No. 676,826. Patented June 18, 1901.

E. F. WILLEY & W. W. McDANIEL.

YARN SPINNING APPARATUS.

(Application filed May 25, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

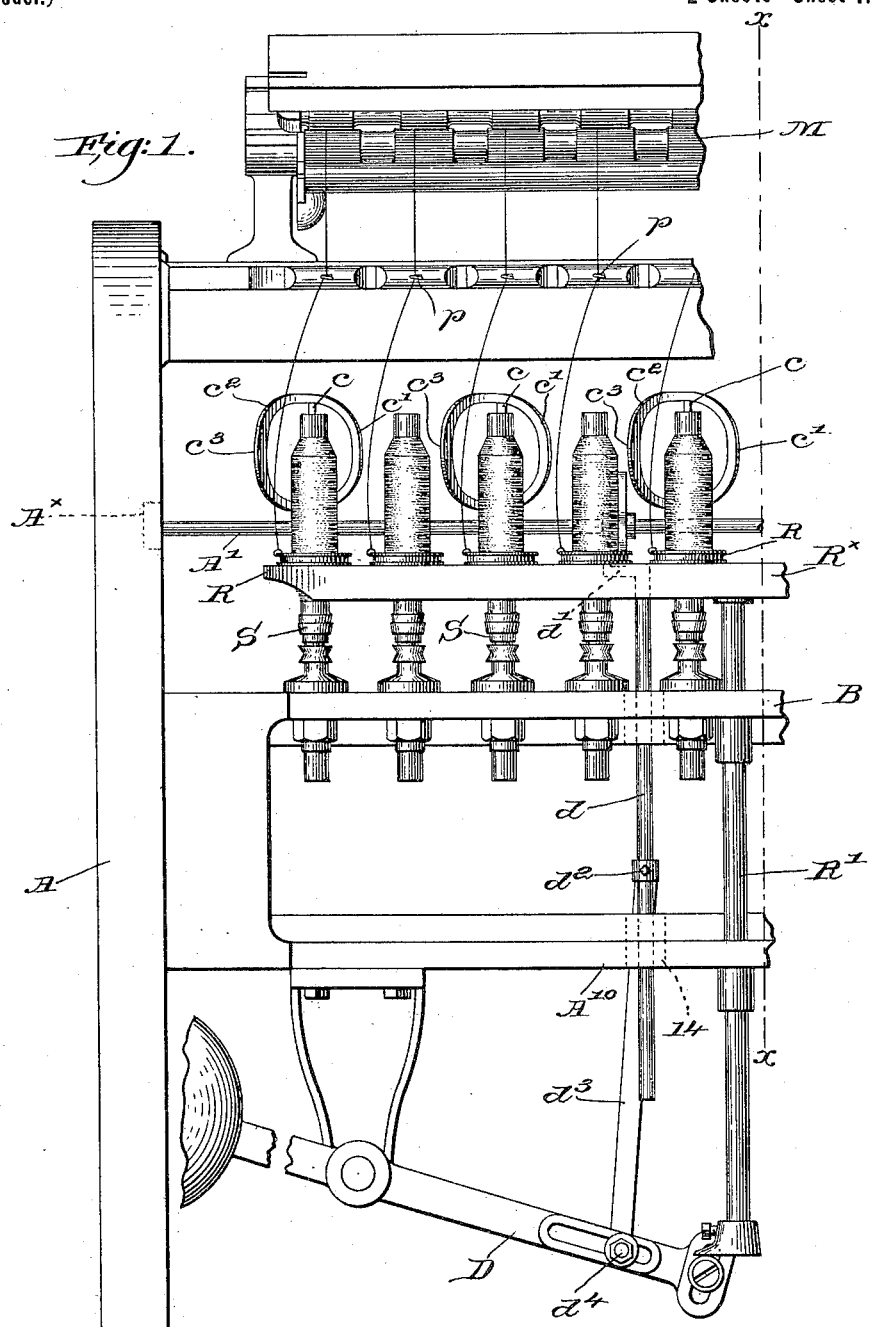

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Fig: 2.

