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(54) **IMPROVED PERIPHERAL REWINDER MACHINE AND METHOD FOR THE PRODUCTION OF ROLLS OF TAPE-SHAPED MATERIAL**

VERBESSERTE PERIPHERE AUFWICKELMASCHINE UND VERFAHREN ZUR HERSTELLUNG VON ROLLEN AUS BANDFÖRMIGEM MATERIAL

MACHINE DE REMBOBINAGE PÉRIPHÉRIQUE AMÉLIORÉE ET PROCÉDÉ POUR LA PRODUCTION DE ROULEAUX DE MATÉRIAU EN BANDE

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(56) References cited:
**EP-A1- 1 094 021 US-A- 5 505 405
US-A1- 2007 176 039 US-A1- 2014 054 407**

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Description

[0001] The object of the present invention is an improved peripheral rewinder machine and a method for the production of rolls of tape-shaped material by means of said rewinder machine.

[0002] More particularly the present invention relates to a rewinder machine of the peripheral type suitable for the production of rolls or logs of tape-shaped material, preferably but not exclusively defined by rolls of paper of the tissue paper, toilet paper, kitchen paper type and the like.

[0003] As is known, the rolls of paper of the toilet paper or paper cloth type or the like are typically made up of a reel of paper or of similar material wound on a central nucleus or core suitable for defining a support element for said reel and, at the same time, conferring to the same the roll shape. The same central core, moreover, having a substantially cylindrical shape, interacts with the support element of the roll of paper or allows the insertion thereof in an appropriate container or dispenser.

[0004] Typically the rolls of paper are produced on systems comprising a plurality of devices interacting one with the other in the execution of the different phases of the production cycle and suitable for allowing the change from the individual constituent elements, such as for example the cardboard core, the paper wound thereon, etc., to the assembly defining the end product made up of the single roll of paper optionally subjected to subsequent phases of packaging and storage.

[0005] These rolls or logs, after the winding phase, are cut in accordance with the specific lengths of the end rolls intended for sale.

[0006] The winding phase is performed by means of automatic rewinder machines provided with winding rollers for the fast and continuous production of rolls or logs. The winding of the paper or the like takes place around cores, in cardboard or plastic or another suitable material.

[0007] Once the phase of winding of a roll has ended it has to be removed to allow the winding of the next roll. This operation, referred to as "exchange" in jargon, takes place through cutting or tearing or the like of the material.

[0008] The rewinder machines typically used for performing these operations of winding are rewinder machines of the "peripheral" type in which the movement of winding is imparted on the rolls or logs 13 being formed by means of a contact between two or more winding rollers rotating (typically three rollers defined by an upper roller 10, a lower roller 11 and by a pressing roller or "presser" 12, as schematised in Figures 1A and 1B) at controlled speed and, likewise, apt to contain the roll or log during the winding.

[0009] The traditional rewinder machines of the peripheral type can have fixed fulcrums for the winding rollers; or presser, lower roller and upper roller can be mounted on mobile and/or robotic arms whose position varies during the winding of the roll itself, pivoting or moving with respect to a fixed fulcrum and moving according to ge-

ometries defined by the growing of the rolls during the production process. Such traditional rewinders are disclosed in e.g. US 2014/054407 A1, EP 1 094 021 A1 or US 5 505 405 A. These traditional rewinder machines, on the basis of the position of the winding rollers, are suitable for covering normally a certain range of diameters of logs to be formed using defined and relative cores.

[0010] However these known rewinder machines have some major disadvantages linked to the difficulty in being able to manage optimally all the final product diameters, i.e. the diameter of the reel or log after winding having defined a starting core. In fact, although succeeding in covering a wide range of product core/log diameters, they do not succeed in containing and managing in the same way both the small rolls and the large ones and the variations of the inner cores.

[0011] In the case wherein the rewinder machine is set for a diameter range tendentially comprised, for example, between 75 mm and 250 mm, having defined a core, it has difficulties in the management of rolls with greater diameter.

[0012] In fact, as schematised in Figure 1A, a roll 13 of large dimensions tends to exit from the containment of the three rollers (upper roller 10, lower roller 11 and presser roller 12) before reaching the correct or final dimension and in order to contain it during the growth (i.e. during the phase of winding) it is necessary to impose on the rollers rates of speed such as to push the growing roll 13 in a direction opposite to that of exiting (indicated by arrow X in Figure 1A) or choose appropriate cores.

[0013] In the case instead of rewinder machines suitable for managing wide rolls with diameters tendentially comprised between 90 mm and 500 mm, problems are found linked to the difficulty of making rolls of small diameter (with diameter substantially comprised between 100 and 200 mm) in that they tend to be too embedded between the three winding rollers and are difficult to extract.

[0014] In fact, as schematised in Figure 1B, the small roll 13 comprised between the three winding rollers tends not to exit and to remain sunken. In order to be able to extract it it is necessary to impart high acceleration on the presser roller 12 and on the lower roller 11 and maintain said two rollers always in contact with the roll to prevent it from being able to fall in the space defined by the three rollers.

[0015] However excessive accelerations may entail some disadvantages linked to defects of the paper or tape wound (for example a winding of poor quality or with defects) and, likewise, to the waste of power and energy necessary.

[0016] In order to solve these disadvantages rewinder machines can be used which use robotic arms placed on the presser roller 12 and with movement not only arched and movements of the lower roller or limiting the ranges of diameter of the core.

[0017] However these solutions are constructionally complex with reference to the control of the movement

and, consequently, costly. The control electronics also has to follow the growing of the roll in such a way as to be able to always extract it in an appropriate manner.

[0018] According to other known solutions, in order to perform the winding extremised rotation speeds are used during the format change and synchronisms calculated in an optimised way so as to allow the extraction of the roll from the space of containment or cradle between the three rollers.

[0019] However these solutions, albeit effective, also tend to be complex to achieve and entail high costs at production level.

[0020] US 2014/0054407 A1 provides a displacement of the lower roller with respect to the upper roller solely in order to change the breadth of the groove between these rollers as a function of the diameter of the core which has to be introduced into the winding cradle. No displacement of the lower roller is provided in order to adapt the winding cradle to the different diameters of the roll to be produced.

[0021] EP 1094021 A1 provides a regulation of the position of the presser, however for the sole purpose of maintaining constant the pressure on the roll being formed as its diameter increases, not for reasons of "containment" of the roll in the winding cradle.

[0022] The object of the present invention is that of obviating the disadvantages stated above. More particularly the object of the present invention is that of providing a peripheral rewinder machine for which it is possible to perform a regulation of the fulcrums so as to adapt the winding rollers to all possible geometries of the rolls to be formed.

[0023] A further object of the present invention is that of providing a peripheral rewinder machine which makes management of format change fast and easy.

[0024] A further object of the present invention is to make available to users an improved peripheral rewinder machine suitable for ensuring a high level of resistance and reliability in time and such, moreover, as to be easily and economically produced. Another object of the invention is that of allowing energy saving relative to the simplification of all the final movements of the rollers which in normal machines are instead performed on the fly during the production of the logs.

[0025] These and other objects are achieved by the process of the invention that has the features claimed in claim 1.

[0026] According to the invention an improved peripheral rewinder machine is provided, suitable for manufacturing rolls or logs of tape-shaped material and comprising a pair of opposed and parallel shoulders rotationally supporting rollers for moving and tensioning the tape-shaped material in the direction of winding rollers comprising an upper roller or first winding roller, a lower roller or second winding roller and a presser roller or third winding roller, said rollers having an axis of rotation perpendicular to said opposed and parallel shoulders, with the upper roller and the lower roller defining a groove for the

passage of the tape-shaped material and of a core and, together with the presser roller, a cradle for the winding of the roll or log, upstream of the lower roller a concave plate being provided, defining with the first winding roller a channel of forward movement of the tape-shaped material and of the core, the lower roller being mounted mobile in the direction of the upper roller, so as to be able to vary the breadth of said groove as a function of the diameter of the core, while the presser roller is mounted oscillating around a fulcrum so as to be able to follow the increase in diameter of the roll or log being formed, wherein means are provided for support of the lower roller translationally moved with respect to the opposed shoulders in the direction approximately perpendicular to the line joining the axes of said upper and lower rollers in order to modify the position of the rotation centre of said lower roller, and means of support for the presser roller translationally moved with respect to the opposed shoulders to vary the position of the fulcrum of oscillation of said presser roller, so as to vary the dimensions of said winding cradle as a function of the diameters of the rolls or logs to be produced, and wherein said concave plate is extendable in order to vary the length of said channel and follow the translation displacement of said second roller.

[0027] Advantageous embodiments of the invention are disclosed by the dependent claims. The constructional and functional features of the peripheral rewinder machine and of the method for the manufacture of rolls of tape-shaped material of the present invention will be made clearer by the following detailed description, in which reference is made to the accompanying drawings which represent a preferred and non-limiting embodiment thereof and in which:

Figures 1A and 1B (already described previously to highlight the defects of the prior art) show schematically conditions of winding of a roll or log in accordance with the traditional devices and, more specifically, Figure 1A shows the condition of winding of a roll of large dimensions, while Figure 1B shows the condition of winding of a roll of small dimensions; Figures 2A and 2B show schematically a front view of an improved peripheral rewinder machine of the invention, set for the production of rolls of small and large diameter, respectively;

Figures 3 and 4 show schematically and in axonometric view the peripheral rewinder machine of the invention according to two working configurations wherein the positions assumed by the lower roller for the functions described here below are highlighted;

Figures 5 and 6 show schematically and in axonometric view the peripheral rewinder machine of the invention according to two working configurations wherein the positions assumed by the presser roller for the functions described here below are highlighted;

Figures 7 and 8 show schematically and in a frontal view the peripheral rewinder machine of the invention according to two phases of the winding of rolls or logs of small diameter;

Figures 9 and 10 show schematically and in a frontal view the peripheral rewinder machine of the invention according to two phases of the winding of rolls or logs of large diameter.

