March 30, 1965 E. BEYELER 3,175,810

STIRRING HEAD FOR MIXING OF LIQUIDS

Filed July 23, 1963

Fig. 1

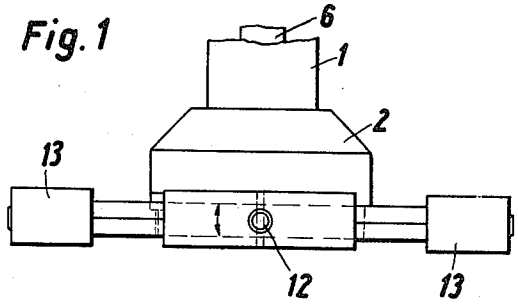


Fig. 2

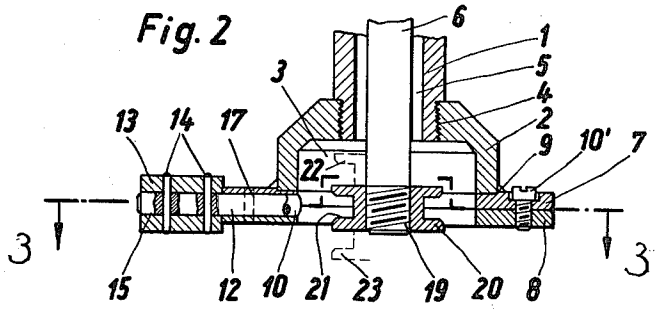
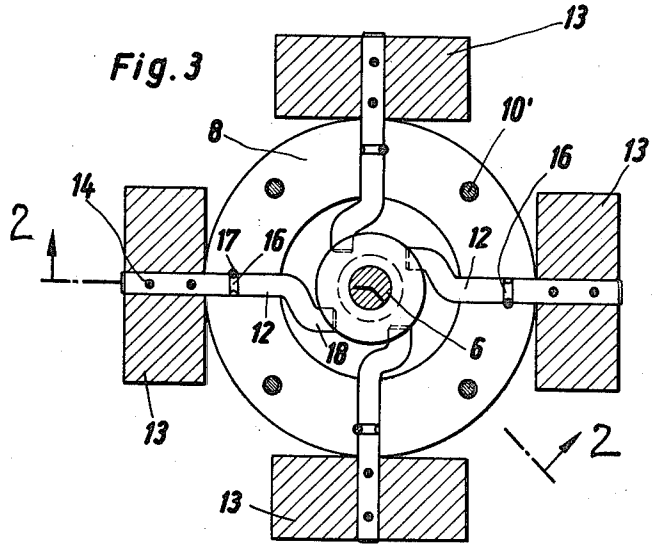


Fig. 3



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STIRRING HEAD FOR MIXING OF LIQUIDS

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The present invention relates to a stirring head for mixing of liquids and pastes, and in particular dispersion-colors by means of a rotating shaft and mixing wings secured to the latter.

A mixing device is known, which comprises a shaft rotating vertically and coaxially in a container and which has at least two propeller-like stirring wings as a rotor, which wings are disposed axially closely to each other in a mirror image arrangement relative to each other. This known device has the drawback that the intensity of the mixing can be changed only by the variation of the number of revolutions of the shaft. It is, therefore, required to provide a variator or a reduction gear.

It is one object of the present invention to provide a stirring head for mixing of liquids, which avoids the drawback of the known device.

It is another object of the present invention to provide a stirring head for mixing of liquids, which includes means for adjusting the mixing intensity without requirement for changing the number of revolutions of the stirring head.

It is yet another object of the present invention to provide a stirring head for mixing of liquids, which comprises a shaft carrying mixing wings swingably disposed about an imaginary axis disposed crosswise to the shaft. By such arrangement, the mixing wings can be adjusted during the mixing operation, whereby the mixing intensity can be changed endlessly without changing the number of revolutions of the shaft of the stirring head. The wings can swing then out of the horizontal position to the right or to the left, so that the liquid product in the container is stirred either from below upwardly or from above downwardly.

It is also another object of the present invention to provide a stirring head for mixing of liquids, which comprises a hollow shaft and a connecting rod is axially movable in the shaft, which connecting rod is connected with the wing shafts for their swinging by means of a crank arrangement. The crank arrangement can be formed in such manner, that the ends of the wing shafts are cranked to form cranks and project into an annular groove provided at the end of the connecting rod. The crank arrangement can be disposed in a hollow flange member open on one side, which is secured to the end of the shaft and two flanges extending crosswise to the shaft can be provided at the open end of the flange member, the wing shafts being swingably mounted between the flanges. The mixing wings can be formed rectangularly and riveted to the wing shafts upon mounting of the mixing wings on the wing shafts.

With these and other objects in view, which will become apparent in the following detailed description, the present invention will be clearly understood in connection with the accompanying drawing, in which:

FIGURE 1 is an elevation of the stirring head;

FIG. 2 is a vertical section along the lines 2—2 of FIG. 3; and

FIG. 3 is a horizontal section along the lines 3—3 of FIG. 2.

