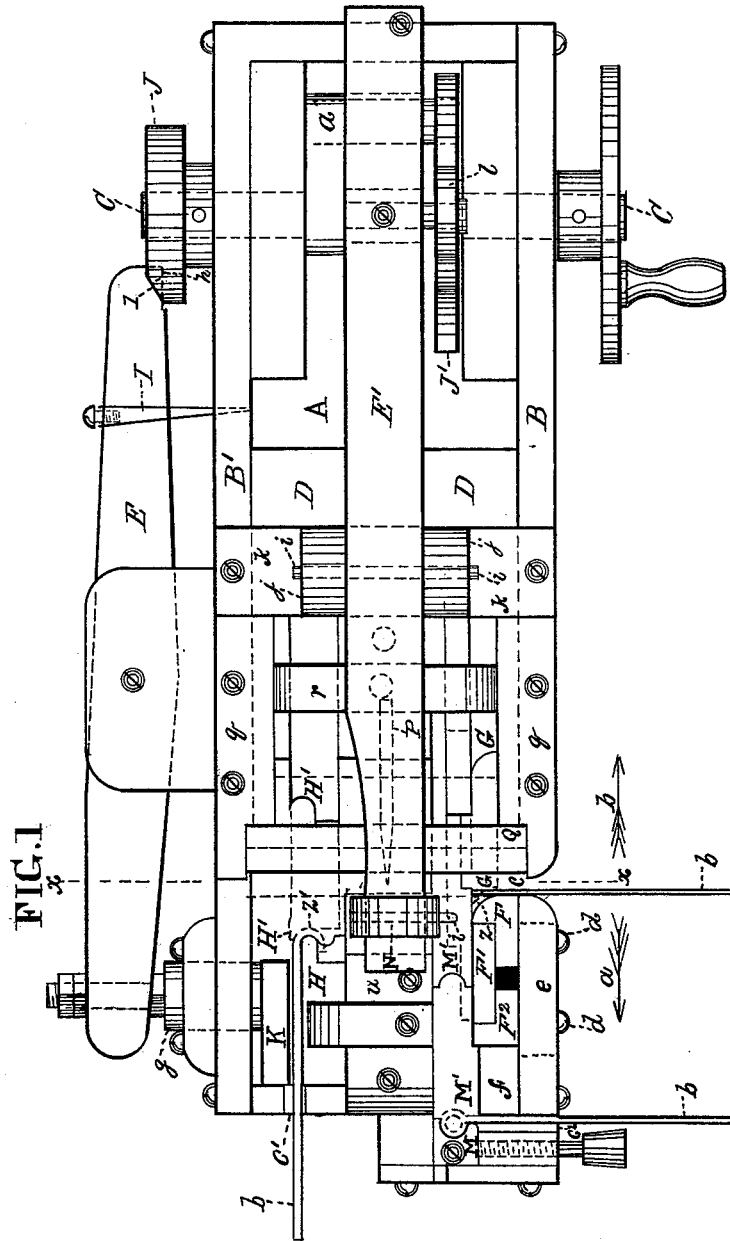


J. EVANS.

Machine for Forming the Eyes of Carriage-Springs.
No. 220,711. Patented Oct. 21, 1879.



Witnesses.

Thomas J. Bewley.

