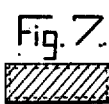
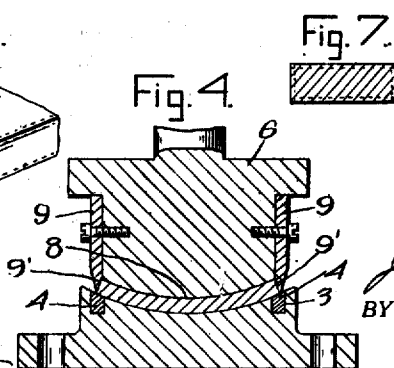
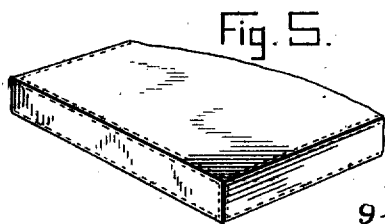
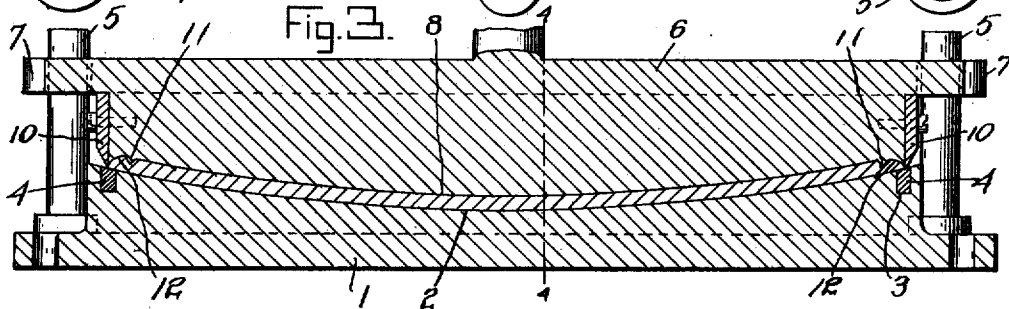
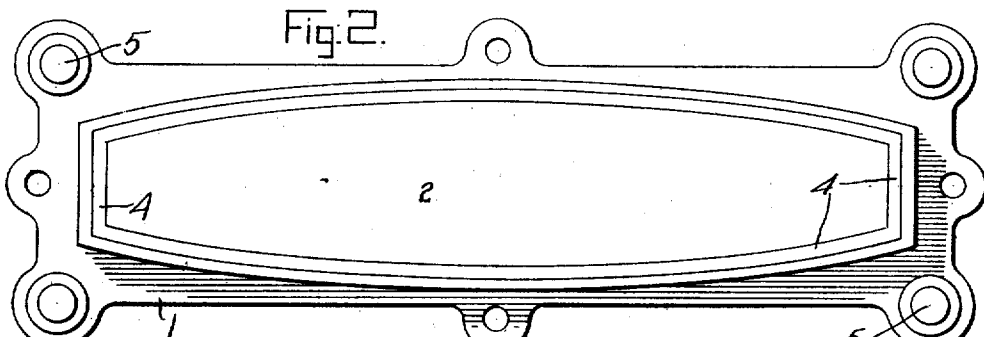
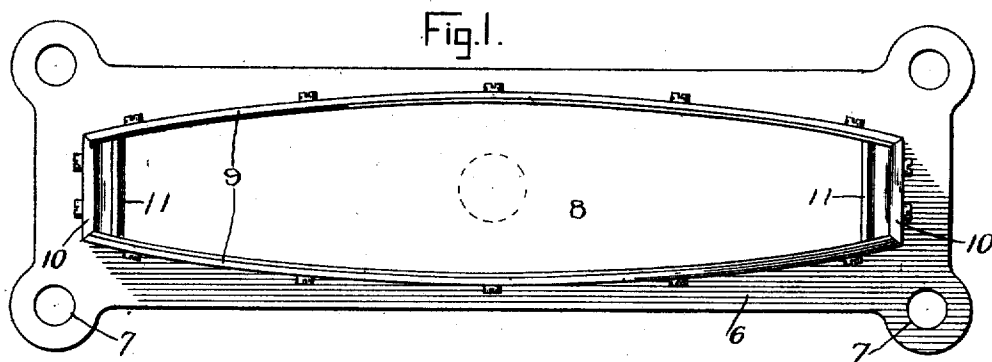


J. T. COLLINS.  
 PROCESS FOR MAKING PAPER BARREL STAVES.  
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912,285.

