(No Model.) 3 Sheets—Sheet 1.

H. D. MARTIN & J. P. TOLMAN.

SEPARATOR FOR SPINNING AND TWISTING FRAMES.

No. 566,205. Patented Aug. 18, 1896.

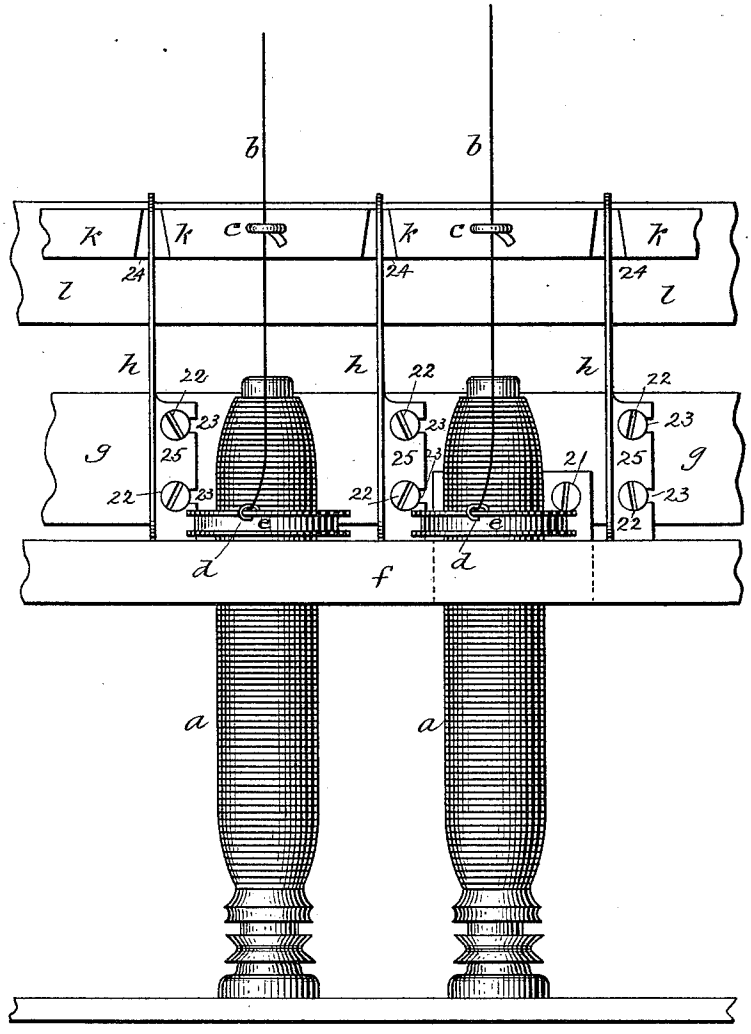

Fig. 1.

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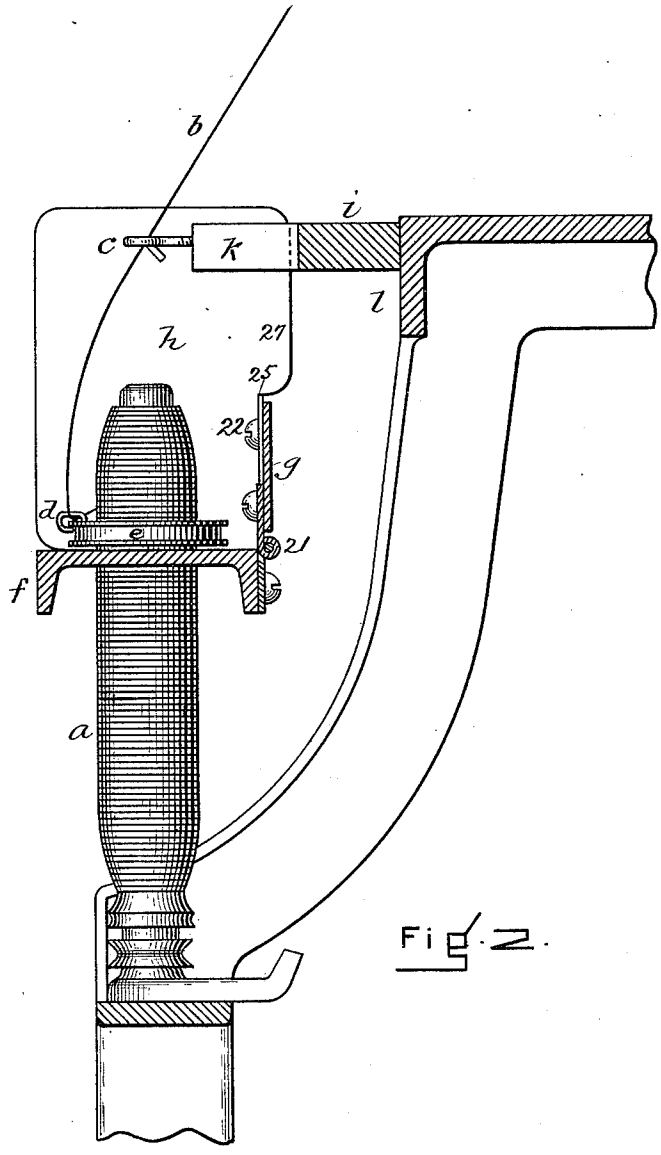