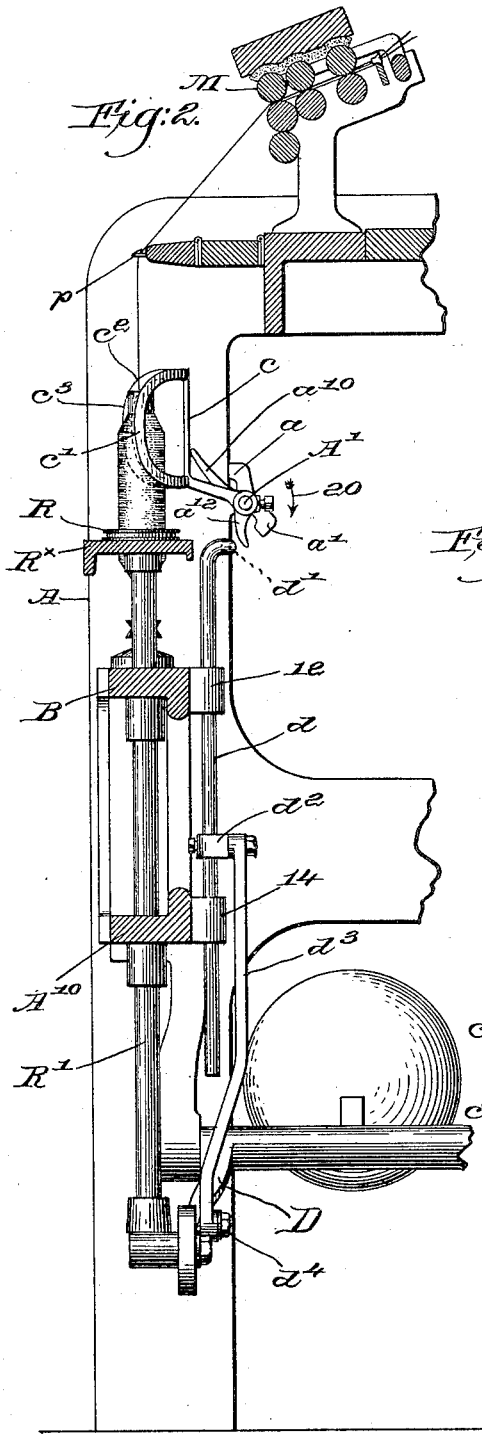


Fig: 4.

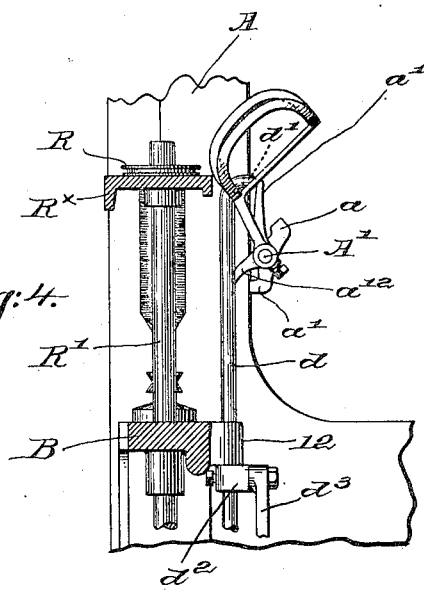
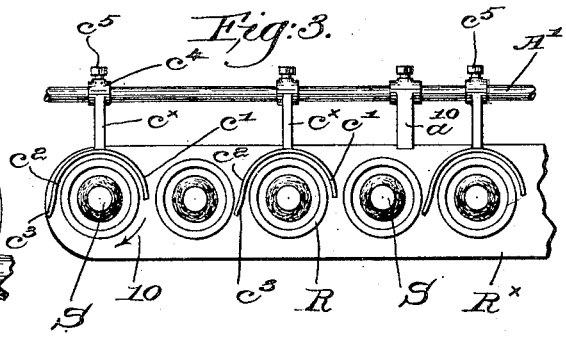


Fig: 3.



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UNITED STATES PATENT OFFICE.

EUGENE F. WILLEY AND WILLIAM W. McDANIEL, OF MANVILLE, RHODE ISLAND, ASSIGNORS TO THE DRAPER COMPANY, OF PORTLAND, MAINE, AND HOPEDALE, MASSACHUSETTS.

YARN-SPINNING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 676,826, dated June 18, 1901.

Application filed May 25, 1900. Serial No. 17,920. (No model.)

