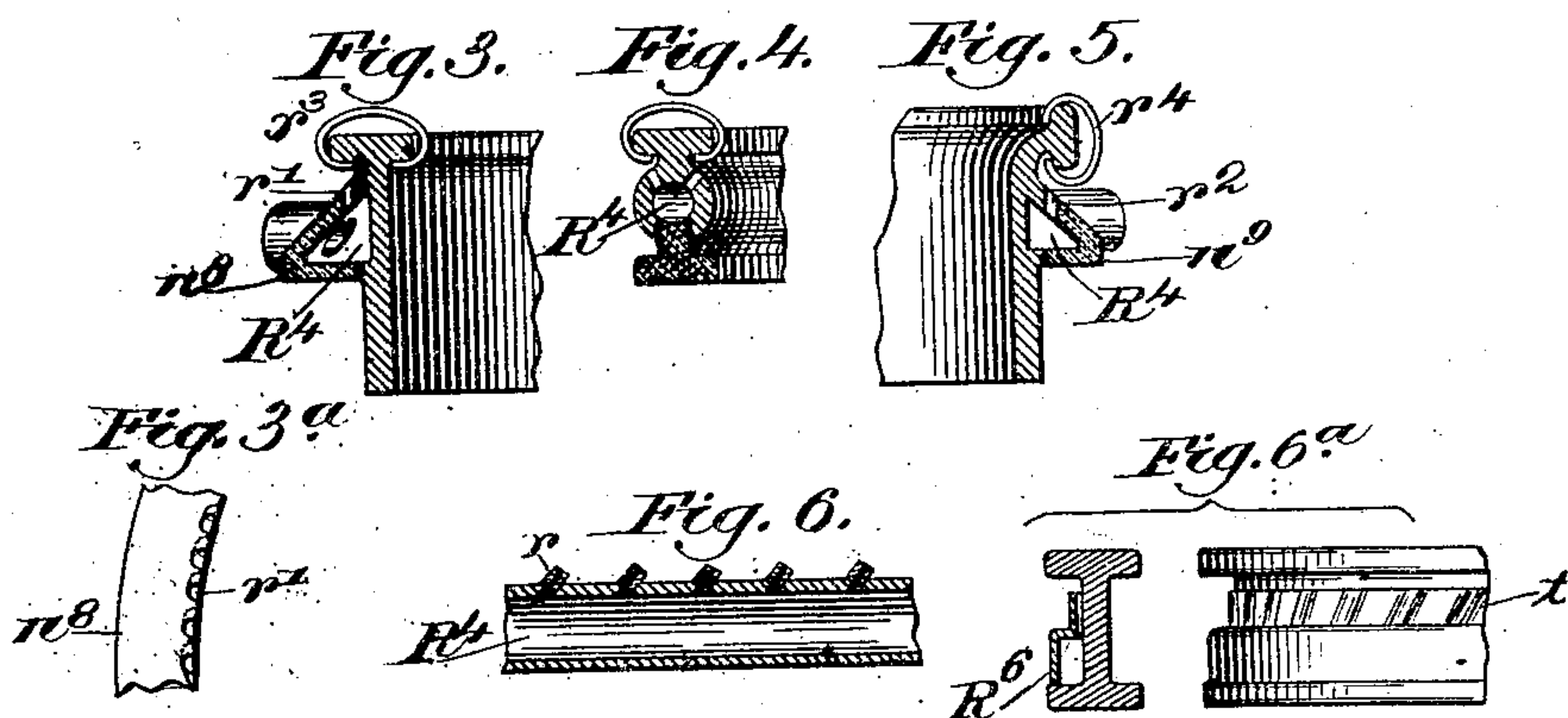