Fig. 2.

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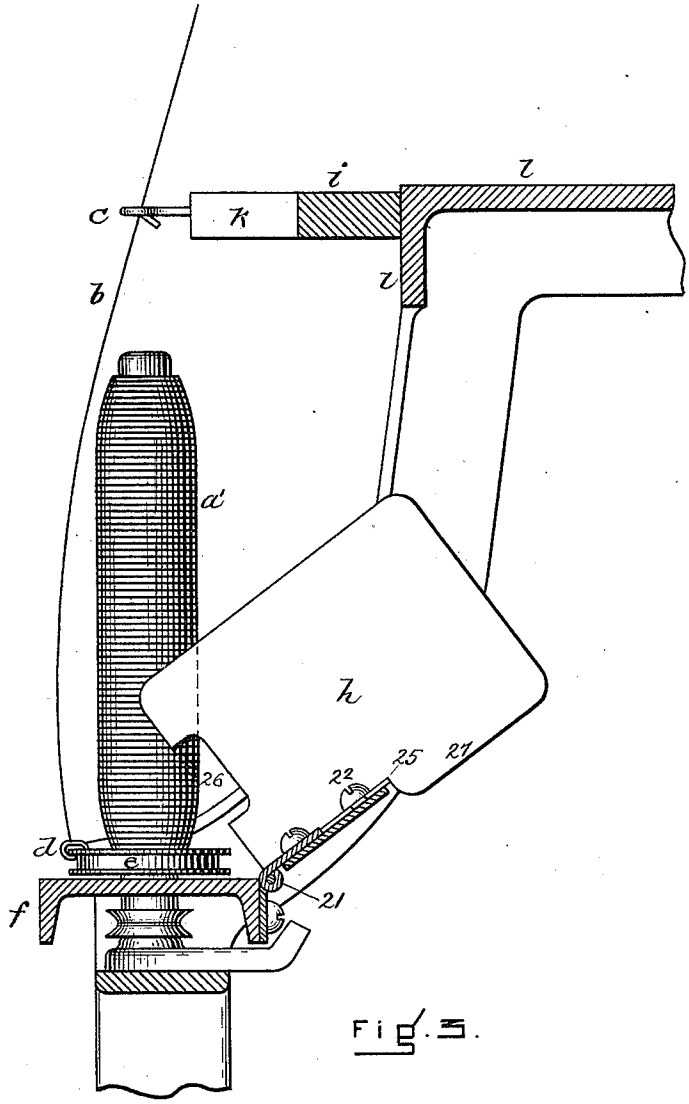

Fig. 3.

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UNITED STATES PATENT OFFICE.

HENRY D. MARTIN, OF SHIRLEY, AND JAMES P. TOLMAN, OF NEWTON, MASSACHUSETTS, ASSIGNORS TO THE SAMSON CORDAGE WORKS, OF BOSTON, MASSACHUSETTS.

SEPARATOR FOR SPINNING AND TWISTING FRAMES.

SPECIFICATION forming part of Letters Patent No. 566,205, dated August 18, 1896.

Application filed August 22, 1895. Serial No. 560,182. (No model.)

To all whom it may concern:

Be it known that we, HENRY D. MARTIN, residing at Shirley, and JAMES P. TOLMAN, residing at Newton, in the county of Middlesex and State of Massachusetts, citizens of the United States, have invented a new and useful Improvement in Separators for Spinning and Twisting Frames, of which the following is a full and complete description, reference being had to the accompanying drawings in explanation thereof.

