United States Patent [19]

Takeuchi et al.

[11] **3,816,991**

[45] **June 18, 1974**

[54] **METHOD AND DEVICE FOR SUPPLYING SLIVER TO A SPINNER MACHINE**

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[22] Filed: **June 28, 1973**

[21] Appl. No.: **374,561**

[30] **Foreign Application Priority Data**

May 7, 1973 Japan 48-49825

[52] **U.S. Cl.** **57/36,** 57/90, 57/156

[51] **Int. Cl.** **D01g 1/06,** D01g 23/00

[58] **Field of Search** .... 57/1 R, 34 R, 36, 90, 106, 57/113, 156; 19/66

[56] **References Cited**

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Primary Examiner—Donald E. Watkins

[57] **ABSTRACT**

A sliver is intermittently introduced into a sliver guide conduit disposed at a position corresponding to each spinning unit in an over feeding condition. The sliver guide conduit comprises an upright portion and a substantially horizontal portion provided with a bottom delivery aperture formed below a feed mechanism of the spinning unit. To prevent an irregular draft of the sliver in the conduit, obstruction means which inhibits free downward displacement of the sliver maybe disposed in the upright conduit portion. The horizontal conduit portion is inclined a little upward so that overflow of the sliver from the bottom aperture can be prevented.

21 Claims, 13 Drawing Figures

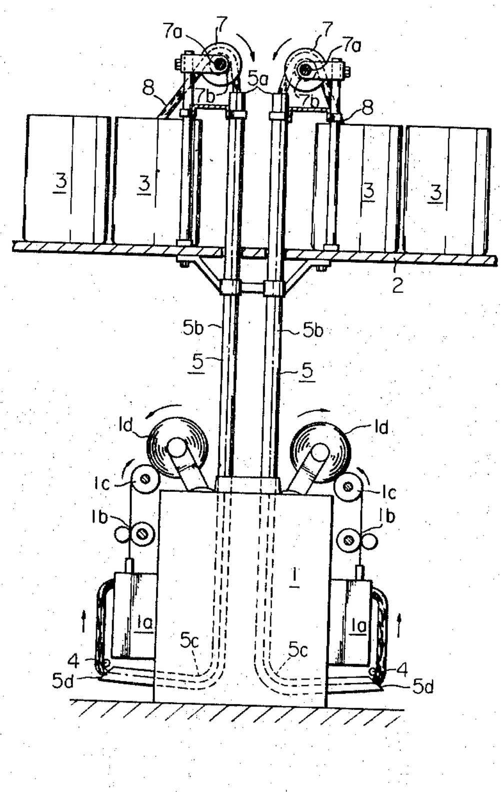
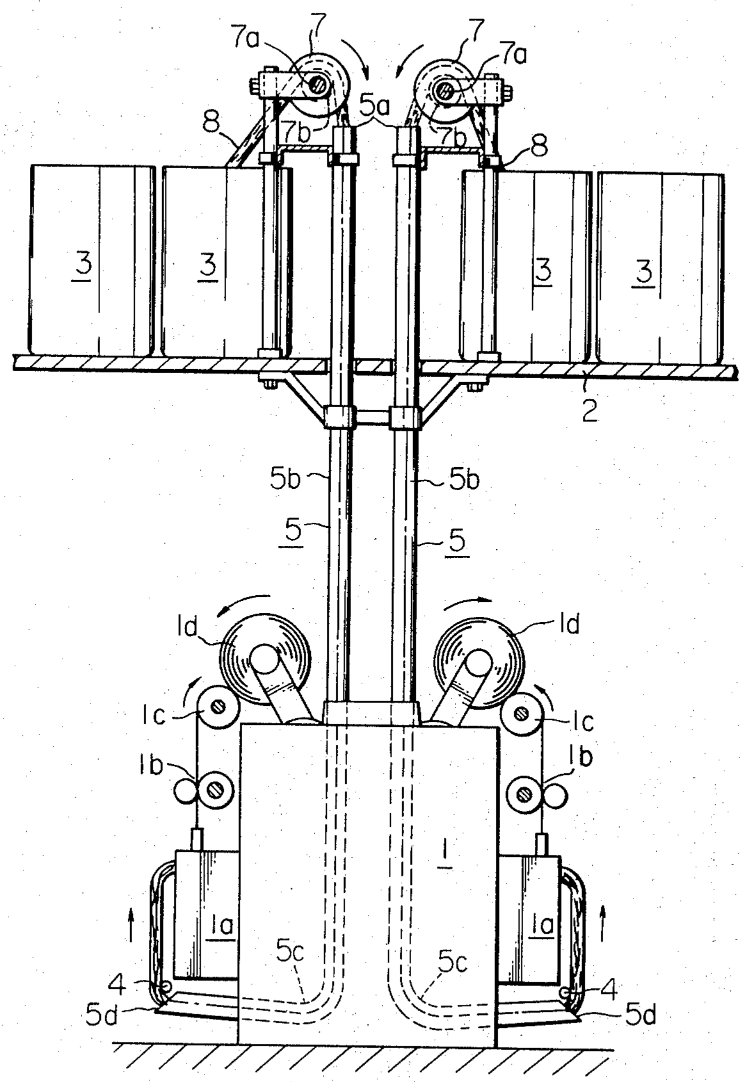


