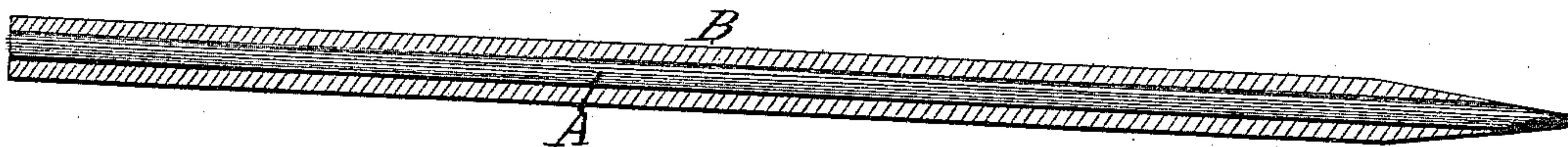
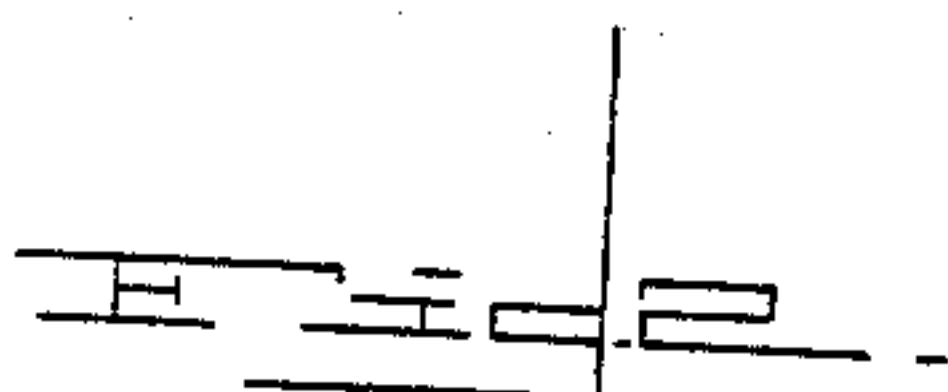
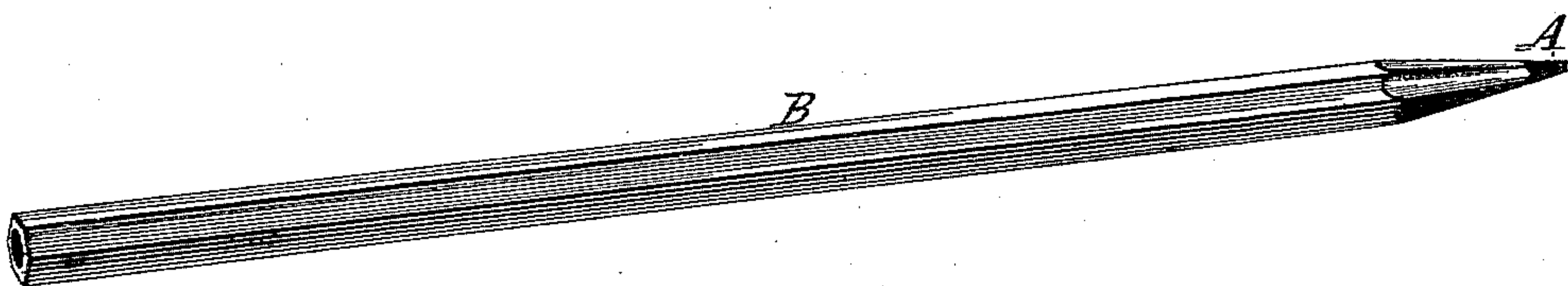
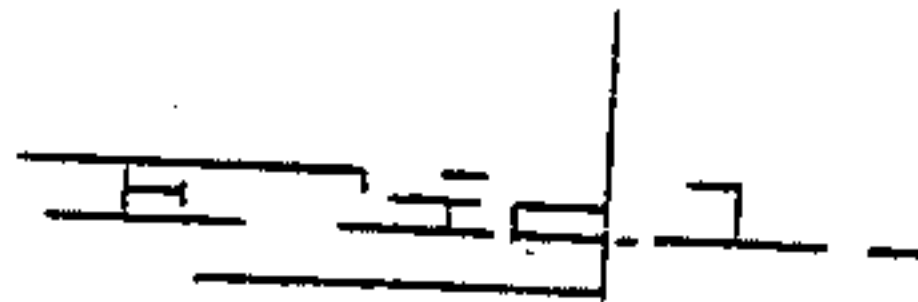


(No Model.)

J. S. TYREE.  
LITMUS PENCIL.

No. 458,244.

Patented Aug. 25, 1891.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

JOSIAH S. TYREE, OF WASHINGTON, DISTRICT OF COLUMBIA.

## LITMUS PENCIL.

SPECIFICATION forming part of Letters Patent No. 458,244, dated August 25, 1891

Application filed January 23, 1891. Serial No. 378,777. (No model.)

*To all whom it may concern:*

Be it known that I, JOSIAH S. TYREE, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Litmus Pencils; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to reagents.

The object of the invention is to keep a reagent in such form that it will always be pure and unchanged, and will thus ever be in condition correctly and accurately to make manifest the known effect of the particular reagent, and to be able readily to present the reagent just as required for use in its pure and unchanged form.

With this object in view the invention consists in preparing the reagent in solid condition, giving it an elongated form, and inclosing it between grooved pieces of wood or placing it in a piece of wood perforated lengthwise, the whole having the appearance of the ordinary lead-pencil, whereby upon cutting away portions of the wood at the end the reagent will always be presented in condition fresh for use.

