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(54) **Bobbin supply system**

Spulenbelieferungseinrichtung

Système de fourniture de bobines

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## Description

**[0001]** The present invention relates to a bobbin supply system according to the preamble of claim 1.

**[0002]** Such a system is known from JP-A-05-221512. This automatic system comprises a horizontal bobbin belt conveyor feeding the bobbins into a drum reservoir having horizontal receiving openings from where the bobbins fall into a chute with its lower part facing down by gravity after having been checked by a top and bottom distinguishing device.

**[0003]** The problem underlying the present invention is to provide a system of the above mentioned type having an uncomplicated structure and being usable by an operator.

**[0004]** This problem is solved by the features included in the characterizing portion of claim 1. Such a system is reliable in operation and may be operated by an operator who enters new full bobbins and also rejected bobbins if usable in the magazine.

## Brief Description of the Drawings

### [0005]

Figure 1 is a front view of the bobbin supply system of the present invention,

Figure 2 is a side view of the bobbin supply system, and

Figure 3 is an enlarged view of the main part of the magazine of the present invention.

## Detailed Description of the Preferred Embodiments

**[0006]** (1) is a bobbin supply device, the structure of which will be described hereafter. (2) is a tray and the tray (2) is transported by a transport line in a state where a bobbin is loaded on to it. (3) is a bobbin removal device and is so constructed that it removes all the bobbins transported along a tray return line (7) from the aforementioned trays (2). (4) is a yarn end finding device which positions the yarn end of the bobbin in a predetermined position on the bobbin so that auto-yarn joining can be performed by the auto-winder (5). (11) is a separation device that sends the defective bobbins (B1) that have failed the yarn end finding process to the defective bobbin transport line (10) and the full bobbins (Bf) that have successfully completed the yarn end finding process to the tray supply line (14). (12) is a control device that controls all of the winding units of the auto-winder and the bobbin supply system.

**[0007]** A transport line using a belt conveyor is used for the transport of trays (2). The transport lines from each winding unit of the auto-winder (5) to the bobbin supply device (1) are called the tray return lines (6,7,8), the transport lines as far as each winding unit of the auto-

winder (5) is concerned and which supply bobbins to the trays (2) by the bobbin supply device (1) are called the tray supply lines (9,14) and the transport line of defective bobbins (B1) is called the defective bobbin transport line (10).

**[0008]** Hereafter the flow of the bobbins supplied to and returned from each winding unit of the auto-winder (5) will be described.

**[0009]** At each winding unit of the auto-winder (5), transport of the full bobbins (Bf) by a conveyor while loaded on the tray (2), rewinding of the yarn from the full bobbin (Bf) to the winding packages and ejection of the empty bobbin (Be) (including residual yarn bobbins) is carried out. The empty bobbin or residual yarn bobbins (Be) ejected by each winding unit of the auto-winder (5) is transported to the tray return line (6) while loaded on the tray (2).

**[0010]** In continuance, the empty bobbin or residual yarn bobbin (Be) loaded on the trays (2) enter the tray return line (7) where the bobbin removal device (3) is positioned, are removed from the tray (2) by the friction of the removal belt of the bobbin removal device (3) and ejected to the bobbin storage box (19).

**[0011]** The bobbin supply device (1) is arranged along the tray return line (8). The trays (2) are temporarily stopped by a stopper (13), full bobbins (Bf) are supplied with the bottom side (Bb) facing downwards by the bobbin chute (18) and the trays (2) with the full bobbins (Bf) are transported to the tray supply line (9).

**[0012]** A bottom bunch cutting device (101) that cuts the bottom bunch wind on the base of the bobbin, a back wind yarn cutting device (102) that cuts the back wound yarn wound on the outer layer of the bobbin and the yarn end finding device (4) are arranged in sequential order from the bobbin supply device (1) along the tray supply line (9). Those that have successfully completed yarn end finding are sent to the tray supply line (14) via the separation device (11).

