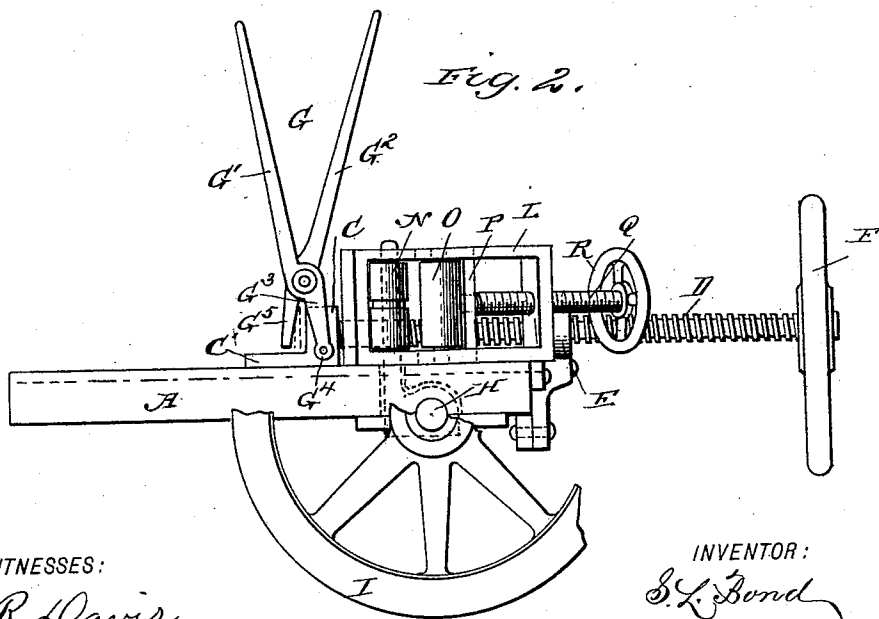
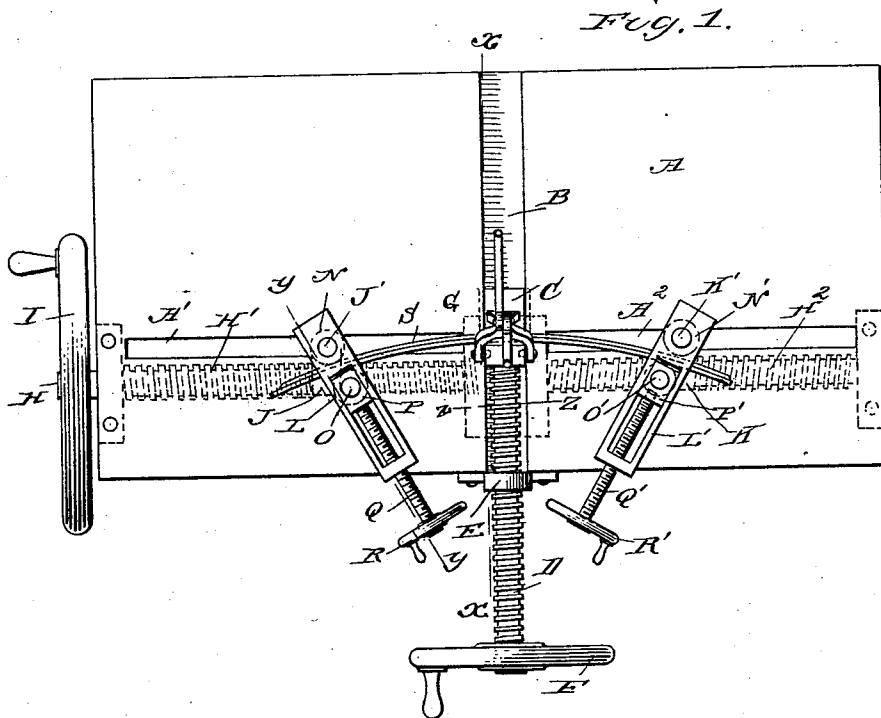


S. L. BOND.  
SPRING BENDING MACHINE.

No. 425,736.

Patented Apr. 15, 1890.



WITNESSES:  
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*C. Sedgwick*

INVENTOR:  
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 BY *Munn & Co.*  
 ATTORNEYS

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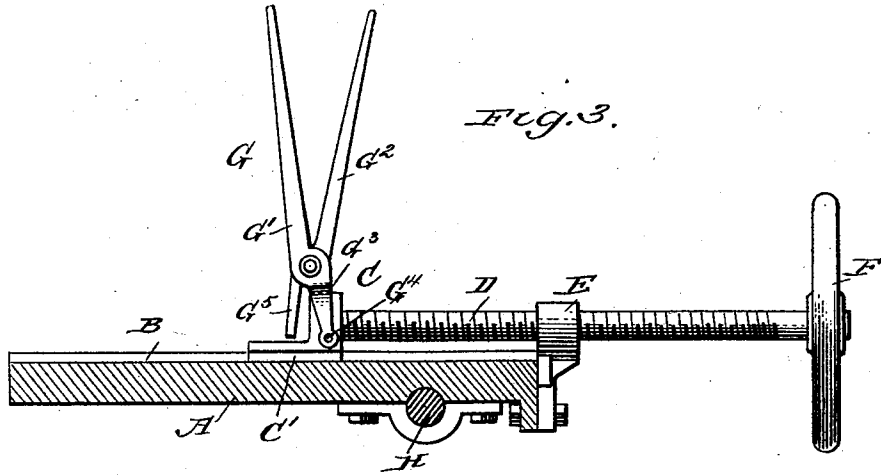


Fig. 3.

