

J. WHITEHEAD.  
SPINNING FRAME.

No. 453,271.

Patented June 2, 1891.

Fig. 1.

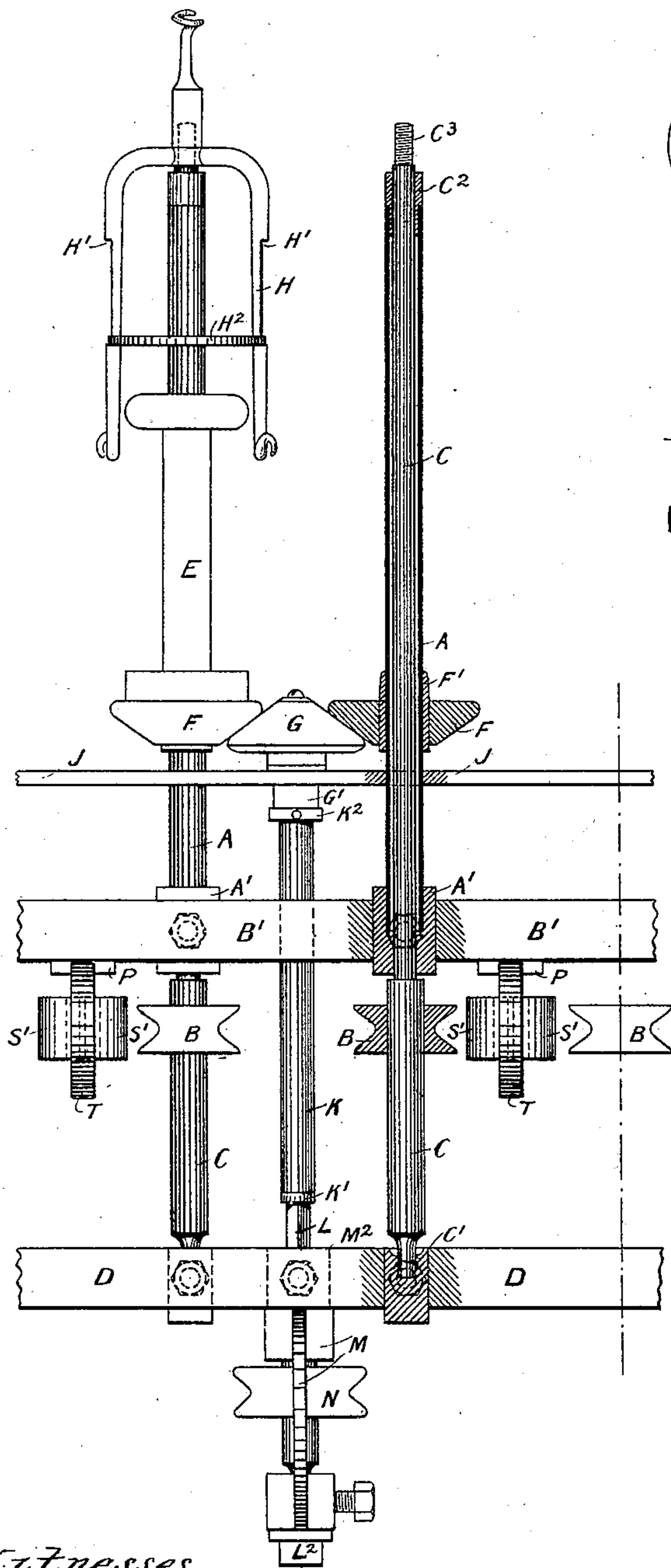


Fig. 3.

