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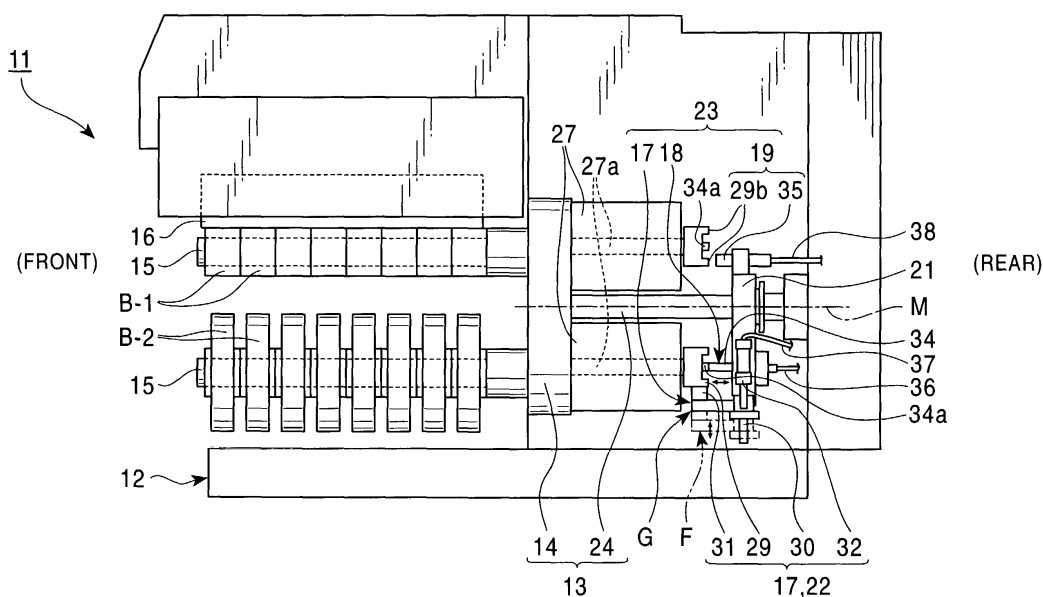
(54) **Take-up winder for filament yarn**

(57) It is an object of the present invention to provide a take-up winder for filament yarn capable of relating the device for bobbin holder such as a compressed air supplying device or a rotating speed measuring device, to the change in the position of the bobbin holder.

The present invention comprises a revolving device 13 for changing the position of a plurality of bobbin holders 5,5 by rotating, a swinging member 21 capable of swinging to both directions around the rotating center line M of the revolving device 13, an interlocking means

22 for interlocking the revolving device 13 and the swinging member 21 capable of being connected and disconnected, and a device for bobbin holder 23 provided in the swinging member 21. The device for bobbin holder 23 is a compressed air supplying device 18 for supplying compressed air for the bobbin releasing operation to the bobbin holder 5 for a wound-up bobbin B-2, or a sensor 35 of a rotating speed measuring device 19 for measuring the rotating speed of the bobbin holder 5 for a winding bobbin B-1 (Fig. 1).

FIG. 1



Description

Field of the Invention

[0001] The present invention relates to a take-up winder for winding the filament yarn around the bobbin set on a bobbin holder.

Background of the Invention

[0002] Conventionally, as shown in Figure 4 which is the right side view of the take-up winder, the take-up winder for filament yarn 1 comprises a turn table 4 supported rotatable by a machine body 2 as to form a revolving device 3, two bobbin holders 5, 5 projecting in cantilever toward the front hand side by being supported by the turn table 4, a contact roller 6 wherein a winding bobbin B-1 is contacted against thereon, a braking device 7 for stopping the rotation of the bobbin holder 5 of which is carrying a wound-up bobbin B-2, a compressed air supplying device 8 for supplying the compressed air for releasing the bobbin to the bobbin holder 5 of which is carrying the wound-up bobbin B-2, and a rotating speed measuring device 9 for measuring the rotating speed of the bobbin holder 5 of which is carrying the winding bobbin B-1.

[0003] Moreover, to attempt the miniaturization of the mechanism for supporting the contact roller 6, there is a take-up winder for filament yarn 1 wherein the elevating and descending amount of the contact roller 6 is decreased, or the contact roller 6 is made not to elevate and descend.

[0004] Furthermore, in this take-up winder for filament yarn, the turn table 4 is rotated gradually accompanying the increase in the winding diameter of the winding bobbin B-1, and the position of the winding bobbin B-1 is arranged to be changed during the winding process.

