

R. E. JOHNSON.  
 SPRING BENDING MACHINE.

APPLICATION FILED FEB. 18, 1908. RENEWED JUNE 9, 1909.

929,309.

Patented July 27, 1909.

Fig. 1.

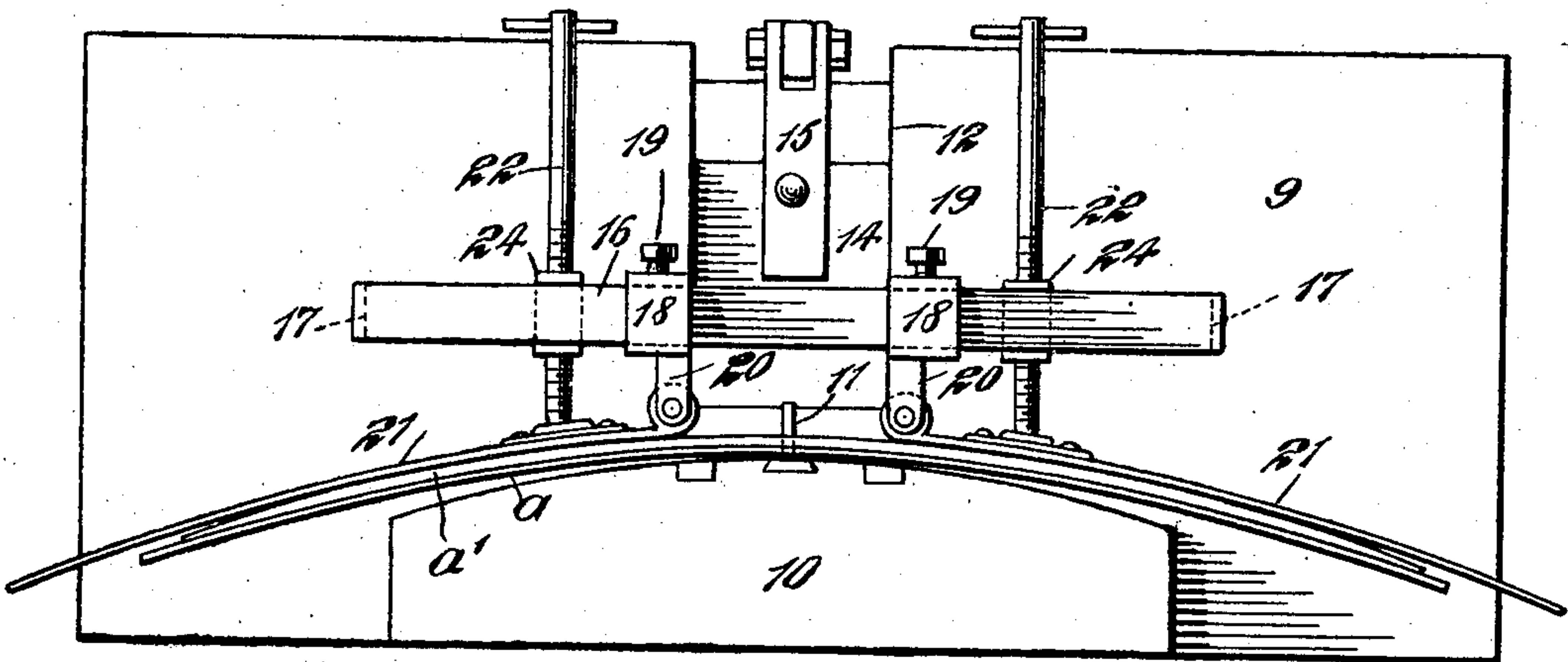
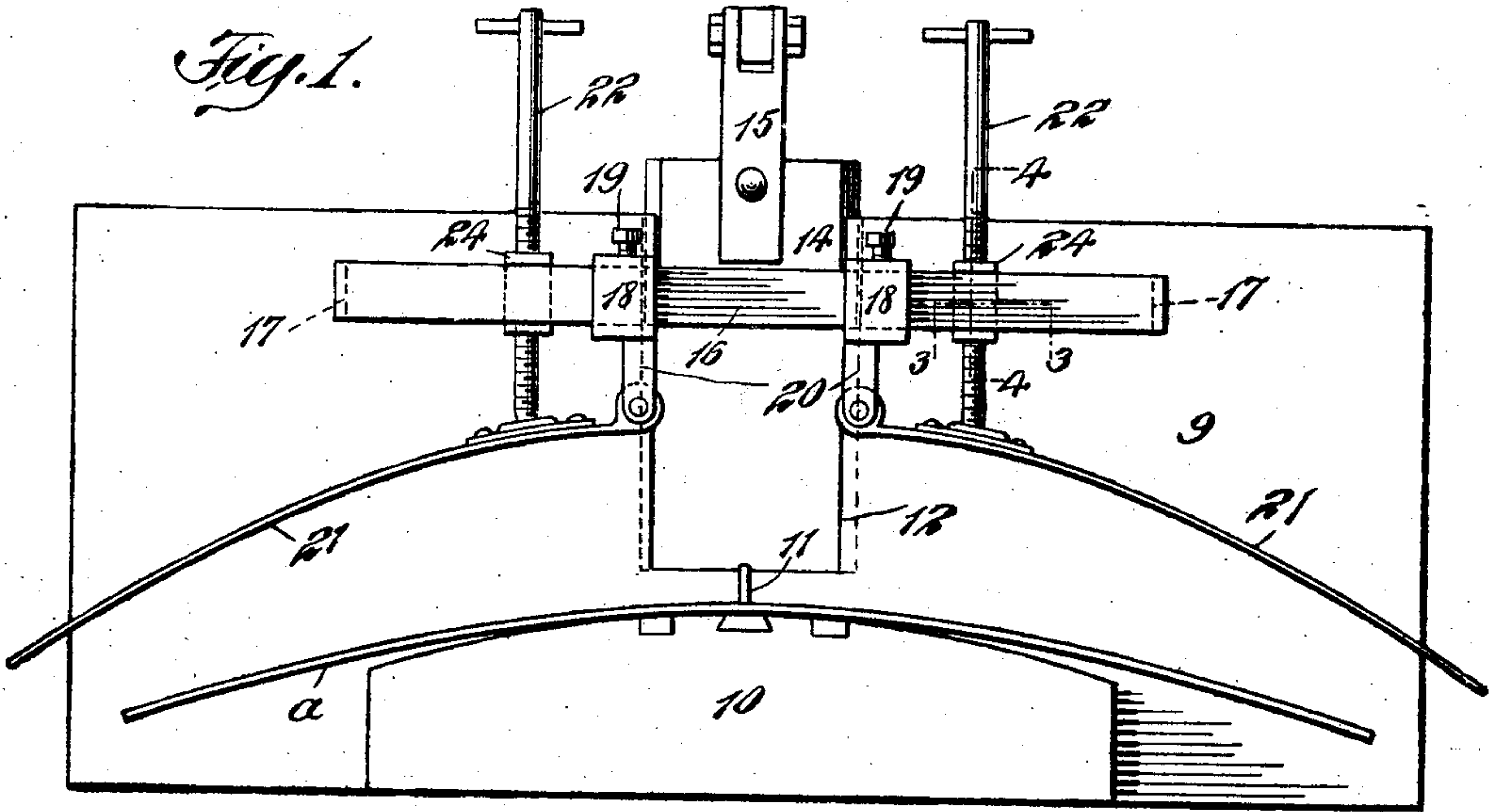


