(No Model.) 3 Sheets—Sheet 1.

T. A. LATHROP.

SPRING SETTING MACHINE.

No. 600,877. Patented Mar. 22, 1898.

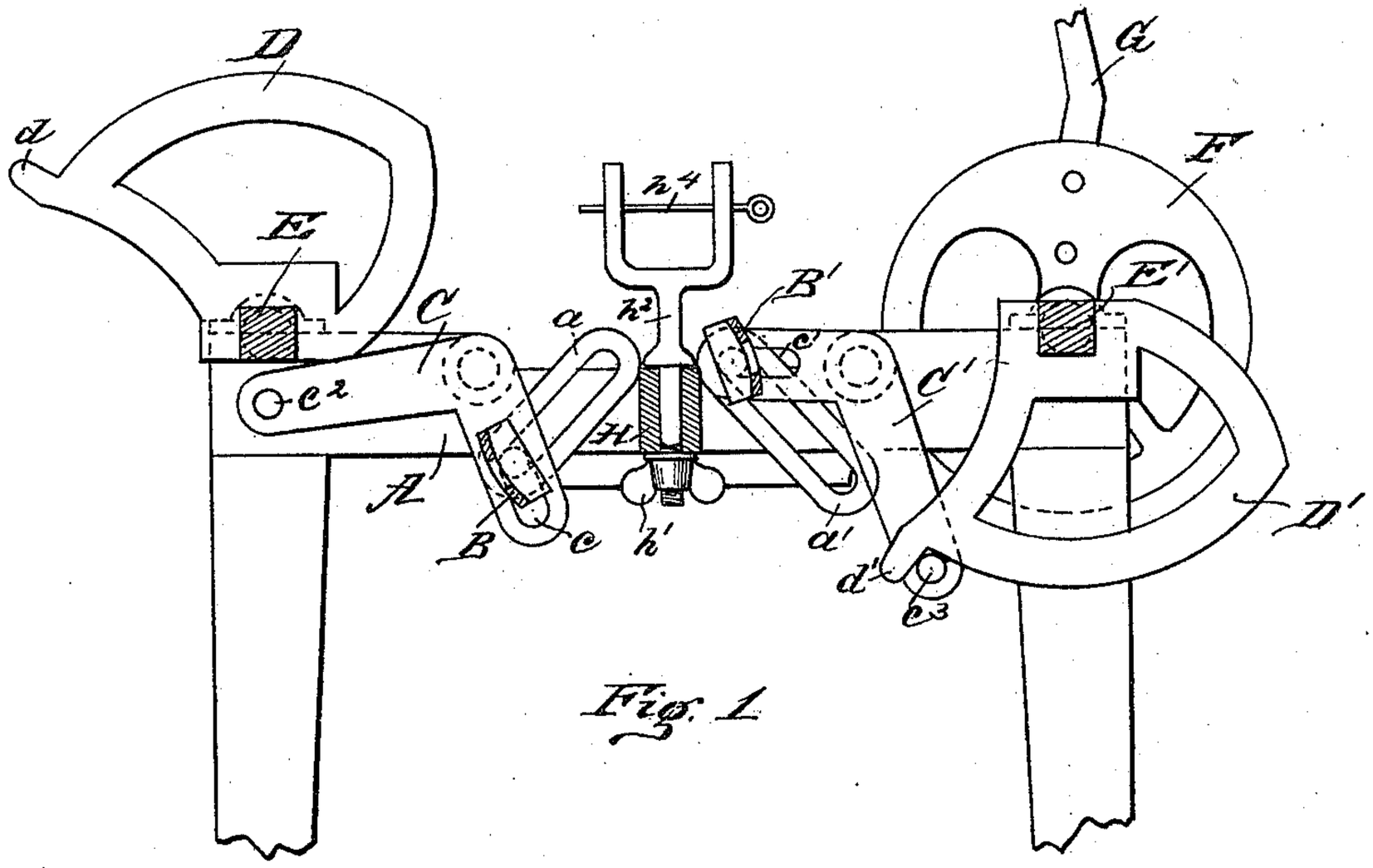

Fig. 1.

