

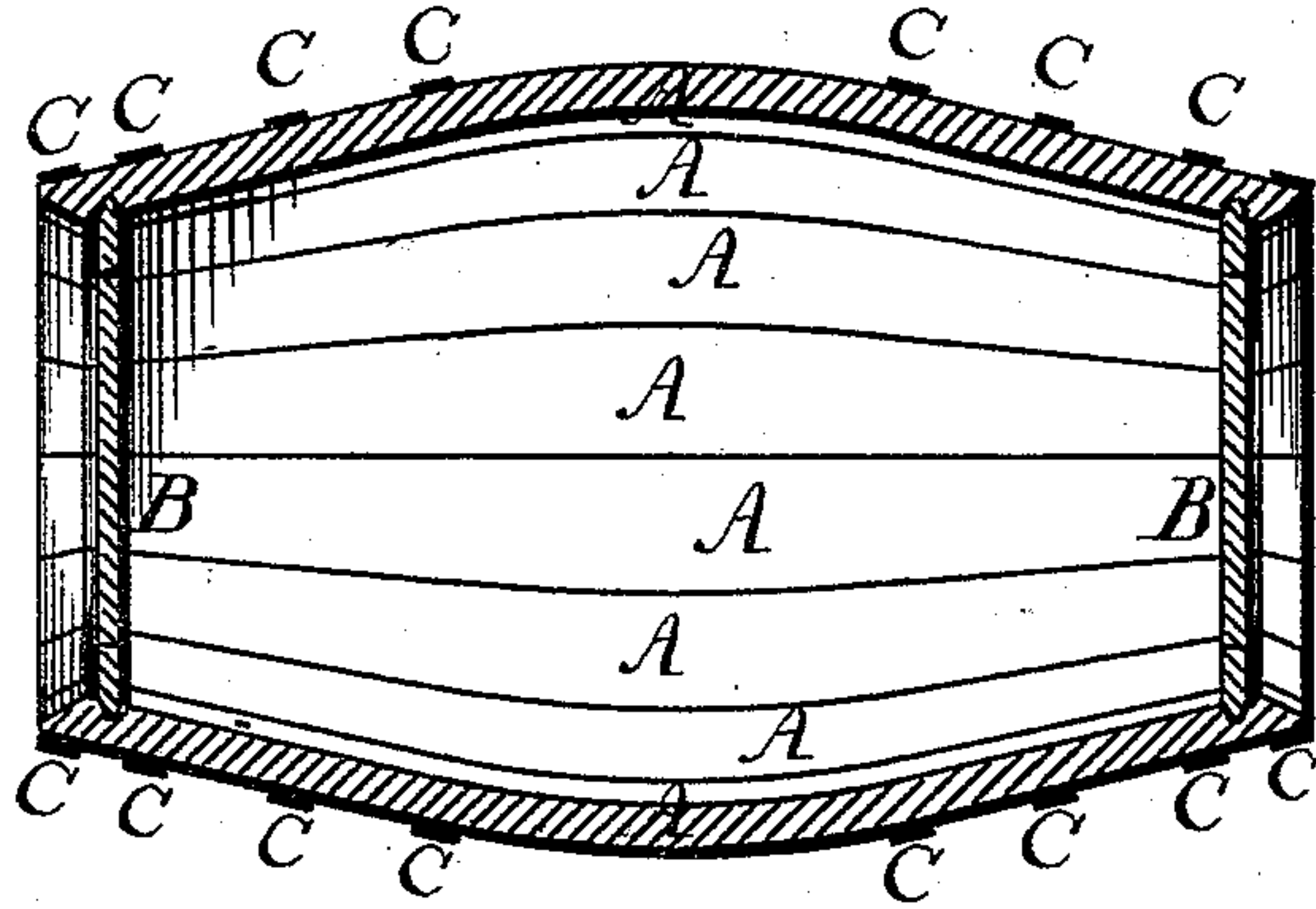
(No Model.)