[0028] Referring to the drawings, the peripheral rewinder machine of the present invention, denoted overall by 20 in Figures 2 to 10, comprises a pair of opposed and parallel shoulders 22 (in the drawings, for clarity of representation, a single shoulder 22 is shown) apt to support during rotation a plurality of rollers with axis of rotation perpendicular to said parallel and opposed shoulders and apt to move a tape-shaped material 23 to allow its winding into rolls or logs 30.

More particularly the parallel and opposed shoulders 22 support the rotation of rollers 24 having the function of tensioning and moving a predefined quantity of tape-shaped material 23 in the direction of winding rollers defined by an upper roller 25 or first winding roller, by a lower roller 26 or second winding roller and by a presser roller 28 or third winding roller, said winding rollers co-

operating in rotation to wind the tape-shaped material into a roll or log 30.

[0029] The upper roller 25 and the lower roller 26 define a groove for the passage of the tape-shaped material 23 and of the core 80 and, with the presser roller 28, define a cradle of winding of said roll or log 30.

[0030] In a manner in itself known the lower roller 26 is mounted mobile in the direction of the upper roller 15, so as to be able to vary the breadth of the groove between the two rollers as a function of the diameter of the core 80.

[0031] The rewinder machine comprises, likewise, a mobile element 32, optionally pivoting, co-operating with the upper roller 25 and with the lower roller 26 and provided with a concave plate 33 with the concavity turned in the direction of the upper roller 25.

[0032] This mobile element 32, by means of the concave plate 33, has the function of co-operating with the upper roller 25 with which it forms a channel 34 for transferring the core 80 into the winding cradle, optionally starting the winding of the roll along the channel 34.

[0033] The concave plate 33 is mobile in the direction of the upper roller 25 to vary the width of the channel 34 and is extendable, being constituted by at least two plates 33', 33" sliding one in respect of the other to follow the movement of the lower roller 26 which will be explained here below. More particularly, during the extension, the plate 33' remains fixed to the structure of the machine, while the plate 33", which can optionally be constituted by two further plates hinged one to the other, follows the movement of the lower roller 26.

[0034] The lower roller 26 is rotatably arranged with respect to a lower plate 36 mobile in translation (as detailed here below), along lower guides 38 attached to

said shoulders by means of an actuator defined by a pneumatic, hydraulic piston 35 or the like attached to the shoulders 22 and to said lower plate.

[0035] In accordance with alternative embodiments the translation of said lower plate 36 along the lower guides 38 can be actuated by means of levers, racks, cams, or the like.

[0036] The movement of the lower roller 26 is synchronised with that of the extendable plate 33.

[0037] The presser roller 28 is rotatably arranged with respect to one end of a rod 40, whose other end is pivoted in 47, to an upper plate 42. The rod 40 is connected, by means of a lever 44, at one end of a further rod 46 whose other end is pivoted with respect to a block 48 attached to the opposed and parallel shoulders 22.

[0038] The upper plate 42 with respect where to the rod 40 is pivoted is translationally mobile along upper guides 52 attached to the opposed and parallel shoulders 22, by means of a further actuator defined by a further pneumatic, hydraulic piston 50 or the like attached to the parallel and opposed shoulders 22 and to said upper plate (Figures 5 and 6). The function of said upper plate will be made clearer further on.

[0039] In accordance with alternative embodiments the translation of said upper plate 42 along the upper guides 52 can be actuated by means of levers, racks, cams, or similar actuation means.

[0040] The rewinder machine likewise comprises a plate-shaped surface 56 defining a chute for the unloading of the finished roll or log 30.

[0041] The piston 35 imposes the translation of the lower plate 36 along the lower guides 38, along a plane parallel to the surface of the opposed and parallel shoulders 22 so as to define a low position (stem of the piston 35 retracted) and a high position (stem of the piston 35 fully extended) for said lower plate (Figures 3 and 4).

[0042] An actuator cylinder (not shown in the drawings), attached to the opposed and parallel shoulders 22, drives the forward and backward movement, in a direction perpendicular to the opposed plates and towards the upper plate, of a pin 60 apt to define a stop or block element for the lower plate when, as explained here below, it is in a high position.

[0043] The further piston 50 imposes the translation of the upper plate 42 along the upper guides 52 so as to define a low position (stem of the further piston 50 retracted) and a high position (stem of the further piston 50 fully extended) for said upper plate 42.

[0044] A further actuator cylinder 62 is attached to the opposed and parallel shoulders 22 and drives a forward and backward movement, in a direction perpendicular to said opposed and parallel shoulders and turned in the direction of the upper plate 42, of a further pin 64 apt to define a stop or block element for the upper plate when it is in a high position.

[0045] The translation of said lower plate and upper plate allows advantageously the regulation of the space between the upper roller, the lower roller and the presser

roller so as to be able to process diameters comprised within a wide range of values.

[0046] With particular reference to Figures 7 to 10 the movements of said plates for the management of the different diameters of rolls or logs are schematised.

[0047] In these drawings, for simplicity of representation, the extendable plate 33 has been omitted, for which reference can be made to the schematisations of Figures 2A and 2B, in the two different layouts.

[0048] Figures 7 and 8 show, by way of an example, the case of a winding of a roll with diameter comprised between 90 and 200 mm.

[0049] As can be seen from the drawings the roll 30 is rotatably arranged between the upper roller 25, the lower roller 26 and the presser roller 28. More particularly the upper roller and the lower roller have the function of moving the tape-shaped material and winding it around a core (if present) fed in the cradle defined by winding rollers, while the presser roller, which is always in contact with the growing roll or log, has the function of maintaining pressed one to the other the layers of tape-shaped material 23 wound during the rotation of the upper and lower rollers.

[0050] More particularly, during the phase of winding and forming of the roll or log 30, the upper roller 25 and the lower roller 26 are fixed in position (respectively attached to the opposed and parallel shoulders 22 and to the lower plate 36) while the presser roller 28 which is rotatably arranged with respect to the pivoted rod 40 accompanies the growing of the roll 30 with the pivoted rod 40 which performs a rotary movement with respect to its point of fulcrum with the upper plate 42.

[0051] Figures 9 and 10 show, by way of an example, the condition of winding of a roll with diameter comprised between 100 and 350 mm.

[0052] In order to be able to perform the winding of rolls with diameter comprised within this range of dimensions, the position of the centre of rotation of the lower roller 26 and of the fulcrum of oscillation of the presser roller 28 is varied by acting, respectively, on the lower plate 36 and on the upper plate 42.

[0053] More particularly the actuator means 35 impose a translation of the lower plate 36 from the low position (Figure 8) to the high position (Figure 9), so as to move the lower roller 26 in the direction approximately perpendicular to the line joining the axes of the upper roller and of the lower roller, while the further actuator means 50 impose a translation of the upper plate 42 from the low position to the high position.

[0054] Simultaneously the actuator cylinder and the further actuator cylinder impose the forward movement, respectively, of the stem 60 and of the further stem 64 which go to block in high position the lower plate and the upper plate. The blocking of the lower and upper plates may likewise be provided in an intermediate position between said low and high positions.

[0055] The rod 40, pivoted with respect to the upper plate 42 as described previously, allows the presser roller

28 to remain always in contact with the roll or log 30 during its growing in diameter due to the winding.

[0056] The two lower and upper plates can be regulated in their high and low positions (for example the lower plate in low position and the upper plate in high position and vice versa) as a function of the features of the roll to be formed, in such a way as to be able to manage a wide range of diameters (tendentially comprised between 75 mm and 500 mm) as well as different qualities of the end product.

[0057] Moreover the regulation of the position of the centre of rotation of the lower roller and of the fulcrum of oscillation of the presser roller can be performed both in automatic mode by means, for example, of the control unit which manages the functioning of the rewinder machine as a function of the roll diameters which characterise the production cycle or manually with the operator acting on the plates of the lower roller and of the presser roller when the production imposes a format change.

[0058] As can be seen from the above the advantages that the improved rewinder machine of the invention achieves are clear.

[0059] The rewinder machine with variable fulcrums of the present invention allows advantageously the management of the winding both of rolls of small diameter and of those of large diameter. More particularly, in the case of rolls or logs of large diameter, the roll or log does not run the risk of abandoning the winding rollers before reaching the correct dimension and, in the case of a roll of small dimensions, said roll does not risk remaining sunken between the winding rollers with consequent difficulty of exiting.

[0060] A further advantage of the present invention is represented by the fact that the variation and the regulation of the position of the centre of rotation of the lower roller and of the fulcrum of oscillation of the presser roller allow these rollers to be maintained always in contact with the roll or log during the phase of winding in an elementary manner. In this way both possible defects on the wound tape and a waste of power and energy needed for winding of the rolls are avoided.

[0061] A further advantage is represented by the fact that the rewinder machine of the invention does not need extremised speeds for the winding rollers and, likewise, does not need perfect synchronisms in order to be able to extract the roll from the cradle (defined by the three rollers) wherein said roll is positioned for winding.

Although the invention has been described above with particular reference to one of its embodiments given solely by way of a non-limiting example, numerous changes and variations will appear clear to a person skilled in the art in light of the description given above. The present invention intends, therefore, to embrace all the modifications and the variations that fall within the scope of the following claims.

