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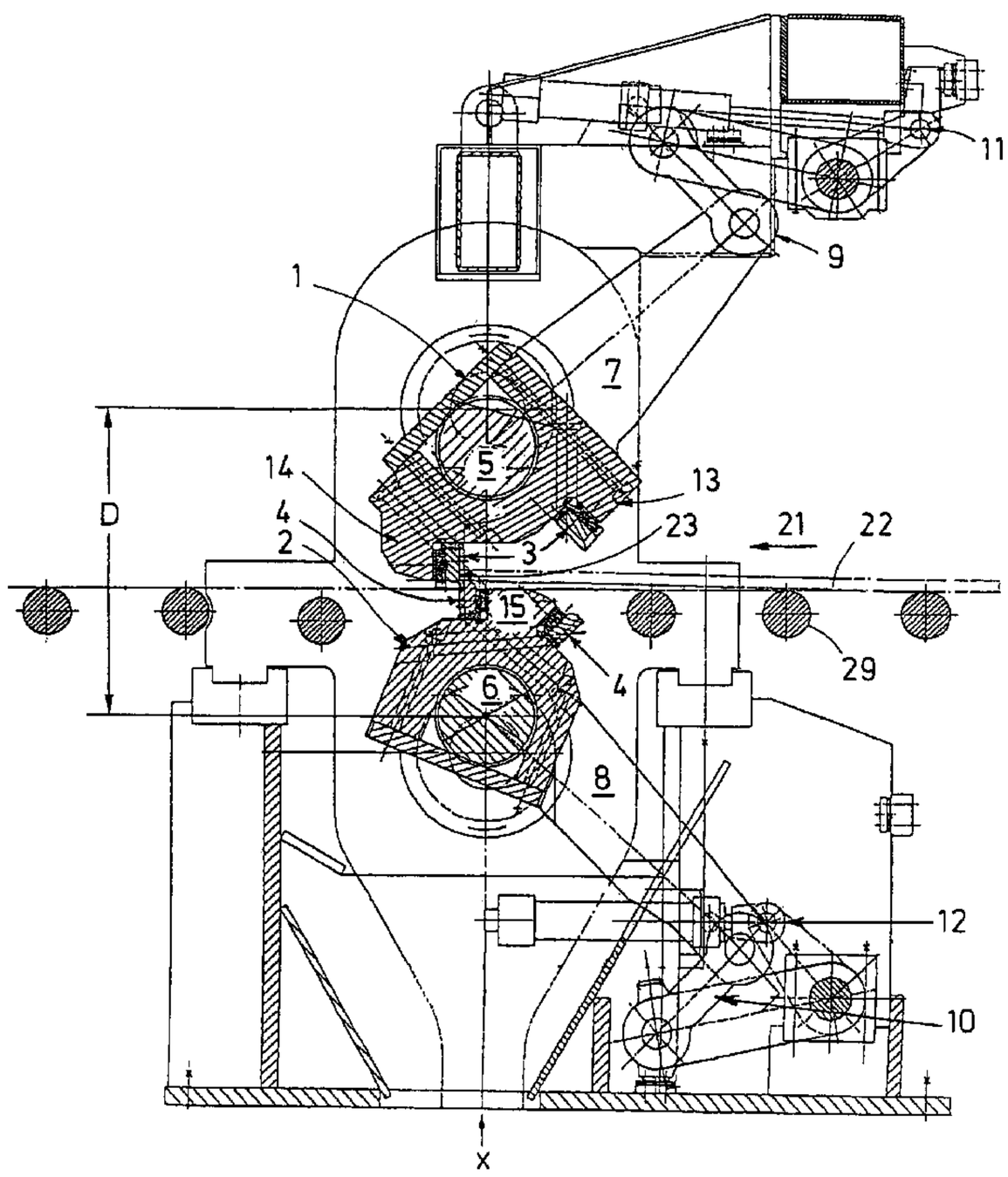
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(54) Titre : CISAILLE A BIELLE COMPRENANT DEUX PAIRES DE LAMES ADAPTEE POUR DECOUPER DES FEUILLARDS

(54) Title: CRANK SCISSORS HAVING TWO PAIRS OF BLADES FOR CUTTING ROLLING STRIPS



(57) Abrégé/Abstract:
The invention relates to crank scissors, especially for cutting rolling strips (22), comprising two pairs of blades (3, 4) which can be secured to blade carriers (1, 2). The blade carriers (1, 2) are arranged in an opposite position on a vertical plane (x-x) in a pair of

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(57) Abrégé(suite)/Abstract(continued):
eccentric drive shafts (5, 6). Double-joint arrangements (9, 10) are maintained in a pivoatable manner on torque-supporting levers (7, 8) co-operating with hydraulic control units (11, 12) engaging thereon. Said type of crank scissors can be improved by enabling the blade carriers (1, 2) to form pairs of bearing surfaces (16-19), which are parallel to the axis, for the pairs of blades (3, 4) on approximately radial projections (13-15), whereon the upper pair of blades (3) is arranged on the inner, bearing surfaces (16, 17) of an arc-shaped recess (20) of the upper blade carrier (1) which are orientated towards each other, and the lower pair of blades (4) is arranged on a relatively narrow projection (15) on the outer bearing surfaces (19, 18) thereof.

