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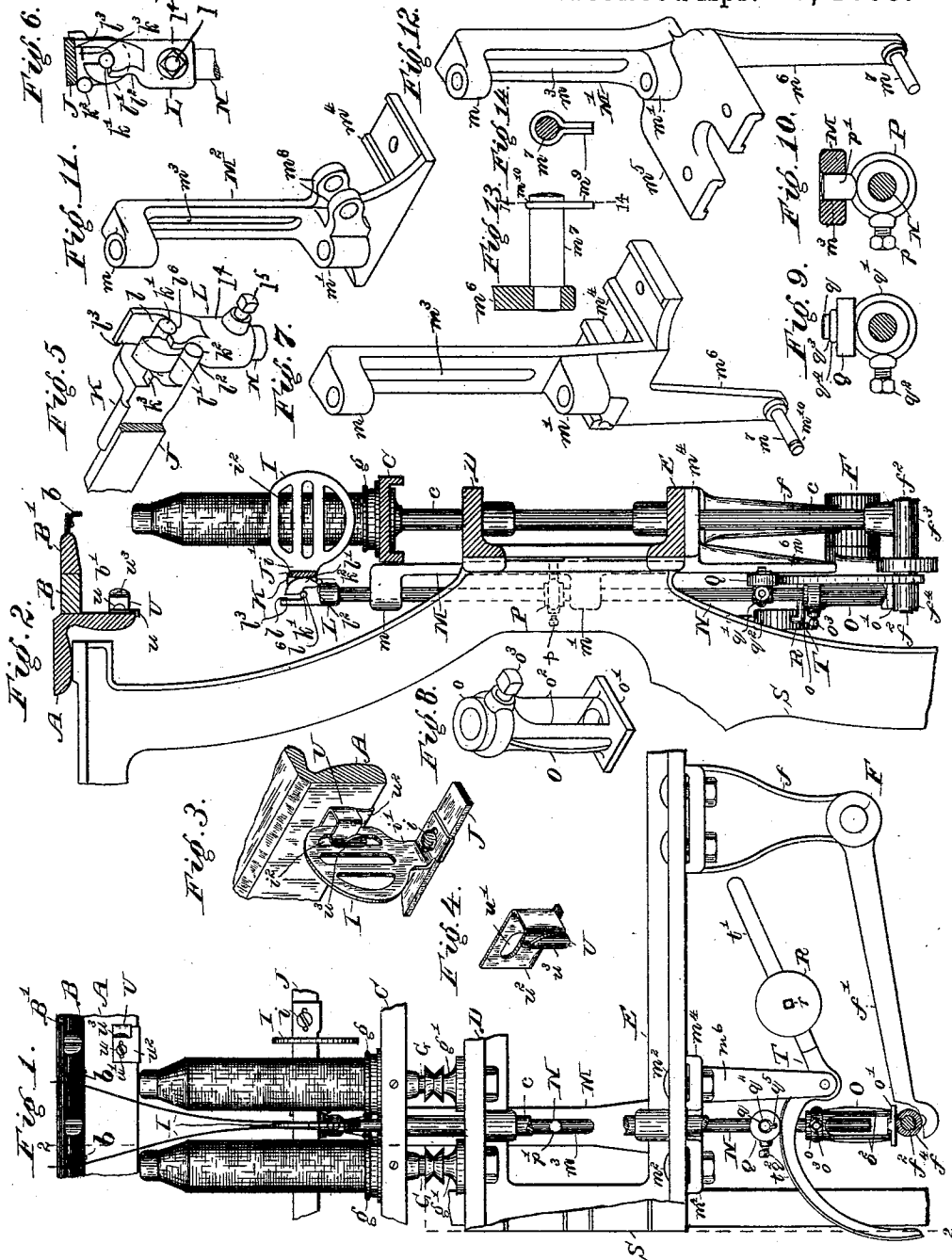
2 Sheets—Sheet 1.

A. D. CHANDLER.

YARN SEPARATOR FOR SPINNING FRAMES.

No. 496,186.

Patented Apr. 25, 1893.



WITNESSES.

Kirkley Hyde.

Myrtie L. Beale.

INVENTOR

Alfred D. Chandler.

By *Albert M. Moore,*

ATTORNEY.