Claims

1. A peripheral rewinder machine (20) suitable for manufacturing rolls or logs (30) of tape-shaped material, comprising a pair of opposed and parallel shoulders (22) rotationally supporting rollers (24) for moving and tensioning the tape-shaped material (23) in the direction of winding rollers comprising an upper roller (25) or first winding roller, a lower roller (26) or second winding roller and a presser roller (28) or third winding roller, said rollers having an axis of rotation perpendicular to said opposed and parallel shoulders (22), with the upper roller (25) and the lower roller (26) defining a groove for the passage of the tape-shaped material (23) and of a core (80) and, together with the presser roller (28), a cradle for the winding of the roll or log (30), upstream of the lower roller (26) a concave plate (33) being provided, defining with the first winding roller (25) a channel (34) of forward movement of the tape-shaped material (23) and of the core (80), the lower roller (26) being mounted mobile in the direction of the upper roller (15), so as to be able to vary the breadth of said groove as a function of the diameter of the core (80), while the presser roller (28) is mounted oscillating around a fulcrum (47) so as to be able to follow the increase in diameter of the roll or log (30) being formed, said rewinder machine **characterised in that** it comprises support means for the lower roller (26) translationally moved with respect to the opposed shoulders (22) in the direction approximately perpendicular to the line joining the axes of said upper and lower rollers in order to modify the position of the rotation centre of said lower roller (26), and means of support for the presser roller (28) translationally moved with respect to the opposed shoulders (22) to vary the position of the fulcrum of oscillation of said presser roller (28), so as to vary the dimensions of said winding cradle as a function of the diameters of the rolls or logs to be produced, and **in that** said concave plate (33) is extendable in order to vary the length of said channel (34) and follow the translation displacement of said second roller (26).
2. The peripheral rewinder machine according to claim 1, **characterised in that** said support means comprise a lower plate (36) supporting the lower roller (26) and translationally mobile along lower guides (38) attached to the opposed and parallel shoulders (22) and an upper plate (42) supporting the presser roller (28) and translationally mobile along upper guides (52) attached to the opposed and parallel shoulders (22).
3. The rewinder machine according to claim 2, **characterised in that** it comprises means for actuating the translation movement of said lower plate (36) and upper plate (42), respectively defined by an actuator (35) and by a further actuator (50) attached to the shoulders (22) and apt to move said lower plate (36) and upper plate (42) between a low position and a high position, said actuator means being constituted by pneumatic or hydraulic pistons, levers, racks, cams, or the like.
4. The rewinder machine according to claim 2 or 3, **characterised in that** it comprises stop or blocking means of the lower plate (36) and of the upper plate (42) in any position between said low and high positions.
5. The rewinder machine according to claim 4, **characterised in that** said stop or blocking means comprise a pin (60) and a further pin (64), respectively suitable for blocking the lower plate (36) and the upper plate (42), said pin (60) and further pin (64) being forward or backward actuated with respect to the lower and upper plates, respectively, by means of an actuator cylinder and of a further actuator cylinder attached to the opposed and parallel shoulders (22).
6. The rewinder machine according to any one of the preceding claims, **characterised in that** said extendable plate (33) is constituted by at least two plates (33'), (33'') sliding one with respect to the other, one of which (33'), during the extension, remains fixed to the structure of the machine, while the other (33''), optionally constituted by two further plates hinged one to the other, follows the movement of the lower roller (26).
7. The rewinder machine according to any one of the preceding claims, **characterised in that** the presser roller (28) is rotatably arranged with respect to one end of a rod (40) pivoted in (47), at the end opposite to that of connection of the presser roller, with respect to the upper plate (42) and connected, by means of a lever (44), at one end of a further rod (46) whose end opposite to that of connection to the lever (46) is pivoted with respect to a block (48) attached to the opposed and parallel shoulders (22) to define a mechanism suitable for keeping the presser roller (28) always in contact with the roll or log (30) being wound.
8. Method for the production of rolls or logs of tape-shaped material by means of the peripheral rewinder machine with adjustable fulcrums according to any one of the preceding claims, comprising the steps of:
 - feeding of a core (80) in the cradle formed by the winding rollers;
 - winding of a predetermined quantity of tape-shaped material (23) around said optional core to define a roll or log (30);

and **characterised in that** it comprises, prior to said steps of feeding and winding, a step of adjusting the position of the centre of rotation of the second winding roller or lower roller (26) and of the oscillation fulcrum (47) of the third winding roller or presser roller (28) as a function of the final diameter of the roll or log to be wound, and a step of regulation of the extension of the concave plate (33) to vary the length of the channel (34) of forward movement of the tape-shaped material (23) and of the core (80) following the displacement of said second roller (26).

9. Method according to claim 8, **characterised in that** the step of adjusting the position of the centre of rotation of the lower roller (26) and/or of the fulcrum of oscillation (47) of the presser roller (28) comprises a translation movement of the lower plate (36) and/or of the upper plate (42) between a low position and a high position and a blocking in the position required.
10. Method according to claim 8 or 9, **characterised in that** the step of adjusting of the extension of the concave plate (33) consists in the reciprocal sliding of at least two plates (33') and (33'').
11. Method according to any one of claims 8-10, **characterised in that** the step of adjusting of the position of the centre of rotation of the lower roller (26) and of the fulcrum of oscillation (47) of the presser roller (28) is performed automatically.
12. Method according to any one of claims 8-10, **characterised in that** the step of adjusting of the position of the centre of rotation of the lower roller (26) and of the fulcrum of oscillation (47) of the presser roller (28) is performed manually.

Patentansprüche

1. Peripherer Umroller (20), geeignet für die Herstellung von Rollen oder Blöcken (30) aus bandförmigem Material, umfassend ein Paar gegenüberliegender und paralleler Schultern (22), die drehbar Rollen (24) zum Bewegen und Spannen des bandförmigen Materials (23) in Richtung der Wickelrollen unterstützen, umfassend eine obere Rolle (25) oder erste Wickelrolle, eine untere Rolle (26) oder zweite Wickelrolle und eine Andruckrolle (28) oder dritte Wickelrolle, wobei die Rollen eine Rotationsachse senkrecht zu den gegenüberliegenden und parallelen (22) Schultern aufweisen, wobei die obere Rolle (25) und die untere Rolle (26) eine Rille zum Durchführen des bandförmigen Materials (23) und eines Kerns (80), und, zusammen mit der Andruckrolle (28), eine Wiege zum Wickeln der Rolle oder des Blocks (30) definieren, wobei vor der unteren Rolle

(26) eine konkave Platte (33) bereitgestellt wird, die mit der ersten Wickelrolle (25) einen Kanal (34) zur Vorwärtsbewegung des bandförmigen Materials (23) und des Kerns (80) definieren, wobei die untere Rolle (26) mobil in der Richtung der oberen Rolle (15) befestigt ist, so dass sie dazu in der Lage ist, die Breite der Rille als eine Funktion des Durchmessers des Kerns (80) zu variieren, während die Andruckrolle (28) oszillierend derart um einen Drehpunkt (47) herum befestigt ist, dass sie dazu in der Lage ist, der Erhöhung des Durchmessers der Rolle oder des Blocks (30), die bzw. der geformt wird, zu folgen, wobei der Umroller **dadurch gekennzeichnet ist, dass** er Stützmittel für die untere Rolle (26) aufweist, die übersetzungsmäßig in Bezug auf die gegenüberliegenden Schultern (22) in die Richtung in etwa senkrecht zu der Linie, die die Achsen der oberen und unteren Rollen verbindet, bewegt werden, um die Position des Rotationszentrums der unteren Rolle (26) zu modifizieren, und Stützmittel für die Andruckrolle (28), die übersetzungsmäßig in Bezug auf die gegenüberliegenden Schultern (22) bewegt werden, um die Position des Drehpunkts der Oszillation der Andruckwelle (28) zu variieren, so dass die Abmessungen der Wickelwiege als eine Funktion des Durchmessers der herzustellenden Rollen oder Blöcke variiert werden, und wobei die konkave Platte (33) erweiterbar ist, um die Länge des Kanals (34) zu variieren und der Übersetzungsverschiebung der zweiten Rolle (26) zu folgen.

2. Peripherer Umroller nach Anspruch 1, **dadurch gekennzeichnet, dass** die Stützmittel eine untere Platte (36) umfasst, die die untere Rolle (26) stützt und übersetzungsmäßig entlang unterer Schienen (38), die an die gegenüberliegenden und parallelen Schultern (22) angebracht sind, bewegbar ist, und eine obere Platte (42), die die Andruckrolle (28) stützt, und übersetzungsmäßig entlang oberer Schienen (52), die an den gegenüberliegenden und parallelen Schultern (22) angebracht sind, bewegbar ist.
3. Umroller nach Anspruch 2, **dadurch gekennzeichnet, dass** er Mittel zur Betätigung der Übersetzungsbewegung der unteren Platte (36) und der oberen Platte (42) umfasst, jeweils durch ein Betätigungsorgan (35) und ein weiteres Betätigungsorgan (50) definiert, die an den Schultern (22) befestigt sind, und dafür geeignet, die untere Platte (36) und die obere Platte (42) zwischen einer Tiefposition und einer Hochposition zu bewegen, wobei die Betätigungsmittel aus pneumatischen oder hydraulischen Kolben, Hebeln, Zahnstangen, Nocken oder dergleichen gebildet werden.
4. Umroller nach Anspruch 2 oder 3, **dadurch gekennzeichnet, dass** er Stopp- oder Blockierungsmittel

der unteren Platte (36) und der oberen Platte (42) in einer beliebigen Position zwischen der Tief- und der Hochposition umfasst.

