

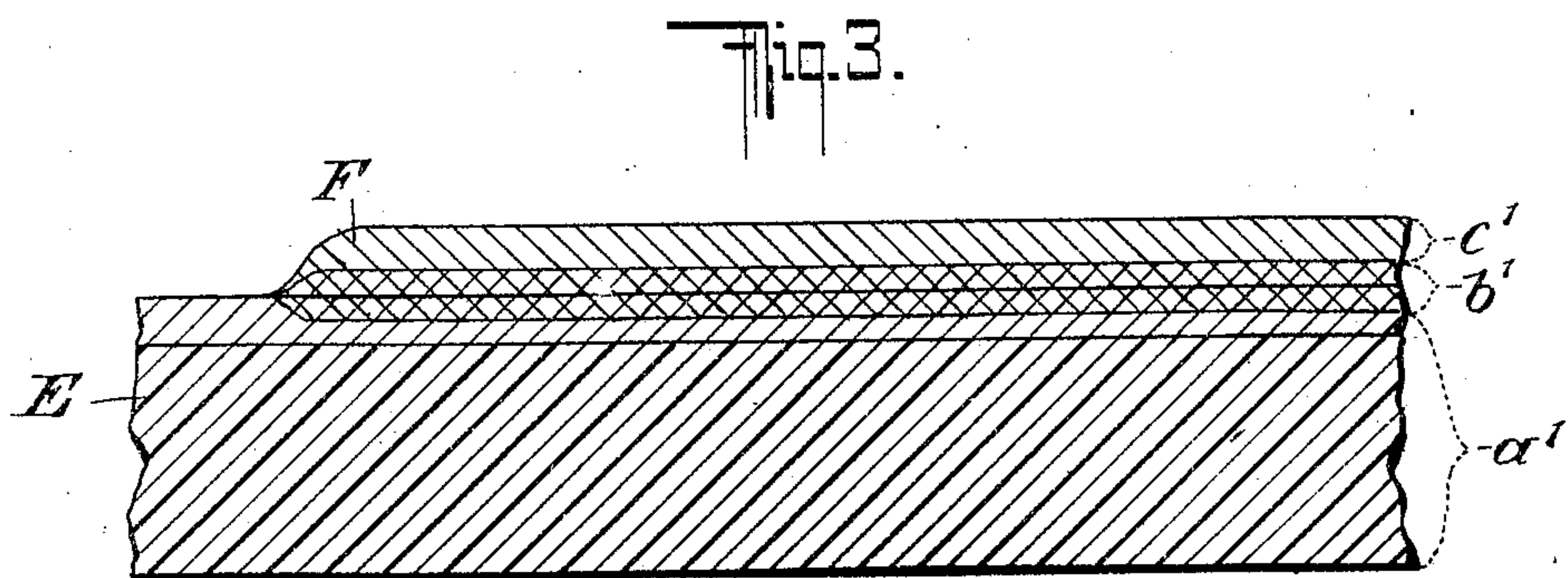
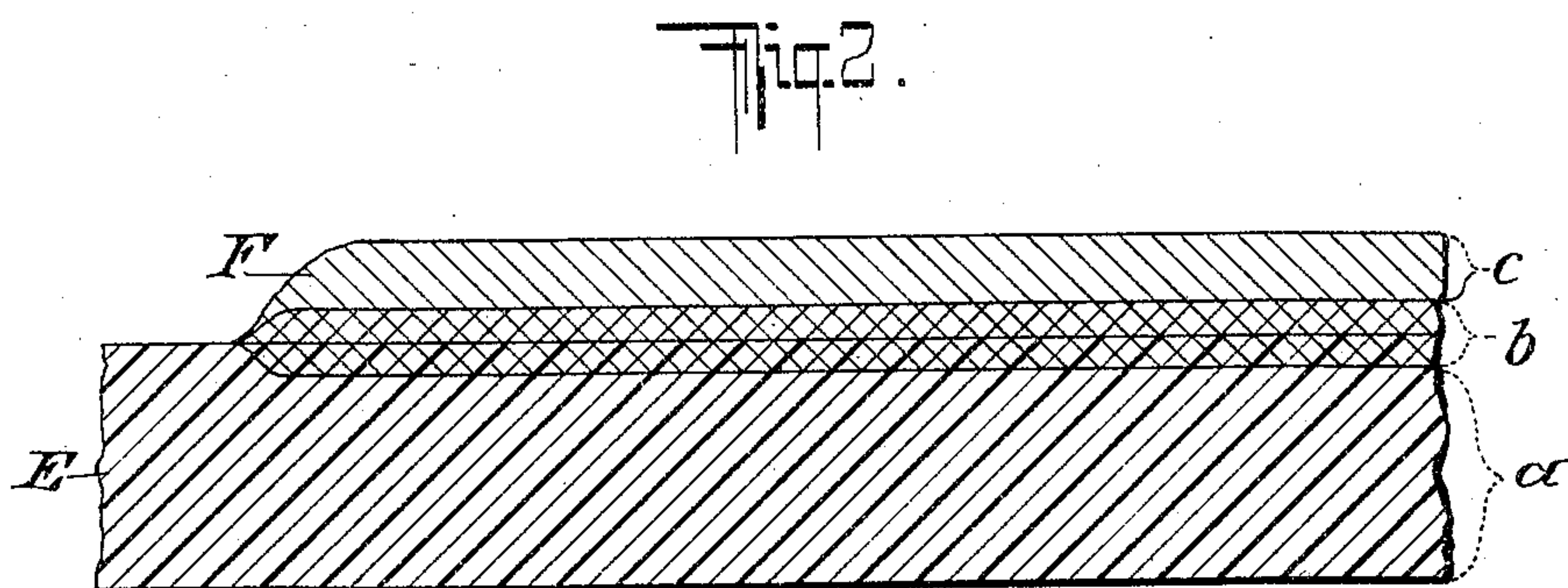
