

(No Model.) 2 Sheets—Sheet 1.  
E. DENBY, J. HELLIWELL, W. HILLARY & W. RILEY  
Spinning Machine, &c.

No. 243,525.

Patented June 28, 1881.

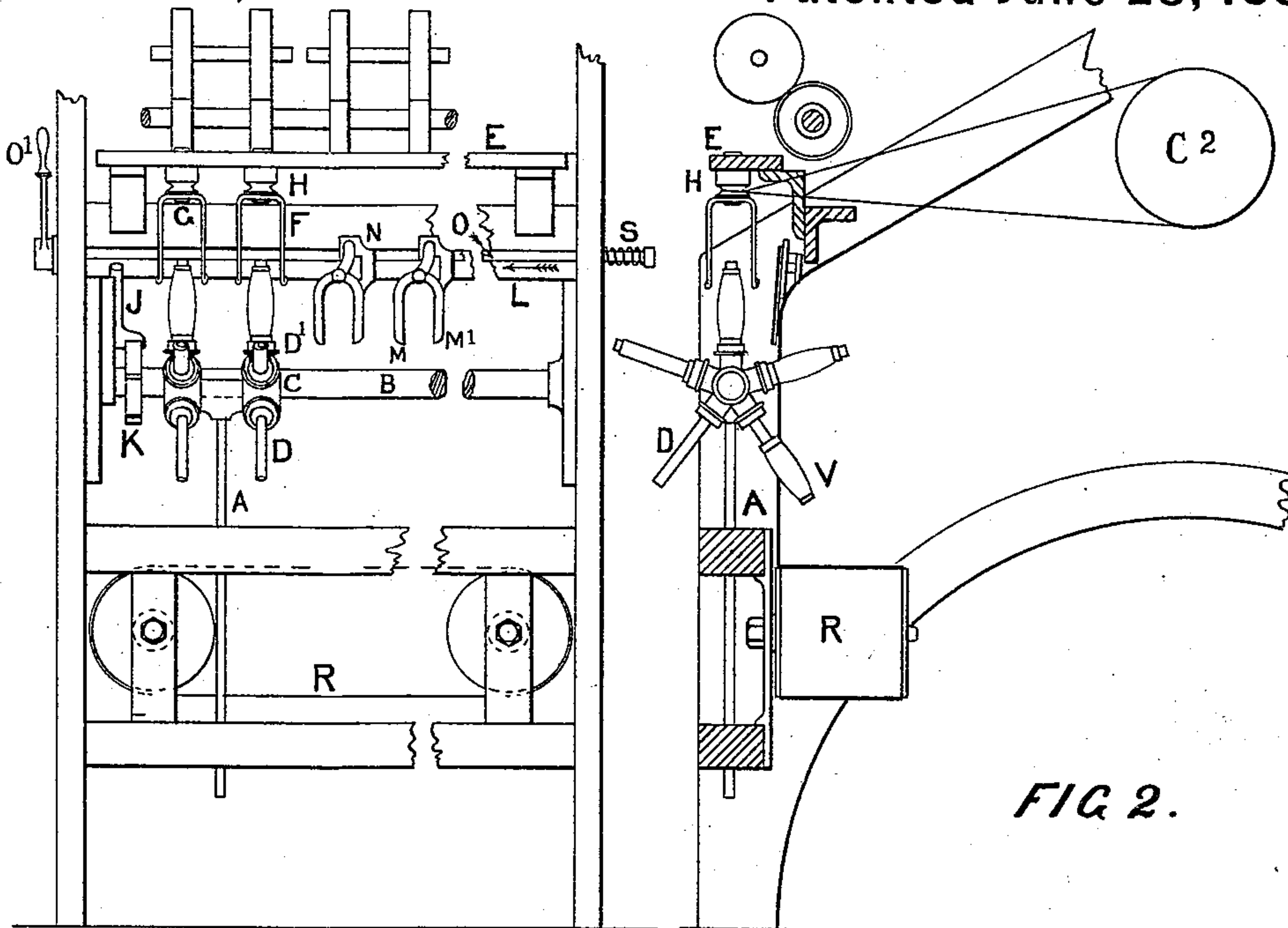


FIG 1.

