

1,050,695.

4 SHEETS—SHEET 1.

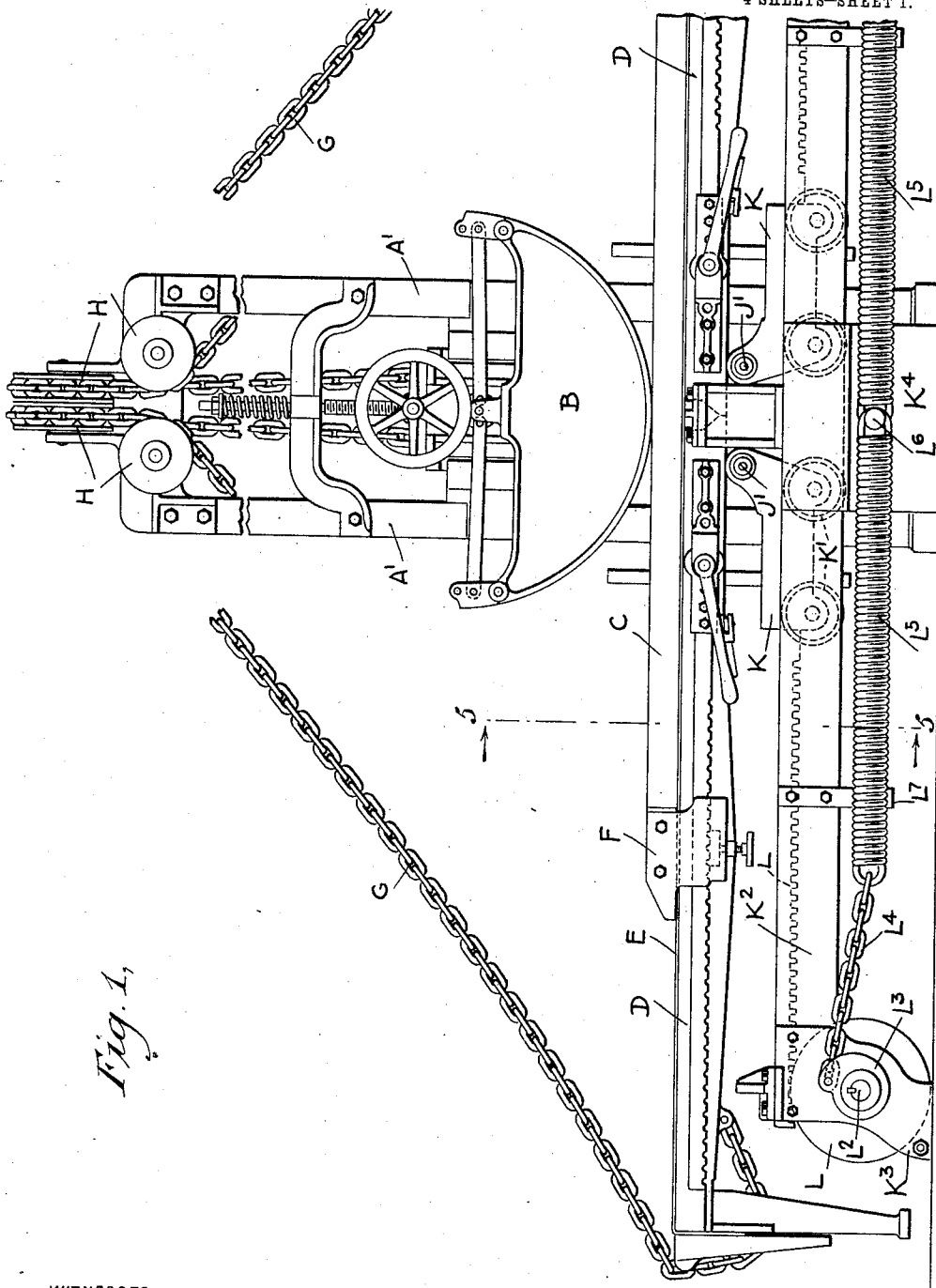


Fig. 1.

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F. T. ROOT & G. A. ENSIGN.
BENDING MACHINE.
APPLICATION FILED JUNE 6, 1912.

1,050,695.

Patented Jan. 14, 1913.

