2 Sheets--Sheet 1.

J. P. HILLARD.

Spinning-Machine.

No. 169,170. Patented Oct. 26, 1875.

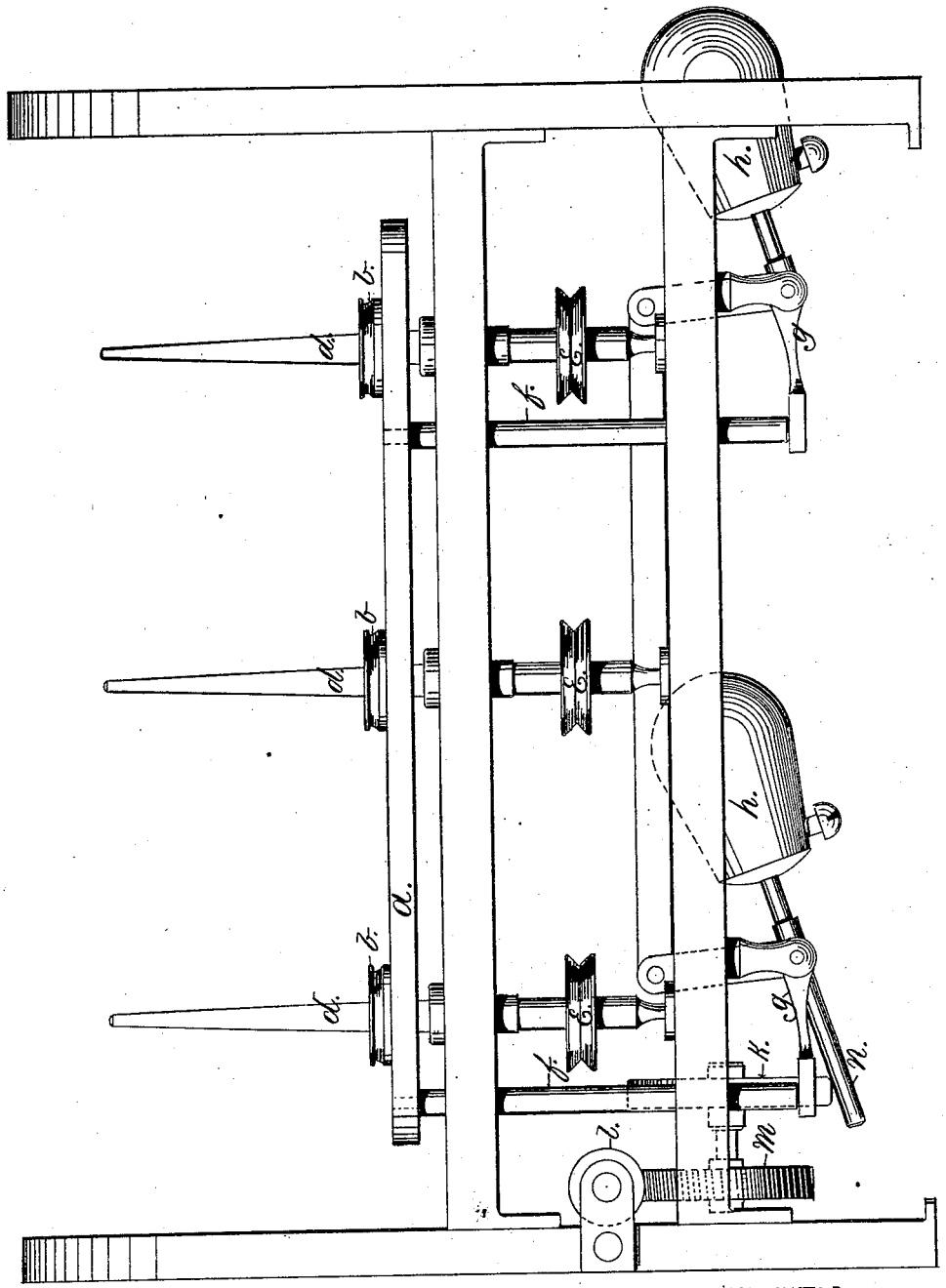

FIG. I.

