(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 714 716 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
25.10.2006 Bulletin 2006/43

(51) Int Cl.:
B21F 27/12 *(2006.01)*

(21) Application number: **06386006.8**

(22) Date of filing: **18.04.2006**

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

(30) Priority: **20.04.2005 GR 2005100201**

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(54) Feeder for concrete armature assembling machine

(57) The **Feeder of concrete armature assembling machine** consists of the columns for the straight iron rod (2) which have the ability for free opening-closing and forward-backward movement. Each column (2) bears at its upper and lower part group of rolls for straightening and propulsion of the iron rod (5). The group of rolls (5) is adjusted at the transferor with the regulating base-guide of the straight rod (18) and (17).

At the front part, the rotating feeder (26) is placed for the feeding of the **assembling machines** (41) with formed shapes.

At the bottom part of the feeder (26), joint (16) for its rotation and the continuous feeding of the assembling machines is adjusted and fastens at positions every 90 .

The feeding of the machine is accomplished manually or via a mechanism of automatic feeding (34).

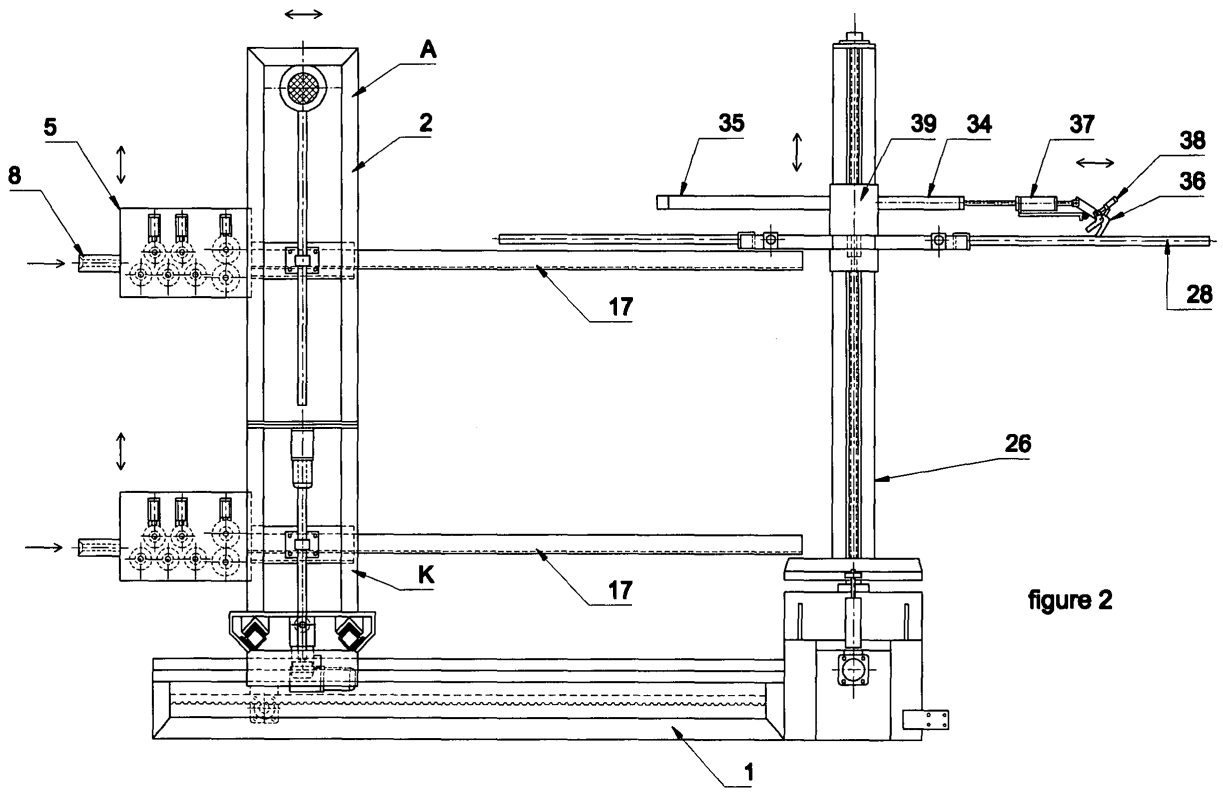

figure 2

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Description

[0001] The invention refers to a **Feeder of concrete armature assembling machine** which feeds the concrete armature assembling machines with formed shapes (stirrups) and straight iron rods.
It accepts a plurality of regulations and movements in order for its components to adjust at the size of the shape and to advance the straight iron rod at the appropriate point of the reinforcement that is to be assembled.

[0002] The reinforcement of building constructions with the known as "concrete armature" is an essential requirement for safe constructions against earthquakes and it is provided by the regulations for the building constructions.
The assembling of the armature is carried out usually by hand or by use of machines and the assembly utensil is the wire and the welding.
Concrete armature assembling machines which are accompanied by a feeder of formed shapes (stirrups) and of straight iron rods, the inventor has requested for grant in the past, bearing the following data:

> **Automatic assembler of concrete reinforcement**, with **Utility Model Certificate No: 2002563** and European Patent Application No: 04386027.9/21-10-04.
> **Concrete reinforcement assembling machinery** with Patent Application No (of Hellenic Industrial Property Organisation): 20040100426 and European Patent Application No: 05386.004.5**/EPO 5386.**

The feeders that accompany the above-mentioned assembling machines are incorporated in the assembling machine; they can feed the machine with formed shapes automatically or manually as well as with straight iron rods which they advance interiorly or exteriorly of the shape.
They have improved the production time in relation to the manual labour while the regulations provided allow a breadth of adjustment not only of the formed shapes but also of the straight iron rod which is advanced till the assembling point by hand and then via mechanisms of the assembling machine.
The reduction of the completion time of an armature assembling "cycle" remains significant since at the above feeders a "dead" point intervenes which regards the placement of the formed shapes so as for the new assembling phase to follow.
Furthermore, only straight iron rods are fed, provided the existence of a machine for straightening of iron rods (or from coil) or the supply of ready straight rods while a number of several regulations for the adjustment of the machine at the sizes and the specifications of the armature to be assembled is accomplished manually or is incomplete.
Other concrete armature assembling machines that exist in the market are not provided with a feeder and their feeding is realised manually.

[0003] The **Feeder of concrete armature assembling machine** is characterised by the fact that it constitutes a co-operating part of the **concrete armature assembling Machines** and it can be fit via screw-connections or via welding at the main machine.
Each of its part that is used for the feeding of the machine with formed shapes and straight rods, is regulated mechanically or manually for the accurate adjustment at the sizes and the specifications of the armature to be assembled.

[0004] The straightening and the advance of the iron rods are carried out by incorporated systems of propulsion and straightening rolls.
The rotating feeder of the machine with formed shapes has the ability to feed the machine automatically or manually while during assembling the operator feeds the corresponding position of the feeder with new to-be-assembled shapes and, as a result, no intermediate "dead" point intervenes at the assembling procedure.

[0005] The invention can be well comprehended by right of the following figures:

Sheet 1 - Figure 1 shows the **Feeder of concrete armature assembling** machine at side view, without the mechanism for automatic propulsion of formed shapes.

Sheet 2 - Figure 2 shows the **Feeder** at side view, with the mechanism for automatic propulsion of formed shapes.

Sheet 3 - Figure 3 shows the **Feeder** at top view.

Sheet 4 - Figure 4 shows the **Feeder** at side view and at symmetrical position the feeding columns with straight iron rods.

Sheet 5 - Figure 5 shows the **Feeder** at side view and at non-symmetrical position the feeding columns with straight iron rods.

Sheet 6 - Figure 6 shows the **Feeder** at top view and indicatively the displacement of the feeding columns with straight iron rods and the rotation of the feeding column with formed shapes.

Sheet 7 - Figure 7 shows the **Feeder** at side view and at a feeding phase of a closed shape with "core" and of straight iron rods.

Sheet 8 - Figure 8 shows the **Feeder** at side view and at a feeding phase of a non-symmetric shape and of straight iron rods.

Sheet 9 - Figure 9 shows the **Feeder** at side view and at a feeding phase of an open shape and of straight iron rods.

Sheet 10 - Figure 10 shows the **Feeder of concrete armature assembling machine** at side view and at full layout, co-operating with the **armature concrete assembling machine** and the pay-offs with the iron coils to feed the straightening and propulsion rolls. At the layout the mechanism of automatic propulsion of the formed shapes is not shown.

Sheet 11 - Figure 11 shows the **Feeder of concrete armature assembling machine** at side view and at full layout, co-operating with the **armature concrete assembling machine** and the pay-offs with the iron coils to feed the straightening and propulsion rolls. At the layout the mechanism of automatic propulsion of the formed shapes and the assembling procedure is shown.

Sheet 12 - Figure 12 shows the **Feeder of concrete armature assembling machine** at top view and at full layout, co-operating with the **armature concrete assembling machine** and the pay-offs with the iron coils to feed the straightening and propulsion rolls.