[0005] In the bobbin exchanging work for exchanging the wound-up bobbin B-2 with an empty bobbin, after the wound-up bobbin B-2 is turned to the exchanging position, the rotation of the bobbin holder 5 with the wound-up bobbin B-2 by inertia is stopped by the braking device 7, the compressed air supplying device 8 supplies the compressed air for releasing the bobbin to the stopped bobbin holder 5, and the wound-up bobbin B-2 is made into a released state. The stopping operation and the compressed air supplying operation to the bobbin holder 5 are carried out with the rotation of the turn table 4 stopped, since the principal parts of the braking device 7 and the compressed air supplying device 8 are provided fixed to the exchanging position. However, the winding by the winding bobbin B-1 is continued while this operation is being carried out. As a result, since it is required to resume as soon as possible the rotation of the winding bobbin B-1 of which the winding diameter is prone to be increasing, and to contact the winding bobbin B-1 against the contact roller 6 at a designated position under an appropriate pressure, both of these

operations in the bobbin exchanging work are required to be terminated within a short period of time.

[0006] There is a limit for the bobbin exchanging work to carry out the stopping operation and the compressed air supplying operation to the bobbin holder 5 within a short period of time. Therefore, there are cases in which the bobbin exchanging work takes a long period of time and fails. In the case the bobbin exchanging work does not complete within a prescribed period of time, an alarm is generated, and the winding is required to be suspended. Especially in the case the filament yarn is thick, since the increasing speed of the winding diameter is fast, it is difficult to carry out the bobbin exchanging work within a short period of time. Therefore, conventionally, concerning the speeding up of the spinning speed, there was a limit from the bobbin exchanging work side.

[0007] Moreover, the take-up winder for filament yarn is required to measure the rotating speed of the bobbin holder 5 of the winding bobbin B-1 side during the winding process. Therefore, in the take-up winder for filament yarn, the sensor of the rotating speed measuring device 9 (not shown in the drawings) is provided for each bobbin holder 5, 5 in the turn table 4 side, the slip ring is provided in the midst of the lead wire extending from the sensor, and by securing the rotation of the turn table 4 by the slip ring, a signal transmission to the measuring circuit from the sensor is carried out. However, the slip ring is prone to generate noise, thus the measuring level is not reliable.

[0008] Thus, it is an object of the present invention to provide a take-up winder for filament yarn, in consideration to the problems described above, capable of interlocking the device for bobbin holder such as the compressed air supplying device or the rotating speed measuring device, and the position changing of the bobbin holder.

Summary of the Invention

[0009] The take-up winder for filament yarn including the revolving device for changing the position of a plurality of bobbin holders by revolving, is characterized in that the means adopted by the present invention for relating the device for bobbin holder to the position changing of the bobbin holder, comprises a swinging member capable of swinging to both directions around the revolving center line of the revolving device, an interlocking means for interlocking the revolving device and the swinging member capable of being disconnected and connected, and a device for the bobbin holder provided in the swinging member. Further, to simplify the structure by sharing with the braking device of the bobbin holder, the interlocking means may comprise a brake wheel rotating with the bobbin holder in a unity, a brake shoe provided in the swinging member, and an operating member for advancing and receding the brake shoe. The brake shoe is advanced and receded from the receding position which does not interfere with the position

changing of the bobbin holder and the swinging of the swinging member, to the advancing position contacting against the periphery surface of the brake wheel. The contacting surface of the brake shoe is formed like an arc so that to hold in the periphery surface of the brake wheel. The revolving device and the swinging member become into an interlocked state by the advancing of the brake shoe, and into a non-interlocked state by the receding of the brake shoe.

[0010] According to the present invention, by interlocking the revolving device and the swinging member by the interlocking means, the device for bobbin holder can be transferred in accordance with the position changing of the bobbin holder, and the bobbin holder in the position changing process and the device for bobbin holder can be linked.

[0011] The means adopted by the present invention for relating the compressed air supplying device for the bobbin releasing operation to the position changing of the bobbin holder, is the take-up winder for filament yarn wherein the device for bobbin holder is a compressed air supplying device for supplying compressed air for the bobbin releasing operation to the bobbin holder.

[0012] In the present invention, the releasing operation of the bobbin holder can be carried out by the compressed air supplying device and the exchanging of the wound-up bobbin and the empty bobbin can be carried out at a random position, even in the midst of the position changing process of the bobbin holder.

