(No Model.) 2 Sheets—Sheet 1.

E. W. ANSTED.

MACHINE FOR BENDING AND FORMING SPRINGS.

No. 483,094. Patented Sept. 20, 1892.

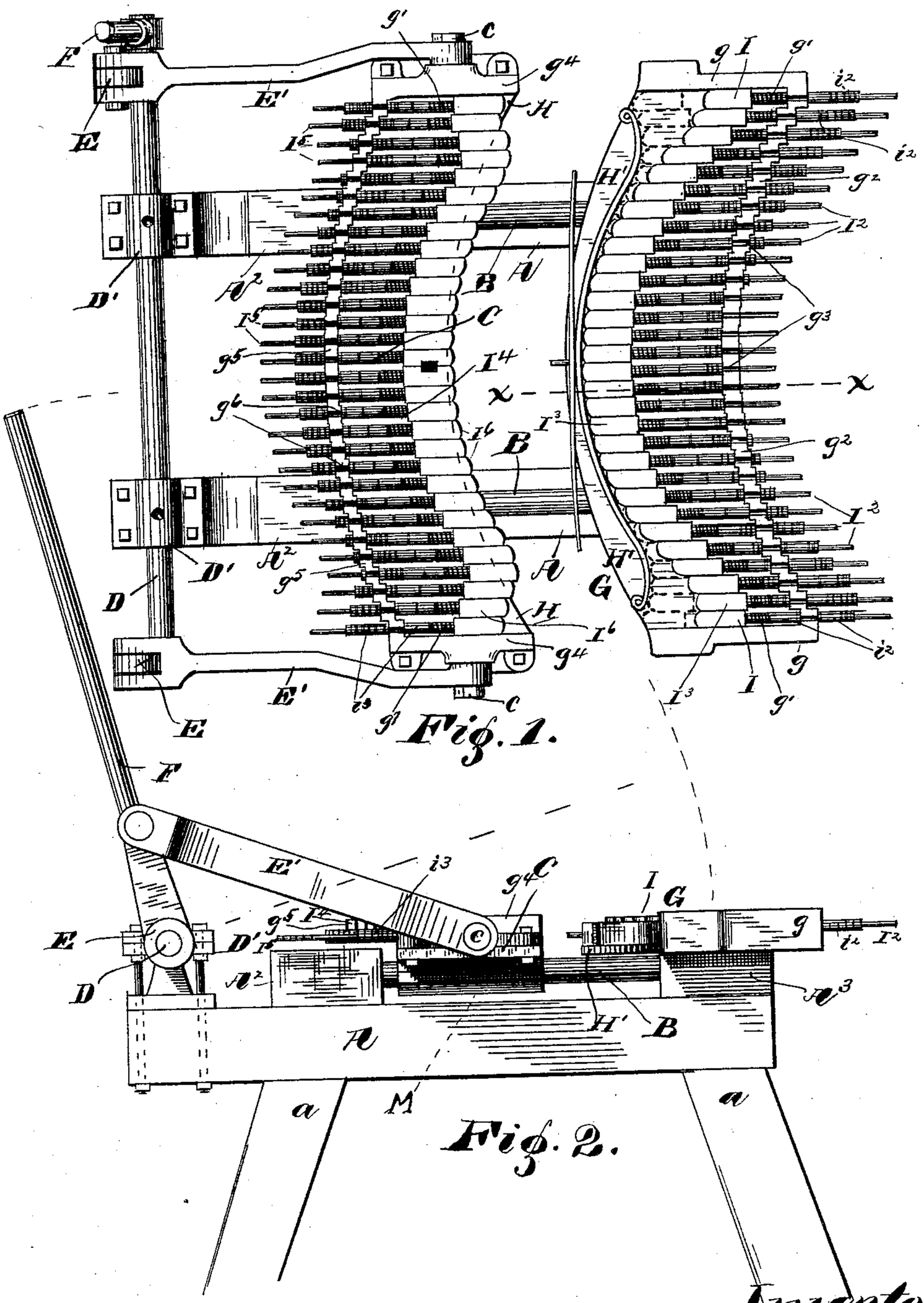

Fig. 1.

