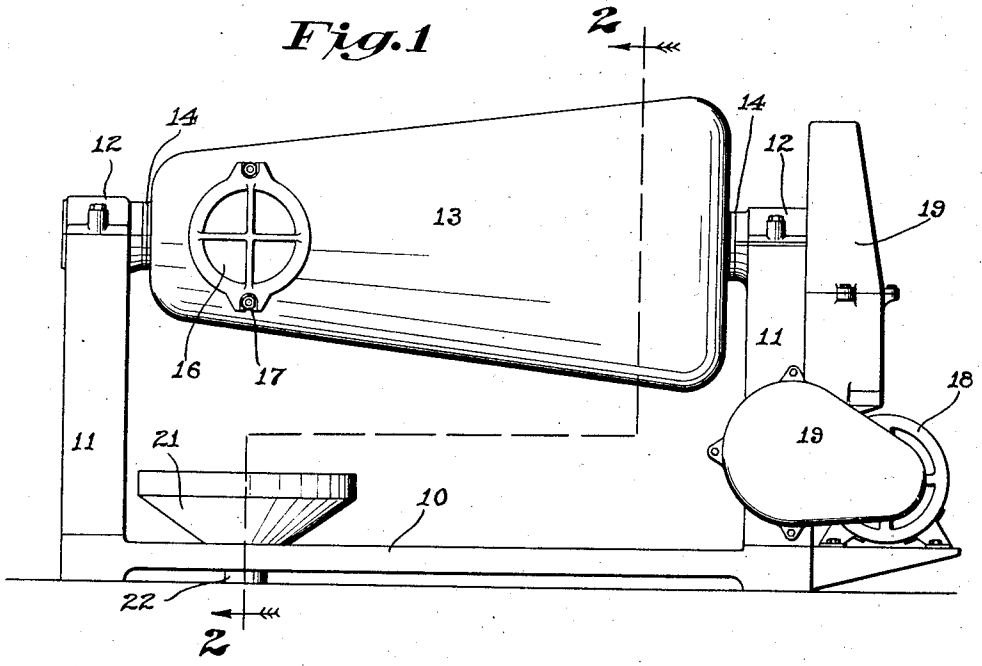
Nov. 22, 1932. D. A. McKINNEY ET AL 1,888,735

PAINT GRINDING MACHINE

Filed March 6, 1930

Fig. 1



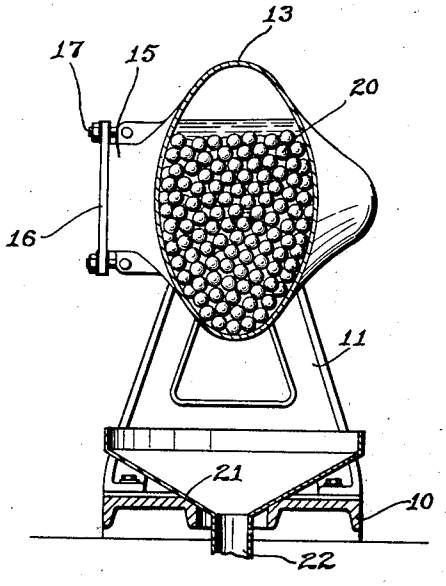


Fig. 2

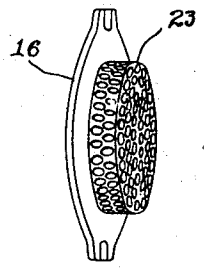


Fig. 3

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UNITED STATES PATENT OFFICE

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PAINT GRINDING MACHINE

Application filed March 6, 1930. Serial No. 433,534.

The object of our invention is to provide a paint grinding machine of simple, durable, and inexpensive construction.

A further object of our invention is to provide a machine for grinding paint which will considerably reduce the time ordinarily taken for this grinding operation. The operation ordinarily called paint grinding, consists of dispersing the paint pigment in an oil. This operation is ordinarily very tedious due to the difficulty of wetting each individual particle of the pigment to obtain a smooth and even flowing paint.

The common method of paint grinding consists in feeding a mixture of pigment and oil between a pair of stones, one of which is rotating. This mixture is introduced through the hollow spindle of the upper stone and later collected from the periphery of the stones. This process is very slow and many passes between pairs of stones or a very slow pass through one pair are necessary to thoroughly disperse the pigment. The cellulose lacquers now in general use require even a longer period for grinding than the ordinary paint due to the extreme difficulty of dispersing the pigment in the nitro-cellulose solution. The invention about to be described relates to a machine which accomplishes the grinding or dispersing operation in a much shorter time than has heretofore been possible.

In general, our machine consists of a container arranged to rotate on a horizontal axis. This container is practically filled with steel balls there being a small space left at the top to allow the balls to roll. The interstices between the balls are filled with a mixture of the pigment and medium in which it is to be dispersed. A feature of primary importance in connection with this machine is that the container is so shaped that both a circumferential rolling action and a longitudinal reciprocation of the balls occur as the container is rotated. We contribute the high speed or short length of time required to disperse the pigment in this machine more to the longitudinal reciprocation of the balls than to any other action.

