H. A. HOUSE.

DRINKING VESSEL AND PROCESS OF MAKING SAME.

APPLICATION FILED FEB. 28, 1922.

1,417,916. Patented May 30, 1922.

Fig. 1.

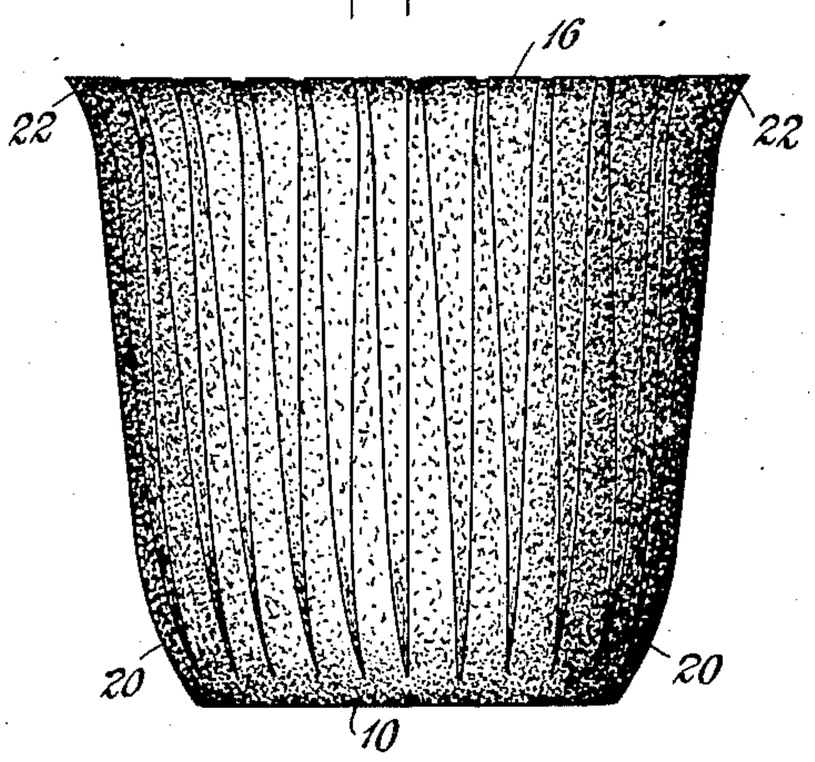


Fig. 2.

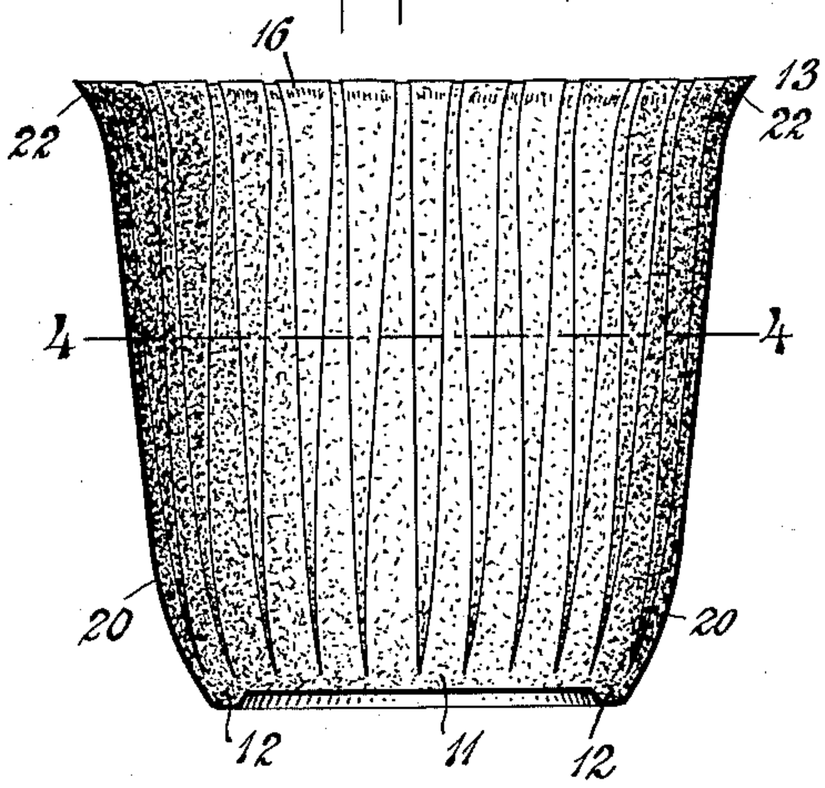


Fig. 3.

