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(11)

EP 1 535 675 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
13.09.2006 Bulletin 2006/37

(51) Int Cl.:
B21D 11/12 (2006.01)

(21) Application number: **04386028.7**

(22) Date of filing: **21.10.2004**

(54) **Mechanism for iron concrete rod bending with cutting ability of the front and rear end**

Mechanismus zum Biegen von Bewehrungsstäben aus Eisen mit Möglichkeit zum Schneiden der Vorder- und Hinterenden

Mechanisme de cintrage des barres d'armatures en fer avec possibilité de couper les deux extrémités

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PL PT RO SE SI SK TR**
Designated Extension States:
AL HR LT LV MK

(30) Priority: **26.11.2003 GR 2003100493**

(43) Date of publication of application:
01.06.2005 Bulletin 2005/22

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Description

[0001] The invention refers to a machine for straightening, bending and cutting iron concrete rod.

[0002] Such a machine may be a special machine known as robotic machine for cutting and forming building steel (straightened rods or from coil) or any other machine which executes the above-mentioned tasks and processes iron rods with various geometrical shapes.

[0003] For many years, the productive procedure regarding cutting and forming of the iron concrete rod for the production of concrete reinforcement or any other type of iron rod, has been industrialized. Various "smart" machinery and mechanisms have replaced the -until then- manual labour and increased in a significant degree the productive abilities.

[0004] Some of these machines are known as "cutting carriages for iron concrete rods" or "machinery for straightening, bending and cutting of iron concrete rods".

[0005] These machines are also known as "robotic machines", manufactured with various abilities by various manufacturers and, in the past, the applicant has been awarded with patents for relative machinery inventions.

[0006] The above-mentioned machinery consist of a set of separate mechanisms each one of which carries out the corresponding task and, as a whole, the final product is produced.

[0007] Significant mechanisms by themselves, or as a part of a set of mechanisms, are the iron rod bending and cutting points.

[0008] The already known machines have the ability, apart from cutting and bending the one side of the iron rod, to also cut and form the second side of the iron rod, something similar to the present invention.

[0009] However, factors such as the great number of the independent mechanisms that execute each task phase have as a result the restriction of the cutting and forming speed as well as the wearing due to the many attachments participating in the procedure.

[0010] The bending speed is lower in relation to the invention, for the reason that although for the first end of the rod is followed the same procedure, that is, propulsion, bending and propulsion, for the bending of the rear end, the bending plate -which has a formation pin- rotates by 180°, the iron rod is moved -via additional propulsive rolls that these machines are provided with- firstly forwards as far as the length of the side to be bended, the cutting is accomplished and then, the rod returns to the bending point or to the bending points for the realization of bending.

[0011] This leads to the increase of the processing time and to the use of an additional roll system.

[0012] The cutting of the bars is done with reciprocation, always on the same point without the ability of the rear end cutting, unless some additional specific movements of the iron rod are made.

[0013] The bending and cutting system consists of two different mechanisms, which are of a higher manufacture cost and they demand more space coverage for the machine.

[0014] Other manufacturers use various independent mechanisms in order to achieve this result.

[0015] The **four-direction mechanism for iron concrete rod bending with cutting ability of the front and rear end** is characterized by the fact that the processes of cutting and bending are executed by an integrated mechanism that performs a series of movements according to the commands given by the program of the machine.

[0016] This integrated structure increases the formation speed and decreases considerably the manufacture and damage cost.

[0017] During the bending phase of the front or the rear side of the iron rod, the cutting preceding the bending is realized via rotation of the cutting tool (immovable-movable point) while the whole mechanism can move and remain at any point of the rod that is about to be formed. The rod can be held in the formation canal via the cutting tool and the immovable formation point, so that during its movement or the movement of the formed shape, no any additional holding mechanism will be needed.

[0018] For the bending of the rear part of the iron rod the entire mechanism for bending and cutting moves so far as the length of the bended part without any demand for an additional roll propulsion system. Moreover, since the bending plate has the ability to bend in four directions via the four formation pins (two at the front and two at the back), the procedure of rotating the formation plate by 180° is not needed.

[0019] Each formation pin can also be used as an extractor, for the unblocking of the already formed shape out of the mechanism.

[0020] This has as result the increased speed of the bending procedure, the decrease of the cost, since the manufacture of undependable mechanisms is avoided, and the damage reduction concerning spare parts used to wear out in particular.

[0021] The invention can be well comprehended by right of the following figures:

Sheet 1 shows the **four-direction mechanism for iron concrete rod bending with cutting ability of the front and rear end** in the section and phase (lower point) that can form the front or rear end of the iron concrete rod.

Sheet 2 shows in top view the **mechanism** with the moving abilities that it can perform (forwards-backwards), the optional assisting rolls and the canal for the holding of the formed rods, which is used for shapes of great length.

Sheet 3 shows the mechanism in the section and phase (upper point) where the cutting of the front or the rear end and the holding of the iron rod can be realized.

Sheet 4 shows in top view the **mechanism** (figure 4) in the phase of the iron rod cutting, the front side cutting in enlargement (figure 5) and the rear side cutting in enlargement (figure 6).

Sheet 5 shows the bending of the rear end (figure 7) in a right angle and the bending of the rear end (figure 8) in a left angle as well as the position of the bending pin (A=up and K=down).

Sheet 6 shows in top view the **mechanism** (figure 9) in the phase of holding and moving the formed shape, the holding of the rod from the rear side in enlargement (figure 10) and the holding of the rod from the front side in enlargement (figure 11).

Sheet 7 shows the **mechanism** during the phase of using the formation pin as an extractor in order to remove the formed shape (figure 12 & 13).

Sheet 8 shows the phases executed in order a square shape to be formed by the procedure of propelling the iron rod to the front and forming it.

Sheet 9 shows the phases executed in order to be formed a square shape by the procedure of having propelled the entire length of the iron rod to be bended and the forming procedure executed backwards.

Sheet 10 shows the **four-direction mechanism for iron concrete rod bending with cutting ability of the front and rear end** placed on a straightening-cutting and bending machine of iron concrete rods (robotic machine), having adjusted the optional rolls, the canal for the holding of the formed shape and the collector which gathers the final product (formed shapes).

Sheet 11 shows the **four-direction mechanism for iron concrete rod bending with cutting ability of the front and rear end** placed on a straightening-cutting and bending machine of iron concrete rods (robotic machine) having adjusted the canal for the holding of the formed shape and the collector which gathers the final product (formed shapes).

Sheet 12 indicatively shows various "closed type" shapes that the **four-direction mechanism for iron concrete rod bending with cutting ability of the front and rear end** can form.

Sheet 13 indicatively shows various shapes (of open and closed type as well as many complicated shapes) that the **four-direction mechanism for iron concrete rod bending with cutting ability of the front and rear end** can form.

Sheet 14 indicatively shows various shapes in spiral figure that the **four-direction mechanism for iron concrete rod bending with cutting ability of the front and rear end** can form.

Sheet 15 indicatively shows various shapes with "core" (single, double, triple, etc) that the **four-direction mechanism for iron concrete rod bending with cutting ability of the front and rear end** can form.

Detailed description:

[0022] The **four-direction mechanism for iron concrete rod bending with cutting ability of the front and rear end**, according to the above-mentioned shapes, consists of a rotating plate (1), which has four openings for the entrance of the four bending pins (5). The bending pins (5) are adjusted firmly by twos on the two half rings (3). The rings are adjusted externally of the plate (1) and glide up and down, with the aid of pistons (7) and transfer-springs (8) depending on the phase that the mechanism performs. The rotation of the plate (1) is accomplished via a pair of gears (11) and (12), and the motion is given by motor (10).

[0023] The rings (3) externally have circumferential grooves (paths) so that during their rotation (e.g. bending phase) they can function as guides of the transfer-springs (8), which, in this way, can move circumferentially of the rings.

[0024] The whole system of the rotating plate is based on ball bearings and corresponding housings.

[0025] Internally of the rotating plate (1) is adjusted the pierced base (2) of knives (20) and in its internal is adjusted the axle (4) for the assembling of the formation pins (6) and for the use of its openings as a steady point so as to achieve

cutting-holding.

[0026] The base for the knives (2) and the axle (4) move and slide up and down by use of a piston (9). The upward motion (figures 3, 4, 5 & 6) is necessary in order to fulfill the front or rear cutting of the iron rod and the use of the knives (20) and of the axle housings (4) (figures 3, 9, 10, 11) as a clamp for the transference of the rod or of the formed shape, and the backward motion is necessary for the front or rear bending (figures 1 & 7).

[0027] The base (2) is seated on ball bearings and corresponding housings. Its rotation regarding the cutting of the rod is executed by use of a piston (13) and a corresponding ringed base (15) which allows the upward and downward movement of the base (2).

