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(54) **WIREDRAWING LINE FOR WIREDRAWING A METAL WIRE, WIRE ROD OR STRIP**

DRAHTZIEHANLAGE ZUM DRAHTZIEHEN EINES METALLDRAHTES, EINES WALZDRAHTS ODER EINES STREIFENS

LIGNE DE TRÉFILAGE POUR LE TRÉFILAGE D'UN FIL MÉTALLIQUE, D'UN FIL MACHINE OU D'UNE BANDE

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Description

TECHNICAL FIELD

[0001] The present invention relates to a wiredrawing line for wiredrawing a metal wire, wire rod or strip.

BACKGROUND ART

[0002] As it is known, a wiredrawing line typically comprises, in the following order, a wiredrawing machine, which is designed to carry out a constant-volume deformation on a metal wire by drawing it through a sequence of dies in order to obtain a wire with a smaller cross-section, an annealing furnace, which carries out a thermal treatment on the hard-drawn wire delivered by the wiredrawing machine in order to recover at least part of the resistance and ductility features of the metal making up the wire, and a spooler to wind the annealed wire around a spool. Sometimes the annealing furnace is absent or not used, so as to obtain, at the end of the process, spools with a simple hard-drawn wire.

[0003] If the wiredrawing line is a multi-wire line, then it comprises different spoolers provided with respective spools or it comprises a collection creel comprising different spools.

[0004] The wiredrawing machine comprises a plurality of drawing rings and the annealing furnace comprises a plurality of idler rollers and at least one drawing ring. The drawing rings, the spools of the spooler and, if provided, the idler rollers are moved, by means of suitable transmission systems, by induction motors. Each one of these motors is controlled by a respective drive. If the wiredrawing line is used to draw wires with a large diameter, the motors coupled with the drawing rings have a great power, for example up to 80 KW and, as a consequence, the relative drives are large and dissipate a lot of heat.

[0005] In order to make the designing simpler and the air cooling easier, all drives are housed in one single box arranged on the outside of the wiredrawing line, namely resting on the ground close to the wiredrawing line. The drives comprise respective DC/AC inverters, which are supplied with power by a power supply means housed in the external box. Each drive is connected to the respective motor by means of a respective shielded power cable.

[0006] However, the presence of the external box has clear drawbacks. First of all, the external box has a large imprint on the ground, which complicates the logistics of the site where the wire drawing line is installed. Furthermore, the power cables are very long (namely, different metres long), so as to cause power losses and, in the special case of use of AC motors, remarkable electromagnetic troubles. Finally, the existence of the external box, which must be installed separately from the other parts of the wiredrawing line, increases building and installation costs of the entire line, as suitable channels or conduits must be built and installed in order to allow the cables to go from the external box to the wiredrawing line.

DISCLOSURE OF INVENTION

[0007] The object of the present invention is to provide a wiredrawing line having an electric architecture that is not affected by the aforementioned drawbacks and, at the same time, can be obtained in a simple and low-cost manner.

[0008] According to the present invention, there is provided a wiredrawing line for wiredrawing a metal wire, wire rod or strip according to the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The present invention will now be described with reference to the accompanying drawings, which show a nonlimiting embodiment thereof, wherein:

- figures 1 and 2 show, according to two respective axonometric views, the first one being a substantially front view and the second one being a substantially rear view, a wiredrawing line according to the present invention;
- figure 3 shows, in a schematic manner, the general electric architecture of the wiredrawing line of figures 1 and 2;
- figure 4 shows, according to a substantially rear axonometric view, the wiredrawing line according to a non-claimed embodiment of the present disclosure, and
- figure 5 shows, in a schematic manner, the general electric architecture of the wiredrawing line of figure 4.

BEST MODE FOR CARRYING OUT THE INVENTION

[0010] In figures 1 and 2, number 1 generically indicates, as a whole, a multi-wire wiredrawing line according to the present invention. The wiredrawing line 1 comprises, arranged in the following order according to a wiredrawing direction T, a multi-wire wiredrawing machine 2, which receives a plurality of metal wires and carries out a wiredrawing thereof so as to reduce their cross-section, an annealing furnace 3, which receives hard-drawn wires from the wiredrawing machine 2 and carries out a direct current resistance annealing of the wires, and a spooler 4, which is designed to wind the annealed wires in respective spools. The annealing furnace 3 comprises a control board 5, which houses known electric apparatuses used to generate the so-called annealing voltage. The wiredrawing line 1 is shown not in use, namely it is shown without raw wires at the input of the wiredrawing machine 2 and without the annealed wires at the output 3a (figure 1) of the annealing furnace 3, namely at the inlet 4a (figure 2) of the spooler 4.

[0011] The wiredrawing machine 2 comprises a plurality of drawing rings 6 (figure 1), which rotate in a synchronized manner so as to draw the wires through a plurality of dies 7. The drawing rings 6 are caused to rotate by one or more induction motors 8 (in the example of figure 1 there are three of them) by means of a gear transmission system, which is known per se and, therefore, it is not shown in the figures. Part of each one of the motors 8 projects from a rear side 12 of the wiredrawing machine 2, namely from a side that is substantially parallel to the wiredrawing direction T, so as not to change the imprint of the wiredrawing machine 2 on the ground. The annealing furnace 3 and the spooler 4 comprise respective protection casings 9 and 10. The control board 5 is mounted on a lateral wall 11 of the protection casing 9, namely on a wall that is transverse to the wiredrawing direction T, so as not to change the imprint of the wiredrawing line 1 on the ground transversely to the wiredrawing direction T.