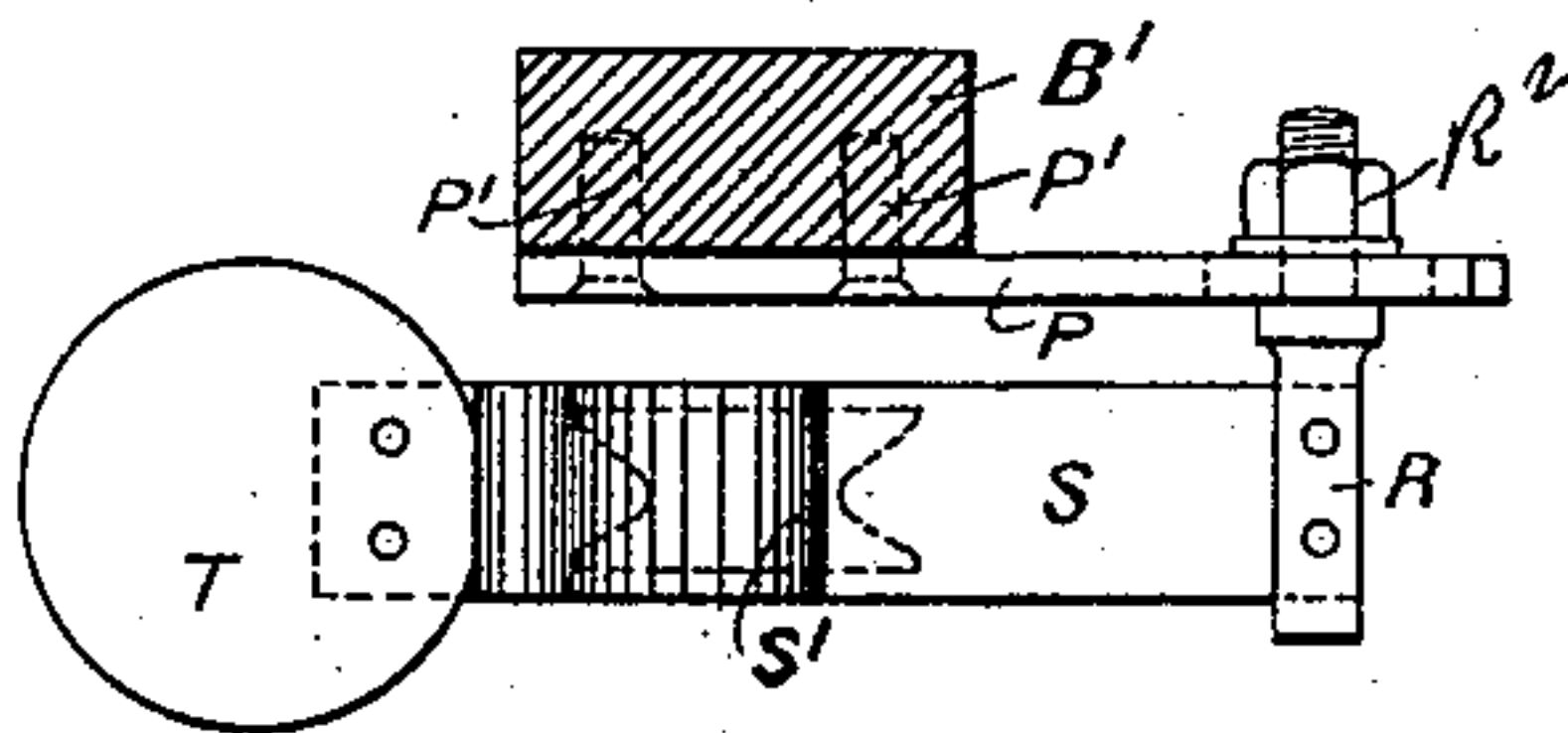


Fig. 4.

