

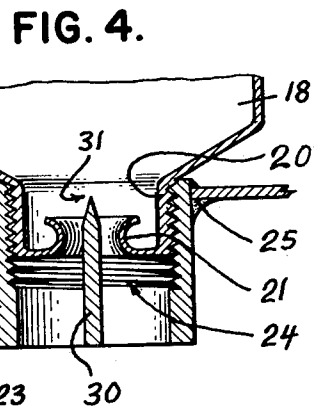
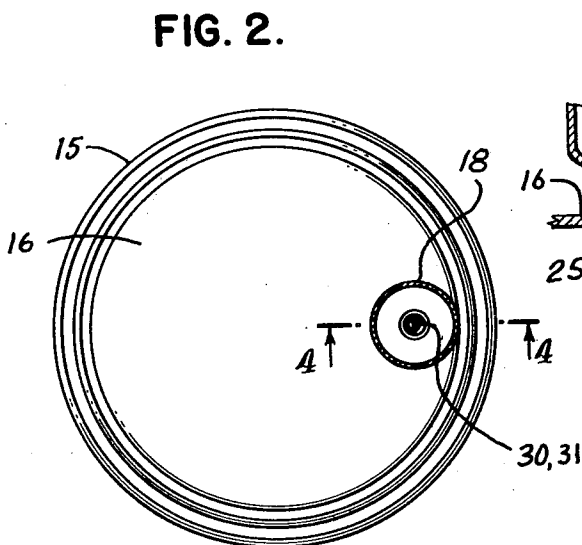
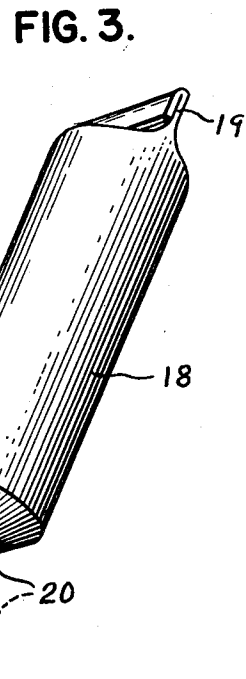
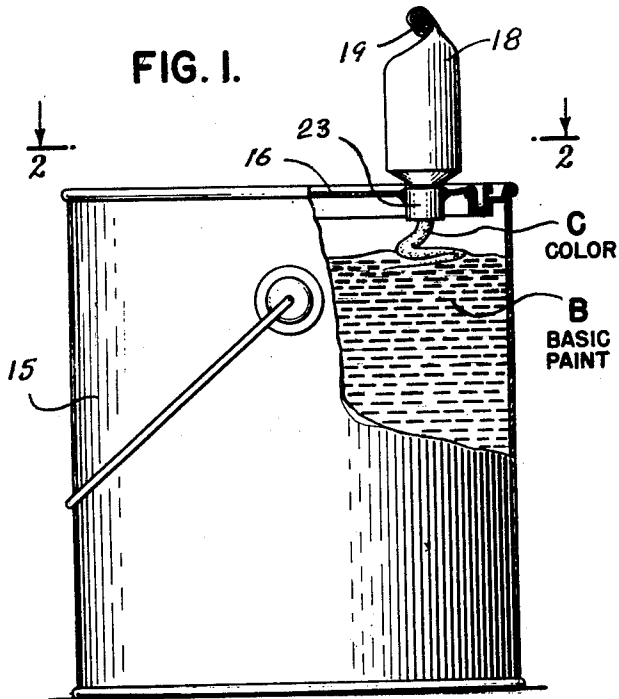
Nov. 7, 1950

I. MACHLEDER
PAINT CONTAINER MEANS AND MIXING
PRESELECTED COLORED PAINTS

2,528,530

Filed April 16, 1945

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

FIG. 5.

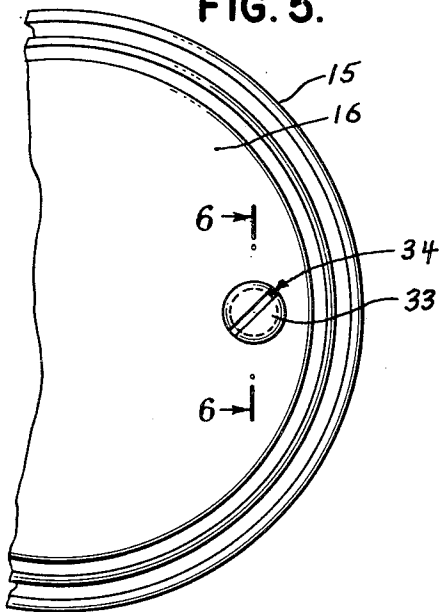


FIG. 8.

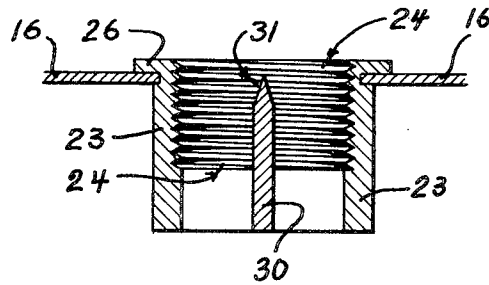


FIG. 9.

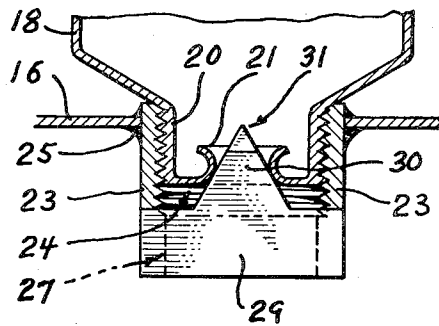


FIG. 6.

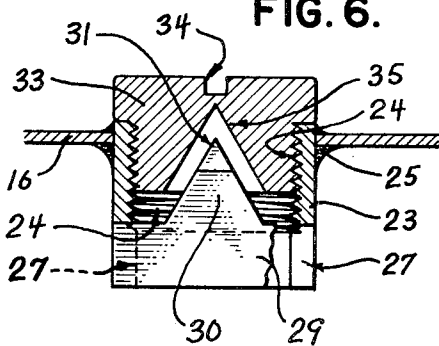


FIG. 10.

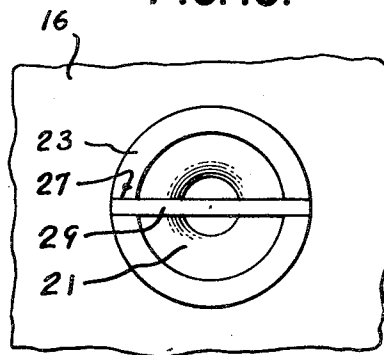
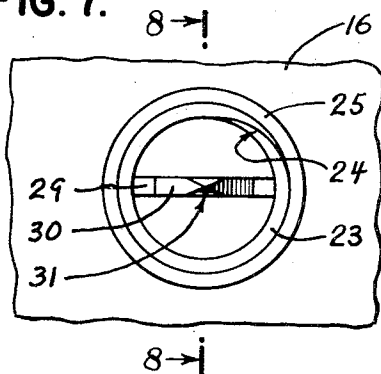


FIG. 7.



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3 Sheets-Sheet 3

FIG. 11

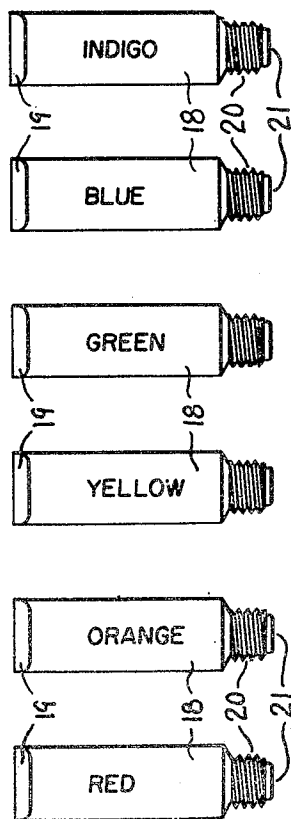


FIG. 13

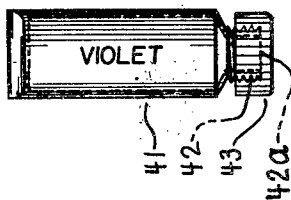


FIG. 15

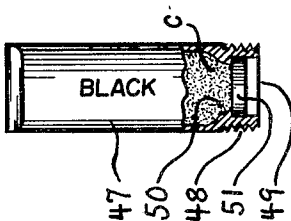


FIG. 12

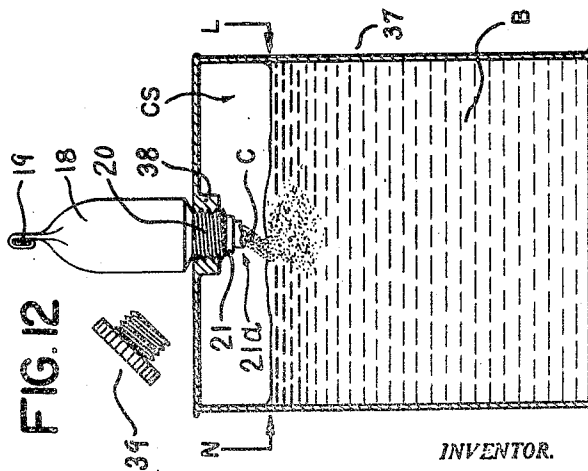


FIG. 14

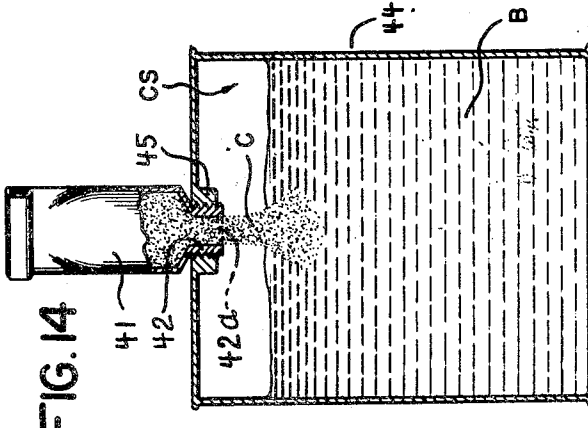
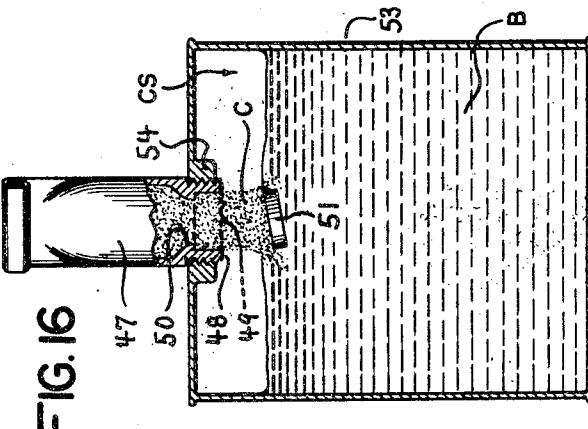


FIG. 16



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UNITED STATES PATENT OFFICE

2,528,530

PAINT CONTAINER MEANS AND MIXING
PRESELECTED COLORED PAINTS

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Application April 16, 1945, Serial No. 588,428

16 Claims. (Cl. 220—85)

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This invention relates to paint container means and mixing preselected colored paints. The invention has utility in a new mode of paint preparation and color blending which is simple and convenient to practice by paint manufacturers, dealers, storekeepers, retailers and consumers.

