

(No Model.)

L. W. LOMBARD.
SPIRAL FRICTION CLUTCH.

No. 390,029.

Patented Sept. 25, 1888.

Fig. 1.

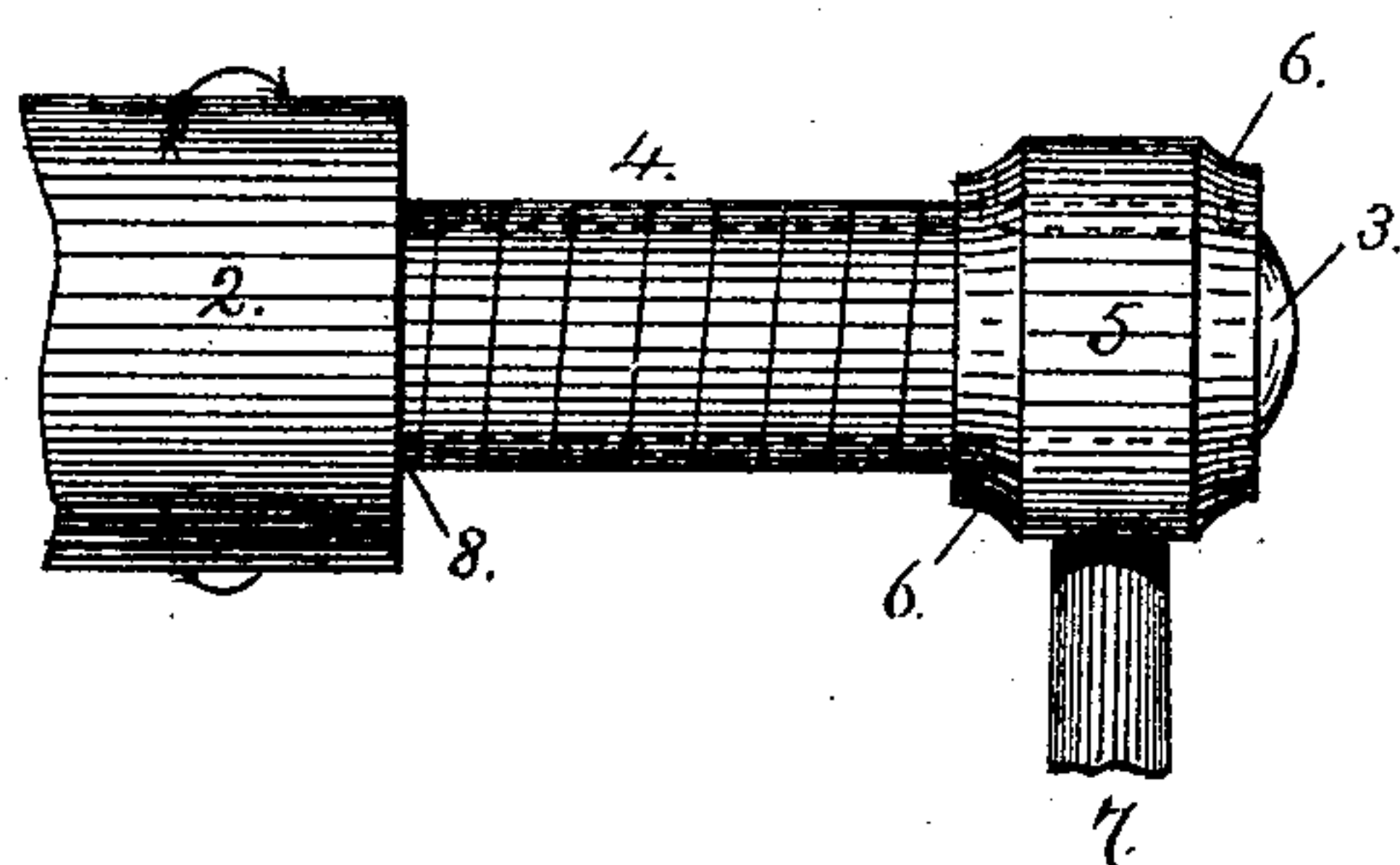


Fig. 3.