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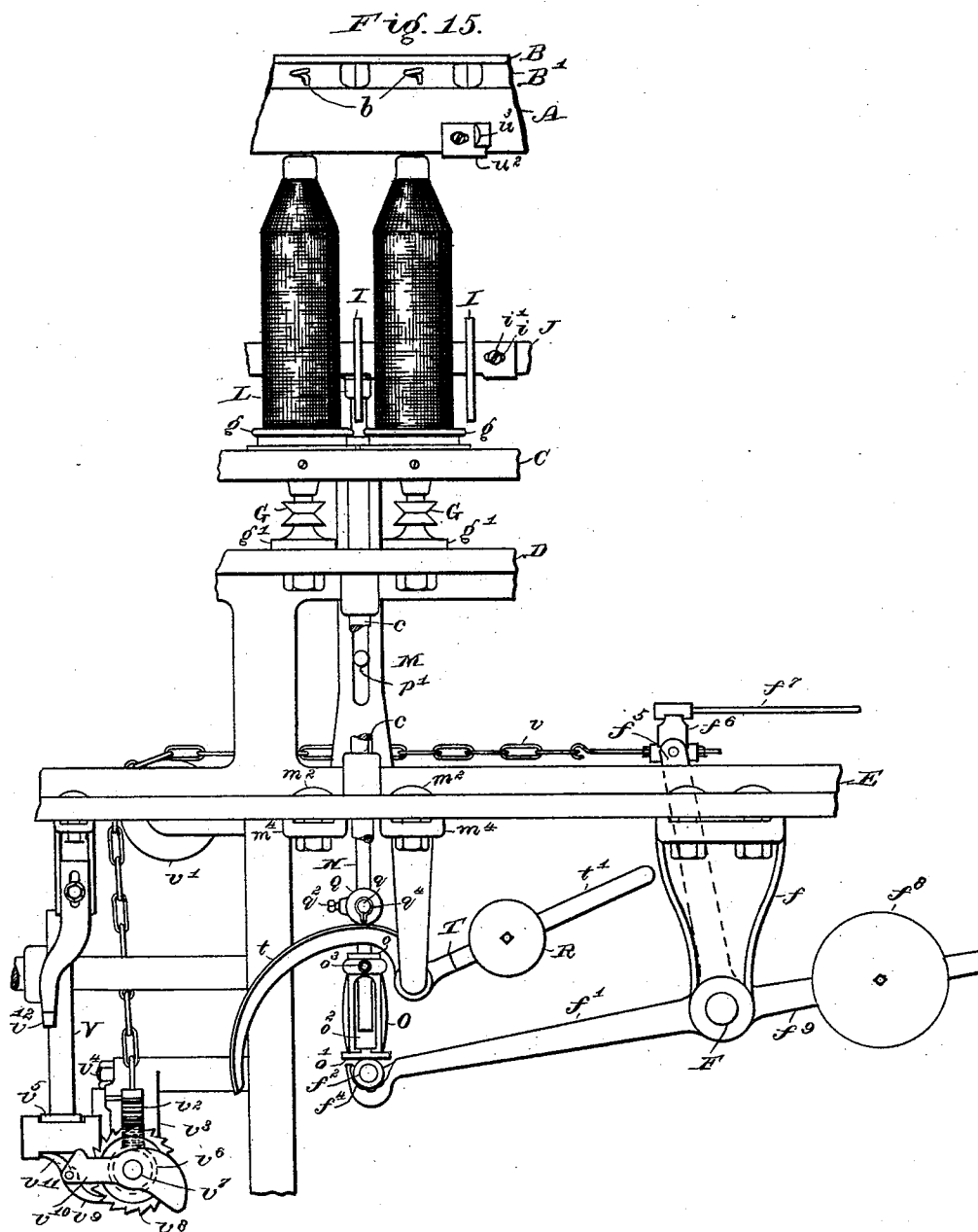
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UNITED STATES PATENT OFFICE.

ALFRED D. CHANDLER, OF LOWELL, ASSIGNOR TO GEORGE DRAPER & SONS,
OF HOPEDALE, MASSACHUSETTS.

YARN-SEPARATOR FOR SPINNING-FRAMES.

SPECIFICATION forming part of Letters Patent No. 496,186, dated April 25, 1893.

Application filed May 23, 1892. Serial No. 434,070. (No model.)

