

R. G. JENNINGS.
 APPARATUS FOR CLEANSING YARNS.
 APPLICATION FILED JAN. 21, 1909. RENEWED AUG. 4, 1910.

991,510.

Patented May 9, 1911.

Fig. 1.

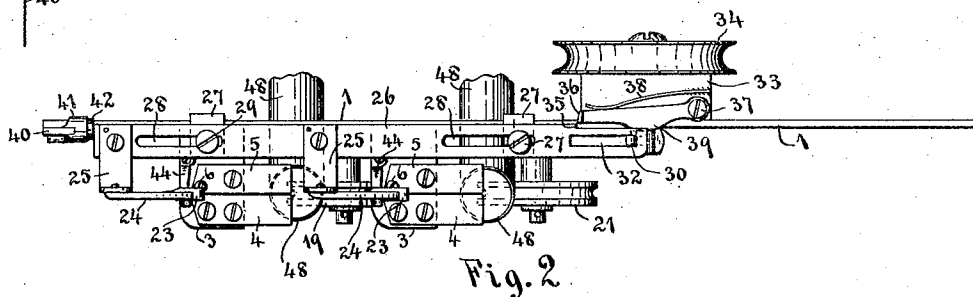
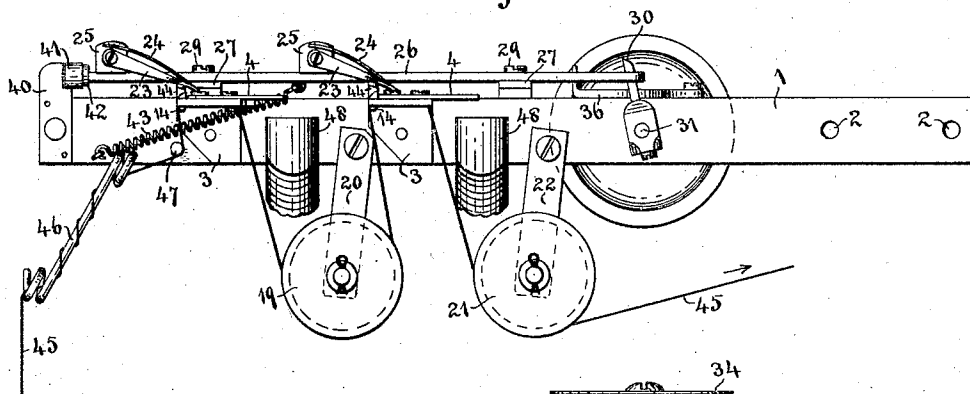


Fig. 2.

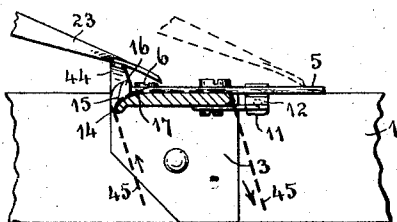


Fig. 3.

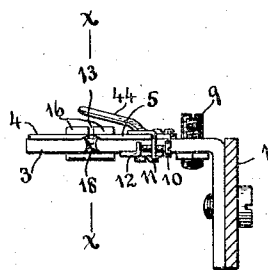


Fig. 4.

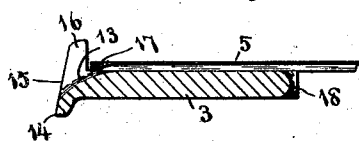


Fig. 6.

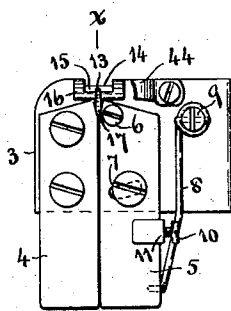


Fig. 5.

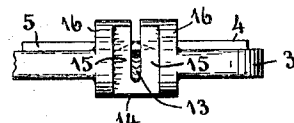


Fig. 7.

WITNESSES:

M. E. Verbeck.

Abner

INVENTOR

Robert S. Jennings

BY

Eugene Diven
 ATTORNEY

UNITED STATES PATENT OFFICE.