[0013] The means adopted by the present invention for relating the sensor for measuring the rotating speed of the bobbin holder to the position changing of the bobbin holder, is a take-up winder wherein the device for the bobbin holder is a sensor of the rotating speed measuring device for measuring the rotating speed of the bobbin holder.

[0014] In the present invention, the sensor provided in the swinging member and the measuring circuit or the like provided fixed to the rotating speed measuring device can be connected directly by the lead wire without intervening the slip ring. Even when the bobbin holder is in the midst of position changing process, the signal measured by the sensor can be transmitted to the measuring circuit via the lead wire.

Brief Description of the Drawings

[0015]

Figure 1 is a right side view of the take-up winder for filament yarn showing the embodiment according to the present invention.

Figure 2 is a rear view of the main part according to the embodiment of the present invention.

Figure 3 is a rear view showing the interlocking means according to the embodiment of the present invention. Figure 3A shows the interlocking condition, and Figure 3B shows the non-interlocking con-

dition.

Figure 4 is a right side view of the conventional take-up winder for filament yarn.

5 Detailed Description of the Preferred Embodiment

[0016] The take-up winder for filament yarn according to the present invention (hereinafter referred to as the take-up winder of the present invention) will now be described based on the embodiment shown in Figure 1 through Figure 3.

[0017] The take-up winder for a filament yarn 11 according to the embodiment of the present invention comprises a turn table 14 supported capable of rotating by a machine body 12 so that to compose a revolving device 13, two bobbin holders 15, 15 supported by the turn table 14 so that they project in cantilever toward the front hand side, and a contact roller 16 of which a winding bobbin B-1 is contacted against thereon. The two bobbin holders 15, 15 are provided in the point symmetric position to the rotating center of the turn table 14. Each bobbin holders 15, 15 carry winding bobbins B-1 and wound-up bobbins B-2. One of the two bobbin holders 15, 15 is located at the winding position of the contact roller 16 side, and the other bobbin holder 15 is located at the bobbin exchanging position. The yarn is wound around the empty bobbins carried by the bobbin holder 15 at the winding position. The bobbin of which the yarn is being wound around is to be referred to as a winding bobbin B-1. As shown in Figure 1, the wound-up bobbin (complete wound bobbin) B-2 of which a prescribed yarn amount is wound, is on stand by in the bobbin holder 15 at the bobbin exchanging position, to be exchanged with an empty bobbin of which yarn is yet to be wound. The wound-up bobbin B-2 is then exchanged with the empty bobbin, and after the exchanging, the bobbin holder 15 of the exchanging position is to be on stand by with the empty bobbin set on, until the winding bobbin B-1 of the bobbin holder 15 at the winding position becomes the wound-up bobbin B-2.

[0018] The improvement of the take-up winder for filament yarn 11 is the employment of a swinging member 21 capable of swinging in both directions of the arrow C having the swinging center on the center line M of which is the same as the rotating center of the turn table 14 rotating in the direction of the arrow A, an interlocking means 22 for interlocking the revolving device 13 and the swinging member 21 capable of being connected and disconnected, and a device for bobbin holder 23 provided in the swinging member 21. A braking device 17, a compressed air supplying device 18 and/or a rotating speed measuring device 19 to be mentioned later on, correspond for the device for the bobbin holder 23.

[0019] The revolving device 13 comprises the turn table 14 supported capable of rotating via a horizontal shaft 24 by the machine body 12, and a driving motor 25 for rotating the turn table 14 in the arrow A direction. The contact roller 16 is provided in the designated po-

sition of the machine body 12, and is made to rotate and drive by the driving motor 26. The contact roller 16 is provided at a designated height position so that the elevating and descending amount is to be reduced according to the winding condition or not to elevate or descend. Each of the two bobbin holders 15, 15 is made to be rotated and driven by an adjustable speed type driving motor 27.