To all whom it may concern:

Be it known that I, ALFRED D. CHANDLER, a citizen of the United States, residing at Lowell, in the county of Middlesex and Commonwealth of Massachusetts, have invented a certain new and useful Improvement in Yarn-Separators for Spinning-Frames, of which the following is a specification.

My invention relates to yarn-separators for spinning-frames and consists in the devices and combinations hereinafter described and claimed, the object of said invention being to provide means for counter-balancing the weight of the separators and for their supporting and actuating devices; means for varying the limit of traverse of the separators; means for guiding the separator-rods; means for enabling the separators to be turned up out of the way in doffing or for other purposes; and means for holding the separators in a raised position and in other respects, hereinafter stated, to improve the construction of the parts which support and operate the separating devices.

In the accompanying drawings, on two sheets, Figure 1 is a front elevation of a part of a ring-spinning-frame, showing parts of the roller-beam, thread-board, finger-board, guide-rail, spindle-rail, ring-rail, lifting-rod and cross-shaft arm, two spindles with their bobbins and cops and two separators and spinning-rings, part of a separator-rod, a part of the separator-bar, the devices which counter-balance the weight of the separating-devices and an end-elevation of the cross-shaft; Fig. 2, a vertical section on the line 2 2 in Fig. 1; Fig. 3, an isometric perspective view of a part of the roller-beam and a part of the separator-bar, showing a separator attached to said bar and a spring-retainer secured on said roller-beam and engaging said separator; Fig. 4, a similar view of said retainer, detached and enlarged; Fig. 5, an isometric perspective view of a part of the separator-bar, a bracket secured thereto and a socket-piece, said separator-bar being in operative position; Fig. 6, a side elevation of a part of a separator-rod, the socket, secured thereto, the separator-bar in section, a side elevation of a bracket, the separator-bar being turned out of its operative position; Fig. 7, an isometric

perspective view of the stand which guides the separator-rod and supports the counter-balancing devices; Fig. 8, an isometric perspective view of the adjustable foot of the separator-rod; Fig. 9, a plan of the anti-friction roll against which the counter-balancing lever presses and the adjustable collar which supports said roll; Fig. 10, a plan of the adjustable guide and stop-collar, provided with a guide-pin, and a horizontal section of the stand which supports the separator-rod, showing said guide-pin arranged in the vertical slot of said stand; Figs. 11 and 12, isometric perspective views of modified forms of the stand shown in Fig. 7; Fig. 13, a side elevation of the stud on which the counter-balancing-lever turns and a section of the lower end of the stand which supports said stud, through the center of said stud, showing the means for holding said lever on said stud; Fig. 14, a section on the line 14 14 in Fig. 13; Fig. 15, a front elevation of what is shown in Fig. 1 and also of the weighted lever of the cross-shaft swivel-arm, the swivel, a part of the rod which connects one swivel-arm with the next, the builder-chain, the chain-roll or pulley, the builder-rack, the worm-shaft, the worm (in dotted lines), the builder-ratchet and the builder-pawl, its supporting-arm, the dagger, the cam-roll, the builder-cam and its shaft.

The roller-beam A; thread-board B; finger-board B', yarn-guides or "pigtales" b; the ring-rail C; the lifting-rod c, guided in the spindle-rail D and guide-rail E, the cross-shaft F, turning in brackets f, secured to said guide-rail and provided with a cross-shaft arm f', the free end of which carries the horizontal stud f² on which turns an anti-friction roll f³, arranged under and supporting the lifting-rod c, the spindles G, spinning-rings g, spindle-bearings g', are of any usual construction and operation.

Each cross-shaft F (one being shown) is provided with a so-called swivel-arm f⁵, to the upper end of which is jointed the swivel f⁶, connected by a rod f⁷ to the next swivel, there being in practice as many cross-shafts F as there are lifting-rods c at one side of the spinning-frame. To the swivel-arm nearest the so-called builder-cam V is connected one

