B. B. LEWIS.

STRIKE SPRING FOR EIGHT-DAY CLOCKS.

No. 249,845. Patented Nov. 22, 1881.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Witnesses.

W. B. Thomson.

L. S. Burr

Inventor.

Benjamin B. Lewis

By James Shepard Atty

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

BENJAMIN B. LEWIS, OF BRISTOL, ASSIGNOR OF ONE-HALF TO THE WELCH SPRING & COMPANY, OF FORESTVILLE, CONNECTICUT.

STRIKE-SPRING FOR EIGHT-DAY CLOCKS.

SPECIFICATION forming part of **Letters Patent No. 249,845**, dated **November 22, 1881.**

Application filed July 31, 1879.

To all whom it may concern:

Be it known that I, BENJAMIN B. LEWIS, of Bristol, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Clocks, of which the following is a specification.

My invention is designed principally for the strike side of a clock-movement, although some parts of it are applicable to either side; and the invention consists in the peculiar construction of a double spring in combination with the strike side of a clock; also, in the manner of fastening the ends of the double spring together, the manner of combining the double spring with the spring-barrel and dividing-disk, and the manner of constructing and securing the click-spring to the plate, all as hereinafter described.

In the accompanying drawings, Figure 1 is a front elevation of a part of the strike side of a clock-movement which embodies my invention, showing a portion of the frame, the main shaft, driving-wheel, and count-wheel. Fig. 2 is a section of the same on line *x x* of Fig. 1. Fig. 3 is a sectional view on line *y y* of Fig. 2. Fig. 4 is a partial edge view of the front plate of the movement-frame, together with a side elevation of the click-spring attached thereto. Figs. 5 and 6 are side elevations of the respective sides of the connecting ends of the double spring, and Fig. 7 is an enlarged sectional view thereof on line *z z* of Fig. 5.

A A designate a portion of the frame of the clock-movement; B, the main shaft, C the main driving-wheel, and D the count-wheel. The time side of the clock may be of any style now in common use, and so also of the strike side, except in the particulars hereinafter specially described as peculiar to said striking side. The main shaft is journaled in the frame A and provided with a ratchet-wheel, *a*, with which engages a pawl or click, *b*, actuated by a spring, *c*, hereinafter described. The driving-wheel C and count-wheel D are both rigidly secured to one and the same hub or hollow shaft *d*, which is slipped loosely on the main shaft B, so as to turn freely thereon. I employ what is known as a "double spring"—that is, two springs coiled or wound in the reverse direction and placed edge to edge, with their outer ends fastened together by a connecting-bar. Such springs are old as applied to the time side of a clock for the purpose of decreasing the strain on the parts of the clock without decreasing the length of the running time, or, in other words, getting the running time of one strong spring with only the power of a light one; but, so far as I know, such springs have never been used to increase the number of revolutions of the main shaft, and thereby reduce the number of wheels in the train. In fact such a result would be anything but desirable in the time side of a clock.

E designates one half of the double spring, and F the other half, the inner end of the half F being connected to the main shaft, and the inner end of the half E to the hub or hollow shaft *d*, which extends through the inside coil of E, as shown in Fig. 2. The two outer ends of the springs or halves of the double spring are connected by a connecting-bar, *e*, of peculiar construction, hereinafter described. Between the edges of E and F there is a disk, G, slotted, as at *f*, Fig. 3, to allow the bar *e* to move to and from the main shaft as the spring is coiled and uncoiled in the act of winding and running down. This double spring is also boxed, as hereinafter described.

The click *b* is on the frame of the clock-movement.

In winding the main shaft the half E of the double spring is first wound, beginning at the inner end of its coil and winding until the outer end acts upon the outer end of F to wind it until both springs are wound. The springs then have a tendency to force the main wheel forward with a continuous motion, while the click on the frame makes it impossible for the main shaft to return, so that it is never moved but in the one direction. Inasmuch as one half of the double spring is wound through the medium of the other half, it follows that more turns or revolutions of the main shaft must be made in winding than if only a single spring were employed, and consequently more turns of the driving-wheel will be imparted by said double spring.