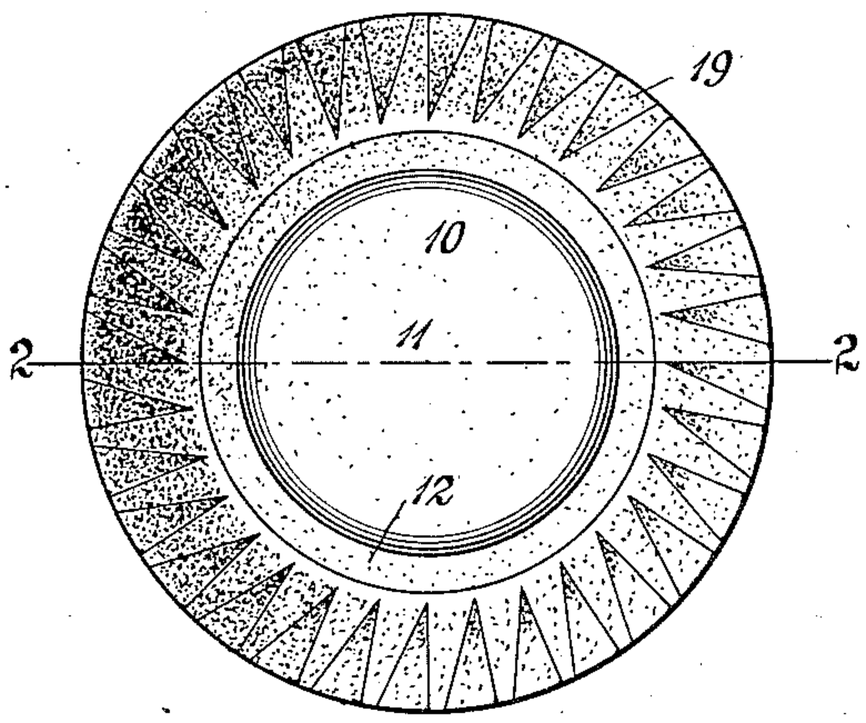


Fig. 4.

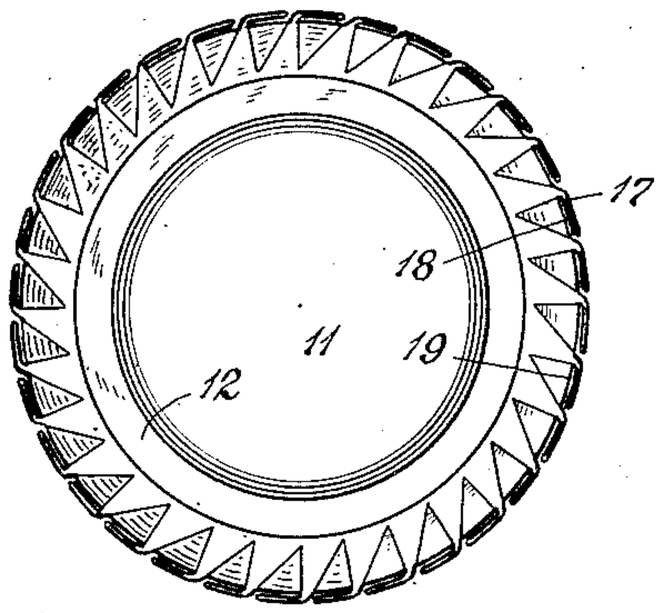
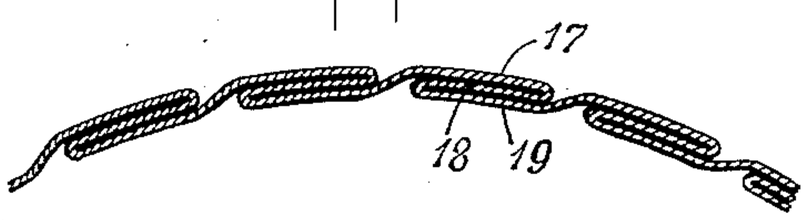


Fig. 5.



WITNESS

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DRINKING VESSEL AND PROCESS OF MAKING SAME.

1,417,916. Specification of Letters Patent. Patented May 30, 1922.

Original application filed April 20, 1911, Serial No. 622,293. Divided and this application filed February 28, 1922. Serial No. 539,822.

To all whom it may concern:

Be it known that I, HENRY A. HOUSE, a citizen of the United States, and resident of Bridgeport, in the county of Fairfield, State of Connecticut, have invented certain new and useful Improvements in Drinking Vessels and Processes of Making Same, of which the following is a specification.