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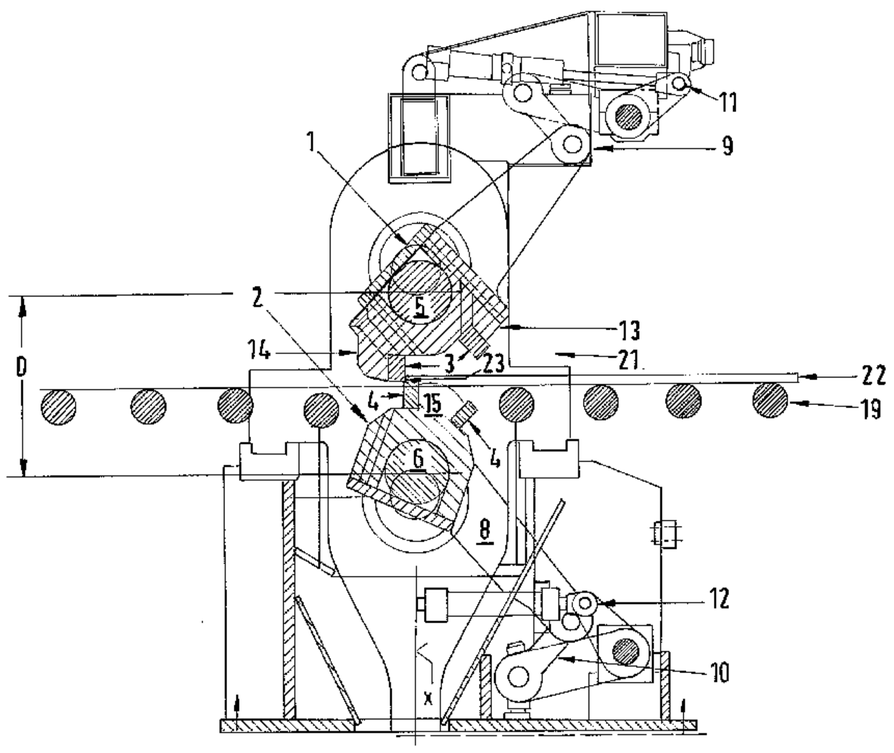
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(54) Title: CRANK SCISSORS HAVING TWO PAIRS OF BLADES FOR CUTTING ROLLING STRIPS

(54) Bezeichnung: KURBELSCHERE MIT ZWEI MESSERPAAREN ZUM SCHNEIDEN VON WALZBAND



(57) **Abstract:** The invention relates to crank scissors, especially for cutting rolling strips (22), comprising two pairs of blades (3, 4) which can be secured to blade carriers (1, 2). The blade carriers (1, 2) are arranged in an opposite position on a vertical plane (x-x) in a pair of eccentric drive shafts (5, 6). Double-joint arrangements (9, 10) are maintained in a pivoatable manner on torque-supporting levers (7, 8) co-operating with hydraulic control units (11, 12) engaging thereon. Said type of crank scissors can be improved by enabling the blade carriers (1, 2) to form pairs of bearing surfaces (16-19), which are parallel to the axis, for the pairs of blades (3, 4) on approximately radial projections (13-15), whereon the upper pair of blades (3) is arranged on the inner, bearing surfaces (16, 17) of an arc-shaped recess (20) of the upper blade carrier (1) which are orientated towards each other, and the lower pair of blades (4) is arranged on a relatively narrow projection (15) on the outer bearing surfaces (19, 18) thereof.

(57) **Zusammenfassung:** Die Erfindung betrifft eine Kurbelschere, insbesondere zum Schneiden von Walzband (22), mit je zwei an Messerträgern (1, 2) bestigbaren Messerpaaren (3, 4), wobei die Messerträger (1, 2) in einer vertikalen Ebene (x-x) gegenüberliegend in einem Paar Exzenter-Antriebswellen (5, 6) gelagert wind. An Drehmoment-Stützhebeln (7, 8) sind Doppelgelenkanordnungen (9, 10) schwenkbar gehalten, die

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Zur Erklärung der Zweibuchstaben-Codes und der anderen Abkürzungen wird auf die Erklärungen ("Guidance Notes on Codes and Abbreviations") am Anfang jeder regulären Ausgabe der PCT-Gazette verwiesen.

mit daran angreifenden Hydraulik-Stellorganen (11, 12) zusammenwirken. Eine solche Kurbelschere wird dadurch verbessert, dass die Messerträger (1, 2) an annähernd radialen Vorsprüngen (13-15) achsparallele Anlagenflächenpaare (16-19) für die Messerpaare (3, 4) ausbilden, von welchen das obere Messerpaar (3) an inneren, gegeneinander gerichteten Anlageflächen (16, 17) einer bogenförmigen Ausnehmung (20) des oberen Messerträgers (1), und das untere Messerpaar (4) an einem der Ausnehmung (20) entgegen gerichteten, relativ schmäleren Vorsprung (15) an dessen äusseren Anlageflächen (19, 18) angeordnet sind.

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CRANK SCISSORS HAVING TWO PAIRS OF BLADES FOR CUTTING ROLLING STRIPS

The invention concerns a crank shear, especially for cutting rolled strip, which comprises two pairs of blades that can be mounted on blade holders, wherein the blade holders are supported opposite each other in a vertical plane in a pair of eccentric drive shafts and are pivoted on torque supporting levers in double-joint mechanisms in interaction with hydraulic control units that act on these double-joint mechanisms.

Widely used crank shears have the disadvantage that they have only one pair of blades, usually with a convex cutting edge. Rotary shears used for the same application are known from the prior art, which have two pairs of blades, each of which has one convex and one concave cutting edge. In this regard, to achieve the ability to have a greater influence on the strip ends, the leading end of the strip is cut, for example, with a convex blade cutting edge, while the tail end of the strip is cut with a concave blade cutting edge.