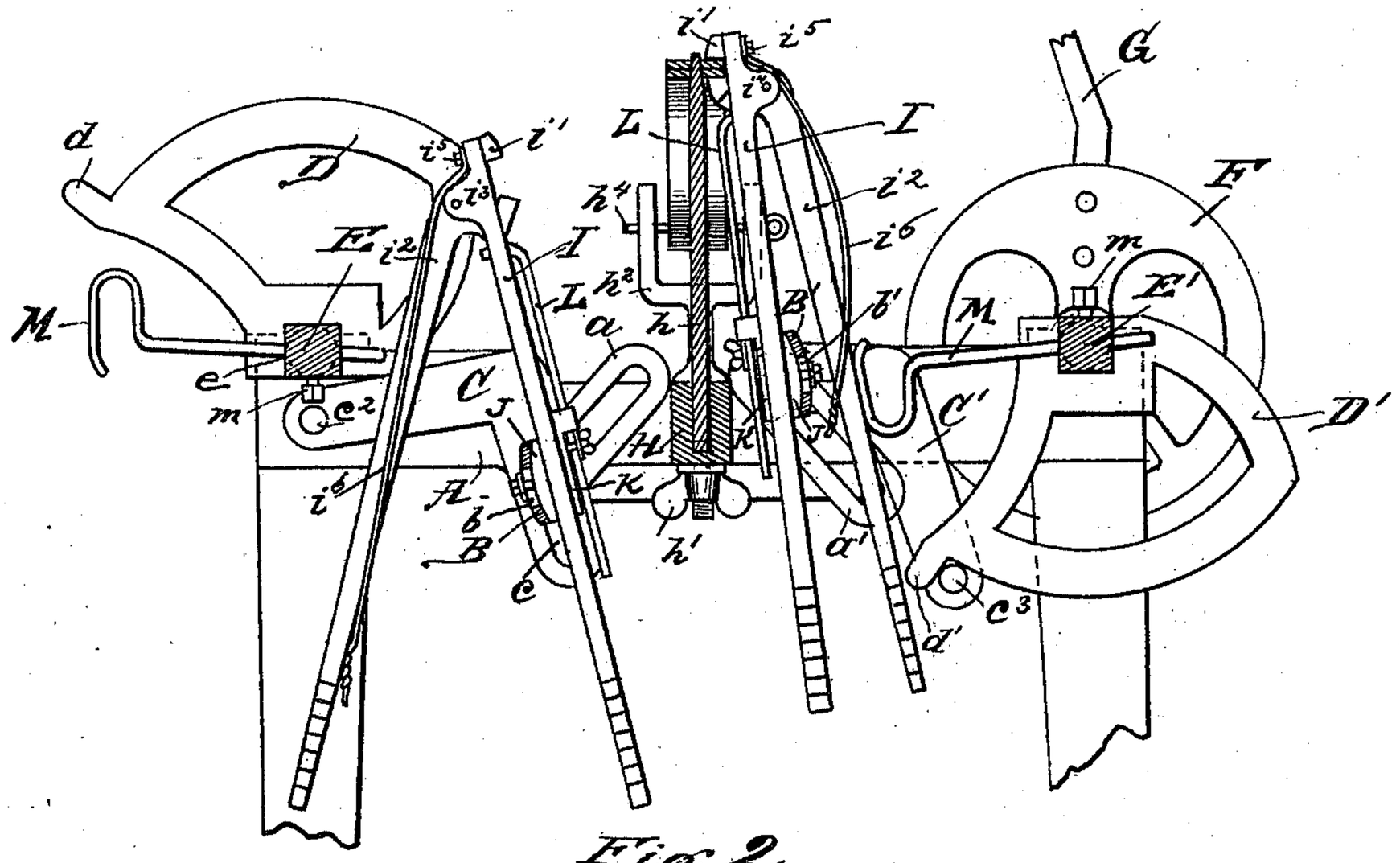

Fig. 2.

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3 Sheets—Sheet 2.

