Sept. 14, 1937. O. E. HUSE 2,093,109

RODENTPROOF CONTAINER

Filed July 15, 1933

Fig. 1

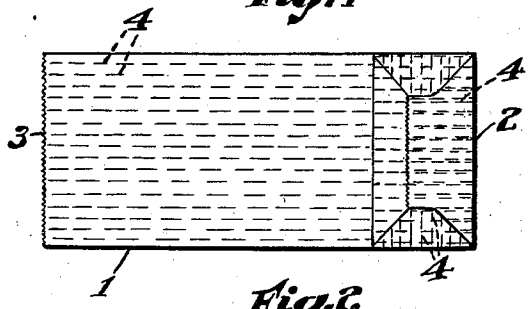


Fig. 2

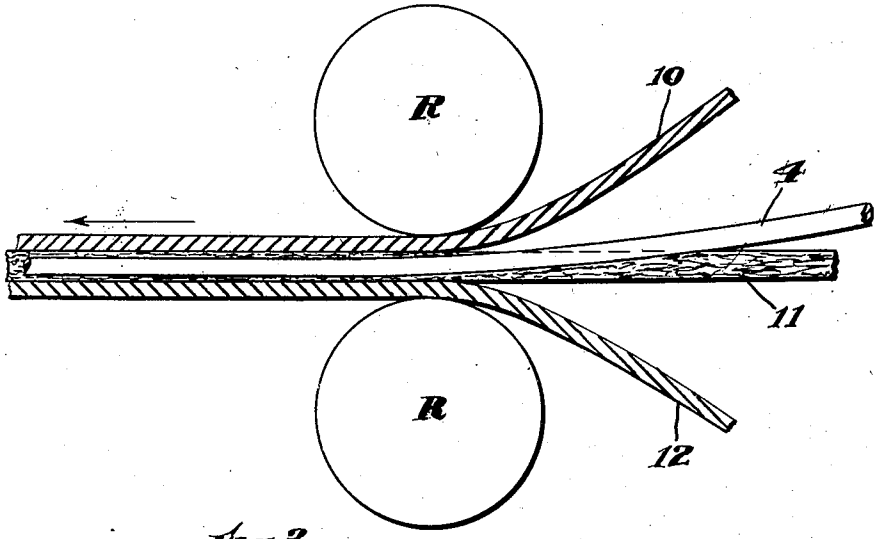


Fig. 3

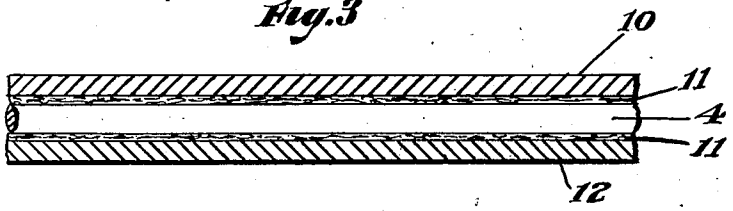
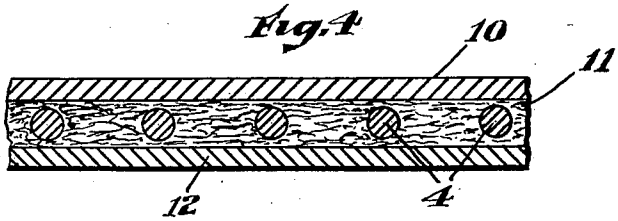


Fig. 4



Inventor
Oscar E. Huse
Ellis Spear
By Attorney

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2,093,109

UNITED STATES PATENT OFFICE

2,093,109

RODENTPROOF CONTAINER

Oscar E. Huse, Gorham, Maine, assignor of one-half to John C. Sherman, Attleboro, Mass.

Application July 15, 1933, Serial No. 680,526

12 Claims. (Cl. 229—55)

In my present invention I present as a general subject matter that of paper, pulp or like bags, sacks, wrappers or containers having certain novel characteristics. More particularly, my concept runs to articles in whole or in part of paper or pulp fabricated with metallic strands by which I produce protection against rodent attack as well as an increase of strength in the container.