The document EP 0 075 448 describes a crank shear with two pairs of blades which are supported opposite each other in a vertical plane in a pair of eccentric drive shafts and are pivoted on torque supporting levers in double-joint mechanisms with at least one hydraulic control unit that acts on these double-joint mechanisms.

The previously known shear for cutting metal strip has two blade holders, which can be rotated relative to each other, so that the blades can be alternately brought by their two blade holders into cutting positions with the metal strip. Each blade holder has a mounting for two blades and can be moved between two positions, in which the corresponding blades can each be brought into an operating position.

With this arrangement, one pair of blades at a time can be sharpened, while the other pair is used for cutting, and then both pairs can possibly be exchanged for one another.

A disadvantage of the previously known crank shear with two pairs of blades is the passage position of extremely small width that can be occupied between the pairs of blades, which, for example, during the passage of an upwardly bent leading end of a strip, can result in collision with the shear. A disruption of this type costs operating time and material. Another difficulty

with the previously known shear is that the blades cannot be mounted in the blade holders with the provenly effective blade guard clamp.

The document EP 0 075 448 A discloses a crank shear with two pairs of blades that can be mounted on blade holders. The pairs of blades can be brought into a cutting position or into a maintenance position by means of a double-joint mechanism. The cutting position or the maintenance position is set by means of actuating cylinders that act on the corresponding double-joint mechanism. This document does not address the question of how a safe position for the passage of upwardly bent rolled strip can be reached.

Proceeding on the basis of the aforementioned prior art, the objective of the invention is to specify a design of the crank shear with two pairs of blades that avoids the aforementioned problems and disadvantages and, in particular, allows a significantly wider passage position for the rolled strip and also allows the use of the proven blade guard clamp without any difficulties.

In one aspect, the present invention provides a guillotine shears for cutting rolled strip, with two knife pairs respectively fastenable to knife carriers, wherein the knife carriers are mounted in a pair of eccentric drive shafts

to be opposite in a vertical plane and are pivotably held at torque support levers in double-joint arrangements in cooperation with hydraulic setting elements engaging thereat, wherein the knife carriers form, at approximately radial projections, axially parallel support surface pairs for the knife pairs, of which the upper knife pair is arranged at inner, oppositely directed support surfaces, the upper knife pair is arranged in a curved recess of the upper knife carrier at the support surfaces, the lower knife pair is arranged at the outer support surfaces of a projection directed oppositely to the recess, and the projection directed oppositely to the recess is relatively narrower, wherein the projection is formed integrally with the lower knife carrier.

In a further aspect, the present invention provides a crank shear for cutting rolled strip, which comprises two pairs of blades that can be mounted on blade holders, wherein the blade holders are supported opposite each other in a vertical plane in a pair of eccentric drive shafts and are pivoted on torque supporting levers in double-joint mechanisms in interaction with two hydraulic control units that act on these double-joint mechanisms, wherein the blade holders form axially parallel pairs of bearing surfaces for the pairs of blades on approximately radial projections, with the upper

pair of blades arranged on inner, facing bearing surfaces of a curved recess of the upper blade holder, and with the lower pair of blades arranged on outer, oppositely directed bearing surfaces of a projection oriented towards the recess, the projection being relatively smaller and formed as a single piece with the lower blade holder, each blade of the lower pair of blades having a completely exposed surface facing away from the other blade of the lower pair of blades, wherein the completely exposed surface is an entire face of the blade, each of the blades of the lower pair of blades being independently attached to the lower blade holder.

In this regard, one embodiment of the invention provides

that in a spread position of the torque supporting levers of approximately 90° and at the shortest separation of the eccentric shafts and a running direction of the rolled strip towards the supporting levers, a position of the pair of blades is reached for the cropping cut at the leading end of the strip, in which the hydraulic control unit on the upper supporting lever of the double-joint mechanism is fully extended, and the hydraulic control unit on the lower supporting lever of the double-joint mechanism is fully retracted.

In addition, the invention provides that in an approximately horizontal parallel position of the torque supporting levers opposite the running direction of the rolled strip and at the shortest separation of the eccentric shafts, and with the upper and lower double-joint mechanism extended approximately linearly, a position of the rear pair of blades for cutting the tail end of the strip is reached, in which the hydraulic control unit on the upper supporting lever of the double-joint mechanism is fully retracted, and the control unit on the lower supporting lever of the double-joint mechanism is fully extended.

Additional details, features, and advantages of the invention are apparent from the following explanation of the specific embodiment of the invention that is schematically illustrated in the drawings.

-- Figure 1 shows a side view of the crank shear with two blade holders and blades mounted on them in an operating phase during the cropping of the leading end of a rolled strip.

-- Figure 2 shows the crank shear in its extremely wide-open position for the passage of the rolled strip.

-- Figure 3 shows the crank shear, likewise in a side view, in a position for cropping the tail end of the strip.

-- Figure 4 shows the crank shear in its open position for another passage of the rolled strip following the cropping of the tail end of the strip.

Figure 1 shows the crank shear with two pairs of blades 3, 4, which can be mounted on blade holders 1, 2, wherein the blade holders 1, 2 are supported opposite each other in a vertical plane (x-x) in a pair of eccentric drive shafts 5, 6 and are pivoted on torque supporting levers 7, 8 in double-joint mechanisms 9, 10 and interact with hydraulic control units 11, 12 that act on these double-joint mechanisms.

The blade holders 1, 2 form axially parallel pairs of bearing surfaces 16 to 18 for the pairs of blades 3, 4 on approximately radial projections 13 to 15, with the upper pair of blades 3 arranged on inner, oppositely oriented bearing surfaces 16, 17 of a curved recess 20 of the upper blade holder 1, and with the lower pair of blades 4 arranged on the outer bearing surfaces 18 of a relatively narrow projection 15 oriented towards the recess 20.