To all whom it may concern:

Be it known that we, EUGENE F. WILLEY and WILLIAM W. McDANIEL, citizens of the United States, residing at Manville, Rhode Island, have invented an Improvement in Yarn-Spinning Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention has reference to apparatus for spinning yarn; and it has for its particular object a novel construction, arrangement, and operation of separators whereby each separator protects or governs the ballooning of the yarn of two spindles. Such construction is simple and effective and at the same time reduces the number of separators to substantially one-half the number of the spindles.

Various novel features of our invention will be hereinafter fully described, and particularly pointed out in the following claims.

Figure 1 is a front elevation, partly broken out, of a sufficient portion of a spinning-frame to be understood with one embodiment of our invention applied thereto, the ring-rail being shown as near the lower end of its traverse. Fig. 2 is a vertical sectional view on the line $x\ x$, Fig. 1, looking toward the left. Fig. 3 is a top or plan view showing the relative arrangement of spindles and separators; and Fig. 4 is a vertical sectional detail similar to Fig. 2, but showing the position of the separators as the ring-rail reaches the upper end of its traverse.

The frame A, spindle-rail B, the series of sleeve whirl-spindles S, rotatably mounted upon the spindle-rail and driven in any suitable manner, the vertically-reciprocating ring-rail $R^{\times}$, provided with rings R, the lifter-rods, only one of which, as R′, is shown, and the lifter-arms D, actuated in usual manner by suitable winding mechanism, (not shown,) the pig-tails p, and the delivery-rolls M are and may be of usual or well-known construction in spinning apparatus.

In carrying out our invention we have constructed and arranged a series of separators to coöperate with the spindles to prevent improper ballooning of the yarn and the consequent interference between the yarns of adjacent spindles by providing one separator to coöperate with two spindles, thereby reducing the number of separators one-half, with a consequent decrease in cost of construction and simplifying the construction of the apparatus.

In the present embodiment of our invention the rock-shaft A′ is mounted back of the vertical path of movement of the ring-rail $R^{\times}$ in suitable bearings $A^{\times}$ on the main frame, said rock-shaft having secured to it the series of separators, stops $a\ a'$, also fast on the rock-shaft, (see Figs. 2 and 4,) being arranged to coöperate alternately with a suitable fixed part of the apparatus—as, for instance, the frame—to limit the rocking movement of the shaft in each direction.

We have herein shown the separators as made skeleton in form, although it will be manifest that they may be made as thin plates or blades bent or curved into proper shape.

As herein shown, each separator comprises an upright vertically-elongated strut c, connected at its top and bottom with curved side pieces $c'\ c^2$, which are also bent transversely to lie in a substantially cylindrical surface, one of the sides, however, as c^2, being extended forward beyond the other side c' and flared, as at c^3, (see Fig. 3,) to present a concaved outer face. The lower end of each upright c is extended to form an arm $c^{\times}$, provided with a hub c^4 to embrace the rocking support A′ and being held in place thereon by a suitable set-screw c^5, and, referring to Fig. 3, it will be noted that the separators are mounted opposite alternate spindles and to partly surround the same, the flaring side c^3 of each separator extending forward between the partly-surrounded spindle and the next adjacent spindle. The direction of rotation of the spindles is shown by the arrow 10, Fig. 3, and viewing said figure it will be manifest that the yarn in each of the partly-surrounded spindles will be guided by the main concentric portion of the separator and restricted in its ballooning until it passes beyond the side c' or "outlet" side of the separator, as it

may be termed, and the yarn in passing therefrom to the inlet or flared side c^3 of the separator will not balloon sufficiently to project beyond such flaring side, but will be directed thereby against the concaved main body portion of the separator. At the same time the yarn leading to the spindle next adjacent the side c^3 of the separator will whip against the external facing of the separator and will be confined or forced inward by the outer face of the side c^3 sufficiently to cause the thread to pass freely by the side c' of the separator next beyond.

The sides c' of the several separators extend forward preferably to a line drawn through the centers of the several spindles, so that there is no danger of two adjacent yarns whipping about each other.

The inlet sides c^3 of the separators are extended forward beyond the center line of the series of spindles for the twofold purpose of confining the yarn of the intermediate spindle to its proper path, as has been described, and to present a wide or flaring entrance for the yarn of the partly-surrounded spindle.