In the manufacture of certain paper bags, vegetable fibres such as sisal have been fabricated in the paper from which the bags are made. This was possible of accomplishment because of the general similarity in the vegetable fibres used and their ultimate association was therefore relatively easy. The purpose of such reinforcement was that of strengthening the paper used for the bag. My primary concept herein is that of a rodent proof bag for flour or other cereals, although as will hereinafter appear, containers in accordance with my invention have great strength, are moisture proof and well adapted to widely varied uses.

I have demonstrated that metallic strands systematically located in the weave of a cotton or like textile bag containing an edible grain, flour or cereal product very successfully exclude rodents, and in fact, discourage the gnawing as soon as the metal is encountered.

Where the relatively high cost of such woven bags is a serious factor in merchandising certain commodities, there has appeared an urgent need for a less expensive container of similar rodent proof character. My present invention contemplates novel containers fabricated in whole or in part from paper or other wood or like fibre material of low cost.

It has been well known to those skilled in practical paper manufacture that a metal fastening or like member tends to cut a contacting paper sheet or to set up under flexation and strain disruptive tendencies. Such would be fatal in a container such as a paper flour sack, for example, because the slightest leakage is so wasteful as to defeat the very economy on which the use of paper is predicated.

According to my concept of the problem's solution, I make possible the avoidance of such difficulties in manufacture and defects in product. My concept provides for a novel basis of fabrication and a new and extremely valuable line of containers.

As a basis of disclosure of my invention I have shown in the accompanying drawing used for its illustration, a bag or sack like container of general standard type but having wholly new and most valuable characteristics.

This illustrative embodiment is to be considered only as illustrative and not limiting, as procedure and product may be and of necessity may be expected to be varied to meet the wide range of demand.

In the drawing:

Fig. 1 is a view of a sack with indicated armor strands.

Fig. 2 is a schematic edge view indicating the make up of my sack with its impregnated pulp blanket with armor strands embedded in it.

Fig. 3 is a sectional view of a fragment of sack wall showing the armor strands embedded longitudinally in the blanket of the sheet.

Fig. 4 is a transverse sectional view of such wall structure.

In the form chosen for illustrative purposes in this drawing, I have indicated generally a paper bag 1 having a folded bottom part 2 of any desired type and an open or top end 3.

Referring to the structure of a container of the bag type as indicated in Fig. 1, it will be noted that its wall structure includes a metallic armament of fine wires 4. The surface sheets 10 and 12 of the container wall are protected against any internal cutting by the wires due to the fact that the wires are embedded in a fibrous blanket 11 interposed between the sheets 10 and 12.

According to my invention this fibrous investment 11 of the armor strands 4 becomes an element of great importance. By making the fibre layer 11 of non-compacted structure and of a thickness sufficient to enclose the wires, I am able to fully embed the strands so that they are held against any cutting or disruptive action on the adjacent sheet. This embedment of fibres is also preferably of absorbent character and is made permanent by an impregnation of an asphaltic or like cementitious character.

So covered and held the armor strands 4 have no cutting effect on the surface sheet or sheets. The impregnation serves also as a consolidating bond for the parts of the wall member and makes the container practically impervious to moisture. Moreover, by mixing with the impregnation a deterrent and/or toxic substance, I further protect the contents from rodent attack.

The wires 4 in the side wall areas of the bag 1 are closely parallel. In practice I find that 30 gage copper wires spaced $\frac{1}{16}$ or $\frac{1}{8}$ inch apart afford an armament effective to exclude even a persistent rodent.

In bag structures as also in carton or like con-

tainer types, the systems of folds common to standard constructions are made by my concept to serve the novel function of providing at these important bottom or end areas a crossing of the parallel wires to effect a reticulation. This is of practical value for several reasons. It affords additional protection to areas exposed in stacking and storing. It also adds strength to the container in its load supporting function.

The wall of the bag 1 may be made up as suggested in Fig. 2. The paper sheet or strips 10 and 12 are drawn from suitable rolls and assembled with or upon the fibre blanket 11. The fibre investment 11 may be as before described a non-compacted sheet in which the strands 4 are embedded or might be a layer of pulp of a depth sufficient to receive the strands 4. The fibre of the blanket 11 may be low cost pulp so that the expense of this element is slight.

As suggested schematically in Fig. 2, the wire 4 may simply be pressed down into the pulp blanket 11 until it is encased by the pulp fibres or embedded in the body of the layer 11. Such a method is simple and efficient and the wires press into the fibre blanket and are bonded therein without any possibility of cutting or disrupting the paper constituting the sheet 10.