S. L. WIEGAND.  
CASK.

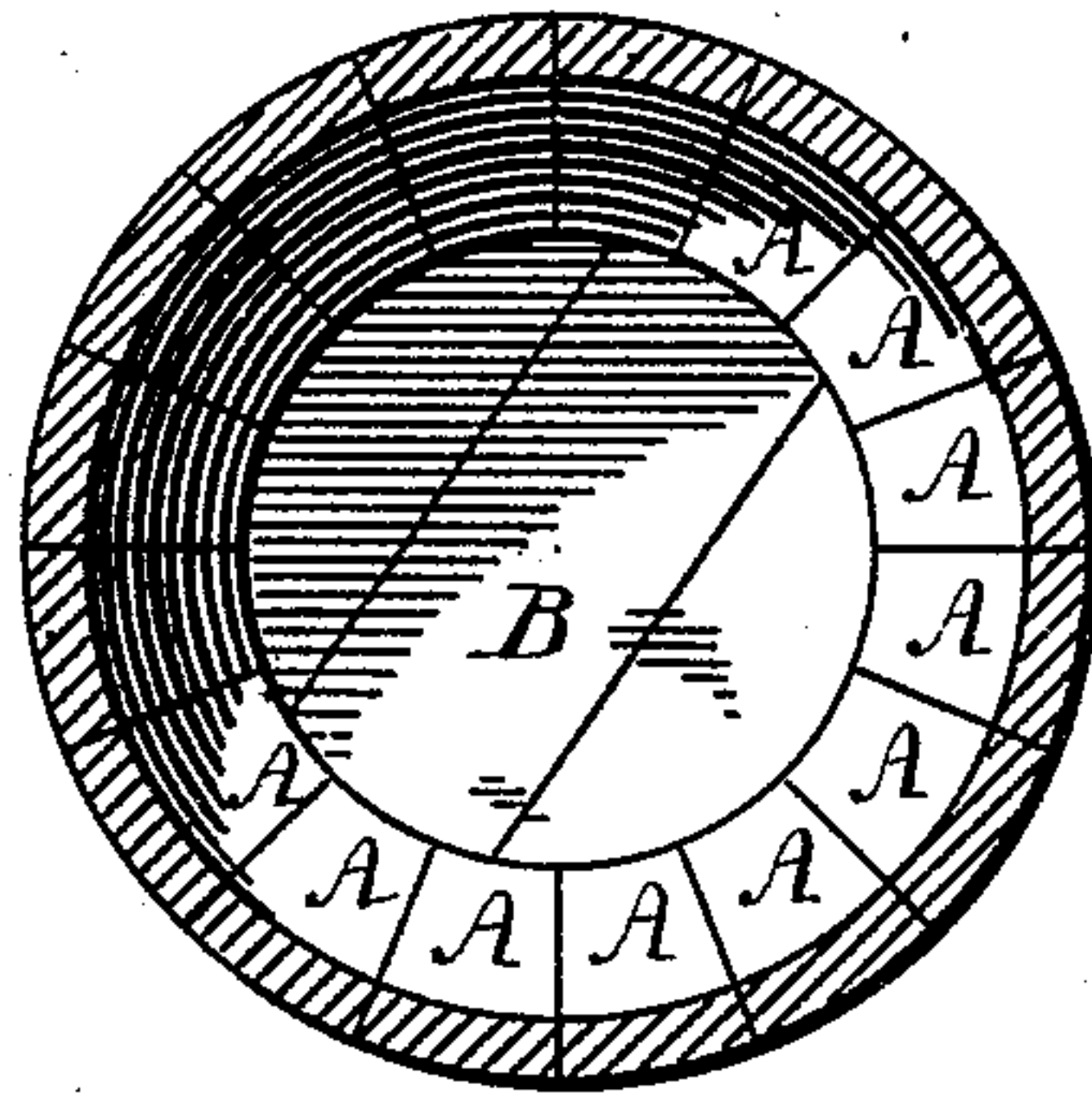
No. 437,410.

Patented Sept. 30, 1890.

