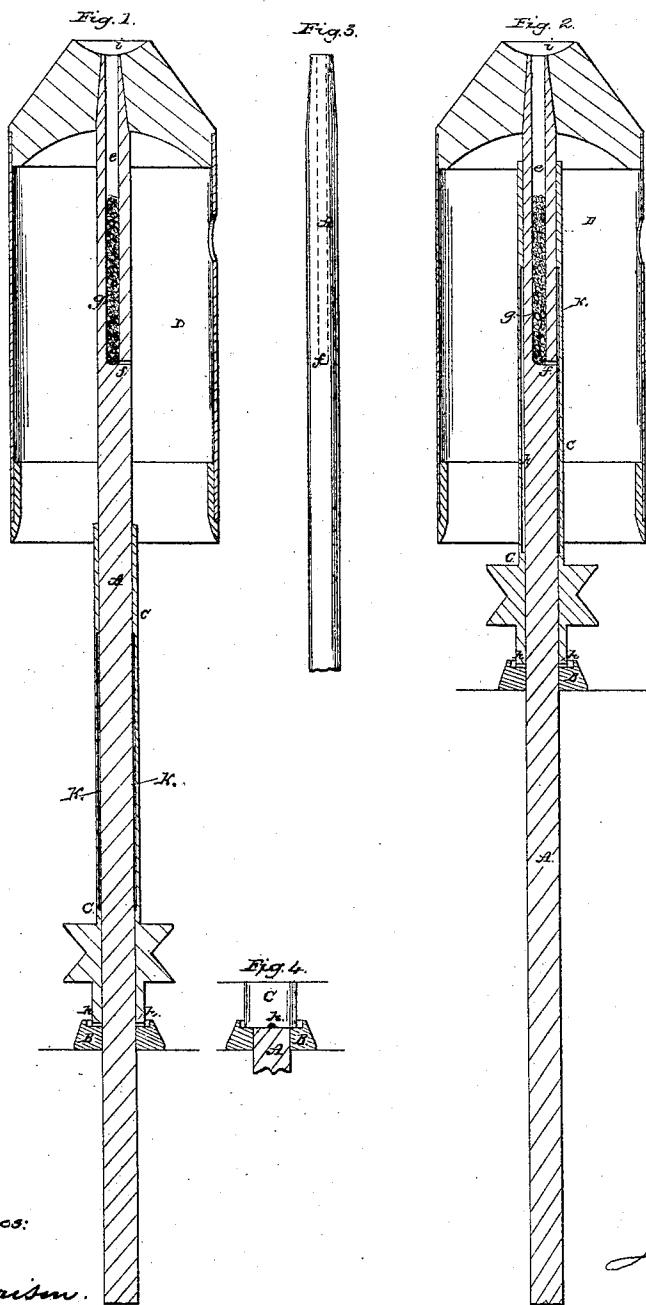


J. Welsh,

Lubricating Spindles,

No 16,298,

Patented Dec. 23, 1856.



Witnesses:

B. M. Morrison.

Brooklyn

Inventor:

*Joseph Welsh*

# UNITED STATES PATENT OFFICE.

JOSEPH WELSH, OF PHILADELPHIA, PENNSYLVANIA.

## LUBRICATING SPINDLE-STEPS.

Specification of Letters Patent No. 16,298, dated December 23, 1856.

*To all whom it may concern:*

Be it known that I, JOSEPH WELSH, of the city of Philadelphia, in the State of Pennsylvania, have invented a new and Improved Mode of Lubricating the Spindles and Steps of Throttle Spinning-Machines; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figures 1, and 2, are vertical longitudinal sections of a spindle and its usual accompaniments—the “cap,” “tube” and “step”—with my invention applied thereto—the tube and step in Fig. 1, being at its lowest position; while in Fig. 2, they are represented as being at their highest position, upon the spindle; Fig. 3, a sectional elevation of the upper part of the spindle; and Fig. 4, a like representation of the lower part of the tube, in connection with a vertical section of the spindle and step—like letters indicating the same parts when on the different figures.

The lubrication of the spindles and steps of throttle spinners, has hitherto required two separate or distinct operations; viz. the application of the lubricant to each part, by a separate or distinct operation—both consuming time, and wasting oil. The usual mode of proceeding is to stop the machine, every two hours, until the small depression at the top of each cap is supplied with oil; the machine is then again put in motion, and the oil passes, in a few minutes, by gravitation, down through a small groove made in the outside of the spindle at its junction with the cap, and subsequently comes in contact with the tube. The “steps” are in like manner supplied with oil every two hours—but without stopping the whole machine. An improved mode has lately been patented by Messrs. Daugherty and McLaughlin, which in some degree economizes time and oil in lubricating the spindles; but I am not aware that any advantage is derived thereby, over the old mode, after the oil has reached the upper end of the tube; which is the time when the most waste takes place. When a spinner is in full operation, the tube carrying the bobbin rotates upon the spindle about seven thousand times per minute, and as the oil, descending from above, comes in con-

tact with the upper end of the tube nearly all of it is thrown centrifugally, against the inner side of the cap, leaving but a very small portion only adhering to the spindle, to serve the purpose of its lubrication; while that part of the step upon which the tube rotates is entirely untouched thereby, and therefore requires its lubricant to be applied thereto by hand, as a distinct operation.

