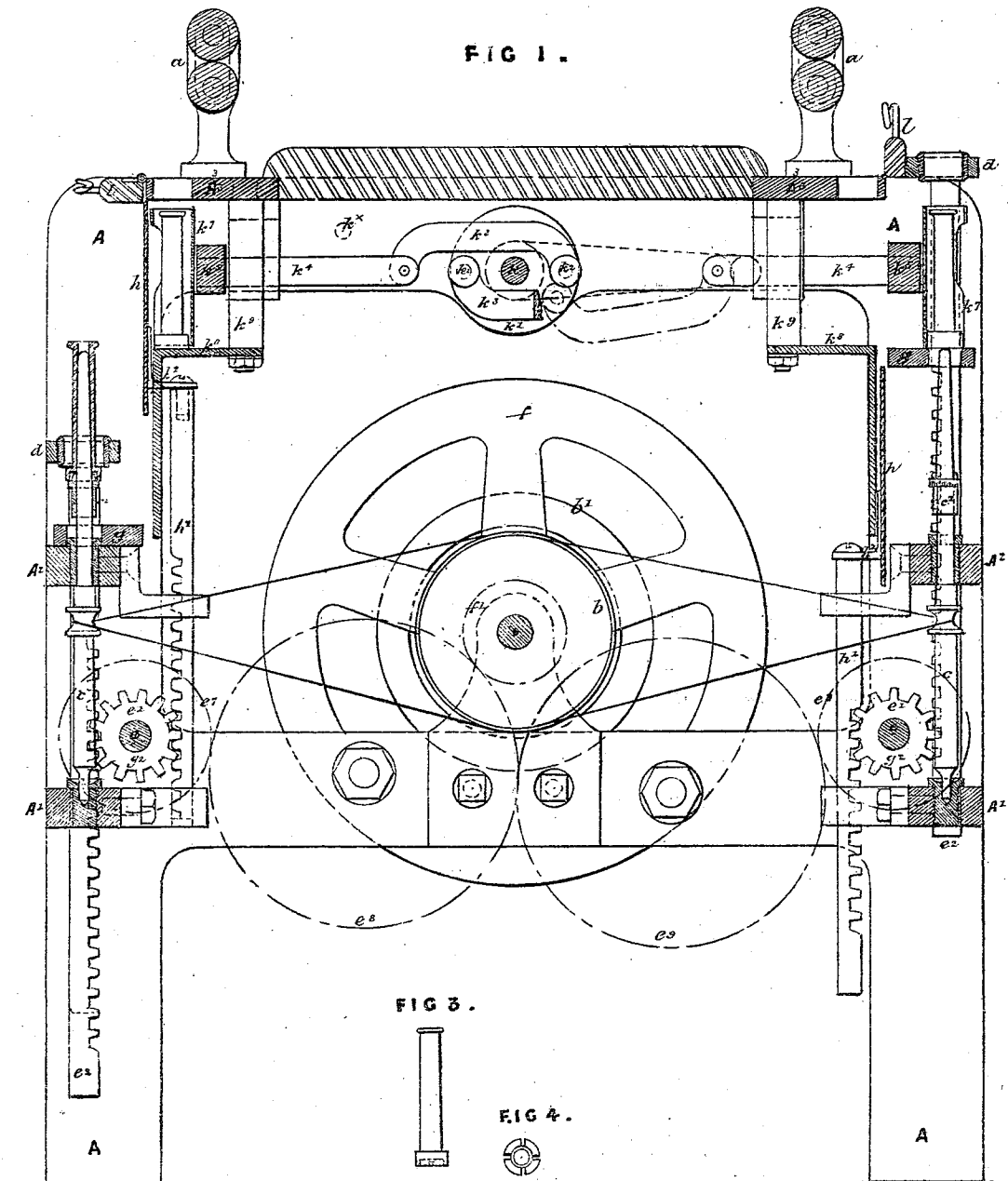


GEORGE BERNHARDT'S
Improvements in Spinning Machines.

No. 123,221.

Patented Jan. 30, 1872.



