

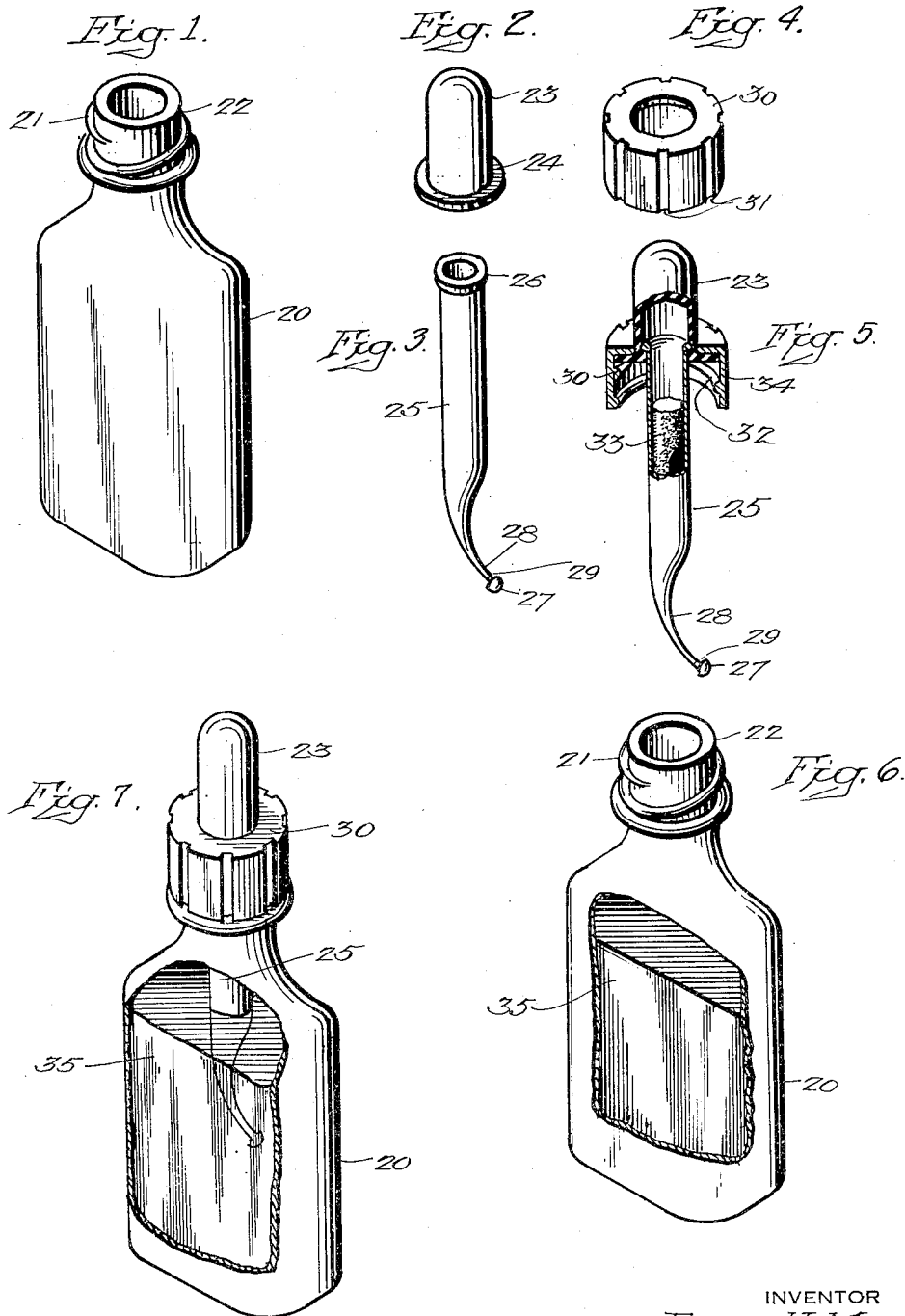
Aug. 29, 1950

L. H. MYERS
PHARMACEUTICAL ARTICLE

2,520,852

Filed Oct. 13, 1947

2 Sheets-Sheet 1



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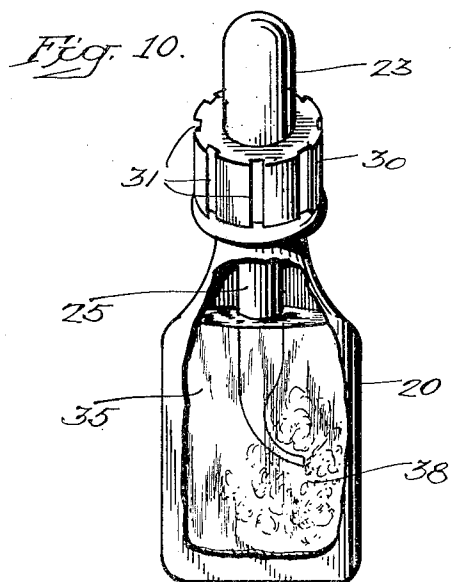
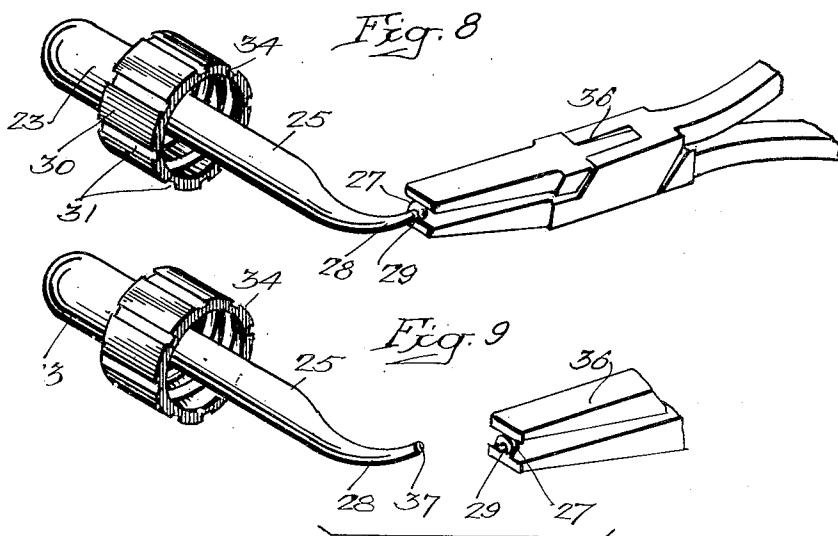
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2 Sheets-Sheet 2



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PHARMACEUTICAL ARTICLE

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My invention relates to pharmaceutical articles. A purpose of my invention is to deal efficiently with storage problems in connection with relatively perishable pharmaceutical preparations.

A further purpose is to deal with such problems by providing a relatively non-perishable pharmaceutical article readily convertible into an article which is ready for use and which includes a relatively perishable pharmaceutical preparation.

A further purpose is to deal with such problems, where the relatively perishable preparation has solid and liquid ingredients less perishable than itself, by storing the ingredients in container elements which eventually together with the pharmaceutical preparation will make up the pharmaceutical article as marketed.

A further purpose is, where a relatively perishable pharmaceutical preparation is made up of perishable solid and liquid ingredients, to store the liquid ingredient in a bottle and the solid ingredient in a pipette having a closed but openable dropper end and forming a part of a dropper cap for the bottle.

A further purpose is to reduce the danger of contamination in pharmaceutical products which are to be mixed after leaving the place of manufacture.