5. Umroller nach Anspruch 4, **dadurch gekennzeichnet, dass** die Stopp- oder Blockierungsmittel einen Stift (60) und einen weiteren Stift (64) umfassen, die jeweils für das Blockieren der unteren Platte (36) und der oberen Platte (42) geeignet sind, wobei der Stift (60) und der weitere Stift (64) in Bezug auf die untere und obere Platte mittels eines Betätigungszyinders und eines weiteren Betätigungszyinders, die an den gegenüberliegenden und parallelen Schultern (22) angebracht sind, vorwärts bzw. rückwärts bewegt werden. 5
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6. Umroller nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** die erweiterbare Platte (33) aus mindestens zwei Platten (33'), (33'') besteht, wobei eine in Bezug auf die andere verschoben wird, von denen eine (33') während der Erweiterung an der Struktur der Maschine fixiert bleibt, während die andere (33''), die wahlweise aus zwei weiteren Platten besteht, die gelenkig zueinander angeordnet sind, der Bewegung der unteren Rolle (26) folgt. 20
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7. Umroller nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** die Andruckrolle (28) in Bezug auf ein Ende eines Stabes (40), gelenkig aufgehängt (47) an dem Ende gegenüber der Verbindung der Andruckrolle drehbar angeordnet ist, in Bezug auf die obere Platte (42) und verbunden durch einen Hebel (44), an einem Ende eines weiteren Stabes (46), dessen Ende gegenüber dem der Verbindung mit dem Hebel (46) in Bezug auf einen Block (48), der an den gegenüberliegenden und parallelen Schultern (22) befestigt ist, gelenkig aufgehängt ist, um einen Mechanismus zu definieren, der dafür geeignet ist, die Andruckrolle (28) stets in Kontakt mit der Rolle oder dem Block (30), der bzw. die gewickelt wird, zu halten. 30
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8. Verfahren zur Produktion von Rollen oder Blöcken bandförmigen Materials mittels des peripheren Umrollers mit einstellbaren Drehpunkten nach einem der vorstehenden Ansprüche, umfassend die Schritte: 45
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 - Zuführen eines Kerns (80) in die von den Wickelrollen ausgebildete Wiege;
 - Wickeln einer vorgegebenen Menge bandförmigen Materials (23) um den optionalen Kern zur Definition einer Rolle oder eines Blocks (30);
 und **dadurch gekennzeichnet, dass** es, vor den Schritten des Zuführens und Wickelns, einen Schritt der Einstellung der Position des Drehzentrums der

zweiten Wickelrolle oder unteren Rolle (26) und des Oszillationsdrehpunkts (47) der dritten Wickelrolle oder Andruckrolle (28) als eine Funktion des letztendlichen Durchmessers der zu wickelnden Rolle oder Blocks umfasst, und einen Schritt der Regulierung der Erweiterung der konkaven Platte (33) zum Variieren der Länge des Kanals (34) der Vorwärtsbewegung des bandförmigen Materials (23) und des Kerns (80) nach dem Verschieben der zweiten Rolle (26).

9. Verfahren nach Anspruch 8, **dadurch gekennzeichnet, dass** der Schritt des Einstellens der Position des Drehzentrums der unteren Rolle (26) und/oder des Oszillationsdrehpunkts (47) der Andruckrolle (28) eine Übersetzungsbewegung der unteren Platte (36) und/oder der oberen Platte (43) zwischen einer Tiefposition und einer Hochposition und eine Blockierung in der gewünschten Position umfasst. 15
10. Verfahren nach Anspruch 8 oder 9, **dadurch gekennzeichnet, dass** der Schritt des Einstellens der Erweiterung der konkaven Platte (33) aus dem reziproken Schieben von mindestens zwei Platten (33') und (33'') besteht. 25
11. Verfahren nach einem der Ansprüche 8 bis 10, **dadurch gekennzeichnet, dass** der Schritt des Einstellens der Position des Drehzentrums der unteren Rolle (26) und des Oszillationsdrehpunkts (47) der Andruckrolle (28) automatisch durchgeführt wird. 30
12. Verfahren nach einem der Ansprüche 8 bis 10, **dadurch gekennzeichnet, dass** der Schritt des Einstellens der Position des Drehzentrums der unteren Rolle (26) und des Oszillationsdrehpunkts (47) der Andruckrolle (28) manuell durchgeführt wird. 35
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Revendications

1. Machine de rembobinage périphérique (20) appropriée pour la production de rouleaux ou tronçons (30) de matériau en bande, comprenant une paire d'épaulements (22) opposés et parallèles supportant des rouleaux (24) en rotation pour déplacer et tendre le matériau en bande (23) dans la direction de rouleaux de bobinage comprenant un rouleau supérieur (25) ou premier rouleau de bobinage, un rouleau inférieur (26) ou deuxième rouleau de bobinage, et un rouleau presseur (28) ou troisième rouleau de bobinage, lesdits rouleaux présentant un axe de rotation perpendiculaire auxdits épaulements (22) opposés et parallèles, avec le rouleau supérieur (25) et le rouleau inférieur (26) définissant une rainure pour le passage du matériau en bande (23) et d'un noyau (80), et conjointement avec le rouleau pres-

- seur (28), un berceau pour bobiner le rouleau ou tronçon (30), une plaque concave (33) étant prévue en amont du rouleau inférieur (26), définissant avec le premier rouleau de bobinage (25), un canal (34) d'avancée du matériau en bande (23) et du noyau (80), le rouleau inférieur (26) étant monté mobile dans la direction du rouleau supérieur (15) de façon à être en mesure de varier la largeur de ladite rainure en fonction du diamètre du noyau (80), tandis que le rouleau presseur (28) est monté oscillant autour d'un pivot (47) de façon à pouvoir suivre l'augmentation de diamètre du rouleau ou tronçon (30) en cours de formation, ladite machine de rembobinage étant **caractérisée en ce qu'elle** comprend un moyen de support pour le rouleau inférieur (26) déplacé en translation par rapport aux épaulements (22) opposés dans la direction approximativement perpendiculaire à la ligne joignant les axes desdits rouleaux supérieur et inférieur afin de modifier la position du centre de rotation dudit rouleau inférieur (26), et un moyen de support pour le rouleau presseur (28) déplacé en translation par rapport aux épaulements (22) opposés pour varier la position du pivot d'oscillation dudit rouleau presseur (28), de façon à varier les dimensions dudit berceau de bobinage en fonction des diamètres des rouleaux ou tronçons en cours de production, et **en ce que** ladite plaque concave (33) est extensible afin de varier la longueur dudit canal (34) et de suivre le déplacement en translation dudit deuxième rouleau (26).
2. Machine de rembobinage périphérique selon la revendication 1, **caractérisée en ce que** ledit moyen de support comprend une plaque inférieure (36) supportant le rouleau inférieur (26) et mobile en translation le long de guides inférieurs (38) fixés aux épaulements (22) opposés et parallèles et une plaque supérieure (42) supportant le rouleau presseur (28) et mobile en translation le long de guides supérieurs (52) fixés sur les épaulements (22) opposés et parallèles.
 3. Machine de rembobinage périphérique selon la revendication 2, **caractérisée en ce qu'elle** comprend un moyen pour actionner le mouvement de translation de ladite plaque inférieure (36) et de ladite plaque supérieure (42), respectivement défini par un actionneur (35) et un actionneur (50) supplémentaire fixés sur les épaulements (22) et aptes à déplacer ladite plaque inférieure (36) et ladite plaque supérieure (42) entre une position basse et une position haute, lesdits moyens d'actionneur étant constitués par des pistons pneumatiques ou hydrauliques, leviers, rails, cames ou similaires.
 4. Machine de rembobinage périphérique selon la revendication 2 ou 3, **caractérisée en ce qu'elle** comprend un moyen d'arrêt ou de blocage de la plaque inférieure (36) et de la plaque supérieure (42) dans n'importe quelle position entre lesdites positions basse et haute.
 5. Machine de rembobinage périphérique selon la revendication 4, **caractérisée en ce que** ledit moyen d'arrêt ou de blocage comprend une broche (60) et une broche supplémentaire (64), respectivement appropriées pour bloquer la plaque inférieure (36) et la plaque supérieure (42), ladite broche (60) et la broche supplémentaire (64) étant actionnées vers l'avant ou vers l'arrière par rapport aux plaques inférieure et supérieure, respectivement, au moyen d'un cylindre actionneur et d'un cylindre actionneur supplémentaire fixés aux épaulements (22) opposés et parallèles.
 6. Machine de rembobinage périphérique selon l'une quelconque des revendications précédentes, **caractérisée en ce que** ladite plaque extensible (33) est constituée d'au moins deux plaques (33'), (33'') coulissant l'une par rapport à l'autre, l'une d'elles (33'), pendant l'extension, reste fixée à la structure de la machine, tandis que l'autre (33''), constituée en option de deux autres plaques articulées l'une à l'autre, suit le mouvement du rouleau inférieur (26).
 7. Machine de rembobinage périphérique selon l'une quelconque des revendications précédentes, **caractérisée en ce que** le rouleau presseur (28) est agencé en rotation par rapport à une extrémité d'une tige (40) pivotée en (47), sur l'extrémité opposée à celle de raccordement du rouleau presseur, par rapport à la plaque supérieure (42) et raccordé, au moyen d'un levier (44), à une extrémité d'une tige supplémentaire (46) dont l'extrémité opposée à celle de raccordement au levier (46) est pivotée par rapport à un bloc (48) fixé sur les épaulements (22) opposés et parallèles pour définir un mécanisme approprié pour maintenir le rouleau presseur (28) toujours en contact avec le rouleau ou tronçon (30) en train d'être bobiné.
 8. Procédé de production de rouleaux ou tronçons de matériau en bande au moyen d'une machine de rembobinage périphérique avec des pivots réglables selon l'une quelconque des revendications précédentes, comprenant les étapes suivantes :
 - alimentation d'un noyau (80) dans le berceau formé par les rouleaux de bobinage ;
 - bobinage d'une quantité prédéterminée de matériau en bande (23) autour dudit noyau optionnel pour définir un rouleau ou un tronçon (30) ;
 et **caractérisé en ce qu'il** comprend, avant lesdites étapes d'alimentation et de bobinage, une étape de réglage de la position du centre de rotation du se-

cond rouleau de bobinage ou rouleau inférieur (26) et du pivot (47) d'oscillation du troisième rouleau de bobinage ou rouleau presseur (28) en fonction du diamètre final du rouleau ou tronçon à bobiner, et une étape de réglage de l'extension de la plaque concave (33) pour varier la longueur du canal (34) d'avancée du matériau en bande (23) et du noyau (80) suivant le déplacement dudit deuxième rouleau (26).