The fibre or pulp blanket 11 is impregnated with hot or emulsified asphalt or like binder. The blanket of fibre 11 being only thick enough to safely embed the wire strands 4 does not take an undue amount of the binder. It is, however, absorbent and easily permeated by the binder so as to form a complete anchoring for the armor wires 4.

In practice the fibre blanket is impregnated as it is drawn into the machine so that the wires 4 seize upon the embedding material and are immediately locked therein. The binder also gives the bond to the sheet or sheets used as the surface layer. While I use for most purposes one paper cover sheet, I may use fabric netting, tinfoil or other desired material. With this combined and impregnated sheet I assemble cover sheets 10 and 12. These are pressed firmly and evenly to consolidate the members, as by rolls R.

The armor wires or strands 4 are for rodent exclusion laid parallel and spaced at any desired distance. In the form illustrated they are shown as all parallel lengthwise of the indicated bag. Where desired a second set of wires may be added transversely of the first and spaced in like manner. The longitudinal wires can be run in continuously. Where transverse wires are used they may be drawn transversely of the sheet by delivery jaws and cut off in successive steps. In some instances the longitudinal armor wires may be supplemented by long fibres or twines transversely laid to increase the strength of the container in that direction.

The fibre or twine used with or without the binder may also be deposited on the metal armor strands either single, crossed or reticulated.

In all these forms the wires 4 are cushioned and held by the blanket or filling of pulp against any cutting of the combined paper sheet and are held against pulling out, ravelling or dislodgement from their desired spacing by the impregnation.

The character of the bag walls may be varied by the kind of binder used or the amount or proportion applied to the fibre. In this way the desired flexibility or stiffness can be controlled. Also, the impregnating gives a water or damp proof protection to the bag contents as well as to the metal armor strands which are thus preserved against rusting or corrosion.

A very efficient impregnation may be made by admixing with asphalt powdered sulphur or sulphur base or so-called colloidal sulphur. This is offensive to rats and is an effective deterrent. In such a mix the tackiness may be increased by adding resin or resin oil to insure good ply adhesion in the container walls.

It is of the essence of my invention that the metallic elements employed shall armor the container, adding their own inherent qualities to the container without weakening the other structural elements thereof.

Hence as stated hereinbefore, means should be provided to seal or embed these metallic elements in a material absorbent enough to hold a sufficient quantity of the cementitious material and soft enough to permit the wires to be pressed well into it. Of the several ways of accomplishing this result, I have found the following way convenient, though I shall here describe it for purposes of illustration, not of limitation.

A sheet of paper pulp, that is to say a sheet formed as such from any paper-making fibre but containing no sizing or other filling material, is creped, crinkled or embossed and then impregnated with either a hot thermoplastic binder, such as melted asphalt, or an aqueous emulsion of like nature. Impregnation may be effected by passing the sheet of pulp into contact with a hot roller smeared with melted asphalt or a roller smeared with emulsified asphalt or the like.

The pulp is thus caused to take up an amount of the impregnant which may weigh on an air dry basis 100% to 150% of the weight of the pulp itself. The pulp having had its effective bulk materially increased by creping or the like treatment is so much the more receptive of the impregnant and (both by reason of its bulk and of the asphalt now associated with it) so much the better able to serve as a bed for the wires. If wires of .005" diameter are used, the uncreped pulp sheet may be initially of .004" thickness and of .007" general thickness after being creped and impregnated.

If I impregnate this pulp sheet with an emulsified asphalt I let it become substantially free from water before utilizing it, at which stage it is sufficiently plastic and tacky to serve my purpose. If I employ a hot (melted) asphalt, I use it while still molten. If now upon such pulp sheet I now run my wires of .005" diameter it is obvious that these wires may be forced as by the pressure of rollers not only to enter the surface of the sheet but to become deeply embedded in it so that none of the wire remains protruding above the surface.

With a sheet of (e. g.) .007" thickness wires of the stated diameter do not cut through the sheet or materially impair it, since at the moment of meeting the wires the sheet is highly plastic.

