Howarth & Jones.

Spinning Mach.

No. 1,043. Patented Dec. 28, 1838.

Fig. 4.

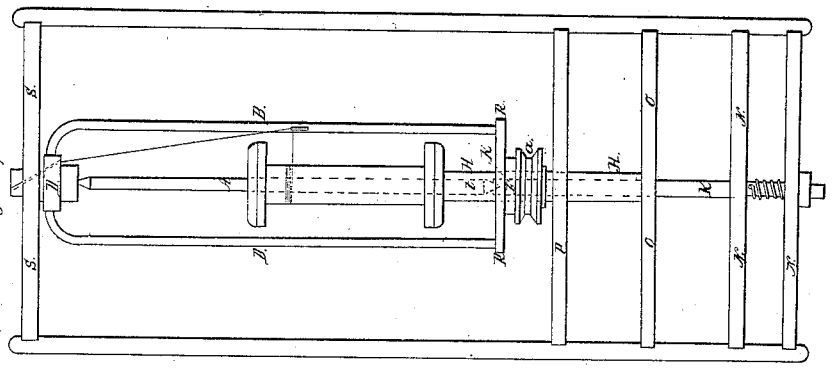


Fig. 1.

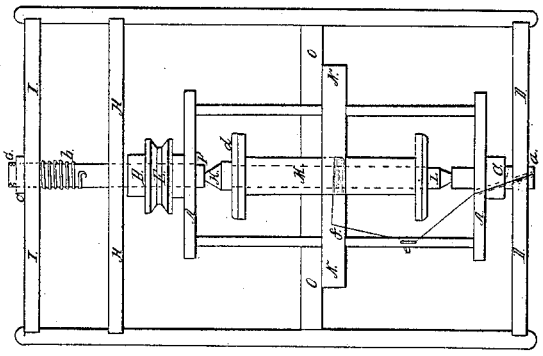


Fig. 3.

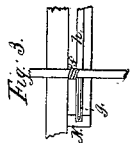
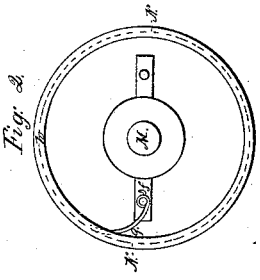


Fig. 2.



Howarth & Jones.

Spinning Mach.

No. 1,043

Patented Dec. 28, 1838.

Fig. 4.

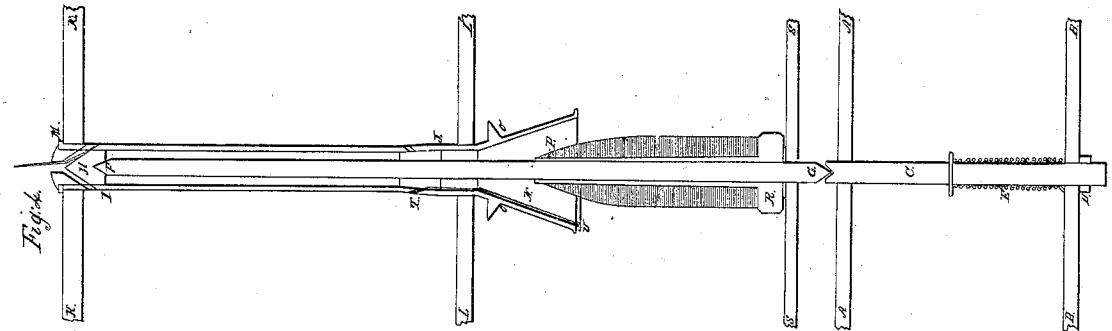


Fig. 3.

