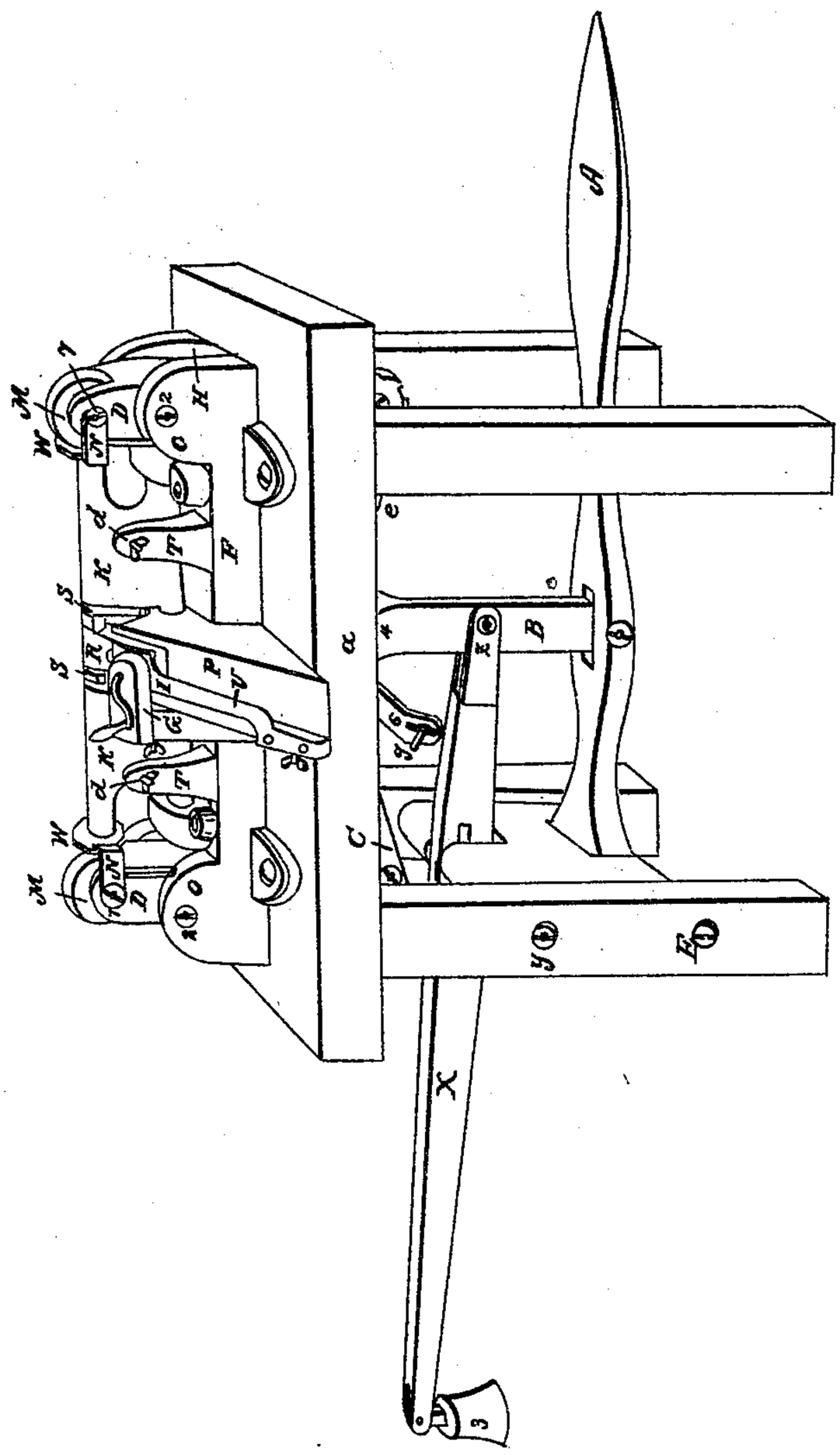
2 Sheets—Sheet 1.

W. T. RICHARDS.

Machine for Making Springs.