Fig. 1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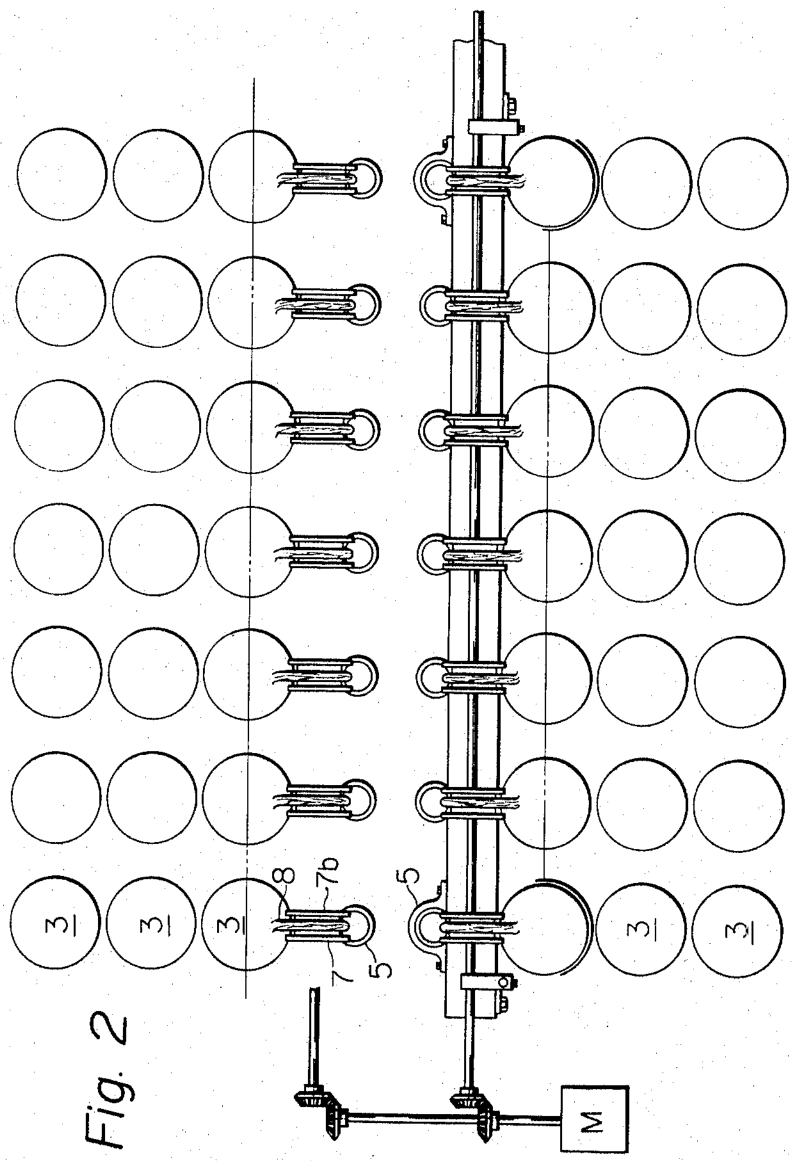