The invention consists, particularly, in litmus combined with clay and gum in suitable proportions and confined in an envelope of wood or the like, readily removable, and which will protect the compound from air and light.

One form of embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of the pencil, and Fig. 2 is a longitudinal sectional view thereof. In these drawings, A represents the litmus combined with the clay and gum, and B represents the cover or envelope. This cover or envelope is preferably of wood, though, if desired, it may be of any other suitable substance, such as paper.

In the making of delicate tests to ascertain acid or alkaline condition of some substance investigated, great difficulty is at present experienced, with uncertainty and error of result, from the condition in which many of the reagents, even where carefully kept, are found. Thus in employing litmus this sub-

stance, as usually presented and obtained by the chemist for work, is generally already in paper, the paper being saturated with a solution thereof. The paper thus saturated with the solution is commonly known as "test-paper;" but as a matter of fact the paper thus charged with litmus is itself often either acid or alkaline, resulting from conditions of its manufacture, so that the name "test-paper" is often erroneous, the employment of the substance frequently leading to diametrically unjust conclusions. Owing to the spare solubility of litmus in water, it is impossible to prepare a solution of sufficient density to impregnate paper and such mediums with a sufficient quantity of litmus or the like to procure a reaction indicating in all cases the presence of either acids or alkalies. Furthermore, deposit from solutions upon paper or the like is generally irregular, so that there will be more litmus or other test-agent taken from the solution upon one part than upon another. The exceeding sensitiveness of test-paper to light, to air, and to other oxidizing influences renders them often totally unfit for use in a very short time. Finally, the employment of test-papers and solutions is not always convenient.

By my invention it is intended to obviate all difficulties above set forth, and to be able at all times to present the testing-agent in its native, original, or real condition, at the same time to be able to have it in form which may always be readily at hand, and to present it with facility and convenience.

As an example, I will show how litmus may be employed with my invention. I take ordinary litmus and incorporate with it fine clay and some suitable gum—such as pure gum-arabic—the parts being combined in about the proportions of seventy-five per cent. of litmus, fifteen per cent. of clay, and ten per cent. of gum. To this may be added a small quantity of glycerine for the purpose of preventing the compound from becoming dry. After the ingredients are thoroughly mixed portions are then taken and rolled out into thin cylinders and placed between two or more grooved pieces of wood so as to form a holder corresponding to the wooden portion of the ordinary lead-pencil. The pieces are then suitably made to adhere. It will be obvious that the



us will thus be protected from influences  
ing to lessen its purity and its certainty  
ise.

employ the litmus it will only be neces-  
to shave off one end of the wood and to  
the portion of the litmus thus exposed  
a suitable backing-surface—such as  
r—the substances with which it is com-  
tending to facilitate this marking, which  
d not be possible with the litmus in the  
state. It is preferable to coat the paper  
ly and uniformly. The paper being  
coated, if the test is to be made immedi-  
it is not material that it should be neu-  
even if the paper be acid or if it be pro-  
cedly alkaline in substance, as the test  
be made immediately the acid or alkali  
paper will not have time to injure the  
s, and its appearance immediately after  
st will give a correct indication.

ny pencil the litmus or other test-agent  
pletely protected from all oxidizing in-  
es, and the great advantage is presented  
ays having fresh reagent at hand with-  
ving to go through the inconvenience  
ping through a dark closet or going to  
tight receptacle for the same.

pencil, like a lead-pencil, may be carried  
pocket or in a memorandum-book, and  
mus or other test agent is always im-  
ely at hand in its purest condition for  
id being applied, as aforesaid, by sim-  
oking the end of the pencil the reagent  
properly exposed upon a suitable back-  
The reagent is thus also ever presented  
most concentrated form, so that the  
st quantities of acid or alkali can at  
e detected. As the pencil is stroked  
he backing, even if the outside of the  
l portion had become oxidized, this  
d portion would be within and a fresh  
ized portion would cover it. With my  
physicians and others who should  
requent tests may always have the  
ready at hand.

e and the same pencil I may have two  
rs of litmus, one prepared to test for

acid and the other prepared to test for alkali,  
or the same pencil may contain two different  
reagents. The ends will then be suitably 50  
marked. For a continuous test, where sev-  
eral reagents have to be used in sequence, the  
pencil may contain them all.

From the foregoing it will be seen that by  
my new presentation of litmus a test agent in 55  
a form not too concentrated is provided, that  
by reason of the combination with the sub-  
stances mentioned marking on a suitable sur-  
face is facilitated, and that complete protec-  
tion from the hands and light is afforded. 60

As a substitute for the clay, any gum, par-  
affine, and wax may under some circumstances  
be used.

Having thus fully described my invention,  
what I claim as new, and desire to secure by 65  
Letters Patent, is—

1. An implement for chemical tests, consist-  
ing of litmus combined with clay and gum in  
about the proportions specified, the compound  
being inclosed in an envelope of wood or the 70  
like, substantially as described.

2. An implement for chemical tests, consist-  
ing of litmus combined with clay and gum in  
about the proportions of seventy-five per cent.  
of litmus, fifteen per cent. of clay, and ten per 75  
cent. of gum, the compound being inclosed in  
an envelope of wood or the like, substantially  
as described.

3. An implement for chemical tests, consist-  
ing of litmus combined with clay and gum in 80  
about the proportions of seventy-five per cent.  
of litmus, fifteen per cent. of clay, and ten per  
cent. of gum, to which compound is added a  
small quantity of glycerine, the whole being  
confined in an envelope of wood or the like, 85  
whereby protection from air and light is af-  
forded, substantially as described.

In testimony whereof I affix my signature in  
presence of two witnesses.

JOSIAH S. TYREE.

Witnesses:

DAVID H. MEAD,  
G. B. KEEFER.