[0012] With reference now to figure 3, the annealing furnace 3 comprises, housed on the inside of its protection casing, two idler rollers 13, a drawing ring 14 and three induction motors 15, which are designed to cause the rotation of a respective one of said idler rollers 13 and drawing ring 14. The control board 5 houses a power supply stage 16, which is of a known type and is designed to turn a three-phase voltage Uac provided by a three-phase source 17 into a direct current intermediate-volt voltage Udc, and subsequent voltage transformation stages, which are known per se and are indicated, as a whole, with number 18, to turn the intermediate voltage Udc into a direct current low-volt voltage Uann to be applied to the wire for its annealing. The intermediate voltage Udc has an amplitude ranging from 500 to 1000 V. The annealing voltage Uann has an amplitude that can be modulated in a known manner in an interval ranging from 0 to 110 V. The maximum level of the annealing voltage Uann depends on the type of metal of the wires to be annealed, on the geometry of the annealing furnace 3 and on the maximum feeding speed of the wires in the wiredrawing line 1.

[0013] With reference again to figure 3, the spooler 4 comprises, housed on the inside of its protection casing 10, a plurality of spools 19, only two of them being shown in the figure for the sake of simplicity, and a plurality of induction motors 20, each designed to cause the rotation of a respective spool 19. The motors 8, 15 and 20 are controlled by respective drives 21, 22 and 23, each one of them being of the type comprising at least one DC/AC inverter.

[0014] With reference to figures 2 and 3, according to the present invention, the drives 21, 22 and 23 are mounted on board the wiredrawing line 1 - in particular on board the respective motors 8, 15 and 20 - and are supplied with power by a single direct current voltage bus, or simply DC bus 24 (figure 3), which is connected to the output of the power supply stage 16 and is mounted along - and on board - the wiredrawing line 1 so as to be able to reach all the drives 21-23. Figure 2 only shows the motors 8 and the drives 21 of the wiredrawing machine 2.

[0015] With reference to figure 3, the DC bus 24 comprises a first part mounted along the wiredrawing machine 2, a second part mounted along the annealing furnace 3 and a third part mounted along the spooler 4. In this way, the power cables (not shown) connecting the drives 21, 22 and 23 to the respective motors 8, 15 and 20 are very short and do not need a special shielding. The drives 21-23 are controlled, by means of a communication bus 25 mounted along - and on board - the wiredrawing line 1, by a control unit 26, which is mounted inside the control board 5 of the annealing furnace 3.

[0016] Therefore, the overall imprint of the wiredrawing line 1 on the ground, in a direction that is transverse to the wiredrawing direction T, is basically defined by the depth of the annealing furnace 3 (figure 2).

[0017] In the hypothesis of using motors 8, 15 and 20 with powers that are smaller than or equal to 40 KW, the drives 21-23 are, for example, of the type sold by Siemens under the name SINAMICS G120D.

[0018] According to a further embodiment of the present invention that is not shown herein, the control unit 26 is mounted inside the so-called control pulpit of the wiredrawing line 1, namely the human-machine interface device that allows an operator to interact with the wiredrawing line 1 (for example to give start and stop orders) and is typically installed on a pedestal resting on the ground or an a hanging arm that is fixed to the frame of the wiredrawing machine 2 or of the annealing furnace 3.

[0019] According to a further embodiment of the present invention that is not shown herein, each motor 8, 15, 20 is liquid-cooled and the respective drive 21, 22, 23 has an outer casing that is integrated with the one of the motor 8, 15, 20 so as to use the same cooling circuit.

[0020] According to an embodiment, which is not part of the present invention and is shown in figures 4 and 5, wherein corresponding elements are indicated with the same numbers and abbreviations of figure 2 and 3, the drives 21 are housed in a small box 27 mounted on the rear side of the wiredrawing machine 2, next to the motors 8 (figure 4), the drives 22 are housed in the control board 5 and the drives 23 are housed in a further small box 28 mounted on a rear wall 29 of the protection casing 10 at a given height from the ground (figure 4). The DC bus 24 partially extends inside the control board 5 and the boxes 27 and 28.

[0021] The position in which the boxes 27 and 28 are installed requires them to have a degree of protection at least of level IP54. The power cables (not shown) connecting the drives 21, 22 and 23 to the respective motors 8, 15 and 20 are longer than the ones of the embodiment of figures 1-3. The box 27 is shaped so as not to project from the rear side 12 more than the motors 8 do. The base 30 of the spooler 4 normally is deeper, transversely to the wiredrawing direction T, than the upper part of the protection casing 10 where the rear wall 29 is located; the box 28 is shaped so as to remain within the depth of

the base 30. Therefore, the imprint of the wiredrawing line 1 on the ground is not influenced by the presence of the boxes 27 and 28.

[0022] Even though the invention described above specifically relates to a given embodiment, it should not be considered as merely limited to that embodiment, as its scope of protection comprises all those variants, changes or simplifications covered by the attached claims, such as for example:

- the use of a larger number of motors 8 for the wiredrawing machine 2 and, therefore, of a larger number of drives 21, for the purpose of increasing the production capacity of the line in terms of number and diameter of the wires to be drawn at the same time;
- the absence of the annealing furnace 3, in which case the control unit 26 is housed in the control pulpit;
- the implementation of the electric architecture described above in a wiredrawing line used for a metal wire rod or strip;
- the idler rollers 13 are not motor-driven, i.e. there are not the relative motors 15 and the relative drives 22; and
- the absence of the annealing furnace 3 and of the relative control board 5, i.e. the wiredrawing line 1 produces hard-drawn wires, in which case the power supply stage 16 is housed in a further small box mounted on the rear side 12 of the wiredrawing machine 2 or is housed in the box 27.

[0023] The main advantage of the wiredrawing line 1 described above is that of having a definitely smaller imprint on the ground compared to the existing lines with the same production capacity, since the drives of the motors are mounted on board the wiredrawing line and, therefore, there is no need for external boxes resting on the ground and used to hold the drives themselves. Furthermore, in case the wiredrawing line comprises an annealing furnace with the relative control board, the direct current intermediate-volt voltage generated inside the control board can be used to supply power to the inverters of the drives, by means of a direct current bus running along the wiredrawing line 1. Finally, the presence of the drives on board the wiredrawing line allows a significant reduction in the length of the cables connecting the drives and the motors, especially in case the drives are directly mounted on the respective motors.

