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GUIDE MECHANISM

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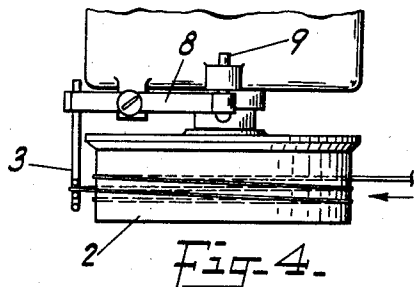


Fig-4.

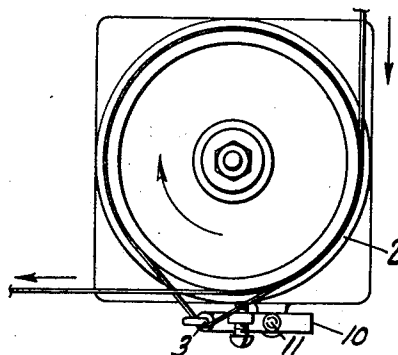


Fig-5.

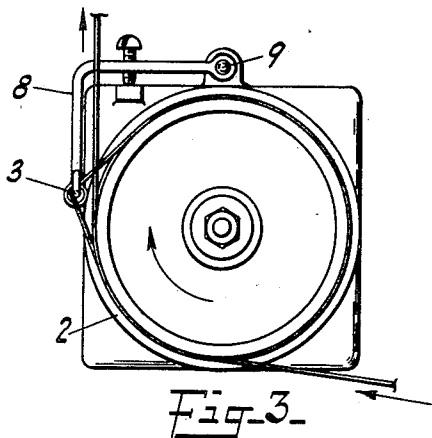


Fig-3.

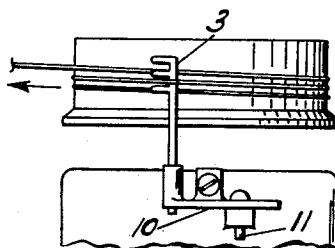


Fig-6.

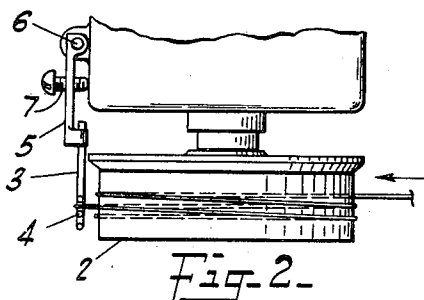


Fig-2.

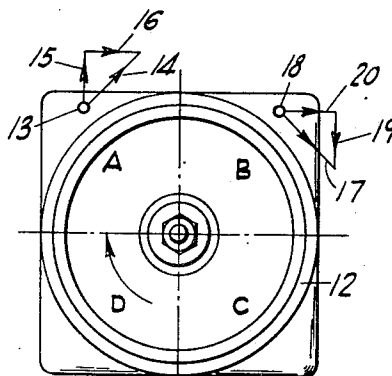


Fig-7.

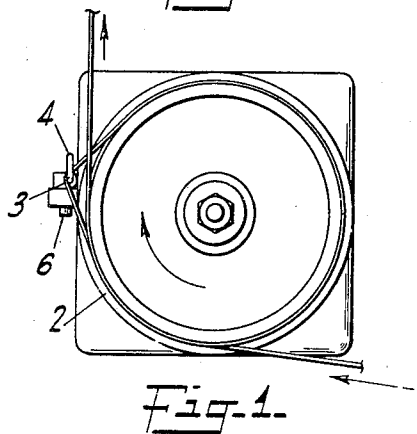


Fig-1.