A further purpose is to eliminate any loss of pharmaceutical materials incident to mixing, and especially incident to pouring in connection with mixing, after the pharmaceutical materials have been manufactured.

Further purposes will appear in the specification and in the claims.

My invention is illustrated in the drawings by embodiments chosen from the standpoints of convenience in illustration, satisfactory operation, and clear demonstration of the principles involved.

Figures 1, 2, 3 and 4 are perspective views showing some of the components that may be included in a pharmaceutical article according to my invention. Figure 1 shows a bottle; Figure 2 shows a dropper bulb; Figure 3 shows a dropper pipette with a closed dropper end; and Figure 4 shows a dropper cap head.

Figure 5 is a perspective view, partially broken away, showing bulb, pipette and head assembled together, along with solid pharmaceutical material in the pipette.

Figure 6 shows a perspective view, partially broken away, of the bottle together with liquid substance which has been put inside it.

Figure 7 is a perspective, partially broken away,

showing an entire article after it has been assembled by putting together the parts shown in Figures 5 and 6.

Figure 8 is a perspective view showing a dropper cap with its closed end about to be removed.

Figure 9 is a perspective view showing a dropper cap just after its dropper end has been removed.

Figure 10 is a perspective view partially broken away of a pharmaceutical article of my invention after the dropper cap has been removed and the solid substance has been permitted to mix into the liquid substance.

