A. & J. STELL.

SPINNING MACHINE.

APPLICATION FILED JULY 5, 1906.

1,049,545. Patented Jan. 7, 1913.

4 SHEETS—SHEET 1.

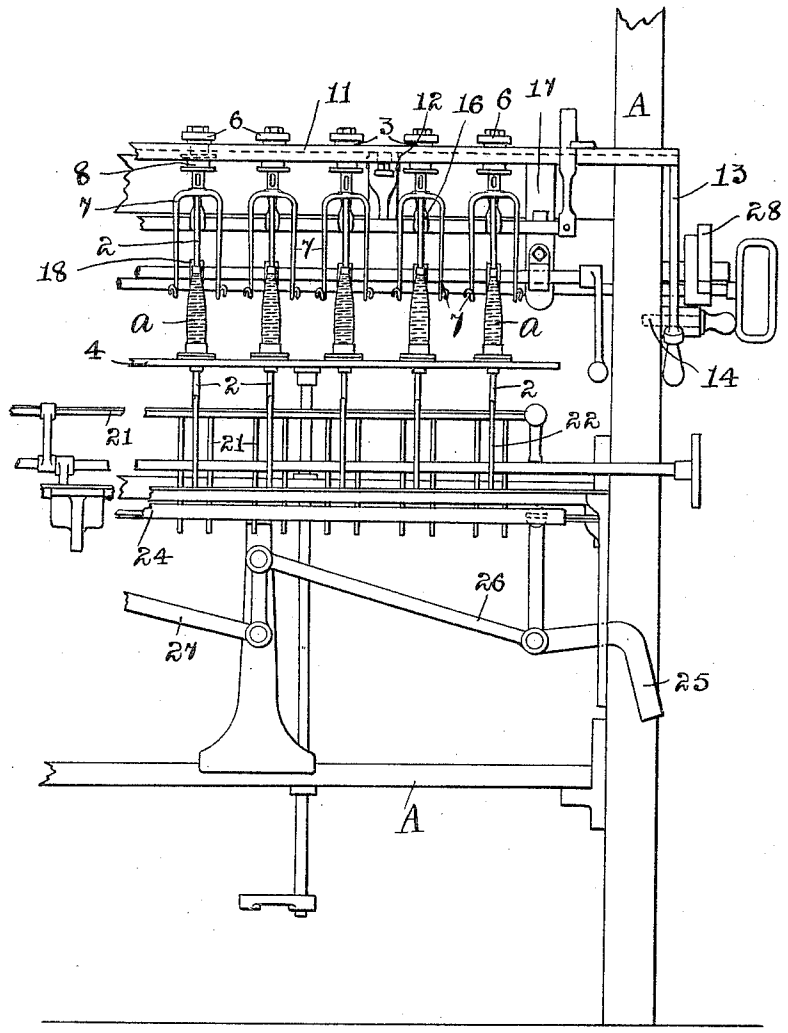

Fig. 1