ROBERT G. JENNINGS, OF ELMIRA, NEW YORK.

APPARATUS FOR CLEANSING YARNS.

991,510.

Specification of Letters Patent.

Patented May 9, 1911.

Application filed January 21, 1909, Serial No. 473,542. Renewed August 4, 1910. Serial No. 575,537.

To all whom it may concern:

Be it known that I, ROBERT G. JENNINGS, a citizen of the United States, residing at Elmira, in the county of Chemung and State of New York, have invented a new and useful Apparatus for Cleansing Yarns, of which the following is a specification.

This invention relates to an improved means for removing impurities, such as broken seeds, fragments of leaves and stalks, dirt, etc., and lumps of fiber which are found in cotton and other yarns, after passing through the carding, combing and spinning operations; the object of my invention being to provide effective means for separating such impurities from the yarn, preparatory to the knitting and weaving operations.

Heretofore the carding, combing and spinning operations, particularly with relation to cotton yarns, have been found inadequate, as ordinarily carried out, to remove all particles of impurities; such impurities being found to exist to a very considerable extent in the lower priced yarns. These impurities, if left in the yarns, not only cause the breakage of needles in knitting machines, and the consequent making of seconds; but also require, when worked up into fabric, that the fabric be subjected to excessive bleaching operations, in order to remove the objectionable appearance of such impurities. By means of my improved apparatus, one form of which is herein described, by way of illustration, I am enabled to remove practically all of such impurities, even from the lower grades of yarn, in a cheap and effective manner and to produce a fabric free from these objectionable specks and blemishes; thus enabling the manufacturer to produce a much higher grade of goods from the low priced yarns, and at a large saving in the cost of production.

I accomplish my object by constructing the apparatus in the manner illustrated in the accompanying drawings, in which—

Figure 1 represents a side elevation of the apparatus; Fig. 2, a plan view thereof; Figs. 3, 4, and 5, details of the cleansing mechanism upon a larger scale, Fig. 3 being a section on the line *w—w* in Figs. 4 and 5; and Figs. 6 and 7, portions of these details on a still larger scale, Fig. 7 being an end view looking to the right in Fig. 6.

Like numerals designate like parts in the several views.

The several parts of the apparatus are

mounted upon a frame-plate 1, which is shown provided at 2, 2, with bolt holes, whereby it may be secured in position upon any form of spinning, winding or other machine, there being a separate apparatus for each strand of yarn.

At suitable points upon the frame-plate I attach one or more brackets 3, and each bracket is provided with blades 4 and 5, the blade 4 being shown herein as rigidly fastened to the bracket, and the blade 5 being pivoted at 6 to swing away from the blade 4, when introducing the yarn, preparatory to running it through the apparatus, the groove at 7 permitting the blade to swing under the head of the screw which holds it against the face of the bracket. The blade 5 is maintained in position relative to the blade 4 by means of a spring 8, fastened to a post 9, on the bracket, said post being screwed into the bracket and held by a lock nut, when in position to give the required tension to the spring, which is wound around the post after one end has been inserted in a transverse hole in the post, (see Fig. 5). Any other spring device, however, may be employed. To adjust the space between the blades there is an adjusting screw 10, supported upon a depending arm 11, attached to the blade 5, said screw engaging a stop 12 fastened to the underside of the bracket 3. This provision for adjustment is made so that the opposing edges of the blades may be set slightly apart. In practice, I set the blades so that a hair may be passed between. Were the edges of the blades to be set up against one another, they would be liable to act as shears, which is not their function, and would cut off the lint from the yarn, causing much waste, as well as cutting the particles of impurities in two, instead of simply pinching them, as is my object.

