

May 18, 1948.

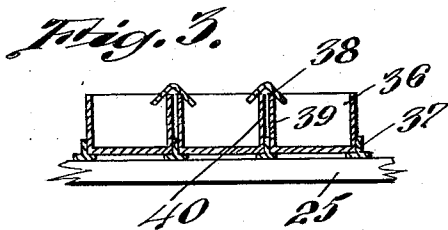
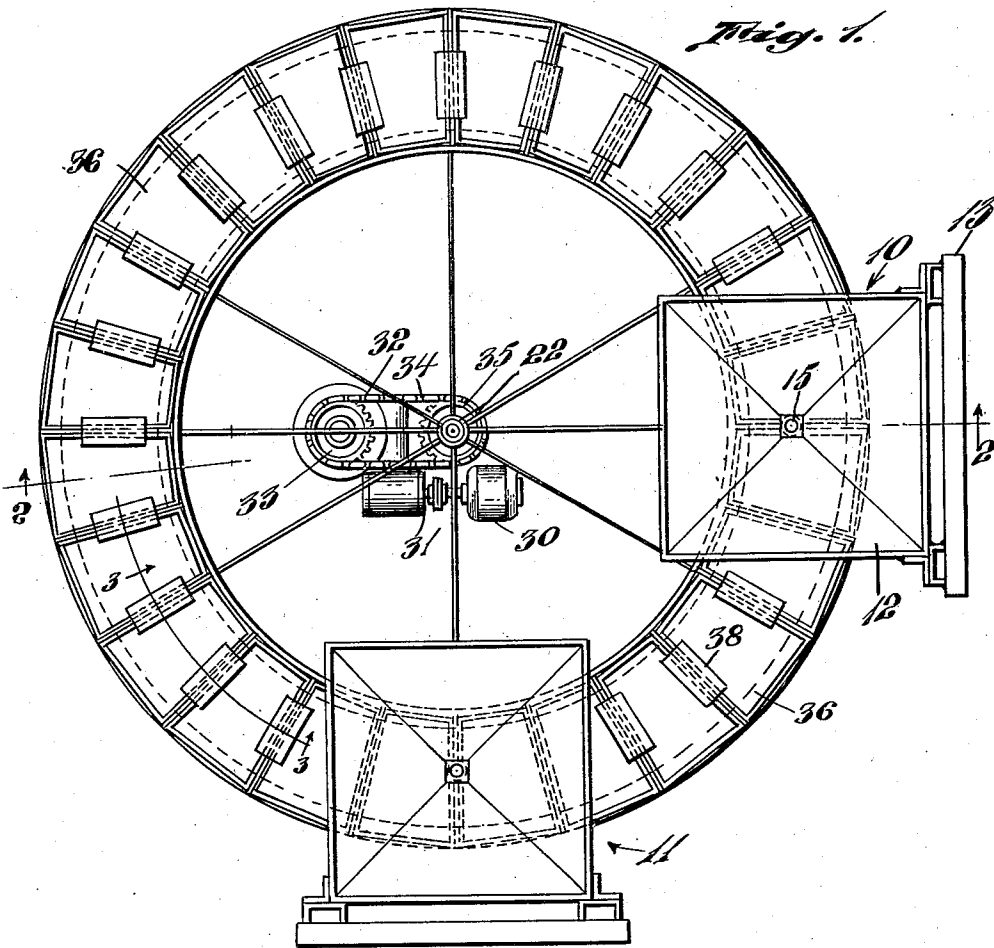
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2,441,774

APPARATUS FOR MIXING POWDERED MATERIAL

Filed Sept. 22, 1944

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 2.

