Nov. 24, 1964 H. A. STIFFLER 3,158,359

DISPERSAL VANE

Filed Jan. 9, 1963 2 Sheets-Sheet 1

FIG.- 1

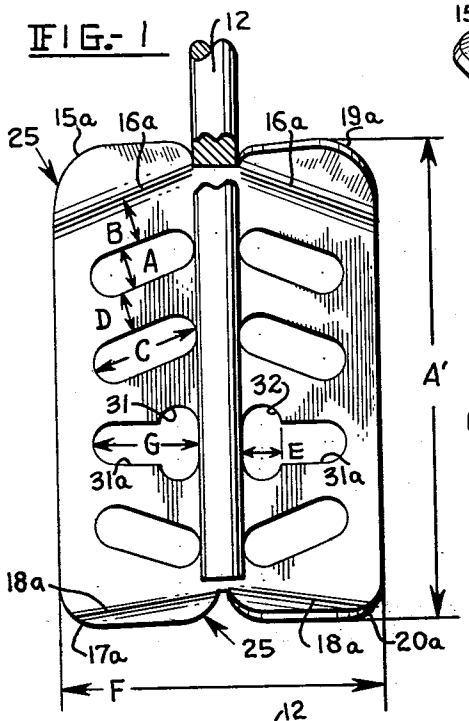


FIG.- 3

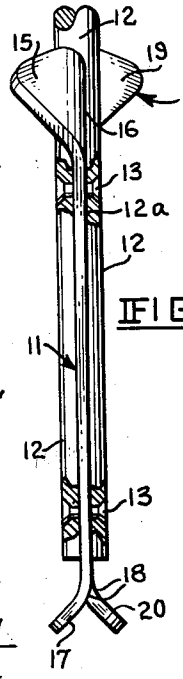


FIG.- 2

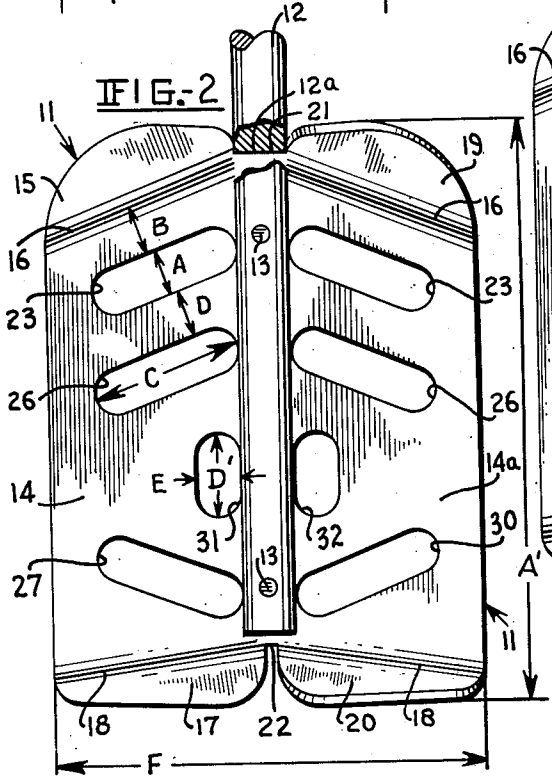
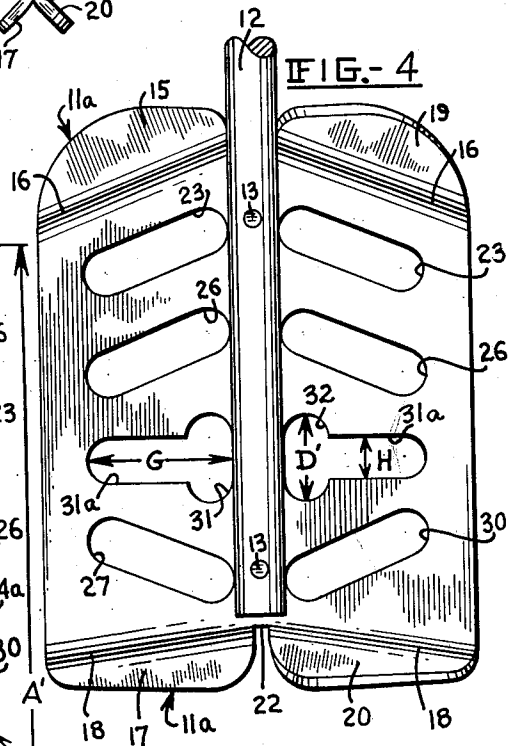