FIG 2.

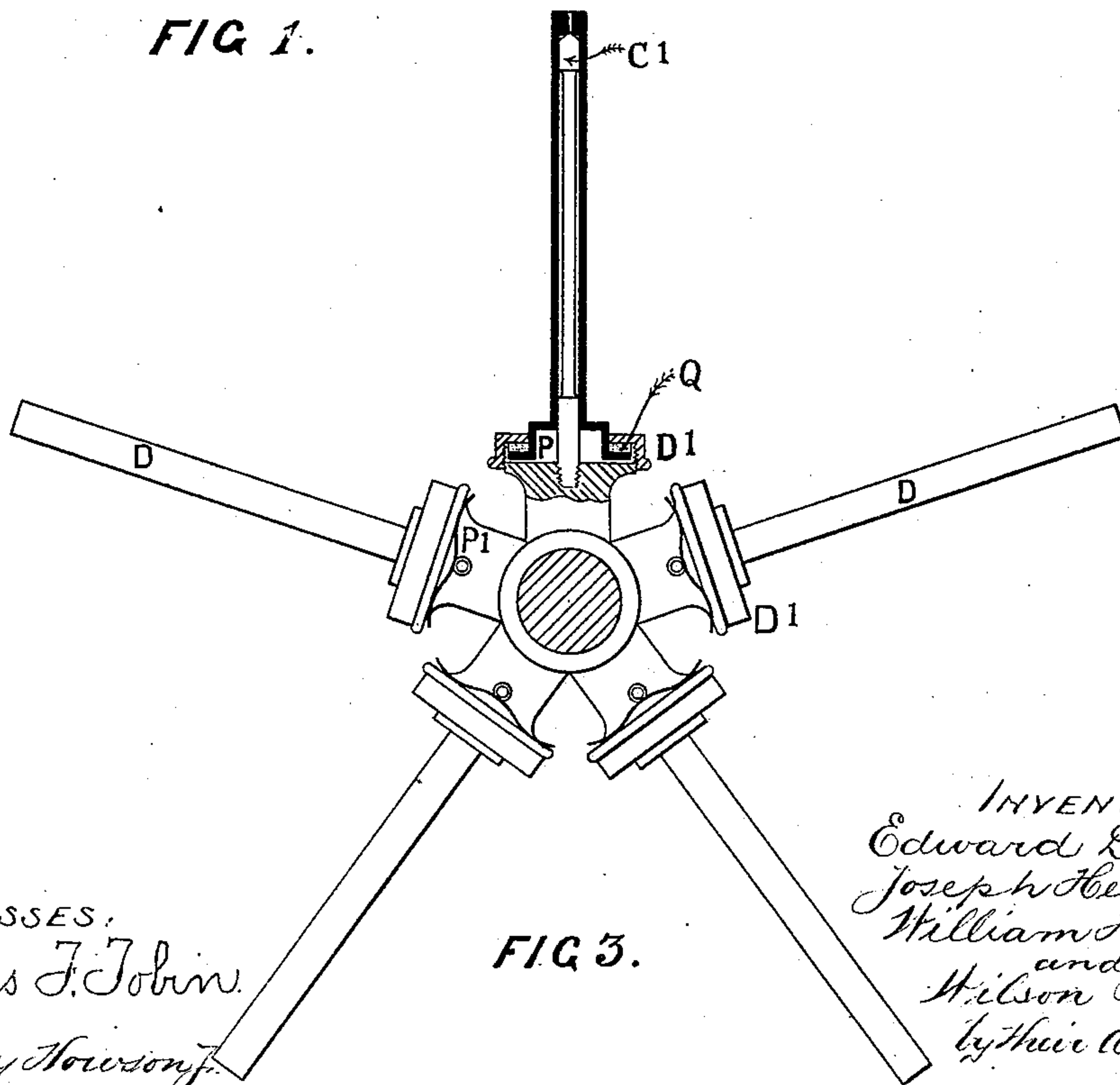


FIG 3.

WITNESSES:  
James F. Tobin.  
Henry Howson.