[0020] The turn table 14 rotates gradually to the direction of the arrow A from the winding starting position J to the winding terminating position K, accompanying the enlarging of the winding diameter of the winding bobbin B-1. Likewise, the bobbin holder 15 at the winding position transfers gradually from the winding starting position J to the winding terminating position K. At the same time, the bobbin holder 15 at the bobbin exchanging position also transfers from the bobbin exchanging starting practicable position D ("interlocking starting position" to be mentioned later on) to the bobbin exchanging terminating position ("interlocking terminating position" to be mentioned later on) E, in the same manner. The winding terminating position K is a position where the wound yarn amount of the winding bobbin B-1 reaches the prescribed amount, in other words, the position where the bobbin becomes the wound-up bobbin B-2, and a position to be changed according to how the kinds of the yarn, the thickness of the yarn, and the prescribed amount of the wound yarn are determined. When the bobbin holder 15 of the winding position reaches the winding terminating position K, the turn table 14 rotates rapidly to the arrow A direction to the bobbin exchanging starting position D. Accompanying this, the bobbin holder 15 of the bobbin exchanging position (bobbin exchanging terminating position E) is brought to the winding starting position J, and the winding of the yarn is to be carried out to the empty bobbin set on the bobbin holder 15. Therefore, the wound-up bobbin B-2 set on the bobbin holder 15 at the bobbin exchanging position is required to be exchanged with an empty bobbin at least before the bobbin reaches the bobbin exchanging terminating position E. In other words, the wound-up bobbin B-2 should be exchanged with an empty bobbin between the bobbin exchanging starting practicable position D and the bobbin exchanging terminating position E. The time required for the bobbin to reach the bobbin exchanging terminating position E from the bobbin exchanging starting practicable position D, in other words, the time required for the bobbin to reach the winding terminating position K from the winding starting position J, is the time required for the wound-up bobbin B-2 to be formed, and is a long period of time.

[0021] The swinging member 21 is formed like both arms extending to the diameter direction, supported by the horizontal shaft 24 of the revolving device 13, and is capable of swinging to both directions of the arrow C between the interlocking starting position D and the interlocking terminating position E. Further, structurally, the swinging member 21 is capable of swinging beyond

the area of the interlocking starting position D and the interlocking terminating position E. However, due to the reasons such as there are no rooms of more than a fixed level in a pipe 36 of the compressed air supplying device 18, a pipe 37 of the interlocking means 22 and a lead wire 38 of the rotating speed measuring device 19 which are attached to the swinging member 21, when aforementioned area is passed over, the alarm is generated electrically and the operation of the take-up winder for filament yarn stops. As a result, the swinging member 21 is made not to swing beyond aforementioned area. The braking device 17 which shares the interlocking means 22, and the compressed air supplying device 18 are provided in the lower end side of the swinging member 21, and the rotating speed measuring device 19 is provided in the upper end side of the swinging member 21.

[0022] The braking device 17 of which shares the interlocking means 22 comprises brake wheels 29, 29 attached to the back end of rotating shafts 27a, 27a of the driving motors 27, 27 which drives each bobbin holders 15, 15, a brake shoe 31 which advances and recedes by being guided by a guiding member 30 provided in the swinging member 21, and an operating tool 32 which is formed by the air cylinder or the like which advances and recedes a brake shoe 31. The advancing and receding area of the brake shoe 31 is between the receding position F where the swinging of the swinging member 21 is not interrupted, and the advancing position G contacting and pressing against a periphery surface 29a of the brake wheel 29. The pipe 37 having flexibility such as a hose is connected to the operating tool 32, for supplying compressed air. A pressing surface 31a (refer to Figure 3) of the brake shoe 31 is formed like an arc, so that the brake shoe 31 is capable of holding in the periphery surface 29a of the brake wheel 29. When the brake shoe 31 advances to the advancing position G to hold in, the brake wheel 29 which is to be a part of the revolving device 13, and the swinging member 21 are interlocked, and the brake is applied to the bobbin holder 15 and the driving motor 27 of which are rotating by inertia. Contrary, when receding to the receding position F, the brake wheel 29 of which is to be a part of the revolving device 13, and the swinging member 21 are brought into non-interlocked state.

[0023] The braking device 17 sharing the interlocking means 22 turns along with the bobbin holder 15 carrying the wound-up bobbin B-2, advances the brake shoe 31 on stand by under non-interlocking state (refer to Figure 3B), and contacts against the brake wheel 29 which has reached the interlocking starting position D, to reach the interlocking state (refer to Figure 3A). When this interlocking state is maintained, the swinging member 21 rotates in the direction of the arrow A along with the turn table 14 (wound-up bobbin B-2), and reaches the interlocking terminating position E. Then, the brake shoe 31 recedes so that non-interlocking state is reached. After swinging following the revolving device 13 toward the

interlocking terminating position E from the interlocking starting position D, the swinging member 21 is made to return forcibly to the interlocking starting position D from the interlocking terminating position E by the return motor 33, so that the swinging member 21 can return accurately to the interlocking starting position D. Further, when swinging from the interlocking starting position D to the interlocking terminating position E, the return motor 33 can be driven subsidiary.

