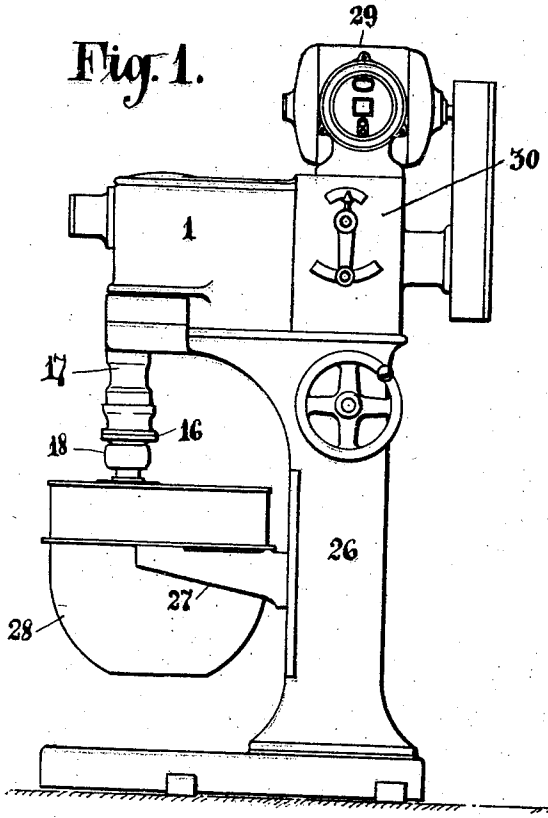
June 24, 1930. E. CHRISTIANSEN 1,767,346

MIXING OR STIRRING MACHINE

Filed Sept. 24, 1929 2 Sheets-Sheet 1

Fig. 1.



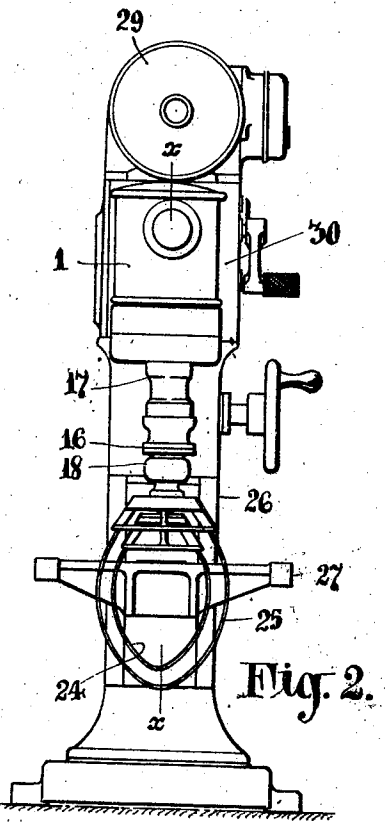


Fig. 2.

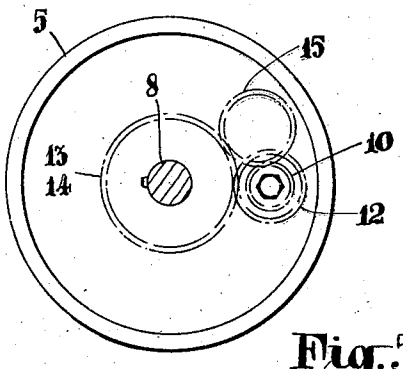
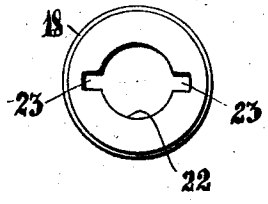


Fig. 5.

Fig. 6.



Egnar Christiansen Inv.

by G. H. Shurtleff & Co. Attys.