FIG.- 4



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Nov. 24, 1964 H. A. STIFFLER 3,158,359

DISPERSAL VANE

Filed Jan. 9, 1963 2 Sheets-Sheet 2

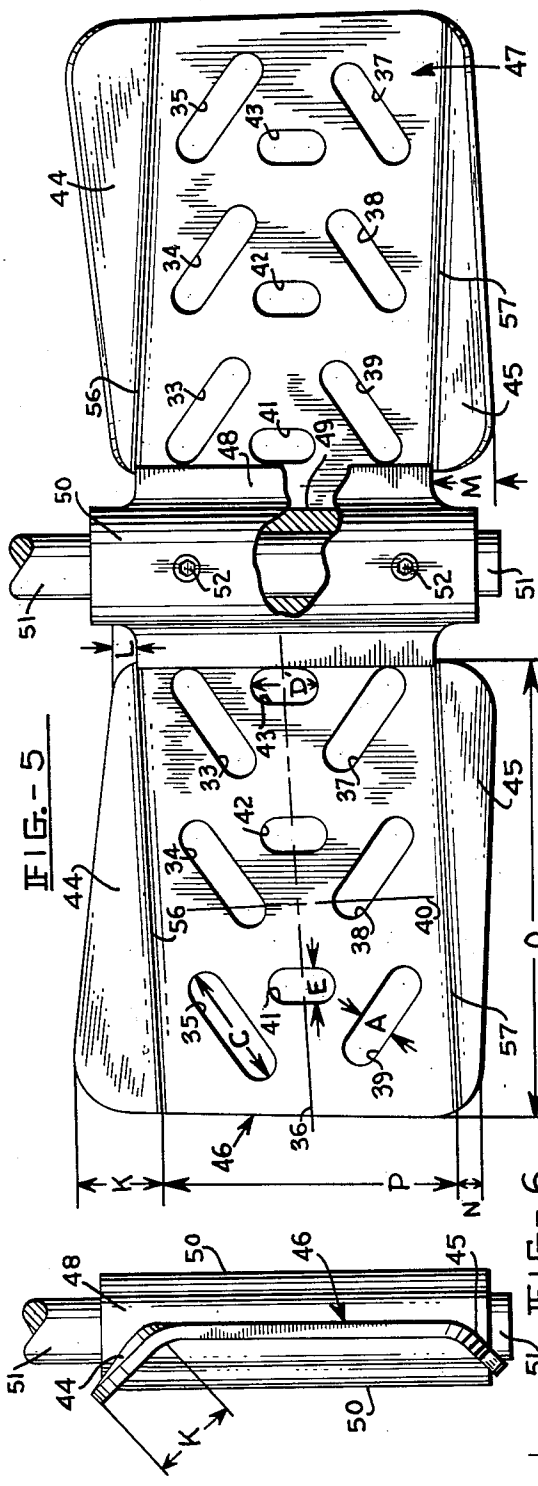


FIG.-5

FIG.-6

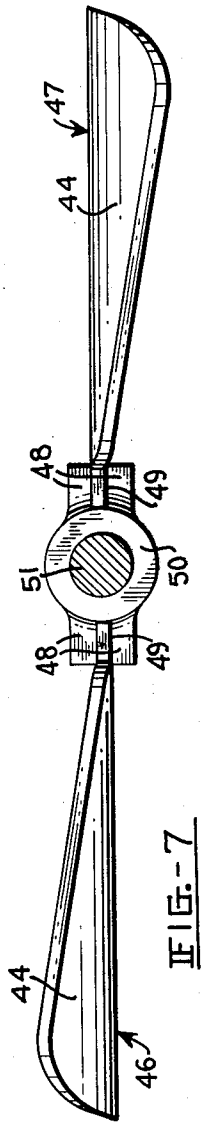


FIG.-7

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DISPERSAL VANE

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5 Claims. (Cl. 259—134)

This invention relates to a vane for intermixing liquids and viscous pastes such for example as activator catalysts and epoxy resins such as Thiokol; calking compounds; waterproofing materials; fluid colors in metallic inks and paints or semi-fluid colors therein; peanut butter; tomato paste; salad spreads; and in general the adding of liquids to the top of pastes and the like whereby the liquid is drawn downwardly into the paste while the paste itself is tended to be lifted upwardly from the bottom of a container in each instance.