[0024] The interlocking means 22 is not to be limited for the case in which sharing with the braking device 17, but can be provided separately with the braking device 17. The drawings are abbreviated, however, the interlocking means of a different embodiment can be comprising an interlocking plug rotating in a unity with a turn table 14 provided in the back end side of the driving motor 27 for example, and an interlocking pin capable of advancing and receding provided in the swinging member 21; and can be formed to be connected and disconnected by inserting and exerting the interlocking pin to the interlocking plug.

[0025] The compressed air supplying device 18 comprises a compressed air inlet 34a provided in the center of the back end side of the brake wheel 29, and a compressed air supplying tool 34 provided freely advancing and receding in the swinging member 21. When the revolving device 13 and the swinging member 21 are interlocked, by interlocking the advanced compressed air supplying tool 34 to a compressed air inlet 34a, the compressed air for releasing the bobbin is supplied to the bobbin holder 15. Further, when the revolving device 13 and the swinging member 21 are not interlocked, by receding the compressed air supplying tool 34, the revolving device 13 and the swinging member 21 can be transferred separately. For the supplying of the compressed air, a pipe having flexibility such as a hose is connected to the compressed air supplying tool 34.

[0026] The rotating speed measuring device 19 which measures the rotating speed of the bobbin holder 15 during the winding process, comprises a sensor 35 provided in the swinging member 21, and a measuring circuit (not shown in the drawings) provided in the machine body 12 side, and the sensor 35 and the measuring circuit are connected by the lead wire 38. Since the swinging member 21 swings within a designated area in both directions of the arrow C, the sensor 35 and the measuring circuit can be connected directly by the lead wire 38 without intervening the slip ring in the midst of the lead wire 38. The sensor 35 detects the rotating speed by approaching under non-contacting state, to protrusions 29b, 29b projecting from the back end side of the brake wheel 29, in the case the revolving device 13 and the swinging member 21 are interlocked.

[0027] Next, the operation of the take-up winder for filament yarn 11 of the embodiment according to the present invention will now be described.

[0028] When the filament yarn (such as polyester filament yarn, nylon yarn, urethane rubber yarn) of the

designated amount is wound up in the winding bobbin B-1, the take-up winder for filament yarn 11 rotates the turn table 14 rapidly in the arrow A direction, and the bobbin holder 15 holding the wound-up bobbin B-2 is transferred to the interlocking starting position D in the lower section. In addition, the bobbin holder 15 holding an empty bobbin is transferred to the winding position J. Consequently, the transferring of the yarn is carried out between the wound-up bobbin B-2 and the empty bobbin contacting against the contact roller 16, and the brake shoe 31 of the braking device 17 sharing the interlocking means 22 is advanced immediately and is pressed against the brake wheel 29 of the bobbin holder 15 of the wound-up bobbin B-2 side. The revolving device 13 and the swinging member 21 are interlocked immediately, and the brake is applied to the bobbin holder 15 of the wound-up bobbin B-2 side which is rotating by inertia.

[0029] Further, the transferring of the yarn and the interlocking by the interlocking means 22, are carried out with the revolving device 13 stopped, but can be carried out within a short suspension time. When the transferring of the yarn is carried out, the yarn is wound around an empty bobbin, and the revolving device 13 rotates gradually accompanying the enlarging of the winding diameter of the winding bobbin B-1. The distance between the winding bobbin B-1 and the contact roller 16 are to be the distance corresponding to the winding diameter. The contacting of the winding bobbin B-1 pressuring against the contact roller 16 is maintained at an appropriate state. Since the swinging member 21 under the interlocking state transfers along with the revolving device 13 (winding bobbin B-1 and wound-up bobbin B-2), even when the bobbin holder 15 of the winding bobbin B-1 side changes the position, the rotating speed of the bobbin holder 15 of the winding bobbin B-1 during the winding process can be measured by the rotating speed measuring device 19.