This application for patent is a continuation-in-part of my parent application heretofore filed on June 22, 1939, under Serial No. 280,459, entitled Paint Cans, which was allowed on October 16, 1944, but which now has been abandoned, and the issue of which is hereby waived in favor of the instant patent case including, among other things, the subject matter thereof.

The invention attains new and beneficial results to be achieved in the paint art by providing a new form of basic paint container and method of use thereof for mixing colored paints, as well as a new combination of paint container means, for coloring enamels, lacquers, varnishes, paints, and the like, that is, all liquid and semi-liquid coating materials known to the paint industry.

My invention is based on a concept differing from previous efforts made in the paint art for maintaining the original chemistry and quality of paint materials produced by the manufacturers, and also differing materially in results from old or conventional practice, although the means and method utilized in practicing the invention and attaining such results are simple and believed not to represent such a departure from present day standards as to preclude convenient adoption thereof by the trade.

Among other things, this invention concerns the problem of maintaining the original chemical formula and structure as well as the quality of paint by shortening the period of time between its manufacture and actual use. And in solving present day paint problems, the invention seeks to eliminate the waste of paint and container materials which, like the question of quality, are factors concerning the paint industry arising, under conventional practice, out of stocks excessive in some ready-mixed paint colors while being depleted in others.

In the practice of my invention, ready-mixed paint as such is not involved. In contrast thereto, I provide for the color blending shortly after the paint is produced at the factory, and likewise shortly before use of the paint by the consumer.

In finding means to reduce the time between manufacture and ultimate use, so as to make available the paint of original quality and perfection to the customer, it is apparent that substan-

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tially new results and economies are gained in behalf of the paint manufacturers, their suppliers of raw materials, the dealers selling to the retail trade, and the consuming public.

*Explanation of conventional
practice and problems*

One of the conditions characteristic of the paint industry under conventional practice is that the use of paint containers of standard construction and graduated sizes is quite firmly entrenched by custom and is not to be readily changed in view of accepted ways and means of handling paint. Thus a major problem in making this invention was and is the requirement that the idea thereof be sufficiently akin to custom as to not unduly alter the routine of standard practice.

Although not generally known, a substantial percentage of paint now sold to the trade has deteriorated due to the period of time it has remained in containers, such as drums, buckets, tin cans, jars, or other standard packaging forms. The chemistry of the paint may have changed due to its ageing, to chemical reaction having set in, and to the pigment settling to the bottom of the liquid vehicle and more or less hardening in the container. Ageing disrupts chemical affinity, and the paint ingredients tend to separate by undergoing chemical reaction which impairs the wear and durability of paint when it is put to actual use.

Also dye colors and oil colors float to the top of the liquid vehicle in the container as a part of the ageing process. In particular, dye colors tend to separate from pigmented paints more rapidly than pigmented oil colors; therefore, the ageing of paints renders it less practical to use dye coloring materials. But since dye colors may afford greater concentration of color values than oil colors for a given amount or volume of coloring, there is need in the paint industry to use dye coloring. It is believed that this invention makes more practical the use of dye coloring matter.

The foregoing disadvantages and other conditions arise in respect to much of the paint now sold to the trade, due to the fact that the paint (although originally of good quality) may have deteriorated by remaining in containers on the dealer's shelves for an unknown long period, sometimes for years, and is no longer fresh paint or enamel, etc. The usual run of consumers, as well as many painters, are unaware of impairment in quality of paint due to its ageing in

containers after careful production by manufacturers.

The long period during which a percentage of ready-mixed paint ages in containers awaiting sale is unavoidable under conventional practice due to lack of sales turnover, that is, the slow-sale of a paint of some particular color or colors in some particular unit or standard sizes of containers and actually no-sale of others over an indeterminate period of time. This problem of turnover arises by reason of having to carry a supply of many colors of ready-mixed paints, multiplied by the several unit sizes which are standard, such as drums, two-gallons, one-gallons, half-gallons, quarts, pints, half-pints, etc., some of which may not be sold for years.

Such unsold paint constitutes a varying percentage of the slow turnover stock ageing in containers on storekeepers' shelves. Even with a large stock of paint on hand of many ready-mixed colors, and in the three popular standard unit sizes (gallons, quarts, pints, etc.), a paint dealer may run short of one or more colors, in the one or more container sizes, called for by a customer.

Aside from the foregoing, one of the research problems of paint chemists and manufacturers, under conventional practice, is that of seeking better ways and means of producing paint which withstands ageing in its container. This problem is in contrast to the fact that paint should be compounded to begin its life of enduring use after it is removed from the container and when spread upon a surface to be preserved and/or decorated thereby.

And finally, the task performed by house painters and the like, in mixing and color blending paint in the presence of air, is not generally recognized as causing further impairment to paint already aged in the can when purchased, and in causing outright loss due to "dry cake" and "paint mess" formed in and on open containers. Present day "open mixing" involves the use of open containers which expose the paint to the air, thus necessitating the repeated use of volatile thinners for reconditioning paint already impaired by evaporation and oxidation caused by aerating the paint by conventional "open mixing," all of which damage paint and, among other things, promote instability in the color value thereof, causing running, streaking, peeling and other defects after the paint is used.

The maltreatment of paint, that is, the damage done to it by conventional mixing, including the use of volatile thinners for diluting operations, is not appreciated by the public and is infrequently alluded to in the art and trade. The efforts heretofore made by others working in the paint art to solve these problems have not resulted in providing a simple means which the industry can or will adopt or the consuming public accept.

Example of dealer's problems under conventional practice

To give an example of the difficulties encountered, there may be on hand a large stock of paint, representing a substantial capital investment in the inventory of a dealer, actually several thousand containers of ready-mixed paint in all the different standard or unit sizes, such as drums, one and two gallon buckets, half-gallons, quarts, pint cans, and half-pint sizes, etc. Yet a dealer may not at a given time have the color and/or the can size or the quantity in the color wanted by a customer.

On the other hand, it may transpire that a customer calls for and receives ready-mixed paint in the unit size and color he desires, but it may have remained on the store shelf for years and deteriorated in quality. He is unaware that the paint thus purchased is from old slow-sale stock. The brand and the manufacturer thereof may be of the very best, but when the aged paint is applied to a surface it may not be of enduring use due to the deterioration in quality as the result of ageing in the container; hence the paint may run and streak, crack and peel, or otherwise show defects, as heretofore mentioned.

In view of the problem, an inconspicuous one except to paint chemists and others identified with supplying ready-mixed paint to the public, it seems well to give a more concrete example of a typical paint store and its inventory under present day practice. Therefore, the purpose of the invention and its benefits can be more readily appreciated.

For example, a dealer may wish or endeavor to have on hand about 28 different color shades (more or less) of ready-mixed house paint of given grades in gallon containers or bucket cans. Now multiply the 28 ready-mixed colors by 12 (single case lot, factory shipment) as the minimum number of gallon sizes to be stocked in each color, if he is to satisfy purchasing economy and barely supply the retail trade. He now has on hand 336 gallon buckets of house paint at the outset, but he lacks a stock of paint in five-gallon drums, as well as in quarts and pints.

Of the above 28 colors in 336 gallon cans of ready-mixed paint at a given time, there may be slow-sale or no-sale for some of them, say 10 of the colors, multiplied by the 12 gallons (more or less) of each of said slow-sale colors, and he has on hand 120 one-gallon cans of dead stock ageing on his shelves. The result is a capital tie-up, the uneconomic use of store shelf space, including transportation, handling thereof, the cost of insurance, and the consumption of raw materials for the production of containers as well as paints.

Next, let us stock 12 quart cans and 12 pint cans (case lots of each) in the 28 colors of the same grade or brand of house paint accumulated above and we have 24 times 28 which makes 672 cans. Add that stock of quarts and pints to the 336 gallon buckets heretofore accumulated, and the dealer has amassed 1,008 cans of house paint in the three needed standard can sizes. But he has on hand only one grade or brand of house paint. A typical paint store may stock at least two grades or brands, with the result that 2,016 units or cans may be on hand at a given time. And to this should be added a stock of bulk paint, as for example, in drums (five and ten-gallons) and also some two-gallon sizes.

Further, add to the above paint stock (remembering that a percentage thereof is deteriorating by ageing in the containers) a line of floor paint in the needed colors and can sizes, plus a line of inside paint, as well as enamels, industrial coatings, lacquers, etc., and also oils, turpentine, thinners, driers, etc. It is seen that the volume of paint and container materials to be manufactured and stocked by a dealer may run into the thousands of gallons and the thousands of containers, yet there may be on hand at most only 12 or a less number of cans in some given sizes and colors, none at all in other sizes and colors, and perhaps only one or two grades in different makes of paint.

