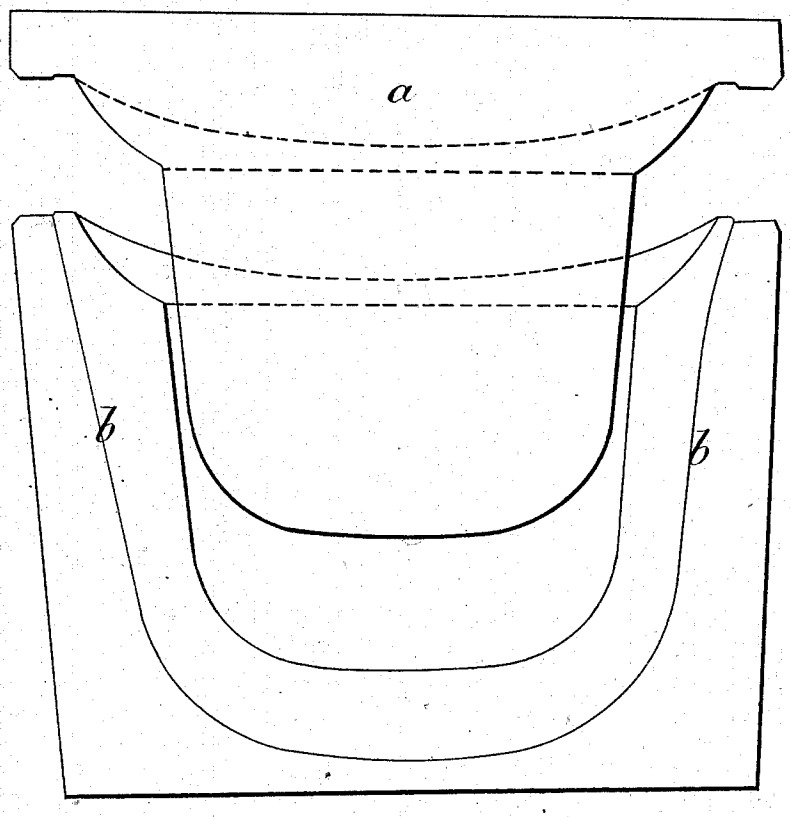
(Model.)

F. WALTON.

MANUFACTURE OF HOLLOW ARTICLES IN WHICH LIGHTNESS, RIGIDITY, AND IMPERMEABILITY ARE REQUIRED.

No. 249,427. Patented Nov. 8, 1881.

Fig: 1.



Witnesses:
E. C. Davidson
James Young

Inventor:
Frederick Walton,
By his Attorneys
Baldwin, Hopkins, & Peyton

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

FREDERICK WALTON, OF HEATHAM HOUSE, TWICKENHAM, COUNTY OF MIDDLESEX, ENGLAND.

MANUFACTURE OF HOLLOW ARTICLES IN WHICH LIGHTNESS, RIGIDITY, AND IMPERMEABILITY ARE REQUIRED.

SPECIFICATION forming part of Letters Patent No. 249,427, dated November 8, 1881.

Application filed July 26, 1881. (Model.) Patented in England July 19, 1880.

To all whom it may concern:

Be it known that I, FREDERICK WALTON, a subject of the Queen of Great Britain, residing at Heatham House, Twickenham, in the county of Middlesex, England, have invented certain new and useful Improvements in the Manufacture of Hollow Articles in which Lightness, Rigidity, and Impermeability are Required, (for which I have received Letters Patent in England, No. 2,976, dated the 19th day of July, 1880;) and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention has for its object improvements in the manufacture of hollow articles in which lightness, rigidity, and impermeability are required. For these purposes I first produce forms for the articles required in paper or paper-pulp. I cause the paper-pulp to be deposited on a perforated shape corresponding to the article it is intended to produce. By this well-known process I produce in thick porous paper seamless forms—it may be of a hat, a helmet, a tray, a bowl, a cup, a box or case, an opera-glass tube, a clock-case or a part thereof, or a raised panel or other hollow article. When the paper form is dry I cover it all over with oxidized or solidified oil composition, which I apply to it by the aid of heavy pressure and by means of dies or molds of the shape of the article. In this way I force a layer of composition of oxidized or solidified oil combined with fiber or pigment or other materials onto the internal and external surfaces of such forms. I afterward harden the coating by exposure to heat.

The annexed drawing, Figure 1, shows, in section, the pair of dies which I employ in producing a helmet-like head-covering. *a* is the upper die, and *b* the lower die. When they are shut together they form a mold and inclose a space corresponding in shape to the article they are intended to produce. At the top they fit together pretty closely, so as to allow little or no escape of the composition when exposed to pressure. There are conical pins on the upper die, which enter corresponding holes in the lower die and serve, when the upper die is brought down, to lead it accurately to its place.

The paper form is placed on the upper die and is slightly attached to it by a string around the upper part or in other convenient manner. A suitable quantity of the coating material to form the coating is then placed in the lower die and the dies are closed together with heavy pressure sufficient to distribute the coating uniformly over the form. The dies are, by preference, used cold, but the composition is heated as much as it will bear without injury, so that it may be soft enough to yield freely to the pressure.