end of a chain v which runs over a chain-pulley or grooved idle-roll v' and, at the other end is secured to the upper end of a curved rack v^2 which is adjustably connected to the builder-arm v^3 , said arm v^3 having a hub, turning on a stud v^4 , projecting from the frame of the machine, and an anti-friction roll v^5 being journaled in said arm v^3 below the builder-cam V and being held against said builder-cam, by a weight f^8 , adjustably supported on the weight-lever or weight-arm f^9 of the cross-shaft, the effect of which weight f^8 is to tighten the chain v and raise the builder-arm v^3 and the cross-shaft arm f' , the downward motion of both said arms being caused by the pressure of said builder-cam V upon said roll v^5 . The rack v^2 is engaged by a worm v^6 (indicated by a dotted circle in Fig. 15,) fast on the worm shaft v^7 , journaled in the builder-arm v^3 , and the ratchet v^8 is also fast on said worm-shaft v^7 and is engaged by a pawl v^9 , pivoted on the weighted pawl-arm v^{10} and having an arm v^{11} which is struck by a dagger v^{12} , secured on the frame of the machine, when the builder-arm is raised gradually, to shorten the traverse of the ring-rail by carrying the lower end of the chain v nearer to the center of motion of the builder-arm.

The parts which operate the builder-arm and cross-shaft arm are all of the usual construction and operation. It will be seen that the ring-rail is raised by the falling of the weight f^8 and falls by its own gravity and the gravity of its connected parts.

The separators I are of sheet-metal and are secured by screws i to the separator-bar J which is arranged back of the ring-rail, parallel therewith, and has secured to it as many brackets K as there are separator-rods N .

Each bracket K is provided with two laterally-projecting pins k' k^2 parallel with each other and with the axis of the bar J . The pin k' enters a slot l in the top of the socket L and serves as a pivot on which the bar J may be turned to raise the separators I out from between the spindles or to restore said separators to operative position, the lower end of said slot being rounded to fit the pivot-pin k' . The socket L has in front of the slot l a projection l' , curved concentrically with the rounded lower end of the slot l , the distance between the lower end of said slot and the curved surface of said projection being equal to the space between the pins k' k^2 . When the separators are turned down into the position shown in Figs. 2 and 5, the pin k^2 rests in a depression l^2 on the front of the socket-piece at the lower end of said projection l' .

The foregoing description applies equally to the improvement in yarn-separators for spinning-frames, described in United States Patent, No. 476,731, granted June 7, 1892, to me, but the slot l in this application is vertical on the front side, except that it is cut under at the bottom, at l^6 , to fit the pin k' , where-

as in said patent the corresponding slot has straight parallel backwardly-inclined front and rear sides. The reason for making the principal part of the slot l vertical in this application is to enable the separator-bar and the separators to be lifted vertically, drawing the pivot-pins k' out of the sockets L , when it is desired to remove said bar or separators for any purpose, without striking a roller-beam, in spinning-frames where the roller-beam extends so far forward as to be struck by the separators if said slots l were backwardly-inclined. Each socket-piece is provided with an upwardly-projecting stop l^3 , substantially as in said patent, except that instead of the separator-bar J striking said stop when the separators are turned up from between the spindles, the bracket K , shown and described in this application is provided with a lateral projection k^3 which striking against said stop l^3 prevents the farther backward movement of the separators. The separator-bar, when in its normal position, is prevented from being disengaged from the socket-piece by the projection l' and pin k^2 holding the pivot-pin k' in the lower portion l^6 of the slot l , but when the separators are lifted the pins k' k^2 are in the position shown in Fig. 6, and allow the pivot-pin k' to be moved back sufficiently to rise in the slot l . The projection k^3 is arranged between the separator-bar K and the pivot-pin k' and is below the top of said separator-bar, as shown in Fig. 5, and therefore allows of the back of the stop being placed as far forward as the back of the socket L , and therefore allows the socket to be arranged at a less horizontal distance from the roller-beam than it was possible to place the corresponding stops and socket in the device shown in said patent. As in said patent the socket-piece L has a collar l^4 held on the upper end of a vertical separator-rod N by a set-screw l^5 turning in said collar and thrusting against said rod, there being as many separator-rods as there are lifting-rods, each separator-rod sliding in the sleeves $m m'$ of a stand M secured to the guide-rail E by bolts m^2 (see Fig. 1) and being raised by the rising of a cross-shaft arm f' , the stud f^2 supporting an anti-friction roll f^4 , precisely like the roll f^3 above referred to but arranged on the opposite side of said arm f' , each separator-rod being provided with a foot O (see Figs. 1, 2 and 8), the lower end of which rests on the anti-friction roll f^4 during the traverse of said separator-rod. Said stand M and foot O differ however from the corresponding parts shown in said patent, as will hereinafter more fully appear.