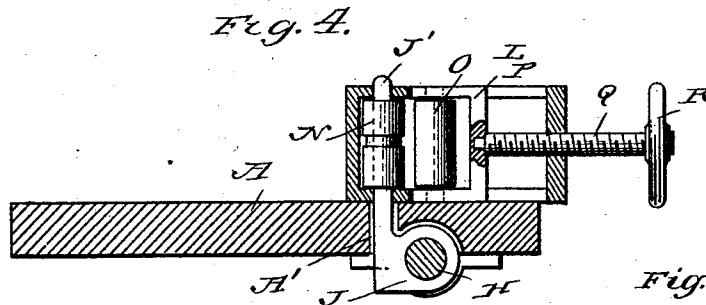


Fig. 4.

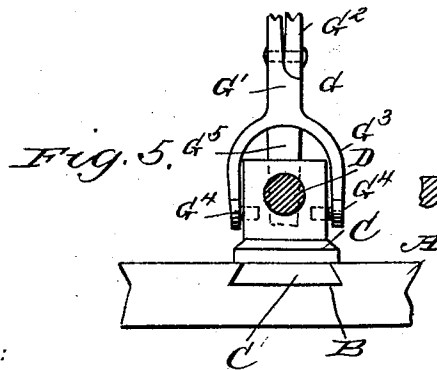


Fig. 5.

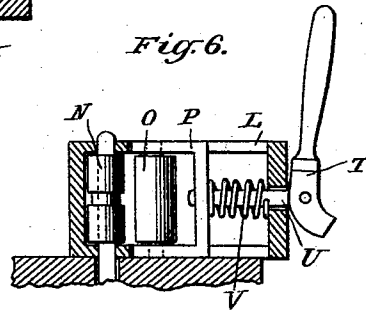


Fig. 6.

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# UNITED STATES PATENT OFFICE.

SOBIESKI L. BOND, OF CHARLESTON, SOUTH CAROLINA.

## SPRING-BENDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 425,736, dated April 15, 1890.

Application filed January 9, 1890. Serial No. 336,332. (No model.)

*To all whom it may concern:*

Be it known that I, SOBIESKI L. BOND, of Charleston, in the county of Charleston and State of South Carolina, have invented a new and Improved Spring-Bending Machine, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved machine for quickly and accurately bending and setting springs to the proper shape, which machine is very simple and durable in construction.

The invention consists of certain parts and details and combinations of the same, as will be hereinafter fully described, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of the improvement. Fig. 2 is an enlarged end view of the same with parts broken out. Fig. 3 is an enlarged transverse section of the improvement on the line  $xx$  of Fig. 1. Fig. 4 is a like view of part of the improvement on the line  $yy$  of Fig. 1, and Fig. 5 is an enlarged sectional front view of part of the improvement on the line  $zz$  of Fig. 1. Fig. 6 is a side elevation of a modified form of part of the improvement.

The improved spring-bending machine is provided with a suitable table A, having in the middle on top a transversely-extending dovetail groove B, in which fits the correspondingly-shaped dovetail C', formed on the under side of a block C, held to slide transversely on the table A by means of a screw-rod D screwing in a nut E fastened on the front end of the table A, as is plainly shown in Fig. 1.

On the outer end of the screw-rod D is secured a hand-wheel F, for conveniently turning the screw-rod D, so as to move the block C in the groove on top of the table A. On the block C is held a pair of tongs G, provided with two prongs G' and G<sup>2</sup>, of which the former is formed at its lower end G<sup>3</sup> into a fork pivoted to the sides of the block C at G<sup>4</sup>, as is plainly shown in Fig. 5. The end G<sup>3</sup> of the other prong G<sup>2</sup> is adapted to press the spring against the rear end of the block C

when the upper ends of the prongs G' and G<sup>2</sup> are pressed together.

In suitable bearings on the under side of the table A is mounted to turn the longitudinally-extending screw-rod H, carrying at one end a hand-wheel I, for conveniently turning said screw-rod. The latter is provided with right and left hand threads H' and H<sup>2</sup>, extending to the right and left of the screw-rod D, as is plainly shown in Fig. 1. On the threads H' and H<sup>2</sup> screw the nuts J and K, placed equidistant from the center of the screw-rod D, so that when the screw-rod H is turned the said nuts J and K move equal distances toward or from the center of the axis of the screw-rod D. The nuts J and K are provided with upwardly-extending pins J' and K', respectively, passing through longitudinal slots A' and A<sup>2</sup>, respectively, formed in the table A. On the upper ends of the pins J' and K' are mounted to turn the frames L and L', respectively, open at the sides to permit the admission of the ends of the spring to be bent.