Many pharmaceutical preparations made up by mixing a solid with a liquid substance (such as distilled water) are used in the resulting liquid form but deteriorate rapidly in that form, whereas both the solid and liquid ingredients keep reasonably well separately. For example, penicillin rapidly loses its effectiveness in solution, but in the dry state retains its value for many months. Many silver salts used in treatment of the mucous membrane, such as silver nucleinate or silver vitellin (Argyrol) are stable in the dry state but solutions of them rapidly deteriorate and become irritating to the membrane. Many iodides, including sodium iodide and potassium iodide, are stable when dry, but in solution oxidize, liberating free iodine. Physostigmine salicylate and other salts of physostigmine when dry are quite stable, but when dissolved in aqueous liquids rapidly become discolored and harmful. Bismuth subnitrate, when suspended in water, is unstable and throws down a precipitate.

Since the druggist cannot predict exactly when such a drug will be needed for use, as a practical matter he cannot buy such preparations already mixed for the customer's use. A great deal of inconvenience in connection with the storage and mixing of the ingredients has resulted thereby.

The pharmaceutical article which I have invented meets this storage problem in a highly convenient and efficient way.

This article is made up of a dropper bottle the lower end of whose dropper is closed off, together with solid pharmaceutical substance resting in the dropper and liquid substance resting in the bottle.

This article can thus be sold to the druggist by the manufacturer as a single unit, and stored just as sold. Thus when it is desired to sell it for use by the public, the lower end of the dropper is simply opened up, and the solid and liquid are permitted to intermingle, the dropper bulb

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being squeezed, and the bottle being shaken if and as necessary.

Considering the matter more specifically, Figures 1 to 7 show the article in a preferred form. A number of the components of the article are first shown separately.

Bottle 20 (Figure 1) is a typical medicine bottle with external threads 21 on neck 22.

Dropper bulb 23 (Figure 2), of some suitable resilient material such as rubber or synthetic rubber, has an outwardly extending flange 24 around its lower end.

Pipette 25 (Figure 3) has a flanged rim 26 around its upper opening. The lower end of the pipette is sealed off by an integral button 27, and the neck 28 of the pipette just above the button is weakened sufficiently by a slight circumferential groove 29 to ensure a clean break when it is desired to remove the button. The pipette should be of a substantially impervious material such as glass.

Cap head 30 (Figure 4) is the kind ordinarily used in dropper bottles, with external longitudinal grooves 31, and internal threads 32 (see Figure 5).

In Figure 5, there is a solid granular pharmaceutical substance 33 inside the pipette 25 in dropper cap assembly 34, which includes bulb 23 and cap head 30 in addition to the pipette.

Figure 6 shows bottle 20, together with liquid substance 35 inside it.

Figure 7 shows the entire article as stored, including the dropper cap assembly, the solid substance, the liquid substance and the bottle, the dropper cap assembly having been screwed on the bottle. As can be seen, the solid and liquid are effectively kept out of contact with each other by the impervious pipette wall and button.

Figures 8 to 10 show the article being converted into an ordinary dropper bottle with a usable pharmaceutical mixture inside.

In Figure 8, dropper cap assembly 34 together with the solid pharmaceutical substance therein has been removed from the bottle and the button 27 is being gripped by pliers 36.

In Figure 9, the button has been removed by these pliers, leaving small discharge end 37 of the pipette open.

Figure 10 shows the article after the cap has been replaced and the bulb squeezed to cause the granular solid to pass through the opening at the small end of the pipette, forming particle cloud 38 through the liquid. After sufficient time and, if need be, agitation, the particle cloud will either all be dissolved in the liquid, or, where the particular solid is not sufficiently soluble in the particular liquid for that, whatever is left will be suspended more uniformly through it and the preparation will be ready for actual use.

In the above process of mixing solid and liquid, care must be exercised that enough is done so that no undue concentration of solid remains in the dropper afterward. For this purpose, the dropper should be inspected to see that all that was originally solid has gone into solution or suspension; and when the dropper has been replaced on the bottle after the inspection, the bulb should best be squeezed several times and after each time allowed to suck in fluid from the general interior of the bottle in order to end any temporary high concentration of suspended or dissolved matter in the dropper.

If the solid is intended eventually to be at least partly in suspension rather than entirely in solution in the liquid, it will of course be understood that the solid at the time of mixture must be in

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particles small enough to pass readily through the small discharge end of the pipette.

