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(54) **Machine for semi-automatic or automatic assembly of circular armature for concrete reinforcement**

(57) The **Machine for Semi-Automatic or Automatic Assembly of Circular Armature for Concrete Reinforcement,** vertically, at its sides, bears bases (5) that have the mountings (6); at each mounting (6) a housing for the holding of the circular shapes (10) is adjusted; on the right and on the left side of the base (5) and upon the mountings (6) a pair of caterpillars (13) is adjusted; adjacently of each base (5) a pillar (14) with lever (15) is placed, that executes rotating motion up to 180°; the complete rotation of the pillar is accomplished via the hoop (3); the straight rods (24) are placed onto telescopic bars (25).

The straight rods (24) advance procedure is achieved via automatic advance system (29); the rods are welded at the circular shapes by use of welding heads (30) which are mounted on telescopic braces (32) and are displaced via carriers (34); at the carriers (36) straightening roll-units (39) that bear welding heads for the spiral (43) are placed; for the holding of the armature pillar on the braces (42), a caterpillar (45) is adjusted.

The iron coils are placed on immovable pay-offs (37).

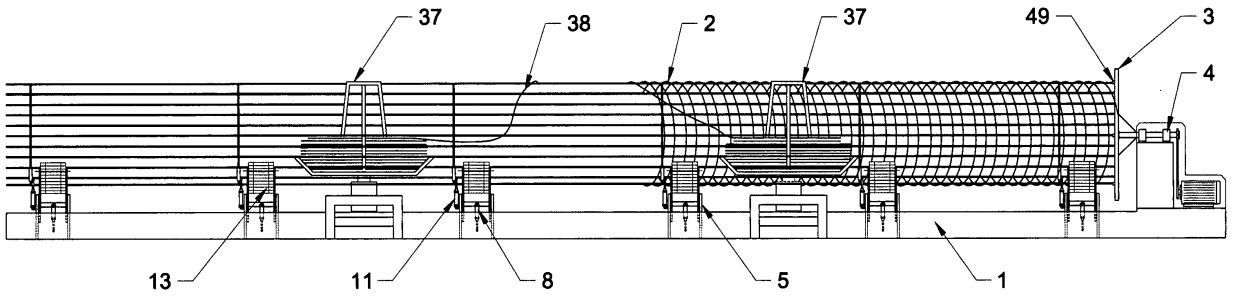

Figure 1

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Description

[0001] The invention refers to a machine that assembles semi-automatically or automatically by method of welding or, in combination with tying by use of wire and welding, formed circular shapes-guides from building steel rod with straight iron rods and, externally, winds coil from building steel rod.

[0002] It constructs circular pillars for reinforcing concrete armature which is essential for building constructions. It has the ability to assemble circular armature of various sizes in regard to diameter and length, with ability of single or / and double assembly of straight rods and spiral winding of the same or / and reverse (crosswise) direction, for greater reinforcement of the column.

[0003] Until today, the common technique for the assembly of circular concrete armature, was that of forming the building steel rods into circular shapes-guides, their setting in definite distance between them, usually with the aid of fixed spacers and then one by one the straight iron rods are tied perimetrically with wire or welded by hand at the points where they intersect with the circular shapes. In this case, the placement of the external spiral requires its formation by use of a machine for shaping iron rods into circular shape, with internal diameter equal to the external diameter of the straight rods so as to "fit" to the under-construction pillar and then to be tied with wire or to be welded by hand at the points where the spirals intersect with the straight iron rods, thus creating the circular concrete armature.

[0004] This way of assembling circular concrete armature leads to the requirement of considerable construction time, small production, the existence of a machine for spiral construction of building steel rod as well as to the demand of accuracy at construction of the internal diameter of spiral that is placed externally to the straight rods in order to achieve contact between spiral intersection points and straight rods.

[0005] By this procedure, we cannot achieve proper clasp and spiral pitch.

[0006] For the industrialization of circular concrete armature assembly, various types of machines have been constructed and are used for this purpose, from various manufacturers and with significant possibilities concerning production increase and quality improvement.

[0007] This type of machines are either provided or not with positions for placement of the circular shapes-guides per definite distance for placement of the straight iron rods that might be advanced for hand operated assembly one-by-one or simultaneously en masse, depending on the type of the machine, and to be welded manually per definite distance perimetrically on the circular shapes-guides, or even to be advanced automatically and welded automatically per definite distance via welding head upon the circular shapes. For the rotation of the under-construction pillar and the placement per distance of the straight rods, as well as for the winding of the spiral externally to the straight rods, they are provided with mechanisms for automatic and controllable rotation. They are provided with pay-off for the placement of the iron coil, which moves either lengthwise or not, depending on the type of the machine and according to the spiral pitch.

[0008] The operation site that these machines require -depending on the type-reaches a length approximately even to the double of the length of the circular armature they produce, due to the way of holding the circular shapes which is accomplished, for example, starting from the two ends of the pile internally and by use of two special plateaus that are adjusted according to the size of the circular shape. Following to the assembly fulfillment and, in order for the circular armature pillar to be released, these special plateaus are pulled back for as much as the length entered from both ends.

[0009] Also, the mounting for the rotation of the under-construction armature pillar is accomplished at the lower part; as a result, side oscillations are created during the phase of the winding of the spiral and, due to this, the construction of a very long pillar is not possible.

[0010] At other type of machines, the advance of the straight iron rods is carried out lengthwise, simultaneously en masse, while the circular shapes-guides are placed-welded manually only at the beginning of the under-construction pillar. Next, the straight rods are welded simultaneously with the winding of the spiral in combination with the advance of the straight rods which is as much as the spiral pitch. These machines make use of an immovable pay-off for the placement of the iron coil and a fixed straightening roll-unit.

[0011] Due to the lengthwise advance of the straight rods, these machines require length at least the double of the maximum length of the armature pillar they assemble, whereas the absence of circular shapes-guides at the total length of the pillar often causes alteration of the diameter of the column - diameter disfigurement, owed to the clasp of the spiral that is winded externally to the straight rods.

[0012] The **Machine for Semi-Automatic or Automatic Assembly of Circular Armature for Concrete Reinforcement** is characterized by the fact that assembles semi-automatically or automatically by method of welding or combining wire tying and welding, formed circular shapes-guides from building steel rod which are distributed at the entire length of the under-construction armature with straight iron rods, of various diameter sizes and lengths and externally winds spiral from building steel rod, with ability of single or / and double assembly of straight rods and winding of spiral of same or reverse (crosswise) direction, for greater reinforcement of the column, thus the Machine occupying a length approximately as much as the maximum length of the under-construction armature.

[0013] It consists of an immovable metal frame upon which are installed the adjustable housings for holding the circular shapes-guides, the adjustable mountings for the placement of the caterpillar pairs for the rotation of the under-construction pillar, the system for automatic or

manual feeding of the assembly point with straight iron rods, the foldable pillars with the lever for the rotation per definite distance of the first welded straight rod at a rotation angle up to 180° for the placement of the straight rods, the mechanism with the hoop and the rotation bars for the placement of the straight rods per distance up to the complete rotation of the pillar, the motor and the drive system for the complete rotation of the hoop and of the under-construction pillar for the winding of the spiral, the carriers with the welding heads which move lengthwise the under-assembly pillar in definite distance for the welding of the straight rods on the circular shapes-guides and of the spiral which is winded externally, the mobile carriers placed lengthwise and moved per definite distance, which bear with: the roll-units for the straightening of the rod from the iron coil, the bases with the caterpillars for the holding of the under-construction circular pillar at the point of the winding of the spiral and the heads for the welding of the spiral that is winded externally to the straight rods which may function in combination with the other welding heads and, finally, the immovable pay-offs for the placement of the building steel coil for the spiral construction.

