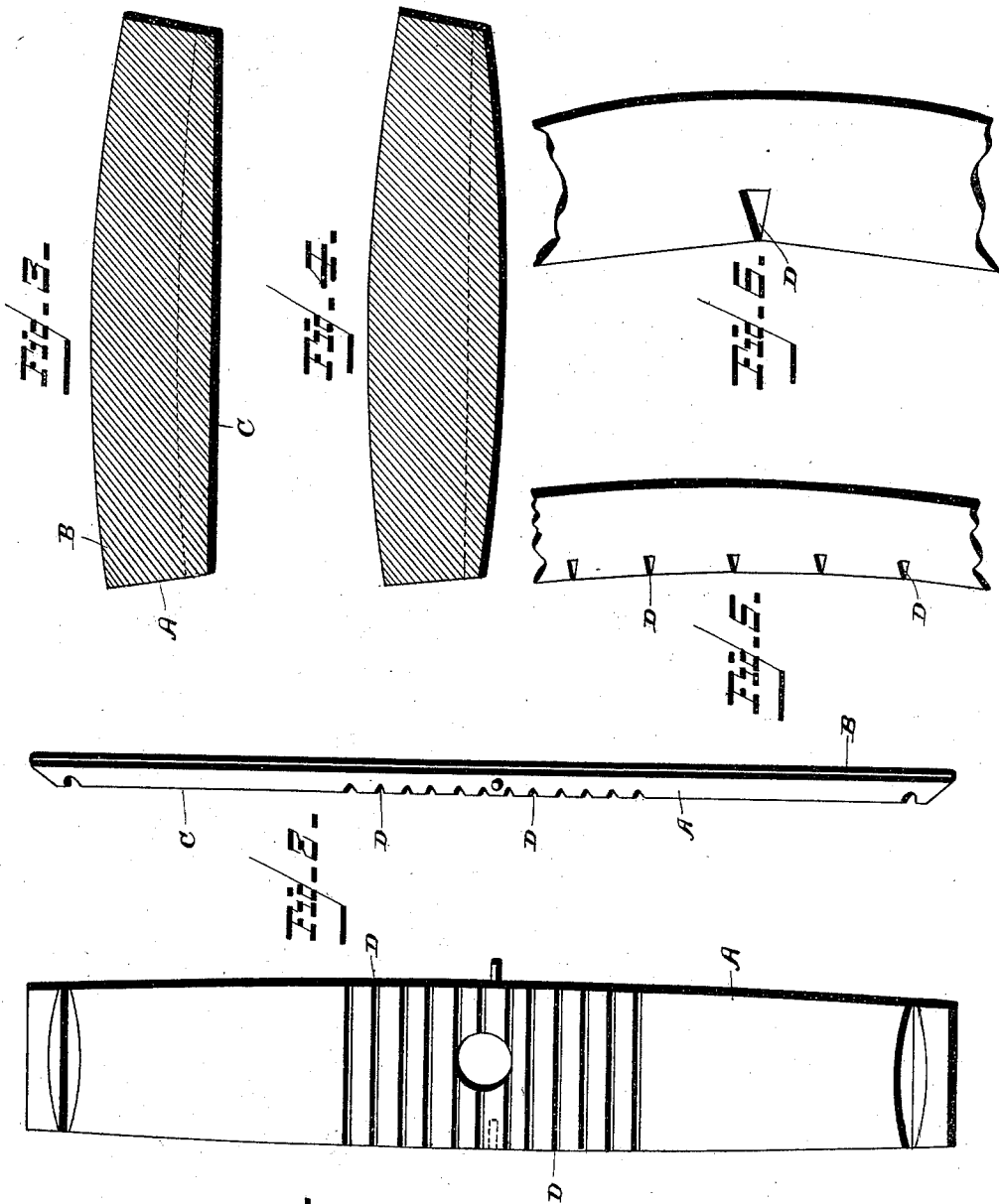


(No Model.)