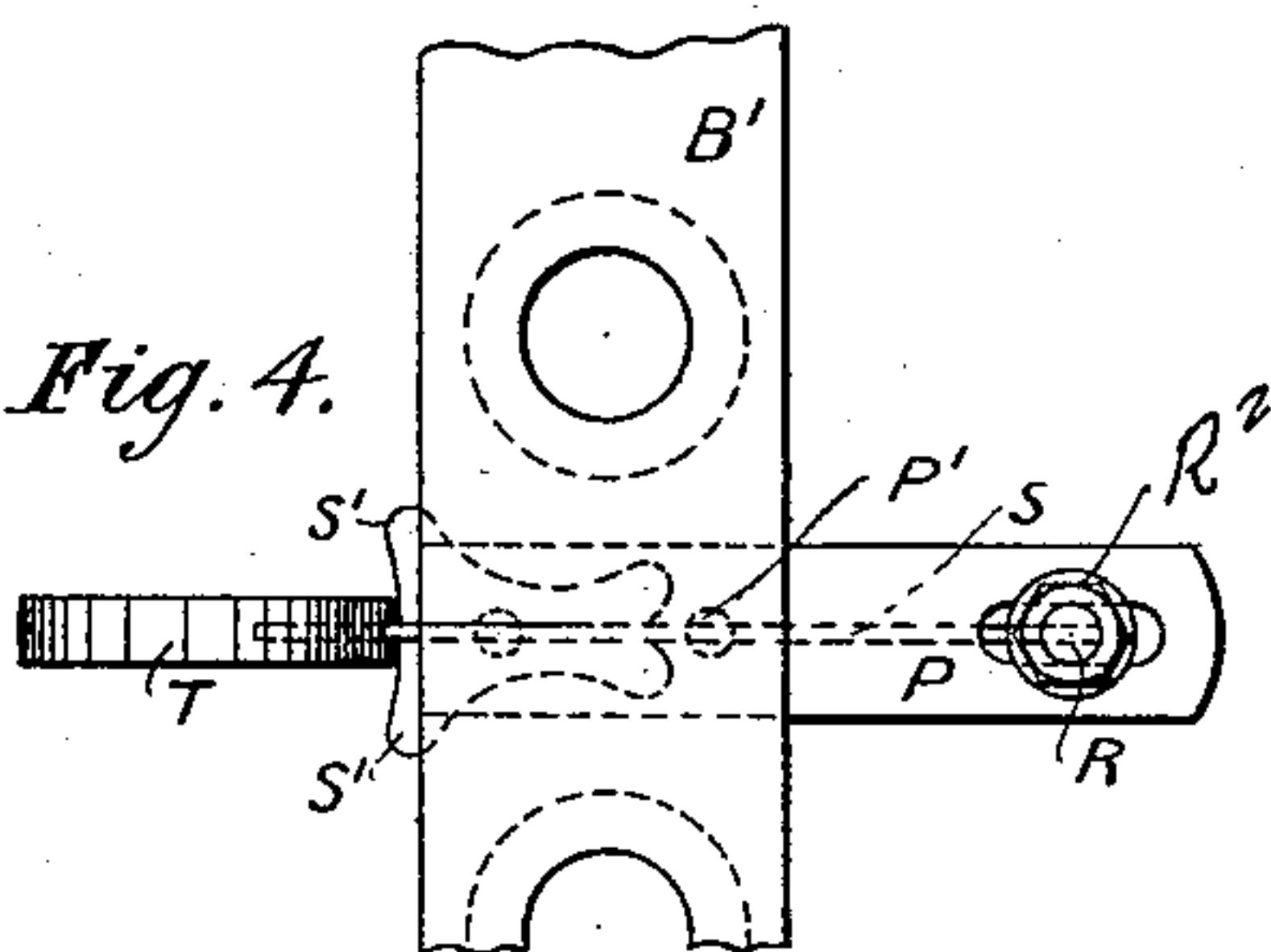
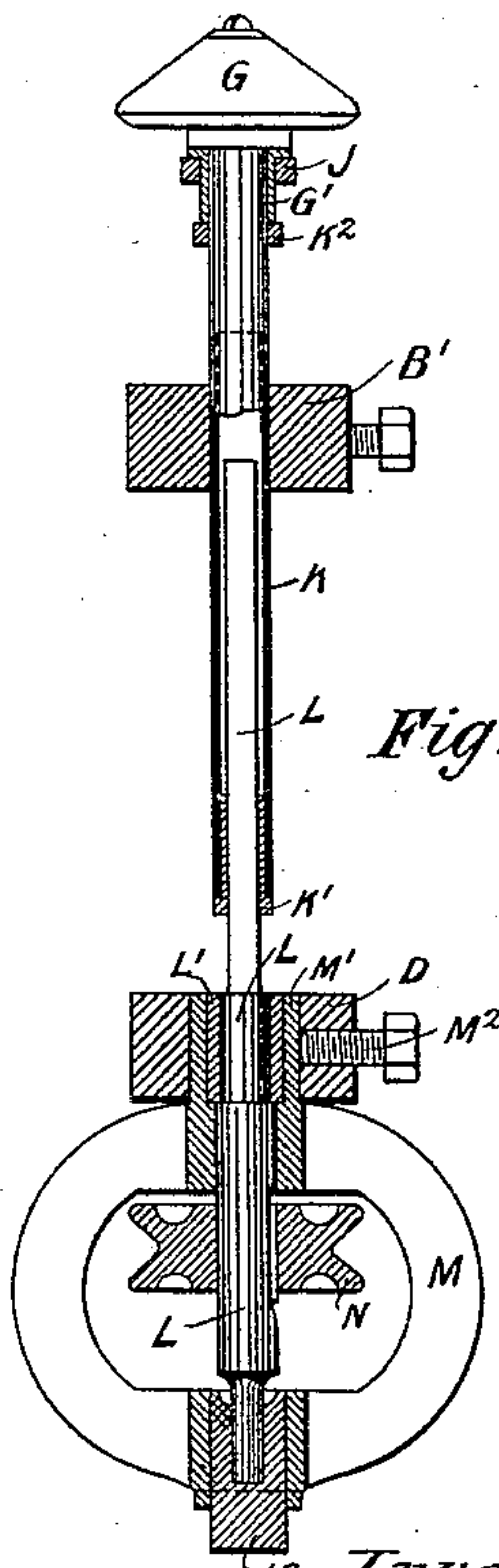