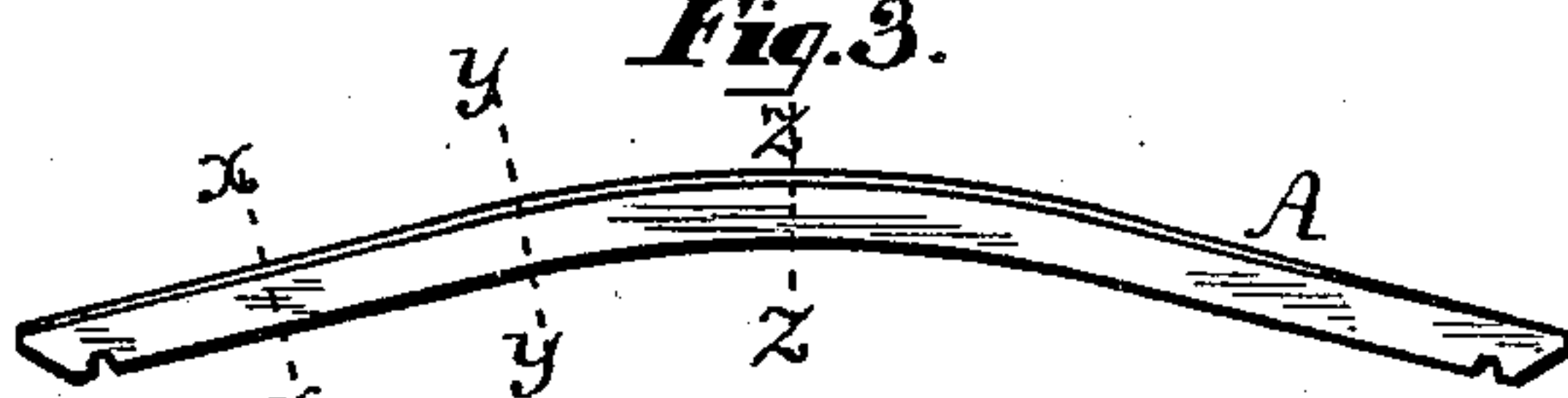
**Fig.1.**



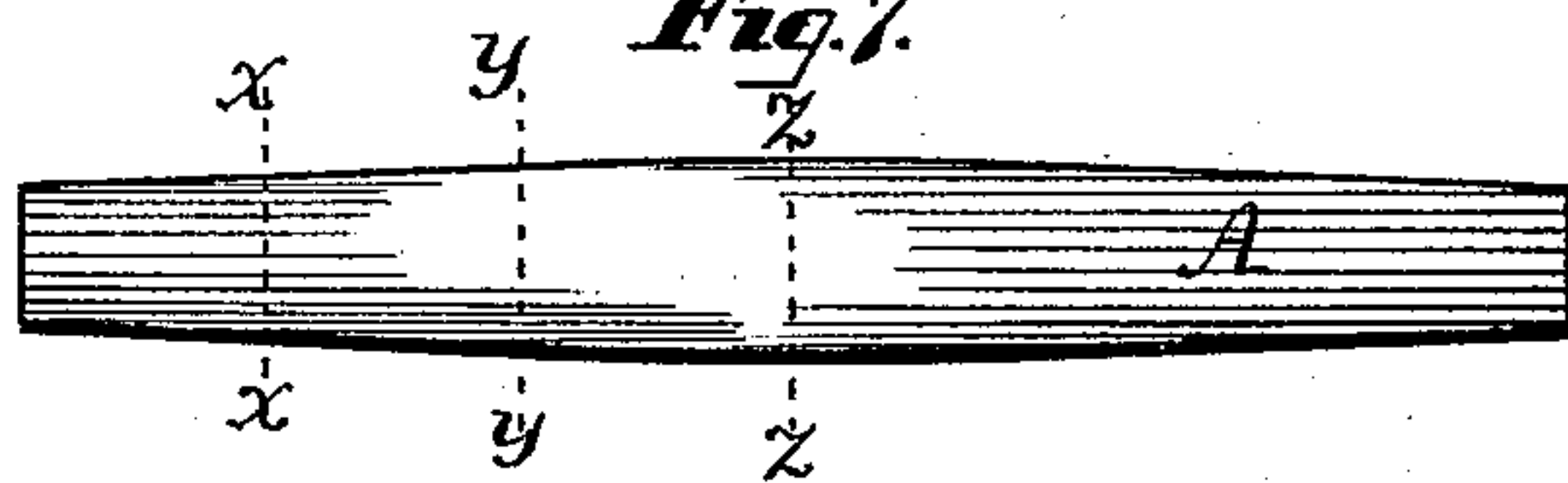
**Fig.2.**



**Fig.3.**



**Fig.7.**



**Fig.4.**



**Fig.5.**



**Fig.6.**



WITNESSES:

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# UNITED STATES PATENT OFFICE.

S. LLOYD WIEGAND, OF PHILADELPHIA, PENNSYLVANIA.

## CASK.

SPECIFICATION forming part of Letters Patent No. 437,410, dated September 30, 1890.

Application filed October 12, 1888. Renewed August 2, 1886. Again renewed August 2, 1888. Serial No. 281,820. (No model.)

*To all whom it may concern:*

Be it known that I, S. LLOYD WIEGAND, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Casks; and I do hereby declare the following to be a sufficiently full, clear, and exact description thereof such as to enable others skilled in the art to make and use the said invention.

This invention relates to that class of casks made for retaining fluids, and has for its object the cheapening of production, greater accuracy of form, facility of repair, and convenience of shipment in parts, besides enabling the manufacturer to avoid the large amount of hand-labor now found indispensable in the present method of manufacturing casks.