It has been found in practice that the contraction of the balloon of the yarn of the intermediate spindle, caused by engagement with the outer face of the side c^3 of the separator, is sufficient to prevent undue expansion or ballooning of the yarn as it passes over the gap or space between the edge c^3 of one separator and the edge c' of the next separator beyond.

From the foregoing description and drawings it will be obvious that each separator comprises two side portions of unequal area and of equal length at their junction, the side portion of greater area being extended beyond the other one and bent outward to present an externally-concaved face, and substantially the side portions are semi-elliptical, with their major axes coincident with each other and with the longitudinal axis of the separator.

By making the separators in the skeleton form herein shown they are very light in weight and may be cheaply constructed.

We have herein shown means for controlling the movement of the separators as the ring-rail is traversed, such means being independent of the rail itself.

Referring to Fig. 2, the ring-rail B and crossgirt A^{10} are provided with vertical bearings 12 14, respectively, for an actuator, shown as a vertically-movable rod d, having its upper end bent laterally to form a cam, as at d'. (See also dotted lines, Fig. 1.) The actuator has adjustably secured thereto a collar d^2, to which is pivotally connected a link d^3, in turn jointed at its lower end at d^4 to the lifter-arm D, so that the swinging movement of the latter will raise and lower the actuator d.

In Figs. 1 and 2 the separators are shown in the position they will occupy for a large portion of the upward stroke of the traverse of the ring-rail from its lowest position; but as the cam d' of the actuator is gradually lifted it will engage a finger a^{10}, fast on the rocking support A', and by such engagement will rock the shaft A' in the direction of the arrow 20, Fig. 2, until the ring-rail and actuator have reached their highest positions, as shown in Fig. 4, at such time the separators being swung rearwardly entirely away from the spindles, as at such time the ballooning is of small moment. The stop a' limits the backward swing of the separators, and as the rail descends and also the actuator d the weight of the separators will swing them down and forwardly into the normal position shown in Fig. 2 as soon as the cam d' descends below the range of the cam-finger a^{10}.

To obviate any sticking of the rocking support A', we have provided a cam-lug a^{12}, fast on the rock-shaft A', which projects into the path of the cam d' should the separators fail to return to their normal positions, and as the actuator descends the cam d' will wipe over the lug a^{12} and positively rock the support A' to restore the separators to operative position.

As shown in Figs. 2 and 4, the sides c' c^2 of the separators spring from the upper and lower ends of the upright c and are curved in the direction of their length, as well as being curved transversely, and, as shown in the drawings, the separators have considerable height, in practice about four inches from top to bottom, so that a long arc of the balloon traverses the separator, the control of the yarn being greatly increased thereby, as the yarn is engaged by the separator at widely-separated points on the arc which the balloon forms.

Our invention is not restricted to the precise construction and arrangement herein shown and described, as we have shown one practical embodiment thereof, without attempting to show and describe the various changes or modifications which may be made therein without departing from the spirit and scope of the invention.

Having fully described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a spinning-frame, a series of spindles, and a series of separators mounted opposite alternate spindles to partly surround them, each separator being of approximately equal height and width, and comprising two unequal and transversely-curved side portions of equal height at their junction, and widest substantially midway between the top and bottom thereof, said side portions having curved front edges, the larger side portion being extended forward beyond its fellow and being flared adjacent its front upright edge to present an exteriorly-concaved face.

2. As a new article of manufacture, a separator for spinning-frames, of approximately equal height and width, and comprising two unequal and transversely-curved side portions of equal height at their junction, and widest substantially midway between the top

and bottom thereof, said side portions having curved front edges, the larger side portion being extended forward beyond its fellow and being flared adjacent its front upright edge to present an exteriorly-concaved face.

3. As a new article of manufacture, a separator for spinning-frames, of approximately equal height and width, and comprising two unequal and transversely-curved skeleton side portions of equal height at their junction and connected by a strut, and widest substantially midway between the top and bottom thereof, said side portions having curved front edges, the larger side portion being extended forward beyond its fellow and being flared adjacent its front upright edge to present an exteriorly-concaved face.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

EUGENE F. WILLEY.
WILLIAM W. McDANIEL.

Witnesses:
GEORGE P. WILLEY,
W. H. GOKEY.