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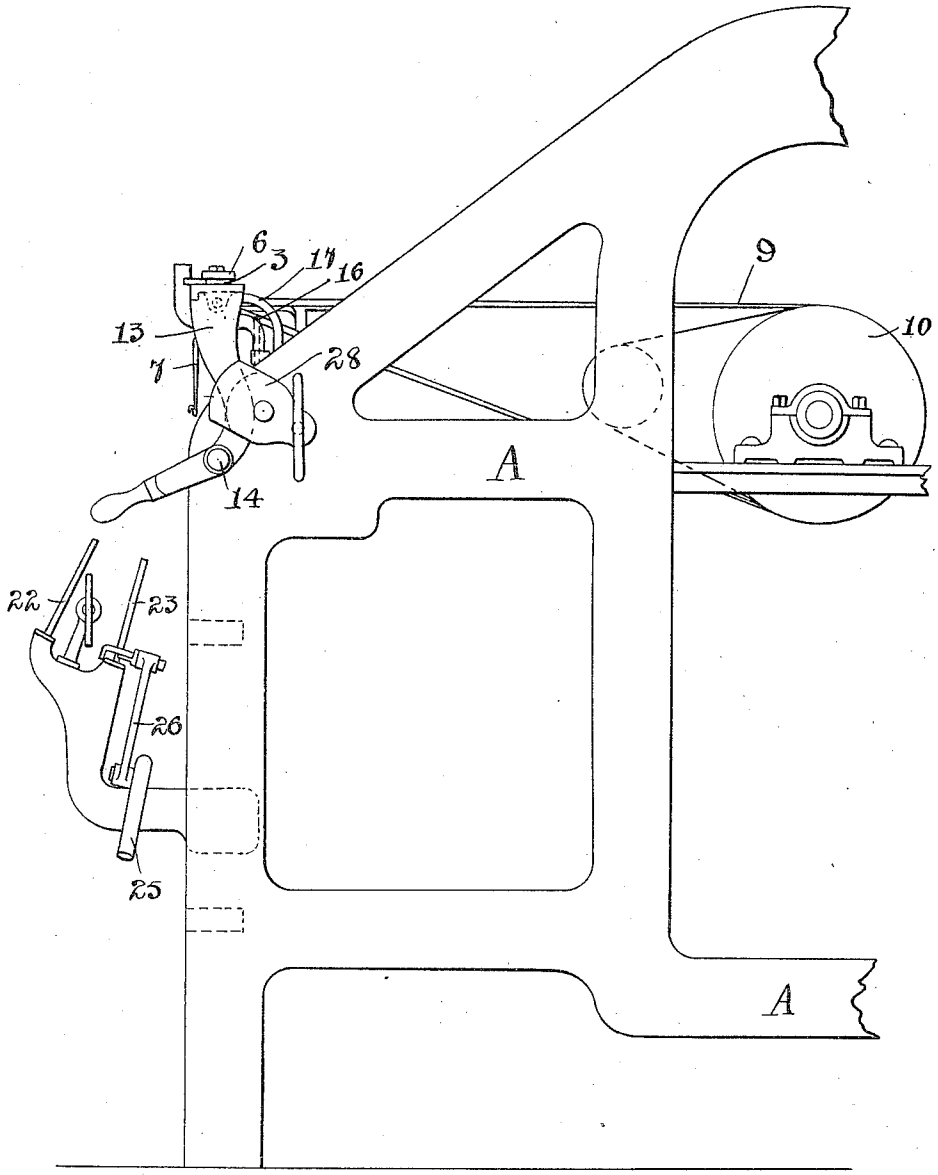

Fig. 2

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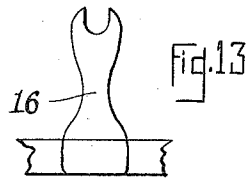