In the spinning or twisting of yarns and threads, and more particularly the spinning of cotton yarns on ring-frames, it is usual to insert some form of separator-blades between the bobbins for the purpose of preventing the yarn in its passage from the thread-guide to the ring-traveler of one bobbin whipping against and breaking the yarn similarly in passage to an adjoining bobbin, as these strands of yarn are severally diverted from their direct course by their high rotative speed, and given a path commonly called "ballooning." Such separator-blades are usually cut into the form of bars or grids, and are usually supported independently of the ring-rail, and in such a manner as to form a sufficient barrier to prevent breaking the threads by ballooning; but they do not form a complete separation between the threads, especially when the ring-rail is at the lower part of its traverse, at which time a considerable opening is made between the ring-rail and the bottom edge of the separative blades.

The present practice in the building and operation of spinning-frames is to use rings of much larger diameter than formerly and to run the spindles at an increased speed, and these conditions have developed a new use for separators which is not met by them as at present constructed. When from any cause one thread of yarn becomes broken, the high rotative speed of the bobbin causes the loose end of the yarn on the bobbin to stand out in a tangential line, frequently extending some distance outside of the periphery of the bobbin. Two evils occur from this: first, the end of the yarn passing underneath a separator-blade or through its grid-shaped openings, and striking the yarn passing to an adjoining bobbin, causes it to be broken; or, second, the broken end in its rapid rotation by striking against the edges of the separator-blades is whipped into the form of lint, which passing underneath the separator-blades or through their openings is gathered into the yarn of the neighboring bobbins, and becoming twisted among the fibers makes bad bunches in the yarn; or such lint is caught up by the travelers running upon the rings and loads them up with lint more rapidly than it can be removed by the traveler-clearers, and thus causes the stopping of the travelers and the breaking down of the yarn.

The object of our invention is to overcome these difficulties by making a complete separation between the bobbins, extending at all times down to the ring-rail, and yet capable of removal when desired for the purpose of doffing or removing the filled bobbins from the frame. To accomplish this, we make use of a series of separator-blades, which are attached to the ring-rail itself, thus having a range of motion as great as that of the rail. The connection between these blades and the ring-rail is by means of a vertical back plate, to which each blade is so secured as to permit easy adjustment or removal, said back plate being hinged to the ring-rail in a manner to allow its being inclined away from its vertical position, whereby the separator-blades may be so far thrown out of their normal position between the bobbins as to permit the easy doffing or removing of the same.

In order to make our meaning clear, we will now proceed to describe the drawings, in which similar parts are referred to by the same letters and numerals, and in which—

Figure 1 is a front elevation of so much of a spinning-frame as is necessary for the understanding of our device. Fig. 2 is a side view, partly in section and partly in elevation, showing one bobbin and the accompanying separator parts at a time when the ring-rail is at a point near the upper end of its traverse, being at the same position as shown in Fig. 1; and Fig. 3 is a side view, partly in section and partly in elevation, showing a filled bobbin, and the ring-rail being run down to its lowest point to allow the

doffing of the bobbins and the separator-blades tipped back from their normal position to allow the more easy handling of the bobbins.

a a a' are bobbins partly filled or filled, supported on spindles. The threads of yarn *b* come from feed-rolls (not shown) to the thread-guides *c*, from which they pass to the travelers *d*, which are mounted upon the rings *e*, around which they run, being dragged by the tension of the yarn induced by the rotation of the bobbins. The rings are secured in the ordinary manner to the ring-rail *f*, which extends the length of the machine, and which has a rising-and-falling vertical traverse arranged as usual to give the yarn delivery at such points as to build the bobbin of the desired shape.

We attach to the ring-rail by hinges 21 a back plate *g*. This plate is parallel to the ring-rail, but stands ordinarily in a vertical plane, as in Figs. 1 and 2. It is made in such lengths as may be convenient, and each length is secured to the ring-rail by any number of hinges that may be deemed necessary or advisable. To this back plate *g* we attach the separator-blades *h*, using for this purpose screws 22, operating through slots 23, so as to permit the easy adjustment or removal of any separator-blade. A part of the back of the separator-blade is bent into a bracket 25 for the purpose of permitting this attachment. The thread-board *i*, with its front extension *k*, is attached to the roller-beam *l* of the main frame of the machine, to which it may be rigidly secured, or may be connected with hinges, as may be desired. In case the thread-board should be so wide, as shown in the drawings, as to be in the path of the separator-blades in their upward movement, its front extension may have cut into it the recesses 24 to allow the passage of the blades. The portions of the thread-board *k* lying between the recesses 24 and forming its front extension may either be rigidly attached to the main part of the board or may, if desired, be attached thereto by hinges in the ordinary manner.

Having now described in detail the different parts of our apparatus, we will proceed to state more fully the method of operation.

