Feb. 20, 1940. H. VOLLMER 2,190,745

PATCH TEST STRIP

Filed April 20, 1937

Fig. 1

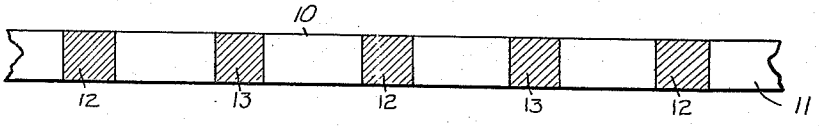


Fig. 2.

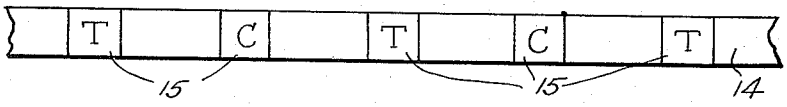


Fig. 3.

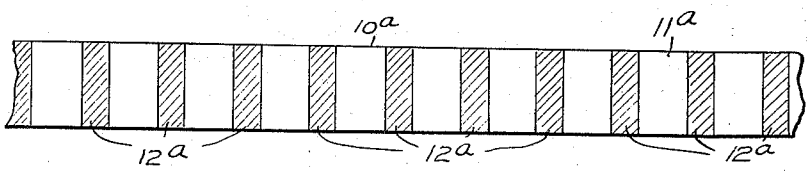
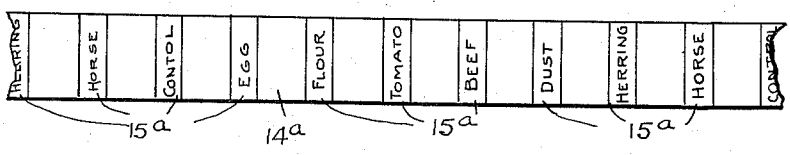


Fig. 4.



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PATCH TEST STRIP

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8 Claims. (Cl. 128—2)

My invention relates to a patch test strip for making tests on human beings to determine the presence or absence of tuberculous infection and the allergic reaction to various substances. The invention also relates to the method of preparing such strips.

Tuberculin tests at present in general use are of three kinds, viz: the intracutaneous Mantoux test, the cutaneous Pirquet test and the percutaneous Moro test. Each of these tests requires careful and in some cases prolonged manipulation, causing fear and discomfort to the patient as well as trying and delicate work by the physician.

In making allergic tests, the usual practice is to either abrade or scratch the skin of the patient and then rub in the dry powdered testing substance with a drop $n/10$ of caustic soda or to intradermally inject a solution of these substances. These procedures are painful to the patient, time consuming and exceedingly trying to both patient and physician inasmuch as the tests are made with a great number of substances, each of which requires skin abrasion and the rubbing in of the test substance or injection of solution.

The principal object of my invention is to provide a simply constructed, convenient form of patch test strip, easily handled and applied, which will give accurate results with comparatively little labor, and thus obviate the disadvantages inherent in the testing media heretofore used.

I accomplish this object by forming my improved strip of a length of adhesive tape or the like and applying on the adhesive face thereof a patch or patches of suitable absorbent material charged or saturated with the testing substances. In the case of tests for tuberculosis the patches would be charged with tuberculin and in the case of allergic tests the patches would be charged with the appropriate allergens. The tuberculin test strip might desirably have control bouillon patches or squares on its adhesive face, adjacent the tuberculin patches themselves, and either or both kinds of strips are desirably provided on their non-adhesive faces with indicia of the testing substances on the adhesive faces.

Examples of my improved patch test strip are illustrated in the accompanying drawing in which Figs. 1 and 2 are elevational views of the opposite faces of a tuberculin patch test strip and Figs. 3 and 4 are similar views of the opposite faces of an allergy test strip.

In Fig. 1, the strip is denoted 10 and on its adhesive side 11 carries patches or squares 12 and 13, respectively, charged or saturated with tuberculin and control bouillon. The non-adhesive side 14 (Fig. 2) of the strip 10 is provided with indicia 15 which correspond in position and indicating designations to the patches 12, 13 on the opposite face of the strip.

Structurally, the strip 10^a of Figs. 3 and 4 is like the strip 10. The adhesive side 11^a of strip 10^a is provided with patches 12^a charged or saturated with the allergy testing substances, the names or designations of which are shown at 15^a on the non-adhesive side 14^a (Fig. 4) of the strip.

I preferably prepare the tuberculin test strip of Figs. 1 and 2 as follows: Sheets of thin absorbent material, preferably filter paper, are saturated with tuberculin and control bouillon, respectively, and are then thoroughly air dried in a dustless chamber or housing. When the sheets are thoroughly dry they are cut into patches or squares about 0.8 by 0.8 cm. and by means of forceps the squares are applied to the adhesive face of the strip. The squares of tuberculin and control bouillon alternate and are spaced apart at least 1 cm. It will be apparent that the strips may be of any desired practical length and may be cut to the size required for any particular use.