[0014] The advantage of this invention is that for the assembly of circular concrete armature the semi-automatic or / and the automatic procedure is followed by use of minimum mechanisms and components adjusted according to the size of the circular armature to be assembled; the machine takes up space approximately as much as the maximum circular armature length possible to be assembled; it produces armature of invariable diameter without deformations since the circular shapes-guides are distributed at its entire length; due to the side supports, the under-construction armature during rotation is homocentric at the entire length since no oscillations are noticed during the winding of the spiral; the existence of more than one welding heads and iron feed pay-offs for the construction of spiral and their lengthwise distribution, reduces significantly the production time of the circular armature while the automatization and the limitation of the hand-operated procedures ensure safety from possible accidents to operators.

[0015] The invention will be well comprehended by right of the following figures:

On **sheet 1** (figure 1) is shown the **Machine for Semi-Automatic or Automatic Assembly of Circular Armature for Concrete Reinforcement** in a lengthwise general view with the under-construction circular armature and the lengthwise immovable pay-offs.

On **sheet 2** (figure 2) is shown a section of the Machine in a phase in which the circular shape-guide is placed and the straight iron rod is automatically advanced.

On **sheet 3** (figure 3) is shown a section of the Machine in a phase in which the procedure of placement of the straight iron rods externally to the shape-guide via manual (semi-automatic) procedure begins (without the existence of a mechanism for the automatic advance of the straight iron rod).

On **sheet 4** (figure 4) is shown a section of the Machine in a phase in which the procedure of placement of the straight iron rods externally to the shape-guide via automatic procedure begins (existence of a mechanism for the automatic advance of the straight iron rod).

On **sheet 5** (figure 5) is shown a section of the Machine in full development the mechanisms' regulation possibilities, concerning their adjustment at the size of the under-construction armature and the displacement of the components for the fulfillment of the assembly procedure.

On **sheet 6** (figure 6) is shown a section of the Machine in automatic procedure of straight iron rods distribution perimetrically of the circular shape-guides up to 180°.

On **sheet 7** (figure 7) is shown a section of the Machine with the mechanism of the hoop for the complete rotation of the under-construction circular armature and the fulfillment of the straight rods distribution as well as the beginning of the procedure of winding the spiral from building steel rod externally to the straight iron rods. The foldable pillar with the lever for the rotation per definite distance of the first welded straight rod in a rotation angle per distance up to 180° is in a position that does not prevent the free rotation of the under construction circular armature.

On **sheet 8** (figure 8) is shown a section of the Machine in phase of winding of the spiral from building steel externally to the straight rods.

On **sheet 9** (figure 9) is shown a section of the Machine with double placement of straight iron rods and winding of double spiral from building steel, externally to the straight rods, of same or reverse (crosswise) direction, for greater reinforcement of the column.

On **sheet 10** (figure 10) is shown a circular pillar for concrete reinforcement armature with double placement of straight iron rods and winding of spiral in reverse direction (crosswise).

On **sheet 10** (figure 11) is shown a circular pillar for concrete reinforcement armature with single external spiral winding.

DETAILED DESCRIPTION

[0016] The **Machine for Semi-Automatic or Automatic Assembly of Circular Armature for Concrete Reinforcement** consists of an immovable metal frame (1) upon which all those mechanisms and components that compose it are installed.

[0017] The length of the frame (1) is as much as the maximum length of the under-construction circular armature for concrete reinforcement (2) and yet as much as needed for the adjustment of the rotation hoop (3) and of its driving system (4) for the rotation of the armature pillar.

[0018] Vertically on the lengthwise sides of the frame (1) the bases (5) are placed which are distributed at the entire length, at equal or non equal distance and at any number according to the requirement of the under-construction circular armature.

[0019] At each base (5) two mountings (6) on the right and on the left side are placed, which are adjusted with articulation (7) on the base (5) and each one executes an opening-closing motion via piston (8), with ability to lock at selected positions with safety pins (9) according to the size of the circular armature.

[0020] At each mounting (6) an adjustable holding housing (10) is adapted which functions in pairs with its opposite one, for the placement and holding of the circular shapes-guides (sheet 2-figure 2). Each holding housing (10) via piston (11) and articulation (12) has the ability to open-close so as to encage or release the circular shape-guide and in pairs to hold it during the phase of its placement and release it with the completion of assembly (welding or wire tying) of the first straight rod on the circular shapes-guides that have been placed lengthwise and which constitute the base for the creation of the circular armature.

[0021] Also, on the right and on the left side of the base (5) and on the mountings (6) a pair of caterpillars (13) is adjusted in a size that embraces all diameter sizes of the under-assembly circular armature. The caterpillars (13) constitute the base for mounting of the under-construction armature from the beginning till the completion of the assembly procedure.

[0022] The caterpillars (13) rotate freely according to the rotation of the under assembly armature and mount via articulation at the centre of their length. This articulation is of free rotation since it enables the entire caterpillar (main body and caterpillar) to move freely for its prompt contact upon the perimeter of the armature.

[0023] Adjacently to each base (5) a foldable column (14) is placed which fastens at a vertical position via piston (22); at the upper part bears a lever (15) which executes rotative motion either continuously or per selected distance up to 180°, driven at the upper half part of the circular shape. The lever (15) mounts with an axle at the upper part of the pillar (14), on a rotation bearing (16) and, following, the axle of the lever (15) bears a gear (17) which via chain (18) is connected with the gear (19) which is placed upon a lengthwise axle (20) that driven via motor (21) thus transferring movement via chain-gears (17, 18 & 19) at the rotation lever (15) so as to rotate per definite distance the first assembled straight iron rod (24) up to 180° for the fulfillment of the first phase of placement of the straight rods on the circular shapes-guides. By completing this procedure, the lever (15) is extracted by unscrewing a bolt in a wide spiral pitch for quick placement and removal. Via piston (23) the foldable pillar (14) reclines in a position outside the periphery of the under assembly pillar, so as the procedure of straight bars (24) assembly on the circular shapes to be continued and completed without obstacle, with rotation per distance executed by the hoop (3) and its driving system (4). The hoop (3) that is used for the entire rotation of the circular armature pillar (2) consists of the circular frame (3) which, perimetrically and per distance bears housings for the placement of the rods (48); the rods (48) are placed actinically and can be as many as optioned. At each rod (48) one or two holding housings (49) of the straight iron rod (24) are placed. The housing (49) has the ability to regulate according to the diameter size of the circular armature and it is firmed at the selected point according to the armature size.

[0024] The straight iron rods to be assembled (24) are placed lengthwise upon telescopic bars (25) that are placed lengthwise the frame near each base (5). The length of each bar (25) is modulated so as to be adjusted to the size of the diameter of the under-assembly circular armature.

[0025] In case of semi-automatic function, the advance of the straight rods (24) at their assembly point on the circular shapes, is achieved by hand and, if chosen to be assembled by use of wire then this is done manually, while in case of welding, apart from the manual procedure, the automatic procedure may be followed.

[0026] In case of automatic function, the advance of the straight rods (24) at their assembly point on the circular shapes, is achieved via straight iron rods advance system which consists of the clasp with the immovable jaw (26), the mobile jaw (27) which opens and closes via piston (28) and, during the receipt- advance phase of the straight iron rod (24) at the welding point, the clasp moves forwards - backwards via piston (29). The lengthwise-placed clasps move forwards - backwards simultaneously for unvarying advance of each iron rod (24).

