

Aug. 11, 1931.

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1,817,937

YARN CLEANER AND SLUB CATCHER

Filed Oct. 11, 1927

2 Sheets-Sheet 1

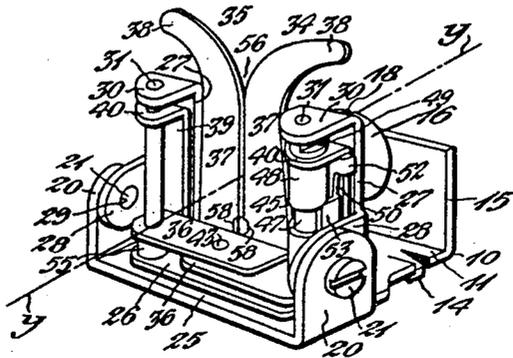


Fig. 1.

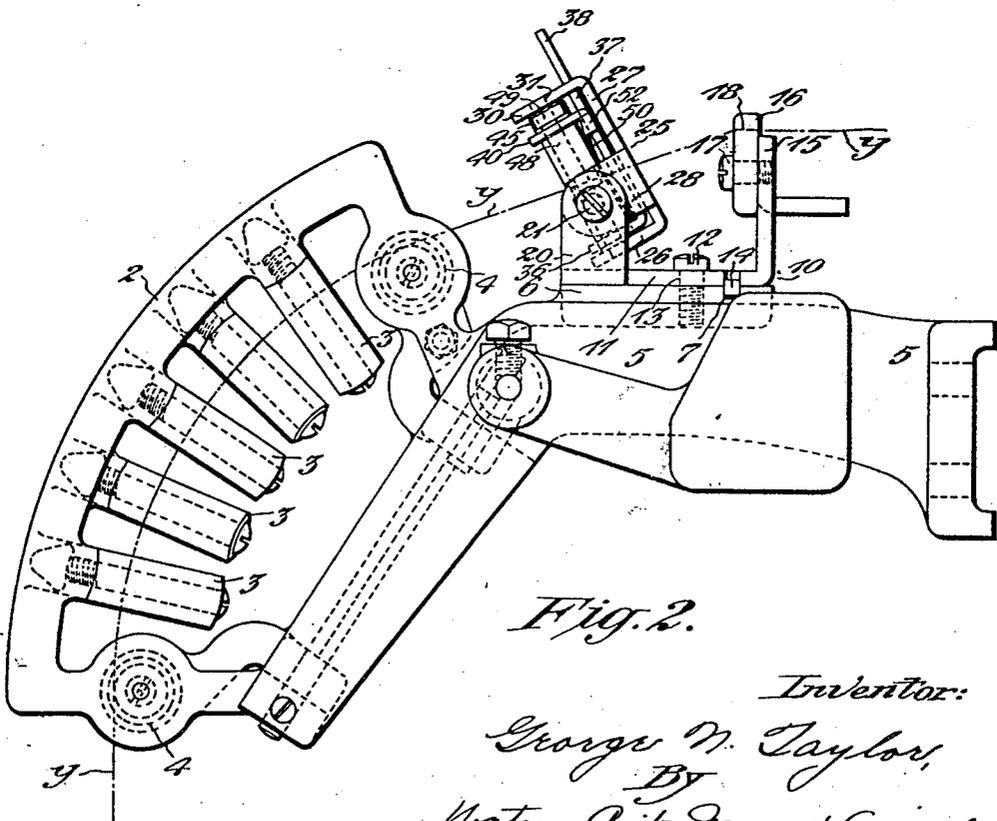


Fig. 2.

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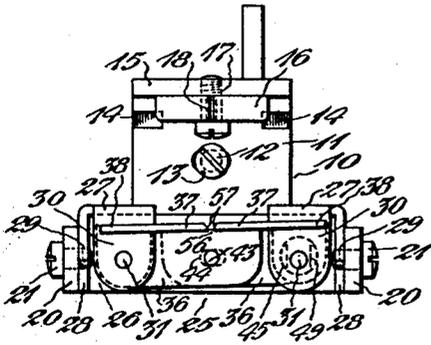


Fig. 3.