The procedure which I follow in preparing the allergia testing strip is the same in principle as that followed in preparing the tuberculin test strip, but differs therefrom somewhat in detail. In preparing the allergy test strip, I form a liquid solution or suspension of the appropriate powdered allergen in a suitable suspension medium, such as hardened fat or a stearate, preferably methyl stearate, and saturate a sheet of absorbent material (filter paper) with the suspended allergen. The saturation is effected while the methyl stearate is heated to approximately 40° C., and as soon as the sheets are withdrawn from the suspension they are placed in a refrigerator where they immediately harden to form thin rigid plates. The plates are then cut into patches or squares, at room temperature, and are applied to the adhesive strip in the manner described with reference to the tuberculin patches. The patches desirably extend from end to end of the strip so the reactions may be read off without removal of the strip from the skin inasmuch as the hypersensitive reaction of the skin which manifests itself in the form of redness and swelling generally extends beyond the contacting surfaces of skin and allergen.

In making tests with my improved tuberculin strip the preferred procedure is as follows:

After first cleaning the skin with ether or benzine, the adhesive side of the strip carrying the test patches is firmly pressed either lengthwise over the sternum or transversely over the upper edge of the trapezius or at any other suitable place and permitted to remain in place for at least 24 hours, the preferred time being 48 hours. The results of the test may be read off the skin immediately after removal of the strip or, preferably, after about 24 hours when any unspecific skin rednesses may have faded out and the tuberculin reaction is intensified. In positive cases the reaction appears as a square, clearly defined redness, with acorn-like follicular elevations on the skin. At the places where the control bouillon patch was in contact with the skin, a pale space will appear.

Inasmuch as the tuberculin contained in the patch is dry, it is in the most highly concentrated form and the natural moisture of the skin (perspiratio insensibilis) will sufficiently liquefy the tuberculin to permit the reaction of the skin on the tuberculin to take place, but the tuberculin still remains so concentrated that a very strong reaction is assured.

In the case of both the allergy test strip and the tuberculin test strip, and more particularly the latter, it is desirable to use adhesive material having a minimum irritating effect on the skin, although even with individuals having highly sensitive skins where the adhesive strip might cause reddening of the skin the test is accurate and reliable because in the case of negative reactions a pale square or patch appears and in positive reactions there is a distinct outstanding redness and swelling as compared with the surrounding skin surface. Any tendency to skin irritation may be reduced or obviated by adding Benzoe Tincture to the adhesive mass of the strip.

The procedure in making allergeric tests is, briefly, as follows: The skin may be abraded or scratched, if desired, although it is not essential to do so. The patch test strip is then applied, permitted to remain the proper time until the reactions have occurred, and the results are then read off from the indicia on the reverse or non-adhesive side of the strip. As stated above, the allergens are not applied to the skin in dry, powdered form but are applied in the form of a suspension whereby their effectiveness is increased and their durability greatly improved. The suspending medium which I use is neutral in the sense that it gives no unspecific reaction with the skin; it provides a solution which is solid at room temperature but is in the form of a liquid suspension or solution at skin temperature, thus rendering manipulation easy and simple. Methyl stearate, which is the preferred suspending medium, melts at 35 to 37° C. which is the normal skin temperature, and by mixing methyl stearate with other stearates the melting point may be varied. However, the admixture of the substances to be dissolved with the methyl stearate somewhat lowers the melting point of the latter so that pure methyl stearate is well suited to the present purpose.

To permit the patch test strip of my invention, whether the tuberculin test strip or the allergia test strip, to be stored indefinitely and easily handled, the adhesive side carrying the patches may be covered with relatively stiff gauze which may be removed before as and to the extent required.

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

1. As a new article of manufacture, a patch test strip comprising a length of adhesive material having on its adhesive face a patch of filter paper saturated with a testing substance selected from the group consisting of tuberculin and allergens.

2. As a new article of manufacture, a patch test strip comprising a length of adhesive material having on its adhesive face a patch of filter paper saturated with a testing substance selected from the group consisting of tuberculin and allergens, and on its opposite face indicia of the character of said patch.

3. As a new article of manufacture, a patch test strip consisting of a length of adhesive material having on its adhesive face a patch of filter paper saturated with tuberculin.

4. As a new article of manufacture, a patch test strip consisting of a length of adhesive material having on its adhesive face a patch of filter paper saturated with tuberculin and another patch of filter paper spaced from the first patch and saturated with control bouillon.

5. As a new article of manufacture, a patch test strip comprising a length of adhesive material having on is adhesive face a patch of absorbent material saturated with an allergens suspended in a medium solid at room temperature and liquefying at normal skin temperature.

6. As a new article of manufacture, a patch test strip comprising a length of adhesive material having on its adhesive face a patch of filter paper saturated with an allergens suspended in methyl stearate.

7. The herein described method of preparing patch test strips, which method comprises dissolving an allergens in a suspension medium solid at room temperature and liquefying at normal skin temperature, saturating filter paper in said solution and hardening the same, and applying patches of said saturated filter paper to a length of adhesive material.

8. The herein described method of preparing patch test strips, which method comprises dissolving an allergic testing substance in methyl stearate, immersing filter paper to the point of saturation in said solution at a temperature of approximately 40° C., refrigerating said saturated paper and applying patches thereof in spaced relation on the adhesive side of a length of adhesive material.

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