March 2, 1943. F. J. BICKENHEUSER 2,312,381

MEDICINAL TABLET

Filed Oct. 24, 1940

Fig. 1.

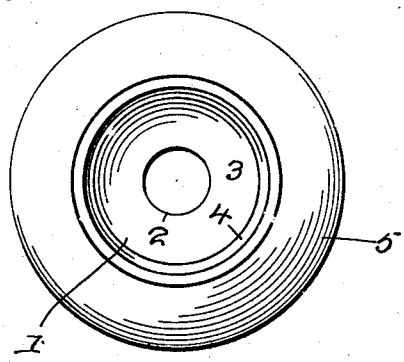


Fig. 2.

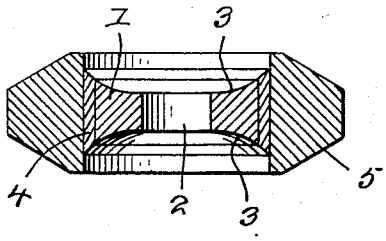


Fig. 3.

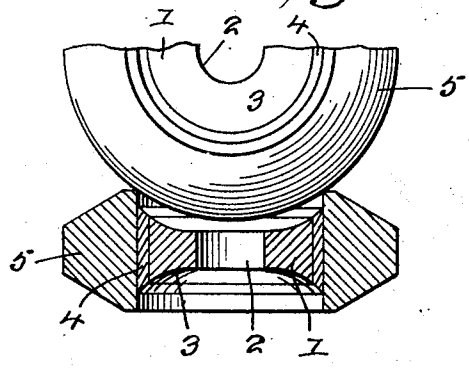


Fig. 4.

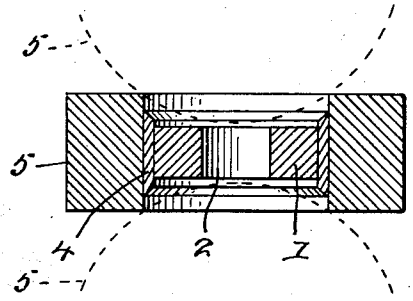
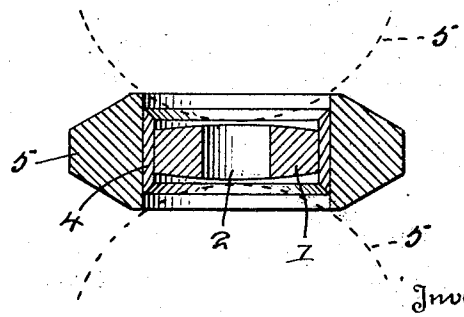


Fig. 5.



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2,312,381

MEDICINAL TABLET

Frank J. Bickenheuser, Tulsa, Okla.

Application October 24, 1940, Serial No. 362,693

1 Claim. (Cl. 167—57)

This invention relates to tablets designed primarily for use in administering such medicines as are to be dissolved by chemical action of a substance that it itself soluble in the liquid in which the said medicine is to be dissolved. An object of the invention is to provide a tablet which can be made up of chemicals and medicines which, ordinarily if in contact with each other, would react chemically one upon the other so as to be rendered inefficient or of reduced efficiency, means being employed whereby these medicines or chemicals are prevented from acting upon each other until just before they are to be consumed.

It is a further object of the invention to provide a tablet which is not held within a protective casing or film but, on the contrary, is (at the time of use) exposed to direct contact with liquid (e. g. water) into which it may be placed in its original undissolved state, whereby prompt solution is effected and the medicine thereby rendered readily effective when taken, without an intermediate period during which a protective coating must be dissolved, as is the case when taking a medicine inclosed in a capsule.