The foregoing and other related conditions increase the cost of paint, lower its quality, cause the waste of paint materials as well as containers, and strangely enough demonstrate the paradox of a depleted stock of paint in the face of a large inventory on hand.

The pyramiding of paint stocks is a burdensome and uneconomic problem long existing as a result of a plurality of colors, multiplied by a plurality of container sizes, plus additional types and brands of coating materials. And there is an unsatisfied desire for an increase in the number of colors, that is, more shades or hues urged by manufacturers which further pyramids the stock of paint. On a whole, it is a problem not appreciated by the public, nor is there any general understanding concerning the poor quality of aged paint resulting directly from the problem of pyramided stocks which is the direct cause of slow-sale turnover of a percentage of paint stocks, as heretofore explained.

Furthermore, the urge for color hues and shades exceeds the conservative example above given due to the science of color styling now on the increase which further enlarges the stock of colors desired in conventional ready-mixed paints. Indeed, it is not uncommon at this time for the color booklet of a manufacturer of ready-mixed paints to display 75 colors, more or less, and to suggest that the dealer or customer write for additional colors.

This multiplicity of colors, when fitted into the requirement of the several standard unit sizes, times the number of cans stocked in one size, times the number of colors in all sizes stocked, plus additional brands and types of paints, begets a multiplicand of astounding proportion which is uneconomic per se in paint merchandise and container materials. The effort by some manufacturers to agree upon a limit to the number of ready-mixed colors apparently is not a solution of the problem. Competition and the urge of the trade toward color styling and additional color shades merely adds to the problem of the paint industry which is of great magnitude in this country, and one may say a formless enterprise insofar as concerns its mounting color and ageing problems.

Remixing aged paint

It is next pointed out that a casual customer may purchase paint of a slow-sale color (which has been on the store shelves for a long period), and finding the pigment solidified in the bottom of the can, he merely forcibly remixes it preliminary to use. He may have little or no understanding of the chemical changes which have occurred to impair the quality, or why the paint is lacking in surface covering capacity, or why his paint job was not a successful and enduring one. And the painter who performed the work may not know why his paint job turned out faulty.

The difficulty encountered in forcibly remixing the settled and oft-times hardened pigment at the bottom of the can usually is not a warning to the house owner or the painter that such paint has deteriorated. The conventional "open mixing" and digging through the vehicle into the settled mass of pigment slops the paint, soils the can, and produces "dry cake" and "paint mess" which is a waste, as well as stirs in air thus leading to further deterioration in quality due to oxidation and vaporization promoted by aeration due to mixing in open containers. And

these faults lead to the use of volatile thinners in open containers which incorporates more air and still further upsets the original chemical balance and good quality engineered into the paint by the manufacturers.

Remixing is not a solution of the problem since, when the paint has aged, chemically changed, driers adsorbed, and the pigment has settled out of the vehicle, it follows that forced remixing, by digging at the pigment and stirring the paint, or by vibrating the can in shaking machines (now available to the dealer—see Jorgenson Patents 2,109,233 and 2,323,403) accomplishes no more than a superficial and temporarily visible remixing without restoring the original chemical balance and structure as engineered and devised by research in factory laboratories.

A possible cure for aged paint, the pigment of which has been settled out of its liquid vehicle for some time, is to reprocess it at the factory. This is not practical because it would require the keeping of time records on the paint in stock, further handling, increased selling overhead, and additional manufacturing expense.

Explanation of the prior art concerning paint and other arts

In recent years, paint chemists, manufacturers and technicians studying the problem have acquired an appreciation for the need of ways and means to effect, in a simple manner, the selection and exact duplication of colors under recognized standards of specification and color description. However, a simple mechanical means and method have not been available to implement these needed processes by which to color a small given amount of paint at the time and place of use as distinguished from mass or bulk-production coloring of paint in the factory long before actual use of the color-mixed paint.

I have been unable to find any simple and practical suggestion in the paint field for solving this problem having its inception at the very beginning of the ready-mixed paint industry in the United States in about the year 1842 when one Quarterman seems to have first produced colored ready-mixed paint for the trade. And the problem is entirely peculiar, specifically, to the paint industry.

While the prior art has suggested measured proportions of coloring matter, in cans, to be added to given size cans of white or other neutral basic paint by the conventional "open mixing" method, to make particular or preselected colored paints, and charts with directions therefor also suggested (as for example, in Stevens Patent 132,874 issued in 1872, as well as in Leggett 173,408 in 1876, and in Bradley 1,360,085 in 1920), no simple mechanical means has been adopted to paint containers for performing the color blending operation in a convenient way which the dealer and the public can practice over the store counter free of "dry cake" and sloshed "paint mess" with attendant loss, soil, and deterioration resulting from "open mixing" as proposed in the patents mentioned.

Of passing interest also is the general line of two-compartment paint cans (as in Jones Patent 906,236 issued in 1908, and Toch 1,706,334 in 1929), but such cans are for handling metallic paints in small quantities, such as bronze, gilt, and aluminium. Thus two-compartment containers are not suitable and not used for ready-mixed paints as such, and are not capable of color preselection since the metallic color in-

gradient in one compartment of such can actually is the pigment already colored and belonging with the liquid vehicle in the other compartment of said can.

Likewise, measured color container patents (as in Radbruch 2,343,026 issued in 1944 and Amundson 2,334,055 in 1943, both having filing dates subsequent to my parent application 280,459) merely refer to the problems without solving them, and propose "open mixing" for the blending of color with a basic paint.

The problems have thus remained and been known for decades—in fact from the beginning of the ready-mixed paint industry, its evolution, from a few simple colors to its present burden of some 40 or 50 color shades or more, is now approaching 100 shades, as scheduled by some manufacturers. This enlarges the percentage of paint ageing and deteriorating in containers, proportionately extends the ageing period, and again multiplies the containers and paint materials tied up awaiting sale. No change has occurred for the better since the inception of the ready-mixed paint business.

It will be noted that, in other arts relating to liquids handled in containers, there does not exist this particular problem, involving the pyramiding or multiplication of stock, stemming from several standard container unit sizes, multiplied by a given number of different colors, nor the need to blend colors (particularly dye coloring) into paint without the access of air, all as here encountered in the paint art.

And there is the further distinguishing characteristic that paint is not in reality a consumable commodity, as is true in the case of so many prepared liquid or semi-liquid commodities available to other trades in containers. Indeed, paint may be regarded as a durable or a lasting commodity, or a semi-unconsumable commodity, in that paint begins or should begin its life when removed from the container and spread on a surface to preserve and/or decorate it for a lasting period. Thus the ready-mixed paint art and containers therefor present their own particular problems.

How this invention solves the problems

It is believed that the problems are solved by this invention, in that the limitations against increasing the number of colors are lifted, the difficulty of color selection is eliminated, the quality of paint is enhanced, that waste in paint materials as well as container materials is eliminated, that the burden of unbalanced paint stocks is eliminated, and that the difficulty of exact duplication of colors is removed.

This invention undertakes a solution of the problem by providing means to prevent ageing of paint by actually eliminating the manufacture of ready-mixed paint as such at the factory. I accomplish this new result by providing means to mix the desired or preselected color of paint at the time of actual sale or to be color blended and made by the customer at about the time the paint is required for use. The manufacturer actually produces just as much or more paint as before, except that all of it comprises a few types of neutral (transparent) and basic (opaque because pigmented) paint; and for convenience I use the latter term "basic paint" to mean, generically, both transparent and opaque coating materials, enamels, varnishes, and all coating materials susceptible to treatment under this invention. The manufacturer also produces or

supplies colors to blend with his basic paints. In other words, the basic paints and colors are of predetermined value (weight and concentration) suited to each other for the practice of this invention.

My container means having a mode of operation new in the paint field renders it unnecessary for the dealer to pyramid his paint inventory by stocking ready-mixed color paints in massed quantities. I have devised a "basic paint container" not entirely filled which is new in the embodiment of a "color-injector fitting," together with a simple "one-time-use color container" filled with a particular color which operates in a new environment with said basic paint container to accomplish the new and beneficial results herein. I use these simple containers in a manner and combination new to the paint art, especially so inasmuch as the cover is not removed from the basic paint container when injecting the color thereinto.

The dealer, in practicing this invention, merely stocks the predetermined "basic paint" in one or a few types, such as white and possibly a few other basic colored paints in the several standard container unit sizes embodying my above-mentioned color-injector fitting. For example, he may have on hand a case (12 cans) of basic paint in each of the three more popular standard sizes (gallons, quarts, pints) and thus only 36 cans. This is in marked contrast to the conventional massing of inventory, as previously discussed. Even two cases of paint on hand in all sizes total only 72 cans in all. And in addition he stocks a quantity of color containers filled with paste-like, dispersible, predetermined colors which may be equal in number to the variety of shades of colored paints desired by the trade.

Since this small volume of paint ingredients (basic paint and color) is used in practicing the invention to make any desired or preselected colored paint in any desired container size, it follows that such small stock of paint ingredients is moved or sold in a shorter time than a pyramided inventory can be disposed of. The practice of my invention results in frequent paint reorders by the dealers to the manufacturers, which means a shorter period between production at the factory and ultimate use by the customers, and hence a shorter period for the paint in the container. Accordingly, the slow turnover and large inventory problems are removed, and fresh paint of originally good quality, as produced by the manufacturers, is supplied for the benefit of the public.

The new mode of operation herein and its results are accomplished by using my paint container means which I have especially devised to practice the invention without substantial change from conventional form and customary utility. Attaining this end was and is a part of my invention, else my new method of operation in mixing the shade of colored paint desired by a particular customer at the time of sale to him could not be accomplished. In other words, the paint industry cannot be expected to change arbitrarily from the entirety of its present methods of merchandising paint ingredients in standard cans.

Having explained some of the problems concerning the paint industry, and in part demonstrated by example some of the limitations and uneconomic processes of conventional practice in the ready-mixed paint field, as having a direct bearing upon lowering the quality of paint now

being sold to the trade, and having briefly mentioned how this invention is believed to solve the problem, there is next explained some of the purposes herein.

Purposes of the invention

Accordingly, the first purpose of this invention was to find a new idea which fitted into the customary ways and means of handling paint, and to provide paint container means and an operating method for mixing colored paint by the dealer or the customer at the time the paint is sold or when actually used.

