April 9, 1963 A. F. SCHOTT 3,084,457

EDUCATIONAL WORK SHEET

Filed June 8, 1959

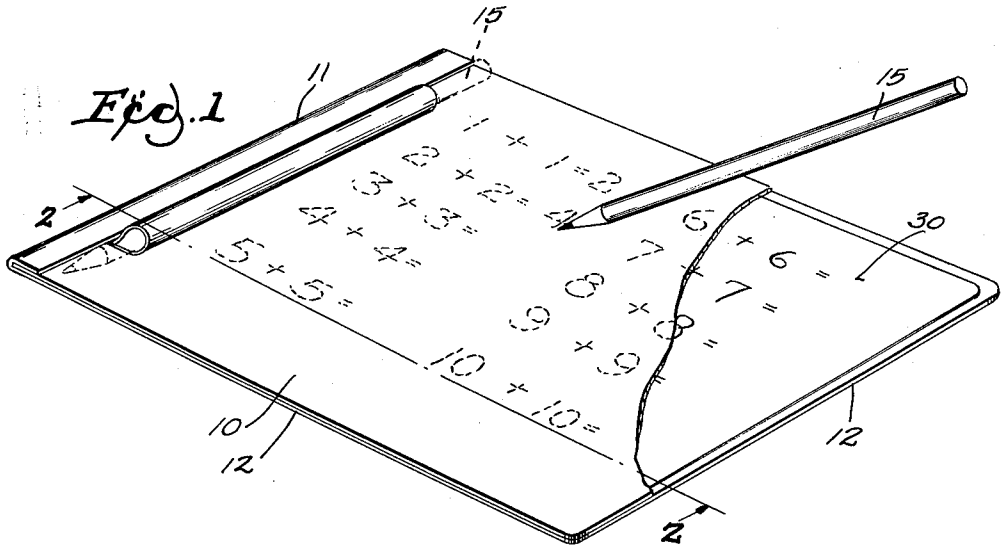


Fig. 1

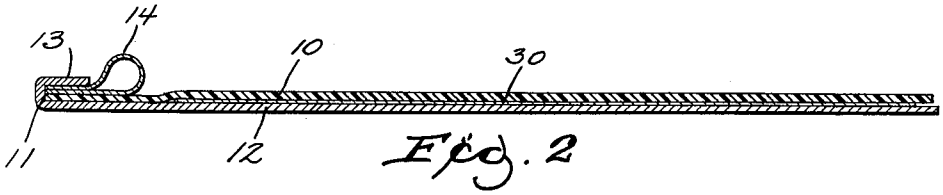


Fig. 2

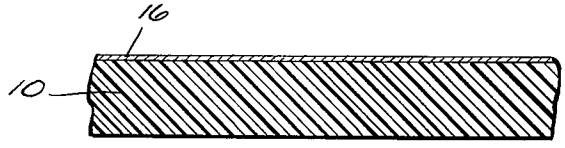


Fig. 3

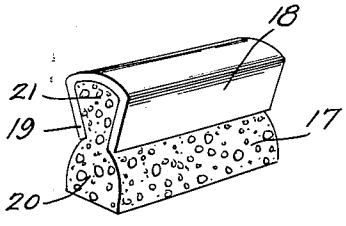


Fig. 4

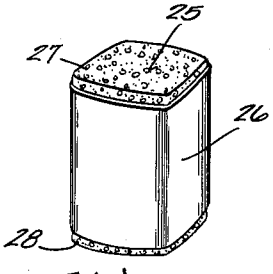


Fig. 5

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EDUCATIONAL WORK SHEET

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This invention relates to an improvement in an educational work sheet.

More particularly stated the invention relates to a substantially transparent work sheet for use in combination with a coating material whereby a sheet of transparent material such as plastic, the surface of which is of uncertain quality for writing purposes, may be made to serve as an excellent writing surface while maintaining its transparency.

The invention further relates to an erasing and coating apparatus which, in use with the transparent plastic work sheet above referred to, enables the user repeatedly to use a work surface and to change at will the instructional background text material which the user is to associate with the written "lesson" or "test" data.

In the drawings:

FIG. 1 is a perspective of the complete assembly including a backboard, sheet of text material, plastic work sheet, pencil and a tubular holder embodying the invention.

