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MACHINE FOR IMPARTING AGITATION TO COMMODITIES

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2 Sheets-Sheet 1

FIG. 1.

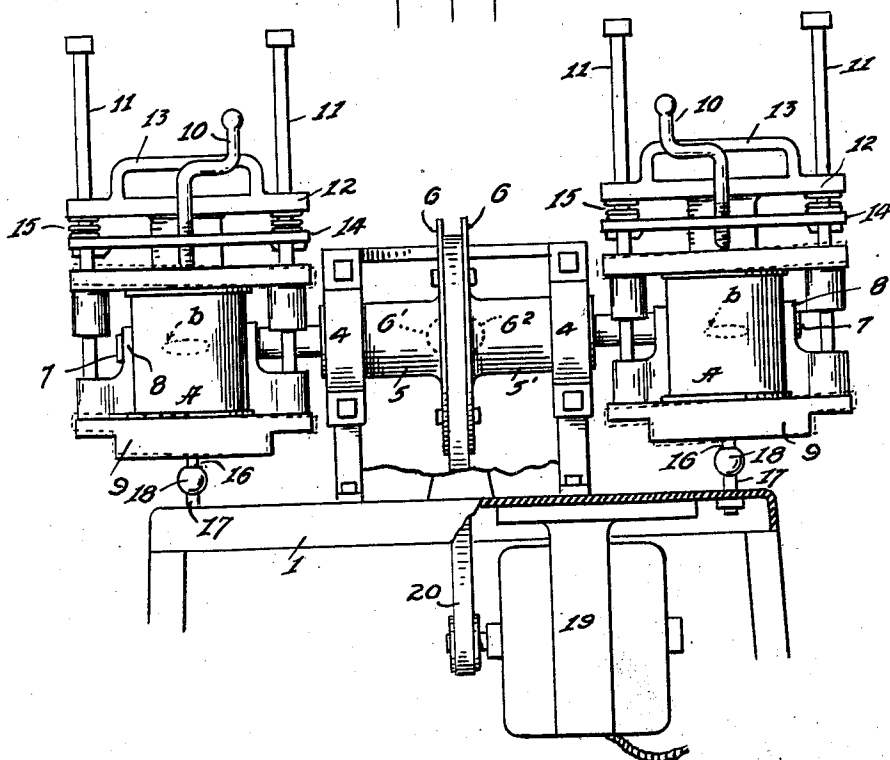
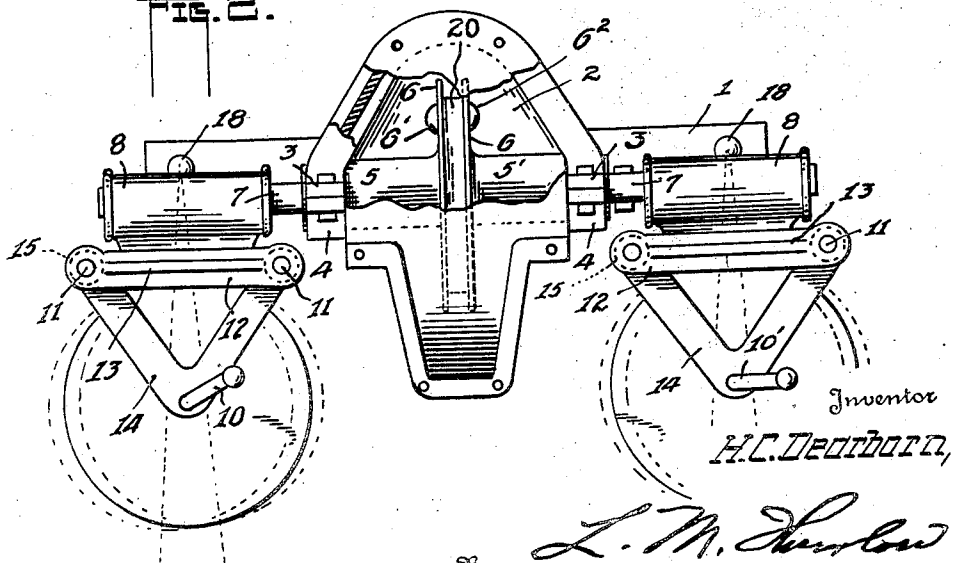


FIG. 2.