No. 2,367.

Patented Nov. 16, 1841.



Witnesses:
A. H. Bailey,
Amon Bailey.

Inventor:
William T. Richards.

2 Sheets—Sheet 2.

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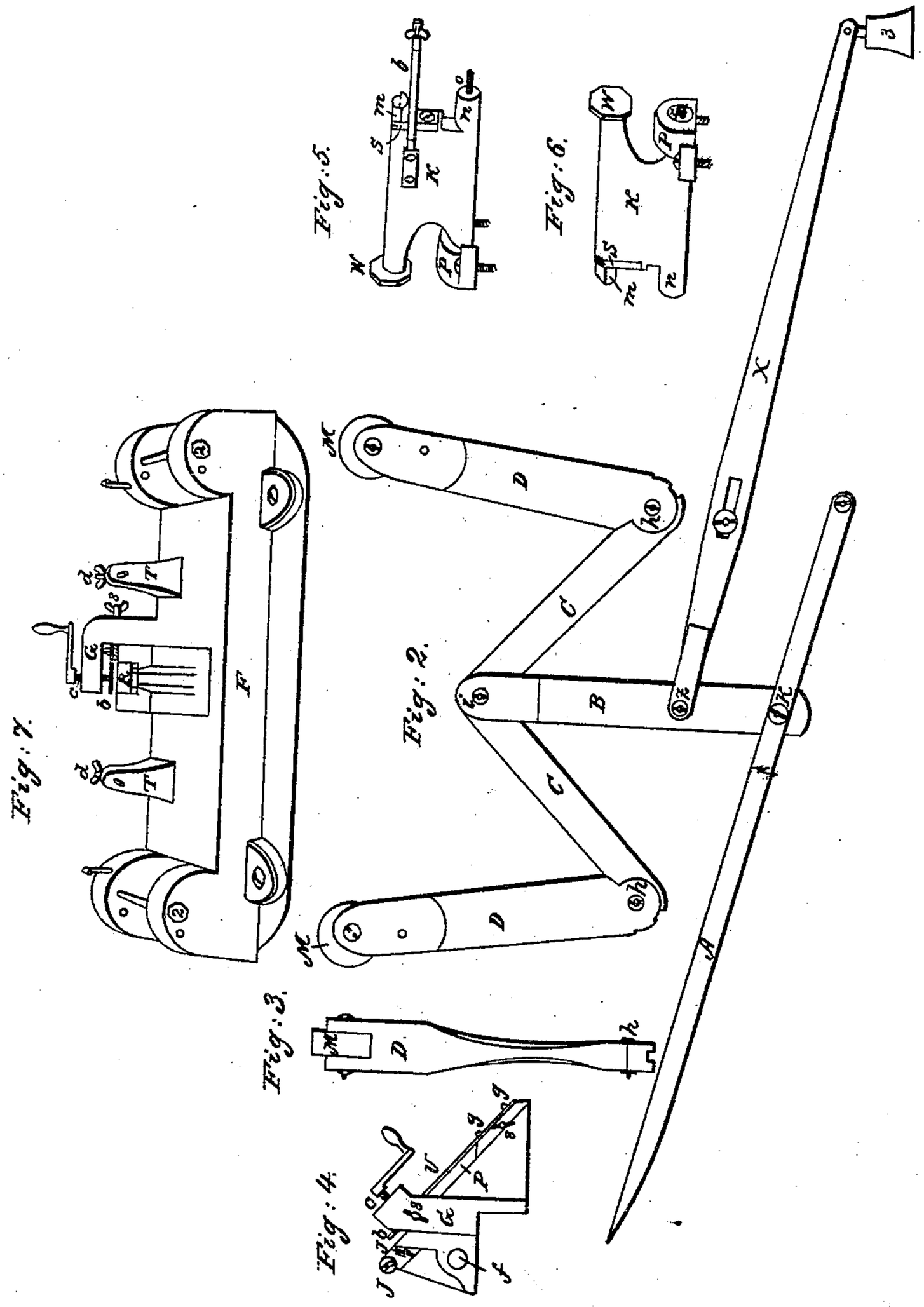

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UNITED STATES PATENT OFFICE.