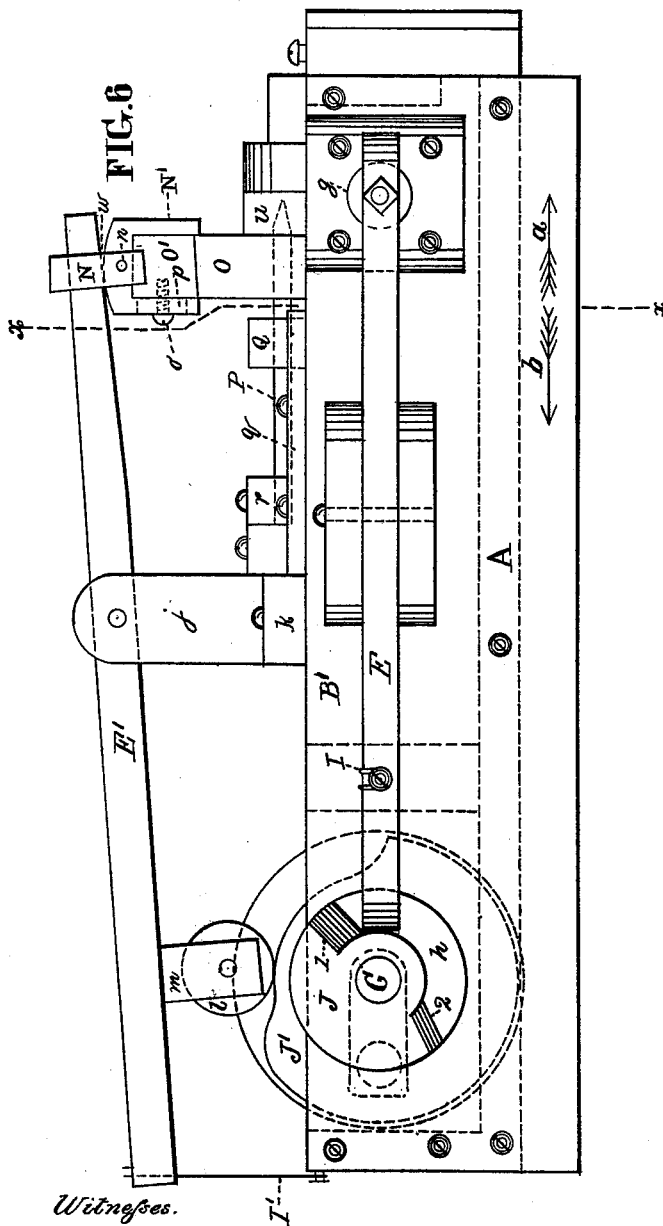
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J. EVANS.
Machine for Forming the Eyes of Carriage-Springs.
No. 220,711.
Patented Oct. 21, 1879.



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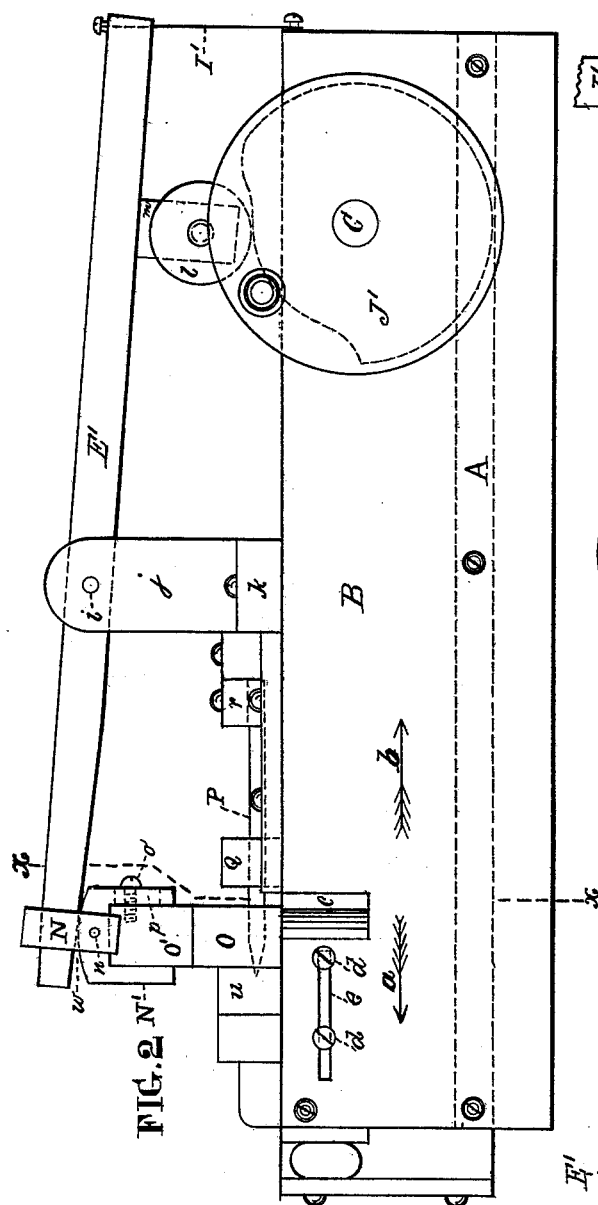