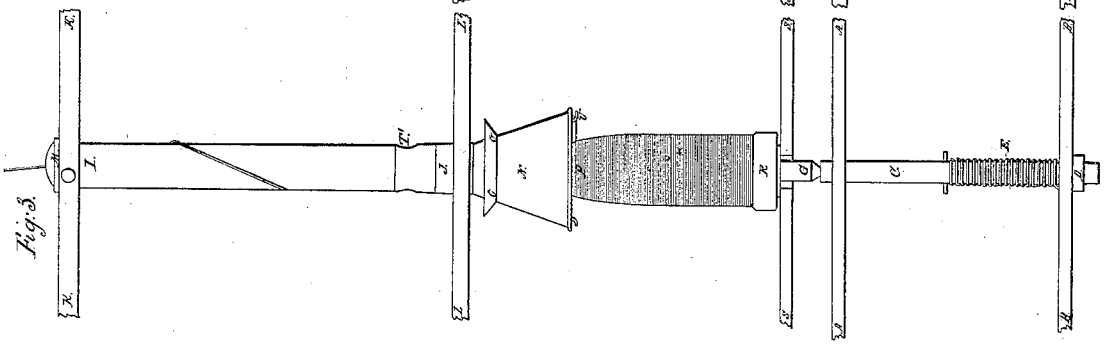


Fig. 2.

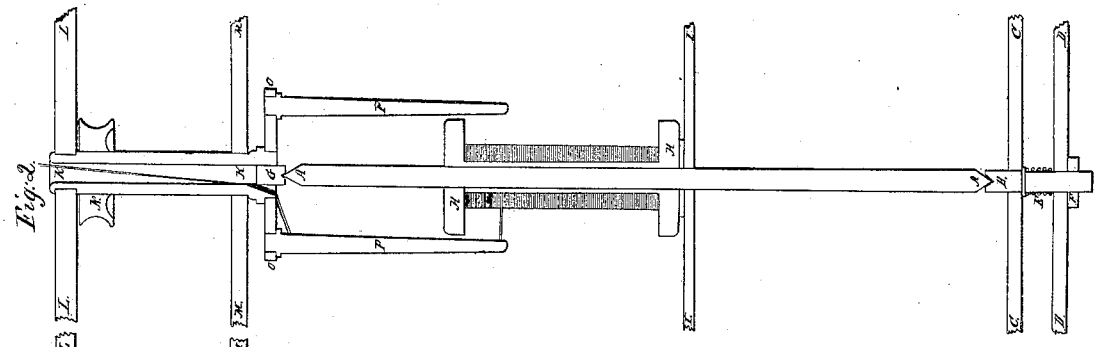