Sheet 13 - Figures 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27 and **28** shows indicative figures that the **Feeder** can feed, as well as the points from where the straight iron rod passes.

Sheet 14 - Figures 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43 and **44** shows indicative figures that the **Feeder** can feed, as well as the points from where the straight iron rod passes.

Sheet 15 - Figure 45 shows indicative figure of concrete armature, as the result of an assembling procedure and the **Figure 46** shows a part of the armature in enlargement.

Sheet 16 - Figure 47 shows indicative figure of concrete armature, as the result of an assembling procedure and the **Figure 48** shows a part of the armature in enlargement.

Sheet 17 - Figure 49 shows indicative figure of concrete armature, as the result of an assembling procedure and the **Figure 50** shows a part of the armature in enlargement.

DETAILED DESCRIPTION

[0006] The **Feeder of concrete armature assembling machine** consists of the metallic base (1) upon which all the components and the mechanisms of the Feeder are installed.

At the base the columns of the straight iron rod (2) are placed which have the ability for opening-closing and their adjustment according to the size and the kind of the shape of the armature to be assembled. The upper part (A) of column (2) opens and closes freely via the motor (3) and the lower part (K) opens and closes freely via the motors (4). The opening and closing of the columns (K) leads the upper part (A) as well, which however comes to the regulation desired via the free movement previously mentioned and it is realised by use of prismatic guides (21).

Each column (2) bears at its upper and lower part straightening group of rolls (5) which collect the iron rod from the iron coils (6) sheet 10, 11 and 12, placed at the corresponding bases-pay offs (7) and, through the insertion-guide (8) drive the iron rod to the straightening rolls. The straightening rolls consist of the bottom line of rolls (9) which is fixed and of the upper line of rolls (10) which is adjustable. The regulation of the upper rolls is accomplished via hydraulic pistons or via other mechanic means (11). Following, there are the propulsion rolls which consist of the lower fixed roll (12) that accepts movement for its rotation from hydraulic or other motor (13) and of the upper (14) that is adjustable. The regulation of the upper roll is achieved via hydraulic pistons or via other mechanic means (15). All the previously mentioned components are adjusted to the base of rolls (5) which, in its turn, is adjusted to the transferor with the base-guide of the straight iron rod (17).

[0007] Each **Feeder** bears four groups of rolls for straightening and propulsion of the iron rod and four bases with guides of the straight iron rod accordingly.

Each base-guide consists of the base (18) upon which is adjusted the straightening guide (17). In case of feeding with ready straightened iron rods (42), the guide accepts more than one iron rods and the quantity depends on the size of the guide and the cross-section of the iron rod.

[0008] According to the position the straight iron rod will have upon the shape of the armature -to be assembled- (at an angular position or at a certain distance from it as if it will be internally or externally of the shape) the guides (17) are adjusted.

The regulation is carried out by adjusting the base (18) upon the screw (19) which accepts anticlockwise or clockwise movement from electro-motor or other motor (20) and with the help of the guides the ascent and the descent of the guide (17) is realized.

By corresponding parts consist as well the four bases-guides that are assembled at the feeder.

The columns of the straight iron rod move forwards-backwards via prismatic guides (22), electro-motor system or other motor (23), toothed measure (24) and pair of gears (25).

At the front part of the base (1) is adjusted the rotating feeder of the **assembling machines** (41) with formed shapes.

It consists of the column (26) which bears the frame (27) of square cross-section. At each side of the frame are adjusted the holding bars (28) of the shapes to be assembled (29). The bars may have a length relative to the quantity of the shapes placed (sheet 10 & 11) and open and close by sliding upon the lengthwise side of the frame

for their adjustment at the size of the shape. The frame together with the holding bars move upwards-downwards for its adjustment according to the size of the shape to be assembled. This movement is achieved via the screw (30), the electro-motor (31) and the sliding point (32).

At the lower point of the column (26) is adjusted a joint (16) for the rotation of the entire column for the continuous feeding of the **assembling machine** and fastens at positions every 90° in order to feed and to be fed. It fastens by means of air piston and holding pin or other mechanism (40).

The feeding of the mechanism is carried out manually or by means of an automatic feeding mechanism (34). In case the feeding is done automatically (sheet 2) at the upper part of the column of the feeder is adjusted the mechanism for the automatic advance of the formed shape (29) which consists of the propulsion piston (35) and the holding clutch of the shape (36) that functions via pistons (37) and (38).

The mechanism for automatic propulsion rotates upon the column at point (39) and can fasten at a feeding position of assembling machine and moves upwards-downwards according to the movements of the frame (27).

A reference regarding the specific mechanism is done also at our applications with the title: **Concrete reinforcement assembling machinery**, with application No (of Hellenic Industrial Property Organisation): 20040100426 and European Patent Application No: 05386.004.5**/EPO 5386.**

The **Feeder of concrete armature assembling machine** constitutes a co-operating part of the **concrete reinforcement assembling Machines** which can be adjusted by means of screw-connections at the main machine via the spring (33) or other mean such as welding for permanent adjustment.

APPLICATION EXAMPLE

[0009] At the **Concrete reinforcement assembling machine** that are the pre-mentioned inventions or other corresponding one, is adjusted the **Feeder of concrete armature assembling machine** via the holding springs (33).

An option of the shapes (stirrups) is made as they are indicatively shown at figures 13 to 28 - sheet 13 and at figures 29 to 44 - sheet 14, in regard to their figure (of opened or closed type, simple rectangle, square, angular, etc. with internal shape -core- bisecticle, trisecticle etc) and are placed at the bars (28) of the rotating column (26) of the feeder.

Initially, the operator loads the one pair of the bars -after having adjusted the bars at the size of the shapes- with such a number of shapes as needed (sheet 12) for the construction of a concrete armature column.

By completing the installation, it releases the holding rotating mechanism of the column (40) and rotates the column (sheet 6) until the bars with the shapes come to a feeding position of the **assembling machine**; at this point the column fastens by means of the mechanism (40).

An option is made regarding if the straight iron rods (42) that will be assembled with the shapes (29) will be directly straightened or they will come from an iron-coil.

In case the option will be of the ready straightened rod, then after the choice of the cross-section and of its length will be done, they are placed at the straight guides (17) and for a time reduction of the production cycle can be more than one at each guide. Next, regulations of the guides are set according to if the straight rods will pass internally or externally of the shape and if they will be assembled at the corner of the shape or other position (as shown at figures of sheets 13 and 14).

In case of option of iron from coil (sheet 10, 11 & 12), then the one end of the iron is inserted manually at the inlet-guide (8), passes to the straightening rolls (9 & 10) and then to the propulsion rolls (12 & 14) and next they are done the necessary regulations for the proper straightening and propulsion of the iron rod. Afterwards, the regulations of the guides are set according to whether the already straight rods will pass internally or externally of the shape and if they will be assembled at the corner of the shape or at other position (figures of sheets 13 and 14).

Manually or automatically is advanced the first shape at the **assembling machine** (41) which via the mechanisms provided, collects it (sheet 10, 11 & 12). Manually is advanced the ready straightened iron rod only till the inlet phase of the iron rod at the **assembling machine** because afterwards the advance is carried out via the mechanisms of the assembling machine.

During propulsion phase of the straight rod at the assembling point, the columns of the straight rod are moved forwards, so as to be a base for the rod till the completion of the assembling length.

Mechanically is advanced at the **assembling machine** the straight iron rod when it comes from iron coil and is cut manually at the length desired by use of cutting tool.

During assembling procedure the operator places at next holding bars (28) the shapes to be assembled (29) so as by completion of assembling of the concrete armature column (figures 45 and 46 - sheet 15, figures 47 and 48 - sheet 16 and figures 49 and 50 - sheet 17) the column (26) to rotate and feed the following assembling phase in order for the procedure to be repeated.

Claims

1. The **Feeder of concrete armature assembling machine** consists of the metallic base (1) above which the moving columns of the iron rod (2) are placed, every column (2) bears at the upper and at the lower part moving groups of rolls for the straightening and the propulsion of the iron rod (5) and bases (18) for the adjustment of the guide of the straight

iron (17) and of the group of rolls (5).
Each **Feeder** is provided with four moving groups of rolls for the straightening and propulsion of the iron rod (5), four guides of the straight iron rod (17) accordingly and move up and down freely in pairs (group of rolls -guide). At the front side of the base (1) is adjusted the rotating feeder (26) for the feeding of the **concrete armature assembling machines** (41) with formed shapes.

2. The **Feeder of concrete armature assembling machine** according to claim 1, is **characterized by** the fact that the columns of the straight iron rod (2) have the ability to open-close and to move forwards-backwards via prismatic guides (22), system of electro-motor or other motor (23), toothed measure (24) and pair of gears (25). The upper part (A) of the column (2) opens and closes freely via the motor (3) and the lower part (K) opens and closes freely via the motor (4) and prismatic guides (21).