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9. Procédé selon la revendication 8, **caractérisé en ce que** l'étape de réglage de la position du centre de rotation du rouleau inférieur (26) et/ou du pivot d'oscillation (47) du rouleau presseur (28) comprend un mouvement de translation de la plaque inférieure (36) et/ou de la plaque supérieure (42) entre une position basse et une position haute et un blocage dans la position requise. 15
10. Procédé selon la revendication 8 ou 9, **caractérisé en ce que** l'étape de réglage de l'extension de la plaque concave (33) consiste en le coulisement réciproque d'au moins deux plaques (33') et (33''). 20
11. Procédé selon l'une quelconque des revendications 8 - 10, **caractérisée en ce que** l'étape de réglage de la position du centre de rotation du rouleau inférieur (26) et du pivot d'oscillation (47) du rouleau presseur (28) est effectuée automatiquement. 25
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12. Procédé selon l'une quelconque des revendications 8 - 10, **caractérisée en ce que** l'étape de réglage de la position du centre de rotation du rouleau inférieur (26) et du pivot d'oscillation (47) du rouleau presseur (28) est effectuée manuellement. 35

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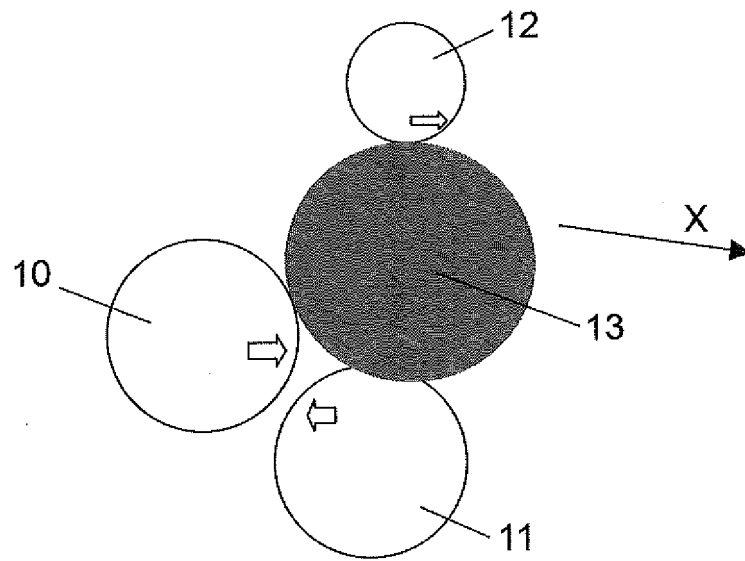