A primary object of the invention is to avoid the intermixing of air into the paste-liquid mixture. A further primary object of the invention is to make the dispersal of the liquid in the paste in a minimum amount of time thereby saving quite a bit of expense particularly in the food and paint factories where pastes are being handled. An outstanding example of use of the device is found in the placing of bacterial and accompanying ingredients into complete suspension for forming Salk polio vaccines.

The material to be dispersed by the vane of the present invention is in all cases a liquid and is always added to a substantially filled container. The vane is designed for low speed operation in the viscous materials but doing so at the low speed to produce a full dispersal in periods of time which are much less than those normally experienced by using devices heretofore employed.

The device can be operated from the usual electric drill driving the vane at the drill speed, so that the vane may be employed in a variety of sizes of containers such as a one quart and a five quart container. The vane is also usable very efficiently in large tanks or vats where the vane may be of much larger size such as from twenty to twenty-four inches in transverse width operable in a thirty to thirty-six inch diameter tank. Savings of time have been found to be at least ninety percent which is very important in the industry such as in paint making where the dispersal of the ingredients has been relatively slow.

These and many other objects and advantages of the invention will become apparent to those versed in the art in the following description of vanes shown in the accompanying drawings, in which

FIG. 1 is a view in vertical elevation of a small size vane;

FIG. 2 is a view in side elevation of a larger size vane;

FIG. 3 is a view in vertical edge elevation and partial section of a vane as shown in FIG. 2;

FIG. 4 is a view in vertical elevation of a vane similar to that shown in FIG. 2 but slightly modified therefrom;

FIG. 5 is a view in vertical elevation of a wide sweep assembly of vanes embodying the invention;

FIG. 6 is a view in vertical edge elevation of the assembly shown in FIG. 5; and

FIG. 7 is a view in top plan.

Referring first to the vane as illustrated in FIG. 2, this vane generally designated by the numeral 11 consists essentially of a flat metallic plate mounted on a shaft 12 which is split to receive within the bifurcation 12*a*, FIG. 3, the vane 11 to be centrally disposed in relation to the shaft 12 and secured thereto by through rivets 13.

The vane 11 has an area therefore on each side of the shaft 12 which areas are equivalent. The left hand area designated by the numeral 14 has an overturned top lip 15 folded along a line 16 which is approximately twenty-five degrees directed downwardly from the shaft 12. The lip 15 is turned over rearwardly to have its

area at substantially forty-five degrees to the area 14 of the vane 11.

The lower edge portion of the vane side 14 has a lip 17 turned backwardly in relation to the face of the vane appearing on the paper, being folded backwardly on the line 18. This line 18 is directed downwardly approximately ten degrees to the axis of the shaft 12. Likewise lips 19 and 20 are turned from the vane area 14*a* to the right of the shaft 12 forwardly on approximately the same angles of the lines 16 and 18 respectively. That is, the lips 19 and 20 are turned from the vane in directions oppositely to those of the lips 15 and 17 as best indicated in FIG. 3.

In the blank form, prior to bending over the top and bottom lips respectively, the height of the blank will be substantially five inches whereas the height with the vanes turned as above indicated will be somewhat less, such as approximately four and three-quarter inches indicated by the letter A', FIG. 2. Also the blank 11 will be notched centrally at its top and bottom edges to form the upper notch 21 which fits against the end of the slot 12*a*, and the bottom notch 22 which is, in its present form, slightly below the lower end of the shaft 12. The spacing between these notches 21 and 22 will be approximately four and one-quarter inches. The upper notch 21 is dropped below the top edges of the lips 15 and 19 approximately five-sixteenths of one inch whereas the lower notch 22 enters the vane a distance of approximately three-eighths of one inch. The bend or fold lines 16 and 18 extend from the intersection thereof with the respective central axis through the notches 21 and 22.