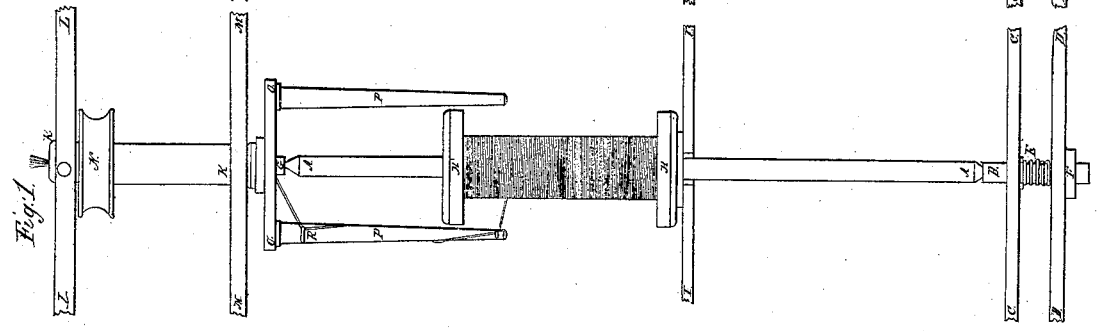
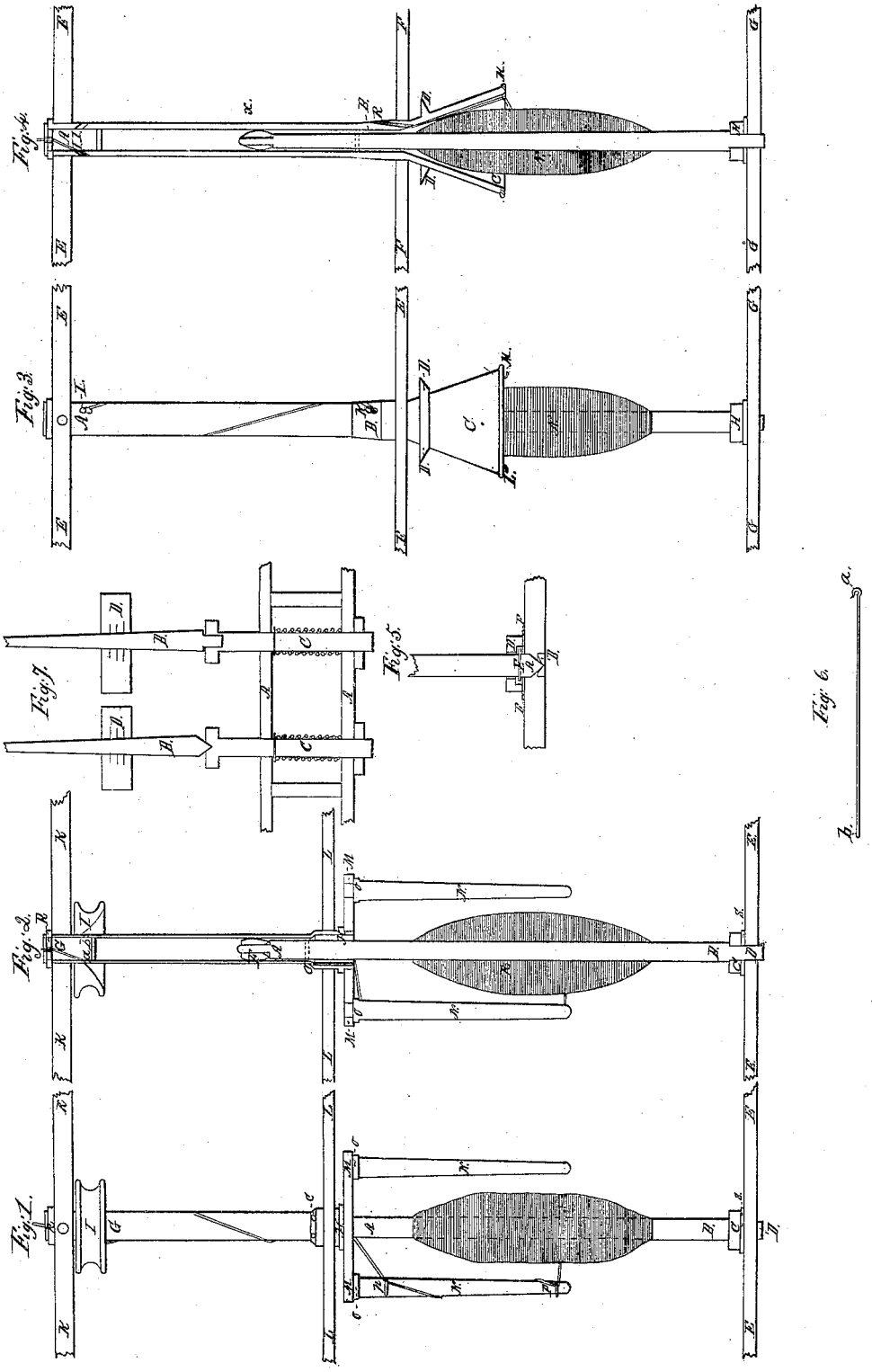