[0028] For the holding and moving the iron rod, the base (2) is rotated via an assisting pneumatic piston (14) and stabilizes the rod between the knives (20) and the opening of the base (4) with such a pressure that it's sufficient for the transference of the rod without scratching its surface.

[0029] The **four-direction mechanism for iron concrete rod bending with cutting ability of the front and rear end** is placed on a metal casing (16). On its two sides are adjusted seating mountings (17) for the sliding of the entire mechanism on the axles-guides for transference (18).

[0030] The backward & forward motion of the mechanism is accomplished by use of pistons (19) or other mechanism.

[0031] The **four-direction mechanism for iron concrete rod bending with cutting ability of the front and rear end** is adjustable to machines for straightening, bending and cutting of iron concrete rods or to corresponding machines which form iron rods.

[0032] On sheets 10 & 11 two cases of such machinery are presented.

[0033] At the point where the mechanism is placed, is constructed an opening as big as the way we select the machine to follow. During the phase of forward and backward motion of the mechanism (figure 2) the spaces created at the opening due to the motion of the mechanism, are covered by laminations (21) which -at the same time- are also used as surfaces for the iron rod being formatted.

[0034] The mechanism can optionally cooperate with a holding-driving canal for the formed shape (26) which has the length of our choice.

[0035] It functions with pistons (27) and has the ability to hold the shapes -in case they are of great length- by operating as a clamp with the help of the pistons and to place them in the collection place that is located on the lower part of the canals after the completion of the formation of the shapes (25).

[0036] Also, in cases that the propulsive roll line is not enough for the machines, a pair of propulsive roll guides (22 & 23) is optionally placed near to the mechanism.

[0037] The pair of rolls consists of the immovable roll (23), the mobile roll (22) that is adjusted by piston (24) according to the diameter size or the cross section of the iron rod.

[0038] The rotation of the roll (23) is carried out by a motor.

[0039] As already mentioned, the **four-direction mechanism for iron concrete rod bending with cutting ability of the front and rear end** is placed in machines for straightening, bending and cutting of iron concrete rod, or in corresponding machines, which processes iron rods, also known as robotic machines.

[0040] This kind of machines can form straightened iron concrete rods or other iron rods and can also elaborate iron rod from coil.

[0041] They function by use of computer, like all the relevant patents, the applicant was awarded with, do.

1st Application example

[0042] The **four-direction mechanism for iron concrete rod bending with cutting ability of the front and rear end**, is placed in a machine for straightening, bending and cutting of iron concrete rod, (electronic robotic machine), figure 14, sheet 10.

[0043] The machine collaborates with canal-holding guide of the formed shape (26) and collector of the formed shapes (25), which is located in the lower part of the machine and of the canal, as well as with assisting propulsive roll-guides (22 & 23) in case the machine does not provide them near the mechanism. The iron concrete rod is inserted into the propulsive and straightening rolls - usually the rod comes from an iron coil (steel works) - or is straight and passes through the assisting propulsive and straightening roll-guides (22 & 23).

[0044] The mechanism is located on the left side of the opening, the bending pins (5) and the cutting knives (20) are located on the lower part.

[0045] The formation pins (6) are at the phase of formation (lower point).

[0046] After programming the computer regarding the shape to be formed (indicative figures on sheets 12, 13, 14 & 15) the square shape is chosen.

[0047] Its formation phases are shown on sheet 8, which concerns the bending of the iron rod when it is being advanced and bent forwards.

[0048] Propulsion and straightening of the iron rod will be as much as the length of the side of the first bended part.

[0049] Realization of the bending (P1) by use of one pair of formation pins coming out and rotating with the aid of the rotating plate (1) as much as the programmed angle and direction.

[0050] Descent of the bending pins pair (5), return of the rotating plate (1) at the initial point and propulsion of the iron rod that much as the length of the bended side (P2).

[0051] After this phase, the shape can insert into the canal-holding guide (26) if its length is correspondent.

[0052] Bend and repetition of the procedure up to (P8) where the axle (4) with the formation pins (6) and the base (2) with the knives (20) are advanced to the upper part so as to accomplish the cutting with the rotation of the knives (20) and the opening of the immovable point (4). Return of the formation pins and of the knives at the lower point, the shape is held at the canal-guide with the aid of the pistons (27) and forward movement of the entire mechanism as much as the length of the last bended part, as it is presented on (P9). Ascent of the bending pins, rotation of the bending plate and bending of the last part.

[0053] The formation is completed. The pins are at the lower point and the rotating plate (1) rotates till the point where one bending pin shall be under the cross section of the iron rod of the formed shape so as to function as an extractor. At this phase, the one pair of bending pins is ascending (figure 12 & 13, sheet 7) and at the same time with the opening of the canal - if the shape due to its size is inside the canal - the formed shape (25) is detached from the mechanism and collected by the collectors for formed schemes which are located at the lower part of the machine and the canal.

2nd Application example

[0054] The **four-direction mechanism for iron concrete rod bending with cutting ability of the front and rear end**, is placed in a machine for straightening, bending and cutting of iron concrete rod, (electronic robotic machine), figure 14, sheet 10.

[0055] The machine collaborates with a canal-holding guide of the formed shape (26) and with a collector of the formed shapes (25) which is located on the lower part of the machine and of the canal as well as with assisting propulsive roll guides (22 & 23) in case the machine does not provided them near the mechanism.

[0056] The iron concrete rod inserts into the propulsive rolls and passes through the assisting propulsive roll-guides.

[0057] The mechanism is located on the left side of the opening, the bending pins (5) and the cutting knives (20) are located on the lower part.

[0058] The formation pins (6) are at the formation phase (lower point).

[0059] After programming the computer regarding the shape to be formed (indicative figures on sheets 12, 13, 14 & 15) the square shape is chosen.

[0060] Its formation phases are shown on sheet 9, which concerns the bending of the iron rod when its total length is being advanced forwards and the bending procedure is executed backwards.

[0061] Propulsion and straightening of the iron rod will be as much as the total length of the sides of the bended parts.

[0062] The straightened rod is inserted to the canal (26) and is held still. The mechanism moves forward as much as the length of the first bended part and, according to those analyzed at the first application example, rear bending is realized (P1).

[0063] At figures 7 & 8 of sheet 5 is shown the way of achieving the rear bending and the position of the bending pins corresponding to each case.

[0064] With 5 (A) the position of the pin is in the upper position and with 5 (K) the position of the pin is in the lower position.

[0065] Return of the rotating plate (1) at the initial point and forward movement of the mechanism as much as the length of the bended part (P2).

[0066] Realization of bending (P3) and return of the plate (1) as its initial point, the formation pins on the lower position, the base (2) with the knives (20) and the axle (4) with the formation pins (6) are advanced to the upper point so as to be realized the clamp of the rod (figures 9, 10, 11, sheet 6) by the rotation of the knives (20) and the immovable point of the axle (4) and with the aid of the piston (14). Release of the rod from the canal (26), movement of the mechanism with the formed shape backwards as much as the bended side, stabilization of the rod in the canal (26), return of the base (2) and the axle (4) on the lower point and forward advance of the mechanism as much as the length of the bended part (P4), realization of bending (P5) and return of the rotation plate (1) on its initial point.

[0067] Similar procedure is followed for the (P6), (P7) and (P8) while in (P9) we have forward bending and completion of the formation procedure.

3rd Application example

[0068] The **four-direction mechanism for iron concrete rod bending with cutting ability of the front and rear end**, is placed in a machine for straightening, bending and cutting of iron concrete rod, (electronic robotic machine), figure 15, sheet 11.

[0069] The machine collaborates with a canal-holding guide of the formed shape (26) and with a collector of the formed

shapes (25) which is located at the lower part of the machine and of the canal.

[0070] The iron concrete rod is inserted into the propulsive and straightening rolls - the rod is usually straightened or comes from an iron coil (steel works) - and passes through the assisting propulsive roll-guides (22 & 23) which these machines are provided with.

[0071] The mechanism is located on the left side of the opening, the bending pins (5) and the cutting knives (20) are located at the lower part.

[0072] The formation pins (6) are at the phase of formation (lower point).

[0073] After programming the computer regarding the shape to be formed, one or more of the indicative figures are chosen as shown at sheets 12, 13, 14 & 15.

[0074] For the formation the procedures mentioned in the two previous application examples are followed.

[0075] **The four-direction mechanism for iron concrete rod bending with cutting ability of the front and rear end**, has the ability of plenty applications regarding formation of iron concrete rods or other iron rods and mainly its use is important when it concerns formations of open-type shapes of great length as shown at figures 14 & 15 and at sheet 13.