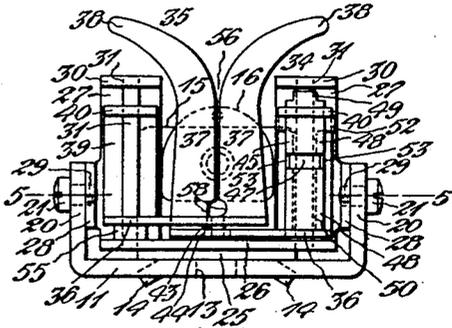


Fig. 4.

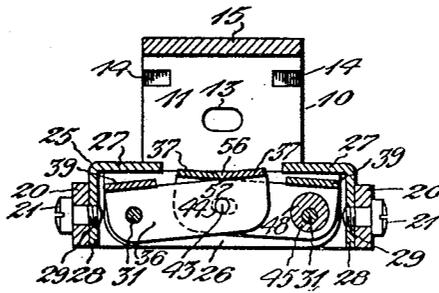


Fig. 5.

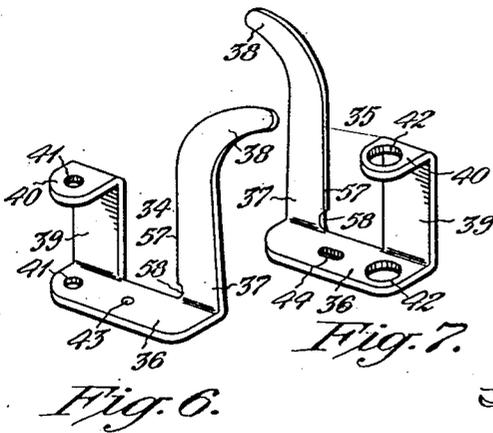


Fig. 6.

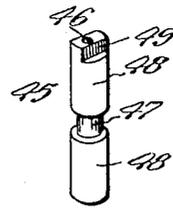


Fig. 8.



Fig. 9.

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UNITED STATES PATENT OFFICE

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YARN-CLEANER AND SLUB-CATCHER

Application filed October 11, 1927. Serial No. 225,547.

This invention relates to an improved yarn-cleaner and slub-catcher for use with winding machines and other textile apparatus.

A principal object of the invention is to provide a device of the type specified for cleaning lint, fluff, specks and other foreign matter from yarn, thread or other filaments and for detecting the presence of slubs, knots, bunches and other enlargements on the strand to break the latter so that the imperfection may be removed and the ends pieced up again.

Another object of the invention is to provide a device of the type specified which is extremely sensitive in action and prompt in operation to break the strand upon the detection of the slub, knot, bunch or other enlargement.

Another object of the invention is to provide a device of the type specified having cooperating yarn-cleaning elements which may be adjusted with the utmost precision and accuracy in accordance with the size or thickness of the strand to be operated upon.

Another object of the invention is to provide a device of the type specified which may be adjusted to operate with the proper degree of sensitiveness so that light obstructions such as lint and fluff may be scraped off from the yarn without causing the slub-catcher to be tripped and actuated to break the strand.

Another object of the invention is to provide a device of the type specified which is simple in construction, economical to manufacture and proof against derangement or getting out of order.

Further objects of the improvement are set forth in the following specification which describes a preferred form of construction of the invention as illustrated by the accompanying drawings. In the drawings:

Fig. 1 is a perspective view of the improved yarn-cleaner and slub-catcher;

Fig. 2 is a side view of the same showing the device as applied to use with a tension-device for tensioning the strand;

Fig. 3 is a plan view of the yarn-cleaner and slub-catcher;

Fig. 4 is a front view of the same;

Fig. 5 is a plan view of the device in section taken on line 5—5 of Fig. 4;

Figs. 6 and 7 are perspective views in detail of the two cooperative yarn-cleaning and slub-detecting elements of the device;

Fig. 8 is a detail view in perspective of the eccentric rod or spindle for adjusting the relation of the yarn-cleaning and slub-detecting elements of the device; and

Fig. 9 is a perspective view of the friction-means for retaining the rod in adjusted position.