4 SHEETS—SHEET 2.

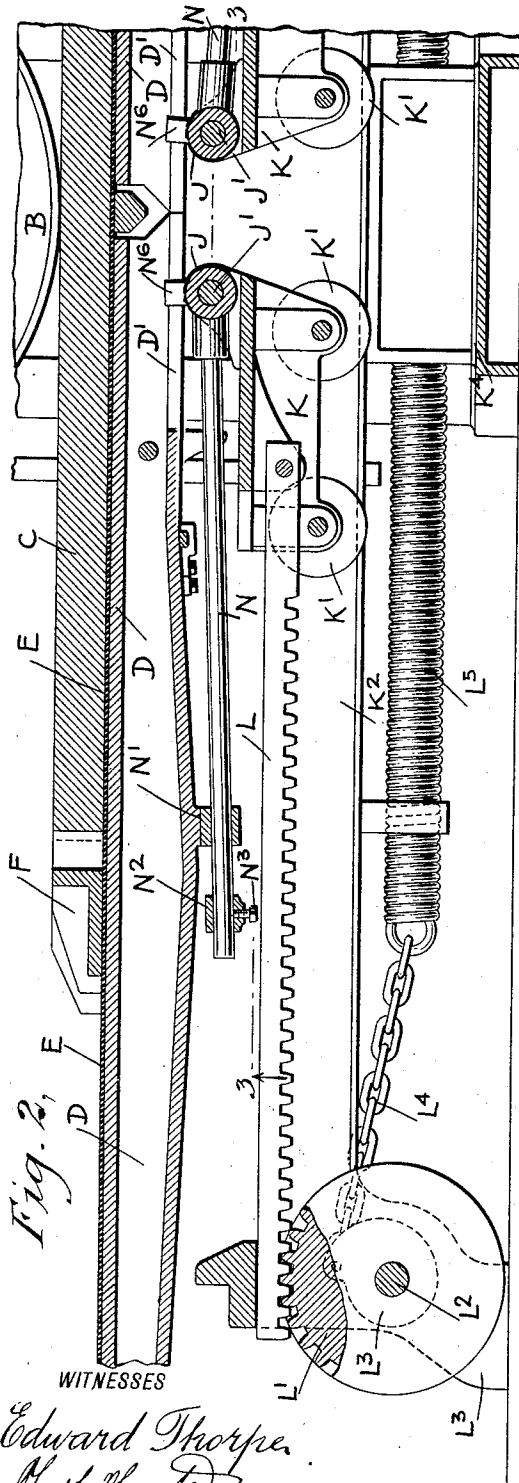


Fig. 2,

WITNESSES

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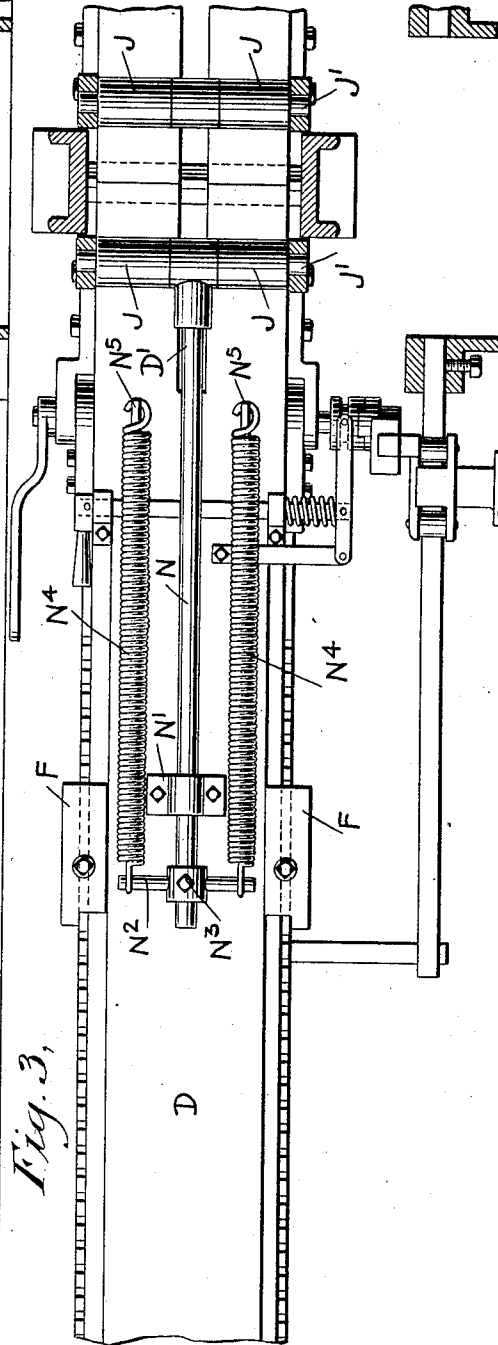


