

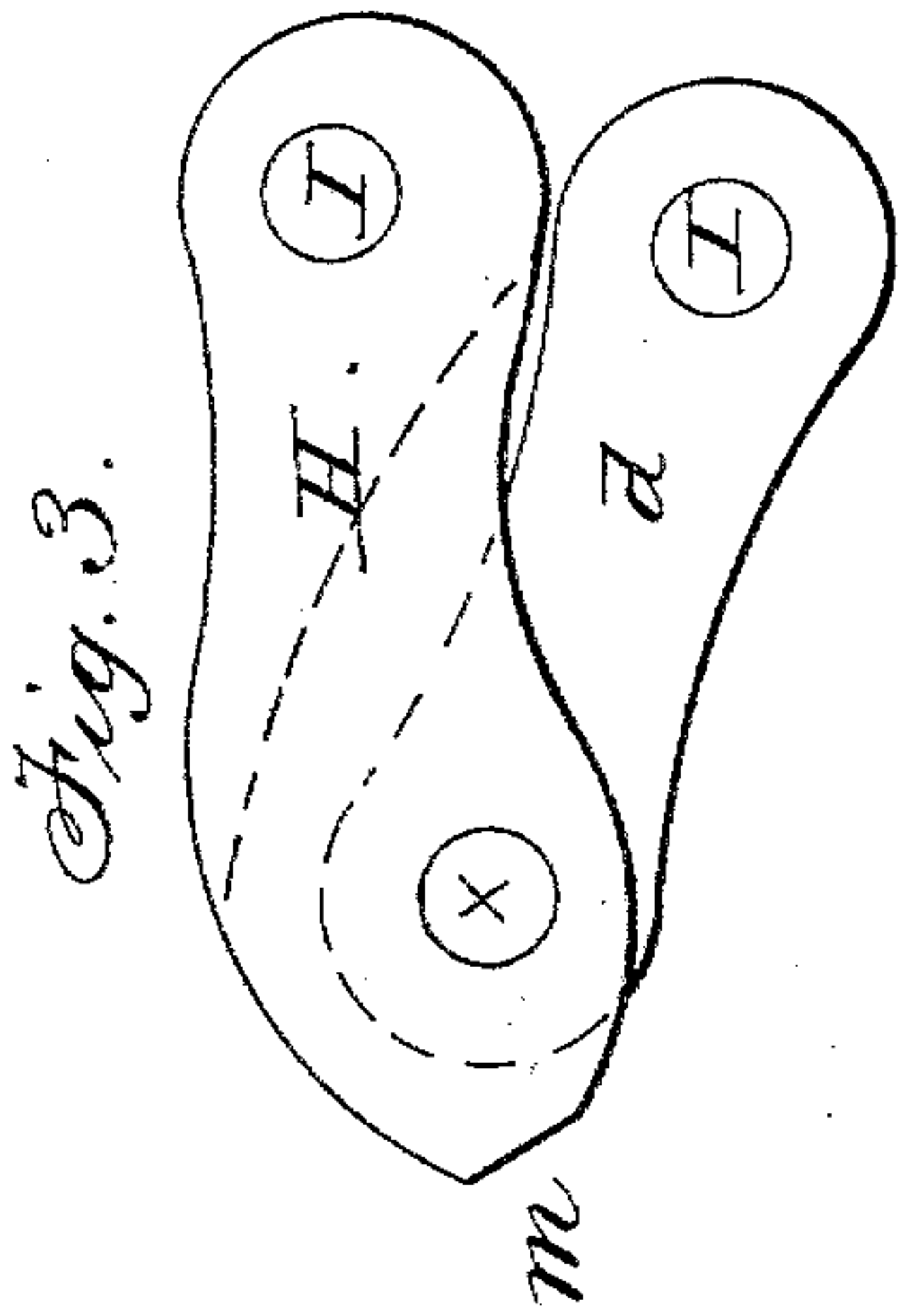
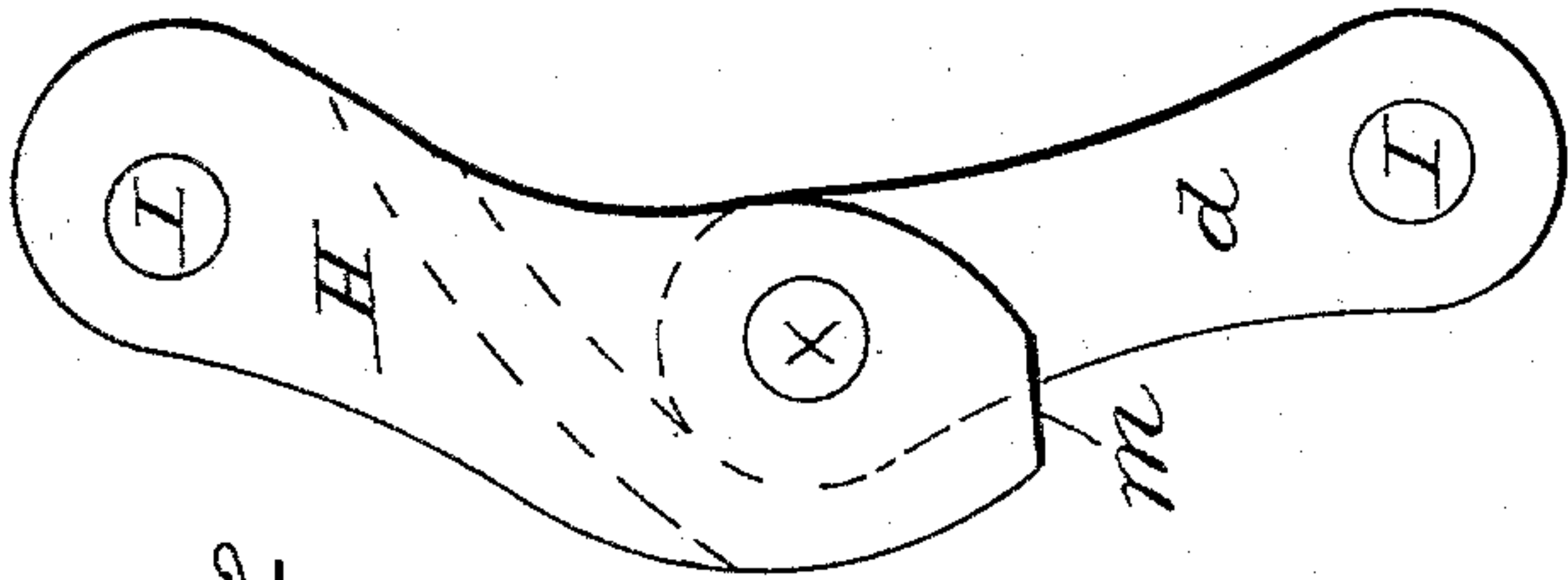