[0030] Moreover, even when the bobbin holder 15 of the wound-up bobbin B-2 side changes the position, the compressed air for releasing the bobbin is supplied to the bobbin holder 15 of the wound-up bobbin B-2 side by the compressed air supplying device 18, and the wound-up bobbin B-2 can be released from the bobbin holder 15 and exchanged with an empty bobbin.

[0031] The bobbin holder 15 of which received the supplying of the compressed air for releasing the bobbin, finishes the preparation of the next transferring process of the yarn by the wound-up bobbin B-2 and the empty bobbin being exchanged. The exchanging work of the wound-up bobbin B-2 and the empty bobbin is to be completed before the swinging member 21 reaches the interlocking terminating position E. Thus, such work can be carried out under the condition in which plenty of time is available. It becomes ready for the next yarn transferring process when the swinging member 21 arrives at the interlocking terminating position E. Therefore, after the interlocking by the interlocking means 22

is cancelled, the swinging member 21 is returned forcibly to the interlocking starting position D from the interlocking terminating position E by the return motor 33, and stands by until the next yarn transferring process is completed.

[0032] Likewise, the take-up winder for filament yarn 11 comprises a swinging member 21 and the interlocking means 22. The device for bobbin holder such as the compressed air supplying device 18, the rotating speed measuring device 19 are to be provided in the swinging member 21. Therefore, even when the positions of the bobbin holders 15, 15 are changed, the device for the bobbin holder can be worked on the bobbin holder of any changed position. As a result, the defects, such as the bobbin exchanging work is needed to be carried out instantly, the reliability of the measurement is needed to be reduced so that the measurement of the rotating speed of the bobbin holder can be carried out at any position, can be eliminated.

[0033] The take-up winder of the present invention is capable of transferring the device for bobbin holder associated with the change in the position of the bobbin holder. As a result, even when the bobbin holder changes its position, the operation, the processing or the like can be carried out easily to the bobbin holder by the device for the bobbin holder.

[0034] The take-up winder of the present invention is capable of transferring the compressed air supplying device for the bobbin releasing operation associated with the change in the position of the bobbin holder. As a result, the bobbin exchanging work can be carried out even when the bobbin holder changes its position, the time limit to the bobbin exchanging work is eliminated, and the speeding up of the spinning speed is no longer limited from the bobbin exchanging work side.

[0035] The take-up winder of the present invention is capable of transferring the sensor associated with the change in the position of the bobbin holder. Therefore, the take-up winder of the present invention can transmit a signal by the lead wire without intervening the slip ring in the measuring circuit from the sensor, enabling the improvement of the reliability in the measuring.

Claims

1. A take-up winder for filament yarn including a revolving device for changing the positions of a plurality of bobbin holders by rotating, comprising:

a swinging member which has the rotating center located on the same core with the rotating center of the revolving device, capable of swinging in both directions with the rotating center as the center;

an interlocking means for interlocking the revolving device and the swinging member, capable of being connected and disconnected;

and

a device for bobbin holder provided in the swinging member.

2. A take-up winder for filament yarn according to claim 1 wherein the device for bobbin holder is a compressed air supplying device for supplying compressed air for the bobbin releasing operation to the bobbin holder.

3. A take-up winder for filament yarn according to claim 1 wherein the device for bobbin holder is a sensor of a rotating speed measuring device for measuring the rotating speed of the bobbin holder.

4. A take-up winder for filament yarn including a revolving member supported rotatable by the machine body and two bobbin holders supported rotatable by the revolving member; wherein the revolving member rotates gradually accompanying the enlarging of the winding diameter of the bobbin set on one of the bobbin holders, and the one of the bobbin holders transfers gradually from the winding starting position to the winding terminating position, and at the same time, the other bobbin holder transfers from the bobbin exchanging starting practicable position to the bobbin exchanging terminating position; comprising:

a swinging member which has the rotating center located on the same core with the rotating center of the revolving member, capable of swinging in both directions with the rotating center as the center;

an interlocking means for interlocking the revolving member and the swinging member, capable of being connected and disconnected; and

a compressed air supplying device provided in the swinging member, for supplying compressed air for the bobbin releasing operation to the other bobbin holder.