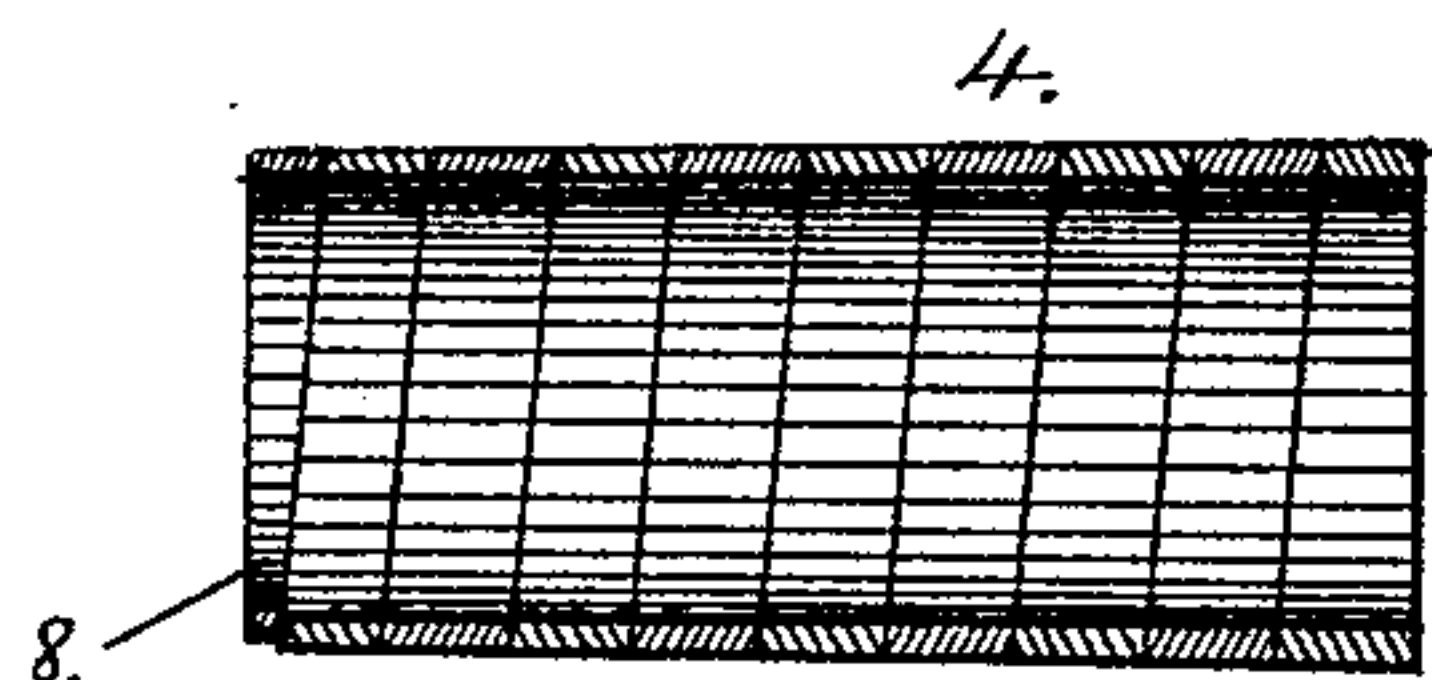
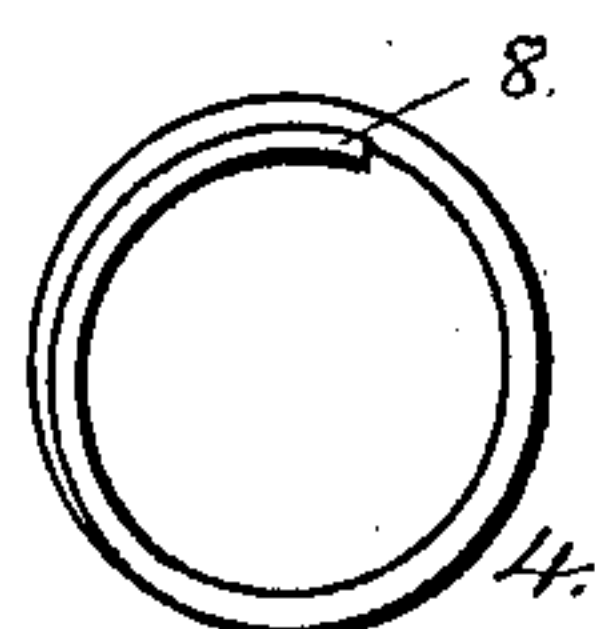
