UNITED STATES PATENT OFFICE.

J. BURROWS HYDE, OF NEW YORK, N. Y.

IMPROVEMENT IN THE MANUFACTURE OF FOIL-LINED REFLECTORS, &c.

Specification forming part of Letters Patent No. 129,478, dated July 16, 1872.

I, J. BURROWS HYDE, of the city, county, and State of New York, have invented Improvements in the Application of Tin-Foil, of which the following is my specification:

The nature of my invention consists, first, in the use of tin-foil for lining shades for lamps and gas-lights, and other reflectors of light, particularly when such shades or reflectors are made from paper, cloth, or other light and cheap material. I make use of thin sheets of rolled brilliant foil, particularly such as patented and manufactured by Mr. John J. Crooke, of New York, which is composed of lead enveloped in tin. A great peculiarity of this foil is its resistance to oxidation, which is doubtless due to a slight galvanic action between the two metals, thereby maintaining its brilliancy for years. This foil is liable to resist ordinary adhesive mixtures or preparations, such as glue, paste, gums, &c., and especially when it is desired to attach it to paper, cloth, or other pliable material—unlike foil of pure tin (French foil of commerce) the surface of which is rarely free from oxidation, and is made by hammering, and much thinner than the Crooke foil, which is rolled. The French tin-foil may, therefore, be more readily attached to paper, but will be useless for reflection of light; whereas the Crooke foil, being composed of united laminæ, for the reasons given, presenting a brilliant glittering surface, and being thicker than the French foil, is more difficult to attach to a pliable material. The difficulty, therefore, in many uses of this foil, has been from the want of some preparation which would adhere to the foil and to the paper, and retain the necessary strength and tenacity, with pliability, without change for any required time, all of which necessary features I have found to exist in a mixture of glue and glycerine, and which for certain uses I mix with the paste from corn-starch or other similar medium.

I first moisten the glue or gelatine in cold water to a consistency to be easily pinched through by the thumb and finger; then pour off any excess of water; next heat the glycerine over a gentle fire, (if in a water-bath, the better,) and, when about 200° heat, add the glue, and keep heated, stirring well until dissolved. The proportions may be varied; but two ounces to four ounces of glue to sixteen ounces of glycerine will answer. This mixture, which I name "Flexine," when cold, forms a jelly-like substance that will keep for years without drying, stiffening, molding, souring, or any other deleterious change. The paste is made of proper consistency, and when in a heated state the flexine is added in about one-fourth the bulk; this gives the proper flexibility to the mass. For use it is simply necessary to soften it by gentle heat; then apply it to the foil in a thin coating with a brush, and lay the foil on the paper or cloth evenly; afterward expose it to dry to dissipate the moisture of the paste.

The paper may be previously embossed with raised figures and the foil attached thereto, or attach the foil to a plain surface, as before described, and pass it through fluted or corrugated rollers, or a corrugated surface under pressure, to improve the reflecting-surface. When thus prepared the sheet may be cut into the proper shape and the shade or reflector formed; or the foundation material for the shade or reflector may be first cut into shape from ornamented paper or other material, and the foil-paper be attached thereto. This will furnish a superior, cheap, and durable shade and reflector combined.

Secondly, as the method of manufacturing or rolling this tin-foil limits its width to a few inches only, its use for enveloping tobacco, drugs, salts, &c., is necessarily confined to small packages only; whereas it would be equally serviceable, and is much needed, for large packages, and particularly for desiccated vegetables and other uses. Therefore attempts have been made to unite two or more widths together, or to secure the foil upon large sheets of paper or cloth, by some adhesive mixture, for both of which uses the mixture described gives perfect satisfaction.

As the foil is manufactured or is passed from the laminating-rolls it is usual to fold it around wooden reels for convenience and safety, for handling, and further use. The mixture may be applied to this foil as it leaves the rolls, or from the reel, being put on by a brush, or a roll having a spongy or yielding surface, the paper or cloth being supplied from a second reel and rolled onto the foil by an elastic roll having the two ends of less diameter than the middle. The foil should be supported at its

line of bearing upon a smooth and firm surface or table.

The means for keeping the flexine or mixture hot and of proper consistency are various, and may be effected by any convenient means, this latter plan being simply for coating the ordinary widths; but when the foil is to be formed in increased widths another plan is necessary. I use a smooth flat table, which will be best if made of marble or some other fine-grained stone, which should be kept moderately hot by steam-pipes underneath. Upon this a sheet of foil is laid and thinly coated with the mixture; then a second sheet of foil is laid on, slightly overlapping the first, and this, in turn, is coated, and so on to the proper width. The paper is then laid on smoothly and rubbed with a smooth rounded straight-edge of hard wood or other convenient mode, and the sheet suspended in a room for drying.

Fancy-colored papers may be prepared with this foil for perfumers' or druggists' use.

I do not claim broadly the manufacture of lamp-shade reflectors by the use of metallic foil applied to paper, as that is not new; but

What I do claim is—

1. A reflector made of tin-foil applied to paper or cloth by a flexible medium, as described.

2. The application of tin-foil to paper or to cloth by a flexible paste, substantially as and for the purpose described.

3. The use of tin-foil applied to paper or other pliable material, and embossing or corrugating the same to produce a surface that will diffuse the reflected light, as described.

4. A reflector made of tin-foil having a surface of tin enveloping or shielding lead or a compound of lead, which said union of these metals retards their oxidation when such foil is applied to a flexible material, as described.

J. BURROWS HYDE.

Witnesses:
W. A. STEPHENS,
W. MURDOCK.