The present improved yarn-cleaner and slub-catcher is adapted for use with various types of textile apparatus, particularly winding or like machines, to clean the yarn, thread or other filament during its transfer in various processes of conversion or treatment. In the present embodiment of the invention the device is shown as adapted for use in cooperation with a tension-device. The tension-device may be of any preferred construction and, as illustrated in Fig. 2 of the present drawings, it comprises a pair of opposite fan-shaped grids 2 provided with a series of porcelain bars or fingers 3. The fingers 3 on the opposite grids are arranged in alternate relation so that when the grids are adjusted in operative position the fingers are staggered to cause the strand of yarn y to follow a tortuous or sinuous course thereover. At either end of the grids 2 are fixed porcelain guides 4 across which the strand y leads as it draws over the bars or fingers 3 in a curved course.

The tension-grids 2 are adjustably mounted on a bracket 5 which may be attached to the frame of the winding machine or other apparatus to project laterally therefrom. Conveniently, the bracket 5 may be employed as a mounting or support for the improved yarn-cleaner and slub-catcher which forms the subject-matter of the present application. For this purpose the bracket 5 is provided on its top with a flat pad or rest 6 formed with a transverse slot or groove 7. The frame or mounting 10 for the yarn-cleaner and slub-catcher is preferably constructed from sheet-metal in the form of an angle-shaped plate

having a horizontal base 11 which seats on the pad or rest 6 and is secured thereto by means of a screw 12 passing through a lateral slot 13 therein, see Figs. 3 and 5. At either side of the base 11 the metal is sheared away to form narrow strips 14 which are bent down at an angle, see Fig. 1, to adapt them to engage in the transverse groove 7 in the pad or rest 6. The strips 14 thus serve as splines or keys to maintain the frame 10 in proper position on its rest 6 while adapting it to be slid laterally one way or the other to adjust the yarn-cleaning and slub-catching elements in alinement with the tension-device mounted on the bracket 5. The frame 10 comprises a vertical plate 15 bent upwardly from the base 11 and serving as a support for a strand-guide 16 secured thereto by means of a screw 17. The strand-guide 16 may be of any suitable form and as herein shown comprises a circular porcelain button having a central hole for the screw 17 and a notch or groove 18 in its upper edge adapted to guide the strand *y* drawing therethrough.

At the front of the frame 10 are two vertical ears 20 bent up from the sides of the base 11 as shown most clearly in Fig. 1 of the drawings. The ears 20 are provided with suitable holes for receiving screws 21 which serve as the pivotal supports for a frame or cradle 25 which carries the operating elements of the yarn-cleaner and slub-catcher. By loosening the screws 21 the frame or cradle 25 may be tilted into different angular positions, see Fig. 2, to adjust the position of the operating-mechanism of the device in the manner and for the purpose as later more particularly explained. When the screws are tightened the cradle 25 will be held in its adjusted position with its sides clamped against the ears 20 on the frame 10, and for convenience of illustration I have shown the cradle 25 as standing in vertical position in Figs. 1, 3, 4 and 5, to which reference will be made to describe the construction of the device.

The cradle 25 is preferably constructed of sheet-metal comprising a base-strip 26 with two arms 27 rising from the rearward edge thereof. Extending forwardly from the sides of the arms 27 are two ears 28 which are provided with threaded holes 29 for receiving the ends of the screws 21, previously referred to as the supports for the cradle. The arms or uprights 27 of the cradle 25 are bent forwardly at the top to provide ears 30 extending parallel with and in opposite relation to the base-strip 26. Extending between the base-strip 26 and the ears 30 are two opposite parallel rods or pins 31 fixedly secured therein at their ends by riveting or other means.

The pins 31 serve as the pivots for a pair of cooperating scraper-blades and slub-detecting elements 34 and 35, shown in detail in Figs. 6 and 7. The two elements 34 and

35 are of substantially the same form and construction, being struck up from sheet-metal and bent into the required shape. Each member 34 or 35 comprises a flat bottom strip 36 provided at one end with an upstanding blade 37 which terminates in a curved or sickle-shaped extension 38. At the opposite end of the bottom strip 36 is an upstanding arm 39 formed with an ear 40 bent over in opposite parallel relation to the bottom strip 36. The bottom strip 36 and the ear 40 on the element 34 are pierced or drilled with holes 41, see Fig. 6, for receiving the left-hand pivot-pin 31 on the cradle 25. The other member 35 has larger holes 42 in its bottom plate 36 and upper ear 40 adapted to receive the enlarged eccentric portions of an adjusting spindle or rod 45, shown in Fig. 8 and to be later described. Projecting downwardly from the bottom plate 36 on the member 34 is a pin 43 adapted to engage with a slot 44 in the bottom plate 36 of the member 35 when the two members are mounted in cooperative relation on the cradle 25 as shown in Figs. 3 and 5.