Fig. 13

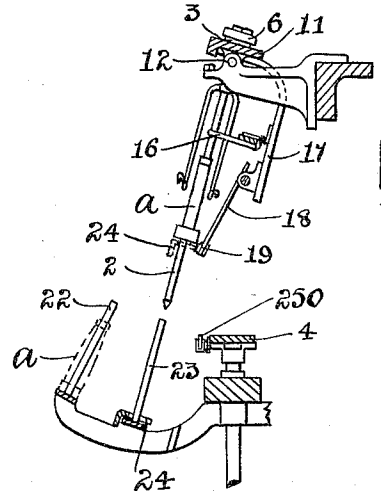

Fig. 4

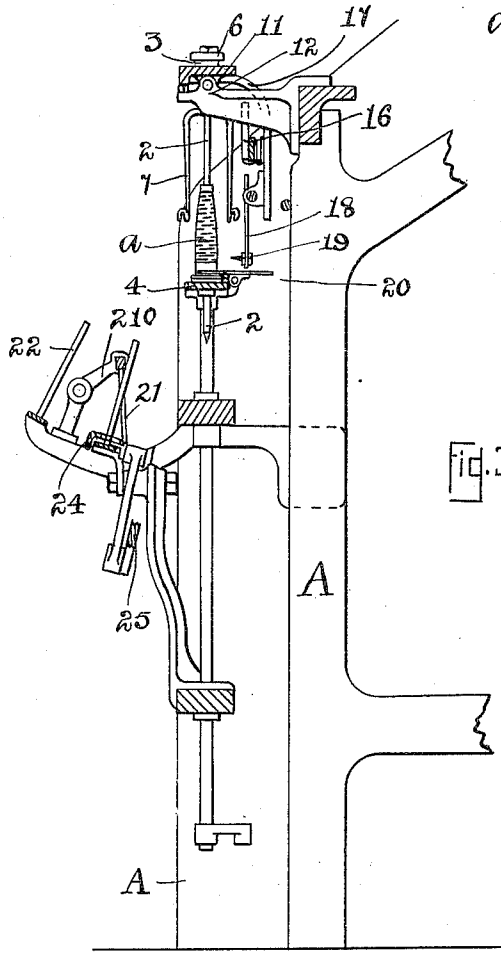

Fig. 3

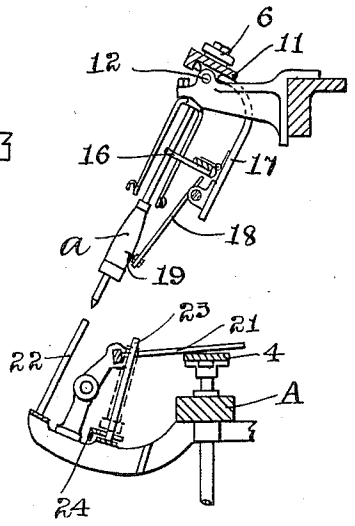

Fig. 5

Witnesses

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4 SHEETS—SHEET 4.