Claims

1. A wiredrawing line for wiredrawing at least one metal wire, wire rod or strip, the wiredrawing line (1) comprising:

- a plurality of rotary organs (6, 13, 14, 19) acting upon said metal wire, wire rod or strip during the working process of the wiredrawing line (1);
- a plurality of induction motors (8, 15, 20), each being designed to cause the rotation of one or more of said rotary organs (6, 13, 14, 19);
- a plurality of drives (21-23), each being designed to control a respective one of said motors (8, 15, 20) and comprising at least one DC/AC inverter; and
- power supply means (16) designed to generate a direct current intermediate-volt voltage (Udc) to supply said drives (21-23) with power;

the wiredrawing line (1) **being characterized in that** said drives (21-23) are mounted on board the respective motor (8, 15, 20) and **in that** it comprises a single direct current voltage bus (24), which is connected to the output of said power supply means (16) and is mounted along the wiredrawing line (1) so as to supply all the drives (21-23) with said intermediate-volt voltage.

2. A wiredrawing line according to claim 1 and comprising a wiredrawing machine (2) and an annealing furnace (3) connected to the output of the wiredrawing machine (2); said power supply means (16) being mounted on board the annealing furnace (3).

3. A wiredrawing line according to claim 2, wherein said annealing furnace (3) comprises a first protection casing (9) and a control board (5), which is mounted on a first wall (11) of the first protection casing (9) and comprises said power supply means (16) and, connected to the output thereof, voltage transformation means (18) to supply a direct current low-volt voltage (Uann), which is used for the annealing.

4. A wiredrawing line according to claim 3, wherein said plurality of rotary organs (6, 13, 14, 19) comprises at least one second rotary organ (14) that is part of said annealing furnace (3), said plurality of motors (8, 15, 20) comprises at least one second motor (15) associated with the second rotary organ (13, 14), and said drives (21-23) comprise at least one second drive (22) associated with the second motor (15) and housed in said control board (5).

5. A wiredrawing line according to any of the claims from 1 to 4 and comprising a communication bus (25), which is mounted along the wiredrawing line (1), a control pulpit, and control means (26), which are housed in the control pulpit and are designed to control said plurality of drives (21-23) by means of said communication bus (25).

6. A wiredrawing line according to claim 3 or 4 and comprising a communication bus (25), which is mounted along the wiredrawing line (1), and control means (26), which are housed in said control board (5) and are designed to control said plurality of drives (21-23)

by means of said communication bus (25).

7. A wiredrawing line according to any of the claims from 1 to 6 and comprising a wiredrawing machine (2); said plurality of rotary organs (6, 13, 14, 19) comprising first drawing organs (6) that are part of the wiredrawing machine (2), said plurality of motors (8, 15, 20) comprising first motors (8) associated with the first rotary organs (6), said drives (21-23) comprising first drives (21) associated with the first motors (8); part of each one of said first motors (8) projecting from a rear side (12) of said wiredrawing machine (2) that is substantially parallel to a wiredrawing direction (T) to an extent that is such as not to change the imprint of the wiredrawing machine (2) on the ground.

8. A wiredrawing line according to claim 3 or 4, wherein said annealing furnace (3) is aligned with said wiredrawing machine (2) along a wiredrawing direction (T) and said first wall (11) is transverse to the wiredrawing direction (T) so that the installation of said control board (5) does not change the imprint of the wiredrawing line (1) on the ground transversely to the wiredrawing direction (T).

9. A wiredrawing line according to claim 1 and comprising a plurality of machines (2-4), each one of said rotary organs (6, 13, 14, 19) being part of a relative machine (2-4) and each drive (21-23) being mounted on board a relative machine (2-4) which comprises the rotary organ (6, 13, 14, 19) associated, by means of the relative motor (8, 15, 20), with the drive (21-23) itself.

10. A wiredrawing line according to claim 9, wherein said plurality of machines (2-4) comprise a wiredrawing machine (2), an annealing furnace (3) connected to the output of the wiredrawing machine (2) and a spooler (4) connected to the output of the annealing furnace (3).

Patentansprüche

1. Drahtziehlinie zum Drahtziehen von mindestens einem Metalldraht, Walzdraht oder Band, wobei die Drahtziehlinie (1) umfasst:

- eine Vielzahl von Rotationsorganen (6, 13, 14, 19), die während des Arbeitsprozesses der Drahtziehlinie (1) auf den Metalldraht, die Drahtstange oder das Metallband einwirken;
- eine Vielzahl von Induktionsmotoren (8, 15, 20), von denen jeder ausgelegt ist, die Rotation eines oder mehrerer der besagten Rotationsorgane (6, 13, 14, 19) zu bewirken;
- eine Vielzahl von Antrieben (21-23), von denen jeder ausgelegt ist, jeweils einen der besagten Motoren (8, 15, 20) zu steuern, und mindestens einen Gleichstrom-Wechselrichter umfasst; und
- Stromversorgungsmittel (16), die ausgelegt sind, eine Gleichstrom-Zwischenvolt-Spannung (Udc) zu erzeugen, um die besagten Antriebe (21-23) mit Strom zu versorgen;

wobei die Drahtziehlinie (1) **dadurch gekennzeichnet ist, dass** die besagten Antriebe (21-23) an Bord des jeweiligen Motors (8, 15, 20) montiert sind und dass sie einen einzigen Gleichspannungsbus (24) umfasst, welcher mit dem Ausgang der besagten Stromversorgungsmittel (16) verbunden ist und entlang der Drahtziehlinie (1) montiert ist, um alle Antriebe (21-23) mit der besagten Zwischenspannung zu versorgen.