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MACHINE FOR IMPARTING AGITATION TO
COMMODITIES

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7 Claims. (Cl. 259—54)

This invention pertains to means for mechanically agitating packages containing more or less liquid products such as paints or other commodities by which to bring about a thorough mixture of the liquids and solids.

An object is to provide in machine for the above purpose what is believed to be a new mechanical motion as applied to mixing and agitating devices wherein certain forces are met by opposing forces in given direction of movement by which balancing of machine parts will result during action to the end that vibrations will be measurably reduced or entirely suppressed.

Another object is to furnish a power operated machine for carrying packaged liquid commodities wherein the parts thereof carrying the commodities are mounted in opposed position for movement in opposite direction by which the moving force of one of them will be offset by the moving force of the other to bring about an action of such machine that will have but little or no vibration due to the balancing of the named forces.

Other objects and advantages besides the above will appear in the following specification aided by the appended drawings forming part hereof, wherein

Figure 1 is a front elevation of a machine involving my invention;

Figure 2 is a plan of the same;

Figure 3 is an end elevation of the mechanism;

Figure 4 is a plan of parts shown in Figure 1, parts being shown in section, the whole being produced on a larger scale than that of the other figures;

Figure 5 is a plan of a structure of a slightly different form, as to certain parts, from those illustrated in the earlier figures, and

Figure 6 is an end elevation of parts shown in Figure 5.

The purpose herein, as intimated, is that of providing a machine, the parts of which are practically balanced by balancing of forces, i. e., setting one force against another, and this may be done in different ways two of which are illustrated herein as showing that the invention is not confined to any given structure for the accomplishment of said purpose.

In the first three figures 1 denotes a table suitably mounted, upon which, in this instance, is fixed a cavitated housing 2 terminating in spaced half-bearings 3, bearing caps 4 being secured thereto in any usual manner. And it may be noted that the housing and table may be an

integral part, the whole answering as a support. Mounted in the bearings thus provided is a shaft preferably of two parts 5, 5' each shaft portion carrying one half of a pulley 6, the two halves 5 of the latter being normally fixed relatively by bolts 6', for example, forming with the shaft-part a complete rigid whole, the pulley being within the named housing 2.

The shaft thus completed is of novel form in that, as shown in Figure 4, at each end thereof outside the bearings 3, 4 is a shaft-extension 7 each of which lies at an angle to the axis of the main portion 5, 5', it being noted that these both extend away from the axis of the main shaft rotation, it being understood that the axial line of each said extension lies in the same plane as that in which lies the axis of the main shaft portion. In the present instance the axial line of the extensions where they join the main shaft are offset radially from the axis of the latter and during rotation of the whole the outer free ends have a circular orbital motion, the axis of the said main shaft being the center about which the orbit is described.

Engaging about each extension 7 is a sleeve 8 (Figs. 1 and 2) which is rigidly connected by means of a radially disposed arm 8' to a plate 9, which together with an upper companion plate 10 serves to carry a can or other package A whose contents is to be agitated.

In this connection the plate 9 includes a pair of spaced upstanding rods 11 (Fig. 3), for example, slidable on which is the named upper plate 10. The latter includes on an extension 12 thereof a grasping piece or handle 13 also slidable on the named rods. Interposed between the plate 10 and the said handle 13 is a member 14 which at one end engages about the rods 11. Expanding springs 15, in this instance encircle the rods and exert pressure between the member and the extension 12. Carried by the member 14 is a threaded cranked member 10' engaging upon the plate 10 by which a can to be operated upon may be clamped upon the plate 9, the whole structure involved, for the sake of brevity, being termed a "carrier" in certain of the claims to follow. The springs tilt the member 14 on the rods 11 so that said member supported by the cranked member is in position to grip said rods firmly, whereupon the said cranked member 10' when operated will create clamping pressure upon the plate 10.