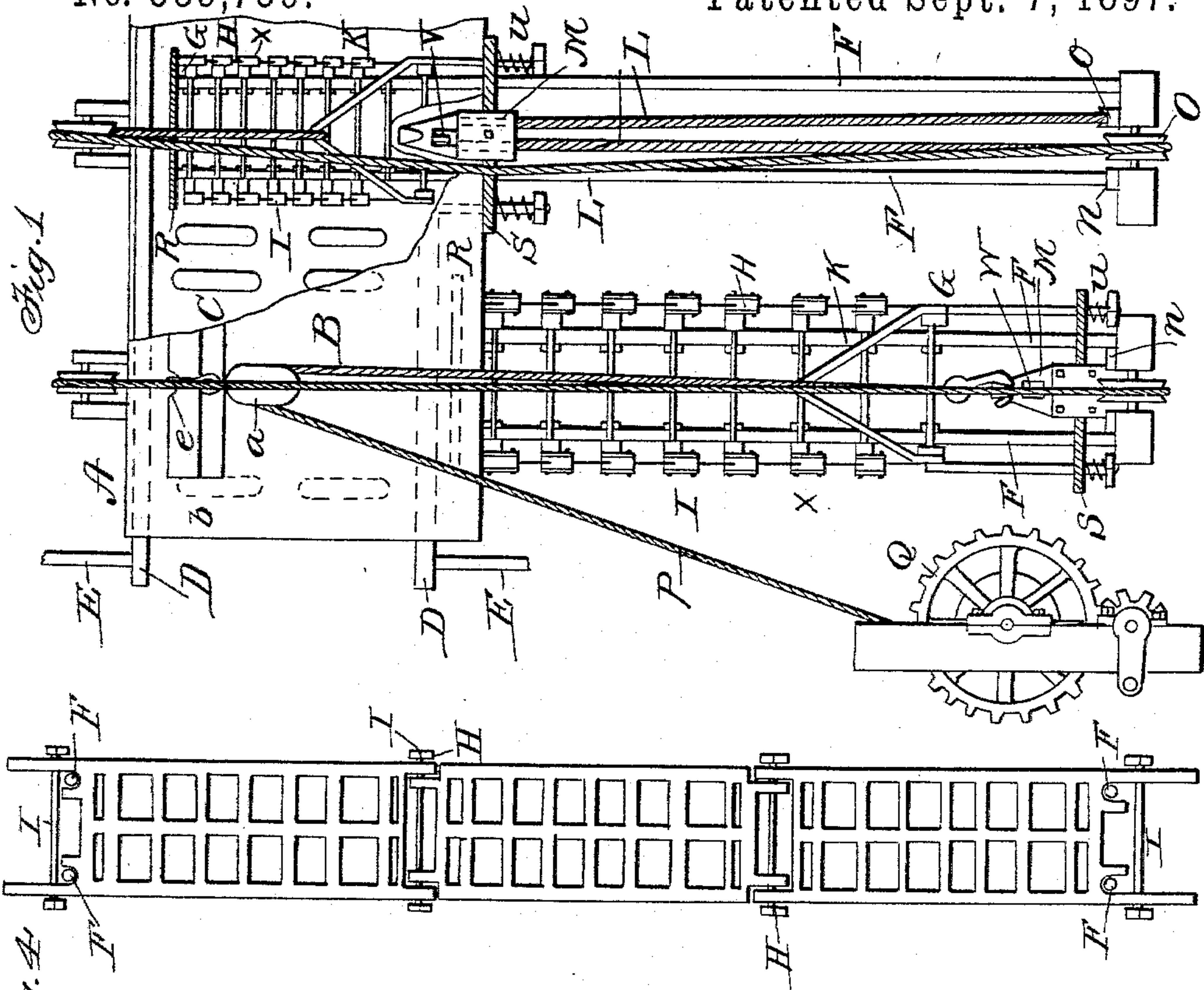
(No Model.)