Claims

1. Mechanism for iron concrete rod bending with cutting ability of the front and rear end, comprising a rotating plate (1) that has four openings for the entrance of four bending pins (5), said bending pins (5) being firmly adjusted by twos on two half rings (3), said half rings being adjusted externally of the plate (1) and adapted to slide up and down with the aid of pistons (7) and transfer springs (8), said half rings having externally circumferential grooves so that during their rotation according to operation phase of the mechanism, to function as guides of said transfer-springs (8) and internally of the rotating plate (1) is adjusted a pierced base (2) of knives (20) and in its internal are adjusted an axle (4) with formation pins (6) and openings for the immovable point of cutting-holding, said base of knives (2) and the axle (4) being adapted to move and slide up and down, said mechanism being placed upon a metallic casing (16) and on its two sides are adjusted seating mountings (17) for the backward and forward motion of the whole mechanism on axles-moving guides (18), said mechanism being placed in the machine at an installation point comprising an opening as big as the way selected the mechanism to follow, wherein during the phase of back and forth movement of the mechanism, the spaces created at the opening due to the movement of the mechanism, are covered by laminations (21) wherein the mechanism runs by use of pairs of gears and pistons.
2. The mechanism for iron concrete rod bending with cutting ability of the front and rear end, according to claim 1, wherein said four bending pins (5) consist two pairs of bending pins (5), adapted to ascend in pair above the rotating plate (1) and execute in combination with said formation pins (6), the front or rear bending of the iron concrete rod at any direction and angle chosen.
3. The mechanism for iron concrete rod bending with cutting ability of the front and rear end, according to claim 1 or 2, wherein said four bending pins (5) consist two pairs of bending pins (5) adapted to ascend in pair above the rotating plate (1) and under the cross section point of the formed shape, in order to function as extractors of the formed shape.
4. The mechanism for iron concrete rod bending with cutting ability of the front and rear end, according to claim 1, wherein said base (2) is adapted to ascend to the upper part and rotate rightwards or leftwards via a piston (13) in order to realize the front or rear cutting of the iron rod.
5. The mechanism for iron concrete rod bending with cutting ability of the front and rear end, according to anyone of claims 1 to 4, wherein said base (2) is adapted to ascend to the upper part and rotate rightwards or leftwards via the piston (14) in order to realize the front or rear holding of the iron rod or of the formed shape.

Patentansprüche

1. Mechanismus zum Biegen von Bewehrungsstahl an vier Seiten mit der Möglichkeit vorne und hinten zu schneiden bestückt von einer sich drehenden platte (1) wo Sie sich vier Öffnungen befinden für vier Pins die für das biegen zuständig sind (5) die soggenanten Pins (5) werden fest angebracht und je zwei, an den halben Ringen (3) die so genannten halben Ringe (3) außen an der Platte (1) die werden so angebracht das Sie sich nach oben und unten bewegen mit Hilfe von Kolben (7) und Federn (8) die so genannten halben Ringe haben außen Simetrische Rillen das so beim drehen und je nach Funktion als Führer dienen (8) und innen an der drehenden Platte (1) befindet sich

eine gelochte Basis (2) von den Messern (20) und innen wird eine Axe angepasst (4) mit Formbacken (6) und einer Öffnung für den festen Punkt die so genannte feste Basis der Messer (2) und die Axe (4) sind so angebracht das Sie sich nach oben und unten Bewegen, der ganze Mechanismus ist in ein Metal Gehäuse (16) an allen beiden Seiten ist es befestigt (16) für die vorwärts und rückwärts Bewegung des Mechanismus befindet sich auf beweglichen Axen (18) der gesamte Mechanismus ist in einer Öffnung montiert und bewegt sich so wie man das braucht für die vorwärts und rückwärts Bewegung die Zwischenräume werden mit blech bedeckt (21) die Bewegung des Mechanismus findet mit Zahnräder und Kolben statt.

2. Mechanismus zum Biegen von Bewehrungsstahl an vier Seiten mit der Möglichkeit vorne und hinten zu schneiden so wie in der Beschreibung 1. wo die so genannten vier Pins (5) bestechen aus zwei paar Pins (5) die angebracht sind oberhalb in paaren über der sich drehenden Platte (1) mit der zusammen arbeit den so genannten Formbacken (6) die vorwärts oder rückwärts Biegung des Bewehrungsstahls in der jeweiligen Richtung und Winkel.
3. Mechanismus zum Biegen von Bewehrungsstahl an vier Seiten mit der Möglichkeit vorne und hinten zu schneiden so wie in der Beschreibung 1. und 2. wo die so genannten vier Pins (5) bestechen aus zwei paar Pins (5) die angebracht werden um paarweise aufsteigend oberhalb der sich drehenden platte (1).
4. Mechanismus zum Biegen von Bewehrungsstahl an vier Seiten mit der Möglichkeit vorne und hinten zu schneiden so wie in der Beschreibung 2. wo die so genannten Basis (2) ist so angebracht das sie sich nach oben bewegt damit sie sich nach rechts oder links dreht mit Hilfe vom einem Kolben (13) damit Sie den Bewehrungsstahl vorne oder Hinten schneiden kann.
5. Mechanismus zum Biegen von Bewehrungsstahl an vier Seiten mit der Möglichkeit vorne und hinten zu schneiden übereinstimmend mit jeder Beschreibung von 1. bis 4. wo die soggenante Basis (2) so angebracht ist das Sie sich nach oben bewegt das Sie sich nach rechts oder links drehen kann mit einem Kolben (14) damit Sie vorne oder hinten den gebogenen Bewehrungsstahl halten kann.

Revendications

1. Mécanisme pour la tige concrète de fer se pliant avec la capacité de découpage de l'avant et a posteriori, comportant un plat tournant (1) qui a quatre ouvertures pour l'entrée de quatre bornes de recourbement (5), bornes de recourbement (5) fermement ajusté par deux demi d'anneaux du en deux (3), lesdits demi d'anneaux étant ajustés extérieurement du plat (1) et adaptés à la glissière en haut et en bas à l'aide des pistons (7) et des ressorts de transfert (8), lesdits demi d'anneaux ayant les cannelures extérieurement circulaires de sorte que pendant leur rotation selon la phase d'opération du mécanisme, à la fonction pendant que des guides de lesdits transférer - ressorts (8) et intérieurement du plat tournant (1) est ajustés une base perçante (2) de couteaux (20) et dedans ses internes sont ajustés un axe (4) avec des bornes de formation (6) et des ouvertures au point immeuble de découpage -se tenir, à ladite base des couteaux (2) et de l'axe (4) étant adapté au mouvement et à la glissière en haut et en bas, à ledit mécanisme étant placé sur une enveloppe métallique (16) et le on ses deux côtés sont les supports de places assises ajustés (17) pour la marche en arrière et avant des guides axe - mobiles d' entier de mécanisme (18), ledit mécanisme étant placé dans la machine à un point d'installation comportant une ouverture aussi grande que la manière a choisi le mécanisme pour suivre, où pendant la phase du mouvement de va-et-vient du mécanisme, les espaces créés à l'ouverture due au mouvement du mécanisme, sont couverts par les stratifications (21) où le mécanisme fonctionne au moyen des ciseaux de vitesses et de pistons.
2. Le mécanisme pour la tige concrète de fer se pliant avec la capacité de découpage de l'avant et a posteriori, selon la revendication 1, où lesdites quatre bornes de recourbement (5) consistent deux ciseaux de bornes de recourbement (5), adaptée pour monter dans les ciseaux au-dessus du plat tournant (1) et pour s'exécuter en combinaison avec lesdites bornes de formation (6), le recourbement avant ou arrière de la tige concrète de fer à tous direction et angle choisis.
3. Le mécanisme pour la tige concrète de fer se pliant avec la capacité de découpage de l'avant et a posteriori, selon la revendication 1 ou 2, où lesdites quatre bornes de recourbement (5) consistent deux ciseaux de bornes de recourbement (5) adaptées pour monter dans les ciseaux au-dessus du plat tournant (1) et sous le point en coupe de la forme formée, afin de fonctionner comme extracteurs de la forme formée.
4. Le mécanisme pour la tige concrète de fer se pliant avec la capacité de découpage de l'avant et a posteriori, selon

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la revendication 1, où ladite base (2) est adaptée pour monter à la partie supérieure et pour tourner à droite ou à gauche par l'intermédiaire d'un piston (13) afin de réaliser le découpage avant ou arrière de la tige de fer.

- 5 5. Le mécanisme pour la tige concrète de fer se pliant avec la capacité de découpage de l'avant et a posteriori, selon n'importe qui de revendications 1 4, où ladite base (2) est adaptée pour monter à la partie supérieure et pour tourner à droite ou à gauche par l'intermédiaire du piston (14) afin de réaliser la possession avant ou arrière de la tige de fer ou de la forme formée.