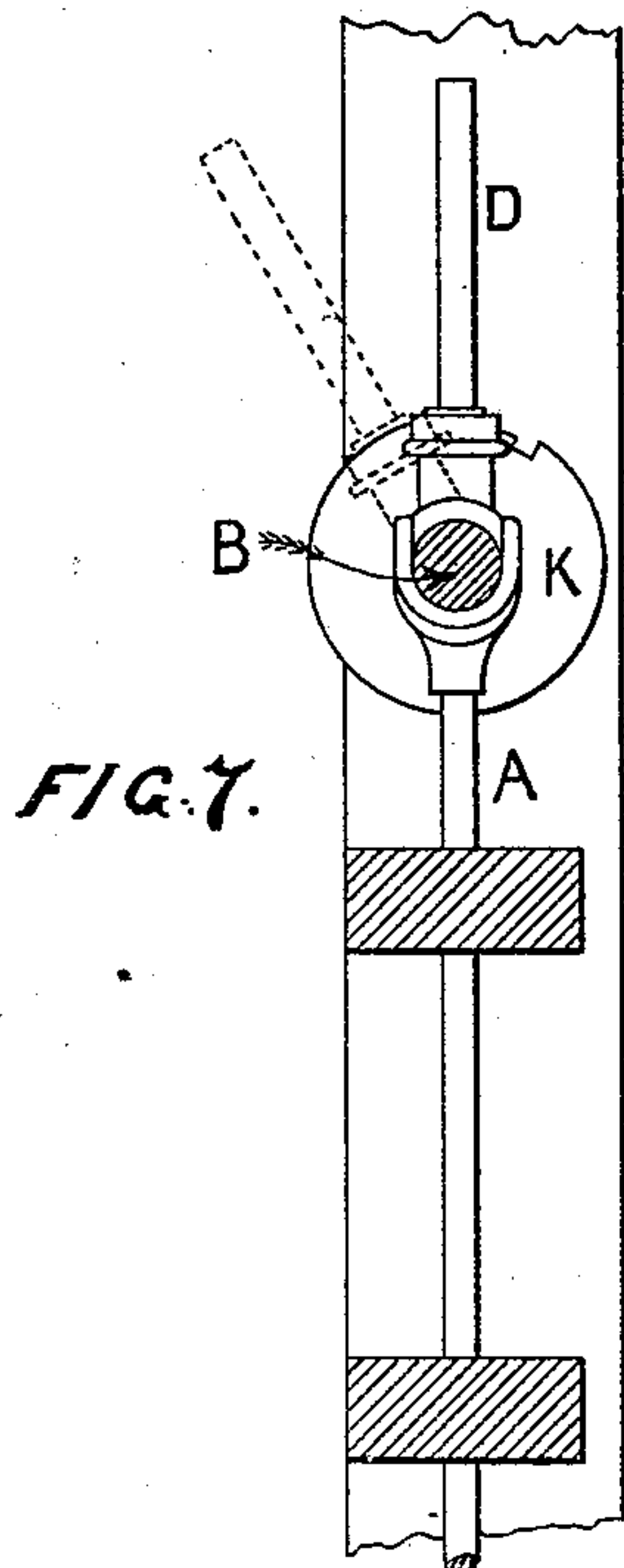
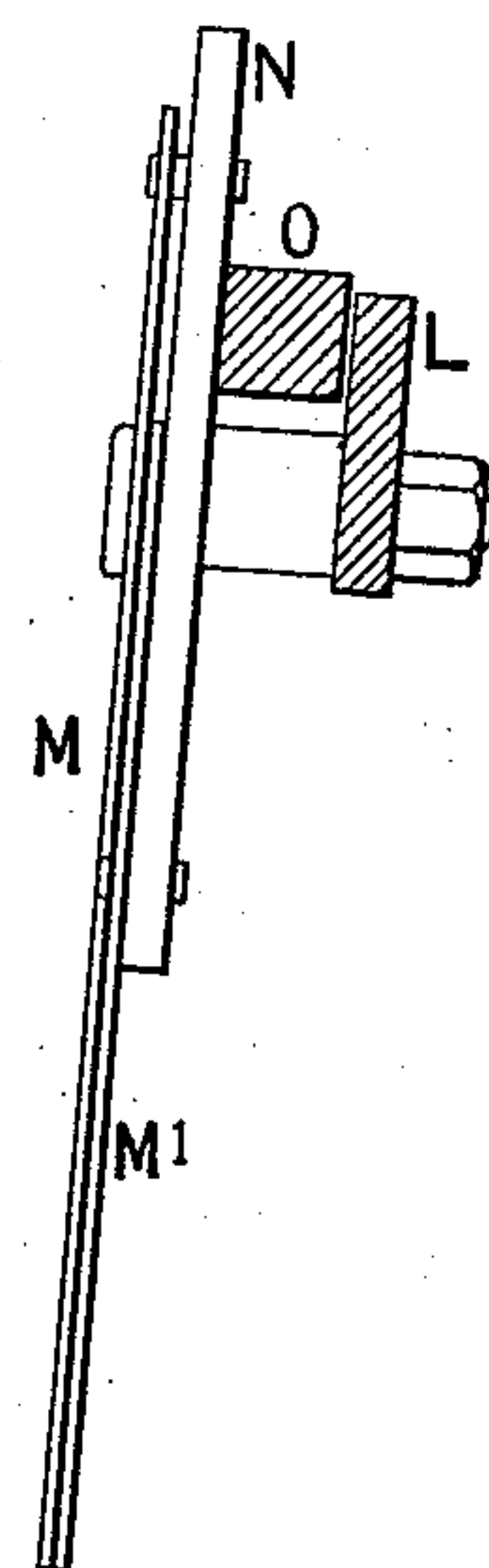
