

Aug. 19, 1924.

1,505,585

F. H. CLOUGH

SPINDLE OF COTTON AND THE LIKE SPINNING MACHINES

Filed June 12, 1922

Fig. 1.

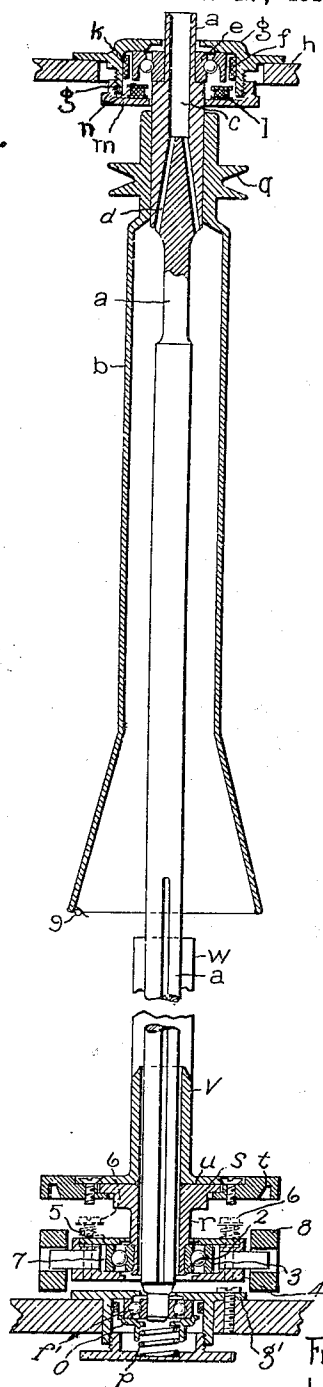
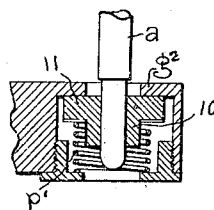


Fig. 2.



Inventor:
Frederick H. Clough,
by *Alfred H. Davis*
His Attorney

UNITED STATES PATENT OFFICE.

FREDERICK H. CLOUGH, OF HILLMORTON, NEAR RUGBY, ENGLAND.

SPINDLE OF COTTON AND THE LIKE SPINNING MACHINES.

Application filed June 12, 1922. Serial No. 567,722.

To all whom it may concern:

Be it known that I, FREDERICK HORTON CLOUGH, a subject of the British Empire, residing at Hillmorton, near Rugby, Eng-
 5 land, have invented certain new and useful Improvements in and Relating to the Spindles of Cotton and the like Spinning Machines, of which the following is a specification.

10 This invention relates to the spindles of spinning machines and more particularly to improvements in machines of the well known ring spinning type. In such machines, the thread or yarn is fed from rollers through
 15 a guide ring to the traveller which rotates on a ring carried by the ring frame round the cop or bobbin on which the thread is to be wound. In such machines twisting is obtained by the rotation of the traveller
 20 and the winding by the slight lag of the traveller relatively to the bobbin; the tension of the thread varies, being greatest when it is being wound on an empty bobbin or a bobbin of small diameter, and least
 25 when the thread is being wound on a full bobbin of large diameter. The speed of such a machine is limited as, at very high speeds, the tension on the thread becomes so great that the thread is liable to break
 30 and in view of this it is practically impossible to spin very fine threads.

The object of this invention is to improve this type of machine so as to permit of a higher speed of twisting and winding being
 35 used with less liability of breakage, so that very fine counts may be used, the tension of the thread being automatically regulated so as to be kept practically constant irrespective of the diameter of the bobbin
 40 on which it is being wound.

The present invention consists in making the spindle integral throughout and in mounting it in special bearings so as to permit of its being run at very much higher
 45 speeds than has hitherto been possible, for example at speeds of twenty thousand revolutions per minute or higher. The invention further consists in a novel method of mounting the bobbin on the spindle so that
 50 it is capable of relative motion thereto.

In the accompanying drawings Fig. 1 illustrates in sectional elevation one method of carrying this invention into effect, and Fig. 2 shows an alternative form of bearing
 55 for the spindle. In this drawing *a* represents a spindle to the upper end of which

is secured funnel or cap *b*. The upper end of the spindle is provided with a central aperture *c* from the lower end of which one or more outwardly extending holes *d* are
 60 formed, the lower end of these holes being in communication with the interior of funnel *b*. The spindle *a* is provided at its upper and lower ends with bearings, the upper one of which consists of a ball bearing
 65 or other suitable form of bearing the inner race *e* of which fits on the spindle while the outer race *f* is contained in a cup shaped member *g* provided with a flange by means of which it is secured to the stationary plate
 70 *h*. The outer race *f* fits loosely into the interior of the member *g* and is surrounded by a tubular washer *k* of felt, rubber or other compressible material. The upper edge of race *f* engages the interior of the
 75 member *g* and is held in frictional engagement therewith by means of a compressible washer or spring *l* held in engagement with the lower edge of the race *f* by means of a second cup-shaped member *m*
 80 screwed on to member *g*. The washer *l* is preferably provided with a metal bearing surface *n* on its upper or upper and lower sides. The bearing illustrated at the lower end of the spindle is substantially the same
 85 as that just described except that in this case the lower edge of the race *f'* engages with an annular member *o* which is forced upwards by means of a spring *p* so as to cause the upper edge of the race *f'* to frictionally
 90 engage the interior of the cup-shaped member *g'*. The spindle is driven by means of a belt passing around a grooved pulley *q* formed integral with or secured to the cap *b*. With bearings such as described the
 95 spindle may be run at very high speeds, as, if oscillations are set up owing to the high speed the bearings permit of the spindle moving laterally and taking up a new position the movement being opposed by
 100 the friction of the edges of the ball races which damps out the oscillation and prevents any tendency for it to continue or increase.

