March 25, 1969 E. DOLL 3,434,274

APPARATUS FOR WINDING ROVINGS HAVING ANTI-TANGLE PLATE STOP MOTION DEVICE

Filed Sept. 3, 1964

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Fig. 1

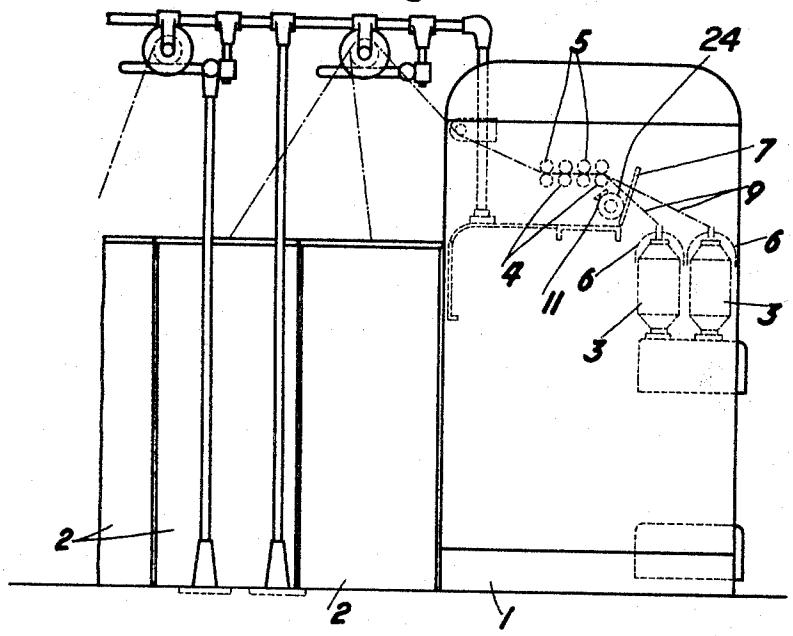
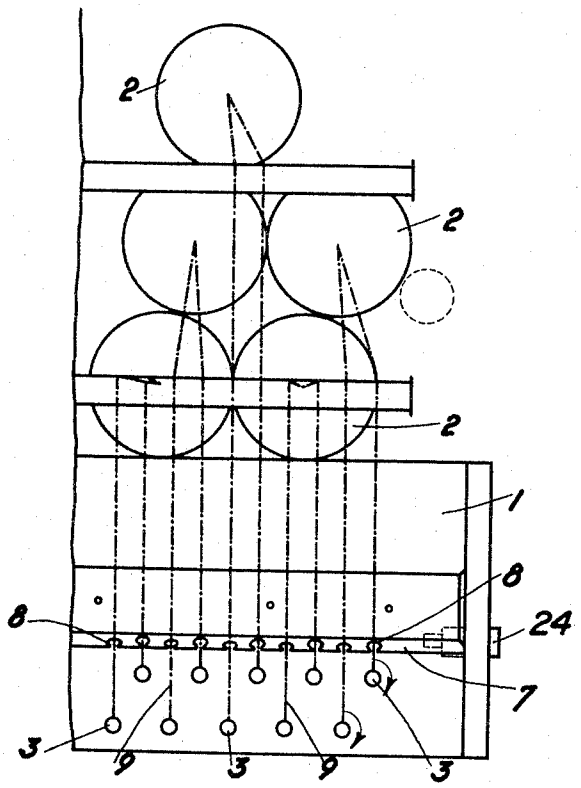