Fig. 1.



Howarth & Jones.
Spinning Mach.

No. 1,043. Patented Dec. 28, 1838.



UNITED STATES PATENT OFFICE.

JOHN HOWARTH AND NATHAN FRYE JONES, OF ANDOVER, MASSACHUSETTS.

FLIER AND SPINDLE FOR SPINNING AND TWISTING COTTON AND OTHER FIBROUS MATERIALS.

Specification of Letters Patent No. 1,043, dated December 28, 1838.

To all whom it may concern:

Be it known that we, JOHN HOWARTH and NATHAN F. JONES, of Andover, Essex county, Massachusetts, have invented new and useful improvements of machinery for spinning cotton and twisting silk, wool, flax, and such fibrous materials to which the same are applicable, which improvements, the principles of the same, and manner in which we have contemplated their application, together with such parts or combinations we claim as our inventions and hold to be original and new, we have herein set forth and described in the following specification and accompanying drawings, to which we have herein referred.

We shall first proceed to describe an improvement, which may be, applied to the common cotton throstle or spinning frame.

Figure 1, Plate 1, exhibits an improved flier. A, A, are cross bars of metal, attached to the necks or tubes B, C. The neck C of the flier, has a bearing at *a* in the rail D, D. The neck B, on which is a wheel or pulley E, turns freely on the step pin F, G. The pin F, G, operates through the bearing rails H H, I I, and has a screw, with a nut —C— on one end operating against a wound circular spring, the one end of which spring is attached to the pin F, G, and the opposite end rests against the side of the rail I, I, as seen in the drawings, the spindle K L, rests in the steps at K, L, in the ends of the pin, F, G, and tube —C—. The spool M, on the spindle K, L, rests on a shoulder *d* of the spindle, and should be made to run quite easy thereon. There is a hook —*f*— on one or both arms of the flier, which hook is more clearly represented in Figs. 1 and 2, Plate 1. A projecting arm *g*, from this hook moves in a groove —*h*, *h*,— in the inside of a ring N, N, while the flier is revolving. The surface of the groove must be very finely polished in order that the end of the arm —*g*— may traverse freely in the same. The ring N, N, is secured to a vibrating rail, O, O.

While the flier revolves, the arm *g* of the hook *f*, is kept in the groove *h*, of the ring N, by the action of the centrifugal force. The yarn passing diagonally through the tube C, is hitched over a hook *e* on one of the sides of the flier, and thence continues over the hook *f* to the spool M. The rail O, O, being vibrated carries the ring up and down, and distributes the yarn on the spool. This flier is only intended to run in a perpendicular position, the end K of the spindle being downward.

In order to regulate the winding of the thread on the spool, by friction, the screw C may be turned, so as to cause the step F, to press against the point K of the spindle, and they increase the friction if necessary; so that the spindle may be retarded, to sufficiently enable the spool or bobbin to take up the thread as fast as the same may be spun.

Fig. 4, Plate 1, is a flier of the ordinary kind now in use, with our improved spindle attached to it. A is the spindle and B, B, the flier. The flier B, has its two sides fastened at their upper ends, into a neck D, and their lower extremities into a cross bar R, R, on the neck F. A wheel or pulley *a* is placed on the neck F, for the purpose of driving the flier. The neck F, rests on the cross rail P. The step pin K, K, passes up through rails N, N, the vibrating rail O, O, the stationary rail P, and wheel or pulley F, to point of spindle A at V. H H is a long tube or ferrule resting on the vibrating rail, O O. This ferrule incloses the step pin, and passes through the neck F, to the spool, the spool resting on the top of the same. As the vibrating rail O, O, rises and falls, the ferrule H, lifts and lowers the spool for the purpose of distributing the yarn thereon. The spool is caused to wind or take up the yarn, by the friction, which it has by resting on the top of the ferrule H, or by the interposition of a washer of leather or cloth between the same. The thread passes through the neck D of the flier to the spool, as in the figure.

Our next improvement is represented by Figs. 1 and 2, Plate 2, and in this description: Fig. 1 is an elevation and Fig. 2, is a section. A, A, is a spindle, resting at its lower end in the end of the step pin B. This step pin B, is supported by the rails, C, C, D, D, and has a wound circular spring E inclosing it with a nut F, and screw similar to those before described in Fig. 1, Plate 1. The upper end of the spindle rests and turns in a bearing or step G. H H, is the spool placed on the spindle, and resting on the vibrating rail I, I. K, K, is a tube supported and turning in suitable bearings in the rails L, L, M, M. The wheel or pulley

N, is placed on the tube K, K for the purpose of driving the flier. A circular plate or cross bar O, O, is attached to or near the extremity of the tube K, K; and flier legs P, P, of the shape seen in the drawings, are screwed into, or otherwise properly attached, to this plate. To one or both of these flier legs small hooks R, R, are affixed. The spindle should be formed of an equal diameter throughout, and polished very smooth, to allow the spool to move on the same, while raised and lowered by the vibrating rail, I, I. Suitable washers of leather or other proper material may be interposed between the lower head of the spool, and the upper surface of the vibrating rail, in order to furnish sufficient friction, to retard the spool while the flier revolves, and causes it to take up the yarn as fast as spun or delivered from the drawing rollers. In order to remove the spool from the spindle, it is only necessary to pass down the step pin and take out the spindle, the front part of the vibrating rail being cut away at the bearing, for this purpose, as seen in the figure. The spool can then be taken off and another substituted whenever necessary. The thread or yarn passes from the drawing rollers into the top of the tube K, K, thence through the tube, coming out at the lower ends, and passing over the guide hooks R, R, on the flier leg, to and around the spool.

