

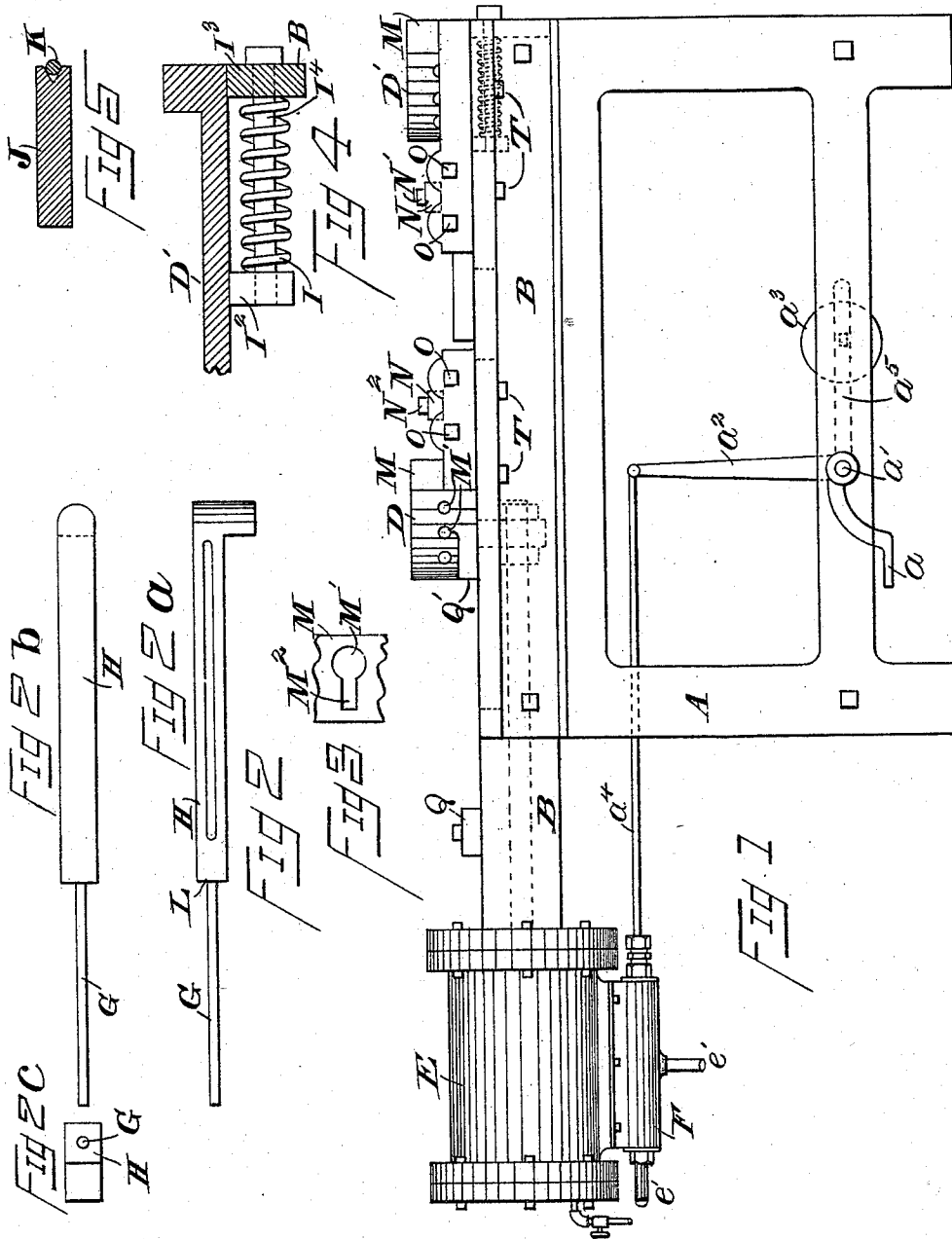
(No Model.)

2 Sheets—Sheet 1.

S. ATKINSON.
MACHINE FOR FORMING SPRINGS.

No. 535,088.