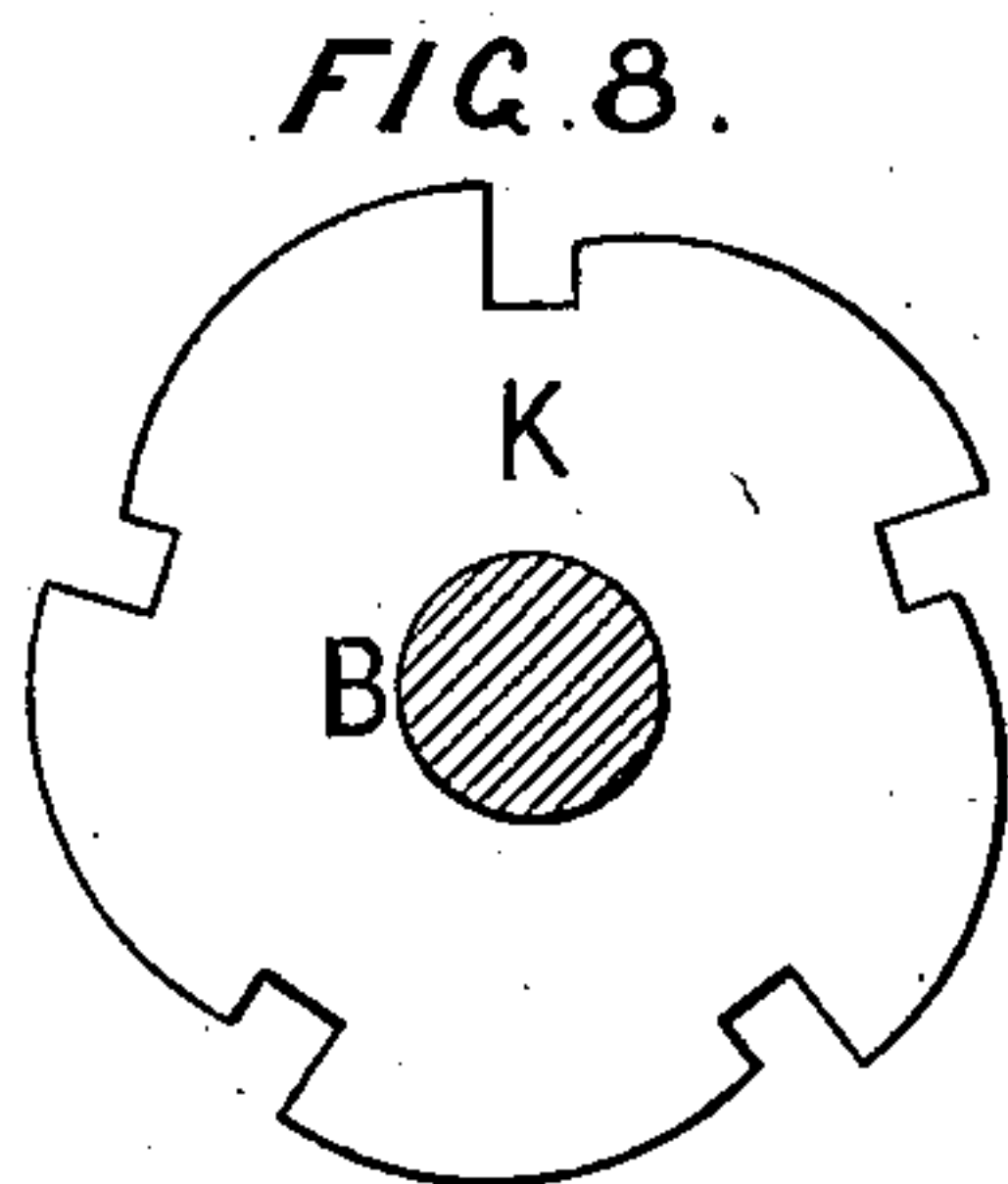
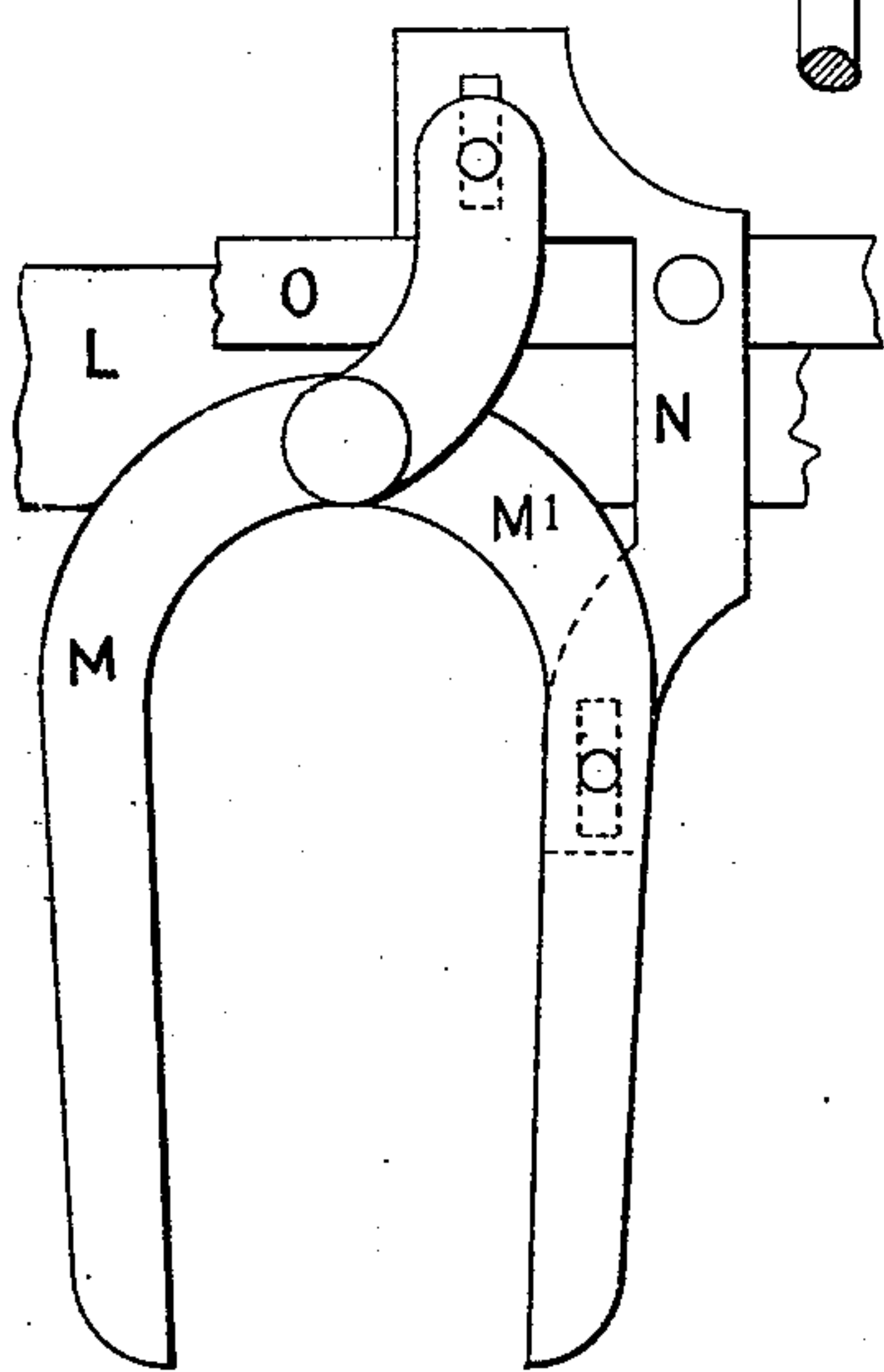