2. Drahtziehlinie nach Anspruch 1 und umfassend eine Drahtziehmaschine (2) und einen Glühofen (3), der an den Ausgang der Drahtziehmaschine (2) angeschlossen ist; wobei die besagten Stromversorgungsmittel (16) an Bord des Glühofens (3) montiert sind.

3. Drahtziehlinie nach Anspruch 2, wobei der besagte Glühofen (3) ein erstes Schutzgehäuse (9) und eine Steuerplatine (5) aufweist, welche an einer ersten Wand (11) des ersten Schutzgehäuses (9) montiert ist und die besagten Stromversorgungsmittel (16) und, mit deren Ausgang verbunden, Spannungstransformationsmittel (18) umfasst, um eine Gleichstrom-Niedervolt-Spannung (Uann) zu liefern, welche für das Glühen verwendet wird.

4. Drahtziehlinie nach Anspruch 3, wobei die besagte Vielzahl von Rotationsorganen (6, 13, 14, 19) mindestens ein zweites Rotationsorgan (14) umfasst, das Teil des besagten Glühofens (3) ist, wobei die besagte Vielzahl von Motoren (8, 15, 20) mindestens einen zweiten Motor (15) umfasst, der mit dem zweiten Rotationsorgan (13, 14) verbunden ist, und die besagten Antriebe (21-23) mindestens einen zweiten Antrieb (22) umfassen, der mit dem zweiten Motor (15) verbunden und in der Steuerplatine (5) untergebracht ist.

5. Drahtziehlinie nach einem der Ansprüche 1 bis 4 und umfassend einen Kommunikationsbus (25), welcher entlang der Drahtziehlinie (1) montiert ist, eine Steuerkanzel und Steuermittel (26), welche in der Steuerkanzel untergebracht sind und dazu ausgelegt sind, die besagte Vielzahl von Antrieben (21-23) mittels des besagten Kommunikationsbusses (25) zu steuern.

6. Drahtziehlinie nach Anspruch 3 oder 4 und umfassend einen Kommunikationsbus (25), welcher ent-

lang der Drahtziehlinie (1) montiert ist, und Steuermittel (26), welche in der Steuerplatine (5) untergebracht sind und dazu ausgelegt sind, die besagte Vielzahl von Antrieben (21-23) mittels des besagten Kommunikationsbusses (25) zu steuern.

7. Drahtziehlinie nach einem der Ansprüche 1 bis 6 und umfassend eine Drahtziehmaschine (2); wobei die besagte Vielzahl von Rotationsorganen (6, 13, 14, 19) erste Ziehorgane (6) umfasst, die Teil der Drahtziehmaschine (2) sind, wobei die besagte Vielzahl von Motoren (8, 15, 20) erste Motoren (8) umfasst, die mit den ersten Rotationsorganen (6) verbunden sind, wobei die besagten Antriebe (21-23) erste Antriebe (21) umfassen, die mit den ersten Motoren (8) verbunden sind; wobei ein Teil jedes der besagten ersten Motoren (8) von einer Rückseite (12) der besagten Drahtziehmaschine (2), die im Wesentlichen parallel zu einer Drahtziehrichtung (T) ist, in einem Ausmaß vorsteht, das so beschaffen ist, dass es den Abdruck der Drahtziehmaschine (2) auf dem Boden nicht verändert.

8. Drahtziehlinie nach Anspruch 3 oder 4, wobei der besagte Glühofen (3) mit der besagten Drahtziehmaschine (2) entlang einer Drahtziehrichtung (T) ausgerichtet ist und die besagte erste Wand (11) quer zur Drahtziehrichtung (T) verläuft, so dass die Installation der besagten Steuerplatine (5) den Abdruck der Drahtziehlinie (1) auf dem Boden quer zur Drahtziehrichtung (T) nicht verändert.

9. Drahtziehlinie nach Anspruch 1 und umfassend eine Vielzahl von Maschinen (2-4), wobei jedes der besagten Rotationsorgane (6, 13, 14, 19) Teil einer entsprechenden Maschine (2-4) ist und jeder Antrieb (21-23) an Bord einer entsprechenden Maschine (2-4) montiert ist, welche das Rotationsorgan (6, 13, 14, 19) umfasst, das über den entsprechenden Motor (8, 15, 20) mit dem Antrieb (21-23) selbst verbunden ist.

10. Drahtziehlinie nach Anspruch 9, wobei die besagte Vielzahl von Maschinen (2-4) eine Drahtziehmaschine (2), einen Glühofen (3), der mit dem Ausgang der Drahtziehmaschine (2) verbunden ist, und einen Spuler (4), der mit dem Ausgang des Glühofens (3) verbunden ist, umfasst.

Revendications

1. Ligne de tréfilage pour tréfiler au moins un fil métallique, un fil machine ou une bande, la ligne de tréfilage (1) comprenant :

- une pluralité d'organes rotatifs (6, 13, 14, 19) agissant sur ledit fil métallique, le fil machine ou la bande pendant le processus d'usinage de la ligne de tréfilage (1) ;
- une pluralité de moteurs à induction (8, 15, 20), chacun étant conçu pour provoquer la rotation des un ou plusieurs desdits organes rotatifs (6, 13, 14, 19) ;
- une pluralité d'entraînements (21-23), chacun étant conçu pour commander un moteur respectif desdits moteurs (8, 15, 20) et comprenant au moins un onduleur courant continu/courant alternatif ; et
- un moyen d'alimentation électrique (16) conçu pour générer une tension intermédiaire de courant continu (Udc) pour alimenter lesdits entraînements (21-23) avec l'énergie ;

la ligne de tréfilage (1) étant **caractérisée en ce que** lesdits entraînements (21-23) sont montés sur le moteur (8, 15, 20) respectif et **en ce qu'**elle comprend un seul bus de tension de courant continu (24) qui est raccordé à la sortie dudit moyen d'alimentation électrique (16) et est monté le long de la ligne de tréfilage (1) afin d'alimenter tous les entraînements (21-23) avec ladite tension intermédiaire.