[0027] The straight iron rods -when the assembly is chosen to be achieved via welding method- are welded upon the circular shapes with welding heads (30) which, -they may be two or more than two- for accurate adjustment at the welding point, are mounted to an articulation (31) and upon a telescopic brace (32). The telescopic brace (32) nestles in a column (33) which relies on a carrier with sliders (34). The carriers (34) move independently lengthwise the under-assembly pillar (2), per definite distance, with motor and drive system (35) for the welding of the cross-section point of the straight rod with the circular shape-guide.

[0028] At each carrier (36) -they are two or more and they are distributed at the length of the under-construction armature- the straightening roll-unit (39) with the three pairs of rolls (40), for the straightening of the building steel rod (38) (sheet 8, figure 8) and the preparation for winding of the spiral externally to the straight iron rods (24), is placed.

[0029] At the carrier, (36) upon articulation (41), the brace (42) is adjusted, which bears welding head (43) that is mounted on articulation (44) for accurate adjustment at the welding point. For the holding of the under-construction column and the avoidance of oscillations at the brace (42) a caterpillar is adjusted (45) in such size that embraces all diameter sizes of the under-assembly circular armature, which rotates independently according to the rotation of the under assembly armature and is mounted with articulation at the centre of its length. This articulation is of free rotation, since it enables the entire caterpillar (main body and caterpillar) to move independently for its prompt contact upon the perimeter of the armature.

[0030] The brace (42) executes via piston (46) askance movement for the adjustment of the welding head (43) and the caterpillar (45) at the size of the under-assembly armature.

[0031] Each carrier (36) moves via sliders, motor and drive system (47) lengthwise the under-construction armature at programmed velocity according to the spiral pitch which is enwreathed externally to the straight rods (24), while the welding head (43) at each cross-section point of the spiral with the straight rod (24) is automatically activated and welds.

[0032] For the construction of the spiral externally to the straight rods (24) immovable pay-offs (37) are placed and they bear the building steel coil (38). The pay-offs may be two or more -normally they are as many as the carriers (36)-, they are distributed at the length of the under-construction armature and function in combination for the increase of the armature construction velocity.

[0033] All actions of the machine executed during automatic production procedure are programmed via computer, while the machine is controlled via control panel.

APPLICATION EXAMPLE - AUTOMATIC ASSEMBLY PROCEDURE

[0034] The size of diameter and length of the circular armature that will be constructed is chosen and all necessary data are inserted in the computer, concerning diameter and length of armature, the number and the distance between circular shapes-guides, the number of the straight rods that will be placed perimetrically of the circular shapes-guides, the spiral pitch, the rotation velocity of the armature to be formed, the duration of welding, etc. All essential movements, hand-operated, mechanic or automatic are made after the fulfillment of the programming (sheet 5, figure 5) for the adjustment of all components and mechanisms at the size of the under-construction circular armature and the procedure begins:

[0035] The size of the cross-section diameter is chosen and the number of the straight iron rods (24) which are placed lengthwise the telescopic bars (25). The cross-section diameter for the building steel iron coil (38) is chosen and it is placed on the pay-off (37) while the end passes from the three pairs of straightening rolls (40) for the straightening of the rod (38) and the preparation of its winding externally to the straight iron rods (24). The circular shapes-guides are installed to the pairs of the holding housings (10) which, via pistons (11), encage and stabilize the circular shapes.

[0036] The carriers (34) and (36) are placed at the points defined for distribution, along of the frame (1).

[0037] The straight iron rods advance systems are activated, which simultaneously collect by use of clasp (26 & 27) one straight rod (24) and they advance it until it reaches the perimeter of the circular shape-guide. The end of the rod (24) passes to the housing (49) that is on the bar (48) of the hoop (3) and it is firmed manually so as the rotation procedure to begin.

[0038] The above-mentioned action is accomplished every time the straight iron rod (24) meets the bar (48) with the housing (49).

[0039] Following, the welding heads (30) are activated, which weld automatically and at the programmed distance, all cross-section points of the straight rod with the circular shape, driven lengthwise via carriers (34). After welding completion, the carriers (34) with the welding heads (30) return back to their initial position and the lever (15) in combination with the hoop (3) rotates the welded straight rod (sheet 2, figure 2) at the programmed angle (pitch) so as the repetition of the procedure to follow till the placement of the straight rods (24) on the circular shapes at the half of the circle, that is approximately 180°. At this point, the rotation lever (15) is removed manually from the foldable pillar (14) and the foldable pillar (14) reclines in a position outside the perimeter of the under-assembly pillar, so as the procedure of straight rods assembling upon the circular shapes (24) to be continued without any obstacle, with rotation per distance that will be executed by the rotation hoop (3) and with similar procedure for straight rod advance and welding.

[0040] By fulfilling the straight rods (24) assembly upon the circular shapes, the ends of the iron rods (38) are welded on the end (beginning) of a random straight iron rod (24) via heads (43) and the procedure of spiral winding begins, with rotation of the under assembly armature by the rotation hoop (3) and simultaneous feeding externally to the straight iron rods by the immovable pay-offs (37) that are placed at selected points along the under-construction armature. The spiral pitch has been defined and the welding heads (43), which are at the carriers (36), simultaneously begin the winding and the welding of all cross-section points of the spiral with the straight rods. The welding of these points can be achieved in combination with the use of welding heads (30) as well.

[0041] By completing the winding, the braces (42)

move backwards, thus releasing the assembled circular armature for concrete reinforcement (2) which is removed so as the procedure to be repeated.

[0042] The above-mentioned case concerns the circular armature assembly with one external winding (sheet 8, figure 8 and sheet 10, figure 10).

[0043] In case of circular armature assembly with two windings of same or reverse (crosswise) direction (sheet 9, figure 9 and sheet 9, figure 10) with the completion of the above-mentioned procedure, a second sequence of straight rods (24) is placed, which are welded on the spiral according to the procedure pre-mentioned and externally to the second sequence of straight rods the spiral winding is realized with same or reverse direction. The way of assembly is- the same with the pre-mentioned one; the only difference is that for the rotation, only the mechanism of the rotation hoop (3) is used.

APPLICATION EXAMPLE - SEMI-AUTOMATIC ASSEMBLY PROCEDURE

[0044] In the case of semi-automatic assembly of circular armature for concrete reinforcement, the procedure followed is the pre-mentioned one; the only difference is that the feeding of the straight rods (24) is not accomplished via system of automatic advance of the clasp (26) and (27), but is accomplished manually, as well as the armature assembly is done manually, by use of wire or welding.