2 Sheets—Sheet 1.

T. J. SULLIVAN.
DEVICE FOR FORMING STAVES.

No. 589,759.

Patented Sept. 7, 1897.



Witnesses
Frank L. Ormand
George J. Weber.

Inventor
Timothy Jay Sullivan
per, C. W. Bradford
Attorney

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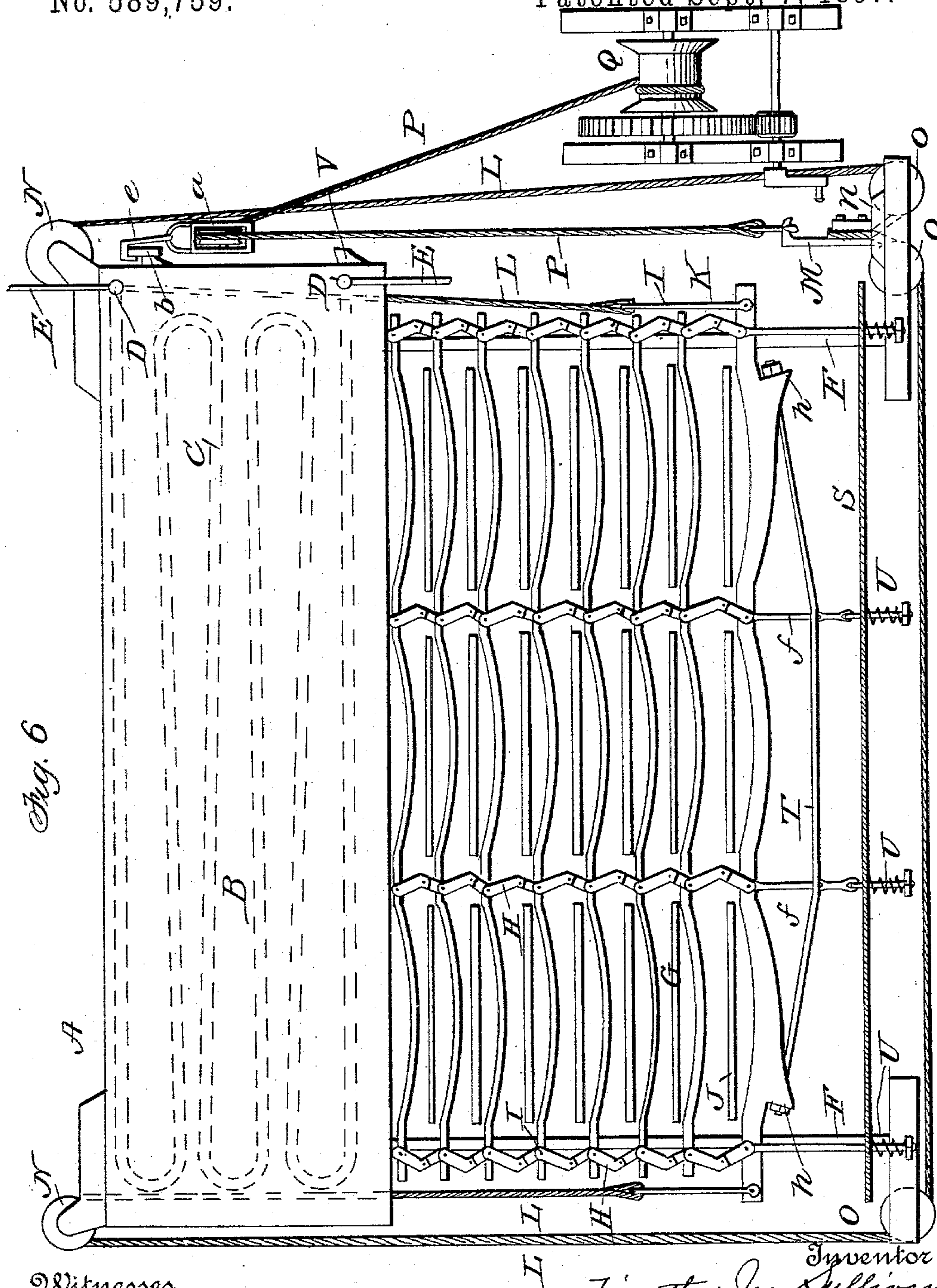