The stand M between the sleeves $m m'$ is provided with a vertical slot m^3 to receive a projection p' on an adjustable collar P which surrounds the separator-rod N and is held at any desired distance above the foot of said separator-rod by a set-screw p which thrusts against said separator-rod, said collar P limiting the downward movement of the sepa-

rator by striking on the top of the lower sleeve m' on the stand M, and its projection p' laterally filling the slot m^3 and preventing the separator-rod from twisting or turning
 5 on its axis when the separator-bar is lifted out of the sockets, the collar P also serving as a stop-collar as above stated by striking on the lower sleeve of the stand M instead of on the top of said stand, as described in said
 10 patent. The foot m^4 through which the bolts m^2 are driven to secure the stand M to the guide-rail E may project horizontally forward below said guide-rail while the sleeves $m m'$ are arranged on the back of the stand (see
 15 Figs. 1, 2 and 7) or a similar foot m^5 and sleeves $m m'$ may both project forward from the body of said stand (see M', Fig. 12), the foot then being arranged on the top of the guide-rail, the last-named construction bringing
 20 the separator-rods and separators farther forward and into a position where they will not strike the lower edge of the roller-beam in rising, in spinning-frames in which the horizontal distance between the back of the
 25 ring-rail and the plane of the front face of the roller-beam is very short. The stand, when used near the support S of a spinning-frame of the usual construction, is provided with a hanger m^6 , preferably cast in one
 30 piece with said stand, as shown in Figs. 7 and 12, and from said hanger near the lower end thereof projects a fulcrum-stud m^7 secured by any usual means to said hanger.

An anti-friction-roll Q turns on a stud q
 35 which projects from a collar q' , adjustably held by the set-screw q^2 at the desired height on a separator-rod, and on the fulcrum-stud m^7 turns a lever T, one arm t of which is so curved that a tangent to said lever at the
 40 point of contact of said lever and the anti-friction roll Q will be horizontal at all times, the other arm t' of said lever carrying a sliding weight R which is held by means of a set-screw r , turning in said weight against said
 45 arm t' , at any desired distance from the fulcrum m^7 , such distance being so regulated as to allow the weight of the separator-rods and parts supported thereby barely to raise the weighted arm of the lever T, when the free
 50 end of the cross-shaft arm descends, the object of the lever T and its weight being, not to raise the separators but to take a part of the strain off from the cross-shaft, which raises said separators precisely as the ring-rail is
 55 raised, that is, by means of the weighted arm f^9 and weight f^8 , this being the more necessary because the separator-bar has a less traverse than the ring-rail and it is desirous to make the traverse of the ring-rail as uniform
 60 and gradual as possible and to obviate the necessity of increasing the size of the weight f^8 and the power required to raise it.

The stud q is provided with an annular groove q^3 near its free end, into which groove
 65 a wire q^4 is laid and bent around said stud, the wire being of sufficient diameter to project from said groove and to form a collar on

said stud and the end-portions of the wire being pinched together, at q^5 , to retain the roll Q on said stud. In the same way the lever T
 70 is retained on the stud m^7 by a wire m^8 arranged partly in the groove m^{10} near the free end of said last-named stud. (See Figs. 1, 9, 13 and 14.)

The construction above described allows
 75 the curved arm of the lever T when placed below the guide-rail to swing without striking the support S of the frame.

Except near the support S, the lever T may be pivoted between the ears m^8 cast on a stand
 80 M² (Fig. 11), in other respects, like the stand M, shown in Fig. 7 (except that the hanger m^6 shown in said last-named figure is omitted as unnecessary), the curved arm t of said lever T in this case extending over the lower sleeve
 85 m' , from which said ears m^8 project laterally, and the anti-friction-roll Q being supported by its collar q' between the guide-rail E and spindle-rail D and the free end of the stud q sliding in the vertical slot, just as the pin p'
 90 of the collar P is described above as operating in respect to the stand M shown in Fig. 7, said collar P, where the stand M², shown in Fig. 11, is used, being arranged above the upper sleeve m of the stand and serving merely
 95 as a stop-collar.