2. Ligne de tréfilage selon la revendication 1 et comprenant une machine de tréfilage (2) et un four de recuit (3) raccordé à la sortie de la machine de tréfilage (2) ; ledit moyen d'alimentation électrique (16) étant monté sur le four de recuit (3).

3. Ligne de tréfilage selon la revendication 2, dans laquelle ledit four de recuit (3) comprend un premier boîtier de protection (9) et un tableau de contrôle (5) qui est monté sur la première paroi (11) du premier boîtier de protection (9) et comprend ledit moyen d'alimentation électrique (16) et raccordé à sa sortie, un moyen de transformation de tension (18) pour fournir une basse tension de courant continu (Uann), qui est utilisée pour le recuit.

4. Ligne de tréfilage selon la revendication 3, dans laquelle ladite pluralité d'organes rotatifs (6, 13, 14, 19) comprend au moins un second organe rotatif (14) qui fait partie dudit four de recuit (3), ladite pluralité de moteurs (8, 15, 20) comprend au moins un second moteur (15) associé au second organe rotatif (13, 14) et lesdits entraînements (21-23) comprennent au moins un second entraînement (22) associé au second moteur (15) et logé dans ledit tableau de contrôle (5).

5. Ligne de tréfilage selon l'une quelconque des revendications 1 à 4 et comprenant un bus de communication (25) qui est monté le long de la ligne de tréfilage (1), un pupitre de commande et un moyen de commande (26) qui sont logés dans le pupitre de commande et sont conçus pour commander ladite

pluralité d'entraînements (21-23) au moyen dudit bus de communication (25).

6. Ligne de tréfilage selon la revendication 3 ou 4 et comprenant un bus de communication (25) qui est monté le long de la ligne de tréfilage (1), et des moyens de commande (26) qui sont logés dans ledit tableau de contrôle (5) et sont conçus pour commander ladite pluralité d'entraînements (21-23) au moyen dudit bus de communication (25).

7. Ligne de tréfilage selon l'une quelconque des revendications 1 à 6 et comprenant une machine de tréfilage (2) ; ladite pluralité d'organes rotatifs (6, 13, 14, 19) comprenant des premiers organes de traction (6) qui font partie de la machine de tréfilage (2), ladite pluralité de moteurs (8, 15, 20) comprenant des premiers moteurs (8) associés avec les premiers organes rotatifs (6), lesdits entraînements (21-23) comprenant des premiers entraînements (21) associés avec les premiers moteurs (8) ; une partie de chacun desdits premiers moteurs (8) faisant saillie d'un côté arrière (12) de ladite machine de tréfilage (2) qui est sensiblement parallèle à une direction de tréfilage (T) sur une étendue qui est telle qu'elle ne change pas l'empreinte de la machine de tréfilage (2) sur le sol.

8. Ligne de tréfilage selon la revendication 3 ou 4, dans laquelle ledit four de recuit (3) est aligné avec ladite machine de tréfilage (2) le long d'une direction de tréfilage (T) et ladite première paroi (11) est transversale par rapport à la direction de tréfilage (T) de sorte que l'installation dudit tableau de contrôle (5) ne change pas l'empreinte de la ligne de tréfilage (1) sur le sol transversalement par rapport à la direction de tréfilage (T).

9. Ligne de tréfilage selon la revendication 1 et comprenant une pluralité de machines (2-4), chacun desdits organes rotatifs (6, 13, 14, 19) faisant partie d'une machine (2-4) relative et chaque entraînement (21-23) étant monté à bord d'une machine (2-4) relative qui comprend l'organe rotatif (6, 13, 14, 19) associé, au moyen du moteur (8, 15, 20) relatif avec l'entraînement (21-23) lui-même.

10. Ligne de tréfilage selon la revendication 9, dans laquelle ladite pluralité de machines (2-4) comprend une machine de tréfilage (2), un four de recuit (3) raccordé à la sortie de la machine de tréfilage (2) et une bobineuse (4) raccordée à la sortie du four de recuit (3).