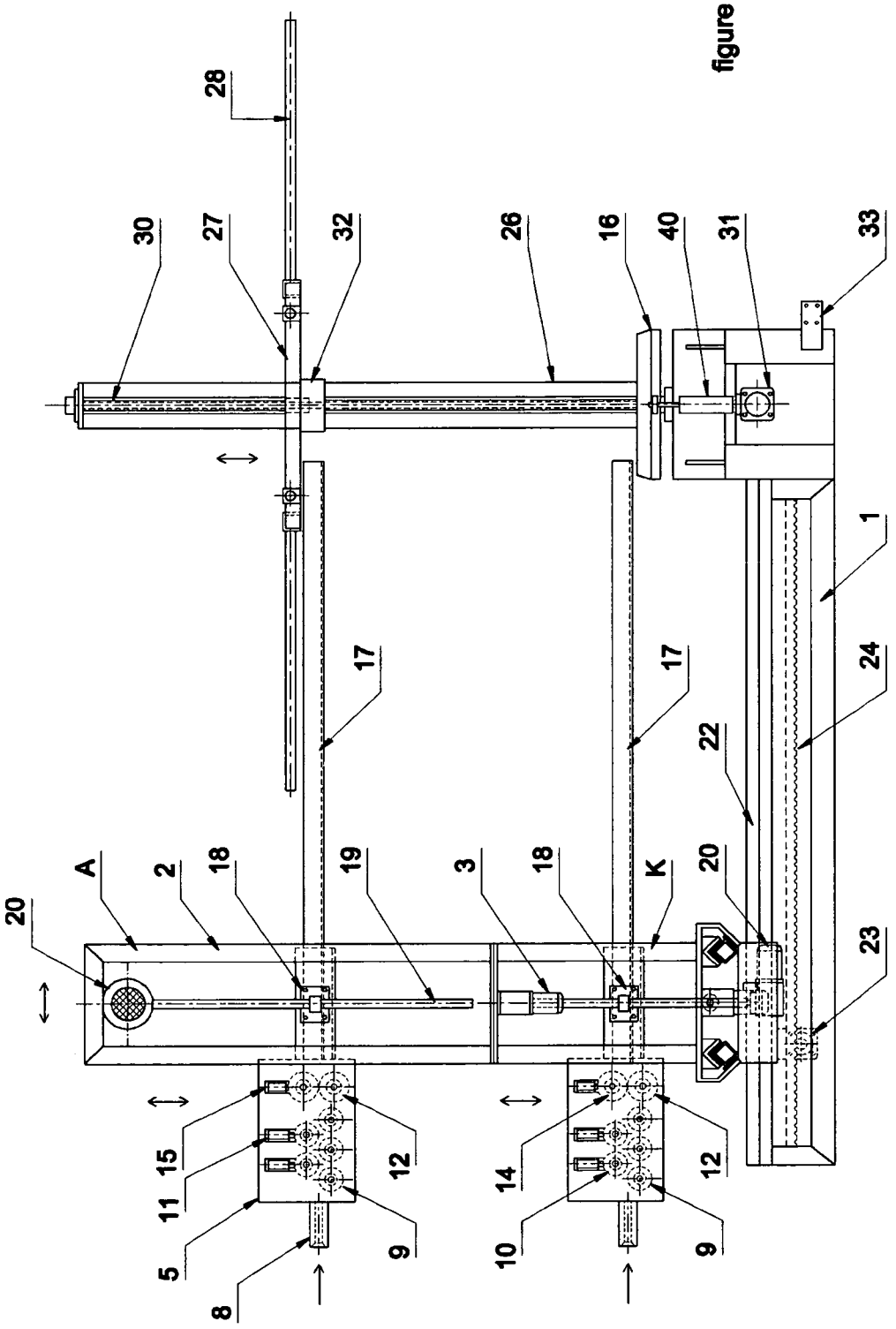
3. The **Feeder of concrete armature assembling machine** according to claims 1 and 2, is **characterized by** the fact that each column of the straight iron rod (2) bears at its upper and lower part moving groups of rolls for the straightening and propulsion of the iron rod (5) which collect the iron rod from the iron coils (6) and via the inlet-guide (8) they lead it at the straightening rolls. The straightening rolls consist of the bottom line of rolls (9) which is fixed and of the upper line of rolls (10) which is adjustable. The regulation of the upper rolls is accomplished via hydraulic pistons or via other mechanic means (11). Following, there are the propulsion rolls which consist of the lower fixed roll (12) that accepts movement for its rotation from hydraulic or other motor (13) and of the upper (14) that is adjustable and rotates freely. The regulation of the upper roll is achieved via hydraulic pistons or via other mechanic means (15).
The regulation of the upwards-downwards movement of each straightening group of rolls (5) is carried out by its adjustment at the base (18) and via the screw (19) which accepts anticlockwise or clockwise movement from electro-motor or other motor (20) and with the help of the guides the ascent and the descent is realized.

4. The **Feeder of concrete armature assembling machine** according to claims 1, 2 and 3, is **characterized by** the fact that it bears four moving groups of rolls for the straightening and propulsion of the iron rod (5), four guides of the straight iron rod (17) and four bases (18) accordingly.
The guide (17) in case of feeding with ready straightened iron rods (42) accepts more than one iron rods. The regulation of the guide (17) is carried out by the adjustment of the base (18) upon the screw (19), which accepts anticlockwise or clockwise movement from electro-motor or other motor (20) and with the help of the guides the ascent and the descent is realized.

5. The **Feeder of concrete armature assembling machine** according to claim 1, is **characterized by** the fact that at the front part of the base (1) is adjusted the rotating feeder (26) for the feeding of the **concrete armature assembling machines** (41) with formed shapes.
It consists of the column (26), which bears the frame (27) of square cross-section. At each side of the frame, the holding bars (28) of the shapes to be assembled (29) are adjusted, which open and close by sliding upon the lengthwise side of the frame (27). The frame (27) together with the holding bars (28) moves upwards-downwards via the screw (30), the electro-motor (31) and the sliding point (32).
At the lower point of the column (26) is adjusted a joint (16) for the rotation of the entire column that fastens at chosen positions every 90° by means of air piston and holding pin or other mechanism (40).