Peter J. Wasey
James Woods } *Witnesses*

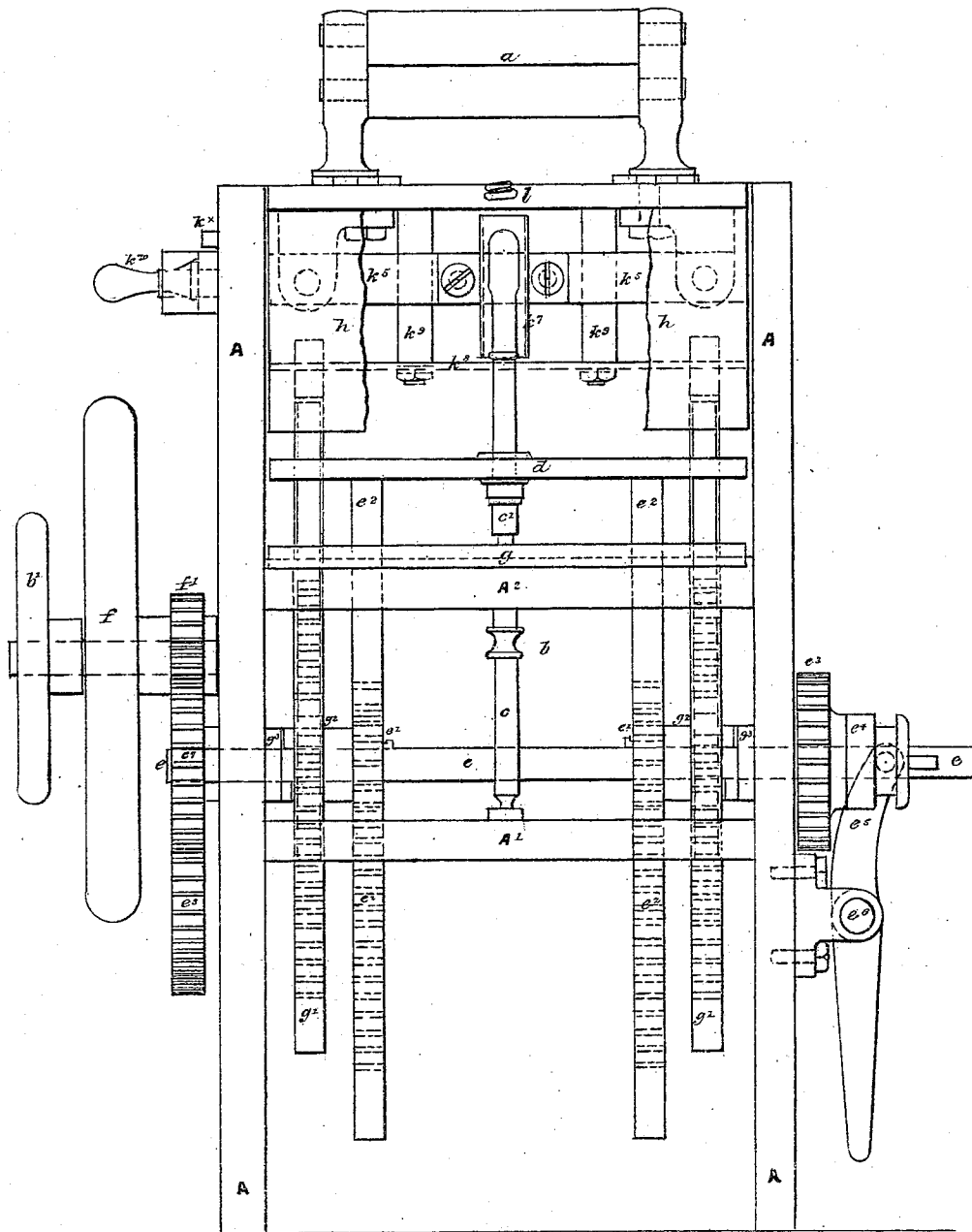
Inventor.
Geo. Bernhardt

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FIG 2.

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Inventor,
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UNITED STATES PATENT OFFICE.

GEORGE BERNHARDT, OF RADCLIFFE, GREAT BRITAIN.

IMPROVEMENT IN SPINNING-MACHINES.

Specification forming part of Letters Patent No. 123,221, dated January 30, 1872.

SPECIFICATION.

I, GEORGE BERNHARDT, of Radcliffe, in the county of Lancaster, in the Kingdom of Great Britain and Ireland, have invented Improvements in Spinning-Machines, of which the following is a specification.

Nature and Object of the Invention.