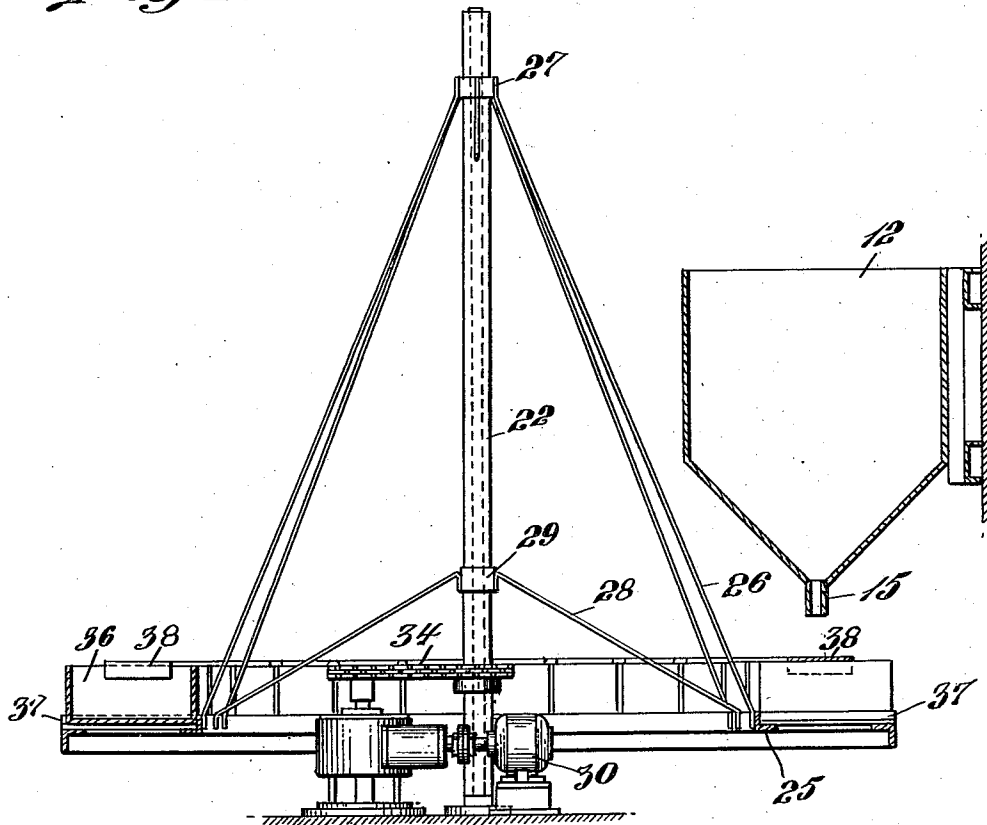


Fig. 4.

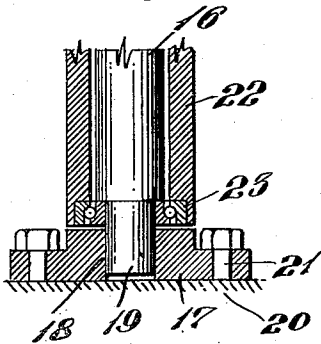
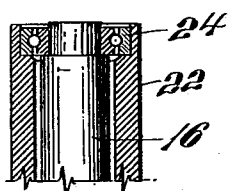


Fig. 5.



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APPARATUS FOR MIXING POWDERED MATERIAL

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1 Claim. (Cl. 259--1)

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Quite frequently when powdered material is shipped in a barrel or some such like container, stratification will occur due to the joggling in transit, such for instance as by truck or train, so that the contents of the barrel or container become very much stratified, that is the finest particles will be at the lower part of the container and the coarsest particles will be at the upper part of the container whereas between the two there will be graduations of different sizes from the fine to the coarse so that no even blend of the divided material occurs. On opening the container after shipment, the problem is presented of getting the fine and coarse mixed so as to provide an even mixture of the entire barrel throughout. Mixing of dry materials usually takes place by agitation or stirring. By such an operation it is found difficult to provide a homogeneous mixture of particles of different sizes.

One of the objects of this invention is to so divide the material in powdered form when found in a stratified condition, that it will be substantially homogeneous for the entire batch which is provided, that is the fine will be mixed with the coarse and intermediate in substantially equal amounts for any given portion of the mass.

Another object of this invention is to provide for the mixing of materials together more completely than can be accomplished by stirring or agitation.

Another object of this invention is to provide an arrangement so that plurality of materials from different batches may be mixed together with uniformity.

Another object of the invention is the selection of portions of each of the different layers of a powdered mass and collecting portions of each stratification together in a compartment and then subsequently again dividing into portions and mixing together these portions whereby a grouping of portions of various parts of the mass as it originally existed is had.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described and particularly pointed out in the appended claim.

In the accompanying drawings:

Fig. 1 is a top plan view of an apparatus for carrying out our invention;

Fig. 2 is a section on substantially line 2—2 of Fig. 1;

Fig. 3 is a section on line 3—3 of Fig. 1;

Fig. 4 is a sectional view showing mounting of the rotary carriage on the lower portion of the upright supporting mast;

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Fig. 5 is a fragmental sectional view illustrating the mounting of the rotary carriage on the upper part of the supporting mast.