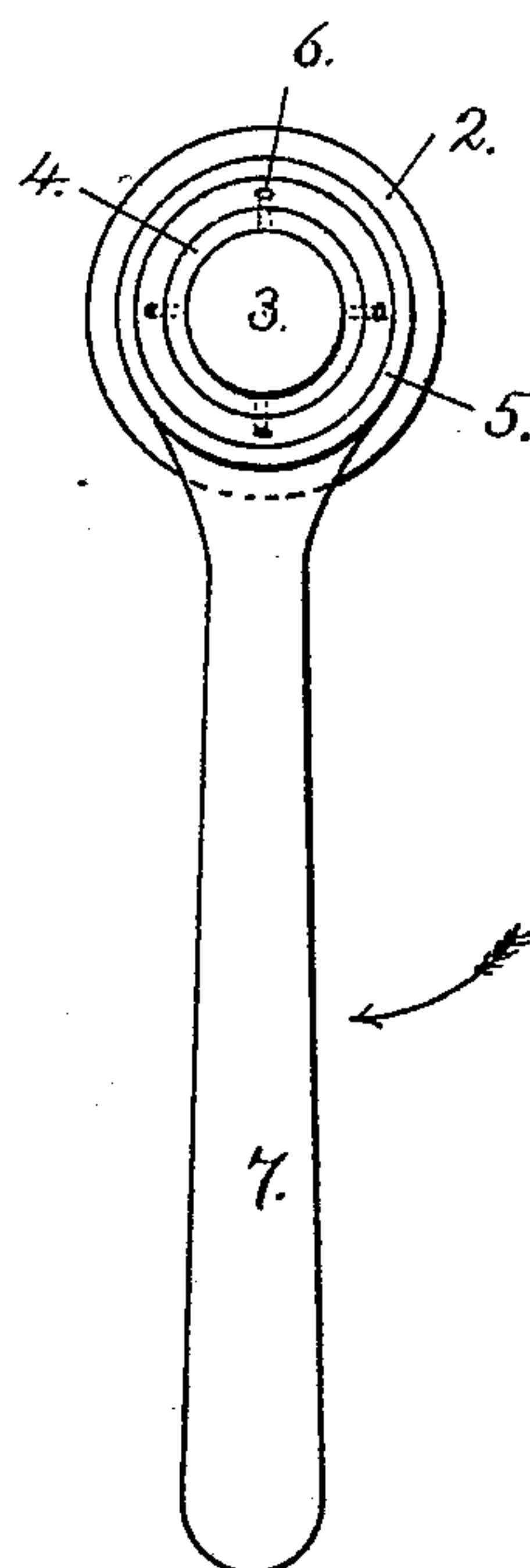