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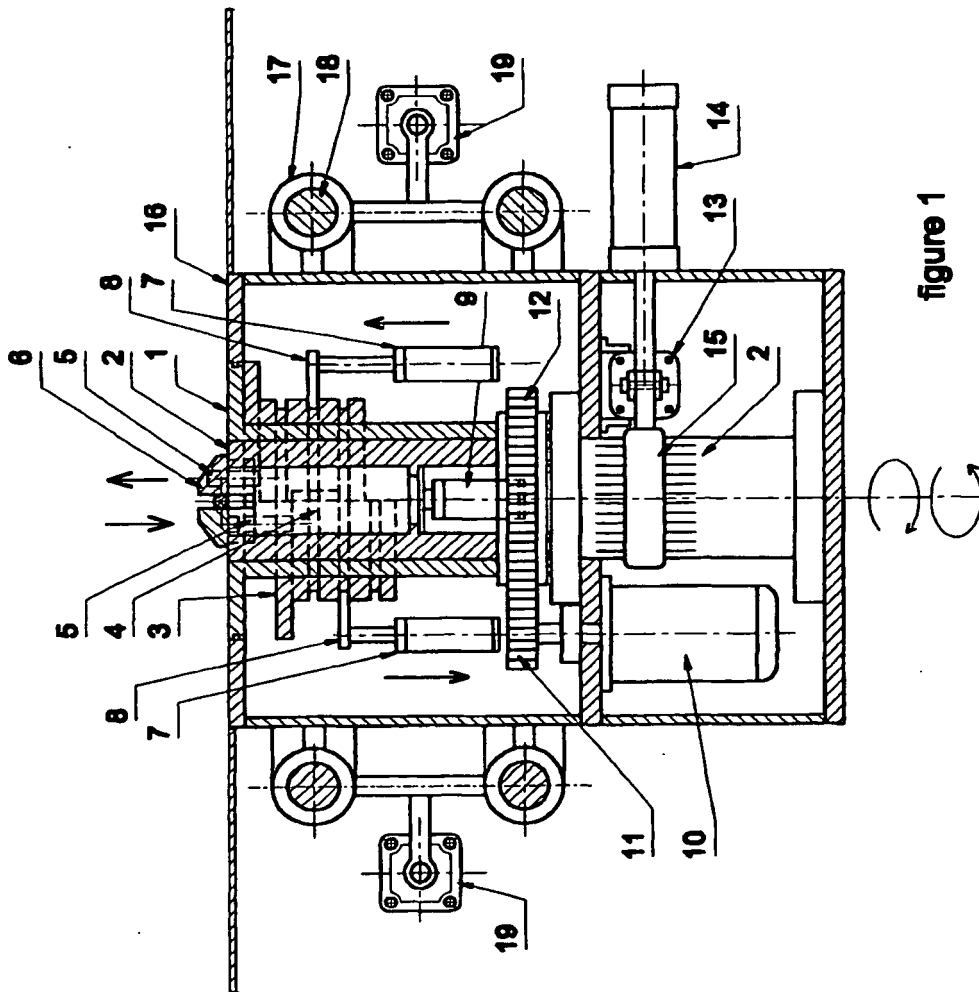
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sheet 1

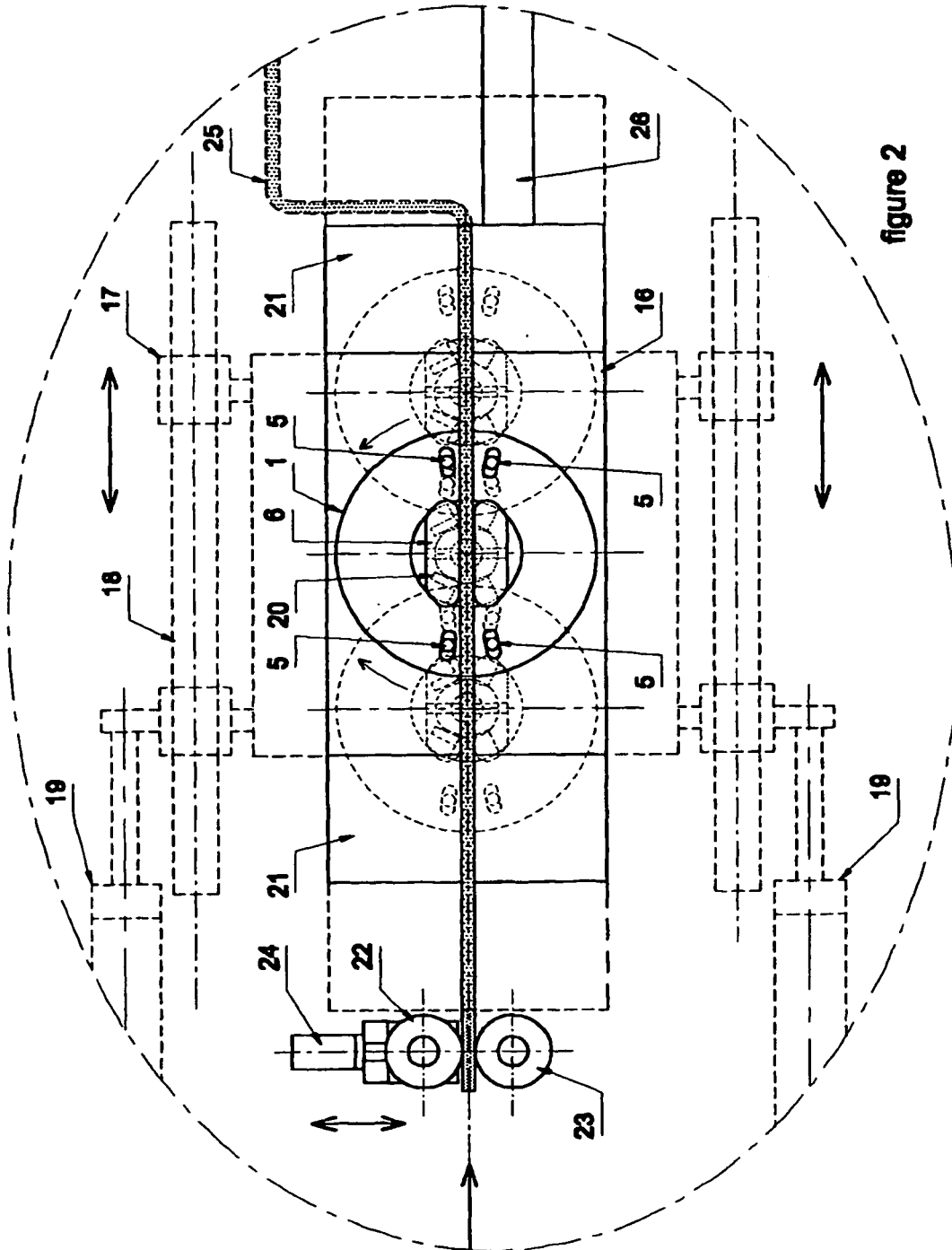
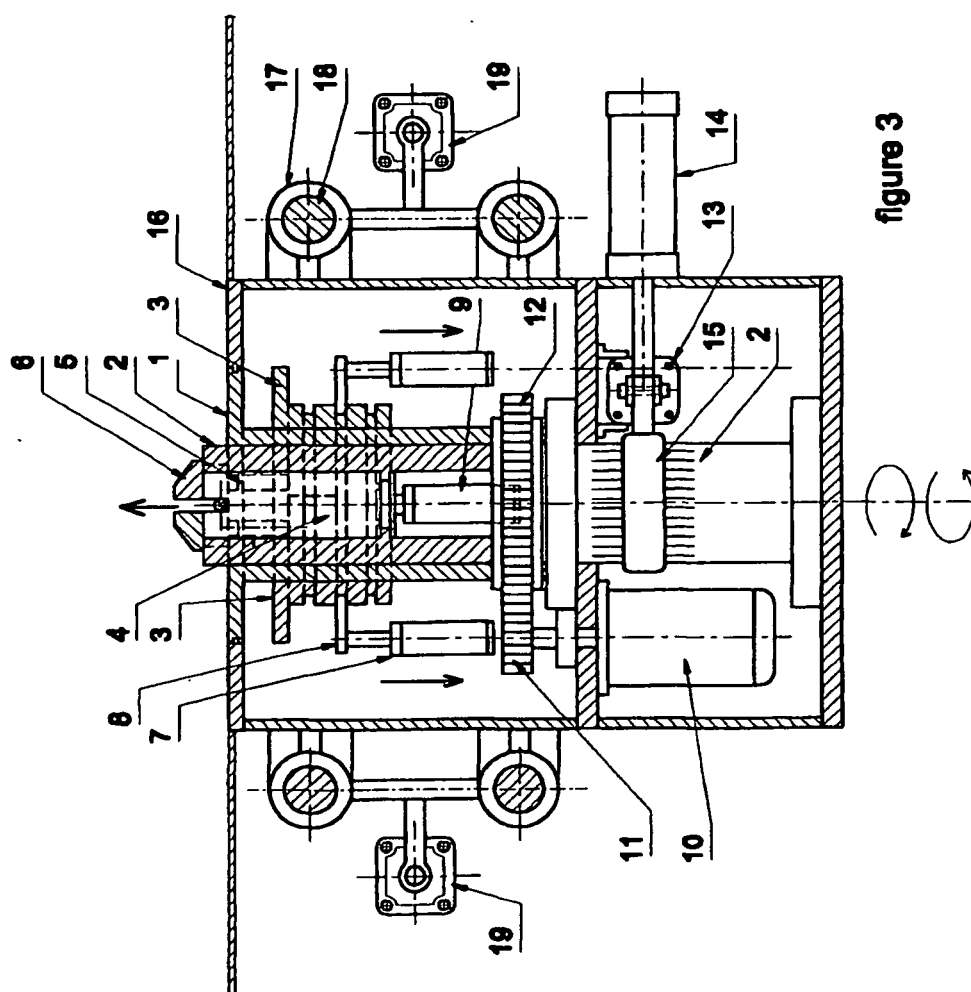