Claims

1. The **Machine for Semi-Automatic or Automatic Assembly of Circular Armature for Concrete Reinforcement** consists of an immovable metallic frame (1) which has length as much as the maximum length of the under assembly circular armature for concrete reinforcement (2) and moreover as much as for the adjustment of the rotation hoop of the pillar (3) and of its driving system (4) is demanded; vertically lengthwise the frame (1) the bases (5) are placed, which are distributed at the entire length at equal or non equal distance and at any number according to the demand; at each base (5) on the right and left side two mountings (6) are placed which are adjusted with articulation (7) on the base (5) and each one executes opening-closing motion via piston (8) and locks in selected positions with safety pins (9); at each mounting (6) an adjustable housing for the holding of the circular shapes-guides (10) is adapted; on the right and on the left of the base (5) and upon the mountings (6) a pair of caterpillars (13) is adjusted that constitutes the seating base for mounting the under-construction armature; adjacent to each base (5) a foldable pillar (14) is placed which locks at a vertical position via piston (22); at the upper part bears a lever (15) which executes rotating movement continuously or per selected distance up to 180° moving at the upper half of the circular shape-guide; the entire rotation of the under-construction pillar is realized via the hoop (3) and its driving system (4); the straight iron rods (24) to be assembled are placed lengthwise on telescopic bars (25) which are located lengthwise the frame (1) near each base (5); the length of each bar (25) is modulated according to the size of the circular shape-guide; the automatic procedure of the straight rods (24) advance to their assembly point on the circular shapes is accomplished via straight iron rods' advance system that consists of the clasp with the immovable jaw (26), the mobile jaw (27) which opens and closes via piston (28) and, during receipt - advance phase of the straight iron rod (24) at the assembly point, the clasp moves forwards -backwards via piston (29); the straight iron rods are welded upon the circular shapes with welding heads (30) that may be two or more and each one is mounted with articulation (31) upon a telescopic brace (32) that nestles in a pillar (33) which relies on a carrier with sliders (34); at each carrier (36), that may be two or more, the straightening roll-unit (39) with three pairs of rolls (40) for the straightening of the building steel rod (38) is placed and it is adjusted with articulation (41) the brace (42) which bears welding head (43) that is mounted on an articulation (44); for the holding of the under-construction column, at each brace (42) a caterpillar (45) is adjusted that rotates independently; it is mounted with articulation at the centre of its length and it is of free rotation; the building steel iron coils (38), for the construction of the spiral, are placed onto immovable pay-offs (37) that are two or more, usually as many as the carriers (36) and are distributed at selected points lengthwise the under-construction circular armature.

2. The **Machine for Semi-Automatic or Automatic Assembly of Circular Armature for Concrete Reinforcement,** according to Claim 1, is **characterized by** the fact that the housings for holding the circular shapes-guides (10) function in pairs with their opposite one and via piston (11) and articulation (12), they have the ability to open-close so as to encage or release the circular shape-guide.

3. The **Machine for Semi-Automatic or Automatic Assembly of Circular Armature for Concrete Reinforcement,** according to Claim 1, is **characterized by** the fact that the caterpillars (13) rotate independently according to the rotation of the under assembly armature and mount at the centre of their length with a freely rotating articulation.

4. The **Machine for Semi-Automatic or Automatic Assembly of Circular Armature for Concrete Reinforcement,** according to Claim 1, is **character-**

ized by the fact that the rotation lever (15) mounts on a bearing (16) with axle at the upper part of the pillar (14) and, following, the axle of the lever (15) bears a gear (17) which via chain (18) is connected with the gear (19) that is placed upon a lengthwise axle (20) that is driven via motor (21) thus transferring movement at the rotation lever (15) in order to rotate per definite distance the first assembled straight iron rod (24) up to 180°.

5. The **Machine for Semi-Automatic or Automatic Assembly of Circular Armature for Concrete Reinforcement,** according to Claims 1 and 4, is **characterized by** the fact that the lever (15) is removed by unscrewing a bolt with wide spiral pitch and via piston (23) the foldable pillar (14) reclines in a position outside the perimeter of the under assembly pillar.

6. The **Machine for Semi-Automatic or Automatic Assembly of Circular Armature for Concrete Reinforcement,** according to Claim 1, is **characterized by** the fact that the lengthwise placed clasps for advance of the straight iron rod (24) with the immovable jaw (26) and the mobile jaw (27) move simultaneously forwards-backwards.

7. The **Machine for Semi-Automatic or Automatic Assembly of Circular Armature for Concrete Reinforcement,** according to Claim 1, is **characterized by** the fact that the carriers with the sliders (34), which may be two or more, move lengthwise the under assembly pillar (2) per definite distance, via motor and drive system (35).

8. The **Machine for Semi-Automatic or Automatic Assembly of Circular Armature for Concrete Reinforcement,** according to Claim 1, is **characterized by** the fact that the braces (42), which may be two or more, execute each one via piston (46) askance movement for the adjustment of the welding head (43) and the caterpillar (45) at the size of the under-assembly armature.

9. The **Machine for Semi-Automatic or Automatic Assembly of Circular Armature for Concrete Reinforcement,** according to Claim 1, is **characterized by** the fact that each carrier (36), which may be two or more, moves per selected distance via sliders, motor and drive system (47), lengthwise the under-construction armature, at a velocity corresponding to the pitch of the spiral that they enwrap externally to the straight rods (24), while the welding heads (43) at each cross-section point of the spiral with straight rod (24) are automatically activated and weld.

10. The **Machine for Semi-Automatic or Automatic Assembly of Circular Armature for Concrete Reinforcement**, according to Claim 1, is **characterized by** the fact that the hoop (3) for the entire rotation of the circular armature pillar (2), consists of the circular frame (3) which perimetrically and per distance bears housings for the placement of the bars (48); the bars (48) are placed radially and may be of such a number depending on the selection; at each bar one or even two housings (49) for holding the straight iron rod (24) are placed and each housing (49) has the ability to regulate and it is firmed at the selected point according to the size of the circular armature.