**[0013]** Further, the full bobbins (Bf) which have failed the yarn end finding process are sent to the defective bobbin transport line (10) by the switching of the separation device (11) by the control device (12) which receives a yarn end finding failure signal from the yarn end finding device (4).

**[0014]** The aforementioned defective bobbin transport line (10) is connected to the tray return line (7) and the defective bobbins (B1) are removed from the trays (2) by the bobbin removal device (3) without exception. The defective bobbins (B1) and the empty bobbin or residual yarn bobbin (Be) all enter the bobbin storage box (19) in a mixed state.

**[0015]** The bobbins which have entered the storage box (19) are differentiated from the bobbins having enough yarn remaining to be wound off by the auto-winder and other bobbins by the operator. The bobbins (B1) which can be rewound are supplied to the magazine (20) of the bobbin supply device (1) after procedures are carried out to facilitate the yarn end finding process by the

operator.

**[0016]** The storage box (19) is positioned inside the operator's operating space (S) where supply of bobbins to the magazine (20) is carried out. The bobbins removed by the bobbin removal device (3) are sent to the storage box (19) inside the operation space (S). Accordingly, the operator need only take out the rewindable bobbins from the storage box (19) in the operating space (S) and supply them to the magazine (20) after correcting them.

**[0017]** Then, full bobbins (Bf) which are loaded on the tray (2) and have finished the yarn end finding process are transported to each winding unit of the auto-winder (5) from the tray supply line (14).

**[0018]** The bobbin supply device (1) is provided with the magazine (20) and the bobbin chute (18). A spur gear (29), being one part of the drive part of the magazine (20), forms a ratchet with the number of teeth being the same as the number of the bobbin insertion holes (37) for inserting the full bobbins (Bf). A spur gear (30) is arranged to stop the rotation of the spur gear (29) with the number of teeth being the same as the spur gear (29). The spur gear (29) and the spur gear (30) are fixed by a bolt (not shown) so that they are stacked vertically and are made to rotate simultaneously.

**[0019]** A arm (25) is supported by the support point (34) of the rod (23) of the cylinder (21) and the rotating shaft (33) being a fixed point. Furthermore, a claw (27) corresponding to the ratchet spur gear (29) is supported so as to be freely rotatable by the support point (31). A arm (26) is supported by the support point (35) of the rod (24) of the cylinder (22) and a support point (32) being a fixed point. Yet further, the support point (32) supports so as to be freely rotatable a claw (28) which is a stopper of the spur gear (30).

**[0020]** The magazine (20) comprises a cylindrical bobbin insertion member (42) which is arranged with a same number of the cylindrical bobbin insertion holes (37) having a diameter larger than the winding diameter of the full bobbin (Bf) as the number of teeth as the spur gear (29) on a circle concentric with the rotating shaft (33) of the spur gear (29), a bobbin reception member (43) that has a bobbin delivery opening (38) cut away only directly above the bobbin chute (18) and enough so that there is no hindrance to dropage of the full bobbin (Bf), and that drive part. The aforementioned bobbin insertion member (42) and the bobbin reception member (43) comprise a stocker for individualising and stocking the bobbins. Also, the drive part is provided with the aforementioned spur gears (29,30).

**[0021]** The tray (2) from which the bobbin has been taken by the bobbin removal device (3) is transported by the tray return line (8) and stopped by the bobbin stopper (13) in a predetermined position where the full bobbin (Bf) can be reliably loaded on the empty tray from the bobbin chute (18).

**[0022]** When the tray (2) stops, a tray detection sensor (15) operates and sends a signal to the control device (12). Due to the signal of the control device (12), the

bobbin chute (18) goes from a open state (18a) being a standby state, to an closed state (18b) for guiding the full bobbin (Bf) to the tray (2).

**[0023]** When the rod (24) of the cylinder (22) is pushed in direction (c) by a signal from the control device (12), the arm (26) supported by the connected support point (35) moves to position (26b) in direction (c) and the connected claw (28) moves higher than the height of the tooth of the spur gear (29) to position (28b) in direction (e) so that spur gears (29,30) become able to rotate.