Fig. 2

Fig. 3A

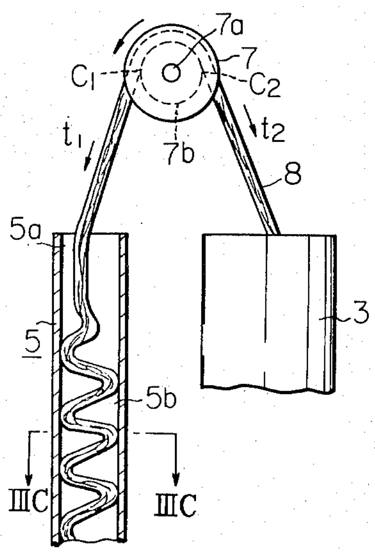


Fig. 3B

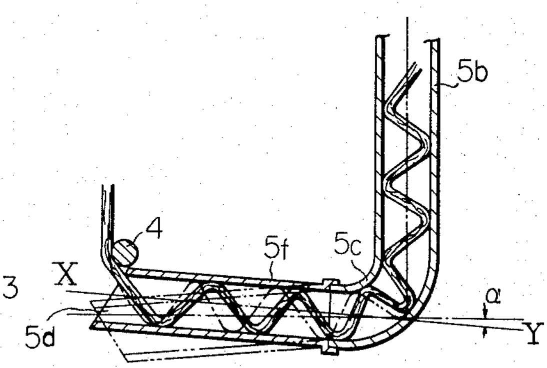


Fig. 4

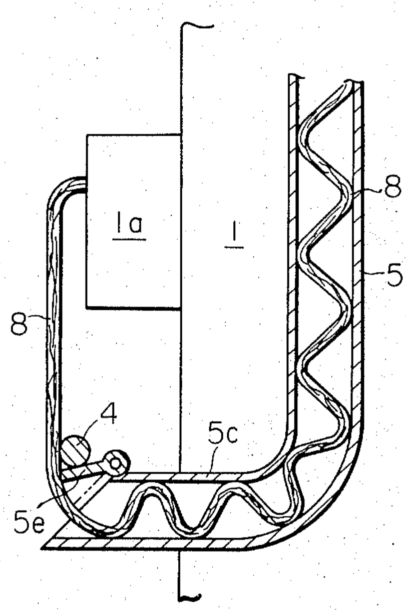


Fig. 3C

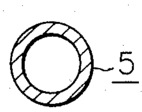


Fig. 5A

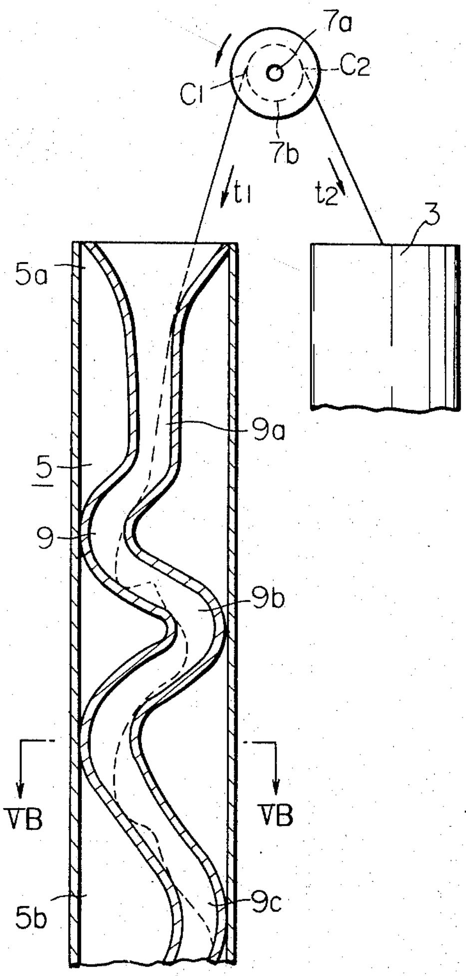


Fig. 5B

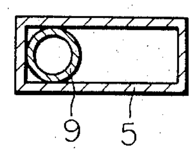


Fig. 6A

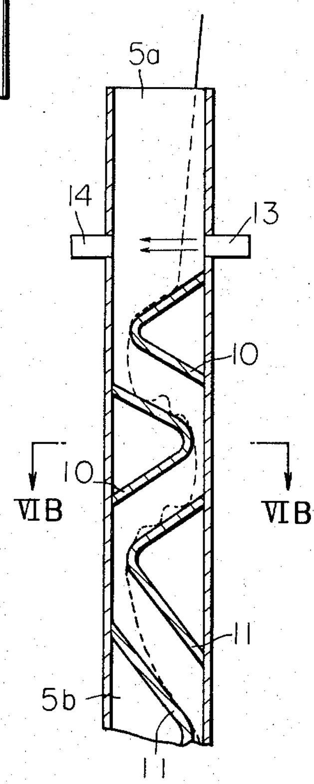


Fig. 6B

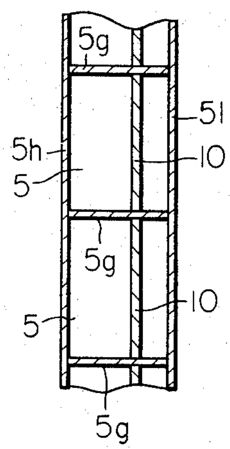


Fig. 7A

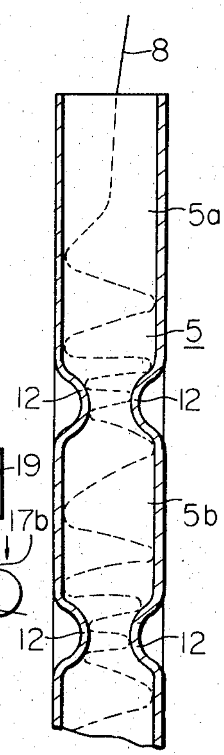


Fig. 7B

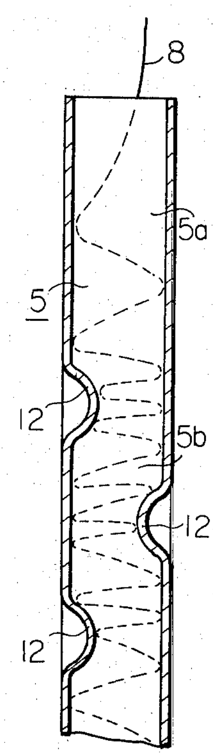
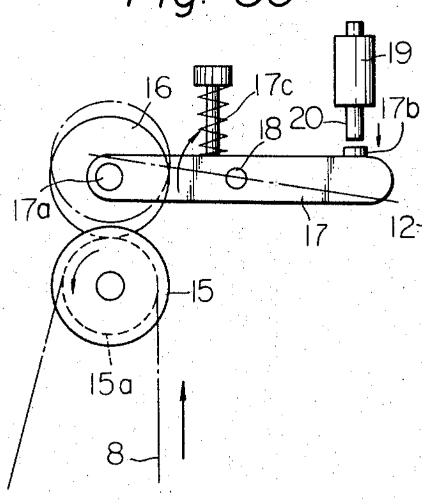


Fig. 6C



METHOD AND DEVICE FOR SUPPLYING SLIVER TO A SPINNER MACHINE

BRIEF EXPLANATION OF THE INVENTION

The present invention relates to a method and device for supplying sliver to a spinning machine; more particularly, the invention relates to a method and device for supplying sliver to a ring spinning frame or a ringless spinning frame so as to attain a large package effect thereupon.

It is well known that the so-called large package system has been positively applied to the spinning process so as to reduce the production cost. Because of the continuing trend of increased labor costs, the large package system has been increasingly applied in the spinning process.

For example, a very large packaged sliver can is disposed at a front side or back side or above each spinning unit of a spinning frame and a sliver is positively taken up from the can by means of a pair of grip rollers which are driven at a speed synchronous with the supply speed of a feed roller of the spinning unit, and the sliver is then supplied to the spinning unit by way of a guide roller. However, based on our experience in mill operations, as the sliver is firstly taken up upward from the cans by means of the take up rollers and then is carried downward so as to introduce it to the guide roller, the effect of the total weight of the free sliver, which has passed through the grip rollers, is concentrated at a sliver portion where the sliver leaves the bottom grip roller. Consequently, a portion of the sliver which has passed through the grip roller receives a load due to the sliver weight so that an irregular draft is created in this sliver portion. If the above-mentioned load is too large, the sliver may be broken. If the above-mentioned irregular draft or breaking of sliver can not be prevented, the quality of yarn produced from the above-mentioned sliver is lowered and the production cost may be increased.