Fig. 2.

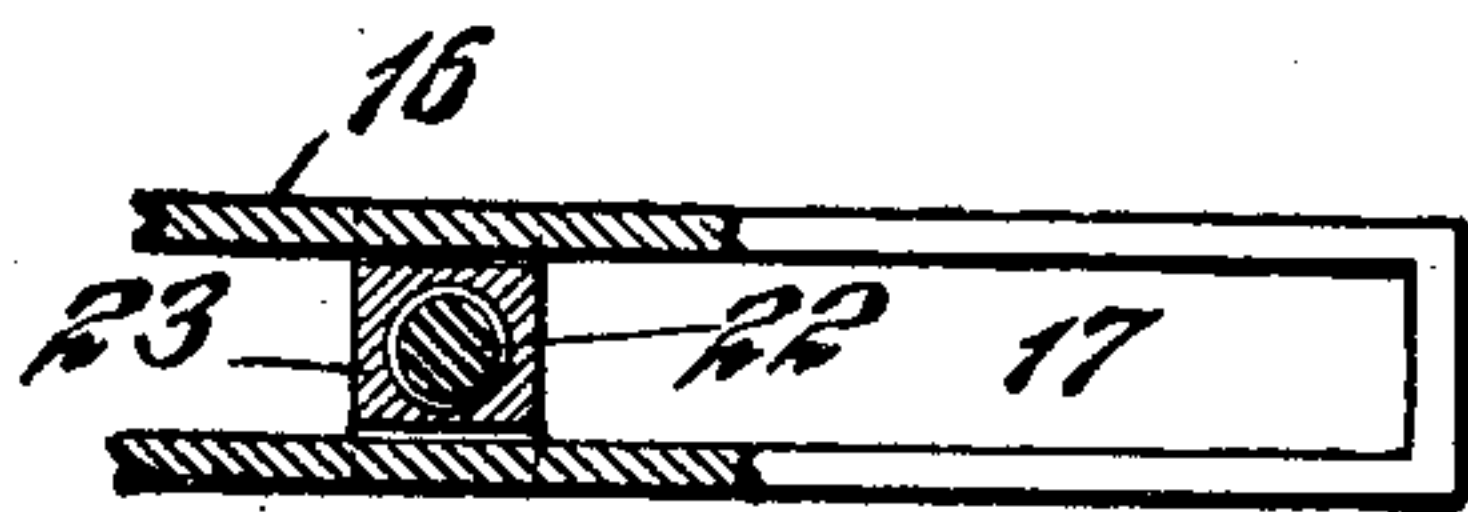


Fig. 3.

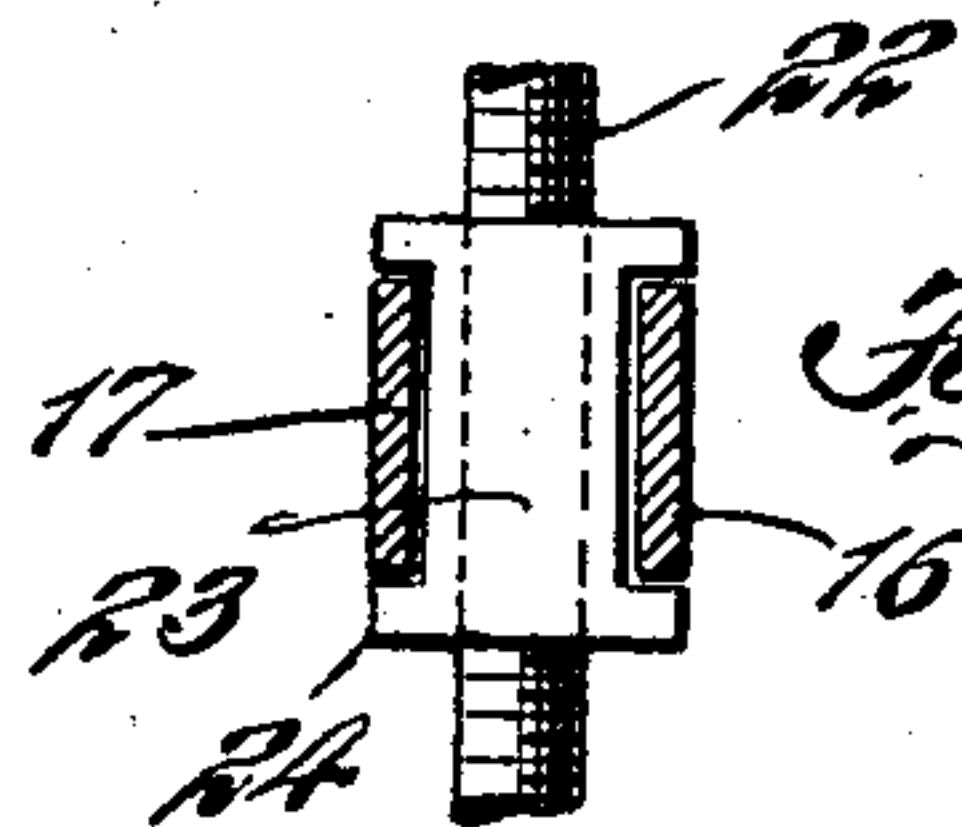


Fig. 4.

WITNESSES:  
*John H. [Signature]*  
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INVENTOR  
 Robert E. Johnson  
 BY  
 Isaac B. Owens  
 His ATTORNEY



# UNITED STATES PATENT OFFICE.

ROBERT E. JOHNSON, OF KINGSTON, NEW YORK, ASSIGNOR OF FORTY-FIVE ONE-HUNDREDTHS TO JOHN DOLAN, JR., OF NEW YORK, N. Y.

## SPRING-BENDING MACHINE.

No. 929,309.

Specification of Letters Patent.

Patented July 27, 1909.

Application filed February 18, 1908, Serial No. 416,441. Renewed June 9, 1909. Serial No. 501,186.

