J. KIRBY.
Bung.

No. 203,740. Patented May 14, 1878.

Fig. 1

Fig. 2

Fig. 3

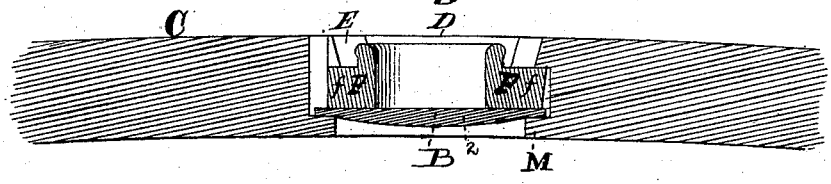

Fig. 4

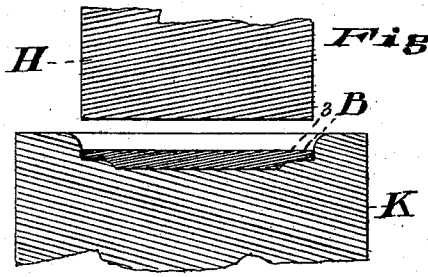

Fig. 5

Witnesses
Edgar J. Gross
Jno. H. Grechli.

Inventor
Josiah Kirby, per
Wm. Hubbell Fisher,
Atty

UNITED STATES PATENT OFFICE.

JOSIAH KIRBY, OF CINCINNATI, OHIO.

IMPROVEMENT IN BUNGS.

Specification forming part of Letters Patent No. **203,740**, dated May 14, 1878; application filed April 26, 1878.

To all whom it may concern:

Be it known that I, JOSIAH KIRBY, of the city of Cincinnati, county of Hamilton, and State of Ohio, have invented a new and useful Bung, of which the following is a specification:

My invention consists in a thin wooden bung, compressed in the direction of its thickness—that is, from top to bottom—constituting a new and improved article of manufacture.

The principal advantages resulting from my invention are as follows: The bung, when placed in position and moistened by being brought in contact with the liquid in the barrel, cask, &c., or by the application of liquid thereto, expands in the direction of its thickness, and makes a tight joint between itself and the parts, which hold it in position, so that no portion of the liquid in the barrel can escape through the bung-hole, and no air can enter the barrel through the said hole.

Another advantage is that the bung, being made thin, is readily punctured for a vent-orifice, or for the insertion of a device which performs the office of a vent.

In the accompanying drawing, Figure 1 represents the simplest form of the pressed bung, the subject of this invention. Fig. 2 represents the usual form of the wooden blank. Fig. 3 illustrates one mode of securing the bung in position in the barrel-stave, said figure being a section through the center of the bung, the bung-hole stave, and follower. Fig. 4 is a vertical central section of a pair of dies for pressing one of the various forms of my pressed bung, and Fig. 5 is a vertical central section of another form of my pressed bung.

The blank A is of wood, and usually about a quarter of an inch thick. Its shape, viewed from top to bottom, is preferably round, but may be square or octagonal, or of any other preferred configuration. Its width across varies, of course, with the size of the bung-hole in which it is to be used.

The blank to be pressed may be cut and pressed simultaneously in a continuous operation; or it may be first cut out and afterward pressed.

The pressing of the blank is accomplished by any of the ordinary and well-known methods. Dies are the common means employed. In Fig. 4, for illustration, a pair of dies, H and K, are shown for pressing the blank, the latter being first introduced into the intaglio die K, and then compressed by the die H being pressed against it.

The simplest form of bung B, pressed according to my invention, is that shown in Fig. 1. Here the whole blank has been evenly and equally compressed, and the bung is consequently everywhere equally thick, and the faces of the bung are perfectly even.

In Fig. 3 is another form (No. 2) of my bung, which has received greater compression at the edges than at the center, one face of the bung being flat, and the other face being somewhat thicker at the center than at the edges, and tapering toward the latter.

In Fig. 4 is another form (No. 3) of my bung, the lower face, at its edge and for some little distance therefrom toward the center, being compressed more than the rest of the bung.

Fig. 5 shows still another form (No. 4) of my bung, the upper and lower faces being formed as the lower face of bung-form No. 3 of Fig. 4 is formed.

Ordinarily the amount of compression which the edges at least receive is such as to reduce them in the pressed bung to a thickness of one-half of that of the blank before being pressed.

It is evident from the foregoing illustrations that the blank may be pressed so that the impression is everywhere the same, in which event the bung is, in cross-section, of the same shape as the blank is; or the pressure upon the various portions may be varied to suit the particular conformation of the parts which are to hold the pressed bung in position in the stave. The preferred form is that shown in Fig. 3, where the edges are pressed more than the center, the edges being usually the place where the greatest expansion of the bung is needed.