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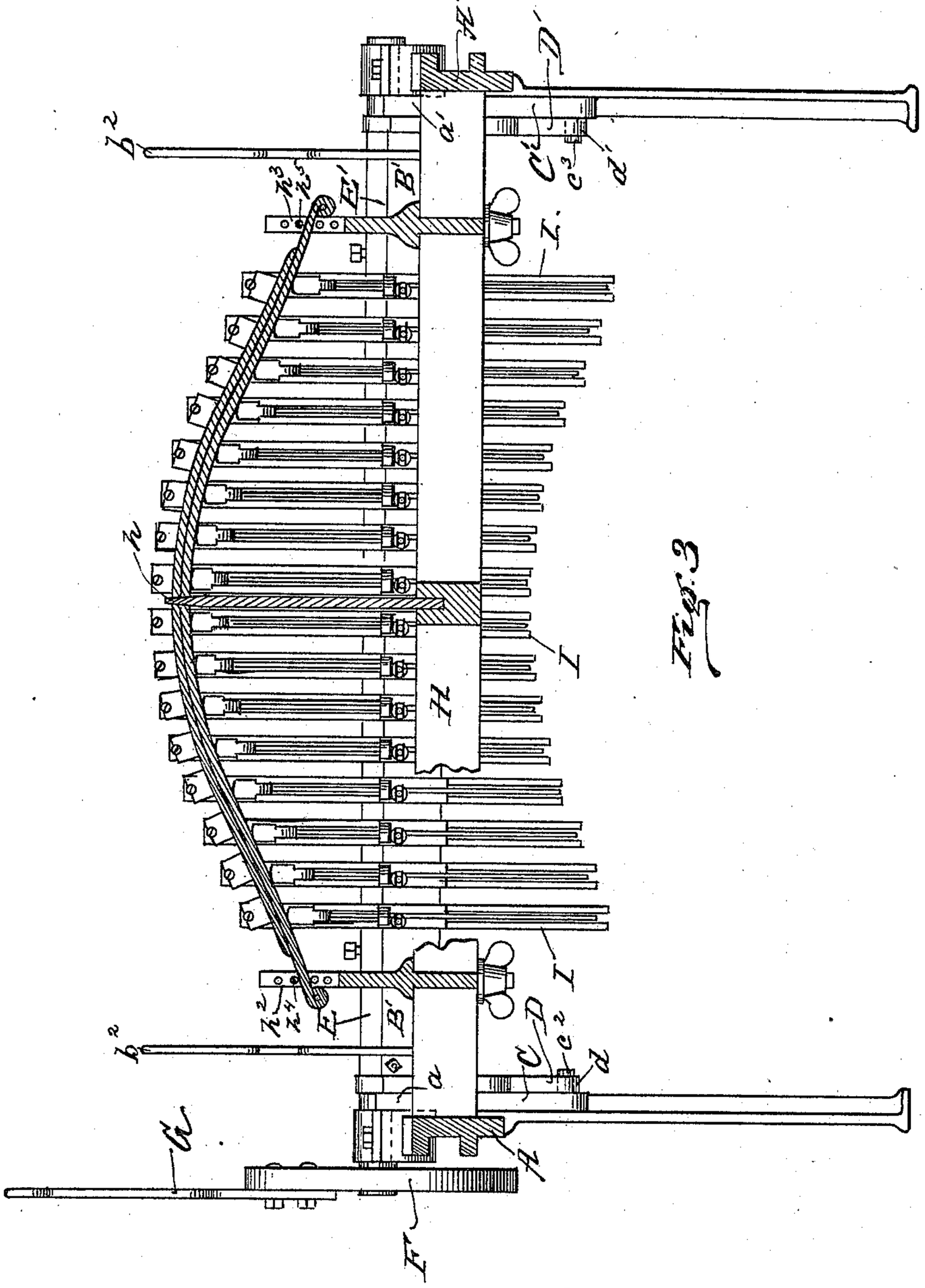