FIG. 1

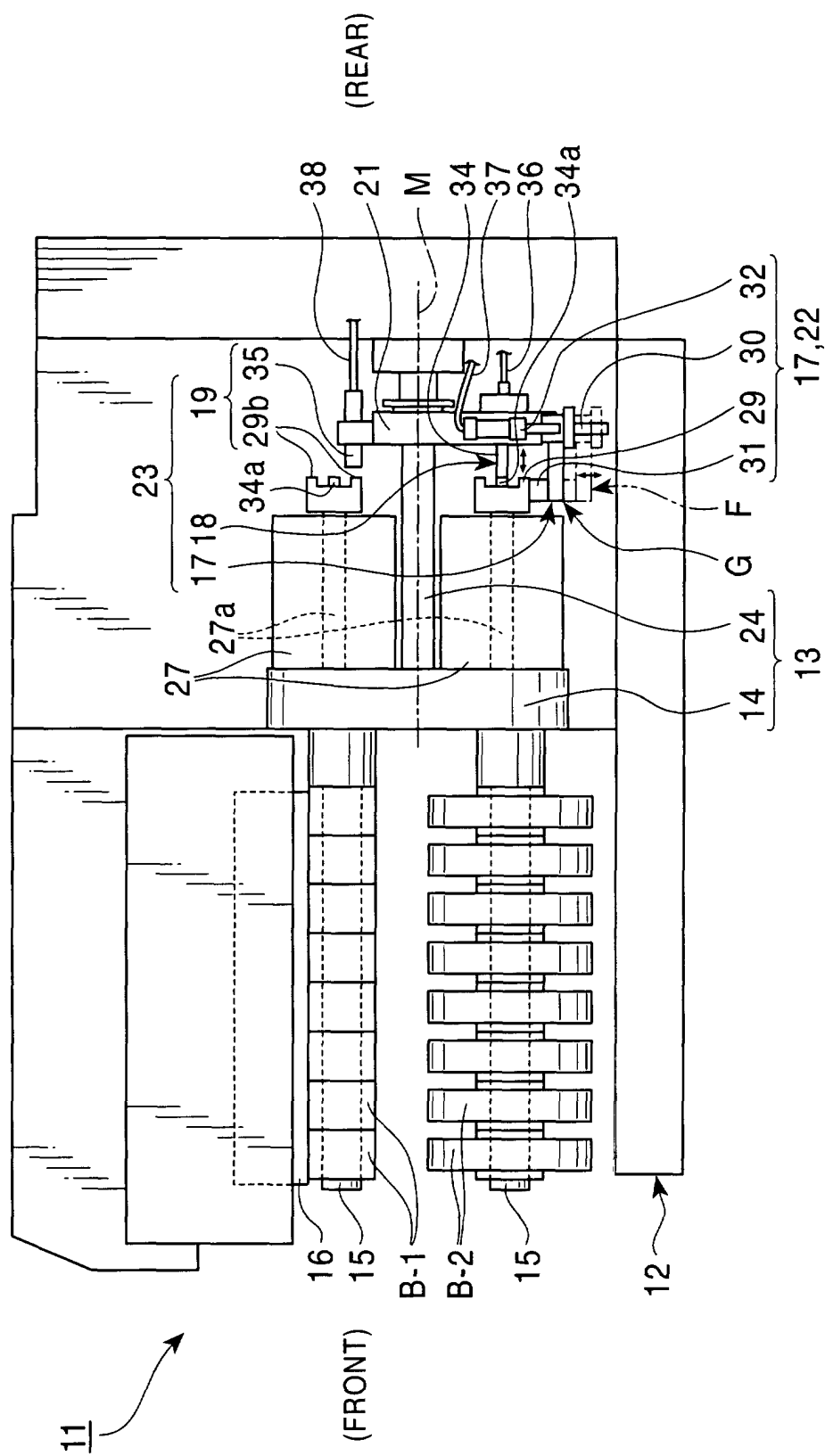


FIG. 2

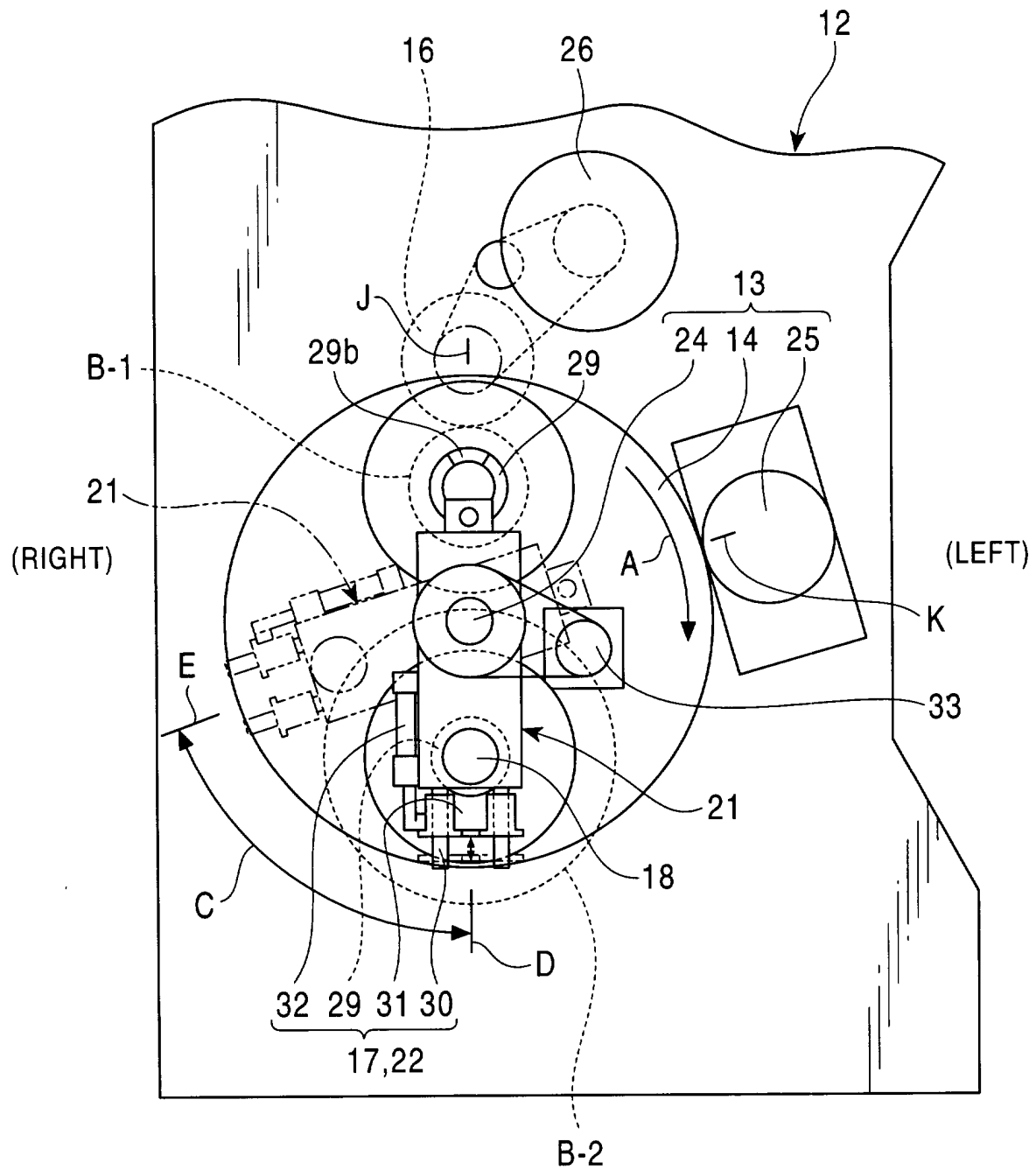


FIG. 3A

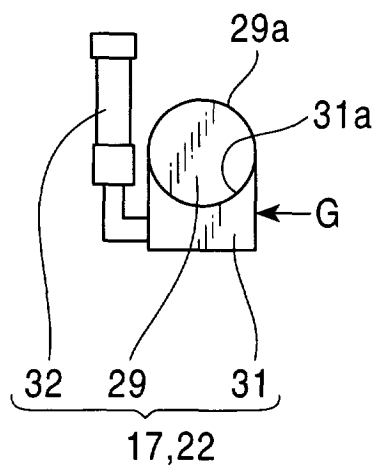


FIG. 3B

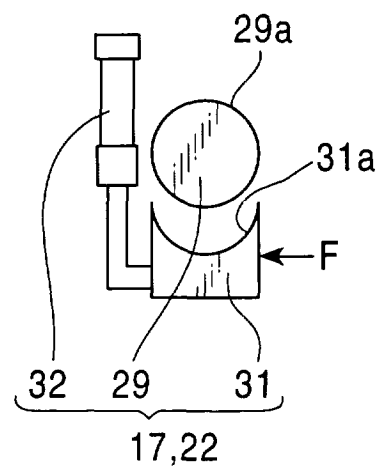


FIG. 4
PRIOR ART

