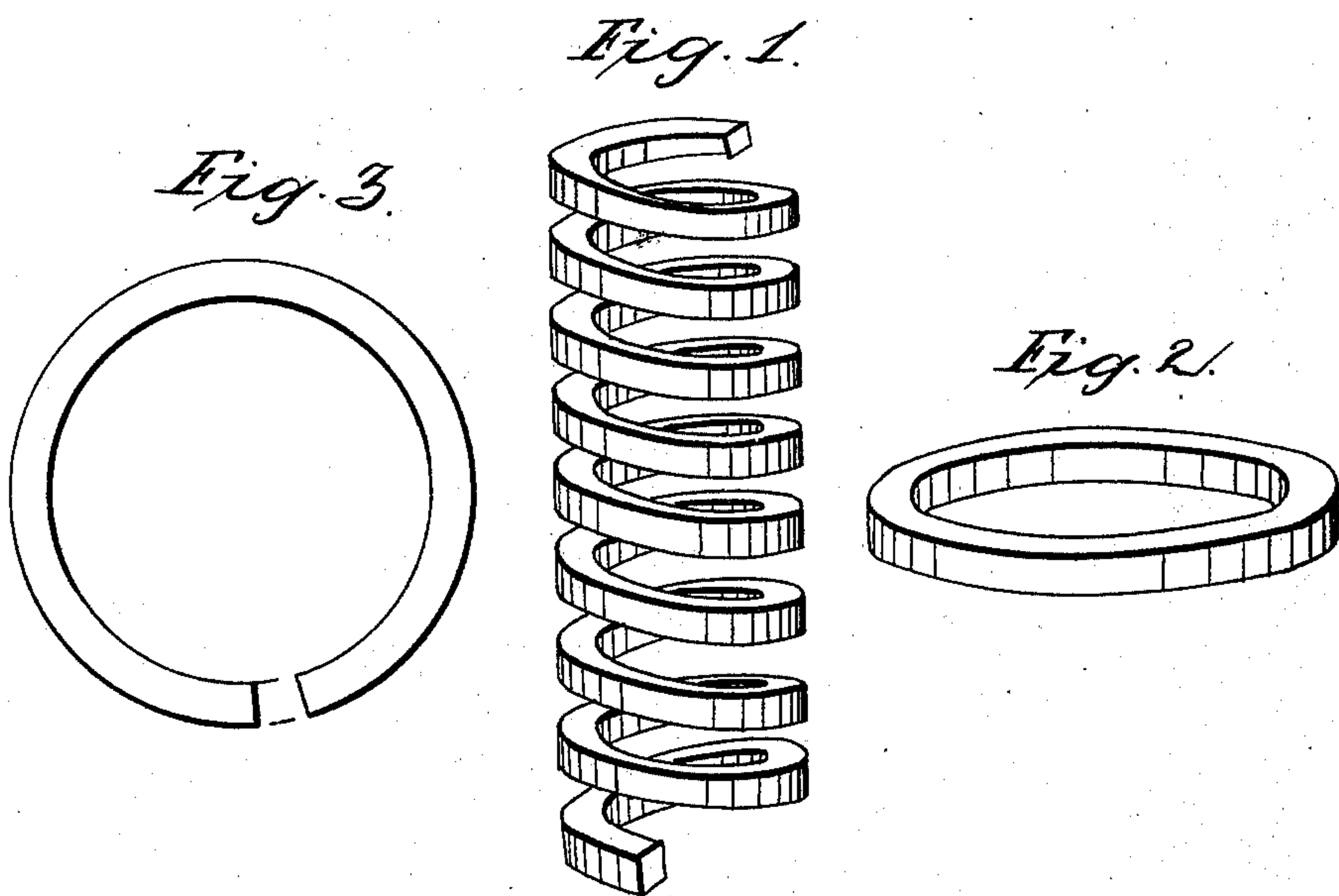


J. Hale,
Bending Wood.
No. 68,624. Patented Sep. 10, 1867.



Witnesses:

M. W. Frothingham.
L. H. Latimer.

Inventor:

Joseph Hale
By his Atty
Crosby, Halsey & Gould.

United States Patent Office.

JOSEPH HALE, OF SOMERVILLE, MASSACHUSETTS.

Letters Patent No. 68,624, dated September 10, 1867.

IMPROVEMENT IN WASHERS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, JOSEPH HALE, of Somerville, in the county of Middlesex, and State of Massachusetts, have invented an improved Washer for Carriage-Axles, etc.; and I do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of my invention sufficient to enable those skilled in the art to practise it.

To those familiar with the use of wheeled vehicles, especially such as are employed for pleasure and in the conveyance of persons, it is well known that washers are placed on the journals of the axles to prevent endwise movements of the wheel-hubs thereupon, to deaden or muffle the noise consequent upon such endwise movement, if any there be, and to allow a slight elasticity in the connection longitudinally of hubs with their axles. For such purposes it has been common to employ leather washers, and it is well known that these wear out rapidly, and also soon become permanently compressed and hardened, so that where they are used the wheels soon get an endwise play, which makes a disagreeable rattle in the movement of the vehicle.

Now, in my invention, I make the washers for the purpose named of wood, with the grain substantially in the direction of lines concentric with the periphery of each washer. In the manufacture of such washers I proceed as follows: First, I prepare a strip of any straight-grained tough wood, hickory by preference, rectangular in cross-section, which is of an area equal to a radial cross-sectional area of the washer to be constructed. This strip I soften by steaming or boiling, and then wind it upon an arbor, which I prefer to make a screw, winding the strip of wood into the spaces between the threads of the screw with a strip of thin metal or a chain, upon the outer surface of the wooden strip; this process preserving the rectangularity in cross-section of the wooden helix so made, and preventing the wood from splintering, splitting, or breaking. The arbor, with the wood secured thereupon, is then left to dry, which drying may be accelerated by the application of heat, and when dry and set the wooden helix is screwed off from its arbor, and is sawed apart, so that each section of the helix will, by a little deflection, form a circular washer, with its sides in planes. The sawing may be so performed that the ends of the wood in the washers will abut, and the joint so made may be in radial lines of the washer, or the joint may be inclined, bevelled, or scarfed, if desired. In some instances washers may be required in which a space is left between the adjacent ends of the wood, and this may be accomplished in the cutting apart of the wooden helix. In the drawings—

Figure 1 shows in perspective a helix of wood, formed as and for the purpose described.

Figure 2 shows in perspective a wooden washer of my invention, with the grain substantially concentric with the periphery of the washer formed by softening, bending, and drying; and with the adjacent ends of the wood in contact upon a joint plane, which is represented as scarfed or bevelled.

Figure 3 shows my improved washer in plan, with the adjacent ends not in contact.

Experiment has proved that these washers take up the oil which is supplied to the axle, and glaze over and wear smooth, while they have a slight but valuable elasticity in yielding to endwise strains on the hub, and are equally efficient with leather in deadening or muffling noise or rattle, while the friction between the parts is reduced to a minimum.

These washers, besides being used with wheels and axles as described, may be similarly employed in connection with other rotating bodies. When made with the adjacent ends not abutting, as in fig. 3, the washer may be compressed into a space of somewhat less diameter than its normal one.

I claim for employment with wheels and axles, or similarly, washers of wood with the grain, substantially as described, when formed by softening, bending, and drying.

Also the process described for forming washers of wood by bending a strip into a helix, and then subdividing it substantially as described.

JOSEPH HALE.

Witnesses:

J. B. CROSBY,

L. H. LATIMER.