In a spread position of the torque supporting levers 7, 8 of approximately 90° and at the shortest separation D of the eccentric shafts 5, 6 and a running direction 21 of the rolled strip 22, the crank shear has reached a position of the pair of blades 3 for the cropping cut at the leading end 23 of the strip. In this position, the hydraulic control unit 11 on the upper supporting lever 7 of the double-joint mechanism 9 is fully extended to spread the supporting lever 7, and the control unit 12 on the lower supporting lever 8 of the double-joint mechanism 10 is fully retracted. Reference number 19 identifies the roller table for conveying the rolled strip 22.

Figure 2 shows a wide passage position of the crank shear for the rolled strip in an extreme spread position of the torque supporting levers 7, 8 of approximately 90° at the greatest separation d of the eccentric shafts 5, 6 and with a running direction 21 of the rolled strip 22 towards the supporting levers 7, 8. In this position, the control unit 12 on the lower supporting lever 8 of the double-joint mechanism 10 is fully retracted for its folding the lower supporting lever 8, and the control unit 11 on the upper supporting lever 7 of the double-joint mechanism 9 is fully extended.

Figure 3 shows the crank shear with an approximately

horizontal parallel position of the torque supporting levers 7, 8 opposite the running direction 21 of the rolled strip 22 and at the shortest separation D of the eccentric shafts 5, 6, and with the upper double-joint mechanism 9 and lower double-joint mechanism 10 extended approximately linearly. A position of the rear pair of blades for cutting the tail end 24 of the strip is reached here. In this position, the hydraulic control unit 11 on the upper supporting lever 7 of the double-joint mechanism 9 is fully retracted, and the control unit 12 on the lower supporting lever 8 of the double-joint mechanism 10 is fully extended.

Finally, Figure 4 shows a passage position through the shear with the eccentric shafts 5, 6 at their greatest separation. Here the upper hydraulic control unit 11 of the upper double-joint mechanism 9 is fully retracted in a position of the upper supporting lever 7 that is downwardly inclined, while the lower control unit 12 of the lower double-joint mechanism 10 is fully retracted.

List of Reference Numbers

1. blade holder
2. blade holder
3. blade
4. blade
5. eccentric drive shaft
6. eccentric drive shaft
7. torque supporting lever
8. torque supporting lever
9. double-joint mechanism
10. double-joint mechanism
11. hydraulic control unit
12. hydraulic control unit
13. projection
14. projection
15. projection
16. inner bearing surface
17. inner bearing surface
18. outer bearing surface

19. roller table

20. curved recess

21. running direction

22. strip/rolled strip

23. leading end of strip

24. tail end of strip

25. stop

26. stop

27. stop

28. stop

CLAIMS:

1. Guillotine shears for cutting rolled strip, with two knife pairs respectively fastenable to knife carriers, wherein the knife carriers are mounted in a pair of eccentric drive shafts to be opposite in a vertical plane and are pivotably held at torque support levers in double-joint arrangements in cooperation with hydraulic setting elements engaging thereat, wherein the knife carriers form, at approximately radial projections, axially parallel support surface pairs for the knife pairs, of which the upper knife pair is arranged at inner, oppositely directed support surfaces, the upper knife pair is arranged in a curved recess of the upper knife carrier at the support surfaces, the lower knife pair is arranged at the outer support surfaces of a projection directed oppositely to the recess, and the projection directed oppositely to the recess is relatively narrower, wherein the projection is formed integrally with the lower knife carrier.

2. Guillotine shears according to claim 1, wherein in a spread position of the torque support levers of approximately 90° and with shortest spacing of the eccentric shafts and a running direction of the rolled strip towards the support levers a position of the knife pair relative to the cropping cut at the strip start is achieved in which the hydraulic setting element at the upper support lever of the double-joint

arrangement is fully moved out and the setting element at the lower support lever of the double-joint arrangement is fully moved in.

3. Guillotine shears according to claim 1, wherein in a spread position of the torque support levers of approximately 90° and with greatest spacing of the eccentric shafts and a running direction of the rolled strip towards the support levers a transit position of guillotine shears is achieved in which the setting element at the lower support lever of the double-joint arrangement is fully moved in and the setting element at the upper support lever of the double-joint arrangement is fully moved out.

4. Guillotine shears according to claim 1, wherein in an approximately horizontal, parallel position of the torque support levers against the running direction of the rolled strip and with shortest spacing of the eccentric shafts with approximately rectilinearly extended upper double-joint arrangement and lower double-joint arrangement a position of the rearward knife pair for cutting of the strip end is achieved in which the hydraulic setting element at the upper support lever of the double-joint arrangement is fully moved in and the setting element at the lower support lever of the double-joint arrangement is fully moved out.

5. Guillotine shears according to claim 1, wherein the transit position through the shears is reached in a position, which is inclined downwardly towards the rolled strip, of the upper support lever with moved-in upper hydraulic setting element and in a position, which is inclined upwardly towards the rolled strip, of the lower support lever with fully moved-out lower setting element of the double-joint arrangements and with greatest spacing of the eccentric shafts.