At 13 the brackets are provided with an inclined channel, preferably curved, which is of a width corresponding to the diameter of the yarn. Before passing through this channel, the yarn is drawn across a transverse edge 14, formed on a guide-way at the side of the bracket leading to the channel, which edge is just sufficiently rounded to avoid abrading the yarn. As particles of impurities are drawn across this edge they are turned to one side, or the other, into lateral engagement with the surfaces 15, which extend from this turning edge beyond the opening into the channel and at an

incline to the channel. The edge also effects a turning of the yarn as it approaches, due to the twisted fibers of the yarn running over the edge, which assists in so turning the particles. The function of this turning edge, is, therefore, to bring the particles of impurities into position on the yarn to ride up the inclines 15 at either side of the channel. As the particles ride along the inclines, they are turned so as to project outwardly on the yarn and so pass in between the lugs 16 at each side of the channel. By the side walls formed by these lugs, they are guided through the channel in this outwardly projecting position on the yarn. From the channel, the outwardly projecting particles pass directly into a V-shaped opening 17 between the blades and are thence drawn in between the gripping edges, with a claw hammer action. These gripping edges are set parallel to the line of travel of the yarn, and in the mechanism, as illustrated, are formed by beveling the blades toward the face of the bracket, so as to form a run-way for the yarn between the gripping edges and the flat face of the bracket through which the yarn will pass free from engagement with the gripping edges. I do not limit myself, however, to this arrangement of these members. As the yarn travels onward, the particles, lumps, and the like, only, are drawn along between the gripping edges, until the yarn is drawn away from the blades through the curved notch 18 at the other side of the bracket, when the particles are pulled away from the yarn and are left behind.

Supported upon brackets 27, attached to the frame-plate 1, is a slide bar 26, said bar being slotted at 28, where the screws 29 pass through to hold the bar upon the brackets 27. Motion in one direction is imparted to this bar by means of a rotating finger 30, mounted on a shaft 31, said finger being adapted to engage the end of the slide bar through a slot 32. The shaft 31 is rotated in a bearing block 33, attached to the side of the frame-plate, and a pulley 34 is attached to the other end of the shaft. A quick return motion is attained by means of the spring 43 fastened at one end to the frame-plate and at the other to the slide bar. The bar 26 is notched at 35 to receive a detent carried by arm 36, which is pivoted at 37 to the bearing block 33, a spring 38 acting upon said arm to press the detent into engagement with the notch. The arm 36 is outwardly curved at 39, said curve being engaged by a side projection from the finger 30, when said finger engages the end of slot 32, to throw the detent out of engagement with the slide bar. At 25, bar 26 is provided with laterally projecting arms which are turned up at their outward ends into alignment with the line of separation between the

blades 4 and 5. Pivoted to these arms 25 are pushers 23, which, when the slide bar is moved to the right, slide along the blades 4 and 5 to clear said blades of particles gripped therebetween, as will later appear. These pushers are formed from strips of metal, which are given a quarter twist at the free end to form a transverse pusher blade, and are held in engagement with the blades 4 and 5 by means of springs 24 attached to the arms 25.

When in operation, the apparatus will be attached, (at any convenient place in the line of travel of the yarn), to the frame of any of the various spinning, winding or like machines, or held in position by an independent support, a separate apparatus being provided for each strand of yarn.

Modifications of the apparatus will be required to be made to meet the different requirements in applying it to different machines, and I do not, therefore, wish to confine myself in the least to any of the specific details of construction herein shown and described by way of illustration.

Apparatus of this nature may also be applied directly to knitting and weaving machines to finally cleanse the yarn before it is worked up into fabric. The course of the yarn through the apparatus is shown by the heavy line 45 in Fig. 1 and the broken line in Fig. 3. The yarn first passes through a suitable tension device to give it the necessary tautness, as it is drawn through the cleansing mechanisms. In Fig. 1, the tension device is shown in the form of a rod 46 having eyes formed thereon at opposite ends and attached to the frame-plate at one end, the yarn being guided through the eyes and given a sufficient number of turns around the rod to give it the required resistance to the forward pull. From the tension rod, the yarn passes around a guide post 47, which is set slightly in advance of the turner edge 14 on the first cleansing mechanism. The tension device may, however, be positioned at the point occupied by the guide 47, and the yarn conducted thence directly to the turner, it being essential, only, that the yarn approach the turning edge at such an angle as to permit the edge to accomplish its purpose, as hereinbefore set forth. From the turner, the action of which upon the particles of impurities has already been described, the yarn passes through the first cleansing mechanism, wherein the gripping edges are set slightly away from the body of the yarn, to effect the removal of the larger particles of impurities, etc. Thence the yarn is conducted around guide wheel 19, supported on arm 20 attached to the frame-plate, and on to the second cleansing mechanism, wherein the gripping edges are set closer to the yarn, where smaller particles, and those missed by the first mechanism, are removed.