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MIXING OR STIRRING MACHINE

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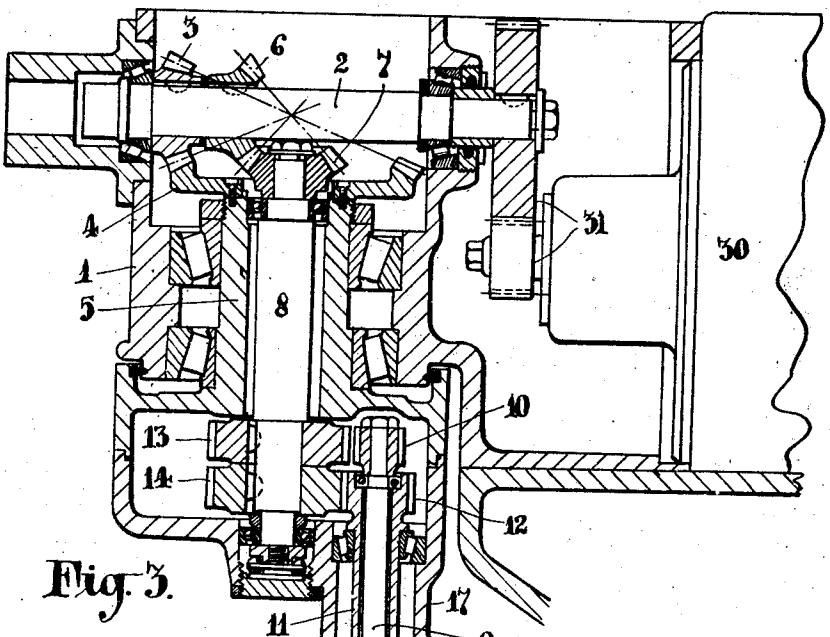


Fig. 3.

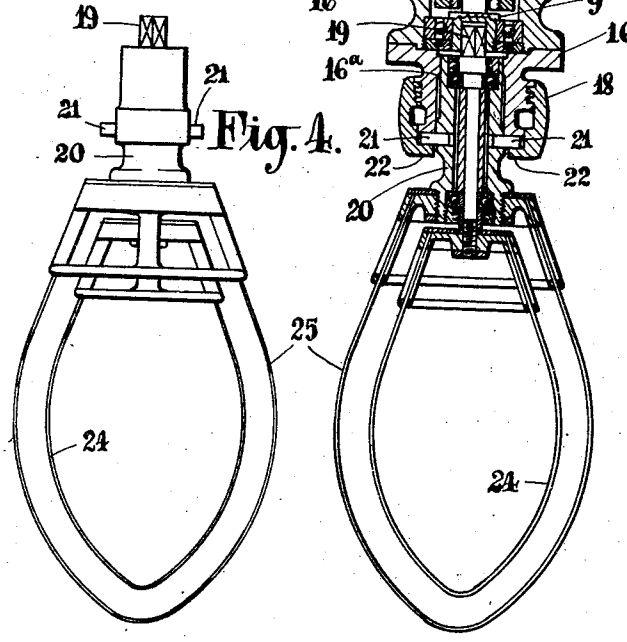


Fig. 4.

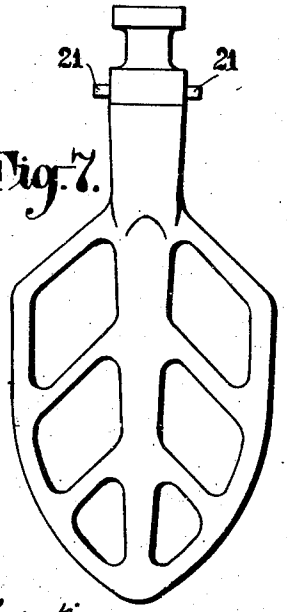


Fig. 7.

Einar Christiansen Inv.

by C. R. Morris & Co attys.

Patented June 24, 1930 1,767,346

UNITED STATES PATENT OFFICE

EJNAR CHRISTIANSEN, OF BIRMINGHAM, ENGLAND

MIXING OR STIRRING MACHINE

Application filed September 24, 1929, Serial No. 394,839, and in England January 10, 1929.