Fig. 6

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UNITED STATES PATENT OFFICE.

TIMOTHY JAY SULLIVAN, OF BOWLING GREEN, KENTUCKY.

DEVICE FOR FORMING STAVES.

SPECIFICATION forming part of Letters Patent No. 589,759, dated September 7, 1897.

Application filed December 4, 1896. Serial No. 614,459. (No model.)

To all whom it may concern:

Be it known that I, TIMOTHY JAY SULLIVAN, a citizen of the United States, residing at Bowling Green, in the county of Warren, State of Kentucky, have invented a new and useful Device for Forming Staves; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improved apparatus for forming staves; and it has for its object to provide a simple, inexpensive, and rapid method whereby the staves are uniformly shaped and the contour thereof preserved when completed.

To this end my invention consists, substantially, in subjecting the material from which the staves are to be produced to a certain treatment, as will be hereinafter fully set forth, and particularly pointed out in the claims.

Accompanying this specification are drawings illustrating my apparatus by which my invention may be carried out, and in which—

Figure 1 is an end elevation of my improved apparatus, the forms being raised to within the drying-chamber, a portion of the casing of which is shown broken away to show the interior arrangement; Fig. 2, a side view, on an enlarged scale, of one pair of the links which connect the forms, shown in the position they occupy when said forms are down; Fig. 3, a similar view showing them in the position they occupy when said forms are raised into the drying-chamber; Fig. 4, a top or plan view of one of the horizontal lines or series of forms; Fig. 5, an end view of one of said forms; and Fig. 6, a side elevation of the apparatus, showing the forms in the position when lowered to receive the blanks.

Corresponding parts in the figures are denoted by the same letters of reference.

Referring to the drawings, A designates a drying-kiln, which comprises a longitudinal heating-chamber B and steam-pipes C, located between the various sections of the formers G throughout the length of the kiln, which intersects with pipes D D and are fed and drained, respectively, by the pipes E E.

By this arrangement the chamber B is heated throughout its entire length.

Guide-posts F F are arranged at opposite ends of each section and guide the formers G G G of the latter to their respective positions in the heating-chamber B.

The formers G each consist of a single section, the top side of which conforms in curvature to the outside of a completed stave and the bottom side conforming to the inside of a completed stave. Thus they are made to perform the double duty of both former and lid, and when coupled together fit one into the other in perfect horizontal alinement.

At the bottom of the heating-chamber B I have the shutter R, which is of such length and breadth and guided by the guide-posts F F that it shuts up the opening through which the formers G were let down, and to the shutter R are suspended the former-irons G by means of the links II and the bolts I and pivots X, forming a continuous chain down the full depth of the section.

At the bottom of each section of formers and at the opposite ends of same are two enlarged and strengthened former-irons conforming approximately to the central former-irons with their respective ends projected in opposite directions a sufficient distance to connect to the yokes K K near the extreme ends of the strengthened forms, and projecting downwardly are two lugs h h, which hold the ends of truss-rods T, upon which stand the posts f f to hold the central forms in perfect horizontal alinement.

Hanging from the bottom former-irons is the shutter S, which is provided with spiral springs U U U, which gives to shutter S limited vertical play.