nism, are removed. From the second cleansing mechanism, the yarn passes to the guide wheel 21 on arm 22, and thence to a cop or cone, if the apparatus be applied to a spinning machine, or to a bobbin on a winding machine, or directly into the fabric in a knitting or weaving machine. Or the yarn may be carried through one or more additional cleansing mechanisms, in which the gripping edges are set still closer to the yarn, where the first two are not found sufficient to effect the desired degree of cleansing. In some cases one, only, of the cleansing mechanisms may be found sufficient; but, in practice, I find from two to four to be preferable, removing the larger particles first, and the smaller particles gradually thereafter. As the particles accumulate between the blades, they must be discharged therefrom, and for this purpose I employ the pushers 23, mounted on the slide bar 26. With each revolution of the shaft 31, which may be rotated at any desired speed by means of pulley 34 belted to a suitable source of power, these pushers are moved over the blades, thereby pushing the particles along between the gripping edges until they drop from the projecting ends of the blades. These particles, when so discharged, may drop or be drawn by air suction into chutes 48, and carried to any desirable point of discharge; or they may be otherwise conducted away from the apparatus. The slide bar 26, as soon as released from the finger 30, as the shaft 31 rotates, is caused to fly back into its first position by means of the spring 43. The bar is stopped on its return stroke by means of a buffer, consisting of a cushioning disk 42, mounted in a socket 41 on an upright 40 which is fastened to the end of the frame-plate; and, when so returned, the bar is locked against rebound by means of the detent on the arm 36, which then engages notch 35. As the pushers are returned to their first positions, they are raised from engagement with the blades by means of the arms 44 back of the blades; thus giving the particles clearance to pass out through opening 17 and in between the gripping edges of the blades. On their outward strokes the pushers are preferably stopped short of the ends of the blades, as shown by the broken line position in Fig. 3, thus permitting a longer dwell of the particles between the gripping edges at this distance from the yarn, to insure a complete separation; the following particles on the next stroke of the pushers forcing the preceding particles out.

Many modifications may be made in the different parts of the apparatus without departing from the spirit of my invention; and, as I believe myself to be the first to devise mechanism which will effectively remove particles of impurities, lumps of fiber, and the like, from a running thread of yarn,

I desire it to be understood that I include, as within the scope of my invention, in the broadest sense, any mechanism which will accomplish this result by gripping, or taking hold of the particles, lumps, and the like, and detaching them from the yarn by a pulling action; also any means for positioning the particles, etc., so as to be acted upon by the mechanism.

What I claim as my invention and desire to secure by Letters Patent is—

1. An apparatus of the character described comprising means for gripping particles of impurities, lumps of fiber, and the like, adhering to a running thread of yarn, and means for thereafter causing a relative movement of the yarn and particles away from one another to detach the particles from the yarn.

2. An apparatus of the character described comprising means for gripping and detaching particles of impurities, lumps of fiber, and the like, from a running thread of yarn, in combination with means for placing such particles in position on the yarn to be engaged by the gripping means.

3. An apparatus of the character described having oppositely disposed gripping members positioned adjacent to and at one side of the line of travel of a running thread of yarn, said members being adapted to receive between them particles of impurities, lumps of fiber, and the like, adhering to the yarn.

4. An apparatus of the character described having oppositely disposed gripping members positioned adjacent to and at one side of the line of travel of a running thread of yarn, said members being adapted to receive between them particles of impurities, lumps of fiber, and the like, adhering to the yarn, in combination with means for removing the particles from said members.

5. An apparatus of the character described, comprising members having oppositely disposed gripping edges positioned adjacent and parallel to the line of travel of the yarn, means for introducing particles of impurities, lumps of fiber, and the like, adhering to the yarn between said edges and means for thereafter drawing the yarn away from said particles when gripped between said edges.