6. Crank shear for cutting rolled strip (22), which comprises two pairs of blades (3, 4) that can be mounted on blade holders (1, 2), wherein the blade holders (1, 2) are supported opposite each other in a vertical plane (x-x) in a pair of eccentric drive shafts (5, 6) and are pivoted on torque supporting levers (7, 8) in double-joint mechanisms (9, 10) in interaction with two hydraulic control units (11, 12) that act on these double-joint mechanisms (9, 10), wherein the blade holders (1, 2) form axially parallel pairs of bearing surfaces (16-19) for the pairs of blades (3, 4) on approximately radial projections (13-15), with the upper pair of blades (3) arranged on inner, facing bearing surfaces (16, 17) of a curved recess (20) of the upper blade holder (1), and with the lower pair of blades (4) arranged on outer, oppositely directed bearing surfaces (19, 18) of a projection (15) oriented towards the recess (20), the projection being

relatively smaller and formed as a single piece with the lower blade holder, each blade of the lower pair of blades having a completely exposed surface facing away from the other blade of the lower pair of blades, wherein the completely exposed surface is an entire face of the blade, each of the blades of the lower pair of blades being independently attached to the lower blade holder.

7. Crank shear in accordance with Claim 6, wherein in a spread position of the torque supporting levers (7, 8) of approximately 90° and at the shortest separation (D) of the eccentric shafts (5, 6) and a running direction (21) of the rolled strip (22) towards the supporting levers (7, 8), a position of the pair of blades (3) for the cropping cut at the leading end (23) of the strip is reached, in which the hydraulic control unit (11) on the upper supporting lever (7) of the double-joint mechanism (9) is fully extended, and the control unit (12) on the lower supporting lever (8) of the double-joint mechanism (10) is fully retracted.

8. Crank shear in accordance with Claim 6, wherein, in a spread position of the torque supporting levers (7, 8) of approximately 90° and at the greatest separation (d) of the eccentric shafts (5, 6) and a running direction (21) of the rolled strip (22) towards the supporting levers (7, 8), a passage position of the crank shear is reached, in which the

control unit (12) on the lower supporting lever (8) of the double-joint mechanism (10) is fully retracted, and the control unit (11) on the upper supporting lever (7) of the double-joint mechanism (9) is fully extended.

9. Crank shear in accordance with Claim 6, wherein in an approximately horizontal parallel position of the torque supporting levers (7, 8) opposite the running direction (21) of the rolled strip (22) and at the shortest separation (D) of the eccentric shafts (5, 6), and with the upper double-joint mechanism (9) and lower double-joint mechanism (10) extended approximately linearly, a position of the rear pair of blades for cutting the tail end (24) of the strip is reached, in which the hydraulic control unit (11) on the upper supporting lever (7) of the double-joint mechanism (9) is fully retracted, and the control unit (12) on the lower supporting lever (8) of the double-joint mechanism (10) is fully extended.

10. Crank shear in accordance with Claim 6, wherein, in a position of the upper supporting lever (7) that is downwardly inclined towards the rolled strip (22) with the upper hydraulic control unit (11) of the double-joint mechanism (9) retracted, and in a position of the lower supporting lever (8) that is upwardly inclined towards the rolled strip (22) with the lower control unit (12) of the double-joint mechanism (10)

fully extended, and with the greatest separation (d) of the eccentric shafts (5, 6), the passage position through the shear is reached.