Connected to yokes K K are the hoisting-lines L L, passing up through the heating-chamber B and over sheaves N N and around the sheaves O O O to grip M, which rests on foundation n in such a manner as to hold it in a perfect vertical position and at the same time limiting the drop of each section.

The links II and d are so constructed that when formers G are suspended, as shown in Fig. 6, a central pivotal vertical alinement between I X I is impossible. The part d, pivoted

at X, comes in contact with part II at *m*, as shown in Fig. 2, thus holding I I out of vertical alinement with X and forming a fulcrum by which the folding of links II *d* is made possible under all circumstances.

The heating-chamber B stands at such a height from the ground as to allow the operators to walk thereunder and place the blanks J in the formers G. The hoisting-line P being now attached to grip M, passing through block *a* to the hoist Q, which hoists the completed section to its respective place in the heating-chamber B, where it remains until staves are dry and formed by hooking the slot W in grip M on the rest V. At this point the springs U U U, making shutter S capable of limited vertical play, which allows the grip M to rise to sufficient height to hook on rest V and settle back to its proper bearing and still hold shutter S tight up against the bottom of the heating-chamber B and completely closing the opening through which the formers went up. The block *a* is now moved on the slide *b* to a point directly over or opposite the next section of formers, where at each of such positions are provided a notch or depression *e* of sufficient depth on slide *b* to hold block *a* from slipping out of alinement, and line P is now connected to the grip M, which is raised off of rest V by the hoist Q and lowered to the position shown in Fig. 6, where the dried and formed staves are pushed out by the operators as the fresh blanks are put in and in turn is raised up to the heating-chamber and grip M, hooked on rest V, and in like manner continue from one section to the other the entire length of the kiln as fast as the heating-chamber will dry and form same.

In carrying out my invention by means of the form of apparatus above described the staves are first cut into the proper size and contour. The flat blanks thus produced are fed to or placed in the formers and are carried by the latter to the heating-chamber B by the means heretofore set forth. From the time the staves are placed in the formers and after they are carried to their respective place in the heating-chamber B they are subjected only to the weight of the former-irons and the shutter R, which weight is not sufficient to bring them to the proper shape and curvature while cold, but the heating-chamber B is of sufficient depth to accommodate the extra height of the sections before the staves have yielded under the weight of the forms, and in that manner they gradually bend as they become heated until by the time they are thoroughly heated and before they are half dry they will have yielded to the exact shape and contour of the formers, and when they are thoroughly dried the section is lowered and the staves are taken from forms ready for use.

It will be noted that in this invention the staves are subjected to the weight of the

formers and shutter R while they remain in the heating-chamber B, which pressure is sufficient to give them the exact curvature and contour long before they are dry or by the time they have received the maximum degree of the heating-chamber.

By this invention the staves produced are of uniform contour, an important desideratum in the art, and being thoroughly dried and seasoned retain their shape until used.

Having thus described my invention, what I claim is—

1. A drying and forming apparatus consisting of a drying-chamber, a series of forms connected by jointed links and mounted to be raised and lowered into and out of said chamber, and means for raising and lowering the same, substantially as set forth.

2. In a drying and forming apparatus, the combination, of the drying-chamber mounted at an elevation, forms joined by hinged links and mounted to slide vertically into and out of said chamber through its bottom, means for operating them, and a follower and floor carried on the top and lower sides of said forms respectively, to close the top and bottom of said chamber when said forms are in position therein, substantially as set forth.

3. In a drying and forming apparatus, the combination of the series of forms arranged in vertical tiers and connected by links jointed midway of their length, said parts being formed one with a curver or bend therein and means for limiting the pivot action to prevent vertical alinement of the several pivots, whereby the opening and closing together of the forms cannot be prevented or impeded, substantially as set forth.

4. The combination in a drying and forming apparatus, of the drying-chamber mounted on supports above the working level, a series of forms mounted one above another and connected by jointed links, which series is mounted to be slid up and down into and out of said drying-chamber, a rigid base supporting said forms, elevating devices connected thereto, and locking devices for locking said forms in position when elevated into the drying-chamber, substantially as set forth.

5. The combination in a drying and forming apparatus, of the drying-chamber, the series of forms arranged one above another and connected by jointed links, a rigid base on which all said forms are supported, a follower mounted to bear upon the uppermost one, and elevating mechanism connected to said base, whereby, when said forms are elevated all the weight rests thereon, substantially as set forth.

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

TIMOTHY JAY SULLIVAN.

Witnesses:

A. M. CAUSEY, Jr.,

M. A. MAXEY.