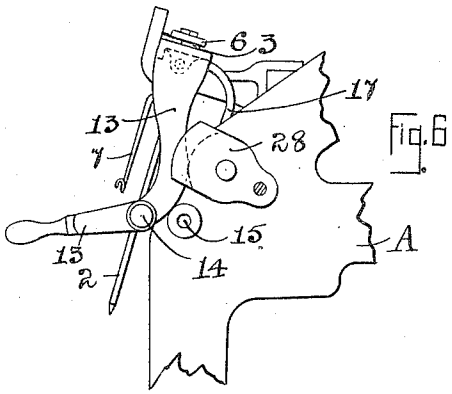

Fig. 6

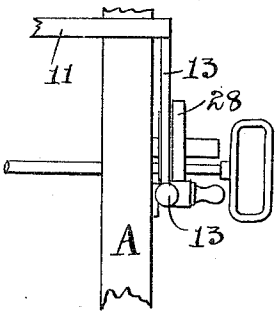

Fig. 8

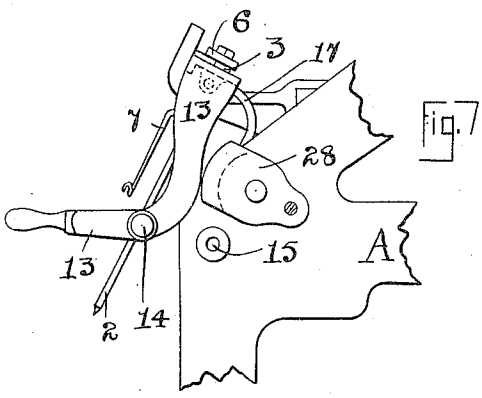

Fig. 7

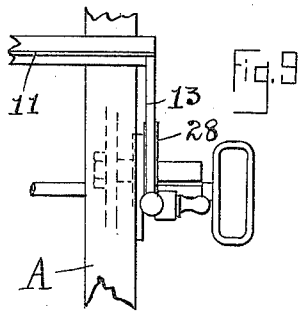

Fig. 9

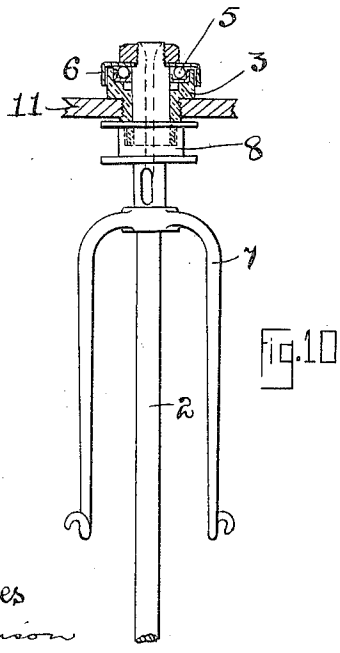

Fig. 10

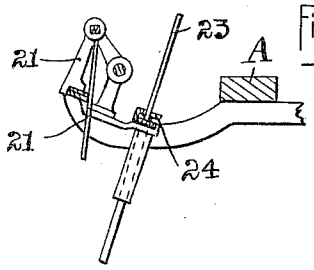

Fig. 11

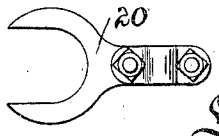

Fig. 12

Witnesses

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UNITED STATES PATENT OFFICE.

ALFRED STELL, OF STEETON, NEAR KEIGHLEY, AND JOHN STELL, OF KEIGHLEY, ENGLAND, ASSIGNORS OF ONE-THIRD TO WILLIAM HOWARD ARNOLD-FORSTER, OF GREENHOLME-MILLS, BURLEY-IN-WHARFEDALE, ENGLAND.

SPINNING-MACHINE.

1,049,545. Specification of Letters Patent. Patented Jan. 7, 1913.

Application filed July 5, 1906. Serial No. 324,753.

To all whom it may concern:

Be it known that we, ALFRED STELL and JOHN STELL, subjects of the King of Great Britain, and residing, respectively, at Greenhill, Steeton, near Keighley, in the county of York, England, and 30 Devonshire street, Keighley aforesaid, have invented certain new and useful Improvements in Spinning-Machines, of which the following description, together with the accompanying sheets of drawings, is a specification.

This invention has for its object the production of spinning machine spindles, their bearings and parts in connection therewith of such a character as to enable them to be rotated at a comparatively high rate of speed without setting up or engendering excessive vibrations, while they will also facilitate the process known as "doffing" that is, the process of removing the wound coils of yarns or threads and replacing upon the spindles the empty bobbins or tubes upon which the continued winding of the yarns or threads subsequently produced has to be carried out.

In the accompanying sheets of drawings which are illustrative of our invention:—Figures 1 and 2 are front and end elevations respectively of sufficient of a spinning machine to show the application of our invention. Fig. 3 is sectional end elevation showing our improved parts in certain of their respective positions. Figs. 4 and 5 are similar views to Fig. 3 but show only those parts which have their relative positions altered to meet other requirements. Figs. 6 and 7 are end elevations illustrating the relative positions of certain adjusting parts hereinafter described. Figs. 8 and 9 are front elevations of parts shown by Figs. 6 and 7 respectively. Fig. 10 is front elevation of our improved spindle and its bearings (the latter being shown in section) drawn to an enlarged scale. Fig. 11 is a sectional end elevation showing certain devices in detail as hereinafter explained. Fig. 12 is a plan of devices for holding the frictioning washers during certain operations hereinafter described. Fig. 13 is a drawing in detail illustrating a part hereinafter referred to.

Similar letters and figures of reference indicate similar parts throughout the several views.

A indicates the framework of the machine.