FIG. 1A

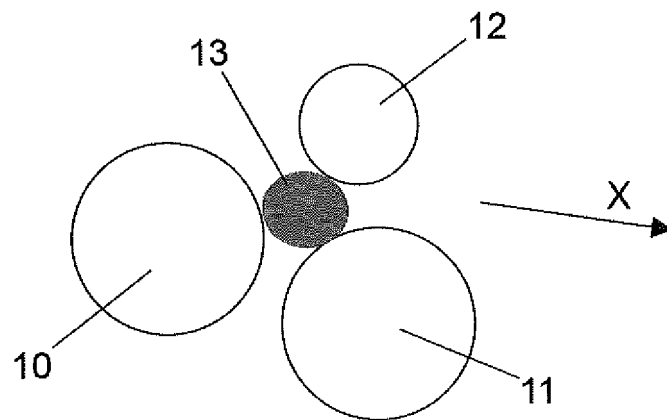


FIG. 1B

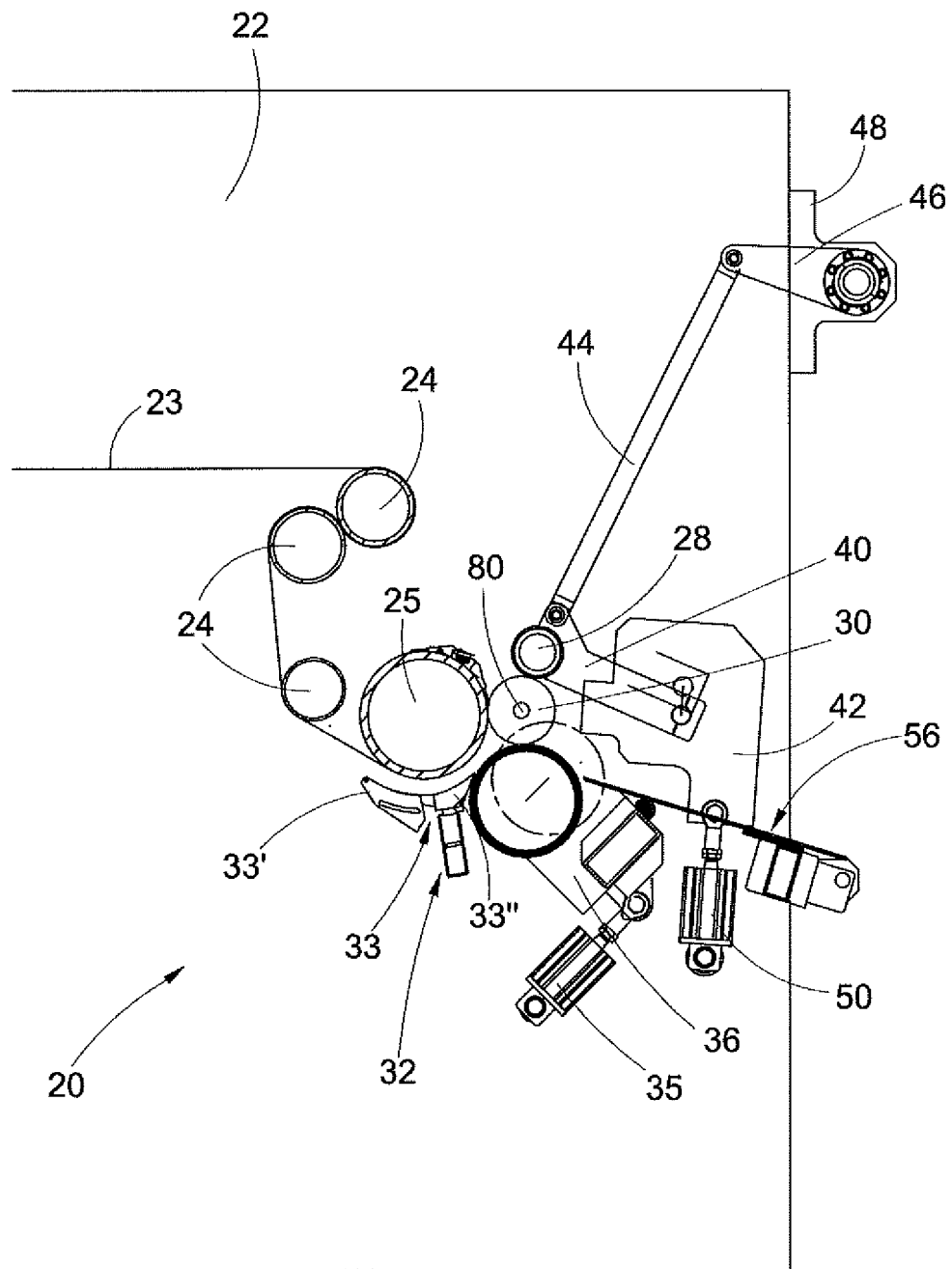


FIG. 2A

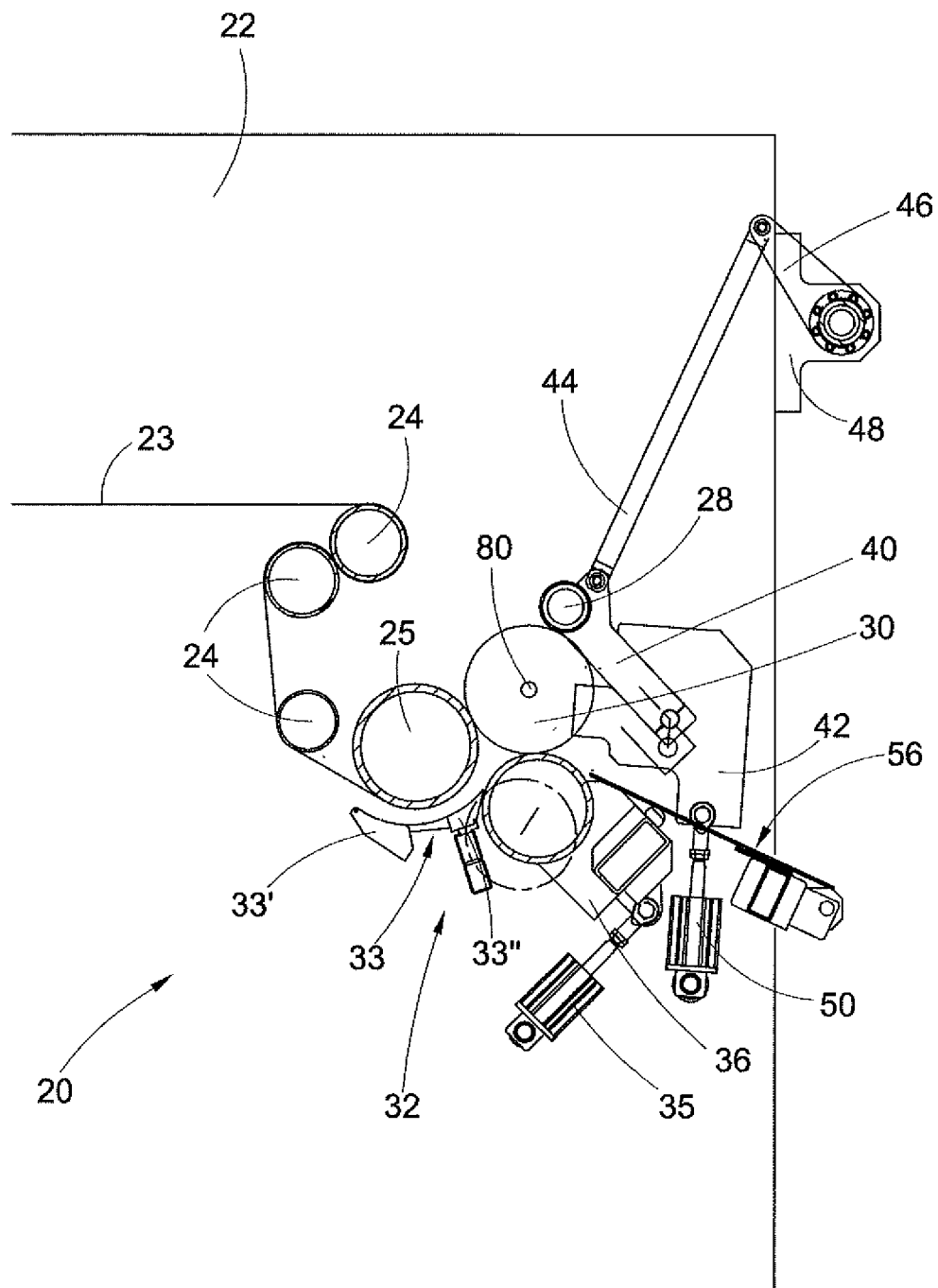


FIG. 2B

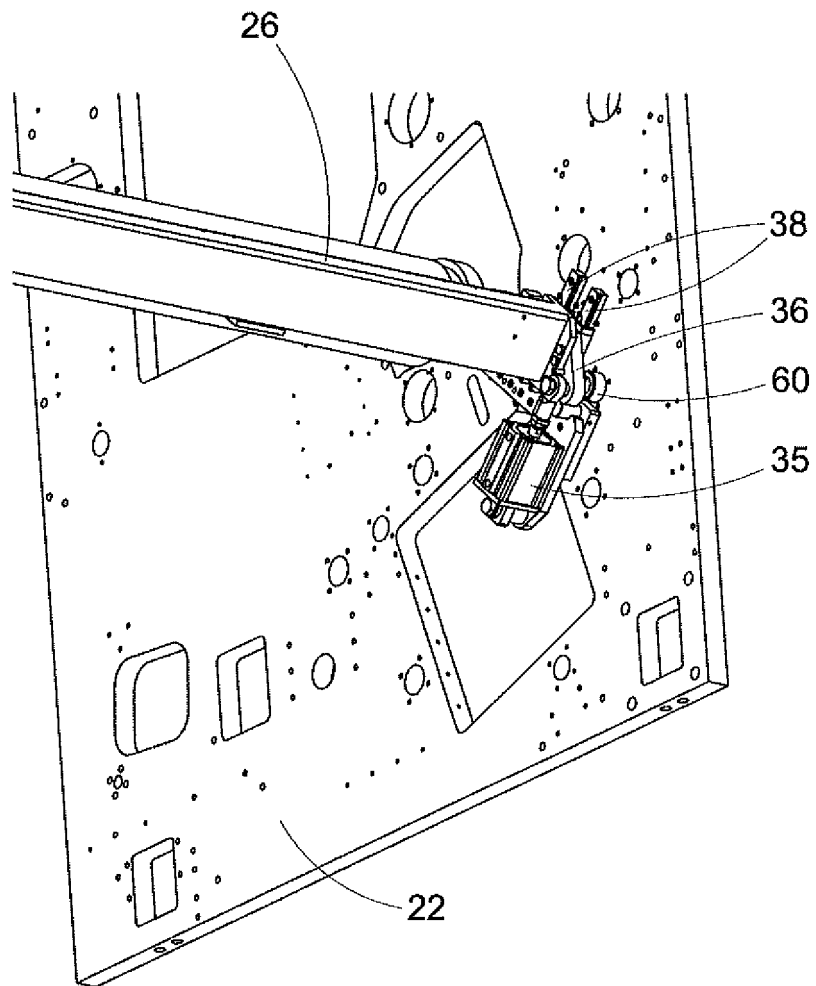


FIG. 3

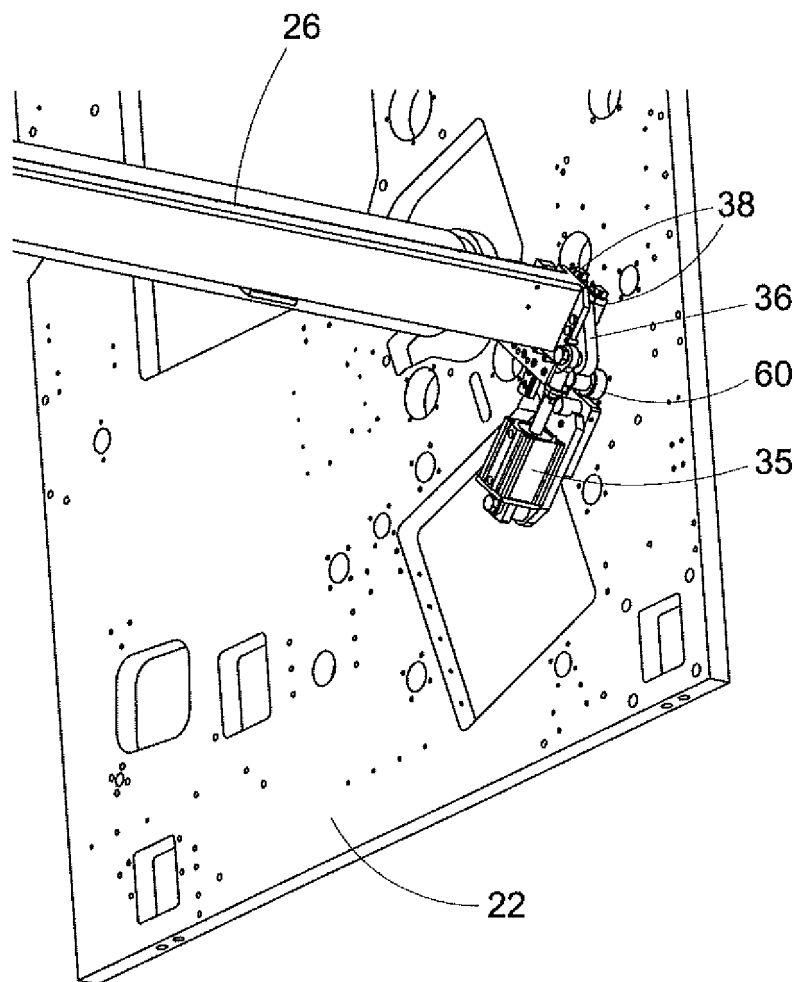