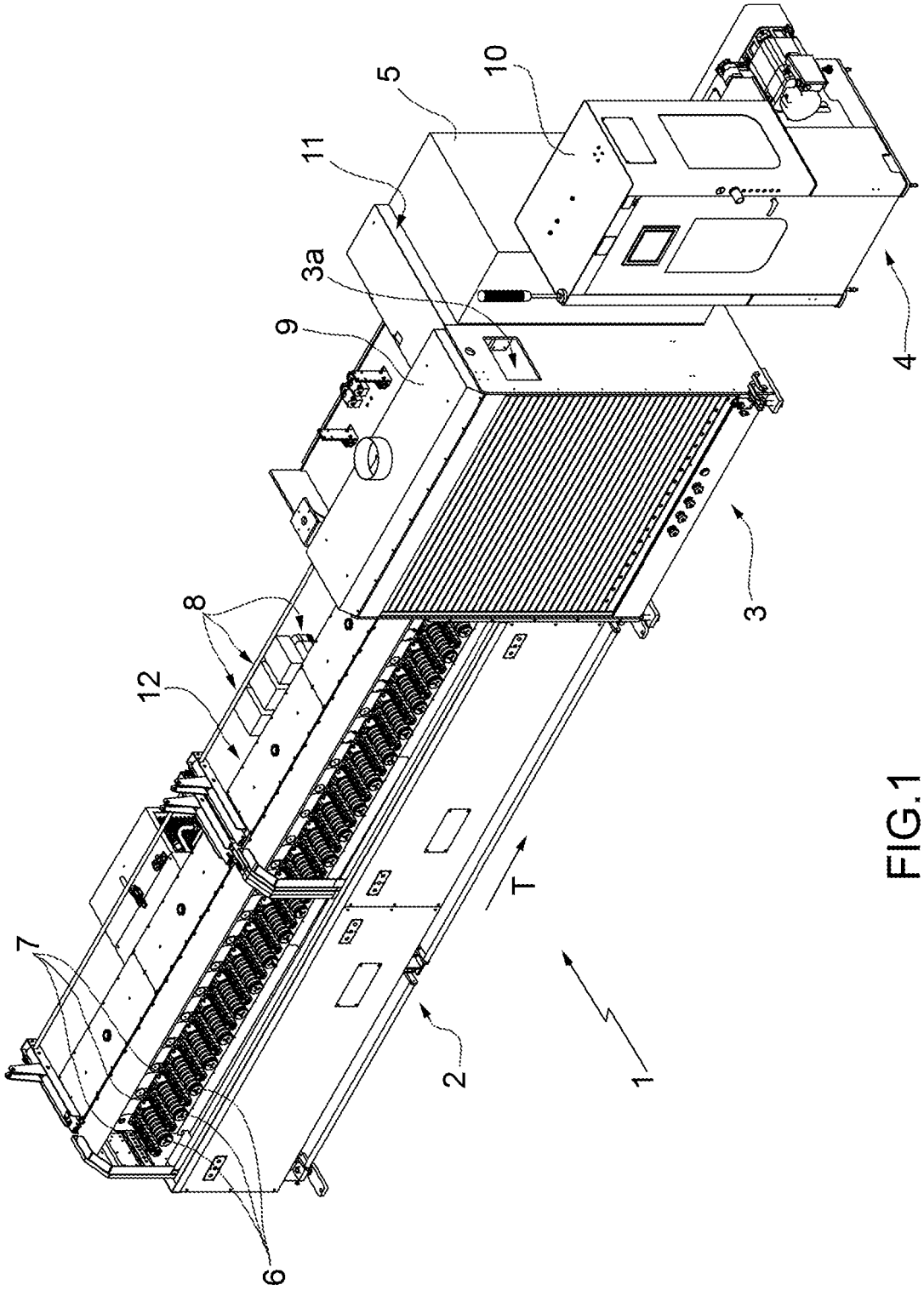


FIG.1

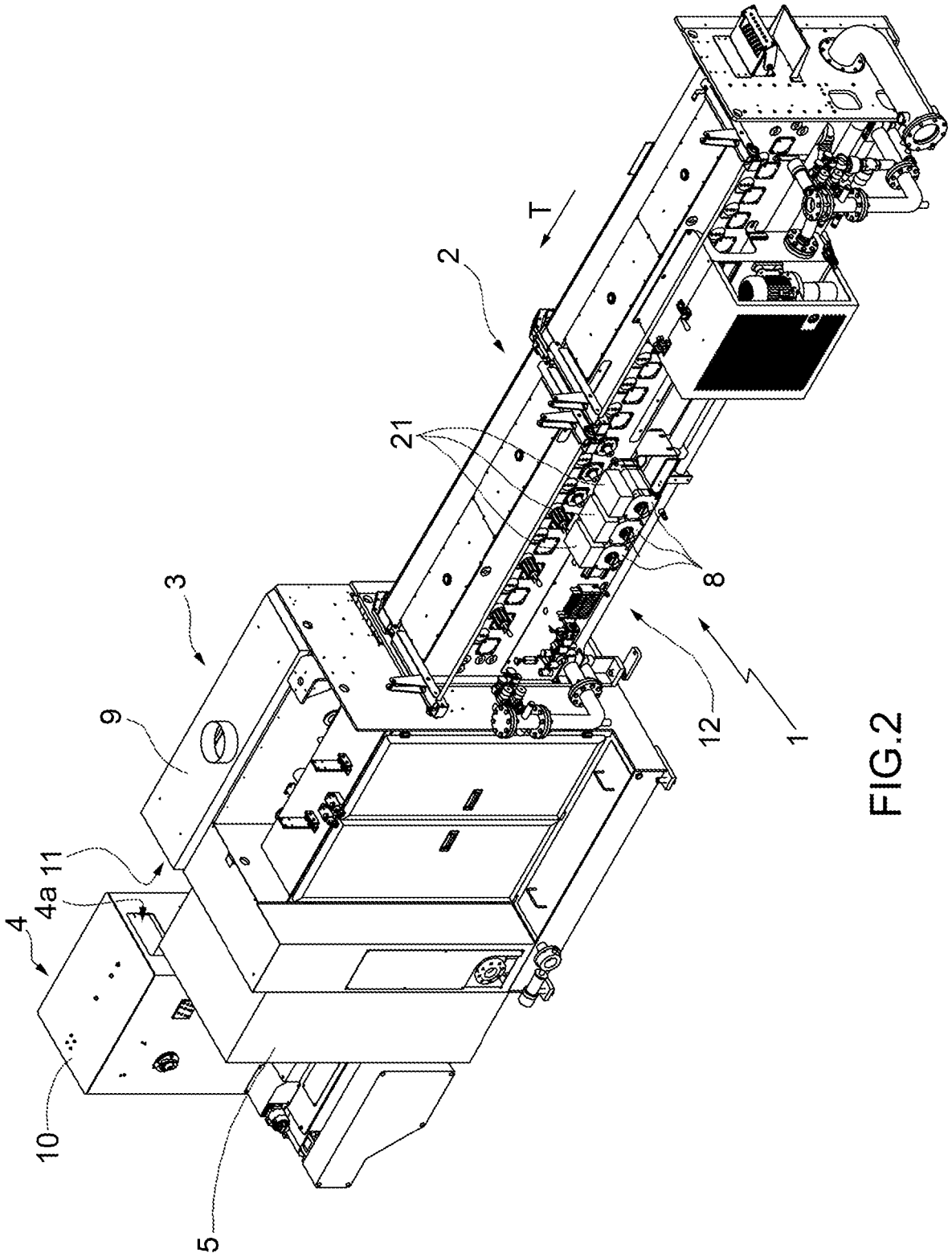


FIG.2