Fig. 1

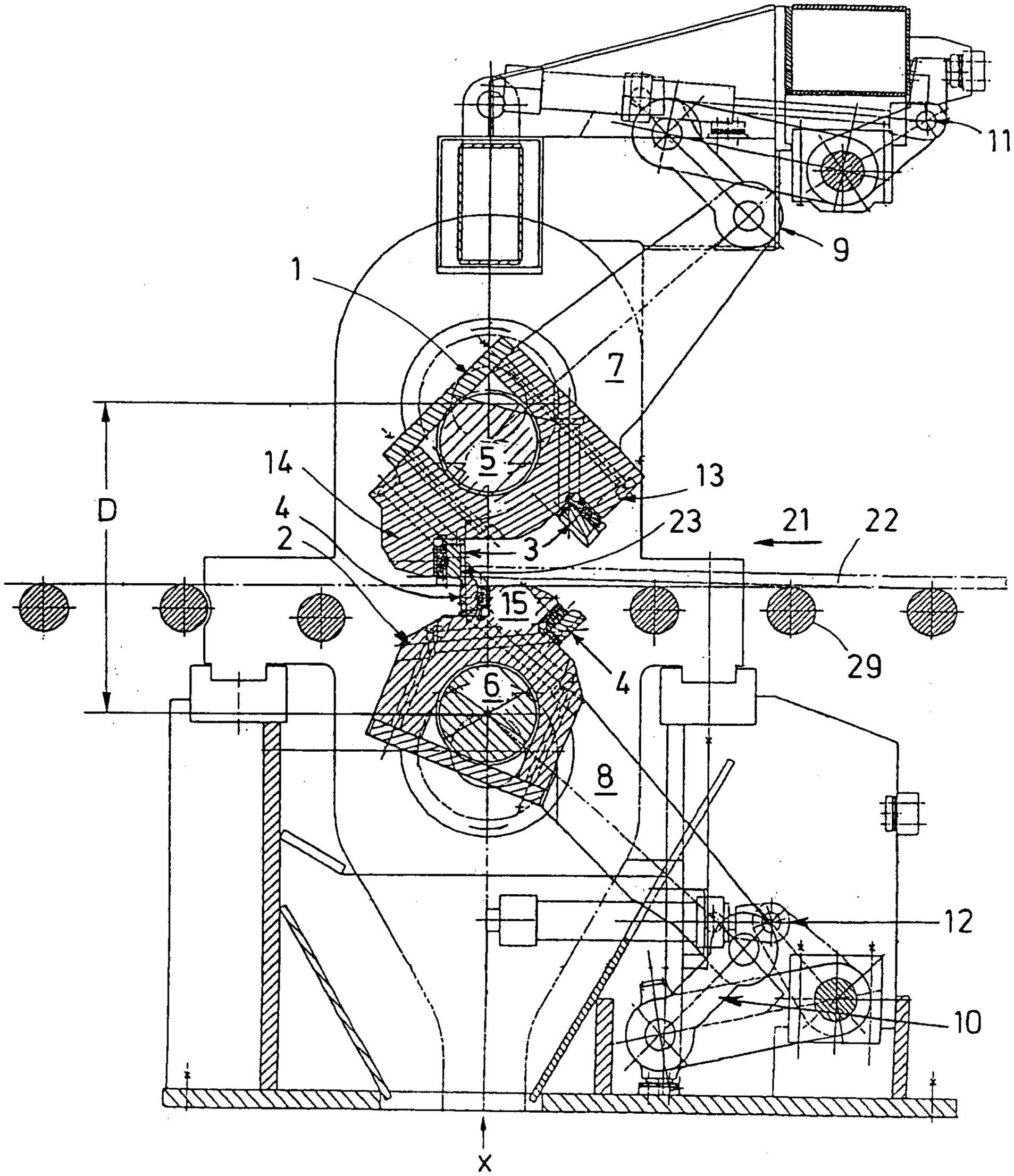


Fig.2

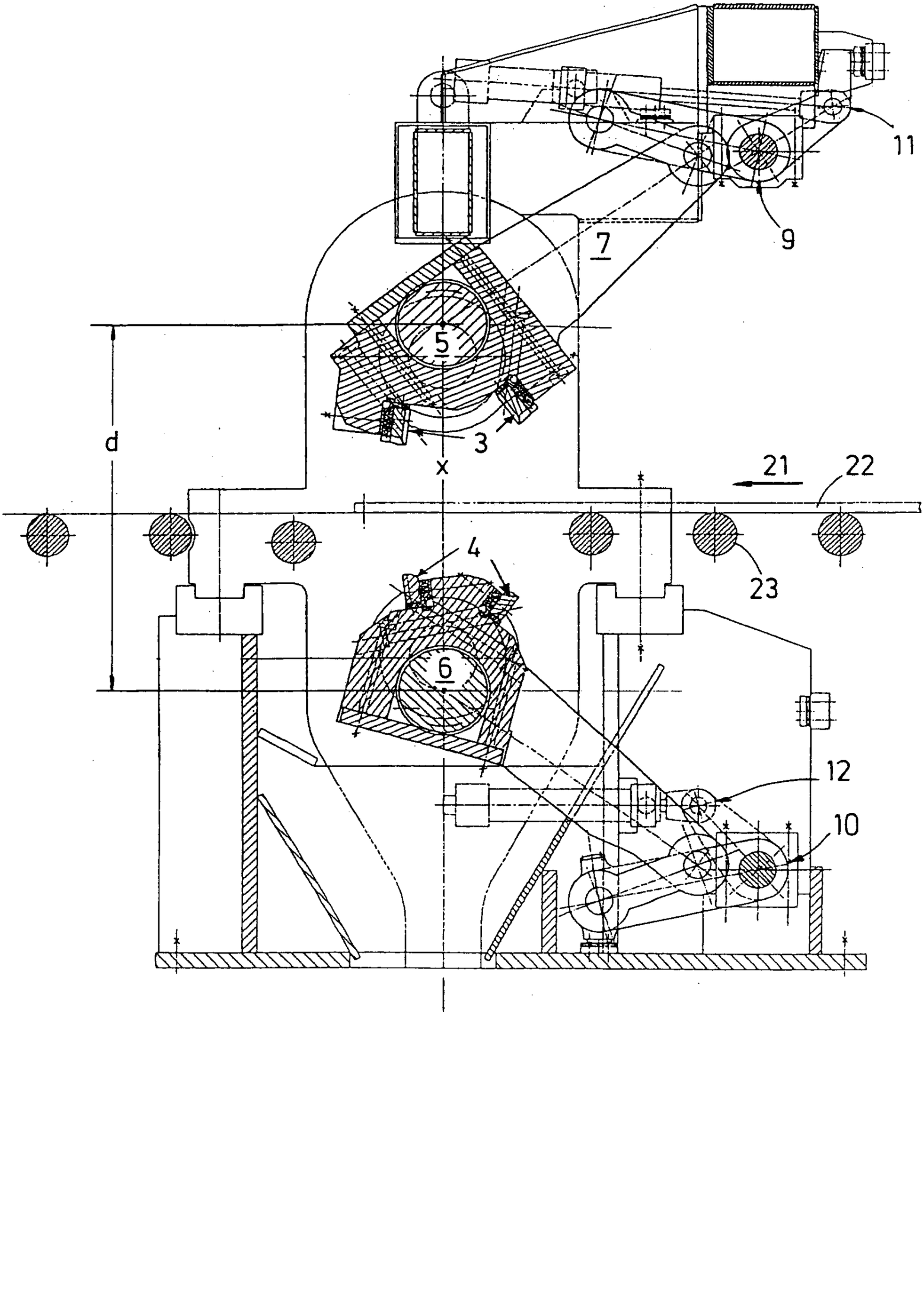