With these and other objects in view our invention consists in the arrangement and construction of our improved device, as described in the specifications, claimed in our claim, and illustrated in the accompanying drawing in which:

Figure 1 shows a side elevation of our improved machine.

Figure 2 shows a sectional view, taken on the line 2—2 of Figure 1, and

Figure 3 shows a perspective view of a strainer used with our machine.

Referring to the accompanying drawing, we have used the reference numeral 10 to indicate generally a frame member having uprights 11 at each end supporting bearing blocks 12. We have provided a hollow container 13 having trunnions 14 extending from each end thereof which are journalled in the bearing blocks 12.

Referring to Figure 2, the end portions of the container 13 are formed with an elongated section substantially at right angles to each other for a purpose presently to be described. Adjacent to one end of the container 13 an opening 15 is formed so that access may be had to the container, a cover plate 16 being ordinarily secured over this opening by means of bolts 17. This cover plate is, of course, provided for preventing the contents of the container from leaking out when the container is rotated. An electric motor 18 is provided which rotates the container 13 through suitable reduction gearing enclosed in a housing 19.

We prefer to fill the container practically full of steel balls 20, and have found that for ordinary paints and lacquers, balls of about ¾ of an inch in diameter are most suitable. It will be apparent that the smaller the size of the balls the greater the number of contacting points result, and inversely, the larger the diameter of the balls, the greater the crushing force on each particle of pigment therebetween. The interstices between the balls are then filled with the mixture to be ground, and after the cover 16 is secured the container is rotated by the motor 18. The speed of rotation of this container is governed by the size thereof, the weight of the balls, and the viscosity of the mixture being

ground. Not only do the balls tumble over each other by the rotation of the container but it may also be seen that they reciprocate to a certain extent due to the shape of the container. This reciprocating action of the balls has been found to grind a given paint in about one third the time which would be required if the container were not shaped to produce this reciprocation.

Directly beneath the cover plate 16 we provide a funnel shaped collecting trough 21 which discharges through a pipe 22 extending down through the floor upon which the machine is located into suitable containers in the room below. A strainer 23 is provided to replace the cover plate 16 after the grinding operation is complete so that when the strainer is in place the container 13 may be rotated and the liquid therein allowed to flow out through the strainer into the trough 21 without the removal of the balls 20. The container may then be placed upright and the strainer removed and the space between the balls filled with more liquid to be ground.

The older method of grinding pigment consisted in mixing the pigment with castor oil or similar medium and then grinding the mixture to disperse the pigment in the oil. The ground mixture was then added to a solution of nitro-cellulose to produce a final lacquer. This process of dispersing the pigment in castor oil is not used with the present machine as we have found that, due to the longitudinal reciprocation of the balls, a faster dispersion may be attained when the pigment is dispersed directly into a gum or nitro-cellulose solution of low concentration.

For the manufacture of high oil absorption carbon black paint in our improved grinding machine, we prefer to use:

	Pounds
Carbon black	60
Ester gum	180
Mixed lacquer solvents	500

These solvents are composed of: butyl acetate, amyl acetate, ethyl acetate, butyl alcohol, toluol, xylol, petroleum naphtha.

The above substances are placed in the container 13 having the balls 20 therein and then the container is rotated at about 11 to 24 R. P. M. for about eight hours. After this operation is complete, the dispersed pigment is taken from the container and mixed with about four parts of 25% solution of nitro-cellulose. This mixing operation simply consists in stirring the dispersed pigments with the solution and requires no grinding. Carbon black is ordinarily very difficult to disperse, and is given as an example illustrating the relative high speed of operation obtained with this machine. If a zinc oxide paint is desired, 450 pounds of the pigment may be substituted in the above mixture in place of the 60 pounds of carbon black and the time required for the grinding will be reduced to above five hours.

Many advantages arise through the use of our improved device, the most important of which is that a pigment may be ground therein in approximately half the time formerly necessary.

Some changes may be made in the arrangement, construction, and combination of the various parts of our improved device without departing from the spirit of our invention, and it is our intention to cover by our claims, such changes as may reasonably be included within the scope thereof.

We claim as our invention:

In a paint grinding machine, a U shaped frame member having a pair of aligned bearings therein, a hollow container having trunnions formed on the ends thereof adapted to rotate horizontally in said bearings, the opposite ends of said container being formed having elliptical cross sections placed at substantially right angles to each other with the major axes of said elliptical sections being equal, an opening in said container adjacent to one end thereof and aligned with the major axis of said end, a strainer adapted to be detachably secured over said opening, a cover plate adapted to be secured over said opening, and a plurality of metal balls in said container, the interstices between said balls comprising the space occupied by the material being ground, whereby upon rotation of said container both longitudinal reciprocation and tumbling action are produced.

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