WILLIAM T. RICHARDS, OF POULTNEY, VERMONT.

MACHINE FOR FORMING THE SOCKETS OF ELLIPTICAL SPRINGS.

Specification of Letters Patent No. 2,367, dated November 16, 1841.

To all whom it may concern:

Be it known that I, WILLIAM T. RICHARDS, of Poultney, in the county of Rutland and State of Vermont, have invented a new and Improved Mode of Manufacturing Elliptical Springs, and do hereby declare that the following is a full and exact description.

The nature of my invention consists in forming by machinery the sockets, (required upon the ends of the upper springs to receive the lower springs so as to form the joints) instead of forming such sockets by hand.

To enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation.

My machine is mounted upon a substantial four legged bench *a*, Figure 1, suitably constructed for the purpose, through which a channel is made, about two feet seven inches in length and about five inches wide. The lever A is suspended at one end upon a pin which passes through the legs of the bench at E; the other end of the lever extends between the left hand legs of the bench.

A vertical pitman B, Figs. 1 and 2, sixteen inches long, is mounted upon this lever at the distance of one foot from its fulcrum E. The upper end of this pitman is attached to the vertex *i*, Fig. 2, (which is a hinge joint) of the angle of an elbow C C as represented in the figure. The arms of the elbow C C are each fifteen inches long. Two vertical levers D D, about seventeen inches long, are attached to the ends of these arms, in a manner to form joints, as shown at *h h*. In the upper ends of these levers are inserted the friction rollers M M. The pitman, elbow, vertical levers, and rollers aforesaid, should be metallic.

Upon the bench *a*, Fig. 1, is placed a metallic bed piece F, two feet eight inches long and eight inches wide. A slit H, five inches long and three and a half wide, is made at each end of the bed piece through which the vertical levers D D extend. From each corner of the bed-piece an ear *o o o o* rises about 4 inches above its surface. Through these ears, and through the vertical levers D D, about three inches below the centers of the friction rollers, pass two pins 2 2 which are the fulcrums of said levers. The inclined plane P is cast with the bed piece, is about four inches wide, at its apex near the front of the machine it is five inches above the surface of the bed piece, and is inclined backward at an angle of about forty-five degrees below a level. This plane constitutes the lower jaw of a clamp as shown in sectional drawing, Fig. 4.

The upper jaw *b* is a plate of iron three inches square, suspended upon the spring U which is attached to the inclined plane as at *g g*. An elbow G, Fig. 7, projects over the clamp and serves as a beam and nut through which the screw *c* passes and bears upon the upper jaw *b* of the clamp. The shear stocks K K′, Figs. 5 and 6, are each seven inches long and five wide, of cast iron, and are attached to the bed piece near the front of the machine by boxes and gudgeons, so as to admit of their being turned backward and forward, at pleasure, and also of being slid one inch or more to the right and left. They are represented, K K′, Fig. 1, in a vertical position. A rod *l*, Fig. 5, is fastened to the front side of the shear stock K′ and extends to the front of shear stock K, Fig. 6, (when they are placed in the machine) so that when the former, K′, is turned from a horizontal to a vertical position, this rod shall turn the latter, K, with it. The guide screw, seen in the end of this rod, bears against the shear stock K, so that in being turned, they shall both move in exactly the same plane. The two arms on the lower side of each shear stock are the gudgeons on which it turns. In the end of each inner gudgeon *n n*, Figs. 5 and 6, at the center, *o*, a hole is drilled, half an inch in diameter and two inches deep. Another hole, *f*, Fig. 4, one inch and a half in diameter, is made through the elevation which supports the inclined plane and into which the gudgeons are inserted. A spiral spring extends through this hole, into those in the ends of the gudgeons which serves to keep the shear stocks always sufficiently apart.

