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(54) Automated system to package and remove rolls of metallic wire wound on reels

Automatisiertes System zum Verpacken und Entfernen von auf Haspeln gewickelten Metalldrahtrollen
Système automatisé à emballer et enlever des couronnes de fils métalliques enroulées sur des bobines

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• **Prospekt "Niehoff Paket-Systeme" von**
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Description

[0001] This invention concerns an automated system to package and discharge rolls of metallic wire wound on reels. To be more exact, the invention concerns a system that provides full automation of the operation of winding the metallic wire and also full automation of the handling of reels thus packaged up to the stage of discharge of the wound rolls of wire.

[0002] The system of the invention is applied downstream of the plants which carry out hot or cold drawing or rolling of metallic wire.

[0003] In this invention the word "wire" is to be understood in its widest meaning as covering wire products having a round, oval, three-lobed, hexagonal, rectangular, square, etc. section.

[0004] The system can be employed also in plants producing other wire materials.

[0005] The state of the art covers the problems linked to the packaging and handling of reels containing metallic wire. These problems concern particularly the operations for the start-up and ending of the winding of the metallic wire; these operations are usually performed by hand and entail a substantial use of labour and considerable downtimes in the wire processing cycle, with resulting heavy production costs.

[0006] Likewise, the handling and removal of the packaged reels cause problems from the point of view of the costs arising from the time taken, the labour force employed and the production equipment used.

[0007] First of all the packaged reels have to be removed from the winding machine and thereafter, if the reels are of a type which can be dismantled by withdrawal of one of their lateral flanges for discharge of the rolls of wire wound on the reels, they have to be sent to a station where the roll of wire is tied.

[0008] Next, the roll of wire is discharged from the reel and the reel is re-assembled so that it can be returned to the working cycle.

[0009] All these operations requiring handling of the reels are normally carried out by hand with the help of auxiliary mechanical means. Moreover, these operations are performed in appropriate stations and thus entail the use of considerable covered space to take into account also the great number of reels and other materials which have to be stored at least momentarily and also the materials continually passing through.

[0010] Document CH-A-618141 discloses an automated system to package and remove rolls of flexible tube, which comprises a winding machine with automated systems to start-up and end the winding of a reel with a three-positional rotary platform, an auxiliary device for tying the reel and a device to clamp and dismantle a reel positioned on the winding machine. The device disclosed in CH-A-618141 is suitable for light weights but not for weights such as that of a reel of metallic wire, which may reach 1500 kgs. or more.

From this point of view the automated system disclosed,

such as the apparatus to tie and dismantle the reels, are not workable in a device which has to handle reels of metallic wire.

[0011] The present applicant has the purpose of overcoming the problems of the state of the art by providing a fully automated system to package and discharge rolls of metallic wire wound on reels.

[0012] The invention is set forth in the main claim, while the dependent claims describe various features of the invention.

[0013] The system according to the invention provides for the preferred use, for the winding, of reels which can be dismantled, namely of reels formed in such a way that the wound roll of wire can be removed by means of the axial withdrawal of one of the two lateral flanges of the reels.

[0014] The system of the invention employs a fully automated winding machine, namely a machine which carries out by automatic methods all the wire winding operations, including the operations linked to the start-up and ending of the packaging of every reel being processed.

[0015] A fully automated winding machine of the type employed in this invention is the subject of a parallel patent application in the name of the present applicant.

[0016] The automatic winding machine is equipped with a three-positional rotary platform, the first position being used for packaging the reel, the second for tying the rolls of wire and the third for removal of the reel.

[0017] The reel, after being packaged with wire in the first position, passes on to the second position where the wound roll of wire is completely tied by means of an appropriate apparatus.

[0018] The insertion and fixture of the actual tying elements can be done by hand or by a suitable automatic device. Thereafter the reel thus tied passes on to the third position, where it is removed by a handling device, which is an automatic device located downstream of the winding machine and suitable to cooperate in succession with two other stations, which open or dismantle the reel and discharge the wound roll of wire respectively.

[0019] By passing along the path in the opposite direction, the handling device re-assembles the reel and takes it back to the third position on the rotary platform.

[0020] By means of the system according to the invention the cycle of final processing of metallic wire is fully automated in this way and is also carried out in the immediate neighbourhood of the winding machine.

[0021] Furthermore, the cycle requires for its fulfilment only three reels, which exchange their functions by rotating together with the platform to the three working positions provided.

[0022] This leads to a great saving of materials and of the space taken up.

[0023] These and other special features of the invention will be made clearer in the description that follows.

[0024] The attached figures, which are given as a non-

restrictive example, show the following:

- Fig.1 is a diagrammatic plan view of an automated system according to the invention;
 Fig.2 shows a section of the system of Fig.1 along the line A-A;
 Fig.3 shows a detail of the system of Fig.1 in the direction of the arrow F.