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GUIDE MECHANISM

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This invention concerns the guiding mechanism associated with a wheel or godet to cause and control the lateral displacement of a thread wrapped one or more times thereabout. Such a mechanism is of use in numerous situations, such as in artificial filament spinning machines, and may take various forms. It may comprise a smooth-faced roller on an axis inclined to that of the wheel, or it may be a peripherally grooved roll or a pronged non-rotary guide in which the grooves or prongs control the displacement of the thread. These guides, whether rotary or non-rotary are fixed in place on stationary bearings if rotary, or on a stationary support if non-rotary, as close as possible to the wheel. The proximity of the guide to the wheel is of importance. If placed too far from the wheel or godet, less traction is obtained between the thread and the wheel so that slippage thereon may occur. Again, if the guide is displaced unnecessarily far from the wheel, the thread makes too sharp an angle about the guide and the increased wear and tear upon the thread gives rise to breakage of the filaments in the thread, particularly when the thread being passed about the wheel and guide mechanism is not completely set up as is often the case where such mechanisms are most frequently used, for example in an artificial filament spinning machine. It has been found in the past that for any one of various reasons, the thread may at times be allowed to wind upon the wheel until a sufficient mass is built up thereon to force the guide, whether rotary or non-rotary, to be deflected away from the wheel. Such guides, rotary or non-rotary, are frequently made of a brittle material, such as porcelain, glass or phenolic resins, which are incapable of bending to any great extent with the result that breakage occurs as the result of such deflection. In the case of guides of the rotary type, they are frequently supported upon a bearing made of such brittle materials so that they are liable to the same excessive breakage during use. The accumulation of the thread about the wheel may result from accidental breakage of the thread in passing from the wheel to the next thread handling device or as the result of an operator's carelessness or forgetfulness when doffing the machine during which operation he may purposely allow the thread to gather upon the wheel.

In accordance with this invention, the guide mechanism of this type is mounted in a novel manner so that it is caused to move from the wheel without breakage by the wound mass gathering upon the wheel. Other advantages will

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be apparent from the drawing and the description thereof hereinafter.

In the drawing, illustrative of the invention,

Figure 1 shows, in elevation, a wheel and associated guide mechanism mounted in accordance with the invention.

Figure 2 shows, in plan view, the arrangement of Figure 1.

Figure 3 is an elevation of a modification,

Figure 4 is a plan view of the modification of Figure 3.

Figure 5 is a plan view showing a modification in which the wheel is mounted on a vertical axis.

Figure 6 is an elevation of the modification of Figure 5, and

Figure 7 is a schematic diagram for illustrating preferred special relationships between the wheel and guide associated therewith.

As shown in Figures 1 and 2 of the drawing, the thread or filamentary bundle proceeds once about the wheel 2 which may be an idler or may be positively driven, then about the guide 3 disposed adjacent the periphery of the wheel which displaces the next lap laterally of the periphery of the wheel. The thread after the next lap may proceed directly to the next thread handling device or it may be wrapped once more about the guide preparatory to displacement of an additional lap about the wheel. Any number of laps displaced upon the wheel may be used. A pronged form of guide is shown in the drawing, the number of prongs 4 being chosen to provide the number of spaces upon the guide needed to displace the desired number of laps upon the wheel. Alternatively, this stationary form of guide may be replaced with a rotary guide in the form of an annularly grooved roller, as many grooves being provided as the number of displaced laps desired upon the wheel. Again, the stationary guide may be substituted by a roller supported upon an axis inclined to the axis of the wheel in conventional manner to effect a displacement of the laps laterally about the wheel without the use of annular grooves thereon.

The guide 3 is adjustably supported in a pivotally mounted bracket 5 adapted to be swung about a substantially vertical axis at 6. A detent 7 may be provided upon the bracket so that it strikes the frame of the machine to limit the swinging motion of the guide 3 in the direction toward the wheel 2. The guide in Figures 1 and 2 is shown disposed adjacent the periphery of the wheel just above its axis. It is not limited to such position however since it may be disposed at a

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position higher than this or at any point in the lower quadrant of the wheel.

Figures 3 and 4 show a modification in which the guide 3 is held in the angular supporting arm 8 pivotally mounted at 9 on an axis offset from and substantially parallel to that of the wheel 2. This arrangement has the advantage over that of Figures 1 and 2 that the angular relationship between the guide 3 and the axis or the periphery of the wheel does not change as the guide 3 is swung away therefrom. This greatly reduces the possibility of building up any excessive bending moment as the result of any laterally offset relationship between the point on the guide about which the filamentary bundle travels and the point where the wrapping on the wheel bears against the guide.

In Figures 5 and 6 a modification similar to that of Figures 3 and 4 is shown for cooperation with a wheel 8 which is rotatably mounted upon a substantially vertical axis instead of a horizontal axis as the wheel 2 in Figures 1 to 4. As shown the guide 3 extends generally parallel to the axis of the wheel 2 and is adjustably mounted in a bracket 10 which is pivotally mounted on a vertical axis at 11.