To attain the object of our invention we arrange each spindle 2 so that its whole weight may be supported by the bearings 3 situated at its upper extremity, its lower end being entirely free of any foot-step support, while the usual and well known lifter rail or movable platform 4 acts as a lateral stay for said spindle during its rotary operations. The bearings 3 are screwed into the rail 11 and made to extend down over a considerable part of the spindle 2 within the pulley 8 as shown in broken lines Fig. 10, while they are further constructed as shown so that we may make use of antifriction balls 5 which operate in a ball-race covered by the part 6 which envelops same to such an extent as to prevent the entrance therein of any stray fibers or other undesirable matter, while the spindle 2 is further constructed to carry its flier 7 and driving pulley 8 in order that rotary motion may be imparted thereto by the driving band or tape 9 taking over the drum or cylinder 10 actuated in manner well known.

By constructing the spindles of a spinning machine and their bearings so that said spindles may be rotated by the actions of driving bands near their said bearings and without being supported by foot-steps, in addition to the steadiness of action of said spindles, we obtain the advantage of the ready application of mechanical devices for performing the process or operation of "doffing" as hereinbefore stated.

The doffing mechanism which we preferably make use of is substantially the same as that described in the specification of British Patent No. 4338 of 1905 granted to William Howard Arnold-Forster, and its adaptation to our construction of spindle and parts may be described as follows:— The bearings 3 for the spindles 2 are supported by a rail 11 extending from end to end of the machine and mounted on pivotal bearings 12 so that it will allow the spindles 2 pendant from it to be swung or shifted forward from their vertical positions shown by Figs. 2 and 3 to occupy their positions shown by Figs. 4 to 7 inclusive. The movements of this rail 11 are effected by a handle 13 which is locked in position by a pin 14 carried by said handle taking into an opening 15 in the end frame when the spindles are in their vertical positions, at which time

they are being or may be rotated by their driving bands to carry out their spinning and winding operations. When sufficient yarn has been wound upon the bobbins *a* the motions of the machine are arrested and the attendant runs his or her hands over all the series of fliers to bring them flat against the machine as shown by Fig. 1. The devices 16 hinged to brackets 17 carried by the rail 11, are then turned over by the operative to fit against and steady the spindles 2 as shown by Figs. 4 and 5 on which the springs 18 carrying the dagger pins 19 are moved forward to strike said daggers 19 into the fibrous substances wound on the bobbins *a* in order to hold them upon the spindles 2 when the lifter-plate 4 is withdrawn. To enable all of these springs 18, which constitute yielding dagger-carrying arms, to be actuated simultaneously so as to cause all of the dagger pins 19 to strike into the material on the bobbin, they may be carried by a rock-shaft having a lever or handle at one end, as shown in Fig. 1, said rock-shaft being supported in bearings carried by the brackets 17 below the spindle-steadying devices 16. At this time the holders 20 for retaining the bobbins in position (see Fig. 3) are turned over to press upon same, so that the lifter-plate 4 may be then lowered (in manner common and well known) in order to leave the lower ends of the spindles 2 above it as shown by Figs. 4 and 5. The thread holders 21 are now turned over on their supports 210 so that their prongs span the bobbins and rest upon the lifter plate 4, after which the attendant moves the spindles 2 forward into alinement with the series of pegs 22, and in this position they are adjusted relatively with the said pegs 22 by being held by the lever 13 resting upon the step-piece 28 which has been slid on its bearings to pass beneath same as shown by Figs. 7 and 9, and when so held the daggers 19 are withdrawn from the bobbins *a* so that these latter now descend by gravity on to the pegs 22. The holders 21 are now turned back to occupy the position shown by Fig. 11 and in doing so one or other of their prongs will catch each thread extending between the flier and the bobbin and will draw it into position to act as hereinafter explained. The spindles 2 are then caused to recede so that they are held opposite the series of pegs 23 (upon which empty bobbins had been previously placed) in which position they are held by the lever 13 resting on the step-piece 28 in the position shown by Figs. 6 and 8. These empty bobbins on the pegs 23 are raised by the notched plate 24 being operated by the hand-lever 25, rod 26, and levers 27, to take over the spindles 2 where they are held by the daggers 19 being moved to take beneath them as shown by Fig. 4, on which the plate 24 is allowed to descend to its normal position shown. On the completion of the operations described the spindles 2 are swung back into their vertical position, the lifter rail 4 is raised, the holders 20, daggers 19 and steadying devices are turned back into their inoperative positions, a few turns are given to the spindles by their driving bands in order to cause the fliers to wind a few coils of yarn on to the bobbins at which time the threads from the full bobbins will be still held by the holders 21 so that by these operations they are brought to extend across the cutting knife 250 extending across the machine in order that by the sliding of this knife the attendant may sever the whole series of threads at one operation. Thus all the parts are readjusted and the machine may be now started into action to continue its usual spinning operations.