FIG. 4

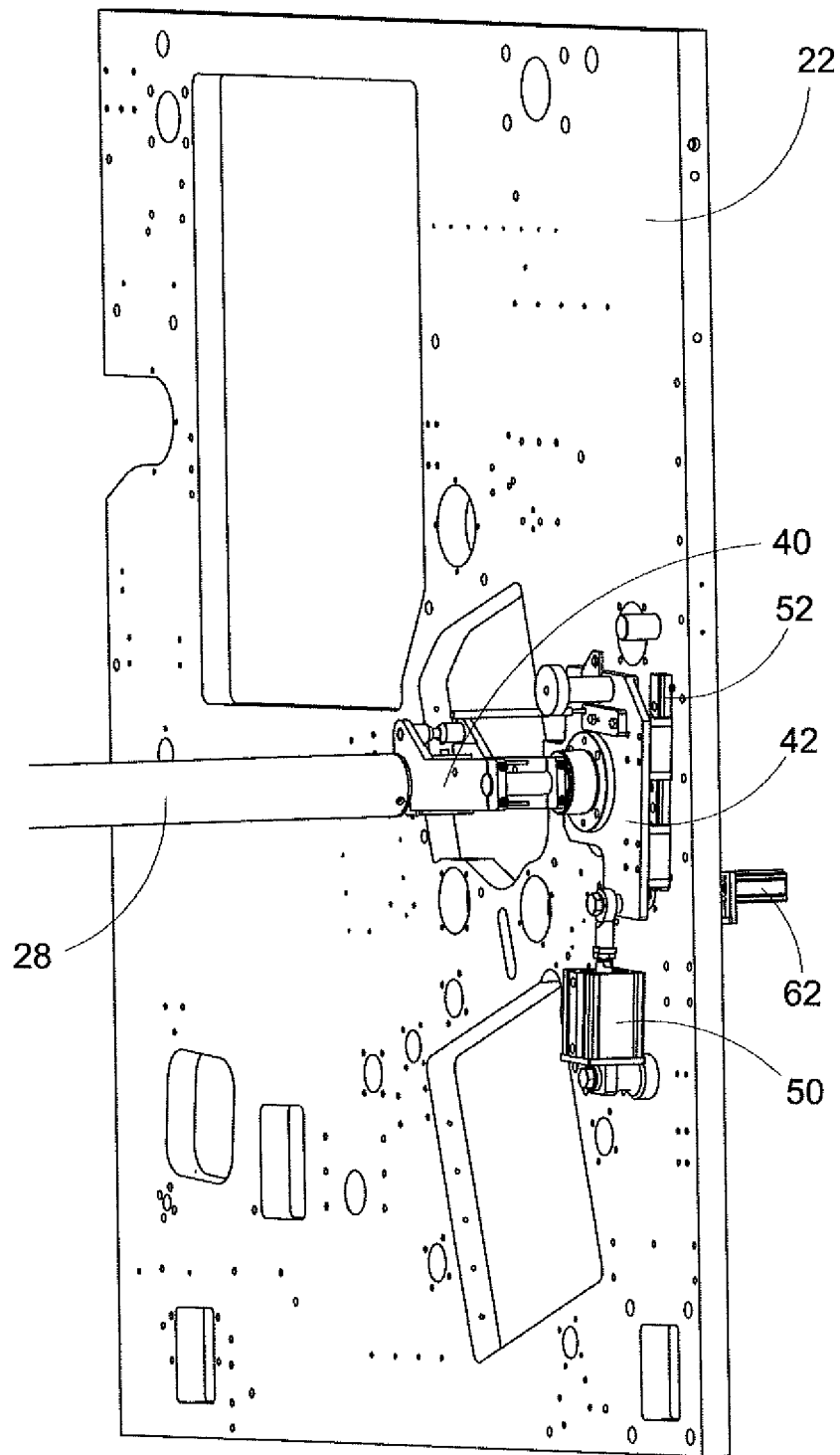


FIG. 5

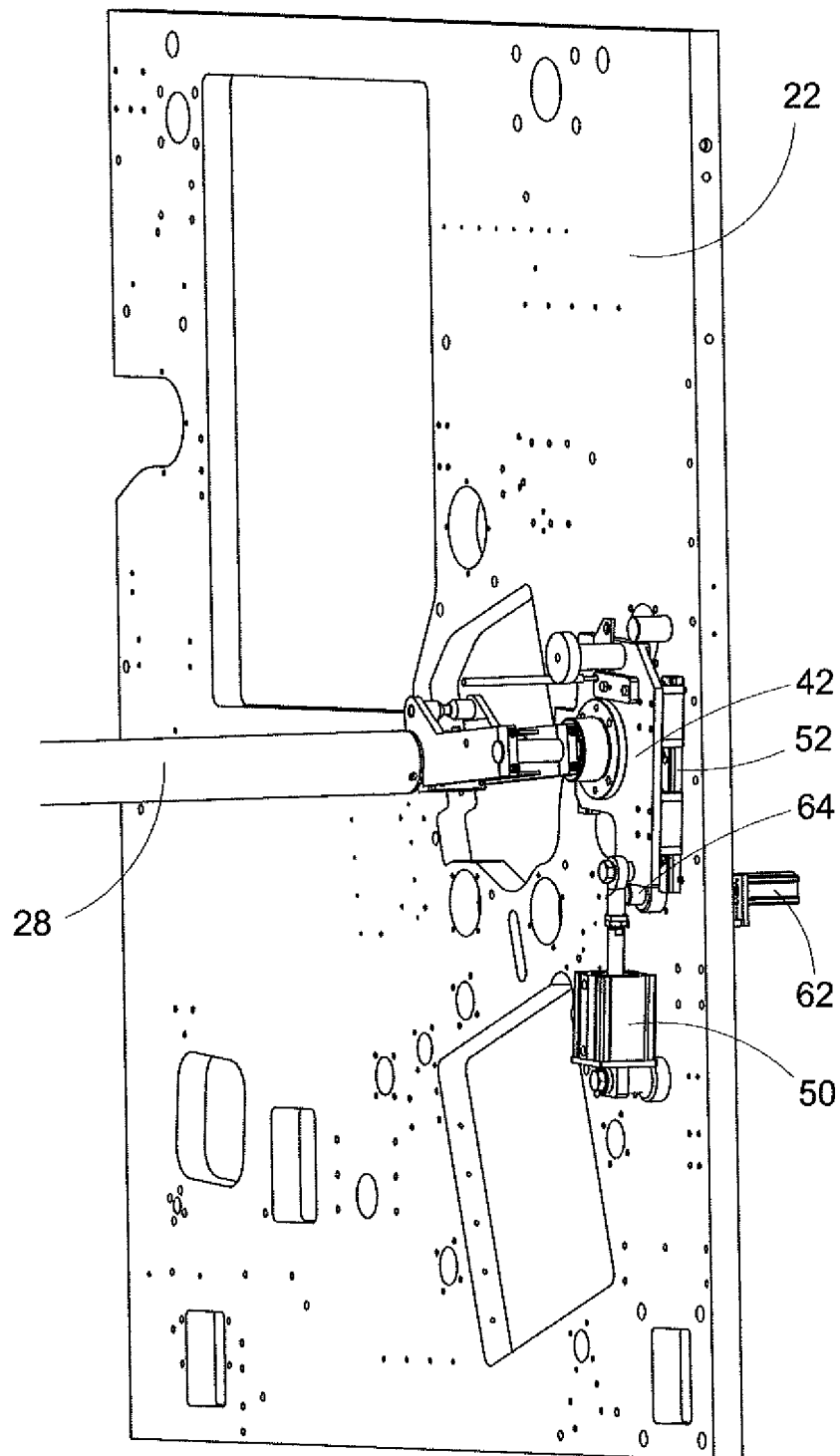


FIG. 6

FIG. 7

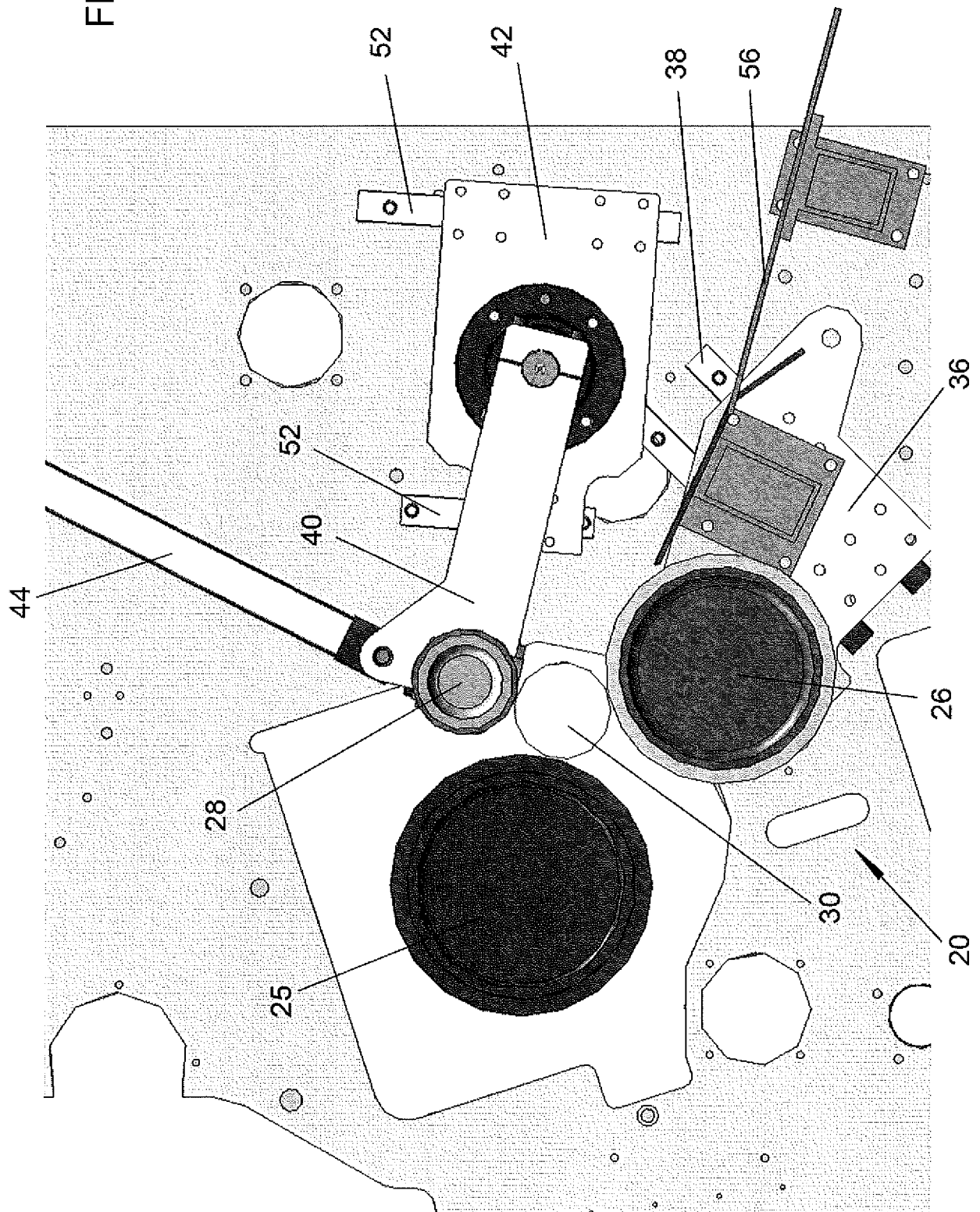


FIG. 8

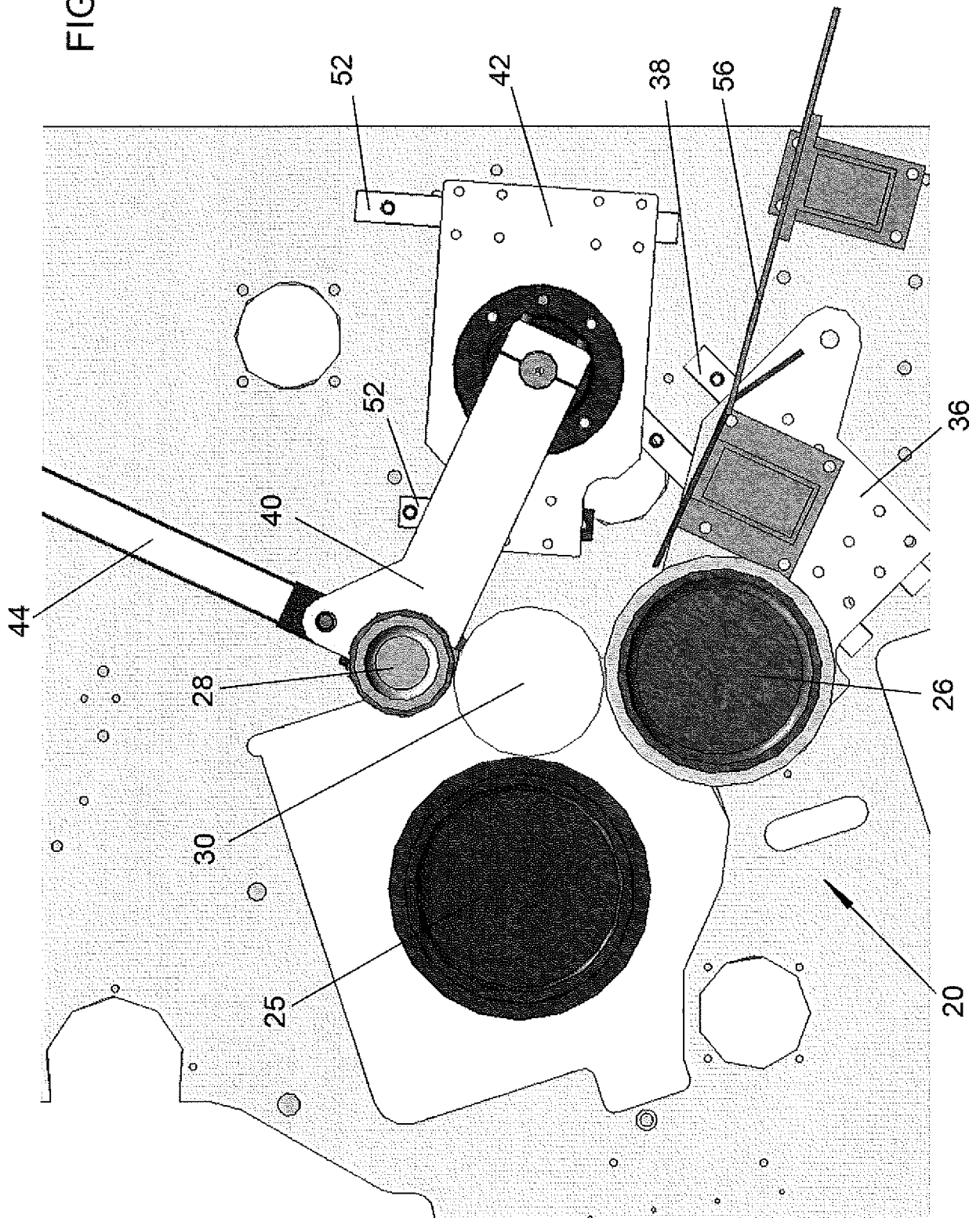