Preferably, the guide 3 is so arranged about the periphery of the wheel 2 that its swinging motion away from the wheel will be in the same general direction as the tangential motion of the wheel. In the embodiments of Figures 1 and 2 and Figures 5 and 6, the pivoting of the guide 3 upon a substantially vertical axis has the advantage that there is no tendency of the weight of the pivoted guide and its supporting arm or bracket to either oppose or favor swinging motion in one direction or the other. In all embodiments shown, wherever the guide 3 is positioned about the periphery of the wheel 2, it may be placed as closely as desired to the periphery of the wheel without being subject to the risk of breakage pointed out hereinabove.

In operation, the guide 3 is held in position adjacent the wheel 2 by gravity (in Figures 3 and 4) or by the laps of the thread. Should the thread build upon the wheel, the guide is gently swung away from the wheel by the thread wrapping before breakage of the guide can occur. Should the thread still be running over the guide at the time the guide is forced away from the wheel, no difficulty is encountered since the relatively few wraps thereabout are either taken with the guides or are broken by the outward movement of the guide. The force exerted by the guide against the few filaments wrapped thereabout is directly supported by the wrapping upon the wheel back of the guide so that relatively little bending moment is exerted upon the guide against such filaments.

The invention is applicable to wheels which are rotatably mounted or driven on axes inclined at any angle to the horizontal or vertical.

Figure 7 diagrammatically illustrates the forces acting upon a guide mounted as shown in Figures 1 and 2 when placed adjacent to any of the four quadrants A, B, C and D of a wheel 12 which is rotated in a clockwise direction (being driven positively or merely as the result of the travel of the thread thereabout) as indicated by the curved arrow. The guide 13 alongside quadrant A is acted upon by a tangential force 14 by the thread wrapping on the wheel. This force 14 may be resolved into a vertical force 15 and a horizontal force 16. Since the guide 13 is mounted on a vertical pivot, the force 16 tends to draw the

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guide toward the wheel but this is opposed by the lifting component 15 which causes motion of the guide in the opposite direction by cam action. In quadrant B, the tangential force 17 upon the guide 18 may be considered to be made up of the vertical and horizontal components 19 and 20 respectively. In this case, however, the horizontal component 20 moves the guide away from the wheel instead of opposing it as in quadrant A. This may be considered a pushing action as distinguished from the cam action in quadrant A. It is thus apparent that it is preferable to mount the guide in either quadrant B or D where the horizontal component of the tangential force favors motion of the guide away from the wheel. However, good results may be obtained by the cam action in quadrants A and C except when the guide is placed too near the top of quadrant A or bottom of quadrant C as viewed in Figure 7. Similar force analyses may be applied to the embodiments of Figures 3 to 6 to determine the most satisfactory arrangement for mounting the guide with respect to the wheel.

The guide mechanism of the invention is especially valuable when applied to the handling of wet threads such as on artificial filament spinning machines, especially for stretching the threads, though it is to be understood that its use is not limited thereto. As will be apparent from the above disclosure, the invention makes it possible to reduce greatly the risk of guide breakage without the necessity to position the guides away from the wheels with a consequent sacrifice in traction of the thread about the wheel and in the quality of the yarns.

While preferred embodiments of the invention have been disclosed, it is to be understood that changes and variations may be made without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. In thread handling apparatus, the combination of a wheel and a guide adjacent thereto for directing a thread with respect to the wheel, the guide being mounted on a member pivotally mounted on an axis substantially parallel to that of the wheel to permit free swinging thereof under the influence of the thread to normal position adjacent the wheel and out of normal position away from the wheel.

2. In thread handling apparatus, the combination of a wheel and a guide to cause lateral displacement of successive laps of a running thread wrapped around the wheel, the guide having a normal operating position adjacent the quadrant of the wheel where the tangential velocity of the thread has a horizontal component directed away from the wheel, and means for mounting the guide to permit free swinging about a substantially vertical axis under the influence of the thread to normal position adjacent the wheel and out of normal position away from the wheel.

3. In thread handling apparatus, the combination of a wheel and a guide adjacent thereto to cause lateral displacement of successive laps of a running thread wrapped around the wheel, the guide being mounted on a member pivotally mounted on an axis offset from and substantially parallel to that of the wheel to permit free swinging about its axis under the influence of the thread to normal position adjacent the wheel and out of normal position away from the wheel, the pivoted axis of the member being disposed in advance of the radial line of the wheel through

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the guide in its normal operating position as determined by the direction of rotation of the wheel.

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