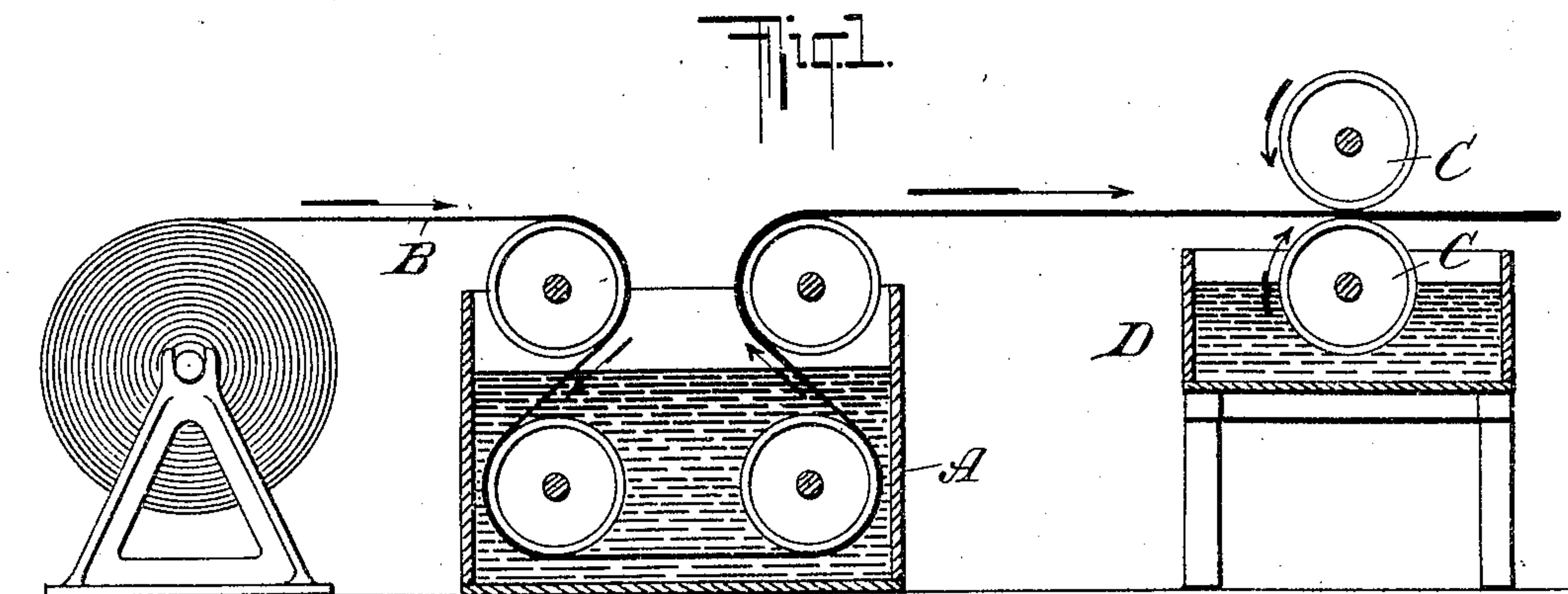
No. 775,635.