sheet 1

figure 1



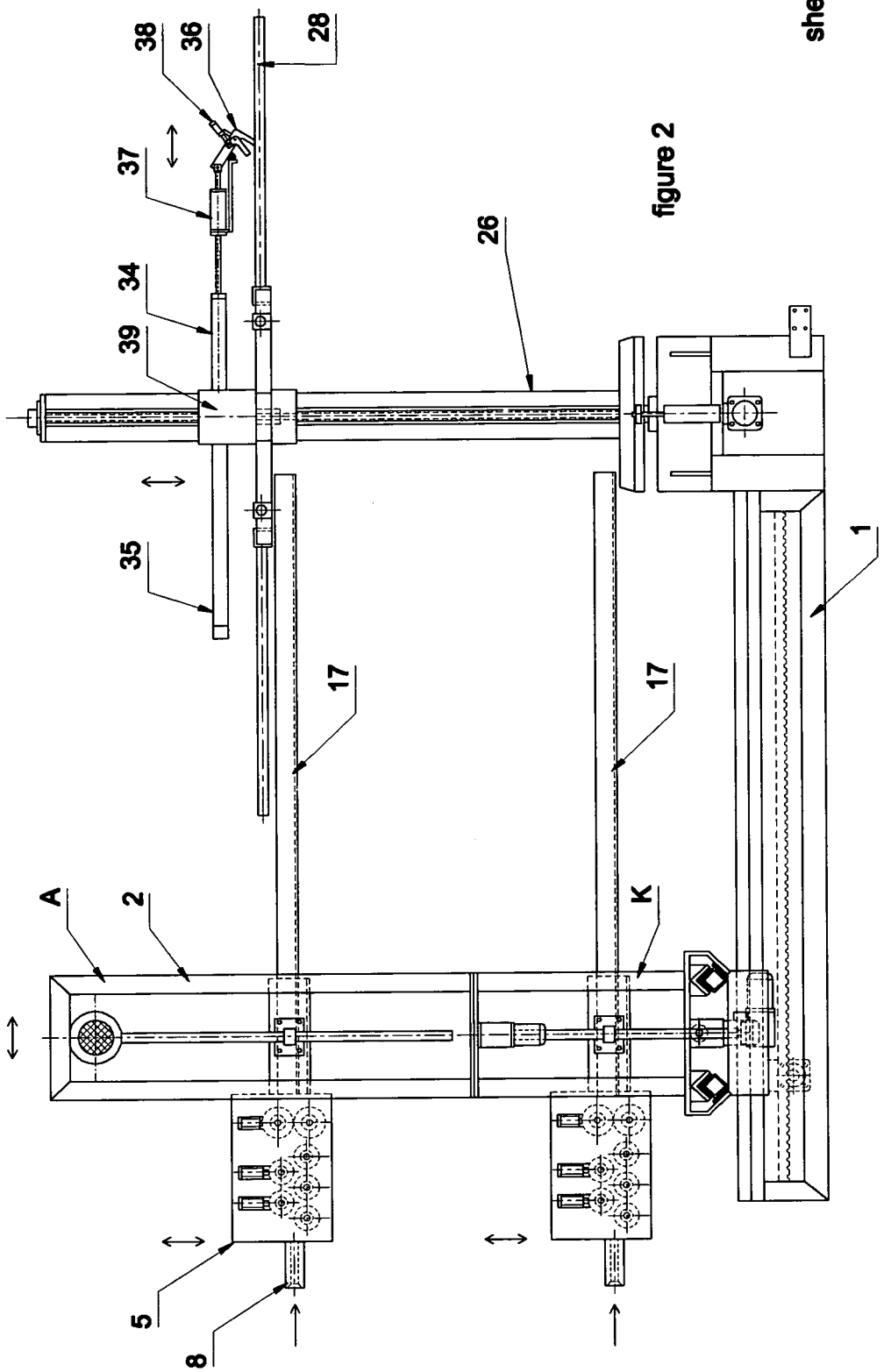
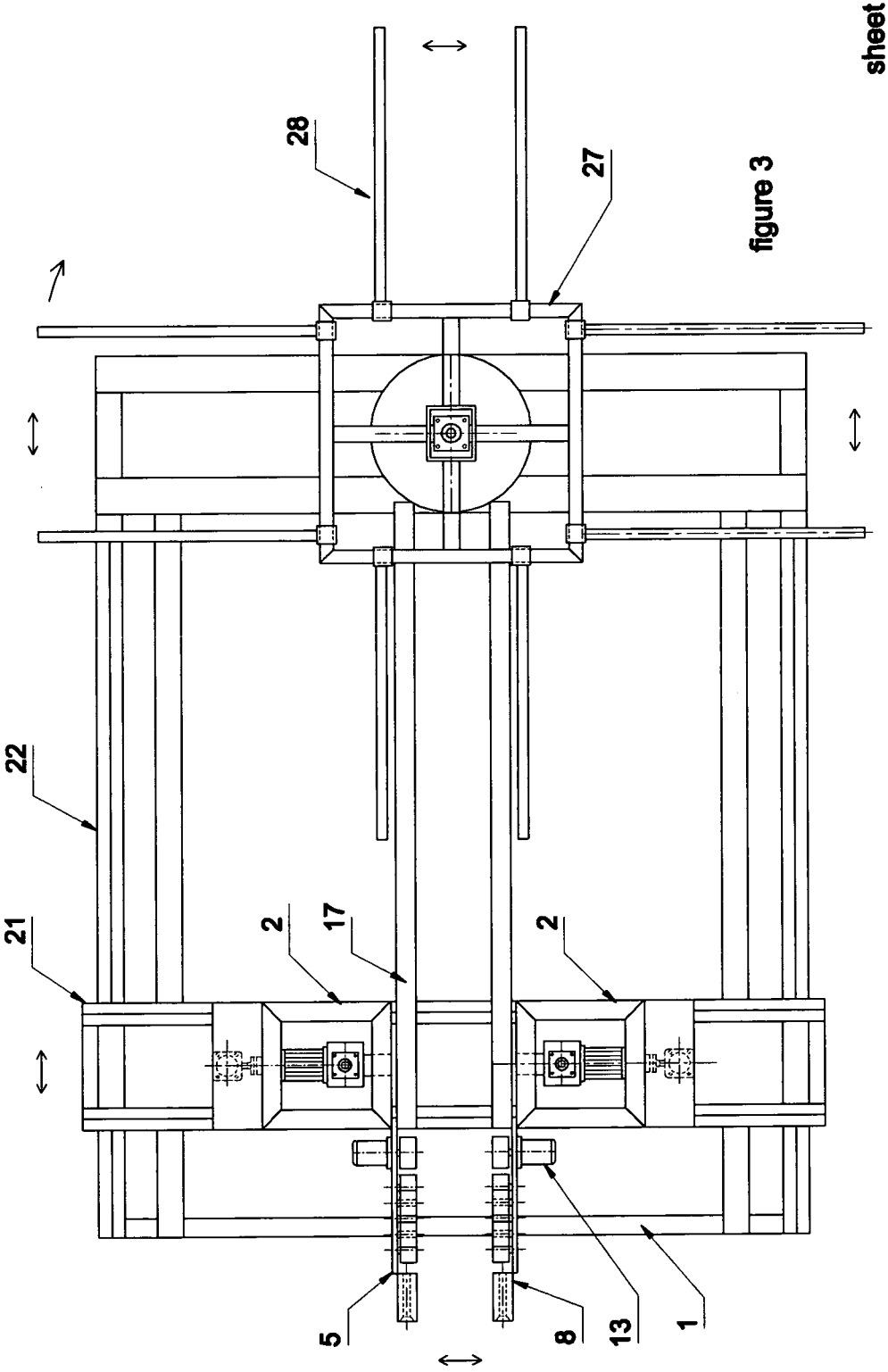