[0025] In the figures an automated system 10 according to the invention comprises a fully automatic winding machine 11 located downstream of a plant to draw or roll metallic wire. This winding machine winds rolls of wire onto reels 12 which can be dismantled (and which are shown diagrammatically with circles in Fig.1), the reels being arranged with their axes vertical on a three-positional rotary platform 13.

[0026] Position A on the platform is the station where the reel 12 is rotated by a suitable headstock and tailstock 14 so as to take up onto its body the metallic wire fed from upstream processes.

[0027] Position B is the station where the packaged reel 12 is tied by an auxiliary device for the tying operation 15.

[0028] Position C is the station where the reel 12 is removed by means of an automatic handling device 16.

[0029] There is one reel 12 in each of positions A, B and C, and each reel is engaged at the same time in the respective operations.

[0030] The winding machine 11 on its side towards the feed of metallic wire is equipped with an automatic apparatus, referenced with 17, for the start-up and ending of the process of packaging a reel 12 which can be dismantled. During start-up this automatic apparatus engages the end of the wire and positions it suitably on the reel located in position A and then permits the start-up of winding.

[0031] When the reel has been packaged, the automatic apparatus shears the end of the wire, bends it suitably and positions it on a retaining support on the reel 12; it then arranges to transfer the sheared end of the wire onto the devices which start up the winding.

[0032] The auxiliary device 15 for the tying operation is shown in position B and consists substantially of a unit 18 to engage and rotate the reel and of a unit 19 to lift the reel.

[0033] The engagement and rotation unit 18 is a control box 20 bearing terminally a mandrel 21 and a gripper 22. In its inactive position this unit 18 is lifted from the reel 12; when a reel 12 reaches the tying station, the control box 20 is lowered automatically to bring the mandrel 21 axially so as to correspond with an upper flange 29 of the reel 12.

[0034] The lifting unit 19 is then actuated and cooperates through an opening 23 in the platform 13 with a lower flange 30 of the reel 12, thus lifting the reel 12 and aligning it with the mandrel 21.

[0035] It should be borne in mind that during the steps

of movement between the positions A, B and C, the reel 12 is merely rested on the platform 13 in correspondence with coordinated openings 23.

[0036] When the reel 12 has been positioned between the mandrel 21 and the lifting unit 19, the gripper 22 is actuated so as to fix itself on one of the spokes of the upper flange 29 of the reel 12, thus putting the reel 12 in a condition to be able to rotate.

[0037] Rotation of the reel 12 takes place by actuation of the mandrel 21 by suitable control means in the control box 20. This rotation is required to enable the elements tying the roll of wire to be inserted within the reel 12, normally at a plurality of points at various angles between them, for instance four points at 90° to each other.

[0038] Therefore, if the operation is carried out by hand by a machine operator positioned according to the arrow F of Fig.1, he will insert a first tying element into the reel 12 halted at position B and then will signal for the reel 12 to be rotated by 90° by means of the mandrel 21 and will repeat the operation of inserting a second tying element, and so on.

[0039] When tying has been completed, the reel engagement and rotation unit 18 and the lifting unit 19 will return to their inactive position and the reel 12 is now readied for movement to position C.

[0040] The tying operation can also be carried out by an appropriately equipped automatic device positioned according to the arrow F.

[0041] In position C the reel 12 is in the station for its removal from the winding machine 11 and for its transfer to subsequent processing stations, which are a station in position D for the dismantling of a reel that can be dismantled and a station in position E for discharge of the roll of wire wound on the reel 12.

[0042] Movement from position C to positions D and E is carried out by the automatic handling device 16, which is located at a stationary position downstream of the winding machine 11 and comprises a support structure 24 for a movable arm 25.

[0043] The movable arm 25 is capable of a rotary movement 26 about the axis of the support structure 24 and of a straight vertical movement according to the arrows 27.

[0044] A handling device of the type shown according to this invention is the subject of a parallel patent application in the name of the present applicant.

[0045] The movable arm 25 bears on its lower side an engagement device consisting essentially of a gripper unit 28 able to close and secure itself to the upper flange 29 of the reel 12.

[0046] The handling device 16 takes the reel 12 from position C, lifts it according to the arrows 27 and rotates according to the arrows 26, thus bringing the arm 25 to position D, which is the station for dismantling, or opening, the reel 12.

[0047] Position D is a stationary station equipped with a clamping device 31, which consists essentially of a

pair of engagement arms 32 that can be retracted by being rotated. Figs.1 and 2 show with lines of dashes (32') the inactive positions of the engagement arms 32 .

[0048] When the reel 12 has been brought by the movable arm 25 to position D, the engagement arms 32 are moved to a position above the upper flange 29 of the reel 12.