Thus in purpose and result, the invention is new and useful, specifically, in the paint field, and proposes, to-wit, to eliminate the dealer's slow turnover problem, the ageing period of paint in the can, and the forced remixing thereof; also to prevent the waste of paint by rendering unnecessary the "open mixing" and the use of excess solvents and thinners; and to supply the trade with fresh paint of original quality and good covering capacity, which is chemically compounded for earlier use than now possible with present day ready-mixed paints; also to free the chemist as well as the manufacturer and the dealer of limitations imposed by the color and container size pyramiding problems, to expand the assortment of color shades, to provide means for exact color duplication, and provide other results new in the paint field.

Further important purposes are to eliminate "paint mess" and "dry cake" wastage of paint in open containers, also to avoid guess work and visual comparison in seeking to match colors, prevent the stirring of paint in containers exposed to the air, prevent the use of paint ingredients chemically unsuited to each other, and to avoid diluting the paint with unsuited thinners which impairs quality by upsetting the chemical formula, and in general correct for the uneconomical processes which seem unavoidable under conventional practice.

And other purposes are served, such as freeing the paint chemists from the uneconomic research for better chemical compositions designed to resist ageing in the can—thus more directly coming to the real problem of producing paint compounded to resist ageing outside the can when the paint comes into use.

A further purpose is to provide paint container means (as such for transporting and handling paint) so constructed and arranged that two containers may be placed in operative relation, that is, joined together in sealed or closed flow communication, in order to empty the entire contents of one container into another (thus constituting its own portable mixing apparatus per se without addition of movable parts), the idea being to so provide paint containers in a new packaging combination that either the dealer or the customer may conveniently empty one container (of color) into the other container (of basic paint) and mix the required color of paint only when it is actually to be sold or used.

A further purpose is to produce a "color-injector fitting" of simple construction which may be built into a conventional paint container to convert it to my new "basic paint container" herein, the latter constituting a new sub-combination which affords a new environment and usefulness for the several forms of simple color containers shown herein and adopted to my color blending method.

Likewise, a purpose is to produce a color-

injector fitting which functions to seal a simple color container (such as a collapsible tube) and a basic paint container (such as a can) in sealed-flow or closed communication with each other to avoid preliminarily opening up and exposing the paint ingredients of either the tube or the can, thus to effect a clean transfer of the color into the basic paint while both remain closed from the access of atmosphere, and without one's hands coming in contact with either of the paint materials.

Another purpose is to provide a pair of paint containers adapted to be joined in combination with each other, by which the operation of joining them acts automatically to cut open a sealing means to place both containers in communication with each other, while maintaining both sealed or closed from the access of air.

Similarly, it is a purpose to provide a pair of paint containers so joined in operative relation that, when pressure is applied to one of them, a passage is opened through which color flows from one container to the other.

Also it results as a purpose herein to provide a mode or method of operation for practicing the invention, wherein the neutral or basic paint ingredient and the coloring ingredient are pre-formed chemically with foreknowledge that said two specific ingredients are destined for blending and actual use with each other at a time much earlier than now prevails in the industry, and wherein container means are mechanically arranged to render convenient the blending or mixing of coloring material into basic paint at or about the time the paint is to be used.

The drawings and description

The accompanying drawings disclose the principle of the invention, exemplify its structural organization and mode of operation, in simple arrangements and method of procedure preferred at this time, and also suggest modifications or equivalent forms as a basis for changes and improvements for benefits specific to the paint art.

The invention is presented in what now appears to be its more convenient forms for use in the paint trade, since I purposely employ paint containers not unlike those with which the trade is accustomed, but modified in structure and mode of use to produce the new results herein.

One means of implementing the idea of the invention comprises the color-injector fitting previously mentioned, and not heretofore used in the paint art, and which produces a new sub-combination in a basic paint container which I now provide for handling a neutral color or basic paint, as distinguished from conventional containers for handling ready-mixed paint.

The description and drawings herein explain the principle of the invention and present the best mode now contemplated in applying such principle, specifically, to the paint art, so as to distinguish the invention from others; and there is particularly pointed out and claimed, the part, improvement or combination, which constitutes the invention or discovery.

In the drawings, Figs. 1 through 10 demonstrate the fundamentals of my color blending method which may be practiced with the paint container means having a "blade" type color-injector fitting, for example, as shown in my parent application Serial No. 280,459 (first form of the invention); while Figs. 11 thru 16 amplify that demonstration and also add modified forms

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of the invention embodying a "bladeless" type of injector fitting.

Accordingly, Fig. 1 shows the basic paint container (in the form of a bucket or can) having the color injector fitting built thereinto and forming my new sub-combination, together with a color container (shown here in the form of a collapsible tube) disposed in operating relation with said basic paint container and forming my new general combination. Color is shown being injected into the paint can.

Fig. 2 is a sectional plan view, looking down from the line 2—2 of Fig. 1.

Fig. 3 is a perspective view of a collapsible color tube having a screw threaded end or neck which is closed by an integral rupturable seal and which does not require a removable cover cap. In other words, this color tube is somewhat different from the collapsible color tube having a cap well known to artists who use tubes containing a thick or paste like color which "piles" or applies itself in relief on a canvas. These distinctions are later explained.

Fig. 4 is a sectional view, taken on the line 4—4 of Fig. 2. The color-injector fitting is shown in section, transversely of its piercing or cutting blade, the seal of the collapsible tube of color is ruptured and folded back to open the tube and connect it in air-tight flow communication through the injector fitting with the basic paint in the can.

Fig. 5 is a fragmentary plan view of the basic paint can per se, showing a closure plug in place which seals the color-injector fitting and the can. This plug is inserted at the paint factory when the can is filled with a neutral color or basic paint.

In passing, it will be seen that Figs. 4 and 6 thru 10 are fragmentary enlargements, for the sake of clarity, of the color-injector fitting built into a paint can.

Fig. 6 is a vertical sectional view through the basic paint can, as on the line 6—6 of Fig. 5, with the closure plug in place, and with the right-hand end of the blade shank of the injector fitting broken away to show one means of assembly.

Fig. 7 is a top view of Figs. 5 and 6, but with the closure or sealing plug removed from the injector fitting when making ready to mount the color tube of Fig. 3 in operating position on the basic paint can.

Fig. 8 is a vertical sectional view through the color-injector fitting, transversely of the piercing blade thereof, as on the line 8—8 of Fig. 7. Incidentally, this view also shows an alternate form of anchoring the injector fitting within the wall of the paint can.

Fig. 9 is a sectional view similar to Fig. 4, except taken at right angles thereto.

Fig. 10 is a bottom view looking up into the color-injector fitting and into the opened tube seal of Fig. 9.

Fig. 11 shows a plurality or a stocked supply of color tubes, and while only six typical colors are noted, nevertheless the series thereof (particularly with Figs. 13 and 15) is intended to represent an infinite number of color tubes containing all the different colors, in the large variety thereof, required to supply the trade with paint colored in accordance with this invention.

Figs. 11 and 12, taken together, show the simplicity of this second form of the invention practiced with a supply of Fig. 3 color tubes and a

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simple basic paint can differing somewhat from the first form thereof shown in Figs. 1 thru 10.

Figs. 13 and 14 show a third form of the invention, wherein an open neck capped color tube is employed, that is, a removable screw cap as its only sealing means, this form of the invention being in contrast to the "capless" sealed color tubes shown in the other views.

Figs. 15 and 16 show a fourth form of the invention, wherein a color tube is provided with a pressed-fit or pressure-removable seal adapted to open only after the tube is mounted in operative relation on the basic paint container.

The drawings show a paint container, in the form of a conventional bucket or can 15, used in handling and selling present day ready-mixed paint, except for the new features added to it in accordance with this invention. A lid or top 16 covers and seals the paint can 15, and such lid may be removably fitted frictionally thereon for subsequent pry-out in the usual manner. The cover 16 is sometimes soldered into the can and thereafter cut open by a can opener, or the lid may comprise a screw cover as in some types of packaging means such as glass jars which also are used in handling paint.

Representative of the standard sizes of containers 15 are drums (such as five and ten-gallon capacity, more or less), two-gallon, one-gallon, half-gallon, quart, pint, and half-pint sizes, etc. And the can 15, 16 per se is merely a conventional example thereof, being shown here to indicate any and all types of paint packaging means filled at a factory with colored ready-mixed paint (present day practice) and shipped to a dealer for ultimate retail sale to a customer. Incidentally, large size paint containers, such as drums, gallons, and the like, are usually provided with a handle or bail, as suggested in Fig. 1.

Accordingly, it is seen that my invention starts with conventional type paint containers or cans 15, 16 of standard sizes and of any suitable material. And from them my new basic paint container is readily produced, as hereinafter described, resulting in an instrumentality purposely not unlike that to which the paint trade is accustomed, except herein for the purpose of holding basic paint, that is, a paint not ready-mixed with coloring matter at the factory.

There is next shown a color container 18 for holding coloring matter which is also of conventional form, except for its characteristic one-operation use and its new environment herein, and except also for the structural change here made by omitting its present day screw cap, as later explained in this first form of the invention (Figs. 1 thru 10 and 11). These color containers 18 are soft metal or foil tubes of seamless deformable material, having a folded end 19 which may be collapsed upon itself and rolled down toward an externally screw-threaded dispensing end or neck 20 out through the passage of which (also shown at 20, dotted lines, Fig. 3) the coloring matter is discharged.

The color in these particular tube containers 18 is a known type of concentrate in liquid or semi-liquid form, such as oil color or dye, which will readily disperse and flow, and thus unlike the color in paste form used by artists. A distinction may be drawn not only between my Fig. 3 color tube and those used by artists, but likewise between the "dispersible" color used herein and the color for "piling" used by artists.

The end of the screw-threaded neck 20 is closed and hermetically sealed at 21. One seal known

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to the collapsible tube art is in the form of a thin rupturable soft metal (such as lead) foil or diaphragm portion 21 integrally formed with or applied to the soft metal of the tubular neck 20. However, this rupturable seal 21 may be of other material, such as plastic, wax, paper, fabric, or the like. In any event, the seal 21 preserves the coloring matter by excluding the air therefrom until ready to open the tube 18 for its one-operation use herein, as a part of this invention, and as thus distinguished from a multi-time or plural-operation-use tube (fitted with a screw cap) known in the art and more generally used by artists instead of house painters.