figure 2

sheet 2

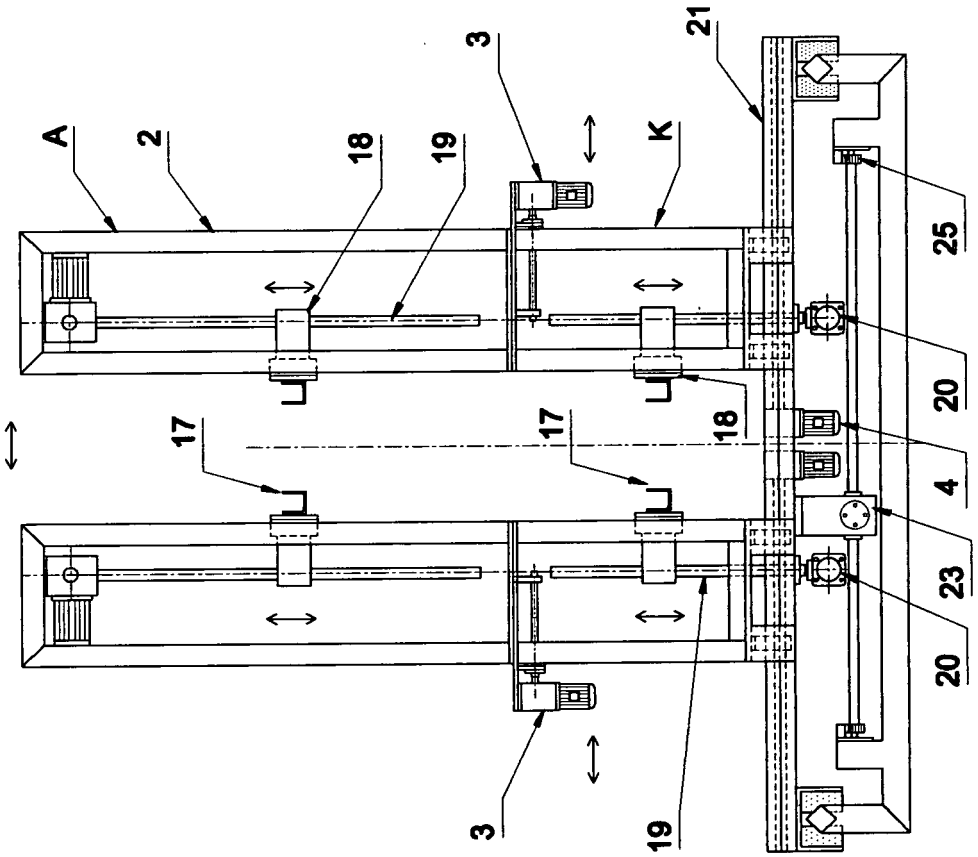
sheet 3

figure 3



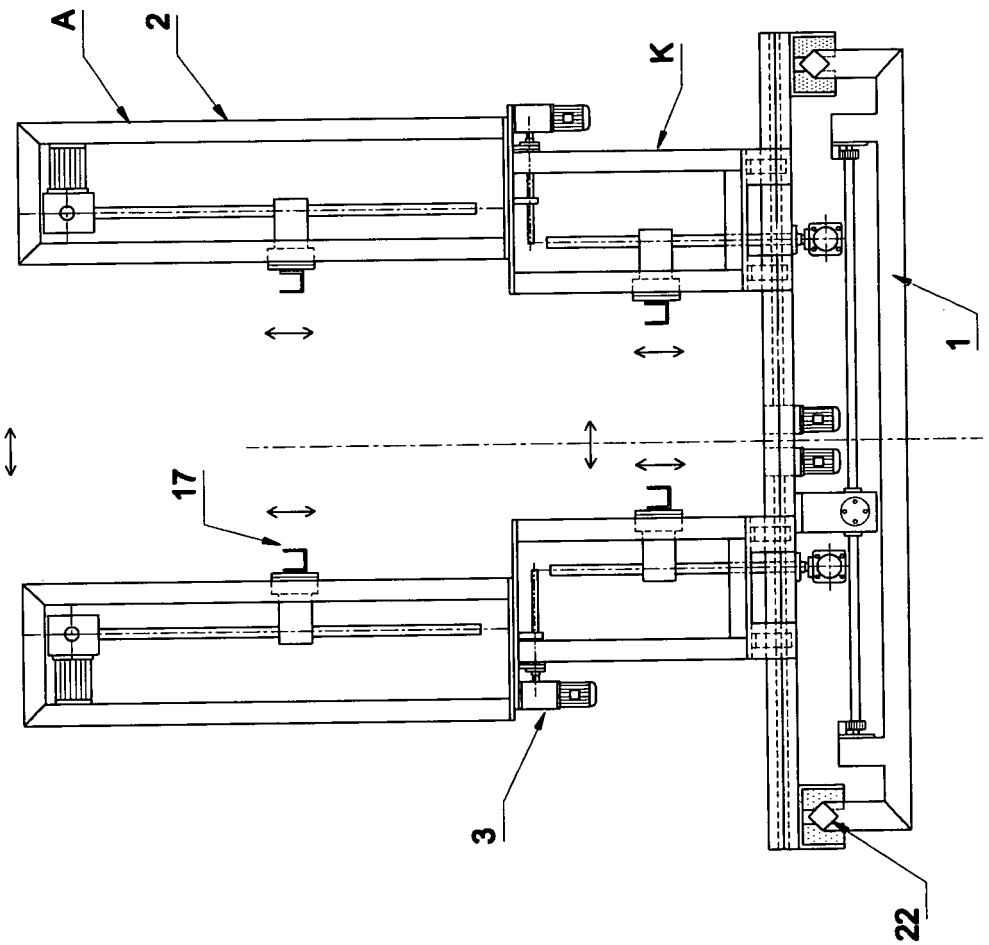
sheet 4

figure 4



sheet 5

figure 5



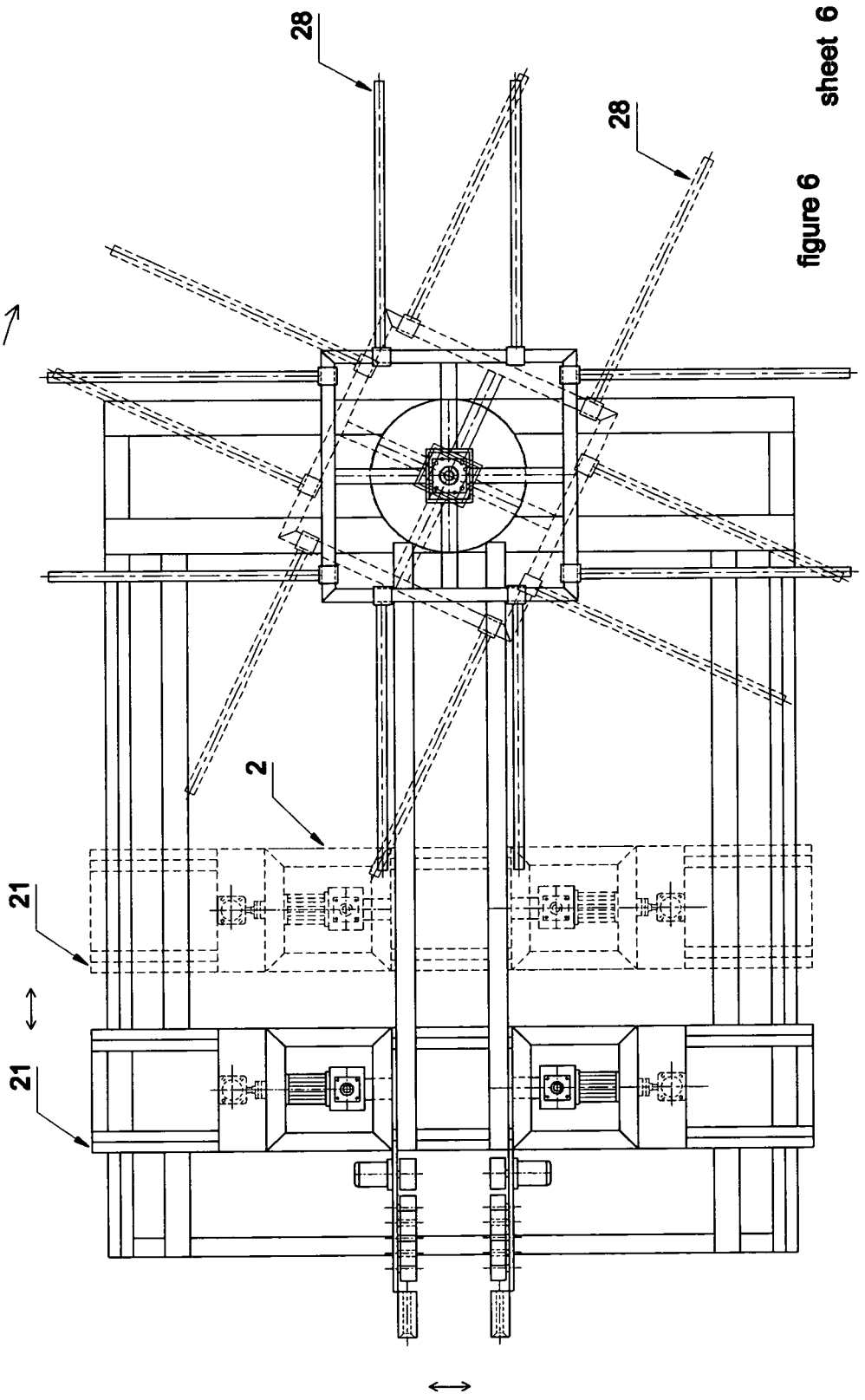
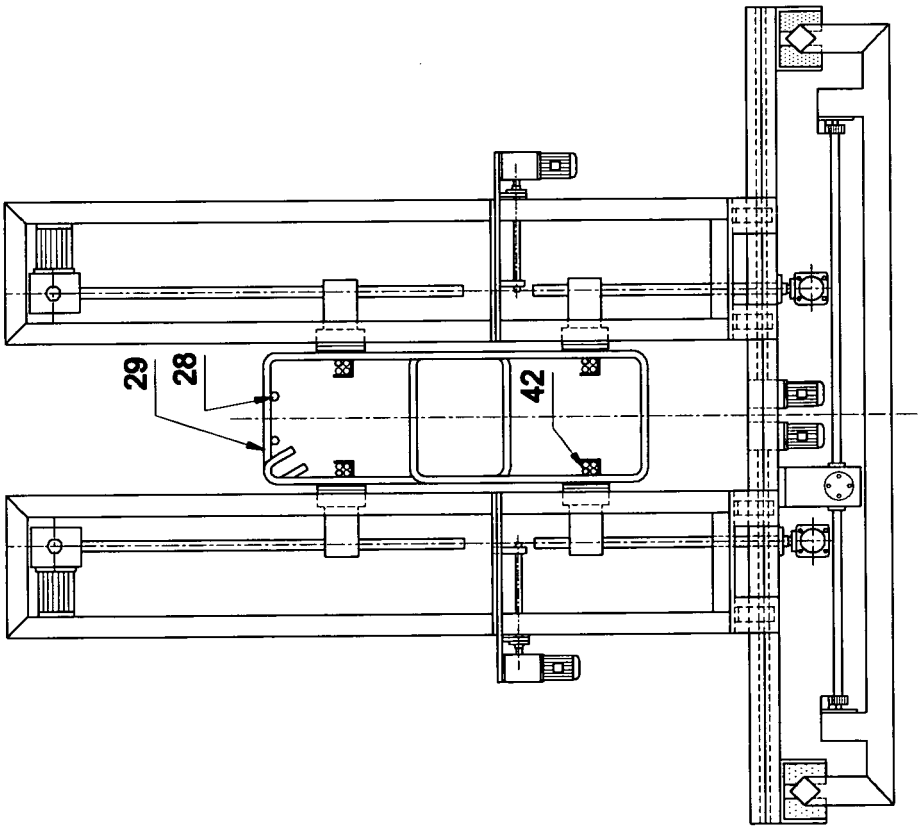