Fig.3

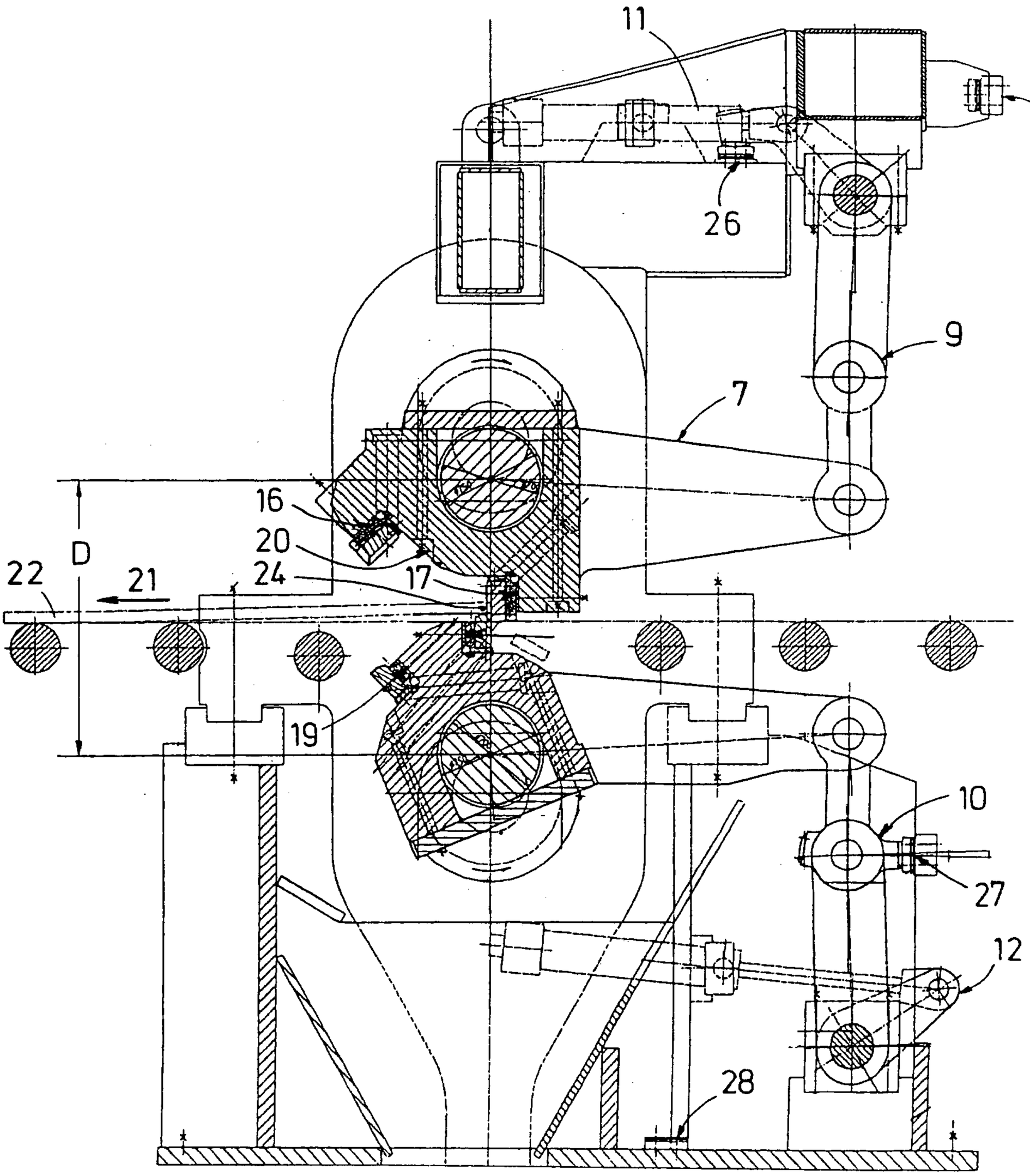
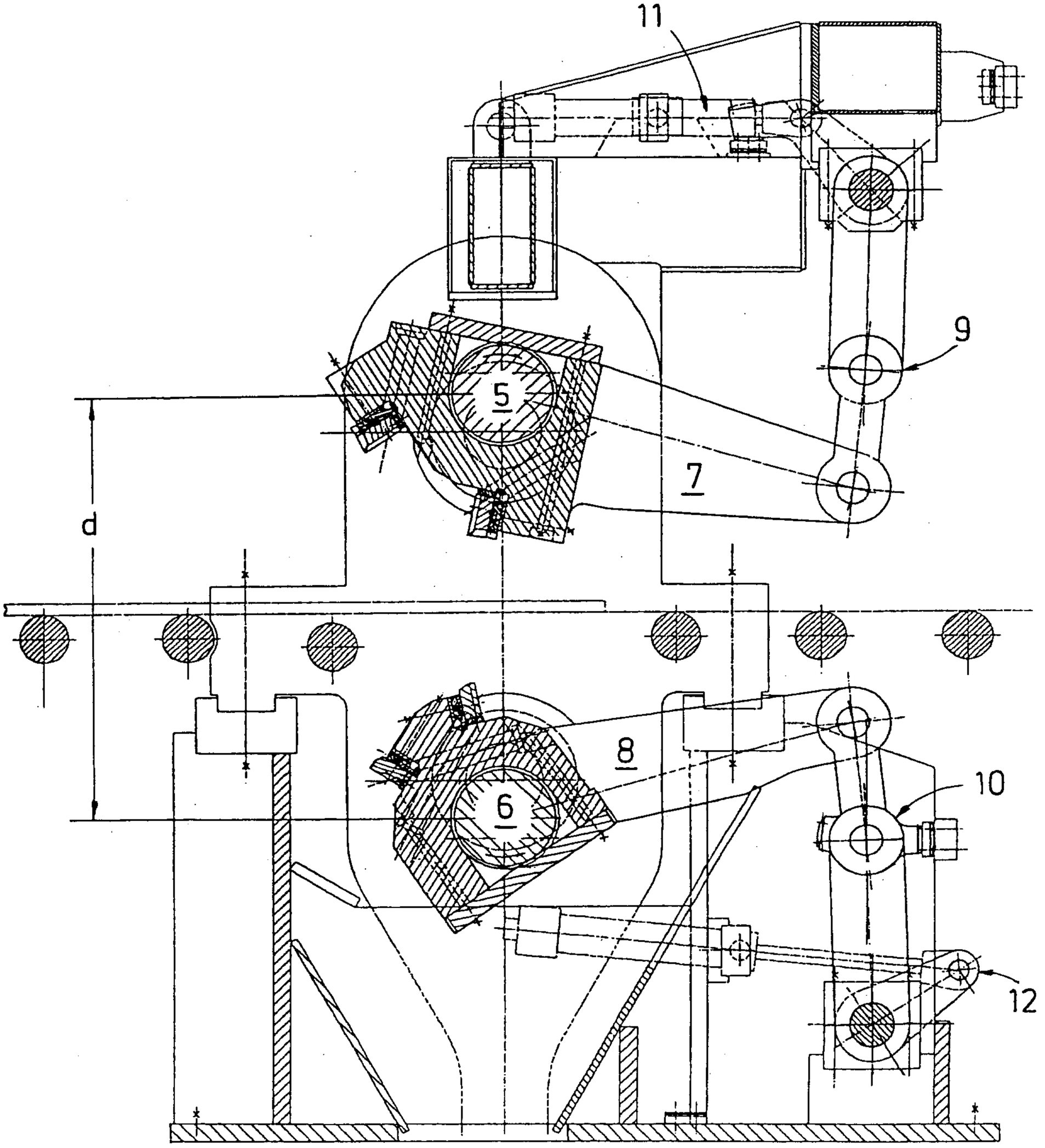