My double spring is specially adapted and designed for the strike side of an eight-day

clock, the count-wheel of which must be capable of making at least sixteen revolutions. It is impracticable to get a single spring into the space usually allotted for the spring of the strike part of an eight-day clock of such length as to impart the sixteen turns to the main shaft. Consequently eight-day clocks have had the count-wheels put on a separate axis from the main driving-wheel and geared up to give them the requisite number of turns. In other words, the main wheel of an ordinary eight-day clock makes but eight revolutions, and in my improved clock the main wheel of the strike side makes sixteen revolutions. This old main strike-wheel, making but eight revolutions, not only necessitated a larger movement-frame and longer train, but also a spring of greater power than would have been required in case the count-wheel were made to turn with the main wheel, because the farther it is from the main wheel the greater is the power required to drive it. By the employment of the double spring in the strike side of an eight-day clock I am enabled to connect the count-wheel rigidly to the driving-wheel, and yet impart to it the necessary sixteen turns—two for each day.

I am aware that the count-wheel and main driving-wheel have been rigidly secured together in thirty-hour clocks; but the count-wheel in that case required to make only two and a fraction turns, so that the ordinary spring was applicable for such use.

I form my main shaft B with two shoulders, the distance between which is equal to the width of the half F of the double spring, and the location of which is such as to bring them flush with the edge of F, as shown in Fig. 2. The disk G, between the halves of the double spring, rests against one shoulder and is governed in position thereby, while the length of the hub or hollow shaft *d* fills the space between said shoulder and the front plate of the frame to govern the end chase of the shaft in one direction. The box or spring-barrel H, having one solid end, is then slipped up against the other shoulder of the main shaft, and the other plate of the frame holds it in place. The disk G is of such size as to just fill the inside diameter of the spring-barrel H, and the construction above described renders any other fastening unnecessary, the disk and spring-barrel being merely slipped loosely upon the main shaft in their proper positions.

In all double springs heretofore made, so far as I know, the connecting ends have been riveted to the connecting-bar, which is objectionable for many reasons, the most serious one, perhaps, being breakage of the springs. Instead of securing the connecting-bar *e* by rivets, I form an elongated slot, *k*, in the end of the springs and pass the ends of the connecting-bar *e*, which consists of a thin flat bar, through said slots and clinch them down without riveting, as shown in Figs. 5, 6, and 7, which makes a very compact and cheap connection, and as the metal is not upset or enlarged in the holes in the end of the spring, there is but little liability of breakage.

My click-spring *c*, I also construct and secure in a novel manner, as follows: It is made of sheet metal, with a flat wing or tenon, *m*, near one end extending beyond the edge of the body of the spring. A shallow notch is left in one side edge of the frame A, into which this wing is placed, and the metal at each end of the notch is battered over a little to secure the spring in place.

I am aware that a double spring having one end of one half connected to the main shaft, upon which shaft was placed a hollow shaft or hub, with the main wheel attached and connected to the inner end of the other half of the spring, and with a ratchet-wheel the click of which was mounted on the frame, is old, and I hereby disclaim the same.

I am also aware that a double spring with dividing-disk and inclosing-barrel on the main shaft of the clock is old, and I hereby disclaim the same.

I claim as my invention—

1. The double spring composed of two connected halves coiled in opposite directions, in combination with the striking mechanism of a clock-movement, substantially as described, and for the purpose specified.

2. The double spring composed of two connected halves coiled in opposite directions, in combination with the main driving-wheel and count-wheel of an eight-day clock, both wheels mounted on the same axis and specially adapted for making at least sixteen revolutions, substantially as described, and for the purpose specified.

3. The main shaft, shouldered as described, in combination with the double spring, spring-barrel having a solid bottom or end, dividing-disk, hollow shaft or hub, main driving-wheel, and movement-plates, the solid end of the spring-barrel being interposed between one shoulder of the main shaft and the movement-plate, substantially as described, and for the purpose specified.

4. In a double spring for clocks, the peculiar fastening for the ends, consisting of the connecting-bar passed through elongated eyes and clinched down without riveting, substantially as described, and for the purpose specified.

5. In a clock-movement, the click-spring *c*, having wing *m*, in combination with the sheet-metal frame having a shallow notch in its edge, which receives the wing, substantially as described, and for the purpose specified.

BENJAMIN B. LEWIS.

Witnesses:
J. H. WELCH,
W. R. HURD.