[0049] Contact between the upper flange 29 and the engagement arms 32 takes place not directly but by means of an appropriate abutment plate 33 belonging to the movable arm 25.

[0050] At this stage the lower flange 30 is released from the reel 12 and will remain positioned in the reel dismantling station when the remainder of the reel 12 is removed from that station.

[0051] The lower flange 30 is released from the reel 12 by the action of suitable means with which the handling device 16 or the reel dismantling station is equipped, depending on the structure of the reel 12. If, for instance, the reel 12 is of a type which can be dismantled by the action of external axial means, as disclosed in a patent application in the name of the present applicant, then the movable arm 25 itself may be equipped with such means to withdraw the lower flange 30 after the reel 12 has been engaged by the gripper unit 28.

[0052] The clamping device 31 is equipped with suitable means which during the step of release of the lower flange 30 control the unavoidable outward springing of the wire due to the coils of metallic wire having been held between the flanges 29-30 and to the very strong tensions built up during winding of the coils.

[0053] If the reel 12 is of the type cited above, it itself will include means to hold the wound roll so that the reel 12 without its lower flange 30 can be removed from position D without the roll being released and falling on the ground.

[0054] Movement of the reel from the station in which it has been dismantled to the next discharge station in position E is also carried out by the movable arm 25 of the handling device 16.

[0055] In the roll discharge station at position E are included collection means able to receive rolls of metallic wire referenced with 34 in Fig.2. These collection means may be storage benches 35, as shown in Figs.1 and 2, or conveyor belts or roller conveyors or any other suitable means to receive and discharge thereafter the rolls 34 of metallic wire.

[0056] The means holding the roll 34 on the reel 12 are disabled at position E so that the rolls 34 can be released on the relative collection means 35.

[0057] The movable arm 25, which is still holding the upper flange 29, retraces its previous course in the reverse direction and therefore takes the reel 12 to be re-assembled at position D, thereafter bearing the reel 12 thus reassembled to position C, where it releases the reel.

[0058] The system 10 according to the invention

therefore requires only three reels 12 during the winding and discharge of the wound roll 34 of wire, namely a first reel 12 for the actual winding process in position A, a second reel 12 being tied at position B and a third reel 12 for the removal step at position C.

[0059] While the first reel is being wound with wire, the second reel can be tied at the same time and the third reel can be engaged, dismantled, re-assembled and re-positioned for use.

[0060] We have described here a preferred embodiment of this invention, but it is clear that many variants are possible for a person skilled in this field without departing thereby from the scope of the invention as claimed.

[0061] For instance, the system can also use reels which cannot be dismantled; in this case the dismantling station can be replaced or amalgamated with a device to feed automatically empty reels which cannot be dismantled, while the station to discharge the roll of wire can become a station for discharge of reels of wire which cannot be dismantled.

[0062] The handling device itself during its return from the discharge station of full reels can arrange to take, in cooperation with the reel feed device, an empty reel required to feed the winding machine.

[0063] During its outward travel the handling device will obviously go directly to the discharge station.

Claims

1. Automated system to package and remove rolls of metallic wire, the system (10) being fitted downstream of a plant carrying out hot or cold drawing or rolling of metallic wire which may have a round, oval, three-lobed, hexagonal, rectangular, square etc. section and is wound in rolls (34) on reels (12) of the type which can be dismantled, on a winding machine (11) located immediately downstream of the drawing or rolling plants, the reels (12) including a lower flange (30) and an upper flange (29) with a cylindrical sleeve which can be stably associated with the lower flange (30), the upper flange (29) and the sleeve including means to prevent the roll (34) from being released when the lower flange (30) is disconnected, the rolls (34) being obliged to undergo an operation to tie the rolls (34) before the definitive extraction of the reel (12) and their final use, the system including the following operational units:

- a winding machine (11) that comprises an automatic control system for the start-up and ending (17) of the completely automated winding of the metallic wire, the automatic winding machine (11) being equipped with a three-positional rotary platform (13) for three reels (12) being processed, the three positions corresponding to a first station (position A) to wind