To this end the nature of said invention consists of a cask the staves of which are all of uniform dimensions and form, bowed or bent centrally in their length and tapering between converging planes from the bilge to the ends, dressed smoothly on their inner and outer surfaces in such varying degrees of transverse concavity and convexity at different points in their length that they form, when assembled with proper heads and hoops, a cask smooth both internally and externally, of practically circular form and even thickness throughout, and so that the staves of any number of such casks can when separated be taken indiscriminately and re-erected with proper heads and hoops again into casks without requiring dressing, jointing, or fitting. These staves are bent or sprung near the center of their length, so that the cask formed from them may, in geometric terms, be described as a zone of a sphere taken at its greatest diameter uniting the bases of two truncated cones. The staves are held together by hoops so riveted as to be of superior strength, and are the subject of an application for Letters Patent of the United States, filed October 12, 1883, and serially numbered 108,848, and the staves of the cask are the product of a series of machines the subject of two applications for Letters Patent of the United States, respectively entitled, filed, and numbered as follows: "Stave-

Planes, filed September 1, 1883, No. 105,333," "Stave-Jointer, filed September 1, 1883, No. 105,332," and the assembling of said staves with the heads and the securing thereof by the hoops is effected by two machines, the subject of two applications for Letters Patent, respectively entitled, filed, and numbered "Cask-Forming Machine, filed October 12, 1883, No. 108,846," and "Hoop-Driving Machine, filed September 1, 1883, No. 105,334." The staves are cut by a cylindric saw from a bolt of timber parallel with the grain thereof, and are then in the form of segments of a hollow cylinder approximately of the same radius as the greater diameter of the cask and having the grain of the wood parallel with the length of the stave. From this machine the staves are passed through a stave-planing machine which simultaneously planes both the inner and outer surfaces thereof smoothly with a degree of transverse convexity of least radius at the ends and gradually increasing in radius toward the center of their length. Next, each of the staves as planed is put in a clamp of the exact shape to fit inside and outside to the surfaces of the stave which it assumes in the finished cask. This springs or bows it from a straight line in the direction of its length to a curve or bend greatest at the center of its length, and holds it clamped in this position while the ends are cut to length and beveled and crozed, and the edges cut or dressed by cutters, so as to form the joint between the staves in plane surfaces, which surfaces, if produced, would intersect each other in the axis of the cask. Upon being released from this machine the staves spring back or straighten measurably toward their previous form and have smooth surfaces. The staves thus prepared (marked A in the several figures of the drawings) are then assembled with heads B and hoops C into the form of casks by a cask-forming machine already referred to, and the hoops B, which are preferably riveted by the rivets described in the application hereinbefore referred to, are driven tightly to place by the hoop-driving machine, thus completing the cask with the exception only of boring the bung-hole, which is done with any of the implements in common use.



In the drawings, Figure 1 shows a longitudinal central section of the cask; Fig. 2, a transverse section through the bilge; Fig. 3, an edge view of a detached stave; Fig. 7, an outer view of a detached stave. Figs. 4, 5, and 6, respectively, show cross-sections of the stave made in the planes indicated by the dotted lines  $x x$ ,  $y y$ , and  $z z$  in Figs. 3 and 7.

It will be observed that the staves A being practically straight upon their convex and concave surfaces in the direction of their length toward the ends of the cask the fibers of the wood are not disturbed at those parts by the bending process, but retain their full strength, which is important in view of the unavoidable weakening done by the crozing cutting across a considerable portion of the fibers.

Upon inspection of the drawings it will be seen that the internal surface of the cask is of regular form and conforms to the external shape, so as to be nearly or quite parallel therewith.

Casks thus made are distinguishable from others by their external and internal form. Instead of being curved throughout the entire length of the staves, the portions of the staves beyond the central pair or bilge-hoops are straight or nearly so, and as assembled in the casks the staves may in geometric terms be stated to form two truncated cones, united at their bases by a central zone of a sphere or spheroid to which the sides of the cones are tangential. The staves, being of uniform dimensions, may be used interchangeably and erected with proper heads and hoops into casks without fitting any of them specially.

I do not claim "a bilged cask having bent outerly and innerly planed staves, all of equal dimensions and of the same shape—i. e., all

of equal length, breadth, and thickness—and of the same inner and outer concave and convex cross-curvatures, diminishing alike in radius from the bilge to the chine, and of the same bevels, varying alike from the bilge to the chine," such casks formed of staves whose edges were bounded by curves of equal opposite radii, having been made and used, and being in that respect, as well as in the variations of bevel of the jointed edges of the staves at different points in their length—necessarily consequent upon the curved form of their edges—materially and substantially different from my invention.

Having described my invention, what I claim is—

1. A cask for containing fluids, consisting of equal staves having the grain of the wood parallel with the length of their internal and external dressed surfaces bowed in the bilge portion and straight in the other portions in the direction of their length upon the inner and outer surfaces and jointed edges, and combined with heads and hoops in the manner set forth and described.

2. Staves for forming casks made of uniform dimensions, having their internal and external surfaces dressed to transverse curves of varying radius to conform concentrically with varying diameters at different parts in the length of the cask, curved lengthwise at the bilge and straight from the croze to the bilge and tapering in breadth between the straight joint edges between their bilge and their ends, substantially as shown and described.

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Witnesses:

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