**[0024]** When the rod (23) of the cylinder (21) is pushed in the direction (a) by a signal from the control device (12), the arm (25) supported by the support point (31) moves to position (25b) in direction (g) with the rotating shaft (33) as a support point, the claw (27) moves to position (27b) by the force of the cylinder (21) rotating the spur gear (29) in direction (g) being an anticlockwise direction and the bobbin insertion member (42) is rotated in the anticlockwise direction (g) by one tooth, in short, by one bobbin insertion hole (37).

**[0025]** Following that, when the rod (24) of the cylinder (22) is returned in direction d by a signal from the control device (12), the arm (26) supported by the support point (35) moves to position (26a) and the claw (28) moves to position (28a) where restriction of the movement of the spur gear (30) is possible by movement in direction (f).

**[0026]** Further, when the rod (23) of the cylinder (21) is pushed in the direction (b) by a signal from the control device (12), the arm (25) moves to position (25a) in a direction opposite direction (g) and the claw (27) moves in direction (h) along the surface (36) of the teeth of the spur gear (29) stopping in position (27a).

**[0027]** When the bobbin insertion member (42) rotates by one the bobbin insertion hole (37), a new full bobbin (Bf) drops by gravity from the bobbin delivery opening (38) and is loaded onto the tray (2) after passing through the bobbin chute (18).

**[0028]** When the full bobbin (Bf) has been loaded, a bobbin detection sensor (16) sends a signal to the control device (12), a signal is sent from the control device (12) and the bobbin chute (18) goes to the open state (18a) also being the standby state. Furthermore, a signal is also sent to the stopper (13), the stopper (13) separates from the full bobbin (Bf) and the full bobbin (Bf) proceeds along the tray return line (8) while loaded on the tray (2).

**[0029]** The above operations are repeated and the full bobbin (Bf) is supplied to the empty tray (2) but as for the insertion of the full bobbin (Bf) in the magazine (20), the operator must determine the top/bottom of the full bobbin (Bf) and insert one bobbin (Bf) at a time into the bobbin insertion hole (37) with the bottom side (Bb) facing downwards.

**[0030]** Further, the number of bobbins insertable into the magazine (20) of a first embodiment of the present invention is (24) but may be changed according to the scale of the operation.

## Claims

1. A bobbin supply system comprising a tray supply line that transports trays to each winding unit of a winding machine from a bobbin supply system (1) that supplies full bobbins (Bf) at a time through a chute (18) to the trays (2); a return line (6, 8) that transports the trays from the winding unit to the bobbin supply system (1) having a magazine (20) which is rotatable around a rotating axis and which stocks the full bobbins (Bf); said magazine (20) comprising cylindrical bobbin insertion members (42) having cylindrical insertion holes (37) and a fixed bobbin reception member (43) with a bobbin delivery opening (38) associated with the top of the chute (18), whereby a full bobbin (Bf) can drop by gravity from the bobbin delivery opening (38) for being loaded onto a tray (2) after passing through the chute (18);  
**characterized in that**  
 at the rearward end of the bobbin supply system next to the magazine (20) an operating space (S) is provided in such a position that full bobbins (Bf) can be manually and individually inserted through the operating space (S) into the insertion holes (37);  
 a storage box (19) is provided in the operating space (S) where bobbins having residual yarn and full bobbins defective as to yarn end finding are entered by a bobbin removal device (3) from the return line (6, 7, 8) and from where the residual yarn bobbins and the bobbins which can be rewound are supplied to the magazine (20) after procedures are carried out to facilitate yarn end finding by an operator, the magazine (20) is inclined in the revert direction, and  
 the bobbin insertion members (42) are provided in a number according to the scale of operation.