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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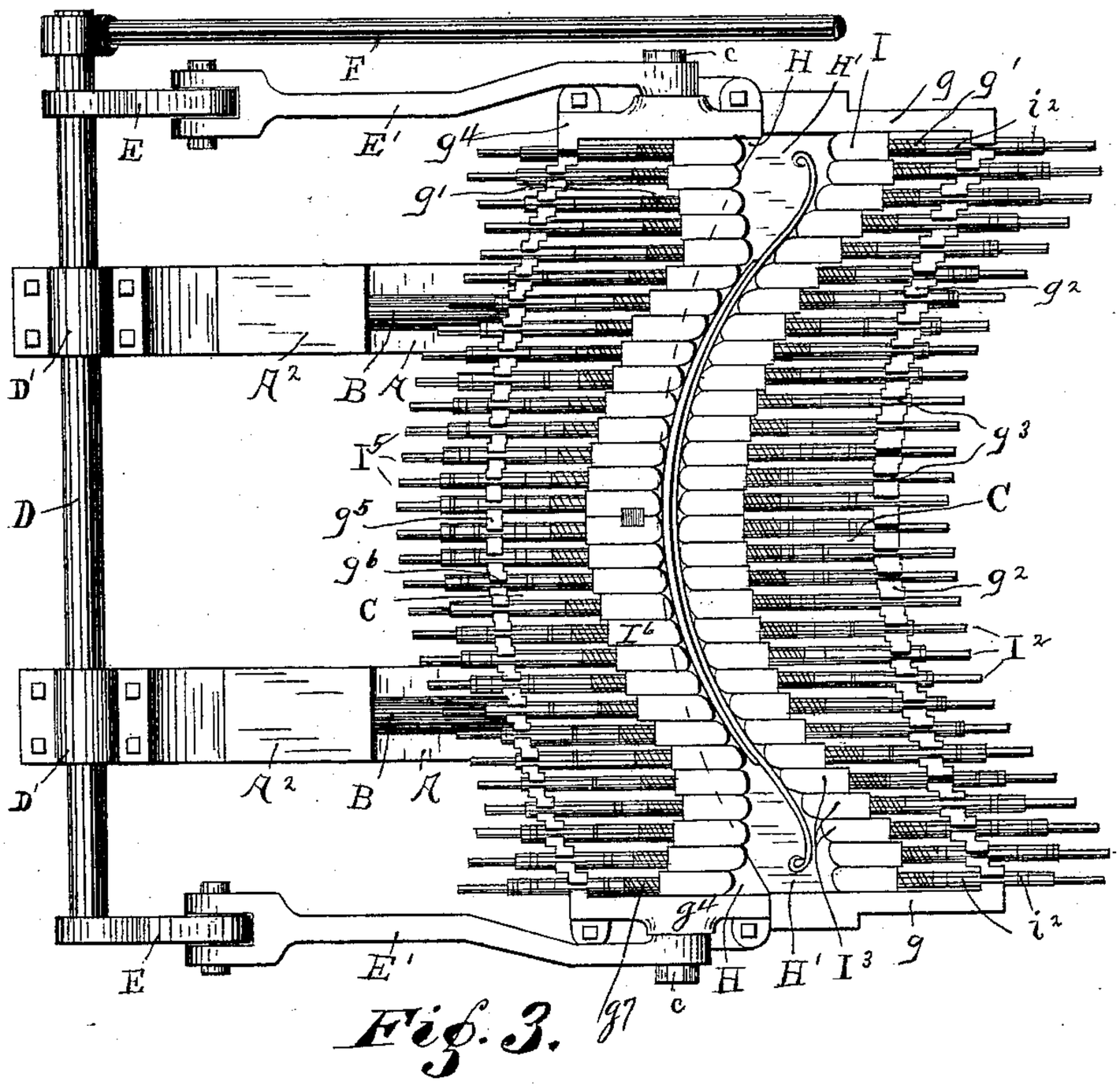

Fig. 3.

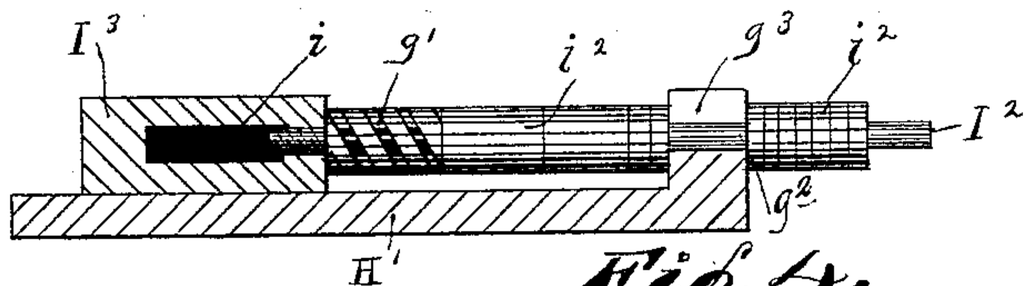

Fig. 4.