Fig. 3,

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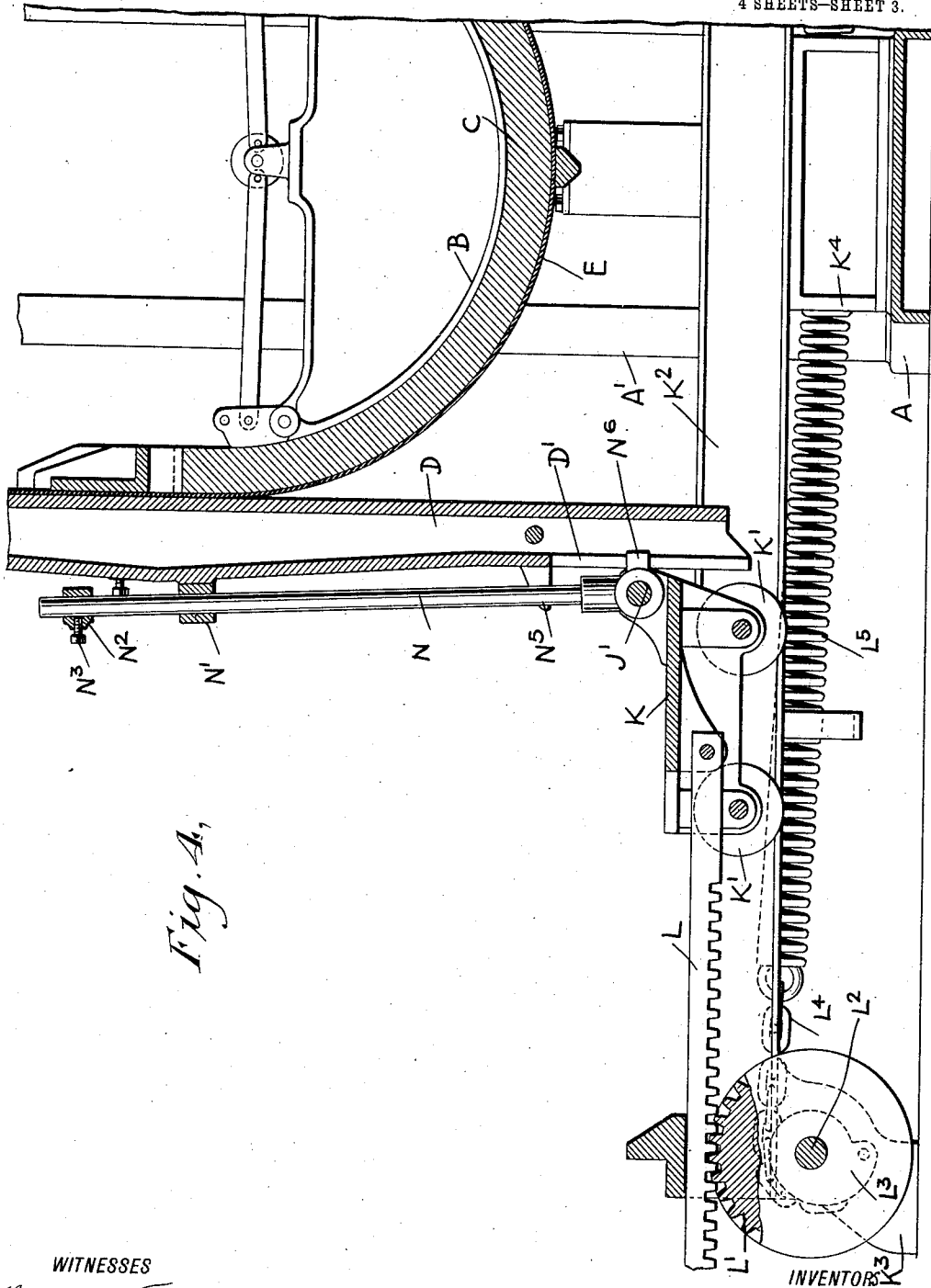


Fig. 4.