On the pins J' and K' in the frames L and L', respectively, are mounted to turn the rollers N and N', respectively, opposite which are arranged similar rollers O and O', respectively, mounted to turn in a frame P or P', respectively, held to slide transversely in suitable bearings formed in the frames L and L', respectively, by means of screw-rods Q and Q', respectively, screwing in the outer ends of the frames L and L', respectively. Each of the screw-rods Q and Q' is provided with a hand-wheel R or R', respectively, for conveniently turning the said screw-rods Q and Q', so as to move the rollers O and O', respectively, inward or outward for admitting the ends of the spring to be bent between the sets of rollers N O and N' O', respectively.

Instead of moving the frames P and P' in the frames L and L', respectively, by means of the screw-rods Q and Q', I may employ a cam-lever T, pivotally connected with a rod U, held to slide in one end of the respective frame L or L' and secured to the frame P or P'. A spring V is coiled in the said rod U and rests with one end on the end of the frame L or L' and with its other end presses against the frame P or P' to hold the latter, with its

roller O or O', in contact with the spring to be bent and passed between the rollers N O and N' O', respectively. When the cam-lever is moved downward, the respective frame P or P' is drawn outward to admit the end of the spring to be bent.

The operation is as follows: The spring S to be bent is placed with its middle against the back of the block C and is then clamped in place by the lower end G<sup>3</sup> of the prong G<sup>2</sup>, which latter is pressed toward the prong G', fulcrumed on the block C. The ends of the spring S are passed between the sets of rollers N O and N' O', the screw-rod H having been previously turned to place the said rollers at the proper distance from the screw-rod D. The screw-rods Q and Q' are screwed up, so as to press the rollers O and O', respectively, in firm contact with the ends of the spring S to hold the latter against the rollers N and N'. The operator now turns the hand-wheel F of the screw-rod D, so as to move the block C rearward, whereby the spring S is bent. It will be seen that when the block C moves rearward frames L and L' swing on their pivots J' and K', respectively, so as to compensate for the movement of the spring ends, which takes place in bending the spring. The spring S may thus be bent into any desired curve, the radius of which may be more or less, according to the distance the block C is moved transversely in the groove B.

It is understood that in case several leaves of springs are to be bent to make a complete leaf-spring the first or main spring is bent according to the shape of a templet and the others are bent accordingly. The bending of the springs takes place while the same are red-hot.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a spring-bending machine, the combination, with a block adapted to slide transversely, of a pair of tongs provided with two pivoted prongs, of which one is pivoted on the said block and the other is adapted to press the spring onto the said block, substantially as shown and described.

2. In a spring-bending machine, the combination, with a block adapted to slide transversely, of two rollers adapted to slide longitudinally at right angles to the movement of the said block and simultaneously toward or from each other, substantially as shown and described.

3. In a spring-bending machine, the combination, with a block adapted to slide and a

screw-rod for moving the said block, of rollers mounted to travel at right angles to the said block and simultaneously toward or from each other, a screw-rod having right and left hand threads, and nuts screwing on the said threads and carrying the said rollers, substantially as shown and described.

4. In a spring-bending machine, the combination, with a block adapted to slide and a screw-rod for moving the said block, of rollers mounted to travel at right angles to the said block and simultaneously toward or from each other, a screw-rod having right and left hand threads, nuts screwing on the said threads and carrying the said rollers, frames hung on the pivots of the said rollers, and a second roller held in each of the said frames opposite the other roller, substantially as shown and described.

5. In a spring-bending machine, the combination, with a block adapted to slide and a screw-rod for moving the said block, of rollers mounted to travel at right angles to the said block and simultaneously toward or from each other, a screw-rod having right and left hand threads, nuts screwing on the said threads and carrying the said rollers, frames hung on the pivots of the said rollers, a second roller held in each of the said frames opposite the other roller, an auxiliary frame carrying the said second roller and mounted to slide in each pivoted frame, and a screw screwing in the said pivoted frame and adapted to move the said auxiliary frame, substantially as shown and described.

6. In a spring-bending machine, the combination, with a roller and a pin on which the rollers turn, of a frame pivoted on the said pin, an auxiliary frame held to slide in the said pivoted frame, and a second roller mounted to turn in the said auxiliary frame opposite the said first-named roller, substantially as shown and described.

7. In a spring-bending machine, the combination, with a roller and a pin on which the rollers turn, of a frame pivoted on the said pin, an auxiliary frame held to slide in the said pivoted frame, a second roller mounted to turn in the said auxiliary frame opposite the said first-named roller, and a screw-rod screwing in the said pivoted frame and adapted to move the said auxiliary frame, substantially as shown and described.

SOBIESKI L. BOND.

Witnesses:

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H. W. MITCHELL, Jr.