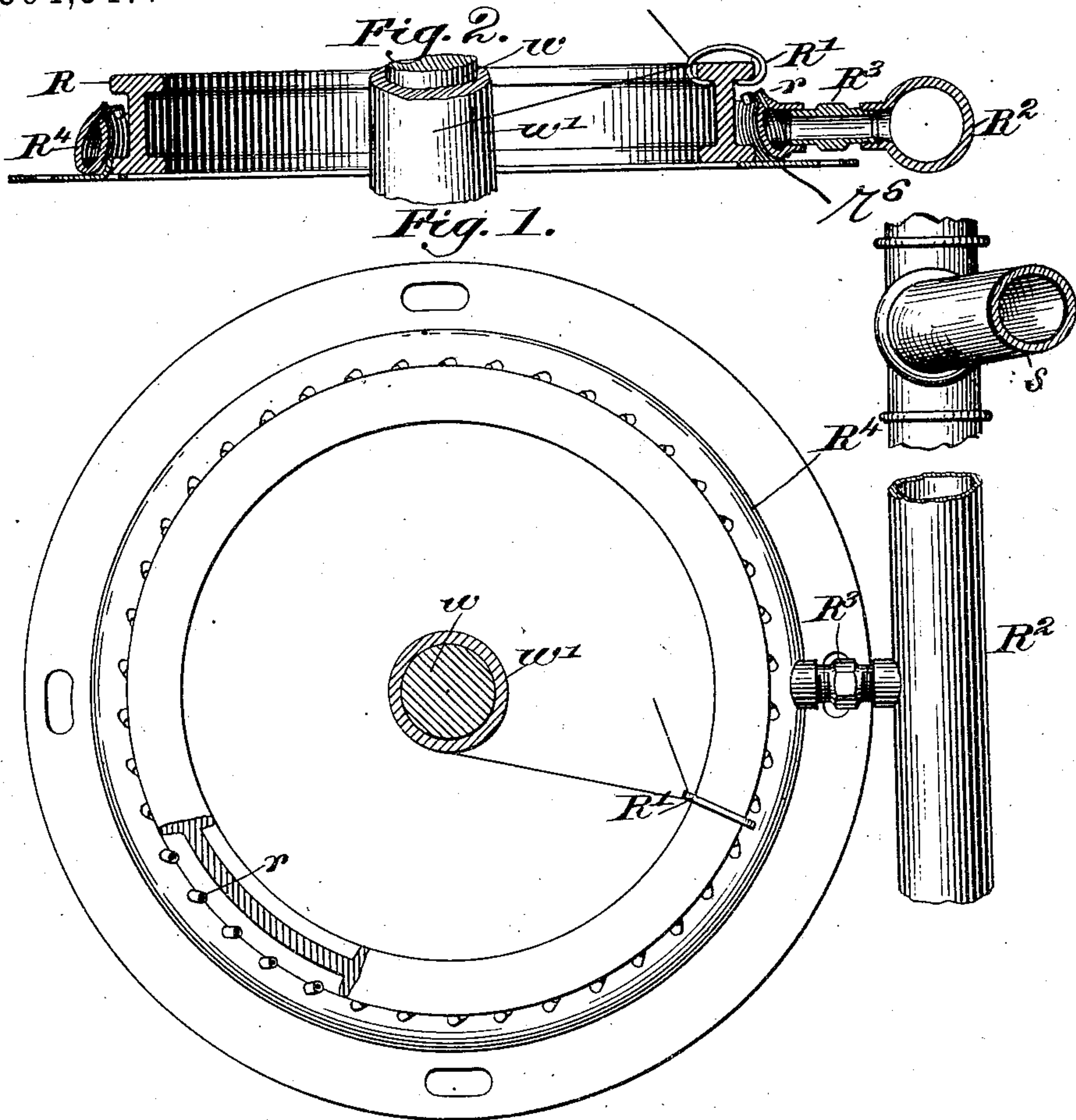