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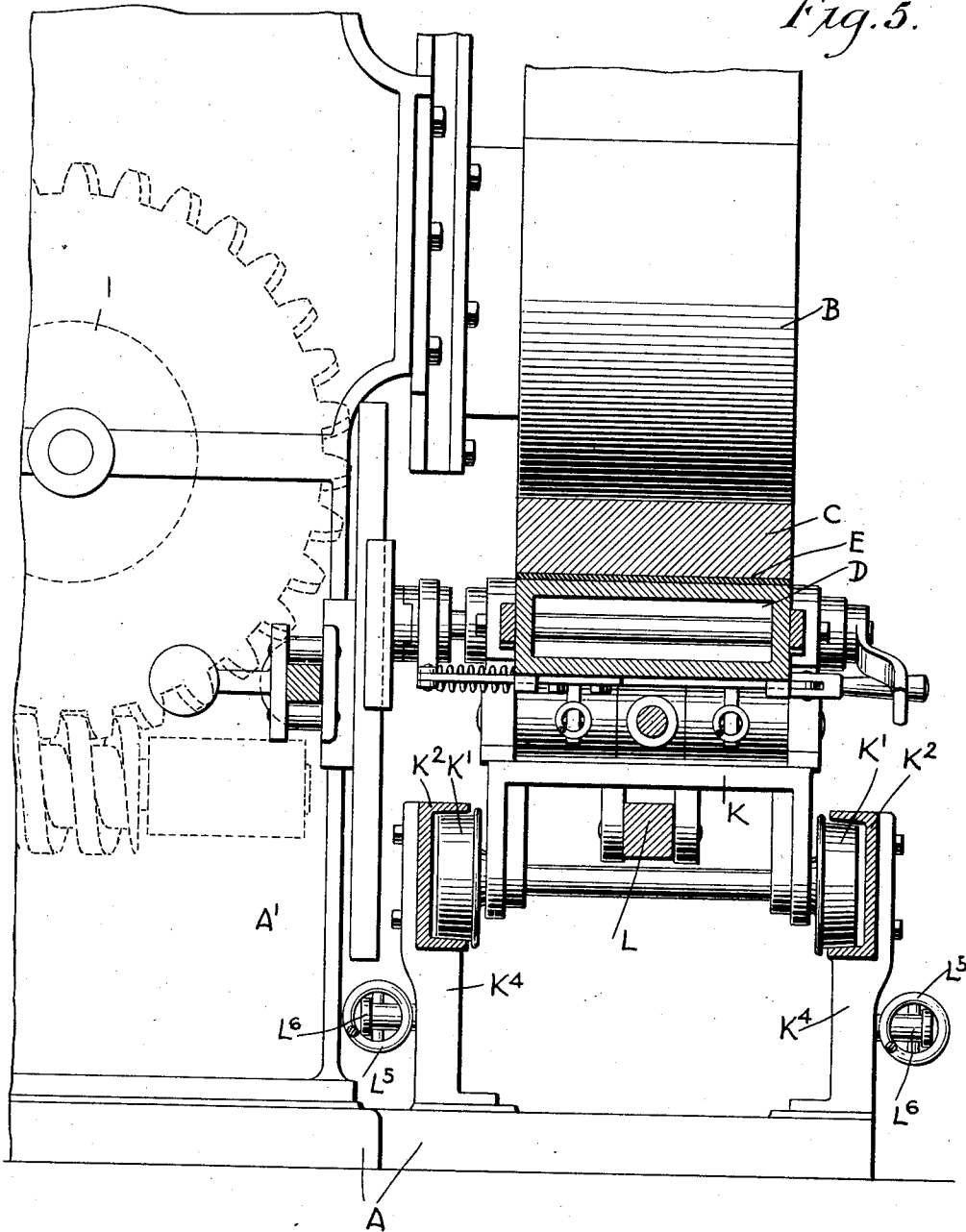
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4 SHEETS—SHEET 4.