Fig. 2.



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(No Model.)

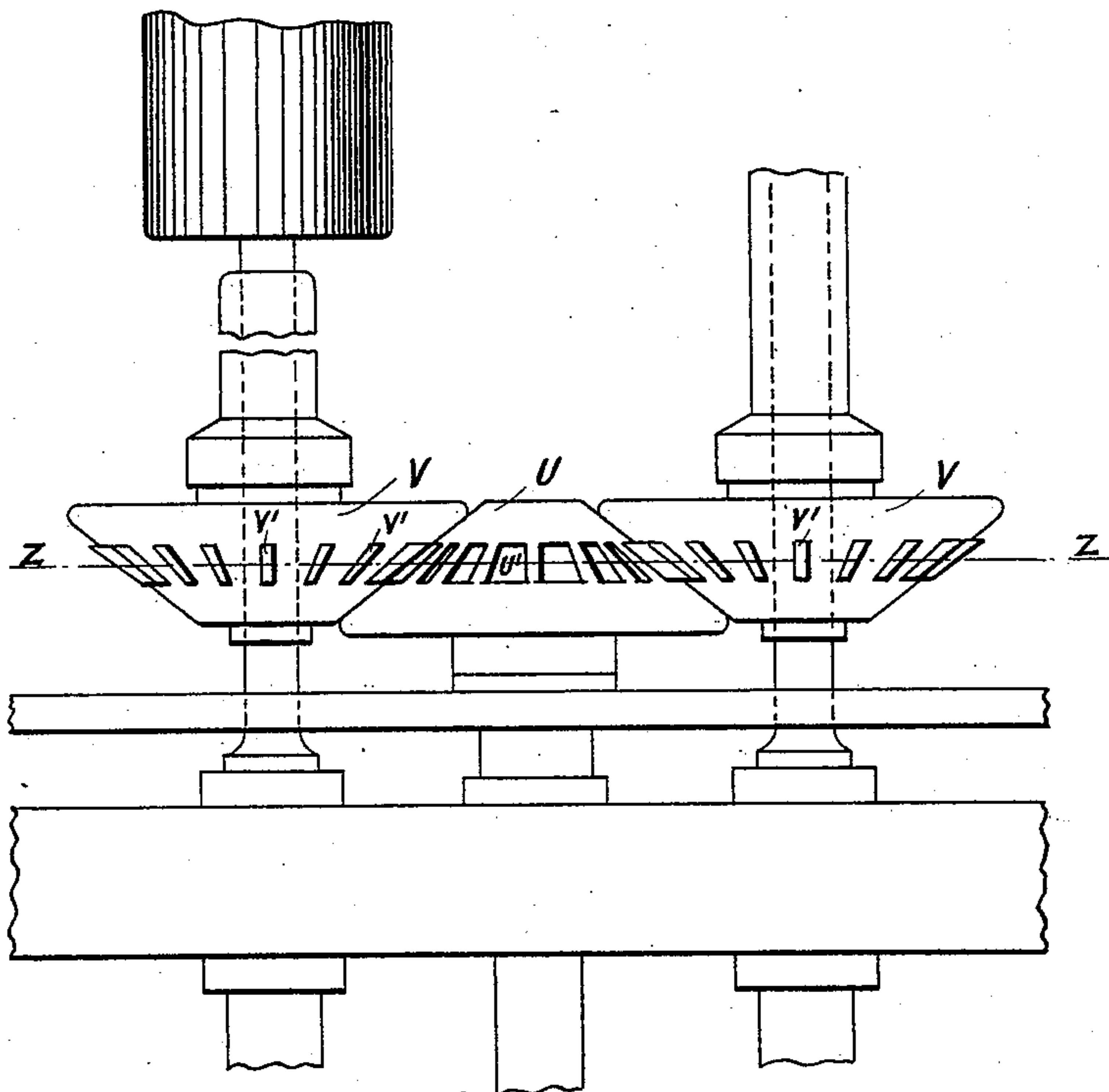
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SPINNING FRAME.