It will be understood that the pharmaceutical article of this invention, while it may include as solid and liquid substance any of those involved in the case of the drugs specifically mentioned earlier, is not limited to them, but could include any solid and liquid substance which together would make up a liquid pharmaceutical preparation more perishable than either the solid or the liquid alone. Thus, distilled water is a very common liquid that might be involved, but, for example, in a proper case the liquid might be a physiological salt solution, or glycerine or alcohol. Nor would it be limited to a mere carrier solution; for example, the liquid in the pharmaceutical article as sold to the druggist might itself be pharmaceutically active, or might already contain some pharmaceutically active ingredient which did not deteriorate unduly in the presence of that liquid, and which was desired in the preparation ultimately used to have mixed with a solid substance which did so deteriorate. Thus, one possible liquid would be boric acid solution, which itself has mildly antiseptic properties.

The specific substance and quantities to be used will, of course, follow whatever is desired from the standpoint of therapeutic need and pharmaceutical practice. Thus, a very common use of my invention would be to have physiological (4 grains per ounce) salt solution in the bottle, and to have penicillin in the pipette in a proportion of about 100,000 units to every cubic centimeter of solution.

It will be understood that the invention is not limited to the particular form which has an integral glass button on the end of the pipette. It is sufficient that the end of the pipette be closed off effectively to prevent substantial intermixture between the two substances.

It will readily be seen that the pharmaceutical article which I have invented will greatly reduce the inconvenience normally experienced in connection with storage and mixing of drugs which deteriorate too quickly when made up in a liquid mixture for use. The pharmacist need merely buy such a pharmaceutical article and store it. Then whenever a customer wants a dropper bottle with the made-up preparation in it, to convert the pharmaceutical article into what is desired is quite simple. Besides reducing the trouble to the pharmacist normally incident to measuring and mixing, it largely eliminates losses through spilling in that process, and greatly reduces the danger of contamination with bacteria and other chemicals in mixing.

In view of my invention and disclosure variations and modifications to meet individual whim or particular need will doubtless become evident to others skilled in the art, to obtain all or part of the benefits of my invention without copying the structure shown, and I, therefore, claim all such insofar as they fall within the reasonable spirit and scope of my claims.

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

1. In a pharmaceutical article, a bottle, a dropper cap on the bottle having a pipette the dropper end of which is closed but alterable to form a normal dropper opening, and in the pipette a solid pharmaceutical substance which is adapted to constitute a solid ingredient of a usable liquid pharmaceutical preparation more perishable than the substance.

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2. A pharmaceutical article comprising a bottle, water in the bottle, a dropper cap on the bottle having a pipette the dropper end of which is closed but alterable to form a normal dropper opening, and in the pipette in solid form a drug which is used as part of an aqueous preparation but keeps better in solid form.

3. An article for pharmacists comprising a bottle, a dropper cap on the bottle having a pipette the dropper end of which is constructed to prevent intercommunication between pipette and bottle until altered, in measured quantity in the pipette a solid pharmaceutical substance to the deterioration of which the presence of carrier fluid would contribute, and in the bottle a predetermined quantity of carrier fluid for the substance.

4. In a pharmaceutical article, a bottle, a dropper cap for the bottle having a pipette the dropper end of which is closed but openable to perform its function in passing drops, in measured quantity in the pipette a solid pharmaceutical agent which deteriorates less rapidly in solid form than when in a liquid carrier, and in the bottle in predetermined proportional quantity a liquid pharmaceutical carrier for that agent.

5. In a pharmaceutical article, a bottle, a dropper cap for the bottle having a pipette the dropper end of which is closed but alterable to meter drops of liquid, in measured quantity in solid form in the pipette a pharmaceutical agent which is soluble for pharmaceutical purposes but

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which keeps better in solid form, in predetermined proportional quantity in the bottle a liquid suitable to dissolve the agent to form a desired usable pharmaceutical preparation.

6. A pharmaceutical article comprising a bottle, distilled water in the bottle, a dropper cap on the bottle having a pipette the dropper end of which is closed but alterable to form a normal dropper opening and, in the pipette, penicillin in solid form.

7. A pharmaceutical article comprising a bottle, distilled water in the bottle, a dropper cap on the bottle having a pipette the dropper end of which is closed but alterable to form a normal dropper opening and, in the pipette, silver vitellin in solid form.

8. A pharmaceutical article comprising a bottle, distilled water in the bottle, a dropper cap on the bottle having a pipette the dropper end of which is closed but alterable to form a normal dropper opening and, in the pipette in solid form, an iodide which is unstable when in the presence of water.

LOUIS H. MYERS.

REFERENCES CITED

The following references are of record in the file of this patent:

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280,838	Great Britain	Nov. 22, 1927