The object of my improvements in spinning-machines is to modify and arrange and make additions to them, so that all the full bobbins of a frame or machine may be simultaneously removed from the spindles and replaced by empty bobbins in a very short time by means of mechanism operated upon by hand at one end of the machine, and thereby economising time and labor and increasing production; and my invention consists in the combinations, arrangements, devices, and mode of action hereinafter described for attaining the above-named object.

Description of the Accompanying Drawing.

Figure 1, Sheet No. 1, is a cross-sectional elevation of so much of a spinning-frame as will be necessary for explaining my invention; and Fig. 2, Sheet No. 2, is a front elevation of the same, showing only one spindle and part of the front covering-plate *h* supposed broken away. Fig. 3, Sheet 1, is a detached side view, and Fig. 4, Sheet 1, an end view of the bobbins employed.

The improvements are illustrated as applied to a ring and traveler spinning-frame, more particularly intended for twisting threads, and commonly termed doubling frames—*A*, the two end frames; *A*¹, spindle footstep rails; *A*², upper spindle-bearing rails; *A*³, roller beams; *a*, draft or other rollers; *b*, tin drum or roller for driving the spindles *e*; and *d* is the ring or coping-rail. All the above-mentioned parts are ordinary. *e* are shafts for actuating the coping or ring-rail, these shafts having toothed wheels *e*¹ upon them, which gear with rack-teeth in bars *e*² that slide vertically through bearings in the upper and lower spindle-rails *A*¹ and *A*² and the ring or coping-rails are secured to the upper ends of the said bars *e*². The shafts *e* receive oscillatory movement to distribute the thread from the ordinary mechanism usually employed, which acts upon the

toothed wheels *e*³, which are loose upon the shafts, but when the machine is spinning these wheels are made fast to the shafts by clutches *e*⁴, that slide on a fixed key. The clutches are acted upon by clutch-levers *e*⁵, and the clutches for both sides of the frame are connected so as to be simultaneously acted upon by securing both clutch-levers upon a cross-shaft, *e*⁶, carried by brackets secured to the end framing. The two shafts *e* are geared together at the end of the frame by means of a toothed wheel, *e*⁷, on each of the shafts *e*, and two intermediate wheels, *e*⁸ and *e*⁹, and one of the latter wheels *e*⁸ is in gear with a pinion, *f*¹, on the boss of a hand-wheel, *f*, loose on the end of the shaft of the tin-drum or roller *b*. The pitch-lines of the toothed wheels last referred to are shown in Fig. 1 in peculiar dotted line. When the machine is spinning the hand-wheel *f* is free to oscillate to and fro with the movement of the coping or ring-rail *d*. *b*¹ is a hand-wheel, fast on the end of the tin-roller shaft, for turning the tin-drum when required. *g* is a rail passing from end to end of the machine, and through this rail there is a hole for each spindle just large enough to pass over the "brad" *c*¹ upon each spindle having the pins in it that drive the bobbin, but smaller than the head of the bobbin. This rail serves to lift the bobbins when doffing and rests when the machine is spinning upon the upper spindle-rail. The lifting-rail *g* is mounted upon the upper ends of vertical bars *g*¹ sliding in bearings in the spindle-rails, these bars having rack-teeth, each rack gearing with a wheel, *g*², loose upon the shaft *e*, so that they do not move with the shafts when spinning, but when these shafts oscillate beyond the extent of movement required in spinning a pin in a boss, *g*³, fast on the shaft *e*, comes against a pin on the face of the wheel, and thus causes the rail *g* to be lifted. Each of the wheels *g*² also gears with a rack-bar, *h*¹, sliding vertically on suitable guides secured to the spindle-rails. The upper end of each of these rack-bars has a bracket, *h*², secured to it, to which the thin plate *h*, of metal, is attached. These plates are for the purpose of covering and uncovering the empty bobbins and mechanism for carrying the same, hereinafter described. The covering-plate *h* is shown in the position it occupies when the