figure 2

sheet 2



sheet 3

figure 3

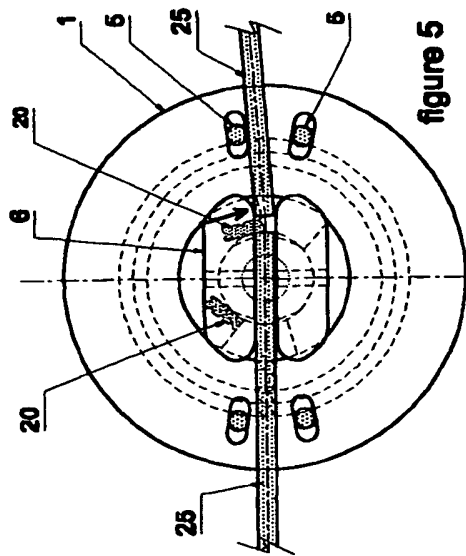


figure 5

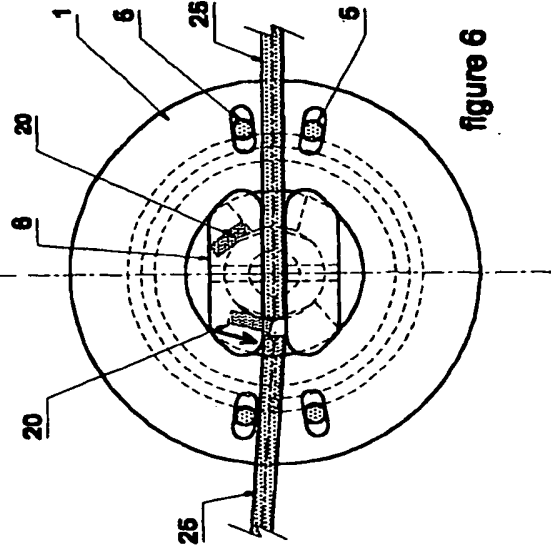


figure 6 sheet 4

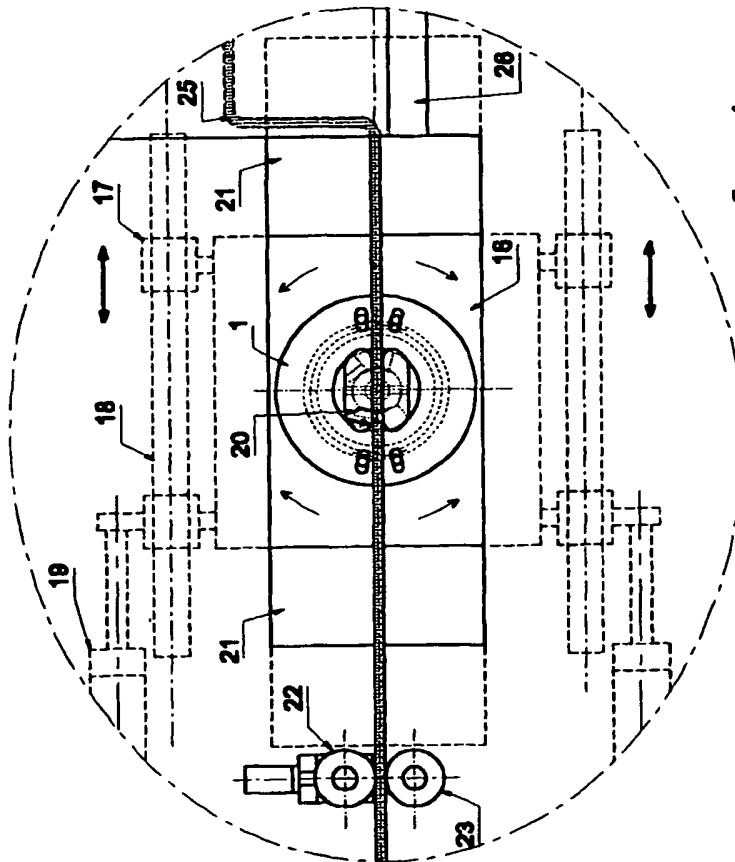
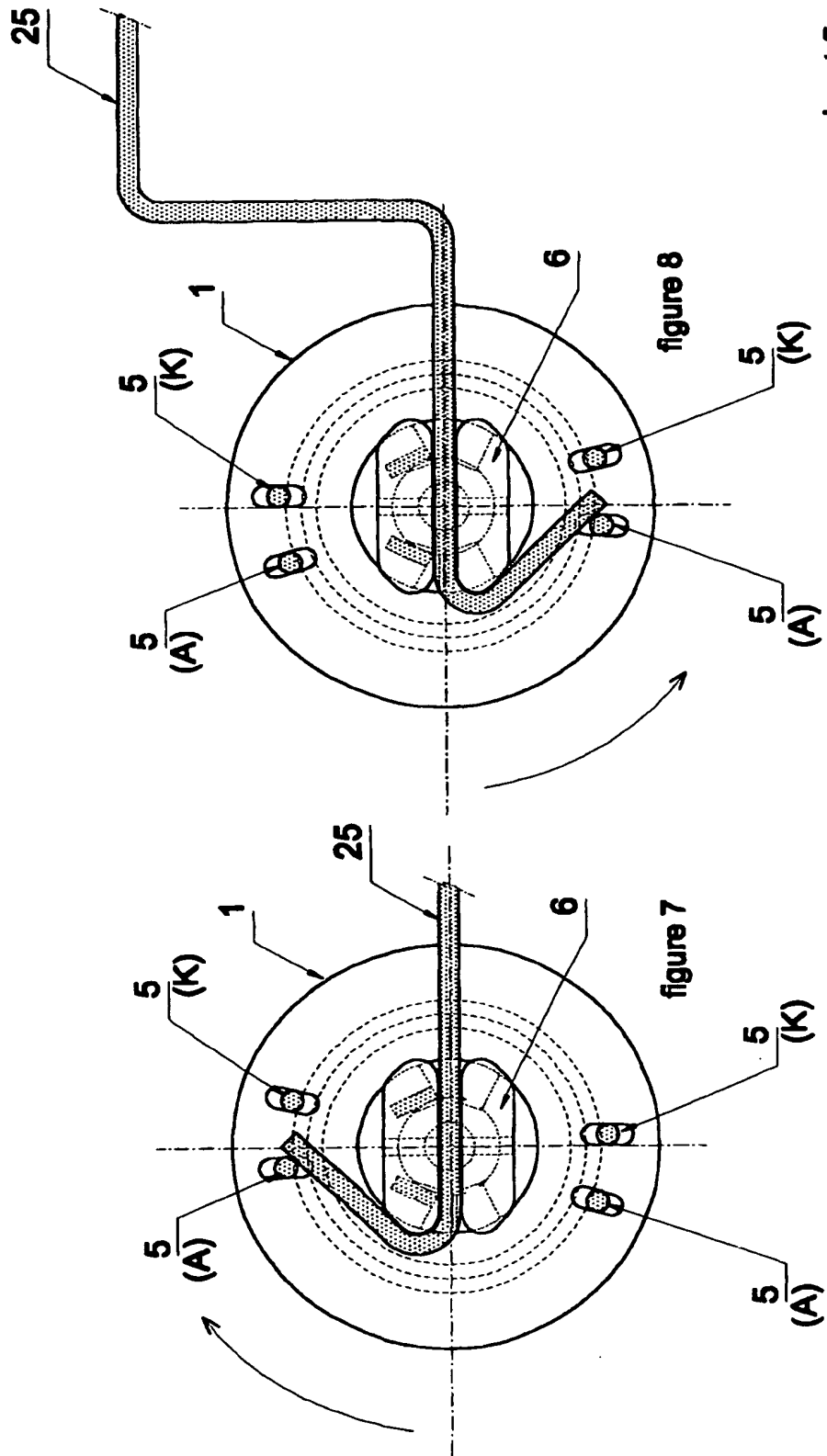
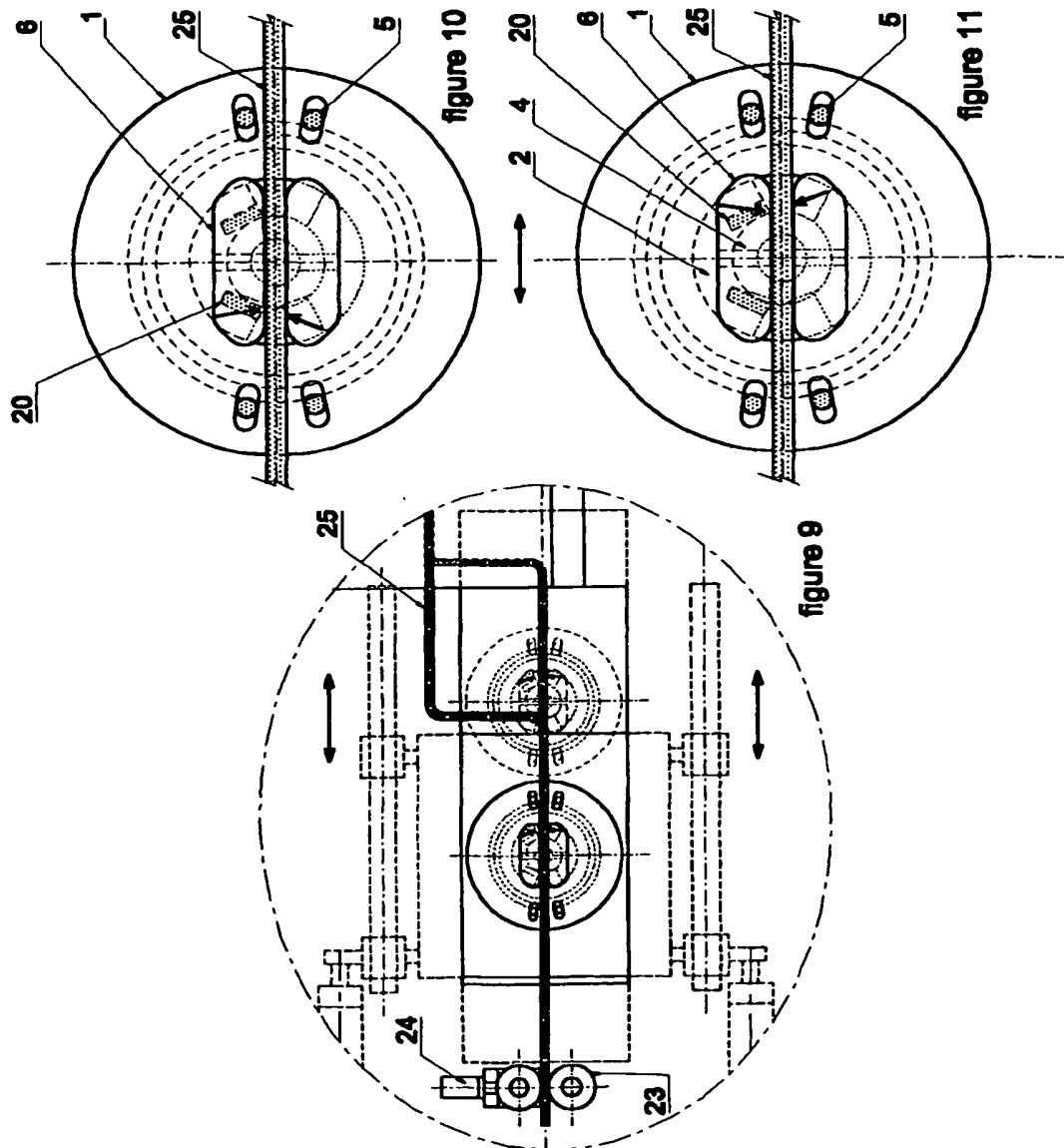