Patented Feb. 16, 1909.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

JOHN T. COLLINS, OF HARTFORD, CONNECTICUT.

## PROCESS FOR MAKING PAPER BARREL-STAVES.

No. 912,285.

Specification of Letters Patent.

Patented Feb. 16, 1909.

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*To all whom it may concern:*

Be it known that I, JOHN T. COLLINS, a citizen of the United States of America, and resident of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Processes for Making Paper Barrel-Staves, of which the following is a full, clear, and exact description.

10 This invention pertains to process for making paper barrel staves, and has for its object a process which will produce in a single operation a stave which is cut, shaped, formed with chines and crozes, and simultaneously compressed into the desired finished product ready for purposes of assemblage into barrels, or the like.

The process more particularly resides in a peculiar softening, by steaming, moistening, or other approved method, of sheeted paper pulp stock or blank material from which the staves are produced, prior to such stock or blank material being shaped by compression. The steaming or moistening 25 penetrates the stock only to a comparatively small extent of its thickness, being but a surface softening thereof, leaving the core, bulk, or mass of the stock in its original hardened state or condition. The softening 30 of the stock takes place at the ends, sides top and bottom faces of the stock.

In the following specification the details of the process will be more fully set forth, further objects being disclosed and set forth 35 therein.

In the drawings, showing one form of apparatus whereby the process may be practiced: Figure 1, is an inverted view of the male die forming a part of the apparatus, 40 Fig. 2, is a plan view of the female or bed die, Fig. 3, is a longitudinal section taken through the two dies the same in the act of forming a stave, Fig. 4, is a transverse section of Fig. 3, on line 4—4 of Fig. 3, Fig. 45 5, is a fragmentary view slightly enlarged showing the stock of sheeted paper pulp from which the staves are formed, illustrating by dotted lines the extent of steaming or otherwise softening of the stock, Fig. 6, 50 is an enlarged transverse section taken through a completed stave, illustrating by dotted lines the form assumed by staves of paper pulp after having been made according to the practice which has generally obtained prior to this invention, and Fig. 7, 55 is a reduced transverse section of a stave

blank showing by dotted lines the extent of softening of the sheeted paper pulp.

The female or bed die is composed of a base plate 1, on the upper face of which the die proper is carried, the latter as depicted 60 in the drawings having a concave compression face or surface 2 whose curvature conforms to that of the outer side or face of the finished stave. Adjacent the bounding edges 65 of surface 2, the die is formed with a groove 3, which in outline conforms to that of the stave product, this groove receiving a filling of lead or other soft metal 4, for a purpose presently obvious. Base plate 1, is equipped 70 with guiding posts 5, projecting upwardly therefrom, whose function it is to provide guiding movement to the male die member in its operations, for which purpose the supporting plate 6 of the male die member is 75 formed with openings 7, receiving posts 5.

The male die member is formed with a die compression face or surface 8, of convex contour, its curvature corresponding to that of the female die face or surface. Suitably secured to the sides and ends of the 80 male die are cutting blades 9, the side blades being shaped or curved from end to end to conform to the configuration of the finished staves, which latter taper in curved lines 85 from their middle portions to their ends. It is to be especially observed in Fig. 4, that the inner side faces of the blades 9, are tapered as indicated at 9', so as to impart to the side edges of the staves their proper 90 angularity. The end blades prescribe the predetermined length of the staves and when combined with the side blades constitute, so to speak, the sharpened walls of a box. The blades or knives are beveled at 95 their free ends as indicated at 10, so as to effect a positive and clean cut of the paper pulp, the knives or blades finding a soft bed in the inset lead strips 4, as above set forth so as to not dull or otherwise impair the 100 efficiency of the cutting edges of the knives or blades. The male die member on its die face is further formed adjacent its ends with outwardly projecting croze forming ribs 11, whose function it is to form the croze at 105 each end of the stave. Beyond these ribs the male die face is formed with a slight depression 12, to form the chines.