A type of collapsible tube (similar to the one shown here at 18) for selling paint colors to artists, is usually supplied by manufacturers in present day practice with a cap to close the tube neck for preserving the paste or "pile" color during the periodic use thereof in small increments. Indeed, conventional practice of artists necessitates periodic and many-times use of color from tubes, although house painters (who generally use color purchased in cans) may sometimes purchase color in tubes.

In both cases just mentioned, the well known screw cap (not shown in the first and second forms of the invention, Figs. 1 through 12) is of essential importance to both conventional practices because the entire paste or "pile" coloring matter is rarely, if ever, dispensed at the time the seal, corresponding to the seal 21 on my color tubes 18 herein, is opened with a knife or pointed tool. Therefore, a screw cap usually accompanies the tube under conventional practice in view of the necessity of replacing the cap on the neck to preserve the unused portion of paste color remaining in the tube awaiting further use from time to time.

In contrast to this old practice, my new "single-operation" collapsible tube 18 does not require a screw-threaded cap, since the tube 18 is used only once, at the time its seal 21 is opened, and then discarded. Therefore, my "single-use" color tubes 18 are simplified in construction, reduced in manufacturing cost, and are convenient to handle due to fewer parts; they operate under conditions differing in environment from conventional practice, and yet are sufficiently akin to standards as to be acceptable to the trade in practicing this invention.

Having the foregoing in mind, it will now be appreciated why, for the sake of simplicity and to render possible the adoption of this invention by the trade, I utilize known types of containers and modify them for the purposes of achieving the new structural combination herein for improving the quality of paints sold to the public in lieu of ready-mixed paints colored at the factory.

Accordingly, in this first example of the invention (Figs. 1 thru 10 and Fig. 11) a sleeve or tubular member, in the form of an injector nipple 23, is disposed through the wall of the basic paint container or can 15, that is, secured in an opening therein, preferably through its top cover 16. This color-injector nipple 23 is screw-threaded at 24 (internally in this embodiment) part way down its throat from the upper end thereof, and has an inside diameter and screw-threaded size adapted to receive, into its threaded throat 24, the externally threaded dispensing neck 20 of the "one-use" collapsible color tube 18 heretofore discussed.

It is significant to observe that the tube neck 20 is threaded only for the purpose of fitting into

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the injector nipple 23 and not for the purpose of receiving the well-known cover cap since it is not a part of the one-use color container 18 herein. I will later on in this description point out another form or species of the invention in which the paint trade may of course use "capped tubes" in practicing the invention if choice does not indicate the type of sealed "capless" and one-use tube shown in Figs. 3 and 11.

The injector nipple 23 may be permanently built into the basic paint can 15 in any suitable manner, such as by soldering it in place, as at 25 (Fig. 4). However, the upper end of the nipple 23 may be externally reduced to form a shoulder which abuts the inner side of the can wall or cover 16 (see Fig. 8), and the thin end edge of the nipple (which projects through the can wall) is flanged over and spun down, as at 26, on the outer surface of the can to anchor the nipple in position with a liquid air tight joint. These two means, or others just as suitable, may be employed for making an injector nipple in the paint can 15 to form a color passage therinto.

The greater portion of the length of the color-injector nipple 23 is concealed within the can 15 in order that the outer end of the nipple may be flush with the outer can surface or nearly so. The nipple 23 may be provided with a pair of oppositely formed slots 27 which extend part way upwardly in its throat 24 longitudinally from its lower end. These slots 27 constitute one of many structural means of anchoring a piercing point or cutting blade in position, as next explained.

Mounted within the lower part of the color-injector nipple 23 is a cross bar member or shank 29, comprising a flat piece of metal, having its ends fixed within the longitudinal slots 27. The length of the shank 29 is shown to be about equal to the diameter of the nipple 23, and the width or height thereof may be in about the proportion shown or otherwise shaped to make a secure anchorage in upright position in the nipple. An inverted V-shaped cutting or extruding blade 30 is formed integrally with the shank 29 and extends upwardly from the middle thereof, thus being mounted centrally within the injector nipple 23. A piercing point 31 is formed at the upper extremity of the converging sides of the blade 30, and the point is positioned just below the upper end of the nipple.

Thus it is seen that the point 31 of the blade 30 is placed just below the initial or first entering screw-thread 24. The piercing point 31 tapers downwardly and outwardly in the manner of an arrowhead blade and, being disposed centrally within the passage 24, leaves a flow passage on each side thereof down through which coloring matter flows into the can 15.

A plug or stopper 33 normally seals the outer end of the color-injector nipple 23. For the type of nipple herein shown, the closure plug 33 is externally threaded; and it screws into the internal threads 24 of the nipple. A tool receiving means or screw driver slot 34 is made in the outer end of this closure plug in order to screw it in snugly to seal the paint can 15 after it is filled at the factory with neutral color basic paint.

The present example of closure plug 33 is hollow in form or made with a socket 35 in its underside to receive the pointed blade 30, 31. The socket 35 permits the blade point 31 to be located high up in the nipple 23, with the outer or top end of the plug located close to or flush with the outer surface of the paint can 15 or its cover 16. Thus the externally screw threaded plug 33

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has adequate length or depth of screw threads to make a firm anchorage within the internal threads 24 of injector nipple.

The inner or lower portion of the color-injector nipple 23 within the can 15 need not be screw threaded and is made just long enough to provide for a secure anchorage of the upright cutting blade 30, 31 integral with the blade shank 29 which cross spans the nipple centrally thereof. Such arrangement rigidly holds the blade upwardly within the mid-portion of the screw threaded color passage 24, and thus encloses the blade and protects it within the nipple.

The aforesaid number 23 designates one form of the color-injector fitting as a whole for convenient reference herein, and the example thereof shown comprises the self-contained three-part assembly which may first be made as a unit and then secured in a conventional paint can 15 with cover 16 by any suitable means, as heretofore explained. These color injectors, in this or other forms of construction, are readily added or built into known types of paint drums, buckets and cans without interfering with present day paint container manufacture, and convert them into my new neutral color "basic paint container" 15, 23 which, for convenience, identifies the old can 15 modified by the color-injector fitting 23.

And, doubtless, the best location for the color injectors 23 is in the lids or covers 16 of my new paint containers. The fittings 23, when closed by their plugs 33, should be flush or nearly so with the surfaces of the container lids 16 in order not to interfere with stacking paint cans on top of each other. The color injector 23 and tube of color 18 are simple in construction and operation in their new environment in the paint art and lead to the new results herein.

In making ready to introduce the coloring matter from the color container, as for example from the collapsible tube 18 into the neutral basic paint can 15, 23, the plug 33 is removed from the color-injector fitting 23. The tube neck 20, with unbroken rupturable seal 21, is now screwed into the stationary fitting 23 of the can setting on the store counter or a table. As the color tube 18 is initially rotated and screwed downwardly into place, the first or outermost screw thread of the tube neck 20 and the first or uppermost thread 24 of the injector fitting take hold of each other. This causes the seal 21 initially to be pierced by the stationary point 31 due to rotation of the seal thereagainst.

By continuing to screw the tube 18 all the way into the color-injector fitting 23, it follows that the foil-like seal 21 is cut away or rolled back by extrusion and opened wide (Figs. 4, 9 and 10). This operation forms a color flow passage from the tube 18 down into the basic paint can 15, 23, closes or seals the connection against air communication, and mounts the tube in rigid vertical position. Next, the tube 18 is rolled down from its top end 19, and thus collapsed, to insure that all coloring matter C is dispensed into the basic paint B. Note (Fig. 1) the color stream C flowing into the basic paint B.

The collapsed tube 18 thus spent, and entirely used in one operation, may now be unscrewed and discarded, whereupon the sealing plug 33 is replaced in the color-injector nipple 23. The can of basic paint B now blended with color C is next shaken up to disperse the color through the paint by impelling the mixture back and forth in the space above the level of the paint.

It will be appreciated that the spent one-use

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collapsed tube 18 may be left in place on the basic container 15, 23 as a closure to seal it and the colored basic paint B therein against the access of air and against leakage when shaking up the paint can. Thus it is not essential to replace the plug 33 which was first inserted at the paint factory when packing the basic paint for subsequent coloring.

It is now seen that a unit of basic paint (or the can 15, 23) and a unit of color (or the tube 18) are mounted and joined together in flow communication and closed or sealed from the access of air. The soft metal wall of the color tube 18 bears gasket-like against the outer flush end of the injector nipple 23 and makes a sealed connection therewith against leakage. The color tube 18 is firmly supported on the basic paint can for its pressure injecting operation, and there is no leakage around the tube neck 20 in nipple 23 when the squeezing pressure is applied to the tube 18 by manually or otherwise reducing and rolling it down to eject its color C down both sides of the blade 30 and through the color flow passage 24.

The top 16 of the paint can has not been opened, this being an important distinction from conventional practice, the can remains clean and without trace of soil or paint mess, the store counter is kept clean, and one's hands never come in contact with the paint ingredients B and C of the combination container means 15, 18, 23. Moreover, there occurred no "open mixing" in the foregoing operation of injecting the color into the closed paint can.

The foregoing describes the construction and mode of operation of the new paint container means comprising, first, the can 15 with its bladed type of color-injector fitting 23, constituting my new sub-combination basic paint container unit 15, 23, and second, the color container unit 18 of the "capless" tube type operating in its new environment, all of which constitute my new two-container three-element combination paint container means 15, 23, 18. In other words, the "blade" type of color-injector fitting 23 (as well as "bladeless" types thereof hereinafter described) comprises the tying means between the two units of paint ingredients by which to operatively associate them (in their several forms of construction) for the purposes of this invention.