Figs. 3 and 4, Plate 2, represent our next improvement. A A, B B, are two rails, supporting the step pin C, with a regulating nut D, and wound circular spring E, as before described in Fig. 1. The lower end of the spindle F, G, is formed conical or in any other proper manner, and rests and turns on the step in the top of the step pins.

The upper ends of the spindle rests and turns in the step H, near the top of the tube I, J, as represented in section in Fig. 4. I J, is a long tube, supported and revolving in suitable bearings in the cross rails K K, L L, and sustained at its top by a shoulder M as seen in Figs. 3, and 4.

The lower part of the tube I, J, has a trumpet or other proper shaped mouth N affixed to it and in this trumpet mouth there may be a flanch O, O, of suitable shape as represented by the figure, which flanch, with the surface of the trumpet mouth, serves the purpose of a pulley, for the band to run on, which drives the tube during the operation of spinning. Or instead of the same, there may be a pulley affixed to any proper part of the tube. P, R, is the bobbin which rests on the vibrating rail S, S, moves freely on the spindle and has a retarding friction applied to the same, as before described in the last mentioned improvement. The thread or yarn passes into the center of the tube at its top, thence, running out through the circumference near the top as seen in the figures, it is wound once or more around the outer surface of the tube and enters the tube again at T. From thence it goes over a hook U to the bobbin P, R. The front part of the vibrating rail, where the spindle passes through said rail, may be cut away so as to allow the spindle to be easily removed when the stop pin is depressed, in order to take off the bobbin, when filled with yarn, and substitute another and empty one in its place.

We shall now proceed to explain those of our improvements, we consider of the most importance, in spinning materials of a fibrous nature, and these are exhibited by elevations and sections in Figs. 1, 2, 3 and 4 of Plate 3.

A B, Figs. 1 and 2 is the spindle having a metallic shoulder C attached near its lower part, and also a journal D, which is supported and turns in a suitable bearing in the vibrating rail E E. This spindle is slightly conical or tapering, as seen in the drawings, and has a small metallic roller F on its upper end. G H, is a tube of metal, the interior of which is polished very smooth, and should be in its internal diameter of uniform size or bore in that part of it through which the roller F, is vibrated to and fro, during the operation of spinning, and revolutions of the tube G H. The tube G H, is driven or caused to revolve, by a pulley or whirl I, attached near its top, or any other proper part thereof. It rests and turns in suitable bearings in rails K K, L L, and has a circular plate or bar M M, connected to its lower extremity.

To the plate M, M, the flier legs N N, are screwed or otherwise properly affixed. These flier legs should be formed tapering, that is to say, larger in diameter at or near their tops, than at their lower extremities, and should have a shoulder O, on each, where it rests against the lower surface of the plate M M, for the purpose of strengthening them or preventing them from spreading or being thrown outward by the action of the centrifugal force while revolving. Small hooks P, P, are attached to each flier leg the tube G H, is sustained during its motion in the bearing of the rails K, K, L L, by a shoulder R, attached to its top, said shoulder resting on the upper face of the upper rail K K. The spindle may be retarded, so as to cause it to take up the yarn, as the same is spun by the interposition of a washer S, or washers of cloth or other suitable substance, between the shoulder C and the upper face of the vibrating rail E E. The yarn as it comes from the drawing rollers, enters the center of the top of the tube as seen in Fig. 1, thence, it is passed out of the tube near the top through proper openings on either side as represented