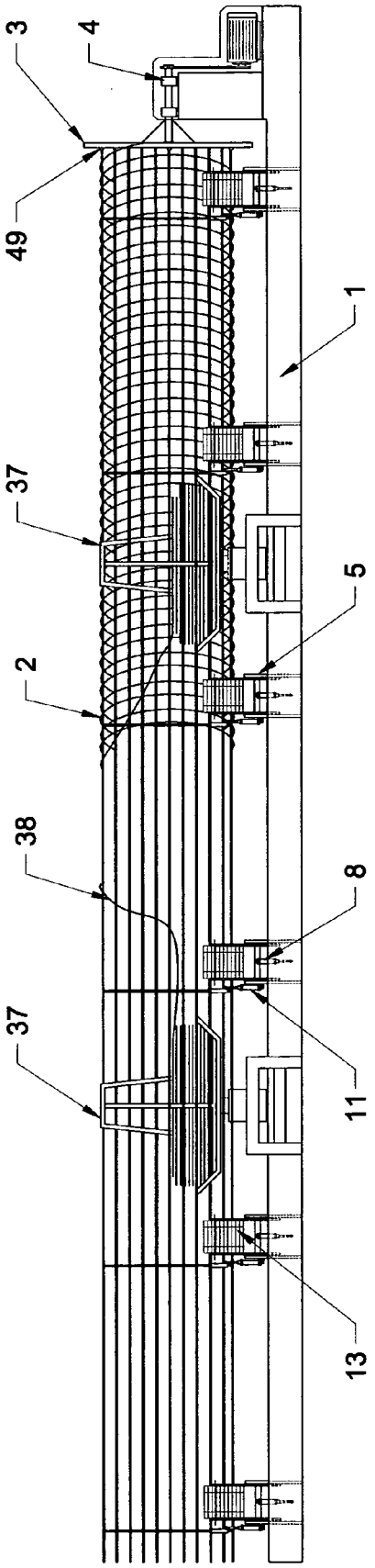

Figure 1

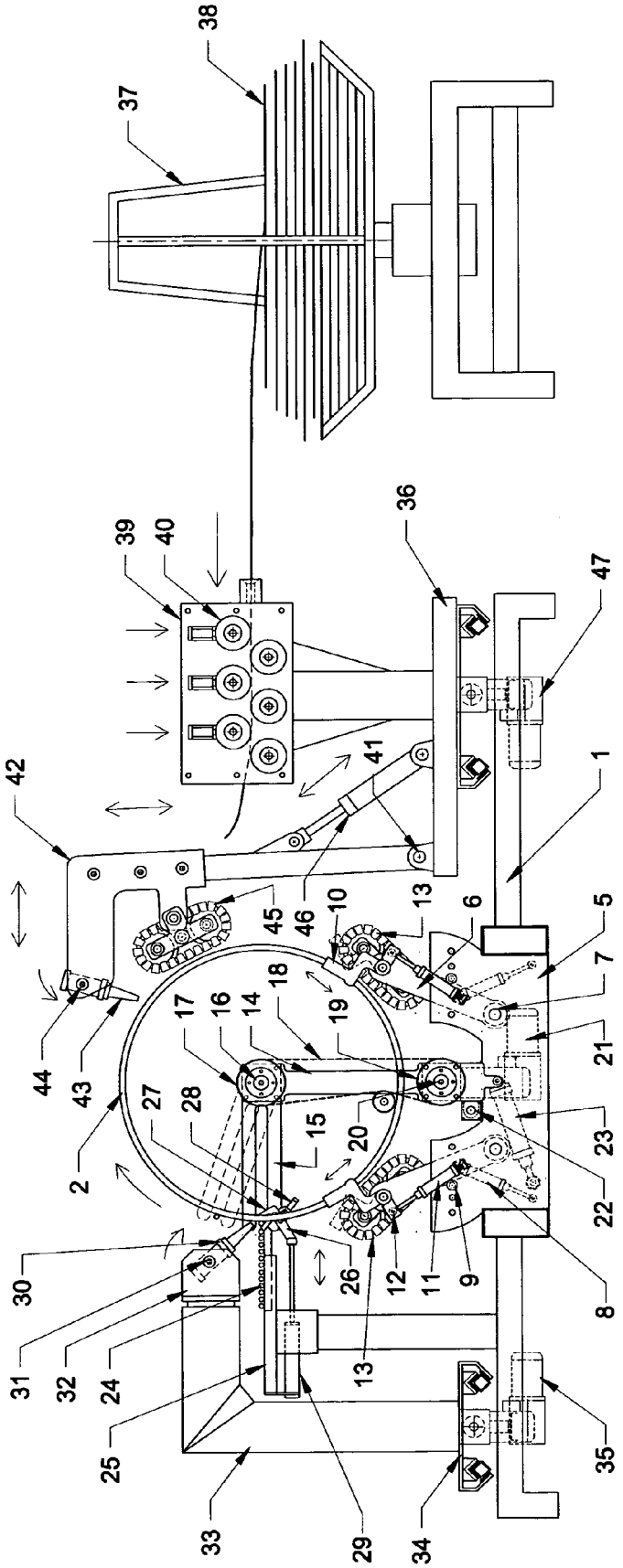
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Figure 2