In the outer arms on the upper edges of the shear stocks, two bolts with large heads W W Fig. 1 are inserted, and by screwing these in or out the shear stocks may be varied in length. Two hooks N N are attached to the vertical levers D D at 7, 7, the object of which is, by catching the bolt heads W W to draw the shear stocks back from the form R, when the lever A is raised. The spiral spring, above mentioned, alone, would force the shear stocks too far apart, so that in turning them up vertically the bolt heads W W would strike against the friction roll-

ers M M. To prevent this two guide screws (as at *r*, Fig. 6) are inserted in the ends of the outer gudgeons of the shear stocks, which the spiral spring aforesaid causes to bear constantly against the vertical levers D D. These levers are always in the same position when the lever A is raised, which is the only time that the shear stocks are turned up to a vertical position. These guide screws are therefore so set that when the shear stocks are turned up each bolt head W will take its place between the friction roller M and the end of the hook N.

The shears or dies S S are small plates of steel attached to the inner ends of the shear stocks as in Figs. 5 and 6 with cylindrical projections *m m* about an inch and a half in length from their upper ends. Around the lower parts of each of these cylinders, is a semicircular projection, presenting at its end a beveled edge which acts as one blade of a pair of shears. A steel form four inches long and two wide, R Figs. 1 and 4 is dovetailed into the upper end of the inclined plane, its face coinciding with the inclined plane, and is fastened by a screw. Its upper end is rounded into a shape suitable for forming the socket of a spring upon it. About one inch from this end, and, on each side, the form is cut away to the depth of one fourth of an inch so as to leave the semicircular edge J J Fig. 4 which together with the beveled edges above mentioned on the shears or dies form two sets of shears. A hole as at *s* is made to receive the punches in the dies. This form at the end may be varied in width for springs of different sizes. When this is done, the set screws, as at *r* Fig. 6 and the bolts W W Fig. 1 must be varied inversely, so that the distance between the bolt heads may continue the same. The guide screw 8, Figs. 1 and 7, passes through the elbow G to assist in placing the spring rightly upon the inclined plane. Also two guide screws *d d* are set in two standards T T, cast on the bed piece for that purpose, so that when the shear stocks are turned up against them, the shears S S Fig. 1 shall correspond with the form R. A gage 6 is attached to the bench *a* with a slit or groove at its end through which a pin passes, which may be moved in its groove and confined by means of a shoulder nut and screw. This gage at its slant is in the same plane with P. The lever X is attached to the pitman B, bearing upon a pin at Y, with a weight 3 suspended upon its long arm, as a counterpoise to the lever A.

The operation of this machine is as follows. The gage 5 Fig. 1 is first set at a distance from the end of the form R, equal to half the required length of the spring. The lever A is raised up to the bench and the shear stocks are turned forward. A plate of steel of suitable dimensions for a spring is previously prepared by punching a hole in the center and welding an ear on each corner at one end. The plate is then heated, and placed upon the inclined plane, with the pin 5 passing through the hole in its center, and with one edge bearing against the guide screw 8; it is there confined by the clamp 1. The end of the spring is smoothly forged over the end and sides of the form. It is then heated again if necessary and placed as before. The shear stocks are turned up against the standards T T, the lever A is depressed, causing the vertical pitman B to descend, which increases the angle of the elbow C C Figs. 1 or 2, forces the lower arms of the levers D D asunder, and consequently, causes the upper arms to approach each other. The friction rollers M M bearing upon the bolt heads W W, drive the shears and punches S S toward the form R, causing them to trim the ears, and punch the holes of the sockets with one operation.

What I claim as my invention and desire to secure by Letters Patent is—

1. The method above described of forming the sockets of elliptical springs by placing them upon the form R and acting upon them by means of the shears S S, in the manner and for the purpose substantially as herein described.

2. I also claim the clamp and gage in combination with the form for the purpose and in the manner described.

3. And I further claim the shears in combination with the stocks constructed and operating substantially as herein described, whereby the shears can be moved out of the way to enable the operator to get at the form.

WILLIAM T. RICHARDS.

Witnesses:
AMON BAILEY,
A. H. BAILEY.