in Fig. 2 at *a b*, and after being wound once or more times around the outer surface of the tube it enters the same again at C near the lower bearing. The tube is sufficiently enlarged at this part thereof (as represented in the drawings), so as to allow the thread or yarn a clear space to move freely between the spindle and internal surface of the tube. The yarn, after leaving the lower extremities of the tube is passed over the hooks P P, and from these to the spindle. In this improvement no spool or bobbin is used, the thread being wound, and the cop R′ produced directly on the spindle. The cop R′ when formed may be easily taken off from the spindle which latter is constructed tapering for this purpose, the spindle being of course removed from the tube prior to this operation. In order to remove the spindle, when the vibrating rail is at its lower position, it is only necessary to lift the spindle out of its bearing, in the rail, and drawing it a short distance sidewise it may be easily taken away, and replaced after slipping off the cop. Should it be desirable to place a spool or bobbin on the spindle, this may be done, and the yarn wound on the same instead of the spindles, but if it is preferred to wind on the spindle, and have the flier legs N N, much shorter they may be reduced to about the length of the conical part of the cop, we wish to build on the spindle. This will be readily understood by the mechanics versed in spinning machinery.

The next of our improvements in their order is shown in Figs. 3 and 4, Plate 3 and is thus described.

A B is a long metallic tube (with a trumpet or other proper shaped mouth —*c*—) similar in all respects to that before mentioned and represented in Figs. 3 and 4 Plate 2, with one exception, viz, that of being somewhat smaller in diameter. It may be driven or caused to revolve by a band passing around a pulley or whirl attached to any proper part of it; or a flanch D, D, may be placed on the trumpet mouth, so as to form with said trumpet mouth a pulley over which the bands may be stretched. The spindle has a small friction roller *x*, on its upper end, and is constructed in every other respect like that on the last mentioned improvement, or seen in Figs. 1, and 2. The tube A B, is supported and turns in suitable bearings in the cross rails E, E, F, F. The spindle rests on the vibrating rail G G, and friction is applied to it in order to cause it to take up the yarn, by interposing a washer, *s*, or washers, of proper size and material, between the shoulder H, and upper face of the vibrating rail. As the yarn leaves the drawing rollers it enters the center of the top of the tube, passing out of either of the openings, I I, just under the rail E E, it is wound one or more times, around the outer surface of the tube, and is then returned to the interior of the tube through the opening K, and thence continues downward close to the inside surface of the trumpet mouth, to and over either of the guide hooks L, M, to the spindle on which it is wound by the revolutions of the tube, and movements of the vibrating rails, which supports and carries the spindle. When the cop N′, is formed the spindle may be removed, and another substituted, in a similar manner to that heretofore mentioned in the last described improvement.

In these two last improvements, the motions of the vibrating rail can easily be varied by the machinery which regulates it, operating so as to give the cop any desired shape on the spindle, which will be readily understood by mechanics who manufacture spinning or throstle frames. The bearings and shoulders of the foot of each spindle may be arranged differently, or as represented in Fig. 5, Plate 3, where A is the foot of the spindle, with a conical or other proper shaped end, resting and revolving in a step B, of the vibrating rail C. D, is the shoulder or metallic washer, as before described, on the spindle. This washer is not fixed to the spindle, as in the other cases, but is loose thereon, and is prevented from slipping or revolving on the spindle, by a pin E, which passes through the spindle, and rests in the groove of the washer, but at the same time will revolve with the spindle. Thus, it will be seen that the foot of the spindle, is supported in the metallic step B, and that the shoulder D, rests independently of the spindle on the cloth washer F. If desirable to increase the friction, circular rings of metal may be dropped over the spindle, and resting on the shoulder D, will cause said shoulder to press with greater force or weight on the washer, and thus increase at pleasure the friction necessary to retard the spindle, to cause it to take up the thread, as given out and spun from the drawing rollers.

Should the yarn break during the operation of spinning, the process of passing the thread from the cop, thorugh and around the spinning tube, and mending or attaching it to the thread from the drawing rollers, is very simple and is thus effected. By explaining the mode of piecing the yarn of any one of my improvements it will be readily understood in all the rest, as the operations are very similar.