machine is spinning on the left of Fig. 1, and in the position it occupies when doffing on the right of the same figure. k is a shaft passing from end to end of the frame in suitable bearings in the frame. Upon this shaft, at suitable intervals, disks k^1 are keyed, each having two crank-pins k^2 , to each of which one end of a link, k^3 , is jointed, the other end being jointed to a rod, k^4 , sliding in a bearing secured to the under side of the roller-beam. To the ends of the slide-rods (the number being according to the length of the frame) a rail, k^5 , is secured, which passes from end to end of the frame; and to the rail a tube, k^7 , is secured to come opposite to each spindle. These tubes are made of metal, and are open in front, except just at their upper ends, the opening being sufficient to allow the barrel of the bobbin to pass through when slightly lowered, so that the head of the bobbin will pass below the bottom of the tube. The empty bobbins are passed into each tube while the machine is spinning through a hole in the roller-beam, which is made opposite to each tube, and the bobbin rests upon a table formed by a plate, k^8 , (one on each side of the frame,) passing from end to end of the machine and carried from the roller-beam by brackets k^9 . The vertical part of the table-plate also serves as a cover, and in it slots are formed for the brackets k^2 to pass through that carry the moving covering-plate h . There is a handle, k^{10} , upon the end of the shaft k , by partly rotating which until it comes against a stop-pin, k^x , in the frame the empty bobbin-rails k^5 on both sides are simultaneously pushed outward until the center of the bobbins come over the ends of the spindles.

I will now describe the mode of doffing by the mechanism. When the bobbins are full the coping mechanism is thrown out of gear with the shafts by moving the clutch-lever shaft e^6 , and then the coping or ring-rails d are lowered by the hand-wheel f , while a small portion of thread is wound upon the lower part of the "brad" c^1 . Then the machine is stopped. The hand-wheel f is then turned back, and the ring-rail d is lifted to the position shown on the right of Fig. 1, the hinged-wire curl or guide-board l being lifted into the position shown. The same movement which lifts the ring or coping-rail also carries the lifting-rail g to the position shown on the right of Fig. 1, where its upper surface is just level with the empty-bobbin table-plate k^8 and just above the tops of the spindles c , and the same movement of the hand-wheel also brings the covering-plate h into the position shown on the right of Fig. 1. The handle k^{10} is now moved till it comes against the pin k^x , and the empty bobbins are by this movement brought over the spindles, as shown, on the right of Fig. 1; then the lifting-rail g is lowered slightly by the hand-wheel f to bring the heads of the bobbins clear of the bottom of the tubes k^7 , and the handle

k^{10} is then turned back to bring the tube-rail k^5 back into the position shown on the left of Fig. 1. The empty bobbin-rail g and ring-rail d are then lowered and the clutches e^4 are brought into gear again, and this completes the operation, which takes from fifteen to thirty seconds.

The collar upon the "brad" c^1 is roughly milled on its edge, and the lower head of each bobbin is notched, as shown by the detached views, Figs. 3 and 4. This roughening of the collar and notching of the bobbin is important, as it prevents the bobbin from turning and the thread from uncoiling from the bobbin when lifted, and consequently when the full bobbins are lifted the threads are broken with certainty between each bobbin, and that part wound upon the lower part of the "brad," leaving the thread between the traveler and lower part of the brad ready to wind upon the bobbin when the frame begins to work. The full bobbins are pushed from the lifting-rail g by the empty bobbin-tubes k^5 , when they come forward, and they fall into any suitable receptacles placed on each side of the frame to catch them. I employ a receptacle formed by two frames jointed together to fold like a camp-stool, which can be easily carried from one frame to another, as required.

When doffing it is an advantage to gear the rollers a on both sides together, so that they can be turned forward slightly (about one-third of a revolution of the front roller) to give slackness to the threads when doffing, which prevents breakage when the empty bobbins come forward.

Claims.

1. The ring-rail d and the doffing-rail g , operated independently of each other from the same shaft e , through the medium of the racks and pinions, or their equivalents, substantially as described.
2. The combination of the lifting-rail g and sliding-plate h , as set forth.
3. The combination, with the spindles, of a stationary platform, k^8 , secured to the frame of the machine, for the reception of the bobbins preparatory to transferring them to the spindles, as described.
4. The combination of the ring-rail d , lifting-rail g , platform k^8 , and sliding tube or case k^7 , all operating together, substantially as described.
5. The combination, with the brad c^1 , of the roughened collar, arranged to insure the simultaneous breaking of the threads between the bobbins and the brads by the elevation of the lifting-rail g , substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

Witnesses: **GEO. BERNHARDT.**
PETER J. LOSEY,
JAMES WOODS.