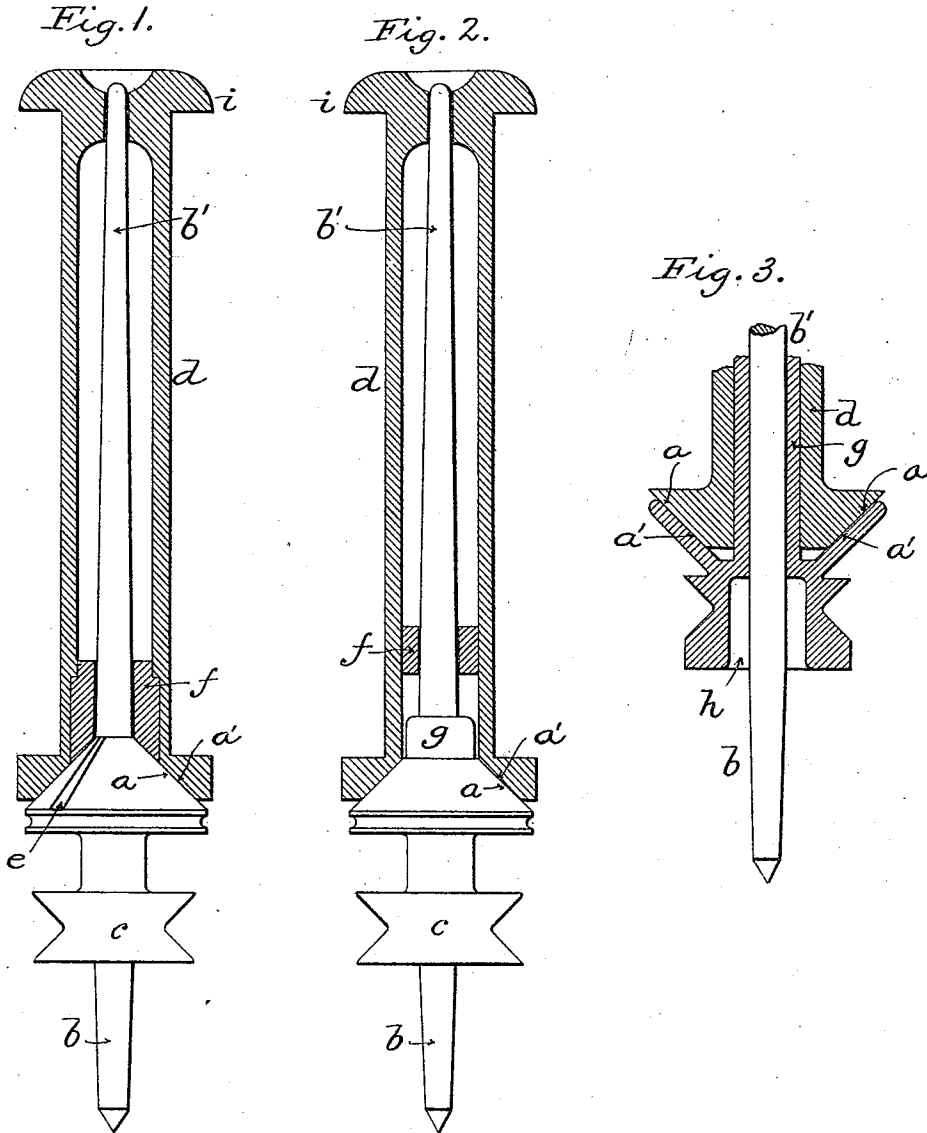


(No Model.)

T. WRIGLEY.
BOBBIN AND SPINDLE.

No. 515,035.

Patented Feb. 20, 1894.



WITNESSES:

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UNITED STATES PATENT OFFICE.

THOMAS WRIGLEY, OF TODMORDEN, ENGLAND.

BOBBIN AND SPINDLE.

SPECIFICATION forming part of Letters Patent No. 515,035, dated February 20, 1894.

Application filed July 18, 1893. Serial No. 480,865. (No model.) Patented in England March 27, 1890, No. 4,779.

To all whom it may concern:

Be it known that I, THOMAS WRIGLEY, a citizen of England, residing at Waterside House, Todmorden, in the county of York, England, have invented certain new and useful Improvements in Bobbins and Spindles, (for which I have received British Letters Patent No. 4,779, dated March 27, 1890,) of which the following is a specification.

My invention relates to means for causing the bobbins or tubes used in spinning and doubling fibrous material to revolve with the spindles by which they are supported, and it consists in the combination of a bobbin (in which term I include tubes with or without heads or flanges) with a spindle, whereby the bobbin is made to rotate with the spindle by means of a frictional frustum of a cone on the spindle and a corresponding frictional frustum on the bobbin; (and by the term "frictional frustum" I mean a cone whose sides have an angle of about forty-five degrees to the horizon, and do not include what may be called "grip frustum," or a frustum whose sides have an angle greater than forty-five degrees, wherein the holding power is due to what may be termed a wedge action.)

In the accompanying drawings, Figure 1, is a longitudinal sectional view taken through the center of the bobbin; the spindle, &c., being shown in outside view or elevation; the whole embodying my invention in one form; Fig. 2, a similar view showing a slightly different form. Fig. 3 represents a third form, in which the external frustums are on the bobbins, and the internal frustums on the spindle, instead of vice versa as in Figs. 1 and 2.