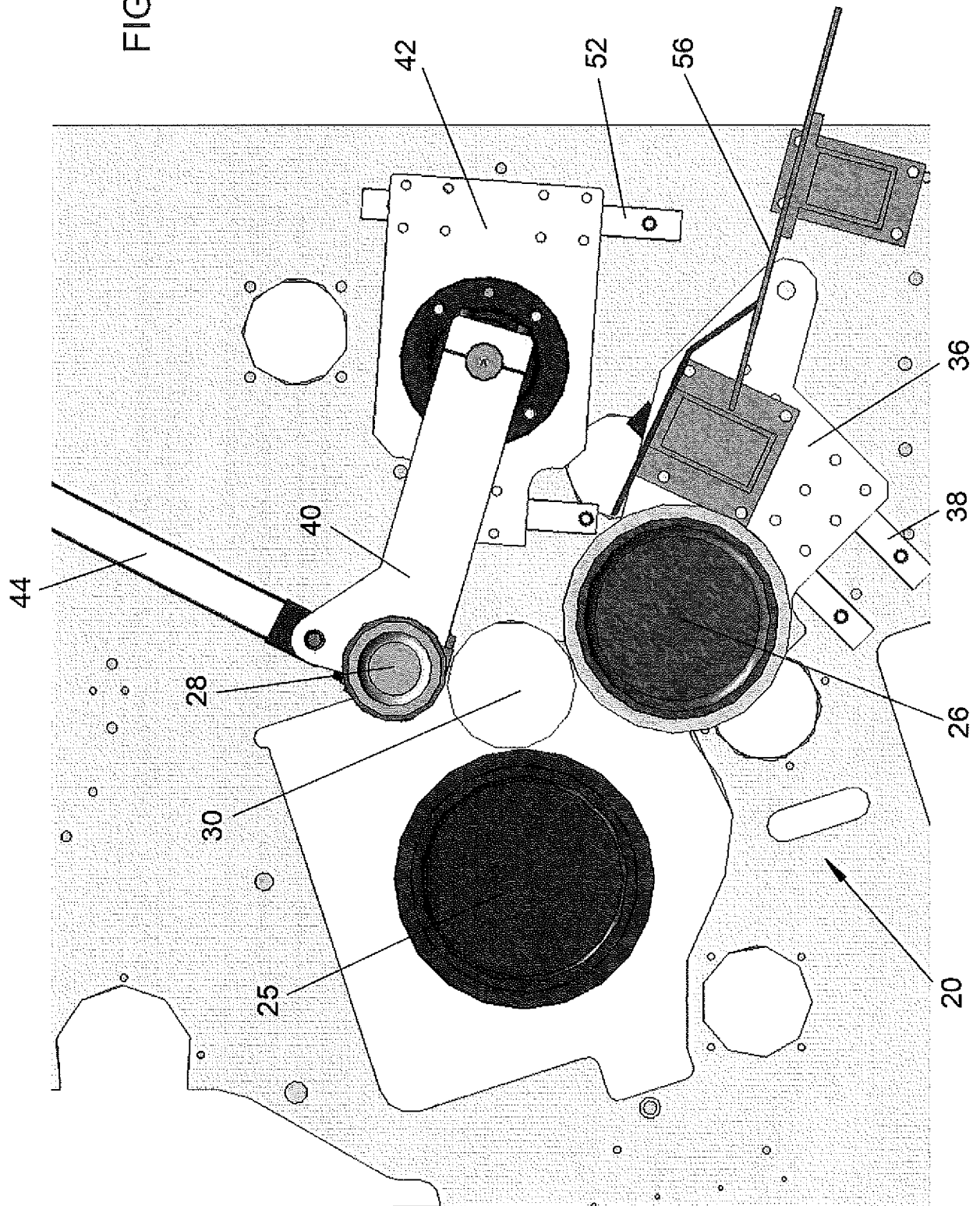
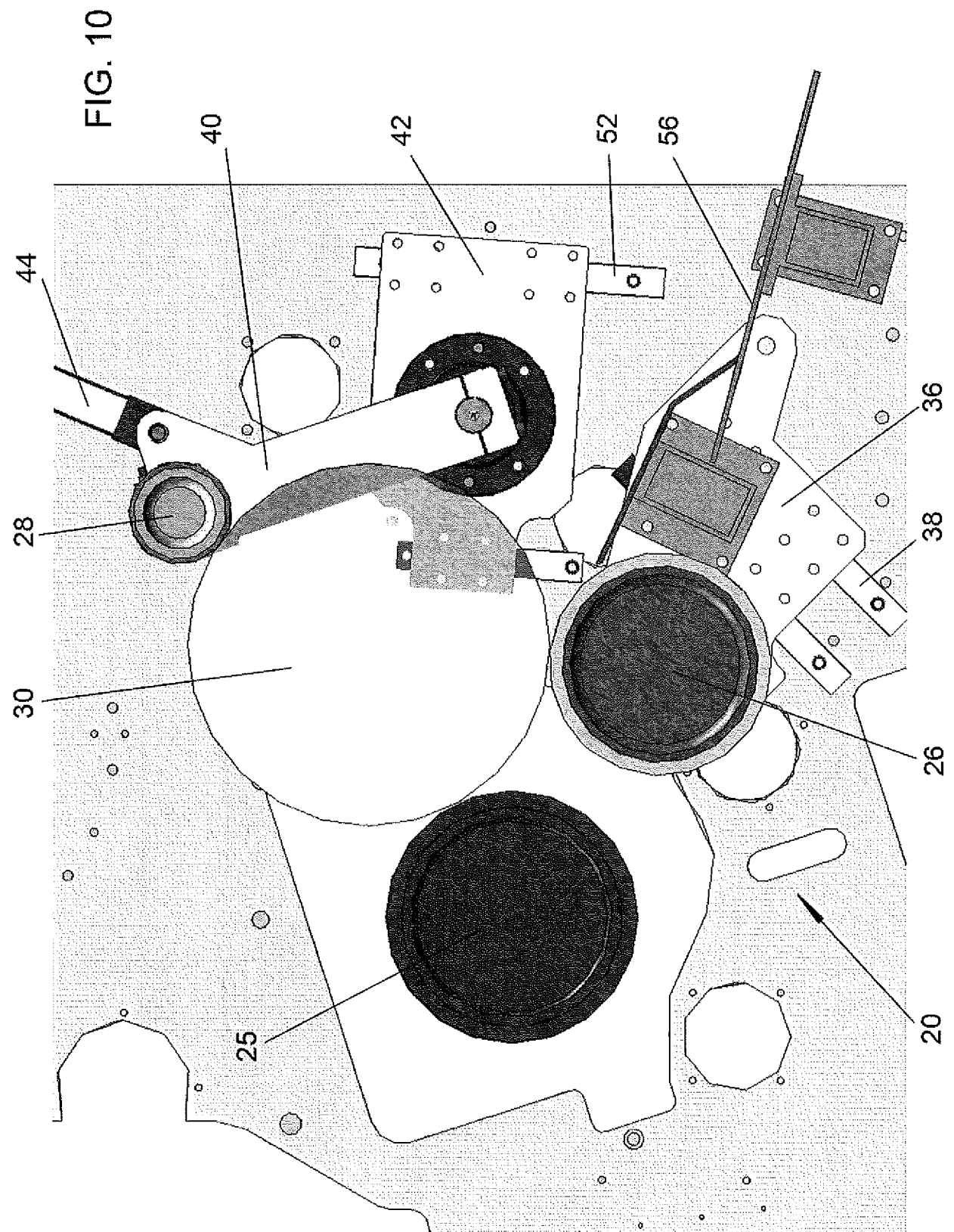


FIG. 9





REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 2014054407 A1 [0009]
- EP 1094021 A1 [0009] [0021]
- US 5505405 A [0009]
- US 20140054407 A1 [0020]