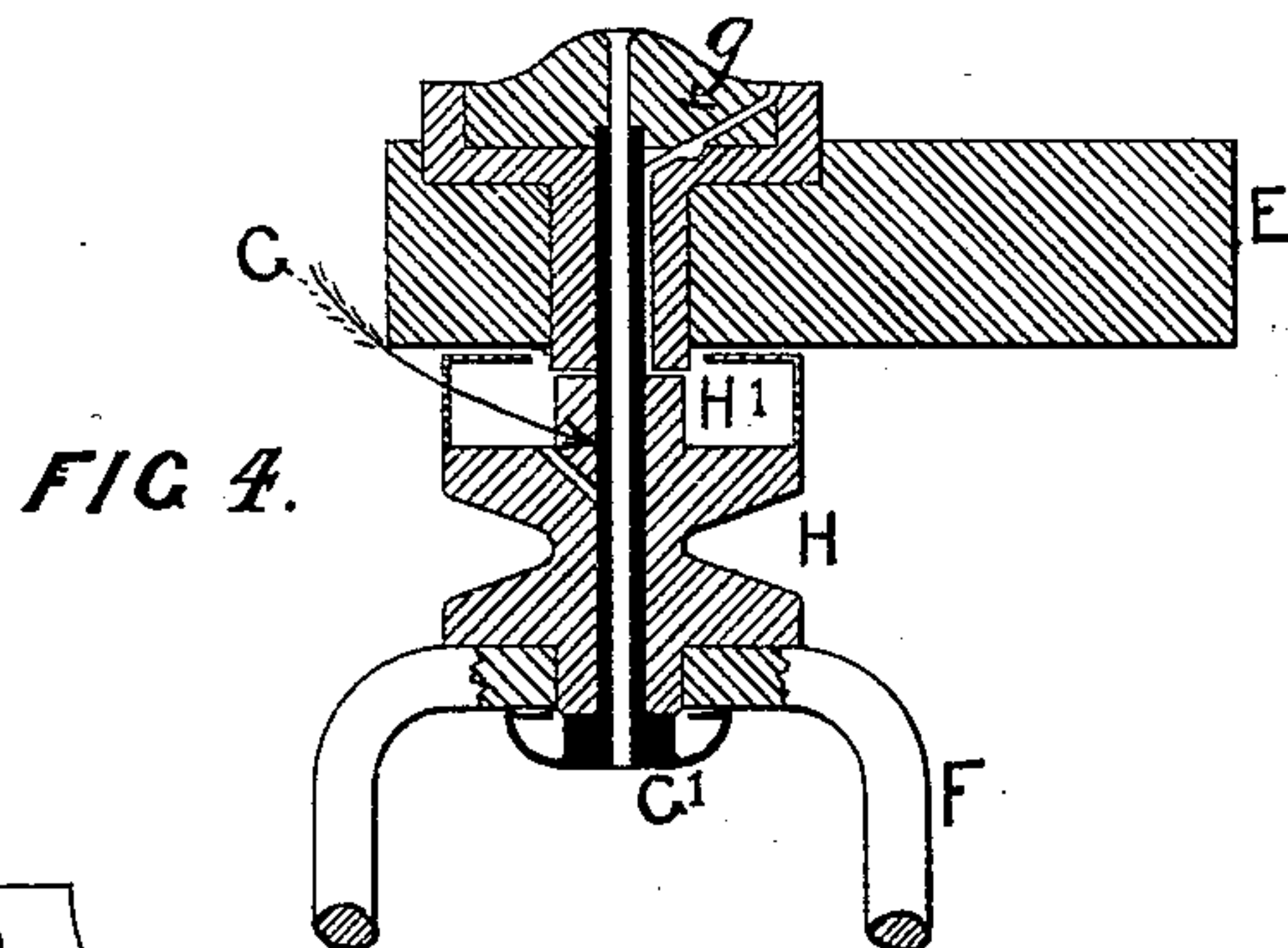
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Edward Denby  
Joseph Helliwell  
William Hillary  
and  
Wilson Riley,  
by their Attorneys.

