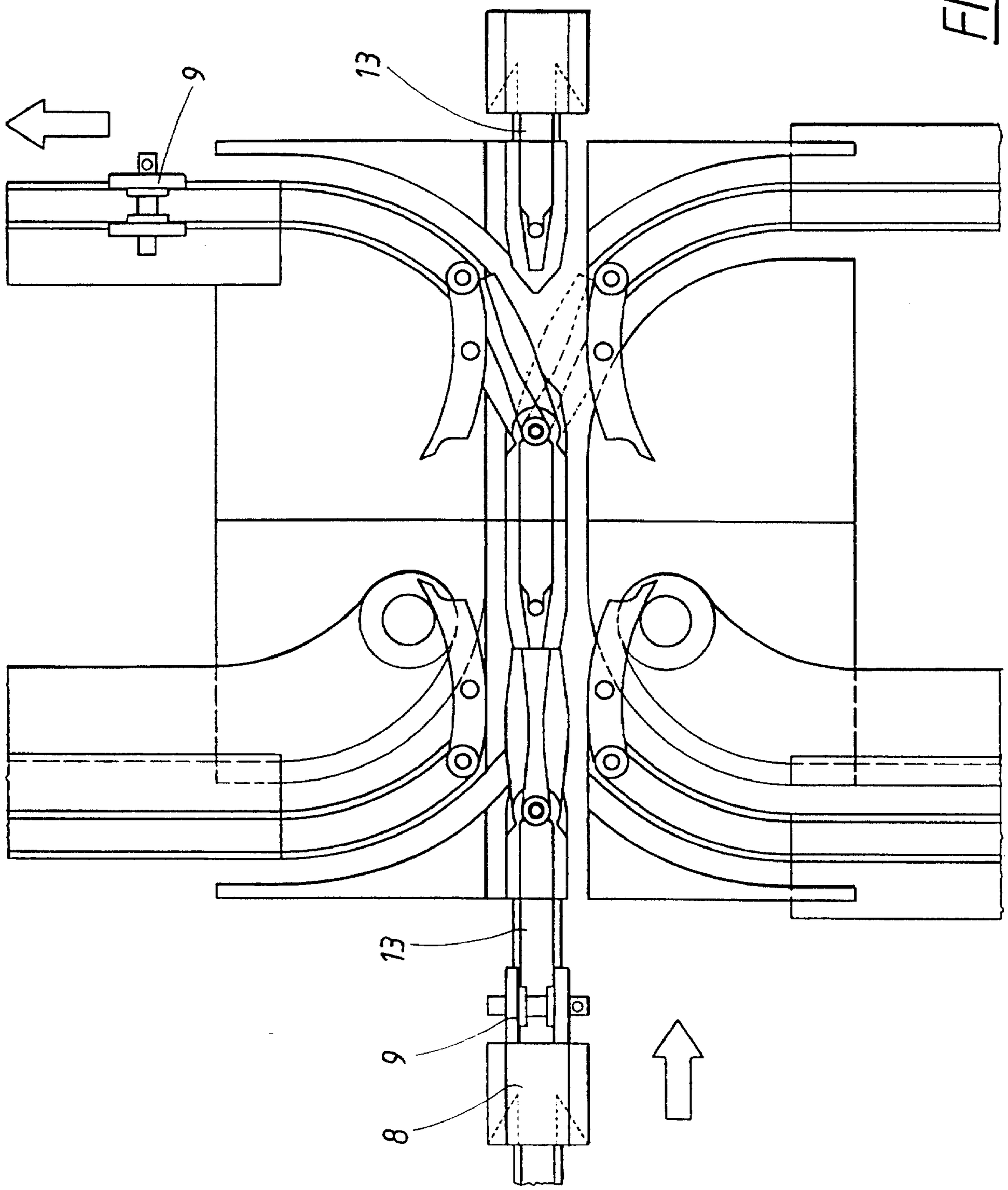


FIG. 8