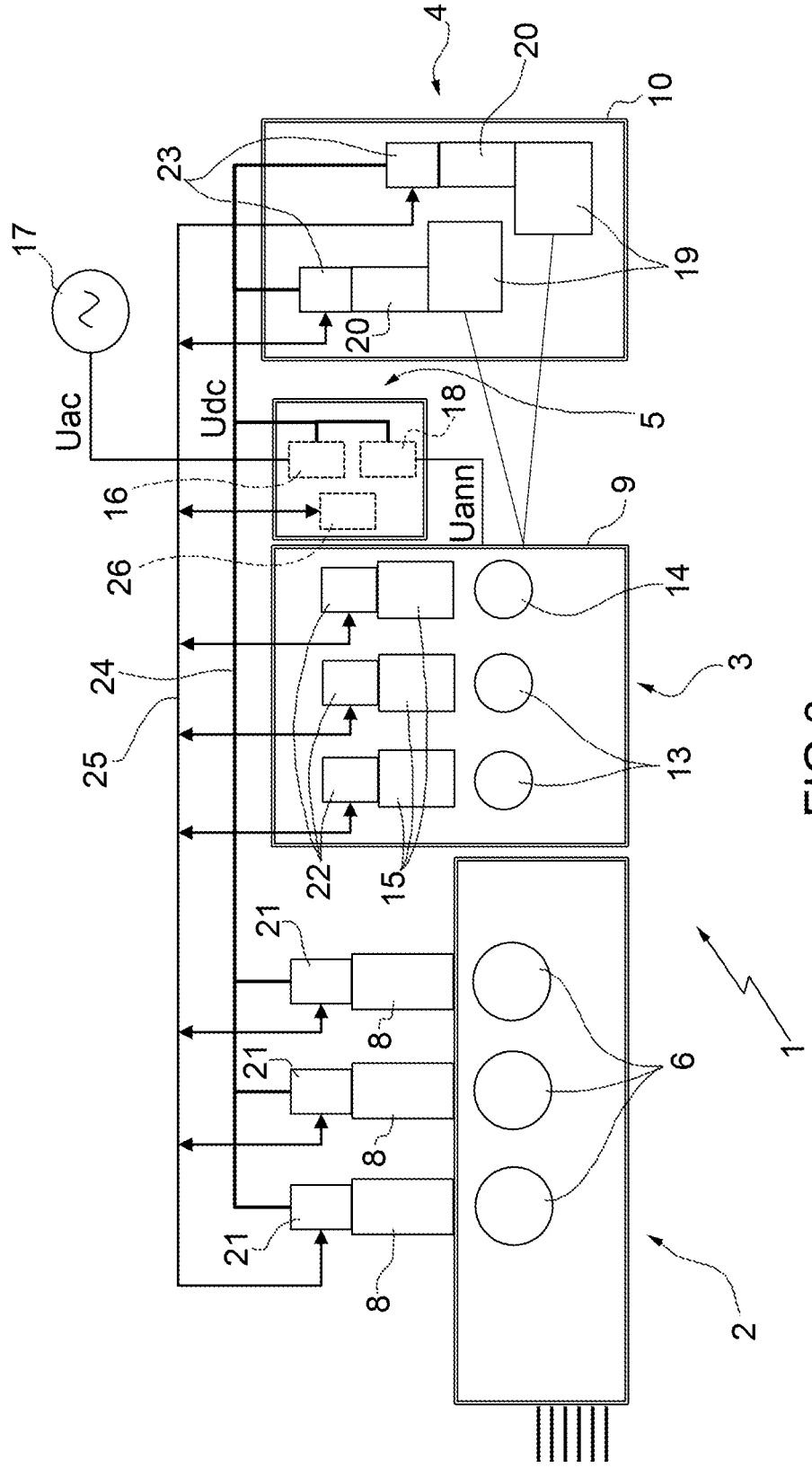

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FIG.3

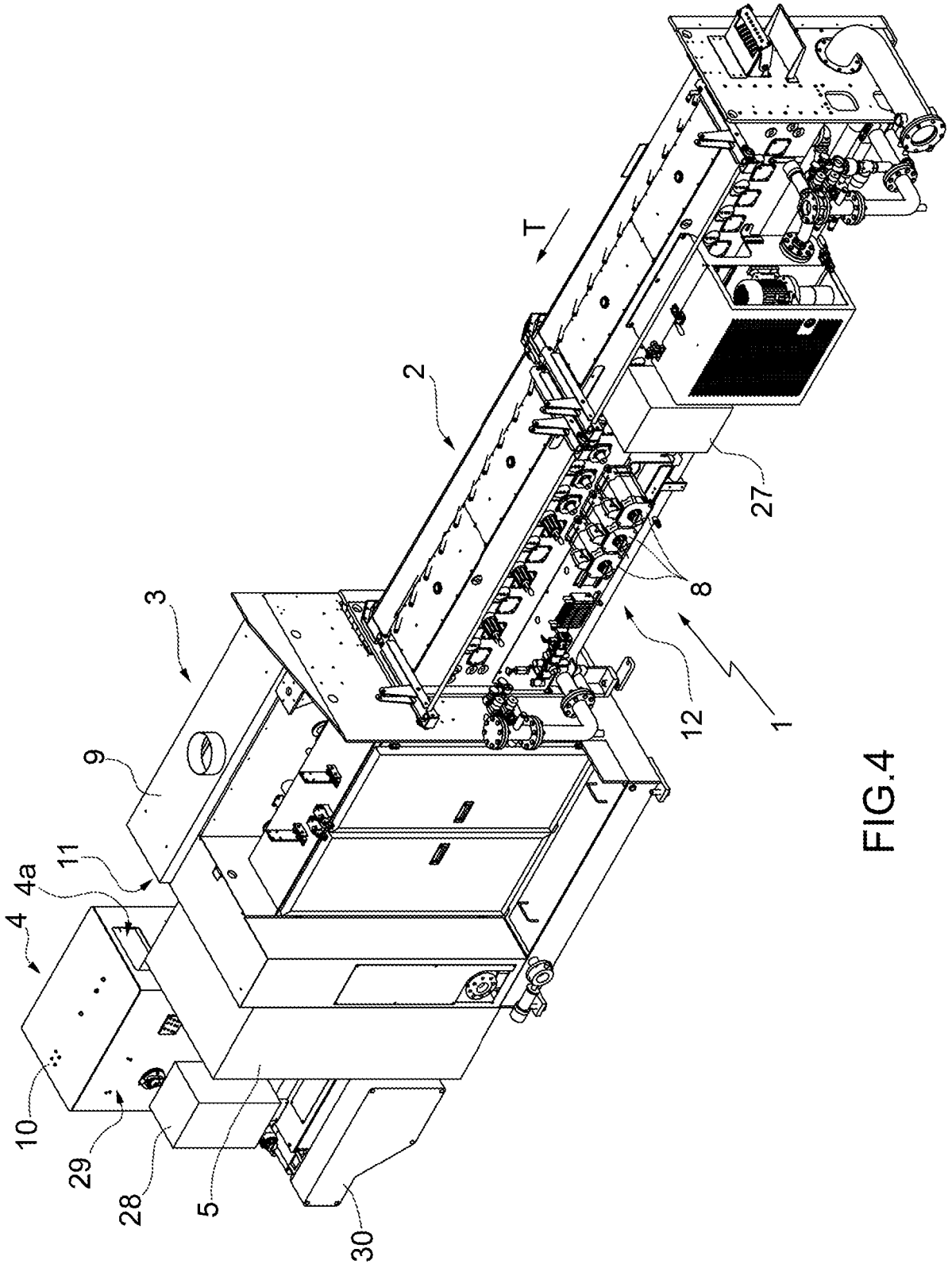