Howson and Co.

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 William Hillary,  
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 by their Attorneys  
 Howson and Son



# UNITED STATES PATENT OFFICE.

EDWARD DENBY, JOSEPH HELLIWELL, WILLIAM HILLARY, AND WILSON RILEY, OF KEIGHLEY, COUNTY OF YORK, GREAT BRITAIN.

## SPINNING-MACHINE, &c.

SPECIFICATION forming part of Letters Patent No. 243,525, dated June 28, 1881.

Application filed October 18, 1880. (No model.) Patented in Great Britain January 26, 1880.

*To all whom it may concern:*

Be it known that we, EDWARD DENBY, JOSEPH HELLIWELL, WILLIAM HILLARY, and WILSON RILEY, all of Keighley, in the county of York, Great Britain, and subjects of the Queen of Great Britain and Ireland, have invented certain Improvements in Spinning-Machines, &c., (for which we have obtained a patent in Great Britain, No. 341, January 26, 1880,) of which the following is a specification.

The object of our invention is to arrange the spindles in spinning, twisting, roving, and similar machines used in the manipulation of fibrous materials in such a manner that the bobbins, when full of yarn or roving, can be what is technically termed "doffed" by mechanical means without having to disconnect the fliers, and to regulate the drag upon the fiber that the tension on the same, in its travel from the front rollers to the spindles, can be adjusted to suit the varying circumstances and nature of the fiber that is being manipulated. Such being the object of this invention, we will describe the particulars thereof, aided by the accompanying drawings, in which—

Figure 1 represents the front elevation of such portions of a spinning-frame fitted with our improvements as are required to make clear our invention. Fig. 2 is a transverse sectional elevation of the same. Fig. 3 is an enlarged view of one set or circle of spindles and tubes, one of which is shown in section; and Fig. 4 is a cross-section through the flier-rail and center of whirl, showing the manner in which we suspend the whirls and fliers.

The lifter-rods A are connected to the ordinary lifters in the usual manner. In the British patent No. 1,504 of 1853, for instance, is illustrated an arrangement of devices which may be employed for operating the lifter-rods. At the top of rods A we form journals, in which are mounted one or more shafts, B, secured together by any ordinary method. On these shafts are attached bosses C, the number varying according to the pitch of fliers and length of frame. To each of the bosses C are secured a number of fixed spindles, C', radiating from the center of shafts B, each spindle being covered by a tube, D, that is free to revolve thereon and kept in position on the spin-

dle by cap D', which is screwed onto projections on boss C. The tubes D and caps D' are more fully described hereinafter.