figure 6 sheet 6

sheet 7

figure 7



sheet 8

figure 8

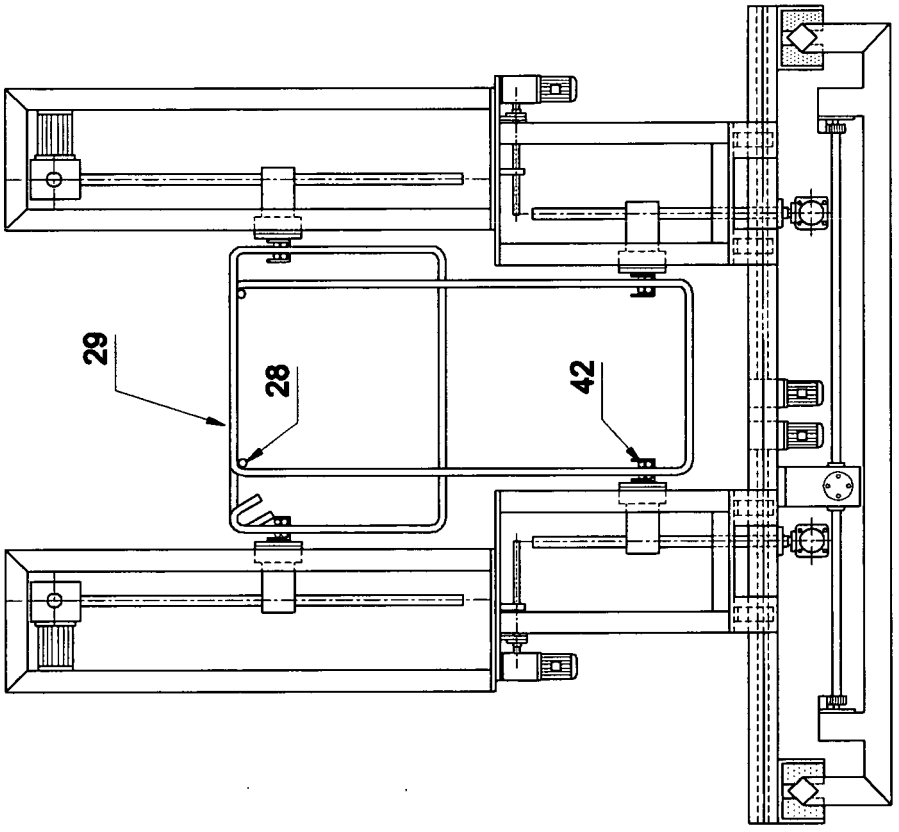
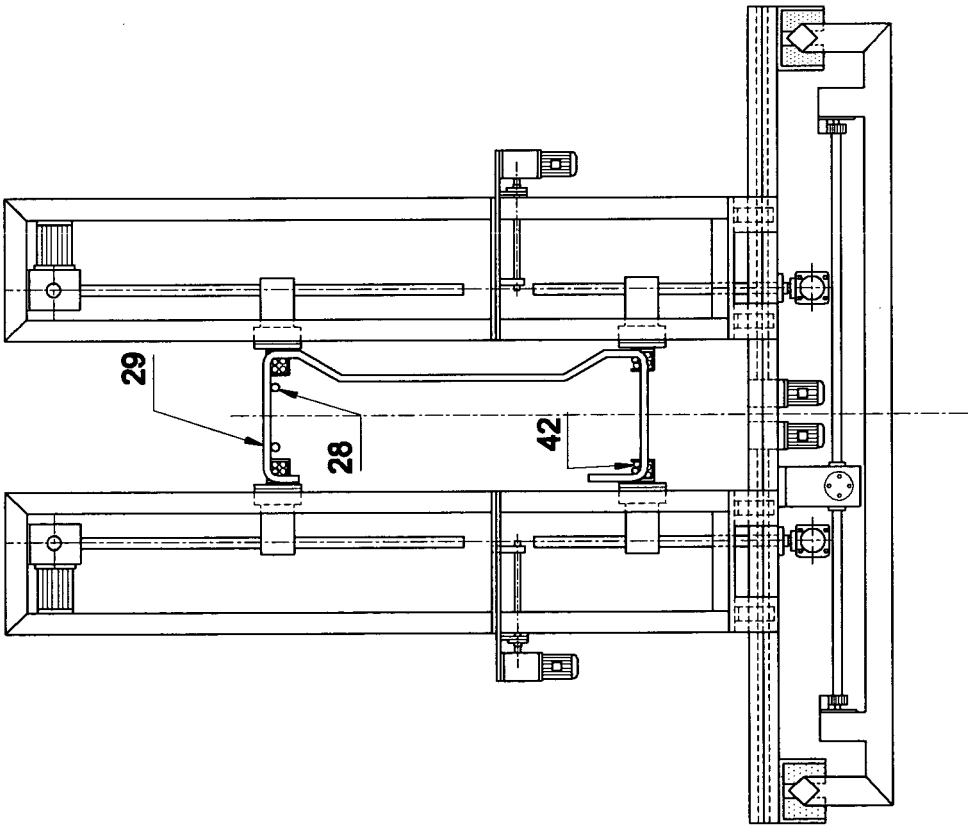