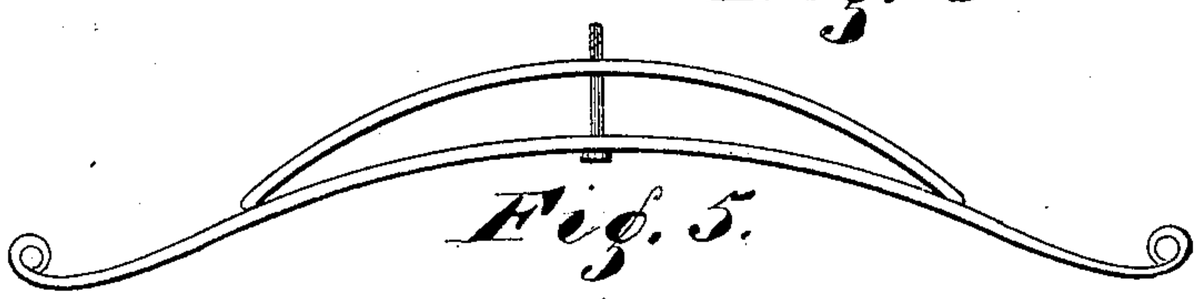

Fig. 5.

Witnesses.
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UNITED STATES PATENT OFFICE.

EDWARD W. ANSTED, OF CONNERSVILLE, INDIANA.

MACHINE FOR BENDING AND FORMING SPRINGS.

SPECIFICATION forming part of Letters Patent No. 483,094, dated September 20, 1892.

Application filed October 29, 1891. Serial No. 410,273. (No model.)

To all whom it may concern:

Be it known that I, EDWARD W. ANSTED, a citizen of the United States, residing at Connersville, in the county of Fayette and State of Indiana, have invented certain new and useful Improvements in Machines for Bending and Forming Springs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in machines for bending vehicle-springs of different degrees of curvature.

The objects of the invention are, first, to provide a machine having the requisite power and that can be operated by hand; second, that can be easily and quickly adjusted to bend different forms of vehicle-springs and without the necessity of a special former or pattern, as has been necessary in machines for this purpose as heretofore constructed. I accomplish these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 represents a plan view of the machine, showing the second leaf of the spring before it is bent and showing the adjustable bending-irons in their proper position to bend the second leaf so as to give it the necessary "set." The dotted lines indicate the position of the bending-irons occupied in forming the bend in the first leaf. Fig. 2 is a view in side elevation of the machine, showing it in the same position as illustrated in Fig. 1. Fig. 3 is a detail in plan view of the machine at the moment of the completion of the bend in the second leaf of the spring. Fig. 4 is a longitudinal section on the line $x\,x$ of Fig. 1. Fig. 5 is a detail showing the set in the second leaf necessary to give the spring its greatest efficiency when the several leaves (all of which are given a corresponding set) are bolted together.

Similar letters refer to like parts throughout the several views.

A represents the bed of the machine, which is supported on suitable standards *a*.

A^2 and A^3 are blocks projected up from the frame A to form seats for the ends of the parallel shafts B. The shafts B are the guide-bars for the sliding frame C, and the sliding frame C carries the adjustable bending-irons that force the leaves of the spring into shape by the forward movement of the frame C.

D is a transverse shaft journaled by means of the journal-boxes D′ to the frame A. It is provided with the two crank-arms E, which are keyed to the shaft, one at each end, and are connected by means of the crank-shafts E′ to the crank-pins *c* on the ends of the sliding frame C. A hand-lever F, attached to the crank-shaft C, enables the latter to be rotated sufficiently to give a reciprocating movement to the sliding frame C by raising and lowering the lever. By this construction the greatest power will be exerted as the crank-arms E and shafts E′ approach a right line, which is also at or near the completion of the bend when the greatest power is required, and enables a man to operate the machine without great fatigue or exertion.

The former-frame G rests on the blocks A^3 and is stationary. The blocks A^3 (see Fig. 2) are upward projections of the frame A and may be either integral therewith or secured thereto by bolts or other suitable means.

Frame G is provided with a series of bending-irons I, arranged side by side between the upwardly-projected end pieces *g* of the frame, so that the enlarged ends of the irons will contact with each other to form a compact body, as shown in Figs. 1 and 3.