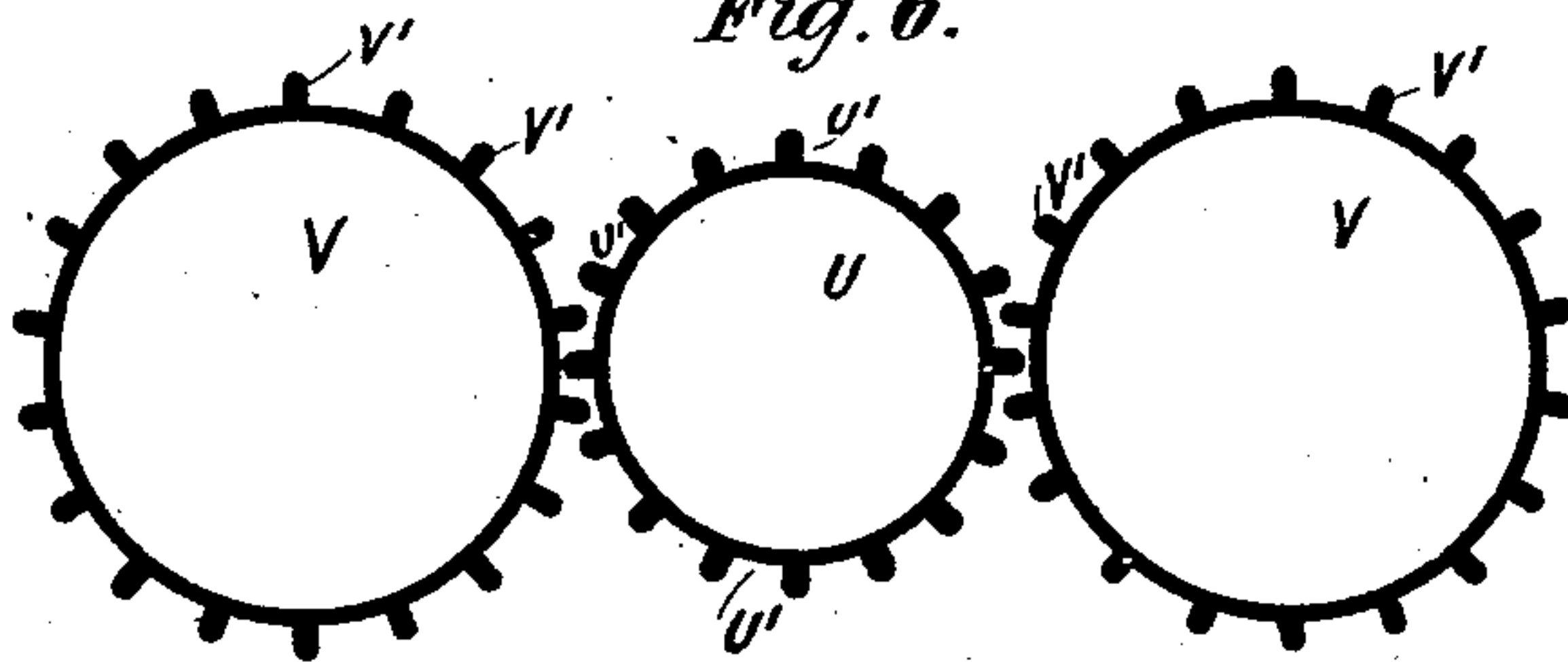
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*Fig. 5.*



*Fig. 6.*



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# UNITED STATES PATENT OFFICE.