PATENTED NOV. 22, 1904.

L. C. RUGEN & H. ABRAHAM.
FLEXIBLE ROOFING OR FLOORING.

APPLICATION FILED FEB. 6, 1904.

NO MODEL.



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UNITED STATES PATENT OFFICE.

LOUIS C. RUGEN, OF BOUNDBROOK, NEW JERSEY, AND HERBERT ABRAHAM, OF NEW YORK, N. Y., ASSIGNORS TO THE STANDARD PAINT COMPANY, OF BOUNDBROOK, NEW JERSEY, A CORPORATION OF WEST VIRGINIA.

FLEXIBLE ROOFING OR FLOORING.

SPECIFICATION forming part of Letters Patent No. 775,635, dated November 22, 1904.

Application filed February 6, 1904. Serial No. 192,422. (No model.)

To all whom it may concern:

Be it known that we, LOUIS C. RUGEN, a resident of Boundbrook, county of Somerset, and State of New Jersey, and HERBERT ABRAHAM, a resident of the borough of Manhattan, city, county, and State of New York, citizens of the United States, have invented certain new and useful Improvements in Flexible Roofing or Flooring, of which the following is a specification.

Our invention relates to coverings of a flexible nature, such as are used principally for roofing and flooring. It has been found that while such coverings can be made to fulfil all requirements of use the production of ornamental effects is very difficult or practically impossible, since the incorporation of various pigments has so far proved just as unsatisfactory as the application of paints or varnishes to the waterproof roofing of the present construction. In all such cases the attempt has failed, either because the foundation has been injuriously affected by the vehicle of the pigment or other material or because the colored coating could not be maintained flexible or permanent.

Our present invention successfully overcomes these difficulties by combining with the foundation a carrier or binder and a pigment so constituted and applied that they not only are thoroughly united with the foundation, so as to prevent cracking and peeling off, but, further, all injurious interaction between the constituents of the foundation and those of the pigment and its carrier is avoided.

In the accompanying drawings, Figure 1 is a sectional elevation of an apparatus suitable for manufacturing our improved fabric, and Figs. 2 and 3 are sectional views of two fabrics drawn upon an enlarged scale.

In carrying out our invention three factors are to be considered—to wit, the flexible foundation, the pigment, and the pigment-carrier.

The foundation consists of any suitable flexible material, generally in the form of sheets or strips of paper, felt, cloth, burlap, &c., saturated with a waterproofing compound con-

taining hydrocarbon material or coated with such a compound or both saturated and coated therewith. The hydrocarbon material may either be a natural product or result from processes of distillation. Thus we may use asphaltum or tars or pitches for saturating the felt or other material, and thus forming the foundation. It will therefore be understood that many of the waterproof flexible materials now on the market may be utilized as foundations for the purpose of our invention.

The carrier for the pigment consists of a substance or mixture which shall be to a greater or less extent weatherproof or resistant to oxidation and which shall be flexible and, moreover, transparent, translucent, or at least light colored, so that its own color may be modified or entirely obliterated by the addition of a pigment. Of course another requisite of this carrier, or "flux," as it might be called, is that it should not injuriously affect the foundation nor be itself injuriously affected thereby. In order to produce such a carrier or flux, we have made use of one or more of the class of bodies known chemically as "resins" and have combined them with waxes, fats, or oils. These oils and fats may be used in their raw condition or they may be first polymerized, oxidized, or otherwise modified for the purpose of rendering them more stable and less liable to change under atmospheric influences. By the use of these two combined ingredients—that is, a resin on one hand and a wax, fat, or oil on the other hand—we produce a carrier or flux which in a molten condition receives pigments of various characters remarkably well, which is resistant yet flexible, which when applied to a foundation of the character hereinbefore described will have no injurious effect thereon nor itself deteriorate, and which, moreover, can be made to adhere permanently and strongly to the said foundation.

The pigment employed in our invention if incorporated with the carrier must be of a character enabling it to withstand the tem-

perature to which the carrier is heated at the time the pigment is added thereto, or the pigment may be applied subsequently to the carrier, which procedure enables us to employ
5 pigments which cannot withstand the temperature of the molten carrier. We believe that mineral colors are best suited for the purposes of our invention.