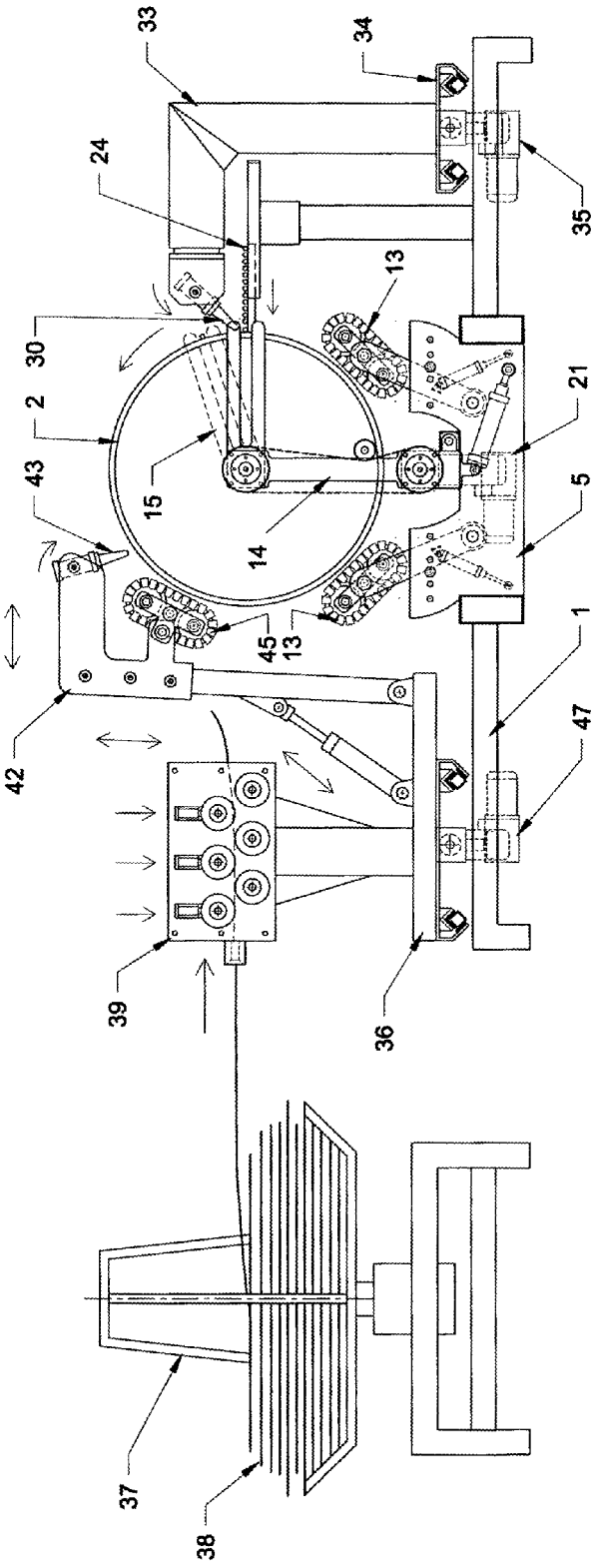

Figure 3

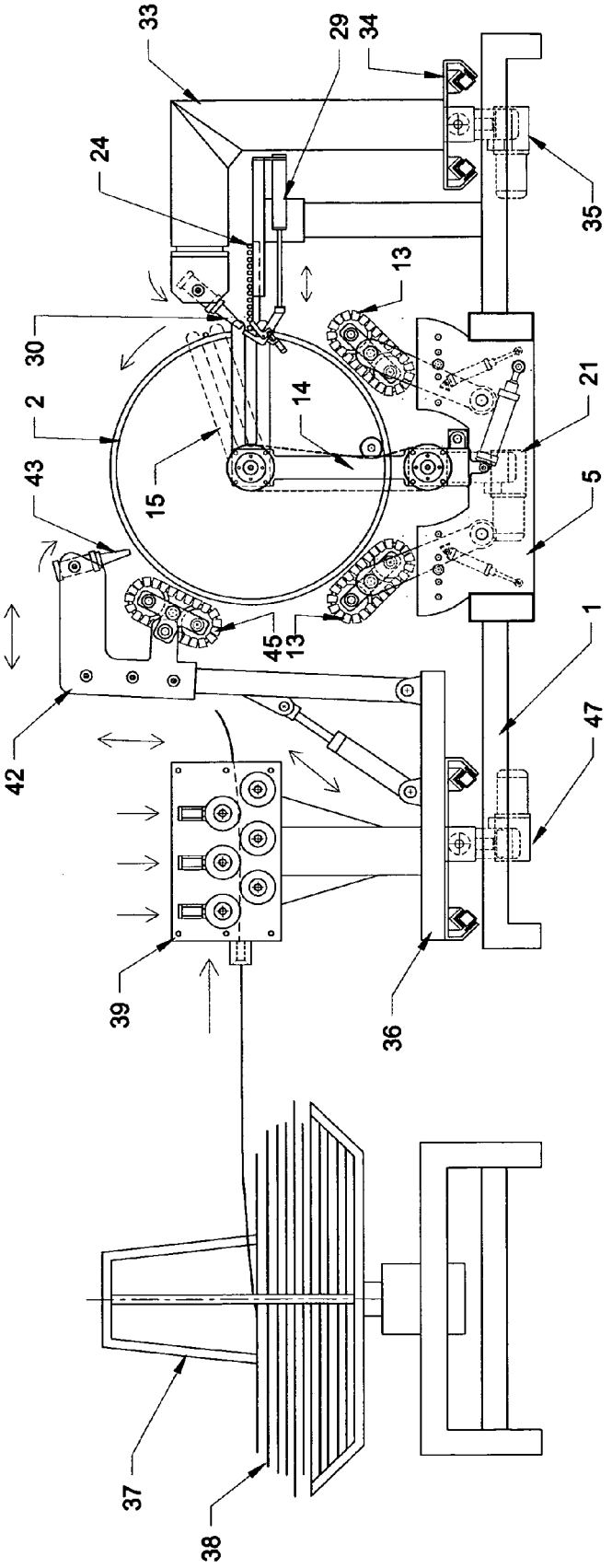

Figure 4

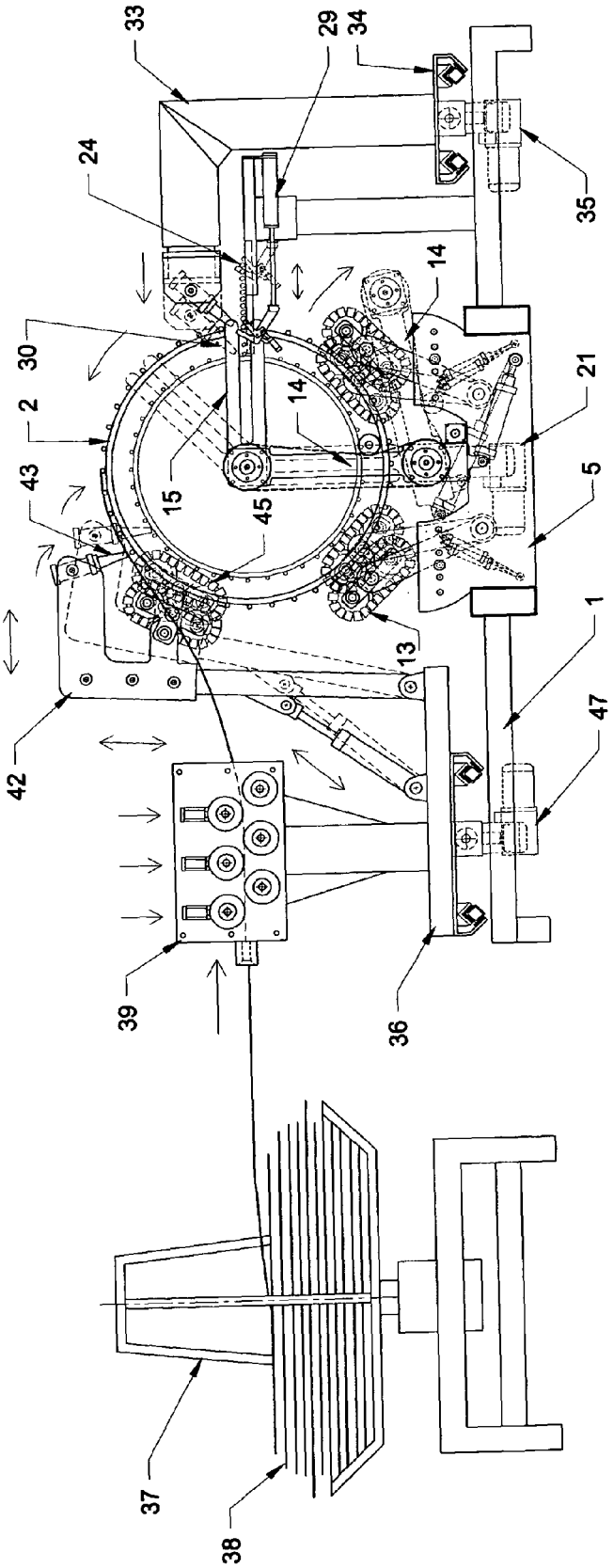

Figure 5