J. PLEUKHARP.
METHOD OF PREPARING BUNG STAVES.

No. 513,339.

Patented Jan. 23, 1894.



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UNITED STATES PATENT OFFICE.

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METHOD OF PREPARING BUNG-STAVES.

SPECIFICATION forming part of Letters Patent No. 513,339, dated January 23, 1894.

Application filed January 21, 1893. Serial No. 459,194. (No specimens.)

To all whom it may concern:

Be it known that I, JAMES PLEUKHARP, a citizen of the United States, residing at Columbus, in the county of Franklin, State of Ohio, have invented certain new and useful Improvements in Methods of Preparing Bung-Staves; 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.

The object of this invention is to devise a process or method by which the bung hole may be bored in the bung stave, before the barrel is formed.

The invention consists in first slowly bending the stave into the form which it will assume in the completed barrel, and then boring the bung hole therein.

The invention also consists in first severing the fibers of the stave on the inner side along the bilge by transverse grooves, then slowly bending the stave into the form which it will assume in the completed barrel, and finally boring the bung hole in the stave.

The invention also consists of the novel features and the peculiar construction and combination of the parts which will be hereinafter more fully described and claimed and which are shown in the annexed drawings, in which—

Figure 1 is a view in elevation of a completed stave having the bung hole bored therein after the manner of my invention as seen from the inner side. Fig. 2 is an edge view of the stave shown in Fig. 1. Fig. 3 is a cross section of the stave showing the neutral axis slightly curved. Fig. 4 is a cross section of a theoretically perfect stave having the opposite sides convex and similarly curved, and having the neutral axis straight. Fig. 5 is an edge view of a stave bent into the desired form prior to boring the bung hole therein. Fig. 6 is an enlarged view of the bilge portion of a stave.

Heretofore the bung hole has been bored only after the barrel was otherwise entirely completed. In the old method of making tight or liquid barrels, staves of varying width are first set up to an approximate given diameter and partially trussed. They are then placed

over fires and warped. The trussing is then completed, the staves crozed and chamfered and the barrel headed and hooped. In this completed form, and usually after the delay of several days to allow the strained fibers to set, they are bored for the bung hole. In the system devised and used by me, sawed staves of any good closed grained hard wood, all of exactly the same size and crozed and chamfered, turned rounding on the outside and left square or straight on the inside, are formed into barrels and headed and hooped without the use of fires or truss hoop, the bung holes being bored by the method or according to the process hereinafter described. The advantage arising from the boring of the bung hole in the bung stave before the barrel is formed, have long been recognized, but though often attempted, has heretofore never been satisfactorily accomplished for the reason that the stave thus greatly weakened was unable to stand the strains from longitudinal bending and transverse warpage incurred in the formation of the barrel, the wood "checking" or splitting about the bung hole. The question which presented itself was how to overcome or remove these strains upon the fibers of the wood.

In the longitudinal bending of the staves to form the bilge the outer fibers are stretched and the inner compressed, with a tendency in consequence of a slipping or shearing of the outer over the inner fibers. The firing of the barrel in the old process is intended to partially overcome this trouble by the shrinkage of the inside fibers of the stave under the action of the heat; but this is an unsatisfactory process as with the removal of the heat, the fibers will tend to resume their former position and condition, resulting in the undue straining of the fibers and consequent weakening of the stave. The longitudinal bending likewise tends to produce a transverse warpage, increasing the strain upon the fibers and its consequent evils. A theoretically perfect stave would be one in which these strains did not exist, one in which there would be no tendency to either shrinkage or warpage, by longitudinal bending.

Considering simply the transverse warpage, I hold that a theoretically perfect stave

would be one double convex with equal curvature outside and inside, throwing the neutral axis in bending into a straight line, transversely from edge to edge. This I endeavor to approximate in practice by leaving the staves square or straight on the inside, instead of hollowing as in the old method.