The principal object of the present invention is to eliminate the above-mentioned drawbacks of the conventional sliver supply system, even if very large packaged sliver-cans are utilized.

A further object of the present invention it to provide a novel device for supplying a sliver to each spinning unit of a spinning machine whereby the troublesome manual operation can be eliminated.

To attain the purpose of the present invention, the following basic principles are applied.

1. The sliver cans are arranged on a floor disposed behind or above the spinning machine.

2. Sliver take up means is disposed above each spinning unit of the spinning machine so as to take up a sliver from a corresponding sliver can and to supply the sliver to the spinning unit.

3. A guide conduit is disposed between the sliver take up means and a feed roller of a spinning unit. The guide conduit comprises a substantially upright portion provided with a top aperture, and a substantially horizontal portion provided with a bottom aperture, and a portion connecting the upright portion with the horizontal portion.

Mr. Ryohei Tsuzuki proposed the utilization of the upright guide tube for supplying sliver to each spinning unit in the U.S. Pat. No. 3,448,571. However, in the practical device of the present invention, particular

considerations are paid to prevent the drawbacks of the known sliver supply system utilizing the sliver guide conduit such as the above-mentioned guide tube. That is, in the present invention, the sliver contained in the sliver can is intermittently fed into the sliver conduit from the top aperture thereof by the take up means, and the sliver introduced into the sliver conduit is temporarily reserved in at least one reserve portion formed in the sliver conduit so as to prevent creation of an irregular draft due to the sliver's own weight. Therefore, the take up means of the present invention has a capacity for over feeding the sliver into the sliver guide conduit. According to out repeated operational tests, it was found that if an upright sliver conduit is applied and the sliver is reserved in the guide conduit, there is a certain tendency of the sliver to overflow at the bottom aperture of the guide conduit. If the sliver overflows at the bottom aperture of the sliver becomes conduit, the sliver entangled so that an irregular draft or breakage of the sliver is inevitable. Mr. Tsuzuki proposed applying a positive means such as a turnable stopper or shutter piece which prevents the above-mentioned overflowing of the sliver. However, the utilization of this positive means is doubtful because, it is necessary to overcome the working force of the positive means when the sliver is delivered from the bottom aperture of the sliver guide conduit whereby the sliver is apt to be drafted irregularly, if the above-mentioned working force is strong. In the present invention, to prevent the above-mentioned overflowing of the sliver from the bottom aperture, a substantially horizontal guide portion is formed at the bottom portion of the conduit. Based on our practical tests, it was found that the disposition of the above-mentioned horizontal guide portion is desirable to slightly incline from a horizontal line so as to dispose the bottom aperture at a slightly higher position than the connecting position formed between the upright portion and the horizontal portion of the guide conduit.

Further, for the sake of easy handling of sliver when the sliver is prepared for feeding the spinning unit, it is preferable to use the horizontal portion of the guide conduit which is turnably mounted on the connecting portion of the guide conduit, if the horizontal guide portion is disposed so as to be slightly inclined as mentioned above.

According to utilization of the above-mentioned device, the sliver can be supplied to the respective spinning units smoothly without any irregular draft or breakage.

BRIEF EXPLANATION OF THE DRAWINGS

FIG. 1 is a schematic side view of a ringless spinning machine utilizing a sliver supply device according to the present invention;

FIG. 2 is a schematic elevation of a plurality of sliver cans mounted on a floor above the ringless spinning machine shown in FIG. 1;

FIG. 3A is a schematic side view, partly in section, of an upper mechanism of the sliver supply device according to the present invention;

FIG. 3B is a schematic sectional side view of a sliver guide conduit utilized in the sliver supply device according to the present invention;

FIG. 3C is a cross-sectional view of a sliver supply conduit taken along a line IIIC—IIIC, shown in FIG. 3A;

FIG. **4** is a cross-sectional view of a bottom portion of a modified sliver guide conduit according to the present invention;

FIG. **5A** is a cross-sectional view of a top portion of a modified sliver guide conduit according to the present invention;

FIG. **5B** is a lateral cross-sectional view of the sliver guide conduit, taken along a line VB—VB shown in FIG. 5A;

FIG. **6A** is a cross-sectional view of a further modified sliver guide conduit according to the present invention;

FIG. **6B** is a lateral cross-sectional view of the sliver guide conduit, taken along a line VIB—VIB, shown in FIG. **6A**;

FIG. **6C** is a schematic side view of a device for controlling the motion of the take up device according to the present invention;

FIGS. **7A, 7B** are cross-sectional views of still further modified sliver guide conduits according to the present invention.

DETAILED ILLUSTRATION OF THE PRESENT INVENTION

Referring to FIGS. **1** and **2,** wherein a ringless spinning frame adapted to a sliver supplying device according to the present invention is shown, a plurality of large packaged sliver cans **3** are arranged on a platform **2** formed above the ringless spinning frame **1**. The sliver cans **3** are arranged at positions corresponding to dispositions of the spinning units **1**a. A sliver guide conduit **5** is disposed at a position corresponding to each spinning unit **1**a.

The sliver guide conduit **5** comprises an upright portion ***5b*** provided with a top aperture ***5a***, and a substantially horizontal portion ***5c*** provided with a bottom aperture ***5d*** at a position just below a stationary guide rod **4** of the spinning unit ***1a***, and a curved portion connecting the upright portion ***5b*** with the horizontal portion **5**c. The upright portion ***5b*** of the conduit **5** passes through the platform **2** and extends downward to a bottom portion of the spinning unit ***1a*** along a backside of the spinning unit ***1a***. The horizontal portion ***5c*** passes below the spinning unit ***1a***.