- the metallic wire on a reel (12) in rotation, to a second station (position B) to tie the already wound roll (34), and to a third station (position C) to remove the already tied reel (12);
- an auxiliary device (15) for the tying, which cooperates with the winding machine (11) in the tying station (position B), the tying station including means to engage and rotate the reel (12) at pre-set angles, the engagement and rotation means including an inactive position and a position wherein the reel is engaged and rotated at a controlled angle; there also being included the following operational units:
 - the automatic system for the start-up and ending (17) of the automatic winding includes means to engage the leading end of the wire and deliver it to the reel (12), and also means to cut and bend the trailing end of the wire, and also means to deliver the bent end of the wire to a holding support on the reel (12);
 - a device (16) for the automatic handling of reels, which cooperates with the winding machine (11) in the reel removal station (position C) and is suitable to transfer the reels (12) to the successive processing steps, the device including a support structure (24) cooperating with a movable arm (25) rotatable around a fixed axis substantially parallel to the axis of the roll (34), the movable arm (25) including at its lower part a gripper unit (28) cooperating with the upper part and with the periphery of the upper flange (29);
 - a reel clamping device (31) operating in a reel dismantling station (position D) located downstream of the winding machine (11) and including engagement arms (32) to control outward springing of the roll (34) of wire when the lower flange (30) is released from the reel (12), the device being suitable to receive the reel (12) brought from the reel removal station (position C) by means of the handling device (16) and to retain momentarily the lower flange (30) disengaged from the sleeve associated with the upper flange (29); and
 - a device (35) to receive and discharge the roll (34) of wire, this device operating in a discharge station (position E) and being suitable to receive and support the roll (34) of wire discharged from the reel (12) by means of the handling device (16), the handling device (16) being also able to travel in succession and alternately along the path from the reel removal station (position C) to the roll discharge station (position E) and vice versa, so as to dismantle and reassemble respectively a reel (12) of a type which can be dismantled.
2. System (10) as claimed in Claim 1, in which the auxiliary device (15) for the tying of the reel is independent and consists of an engagement and rotation unit (18) cooperating with the upper flange (29) of the reel (12) and of a lifting unit (19) cooperating with the lower flange (30) of the reel (12).
 3. System (10) as claimed in any claim hereinbefore, in which the handling device (16) comprises a stationary independent structure (24) located downstream of the automatic winding machine (11).
 4. System (10) as claimed in any claim hereinbefore, in which the engagement arms include a position to clamp the roll axially and a position of non-interference.
 5. System (10) as claimed in any claim hereinbefore, in which the reel clamping device (31) includes a means for the temporary receipt of the lower flange (30) withdrawn from the reel (12).
 6. System (10) as claimed in any claim hereinbefore, in which the means that receives the roll (34) of wire discharged from the reel (12) is a discontinuous means (35).
 7. System (10) as claimed in any claim from 1 to 5 inclusive, in which the means that receives the roll (34) of wire discharged from the reel (12) is a continuous means, for instance a conveyor belt.
 8. System as claimed in any claim hereinbefore, in which the platform (13) of the winding machine (11) includes openings (23) coordinated with the three working positions (position A, position B and position C).

Patentansprüche

1. Automatisiertes System (10) zum Verpacken und Entfernen von Metalldrahtrollen, das in Arbeitsrichtung nach einer Anlage zum Warm- oder Kaltziehen oder Walzen von metallischem Draht angeordnet ist, der einen runden, ovalen, dreilappigen, hexagonalen, rechteckigen, quadratischen etc. Querschnitt haben kann und in Rollen (34) auf Haspeln (12) aufgewickelt ist, die zerlegbar sind, wobei eine Wickelmaschine (11) unmittelbar anschließend an die Zieh- oder Walzanlage angeschlossen ist und die Haspeln (12) einen unteren Flansch (30) und einen oberen Flansch (29) mit einer zylindrischen Hülse aufweisen, die mit dem unteren Flansch (30) stabil verbindbar sind, wobei der obere Flansch (29) und die Hülse Mittel besitzen, die ein Lösen der Rolle (34) verhindern, wenn der untere Flansch (30) entkuppelt wird, und die Rollen (34) vor ihrer endgültigen Trennung von der

Haspel (12) und ihrem Endgebrauch einem Fixier-
vorgang unterzogen werden, und das System die
folgenden Arbeitseinheiten aufweist:

- eine Wickelmaschine (11), die ein automati- 5
sches Steuerungssystem (17) für das Anfahren
und Beenden des vollautomatischen Wickelns
des metallischen Drahtes sowie eine drehende
Drei-Positionen-Plattform (13) für drei zu bear- 10
beitende Haspeln (12) aufweist, wobei die drei
Positionen einer ersten Station (Position A)
zum Aufwickeln des metallischen Drahtes auf
eine Haspel (12), einer zweiten Station zum 15
Binden oder Fixieren (Position B) der aufgewik-
kelten Rolle (34) und einer dritten Station (Posi-
tion C) zum Entfernen der verankerten Haspel
(12) entsprechen,
- eine Hilfsvorrichtung (15) für die Fixierung, die 20
mit der Wickelmaschine (11) zusammenarbei-
tet und Organe zum Ergreifen und Drehen der
Haspel (12) unter vorgegebenen Winkeln auf-
weist, wobei die Organe zum Ergreifen und 25
Drehen eine nicht aktive Stellung und eine
Stellung aufweisen, in der die Haspel ergriffen
und um einen bestimmten Winkel gedreht wird;
wobei ferner die folgenden Arbeitseinheiten
vorgesehen sind:
- das automatische System für das Anfahren 30
und Beenden (17) des automatischen Auf-
wickelns besitzt Mittel, um den Anfang des
Drahtes zu ergreifen und ihm der Haspel zu
übergeben, und ebenso Mittel, um das Ende
des Drahtes abzuschneiden und zu biegen, 35
ferner Mittel, um das gebogene Ende des
Drahtes einem Halteträger der Haspel (12) zu
übergeben;
- eine Vorrichtung (16) für die automatische 40
Behandlung der Haspeln, die mit der Wickel-
maschine (11) in der Haspelentfernungsstation
(Position C) zusammenarbeitet und zur Über-
führung der Haspeln (12) zu den aufeinander-
folgenden Bearbeitungsschritten ausgebildet 45
ist, welche Vorrichtung eine Tragkonstruktion
(24) aufweist, die mit einem beweglichen Arm
(25) zusammenwirkt, der um eine im Wesentli-
chen parallel zur Achse der Rolle (34) verlau-
fende feste Achse drehbar ist und an seinem 50
unteren Teil eine Greifeinheit (28) aufweist, die
mit dem oberen Teil und dem Rand des oberen
Flansches (29) zusammenwirkt;
- eine Haspelfesthaltevorrichtung (31), die in 55
einer Haspelzerlegestation (Position D) arbei-
tet, in Arbeitsrichtung nach der Wickelma-
schina (11) angeordnet ist und Greifarme (32)
zur Verhütung eines Ausschnellens der Draht-
rolle bei Freigabe des unteren Flansches (30)
von der Haspel (12) aufweist, welche Vorrich-
tung zur Aufnahme der von der Haspelentfer-

nungsstation (Position C) mittels der
Behandlungsvorrichtung (16) gebrachten Has-
pel (12) und zum zeitweisen Halten des von der
mit dem oberen Flansch (29) verbundenen
Hülse abgezogenen unteren Flansches (30)
geeignet ist; und

- eine Vorrichtung (35) zur Aufnahme und Entla-
dung der Drahtrolle (34), wobei diese Vorrich-
tung in einer Entladestation (Position E)
arbeitet und zur Aufnahme und zum Tragen der
von der Haspel (12) durch die Behandlungsvor-
richtung (16) entladenen Drahtrolle ausgebildet
ist,
wobei die Behandlungsvorrichtung (16) auch
dazu ausgebildet ist, sich aufeinanderfolgend
und alternierend längs des Weges von der
Haspelentfernungsstation (Position C) zur Rol-
lenentladestation (Position E), und umgekehrt,
zu bewegen, sodaß eine zerlegbare Haspel
(12) zerlegt und wieder zusammengesetzt wer-
den kann.

2. System (10) nach Anspruch 1, in dem die Hilfsvor-
richtung (15) für das Binden oder Fixieren der Has-
pel selbstständig ist und aus einer Greif- und
Dreheinheit (18), die mit dem oberen Flansch (29)
der Haspel (12) zusammenwirkt, und einer Hebe-
einheit (19) besteht, die mit dem unteren Flansch
(30) der Haspel (12) zusammenwirkt.
3. System (10) nach einem der vorstehenden Ansprü-
che, in dem die Behandlungsvorrichtung (16) einen
stationären selbständigen Aufbau (24) aufweist,
der in Arbeitsrichtung nach der automatischen Wic-
kelmaschine (11) angeordnet ist.
4. System (10) nach einem der vorstehenden Ansprü-
che, in dem die Greifarme eine Stellung zum axia-
len Festhalten der Rolle und eine nicht
beeinflussende Stellung aufweisen.
5. System (10) nach einem der vorstehenden Ansprü-
che, in dem die Haspelgreifvorrichtung (31) Organe
für die zeitweilige Aufnahme des von der Haspel
(12) ausgestoßenen unteren Flansches (30) auf-
weist.
6. System (10) nach einem der vorstehenden Ansprü-
che, in dem die Organe zur Aufnahme der von der
Haspel (12) ausgestoßenen Drahtrolle (34) diskon-
tinuierliche Organe (35) sind.
7. System (10) nach einem der Ansprüche 1 bis 5, in
dem die Organe zur Aufnahme der von der Haspel
(12) ausgestoßenen Drahtrolle (34) kontinuierliche
Organe, beispielsweise Bandförderer sind.
8. System (10) nach einem der vorstehenden Ansprü-

che, in dem die Plattform (13) der Wickelmaschine (11) Öffnungen (23) aufweist, die den drei Arbeitspositionen (Position A, Position B und Position C) zugeordnet sind.