The plates 9 and 10 together with the structure just named, are thus spaced by the arm 8' a substantial distance laterally from the axis of shaft 5, and are as a whole, jointly supported

both by the sleeves 8 and shaft extensions 7 as well as means now to be described. That is to say, 16 and 17 indicate an extension on the lower plate 9 and the table 1, respectively, while extending between them at a point below the carrier and freely engaging each is a link 18, (Fig. 3) the parts being so constituted that the weight of the plate structure described will be supported thereby, yet permitting free action of the carrier, the extension and link being termed "means." As constructed herein, as one method answering the purpose desired, the said extensions 16 and 17 terminate each in a ball, the link ends having shell portions to engage about said balls while permitting the free action named. The supporting portions may, of course, involve the abutting of the shell portion at each end of the link upon the extensions adjacent the balls of such extensions, the weights of the carrier naturally tending to force the link toward the extension 17.

At 19 is indicated a motor suspended below the support or table 1, a belt 20 trained over the pulley of the motor being likewise trained over the said pulley 6.

In Figure 4 is shown a manner of manipulation of parts whereby a belt may readily be installed in operating position as a replacement of the belt 20. As previously stated, the pulley 6 is separable along a median plane at right angles to the axis into two similar halves, each carrying a shaft section, said figure denoting a change in position of these parts axially in broken lines. The removal of the bolts 6' permits the pulley-halves being separated sufficiently to admit of drawing the looped belt up between them into position, and reassembling such halves.

In the action of separating the parts the shaft sections can be shifted endwise in their bearings 3, 4, and due to the fact that the plate structure 9, 10 can shift in a direction substantially paralleling the axis of the shaft 5, 5' at the link connection 16, 17, 18 no difficulty will be encountered in the shaft shifting act.

In the rotation of the said shaft 5, 5' it is clear that the ends of the shaft extensions 7, in rotation, Figure 3, will have a circular orbit about the center *a* of the main shaft portions due to the offcenter and angular arrangement of such extensions. Since both extensions 7 are offcenter at the same side of the main shaft axis, and to the same degree, they will have like orbits. Due to this fact the plate structure 9, 10 during action will be tilted in opposite directions as indicated in broken lines in Figure 1. As a matter of fact the plate structures which should apparently swing in a straight line have a movement more or less arcuate as the said structures follow the winding action of the shaft extensions, and at the same time the two named structures approach each other and recede in the same timing, the cans or packages apparently having a slight elliptical movement at a given point as indicated in broken lines at *b* in said Figure 1, the longest diameter of the orbit substantially paralleling the main shaft axis.

This peculiar action imparts to the contents of the can or cans an erratic movement which quickly causes a thorough mixing of solids and liquids.

It is to be understood that while the containers for the commodity to be agitated are shown in an upright position they may have a reclining position and the structure of the

clamping portion therefor may naturally be accommodated to the walls of the container in that position as being within the purpose of the invention.

The form shown in Figure 5 may involve a shaft 21 straight throughout mounted in bearings 4'. Outward from each said bearing between the same and the shaft end may be a ball type of enlargement 22, for example, while outward from each of the latter near each shaft-end is an eccentric 23. Enclosing each enlargement 22 and an adjacent eccentric is a sleeve or member 24 corresponding to said sleeve 8 described, and so formed as to provide a socket 25 permitting a free shiftable rocking movement of said member, the halves of each member being separable as suggested by the structure shown in Figure 6.

As in the example illustrated in Figs. 1-4, to the end that the forces set up by each carrier will be opposed to each other, the eccentrics 23 (Fig. 5) are set in the same angular position on the shaft to extend from the same side thereof so that their longest radii will lie in the same plane, which plane naturally includes the shaft-axis.

In either form shown the action imparted to the cans is, of course, an oscillating one as viewed from the front, Figure 1 in dotted lines, and a sidewise action as viewed in plan, Figure 2, i. e. toward and away from each other, the oscillations and sidewise movements of the cans being in unison and traveling in exactly opposite or opposed directions.

In machines as usually provided for the purpose herein-named considerable vibration is present due to the unbalanced forces, especially where but a single can or package is being handled.

As distinguished from such machines the type herein employs duplicate can holding parts whose forces in operation of the machine are opposed to each other to effect a balancing of such forces since a force set up in one can holding part in a given direction is directly offset by the other in an opposed direction. At the outset, of course, all machine parts are properly balanced against each other and even when the contents of but one can is to be mixed a companion can, or any other object of equal weight is employed as the natural balance therefor in an otherwise balanced mechanism.