## Patentansprüche

1. Spulensiefersystem, bestehend aus einer Tellerlieferbahn, die Teller zu jeder Spulstelle einer Spulmaschine von einem Spulensiefersystem (1) transportiert, das volle Spulen (Bf) einzeln durch einen Trichter (18) zu den Tellern (2) liefert, einer Rückföhrbahn (6, 8), die die Teller von der Spulstelle zum Spulensiefersystem (1) transportiert, das ein Magazin (20) hat, das um eine Drehachse drehbar ist, und das die vollen Spulen (Bf) lagert, wobei das Magazin (20) zylindrische Spulen Einsetzelemente (42) mit zylindrischen Einsetzöffnungen (37) und ein stationäres Spulenaufnahmeelement (43) mit einer Spulenabgabeöffnung (38) hat, die dem oberen Ende des Trichters (18) zugeordnet ist, so dass eine volle Spule (Bf) aufgrund der Schwerkraft aus der Spulenabgabeöffnung (38) fallen kann, um auf einen Teller (2) nach Durchgang durch den Trichter (18) geladen zu werden,

## dadurch gekennzeichnet, dass

- am hinteren Ende des Spulensiefersystems nahe dem Magazin (20) ein Arbeitsraum (S) in einer solchen Position vorgesehen ist, dass volle Spulen (Bf) manuell und einzeln durch den Arbeitsraum (S) in die Einsatzöffnungen (37) eingebracht werden können,
- ein Lagerkasten (19) im Arbeitsraum (S) vorgesehen ist, in dem Spulen mit einem Restfaden und hinsichtlich des Fadenendeauffindens fehlerhafte volle Spulen durch eine Spulenenahmevorrichtung (3) aus der Rückföhrbahn (6, 7, 8) eingegeben werden, und aus dem die übrigen Fadenspulen und die Spulen, die abgespult werden können, dem Magazin (20) zugeföhrst werden, nachdem von einem Bediener Vorgänge durchgeführt worden, um das Fadenendeauffinden zu erleichtern,
- das Magazin (20) nach hinten geneigt ist, und
- die Spuleneinsatzelemente (42) in einer Anzahl entsprechend dem Arbeitsablauf vorgesehen sind.

## Revendications

1. Système de fourniture de bobines comprenant une ligne de fourniture de plateau qui transporte des plateaux à chaque unité d'enroulement d'une machine depuis un système d'enroulement de bobine (1) qui alimente des bobines pleines (Bf) à un moment par un toboggan (18) aux plateaux (2), une ligne de retour (6, 8) qui transporte les plateaux depuis l'unité d'enroulement au système de fourniture de bobines (1) qui présente un magasin rotatif (20) autour d'un axe de rotation et qui stocke les bobines pleines (Bf); le dit magasin (20) comprenant des organes d'insertion de bobines cylindriques (42) avec des trous cylindriques d'insertion (37) et un organe de réception de bobine fixe (43) avec une ouverture de livraison de bobine (38) associée au début du toboggan (18), une bobine pleine (Bf) pouvant chuter par gravité depuis l'ouverture de fourniture de bobine (38) pour être chargée sur un plateau (2) après avoir passé le toboggan (18),  
**caractérisé en ce**  
**qu'** à l'extrémité arrière du système de fourniture de bobines proche du magasin (20), un espace de fonctionnement (S) est prévu dans une position de sorte que des bobines pleines (BF) peuvent être insérées manuellement et individuellement par un espace de fonctionnement (S) dans les trous d'insertion (37);  
**qu'** une boîte de stockage (19) est prévue dans l'espace de fonctionnement (S) (S) où les bobines ayant un fil résiduel et les bobines pleines défectueuses à l'extrémité de fil sont entrées par un dispositif de retrait de bobine (3) depuis la ligne de retour (6, 7, 8)

et de là les bobines de fil résiduel et les bobines qui peuvent être rembobinées sont fournies au magasin (20) après que des procédures aient été effectuées pour faciliter la recherche de l'extrémité de fil par un opérateur,

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ce que le magasin (20) est incliné dans la direction opposée et

en ce que les organes d'insertion de bobine (42) sont prévus dans un nombre correspondant à l'étendue de l'opération