This invention relates to drinking cups made of paper or similar material. Hitherto drinking cups had been made of paper which was suitably prepared so as to be impervious to liquids but these cups were made of two pieces, which after a single use of the cup tended to separate so as to render the cup useless. Efforts were also made to prepare cups of a single piece of paper by folding or pleating paper into cup form and then paraffining the same to stiffen the structure and to permit it to remain sufficiently rigid for the purpose of a single use. Such structures were, however, fragile cups that could be used once only at best and then only with difficulty and upon such single use ceased to be useful as cups. Such cups were, however, wholly non-commercial for a variety of reasons. In the first place, such cups must, in order to become a commercially useful product, be capable of production in huge quantities in a small time; that they must be uniform in dimensions they must occupy the smallest possible space; when nested they must in the nested condition be uniformly spaced apart; in order to be dispensable by machinery they must be alike no matter when produced so as to fit the same standard distributing machines; they must be strong; they must be rigid; the pleats must be resistant against opening; but above all they must be made so inexpensive as to be capable of reaching the general public at a cost very much less than, and at most such as not to exceed, the minimum unit of coinage.

The object of the present invention is to provide a drinking vessel made of paper and so constructed as to be entirely stiff and capable of withstanding the stresses of use to such an extent that the cup is not destroyed until its user physically applies the destructive force, the entire cup to be of extreme cheapness and to contain as small an amount of paraffine, or like material, as possible.

Attempts to make such cups by paraffining the paper in the first instance and then pleating, relying upon the adhesive character of the paraffin to cement the pleats together have been wholly unsuccessful. Attempts to pleat paper into cup shape and then paraffining have, obviously, resulted in the production of a usable cup structure but not of such a structure as was capable of fulfilling the requirements of applicant's purposes, i. e. of supplying the public with one-piece paper drinking cups at nominal cost but of great strength, rigidity, durability, uniformity and efficiency.

Applicant's invention differs from all prior suggestions in this, that he takes into consideration and employs beneficially in conjunction with each other the following three essentials:

1. The original paper must not be dried out or brittle but must be pliable by reason of contained moisture;

2. The pleated paper cup must be formed under conditions of elevated temperature; and

3. The paraffining of the cup must occur before the paper has lost the elevated temperature of its formative period; i. e. immediately after it leaves the forming instrumentalities or at least at a time when the cup (should it have cooled) is nevertheless maintained in or restored to the same physical condition as when it is first made.

The invention is illustrated in the accompanying drawings, in which Fig. 1 is a perspective view of a drinking cup embodying the invention; Fig. 2 is a vertical central section of the same taken on the line 2—2 of Fig. 3; Fig. 3 is a top plan view. Fig. 4 is a transverse section on line 4—4 of Fig. 2 and Fig. 5 is a detail enlarged.

The vessel is formed from a single sheet of paper, by means of pleating the sides of the vessel, which takes up the surplus material, the same being folded as indicated in tapering pleats 16, said pleats being of greatest width at the top of the vessel shown, and tapering therefrom toward the bottom of the vessel, where they disappear. These pleats are made of considerable number, so as to distribute the reinforcing which they provide uniformly around the vessel. The pleats will more or less cover the surface of the vessel and thereby reinforce the same as also provide vertical ribs of three thicknesses of material, namely, the outer

fold 17, the intermediate fold 18, and the inner fold 19, which act by themselves, to give a strengthening power to the vessel. At the upper edge of the vessel there is formed a lip 22, pressed as thin as possible. At the bottom of the cup is preferably formed a recess 11 extending upwardly from the annular portion 12 of the cup bottom 10.

