J. T. COLLINS.

APPARATUS FOR MAKING PAPER BARREL STAVES.

APPLICATION FILED APR. 18, 1908.

912,284. Patented Feb. 16, 1909.

Fig. 1.

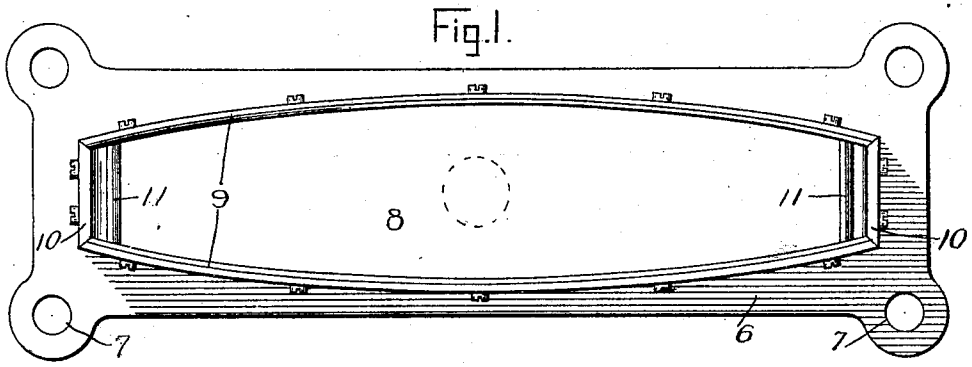


Fig. 2.

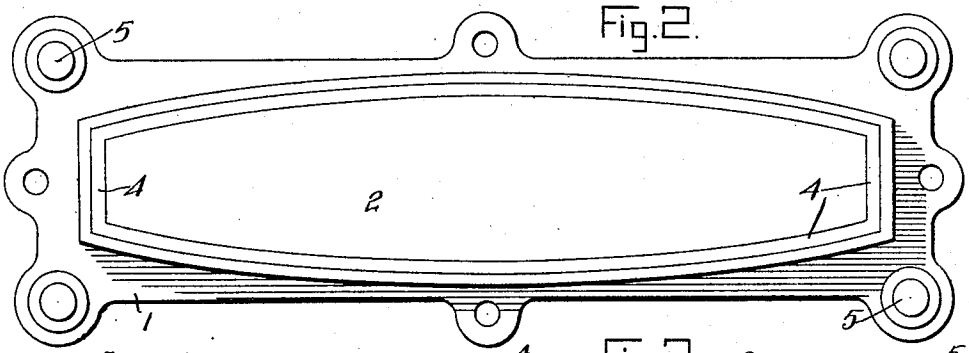


Fig. 3.

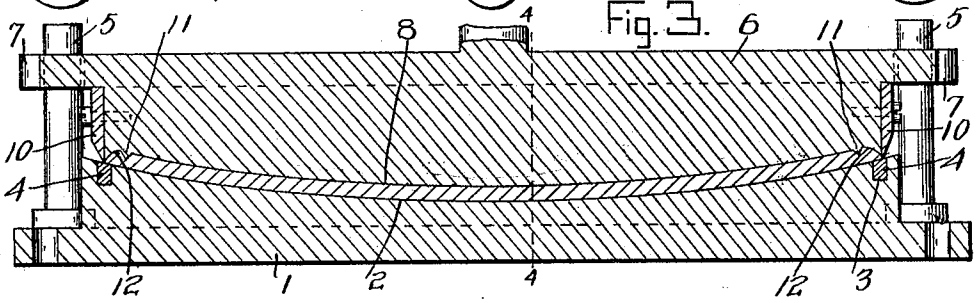


Fig. 5.

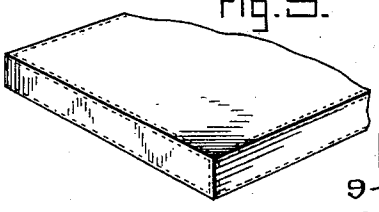


Fig. 7.

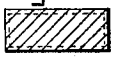
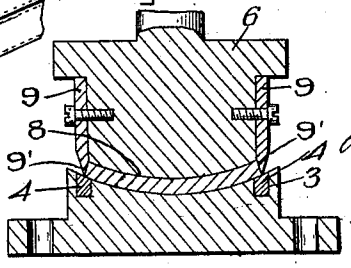


Fig. 6.



Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR MAKING PAPER BARREL-STAVES.

No. 912,284. Specification of Letters Patent. Patented Feb. 16, 1909.

Application filed April 13, 1908. Serial No. 427,924.

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 Apparatuses for Making Paper Barrel-Staves, of which the following is a full, clear, and exact description.

This invention pertains to apparatus for making paper barrel staves, and has for its object an improved apparatus which in a single operation will cut, shape and form the chines and crozes, and simultaneously compress the staves into the desired finished product ready for purposes of assemblage into barrels, or the like.

The invention further consists in the construction, arrangement and combination of parts to be hereinafter set forth.

In the drawings: Figure 1, is an inverted view of the male die forming a part of the invention, 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. 5, is a fragmentary view slightly enlarged showing the stock of sheeted paper pulp from which the staves are formed, showing in dotted lines the extent of steaming or otherwise softening of the stock, Fig. 6, 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, 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 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 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 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 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 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 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 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 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 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 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 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. By so softening only the surface portions of the staves, stock or blank as depicted by dotted lines in Fig. 5 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 is shown by dotted lines Fig. 6.

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.

In operation the stock as aforesaid either in sheets or in strips of proper length having been surface 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.

Having thus fully described the invention, what is claimed is:—

1. An apparatus for making paper pulp barrel staves embodying means to simultaneously cut, shape, compress and form chines and crozes in the staves.

2. An apparatus for making paper pulp barrel staves consisting of a pair of coöperating dies to receive the paper pulp stock therebetween and compress, shape and form the crozes and chines therein, and means whereby the stock is simultaneously cut into the desired proportions.

3. An apparatus for making paper pulp staves consisting of a pair of coöperating dies to receive the stock therebetween to shape and compress the same, and knives carried by one of said dies to cut the staves into the desired proportions.

4. An apparatus for making paper barrel staves consisting of a male and a female die, ribs carried by the male die to form crozes in the staves, and knives at the sides and ends of said male die to cut the staves.

5. An apparatus for making paper barrel staves consisting of a male and a female die to receive the stock therebetween to shape and compress the same, means carried by the male die to form chines and crozes in the staves and knives carried by the male die and arranged thereon to cut the staves in the desired proportion.

6. An apparatus for making paper barrel staves consisting of a male and a female die to receive the stock therebetween to shape and compress the same, ribs on the male die to form crozes in the staves, the male die at its ends beyond said ribs being shaped to form chines in the staves, knives secured along the sides and ends of said male die, and an inset filling of solid material softer than the knives carried by the female die to coöperate with said knives to form a sealing union between said dies during the act of compression.

7. An apparatus for making pulp barrel staves embodying means to simultaneously compress, shape and cut the staves into requisite size.

8. An apparatus for making pulp barrel staves consisting of a male and a female die to compress and shape the stave therebetween, end and side knives carried by one of said dies to cut the staves into requisite length, the side knives on the inner faces being shaped to form the stave sides inclined.

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

JOHN T. COLLINS.

Witnesses:
W. S. Bellows,
G. R. Driscoll.