figure 4





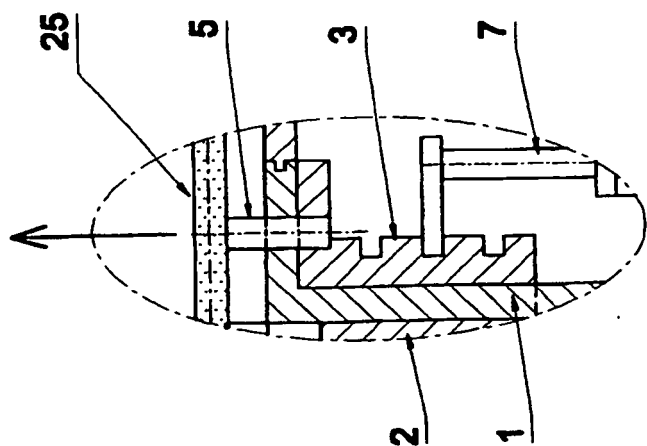


figure 12

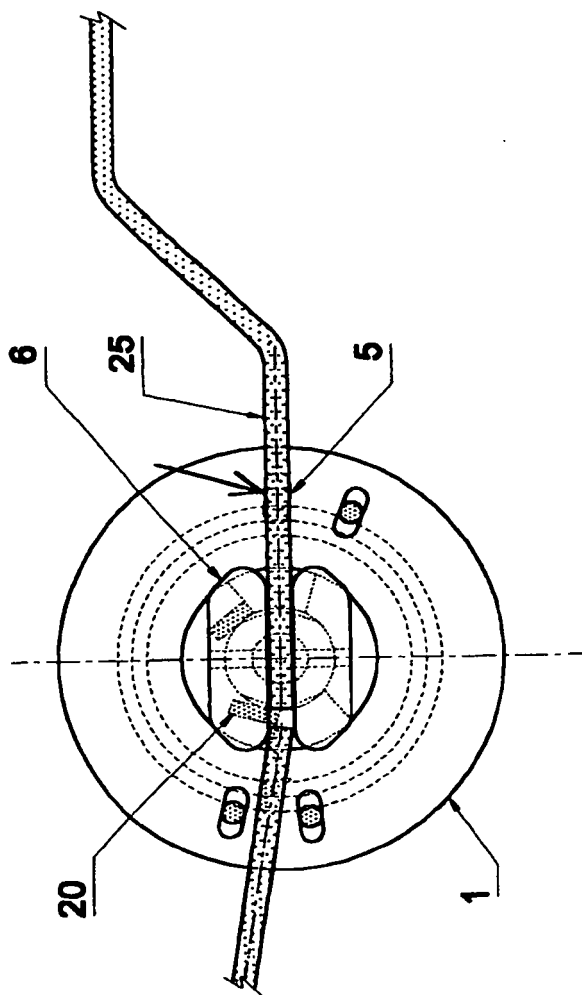
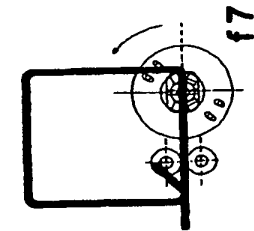
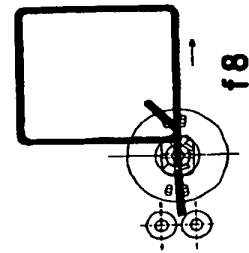
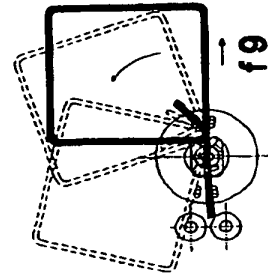
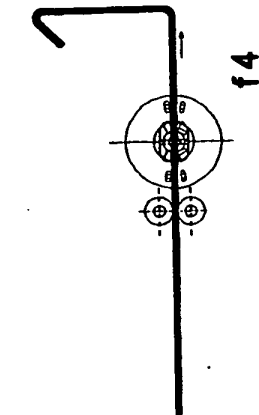
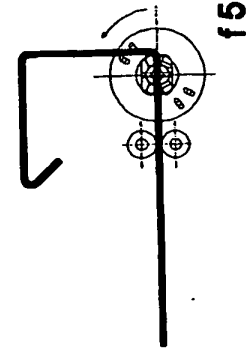
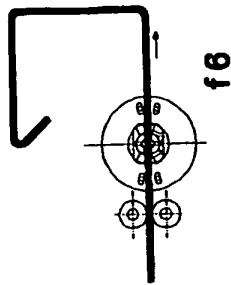
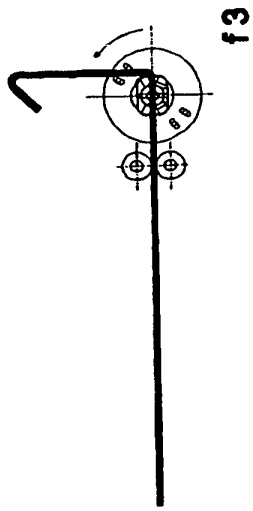
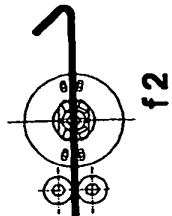
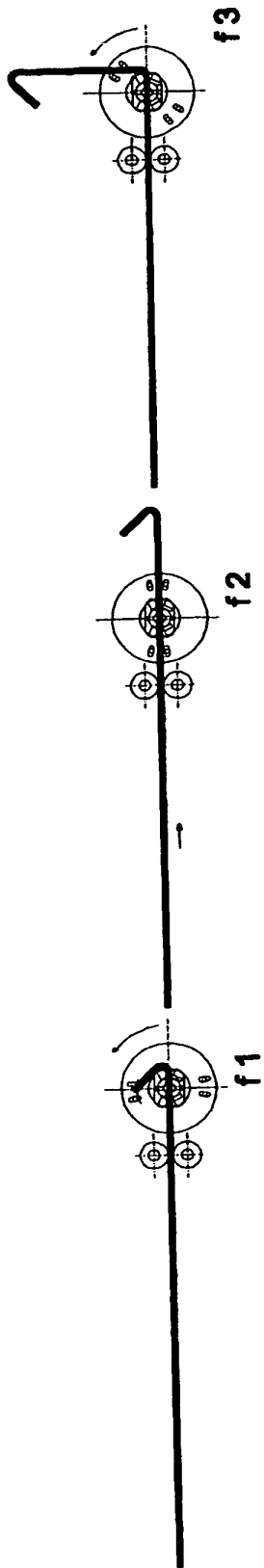
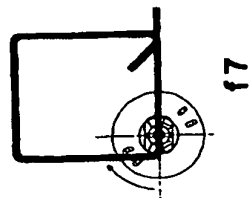
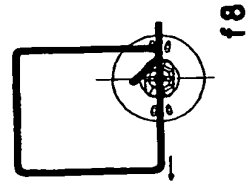
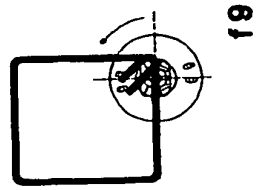
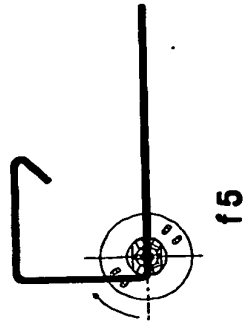
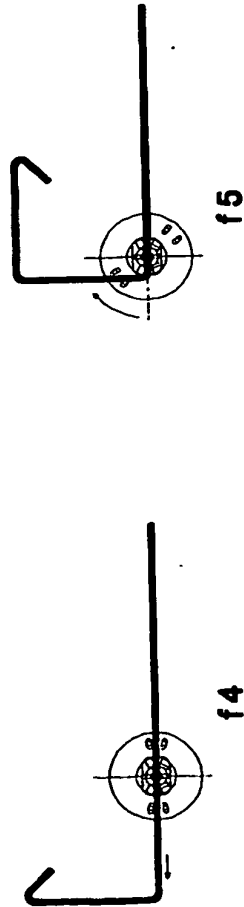
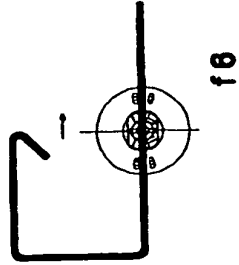
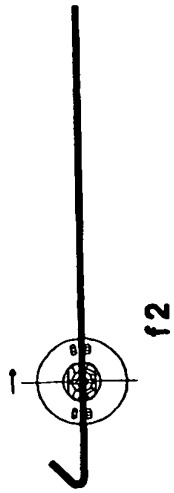
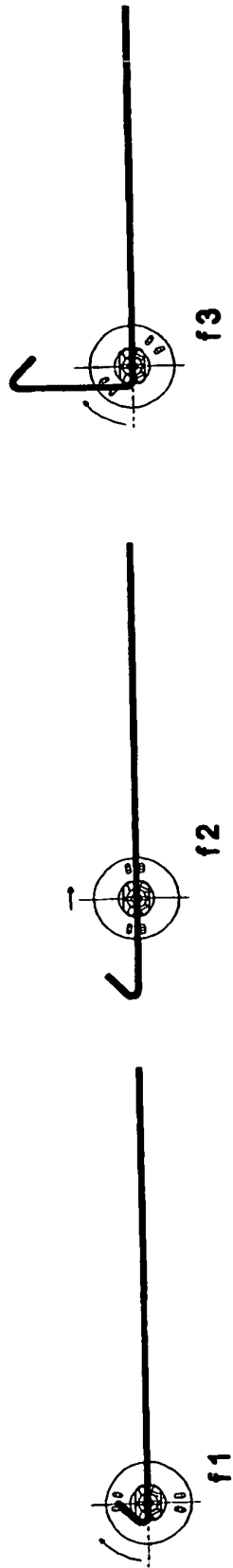