When now this sheet with the wires positioned upon it, meets the surfacing elements of my invention these elements being relatively non-plastic may be pressed upon pulp-sheet and wires firmly enough to bond the structure together and to sink the wires completely into the mass of the pulp sheet, while retaining the adhesive surfaces thereof in a substantially uninterrupted area for contact with the surfacing elements.

The specifications just recorded are useful when I use round wires, but if I use strands of

metal such as result from rolling a wire to partly flatten it, then obviously the total thickness of the pulp sheet may accordingly be less, and less material thus consumed.

Moreover, with flatted wires I may secure a more effective armoring of the container.

Within the limits of my claims the practice of my invention may be and will be varied by the manufacturer according to his preferences for procedure and the kind of article he is producing.

What I therefore claim and desire to secure by Letters Patent is:—

1. A container consisting of a sheet fabricated to form its sides and bottom walls and comprising inner and outer layers and a fibre pulp layer confined therebetween and metal strands embedded in said pulp layer and disposed in spaced relation vertically of the bag, and a thermoplastic binder sealing said strands in the fibre layer and bonding said layers to each other.

2. A rodent proof paper container including in its wall structure parallel metal strands in relatively close disposition and extending longitudinally of the container in strengthening and protecting relation to the container and its contents and a softer fibrous layer into which said strands are embedded and confined, and a thermoplastic binder sealing said strands in said fibrous layer.

3. A container comprising a wall member including an external paper sheet, a blanket layer of absorbent fibre, and a metallic reinforcement embedded therein, said blanket layer being impregnated with an asphaltic binder in sealing relation to the metallic reinforcement within the fibre blanket.

4. A rodent proof container consisting of wall members, said walls comprising a paper layer, a plurality of metallic strands in rodent proof disposition, a pre-fabricated relatively highly absorbent fibre layer, and an asphaltic binder absorbed into the fibres and compacted to effect an embedding of said strands into said fibre layer and out of cutting relation to said paper layer.

5. A rodent proof bag consisting of a tubular member having a bottom and side walls, said member comprising a paper layer, a plurality of metallic strands, a pre-fabricated relatively highly absorbent fibre layer, and an asphaltic saturation to fibre satisfaction and compacted whereby said strands enter said fibre layer and are out of cutting relation to said paper layer and in strengthening relation thereto.

6. A rodent proof container consisting of bottom and side walls, said walls comprising a paper layer, and a layer of relatively absorbent material, and a plurality of metallic strands, and an asphaltic binder retentive of said metallic strands into said relatively absorbent fibre and to cementitiously unite said paper layer and said fibre layer whereby a flexible container wall is provided in which said metallic strands are prevented from cutting said paper layer.

7. A container comprising a wall member consisting of a cushioning layer of uncompacted soft fibrous absorptive material, a plurality of metallic strands embedded in said absorptive material, said strands bonded in said absorptive material by an impregnation of said material with an adherent waterproof substance, a paper covering sheet being sealed to said cushioning layer by said adherent waterproof substance.

8. A container comprising a wall member consisting of a cushioning layer of uncompacted soft fibrous absorptive material, a plurality of metallic strands disposed in spaced parallel relation longitudinally of the bag and embedded in said absorptive material, said strands bonded in said absorptive material by an impregnation of said material with an adherent waterproof substance, a paper covering sheet being sealed to said cushioning layer by said adherent waterproof substance.

9. A container comprising a wall member consisting of a cushioning layer of uncompacted soft fibrous absorptive material, a plurality of metallic strands embedded in said absorptive material, said strands bonded in said absorptive material by an impregnation of said material with an adherent waterproof substance, paper covering sheets being sealed to said cushioning layer by said adherent waterproof substance.

10. A container comprising a wall member of a material including a cover sheet, a cushioning layer of soft fibrous absorptive material, a plurality of metallic strands embedded in said absorptive material, and an adherent waterproof substance impregnating said absorptive material sealing said strands therein and binding said cover layer to said cushioning layer.

11. A container comprising a wall member of a material including a cushioning layer of soft fibrous absorptive material, a plurality of metallic strands embedded in said absorptive material, an adherent waterproof substance impregnating said absorptive material and sealing said strands therein.

12. A container comprising a wall member of a material including a cushioning layer of flexible, absorptive, uncompacted material, a plurality of metallic strands embedded in said layer, an adherent waterproof substance impregnating said layer and sealing said strands therein.

OSCAR E. HUSE.