The adjusting spindle or rod 45, shown in Fig. 8, has a bore 46 by means of which it is rotatably mounted on the right-hand pivot-pin 31 on the cradle 25. Its central portion is reduced in diameter at 47, and at either side thereof are enlarged hubs or bosses 48 which are disposed eccentrically with respect to its longitudinal bore 46. The bottom of the spindle 45 seats against the bottom strip 26 of the cradle 25, as shown most clearly in Fig. 4 of the drawings, and the enlarged eccentric bosses 48 engage with the holes 42 in the bottom plate 36 and ear 40 on the member 35 when the latter is assembled in cooperative relation with respect to the other member 34 pivoted directly on the left-hand pin 31. The upper end of the spindle or rod 45 is flattened off at 49 to adapt it to be engaged by a spanner-wrench whereby it may be rotated to adjust the position of the member 35 with respect to the member 34 in the manner and for the purpose as later more fully explained.

Friction detent-means are provided for retaining the spindle 45 in its adjusted position rotatively of its bearing-pin 31. As herein illustrated the detent-means comprises a bowed spring 50, shown in detail in Fig. 9, which is disposed between the arm 39 of the member 35 and the side of the adjusting spindle 45. The spring 50 is provided with an upper cross strip or T-head 51 having lugs 52 bent over from its ends to adapt them to straddle the sides of the arm 39 whereby to hold the spring in place with its lower edge resting against the bottom strip 36 of the member 35. Reaching forwardly from the bowed portion of the spring 50 are two ears 53 which straddle the central reduced portion 47 of the spindle 45 to hold the spring in place laterally. The detent-member 50 is snapped into place be-

tween the spindle 45 and the arm 39 of the member 35 in the position as shown in Figs. 1 and 2, whereby it is held under compression to exert a frictional pressure against the side of the spindle 45 to restrain the latter from turning after it has once been adjusted rotatively of the pin 31.

It will be observed from the above description and by reference to Figs. 1, 3, 4 and 5 of the drawings that the element 34 is hinged directly on the left-hand pivot-pin 31 extending between the base-strip 26 and the ear 30 of the cradle 25. A collar or washer 55, see Figs. 1 and 4, surrounds the pin 31 between the bottom-strip 36 of the member 34 and the base-strip 26 of the cradle 25 to raise the member 34 above the base-strip 26 so that its bottom-strip 36 may overlap the corresponding bottom-strip on the other member 35. The opposite member 35 is pivoted on the enlarged eccentric hubs 48 of the spindle 45, as before stated, with its bottom-strip 36 held slightly above the base-strip 26 of the cradle 25, the member 35 being supported in this raised position by the upper edge of the spring 50 which engages under its ear 40 as shown in Figs. 1 and 4. The two cooperating blade-members 34 and 35 are thus pivotally mounted with their base-strips 36 in overlapping relation and their vertical blades 37 disposed in substantial alinement so that their rearward edges form a vertical slit 56, providing an opening through which the strand of yarn draws in the manner as later more fully explained. The opposed edges 57 of the blades 37 are preferably ground to a bevel in the manner of a knife blade as shown in Figs. 3 and 5 of the drawings. The upper curved extensions 38 of the blades 37 form a reentrant guideway for directing the strand into place to adapt it to draw between the knife edges of the blades in the manner as illustrated in Figs. 1 and 2. Preferably, the knife edges 57 are cut away at the bottom to form an opening 58 for the escape of dirt, lint and other foreign matter which collects on the blades and drops down through the slit 56.