Fig. 2 shows an alternative form of bearing 105 for the spindle to that shown in Fig. 1. In this case the spindle *a* is surrounded by a bush or sleeve of graphite 10 provided with a flange 11 at its upper end which is held in engagement with the interior of the member
 110 *g*², by means of a spring *p'*. The flange 11 is capable of lateral movement but as de-

scribed in connection with the bearings illustrated in Fig. 1 this lateral movement is accompanied by considerable friction between the flange and the member g^2 which tends to damp out any oscillation of the spindle causing the movement. Bearings such as illustrated in Fig. 2 may be used either at the upper or lower end of the spindle in place of those illustrated in Fig. 1.

In order to admit of relative movement of the spindle and the bobbin which is mounted upon it I provide a sleeve r which surrounds the spindle a and is feathered thereon so as to be capable of longitudinal movement while running in synchronism therewith. This sleeve is provided with a flange s at its upper end which is frictionally held between an annular ring t and a flange u formed on a sleeve v which loosely surrounds the spindle a . In some circumstances either u or t may be slightly springy. A paper or other spool or quill w on which the thread is wound is fitted on the sleeve v which is made slightly tapered in order to hold it firmly. As shown the quill w is loose around the spindle a . The quill and spindle will tend to run in synchronism but means are provided whereby the quill w and sleeve v run at a slightly different speed from the spindle a to cause winding of the yarn on the quill. Secured to the lower end of sleeve r is the inner race 2 of a ball or other suitable bearing, the outer race 3 of which is held between a plate 4 and an annular washer 5 which are resiliently secured together by means of spring surrounded studs 6. An annular space 7 is provided around the race 3 so that the bearing is free to move laterally should oscillation of the spindle occur thus allowing it to take up a new position when the position of the spindle bearing alters. This lateral movement however is opposed by the friction between race 3 and plate 4 and washer 5 which assists in damping out the oscillation. Vertical reciprocating movement is transmitted to the sleeve v by means of the traverse frame 8 which is secured to the plate 4 in any convenient manner. This reciprocating motion allows of the thread being wound evenly on the quill. The slip between the sleeve v and the spindle may be controlled in any suitable manner, for example the tension of the thread may be caused to apply a brake either mechanically or electrically to the surface or periphery of the annular ring t .

The operation is as follows:—The thread is fed from the draft rollers through a ring which is mounted substantially vertically above the aperture d . It then passes down into the interior of the funnel b and from the lower edge through a suitable eye 9 on to the quill on which it is wound by the retardation of the sleeve v . The ring

through which the thread passes before entering the funnel is preferably mounted on a pivoted lever which operates the mechanism for applying the braking effect on the annular ring t and sleeve v .

It is to be understood that although the bearings described above are particularly suitable for spindles of spinning and the like machines they are not limited to this use as they are equally applicable to all types of spindles which are required to run at very high speeds.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. In a spinning or like machine, a spindle, a bearing at each end of the spindle, a loose sleeve mounted on the spindle between the said bearings, and a member rotated in substantial synchronism with the spindle and mounted on the spindle between the said bearings for longitudinal movement with the spindle for frictionally driving the said sleeve.

2. In a spinning or like machine, a spindle having a tubular end, a bearing at each end of the spindle, a loose sleeve mounted on one end of the spindle between the said bearings for driving a bobbin, a funnel secured to the other end of the spindle between the said bearings and through which the thread passes to a bobbin after passing through the said tubular end of the spindle, a member rotated in substantial synchronism with the spindle and mounted on the sleeve end of the spindle between the said bearings for longitudinal movement with the spindle for frictionally driving the said sleeve, and a brake for the said sleeve for regulating the tension of the thread wound on the bobbin.

3. In a spinning or like machine, a spindle, a bearing at each end of the spindle, and means for supporting the said bearings to permit the same to move laterally upon oscillation of the spindle and set up friction which damps out the oscillation.

4. In a spinning or like machine, a spindle, a bearing at each end of the spindle, means for supporting the said bearings to permit the same to move laterally upon oscillation of the spindle and set up friction which damps out the oscillation, a loose sleeve mounted on the spindle, and a member rotated in substantial synchronism with the spindle and mounted for longitudinal movement therewith for frictionally driving the said sleeve.

5. In a spinning or like machine, a spindle, a bearing at each end of the spindle, means for supporting the said bearings to permit the same to move laterally upon oscillation of the spindle and set up friction which damps out the oscillation, a loose sleeve mounted on the spindle for driving

a bobbin, a member rotated in substantial synchronism with the spindle and mounted for longitudinal movement therewith for frictionally driving the said sleeve, and a
5 brake for the said sleeve for regulating the tension of the thread wound on the bobbin.

6. In a spinning or like machine, a spindle having a tubular end, a bearing at each
10 end of the spindle, means for supporting the said bearings to permit the same to move laterally upon oscillation of the spindle and set up friction which damps out the oscillation, a loose sleeve mounted on one
15 end of the spindle between the said bearings for driving a bobbin, a funnel secured to the other end of the spindle between the

said bearings and through which the thread passes to a bobbin after passing through the said tubular end of the spindle, a member
20 rotated in substantial synchronism with the spindle and mounted for longitudinal movement with the spindle for frictionally driving the said sleeve, and a brake for the said sleeve for regulating the tension of the
25 thread wound on the bobbin.

In witness whereof, I have hereunto set my hand this twenty-fifth day of May, 1922.

FRED. H. CLOUGH.

Witnesses:

J. A. FOSTER,

DOROTHY WHITE.