To obviate these defects incident to both the modes specified, is the object of my invention.

It consists in introducing the oil through the spindle directly to the inside of the tube, and conducting the surplus over what is consumed in thus lubricating the spindle, directly, by gravitation and the centrifugalizing effect of the tube itself, so as to lubricate the face of the step upon which the said tube rotates.

I will now proceed to describe its construction and mode of operation. Referring to the drawings, A, is the spindle; B, the step; C, the tube; and D, the cap.

The spindle and cap are constructed and connected together in the usual well known manner, except that there is no groove made on the outer side of the spindle as hitherto for the purpose of allowing the oil to pass below; but instead thereof I bore out the center of the upper end of the spindle, so as to form a chamber (e) therein which is about three-and-a-half inches deep and about three sixteenths of an inch in diameter; and then make a radial opening (f), of about one sixteenth of an inch in diameter, leading from the bottom of the said chamber (e) to the outside of the spindle. I now pack, by moderate pressure, a sufficiency of raw cotton (g), or other suitably porous substance, into the tube (e) so that it shall occupy about the whole of the lower half of the same. This chamber (e) and outlet (f) constitute together, a reservoir and conducting tube for the oil used as the lubricant.

The tube (C) is constructed in every respect in the usual well known form, but instead of leaving its bottom end a continuous annular plane as hitherto, I cut one or two grooves radially across it, as shown at h. This groove, or grooves, should be made about an eighth of an inch wide, and the sharp corners of the metal on each side thereof, rounded-off smoothly. The depth

need not be more than a sixteenth of an inch, and should always be less than the depth of the usual depression which is in the step. It forms a conductor for the surface of the said step, during the rotatory motion of the tube.

Operation: After the cotton or other porous packing (*g*) has become saturated with the lubricant, and, before putting the spinner in motion in the morning of each day, the operator, with oil-can in hand, passes from one spindle to another of the frame and fills the chamber (*e*), with the lubricating oil. On the machine being now put in motion, the tube (*C*) rotates rapidly on the spindle, its upper bearing surface being also at the same time carried slowly up and down on the spindle about every two minutes, passing and repassing over the mouth of the outlet (*f*), and thus continually and abundantly lubricating all that part of the spindle over which it moves, and withdrawing also a surplus quantity for the lower bearing surfaces of the tube in contact with the spindle and face of the step; which surplus, by gravitation down the recessed side (*K*) of the tube, reaches the said lower bearing surface of the same, and eventually, by the centrifugal tendency produced by the rotatory motion of the said tube, passes into the grooves (*L*, *L*<sub>1</sub>) thereof (the boundary edge around the depression in the step preventing the said oil from being thrown out by the centrifugal force of the tube)—and thereby lubricates the step. A small hole, bored obliquely upward through the side of the lower end of the tube; or a horizontal hole made radially through the same and connected with a conductor to prevent the oil's being thrown off by centrifugal action, will produce the same effect in oiling the step; but I prefer the groove or grooves (*L*, *L*<sub>1</sub>) as being equally effectual, and more easy of construction.

The cotton (*g*) should be so packed in the chamber (*e*) as to prevent the oil from flowing freely by gravitation, but yet sufficiently loosely to allow the oil to be drawn, by the action of the tube (*C*), as freely as may be required for lubricating both the spindle and step. As a criterion for judging on this point, I would observe that once filling the chamber (*e*) with oil in the morning as

described before, is, if the cotton be properly packed, sufficient to keep both the spindle and step perfectly lubricated during the whole day's, or ten hours', running of the machine.

In contrast with the modes hitherto practiced for lubricating throste spindles and steps, it will be perceived that the advantages of my invention are very manifest and important, not only as economizing time and oil—(the quantity of the latter required for keeping both the spindle and step properly lubricated for ten hours running, not being greater than the quantity required by the old mode at every two hours; or, by the later mode at each doffing—to say nothing of what is spilled in the operation of oiling from a can every two hours—and therefore, a saving in the legitimate use of the oil alone of about four-fifths)—but in the greater cleanliness and convenience incident thereto. Another incidental advantage of some importance over the old mode of lubricating, arises from the fact that the oil becomes filtered in its passage through the cotton, and thus freed from all the grit which is usually acquired by exposure in the mill, and which causes a rapid wearing away of the rubbing surfaces of the spindles and tubes.

The cost of boring the spindles and grooving the end of the tubes is but trifling. I do not claim introducing the oil, through the spindle, directly to the inside of the tube, as set forth and described herein; nor do I claim anything contained in the patent of E. W. Welch, dated January 28<sup>th</sup>, 1840; nor anything in the applications of Joseph Turner, and of E. S. Webster, rejected respectively in 1848 and 1849—but

What I claim as my invention, and desire to secure by Letters Patent, is—

Making the groove, or grooves (*L*) or their equivalents, at the lower end of the tube (*C*) so as to conduct thereby during the rotatory motion of the said tube, the surplus oil from the spindle (*A*), to the horizontal face of the step (*B*), substantially in the manner and for the purpose set forth and described.

JOSEPH WELSH.

Witnesses:

BEN. MORISON,  
JNO. B. KENNEY.