Fig. 2



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Fig. 3

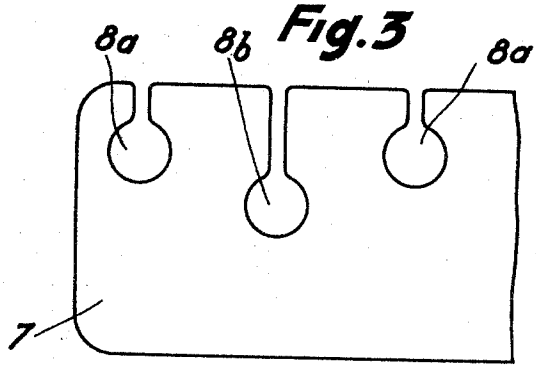


Fig. 4

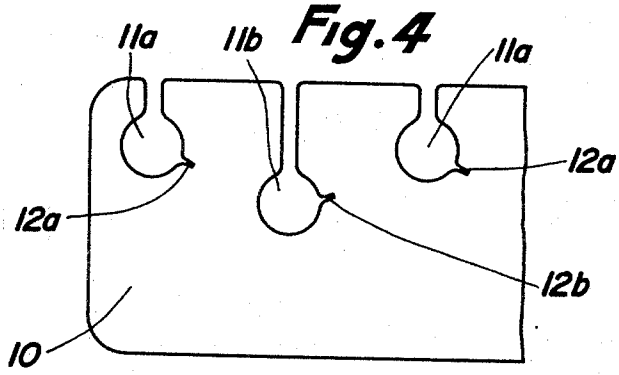


Fig. 5

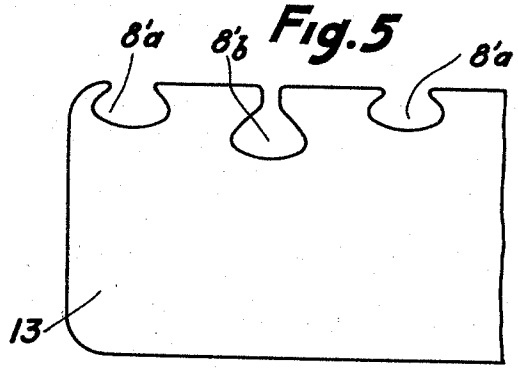
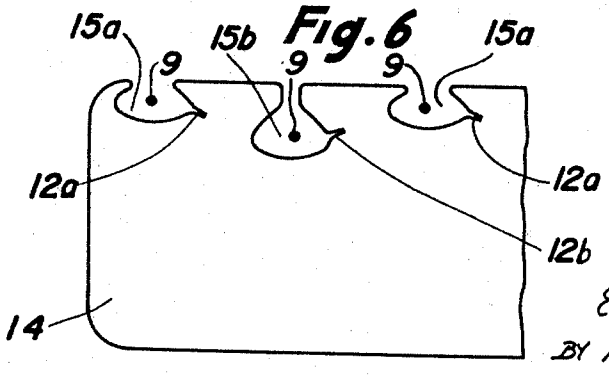


Fig. 6



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FIG. 8

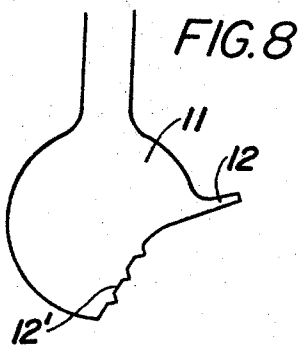


FIG. 9

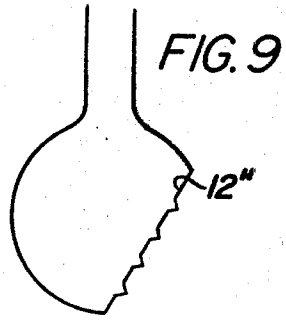
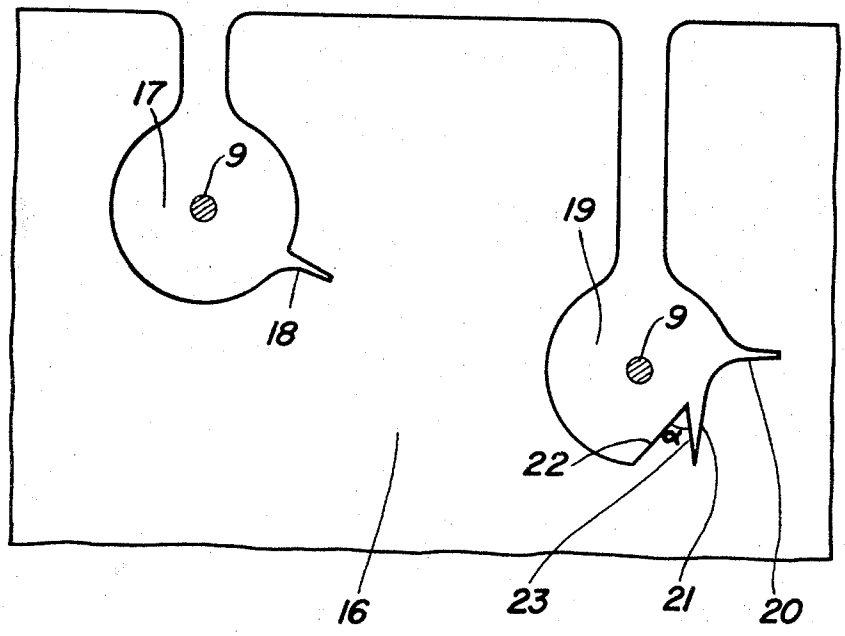