In place of the ordinary wire board we substitute bar E that extends the length of machine. The fliers F are carried by tubes G, that pass through the center of each flier-head and whirl H. These tubes G are each secured to and carried by a flange, g, having a bearing in a metal plate secured to the rail, as illustrated in Fig. 4. The whirls are revolved by ordinary bands in connection with cylinder C<sup>2</sup>, and the top of each whirl is recessed at H', for the purpose of lubricating tube G, to which communication is made by small holes from bottom of recess H'. This recess is partly covered by a thin plate which retains the oil, preventing the same being thrown off by the centrifugal force of the revolving whirl. The flange G' at bottom of tube G is recessed also. The fiber, after passing between the front rollers, is conducted through hole in the center of tube G to the revolving fliers F and spun onto the bobbins on vertical tubes D. When the bobbins are full of yarn ready to be doffed the frame is stopped and lifter lowered such a distance that the tops of vertical tubes D are clear of the bottoms of fliers F. The shafts B are then turned in the journals until the next series of spindles on which the empty bobbins have been placed are brought in a perpendicular position and secured by placing catch J in the top notch or indentation formed in the periphery of disk K, which is secured on shaft B. The lifter is then reversed, the shafts B and attachments raised, and by turning cylinder C<sup>2</sup> part of a revolution the yarn from the full bobbins is wrapped round the empty bobbins, now in a vertical position. The threads of yarn between the full and empty bobbins are then cut by means of a series of shears, details of which are shown in Figs. 5 and 6, which are actuated in the following manner:

The bar L is carried by suitable brackets, and extends the length of the frame. To this bar are attached, opposite to each circle of spindles and tubes D, a pair of shear-blades, M and M', each blade being connected to a small bracket, N, the blade M to the top portion and M' to the bottom portion. These



brackets are secured to rod O running the length of the frame, and to one end we attach lever O', which, when actuated, draws the rod O in the direction of horizontal arrow, bringing the blades of shears together and severing the threads of yarn. When the lever O' is released the spring S at end of rod O draws the same into its original position, opening the blades ready for cutting the yarn at the next doffing; but this cutting attachment forms no part of our invention. The machine is then ready to be put in motion, and when the bobbins are full of yarn another series of empty bobbins are brought to the top and the operation repeated. The first-mentioned full bobbins will have arrived at such an angle (shown in Figs. 2 at V) that they will slide off the tubes and fall onto an endless revolving cloth, R, which cloth will convey and deliver them into a suitable receiver.

In order to keep the tubes D in position on the fixed spindles, and at the same time regulate the drag, we form at the bottom of each tube a flange, P, true with the axis of the tube. Over this flange we place a cap, D', which screws onto a projection of boss C and is held in position by spring P' attached to the boss, and pressing against the roughened under side of cap D', so as to prevent the accidental unscrewing of the said cap. Between the top surface of flange P and the under side of cap D' we place a flexible washer, Q, which forms a cushion between the same. By screwing and adjusting the pressure of the cap D', compressing the flexible washer Q on flange P, the power required to revolve tube D on fixed-spindle C' will be in proportion to the pressure of cap D' on the said flexible washer, and the drag upon the fibrous material will be increased or diminished in proportion to the pressure that is put upon the said washer by the caps D'.

Our improvements are also applicable to machines for twisting yarns, and the *modus operandi* for carrying out our invention is the same as that already described for spinning.

When applying our improvements to roving-frames we construct the spindles, tubes, and caps in the same manner as those described, but instead of having a revolving shaft we mount a shaft at the top of lifter-spindles with only one set of spindles, which are in a vertical position when the machine is in motion.

Fig. 7 is an end view of shaft and spindle tube in a vertical position. The shaft is held by a catch fitting into notch in disk K. By raising the catch the spindles can be turned toward the operator, in the position shown by dotted lines, and doffed in the usual manner.

Fig. 8 is a detail of disk K that is secured on shaft B and used for the purpose of keeping the spindles in spinning-machines in a vertical position.

What we claim as our invention is—

1. The combination of the frame and the flier of a spinning and twisting machine with a rotary shaft having bosses C with fixed spindles C', and incasing-tubes D, adapted to turn on said spindles under the pull on the yarn, all substantially as set forth.

2. The combination of the frame and flier of a spinning and twisting machine with a rotary shaft carrying fixed spindles C', incasing-tubes D, and retarding devices for acting on said tubes, substantially as described.

3. The combination of boss C, fixed spindle C', and incasing-tube D, with screw-cap D' and yielding washer Q, as and for the purpose set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

EDWARD DENBY.  
JOSEPH HELLIWELL.  
WILLIAM HILLARY.  
WILSON RILEY.

Witnesses:

JOHN GILL,  
WILLIAM J. WAUGH.