This horizontal portion ***5c*** of the conduit **5** is preferably inclined upward from the connecting portion, as shown in FIG. **1,** so that a resistance to an excess output of sliver from the bottom aperture **5**d of the conduit **5,** is created. It is also permitted to use a rotatable guide roller instead of the guide rod **4.** If it is necessary to arrange the sliver cans **3** before each spinning unit ***1a***, the sliver guide conduit **5** may be disposed in front of each spinning unit ***1a***. However, in this case, the horizontal portion ***5c*** of the sliver guide conduit **5** is required to pass proximately above a floor upon which the spinning machine is installed, so as to allow free passage of an operator or carriages in front of the spinning machine. A sliver take up device provided with a take up roller **7** is disposed just above the top aperture ***5a*** of sliver guide conduit **5.** This take up roller **7** is positively driven by a driving means (not shown) at a higher peripheral speed than the feed speed of a feed roller (not shown) of each spinning unit ***1a***.

A suitable driving mechanism may be utilized as the above-mentioned driving means, such as for example a chain drive mechanism which transmits the driving power of a main driving motor of the spinning machine **1**, or a driving mechanism provided with a certain reduction gear mechanism driven by a separate motor disposed on the platform **2.** However, in the both cases, it is essential to positively drive the take up roller at a particular peripheral speed as mentioned above. If the take up roller **7** is turnable mounted on a supporting shaft ***7a*** thereof and resistance of the turning of the roller **7** about the shaft ***7a*** is very low, it is possible to take up the sliver from the sliver cans **3** only by the weight of sliver in the sliver guide conduit **5.** Also applicable is a pair of take up rollers comprising a positively driven roller and a roller always urged against the positively driven roller so that a sliver from the sliver cans **3** is always taken up according to the grip of the above-mentioned two rollers. In this case, it is necessary to control the rotating motion of the take up roller so as to satisfy the above-mentioned intermittent supply motion. The detailed mechanism of this type take up roller mechanism is hereinafter illustrated in detail.

A yarn produced by a spinning unit ***1a*** is taken up by a pair of take up rollers ***1b*** and is wound as a yarn package **1**d by means of a winding roller ***1c***. Consequently, a sliver **8** contained in the cans **3** is taken up from the cans **3** by the take up roller **7** and then fed into the sliver guide conduit **5** through the top aperture ***5a***. When the sliver **8** is taken up by the roller **7**, the sliver **8** is introduced into an annular guide groove ***7b*** of the roller **7** in such a way that the sliver **8** is belted thereon. Consequently, the sliver **8** is displaced together with the contact surface of the groove ***7b*** of the roller **7** which is positively driven.

The sliver **8,** which is introduced into the sliver guide conduit **5** from the top aperture ***5a***, is then moved downward by way of the upright portion ***5b*** of the conduit **5,** and further moved through the horizontal portion ***5c*** and finally taken up from the bottom aperture ***5d*** of the conduit **5,** and fed to a feed mechanism (not shown) of the spinning unit ***1a***. As the sliver passage formed in the conduit **5** curves at the connecting portion between the upright portion ***5b*** and the horizontal portion ***5c*** and the feed speed of the take up roller **7** is higher than the feed speed of the sliver **8** into the spinning unit **1**a, the sliver introduced into the conduit **5** is gradually reserved in the upright portion ***5b***. According to a resilient property of the sliver **8** and frictional contact of the sliver **8** with the inside wall of the conduit **5,** the sliver **8** in the upright portion ***5b*** of the conduit **5** passes therein in zig-zag or spiral form. As already illustrated, in the present invention, it is necessary to eliminate the undesirable irregular draft of sliver and to prevent overflowing of the sliver at the bottom aperture ***5d*** of the conduit **5.** To attain this purpose, particular considerations are paid to the sliver guide conduit **5.**

The sliver guide conduit **5** shown in FIGS. **3A** and **3B** is an embodiment having an extremely simple construction. The top aperture ***5a***, upright portion ***5b*** and the horizontal portion **5**c are provided with a cylindrical inside wall as shown in FIG. **3C.** The take up roller **7** is rigidly mounted on a shaft ***7a*** disposed above the top aperture ***5a*** of the sliver guide conduit **5.** The shaft ***7a*** is positively driven by a driving means (not shown) so as to drive the take up roller **7** at a higher peripheral speed than the speed for feeding the sliver **8** into the spinning unit ***1a***. The sliver **8** prepared in the can **3** is introduced into the top aperture ***5a*** of the sliver guide conduit **5** by way of the annular groove ***7b*** of the take up roller 7; then the sliver **8** passes by its own weight downward through the upright portion *5b* and arrives at the curved connecting portion of the conduit **5**. As already illustrated, the sliver **8** is apt to be reserved in the upright portion *5b* in a zig-zag or spiral form even if the delivery of sliver **8** from the bottom aperture *5d* is continued at a predetermined constant speed. The stored quantity of sliver **8** is gradually increased. And when the above-mentioned stored sliver in the upright portion *5b* reaches a position adjacent to the top aperture *5a* of the conduit **5**, the friction of the sliver **8** against the annular groove *7b* of the take up roller **7** is considerably reduced. This is because of the downward force of the portion of sliver contacting the annular groove *7b*, which is due to the weight of sliver below the roller **7**, is reduced to a force resulting from only the weight of the sliver above the reserved sliver in the conduit **5**. In the condition where the reserved sliver in the upright portion *5b* reaches the proximity of the top aperture *5a*, the downward force of the sliver **8** against the take up roller **7** becomes very small thereby stopping the taking up motion of sliver **8** from the can **3** by the positive rotation of the take up roller **7**. In this condition, the roller **7** is rotating but the sliver **8** is slipping upon the annular groove *7b*. It can be interpreted that, when the dynamic frictional force F between the sliver **8** and the annular groove *7b* of the roller **7** is sufficiently large to displace the sliver **8** together with the annular groove *7b* of the roller **7**, the roller **7** takes up the sliver **8** from the can **3**, even if a certain slip between the sliver **8** and the annular groove *7b* exists. The larger the effective weights t_1, t_2 of slivers at feed and delivery sides of the annular grooves *7b* of the take up roller **7** are, which apply to the contact points C_1, C_2, the larger the dynamic frictional force F becomes. The effective weight t_1 corresponds to the weight of sliver **8** hanging from the contact point C_1 into the upright portion *5b* of the conduit **5**, and does not involve the weight of sliver **8** which is reserved in a zig-zag or spiral form in the upright portion *5b*. If the length of the above-mentioned hanging sliver **8** is 5 meters, and the weight of sliver is 60 g/m, t_1 is 300 g. On the other hand, l represents the length of sliver between the contact point C_2 and a position where the sliver **8** leaves the block of slivers contained in the can **3**, (for the sake of illustration, the above-mentioned sliver is hereinafter referred to as a free sliver), t_2 varies according to the length l of the free sliver. The length l of the free sliver varies according to the consumption of the material sliver prepared in the can **3**. And, when the dynamic frictional force F overcomes the weight t_2 of the free sliver **8**, the sliver **8** in the can **3** is taken up by the dynamic frictional force F from the can **3**. Consequently, at the beginning of the spinning operation, the sliver **8** is introduced into the sliver guide conduit **5** by the take up roller **7** in the overfeeding condition so that the overfed portion of the sliver **8** goes into reserve in the upright portion *5b* of the conduit **5** in the zig-zag or spiral form. The effective weight t_1 is gradually lowered according to the increasing quantity of the reserved sliver in the conduit **5**, during the spinning operation.