figure 9



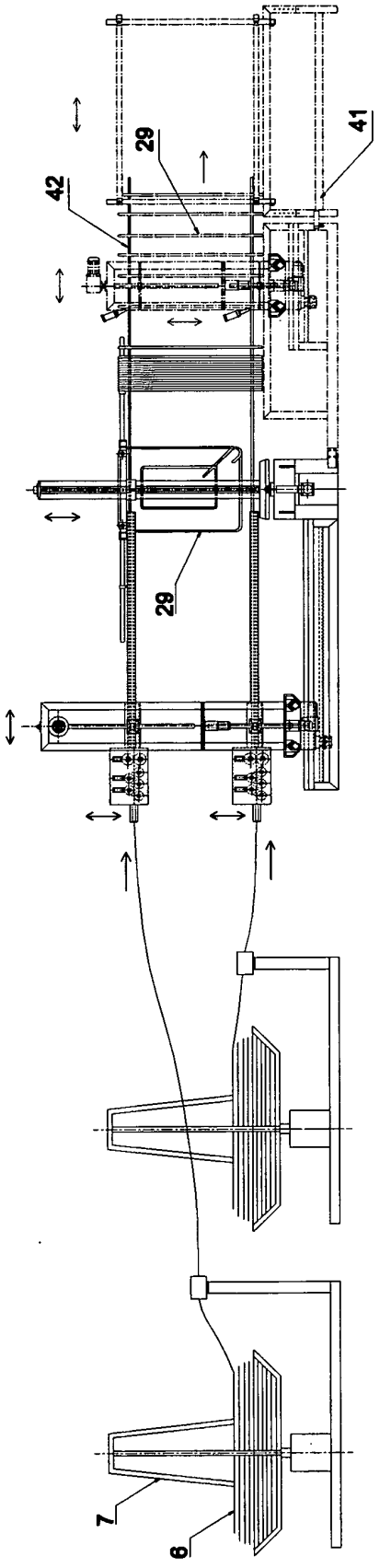


figure 10

sheet 10

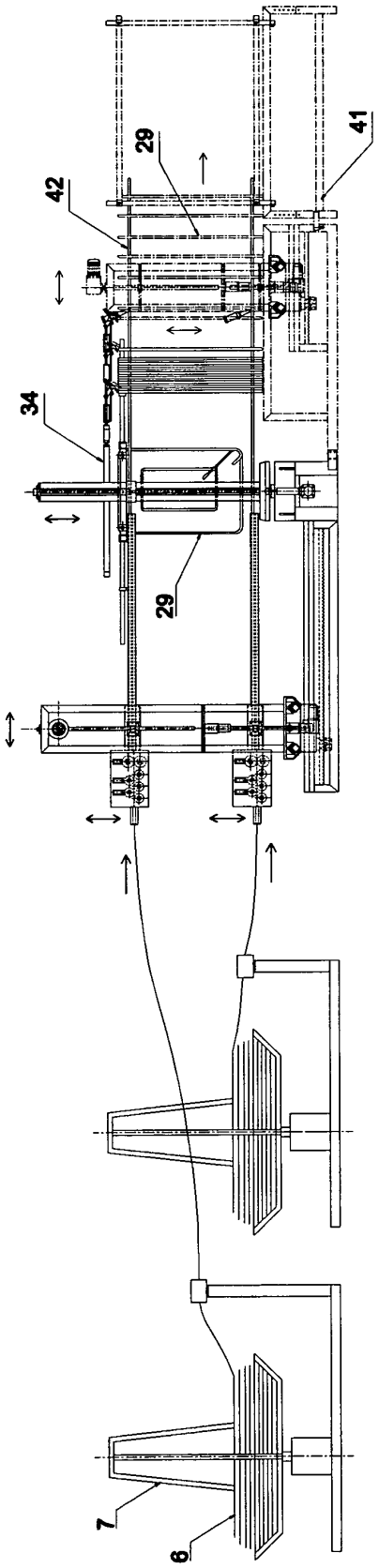


figure 11

sheet 11

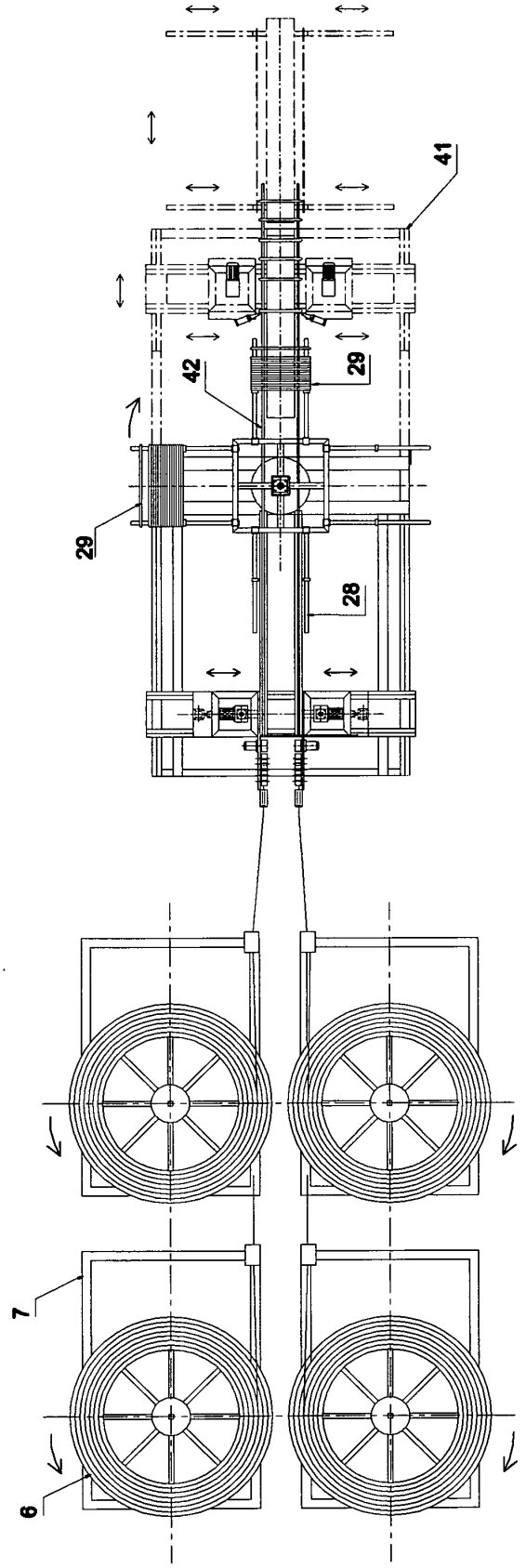


figure 12

sheet 12

fig.26

fig.27

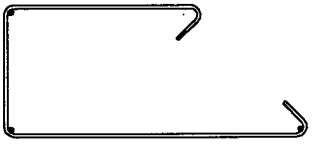


fig.28

fig.23

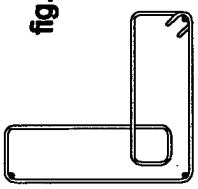


fig.24

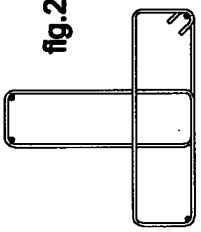


fig.25

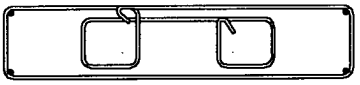


fig.20

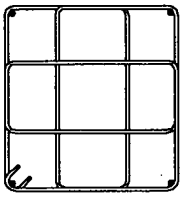


fig.21

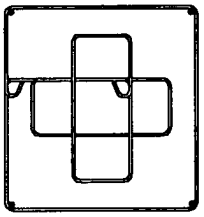


fig.22

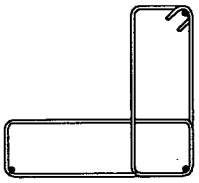


fig.17

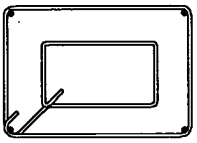


fig.18

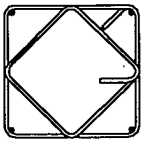


fig.19

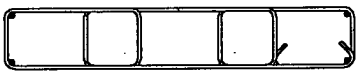
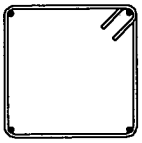


fig.13



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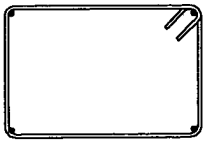

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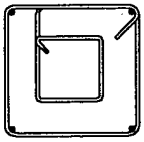

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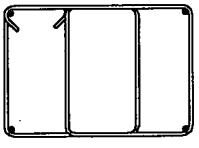


fig.42

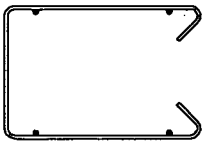


fig.43

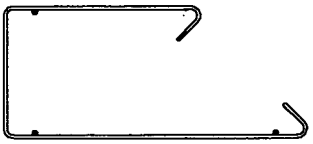


fig.44

fig.39

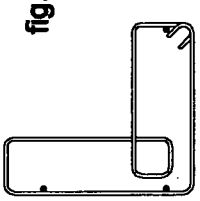


fig.40

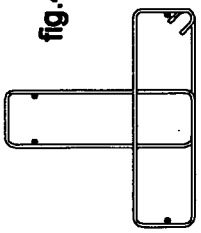


fig.41

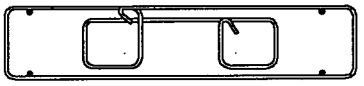


fig.36

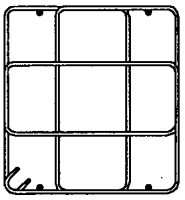


fig.37

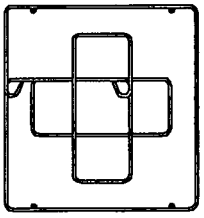


fig.38

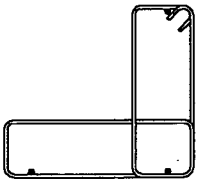


fig.33

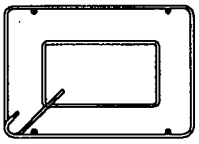


fig.34

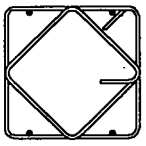


fig.35

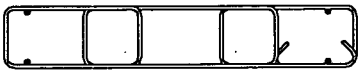


fig.29

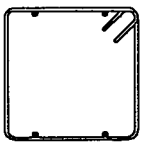


fig.30

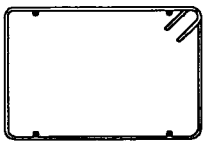


fig.31

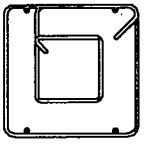
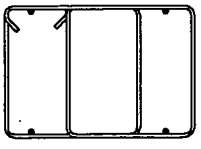


