

(No Model.)

R. F. RADEBAUGH.

PROCESS OF AND APPARATUS FOR TREATING WOODEN STOPPLES.

No. 535,770.

Patented Mar. 12, 1895.

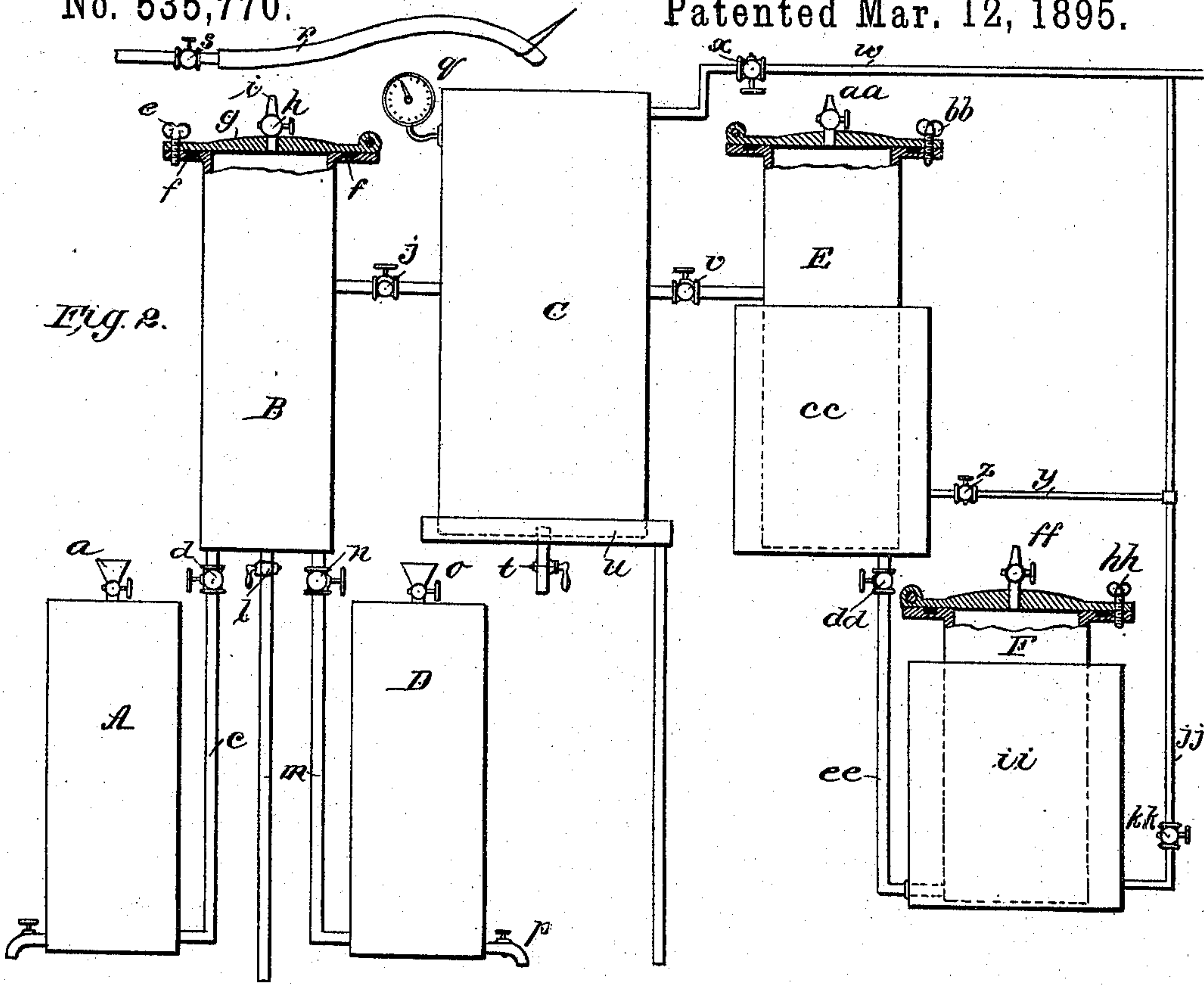


Fig. 2.