Having thus described the nature and object of our invention what we claim is:—

1. A spinning machine having a pivoted rail provided with spindle bearings, complete spindles depending from said bearings and supported solely thereby, and having free lower ends, and means for rocking the rail to shift said spindles out of vertical position, the means whereby the spindles are driven being at the upper parts thereof.

2. A spinning machine having a pivoted rail provided with spindle bearings, complete spindles depending from said bearings and supported solely thereby, and having free lower ends, said bearings each including a ball race and balls carried by said race, the means whereby the spindles are driven being at their upper portions, and means for rocking the rail to shift said spindles out of vertical position.

3. A spinning machine having a pivoted rail provided with bearings and complete spindles depending from said bearings and supported solely thereby, and having free lower ends, pulleys on the upper portions of the spindles, said pulleys having annular recesses receiving the lower ends of the bearings, and means for rocking the rail.

4. A spinning machine having a pivoted rail provided with bearings and complete spindles depending from said bearings and supported solely thereby, and having free lower ends, said spindles having pulleys adjacent the bearings, means for rocking the rail, and a lifter rail or movable platform movable to and from the lower ends of the spindles.

5. A spinning machine having a pivoted rail provided with bearings and complete spindles depending therefrom and supported solely thereby, and having free lower ends, said spindles having pulleys adjacent the bearings, means for rocking the rail to shift the spindles outward from vertical po-

sition, and doffing mechanism for receiving the bobbins from the spindles.

6. A spinning machine having a pivoted rail provided with spindle bearings, complete spindles and fliers depending from said bearings, the spindles having free lower ends, said bearings each including a ball race and balls carried by said race, means for rocking the rail to shift said spindles and fliers out of vertical position, and means for locking the rail to hold the spindles in vertical position.

7. A spinning machine having a pivoted rail provided with bearings, complete spindles and fliers depending from said bearings, the spindles having free lower ends, pulleys on the spindles, means for rocking the rail, means for locking the rail to hold the spindles and fliers in vertical position, and means for steadying the spindles in a row when in inclined position.

8. A spinning machine having a pivoted rail provided with bearings, complete spindles and fliers depending from said bearings, the spindles having free lower ends, means for rocking the rail, a lifter rail or movable platform movable to and from the lower ends of the spindles, and means for holding the bobbins on the spindles when swung outward.

9. A spinning machine having a pivoted rail provided with bearings, complete spindles and fliers depending therefrom, the spindles having free lower ends, means for rocking the rail, means for locking the rail to hold the spindles and fliers in vertical position, means for steadying the spindles in a row when in inclined position, and doffing mechanism located below the plane of the lower ends of the spindles.

10. A spinning machine having a pivoted rail provided with bearings, complete spindles and fliers depending therefrom, the spindles having free lower ends, means for rocking the rail to shift the spindles and fliers outward from vertical position, means for locking the rail to hold the spindles and fliers in vertical position, means for steadying the spindles in a row when in inclined position, means movable to engage the bobbins on the spindles to hold said bobbins temporarily when the spindles are swung outward, and doffing mechanism for receiving the bobbins from the spindles.

In testimony whereof we have affixed our signatures in presence of two witnesses.

ALFRED STELL.
JOHN STELL.

Witnesses:
FRED HAMMOND,
SAMUEL HEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."