Fig. 3

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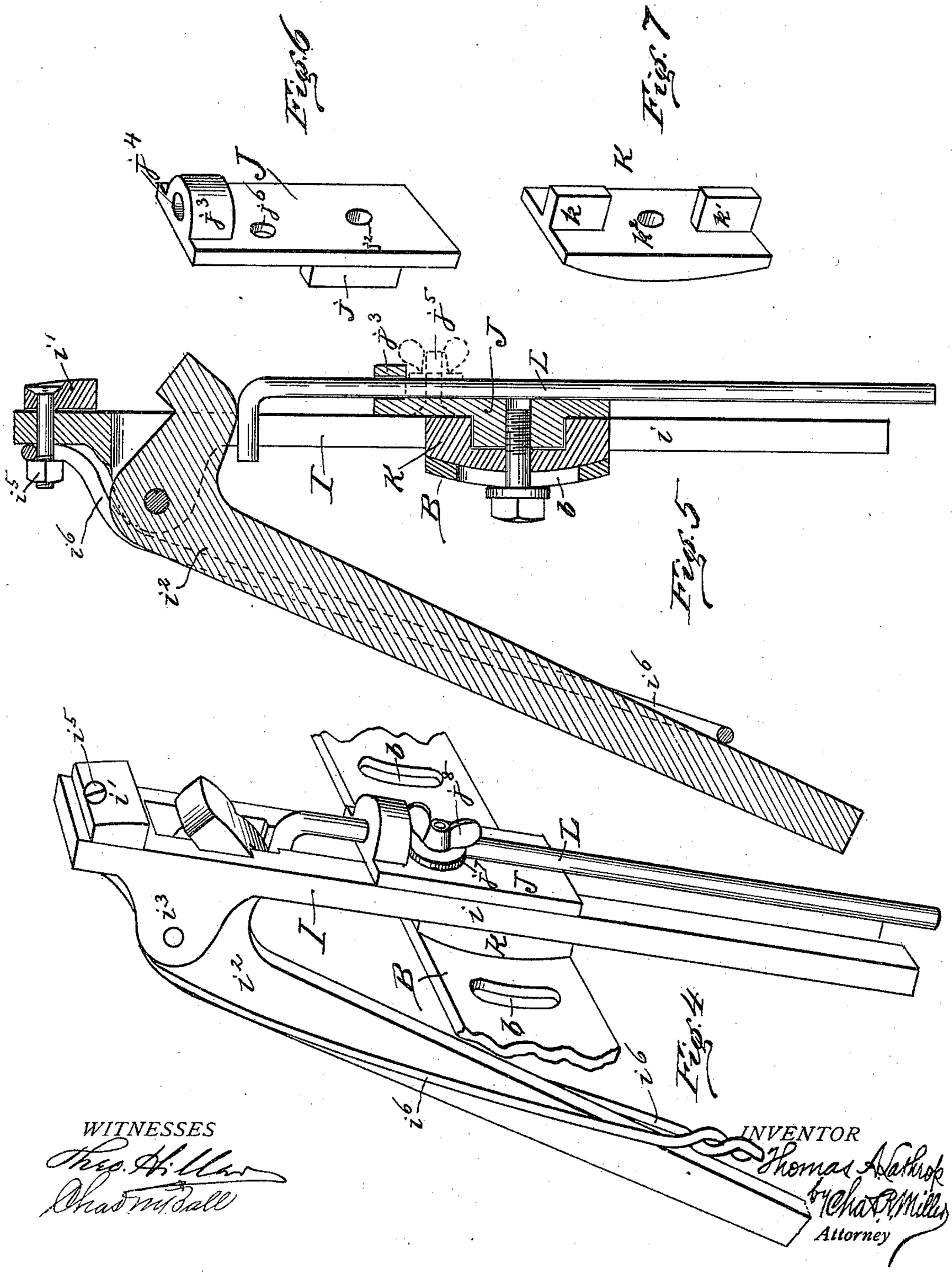

UNITED STATES PATENT OFFICE.

THOMAS A. LATHROP, OF KALAMAZOO, MICHIGAN.

SPRING-SETTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 600,877, dated March 22, 1898.

Application filed September 16, 1897. Serial No. 651,933. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. LATHROP, a citizen of the United States, and a resident of the city of Kalamazoo, county of Kalamazoo, State of Michigan, have invented a new and useful Improvement in Spring-Setting Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

My invention relates to improvements in machines for spring-setting; and it consists of a series of tongs of any desired number mounted upon a movable carrier, each pair of tongs being capable of an independent adjustment, and means for mechanically raising and lowering the tong-rack to engage and disengage the tongs with the springs and mechanically applying pressure thereto, so as to clamp the various parts of the spring together, as will be hereinafter more fully set forth.

In the accompanying drawings similar letters of reference refer to similar parts.

Figure 1 is an interior end view of one side of the machine. Fig. 2 is a sectional view through the center of the machine. Fig. 3 is a longitudinal sectional view from end to end through the center of the machine, showing the tongs closed upon one side thereof. Fig. 4 is a perspective view of one of the tongs attached to the tong-carrying bar. Fig. 5 is a sectional view through one of the tongs and the tong-carrying bar, showing the method of attachment thereto. Fig. 6 is a perspective view of one portion of the clamping-block by means of which the tongs are held in engagement with the tong-carrying rack and bar, and Fig. 7 is a similar view of another portion of the clamping-block.