Therefore, the effective weight t_1 becomes smaller so that the dynamic frictional force F becomes smaller which creates a slip between the sliver **8** and the annular groove *7b* of the take up roller **7**. And in the extreme condition where the top portion of the reserved sliver reaches a position close the top aperture *5a* of the conduit **5**, the effective weight t_1 becomes very small and, as a result, the dynamic frictional force F becomes so small that the sliver **8** cannot be pulled from the can **3**. In this condition, the quantity of the reserved sliver **8** in a zig-zag or spiral form is decreased because of the continuous delivery of sliver **8** from the bottom aperture 5d of the conduit **5**, and the effective weight t_1 is thereby increased so that the dynamic frictional force F is also elevated. When force F overcomes the effective weight t_2 of the free sliver, the sliver **8** is again introduced into the conduit **5** by the positive turning motion of the take up roller **7**. As illustrated hereinbefore, the sliver supply motion is carried out intermittently. Therefore, the possible irregular draft of sliver due to excess weight of the sliver can be desirably prevented.

The sliver **8** is continuously taken up from the conduit **5** by way of the bottom aperture *5d* at a constant speed and then fed to the spinning unit 1a. However, when a certain quantity of sliver **8** is stored in the upright portion *5b* of the conduit **5** as shown in FIGS. **3A** and **3B**, this stored sliver urges the sliver positioned at the curved connecting portion of the conduit **5** so that the sliver positioned in the horizontal portion *5c* of the conduit **5** receives a certain pressure by which the sliver is forced out from the bottom aperture *5d*. Several methods to prevent this trouble have been adopted in the present invention. One of them was achieved by the particular arrangement of the horizontal portion *5c* of the conduit **5**. In this particular arrangement of the horizontal portion *5c*, the longitudinal axis thereof is inclined from an actual horizontal line in such a way that the bottom aperture *5d* is positioned a little higher than the bottom of the curved portion of conduit **5**. It is also helpful to use a shutter piece *5e* turnably disposed to an upper edge of the bottom aperture *5d* as shown in FIG. **4**. As already discussed, it is preferable to use a shutter piece *5e* which does not require a strong turning force which may create an irregular draft of sliver in the sliver passage between the aperture *5d* and the feed mechanism of the spinning unit *1a*. If the horizontal portion *5c* of the conduit **5** is applied to the present invention, it is preferable to adopt a horizontal portion *5c* which is turnably connected to the curved connecting portion of the conduit **5** in such a way that, at the time of preparing for a spinning operation when the sliver is introduced through the conduit **5**, the horizontal portion *5c* of the conduit **5** is firstly positioned in a horizontal condition, and after the front end of the sliver is passed through the bottom aperture *5d* of the conduit **5**, then the portion *5c* is positioned in the above-mentioned inclined condition. Therefore, introduction of the sliver through the conduit **5** can be easily carried out.

It is also useful to adopt a sliver guide conduit **5** provided with a plurality of narrow channels which disturb free downward displacement of the sliver by its own weight. According to the application of this sliver guide conduit **5**, even if a large quantity of sliver **8** is reserved in the upright portion *5b* of the conduit **5**, the weight of the stored sliver **8** is partially supported by these channels and consequently the stored sliver **8** in the upright portion *5b* of the conduit **5** does not urge the sliver in the horizontal portion *5c*; in other words; the forcing out of the sliver **8** from the bottom aperture *5d* can be satisfactorily prevented.