JAMES WHITEHEAD, OF LEICESTER, ENGLAND.

## SPINNING-FRAME.

SPECIFICATION forming part of Letters Patent No. 453,271, dated June 2, 1891.

Application filed December 28, 1889. Serial No. 335,239. (No model.) Patented in England March 1, 1888, No. 3,130.

*To all whom it may concern:*

Be it known that I, JAMES WHITEHEAD, a subject of the Queen of England, residing at Leicester, in England, have invented certain new and useful Improvements in Spinning-Frames, (for which I have obtained Letters Patent of Great Britain, No. 3,130, dated March 1, 1888,) of which the following is a specification.

This invention relates to improvements in fly-spinning frames, parts of which are also applicable to cap-spinning, ring-spinning, or roving machinery employed in the spinning and twisting of worsted, cotton, and other yarns used in the manufacture of hosiery and for other purposes, and includes (a) an improved arrangement for driving the bobbin apart from the thread; (b) a brake motion for stopping each spindle separately, and (c) means for preventing the expansion by centrifugal action of the flier-arms when driven at a high speed.

In the accompanying drawings, Figure 1 is a view illustrating the foregoing improvements and showing two spindles, one in elevation complete and the other in section, having the flier and bobbin removed. Fig. 2 is a view, partly in elevation and partly in section, of the spindle from which the bobbins receive their separate motion. Fig. 3 is a side elevation of the improved brake, and Fig. 4 is a plan of same. Fig. 5 is an elevation, and Fig. 6 is a horizontal section on the line Z Z of Fig. 5, of cone-pulleys especially applicable for driving the spindles of cap-spinning frames.

The spindle is connected with and communicates motion to the flier, while the bobbin is carried or mounted on the tube, which is stationary, and thereby allows of a separate revolving motion being imparted to the bobbin, as is hereinafter described.

In Fig. 1, A is the tube, preferably of steel, having its bearing in a boss A', fitted in the spindle-rail B'.

Contained within the tube A and free to revolve therein is the vertical spindle C, supported by a bearing C' in the step-rail D and having a bearing in the boss A' and carrying a pulley B, from which it receives its motion. Part of the vertical spindle C is reduced in diameter, as illustrated in the spindle shown

in section, to enable it to pass through and clear of the tube A. The upper end C<sup>3</sup> of the said spindle C projects above the tube and is tapped or screwed to receive the flier H, a bush C<sup>2</sup> being provided at the top of the tube to minimize the vibration of the spindle C when being driven at a very high speed.

One part of the invention comprises means for imparting to the bobbin E a separate and individual motion altogether apart from that given to it by the thread. This is effected by mounting the bobbin E upon the tube A, which, being stationary, may be termed a "dead-spindle." Upon the lower part of this tube and fitting loosely to allow it to move up and down is a boss or bearing F', carrying an inverted cone F, which is driven by frictional contact with a cone-pulley G. A cone-pulley G, preferably covered with leather, is arranged between every two of the cones F, so as to drive them in the same direction, and has its bearing in a bush or journal G', fitted in the riser-plate J.

Connected to or formed integrally with the cone-pulley G is a vertical tube K, provided at its upper end with a loose collar K<sup>2</sup> and at its lower end with a bush K'. The bush K' is adapted to receive a small square spindle L, from which the tube receives its motion and upon which it is capable of moving up and down while revolving. The lower portion of the spindle L is of circular section and works in a bushing L', fitted in the boss M' of the bracket M, the latter depending from and being secured to the bottom step-rail D by means of a screw-bolt M<sup>2</sup>.

The spindle L is supported by and works in a foot-step bearing L<sup>2</sup> in the lower part of the bracket M and has keyed or otherwise secured thereon a pulley N, from which it receives its motion.

An alternative method of driving the bobbins, and one which is more particularly applicable to the driving of the bobbins in cap-spinning frames is illustrated in Figs. 5 and 6.

U is a driving-pulley, which may be mounted on a spindle and receive motion in a similar manner to the pulley G shown in Fig. 1. The pulleys V V, carrying the bobbins, are provided with teeth or projections V' to gear into openings or slots U' in the pulley U.



