

July 21, 1942.

F. DIEFFENBACH

2,290,170

METHOD FOR INSPECTING COATED SURFACES

Filed Oct. 8, 1940

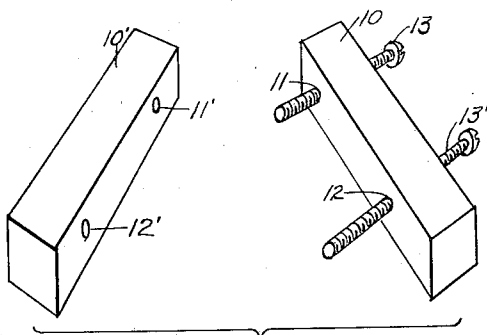


Fig. 1.

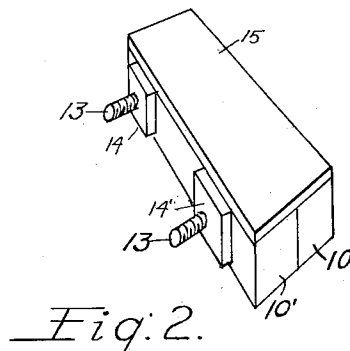


Fig. 2.

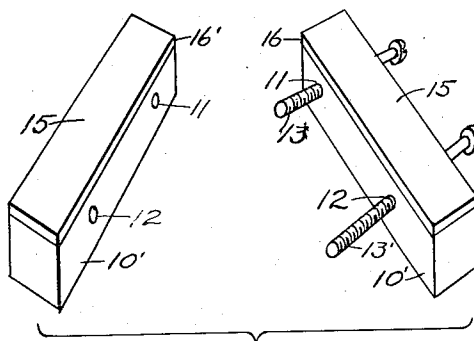


Fig. 3.

Fig. 4.

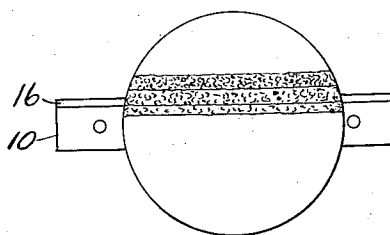
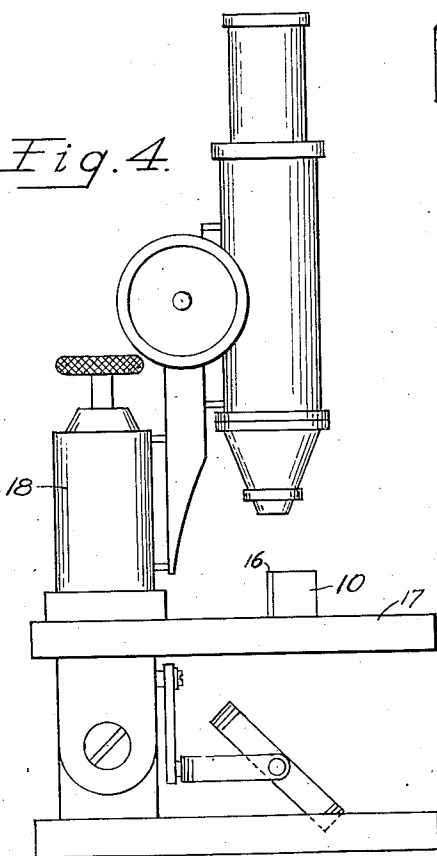


Fig. 5.

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2,290,170

METHOD FOR INSPECTING COATED SURFACES

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Application October 8, 1940, Serial No. 360,246

3 Claims. (Cl. 73—51)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

This invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates generally to a method for the inspection of protective coatings, but more particularly to the microscopic inspection of cross-sectional areas of coated surfaces.

One object of the invention is to provide a simple and effective method for preparing coated surfaces for the microscopic inspection of the adhesive union between the layers of said coatings and the surface over which they are spread.

Another object of the invention is to provide a simple, efficient and economical method for preparing coated surfaces and exposing cross-sectional areas thereof for microscopic inspection.

Another object of the invention is to provide a method for the study of paint and painted surfaces in a manner similar to metallography in which the structures of metals are microscopically inspected and studied.