FIG. 7



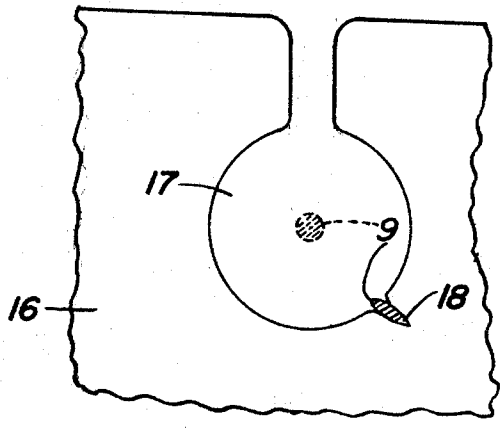


FIG. 10

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3,434,274

APPARATUS FOR WINDING ROVINGS HAVING ANTI-TANGLE PLATE STOP MOTION DEVICE

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Claims priority, application France, Oct. 2, 1963, 949,340; Feb. 10, 1964, 963,247
Int. Cl. D01h *13/16, 13/04;* D01g *31/00*
U.S. Cl. 57—80 8 Claims

The invention relates to a plate having specially shaped apertures for the passage of the roving leaving the draft rolls of a fly-frame and passing to the rotating flyer, and serving to prevent entanglement with adjoining flyer rovings and projection of raw material all around, making it thus possible to obtain the automatic and immediate necessary stopping of the flyer.

If the roving breaks at the outlet of the draft roll of the fly frame before being wound on the bobbin through the hollow flyer, the free end is uncontrolled and, if the flyer is not rapidly stopped within a few seconds, may become entwined with roving from the neighboring spindle or even fly off over a number of neighboring spindles, producing a succession of breakages. In addition, the loose end on a broken bobbin itself lashes, projecting material all over if rapid stoppage is not obtained.

Particularly with modern flyers running at higher speeds and equipped with much larger flyers, the above mentioned disadvantages occur to an even greater extent when the roving breaks, and it is even more imperative that the flyer should be stopped in the few seconds after the breakage occurs. The rovings are subjected to greater stressing not only because of the higher delivery speed of the draft roll (20–25 metres per minute), but also by a more powerful current of air directed transversely to them and produced by the flyers rotating at a higher speed.

In order to avoid these disadvantages it has already been attempted to equip flyers with so-called anti-tangle plates. These were successful to a certain extent on low speed machines, for rather fine roving and with constant attention of the operator who could not stop the machine in time. They are however absolutely ineffective on high-speed modern flyers, several of which should be given to one operator. These plates were fitted, in an approximately vertical position, between the delivery roll and the top of the flyer and for each roving had the passage aperture of about 30 to 40 mm. of diameter in order that the roving could pass freely without ever getting in contact with the edges of this aperture, even taking account of the reciprocating movements provided in the draft in order to avoid rapid wear of the synthetic pressure rolls.

In order to obviate the above mentioned disadvantages, it has also already been proposed to provide feeler devices which stop the machine when a roving breaks. It has in addition been attempted to remove the broken rovings into suction pipes by pneumatic means, possibly in combination with the stopping of the machine by a feeler device provided in the pipes. Since each spindle must be equipped with an apparatus of this type, despite their generally satisfactory operation they are very expensive to purchase, require a great deal of space, and frequently are also delicate and not reliable enough.

The rotation in the same direction of the flyers produces a strong current of air along the machine in the same direction, and it has now been observed that when a roving breaks the free end is always carried away by this air current towards the same side and at the same angle, and the roving then always comes into contact with the edge of the anti-tangle plate at the same part of the passage aperture in the latter. It is therefore sufficient for the roving to be immediately held at that precise point when it

breaks and thus to be prevented from flying around further. After it has been held, the roving will then pile up between the delivery roller and the plate and this piling can be used to stop the machine as it breaks a light beam.

The object of the invention is now to put this conception into practice in order to overcome the above mentioned disadvantages in a simple and inexpensive manner; the invention accordingly relates to a plate provided with apertures for the free passage of the roving leaving a fly-frame and passing to the rotating flyer, said plate being characterized in that at the precise point at which the broken roving makes contact under the action of the current of air emanating from the rotating flyers, the edge of the passage apertures have gripping means.