Fig. 5.



WITNESSES

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UNITED STATES PATENT OFFICE.

FRANK T. ROOT, OF YORK, PENNSYLVANIA, AND GEORGE A. ENSIGN, OF DEFIANCE, OHIO, ASSIGNORS TO DEFIANCE MACHINE WORKS, OF DEFIANCE, OHIO.

BENDING-MACHINE.

1,050,695.

Specification of Letters Patent.

Patented Jan. 14, 1913.

Application filed June 6, 1912. Serial No. 702,127.

To all whom it may concern:

Be it known that we, FRANK T. ROOT and GEORGE A. ENSIGN, both citizens of the United States, and residents, respectively, of York, in the county of York and State of Pennsylvania, and of Defiance, in the county of Defiance and State of Ohio, have invented a new and Improved Bending-Machine, of which the following is a full, clear, and exact description.

The invention relates to wood-bending machines, such, for instance, as shown and described in the Letters Patent of the United States, No. 603,926, granted to Charles Seymour, May 10, 1898.

The object of the present invention is to provide a new and improved bending machine arranged to insure positive movement of the bending arms to cause the timber to snugly hug the form and thus produce accurate bending of the timber. For the purpose mentioned use is made of trucks mounted to travel and engaged by the ends of the bending arms, the trucks being yieldingly sustained to hold the bending arms firmly in contact with the timber during the bending operation.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a front elevation of the bending machine; Fig. 2 is an enlarged sectional front elevation of part of the same; Fig. 3 is an inverted sectional plan view of the same on the line 3—3 of Fig. 2; Fig. 4 is an enlarged sectional front elevation of the bending machine and showing one of the bending arms in bending position; and Fig. 5 is an enlarged cross section of the bending machine on the line 5—5 of Fig. 1.

The frame on which the bending machine is mounted consists of a base A and standards A' erected on the said base, and on the standards A' is mounted a form B around which the timber C is bent by the use of de-

pending arms D, D, and a master strap E overlying the said bending arms D, the latter also carrying head blocks F against which about the ends of the timber C placed on top of the master strap E, as indicated in Figs. 1 and 2.

The outer ends of the bending arms D are connected with ropes, cables or chains G which extend upwardly and inwardly and pass over pulleys H journaled in the upper ends of the standards A', and the said chains G then wind on a drum I journaled on the standards A' and driven by a suitable mechanism, not shown. When the drum I is rotated and the chains G are wound up thereon then an upward swinging motion is given to the bending arms D to bend the timber C around the form B, as indicated in Fig. 4.

The inner ends of the bending arms D are yieldingly sustained by engaging rollers J journaled on transverse shafts J' journaled in suitable bearings arranged on trucks K having truck wheels K' mounted to travel longitudinally on a track K² provided at its outer ends with lugs K³ resting on the floor or other support and mounted at the middle on a lug K⁴ held on or forming part of the base A. On each of the trucks K is pivoted the inner end of a rack L in mesh with a gear wheel L' secured on a shaft L² journaled in the outer lugs K³, and on the outer end of the shaft L² are secured drums L³ to which are secured ropes, cables or chains L⁴ extending rearwardly and connected with the outer ends of springs L⁵ secured at their inner ends to studs L⁶ projecting from the sides of the lugs K⁴, as plainly indicated in Figs. 1 to 5. When the bending arms D are swung upward by the action of the chains G, as previously explained, the inner ends of the bending arms D bear against the rollers J and consequently cause the trucks K to travel outward away from each other and in doing so the racks L carried by the trucks K rotate the gear wheels L' and consequently the shaft L² and the drums L³ to wind up the chains L⁴ thus placing the

springs L⁵ under tension. It will be seen that by the arrangement described the yielding lugs K³ form an elastic or a retaining resistance for the bending arms D to exert a thrust against the said bending arms to insure a close hugging of the timber around the form B. When the timber has been bent around the form B it is secured in bent shape by suitable straps or shackles to permit of returning the bending arms D to their normal lowermost position shown in Fig. 1, to allow of conveniently removing the bent timber from the form and to proceed to bend a new batch of timber in the manner above described.