Revendications

1. Système automatisé pour remplir et enlever des couronnes de fil métallique, le système (10) étant installé en aval d'une installation effectuant le tréfilage ou le laminage à chaud ou à froid de fil métallique, qui peut avoir une section ronde, ovale, à trois lobes, hexagonale, rectangulaire, carrée, etc. et est bobiné en couronnes (34) sur des bobines (12) du type qui peut être démonté, sur une machine de bobinage (11) située immédiatement en aval des installations de tréfilage ou de laminage, les bobines (12) comprenant une bride inférieure (30) et une bride supérieure (29) avec un manchon cylindrique qui peut être associé de manière stable à la bride inférieure (30), la bride supérieure (29) et le manchon comprenant des moyens pour empêcher que la couronne (34) soit libérée lorsque la bride inférieure (30) est déconnectée, les couronnes (34) étant obligées de subir une opération de liage des couronnes (34) avant l'extraction définitive de la bobine (12) et leur utilisation finale, le système comportant les unités opérationnelles suivantes:

- une machine de bobinage (11) qui comprend un système automatique de commande pour le démarrage et la fin (17) du bobinage entièrement automatisé du fil métallique, la machine automatique de bobinage (11) étant équipée d'une plate-forme rotative à trois positions (13) pour trois bobines (12) en cours de traitement, les trois positions correspondant à un premier poste (position A) pour bobiner le fil métallique sur une bobine (12) en rotation, à un deuxième poste (position B) pour lier la couronne (34) déjà bobinée et à un troisième poste (position C) pour enlever la bobine (12) déjà liée,
- un dispositif auxiliaire (15) pour le liage, qui coopère avec la machine de bobinage (11) dans le poste de liage (position B), le poste de liage comprenant des moyens pour engager et faire tourner la bobine (12) à des angles préfixés, les moyens d'engagement et de mise en rotation comprenant une position inactive et une position dans laquelle la bobine est engagée et tournée d'un angle contrôlé; les unités opérationnelles supplémentaires suivantes étant également prévues:
- le système automatique pour le démarrage et la fin (17) du bobinage automatique comprenant des moyens pour engager l'extrémité de tête du fil et la délivrer à la bobine (12), et également des moyens pour couper et plier l'extré-

mité de queue du fil, ainsi que des moyens pour délivrer l'extrémité pliée du fil à un support de retenue prévu sur la bobine (12);

- un dispositif (16) pour la manutention automatique de bobines, qui coopère avec la machine de bobinage (11) dans le poste d'enlèvement de bobine (position C) et est adapté pour transférer les bobines (12) vers les étapes successives de traitement, le dispositif comprenant une structure de support (24) coopérant avec un bras mobile (25) pouvant tourner autour d'un axe fixe essentiellement parallèle à l'axe de la couronne (34), le bras mobile (25) comprenant dans sa partie inférieure une unité d'accrochage (28) coopérant avec la partie supérieure et avec la périphérie de la bride supérieure (29);
- un dispositif (31) de serrage de bobine qui travaille dans un poste de démontage de bobine (position D) situé en aval de la machine de bobinage (11) et comprenant des bras d'engagement (32) pour commander le rebond de la couronne (34) de fil vers l'extérieur lorsque la bride inférieure (30) est libérée de la bobine (12), le dispositif convenant pour recevoir la bobine (12) apportée du poste d'enlèvement de bobine (position C) au moyen du dispositif de manutention (16) et pour retenir momentanément la bride inférieure (30) dégagée du manchon associé à la bride supérieure (29); et
- un dispositif (35) pour recevoir et enlever la couronne (34) de fil, ce dispositif fonctionnant dans un poste d'enlèvement (position E) et étant adapté pour recevoir et soutenir la couronne (34) de fil enlevée de la bobine (12) au moyen du dispositif de manutention (16), le dispositif de manutention (16) étant également capable de se déplacer successivement et en alternance le long du parcours séparant le poste d'enlèvement de bobine (position C) et le poste de déchargement des couronnes (position E), et inversement, de manière à respectivement démonter et remonter une bobine (12) d'un type qui peut être démonté.

2. Système (10) selon la revendication 1, dans lequel le dispositif auxiliaire (15) pour le liage de la bobine est indépendant et est constitué d'une unité (18) de saisie et de rotation coopérant avec la bride supérieure (29) de la bobine (12), ainsi que d'une unité de levage (19) coopérant avec la bride inférieure (30) de la bobine (12).

3. Système (10) selon l'une quelconque des revendications précédentes, dans lequel le dispositif de manutention (16) comporte une structure stationnaire indépendante (24) située en aval de la machine automatique de bobinage (11).