As the bending-irons for the sliding frame C and former-frame G are similar in construction, the same description will suffice for both. The frames C and G each have horizontal iron plates or tables H and H′, respectively, with upwardly-projected end pieces *g* g^4 and bearings g^2 and g^5 on their outer side edges. The bearings g^2 g^5 are provided with a series of transverse slots g^3 and g^6 to receive the rods I^2 and I^5 of the bending-irons I and I^4. The bending-irons I I^4 have the heads I^3 and I^6 of cast iron or steel.

For cheapness and convenience in attaching to the rods I^2 and I^5 the heads are made with a transverse slot *i*, which is cored out in molding and is provided with an opening at its rear end for the insertion of the rods I^2 and I^5.

As shown in Figs. 1 and 3, the bending-irons are laid in a continuous series across the tables H and H′ with the projecting rods I^2 and I^5 in-

serted in the slots g^3 and g^6. The line in curvature made by the front ends of the heads I^3 I^6 as arranged in series across the tables corresponds with the form to be imparted to the spring. As each of the bending-irons has independent longitudinal adjustment, the line of curvature may be varied at will by shifting the irons in or out. Any desired adjustment is retained by means of a series of adjustable collars i^2 and i^3, of varying lengths, which are introduced between the heads I^3 and I^6 and the bearings g^2 and g^5. By raising the rods out of the slots g^3 and g^6 the collars may be moved in either direction past the bearing g^2 g^5. By this construction a direct bearing from the heads I^3 and I^6 to and against the solid upward projection g^2 and g^5 of the bed-plate is had, and the rods I^2 and I^5, serving simply as guides to hold the collars and heads in position, are relieved from strain and wear. This insures a strong and durable construction, and the slotted bearings enable the adjustments to be made with ease and speed.

In order to afford a yielding resistance to the bending-irons, which is desirable, coiled springs g' and g^7 are substituted for the collars next to the head of the irons I^3 and I^6.

To better equalize and distribute the pressure on the bending-irons, it has been found desirable to interpose a cold plate or bar, which for convenience is placed between the spring to be bent and the stationary bending-irons. In bending the first leaf of the spring a cold plate for that purpose is specially employed; but in bending the other leaves the preceding one is used to distribute the pressure, as is shown in the drawings. After the first or longest leaf has been bent the bending-irons are moved so as to give the proper set to the other leaves.

The dotted lines in Fig. 1 indicate the position of the bending-irons for forming the first leaf, and the full lines the position necessary to give the set to the next leaf, whose ends will be bent in more, and being hot will retain the shape, while the longer leaf, being cold, will spring back without retaining the additional bend. The sliding frame C is connected by the slide-boxes M with the slides B.

I claim—

1. The table H, provided with bearings g^5, slotted openings g^6, and end projections g^4, bending-bars I^4 with heads I^6, rods I^5, collars i^3, springs g^7, and sliding boxes M, together forming the sliding frame C, in combination with the table H', bearings g^2, end projections g, bars I, with heads I^3, rods I^2, collars i^2, and springs g', together forming the stationary former G, and the slide-bars B, substantially as and for the purposes set forth.

2. The combination of the sliding frame C with a stationary former G, each having a series of bending-irons capable of adjustment to conform to the shape of the spring to be bent and held from longitudinal movement by an upwardly-projected flange integral with or secured to the bed-plate of the machine, said flange being slotted vertically to allow the end of the bending-irons to be dropped into place therein, and easily removed in adjusting the length of the irons, substantially as described.

3. In a machine for bending vehicle-springs, the bearings g^2 and g^5 with slotted openings to receive the rods I^2 and I^5, whereby the bending-rods may be easily and quickly adjusted, in combination with the bending-rods I^2 and I^5, having suitable heads to contact with the leaf of the spring being bent, mechanism for impinging the leaf between the said heads by forcing the series of heads on opposite sides of the leaf together, and a suitable framework to connect and support the several parts, and a steel blank to be bent into the leaf of a vehicle-spring.

4. The combination of the sliding frame C, having adjustable bending-irons with a stationary former-frame G, also having adjustable bending-irons, said former and frame each having upwardly-projected bearings with slots therein to receive the rods of the bending-irons, and said bending-irons for both sliding and former frames being constructed on the same pattern, viz: a four-sided elongated metallic head with a rod extension, and each of said rods being provided with a series of collars and a coiled spring, substantially as described and specified.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD W. ANSTED.

Witnesses:

CHAS. P. ANSTED,

ROBERT E. SNELL.