The gripping means may be preferably in the form of one or more recesses in the one side of the edge of the aperture. They may also be in the form of a comb or sawteeth. The recesses are preferably given the form of elongated sufficiently deep slots rounded in a triangular shape at their entrance to make it easy for the broken roving to slide into the slot under the action of the side blow from the rotating flyers.

With the above described features the broken roving being delivered flat, without twist, after fracture, slips itself easily into the gripping means under the action of the flyer wind and is secured within the gripping means. If the loose end in front of the plate flies into contact with the next roving it breaks immediately (having no twist in that it is held flat in the slot) just in front of the slot. It can practically never be blown on further as it is much too short. The defect is thus reduced to a strict minimum and the material being still delivered drops behind the plate (instead of being projected through the large aperture), where provision is made for the material to cut a classical light beam as is explained hereafter.

The gripping means may then be supplemented by stopping means, known per se, for automatically stopping machines, for example a photoelectric cell which operates a relay as soon as the light beam is broken by the gripped roving.

It may happen, particularly on the spindles of the rear row that a breakage of the roving in the flyer or presser finger will sometimes give rise to winding on the flyer head so that the roving, although slackened, is too heavy to be blown and continues to be turned so that it cannot come into the region of the first gripping means. The material is thus not accumulated behind the plate and the light beam acting on the photoelectric cell is not interrupted.

According to the invention this last mentioned disadvantage is obviated through the fact that two or more recesses are provided in the passage apertures for the rovings running principally to the rear row of spindles, one of these apertures being disposed radially and approximately horizontally while the other is disposed substantially vertically; or a single aperture may also be provided the edge of which may be in the form of an inclined comb which may or may not have slots extending radially.

If the roving now breaks in the flyer of a spindle of the rear row and the roving starts to wind on the flyer head, the roving continues to be rotated. The roving is diverted by its own weight towards the lower slot away from the direction imposed by the air current, and on the immediate dropping of the roving because of the continued delivery it passes into a lower slot, is held fast in the latter, so that the material accumulates behind the plate and the photoelectric cell responds through the interruption of the light beam.

The invention will be examined more fully below with the aid of illustrated examples. In the drawings:

FIGURE 1 shows a fly-frame in elevation,

FIGURE 2 a portion of a fly-frame in ground plan,

FIGURES 3 and 5 each show a conventional plate at the outlet of the drawing machine,

FIGURES 4, 6 and 7 each show a plate according to the invention, and

FIGURES 8 and 9 each show a further embodiment.

FIGURE 10 is an enlarged fragmentary view of a portion of the plate of FIGURE 7 with the roving engaged in the slot.

Rovings originating from the cans **2** are passed to fly-frame **1** and after drawing and twisting are wound on to bobbins **3**. Drawing is effected in a number of pairs of rollers consisting of grooved drawing rollers **4** and pressure rollers **5**. Between the pair of delivery rollers **4**, **5** and the flyer **6** effecting the winding for each spindle a plate **7** is provided in an almost vertical position which has the large (30 to 40 mm.) apertures **8** for the passage of the roving **9**. The shapes of these apertures previously used vary in dependence on the origin of the machine. The plate **7** illustrated in FIGURE 3 has apertures **8***a* situated near the top edge for the rovings which are fed to the front row of flyers, while the apertures **8***b* situated at a lower level are intended for the rovings feeding the second rear row of flyers. The plate **10** according to the invention which is illustrated in FIGURE 4 has apertures **11***a* and **11***b* in each of which a slot **12***a* and **12***b* respectively is formed. The shape of these slots is substantially elongated having a triangular entrance with rounded corners. The slots **12***a* are slightly inclined downwards, while the slots **12***b* are inclined slightly upwards but their angles may be different according to the weight and speed of the roving. The particular shape was preferred for the slots because this constitutes the simplest means, requiring no attention, for catching and holding the roving fast enough after breakage. These slots could naturally be replaced by other means, for example a comb, sawteeth, or other means having a rough surface nature and able to hold fast enough a roving. They are situated in the precise position to which the broken roving is directed by the air current produced by the flyers. This point can easily be determined, taking into account the direction of rotation of the flyers. If the latter rotate in the clockwise direction (see FIGURE 2) an air current flowing from left to right is logically produced and the slots are disposed on the right hand edge, approximately where the broken roving hanging free makes contact under the action of the air current and the inclination being adapted to the movement, which is a combination of the blow, speed of delivery, and weight of the roving.