The upper and lower portions of the pulleys V V and U are constantly in frictional contact with each other; but if from any cause whatever they should momentarily get out of frictional contact the fact of the pulleys gearing into each other, as described, insures a positive movement and prevents any irregularity in the twist of the yarn.

Another improvement I effect in connection with this class of machinery consists in the provision of a brake for stopping or arresting the motion of any particular spindle without in any way interfering with the working of the adjacent spindles. The construction of the brake I employ for such purpose may be described as follows: To the under side of the spindle-rail B', I fix, by means of screws P', Figs. 3 and 4, a horizontal plate P, slotted at its outer end to receive and allow of the adjustment of a vertically-depending rod or pin R, in which is riveted or otherwise secured one end of a steel blade S, carrying on one or each of its sides a brake shoe or block S', of wood or other suitable material, hollowed or recessed, as shown in plan in Fig. 4, the outer end of the steel blade S being fitted into or upon a wooden disk or equivalent T. The pin R is held within the slot by the nut R<sup>2</sup>, screwing on its upper end. To bring this appliance into operation, the knee of the operator may be pressed against either side of the disk T, and the hollowed or recessed part of the block S' will be brought into contact with the pulley B, which drives the spindle C, and the latter will be instantly stopped. When the knee of the operator is removed from the disk T, the brake immediately releases itself and assumes its normal position, and the spindle, being out of frictional contact with the said brake, at once recommences to revolve. One of these brakes may be provided to act upon each spindle or be placed between every pair of spindles, as shown in Fig. 1. I prefer to adopt the latter method.

Another part of my invention relates to means for preventing the arms of the flier H expanding by centrifugal action when revolving at a very high speed.

A flier H embodying my improvements is shown in Fig. 1. A portion of the outer side of each of the flier-arms is cut away, thus forming a recess H', the extent of which is preferably about two inches in length and one-sixteenth of an inch in depth. A steel ring H<sup>2</sup>, or equivalent, is placed within this recess and is adapted to fit rather loosely, so as to render it capable of moving easily up and down when the arms are stationary; but when the flier commences to revolve the ring H<sup>2</sup> is carried round with it, and as the speed increases the flier-arms have a tendency to expand, thus causing the ring to fit tightly in the recess and thereby pinioning the arms and arresting their further expansion at whatever rate of speed the flier is subsequently driven. The ring being permitted

to move up and down in the recess in the flier-arms makes it very easy for the operator to find the end of the thread on the bobbin when piecing a broken thread. The ring is fitted loosely in the recess and may be moved by the slightest touch of the finger to any part of the recess while the thread is found. Thus should the end of the thread lie near the end of the bobbin, the operator simply pushes the ring along until it can be grasped, draws the thread out, and makes the proper connections without having to wait and pass the broken end through the ring, as has been necessary in this class of fliers having stationary rings. The outer edges of the flier-arms are oval-shaped, and the placing of the ring H<sup>2</sup> in the recess H' is effected by pressing the lower ends of the flier-arms toward each other and forcing the ring up the arms into the recess.

I claim—

1. In a spinning-machine, the combination, with the series of spindles carrying the fliers, of the bobbin-supports surrounding the same, the cone friction-pulleys on said supports, the independent co-operating cone-pulleys arranged between alternate adjacent bobbin-supports for imparting motion thereto, and telescoping supports for said drive-pulleys, whereby they may be elevated without interrupting the rotation of the parts, substantially as described.

2. In a spinning-machine, the combination, with the spindle and bobbin support, of the flier having its arms recessed, and the ring for preventing the expansion of the arms, located in said recesses, substantially as described.

3. In a spinning-machine, the combination, with the spindles carrying the fliers, of the brake located between adjacent spindles and mounted on a spring held in a rigid support, whereby the brake is automatically released when moved in either direction, substantially as described.

4. In a spinning-machine, the combination, with the frame B' and spindles, of the brake S', mounted on a spring S, held rigidly in an adjustable support R, substantially as described.

5. In a spinning-machine, the combination, with the spindles for the fliers and the power-spindles, of co-operating cone friction-pulleys mounted on said flier, and drive-spindles having centrally-arranged widely-separated teeth co-operating to drive the flier-spindles when the friction-surfaces are out of contact, substantially as described.

In testimony whereof I have hereto set my hand in the presence of two subscribing witnesses.

JAMES WHITEHEAD.

Witnesses:

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