One of the reasons why it is especially desirable to compress the face of the bung near the edges is because the compression is performed for the purpose of obtaining a correspondingly large expansion of the bung at the points of compression—viz., at the points where

the bung rests upon a seat or the equivalent thereof—the expansion being employed to cause the joint between the bung and seat to be perfectly tight. Another reason is that it is desirable to bring the bung and the mechanism for securing it in the hung-hole all within the thickness of an ordinary barrel-stave, which could not be done if the bung were not pressed before being used.

Any desirable mode of introducing the bung into the bung-hole and of holding it there may be employed, the particular means for this purpose not being the subject of this patent, which has to do with the bung alone. For the purpose of illustration I have, however, shown one practical mode of holding the bung in place in the bung-hole, remarking that the mode and means here employed are the subject of other applications for Letters Patent.

C is a stave of a cask or barrel, &c., in which is a bung-hole, D, provided with appropriate lugs E, situated at intervals around the upper portion of the interior of the bung-hole.

A follower, F, preferably open from top to bottom, at the center is provided with studs or arms *f*, and, except where the arms project, is of such smaller diameter as to allow it to be dropped into the bung-hole past the lugs E, and the arms or studs projecting sufficiently that, the follower being turned, the arms will pass beneath the lugs and prevent the follower from coming out of the bung-hole. Near or at the lower edge of the bung-hole an annular flange or seat, M, projects inwardly therefrom sufficiently to form a rest or seat for the bung. The follower being out of the bung-hole the pressed bung is dropped into the latter and rests upon the seat B. The follower is then introduced into the bung-hole till it rests upon the bung, after which it is turned by the thumb and forefinger so that the arms *f* come beneath the lugs E.

It may be here remarked that the thickness of the follower is so graduated with reference to the bung and the lugs E that when the follower is turned the arms shall fit closely beneath the lugs E. Of course, any other suitable device may be employed to hold down the bung, and keep it securely in position. Any appropriate device may be employed to remove the follower. The pressed bung coming in contact with the liquid in the barrel is moistened, and the compressed portions thereof very rapidly and powerfully expand, and fill all the small inequalities in the face of the seat. As the bung is held firmly down by the follower, the joint between the bung and the seat is rendered extremely tight. In fact, the joint is water-tight and also air-tight. As the expansion of the wood of the bung is most needed where the bung touches the seat, it is evident that that portion is the portion of the bung which it is most necessary to compress. That is why the forms 1, 2, 3, and 4 shown are all valuable forms of my invention.

The follower may touch one of the faces of the bung at any desired point; but the preferable place is that part of the face which is opposite to that portion of the other face which touches the seat.

I have sufficiently illustrated my invention to show that a thin bung pressed in the direction of its thickness is a practical and very useful bung. As it is very much thinner than a common bung, much wood is saved in the manufacture of each bung; and as there is a vast quantity of bungs manufactured, the saving of wood is enormous. The thin bung is sufficiently strong to resist all the pressure to which it will be subjected by the fluids or gases within the barrel.

I have subjected a bung, pressed as aforementioned, and whose blank was, before compression, a quarter of an inch thick, to a pressure of three hundred pounds, and the bung sustained this pressure without a single indication of yielding.

Another advantage of my thin pressed bung is, that it may be readily and quickly punctured for a vent, or for the insertion of a device which performs the office of a vent. Such puncturing can be done without expense, and no previous preparation of the bung for this purpose is required.

The puncturing of the bung is usually done at the center of same, and the opening shown in the center of the follower conveniently admits of the introduction of a puncturing instrument to the bung, and also of a device for performing the office of a vent.

While it is a fact that the bung, after being placed in the bung-hole, can be somewhat compressed by the follower, and expanding, when moistened, will tighten the joint between it and the seat, nevertheless it is a desideratum—in fact, a necessity—to compress the bung before placing it in the bung-hole. The reason for this is that the stave is not very thick, and it is quite essential that the bung, when placed in the bung-hole, should occupy as little room as possible, in order to afford sufficient room for the insertion of a follower.

What I claim as new, and desire to secure by Letters Patent, is—

As a new article of manufacture, a thin bung compressed in the direction of its thickness, substantially as set forth, prior to and in preparation for being used in a bung-hole, for the purposes mentioned.

JOSIAH KIRBY.

Attest:
W. S. CHRISTOPHER,
C. WALTON, Jr.