The above-mentioned applications of channels in the upright conduit 5 are shown in FIGS. 5A, 5B, 6A and 6B. Referring to FIGS. 5A and 5B, the sliver guide conduit 5 is provided with a curved guide tube 9 therein. At the top end portion of the conduit 5, a trumpet like portion 9*a* is formed by the guide tube 9. At least one combination of the gently sloped portion 9*b* and steep portion 9*c* is formed at a portion corresponding to the upright portion 5*b* of the conduit 5 in zig-zag condition. These gently sloped portions work as channels which disturb the free downward displacement of sliver 8. According to the application of the trumpet like inlet and a plurality of channels formed at the portion corresponding to the upright portion 5*b* of the sliver guide conduit 5, the effective weight t_1 of the sliver 8, which is applied to the contact point C_1 of the take up roller 7, is dependent upon the sliver 8 above the first gently sloped portion 9*b*. Therefore, the surface condition of the annular groove 7*b* and the turning speed of the take up roller 7 must be designed so as to satisfy the principle of intermittent take up motion of the take up roller 7 hereinbefore described. The sliver 8 introduced into the tube 9 can be stored on the gently sloped portions 9*b* so that the overflow of sliver 8 from the bottom aperture 5*d* can be satisfactorily prevented.

Instead of applying the combination of the gentle sloped portion and the steep portion in the tube 9 of the embodiment shown in FIGS. 5A and 5B, in the modified embodiment shown in FIGS. 6A and 6B a pair of common upright guide plates 5*h* and 5*i* are disposed behind the spinning units 1*a* in parallel condition, and a plurality of dividing plates 5*g* are inserted in the space between these upright guide plates 5*h* and 5*i* so that a plurality of sliver guide conduits 5 are formed at each corresponding position to each spinning unit 1*a*. In each sliver guide conduit 5, plural pairs of obstruction plates 10 and 11 are alternately secured to the inside walls of the upright guide plates 5*h*, 5*i* or the inside walls of two facing dividing plates 5*g* in the upright conduit portion 5*b*, so that a zig-zag curved sliver passage comprising a plural combination of a gentle sloped passage and a steep passage is formed in each sliver guide conduit 5. The sliver 8 introduced into each sliver guide conduit 5 can be temporarily held in reserve at the gentle sloped passages so that almost the same effect as the embodiment shown in FIGS. 5A and 5B can be expected. However, because the construction of the guide conduit shown in FIGS. 6A and 6B is simpler than the one shown in FIGS. 5A and 5B, the embodiment shown in FIGS. 6A and 6B can be understood as more practical and valuable. In the above-mentioned embodiments, a gentle sloped sliver passage and a steep sloped sliver passage are alternately formed in the upright portion of the sliver guide conduit or tube. However, a sliver guide passage which involves only a plurality of gentle sloped sliver passages or steep sloped sliver passages so as to form a zig-zag passage, may be applied with almost the same effect as the above-mentioned two embodiments.

Other modified embodiments of sliver guide conduit according to the present invention are shown in FIGS. 7 and 8. In these embodiments, the upright portion 5*b* of the sliver conduit 5 is provided with a plurality of channels which are formed by narrowing the lateral cross section thereof. That is, in FIG. 7, the wall of the conduit 5 is projected inward at the channel portion thereof. This inward projection 12 is preferably formed in the shape of an annular projection. However, as shown in FIG. 8, the inward projections 12 may be alternately formed on two sides facing each other. As the lateral space of the sliver passage in the upright portion 5*b* of the conduit 5 is reduced at each channel portion, the sliver 8 introduced into the conduit 5 can be separately reserved in the conduit 5 by the obstacle created by these channels so that almost the same result as the embodiment shown in FIGS. 5A, 5B can be expected.

In the case of applying a positive feeding mechanism to the present invention, it is essential to control the intermittent motion of the positive feeding mechanism. The sliver guide conduit 5 shown in FIG. 6A and a positive feeding mechanism shown in FIG. 6C are an example of this control system. The positive feeding mechanism of this embodiment comprises a take up roller 15 provided with an annular groove 15*a* and a pressure roller 16 turnably mounted on a shaft 17*a* so as to engage with the annular groove 15*a* of the take up roller 15. The roller 15 is continuously driven by a driving mechanism (not shown). The shaft 17*a* is rigidly mounted to a supporting lever 17 which is turnably mounted on a shaft 18 secured to the spinning machine. The pressure roller 16 is urged against the annular groove 15*a* by its own weight so as to positively feed the sliver 8 by the rotation of the take up roller 15. However, if it is required to grip the sliver 8 in a stable manner by these rollers 15 and 16, a spring loading system 17*c* may be applied to the lever 17.

A notch 17*b* is formed at a free end portion of the lever 17, and a solenoid 19 is disposed above the notch 17*b* in such a way that a solenoid lever 20 is capable of pushing the notch 17*b* downward when the solenoid is energized. When the solenoid 19 is energized, the solenoid lever 20 pushes the notch 17*b* downward so that the supporting lever 17 turns about the shaft 18 in the clockwise direction. According to this turning motion, the roller 16 is disengaged from the annular groove 15*a* of the take up roller 15 so that the positive feeding motion by the take up roller 15 with the roller 61 is stopped even if the roller 15 is continuously driven. As shown in FIG. 6A, a photoelectric device comprising a light projector 13 and a photo-cell 14 is disposed at an entrance portion of the sliver guide conduit 5 above the first obstruction plate 10. The output of this photo-cell 14 is amplified by an amplifier (not shown) and utilized so as to actuate the solenoid 19 by applying a suitable electric circuit well known in the art. The electrical relation between the solenoid 19 and the above-mentioned photoelectric device is designed as hereinafter illustrated. When the sliver 8 is introduced into the conduit 5 is temporarily held in reserve in the conduit 5, and this stored sliver interrupts the light projected from the projector 13 toward the photo-cell 14, the solenoid 19 is actuated. Consequently, the sliver 8 is intermittently introduced into the conduit 5 by the control action due to the condition of sliver reserve in the conduit 5.