The procedure in manufacturing the improved fabric is as follows: The foundation is prepared in any approved manner. The carrier or flux is then prepared by mixing and fusing together the oil, fat, or wax, or mixtures of oils, fats, and waxes with resin
15 or mixtures of resins. The heating of the mixture is continued until the mass becomes thoroughly homogeneous. The temperature should range from 10° to 50° centigrade above that necessary to fuse the constituent
20 possessing the highest melting-point. When the mass is thoroughly mixed and free from lumps and strings, the temperature is permitted to fall somewhat, and if immediate admixture of the pigment is desired the pigment is stirred in until it has become completely suspended in the molten matrix or carrier. The stirring is continued until the mass thickens in order to prevent the pigment from settling. Then the colored facing
30 consisting of carrier with the pigment is applied in the presence of heat to the foundation, which preferably should be in a heated condition, so that the impregnating or coating material (the hydrocarbon mixture) may be in a soft or molten state. When ready-made fabrics are used for the foundation,
35 they may first be heated to bring the saturating or coating compound into a plastic state. In many cases the temperature of the colored facing is sufficiently high to soften the foundation. In some cases it may be preferred to first apply the carrier alone and then the pigment, dissolved or suspended in any appropriate vehicle. In practice we would simply run the paper or other fabric through a vessel containing a molten hydrocarbon mixture, and on emerging from this and before it has a chance to solidify the foundation thus prepared would receive a uniform facing
50 of the carrier and pigment by means of heated rollers. This is, however, only one example of mechanical means for carrying out our invention. Instead of the procedure just described we might simply coat the paper or other fabric with a hydrocarbon compound and then apply the colored facing thereto, or we might first saturate and then coat the paper with hydrocarbon compounds and finally apply the colored facing. It will be observed that the
60 hydrocarbon material of the foundation and the colored facing are brought together while both are in a molten or plastic condition and that they are subjected to pressure while in such condition. This causes the foundation
65 and the facing to interlock or amalgamate at

their junction. Thus the finished article comprises three portions, one of which is formed by the facing exclusively, another by the foundation exclusively, and the third intermediate portion by an interlocking of the two
70 first named.

In the accompanying drawings, A indicates the tank containing the saturating or impregnating hydrocarbon material for the sheet or strip B of paper or other material fed through
75 said tank by any approved mechanism. On emerging from said tank the still soft and plastic or half-molten material passes with the paper or other fabric between rollers C, heated to the proper temperature. The lower
80 roller feeds the colored facing mixture prepared as above to the foundation from a tank D and applies such mixture so as to cause it to interlock with the foundation. In Fig. 2, E indicates the paper or other fabric contain-
85 ing or impregnated with the solidified hydrocarbon mixture, and F the colored facing. The three portions are designated as *a b c*, it being apparent that the intermediate portion *b* is formed by the interlocking of the other
90 two. In this special case the intermediate portion consists, as it were, of two layers, since the fabric of the foundation occupies only part of the intermediate portion, while the hydrocarbon of the foundation permeates
95 the entire intermediate portion.

It will be understood that if desired a colored facing of the character hereinbefore described might be applied upon both sides of the foundation and that our invention is not
100 restricted to the manufacture of a fabric having only the three portions shown in Fig. 2. When the foundation consists of a fabric coated with a hydrocarbon mixture, (whether impregnated or not,) the intermediate or interlocking portion *b'*, as shown in Fig. 3, does
105 not contain the fabric of the foundation. The principle, however, remains the same.

As regards the proportions in which the ingredients of the carrier or flux are to be
110 compounded we wish to say that these will depend entirely on the particular use to which the finished product is to be put. It has been found that the hardness and brittleness of the colored facing increase with the percentage
115 of the resin, while the flexibility increases with the percentage of fat, oil, or wax. Tackiness is caused by the presence of an excess of oil or fat and may be overcome either by decreasing their percentage or by increasing
120 that of the pigment. It will be obvious that the thickness of the facing may be regulated both by the temperature of the material and by the distance between the rollers.

We have referred to the ingredients of the carrier or flux as being a "resin" or a mixture of resins on one hand, and "fats, oils, waxes," or a mixture of them, on the other hand. For the sake of simplicity we have referred to the second ingredient as a "fatty
130

body" in the appended claims, it being understood, though, that in our process this second ingredient may consist of either vegetable or animal oils or fats and liquid or solid waxes, whether vegetable, animal, or mineral, as well as products obtained from mineral oils and other products, such as sod-oils or degreas, fatty acids, &c. It will be understood that all these substances may be considered equivalents for the purposes of our invention.