A further object is to provide a product in which two preparations such as aspirin and an effervescent mixture or material, are combined in a single tablet. It is well known to the medical profession and the laity in general that when aspirin is administered with a dilute solution of sodium bicarbonate, the aspirin is readily soluble in such solution and hence is more effective than when taken alone. For ordinary purposes, the useful results would not be obtained mereby by combining these two ingredients into one tablet, for the reason that in the presence of stronger solutions of alkali, the aspirin (acetyl salicylic acid) is to a considerable extent, hydrolyzed, leaving sodium salicylate and sodium acetate. The present invention has for an object the formation of a tablet made up essentially of aspirin and an effervescent material preferably giving by reaction a soluble sodium salt. The components of the effervescent mixture will not react one upon the other, in the dry state, but these rapidly react with each other when the tablet is dropped into water, with the evolution of gas bubbles.

It is a further object to provide a tablet so shaped that, when the tablets are placed one upon the other, the aspirin portion of each tablet is at all times protected from direct contact with any portion of the effervescent mixture forming another portion of the tablet.

It is another object to so shape the tablet as to insure flow of a portion of the liberated gas against the inner portion of the tablet (the active medicinal material) regardless of the position of the tablet when submerged, thereby insuring sufficient agitation of the tablet to effect a perfect suspension and solution, of the aspirin and at the same time to dissolve a protective medium which constitutes a part of the tablet and which is interposed between the aspirin and the effervescent composition contained in the tablet.

With the foregoing objects in view and others which will appear as the description proceeds, the invention consist of certain novel details of construction and combinations of parts hereinafter more fully described and pointed out in the claim, it being understood that changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as claimed.

In the accompanying drawing several of the preferred forms of the invention have been shown.

In said drawing

Figure 1 is an enlarged plan view of a tablet constructed in accordance with one embodiment of the present invention.

Figure 2 is a central transverse section therethrough.

Figure 3 is a detail view illustrating portions of two tablets positioned edge to face and showing how the annular portion 5 is kept out of contact with the inner portion 1 if the tablets are packed in bulk.

Figure 4 shows a section of a modification in which the top and bottom of the annular casing of effervescent salt mixture, and the top and bottom of the aspirin tablet are both flat.

Figure 5 is a section of another form in which the top and bottom of the tablet of aspirin are outwardly curved, as in many of the aspirin tablets now on the market.

Referring to the figures by characters of reference, 1 designates the inner or central section of the tablet preferably formed with a central opening 2 and the opposed faces of this central portion may be concave as indicated at 3. A protecting material or shielding layer 4 preferably soluble in water is applied to the periphery of the central portion 1 and constitutes the base on which is applied the outer or peripheral portion 5 of the tablet, this latter portion being formed preferably of an effervescent mixture tightly compressed and preferably tapered outwardly toward its periphery.

Although the alkali in the effervescent material would, (in the absence of the ring of inert soluble material 4) normally attack the aspirin chemically and reduce its efficiency, such objectionable result is prevented in the present instance because of the interposed annular shield 4 which can be of a material readily soluble in water, as for example, glucose. The outer annular portion 5 is preferably of much greater thickness than the inner portion 1 so that it is thus possible to stack the tablets one upon the other and package them, or simply pour a selected number of the tablets into a carton, bottle or other bulk package, with

no danger of the alkali component of the compressed effervescent material contacting with any portion of the aspirin. Thus deterioration of the tablet while in storage is prevented.

In Figures 4 and 5 modifications are shown, the dotted circles in these figures being put on to show the outline of another tablet, when packed in bulk.

When it is desired to use the tablet, the same is dropped into a convenient quantity of water, say in a drinking glass, and the materials forming the annular portion 5 immediately begin to react and to effervesce. If the tablet is in a substantially horizontal position, a substantial percentage of the generated gas will escape upwardly through the opening 2. If the tablet is in an inclined or vertical position, portions of the gas generated will flow along one or both of the surfaces of the inner portion 1. Under any conditions the tablet is completely dissolved or put completely into solution, due to the agitation resulting from the release of the gases and due to the mildly alkaline nature of the solution of the material 5. Thus when the medicine is administered it will have maximum therapeutic value because of its use with the effervescent material.

It is designed to have the two portions 1 and 5 of each tablet so balanced or proportioned that all parts go into complete suspension or solution during the same time interval. Hence the more rapidly dissolving effervescent material 5 is of much greater bulk than the aspirin part 1.