Sheet 3 of the drawings, Figs. 11 and 12

The practice of the invention and the method of blending a unit of concentrate color or colors C into a unit of basic paint B will be understood from the foregoing description taken in connection with Figs. 1 thru 10. However, reference is now made to Sheet 3 of the drawings for an additional explanation and also a showing of what may be said to be three modified forms of the invention, wherein Figs. 12, 14 and 16 show, diagrammatically, paint containers 37, 44 and 53 which are representative of any of the conventional or standard sizes of paint cans or buckets, the most common of which are gallon, quart and pint sizes.

At this point in the description, it is to be noted that Sheet 3 demonstrates the utility of the invention and the method of practicing it in a simple way without using the blade 30, 31 of the color-injector fitting 23 heretofore explained. Thus the three basic paint containers of Sheet 3 have simple bladeless color-injector nipples and are similar or in fact the same in structural form for receiving the three different structural forms

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of color containers shown in Figs. 11, 13 and 15.

The collapsible tube type of color containers, shown in the latter views, are again indicated as being an appropriate means for illustrating the principles of the invention, and are to be taken, singly or together, as representing a supply of color containers. Indeed, the same is true of Fig. 3 showing a single color tube 18. The eight tubes shown in Figs. 11, 13 and 15, and the names of the eight colors printed thereon, demonstrate only a few of the vast number of a supply of color units from which a paint dealer may select one or more tubes to color basic paint to the preselected requirements of the trade. Each color tube (Figs. 11, 13 and 15) may be marked with a printed legend which designates its predetermined color value, in weight and concentration, in order to facilitate selection of one or more of the particular color tubes from the supply.

Coming now to the modified forms of the invention, I first refer to Figs. 11 and 12, wherein the color tubes 18 are featured in a manner differing from that presented in Figs. 1 thru 10.

Fig. 12 diagrammatically represents in section a standard size paint can 37 with a simple nipple 38 (as for example of screw-threaded form) made in the wall of the can, with a stopper or sealing plug 39 removed from said nipple. This plug 39 is removed by the paint dealer or his customer for the first time since its insertion at the paint factory for maintaining the basic paint can 37, 38 sealed against the access of air. The seal 21 (heretofore explained) on the color tube 18 is now cut open by hand with a knife or pointed tool, and the opened color tube is then screwed into the nipple 38 which supports the tube on the can for the color injecting operation.

The seal 21, cut open by a hand tool, has its cut jagged edge indicated at 21a in Fig. 12. This three-element container means 18, 37, 38 is now seen to be connected in sealed flow communication. The color C is shown being injected from tube 18 by rolling or folding its top end 19 downwardly until all of the color is discharged into the basic paint B within the can 37, 38. When rolling the tube end 19 downward, the color flows as a stream C from the tube into the basic paint B of container 37, the same as in Fig. 1 (first form) of the invention.

Figs. 13 and 14

These two views demonstrate a third form of my new paint container means and paint mixing method by employing a form of color container differing from that heretofore explained. A tube 41 of color has its open screw-threaded neck 42 covered by a screw cap 43. The neck 42 is normally open, as indicated at 42a, and hence does not have the integral seal 21 of the color tubes 18 shown in Figs. 3, 11 and 12.

The use of the screw "capped" color tube 41, 43 is shown in Fig. 14 on a paint can 44 having a screw-threaded nipple 45. This new basic paint can 44, 45 of course is fitted with a stopper or sealing screw plug of one form or another (as at 39 in Fig. 12) for sealing it at the factory immediately after being packed with basic paint B.

To blend color into the basic paint B, the sealing cap 43 is removed from the color tube 41 (and also the plug 39 from the basic paint can 44, 45), whereupon the color tube 41 is mounted on the can to complete the assembly of the new three-element paint container means 41, 44, 45 for performing the color-injecting operation.

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The tube 41 now is fully collapsed by rolling down its end for injecting the color C into the basic paint B.

Figs. 15 and 16

This fourth form of the invention employs a supply of color tubes having sealing means differing from the integral seal 21 (Figs. 3 and 11) and from the screw-cap cover 43 (Fig. 13) just described.

Accordingly, there is shown a color tube 47 with a screw-threaded end or neck 48. The neck 48 shown may be of the same size as the body 47 of the color tube. This color tube is formed or molded with a large open passage 49 extending downwardly from a shoulder 50 in its neck or passage. A sealing washer or plug 51 has a push fit into the passage 49 up against the shoulder 50 and temporarily remains securely in place by frictional engagement with the interior neck passage 49 to seal the color C in the tube. This closure or temporary sealing washer 51 is adapted to be pushed or "popped" out by pressure, as next explained.

In Fig. 16, my basic paint can is indicated at 53 packed with basic paint B and its color-injector nipple 54 is sealed with a suitable stopper means (as at 39 in Fig. 12) at the factory and adapted to be removed for the first time by the dealer or customer when the basic paint B is to be colored. The color tube 47 is screwed directly into the color-injecting nipple 54, with the sealing washer 51 left in place. Accordingly, this color tube is not opened by the operator in preparing to color the basic paint B in my new paint can 53, 54 and hence no soil occurs in performing the operation.

Having thus assembled the new paint ingredient container means 47, 53, 54, the color tube 47 thereof is now collapsed by rolling down its upper end, whereupon the pressure applied against the color C is transmitted to the sealing washer 51 and forces it out and downwardly into the basic paint B, as shown in Fig. 16. In other words, the temporary sealing washer 51 readily dislodges from the neck passage 49 due to the collapsing pressure of the tube 47, and the color is ejected through the passage 49 into the basic paint B in the form of a stream C.

In summarizing the three foregoing constructions shown in Sheet 3, the collapsed tube or tubes 18, 41 and 47 may now be left in place on the basic paint cans, after all the color C has been ejected from said tubes, inasmuch as they constitute a sealing means maintaining the basic paint cans 37, 44 and 53 closed against the entry or access of air to the combined paint ingredient mix CB. On the other hand, the original sealing plug or plugs 39, as used by the manufacturer when packing the basic paint B, may be restored to the injector nipples of the cans for sealing them at the time a storekeeper or customer colors the paint.

Also, it will be observed that when the color units are mounted on the basic paint units they are sealed from the access of air, that is, against the entry of air into the paint cans, and that the entire color ingredients of the tubes are injected into the basic paint cans in a single operation, or at one setting, at the time the basic paint B is being colored for a customer. While only one tube of color C is injected at a time, due to the provision of only one color-injector fitting in small basic paint containers, it of course follows that any number of tubes of color can

be injected in succession, one after the other, through the injector fitting or fittings.

Here again it is seen that the color containers 18 and 41 as well as 47 have performed their functions in one operation because they are rolled down until collapsed against the tops of the basic paint cans 15, 37, 44 and 53. In other words, these color tubes constitute "single-operation tubes," in that they are used one time only and then discarded since their entire measured contents of color concentrate C are discharged at one setting into the basic paint B.

The basic paint container 37, 38 (and the others shown) is now shaken to disperse the color C throughout the basic paint B. By shaking or vibrating the container, the mix CB is impelled into and about the space left in the can above the paint level which results in thoroughly mixing the dispersed color into the basic paint to color it.

It will be noted that the operation of injecting the color C into the basic paint B is performed without removing the covers of the paint cans (an important feature of the invention) and thus without soil or "open mixing" or the formation of "paint mess" or "dry cake" waste.

When the customer is actually ready to use the colored paint, the lid of the can 15 (Fig. 1) is pried out, or is cut out (Figs. 12, 14 and 16) for the first time since the basic paint B was packed or filled in the can. It will be found, upon opening the container that the fresh basic paint B therein has completely absorbed the color C due to the fact that these two ingredients have a dispersing and absorbing affinity for each other due to the fresh stock being used. Therefore, little stirring or paddling of the preselected colored paint is required since homogeneity of color and texture of the mix CB is achieved due to the freshness of the basic paint stock.

In the foregoing specification in general, a description of the several mechanical means and the operating method of my invention has been given in respect to the several forms of construction and is hereinafter concluded with a statement of matters relating to the filling of the paint container means and how the invention is used in the trade.

Packaging the new container means with fresh paint ingredients

In conventional practice, ready-mixed paint is preferably weighed, rather than measured by volume, because temperature changes do not interfere with making exact and constant volume measurements of pints, quarts, and gallons, etc. This known practice also includes the use of a can, for ready-mixed paint, which preferably is oversize in order to insure leaving the well known air space between the surface of the ready-mixed paint and the top of the can to accommodate for contraction and expansion due to temperature variations and also to retain accumulated gases emanating from the chemical ready-mix in the can. The ageing of such ready-mixed paints in cans has been explained previously.

In practicing this invention, I modify the above conventional practice by increasing the volume of the air space in my basic paint can, in order to make room for receiving the necessary amount of color C, and also to permit subsequent shaking and mixing of the freshly blended paint mix BC without removing the cover or lid from the can. By increasing the volume of air space, to make room for the color and for agitating and impell-

ing the mix into the air space, I preserve the same essential space as used in conventional practice and for the same good purposes thereof.

While my experiments have taught that the standard air space provided by conventional packaging or filling of paint in the top of the paint can will receive amounts of colors which will tint the basic paint to light shades of colored paints, nevertheless it appears essential to leave more space, as a part of my new method, than now exists in order that the practice of the invention may be grounded on sound engineering principles, in order also not to impair the function of the can in accommodating itself to contraction and expansion as well as the retention of gases which accumulate therein, and in particular for the purpose of receiving a large amount of color ingredient C when coloring the basic paint B to deep or heavy shades.

Accordingly, when the fresh basic paint B is packed or filled in my new basic paint containers by the paint manufacturer, a color-receiving space CS (see Fig. 12) is left between the surface of the basic paint and the can lid not only for the same two purposes as heretofore mentioned as to conventional practice, but additionally for my two new purposes, to-wit, that of first receiving the color concentrates C, and thereafter for agitating the fresh mix CB in the available space CS.

The amount or volume of particular colors C required to color the fresh basic paint B to suit a customer depends upon numerous factors, such as the type of basic paint used, that is, whether clear or pigmented; also the strength of color and whether dye or oil-pigmented color; the depth or hue of shade of the colored paint preselected by the customer; the number of color shades a manufacturer and his dealers may prefer to supply their particular trade, and in some instances their trade in a certain geographical locality; and also the cycle period in which the paint industry finds itself, that is, whether in a rising or declining tide of public acceptance of colors. Also other variables confront the paint industry which prevent a definite determination of the size or volume of the color-receiving space CS employed here in the practice of the invention.