figure 13



sheet 8



sheet 9

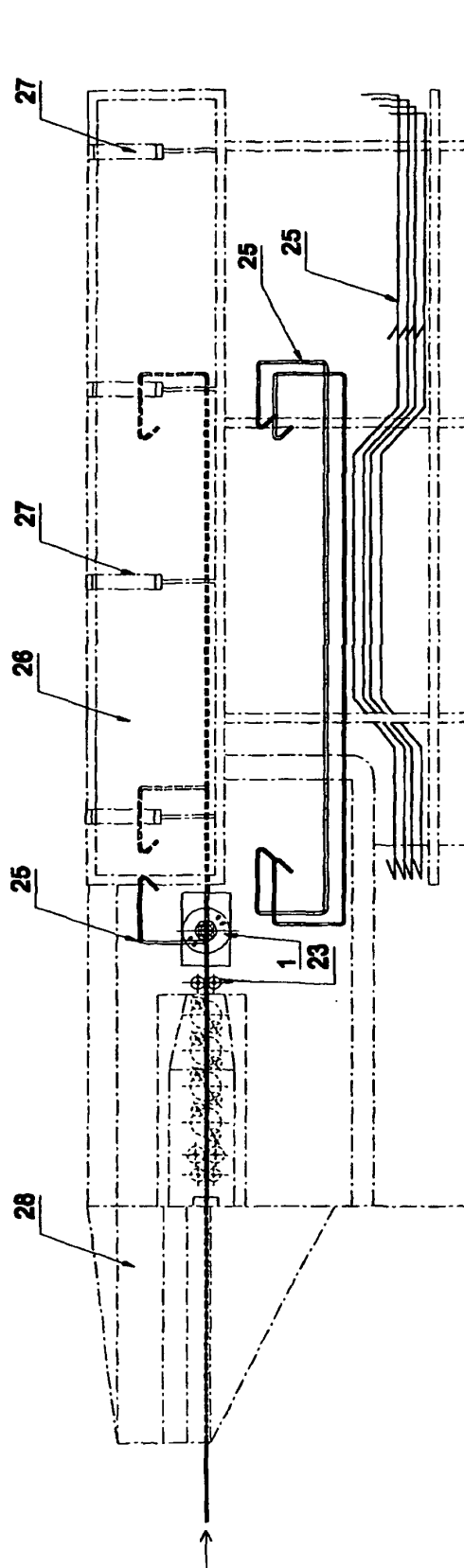


figure 14

sheet 10

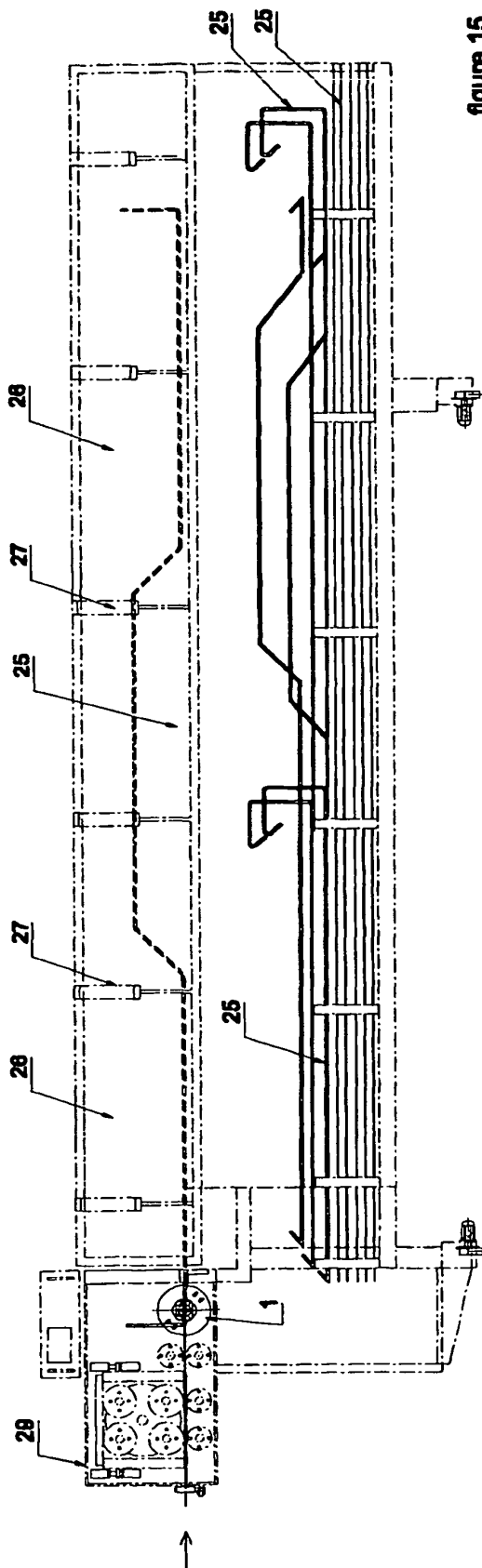