This invention relates to a mixing or stirring machine, and particularly relates to a machine for mixing food of the type in which a mixing, stirring, or beating tool is rotated about an axis, which axis moves over a circular path.

The invention has for its object to provide for a more efficient mixing or stirring action, and also to enable the machine to deal with a large variety of materials.

According to the present improvements, a mixing, stirring, beating or like tool has two or more rotary movements applied thereto so that, for instance, one portion of the tool can rotate in one direction, whilst another portion of the tool rotates in the opposite direction. By this invention also mixing, stirring or like tools are adapted to be interchangeably fitted so that either a plurality of motions can be applied to various parts of the tool, or so that any one movement only, or any particular combination of movements can be applied to the particular stirring or like tool fitted. In the case of a stirring or like tool having two parts which are driven in opposite directions, two concentrically mounted spindles are driven in opposite directions about their axis, and the spindles are also given a relative bodily movement over a circular path in relation to the food or other container. Any suitable gearing may be utilized to effect this movement, and if desired, a variable gear may be incorporated so that the speed of rotation of the various parts may be varied to suit the particular conditions of mixing, stirring or beating.

Referring to the drawings:—

Figure 1 is a side elevation of a machine constructed according to this invention.

Figure 2 is an end view.

Figure 3 is a section of a portion of the machine on line x—x of Figure 2.

Figure 4 is a view of the mixing or beating tool detached.

Figure 5 is an inside view of the rotating head.

Figure 6 is an underside view of the coupling nut for fixing the mixing tool, and

Figure 7 is a view of a single mixing tool.

According to a convenient embodiment of this invention, the mixing or like machine comprises a stationary head 1 in which is fitted a horizontal driving shaft 2. To this shaft is fixed a bevel wheel 3 which engages a bevel wheel 4 carried by a rotary head 5. The horizontal driving shaft also carries a second bevel wheel 6 which gears with a bevel wheel 7 located at the top of a vertical shaft 8 rotatably mounted in relation to the said rotary head 5. The bevel gears are such that the rotary frame 5 is driven in the same direction but at a slower speed than the vertical shaft 8. The rotary head carries two vertical and concentrically arranged spindles. The inner spindle 9 carries at its upper end a spur wheel 10, whilst the outer concentric spindle 11, in which the spindle 9 is journalled, also carries a spur wheel 12. The central vertical shaft 8 carrying the bevel wheel 7 has two spur wheels 13 and 14 fixed thereon, the lower one 14 of which is in direct gear with the spur wheel 12 carried by the outer concentric spindle 11, whilst the upper spur wheel 13 is in gear, through the medium of an intermediate wheel 15, with the spur wheel 10 carried by the inner concentric shaft 9. When therefore the horizontal driving shaft 2 is rotated, the two concentric spindles 9 and 11 will be rotated in opposite directions, whilst such spindles will be carried bodily round in a circular path. The lower ends of the concentric spindles are arranged to be detachably coupled to two concentric spindles on the mixing or like tool, or if the mixer has only one rotatable part, it is adapted to be coupled to the outer concentric spindle. The outer concentric spindle has secured thereon a coupling member 16 having a cup-shaped top, which passes around the housing 17 for the concentric spindles, to prevent flour dust from entering the bearings, the said cup-shaped top being fitted with a sealing washer 16^b. The foot 9^a of the inner concentric spindle has conveniently a square recess therein, whilst the coupling member 16 has a nut 18 screwed thereon. A ball bearing is located between the coupling member 16 and the foot of the spindle 9. The detachable and interchange-