Between the fold lines 16 and 18, there are a plurality of openings through the vane 11 on each side of the shaft 12, the central axes of which through their major lengths are parallel in part with the line 16 and in part non-parallel. On each side of the shaft 12 are two slots designated by the numerals 23 and 26. Slot 23 is the uppermost one and has its major axis extending at approximately twenty-five degrees downwardly from the axis of the shaft 12, and has rounded ends, the inner ends of which are substantially tangential to a side of the shaft 12 as viewed in FIG. 2. This slot 23 has a transverse width A and the side of the slot is spaced downwardly from the line 16 a distance B. These two dimensions A and B are equal, three-eighths of one inch, in the present form and size for a five quart container sized vane. That is, the vane in FIG. 2 is of a size in accordance with the dimensions given for use in a five quart container of the standard height. The axial length of the slot 23 is the dimension C which in the present size is approximately one and one-eighth inches. The slot 26 is identical in size, being located on the same angle as that of the slot 23 and spaced downward from the slot a distance D or three eighths of one inch. There is a third angularly disposed slot 27 above the fold line 18. This slot has the same length and transverse dimensions as those of the slots 23 and 26. The longitudinal axis of the slot 27 is on a line extending upwardly and outwardly to be disposed approximately twenty-five degrees to the axis of the shaft 12, and the intersection of the axes of the slot 27 and the shaft 12 is approximately three-eighths of one inch above the end of the notch 22. Thus the slot 27 is directly upwardly from the bend line 18 which is directed downwardly at a lesser angle.

On the other side of the shaft 12, the right hand side as viewed in FIG. 2, the slots 23 and 26 conform in sizes to the slots 23 and 26 on the other side and are disposed and spaced apart by the same angles and dimensions. The lower slot 30 on the same right hand side is likewise the same size as slot 27 and is disposed on the same angular axis with the same spacing above the bend line 18 on that side.

Spaced centrally in the space on the vane side area 14 and between the slots 26 and 27 is a fourth slot 31 having a vertically disposed major axis of a length D' which in the present described size is three-quarters of one inch. The width of this slot 31 is indicated by the dimension letter E which in the present instance is three-eighths of one inch. A vertically disposed slot 32 is likewise positioned on the opposite side of the shaft 12 having the same dimensions. Both of these slots 31 and 32 have their adjacent sides along the sides of the shaft 12 as viewed in FIG. 2. The width of the vane 11 is indicated by the dimension letter F which in the five quart size is three and three-quarter inches.

In FIG. 4 is illustrated a vane likewise designated for a five quart mixing vessel and this vane designated by the numeral 11*a* is identical in shape, size and dimension to the vane 11 with exception of added openings. The vertical slots 31 and 32 each opens centrally into a horizontally disposed slot 31*a*. This opening 31*a* has the vertical width of H and has a horizontal length on its axis of G which in the indicated size is three-quarters of one inch extending respectively from the outer boundary line of the openings 31 and 32. In each of the vanes 11 and 11*a*, the corners of the lips 15, 17, 19, and 20 are rounded as indicated in the drawings.

The vane shown in FIG. 1 is of that design intended for use in a one quart size container. As to general configuration, this vane designated by the numeral 25 in general is of the same configuration as the vane shown in FIG. 4, but the dimensions are different. The vane 25 has an A' dimension of three and five-eighths inches; an F dimension of two and seven-sixteenths inches; the incline openings' or slots' dimension A is eleven thirty-seconds of one inch; B dimension, eleven thirty-seconds inches; C dimension, twenty-five thirty-second inches; D dimension, twenty-one thirty-second inches; E dimension, eleven thirty-second inches and G dimension, twenty-three thirty-second inches. These dimensions are within one thirty-seconds of one inch tolerance. The drive shaft 12 is three-eighths of one inch in diameter. The top central notch from which the bend lines 16*a* slope is one quarter inch deep from the top and bottom horizontal lines across the extreme tips of the lips 15*a*, 19*a*, and 17*a*, 20*a*. The bend lines 16*a* and 18*a* are at the same angles as those in FIGS. 2 and 4. The vane 25 carries the horizontal slots opening from the vertical slots 31*a* in the same manner as is indicated in FIG. 4.

In FIGS. 5–7 a structure is illustrated to be used in relatively large diameter tanks or vats such as from thirty to thirty-six inches in diameter. The overall diameter of the assembled disperser vane will range from twenty to twenty four inches. The speed of rotation would be approximately seventy-five revolutions per minute.

In this structure, there are two individual identically shaped and dimensioned wings 46 and 47 respectively. These wings have their major central axes horizontally disposed and their major areas are planar and not warped or curved. A foot 48 is provided on each of these wings 46 and 47 to enter within slots 49 provided on opposite sides of a hub 50 that is there is one slot 49 on one side of the hub and one slot 49 on the other side of the hub. These feet 48 are secured within their respective slots 49 by any suitable means, such as by welding. The hub 50 is secured to the shaft 51, preferably by means of securing screws 52 so that the hub may be removed from the shaft 51 if and when desired.