The bending arms D during the bending operation are urged upward to insure a close fitting of the timber around the form, and for this purpose the following arrangement is made: On the shaft J' of each truck K is pivoted a rod N mounted to slide in a bearing N' attached to the corresponding bending arm D, and on the outer end of the rod N is adjustably secured a cross bar N² by the use of a set screw N³, as plainly shown in Figs. 2, 3 and 4. To the ends of the cross bar N² are secured springs N⁴ extending approximately parallel to the rod N on opposite sides thereof and connected at their inner ends to lugs N⁵ attached to the corresponding bending arm D near the inner end thereof. Thus by the arrangement described the bending arm D is yieldingly supported from the corresponding truck K and is urged upward by the springs N⁴ during the bending operation to insure close hugging of the timber C on the form B. The fulcrum end of the hub of each rod N is provided with a lug N⁶ extending into a guide slot D' formed in the corresponding bending arm D so as to hold the latter against lateral movement during the bending operation.

It is understood that the weight of the bending arms D is taken up by the springs N⁴ at the time the bending arms approach a vertical position. The tension of the springs N⁴ is increased during the upward movement of the bending arms D and hence the bending arms D are urged upward to prevent bends in the timber outward from the form, especially as unsupported bending arms tend to influence the timber to leave the form on the quarters.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:

1. A bending machine, comprising a form, bending arms mounted below the form, means connected with the outer ends of the arms for imparting a swinging motion to the same, a longitudinally-extending track, trucks mounted to travel on the said track

and engaged by the inner ends of the said swinging arms to impart a traveling motion to the said trucks on imparting a swinging motion to the said bending arms, drums, spring-pressed chains winding on the said drums, and gearing connecting the said trucks with the said drums to rotate the latter at the time the trucks travel outward or inward on the said track.

2. A bending machine, comprising a form, bending arms mounted below the form, means connected with the outer ends of the arms for imparting a swinging motion to the same, a longitudinally-extending track, trucks mounted to travel on the said track and engaged by the inner ends of the said swinging arms, racks on the said trucks, drums provided with gear wheels in mesh with the said racks, chains winding on the said drums, and springs fixed at one end and connected at the other end to the said chains.

3. A bending machine, comprising a form, bending arms, means connected with the outer ends of the said bending arms for imparting a swinging motion to the same, a longitudinally extending fixed track, yieldingly-sustained trucks mounted to travel on the said track and engaged by the inner ends of the said bending arms, and yielding supports carried by the said trucks and slidingly connected with the said bending arms to urge the latter upward at the time the said bending arms approach a vertical position.

4. A bending machine, comprising a form, bending arms, means connected with the outer ends of the said bending arms for imparting a swinging motion to the same, yieldingly sustained trucks engaged by the inner ends of the said bending arms, rods pivoted on the said trucks and slidingly connected with the said bending arms, and springs connecting the said rods with the said bending arms to urge the latter upward during the bending operation.

5. A bending machine, comprising a form, bending arms, means connected with the outer ends of the said bending arms for imparting a swinging motion to the same, yieldingly-sustained trucks engaged by the inner ends of the said bending arms, rods pivoted on the said trucks, bearings on the said bending arms and slidingly engaged by the said rods, and springs connecting the outer ends of the said rods with the said bending arms.

6. A bending machine, comprising a form, bending arms, actuating means connected with the outer ends of the said bending arms for imparting a swinging motion to the same, and overbalancing means connected with the said bending arms for urging the

latter upward at the time the said bending arms approach a vertical position.

7. A bending machine, comprising a form, bending arms, means connected with the
5 outer ends of the said arms for imparting a swinging motion to the same, and spring devices connected with the said bending arms and overbalancing the weight thereof to sustain the weight of the bending arms
10 as the same approach a vertical position and to urge the bending arms upward.

In testimony whereof we have signed our

names to this specification in the presence of two subscribing witnesses.

FRANK T. ROOT.

GEORGE A. ENSIGN.

Witnesses to the signature of Frank T. Root:

C. C. HOFFMAN,

H. F. GERHE.

Witnesses to the signature of George A. Ensign:

C. H. DEMMING,

H. F. GERHE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