In proceeding with this invention we deposit small portions of each stratification of the powdered material as it may exist in a batch of powdered material into each of several compartments by running small portions of the lower layer of divided material into each container and then small portions of the next intermediate layer and then the next intermediate layer; and so on throughout the batch so that a small portion of each layer of material will be in each container. This is conveniently accomplished by placing the powdered material from the barrel or container in which it is shipped into a large hopper and permitting discharge of the powdered material through a nozzle while separate compartments are passed beneath the discharging nozzle in a certain uniform timed relation in a manner so that each container or compartment will pass beneath the nozzle a number of times at least equivalent to such number of different strata as may exist that a small part of each stratification of powdered material may be collected in each container. This arrangement provides a very good mixture of the different parts of the powdered material. If desired, the powdered material may be taken from a plurality of different sources. If it is desired to get further mixing of the material, that collected in different compartments may all again be dumped into the hopper and the same run out again into individual or separate containers that a greater dividing of various portions of the entire mass may be had and collected in individual batches.

With reference to the drawings we have provided hoppers at 10 and 11 of a sufficient size to contain within them, as at 12, the entire batch of the powdered material to be mixed. These are conveniently mounted upon some support 13 so that the hopper is in overhanging relation or extends out therefrom. A discharge nozzle 15 is provided at the lower end of each hopper.

Various ways may be provided for passing separate compartments or individual containers beneath the discharge nozzle 15. We have, however, illustrated as a convenient means for accomplishing this, the utilization of a mast 16 which is supported in a base 17 having a socket 18 to receive the reduced portion 19 of the mast. The base 17 is secured to some suitable support 20 by means of bolts 21. Telescoped over this mast 16 there is a tubular member 22 which is mounted on ball bearing 23 at its lower end and

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ball bearing 24 at its upper end so as to provide easy rotation thereof on the mast as an axis.

An annulus 25 is supported by means of tie rods 26 from the collar 27 located adjacent the upper end of the tubular member 22 and thrust rods 28 supported from the collar 29 adjacent the lower end of the member 22 so that the annulus may be rotated clear of the floor or support for the mast 16 and beneath the two nozzles 15 of the two hoppers. This annulus is driven by an electric motor 30 which, by means of shaft 31 and transmission gearing 32, drives the sprocket gear 33 and through chain 34 drives the sprocket 35 fixedly mounted on the member 22 for the rotation thereof about the mast 16.

Separate compartments are provided by individual containers 36 each supported upon tracks 37 extending generally radially of the annular member 25. These individual containers 36 may be each lifted from the annulus for handling of the powdered content which is collected therein. These containers on the annulus will pass beneath each of the nozzles 15 of the hoppers which are provided thereover and as the material runs out of each hopper or a single hopper it will be collected in a container in an amount equal to the time that each container is beneath the nozzle 15. This amount may be regulated by the speed at which the container is caused to travel in its closed path.

In order that the powdered material which is collected in each container will not drop between the walls of adjacent containers we provide a cap or inverted V deflector 38 which bridges two walls 39 and 40 of adjacent containers so as to direct the material which is discharged from the hopper to one or the other but not between two adjacent containers. It will, of course, be appreciated that if the containers were so designed that they contacted side by side so as to leave no gap between them such a capping arrangement of the adjacent walls would not be needed.

After a batch of material to be mixed is divided in this manner once, if it is desired that the same be mixed to a greater degree, then, we may dump the material from each of the containers back into the hopper and run the same

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through again. In this manner a greater division will be provided and a more even mixture accomplished.

From the above it will be clearly apparent that we have provided for a dividing of powdered material from each of as many layers as may exist of different grades of coarseness or fineness and collected portions of each in an accumulated mass of substantially the proportions and size which we desire for further use.

We claim:

An apparatus for mixing powder comprising a revoluble carrier having its periphery traveling in a closed path, individual readily portable containers resting upon said carrier adjacent its periphery and so placed that their walls are at generally right angles to the path of travel and are in close adjacency, bridging means extending from the wall of one container to the wall of the next container, and a hopper for the powdered material to be mixed provided with a discharge nozzle located over the path of travel of said containers and their bridging means for discharging material thereinto.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

| Number | Name | Date |
|-----------|---------|---------------|
| 445,732 | Oldham | Feb. 3, 1891 |
| 532,500 | Thomann | Jan. 15, 1895 |
| 637,081 | Calkins | Nov. 14, 1899 |
| 722,782 | Weaver | Mar. 17, 1903 |
| 832,400 | Lyons | Oct. 2, 1906 |
| 1,125,103 | Iijima | Jan. 19, 1915 |
| 1,145,215 | Roney | July 6, 1915 |
| 2,094,802 | Hexter | Oct. 5, 1937 |

FOREIGN PATENTS

| Number | Country | Date |
|---------|---------|---------------|
| 467,526 | Germany | Oct. 26, 1928 |