6. An apparatus of the character described comprising a pair of blades having oppositely disposed gripping edges positioned adjacent and parallel to the line of travel of the yarn, one of said blades being susceptible of motion to and from the other, a spring adapted to hold said blade normally in operative position with relation to the other blade, means for introducing particles of impurities, lumps of fiber, and the like, adhering to the yarn between the gripping edges and means for thereafter

drawing the yarn away from the blades to separate the particles from the yarn.

7. An apparatus of the character described comprising members having oppositely disposed gripping edges positioned parallel to the line of travel of the yarn, said edges receding from one another at one end to form a V-shaped opening, a guide channel leading to said opening, means for turning particles of impurities, lumps of fiber, and the like, into a position on the yarn, as it passes into and through said channel, whereby they will enter said opening, a runway for the yarn adjacent the gripping edges, and means for directing the yarn away from said edges after passing over the runway.

8. An apparatus of the character described, comprising members having oppositely disposed gripping edges positioned parallel to the line of travel of the yarn, means for introducing particles of impurities, lumps of fiber, and the like, adhering to the yarn between said edges, means for there- after drawing the yarn away from said particles when gripped between said edges, and means for removing the separated particles from between said edges.

9. An apparatus of the character described comprising members having oppositely disposed and slightly separated gripping edges positioned adjacent and parallel to the line of travel of the yarn, means for introducing particles of impurities, lumps of fiber, and the like, adhering to the yarn between said edges and means for there- after drawing the yarn away from said edges.

10. An apparatus of the character described comprising members having oppositely disposed gripping edges positioned adjacent and parallel to the line of travel of the yarn, said edges receding from one another toward one end to form a V-shaped opening between the edges, and means for introducing particles of impurities, lumps of fiber, and the like, adhering to the yarn into said opening as the yarn is drawn through the apparatus adjacent said edges.

11. An apparatus of the character described comprising members having oppositely disposed gripping edges positioned adjacent and parallel to the line of travel of the yarn, means for adjusting the space between said edges, and means for introducing particles of impurities, lumps of fiber, and the like, adhering to the yarn between the edges as the yarn is drawn through the apparatus.

12. An apparatus of the character described comprising members having oppo-

sitely disposed gripping edges positioned adjacent and parallel to the line of travel of the yarn, and a guide member having a channel leading to an opening between said edges, the walls of said channel at their outward ends extending to a transverse turning edge on the guide member across which the yarn is drawn on its way to the channel.

13. In an apparatus of the character described, the combination, with mechanism for removing particles of impurities, lumps of fiber and the like, from the yarn, of a member over which the yarn travels to the removing mechanism, said member being provided with a transverse turning edge across which the yarn is drawn on its way to said mechanism, whereby a turning motion is imparted to the particles to bring them into position upon the yarn to be engaged by the removing mechanism.

14. In an apparatus of the character described, the combination, with mechanism for removing particles of impurities, lumps of fiber, and the like, from the yarn, of a member over which the yarn travels to the removing mechanism, said member being provided with a transverse turning edge across which the yarn is drawn, and a channel beyond said edge into which the yarn passes on its way to said mechanism, the side walls of the channel at their outward ends being inclined from the turning edge.

15. In an apparatus of the character described, the combination, with members having oppositely disposed gripping edges positioned adjacent and parallel to the line of travel of the yarn, of a slide bar mounted parallel to said gripping edges, a pusher bar mounted on the slide bar in a position to travel across said members along the gripping edges, and means for imparting a forward and back motion to the slide bar.

16. In an apparatus of the character described, the combination, with members having oppositely disposed gripping edges positioned adjacent and parallel to the line of travel of the yarn, of a slide bar mounted parallel to said gripping edges, a pusher bar mounted on the slide bar in a position to travel across said members along the gripping edges, means for imparting an intermittent forward and a quick return motion to the bar, a buffer to cushion the return stroke, and means for preventing rebound after the bar has struck the buffer.

In testimony whereof I have affixed my signature, in presence of two witnesses.

ROBERT G. JENNINGS.

Witnesses:

EUGENE DIVEN,
A. S. DIVEN.