*To all whom it may concern:*

Be it known that I, ROBERT E. JOHNSON, of the city of Kingston, county of Ulster, and State of New York, have invented certain new and useful Improvements in Spring-Bending Machines, of which the following is a full, clear, and exact specification, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a machine for bending or shaping the leaves of flat or elliptic springs, particularly those constructed of a number of leaves laid one against the other, and it resides in certain features of structure and organization all of which will be fully set forth hereinafter and particularly pointed out in the claims.

Reference is had to the accompanying drawings, which illustrate, as an example, one manner of embodying the various principles of my invention, in which drawings,

Figure 1 is a plan view showing the machine open; Fig. 2 is a plan view showing the machine closed; Figs. 3 and 4 are detail sections respectively on the lines 3—3 and 4—4 of Fig. 1.

9 is the table which has a suitable support (not shown) and an abutment or anvil 10 rising from its surface. This anvil has a horizontally disposed pin 11 adapted to be received in the center openings of the spring leaves *a*, *a'* to position the leaves on the anvil and to hold them in place during the bending operation.

In the table 10 is a guide way 12 receiving a slide 14 which is operated toward and from the anvil by a suitably driven linkage 15 which may be of any desired form and which is not illustrated in detail. The slide 14 carries a cross beam 16, the end portions of which are slotted as at 17. On these end portions of the beam 16 collars 18 are adjustably mounted and held by set screws 19 or other suitable means. These collars 18 have lugs 20 to which the bending arms 21 are pivoted. The bending arms are preferably of stout spring metal and are adjustable by screws 22 working in nuts 23 which slide in the slots 17 of the cross beam. The nuts 23 are square so that they will not turn in the slots and have heads 24 which prevent them from moving longitudinally with the screws.

In the operation of the invention a hot

spring leaf —*a*— is placed on the anvil 10 and centered by the pin 11 fitting in the usual opening of the spring leaf. The bending arms 21 are then adjusted to the desired length, form and curvature of the spring by the combined action of the collars 18 and screws 22, and the linkage or other operating means 15 is then actuated to advance the slide toward the anvil. Thereupon the bending arms 21 engage the hot spring leaf and bend the same over the anvil into the form determined. A second hot spring leaf —*a'*— is then engaged against leaf *a*, and the operation is repeated, the leaf *a'* being thereby bent against and conforming to the shape of the leaf *a*. The leaf *a* is then removed and a third hot leaf—not shown—is then placed against the now cold leaf *a'*, and the operation again repeated. In this manner the various leaves of which the spring is composed are bent against each other and conform exactly to each other so that they may be fastened snugly together into the finished spring in the usual manner.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent of the United States is—

1. A spring bending machine having means for holding the spring, a carrier, a part adjustable thereon, a bending-arm pivoted to said part, means on the carrier for adjustably holding the free end of the arm, and means for driving the carrier to engage the bending arm with the spring.

2. A spring bending machine having means for holding the spring, a slide or carrier, a transverse beam held thereby, a part adjustable on the transverse beam, a bending arm pivoted thereto, means on the beam for adjusting the free portion of the arm, and means for driving the slide or carrier to engage the arm with the spring.

3. A spring bending machine having means for holding the spring, a slide or carrier, a transverse beam held thereby, a part adjustable on the transverse beam, a bending arm pivoted thereto, means on the beam for adjusting the free portion of the arm, and means for driving the slide or carrier to engage the arm with the spring, said part adjustable on the transverse beam comprising a slidable collar and means for holding the same in the desired position.

4. A spring bending machine having means for holding the spring, a slide or car-



rier, a transverse beam held thereby, a part adjustable on the transverse beam, a bending arm pivoted thereto, means on the beam for adjusting the free portion of the arm, and  
5 means for driving the slide or carrier to engage the arm with the spring, said means for adjusting the free portion of the arm comprising a non-rotary nut slidable in the beam and a screw working in the nut and  
10 engaging the arm.

5. A spring bending machine comprising an anvil to hold the middle part of the spring leaf, a slide movable toward and from the anvil, a transverse beam carried by  
15 the slide and having slotted end portions, collars adjustable on the beam, bending arms pivoted to the collars, nuts non-rotatably

held in the slots of the beam, screws operating in the nuts to engage the bending arms and means for driving the slide. 20

6. A spring-bending machine having means for holding the spring leaf, a carrier movable toward and from the same, two spring arms mounted at their near ends on the carrier, and adjustable means furnishing  
25 rigid backings for said arms at the points of their engagement therewith.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT E. JOHNSON.

Witnesses:

CHARLES W. KLINE,  
CHARLES IRWIN.