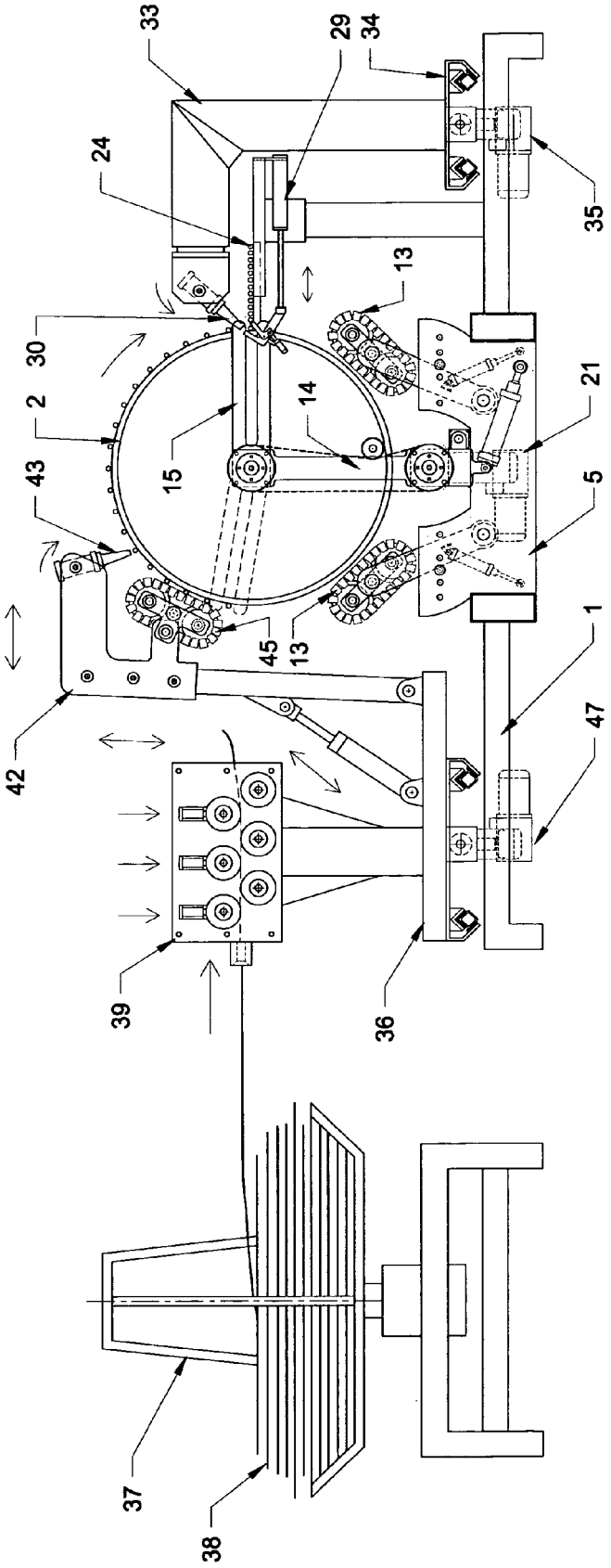

Figure 6

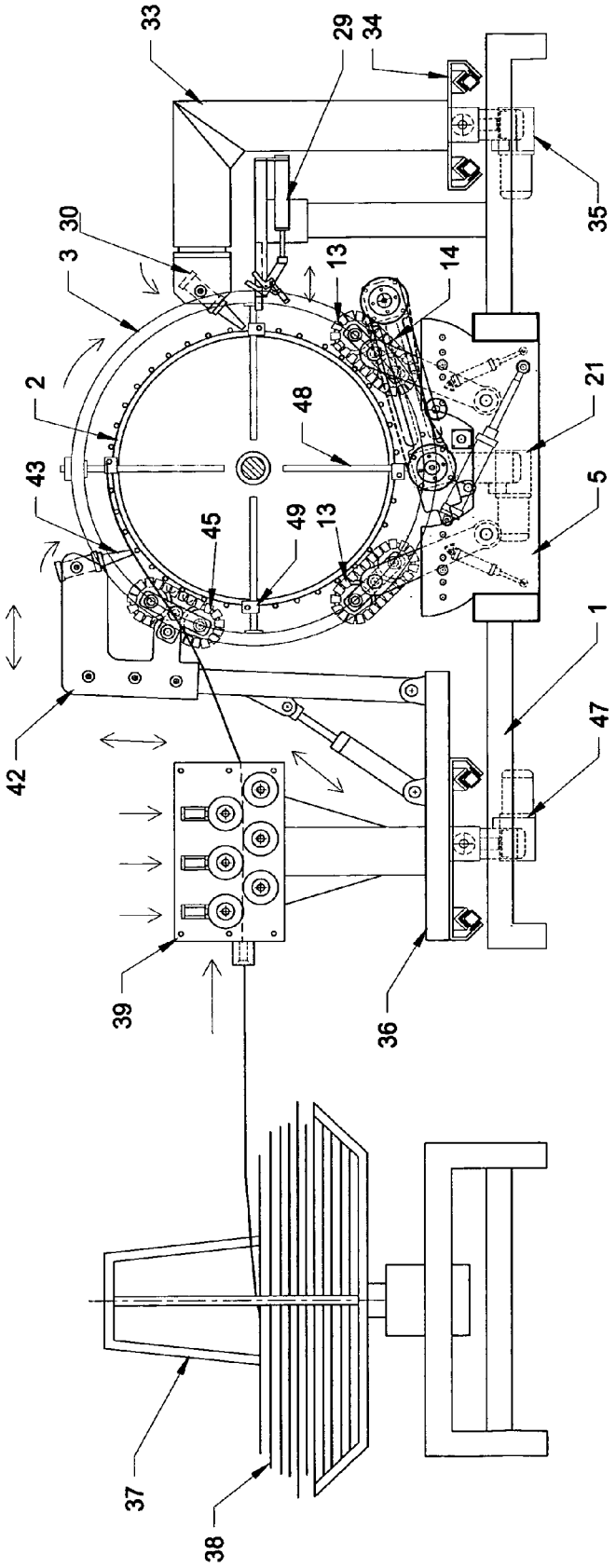

Figure 7

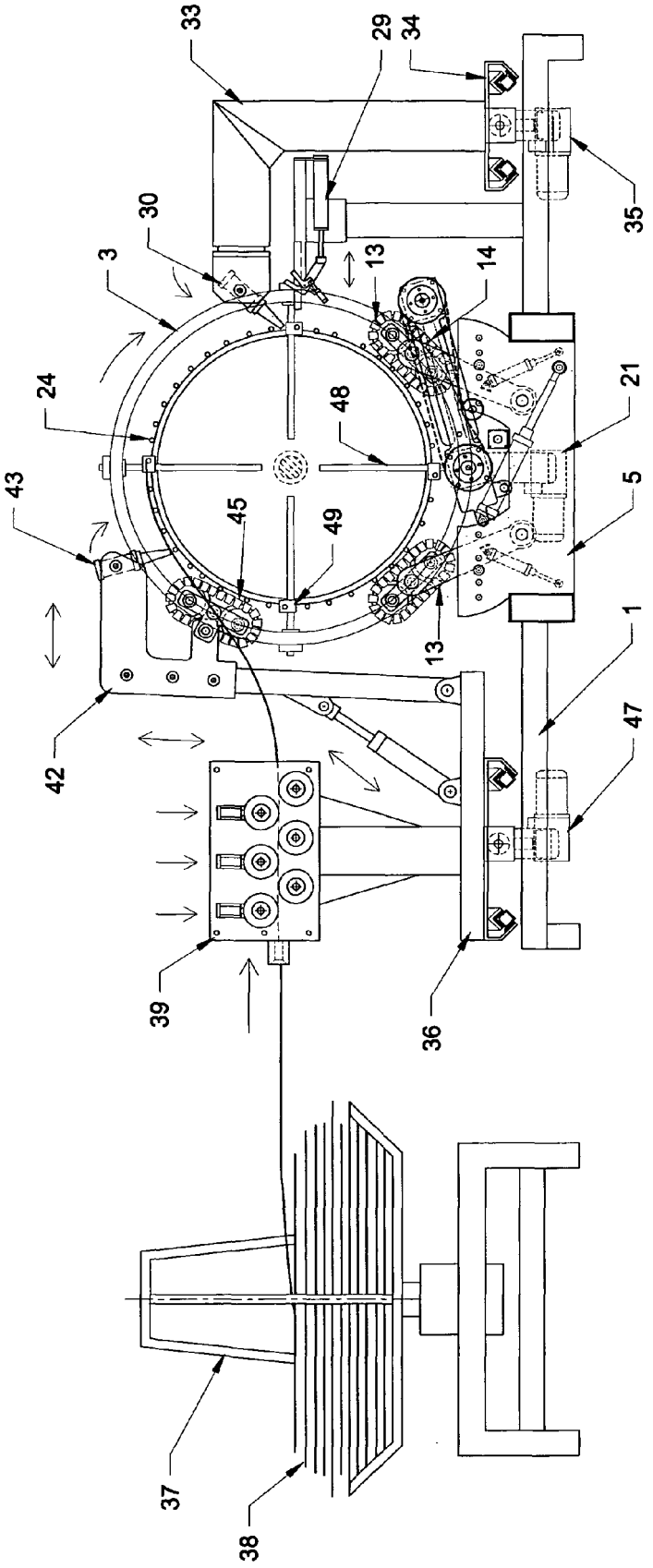

Figure 8