In the drawings, *b* is the foot, and *b'* the blade of the spindle; *c* the wharve or whirl, and *a* the frictional frustum on the spindle. The bobbin *d* is formed with a corresponding frictional frustum *a'*, and may be bushed as shown at *f*, Figs. 1 and 2, but these bushes *f* must not fit the tapering or sharp cone of the blade *b'* snugly enough to prevent free contact between the frustums *a* and *a'*. The bobbins shown have heads *i*, and the upper end of the blade *b'* is shown as loosely filling the bore in the upper end of the bobbin; but

here, also, the fit must not be so snug as to prevent free contact between the frictional frustums.

In Fig. 1 I have shown a groove *e* in frustum *a* for the purpose of allowing a freer escape of air from between the frustums *a* and *a'*, when the spindle and bobbin revolve rapidly; thereby insuring a frictional contact of the surfaces of the bobbin and the spindle between the frustums. In lieu of the larger groove *e*, a number of smaller ones may be formed in the cone's surface for the purpose stated; it is obvious, however, that the result or effect is substantially the same in both cases.

The essential feature in the present invention is that the connection between the bobbin and spindle is frictional, and yet amply sufficient to drive the bobbin.

I am aware that the connection between the bobbin and the spindle by means of the grip or sharp frustums of cones having sides inclined at an angle far in excess of forty-five degrees, is well known, and that this connection is shown in many patents; and while I disclaim all that is shown in these patents, I yet assert that the connection by comparatively blunt frictional frustums, whose sides incline at an angle of forty-five degrees or thereabout, is wholly new with me, and it is an improvement of great value. Or, in other words, in the patents referred to, the wedge principle is employed to retain the bobbins in place upon the spindles, the bobbins being pressed and forced downwardly upon the wedge shaped seats having an angle in excess of forty-five degrees, and a space left between the end of the bobbin and the lower end of the wedge, or grip frustum, to provide for the gradual wear of the bobbin. By employing frictional surfaces having an angle of approximately forty-five degrees, I avoid all chance of splitting the bobbin, as is likely to occur with those spindles having conical surfaces of a greater angle; for it is a well known fact that a cone does not act as a wedge, in the ordinary acceptance of the term, unless its sides exceed the angle of forty-five degrees. Furthermore, it has been demonstrated by actual tests (see *The Textile Manufacturer*,

August 15, 1891,) that an actual increase in the length,—in one case fifty-five per cent. more,—in the winding is attained; that the yarn spun is slightly stronger and more elastic; and that the invention effects practically a saving of one-sixth in cost by the increased output.

I would say that I am also aware that it has been proposed to provide a bobbin with a tube and to connect the tube with the bobbin by means of longitudinal keys, and to provide the tube with a flange having a conical face to fit a corresponding socket in the whirl; and to such structure I make no claim.

It will be noticed upon reference to Figs. 1 and 2 that the upper end of the spindle does not come into contact with the bobbin, the driving of the latter being effected at the lower end of the bobbin solely by the conical surfaces, thus bringing the weight of the bobbin and its yarn near the center of gravity of the spindle. The practice now almost universally adopted, of having the bobbin fit the spindle at both ends, throws a part of the weight upon the point of the spindle,—the farthest possible distance from the center of gravity of the spindle,—thus allowing an unbalanced bobbin to exert its full centrifugal force upon the spindle.

A great advantage of the present arrangement resides in the ease with which the bobbins may be taken from the spindles when running, without in the least retarding the spindle in its motion, when necessary to piece broken threads, or for other purposes. This cannot be accomplished with the ordinary constructions without exerting sufficient force to overcome the frictional contact between the bobbin and spindle, which, it is apparent, will produce considerable strain upon the spindle; or without stopping the spindle.

The bobbin is self-centering, that is to say, by reason of the omission of any driving con-

tact between the bobbin and the point of the spindle, it becomes only necessary to place the bobbin upon the spindle and allow it to drop to place, thus avoiding jamming at the point or foot of the spindle.

What I claim as my invention is—

1. In ring spinning, the combination with a spindle having a cone-shaped driving surface; of a bobbin having at its lower end a corresponding driving surface,—said bobbin being held to its seat solely by its weight and not having driving contact with the spindle at any point other than where the cones meet.

2. In combination with the spindle having a cone-shaped driving surface whose faces are at an angle of about forty-five degrees to the horizon; a bobbin having a corresponding surface and held in engagement with the spindle cone solely by the weight of the bobbin; and a whirl rigidly affixed to the spindle, all substantially as shown and described, whereby all tendency to split and all wedging action are avoided, and whereby also the weight of the bobbin and yarn is carried by the spindle at one point only, and as near as possible to the center of gravity of the said spindle.

3. In combination, a rotary spindle having a frictional driving surface in the form of a frustum of a cone, with a bobbin having a corresponding frustum to fit the said frictional driving surface of the spindle, and having one or more air ducts communicating with the bobbin chamber for the purpose hereinbefore set forth.

In witness whereof I hereunto set my hand in the presence of two witnesses.

THOS. WRIGLEY.

Witnesses:

RICHD. A. THORP,
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JOHN WALTON,
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