For reasons discussed, there is indicated diagrammatically (Fig. 12) the fresh basic paint B filled to my new level NL which leaves the aforementioned color-receiving space CS above the basic paint surface NL adequate for the reception of one or several color units chosen from a plurality thereof for their predetermined color value (in weight and concentrate) to transform a given unit of fresh basic paint into a colored paint preselected from a chart to suit the customer's fancy.

In some of my experiments conducted with this invention, I at first estimated that between 15 to 20% of can space might be sufficient to receive the particular chosen color or colors. Now, however, the experiments also have demonstrated that I cannot determine the exact amount of color-receiving space CS required because of the variables discussed above.

For the reasons explained, there is diagrammatically indicated the basic paint level, as a new level line NL, sufficiently low in the basic paint can 37 (Fig. 12) as to provide the color space CS to accommodate the maximum number of chosen color tubes or the volume of color which

one may inject for the purpose of mixing a shade of preselected colored paint indicated on a color chart from which the customer makes his selection. It follows, therefore, that paint manufacturers, in varying the volume of the color space CS (Fig. 12), by raising or lowering the basic paint level NL, are correct in their procedure.

Having mentioned in the foregoing the packaging of the basic paint containers with fresh stock B, I will next refer to the packaging of the color containers.

The color tubes herein for the general and house painting trades are necessarily filled with paste-like or semi-liquid dispersible color concentrate, whereas, in contrast thereto, artists' tubes are filled with "pile" colors which stack or pile in relief on canvas in the finer arts. But "pile" color as such is not suitable for mixing colored paints for house painting and the like in accordance with my invention because it does not possess sufficient dispersibility; it is compounded for painting on canvas. On the other hand, I fill collapsible tubes with concentrated color for maximum dispersibility and affinity with basic paints.

Therefore, as far as I can determine, in the packing of my color tubes, I modify the practice over that used for the artists' trade, in that I not only am able to omit the screw cap as such from the tubes (as in Figs. 1 thru 12, also Figs. 15 and 16) but also fill them with dispersible concentrated colors C which are entirely different in chemical characteristics and utility from that used by artists.

It is also well to explain that, in conventional practice, dispersible color concentrate is sold in cans to house painters. But such "canned" colors are not originally produced by chemical formula precisely suited to blending with a particular chemically formed basic paint—thus the trade does not have available paint ingredients chemically compounded under advance or foreknowledge that they are to be blended. Now, by "tubing" the dispersible color concentrate heretofore "canned," the perfected technique and skill of the paint manufacturer and chemist are made available to the trade because these new "tubed" colors find new utility with my basic paint container which is not possible to attain with colors in jars, cans, etc.

In addition to the foregoing, the old practice of supplying "canned" dispersible color concentrate to house painters aids and abets the fault of "open mixing" because house painters ordinarily open a can of color and thereafter it remains exposed to the air, subject to oxidation which dries the color due to loss of its volatile agents, and this leads to "dry cake" and color waste. Such unavoidable difficulty is eliminated in the practice of this invention because my new color units disperse at one time their entire concentrate C which is immediately absorbed into the fresh basic paint B without exposure to the air.

The apparatus comprises a portable paint mixer

In considering the foregoing description of the paint container apparatus filled or charged with paint of the kind just described, it will be noted that the containers used in this art are portable, particularly the popular or smaller sizes thereof. Likewise, my new basic paint and color containers are portable separately, as well as when connected in operative relation. The popular sizes of my basic paint containers, and the color containers in

general, are readily stored and handled on store shelving and counters.

The portability of my basic paint buckets (noting the handle thereof shown in Fig. 1) is actually in striking contrast to conventional practice in the paint trade, and this is due to the fact that house painters in general now mix their paints in open containers, as for example in stationary five-gallon sizes usually left on the floor or in the paint shop. The aerated "open mixed" paint is poured therefrom into the old style portable pail or bucket and the latter is carried to the paint job.

Now it will be seen that my portable mixing containers (Figs. 1, 12, 14 and 16) hold their colored paints CB as originally mixed therein and are carried directly to the paint job, and that they are not supplied from the "open mixing" containers which, if of large size, are usually stationary and left on the floor because unsuited to be carried to the work or used on a painter's ladder or scaffold.

For the above reasons I believe that the portable feature of my mixing containers is new in the paint art, noting here that they serve the double purpose of constituting a mixing apparatus as well as the carrier of the paint, and that this two-purpose function or result is quite unknown in the paint art.

The empty space, that is, the color-receiving space CS, and the line NL up to which my basic paint B is filled to provide said space CS, have been explained previously in connection with Fig. 12; and it will be understood how these features are applicable to all forms of construction shown. An understanding of these principles makes it clear that the empty space CS is more than sufficient to receive the color so that after it is injected there still remains sufficient space to permit my basic paint cans to function as paint mixers when they are agitated.

The advantages achieved in using my new mixing containers have been pointed out. Such advantages result directly from the prescribed packaging or filling of the paint ingredients as explained in the foregoing topic. Accordingly, it will be seen that one of the important phases of the invention relates to the apparatus properly space-filled with fresh paint in order that it may function as a mixer as well as a carrier of paint.

General explanation of the practice of the invention and advantages

In practicing the invention with the container apparatus filled with fresh paint stock as explained, it will be understood that the paint dealer should be provided with a table or chart system to designate the particular color units he must choose from his supply (Figs. 3, 11, 13 and 15) in order to mix a colored paint preselected from said table or chart to suit the customer.

A simple form of chart may be lettered or numbered, and likewise the various sizes and values of the color tubes and the number thereof (one or more) may be lettered or numbered with suitable legends for relating and conforming them to a unit of basic paint to be colored to suit. Such color chart or selector may indeed call for two or three or even a greater number of color tubes to convert a given size can of fresh basic paint B to a particular shade—for it is understood that a color can be deepened or intensified by simply adding a second, a third, and so on, tube of color C to produce additional or stronger color hues. Thus in a simple way, a great many more color

hues are rendered available to the trade, by this invention, than is possible with ready-mixed paint under conventional practice.

The chart instructs the dealer and the customer as to the size of color tube and/or the number thereof to select from the color supply for use with a given size of fresh basic paint in my new can to produce a colored paint to suit. As a diagrammatic indication of a color supply, reference is made to sheet 3 of the drawings showing tubes having primary colors such as red, orange, yellow, green, blue, indigo, violet and black. The chosen tube or tubes of color C may be injected into the basic paint B at the time of sale, or by the customer when he is actually ready to use the paint. In any event, the color units are used only once and discarded.

As will be understood by those skilled in the paint art, the combining at one time of the entire contents of each container is in striking contrast to old practice. It is possible to always duplicate a previous color with exactness, and also enables the paint manufacturer to perfect the chemistry of the ingredients for future blending because he possesses foreknowledge of the blend. And with that factor a known one the manufacturer can compound basic paint B and its color C with greater staying and surface covering characteristics to endure against peeling and cracking, especially against color fading, and other defects. It is believed to be in the interest of public safety and health to standardize and render capable the exact duplication of colors from time to time.

Inasmuch as the two separate paint ingredients B and C in both paint containers are specially preformulated chemically for subsequent affinity with each other, as will be seen by those skilled in the paint art, the complete mixing of paint is now more easily carried out than forced remixing of aged ready-mixed paint under old practice. After the color tube emptying operation is completed and the sealing plug 33 or 39 is replaced in the basic paint can, you merely shake up the can which disperses and impels the mix CB throughout the color-receiving space CS. The texture of the basic paint readily absorbs the color C because both ingredients are fresh stock. The affinity of fresh paint B with the color C is so pronounced that color dispersion, penetration and absorption are rapid. Thus the blending of the two paint ingredients readily occurs with minimum shaking and stirring, in contrast to the difficult coloring of aged paint.

Colored paint CB thus readily mixed is perfected in its chemical structure because the stock B is not previously aerated or oxidized; and the paint is tamper proof in that the new mix CB does not invite the addition of thinners and other reconditioning ingredients. Significantly, a paint having its originally good factory quality is easier to spread and apply to a surface since it possesses an easier "slip" under the brush and is free of brush marks.

This new pre-knowledge for the manufacture of paint ingredients differs materially from conventional practice where a bucket of paint and a quantity of color (whether "tubed" colors or "canned" colors) are purchased in a paint store, and likely as not they are chemically unsuited to each other, and do not attain chemical affinity when combined, because not chemically preformulated for each other. Pre-knowledge control of subsequent blending, and the omitting of chemical color concentrates at the time of manu-

facture, also results in producing paint which has a minimum of gas formation. Therefore, less trouble develops in can leakage due under old practice to the internal gas pressure and sometimes the bursting of a paint can.

The invention eliminates the old practice of "mixing and trying" which involves "guesswork" by house painters and the like in matching and rematching colors. The eye only approximates color comparison, and the ability to match colors varies with painters. Such inexact practice has always been followed when a portion only of the color from a tube or a can is introduced into an open paint can when coloring a small quantity, or a portion only from an open color can is introduced into an open paint can when coloring a large quantity of paint. The old practice of mixing and trying leads to the use of volatile thinners and tends to wash the vehicle away from the pigment, while at the same time stirring air into the batch which promotes deterioration by oxidation and vaporization.

Thus the old method of "mixing and trying" by the "open mixing" practice requires stirring in and the further use of thinners, driers, oils, varnishes, or other ingredients of fancy to a particular painter, day after day on the job. The result is that the original chemical balance and quality structure of the paint, engineered into it at the factory, is entirely lost due to atmospheric exposure and the additions of ingredients by workmen on the job who may have only meager knowledge concerning the chemistry of paint. Such practice causes deterioration in quality and also waste of paint. It is a familiar sight to see "dry cake" and "paint mess" accumulated on the inside and outside of a can in multiple layers, one layer added to dry on top of a previously dried layer each time the paint is stirred in the presence of air. And in time a painter's mixing drum or bucket is thickly "dry caked" with paint layers encrusted on its sides and entirely wasted.