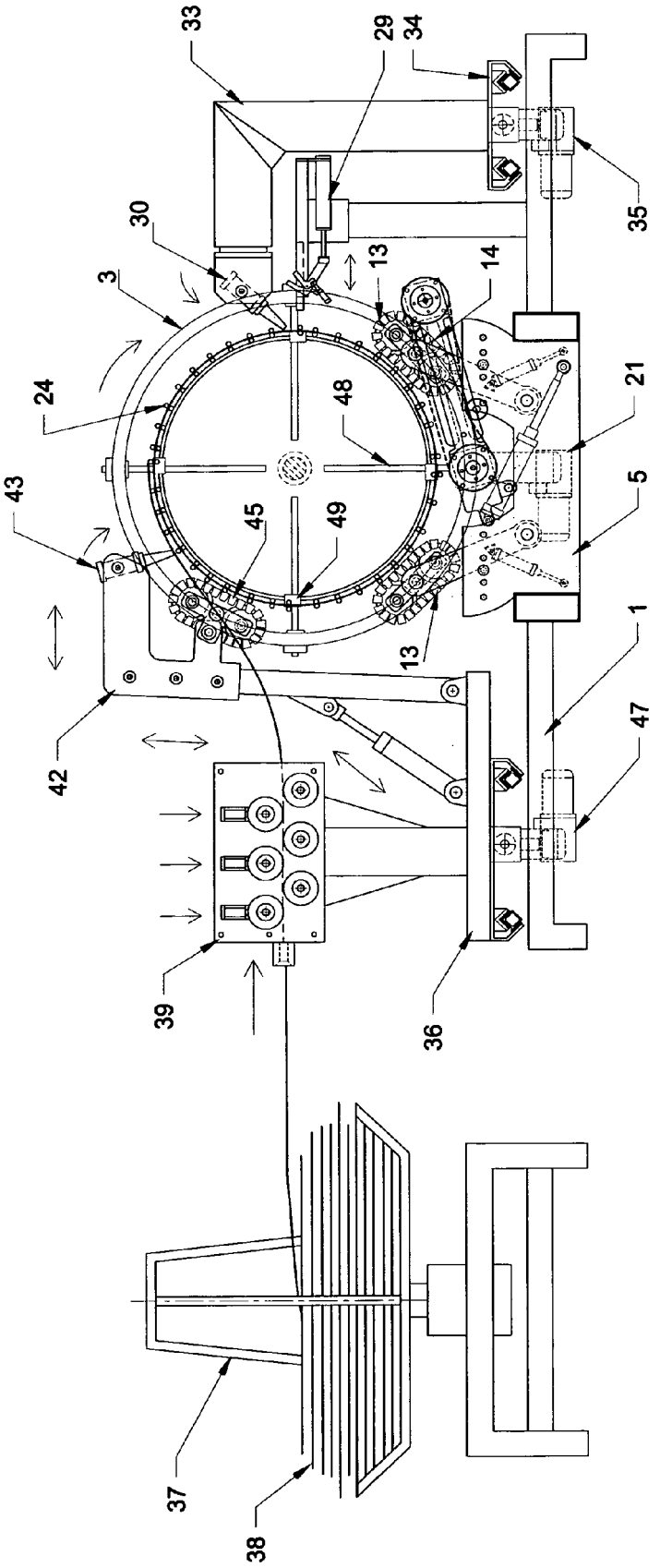

Figure 9

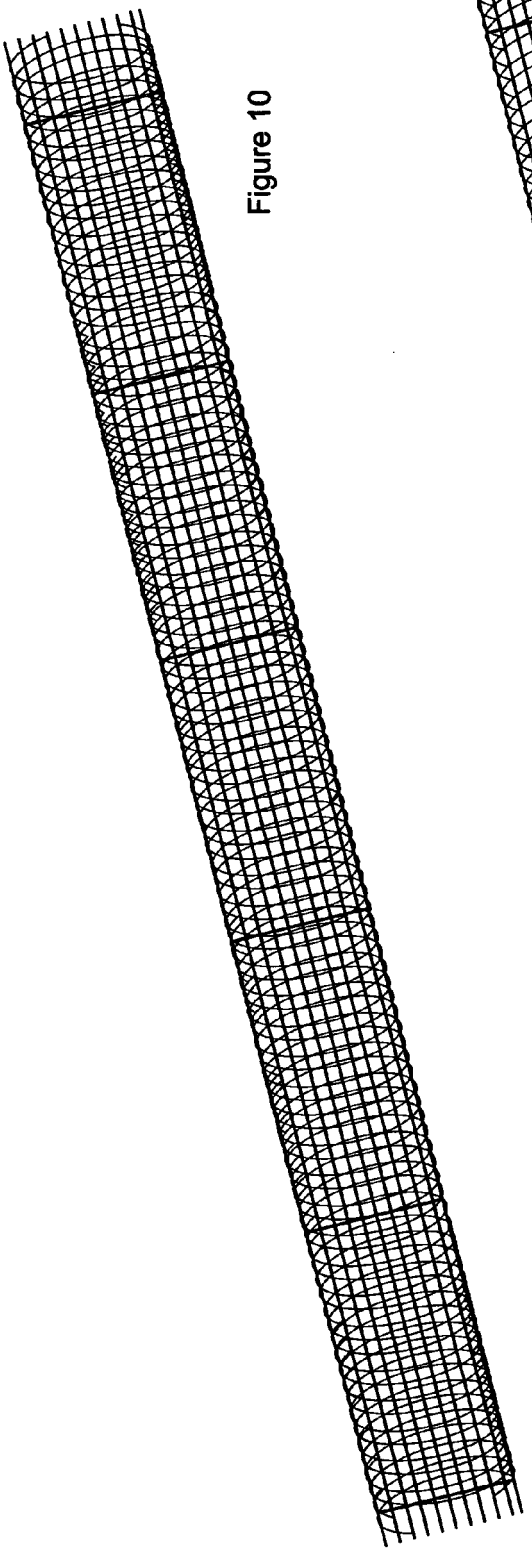

Figure 10

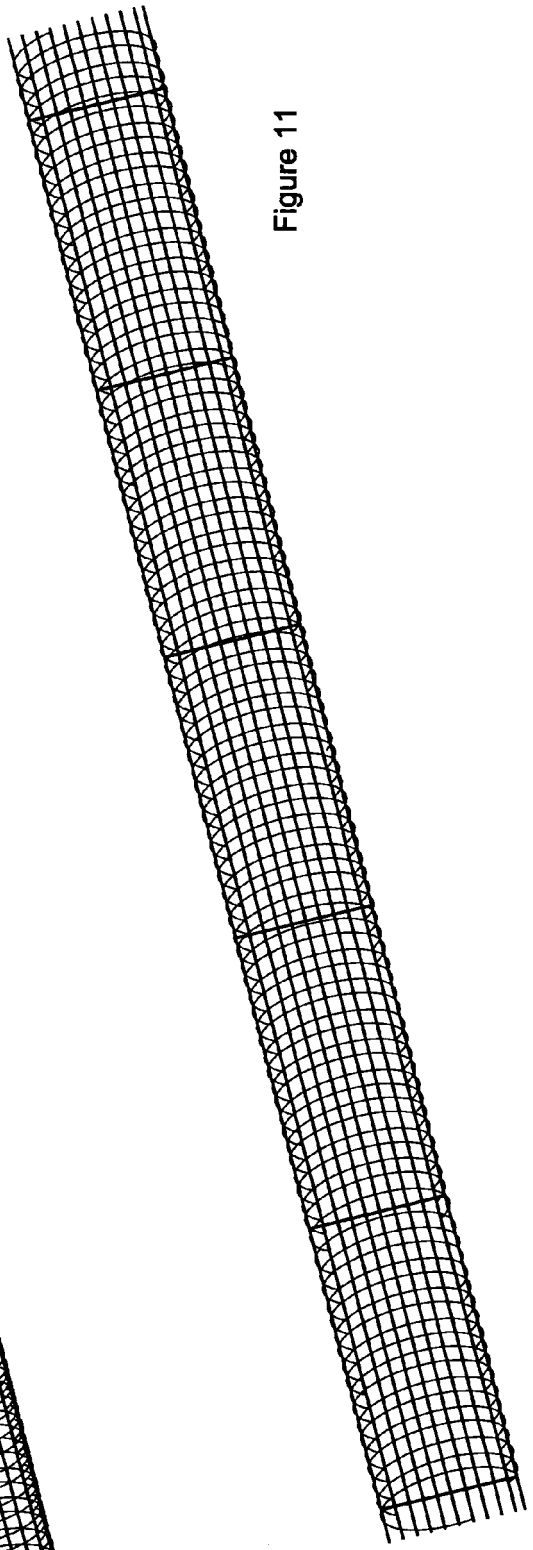

Figure 11