FIG. 2 is a section on line 2—2 of FIG. 1.

FIG. 3 is an enlarged section through the plastic work sheet and the dried coating thereon forming the working surface of the work sheet.

FIG. 4 is a perspective of one form of eraser and coater forming part of the invention.

FIG. 5 is a perspective of an alternative form of eraser and coater.

The work sheet includes an area of transparent plastic. According to experience and tests, a vinyl plastic is very satisfactory if of sufficient thickness, for instance 10,000th of an inch, to provide a flexible rugged cover sheet **10** secured along one margin, for instance at **11**, to a backboard **12**. As shown in FIGS. 1 and 2, the backboard is folded over at **13** to marginally enclose not only the work sheet **10**, but also to enclose margins of a tube **14** used for retention and storage of a pencil **15**. Any suitable form of bond or mechanical fastening device may be used to provide permanent assembly of the parts within the fold **13**.

Very importantly in accord with this invention, the plastic work sheet **10** is provided with a coating as shown in FIG. 3. Various forms of plastic which have been tested for this purpose have provided a writing surface which is less than desirable, whether the writing instrument be pen with one of the common types of ink or is a graphite pencil or colored crayon. With any of these writing materials, erasure is difficult if not impossible and even the initial writing operation is spotty and irregular because of the semi-greasy surface which is provided by many of the plastics. It has been found in accord with this invention that the surface of the work sheet **10**, if coated with dried solution of an erasable coating **16** (defined below), provides an excellent writing surface, not only because the transparency of the work sheet is maintained despite the coating **16**, but also because the many common types of writing material listed above will readily scribe a clear definite decipherable legend on such a coating **16**.

The erasable coating is preferably a non-ionic aliphatic polyoxyethylene ester, which is easily miscible with water and has both detergent and surface active (wetting) qualities, and is chemically inert. The above polyoxyethylene esters have exceptionally high detergent and wetting action with little or no foaming or sudsing action. Non-

ionic polyoxyethylene ethers and thioethers and aliphatic ethylene glycols and esters may also be used as well as the mildly cationic surface active agents such as the ethylene oxide derivatives of rosin amines. The essential properties are chemical inertness, fast and high wetting action and substantially no foaming. A complete coating of uniform thickness is thus produced and maintained without particular attention to the way in which the work sheet is wiped and all pencil, pen or crayon marks are completely and quickly erased. Such coating is herein designated as an "erasable coating."

The erasable coatings referred to are normally soluble in water and are readily applicable to a surface of such transparent plastics by means of a spongy substance moistened with the coating and wiped across the transparent plastic surface in ordinary wiping action. Furthermore, it is true that this erasable coating in water solution dries very rapidly and the actual coating is left in the form of a smooth surface having just the right amount of abrasive characteristic to receive pencil, crayon or ink inscription.

When the work sheet has served its purpose, the writing on the plastic surface including the erasable coating may be wiped from the plastic surface of sheet **10** merely by using a water moistened sponge or rag. The coating previously applied, however, in accord with this invention, does not wipe off completely and continues to protect the transparent plastic sheet from becoming translucent or opaque. A form of coating device and eraser is incorporated in either one of the exemplifications shown in FIGS. 4 and 5. A "block" **17** of a substance such as sponge rubber is provided with a reservoir retainer **18** in the form of a channel, the margins of which are pinched together somewhat as shown at **19** to divide the block **17** into two portions **20** and **21**. Initially, the entire block of sponge rubber is soaked in erasable coating **16** carried by water as solvent, thus insuring that not only is the portion **20** heavily impregnated with erasable coating but also that the portion **21** is provided with an adequate reserve supply. It has been found that an instrument such as this wherein the channel member **18** is made of material such as metal or plastic comprises an easily handleable wiping device readily impregnated with water in portion **20** for ordinary erasing and coating operations. Also, if by repeated use, the amount of erasable coating in the zone **20** should be depleted, it is only necessary to apply sufficient solvent such as water to the zone **21** and with repeated squeezing operations applied to the portion **20** draw from the reservoir portion **21** whereby to feed the coating material into portion **20**.