It will be seen that with the parts assembled in the relation as above explained the two blade-members 34 and 35 are hinged in opposite relation to adapt their knife edges 57 to close together to seize or bite the yarn drawing therethrough. The blades are normally maintained with their edges in opposite relation by the engagement of the pin 43 on the member 34 with the slot 44 in the member 35. It is also to be noted that while the member 34 pivots directly on the pin 31, the member 35 swings about the axis of the hubs 48 of the spindle 45 which are eccentric with respect to the other pin 31. The axes on which the two members 34 and 35 swing therefore have a fixed relation, but by turning the adjusting-spindle 45 on its pin 31 the pivotal axis of the member 35 may be dis-

placed toward or away from the axis of the other member 34 to adjust the relation of the opposed knife edges 57 of the blades 37. In this way the width of the opening or slit 56 between the edges of the blade-members may be regulated in accordance with the size or thickness of the yarn to be operated upon, the two members 34 and 35 being normally held in the relation shown in Fig. 3 with their knife edges spaced slightly apart. The blade-members 34 and 35 are limited in their forward swinging movement to hold them in open relation by the overlapping engagement of the knife-blade on one member with the rearward edge of the base strip 36 of the other member, see Fig. 5.

In applying the present improved yarn-cleaner and slub-catcher to use it is arranged in the path of the yarn feeding to the machine in which the material is to be converted. For example, on winding machines it is arranged to act on the strand of yarn, thread or other material as the latter draws between the tension-device and the winding-spindle and such an adaptation is shown in Fig. 2 of the present drawings. The strand γ draws up from a source of supply, not herein shown, across the lower guide 4 of the tension-device and thence passes in a curved and tortuous course across the fingers 3 of the tension-rids 2 and over the upper fixed guide 4. From the upper guide 4 the strand γ draws in a straight course to the fixed guide 16 on the tension-frame 10, passing through the slit or opening 56 between the blade-members 34 and 35 of the yarn-cleaner and slub-catcher which is disposed in alinement therewith.

As before stated, the frame or mounting 10 for the yarn-cleaner and slub-catcher is supported on the bracket 5 of the tension-device and may be adjusted transversely thereof by loosening the screw 12 and sliding the frame on the pad 6 to bring the slit 56 between the edges of the blade-members 34 and 35 into alinement with the course of the strand γ drawing between the fixed guides 4 and 16. As shown in Fig. 2 of the drawings, the cradle 25 which serves as a mounting for the members 34 and 35 is adjusted at an angle to the perpendicular to hold the blades 27 at substantially right-angles to the course of the strand γ . This adjustment is effected by loosening the screws 21 and tilting the cradle 25; after which the screws are tightened to clamp the ears 28 on the cradle against the side of the ears 20 on the frame 10. The tilting adjustment of the cradle 25 on the frame 10 is primarily for the purpose of causing the blade-members 34 and 35 to be held in open relation under the action of gravity, that is, with their knife edges 57 spaced apart as shown in Figs. 3 and 4 to provide the slit 56 for the strand to draw through. The width of the slit between the edges of the blades 37 is adjusted by turning the spindle 45 on its

supporting pin 31, thereby causing the eccentric hubs 48 of the spindle to move the blade-member 35 one way or the other with respect to the fixed pivotal mounting of the blade 34 to increase or diminish the width of the slit 56 between the edges of the blades.

The adjustment of the cradle 25 at an angle to the vertical may be altered as required to vary the gravitational effect on the blade-members 34 and 35. That is to say, as the cradle 25 is tilted to a greater degree from the vertical the effect of gravity to maintain the blades in open relation will be increased, whereas if the cradle is tilted in the opposite direction the force of gravity will be reduced. In this way a greater or less resistance is applied against the closing action of the blades when they are engaged by an obstruction on the running strand. The purpose of this adjustment is to provide the proper resistance to the swinging movement of the blade-members 34 and 35 whereby they will normally act with a delicate contact on the yarn to scrape the accumulation of lint, fluff, specks and other foreign matter therefrom, while at the same time being sensitive to close together promptly upon the detection of a slub, knot, bunch or other enlargement on the yarn which cannot be freed therefrom under the scraping action. The method of operation of the device is as follows.

As the strand *y* draws up through the tension-device and passes through the slit 56 between the knife edges of the blades 37 it will be acted upon in the manner as previously indicated to scrape off all foreign matter adhering lightly to the yarn, thread or other material. When, however, a slub, knot, bunch or other irremovable enlargement on the yarn encounters the edges of the blades 37 its passage through the slit will be obstructed to cause the blades 34 and 35 to be swung into the position shown in Fig. 5 of the drawings. That is to say, the blades will be swung upwardly against the force of gravity normally maintaining them open in the position illustrated in Fig. 3 so that their knife edges are brought together as shown in Fig. 5 to seize or bite the yarn. This action causes the yarn to be cut or broken where the sharpened edges 57 of the blades bite thereagainst so that the slub, knot or other enlargement may not pass through the device to the machine wherein the material is being wound or otherwise converted. Usually, the winding machine is provided with a drop-wire or breakage-lever, not herein shown, which is normally supported by the running strand and which when released by the breakage thereof is caused to initiate the action of the stopping-mechanism of the machine. In this manner the improved yarn-cleaner and slub-catcher acts automatically to scrape and clear all foreign matter from the strand passing therethrough while also detecting the presence of slubs, knots,