Importance is attached to the fact that the tablet is not inclosed on encased as would be true should a capsule be employed for holding it. Instead the therapeutic elements are constantly exposed so as to be quickly and simultaneously dissolved in water or other selected liquid.

The layer 4 also will dissolve slowly, during the act of solution of the aspirin. This layer need not be of glucose, but can be of various compositions, water-soluble gums, sugars, inert salts with no bad taste, etc. being suitable. This could also be of a material that is inert to the materials 1 and 5, but which has a medicinal value.

I have showed the central hole in the tablet 1, in the drawing. The hole can be omitted if desired, in which event the gas liberated below the tablet will turn the tablet over frequently, keeping the mixture well agitated until dissolved.

While a combination of aspirin and effervescent material has been described, it is to be understood that other combinations of medicines might be used to equal advantage. In every case the finished tablet is in one piece so that there is no danger at any time of separation of the ingredients while being stored or handled prior to use.

By referring to Figure 3 it will be noted that even though the tablets should be packed in bulk with the edges of some tablets extending into the recesses in other tablets, the edge of the annular portions 5 will be maintained out of contact with the inner portions 1. Thus there is no contact of the (acid) aspirin, with the (alkaline) effervescent material, which would lead to some reaction (though slow) between these, even though dry (as during long storage of the tablets in bulk, see Fig. 3), which would cause deterioration.

As an example to which the invention is not restricted, the aspirin portion 1, may be 5 grains, and the amount of effervescent mixture may be 40–50 grains.

The effervescent mixture may be made up from 75 parts powdered citric acid, 130 parts of sodium bicarbonate and 55 parts of powdered tartaric acid. (If desired 54 parts of this sodium bicarbonate could be substituted by 24 parts of lithium carbonate, to give soluble lithia in the tablet).

Other suitable effervescent mixtures are 2 parts each of tartaric acid and sodium bicarbonate with 1 part of an inert material, or 4 parts sodium bicarbonate, 1 part tartaric acid and 2 parts citric acid, with 1–3 parts lactose. Such effervescent mixtures can preferably be very slightly moistened with strong alcohol, before being compressed into the annular shape shown.

These effervescent materials will, by themselves, give very mildly alkaline solutions which dissolve the aspirin, without injury thereto, as would be produced by a strongly alkaline solution.

It will be understood that the range of solid acid materials in such effervescent compositions is rather wide, numerous organic or inorganic acid salts (e. g. mucic acid, acid phosphates, sodium bisulphate, potassium bitartrate are a few examples), and these acids or acid salts may react with the carbonates or bicarbonates to give medicinally useful products, or not, as desired. Thus the potassium bitartrate acting on the soda gives Rochelle salt, useful as a laxative.

In another modification, which is cheaper to construct, the encircling ring of effervescent salt is not much thicker than the aspirin tablet. Such tablets could be dispensed in tubular bottles, only slightly larger in diameter than the tablet. Or they could be dispensed in oiled paper rolls, like a stack of coins in a tubular paper wrapper. The tablets shown in the drawing can be dispensed in a similar manner.

The invention is useful as furnishing aspirin or various other medicines which are insoluble or difficultly soluble in water or other selected liquid vehicle.

This application is in part a continuation of my copending application, Serial No. 269,202, filed April 21, 1939, which in turn is in part a continuation of an earlier application, Serial No. 182,905, filed December 31, 1937.

What is claimed is:

A medicinal tablet for being dissolved in a selected potable liquid, including a medicinal central thin portion composed of a medicament not readily soluble in said potable liquid, an effervescent annular portion, and a protective layer between said portions, which layer is soluble in said potable liquid, the thickness of the central portion being less than the thickness of a neighboring portion of the said annular portion, thereby to provide central recesses in the opposed faces of the tablet, and the curvature of the periphery of the annular portion and the thickness of the central portion being such as to prevent edgewise insertion of the periphery of one tablet into contact with any part of the exposed surface of said central portion of another of such tablets, the effervescent annular portion being composed of substances that will react in said potable liquid to give gas and a residue soluble in said potable liquid.

FRANK J. BICKENHEUSER.