I prepare a suitable composition from drying oil which by long-continued boiling, as is well understood, has been reduced to a condition such that when cold it is solid and almost dough-like. I mix this solid oil with other ingredients, as follows: solid oil, four pounds; cork, (finely ground,) four pounds; red lead, four ounces; lime, (quick,) four ounces; paraffine-wax, six ounces. The composition may be softened by adding a little boiled linseed-oil. I sometimes substitute two pounds of flock fiber for the ground cork. The purpose served by the paraffine-wax in this and similar compositions is to cause the molded article to leave the mold freely, and the quantity used should be no more than is requisite to attain this end. The cork-dust gives lightness with body, and is useful for head-coverings and like articles.

Another and harder composition suitable to receive japan contains the following ingredients: solid oil, four pounds; shellac, one pound, (more or less, according to the hardness required;) lamp-black, one-fourth pound. I prefer in preparing this to use solidified oil prepared by exposing oil in films, and to unite with it the shellac in a steam-heated pan, and to use a slight quantity of spirits of wine if the composition is required to be soft; and another: solid oil, (as above,) four pounds; bitumen, one and one-half pound; lamp-black, one-half pound. Coal-naphtha or similar solvent may be used to soften this composition.

Sometimes I boil the gums I may use to harden the oil in a cauldron with the oil. Co-

pal, kauri gum, and such resins are advantageously so prepared.

When it is required that the paper form should be covered on both sides, after it has received the outer covering it is replaced in the lower die, a suitable quantity of composition is put in, and it is again pressed. Unless the second or inner coating be quite thin the upper die should be changed, so that a suitable space for the composition may be left when the mold is closed. For some forms it will not be necessary to change the upper die.

Sometimes to obtain a better adhesion of the composition to the form I perforate the form; or I can varnish it with a gum-varnish, and I then cover the form while the varnish is in a tacky condition.

The hollow articles thus produced by covering a form with oxidized or solidified oil composition are placed in a stove on blocks, which prevent them getting out of shape, and they are exposed, say, for six hours or more, to a temperature of from 100° to 130° Fahrenheit. On leaving the stove the articles will in many cases require only to be trimmed or finished off to be ready for use.

This process is applicable to the manufacture of a great variety of hollow articles. For example, helmets and head-coverings are advantageously thus made, having the lightness, impermeability, rigidity, and resistance to wear desirable in these articles. My improved method of manufacture is also applicable to the production of tea-trays and many other articles.

To demonstrate clearly the advantages of my process I may state that in the manufacture of tea-trays and most japanned articles it has been usual to give the paper form repeated layers of color or japan, and to cut down the surface each time until a fine, smooth exterior is obtained. As each layer must be well dried before the application of another, it will be seen that much time and labor is required, which by my process is saved, as the surface of the mold being perfectly even and polished, it follows that the articles receive from the mold the same finish.

For articles to be japanned I employ the harder compositions. The japanning is conducted in the ordinary manner at a moderate temperature, but much fewer coats and less cutting down will be required to obtain a surface.

In the manufacture of tea-trays and similar articles by covering forms in molds according to my method some parts of the surface may be perfectly plane and even, while others may be ornamented in relief. This effect I obtain by engraving the molds at such places, and forms of pearl, metal, or other ornamental substances may be inserted into cavities in the molds and so combined with the composition of solid oils. Bowls, boxes, and a variety of articles can be made in this manner.

In place of employing hollow forms of paper or paper-pulp I can, in some cases, employ like forms made in thin sheet metal, and which may be produced by stamping; or, sometimes, I employ forms of paper, felt, or woven fabric made in sections and arranged on a block. The pieces can be thinly coated with composition and placed together on the block while the composition is in an adhesive state. In some cases it will be convenient to spread the composition upon the form before putting it into the mold. In this manner, for instance, I can produce the parts of a portmanteau. I have a block corresponding, say, to one-half of the portmanteau. On this block I build up a form with several layers or plies of canvas thinly covered with composition in an adhesive state. I then coat this form both inside and out with composition, spreading it on by hand or otherwise. The form thus coated, after it has been dried, to evaporate the solvent, and, if necessary, warmed to soften the composition, is next transferred to a mold suitably shaped and ornamented to correspond to the half-portmanteau which it is intended to fashion. Pressure is then applied to cause the form to fill out the mold and adapt itself accurately to its configuration. In cases of this sort an impermeable bag into which water can be forced under considerable pressure may advantageously be substituted for the second die, or that which in other cases fills the interior of the form. This method of applying pressure is well understood and often applied in shaping the brims of hats. Many other like articles may be produced in a similar manner.

Having thus described the nature of my said invention, and the manner of performing the same, I would have it understood that I claim—

1. The manufacture of hollow articles by molding the hereinbefore-described composition of oxidized or solidified oil and other ingredients upon forms of paper, thin sheet metal, or other material by pressure in dies or molds, substantially as described.

2. The manufacture of hollow articles by molding the hereinbefore-described composition of oxidized or solidified oil and other ingredients upon a form by pressure in dies or molds, and then japanning upon the molded surface, substantially as described.

3. The hereinbefore-described hat or other similar hollow article, formed of a composition of oxidized or solidified oil and other ingredients, as set forth, molded upon forms of paper, thin sheet metal, or other similar material, by pressure in dies or molds, substantially as described.

FREDK. WALTON.

Witnesses:
JOHN DEAN,
J. WATT,
Both of 17 *Gracechurch Street, London, E. C.*