Thus when the work sheet **10**, with its coating **16**, calls for an erasing operation, the moistened portion **20**, when wiped across the surface of the plastic **10**, will erase the inscription and actually remove most of the coating from the plastic. At the same time some of the solution bearing the erasable coating will be deposited upon the cleaned surface whereby to re-establish the coating when the solvent dries. Remarkably, this cleaning and re-establishment of the writing surface takes place whether the inscriptions have been made with ink, crayon, or graphite pencil.

Mention has already been made that an alternative form of the coater and eraser (see FIG. 5) may be made up in the form of a suitably shaped block of sponge rubber **25** or other absorbent material partially encased in a somewhat constricting band **26** made of somewhat "harder" rubber or plastic. The block **25** of spongy absorbent material is impregnated at the center with the concentrated coating material, thus providing a portion to act as a reservoir somewhat comparable to the reser-

voir at 21 and erasing and wiping surfaces at the ends of the block exposed beyond the band 26. Here the band 26 is flexible and can be squeezed between the fingers of the user to cause the reservoir portion to deliver the coating to the end portions whenever a fresh supply of coating is needed.

It seems important to carry out the principles of the invention that the substance to be stored in the portions 20 and 21 or 25 of the eraser or coater be of such composition to provide a wetting agent, thus assuring that the wiping action for erasure purposes will replace the coating material in solution pursuant to the wiping action, and the redeposited and newly deposited erasable coating is spread. If the erased colored material from the scribed legends which has been picked up by the sponge 17 or 25 tends to provide a disfiguring color deposit on the newly spread coating, it has been found to be possible to wash the zone 20 or the zones 27—28 whereby to remove the discoloration and then the repeated squeezing to draw upon the reserve supply of coating will re-estabish the eraser and coater as a practical tool. In testing operations, it has been ascertained that with repeated washings and relatively heavy use of an eraser and coater, a single thorough impregnation with erasable coating combined with the use of the erasers indicated in FIGS. 4 and 5 will last an ordinary elementary school student approximately six months, whereupon the washing and reimpregnation referred to above will reestablish the device for another lengthy period.

From the above description, it will be seen that this asembly and the wiper and coater equipment described provide a working set of tools adequately substituting for the large scale use of paper work sheets and sheets used for copying, calculating and other like applications heretofore customarily used in schools and other places where work sheets are a common expense. It is only necessary for the teacher or student to place an exercise sheet or text material in blank form as shown in 30 under the plastic or transparent sheet 10 as a guide for a student to follow in placing his answer or in completing the blanks in the text. When the lesson on the one sheet has been completed, the text material 30 can be replaced with the next lesson and a simple erasing and wiping operation with a moistened device such as shown in FIGS. 4 and 5 will restore the working surface and a coating 16 for the next use of this work sheet.

I claim:

1. A legibly inscribable work sheet assembly including a backboard, a text sheet and a transparent scribing top sheet, said top sheet providing a transparent member

and said transparent member being provided with a water soluble coating of dried erasable coating solution.

2. A legibly inscribable work sheet assembly including a backboard, a text form sheet and a transparent member, said transparent member being provided with a water soluble coating in the form of a dried film comprising an applied solution of a non-ionic aliphatic polyoxyethylene ester.

3. A legibly inscribable work sheet assembly including a backboard, a text form sheet and a transparent member, said transparent member being providing with a water soluble coating in the form of a dried film comprising an applied solution of a non-ionic polyoxyethlene ether.

4. A legibly inscribable work sheet assembly including a backboard, a text form sheet and a transparent member, said transparent member being provided with a water soluble coating in the form of a dried film comprising an applied solution of a non-ionic polyoxyethylene thioether.

5. A legibly inscribable work sheet assembly including a backboard, a text form sheet and a transparent member, said transparent member being provided with a water soluble coating in the form of a dried film comprising an applied solution of an aliphatic ethylene glycol.

6. A legibly inscribable work sheet assembly including a backboard, a text form sheet and a transparent member, said transparent member being provided with a water soluble coating in the form of a dried film comprising an applied solution of an aliphatic ethylene ester.

7. A legibly inscribable work sheet assembly including a backboard, a text form sheet and a transparent member, said transparent member being provided with a water soluble coating in the form of a dried film comprising an applied solution of ethylene oxide derivative of rosin amines.

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