Gray & Curtis,

Straightening Springs,

No. 46,421. Patented Feb. 14, 1865.

Fig. 1

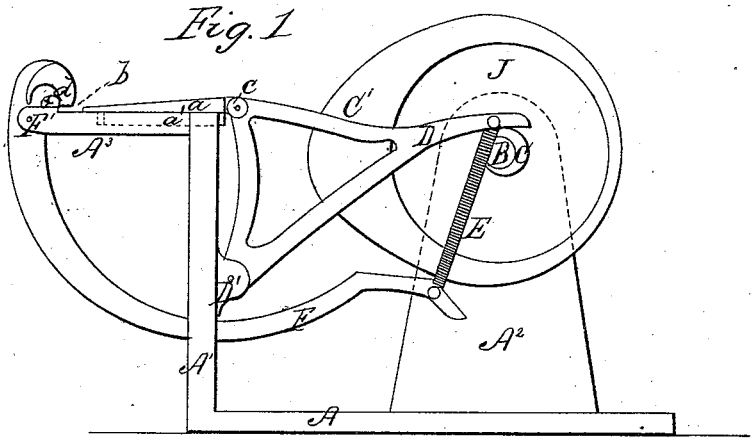


Fig. 3

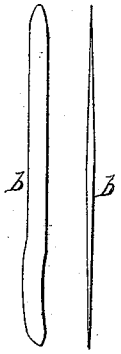
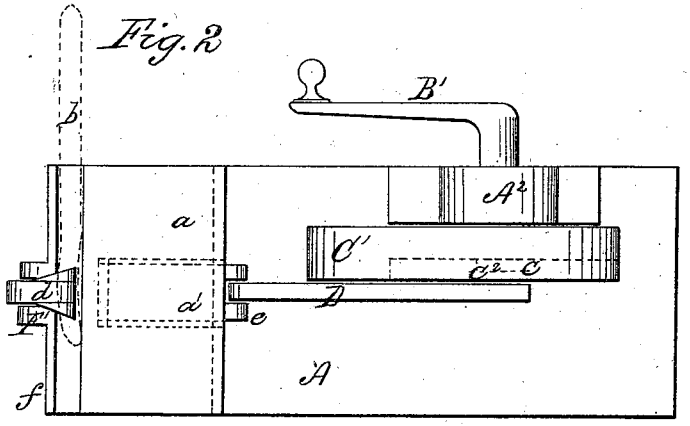


Fig. 2



Witnesses;
Henry Morris
C. L. Toplift

Inventors;
James W. Gray
C. H. Curtis
per Munn & Co.
Attys.

UNITED STATES PATENT OFFICE.

JAMES W. GRAY AND CHARLES H. CURTIS, OF BRIDGEPORT, CONNECTICUT, ASSIGNORS TO THEMSELVES AND THE SPRING PERCH COMPANY, OF SAME PLACE.

IMPROVED MACHINE FOR STRAIGHTENING ELLIPTIC SPRINGS.

Specification forming part of Letters Patent No. **46,421**, dated February 14, 1865.

To all whom it may concern:

Be it known that we, JAMES W. GRAY and CHARLES H. CURTIS, of Bridgeport, in the county of Fairfield and State of Connecticut, have invented a new and Improved Machine for Straightening the Leaves of Elliptic and other Springs; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of a machine constructed after our invention. Fig. 2 is a plan of the same. Fig. 3 is a detail showing a side and an edge view of a leaf of a carriage-spring, one end of which has been straightened.

Similar letters of reference indicate like parts.

The object of our invention is to produce a machine which will straighten the leaves or plates of carriage-springs, after they have been wrought or rolled out, by a single operation. The plates which form the leaves of elliptic and other carriage springs are left so crooked and bent in their rough condition after they are forged or rolled out as to require a good deal of labor in straightening them to get them ready for fitting and finishing. This has hitherto been done by manual labor with the hammer and anvil, the workman being guided by the square or a straight edge in getting the leaves true and properly shaped. Of course this mode of straightening such plates is tedious and expensive and the character and perfection of the work have always varied with the skill and pains of the workman. Our invention consists in devising and constructing a machine for performing this work, as hereinafter described.