bunches and other enlargements on the yarn to cause the latter to be broken so that the imperfection may be removed and the ends pieced up again in the usual manner.

It has been noted that the device is adjustable to provide for regulating the gravitational resistance to the swinging action of the blade-members 34 and 35 so as to secure a sensitive action of the scraper-blades. That is to say, this adjustment provides for setting the blades so that normally they will apply sufficient resistance to the passage of loose matter on the yarn while still being sensitive to detect any enlargement on the strand which cannot be removed to cause the blades to act to positively seize and break the strand.

It will further be observed that the present improved device is simple in construction, compact in size and adapted for economical manufacture through the use of sheet-metal stampings struck up and formed in suitable dies. The device is adapted for convenient adjustment both to regulate the width of the opening or slit through which the strand draws in accordance with the size or thickness of the yarn being operated upon; and to control the degree of resistance exerted by the scraper-blades to the passage of obstructions on the yarn whereby to secure a sensitive detecting action and a prompt response thereto.

While I have herein described and illustrated the improved device in a preferred embodiment and as applied to one specific use it is to be understood that various modifications may be made in the form and structure of its mechanism and in the method of adapting it to use without departing from the spirit or scope of the invention. Therefore, without limitation in this respect, I claim:

1. In a device of the type specified, the combination of a base-member having upstanding ears, a cradle having ears at its sides, screws extending through the ears on the base-member and cradle to adjustably secure the latter at different angles of inclination with respect to the vertical, a pair of pivot-pins supported in opposite parallel relationship on the cradle, arms pivoted on said pins and extending therefrom in overlying relationship, and blades at the ends of the arms projecting upwardly therefrom in substantially the same plane with their adjacent edges forming a slit through which the yarn draws whereby to clean it of slubs, lint, and other foreign matter.

2. In a device of the type specified, the combination of a frame comprising a base with ears projecting upwardly therefrom, a cradle having a base with ears at its sides and opposite arms rising from the base and formed with ears at the top, means for clamping the ears at the sides of the cradle to the ears on the frame, pivot-pins extending between the base of the cradle and the ears at

the top of its arms, and a pair of scraper-blades pivoted on the pins with their edges in opposite spaced relationship to provide a slit through which the yarn draws to scrape slubs, motes, and other foreign matter therefrom.

3. In a device of the type specified, the combination of a support, a cradle adjustably mounted on the support and having upper and lower bearing-portions, a pair of upright pivot-pins held in parallel spaced relationship in said bearing-portions, and sheet metal arms provided with spaced ears pivoted on said pins and extending toward each other in overlying relationship, said arms having scraper-blades constructed integral therewith and extending perpendicularly therefrom with their edges spaced apart to form a slit through which the yarn draws.

4. In a device of the type specified, the combination of a support, a cradle adjustably mounted on the support to adapt it to be set at different angles to the vertical, pivot-bearings on said cradle, and scraper-members pivoted on said bearings, said members constructed of sheet-metal folded to provide arms extending from the pivots in overlying relationship, and blades projecting at right-angles to the arms with their edges spaced apart to form a slit through which the yarn draws.

5. In a device of the type specified, the combination of a frame having opposite ears and a rearward wall, yarn-guiding means on said wall, a cradle having ears abutting the ears on the frame and upright portions provided with opposite spaced bearings, screws extending through the ears on the frame and cradle to adjustably secure the latter at different inclinations to the vertical, a pair of pivot-pins extending between the bearings on the cradle, and a pair of scraper-members having spaced bearings mounted on the pivot-pins and arms extending toward each other and carrying blades projecting therefrom with their edges in opposite spaced relationship to form a slit through which the yarn draws.

In testimony whereof I hereunto affix my signature.

GEORGE N. TAYLOR.

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