Of course, the basic paint B will age even though the color C is not blended therewith, but not so rapidly since fewer chemical ingredients are present in the basic paint to react chemically. And ageing of the color C in tubes is nil or at a minimum, and does not appear as a problem; indeed the dealer's color turnover is as rapid as that of the basic paint. But this "ageing" is now beside the point because the dealer, in practicing the invention, stocks a quick turnover supply of basic paint; he does not carry ready-mixed colored paint, in consequence of which he is not burdened with a percentage of slow-sale and no-sale paint. He sells his several types of basic paint and continuously reorders a fresh stock from the factory. And the factory reaps the benefit of getting its product into use before it ages.

Color styling now coming into practice (the making of optical illusion effects to suggest new proportions in size and shape of painted surfaces) is also simplified by this invention by reason of the means provided herein for attaining exactness in color design without "guess work." In this way, a painter on the job may execute the color-design lay-out previously prepared by an artist or decorator.

Of major importance, also, is the fact that this invention provides a new basis for laboratory work. The paint chemist is now free to work with an entirely new time period without being faced with the problem of ageing in the can, as under old practice. The result is that the technician is free of the task of seeking better ways

and means to inhibit ageing in the can, and now may redirect his research to the problem of compounding paint ingredients solely for their capacity to decorate and preserve painted surfaces.

Paint fresh from the factory is free of chemical reaction, settling-out of its pigment, and color separation. There is a minimum of neutralization and absorption of driers, no sagging, saponification, or agglomeration. These faults in aged or stale paint are eliminated by this invention with its cure for chemical ageing. The dealers inventory and stock problems are simplified, great masses of containers and paint materials are saved, and the paint manufacturer is not exposed to blame for defective painting jobs.

I have worked with a variety of methods and devices to shorten the period of ageing in the can, as well as factors collateral thereto, without any worthwhile benefits until now. The result is that my new paint container means and mixing method are believed to be a solution to the problem and of outstanding benefit to the paint industry.

This invention is presented to fill the need for a useful paint container means and mixing preselected colored paints. Various modifications in construction, mode of operation, use and method, may and often do occur to others skilled in the art, especially so after acquaintance with an invention. Accordingly, this disclosure is exemplary of the principles and equivalents without being limited to the present showing of the invention.

What is claimed is:

1. A sealed paint container having a cover and being adapted to hold basic paint ready to be colored to suit without removing the cover from said container, an internally screw-threaded opening provided in the sealed paint container, and a blade in the opening adapted to rupture a sealed container of coloring matter when said latter container is mounted in the opening.

2. A sealed paint container having a cover and being adapted to hold basic paint ready to be colored to suit without removing the cover from said container, a tubular member on said cover communicating with the interior of the sealed paint container, and a diametrically disposed upwardly pointed piercing blade in the tubular member.

3. A sealed paint container having a cover and being adapted to hold basic paint ready to be colored to suit without removing the cover from said container, an opening formed in the cover of the sealed paint container, an internally screw-threaded tubular member fixed within the opening, said tubular member being formed with a pair of longitudinal and diametrically disposed slots, and a flat piercing element having portions fixed within said slots, the piercing element including an inverted V-shaped upwardly pointed portion.

4. In combination, a sealed paint container having a cover and being adapted to hold basic paint ready to be colored to suit without removing the cover from said container, an opening formed in the cover of the sealed paint container, an internally screw-threaded tubular member fixed within the opening, said tubular member being formed with a pair of longitudinal and diametrically disposed slots, a flat piercing element having portions fixed within said slots, the piercing element having an inverted V-shaped upwardly pointed portion; and a collapsible tube of coloring matter having an externally screw-threaded neck adapted to be screwed into said tubular member, a seal provided at the outer end of the neck adapted to be opened by the flat piercing ele-

ment when said neck is screwed into the tubular member, whereby the coloring matter can be introduced into the basic paint and agitated to produce a preselected color without exposing either the basic paint or said coloring matter to atmosphere.

5. A sealed paint container having a cover and being adapted to hold basic paint ready to be colored to suit without removing the cover from said container, an internally screw-threaded opening provided in the sealed paint container, a blade in the opening adapted to rupture a sealed container of coloring matter when said latter container is mounted in the opening, and a closure means removably mounted in the opening for sealing said opening against the access of air to the sealed paint container.

6. A sealed paint container having a cover and being adapted to hold basic paint ready to be colored to suit without removing the cover from said container, a tubular member on said cover communicating with the interior of the sealed paint container, a diametrically disposed upwardly pointed piercing blade in the tubular member, and a removable closure means carried by the tubular member for enclosing the piercing blade as well as maintaining said tubular member sealed against the access of air.

7. A sealed paint container having a cover and being adapted to hold basic paint ready to be colored to suit without removing the cover from said container, an opening formed in the cover of the sealed paint container, a screw-threaded tubular member fixed within the opening, said tubular member being formed with slot means, and a flat piercing element having portions fixed within the slot means, the piercing element including an inverted V-shaped upwardly pointed portion, and a removable closure means carried at the outer end of the tubular member for covering the piercing element and sealing the paint container against the access of air.

8. In combination, a sealed paint container having a cover and being adapted to hold basic paint ready to be colored to suit without removing the cover from said container, a tubular passage extending through the cover and into the sealed paint container, a flat piercing element fixed within that end of the tubular passage which is inside the sealed paint container, a pointed portion formed on the flat piercing element extending outwardly in the tubular passage and stopping short of the outer end of said passage, a closure means removably sealing the tubular passage against the admission of air into the sealed paint container; and a collapsible tube adapted to hold coloring matter, an end portion formed on the collapsible tube adapted to be attached to the outer end of the tubular passage, a seal formed at the end portion of the collapsible tube and adapted to be ruptured by the pointed piercing element when being attached to the tubular passage, whereby the coloring matter can be introduced into the basic paint and the sealed paint container agitated to produce a preselected color without exposing said basic paint or coloring matter to atmosphere and without creating paint mess on and about said sealed paint container.

9. A paint package comprising a container holding a measured amount of fresh basic paint leaving a color-receiving space therein above said basic paint, an injector nipple provided in the basic paint container, a color container holding a dispersible color concentrate, attaching means

provided on the color container and connecting it with the injector nipple for supporting said color container on the basic paint container in open communication therewith, whereby all the color concentrate is adapted to pass from the color container at one setting into the color-receiving space of the basic paint container to form a mix of fresh basic paint and color concentrate, and the basic paint container shaken to impel the mix into the color-receiving space for dispersing the color concentrate through the basic paint, thus producing colored fresh paint.

10. A portable basic paint container holding a measured amount of fresh basic paint adapted to receive and absorb color without the access of air, and leaving an empty space therein above said basic paint more than sufficient to receive said color, an injector nipple provided in the basic paint container, a portable color container holding dispersible color concentrate, attaching means provided on the color container connecting it with the injector nipple for supporting it uprightly on the basic paint container in a position adjacent the empty space therein; whereby all the color concentrate passes from the color container at one setting into the empty space to form a mix of fresh basic paint and dispersible color concentrate, and the basic paint container being shaken while sealed from the access of air to impel the mix into the empty space for dispersing the color concentrate through the fresh basic paint, thus producing colored fresh paint without creating paint mess or waste or incorporating air.

11. A sealed basic paint container having a cover and holding basic paint ready to be colored to suit without removing said cover, the basic paint container having an opening forming a color-flow passage therinto, a color container holding color concentrate, and engaging means provided at the opening and on the color container connecting said two containers in sealed flow communication, whereby the color concentrate passes through the opening and is absorbed into the basic paint.

12. A sealed basic paint container having a cover and holding basic paint ready to be colored to suit without removing said cover, the basic paint container having a screw-threaded opening forming a color-flow passage therinto, a collapsible tube holding color concentrate, screw threads provided on the end of the collapsible tube connecting said tube in sealed flow communication with the basic paint container, whereby the color concentrate passes through the color-flow passage and is absorbed into the basic paint.

13. A sealed basic paint container having a cover and holding basic paint ready to be colored to suit without removing said cover, the basic paint container having an opening forming a color-flow passage therinto, a collapsible tube holding color concentrate, a discharge passage provided in the tube, a pressure-removable sealing plug held within the discharge passage to retain the color concentrate in the tube, and engaging means provided at the opening and on the collapsible tube connecting it in sealed flow communication with the basic paint container, whereby collapsing pressure applied to the tube forces the sealing plug from the passage and the color concentrate passes through the opening and is absorbed into the basic paint.

14. A paint ingredient package, for making colored paint from fresh ingredients, comprising a container partially filled with basic paint, thus providing a color-receiving space above the level of said basic paint, another container in the form of a collapsible tube entirely filled with a preselected dispersible color, each container having its paint ingredients chemically preformulated for blending affinity with the other, a passage provided in the container of basic paint and also in the collapsible tube of color adapted to cooperate with each other, and supporting means mounting the preselected tube of color upon the container of basic paint with both passages connected in open communication with each other but closed against exposure of their ingredients to atmosphere, by which the color is introduced into the color-receiving space upon collapsing the tube, and the ingredients agitated in the color-receiving space, the basic paint in the amount required being thusly colored as preselected at about the time of its use, and the colored paint remaining sealed until such use.

15. In a method of coloring paint to a preselected shade, the steps of sealing basic paint and sealing liquid or semi-liquid dispersible colors in separate containers, choosing one or more containers of sealed color, and then mixing said chosen sealed color or colors with the basic paint in the sealed container of the latter; the improvement in said method which consists of injecting said color in a stream from the chosen color container directly into the container of basic paint through a confined passageway connecting the two containers, thereby maintaining both the basic paint and the color closed against the access of atmosphere, when combining them, followed by agitating the combined mix for dispersing the color therethrough while still maintaining said combined mix closed against the access of atmosphere; thus mixing a paint of said preselected color, without creating paint mess, or causing waste, likewise without subjecting the paint to the atmosphere, and also inhibiting oxidation thereof.

16. The paint coloring method of claim 15, further characterized by injecting at one time the entire color of said chosen color container into the basic paint in the sealed container of the latter.

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