A and A′ represent the side bars of the frame of the machine, which are supported by legs at either end, attached thereto by bolts or otherwise, as may be desired.

Mounted upon the side bars A and A′ and upon either side of the center thereof there are camways *a a′*, in which are mounted the tong-carrying bars B and B′ upon either side of the center of the machine and extending from end to end. These tong-carrying bars B and B′ may be either concave or convex; but I have shown them and prefer to use them convex in form and terminating at either end in circular lugs or bars which engage with and move in the cam-racks *a a′*.

Pivotally journaled in the end bars A and A′ of the machine are cranked levers C and C′, in the inner end of which there are slotted apertures, as *c c′*, which engage the lugs upon the ends of the tong-carrying bars B and B′. At the outer end of each of the levers C C′ there are provided pins c^2 and c^3, which engage with projecting lugs *d d′* on the cams D and D′, mounted upon shafts E E′ at each end of the end bars A A′. These shafts extend longitudinally from side to side and are square, terminating, however, in circular lugs or bearings which pass clear through the boxes on the corners of the machine and carry at opposite ends the balance-wheels F, to which are attached by bolts or otherwise the handles G. Through the center of the machine and extending longitudinally from end to end and bolted at either end to the end bars A and A′ there is provided a slotted supporting-bar H to carry the center pin *h*. Similarly mounted thereon are the bifurcated end supporting-pins h^2 and h^3, which can either be held in position thereon by means of the thumb-screw *h′*, as shown, or by wedges or any of the well-known means, the object being to have them capable of longitudinal adjustment, so as to conform to the size of the spring to be operated upon. Holes are provided in the upright or bifurcated portion of the supporting-bars h^2 and h^3 to carry the pins h^4 and h^5, which pins engage with the ends of the springs.

Referring now to the tong-carrying bars B and B′, heretofore referred to, they are provided with vertical slots *b* and *b′*, through which there are passed screw-seated bolts, by means of which the clamping-block and tongs are held in engagement therewith. To either end of these bars there may be attached stops or handles b^2. The tongs I, adapted to be mounted thereon, are of the form shown in Fig. 4. The inner member thereof *i* is substantially U-shaped, the limbs thereof adapted to receive lugs upon the clamping-blocks, as will be hereinafter more fully described. To the upper portion of the inner member *i* there is pivoted a block *i′*, forming the upper jaw. The blocks *i′*, being pivotally attached, are rendered capable of adjustment to the

curvature of the spring. The outer member i^2 of the tongs is substantially L shape in form, terminating in a slightly-curved jaw, and is pivotally mounted upon extensions or brackets i^3 and i^4 upon either side of the upper portion of the inner member of the tongs i. For the purpose of holding the tongs in an open position there is attached to the upper part of the tongs by means of the bolt i^5 a wire spring i^6, which passes down upon either side of the outer member i^2 and terminates on the inside thereof.

The clamping-blocks J and K, by which the tongs are held loosely in engagement with the tong-carrying bar, are shown in Figs. 6 and 7. The inner portion of the part K is made to conform in shape to the tong-carrying bar and has upon its outer surface lugs k and k', and through the center thereof there is a perforation or hole k^2, through which there is passed the bolt heretofore referred to. The part J is substantially flat, having upon its inner side a projecting lug j, which passes between the limbs of the inner member of the tongs. These lugs serve to hold the clamping-blocks J and K apart and permit the tongs to slide up and down upon the tong-carrying bar. Through the center of the clamping-block J and the projecting lug j there is provided an opening or hole j^2 to permit of the passage of the bolt heretofore referred to. At the upper portion of the part J there is provided a lug j^3, having a hole j^4 therein to carry the L-shaped pin L, which passes up under the lower jaw of the tongs and as they are opened causes the tongs to raise vertically and raise the upper jaw from the spring. This rod L is held in adjustment upon the block J by means of a T-headed nut j^5, passing through the hole j^6 and carrying a clamping-plate j^7 and a thumb screw or nut j^8.