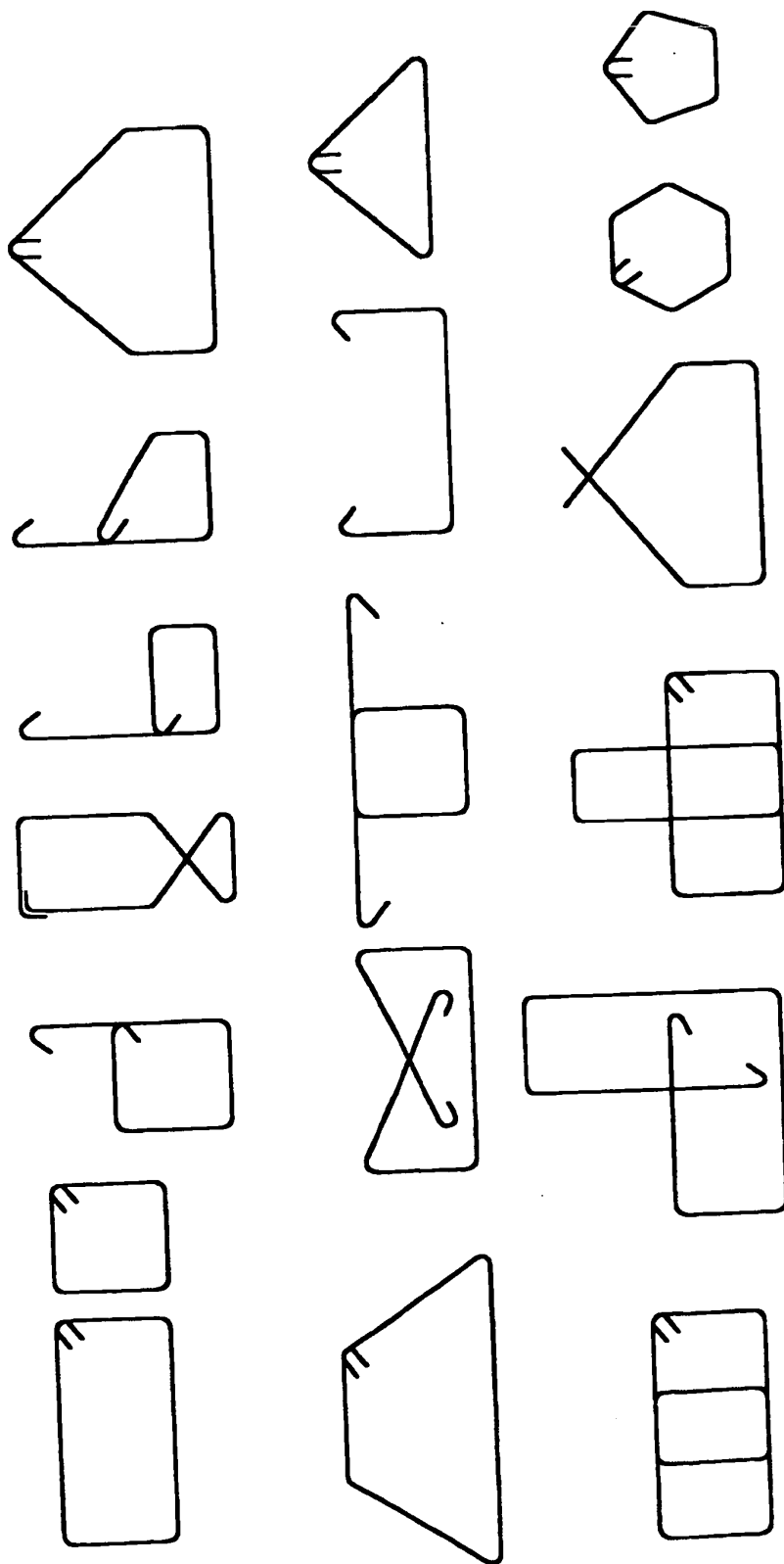
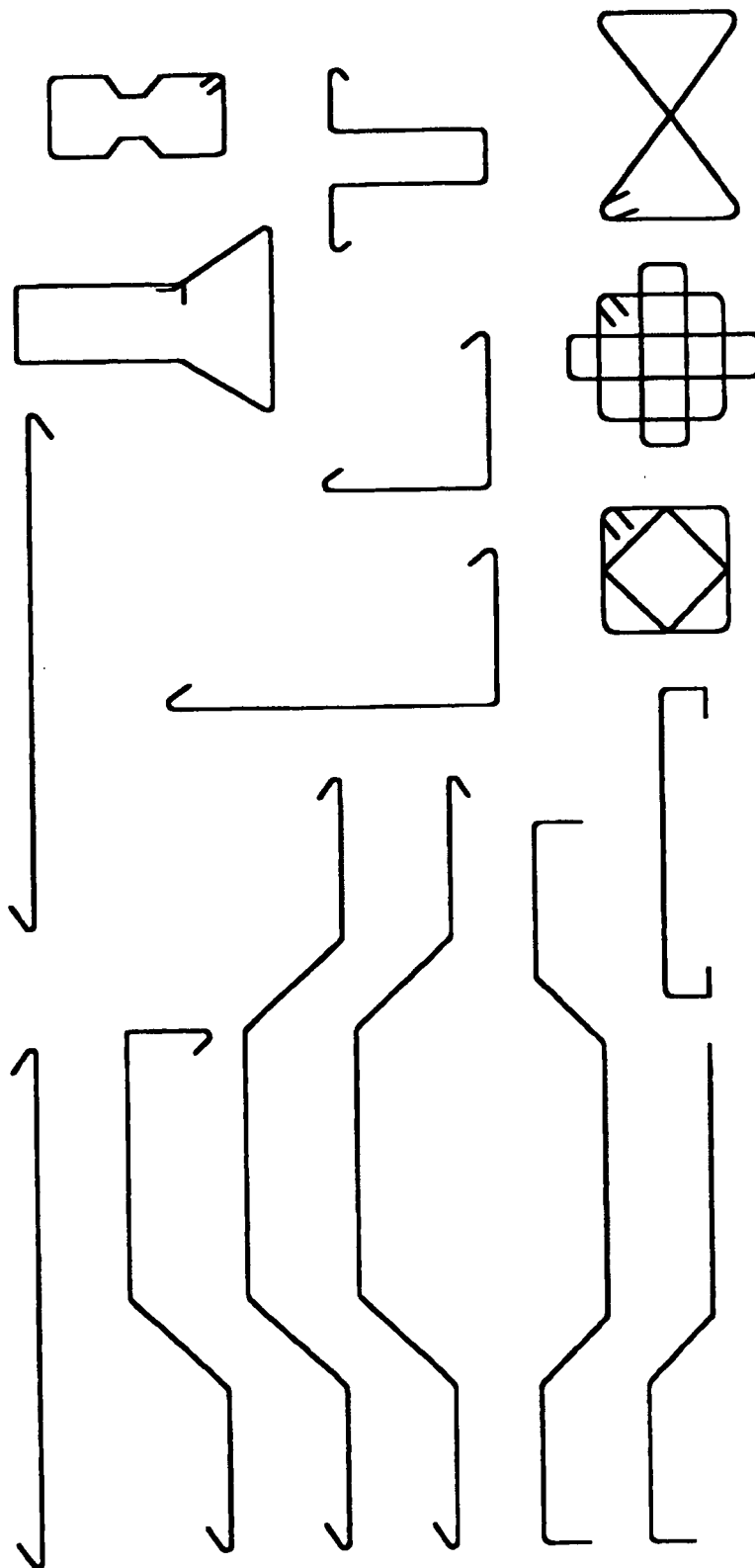


figure 15

sheet 11





sheet 13