A is a bed-plate which supports two standards, A′ A^2. The standard A^2 supports a short shaft, B, which carries at one end a crank, B′, or any other device for driving machinery, and at the other end a cam-wheel, J, bearing two cams, C and C′. The cam C′ is formed upon the periphery of the wheel, and the cam C is made by grooving the face of the wheel so as to form a hub about the shaft B, which hub is so shaped as to form the cam. The cams have their greatest convexity upon opposite sides of the shaft. The standard A′ supports a horizontal table, A^3, which has a rim, *f*, at its outer end and a boss, F′ beyond the rim, which boss is forked or recessed to receive the lever F, which is pivoted therein, as seen in the drawings. The lever F is semicircular in its general outline, to enable it to reach from the cam-wheel to and above the boss F, a slot being cut for its passage through the standard A′. Its long arm is held up against the cam C′ by means of a spiral spring, E, while its short arm is curved to a semicircular form, so as to form a jaw, *d*, whose face is a plane surface and intended to be parallel with the table A^3 when the cam C′ operates upon the lever. *a* is a sliding plate which slides back and forth upon the table A^3, upon whose surface it is retained by a dovetailed tongue-and-groove joint, *a′*, formed by a tongue on the under side of the sliding plate, fitting into a groove in the table. The sliding plate, therefore, is only permitted a reciprocating motion to and from the rim *f* of the table. The sliding plate *a* is connected by a joint, *e*, to a vibrating lever, D, which vibrates about its fulcrum D′. The free end of this lever extends along the grooved face of the cam-wheel J and is widened at a^2 near its end, so as to rest upon the periphery of the cam C, against which it is held by the spiral spring E, before mentioned.

The action of the parts is as follows: The leaf to be straightened is laid upon the table A^3 so soon as it is rolled out or forged and while it is still hot, one of its edges resting against the rim *f*. The cam-wheel is then rotated, when the cam C will drive the sliding plate *a* against the inner edge of the leaf and thereby straighten both its edges, one edge being straightened along the rim *f* and the other along the end of the sliding plate. The horizontal pressure brought against its edges would cause the leaf to bulge out and increase in thickness if means were not taken to prevent it. As this effect would give wrong proportions to the leaf, it is necessary that the tendency produced by the horizontal pressure be counteracted. We therefore have provided the jaw *d*, which is to be made of such a width as to be equal to the width of the

straightened leaf and of a length sufficient to press upon the leaf along the line of the horizontal pressure. It projects over the rim *f* just far enough to clear it when it is brought down toward the table.

The cam C′ is so constructed as to bear upon the lever F at the same time the cam C is acting to move the sliding plate *a*, and the jaw *d* is thereby brought upon the leaf so as to hold it down upon the table when the horizontal pressure begins to be exerted against its edges. As the leaf is more and more compressed thereby in a lateral direction the jaw is made to compress it more and more in a vertical direction, so as to prevent it from gaining in thickness or swelling up under the action of the sliding plate. When the rotation of the cam-wheel has carried the cams past the levers D and F, they are drawn against the reduced sides of the cams by the action of the spring E, and the jaw and sliding plate are thus made to recede to their normal position and thereby release the leaf. The cams are so constructed as that their throw shall give sufficient movement to the sliding plate and to the jaw to straighten the plate and cause it to retain its thickness and no more.

The machine in all its parts is to be made of metal, and strong enough to endure the force employed in its operations.

When one end of the leaf has been straightened, it is immediately taken out of the press and the other end is laid upon the table to be operated upon.

Instead of using a jaw like *d*, operated by a cam to hold the leaf against "bulging" under the pressure on its edges, we can effect the desired end by causing a hammer to fall, by means of a wiper on the cam-wheel or on its shaft, upon the leaf at the instant the cam C has made its greatest throw, and thereby flutten it and cause its edges to lie snugly against the rim *f* and the edge of the sliding plate *a*.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. The combination of the sliding plate *a* and the jaw *d* with the table A^3 and its rim *f*, constructed and operating substantially as and for the purpose above described.

2. The combination of the levers which operate the jaw *d* and sliding plate *a* with the cams C C′ and the spring E or its equivalent, all constructed substantially as above described.

JAMES W. GRAY.
CHARLES H. CURTIS.

Witnesses:
JEWETT PECK,
JOSEPH THOMPSON.