We have referred to the advisability of subjecting the oils and fats to a modifying process in some cases, particularly where it is desired to increase the resistance of the facing to atmospheric influences. This may be obtained by preliminary processes of oxidation or polymerization. It will be obvious that if the ingredients are brought to a condition in which they will quickly acquire their highest state of oxidation they will not be liable to change by external oxidizing influences. Oils and fats may be oxidized by heating them in the presence of oxidizing agents, and at the same time a polymerization is obtained whereby a more stable arrangement of the molecules takes place. The heat for this purpose shall preferably be just below the decomposition-point of the fat or oil. Instead of heating in the presence of oxidizing agents, other processes might be employed, as the addition of sulfur or chlorine and heating of the mixture. As an example of our process we would give the following: The sheet or roll of paper is saturated with pure soft asphalt heated to a temperature of about 100° centigrade, and a mixture, which we will call "mixture A," is prepared by heating together for about six hours at a temperature of 200° centigrade four pounds of American linseed oil, one ounce of litharge, and one ounce of manganese borate. Then another mixture is prepared by heating together four pounds of kauri-gum, three pounds of Burgundy pitch, and two and one-fourth pounds of mixture A. While the temperature is about 130° centigrade, add to the mixture four pounds of red iron oxid and roll the resulting mixture, when it has attained a temperature of 105° to 110° centigrade, on the paper saturated with the asphalt, the rollers being heated with steam to a temperature of about 150° centigrade.

The improved flexible material obtained in accordance with our invention is adapted for use as roofing, flooring, or in any situation where permanent qualities, combined with more or less flexibility and with the possibility of an ornamental appearance, are desired. The material is not only flexible and readily ornamented, either in plain colors or in designs; but the ornamentation is permanent and the colored facing has no detrimental effect on the underlying foundation. This result is due, first, to the fact that the ingredients of the facing have been selected so as to avoid any injurious interaction, either phys-

ically or chemically, between the foundation and the facing, and, second, to the particular manner of applying the facing to the foundation, so as to secure an interlocking of the two.

We claim as our invention and desire to secure by Letters Patent—

1. The herein-described process of manufacturing a flexible material, which consists in impregnating a suitable fabric with a hydrocarbon mixture and then applying to the foundation thus formed, and while the hydrocarbon mixture is soft and plastic, a colored facing consisting of a pigment and a mixture of a resinous body with a fatty body, the said facing being applied in a heated plastic condition so as to cause said coating to interlock with the foundation.

2. The herein-described process of manufacturing a flexible material, which consists in impregnating a suitable flexible fabric with a heated hydrocarbon mixture, to produce a foundation, then applying to the said foundation in the presence of heat and pressure a colored facing, consisting of a pigment and a carrier or flux containing a resinous body and a fatty body, said facing being in a plastic condition so as to cause the facing and the foundation to interlock.

3. The herein-described process of manufacturing a flexible material, which consists in treating a suitable material with a hydrocarbon to form a foundation, and applying to the said foundation in the presence of heat, a colored facing consisting of a pigment and a mixture containing a resinous body and a fatty body.

4. The herein-described process of manufacturing a flexible material, which consists in applying to a foundation which contains a hydrocarbon ingredient, a colored facing consisting of a pigment and a mixture containing a resinous body and a fatty body, the said facing being applied in the presence of heat to cause the facing and the foundation to interlock.

5. The herein-described process of manufacturing a flexible material, which consists in applying to a foundation containing a hydrocarbon ingredient adapted to become plastic under the influence of heat, a colored facing consisting of a pigment and a carrier or flux containing a resinous body and a fatty body, the said facing being applied in the presence of heat so as to cause it to interlock with the foundation.

6. The herein-described process of manufacturing a flexible material, which consists in applying to a suitable foundation containing a hydrocarbon ingredient which becomes plastic under the influence of heat, a facing consisting of a pigment and of a mixture of a resinous body and a fatty body, the color of which is dominated or obliterated by that of the pigment, said facing being applied in a

heated plastic condition to cause it to interlock with the foundation.

7. As a new article of manufacture, a flexible material, said material comprising three
5 portions, to wit, a foundation containing a hydrocarbon, a facing, and an intermediate portion formed by the interlocking of the other two, the said facing containing a resinous body and a fatty body.

10 8. As a new article of manufacture, a flexible material having a foundation with a hydrocarbon ingredient, and a facing containing a resinous body and a fatty body, said facing

and foundation being interlocked so that the hydrocarbon of the foundation and the two
15 ingredients of the facing are all three present in an intermediate portion.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

LOUIS C. RUGEN.
HERBERT ABRAHAM.

Witnesses:

JOHN LOTKA,
EUGENE EBLE.