In ordinary times, and during the operation of spinning, the separator-blades *h*, standing upon the ring-rail *f*, as shown in Figs. 1 and 2, and rising and falling therewith, form a complete barrier between all that part of the bobbins that stands above the level of the rail, so that neither the ballooning of the thread nor the whipping of a broken end nor the lint coming therefrom can pass from the incasement of one bobbin to its neighboring bobbin to cause breakage or injury to the yarn thereof. When the bobbins are filled, and it is desired to doff or remove them, the ring-rail is as usual run to the bottom point of its traverse and the separator-blades are by hand moved back into the inclined position shown in Fig. 3. As many blades are thrown back by a single motion as are attached to any one section of the back plate *g*. When the full bobbins have been removed and empty ones put in their places, the separator-blades are returned by hand to their normal position and the operation of spinning may recommence.

In order to facilitate the cleaning of the machine, we ordinarily place the back plate *g* with its lower edge a little higher than the top of the ring-rail *f*. This leaves a narrow longitudinal opening, as shown in the drawings, through which the air may pass and prevent the gathering of dust and lint, and through which such gatherings as do accumulate may be removed by brushing.

In case the rings are made so large as to approach each other too closely to permit the insertion of the separator-blade between them without danger of its being struck by the travelers *d* in their passage around the rings, a small part of the blade *h* may be cut away, as indicated at 26 in Fig. 3. The approaches to this opening are so nearly closed by the rings on either side as to cause no damage to the yarn either from the passing of lint or from the whipping of ends.

It will be observed that while the lower part of the back edge of the blade *h* is turned over into the form of a bracket 25, the remaining part 27 is allowed to project back beyond the back line of the ring-rail. Thus if a broken end of yarn upon the bobbin is but a short distance above the ring-rail, being opposite the lower half of the separator-blade, it is incased on three sides by two adjoining separator-blades and by the back plate *g;* and if such broken end is opposite the upper half of the blade the back edge of the blade is so far removed as to make it nearly impossible for the end of yarn to strike it and be cut into lint. This leaves only the front edge of the separator-blades as a possible place for the broken ends of yarn to strike and be frayed against. It is not considered practicable to extend these blades farther forward than the front of the ring-rail, because of the danger of their being struck and bent by passing persons or objects, but in practice we have not found this a source of trouble, as the currents of air tend to carry lint so formed to the front and away from the machine, instead of causing it to go back between the separators and gather on the yarn or the travelers.

Having thus fully described our invention, we claim and desire to secure by Letters Patent of the United States—

1. In a spinning or twisting frame, the combination of rotary spindles and bobbins mounted thereon, a vertically-moving ring-rail having holes for the reception of the spindles and bobbins, the travelers carried thereby, a wide rear guard-plate *g* hinged to the ring-rail and vertically movable therewith, and separator-blades *h* rigidly attached to

said guard-plate to extend forward therefrom above the ring-rail and between the bobbins and spindles, whereby the said blades are rigidly held by a plate or support common to them all, and whereby also the said plate acts as a back guard for each bobbin, and provides means for the simultaneous movement of an entire group or gang of separators vertically as well as into and out of operative relation with the bobbins, substantially as described.

2. The combination in a spinning or twisting frame of the movable ring-rail, the rotary spindles and bobbins along which the said rail is movable, the ring-travelers carried by said rail, the separators mounted upon said rail and comprising the guard-plate *g*, and the separator-blades *h* extending forward from the guard-plate, and an aperture or opening into each separator-space at the back lower corner thereof, through which a current or draft of air to the front of each separator-space is established by the rotation of the traveler and bobbin, and the surface of the rail between the blades freed from lint, as and for the purposes described.

3. The combination in a spinning or twisting frame of the vertically-movable ring-rail, the separator-blades *h* carried thereby to be movable therewith, the travelers mounted upon said rail to be movable therewith, the said separator-blades having openings 26 in their lower parts to provide space within which the travelers may rotate without striking the plates, and whereby the separators do not interfere with, or prevent a close setting of spindles and travelers, substantially as described.

4. The combination of the ring-rail, the ring-travelers carried thereby, the rotary spindles mounted thereon, the ring-rail and travelers having vertical movements in relation to said spindles and bobbins, the separators mounted upon said ring-rail, to be movable therewith, and comprising a wide back guard-plate *g* hinged to the ring-rail, a number of separator-blades rigidly secured to said plate to extend forward therefrom between the bobbins and travelers resting upon the said rail, and having rearward extensions above said back guard-plate, and the thread-board having recesses 24, into which the rear parts of the said separator-blades are vertically moved when near the end of their upward movement, all as and for the purposes specified.

HENRY D. MARTIN.
JAMES P. TOLMAN.

In presence of—
FRANK G. PARKER,
JAMES A. LOWELL.