fig.32



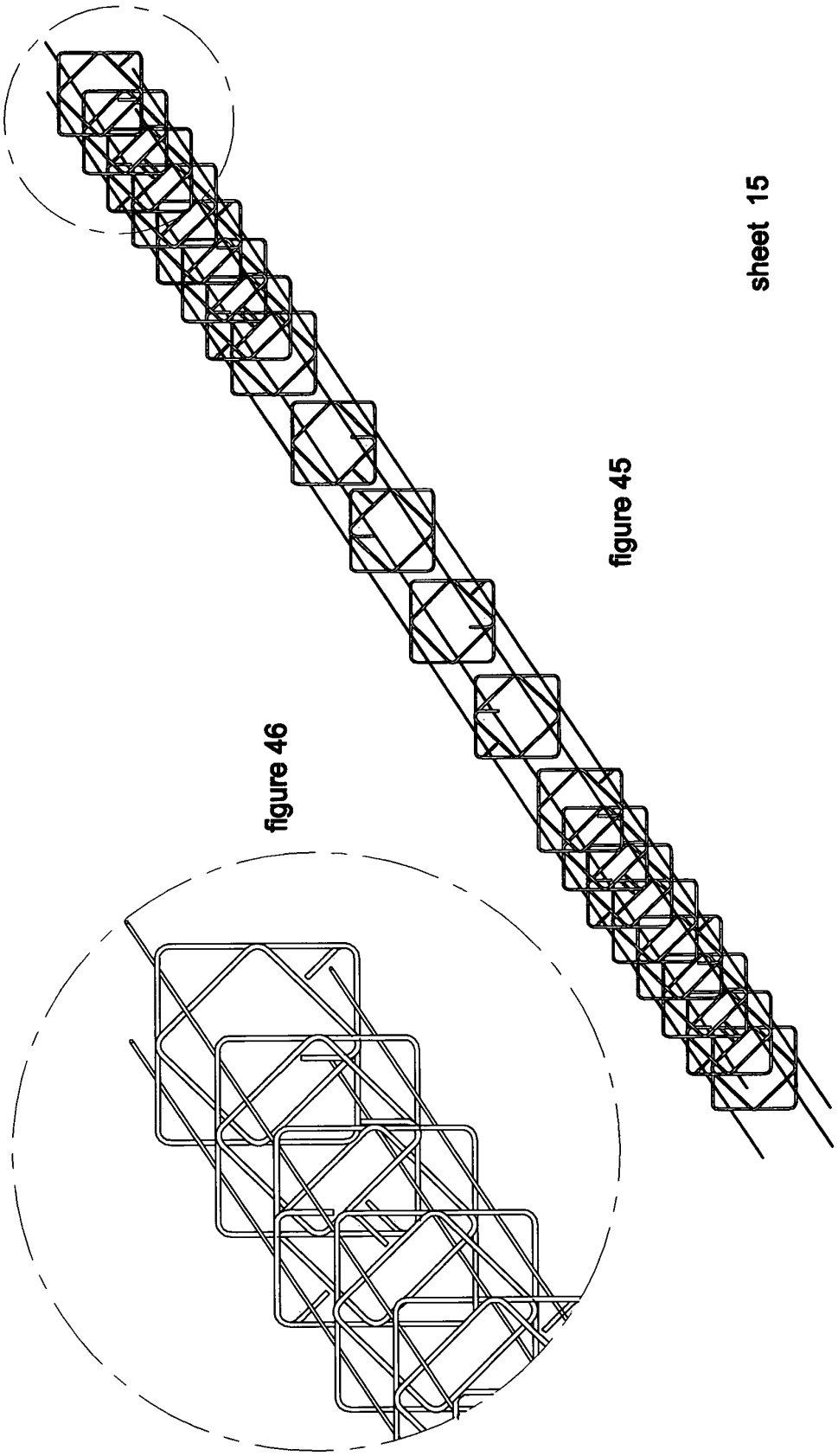


figure 45

figure 46

sheet 15

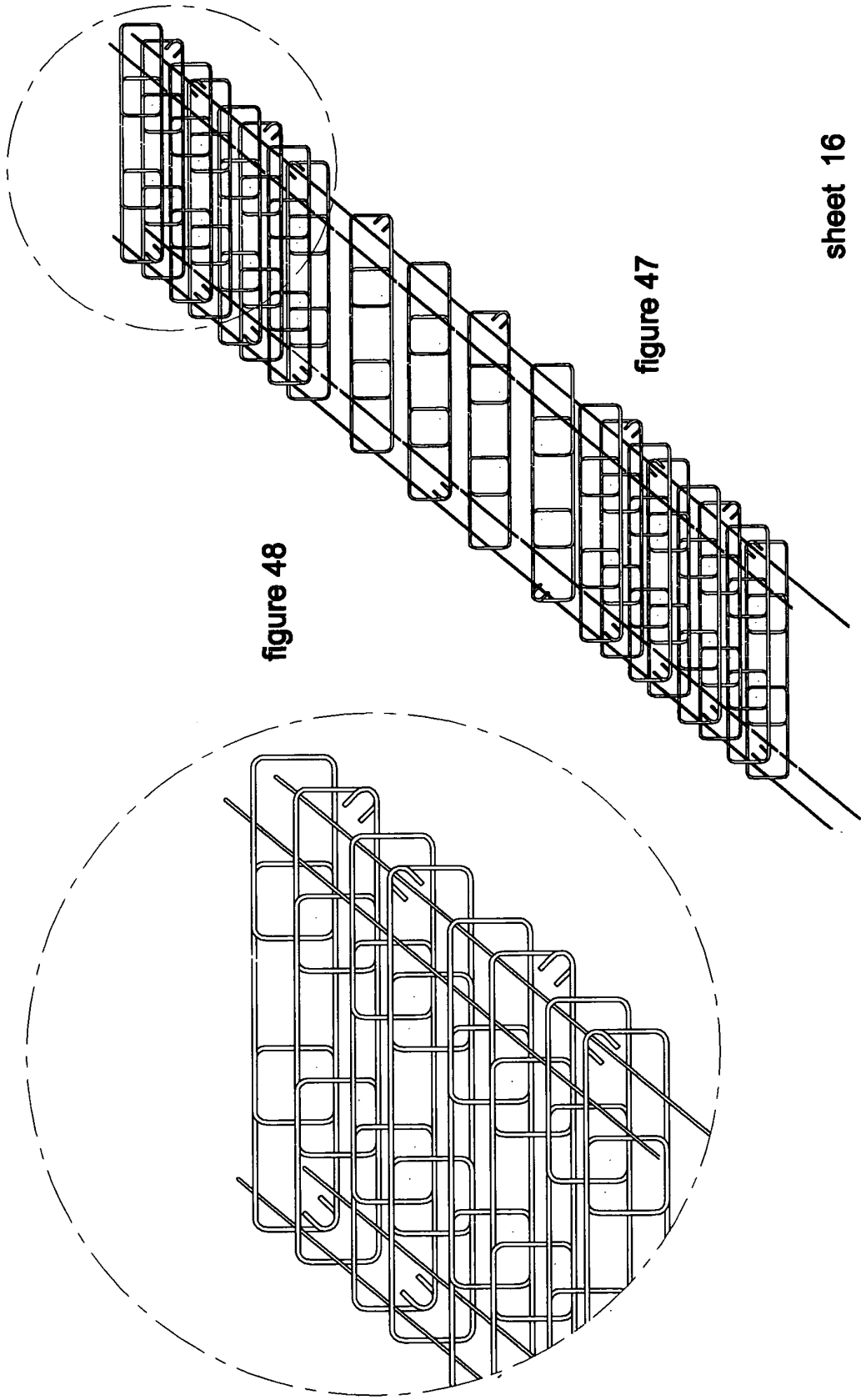
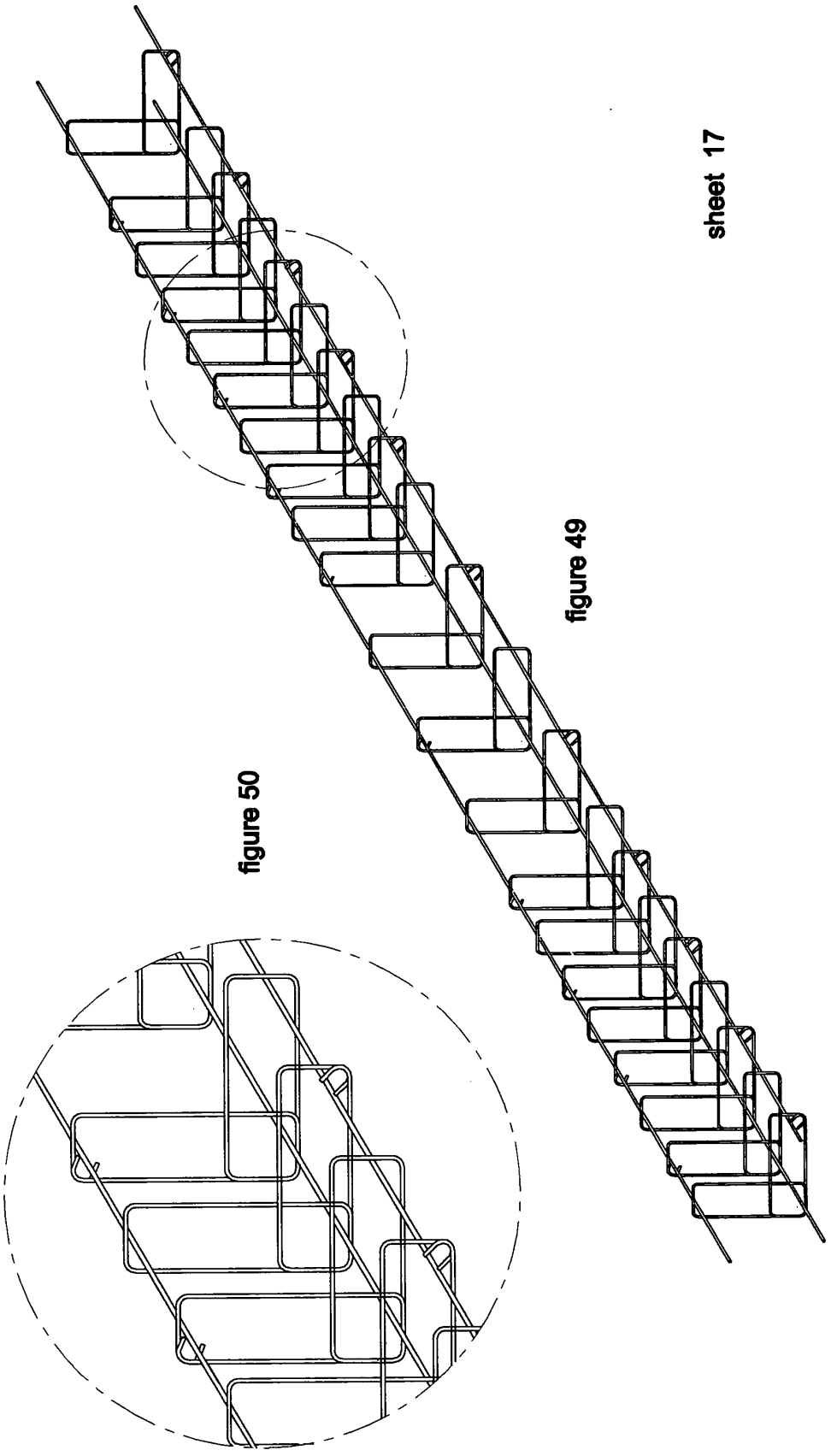


figure 47

figure 48

sheet 16



sheet 17

figure 49

figure 50

European Patent Office

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Application Number
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B21F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	28 July 2006	Barrow, J

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