able fixing tool comprises corresponding concentric spindles 19 and 20, and when fitted into position, the top of the inner spindle 19 engages the aforementioned square recess in the foot 9^a of the inner concentric spindle 9. The outer concentric spindle 20 is adapted to enter the sleeve 16^a of the coupling 16, and is fixed thereto by means of the pins 21 on the sleeve 20 which are clamped in position by the nut 18. This nut 18 is screwed on the sleeve 16^a and has a flange 22 provided with slots 23 through which the pins 21 are threaded. The rotation of the nut 18 moves the slots 23 out of register with the pins and locks the pins in notches in the underside of the sleeve 16^a. If a mixing or like tool as shewn by Figure 7 carries only one set of vanes for instance, which are to be rotated, the inner concentric spindle is omitted. In this case the machine will work as before, but the inner concentric spindle 9 will run idle. The mixing or like tool will vary according to the nature of the material to be dealt with. In one instance, a mixing tool comprises a number of shaped wires or like members 24 which are adapted to rotate in an outer wire or like member formed of a number of shaped wires 25.

The stationary head 1 of the machine is carried on any suitable pedestal 26 which adjustably carries the support 27 for the bowl 28 or other container for the material to be mixed. The shaft 2 is conveniently driven by an electric motor 29 through the medium of the change speed gear box 30 and toothed gear 31.

By the use of a mixing tool which is given a bodily rotary movement, and having parts which are given a rotary movement in relation to one another a rapid and efficient mixing action is obtained. In the case of the machine described the mixing tool moves bodily around the bowl or container which movement imparts a stirring action whilst the rotation of the mixing tool about its own axis imparts a local mixing or breaking up of material to be mixed, but by the use of a second rotating part to the mixing tool the bulk broken up or scattered by the one rotating part is subjected to a further breaking up or scattering action, with the result that the material to be mixed is finely divided which ensures that the material is more intimately mixed than has heretofore been the case. The mixing is moreover effected in a much shorter time than with machines heretofore in use.

Claims.

1. A stirring, mixing or beating machine comprising a plurality of concentric spindles, means for separately rotating said spindles in opposite directions, means for rotating the spindles bodily in a circular path and a mixing or beating tool having beating members rotating with each spindle so that the path of the beating members on one spindle crosses the path taken by the beating members of another spindle.

2. A stirring, mixing or beating machine, comprising a plurality of concentric spindles, means for separately rotating the concentric spindles in opposite directions, means for rotating the concentric spindles bodily in a circular path, a mixing or beating tool having a plurality of concentric spindles, and each spindle carrying beating members so that the beating members carried by one spindle cross the paths of the beating members carried by the other spindle, and coupling means for detachably fixing the concentric spindles of the mixing tool in driving connection, respectively, with the first mentioned concentric spindles.

3. A stirring, mixing or beating machine, comprising a rotary head, two concentric spindles mounted eccentrically on the rotary head, means for driving the rotary head, and means for driving the concentric spindles in opposite directions, a mixing or beating tool comprising a hollow spindle and an inner spindle mounted concentrically therein, and beating members carried by these spindles so that the beating members carried by one spindle cross the paths of the beating members carried by the other spindle, means for coupling the inner concentric spindles comprising a socket and projection engagement for the inner spindles and means for coupling the outer spindles which latter coupling means support the mixing tool when in working position.

4. A stirring, mixing or beating machine comprising a stationary head, a rotary head mounted therein, means for rotating the rotary head, a hollow spindle journalled in a housing sleeve on the rotary head, a coupling member fixed to the lower end of the hollow spindle and having a groove in the upper edge for engaging the lower end of the housing sleeve, an inner spindle journalled in the hollow spindle, a mixing tool comprising two concentric hollow spindles each carrying beating members so that the beating members carried by one spindle cross the path of the beating members carried by the other spindle, a projection on the inner mixing tool spindle for coupling in a recess in the first mentioned inner spindle, and lateral pins on the outer mixing tool spindle for engaging under the flange of a securing nut screwed to the said coupling member.

In witness whereof I have signed this specification, Birmingham, England.

EJNAR CHRISTIANSEN.