WITNESSES

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W. C. King

INVENTOR.

James P. Hillard

per Joseph A. Miller

Attorney

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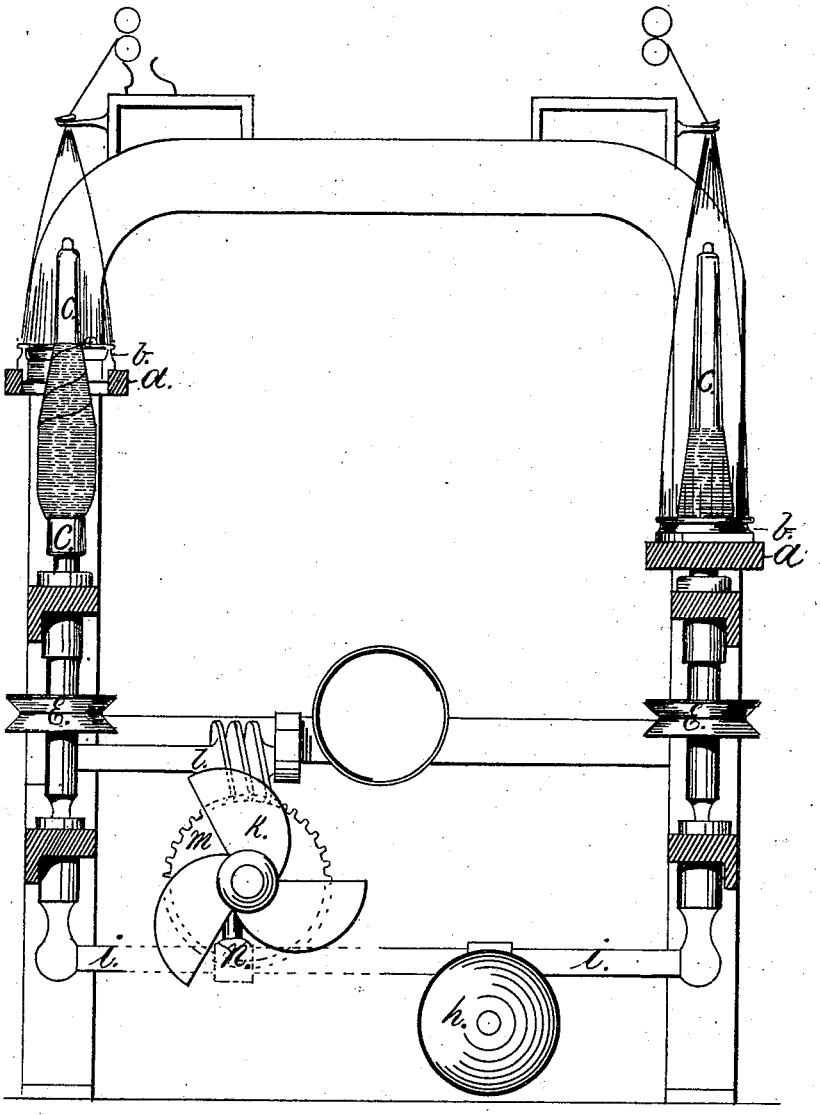

FIG. II.

WITNESSES

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INVENTOR

James P. Hillard

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UNITED STATES PATENT OFFICE.

JAMES P. HILLARD, OF FALL RIVER, MASSACHUSETTS.

IMPROVEMENT IN SPINNING-MACHINES.

Specification forming part of Letters Patent No. **169,170**, dated October 26, 1875; application filed July 3, 1875.

To all whom it may concern:

Be it known that I, JAMES P. HILLARD, of Fall River, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Spinning-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings forming part of this specification.

Figure I is a side elevation of my improved spinning-frame. Fig. II is a sectional view of the same, the ring and ring-rail on the left side being shown on the upper end of the traverse, and on the right side at the lower end of the traverse, so as to illustrate more fully the nature of the invention.

My invention relates to that class of spinning-machines known as ring spinning-frames; and consists in giving to the ring-rail such reciprocating motion as will wind the thread on the quill or bobbin evenly and in a close spiral when the ring-rail is descending, and in an open spiral form when the same is ascending, thus binding the thread and producing a cop or bobbin similar to the cop produced on a mule-frame.