In manufacturing these vessels or cups, the sheet of paper from which they are formed must be such as to be easily shaped and pleated, and good quality paper generally carries enough contained moisture to satisfy conditions although in certain instances it may be advisable to supplement the paper's natural moisture content. The paper blank is depressed at its center and by proper simultaneous depression and manipulation of the forming tools the sheet outside of the base is pleated and given the general shape shown in the drawings. The mechanism used for forming the cups is no part of this application and many varieties of machines are available for performing the operations of shaping and pleating the paper blank in the desired manner. See, for example, Patent No. 1,047,173 of December 17, 1912. It is, however, a feature of proper cup making tools or implements, from the standpoint of the present invention, that the cup after it has been pleated shall be compressed in its pleated form under substantial pressure and under hot formative conditions, as otherwise a cup such as shown in the drawings will not be produced. A paper cup pleated and compressed in its cold state will not be compact like the cups shown in the drawing and will not maintain itself in use, as a cup, but will readily open up and be substantially useless. The moisture contents of the paper, to which reference has already been made, prevents the paper from becoming brittle even though it is made and compressed under hot conditions and it is probable that said moisture, together with the sizing in the paper, participates in giving the cup when made hot its proper set and relative permanence of structure, such as is indicated in the cup shown in the drawings. After the cups have been formed and while they are still warm, they are treated with or immersed in melted paraffin, or like material, which saturates the paper fibre and waterproofs the same and at the same time cements the folds of the pleats forming the ribs together, so that the cup when cold with the consequent stiffening of the paraffin becomes rigid and waterproof. The fact that the cups are warm at the moment of their contact with hot paraffin means that the cups at that time are in the condition of their creation and this circumstance is of considerable importance. If the cups, after being formed as described, are permitted to become cool and are then paraffined, it will be found not only that the pleats of the paper have a tendency to open up (even though the cups are subsequently re-warmed) but also that the final product is no longer uniform or as structurally sound as it should be. When the cups are paraffined at the moment of the release from the mold or pressure device and while they are still warm, their then condition will be permanentized by the paraffin and the latter, due to the warmth of the paper itself, is enabled to enter into the interstices of the cellular structure of the paper, thereby on cooling rendering the paper itself rigid and forming a waterproof condition within the body of the paper. In other words, the paraffin enters throughout the cellular body of the paper and forms an entirely paraffined condition in the paper itself and more or less completely fills all the interstices and completely coats the internal structure of the paper. It is, consequently, indispensable that the application of the paraffin must take place upon the cup while the latter is in the condition in which it first leaves the forming instrumentalities and preferably before the warmth of the cup imparted to it during its formation, is dissipated. The cup being freshly formed, all the paper parts of the cup are in their proper relative positions, just as shown in the drawing, in which position they are then promptly permanentized, whereas if the cups are allowed to stand and become cool, they will either, if paraffined in that condition, result in a non-commercial cup or require restoration to the condition of their first creation, a wasteful and unsatisfactory practice.

It is thus obvious that unless the various essentials of my process are employed, a cup such as shown in the drawings will not be produced and the essentials of my cup and of my process of making the cup are that the paper cup must be formed in such a way that it shall be warm when it leaves the forming or pressure instrumentalities and that it shall be paraffined while still in this condition. I do not claim any process of making single piece paper cups which are formed in such a way as to be folded and pleated under cold conditions, nor any such cup or process when the paraffin is applied during a time when the paper is no longer in the condition (warm) of its creation, but I do claim the process which involves making the cups under hot conditions and paraffining the same before they have lost their formative (warm) condition.

The within specification is a division of application Serial No. 622,293, filed by me on April 20, 1911.

The cups, as described, form a practical, cheap, attractive and sanitary drinking ves-

sel and are especially adapted to be used in hospitals, schools and public places, and by reason of their structure and rigidity they are enabled to retain water or other liquid for hours making them especially adapted for use by doctors and dentists, especially as they are not subject to objectionable self destruction upon being used by the same patient more than once.

One embodiment of the invention has been shown and described, but it is obvious that the invention can be applied for vessels and receptacles of many shapes and for various purposes, and to this end changes may be made in the construction without departing from the spirit of the invention.

I claim:

1. The process of making pleated paper vessels which consists in subjecting a single sheet of paper having a substantial moisture content, to a pleating operation to form the same into the general shape of the desired vessel, giving the pleats of the vessel a set under conditions such that the paper itself is heated and then before said heat is dissipated, applying to said vessel melted paraffin.

2. The process of making pleated paper vessels which consists in subjecting a single sheet of paper having a substantial moisture content, to a pleating operation to form the same into the general shape of the desired vessel, including a laterally projecting lip thereon, giving the pleats of the vessel and of its lip a set under conditions such that the paper itself is heated and then before said heat is dissipated, applying to said vessel melted paraffin.

3. A pleated paper drinking cup, consisting of a pleated cellular base having a cup shape, the pleats of which are associated in approximately the same relative position towards each other as they are when freshly formed, and congealed paraffin uniformly and thoroughly distributed throughout the entire cellular body of the base, the same being the result of the application of melted paraffin to the pleated base while the latter is warm.

4. A pleated paper drinking cup, consisting of a pleated cellular base having a bulged body and an outwardly extending lip substantially the shape of an ogee curve, the pleats of which are associated in approximately the same relative position towards each other as they are when freshly formed, and congealed paraffin uniformly and thoroughly distributed throughout the entire cellular body of the base, the same being the result of the application of melted paraffin to the pleated base before the latter has lost the heat of its creation.

5. A drinking cup, consisting of a paper base having a cup shape, the cells of which are throughout the entire paper base filled with paraffin congealed from melted paraffin applied to the cup shaped paper base before the latter has lost the heat of its creation.

In testimony that I claim the foregoing as my invention, I have signed my name.

HENRY A. HOUSE.