The slots **11***a* and **11***b* are elongated and provided with small rounded entry apertures, in which through the action of the air current the roving is slipped and held fast enough or clamped flat after the breakage. It is thus impossible for the roving to unite with a neighbouring roving or to fly off over a plurality of rovings. Edges of these elongated slots are not sharpened because there is no cutting action needed.

The plate **13** shown in FIGURE 5 is of conventional type, and this type is illustrated in FIGURE 6 as a plate **14** improved according to the invention and provided with elongated slots **15***a* and **15***b*. Small cross sections in the centers of the apertures represent the cross sections of the roving **9** in its normal running position.

FIGURE 7, which illustrates a part of a plate **16**, shows the roving passage large apertures **17** with slots **18** for the front row of spindles and the apertures **19** with slots **20** for the rear spindles. In addition, the aperture **19** has a second slot **21** which extends in the substantially vertical direction in relation to the horizontally disposed slot **20**. On the opposite side to the slot **21** the edge **22** of the aperture **19** runs at an acute angle in relation to the adjoining side **23** of the slot.

The slot **20** serves to hold flat the freely flying roving, while the slot **21** has to hold the roving **9** when winding on the flyer head occurs. The roving **9** then rapidly drops because during winding on the flyer head the winding speed is far lower than the speed of delivery of the drawing machine. The roving however does not move away horizontally under the influence of the flyer wind, because of the twist which accounts for a greater density and it thus piles up on the flyer head.

As soon as the roving **9** has been held fast by the plate **10** or **14** or **16**, as, for example in FIGURE 10, it begins to accumulate behind the plate or to wind on to a clearer roller, not shown, if provided beneath the delivery cylinder, or when suction removal means, not shown, are provided the roving delivered is continuously drawn off by suction, while the negative pressure used for this purpose may be less than normal as the broken roving without twist, falls on the suction pipe instead of being blown away as before.

FIGURE 8 shows a modified form having a slot **12** in the aperture **11**; the edge extending downwards is in the form of a comb **12'** in which slots may be short, as illustrated in FIGURE 9, or elongated as for example that illustrated in FIGURE 10.

According to FIGURE 9, there is no slot provided, but only a comb, **12''**.

The roving is directed to the flyer **6** via passage through the air current produced by rotation of the flyer, and the anti-tangle plate is mounted in the path of movement of the roving to the flyer. The gripping means of any of the forms of anti-tangle plates according to the invention is positioned in the air current downstream of that current with respect to the larger or main aperture in the plate.

The above described improvement enables the imperative automatic stopping of the fly-frame to be effected very simply and quickly through the operation of a relay by a photoelectric cell as soon as a light beam emitted by a source of light **24** is interrupted by the accumulating roving held fast in a slot **11***a* or **11***b* and piling up behind the plate **10** and the previous permanent attention of the operatior is not required anymore.

What I claim is:

1. In apparatus for winding rovings, the combination of a rotatable flyer rotation of which produces an air current; means for directing a roving to said flyer via passage through said air current; an anti-tangle plate mounted in the path of movement of the roving to said flyer and having an aperture through which the roving runs to said flyer and also having gripping means at one side of said aperture, said aperture and gripping means being positioned in said air current with said gripping means located downstream of said air current with respect to said aperture, whereby the end of a broken roving passing through said aperture will be blown by said air current to and gripped by said gripping means; and a stop motion device responsive to gripping of said broken roving end by said gripping means for stopping said apparatus.

2. Apparatus according to claim **1** in which said aperture is relatively large so as normally to accommodate free passage of an unbroken roving, and said gripping means comprises at least one relatively small recess open to said aperture and extending into said plate and adapted to receive and grip the broken roving end.

3. Apparatus according to claim **2** in which said recess has rounded corners where it opens to said aperture.

4. Apparatus according to claim **1** in which said gripping means comprises a comb in the wall of said aperture.

5. Apparatus according to claim **4** in which said comb extends obliquely downwards.

6. Apparatus according to claim **1** in which said gripping means comprises sawteeth in the wall of said aperture.

7. Apparatus according to claim **1** in which said gripping means comprises at least one triangular slot open to said aperture and extending into said plate.

8. Apparatus according to claim **1** in which said gripping means comprises two recesses communicating with said aperture, one of said recesses extending substantially

horizontally into said plate, and the other of said recesses extending substantially vertically into said plate.

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JOHN PETRAKES, *Primary Examiner.*

U.S. Cl. X.R.

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