Fig. 2.

Fig. 4.



Witnesses.
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UNITED STATES PATENT OFFICE.

LEVI W. LOMBARD, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO J. FRANKLIN RYDER, OF SAME PLACE.

SPIRAL FRICTION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 390,029, dated September 25, 1888.

Application filed November 15, 1887. Serial No. 255,233. (No model.)

To all whom it may concern:

Be it known that I, LEVI W. LOMBARD, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Spiral Friction-Clutches; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to friction-clutches, more particularly that class which are to be substituted for a pawl and ratchet or other similar mechanical agency employed where continuous rotary motion is to be obtained in lieu of oscillating or right-line reciprocating movement; and it consists in the construction and combination of parts, hereinafter particularly set forth and claimed.

The drawings accompanying this specification represent in Figure 1 a side elevation of a spiral spring-clutch embodying my invention. Fig. 2 is a diametrical longitudinal section of a spring removed from the shaft-journal. Fig. 3 is an end view of the free end of the spring. Fig. 4 is an end elevation of the same supplied with an actuating-lever.

In the above drawings, 2 represents a shaft having a journal, 3, upon which is fitted a spiral spring, 4, of an internal diameter equal to or slightly larger than the diameter of the journal upon which it is mounted. These springs are to be formed of a continuous band or strip of metal having inherent elasticity, coiled so as to bring and maintain the opposite edges of the band preferably contiguous, as shown. In this way the clutch occupies less space and is much more compact in form. This spring 4 in the present instance is entered within a hub, 5, and secured by pins 6, and in the event of the shaft 2 being employed to actuate a drill an actuating-lever, 7, (see Fig. 4,) is attached to it.

In Fig. 1, as shown by the dotted lines of the shaft-journal 3, the band which composes

the spring is of the same thickness at all points. In Fig. 2, however, I have represented a spring which tapers from the end attached to the hub to its free end 8. The latter is thereby rendered more elastic and is easily adapted to compress the shaft.

It will be understood that if the "free" end 8, so called, of the spring were secured and held fast the action of the spring could easily be seen, but thereby the clutch would be rendered inoperative for the purpose for which it is intended. Hence, to overcome this difficulty and maintain the end 8 of the spring entirely free, that said spring may be turned in a direction reversely of its twist as it rests coiled upon the shaft, without moving said shaft, and yet be capable when turned in the opposite direction of grasping and actuating the journal, I have bent the extremity of the spring at 8 slightly inward. By thus contracting the diameter thereof at this particular spot the frictional pressure is greater than in any other place along the journal. The resultant effect is to retard this end of the spring when turned in a direction as would be termed "coiling the spring," this retardation being due to the greater friction at this point, while the hub 5, by means of its lever or other actuating device, twists the bands composing said spring, which is contracted slightly in diameter and tightly hugs the journal 3. In the modification shown in Fig. 2, owing to the reduction in the thickness of the band, the inherent elasticity of the spring at this point causes sufficient frictional pressure to produce the result before mentioned without contracting its free end 8.

The operation is as follows: Presuming the lever 7 is thrust in the direction of arrow, or such direction as to coil the spiral spring, the latter, by the greater frictional pressure at its free end 8, is caused to grip the journal, and the latter is turned forcibly through a partial revolution. Reverse movement of the lever at once permits the spring to uncoil very slightly, the shaft is released and is free to continue onward, while the lever and spring, with the hub, are brought back to their first position. The advantages of this style of friction-clutch

are numerous. It may be applied to any smooth journal, is very simple, easily constructed, and readily adapted to various places and conditions of work. There is no lost motion. It will hold well upon a lubricated surface.

In lieu of a spring-clutch with a given amount of frictional surface, as shown, an equal amount may be obtained by increasing the size of the journal and reducing the number of coils. This form of clutch could be readily adapted for shaft-pulleys, since it can be secured within the hub, thus obviating the use of a spline-and-groove connection, while the pulley can be instantly removed from the shaft, if desired.

An evident mechanical equivalent would be to have the internal diameter of the spring-clutch uniform its entire length and slightly enlarge the journal where the free end of the spring rests to obtain the necessary frictional pressure.

What I claim is—

1. In combination with a shaft-journal, a

spring curled thereon, and a hub to which one end of the spring is connected, the other end of said spring being free but of less diameter than the remainder of said spring, in order that it may be more certain to bind on said journal when the hub is turned in a direction to curl the spring, for the purpose set forth.

2. The combination of the shaft 2, having journal 3, with the hub 5 on said journal, the lever 7, rigid with said hub, and the spring 4, which is attached at one end to said hub, wound on said journal, and has its other end free, but of less diameter than the remainder of said spring, to insure the gripping of said journal when the hub is turned so as to tighten said spring, for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

LEVI W. LOMBARD.

Witnesses:

H. E. LODGE,
F. CURTIS.