Prior to subjecting the stock of which the staves are formed to the action of the apparatus above set forth, the stock, which may 110 be in the form of a sheet or strips of proper

dimensions, is steamed, moistened or otherwise softened at the external or surface portions only, leaving the greater mass or bulk at the inside in its normal hard condition.

5 By so softening only the surface portions of the staves, stock or blank as depicted by dotted lines in Fig. 3 of the drawings, the finished stave when removed from the dies at the completion of their operation, retains its proper arc shape. Were the stock to be softened by steaming entirely through its mass, a stave after leaving the dies, would in drying curl in an extreme manner as shown by dotted line Fig. 3.

10 The stave stock or blanks are produced from sheeted, paper pulp of greater thickness than the finished product for instance if the stock is five-eighths of an inch in thickness they are compressed by the die action to three-eighths of an inch in thickness. It is therefore to be observed that the surface or partial softening of the blanks is of the greatest and utmost importance, since the body, mass, or bulk of the blank is allowed to remain in its original hard condition, and is in fact given a second compression to further increase its degree of hardness. Moreover it is to be noted that the softened mass of pulp will by the act of compression be hardened to an extreme degree inasmuch as the unsoftened or hard portion of the mass of pulp will provide a firm solid bed on which the softened mass is compressed. Thus both the softened and unsoftened portions profit by their different stated conditions during the process of compression.

15 In operation the stock as aforesaid either in sheets or in strips of proper length having been surfaced softened is introduced between the two dies. The male die is then operated in any suitable manner to compress the stock so that the same assumes the position between the dies as depicted in Fig. 3 of the drawings. The descent of the male die upon the stock is accompanied by simultaneous cutting action of the blades which trim the stock and cut the same into desired length and width. The chines and crozes are also formed in this stated operation and the side blades due to their bevel as illustrated in Fig. 4, impart the required angularity to the stave sides such as is necessary to provide a perfect fit between adjacent staves in the finished barrel. The lead inset or filling contacts with the cutting edges of the knives and thereby provides a sealing joint or union between the two dies preventing the egress of the softened pulp during the heavy compression of the stock.

20 It is understood that the sheeted paper pulp from which the staves are made is in its finished condition at the time of softening, that is to say in its manufacture it has been hardened by compression or otherwise.

To practice the present invention the hardened sheet pulp is partially softened and its softened portions shaped by compression to form the finished stave as depicted in the drawings. Thus the re-compression of the softened parts gives added hardness to the surface of the staves, rendering the surface finish of increased durability, since the compression of the softened parts is backed up or provided a hard bed by the unsoftened bulk of the stock.

Having thus described the invention what is claimed is:—

1. A process of making barrel staves of sheeted paper pulp consisting in softening the stock at its bounding surfaces only, leaving its center in its original hardened condition, and in then shaping the stave.

2. A process of making barrel staves of sheeted paper pulp which consists in partially softening the side faces of the pulp stock and in then shaping the staves by compression.

3. A process of making barrel staves of previously hardened and compressed paper pulp which consists in softening the pulp adjacent the surface thereof so as to leave the core or bulk of the stave in its original hardened condition, and in then shaping the stave and displacing portions of its softened surface to form the chines and crozes.

4. A process of making barrel staves from sheeted paper pulp which consists in partially softening hardened sheeted paper pulp and then in shaping such softening parts, by compression, on the unsoftened parts of the paper pulp.

5. A process of making barrel staves from paper pulp which consists in partially softening the stock, compressing such softened parts to harden and shape the same, and simultaneously cutting the stock into staves of requisite size.

6. A process of making barrel staves of sheeted paper pulp which consists in softening the surface portions of the stock and leaving the mass or bulk of the stock in its original hardened condition, and then in compressing the softened portions to shape the stave whereby the finished stave has a less thickness than the sheeted paper pulp.

7. The herein described process of making barrel staves of sheeted paper pulp which has a thickness in excess of the finished stave, which consists in softening the stave faces and leaving the center thereof in its original hard condition and in then compressing such softened faces to shape the same.

Signed by me at Springfield, Massachusetts, in presence of two subscribing witnesses.

JOHN T. COLLINS.

Witnesses:

G. R. DRISCOLL,  
W. S. BELLOW.