Fig. 6, Plate 3, represents a long wire, with a small hook —*a*— on one end as seen in the drawing. When the thread breaks, the hooked ends of this wire is passed down the inside of the trumpet end of the tube, (see Figs. 3 and 4, Plate 3), through either of the openings K, just above the bearing rail

F, F. The thread from the cop after being passed over one of the guide hooks on the lower circumference of the trumpet mouth, is hitched over the hook —*a*— of the wire, and drawing it upward through the opening K, and winding the threads around the tube, one or more times, the opposite —*b*— of the wire is passed through either of the openings I, and the center of the top of the tube, and the thread on the hook is thus fastened to the thread from the drawing rollers, thus the operation is completed.

To the improvements represented in Figs. 3 and 4 of Plate 2, there should be attached a vibrating rail or rails A, A, connected together as seen in Fig. 7 of Plate 3, through which a step pin C passes on which the spindle B is to rest.

The step pin and all the apparatus connected thereto is precisely similar to those before described in Figs. 1, 2, 3, and 4 of Plate 2. This is necessary to enable the operative, to find and piece the thread, (when the same is broken on that part of the cop above the trumpet mouth of the tube, which is effected by pressing the spindle B down on the step pin C, the elasticity of the spring restoring the step pin to its proper position after the desired operation is completed. The points of the spindles, which rest on the step pin, may have either of the shapes represented in Fig. 7.

Instead of retarding the spindle by friction created by means of a washer and shoulder attached to the same as before described in Figs 1, 2, 3, and 4, of Plate 3, we apply what we denominate a fan friction which is described as follows: To any proper part of the spindle there may be attached a rectangular or other proper shaped piece of tin, brass, copper or any other suitable metal or material (as seen at D, Fig. 7) which when the spindle revolves acts against the atmosphere and retards the same uniformly and sufficiently to enable it to take up the yarn or thread as fast as spun or twisted and delivered from the drawing rollers. This can be applied alike to spindle, spool or bobbin. By varying the size of this piece of metal it will be readily perceived that the retarding of the spindle, &c., may be regulated.

There may be other methods of sustaining the top of the spindle beside that represented in Figs. 2, and 4, Plate 3 one of which is as follows: Immediately above the holes C and K Figs. 1, 2, 3 and 4, Plate 3 through which the thread passes to the inside of the tube, there is a collar (represented by dotted lines in Figs. 2, and 4) Plate 3 firmly fixed to the internal surface of the tube, with a hole in the same, sufficiently large for the spindle to pass through and turn in the same. This arrangement supersedes the necessity of a tapering shaped spindle, and likewise the roller on the top of the same, the spindle being of uniform diameter throughout its length.

In order to check the revolutions of a single tube or flier (while the machinery is in motion) (to facilitate the mending of the thread) there may be applied a clamp screw of any proper metal and construction, working through the top rail and against the tube as represented in the figures of Plates 2 and 3, the operations of which will accomplish the desired effect.

The arrangements of machinery above described may be attached to any machine where a twisting apparatus is required, for the purpose of roving and spinning cotton or other fibrous material. The manner of attaching and driving the same will be readily understood by all mechanics acquainted with this king of machinery, and will not therefore require any description from us.

Having thus described and explained our improvements in the above specification and accompanying drawings we shall claim in the same as our inventions, as follows:

1. We claim supporting the top of the spindle during its vibrations or movements up and down, in an elongated tube (as represented in Figs. 1, 2, 3 and 4 of Plate 3) whether the spindle be provided with a roller at the end, fitting into the tube, or passes through a collar firmly fixed in the inside of the tube as herein described.

2. We claim the manner of applying the friction to retard the spindle, (in order to cause it to take up the yarn as the same is spun or delivered from the drawing rollers to be wound on the spindle), which we have herein above described and exhibited in Fig. 5, Plate 3.

3. We claim the manner of retarding a spindle, spool or bobbin, by a rectangular piece of metal or material, attached to the same, and operating against the atmosphere when in motion, the resistance of which creates a uniformity in the retardation of the same, as herein described.

In testimony that the above is a true description of our said inevtions and and improvements we have hereunto subscribed our signatures and affixed our seals, this twentieth day of September in the year eighteen hundred and thirty eight.

JOHN HOWARTH. [L. S.]
NATHAN FRYE JONES. [L. S.]

Witnesses:
JOSEPH T. ABBOTT,
SOLOMON H. HIGGINS.