Patented Mar. 5, 1895.



WITNESSES

Wm. A. Jones
H. Smith

INVENTOR

Samuel Atkinson

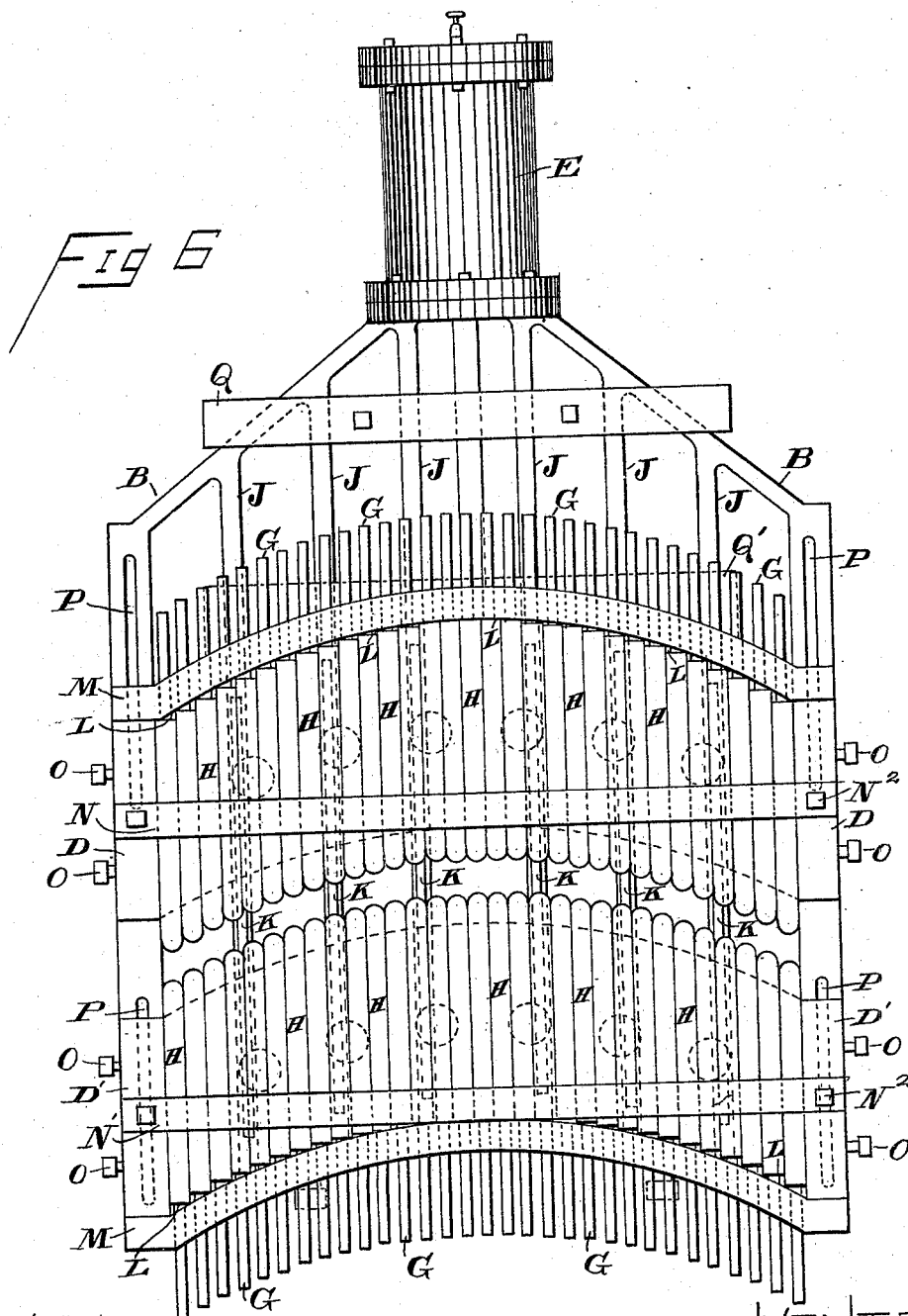
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UNITED STATES PATENT OFFICE.