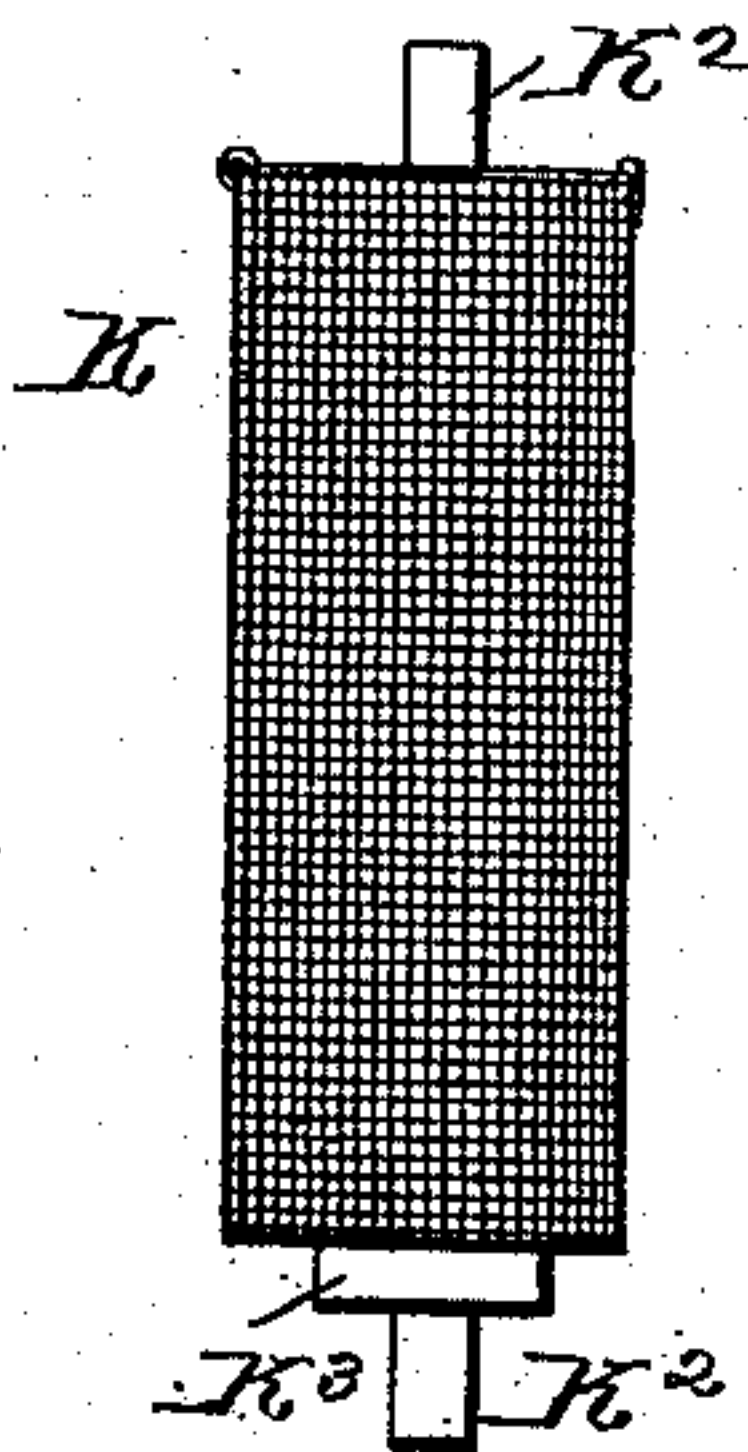
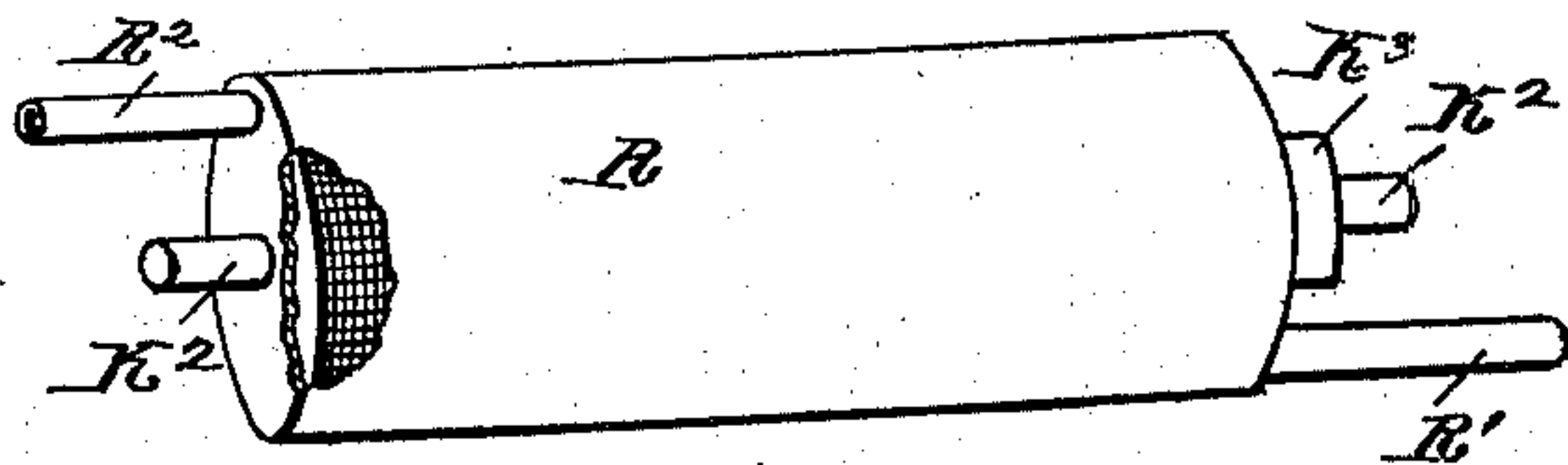