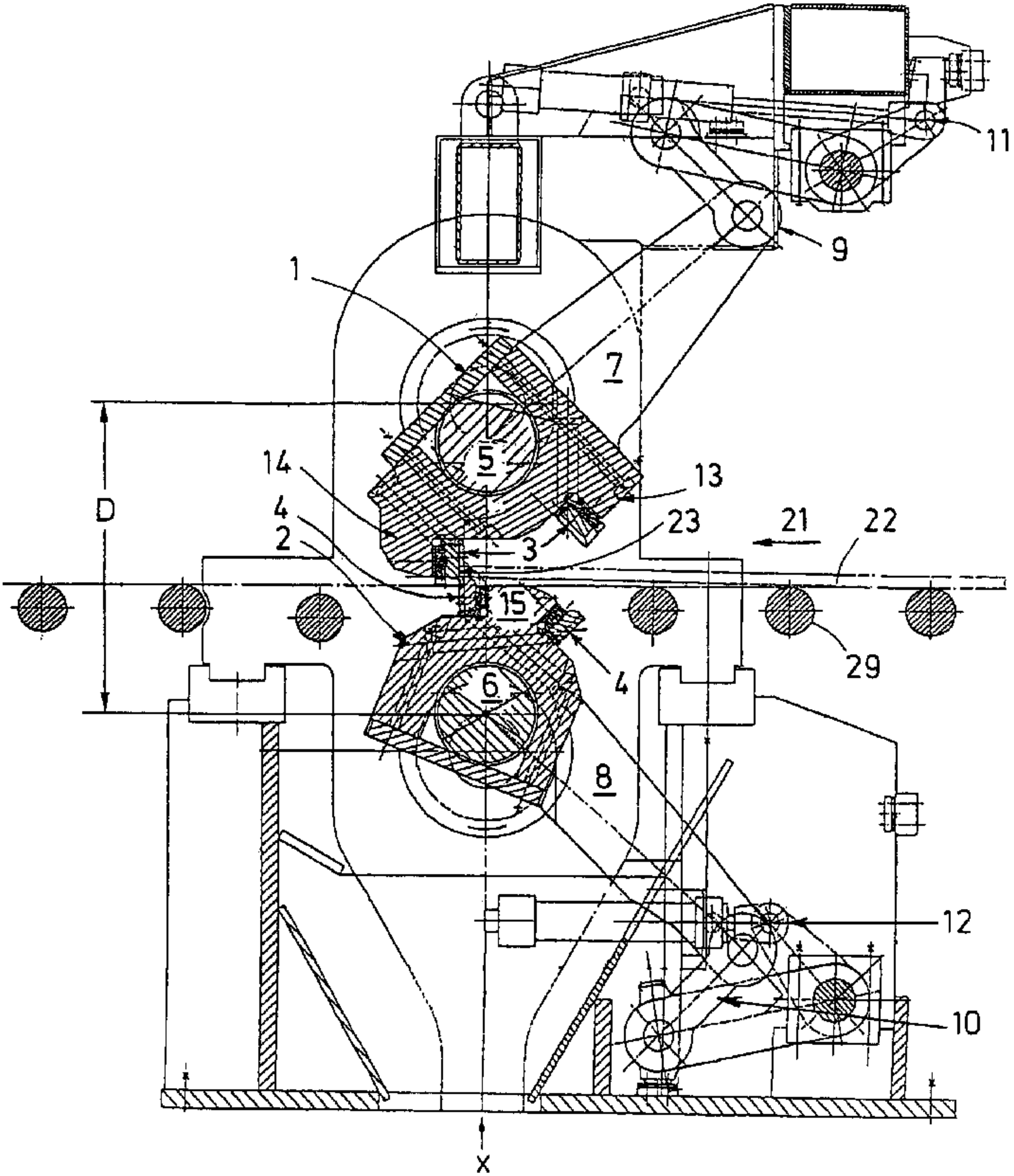


Fig.4




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