In a study of Figure 4 of the drawings it is to be noted that the axial line of the journaled shaft 5 when extended meets the center lines of the extensions 7, 7, at a point within a sleeve 8. Such point therefore, since in line with said axis, has no movement and in this instance lies substantially midway the length of the sleeve. The latter in the rotation of the extension therefore has a universal wobbling movement about such point for the commodity-mixing act, both ends of the sleeve describing circular orbits, and since the sleeves must impart to the container opposite directions of movement the forces are balanced against each other.

Naturally, if a sleeve were shifted outwardly or toward the free end of the extension 7 so that the end thereof shown nearest the shaft portion 5 might lie at the above named "point," that end would have practically no lateral movement, merely rotating as would a pulley, for example. The balance of the sleeve, however, would partake of a circular swing in a plane at right angles to the direction of rotation, setting up thereby an un-

balanced force. Since, however, the sleeves have a position on the extension where their extremities lie each side of the place of meeting of the shaft axis and the axis of the extension both said extremities are made to swing about said point with the result, therefore, that the carriers for the containers are swung in opposed directions paralleling the shaft axis and hence the forces are set one against the other giving a consequent balance of those forces.

In the modification shown in Fig. 5, the outer end only of the sleeve 24 describes a circular orbit, the inner end being centered on the axis of the shaft. Hence the sleeve partakes of a universal wobbling motion around the ball 22. Since, however, similarly mounted sleeves are provided at opposite sides of the pulley, the forces set up by them are balanced, as above described.

At the high rate of motion employed the "throw" of the shaft extension 8 and related structure carried thereby may be balanced by properly weighting the pulley 6 at 6², for example, or equivalent means.

The construction of the shaft 5, 5', 7 is believed to be novel while applicable to any machine for any other purpose than that for which it is used herein.

The means for clamping the can is convenient and quickly manipulated in accommodating cans of varying height. Normally, the cranked member 10' engages the plate 10. Upon loosening the same the handle portion 13 may be readily shifted along the rods 11 to a desired position. The springs 15 constantly exert pressure upon the member 14 at the rod position thereby keeping the widest separation of the latter and the handle portion and but a slight turn of the cranked member is necessary to bring about the can clamping act.

I claim:

1. In a machine for agitating commodities, a rotatably mounted driving shaft having a straight portion with a line axis of rotation, a carrier adjacent each end of said shaft and each moveable in its entirety in its orbit with respect to a fixed point for it on the axis of said shaft, each of said points being symmetrically disposed beyond the adjacent end of the straight portion of said shaft, each carrier being positioned eccentrically with respect to said shaft axis and on the same side of said shaft axis and in the same relative position with respect to said shaft, connecting means connecting each carrier to its adjacent end of said shaft so as to be driven thereby in the orbit with respect to its respective fixed point, and means on each carrier for securing a container for the commodity to be agitated, said connecting means at each end of said driving shaft including a stub shaft extending as a continuation of said driving shaft and at an angle diagonal to said driving shaft, both of said stub shafts lying in a plane which includes the axis of said driving shaft.

2. In a machine for agitating commodities, a rotatably mounted driving shaft having a straight portion with a line axis of rotation, a carrier adjacent each end of said shaft and each moveable in its entirety in its orbit with respect to a fixed point for it on the axis of said shaft, each of said points being symmetrically disposed beyond the adjacent end of the straight portion of said shaft, each carrier being positioned eccentrically with respect to said shaft axis and on the same side of said shaft axis and in the same relative position with respect to said shaft, connecting means connecting each carrier to its adjacent end of said

shaft so as to be driven thereby in the orbit with respect to its respective fixed point, and means on each carrier for securing a container for the commodity to be agitated, said connecting means at each end of said driving shaft including a stub shaft extending as a continuation of said driving shaft and at an angle diagonal to said driving shaft, both of said stub shafts lying in a plane which includes the axis of said driving shaft, and both stub shafts extending on the same side of said axis.