With these and other objects in view this invention consists in certain novel details of construction, combination and arrangement of parts, to be more particularly hereinafter set forth and claimed.

Referring to the figures in which like parts are represented by similar reference characters:

Fig. 1 is a perspective view illustrating separated uncoated inspection blocks;

Fig. 2 is a perspective view showing the inspection blocks united and coated on one surface;

Fig. 3 is a perspective view illustrating the blocks separated as in Fig. 1, but with coated surfaces;

Fig. 4 is a side elevation showing an inspection block mounted upon the stage of a microscope; and

Fig. 5 illustrates an enlarged cross-section of the coatings as viewed through the eyepiece of the microscope.

Referring to Fig. 1 it will be noted that the apparatus comprises two inspection blocks 10 and 10' which are provided with smooth lateral surfaces, and are drilled respectively at 11 and 11' and 12 and 12' for the reception of bolts 13 and 13', which are adapted to detachably connect the blocks and hold them tightly united by means of the nuts 14 and 14' as shown in Fig. 2.

These testing blocks may be made of steel, aluminum, wood, plastic or any other suitable material depending on the type and quality of

the protective coating which is to be inspected or the material which it is desired to coat, so as to ascertain the adhesive qualities of the coating with respect to said material.

After connecting the blocks 10 and 10' and fastening them tightly together by screwing up on the nuts 14 and 14', one of the lateral surfaces extending over both of the blocks 10 and 10', is given one or more coats of paint, varnish, enamel or other protective coating which it is desired to inspect, as indicated by the numeral 15, Fig. 2.

After the coating or coatings 15 have completely dried the nuts 14 and 14' are unscrewed from the bolts 13 and 13' and the blocks 10 and 10' separated as shown in Fig. 3, thus splitting the coated surface along a central edge, as indicated by the numerals 16 and 16'.

One of these blocks 10 or 10' is then placed on the stage 17 (Fig. 4) of a microscope 18 with the split edge 16 of the coated surface 15 directly beneath the objective lens (not shown), and the microscope adjusted and focused in the usual manner for microscopic inspection of the cross-section area of the coating or coatings to note the cohesive and adhesive characteristics and qualities of coating material.

The device set forth herein permits the study of the internal structures of paints and paint systems microscopically in a manner analogous to metallography in the field of metals. The device has thus permitted numerous discoveries, such as the following:

(a) Adhesion between successive coats of paint in a paint system seems to be partially dependent upon the interlock of pigment particles. This explains, at least partially, the very decided lack of adhesion between dissimilar coatings in a paint system.

(b) The structure of certain paint films are heterogeneous throughout their thicknesses, the study of which is very important in that a paint film, particularly under water, must be stable throughout its thickness.

(c) The reason for the blistering of paints containing certain amounts of zinc yellow has been discovered.

The technique involved in the use of this device may be diversified in many ways. The cross-sections are studied similarly to metallography specimens, that is, by treating with various reagents to etch or react with various constituents of the paints to be studied. However, much can be determined with this device by examination without reagents. Such exami-

nation cannot be made by cutting the paint film since the constituents of the various coatings are pressed together by the cutting blade. This device permits the study of paint films and systems in a manner that sets forth the effect of various applications of protective coatings to a surface.

Having described my invention, what I claim as new and wish to secure by Letters Patent is:

1. A method for preparing coated surfaces for microscopic inspection of cross-sectional areas thereof comprising, coating a common plane surface of two adjoining detachably connected inspection blocks, allowing the coating to dry and then separating said blocks to fracture the coating along the line of jointure of said blocks to expose cross-sectional areas of the divided coating.

2. A method for determining the adhesive

5 qualities of coated surfaces comprising, coating a common plane surface of two adjoining detachably connected inspection blocks, allowing the coating to dry, separating said blocks to fracture the coating along the line of jointure of said blocks and placing a cross-sectional area of the divided coating in the field of a microscope for inspection of the internal structure of the coating along the ruptured edge.

10 3. A method for preparing coated surfaces for microscopic inspection comprising, coating a continuous surface of two adjoining detachably connected inspection blocks, allowing the coating to dry and then separating said blocks to fracture the coating along the line of jointure of said blocks to expose cross-sectional areas of the divided coating.

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