4. Système (10) selon l'une quelconque des revendications précédentes, dans lequel les bras de saisie comprennent une position permettant de pincer la couronne axialement et une position de non contact. 5
5. Système (10) selon l'une quelconque des revendications précédentes, dans lequel le dispositif (31) de serrage de bobine comporte des moyens pour la réception temporaire de la bride inférieure (30) extraite de la bobine (12). 10
6. Système (10) selon l'une quelconque des revendications précédentes, dans lequel le moyen qui reçoit la couronne (34) de fil déchargée de la bobine (12) est un moyen (35) discontinu. 15
7. Système (10) selon l'une quelconque des revendications 1 à 5 incluse, dans lequel le moyen qui reçoit la couronne (34) de fil déchargée de la bobine (12) est un moyen continu, par exemple une bande transporteuse. 20
8. Système (10) selon l'une quelconque des revendications précédentes, dans lequel la plate-forme (13) de la machine de bobinage (11) comporte des ouvertures (23) coordonnées avec les trois positions de travail (position A, position B et position C). 25

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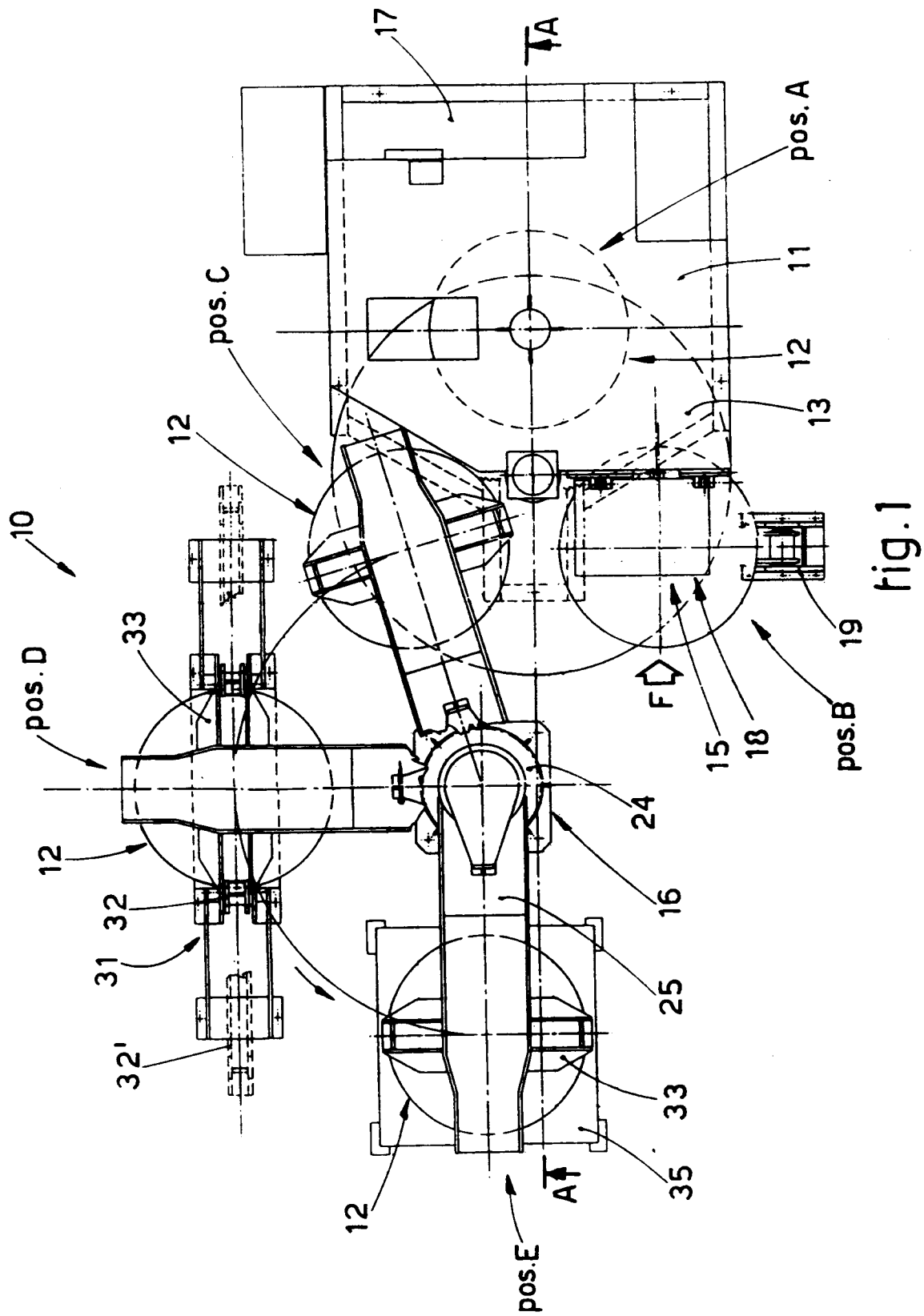