SAMUEL ATKINSON, OF ELMWOOD PLACE, OHIO.

MACHINE FOR FORMING SPRINGS.

SPECIFICATION forming part of Letters Patent No. 535,088, dated March 5, 1895.

Application filed August 14, 1893. Serial No. 483,109. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL ATKINSON, a citizen of the United States, and a resident of the village of Elmwood Place, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Machines for Forming Springs, of which the following is a specification.

The several features of my invention and the various advantages resulting from their use, conjointly or otherwise, will be apparent from the following description and claims.

The principal function of my invention is the bending of pieces of metal into shape for vehicle springs.

In the accompanying drawings making a part of this application, and to which reference is hereby made and in which similar letters of reference indicate corresponding parts,—
Figure 1, Sheet 1, is a side elevation of a machine illustrating my invention. Fig. 2 shows three detail views of the key that lies on the key board D, D', as shown in Fig. 6, viz: Fig. 2^a is a side elevation of the said key. Fig. 2^b is a top view of the same. Fig. 2^c is a view of that end of the key which faces toward the left in Fig. 2^b. Fig. 3 illustrates the form of that opening in the key boards D and D', through which the tail piece G of key H passes. Fig. 4 shows a mode of combining with the key board D' a spring to enable it to yield under too much pressure and thereby be prevented from being broken. Fig. 5 shows a transverse section of a rib J, and of the bar it slides upon, and illustrates their relative formation as regards one another. Fig. 6, Sheet 2, is a plan view of the machine shown in Fig. 1.

A indicates the supporting frame.

B is the bed on which the key-boards D and D' slide.

E indicates a steam cylinder which has its piston rod connected to the key board D in any desired and suitable manner.

F is a piston slide valve and box by which steam is admitted to the cylinder E and permitted to escape therefrom. Steam enters the slide valve box by the feed pipe *e*, and exhausts at the exit conduit *e'*. This slide valve F is opened and closed by placing the foot on the lever *a*. The latter then rotates shaft *a'*, and thereby moves the arm *a''* of said shaft to

the left, carrying the valve rod *a''* in the same direction and opens valve F, thereby causing the piston rod B to move the key board D toward the key board D'. The key board D is drawn back, by removing the pressure of the foot on the lever *a*. Thereupon the weight *a''* through lever *a''* and the slide valve rod *a''* moves valve F toward the right, admitting steam to the other end of the cylinder E and exhausting the dead steam in the opposite end of the cylinder. In each keyboard are openings to admit a portion of the keys.

Where only one form of spring is to be made, the keys may be of such a relative length as that their working ends will be in the right curve or shape to form such a spring, or the key board may be of such a curve at the surface where the keys rest against it, the keys all being of the same length.

One of the great objects of my invention is to provide a machine which can readily and quickly be adjusted to form a spring of any given curve. I have, therefore, provided these main keys H, and have made openings as M', Fig. 3, in the key boards for receiving these keys. The tail piece G of a key slides in the opening M' of the key board in which it is placed. The shoulder L of the key impinges against the high or equivalent portion of the keyboard. When it is desired that the working end of the key shall be in a more advanced position for co-operating with other keys in forming a different or greater curve in the spring to be shaped, then one or more washers are placed on the tail piece G of the key and between the shoulder L of the latter and adjacent surface of the keyboard. These washers, backed by the keyboard, then form the advanced abutment against which the key rests while in operation.

The openings M', M² in key boards D, D' are made the shape shown so that the end G of key H can be raised up and a washer passed through the round part of the opening M' and dropped down in the slot M². This prevents the taking out of the keys H when it is desired to place washers back of the keys.

In the stationary keyboard D', are located springs I, preferably coiled ones. Each of these springs is located between an abutment I² of the keyboard and a fixed abutment I³

of the frame B. The spring embraces a guide rod I⁴ fixed to the abutment I² of the keyboard and sliding through the abutment I³, or vice versa.