(No Model.)

J. W. FOSTER.
RING SPINNING AND TWISTING FRAME.

No. 594,347.

Patented Nov. 23, 1897.



Witnesses:
A. C. Harmon
Thomas J. Drummond

Inventor:
John W. Foster.
by Lerby Gregory attys

UNITED STATES PATENT OFFICE.

IN W. FOSTER, OF WESTFIELD, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO MULFORD M. DUNN, OF BOSTON, MASSACHUSETTS.

RING SPINNING AND TWISTING FRAME.

SPECIFICATION forming part of Letters Patent No. 594,347, dated November 23, 1897.

Application filed March 25, 1896. Serial No. 584,764. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. FOSTER, of Westfield, county of Hampden, State of Massachusetts, have invented an Improvement in Ring Spinning and Twisting Frames, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

In ring-frames the yarn as it is spun is wound on a bobbin, the bobbin being considered necessary, as it presents a surface of much greater diameter to which to attach the end of the thread and enable it to occupy such a diagonal position between the bobbin and the usual traveler on the race of the ring as to draw the traveler of proper weight to finish the set about the ring, or, in other words, the bobbin affords a sort of leverage on the thread.

In spinning it is customary to use a traveler just heavy enough to run freely on the ring when the bobbin is substantially full, and this traveler if too heavy will break the yarn, and if too light the yarn will balloon and kink. The traveler used is as heavy as the strength of the yarn will admit, and much of the strain on the yarn is due to dragging the traveler about the ring. The diameter of the yarn load or mass of yarn wound on the bobbin is limited by the inner diameter of the ring, and because of the employment of the bobbin the quantity of yarn spun and wound at one operation is further limited. Further, because of the strain of the yarn in dragging the traveler about the ring very soft or hosiery yarn cannot be practically spun on ring-frames, and so, also, but a comparatively small quantity of weft-yarn is spun and wound on ring-frames, for they are usually also fine or slack spun.

I have aimed to so improve ring-spinning frames that a very much larger quantity of yarn may be spun and wound at a continuous operation and with much or little twist, as may be desired.

In my invention I do away with the usual bobbin and let the yarn take its place, and to do this I employ on the spindle a cop-tube, of paper or other light material, and I help the

traveler about the ring as the spinning and winding are started, withdrawing the assistance when the yarn load is of proper size to afford proper leverage for the yarn leading to the traveler, if the winding is what is known as "warp-wind," but if the wind is weft-wind the assistance will be continued until the cop is fully wound. I provide in connection with the ring a blast or current of air which is directed against the traveler in the direction of its travel about the ring, the air preferably meeting the end or any part of the traveler at the under side of the flange of the race either on the outside or inside, the air blast or current issuing from a suitable passage or conduit either independent of or in the ring. By helping the traveler by the air blast or current; I may, if desired, increase the diameter of the ring, thus further increasing the diameter of the yarn load and the number of yards spun in one length. Any appreciable increase in the number of yards of yarn spun and wound in a cop is of great importance commercially, and is felt beneficially in the cheapening of all subsequent processes through which the yarn is put in the production of cloth, and the longer the yarn the less frequent the stoppage of the machines for both making it and subsequently handling it. The air-blast may be produced in any suitable manner and will be controlled to be delivered in proper quantity or strength.

One part of my invention therefore consists in providing a spinning or twisting frame having a ring and traveler with means to direct a blast or current of air against the traveler to aid the yarn or thread in starting and moving the traveler about the race of the ring.

Figure 1 is a top or plan view of a ring, part of a ring-rail, a traveler, and means for aiding it in its movement about the ring, the figure also showing part of a spindle having a cop-tube. Fig. 2 is a section of the parts shown in Fig. 1; Figs. 3, 4, and 5, sections of rings. Fig. 3^a represents part of the ring Fig. 3 removed to better show its construction; Fig. 6, a piece of pipe having education-orifices. Fig. 6^a shows a section of a modified form of ring and its surrounding conduit.

In the drawings, R represents a ring having

a raceway at either end, and R' a traveler adapted to be pulled around the race of the ring by the drag of the yarn.