The stirring head comprises a shaft 1, the lower end of which is immersed, preferably, vertically into the liquid to be mixed. A flange member 2 is secured to the lower

end of the shaft 1 and in particular, is screwed to a thread 4 of the latter. The flange member 2 is open at its bottom and surrounds bell-like a hollow chamber 3. The shaft 1 has an inner bore 5. A connecting rod 6 is axially movable in the inner bore 5 of the shaft 1. An upper annular flange member 7 is welded at the point indicated by 9 to the lower free end of the flange member 2. Screw bolts 10′ extend through the upper annular flange 7, which screw bolts 10′ secure a lower, annular flange member 8 to the flange member 7. Four bores 10 extend crosswise to the longitudinal axis of the shaft 1 at the joining faces of the flange members 7 and 8, which bores 10 are disposed at an angle of 90° apart from each other.

Wing shafts 12 are swingably mounted in the bores 10. Each wing shaft 12 projects outwardly with a section from the corresponding bore 10. Mixing wings 13 having a bore 15 are mounted on the projecting ends of the respective wing shafts 12. Each mixing wing 13 is, preferably, of rectangular shape. The mixing wings 13 are disposed horizontally in the median position of the connecting rod 6 on the wing shafts 12 and in this position they are secured to the wing shafts 12 against rotation by rivets 14. The wing shafts 12 are secured against axial movement within each bore 10 by means of a pin 17 extending into an annular groove 16 within each bore 10 of the flange members 7 and 8. The inner ends of the wing shafts 12 extend into the hollow chamber 3, which is surrounded by the flange member 2 and the wing shafts 12 are cranked within the hollow chamber 3 to form cranks 18. The lower end of the connecting rod 6 projects into the hollow chamber 3 such, that its lower edge is disposed in its median position at about the level of the bottom side of the flange member 8. The lower end of the connecting rod 6 is equipped with an outer thread 19. A disc 20 is screwed to the thread 19 of the connecting rod 6, the peripheral face of the disc 20 having an annular groove 21. The cranks 18 of the wing shafts 12 extend into the annular groove 21 of the disc 20 such, that they are subjected to a swinging movement upon axial displacement of the connecting rod 6.

In the embodiment shown in the drawing, the stirring head is shown in its median position, in which the mixing wings 13 are disposed horizontally. If, for instance, dispersion-colors are to be mixed together, the stirring head is immersed into the liquid colors. The shaft 1 is subjected to rotation by any conventional means (not shown). The position of the mixing wings 13 is varied by means of displacement of the connecting rod 6. The connecting rod 6 can be moved within the shaft 1 from the median position, shown in full lines in FIG. 2, into an upper position 22, shown in dotted lines, on into a lower position 23, shown likewise in dotted lines. The ends of the crank arms 18, disposed in the annular groove 21, are moved, thereby, due to the movement of the disc 20 together with the connecting rod 6, whereby the wing shafts 12 and the mixing wings 13 swing about their substantially horizontal axes. The mixing wings 13 can, thus, be turned towards the right or towards the left. Due to the variation of the rising angle of the mixing wings 13, the mixing intensity is varied. In view of the possibility of swinging of the mixing wings 13 in both directions, the liquid to be mixed can be stirred either from above to below or from below to above.

If desired, the adjustment of the mixing wings 13 can be obtained during the stirring procedure also by any conventional hydraulic means.

While I have disclosed one embodiment of the present invention, it is to be understood that this embodiment is given by way of example only and not in a limiting sense, the scope of the present invention being determined by the objects and the claims.

I claim:

1. A stirring head for mixing of liquids and pastes particularly of dispersion-colors, comprising

a shaft adapted to be rotated,

mixing wings secured to and projecting laterally from said shaft,

means permitting swinging of said mixing wings about an imaginary axis disposed crosswise to the longitudinal axis of said shaft,

said shaft being a hollow shaft, and

said means permitting swinging of said mixing wings comprises a connecting rod axially movable in said hollow shaft,

a wing shaft coordinated to and supporting the corresponding of said mixing wings and extending radially from said connecting rod, and

a crank operatively connecting each of said wing shafts with said connecting rod.

2. The stirring head, as set forth in claim 1, which includes

a flange member secured to the lower end of said hollow shaft and open at one end,

said flange member receiving therein said crank,

two flanges disposed parallel relative to each other and perpendicularly to the longitudinal axis of said shaft and secured to said flange member, and

said wing shafts being swingably mounted between said flanges.

3. The stirring head, as set forth in claim 1, wherein

said connecting rod has at one end at least one outer annular groove, and

the inner end of said wing shafts is cranked to constitute said cranks and extends into said outer annular groove.

4. The stirring head, as set forth in claim 1, which includes

a disk secured to the lower end of said connecting rod and having said outer annular groove, and

means for threadedly connecting said disk to said connecting rod.

References Cited by the Examiner

UNITED STATES PATENTS

1,129,158	2/15	Babek	259—134
1,183,637	5/16	Gerbing	249—134
1,345,452	7/20	Hartshorn	259—107

FOREIGN PATENTS

217,913	10/58	Australia.

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