The adjustable foot O (instead of being formed in two parts, the upper of which is secured on the lower end of the separator-rod and the lower of which is adjustable on said
 100 upper part, as in said patent) consists of a single piece and has a collar o to receive the lower end of the separator-rod N, a horizontal sole o' resting upon the roll f^4 during the traverse of said separator-rod, as above-described, and connected to the collar o by extensions o^2 from said collar. A set-screw o^3
 105 turns in said collar o and thrusts against the separator-rod N, holding the sole of the foot O on a level with or at any desired distance below the end of said rod N, to vary the upper limit of the traverse of the separator-bar and separators.

The separator or separator-blade shown is different in form from what is shown in said
 115 patent and is designed to enable the separator to have a greater depth and to secure a more perfect separation of the yarns and therefore to allow of a longer traverse of the ring-rail and a greater speed of the spindles and the
 120 use of a lighter traveler.

The shank i' of each separator I herein described, when in operative position is considerably higher than the middle of the separator instead of being at the same height
 125 therewith, the separator not extending above the shank i' far enough to prevent said separator, when near the upper end of its traverse being thrown into a vertical position against the roller-beam, but far enough to enable
 130 the upper part of the separator to rise into the space b' between the nearest adjacent finger-boards B' and between the yarn-guides carried by said finger-boards. Below

the shank i' the separator reaches down for a distance depending on the length of traverse, the speed of the spindles, the weight of the traveler, and the number of the yarn,—
 5 because the longer the traverse, the greater the speed of the spindles, the lighter the traveler, or the heavier the yarn, the greater will be “the balloon” described by the yarn and the greater will be the depth of the separator
 10 required below the shank i' .

Separators which are drawn or swing backward from between adjacent spindles as the ring-rail rises, must necessarily be of comparatively slight depth, to avoid striking the
 15 roller beam or being struck by the rising ring-rail and sometimes consist of a plate not over one eighth of an inch in thickness arranged horizontally. I am enabled to use a blade three and a half inches or more in depth, because my separator has a vertical traverse
 20 and moves upward out of the way of the ring-rail. Using a separator of great depth, the traverse of the separator may be much less than that of the ring-rail, because it is
 25 only necessary that the separator should move upward far enough to avoid being struck by the rail-ring and downward far enough to prevent the interference of the
 30 yarns of adjacent spindles. I can therefore use a much longer traverse of the ring-rail, that is, use much longer bobbins, run the spindles at a greater speed, use lighter travelers and spin heavier yarn than would be
 35 possible with a separator of slight depth, it being evident that with a long traverse, or under any of the circumstances above mentioned, which increase the diameter of the balloon, a separator of slight depth would allow the yarns of adjacent spindles to interfere above or below or both above and below the separator.

The shape of the separators I as above described is such that the principal part of their weight, when in a vertical position would obviously be in front of the pivot-pin k' and would cause them to fall forward. I therefore use a retainer U of sheet-metal, secured to the front of the roller-beam by a screw u
 45 which passes through a slot u' in the shank u^2 , said retainer near its free end being rounded, at u^3 , toward one of the separators on a separator-bar and adapted to press against the sides thereof with considerable friction or to enter slightly one of the slots z^2
 50 cut in each separator (to lessen the weight of the separators) and to hold all the separators on said separator-bar in a vertical position.

In some spinning-frames, the horizontal distance from the vertical plane in which the spindles stand to the front of the roller-beam is sufficient to allow separators, shaped as herein shown and described, to be tipped over backward until the center of gravity of the separators is in the rear of their pivot pins
 60 and in such cases the retainer U may be dispensed with.

I claim as my invention—

1. The combination of separator-rods, a separator-bar, supported thereon, separators supported on said separator-bar, means for giving to said separator-rods and separators an
 70 intermittent vertical traverse and weighted levers, arranged to engage studs with which said separator-rods are provided, partly to counter-balance the weight of said separator-rods, separator-bar and separators, and to
 75 lessen the power required to raise the same, as and for the purpose specified.

2. The combination of the spindles, the ring-rail, the lifting-rod, the separators, the
 80 separator-bar, the separator-rod, the cross-shaft, having an arm, extending under said lifting-rod and said separator-rod, means for rocking said cross-shaft to give said lifting-rod and separator-rod a vertical movement, a
 85 stop, to limit the downward movement of said separator-rod, and a weighted-lever, arranged to engage a stud with which said separator-rod is provided, partly to counter-balance the weight of said separators, separator-bar and
 90 separator-rod, and to render uniform the movement of said cross-shaft arm and ring-rail, as and for the purpose specified.