Considering simply the shearing strain or tendency of the outer fibers to slip over the inner, due to the stretching of the outer and compression of the inner fibers, in longitudinal bending to form the bilge of the barrel, I hold that a theoretically perfect stave would be one which in cross section would be a line simply, the neutral axis. This I endeavor to approximate in practice by severing the inner fibers at intervals along the part of greatest strain—the bilge, and cutting away sufficient material to allow the ends of the fibers to unite without undue strain from compression. This cut or groove theoretically would be sufficient in depth to coincide with the neutral axis, and V-shaped, which practically would be impossible. In practice I prefer to make the cuts and grooves with thin saws, and depend upon the sizing or gluing of the barrel, to fill up any interstices and so make it practically correct; but even with these approximations to the theoretically perfect stave, I found that the boring of the bung hole before the formation of the barrel would still result in the “checking” of the wood from the undue strains upon the fibers. It has long been known that a second bending either of metal or wood is always easier than the first, requiring less power to produce it, and hence the strain between the particles in the metal and the fibers in the wood, must be less, there having been a displacement or movement of the particles in the metal and a slipping of the fibers in the wood during the first bending. The process of setting consists simply in the giving of sufficient time to complete this slipping and so overcome the strain. With this fact before me I then determined upon a first slow bending of the bung stave into the form it would eventually take in the completed barrel, then boring the bung hole and proceeding as before in the formation of the barrel. This process is found to be entirely satisfactory, completely overcoming the difficulty. By this process, not only is the labor required to do the boring greatly reduced, but all “checking” of the bung stave entirely overcome. The sweating of the barrel on the inside, while the fibers are being allowed to “set,” in the old process, before the boring of the bung hole is also obviated.

The process in detail as practiced by me is as follows: The finished staves—which in the new process for the making of barrels devised and used by me, are turned rounding on the outside and left square or straight on the inside, and crozed and chamfered, are run over a mandrel carrying a dozen thin circular saws about one-half or three-fourths of an inch apart, by which cuts or grooves are

made transversely across the inside of the stave at the bilge, as shown in Fig. 1. They are then run through a series of rolls by which the stave is bent slowly and gradually into the form it will assume in the completed barrel. They are then bored for the bung hole, and put in with the other staves to be formed into barrels, trussed, headed and hooped. My stave by its very form, turned rounding on the outside as at B and left square on the inside, as at C is, I believe, subject to less strains under longitudinal bending to form the bilge than the old form of staves. The severing of the inner fibers at the place of greatest strain likewise tends to reduce the strain by the removal of the compression of the inner fibers; but by the slow and gradual bending, especially are these strains removed by the movement and partial setting of the fibers.

I am aware that the idea of boring the bung hole before the barrel is formed is old, but that it has never before been successfully accomplished is proven by the fact that while the advantages are readily seen and everywhere acknowledged, the universal practice is to bore for the bung hole only after the barrel is otherwise completed.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The herein described process of preparing bung staves and providing the bung hole therein prior to forming the barrel, which consists in first slowly and gradually bending the properly prepared stave into the form which it will assume in the completed barrel then boring the same to form the bung hole, and subsequently treating the stave as other staves in the formation of the barrel, substantially as described.

2. The herein described process of preparing bung staves and providing the bung hole therein prior to forming the barrel, which consists in first providing transverse grooves on the inner side of the stave along the bilge, then bending the stave into the form it will assume in the completed barrel, and lastly boring the stave to form the bung hole, substantially as described.

3. The herein described process of preparing bung staves and providing the bung hole therein prior to forming the barrel, which consists in first transversely grooving the properly prepared stave, rounding on the outside; straight on the inside and crozed and chamfered, on the inside along the bilge, then slowly and gradually bending the stave into the form it will assume in the completed barrel, and finally boring the stave to form the bung hole, substantially as set forth.

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

JAMES PLEUKHARP.

Witnesses:

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