fig.1

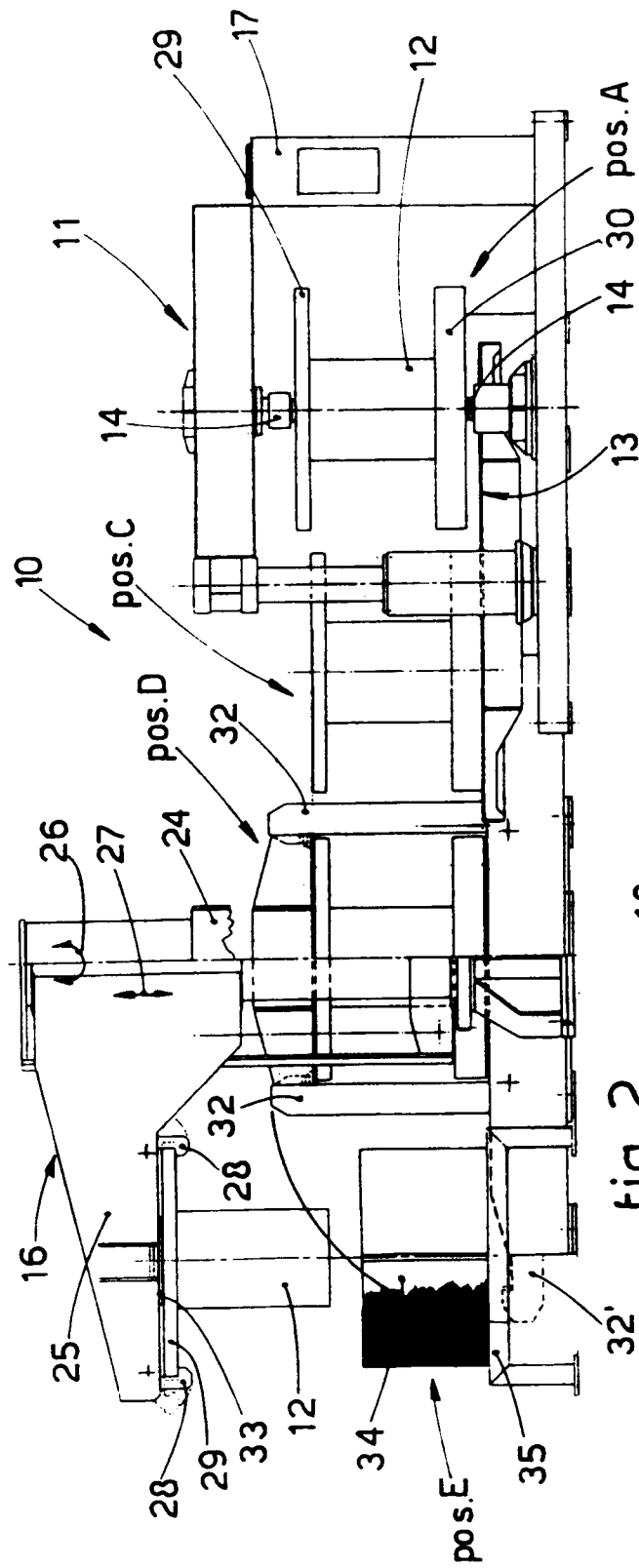


fig. 2

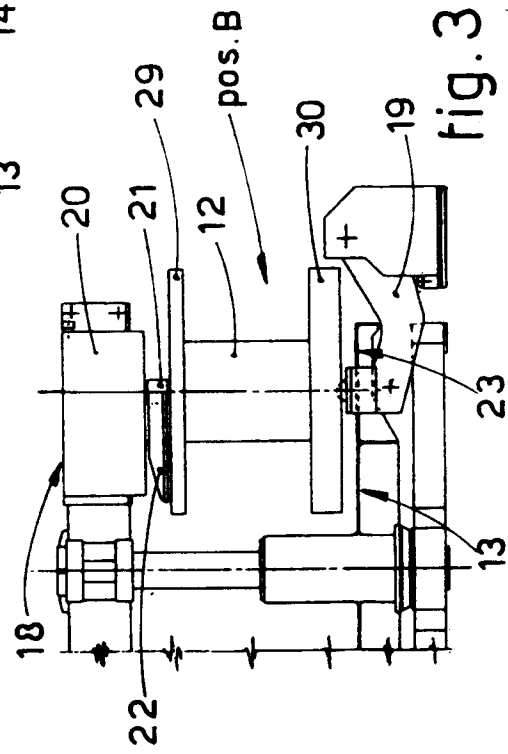


fig. 3