In the drawings, *a a* are the reciprocating ring-rails. *b b b* are the spinning-rings, on which the traveler moves, and which are secured to the ring-rails *a a*, and *c* is the bobbin or quill supported on the spindle *d*. Rotative motion is imparted to the spindle by the whirl E. The ring-rail is supported in the usual manner by the rods *f f* resting on the brackets *g g*, and the weight of the ring-rail is balanced by the weight *h h*, secured to the rock-shaft *i*, to which the brackets *g g* are also secured. In ring spinning-frames constructed before this invention, weights somewhat similar to the weights *h h* have been adjusted to balance, or nearly balance, the ring-rails. In my improved ring spinning-frame, the weights *h h* are adjusted so as to more than balance the ring-rail, and perform the additional function of always lifting the ring-rail to the highest point of reciprocation, unless the same is depressed by some mechanical means, and when such means cease to depress the ring-rail, the weights *h h* will at once raise the same to the highest point.

The means used to gradually depress the ring-rail from the highest to the lowest point of traverse, consist in the three-throw cam *k*, operated by the screw *l*, and screw-gear *m*, and acting upon the arm *n*, which is secured to the rock-shaft *i*, and imparts the reciprocating motion to the ring-rail through the brackets *g g* and the rods *f f*. The curved portion of the cam *k* must be constructed so that the pressure on the arm *n* will depress the ring-rail so as to lay the yarn on the cop or bobbin uniformly and closely, one thread to the other, and maintain a uniform drag on the traveler, until the lowest point is reached, when the curved line of the cam passing beyond the arm *n*, the ring-rail is suddenly raised by the weights *h h*, and the thread is wound on the cop or bobbin upwardly and in an open spiral, thus forming a binder to the thread wound during the downward motion of the ring-rail.

The advantages of winding the yarn or thread on the downward traverse and binding on the upward traverse are, first, that the diameter of the cop decreases upward, and with the same speed of the spindle and delivery-roll, an open spiral may be formed; and second, by the rapid upward motion of the ring-rail the extra length of thread between the eye or the bite of the delivery-roll and the traveler, allows for the extra length required to form the open spiral or binder.

In a mule-frame the cop is formed by binding downward and winding upward, and in all previous attempts of which I am aware, the same course has been pursued in spinning cops on ring-frames, and have failed, because the rapid downward motion of the ring and traveler brought such excessive strain on the yarn as to break or, at least, greatly weaken the same; for not only does the amount of yarn required to bind the cop downward rapidly increase, but the length of yarn between the eye and the traveler also increases. The drag is therefore greatly increased, the size of the thread diminished, and the yarn liable to break.

In my improved spinning-frame, the slack that would be produced by the rapid upward motion of the ring-rail between the eye and the traveler, and the decreasing diameter of

the cop allows me to form an open spiral binder on the cop or bobbin, and maintain a uniform drag on the yarn during the formation of the cop.

It is obvious that the depressing of the ring-rail can be accomplished in various ways other than by the three-throw cam *k*, shown and described. The method also of driving the same may be changed and the same result obtained. I therefore do not wish to confine myself to any particular form of cam or method of driving the same.

What I claim as new and my invention, and desire to secure by Letters Patent, is—

1. The combination with the ring-rail of a spinning-frame, of the weights *h h*, and intermediate mechanism, whereby the rail is lifted and the open spiral binding-yarn caused to be wound in an upward direction on a cop or bobbin, substantially as described.

2. In combination with the reciprocating ring-rail of a spinning-frame, the arm *n*, cam *k*, and weight *h*, adapted to operate together, substantially as and for the purpose specified.

3. In a ring spinning-frame, the combination with the reciprocating ring-rail *a*, of means substantially as described, whereby a slow downward and rapid upward motion is imparted to the same, for the purpose of winding the yarn or thread on the cop or bobbin in close spirals on its downward traverse, and binding the same on its upward traverse by an open spiral binding-thread, as described.

JAMES P. HILLARD.

Witnesses:
WALTER PAINE, 3d,
DANIEL E. CHACE.