Referring now to the shafts E and E′, heretofore referred to, there are provided along their entire length openings or holes e, in which are mounted the adjustable finger-springs M. These springs are held in engagement with the shafts by means of screw-bolts m, the ends thereof engaging with the adjustable finger-springs M, and by means of these bolts the finger-springs may be adjusted forward or backward, so as to produce a greater or less pressure upon the tongs for the purpose of closing them. The outer end of the finger-springs M is substantially U-shaped, so as to produce an elastic pressure upon the tongs when the shafts E and E′ shall have been revolved or turned around by means of the levers G and G′.

In operation a sufficient number of tongs to conform to the size of the spring to be operated upon are adjusted upon the tong-carrying bars. The back or main leaf of the spring is then supported upon the center post h, a leaf is placed thereon, and the ends of the spring engage with the rods h^4 and h^5, passing through the bifurcated upper end of the supporting-bars h^2 and h^3 at either end of the machine. The handles or levers G and G′ are then raised, and the cams engage the levers C and C′ upon the sides of the machine and cause the tong-supporting bars B and B′ to travel up in the cam-racks a and a', so that the jaws of the tongs pass over and under the leaves of the spring. At the same time the shafts E and E′ are caused to revolve, carrying with them the finger-springs M, which engage with the free member of the tongs and close the tongs against the leaves of the spring, clamping and setting the same in position with the one operation. In case it is desired to add additional leaves to the spring the levers G and G′ are lowered, when the finger-springs M are turned backward. At the same time the tongs are freed from engagement with the spring and carried backward, and another leaf is placed in position, as heretofore described, when the operation is repeated.

Heretofore the process of spring-setting has been mostly carried on by hand. The back of the spring, together with the leaf to be set thereto, were heated and placed upon a supporting-rack, when the operators—two in number, one upon each side—with tongs pressed the leaf and back together, going over the entire portion of the spring in the way described. It will be observed that by means of my device the whole operation can be conducted by one man and in much less time, and by reason of the saving in time the whole surface of the parts to be set are clamped together before any change in temperature takes place.

It is manifest that various changes in the appearance and construction may be made without departing from the spirit of my invention, and I do not desire to limit myself to the particular construction shown.

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

1. In a spring-setting machine, a series of tongs of any desired number, adjustably mounted upon movable carrier-bars, and means for raising and lowering the tong bar or rack to engage and disengage the tongs with the spring, and means for operating the tongs, substantially as described and for the purpose set forth.

2. The combination in a spring-setting machine, of a frame having attached thereto camways, carrying tong bars or racks, to which are adjustably attached tongs, crank-levers pivoted to the frame and engaging the tong-carrying bar or rack, cams engaging therewith, and shafts carrying adjustable spring-fingers for engagement with the tongs, substantially as described and for the purpose set forth.

3. The combination in a spring-setting machine, of a traveling tong-carrying rack mounted in camways attached to both ends of the supporting-frames, and crank-levers pivotally attached to the supporting-frame, the inner ends thereof having a slotted engage-

ment with the tong-rack, and cams mounted upon shafts and adapted to engage the free ends of the crank-levers, adjustable spring-fingers mounted in the shaft, and operating-levers attached to the shaft, substantially as described and for the purpose set forth.

4. The combination in a spring-setting machine, of frames having attached thereto cam-racks carrying tong-supporting bars, with adjustable tongs clamped thereon, crank-levers pivotally attached to the frame, the inner ends thereof having slotted engagement with the tong-carrying racks or bars, longitudinal shafts carrying cams for engagement with the free ends of the crank-levers, adjustable spring-fingers mounted in the shafts, and balanced levers attached to the ends of the shafts, substantially as described and for the purpose set forth.

5. A tong for a spring-setting machine having a slotted inner member to which is pivotally attached at the upper end thereof, the upper jaw, brackets carrying an L-shaped member terminating in the lower jaw, the free ends of the inner member adapted to engage and be held in adjustment with the tong-carrying rack, substantially as described and for the purpose set forth.

6. A two-part tong-clamping block for spring-setting machines, consisting of an inner member, conforming in shape to the tong-carrying rack, and having upon its outer surface, lugs for engagement with overlapping lugs upon the other member, and a locking-bolt by means of which the parts are locked in engagement with each other, and to the tong-carrying bar, substantially as described and for the purpose set forth.

In testimony whereof I have hereunto set my hand this 7th day of September, A. D. 1897.

THOMAS A. LATHROP.

Witnesses:

JOHN W. ADAMS,

F. V. WICKS.