FIG. 2



FIG. 5

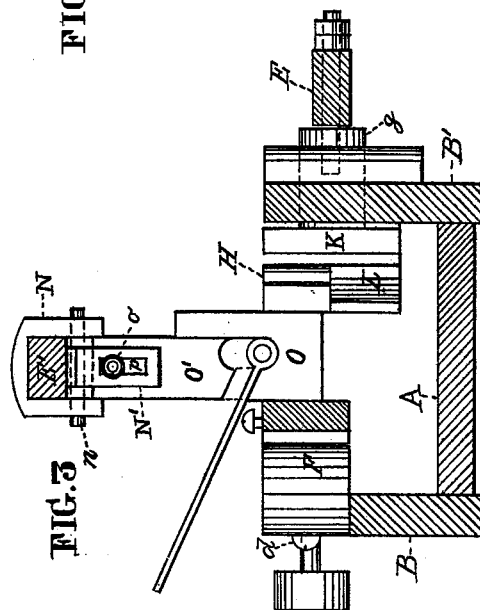


FIG. 3

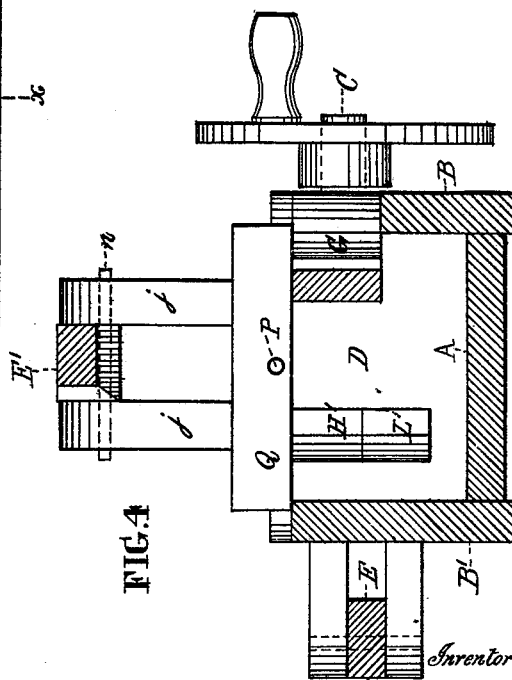


FIG. 4

Witnesses

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UNITED STATES PATENT OFFICE.

JOHN EVANS, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN MACHINES FOR FORMING THE EYES OF CARRIAGE-SPRINGS.

Specification forming part of Letters Patent No. **220,711**, dated October 21, 1879; application filed February 13, 1879.

To all whom it may concern:

Be it known that I, JOHN EVANS, of the city and county of Philadelphia, in the State of Pennsylvania, have invented a new and useful Improvement in Machines for Forming the Eyes of Carriage-Springs, of which the following is a specification.

My invention consists of a series of stationary and movable dies for forming the eyes of carriage-springs and mechanism for operating the movable dies, as hereinafter fully described.

In the accompanying drawings, which make a part of this specification, Figure 1 is a plan view of my improved machine. Fig. 2, Sheet No. 2, is a side elevation of the same. Fig. 3 is a cross-section at the broken line *x x* of Figs. 1, 2, and 6, looking in the direction of the arrows *a*. Fig. 4 is a like section at the same lines, looking in the direction of the arrows *b*. Fig. 5 is a top view of the dies *L L'* detached from the machine, having the finished bent eye of the plate between them. Fig. 6, Sheet No. 3, is a rear elevation of the machine.

Like letters of reference in all the figures indicate the same parts.

To the bed-plate *A* are firmly secured the housings *B* and *B'*, between which the stationary and movable dies are situated.

C is the driving-shaft, having a crank, *a*, for giving a reciprocating movement to the slide *D*, to which the movable dies for bending the eyes are attached, the slide being brought to its outward position for opening the dies, as shown in full lines, and returned to its inward position for closing the dies, as shown in dotted lines, in each pair of dies the bend given by them respectively being also shown by dotted lines.

The shaft *C* is provided with cams *J* and *J'*, that operate the levers *E* and *E'*, fully described hereinafter.