Fig. 3.



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# UNITED STATES PATENT OFFICE.

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## PROCESS OF AND APPARATUS FOR TREATING WOODEN STOPPLES.

SPECIFICATION forming part of Letters Patent No. 535,770, dated March 12, 1895.

Application filed May 22, 1894. Serial No. 512,096. (No model.)

*To all whom it may concern:*

Be it known that I, RANDOLPH F. RADEBAUGH, of Tacoma, in the county of Pierce and State of Washington, have invented a new and useful Improvement in Processes of and Apparatus for Treating Wooden Stopples, of which the following is a specification.

In the Patent No. 197,220, granted November 20, 1877, to Frank A. Howig, Frank B. H. Wing and myself, a process of treating wooden bottle stoppers and bungs was described which consisted in removing the resinous and gummy matters from the stopples by treatment with a strong alkaline solution, then subjecting them to steam or hot water to remove the alkali, then treating with glycerine to soften and maintain their moist and flexible condition, and finally filling the stoppers with paraffine or wax to render them impervious to liquids.

My invention is designed to provide a simple, practical, and economical method and apparatus for treating in a large way wooden stopples in accordance with the general principles laid down in said patent, and to that end it consists in special apparatus and mode of working hereinafter shown and described, in which—

Figure 1 is a side view of a wire basket or cage for receiving the stopples to be treated. Fig. 2 is a sectional side elevation of the main parts of the apparatus, and Fig. 3 is a perspective view of the cleaning drum.

The bottle stoppers or bungs, which for convenience will be hereinafter called stopples, as they drop from the cutting machine are received into a strong galvanized wire basket K, Fig. 1, having a lid adapted to be securely fastened, and in which basket they will for the sake of convenience in handling be held throughout the succeeding stages of treatment. It is intended to use for this purpose a basket having a capacity suited to receive the entire daily product of one stopple cutting machine. This basket is preferably of cylindrical form and provided with journals K<sup>2</sup> adjusted at the end centers for revolving the whole by machinery in order to rapidly expel the water taken up in subsequent stages of the process. At one of the journals, pref-

erably that at the bottom of the basket when in vertical position, is to be attached a drive wheel K<sup>3</sup> for engaging with the driving mechanism.

The wire basket, having been filled with stopples and the lid closed and firmly secured, will be rolled or lifted to the treating apparatus which may be placed conveniently near the cutting machine. This apparatus consists, see Fig. 2, of five air-tight iron vessels A, B, D, E, F, and a steam condensing exhauster C, or vacuum device, with connecting pipes and valves as shown in the drawings, the upper vessels B, E, at either side of the exhauster being large enough to receive and inclose the wire basket K with its journals.