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FIG. 1

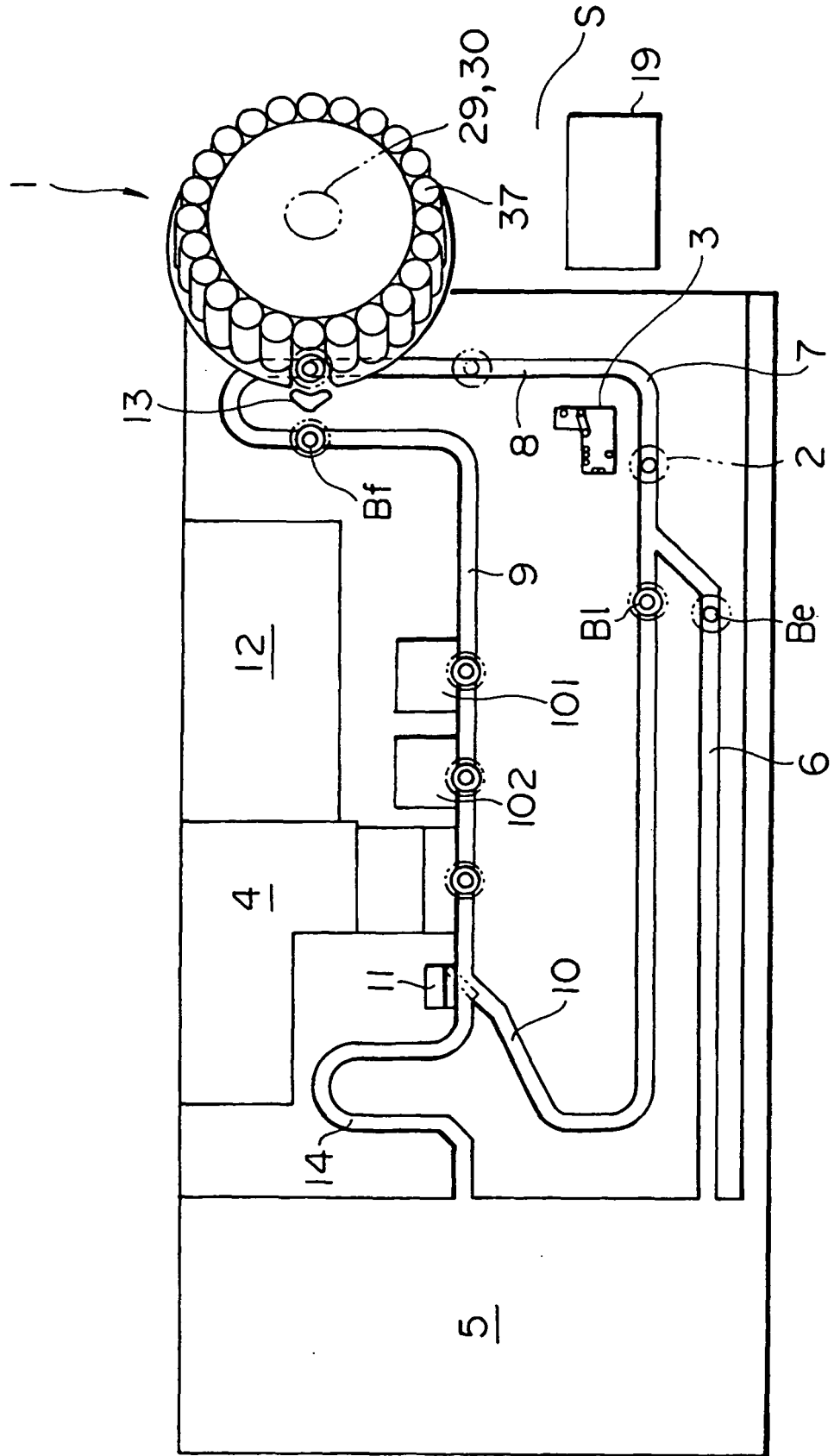
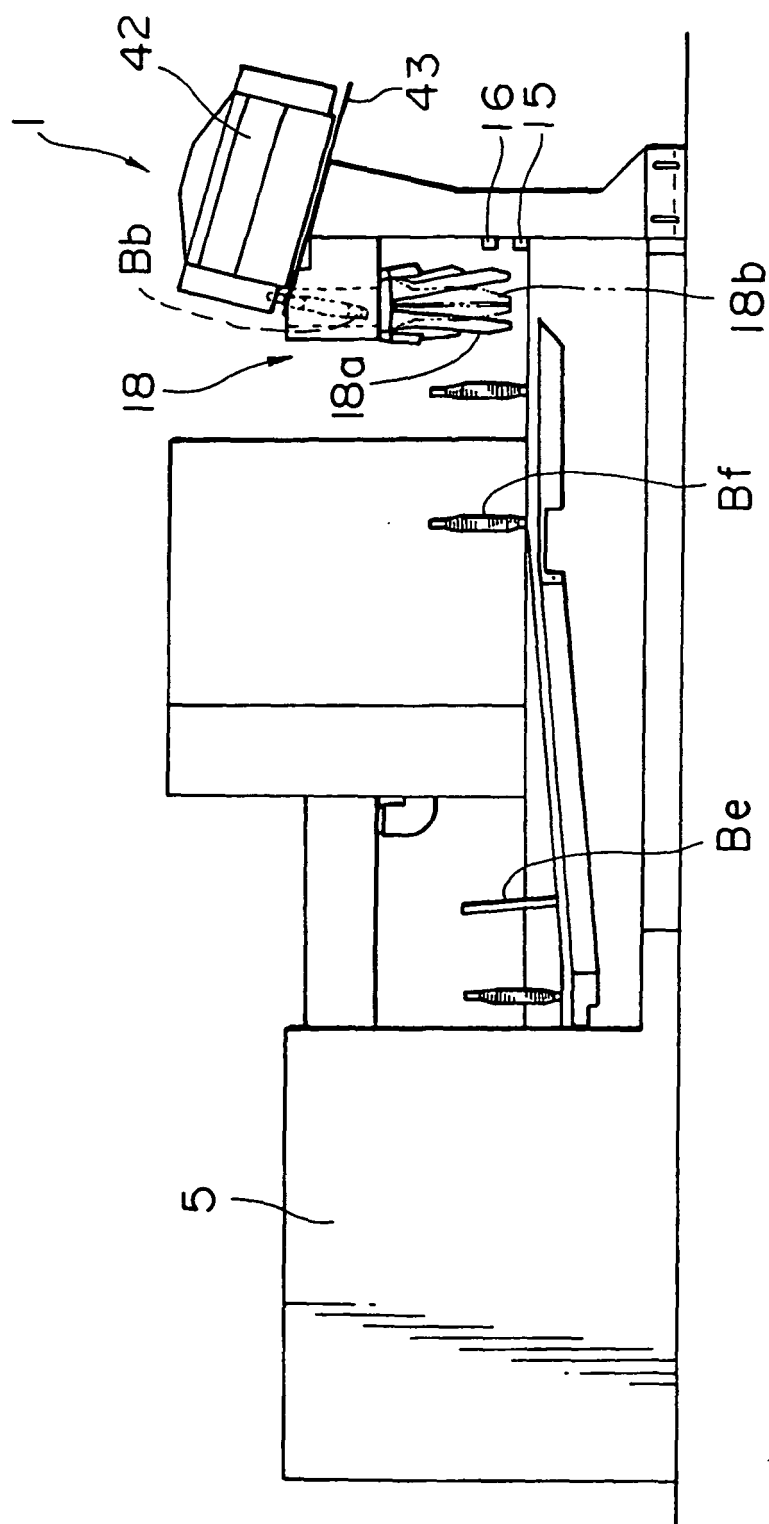


FIG. 2



மேல்