There is a sectional stationary die consisting of the pieces *F*, *F'*, and *F''*, in combination with the movable die *G*, for thinning one end of the plate *b* and giving it the first bend, *Z*, which is shown by dotted lines in Fig. 1, one end of the plate being previously placed in the cross-slot *c* of the housing *B*. The piece *F'* is held in the *L*-shaped rabbets of the pieces

F and *F''*, which are secured to the inner side of the housing *B* by means of the screws *d d*, which pass through the slot *e* of the housing, the piece *F''* resting against the abutment *f*.

Each corner of the sectional piece *F'* may be used by reversing the ends and the sides of the piece, so as to bring each corner in succession to the position for operation, and hence the die only requires sharpening one-fourth as often as a solid die. Besides, the sharpening may be expeditiously effected by grinding the ends of the piece *F'*, while a solid die would have to be subjected to the less expeditious mode of filing. To compensate for shortening the die by grinding, packing should be placed between the abutment *f* and the piece *F''*.

The second bend, *Z'*, of the eye is formed by means of the stationary die *H* and the movable die *H'* after placing the plate in the longitudinal vertical slot *c'* at the opposite side of the machine, the slot being opened to receive the plate by the joint action of the lever *E*, spring *I*, and cam-wheel *J*, withdrawing the follower *K*, which is connected to the lever by means of the stem *g*, adjustable by means of nuts on its outer end, packing at the inside of the lever in accommodation to plates of different thickness.

The follower is opened by the handle of the lever being forced into the depression *h* of the cam-wheel by the action of the spring *I* as the incline *I* passes it. Before the movable die *H'* reaches the plate the follower *K* is brought against the latter, and clamps it tightly against the flat side of the stationary die *H* by a reverse movement of the lever given by the incline 2 of the cam-wheel.

After the bend *Z'* is made as described, while the slide *D* is returning to its opened position the follower *K* is caused to recede from the plate by the action of the lever *E*, as above described, and the plate is dropped down to the bottom of the slot *C'*, to have the finishing-bend *Z''* given to it by means of the stationary die *L* and movable die *L'*. The result of the action of this pair of dies is shown in the detached view, Fig. 5.

For bringing the straight part of the plate to the middle of the eye after the completion of the bend when this form is required, the

plate is placed in the cross-slot C² at the front side of the machine and operated upon by the stationary die M and movable die M'.

The movable and stationary dies are all detachable for the purpose of changing them for other dies of different sizes and forms.

The lever E' is hung on the fulcrum *i* between the standards *j j*, which project from the cross-bar *k*, which is bolted fast to the housings B and B'. The lever is operated by means of the cam J', the friction-wheel *l*, connected to the arm *m* of the lever, resting upon the periphery of the cam, and being held in connection therewith by means of the spring I'. To the operating end of the lever is connected the double yokes N and N', for the connection of the vertical and movable die O', the end of the lever being placed in the opening *w* formed by the connection of the two yokes, in which it has free play. The yoke N' is connected to the yoke N by means of the joint-pin *n*, and the die O' is held in the yoke N' by means of the screw *o*, which passes through the slot *p* of one arm of the yoke, the slot admitting of the adjustment of the die. P is a mandrel having one end fast in the slide D. After the die O' is brought to its closed position upon the die O, the mandrel is brought into the eye to open it and round up its exterior surface. The mandrel is brought to a point to insure a free entrance into the die and cause it to advance freely through it. The mandrel in the reciprocating

movements of the slide D slides in an opening of the follower Q, the ends of which rest upon the housings in the notches of the cap-plates *q q*, which form an upper guide for the slide D. As the slide is brought to the end of its inward stroke the cross-piece *r* connected to its upper side bears against follower Q, and forces it forward, so as to press the ends of the eye between it and the abutment *u*, to square the ends.

I claim as my invention—

1. The sectional die, consisting of the pieces F, F¹, and F², the pieces F and F² having L-shaped rabbets, substantially as and for the purpose set forth.

2. The dies L and L', arranged beneath the dies H and H', for giving the third and finishing-bend Z² to the eye of the plate *b* before removing it from the machine, substantially as set forth.

3. The combination of the lever E, spring I, cam-wheel J, and follower K with the dies H and L, substantially in the manner and for the purpose set forth.

4. The combination of the dies O and O', yokes N and N', mandrel P, follower Q, abutment *u*, and slide D, for rounding up the eye and squaring its ends at one operation, substantially as set forth.

JOHN EVANS.

Witnesses:

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THOMAS J. BEWLEY.