A represents an iron vessel in which a saturated solution of potash in water will be poured until full, or nearly so.

B represents the tank in which the basket of stopples will be placed and from which the air is to be thereafter exhausted. This tank has a hinged lid g, with rubber packing f and closing screw e.

C is the condensing exhauster made of boiler plate or heavy galvanized iron with drip trough u and waste pipe.

The basket filled with stopples having been placed in the tank B, and the lid closed and fastened down by the thumb screw, the valves d, h, j, l, and n are closed, and tank B then becomes an air tight vessel. The next operation is to open the valve x in pipe w, which leads to a steam boiler, so as to fill the condenser C with steam to a pressure of from twenty to forty pounds as may be found necessary, and as indicated by the gage q near the top of the condenser. The desired pressure having been obtained, the valve x is closed and the valve s opened turning cold water from a hydrant through hose r upon the top of the condenser. When the latter is found to be cold, the valve j is opened and left open until the sound of rushing air passing from tank B to C ceases, and valve j is then closed. Valve d is then opened admitting to the stopples the potash from the tank A which is placed at a lower level. The potash from atmospheric pressure rises into the partial vacuum of tank B and enters the pores of the



stopples and does its work of softening the wood in from two to four hours. In two hours' time the lid *g* may be lifted and the condition of the stopples ascertained by mere pressure between thumb and finger. If half a dozen be thus tried without finding any that remain hard, the entire lot may be safely accounted as soft and ready for the next step. The valves *d* and *h* are then opened allowing the potash to return by gravitation to its reservoir A, after which valve *d* is closed.

The water which flows over chamber C to condense the steam within is gathered by trough *u* and carried off by the down spout, while a discharge cock *t* serves to drain the interior of chamber C of any water of condensation.

The next step is to thoroughly remove the potash remaining in the stopples, and for this purpose cold running water is used, and to facilitate its action I employ the ordinary pressure of the hydrant by attaching the hose *r* at the nozzle *i* and, after allowing time for the vessel to fill with water, opening the drain cock *l*. To further expedite this part of the operation the flow of water may be increased by higher pressure of a force pump (not shown) which shortens the time required to free the stopples from potash. The potash under hydrant washing, as described, disappears in from two to three hours ascertainable by simply tasting the ends of a few stopples. The basket of stopples is then taken out of tank B, its journals fastened in boxes provided for them, and set in motion at a rate of speed sufficient to rapidly remove by centrifugal action the water held in the pores of the wood. The stopples are then returned to tank B and again inclosed therein to receive treatment of pure glycerine, one part diluted with about three parts of cold water. This is applied in the same manner as that described in the use of potash, the tank D being for this purpose filled with the glycerene mixture.

As in the case of potash the mere immersion in glycerine and water will meet the actual requirements, but only at the expense of much time, which means accumulation of large bulks of stopples in process and consequent excessive space for treating room. Hence the economy and value of expediting the treatment, which, by the exhaust herein described is a manipulation consuming less than twenty minutes, as against two days for simple immersion.

The object in adding water to the glycerine was simply to provide a vehicle by which the latter could be conveyed in moderate quantity through the pores, and thus reach all of the fibers and cells of the wood with a lubricant or softening medium that will not evaporate, that will be harmless, and whose presence even will not be apparent to the eye. In no other way that I have learned could the glycerine be introduced and uniformly distributed in small quantity throughout the cell walls of the wood. If undiluted glycer-

ine were used, the result would be waste and a product which would be found unmarketable because damp and gummy as though covered with molasses. The vehicle (water) having performed its function, is to be removed, without heat, and as expeditiously as possible. For this purpose the centrifugal motion for evaporating is plainly indicated as the best. The basket of stopples is again taken from B, fastened in its boxes, set in motion and so continued until it is found that moisture can not be expelled from the ends of the stopples by pressure between thumb and finger.