What is claimed is:

1. In a method for supplying a sliver to each spinning unit of a spinning machine by way of a sliver guide conduit disposed at a position corresponding to each spinning unit and a take up means, disposed above said sliver conduit, from a receptacle arranged at a position proximate the arrangement of spinning units, the improvement comprising in combination, taking up a

sliver upwardly from said receptacle containing a material sliver and intermittently introducing said sliver into said sliver guide conduit, displacing said introduced sliver in said sliver guide conduit in a zig-zag or spiral condition in said sliver guide conduit while stopping temporarily for a variable time therein,

continuously delivering said introduced sliver from a bottom aperture of said sliver guide conduit with a predetermined constant delivery speed which is slower than the speed said sliver is introduced into said sliver guide conduit.

2. A method according to claim **1**, wherein said intermittent introduction of sliver is based upon the slipping of the sliver on said take up roller when a certain quantity of sliver is temporarily reserved in said sliver guide conduit.

3. A method according to claim **1**, wherein said intermittent introduction of sliver is carried out by temporarily stopping the positive feeding of the sliver by said take up roller.

4. A device for supplying sliver to each spinning unit of a spinning machine from a receptacle disposed behind or above said spinning machinery by way of a sliver guide conduit disposed at a position corresponding to each spinning unit comprising in combination,

means for introducing said sliver into said sliver guide conduit at a speed faster than the speed for delivering said sliver from said sliver guide conduit,

said sliver guide conduit comprising a substantially upright portion provided with a top aperture for receiving said sliver thereinto and a substantially horizontal portion formed at a downstream portion thereof and a curved portion for connecting said upright portion with said horizontal portion, being said horizontal portion provided with a bottom delivery aperture formed at a terminal thereof; whereby smooth movement of said sliver from said upright portion toward said aperture of said horizontal portion is disturbed by said curved portion and the continuous introduction of said sliver into said guide conduit is temporarily disturbed.

5. A device according to claim **4**, further comprising

means for temporarily interrupting the continuous introduction of said sliver into said sliver guide conduit by said introducing means.

6. A device according to claim **4**, wherein said introducing means comprises a take up roller disposed above said sliver guide conduit which is continuously driven by a driving mechanism, at a higher peripheral speed than the speed for feeding sliver into each spinning unit.

7. A device for according to claim **5**, wherein said temporarily interrupting means comprises a plurality of curved sliver passages formed in said upright portion of said sliver guide conduit so that the smooth downward movement of the sliver introduced in said conduit is interrupted and said introduced sliver is intermittently reserved on said interrupting means.

8. A device according to claim **4**, wherein said horizontal portion of the conduit is inclined slightly upward so that said bottom delivery aperture is positioned above the upstream end of said horizontal portion of the conduit.

9. A device according to claim **4**, wherein said horizontal portion of said sliver guide conduit is provided with a piece turnably mounted on an upper edge portion of said bottom delivery aperture so that said bottom aperture is covered by said turn piece.

10. A device according to claim **8**, wherein said horizontal portion of said sliver guide conduit is turnably connected to a connecting bottom end portion of said upright portion thereof.

11. A device according to claim **7**, wherein said curved sliver passages are a combined passage comprising pairs of a gentle sloped passage and a steep sloped passage.

12. A device according to claim **5**, wherein said temporarily interruption means comprises a plurality of inward projections formed on the inside wall of an upright portion of said sliver guide conduit so that the lateral cross section of said upright portion of said conduit is reduced.

13. A device according to claim **12**, wherein the lateral cross section of said conduit is circular and each of said inward projections has the shape of an annular projection formed in a concentric relationship with said upright portion of said conduit.

14. A device according to claim **5**, wherein said sliver guide conduit has a rectangular lateral cross section, said interrupting means comprises pairs of projections formed on the inside walls of said conduit in such a way that one is formed on a first inside wall of said conduit, while the other is formed on an inside wall facing said first inside wall.

15. A device according to claim **14**, wherein said projection has a slope formed at upstream side of said conduit.

16. A device according to claim **5**, wherein all sliver guide conduits are formed by a pair of guide plates extending along the lengthwise direction of said spinning machine and facing each other, and a plurality of separation plates which divide the space formed by said guide plates into a plurality of sliver guide conduits for guiding each sliver introduced therein to the respective spinning units, each of said sliver guide conduits is provided with a top aperture formed adjacent to said introducing means and with a bottom delivery aperture formed adjacently below the respective spinning units, said interrupting means formed in each of said sliver guide conduits is a plurality of pairs of projections projected from said guide plates or said separation plates so that a curved sliver passage is formed in each sliver guide conduit.

17. A device according to claim **6**, wherein said take up roller is provided with an annular groove for forming a sliver passage.

18. A device according to claim **4**, further comprising control means for controlling the motion of said sliver introducing means.

19. A device according to claim **18**, wherein said sliver introducing means comprises a bottom take up roller continuously driven by driving means mounted on said machine and a top roller driven by frictional contact with said bottom roller, said control means comprising a photoelectric detector disposed at a top portion of each sliver guide conduit, said control means releasing said frictional contact of said top roller with said bottom take up roller when said photoelectric detector detects a predetermined sliver reserve condition in said conduit.

20. A device according to claim **4**, further comprising a pair of continuously rotating withdrawing rollers disposed at a position adjacent to and below said spinning unit along a sliver passage between said bottom delivery aperture of said sliver guide conduit and a feed mechanism of said spinning unit.

21. A device according to claim **20,** wherein said sliver guide conduit comprises upright portions provided with a top aperture for receiving said sliver, and a substantially horizontal portion positioned below said spinning unit which is provided with a bottom delivery aperture from where said sliver is delivered.

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