5 The springs are of so great resistive strength as not to yield during the ordinary operations of the machine in forming a spring but when from any cause, an unexpected and extra pressure is brought to bear upon the keys
10 and the keyboard D', the springs I will yield and the keyboard and keys will be preserved from being broken or otherwise injured.

The bed framework B is provided with the ribs J, and the latter are each recessed to receive a steel bar K, on which latter the keyboard D slides. (See Fig. 5.) This steel bar
15 being round, there is small surface contact with the keyboard, thereby greatly reducing the friction of the keyboard in sliding on the frame. Furthermore, when the bars K are worn out, they can be readily replaced at a
20 slight cost, by new ones.

The bars N and N', respectively fastened by bolts N² or otherwise to the keyboards D
25 and D', prevent the keys from rising when shaping a spring.

Set screws O, at the sides of the keyboards, are for tightening the keys from the side, thereby bringing the keys together into one
30 compact operative group.

In the frame B are slots P. Thus each slot allows a cap screw T screwed into the keyboards D or D' to slide back and forth.

The keyboard D' does not have much play,
35 but is so constructed in connection with the springs I as not to be rigid.

The bar Q fixed on the frame and the straight piece Q' on the keyboard D are for straightening the stock (that is the piece of metal to
40 be bent into the form of a spring) before the said stock is put between the keyboards to take its permanent form. The stock is straightened when the keyboard comes back from forming a spring.

45 Many details of the operation of my machine have been already described.

The mode of operation, in general, of my invention is as follows: The stock out of which the spring is to be made is heated more or less,
50 or left cold, as desired. If it needs straightening, it is placed directly in front of the bar Q and between it and the bar Q'. The keyboard D is now forcibly retracted, and the stock straightened between the bars Q and
55 Q'. The stock is now removed and placed between the keyboards D and D', that is to say between the operative line of keys of keyboard D on the one side and the operative line of keys of keyboard D' on the other. It
60 will be understood that the outlines of the

working ends of the keys embody and describe the outline of the curve or curves which it is desired to impart to the stock. Such outlines have been given by adjustment
65 of the keys as aforementioned. The keyboard D and its keys are now advanced, and the stock is forcibly bent between them and the opposing keys of the keyboard D'. Another piece of stock to be straightened has,
70 if desired, been placed directly in front of bar Q. The keyboard D is now retracted, and the stock at bar Q is straightened. Stock to be bent into the spring form is placed against the front edge of the keys of keyboard D' and keyboard D advanced, bending the stock
75 into the form of a spring. The foregoing operations are repeated until the desired amount of stock has been shaped into springs.

I desire it to be understood that I do not limit myself to the special mechanism shown
80 and described for moving the keyboard D, to wit: the steam cylinder E, slide valve, lever a, weight a³ and their connections. On the contrary, the means for moving the keyboard D may be varied. So also the motive power
85 may be varied, as for instance water power or electric force may be employed in lieu of steam, and desired mechanism for rendering such powers effective is to be used.

While the various features of my invention
90 are preferably employed together, one or more of them may be employed separately or in connection with machines for forming springs other than the one herein fully and specifically described.

95 What I claim as new and of my invention, and desire to secure by Letters Patent, is—

1. In a mechanism for forming springs, the keyboards carrying the keys, one of the keyboards being capable of being approximated
100 to and separated from the other keyboard and carrying the straightening bar Q', and the frame B having a complementary straightening bar Q, substantially as and for the purposes specified.

2. In a mechanism for forming springs, the keyboards carrying the keys, one of the keyboards being capable of being approximated
105 to and separated from the other keyboard, and carrying the straightening bar Q', and the frame B having a complementary straightening bar Q, the movable keyboard as D' being connected to a piston of a steam cylinder, under the control of the operator, substantially
110 as and for the purposes specified.

SAMUEL ATKINSON.

Attest:

WM. E. JONES,
K. SMITH.