3. The combination of separator-rods, a separator-bar supported thereon, separators, supported on said bar, means for giving to said separator-rods a vertical traverse, collars, adjustable on said separator-rods and provided with studs, anti-friction rolls, turning on said
 95 studs, and weighted levers, arranged to press against the under sides of said rolls, partly to counter-balance the weight of said separator-rods and the parts supported thereby, and to lessen the power required to raise the same as and for the purpose specified.

4. The combination of separator-rods, a separator-bar supported thereon, separators, supported on said bar, means for giving to said separator-rods a vertical traverse, anti-friction-rolls, carried by said separator-rods, levers, having weighted arms and having other
 100 arms, arranged to press upward against said rolls, said levers and rolls having common horizontal tangents at their points of contact with each other at all times, partly to counter-balance the weight of said separator-rods and the parts supported thereby and to lessen the power required to raise the same as and for the purpose specified.

5. The combination of the separator-rods, a separator-bar, supported thereon, separators, supported on said bar, stands, in which said separator-rods are guided vertically, said stands being provided with hangers, having studs, levers turning on said studs and engaging projections with which said separator-rods are provided, said levers being weighted, partly to counter-balance the weight of said separator-rods and of the parts supported by said rods, and means for giving a vertical
 120 traverse to said separator-rods as and for the purpose specified.

6. The combination of the separator-rods, separator-bar, supported thereon, separators,

supported on said bar, stands, in which said separator-rods are guided vertically, and collars, arranged on said separator-rods, and provided with projections which enter vertical slots, with which said stands are provided, to prevent said separator-rods from turning in said stands, as and for the purpose specified.

7. The combination of the separator-bar, separators, secured thereto, the separator-rod, a socket, rigidly secured thereto, and having a stop and a bracket, secured to said separator-bar and having a pin, which turns in said socket, and having a lateral projection which strikes against said stop, and is arranged between said separator bar and the center of motion of said bracket to support said separators in a raised position, as and for the purpose specified.

8. The combination of the separator-bar, a bracket, secured thereto and having laterally-projecting pins, separators, secured to said bar, the separator-rod, a socket, rigidly secured thereto and provided with a slot having a vertical front side, cut under and rounded at the bottom thereof, to receive one of said pins, said socket also having a curved projection concentric with the rounded lower end of said slot, to be engaged by the other of said pins, normally to retain said first-named pin in said slot, as and for the purpose specified.

9. The combination with a separator-blade, of a spring locking device adapted to engage the separator-blade and to retain the same in its elevated position for doffing, as and for the purpose specified.

10. The combination of the roller-beam, the pivoted separator-bar, separators, rigidly secured thereto, and a spring retainer secured to said roller-beam, to engage one of said separators and to hold the same in a raised position, as and for the purpose specified.

11. The combination of the separators, separator-bar, separator-rods, stands, in which

said separator-rods are guided vertically, and collars, surrounding said rods and having projections, adapted to enter and have a sliding fit in vertical slots with which said stands are provided, to prevent said rods from turning in said stands, as and for the purpose specified.

12. The combination of spindles, means for rotating the same, the roller-beam, yarn-guides and a separator, having a shank, horizontal at all times when said separator is in operative position, and having a blade, the center of which is below said shank and which extends above and below said shank and for a greater distance below than above said shank, and means for giving to said separator a vertical traverse, as and for the purpose specified.

13. The combination of the spindles, means for rotating the same, the roller beam, the thread-board, yarn-guides, separators, each having a blade of greater depth than the distance from the top of the finished cop to said yarn-guides, and means for imparting a vertical traverse to said separators and for raising the tops of said separators between and above said yarn-guides, as and for the purpose specified.

14. The combination of the spindles, means for rotating the same, the roller-beam, the thread-board, yarn-guides, separators, each having a blade of greater depth than the distance from the top of the finished cop to said yarn-guides, and means for imparting a vertical traverse to said separators and for raising the tops of said separators in front of the roller-beam, as and for the purpose specified.

In witness whereof I have signed this specification, in the presence of two attesting witnesses, this 14th day of May, A. D. 1892.

ALFRED D. CHANDLER.

Witnesses:

ALBERT M. MOORE,

WALTER A. CHANDLER.