FIG.4

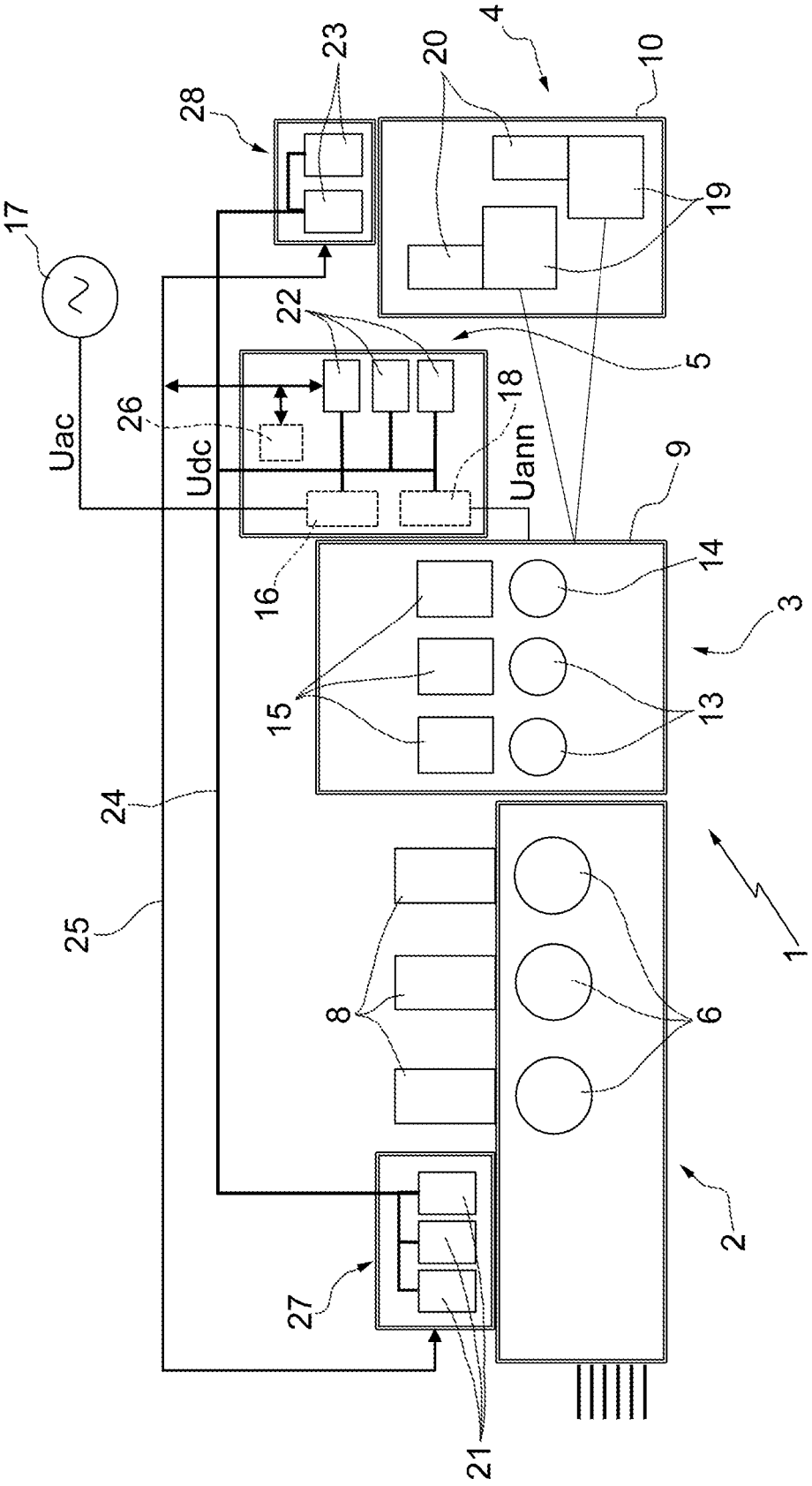

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FIG.5