3. In an agitating machine, a rotatably mounted driving shaft, a non-rotatable sleeve at each end of said driving shaft and disposed at an angle to the axis thereof, separate means at each end of said driving shaft between said driving shaft and the adjacent one of said sleeves and adapted to be rotated by said driving shaft, each of said means including support means on which its respective adjacent sleeve is mounted, the end of each of said means farthest from said driving shaft having a portion eccentric with respect to said driving shaft and rotatable therewith, whereby rotation of said driving shaft causes the end of said sleeves farthest from said driving shaft to travel in a circular orbit around the axis of said driving shaft and each of said sleeves as a whole to execute a wobbling motion about a point on said axis, a separate carrier for an article to be agitated operatively connected to each of said sleeves, each of said carriers being spaced laterally from the axis of said shaft and rigidly connected to its respective sleeve to move therewith, and separate means below each carrier cooperating with its respective sleeve for supporting each carrier in such manner that it is capable of free universal movement.

4. In an agitating machine, a rotatably mounted driving shaft, a non-rotatable sleeve at each end of said driving shaft and disposed at an angle to the axis thereof, separate means at each end of said driving shaft between said driving shaft and the adjacent one of said sleeves and adapted to be rotated by said driving shaft, each of said means including support means on which its respective adjacent sleeve is mounted, the end of each of said means farthest from said driving shaft having a portion eccentric with respect to said driving shaft and rotatable therewith, whereby rotation of said driving shaft causes the end of said sleeves farthest from said driving shaft to travel in a circular orbit around the axis of said driving shaft and each of said sleeves as a whole to execute a wobbling motion about a point on said axis, a separate carrier for an article to be agitated operatively connected to each of said sleeves, each of said carriers being spaced laterally from the axis of said shaft and rigidly connected to its respective sleeve to move therewith, and separate means below each carrier cooperating with its respective sleeve for supporting each carrier in such manner that it is capable of free universal movement, the axes of both said sleeves lying in the same plane with the axis of said driving shaft and extending on the same side thereof.

5. In an agitating machine, a rotatably mounted driving shaft, a non-rotatable sleeve at each end of said driving shaft and disposed at an angle to the axis thereof, separate means at each end of said driving shaft between said driving shaft and the adjacent one of said sleeves and adapted to be rotated by said driving shaft, each of said means including support means on which its respective adjacent sleeve is mounted, the end of each of said means farthest from said driving

shaft having a portion eccentric with respect to said driving shaft and rotatable therewith, whereby rotation of said driving shaft causes the end of said sleeves farthest from said driving shaft to travel in a circular orbit around the axis of said driving shaft, a separate arm rigid with respect to each of said sleeves projecting radially therefrom and secured against rotation with respect to said driving shaft, a separate carrier for an article to be agitated rigidly connected with each of said arms at a point spaced from its respective sleeve and adapted to move with said arm, and support means below each of said carriers serving in cooperation with said arm and said shaft to support the respective carriers while permitting free universal movement thereof.

6. In an agitating machine, a rotatably mounted driving shaft, eccentrics secured to said shaft one at each end thereof, sleeve members one each surrounding each of said shaft ends and each sleeve member having one of its ends journalled on its respective eccentric, each sleeve member having means supporting the other end thereof on said shaft for free universal movement with respect thereto, whereby rotation of said shaft and said eccentric imparts a wobbling motion to

said sleeve members, a separate carrier for the article to be agitated rigidly connected to each of said sleeve members to move therewith but spaced therefrom, and supporting means below each of said carriers serving in cooperation with said shaft and said sleeve members to support each of said carriers, said supporting means being constructed to permit free universal movement of said carriers.

7. The combination with a support including a pair of spaced aligned bearings fixed with respect to each other, of a pulley of two individual separable parts lying between the bearings, an axially extending shaft section for each pulley part and secured thereto, each shaft engaging in a bearing, said pulley parts being separable along a median plane at right angles to its axis into two similar halves, each of which provides one of the side flanges of the pulley, and means to secure the pulley halves to each other in assembled fixed relation, said halves and shaft sections being movable axially away from each other in order to permit the insertion of an endless belt between the pulley halves into a position to be looped around said pulley.

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