Each one of these wings 46 and 47 is provided with a plurality of angularly disposed slots 33, 34, and 35 spaced from a central horizontally disposed axis 36 to slope angularly upwardly and toward the hub 50. Likewise there are a plurality of slots 37, 38, and 39 below the axis 36 sloping downwardly and toward the hub 50. As is set out in FIG. 5, these two sets of slots are equally spaced from the axis 36 by ends thereof.

Each of the six slots has an A dimension of three-eighths of one inch and a C dimension of one and seven thirty-seconds inches. The angle of the axes of these six slots from the axial line 36 is thirty-two degrees with a tolerance of possibly one degree in either direction. Each of the six openings has opposite ends curved on a radius of three-sixteenths of one inch, the center of which curvature in relation to an upper and lower opening is on a vertical line passing through the axial line 36 at right angles, this vertical line being identified by the numeral 40.

Three generally vertically disposed openings 41, 42, and 43 are centrally disposed on the vertical line 40 in each instance. Each of these openings 41, 42, and 43 have an E width of three-eighths of one inch and a D' length of twenty-one thirty-seconds inches. The opposite ends of each of the openings 41, 42, and 43 are rounded on a three-sixteenths inch radius.

Each wing 46 and 47 has top and bottom lips respectively 44 and 45 extending from upper and lower marginal portions at an angle in each instance of forty-five degrees. The lips 44 and 45 on the wing 46 are directed rearwardly and on the wing 47, forwardly in the form shown in FIGS. 5–7. The horizontal lengths of each of these lips 44 and 45 has an O dimension of four and three-eights inches. The under lip 44 has a major width K at the outer end of the wing 46 of eleven-sixteenths and a minor width L adjacent the hub 50 of three-sixteenths of one inch. The lower lip 45 has a major width M at the foot end of nine-sixteenths of one inch and a minor width N of three-sixteenths of one inch at the outer end of the wing. These lips 44 and 45 are folded from the planar area of the wing in each instance along lines which diverge outwardly approximately three degrees from the central axial line 36 from lines 56 and 57. The overall horizontal length of the wings 46 and 47 in each instance from the junctions of the lips with the feet 48 is an O dimension of four and three-eighths inches. The vertical height of the end of each wing 46 and 47 between the lines 56 and 57 at the outer extremities is a P dimension which in the present showing is two and seven-eighths inches. For a dispersal vane of these dimensions, a five-eights inch shaft 51 is sufficiently large to drive it. The distance from the center of the shaft 51 to the smaller end of the upper and lower lips is one and seven-eighths inches.

The various sizes given and defined by dimensions are presented herewith in order that one versed in the art would be able to duplicate these dispersing vanes for the particular size. However it is to be understood that the invention is not to be limited to these precise sizes since they may vary in accordance with the container in which the materials are to be dispersed.

Therefore I do not desire to be limited to the precise forms set forth herein since structural changes may be made without departing from the spirit of the invention, and I therefore do not desire to be limited to those forms beyond the limitations which may be imposed by the following claims.

I claim:

1. A liquid-paste dispersal member comprising an elongated flat plate rotatably driven and having a plurality of slots therethrough;

a number of said slots being in spaced apart arrangement and inclined alike in one direction from a major axis of the plate;

at least one of said slots other than in said number being spaced from those of said number and inclined in an opposite direction from said axis;

drive means engaging said plate and centrally disposed thereof; and

a lip extending from the top of and angularly from said plate upwardly and forwardly on one side of said drive means;

a second lip extending angularly from the bottom of

said plate downwardly and forwardly on said one side of the drive means;

a third lip extending angularly upwardly and rearwardly from the top of said plate on the other side of said drive means;

a fourth lip extending angularly downwardly and rearwardly from the bottom of said plate from said other side of the drive means;

said top lips increasing in area from said drive means to their outermost end portions; and

said bottom lips decreasing in area from said drive means to their outermost end portions.

2. The structure of claim 1, in which

said one slot is adjacent a bottom lip.

3. The structure of claim 1, in which

said plate comprises two wings, one extending laterally to each of opposite sides of and are fixed to said drive means; and

said plate major axis extends centrally and horizontally of the wings.

4. The structure of claim 1, in which

said top lips have bend lines between them and said plate at acute angles below a horizontal line across the tops of said lips.

5. The structure of claim 4, in which

said lips have bend lines between them and said plate at acute angles below a horizontal line across the ends of the bottom lips adjacent said shaft.

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