B represents a ring-rail, it carrying in usual manner any number of rings. *w* shows part of a spindle, and *w'* a cop-tube thereon. The ring-rail is shown as provided at its inner side with an air-pipe R², and opposite each ring there is a branch R³, which leads air from the pipe into a passage or conduit R⁴, which may be made in a separate pipe surrounding the ring and between its upper race and the ring-rail, the said conduit having any desired number of suitable eduction-orifices *r*. In the drawings I have shown a great number of these orifices; but in practice I may use as few as four or five.

In the modification, Figs. 3 to 5, of my invention the conduit or air-space R⁴ may be made inside of and as part of the rings.

In Figs. 3 and 5 the eduction-orifices *r'* *r*² cooperate with the outer portion of the travelers *r*³ *r*⁴; but in Fig. 4 there are two eduction-orifices, one for each end of the traveler.

In Fig. 6 the air-space is in a substantially round pipe, and the eduction-orifices are, it will be seen, inclined, as in Figs. 1 and 2, in the direction of the arrow, that direction being supposed to be the line of movement of the traveler about the race. This inclined delivery of the air issuing from the conduit R⁴ is very essential in causing the proper impingement of the air current or blast against the traveler to give it the right direction of movement, and preferably the air blast or current will contact with the traveler at or near the under flange of the upper race.

The pipe R² is connected by a flexible pipe S, which in turn will be connected to the delivery-nozzle of a fan or blower of usual construction, but not shown, the said fan being preferably mounted upon the ceiling at a proper point in the room. The fan may be large enough to furnish air for a number of ring spinning or twisting frames, each frame being suitably connected therewith by a proper pipe, or each frame may have its own small fan. I prefer, however, that one fan shall supply a number of frames, the flexible or rubber pipe S bending as the ring-rail rises and falls. The ring will be secured to a proper holder, as *r*⁶, in any usual manner.

I have shown in Figs. 1 and 2 but a small part of a spindle *w*, it being of any usual or suitable construction, and *w'* is part of a thin paper cop-tube of usual construction.

The pipe R², carried by the ring-rail and by which to convey or supply air to the conduit

of whatever form from which it is supplied to the traveler, will preferably be tapered somewhat toward its farther end or ends, to thus tend to keep the air-pressure equalized in the pipe.

By the use of my invention soft slack-twisted yarn, such as spun on mules, may be spun and wound on cop-tubes carried by the spindles of ring-frames, and the winding may be either after the manner of winding weft or warp.

The rings shown in Figs. 3 and 5 are made in two parts, the parts *n*⁸ *n*⁹, containing the main air-passage, having their upper edge next the under side of the raceway of the ring provided with a series of diagonal notches, as shown in Fig. 3^a, where is shown in top view a portion of the part *n*⁸ of the ring.

In Fig. 6^a I have applied outside an ordinary ring-body a piece or belt of metal bent or shaped to leave an air-conduit R⁶, the air entering the conduit passing out therefrom in an upwardly-inclined direction through small grooves *t*, made at the inner side of the belt and impinging on the traveler.

I claim—

1. In a spinning or twisting machine, the following instrumentalities, viz: a ring and traveler, and means to direct a current or blast of air against the traveler to aid the same in traveling about the race of the ring, substantially as described.

2. In a spinning or twisting machine, the following instrumentalities, viz: a spindle adapted to receive a cop-tube, a ring and traveler, and means to direct a current or blast of air to aid in moving the traveler about the race of the ring when the spindle is rotating to twist the yarn or thread to wind the same, substantially as described.

3. A ring-rail, a ring thereon having a traveler, a conduit to supply a current or blast of air to the traveler, a pipe carried by the said rail to supply air to said conduit, and a flexible pipe connected to said air-pipe, said flexible pipe rising and falling with the ring-rail, substantially as described.

4. A spinning or twisting ring having a conduit for the reception and discharge of air, to operate substantially as described.

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

JOHN W. FOSTER.

Witnesses:

GEO. W. GREGORY,
ADDIE F. DANIELS.