The next step in the process is that of closing the ducts or pores of the stopples with a kind of substance that will adhere to their walls, that will not be offensive, and that will not injure the contents of any bottles in which they may be used as stoppers. Such a substance is beeswax. This is to be melted to a thin liquid condition, for which purpose one of the iron vessels above mentioned is provided, represented in the drawings by F. This quite or nearly filled with beeswax stands in a galvanized iron tub *i i*, which latter is filled with water surrounding F, and near the bottom of which is introduced the pipe *j j*, conveying steam from the boiler into the water and thus conveniently melting the wax. The vessel E represents the exhaust tank for waxing, and in this the basket of stopples is placed and hermetically sealed by the thumb screw *b b*, as in preceding operations. The object of the iron tub *c c*, surrounding E, the steam pipe *y* and valve *z*, is to provide steam heat so that the walls and bottom of E will not be cold and stiffen the wax as it flows in. The wax being hot as desired and the basket of stopples placed in E, the operation of filling the pores of the wood by suction, through first condensing steam in the exhauster C, and opening the connecting valve is repeated, just as in the two previous cases of potash and glycerine, except that I am now operating the tank E instead of B as a stopple holder, and beeswax in a fluid state instead of the other fluid mentioned. Within five minutes after the hot wax rises through the valve *d d*, it may be returned to F, a hardly appreciable portion of it having remained in the pores of the stopples, and yet sufficient to close them and to render the stopples impervious to the thinnest and most volatile liquids, including ether. The stopples as now taken from the tank E are found to be coated with a layer of beeswax which it is necessary to remove. Heat, moderate in degree and brief in application may now be used to advantage. I have handled a small wire basket full of these stopples covered with beeswax, plunging it into boiling water, agitating it therein, and quickly withdrawing it, using care so as not to melt the wax out of the pores while endeavoring to get it off the exterior, and in this have been successful. I prefer however to apply this mode on a larger scale and one



less expensive in practice by providing a tight drum R Fig. 3, opened for overflow on its upper side so that the wax may rise and be carried off. This drum is intended to incase the

5 wire basket K which is set to rotating on its journals, and while so in motion I flood the drum with hot water, and cold water successively, the latter being intended to check the melting of the wax in the pores.

10 R is the drum inclosing revolving basket of stopples. R' is the inlet pipe for hot and cold water, and R<sup>2</sup> is the overflow carrying wax to a still body of cold water where it is gathered and saved.

15 The stopples being cleaned of wax should be rotated until dry on their surface, after which they are ready for market.

Having thus described my invention, what I claim as new, and desire to secure by Letters

20 Patent, is—

1. In a process for treating wooden stopples with wax, the sub process consisting of inclosing them within an open cage, hermetically sealing the cage within a treating chamber, admitting steam to the treating chamber, condensing the steam in a separate vacuum chamber in open communication with the stopple treating chamber for the double purpose of exhausting the moisture and air from the stopples and lifting an alkaline solution into contact therewith, discharging the alkaline solution by gravity, flowing water under pressure through the treating chamber to wash out the alkali, then removing the cage of stopples and expelling the water by a revolution of the cage without removing the stopples therefrom, then restoring the cage of stopples to the treating chamber and renewing the vacuum by condensation of steam and

30 lifting a solution of glycerine by the same agency into contact with the stopples, and then removing the cage of stopples and ex-

45 pelling by centrifugal action the surplus glycerine solution substantially as and for the purpose described.

2. The process of impregnating wooden stopples with an impervious uniform and non-gumming coating, which consists in inclosing them in a revoluble cage and placing the cage in a chamber capable of being hermetically sealed, exhausting the air from the chamber and raising by the vacuum a body of hot waxy material into the chamber to cover the stopples, then removing the cage with the stopples, and inclosing it in another chamber, and while rotating the cage flowing a body of hot water through said chamber to remove and carry off the surplus wax by the combined influences of agitation, buoyancy of the wax, and temperature of the water and its carrying power as a vehicle, thereby leaving the stopples with a slight but uniform coating of wax penetrating their pores without gumming or sticking in irregular films on the outside substantially as set forth.

3. An apparatus for successively treating wooden stopples with alkali, glycerine and wax, consisting of a vacuum chamber, a treating chamber B with fresh water inlet and outlet and detachable cover adapted to be hermetically sealed a revoluble cage K for the stopples, adapted to fit in said heating chamber, two subjacent tanks A and D for alkali and glycerine respectively connected to the treating chamber by pipes and valves, a wax coating chamber E also connected to the vacuum chamber and adapted to receive the said cage and also having a subjacent wax heating reservoir, all substantially as shown and described.

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Witnesses:

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