Oct. 3, 1944. J. LUPO 2,359,322

TUMBLING APPARATUS

Filed March 11, 1943 2 Sheets-Sheet 1

Fig. 1.

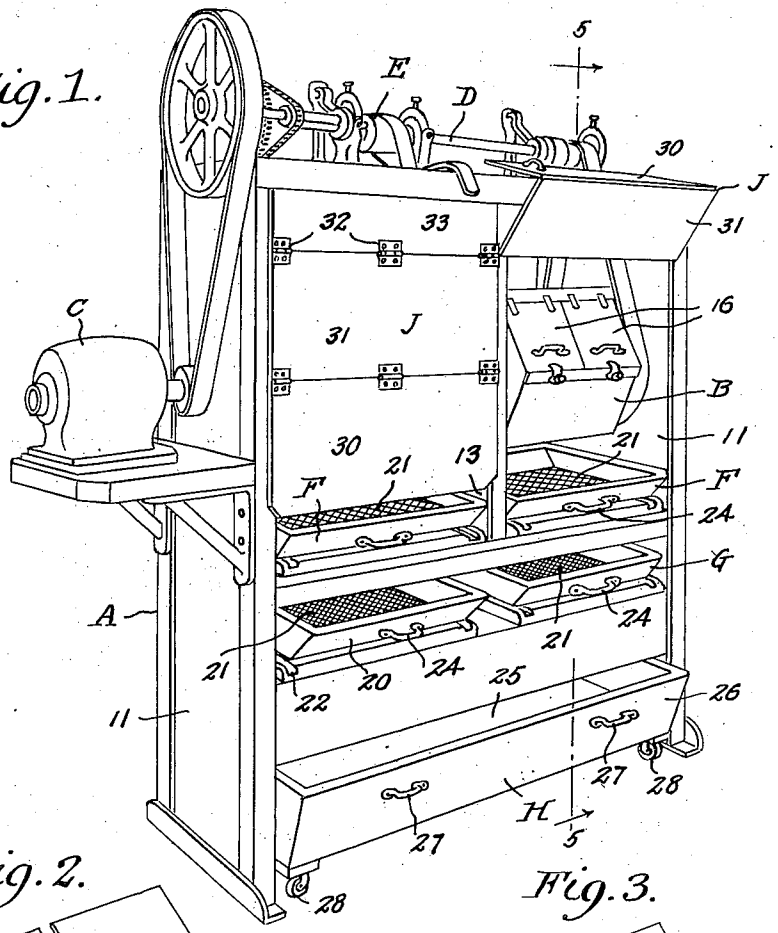


Fig. 2.

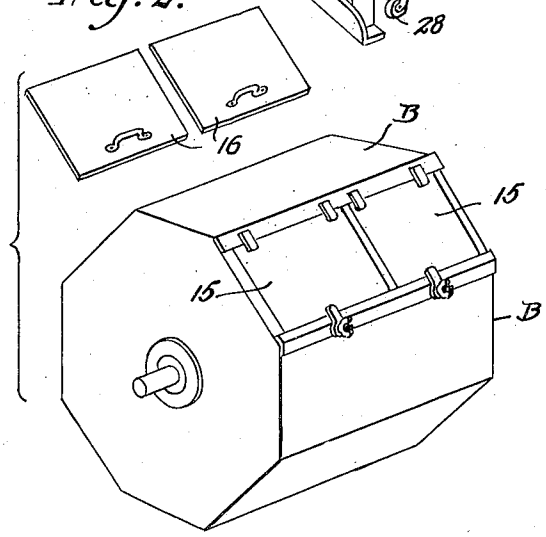


Fig. 3.

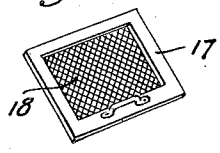
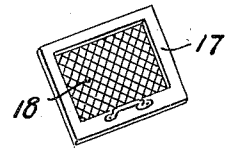


Fig. 4.



INVENTOR.
Joseph Lupo
BY
Clarke Ott
ATTORNEYS

Oct. 3, 1944. J. LUPO 2,359,322

TUMBLING APPARATUS

Filed March 11, 1943 2 Sheets-Sheet 2

Fig. 5.

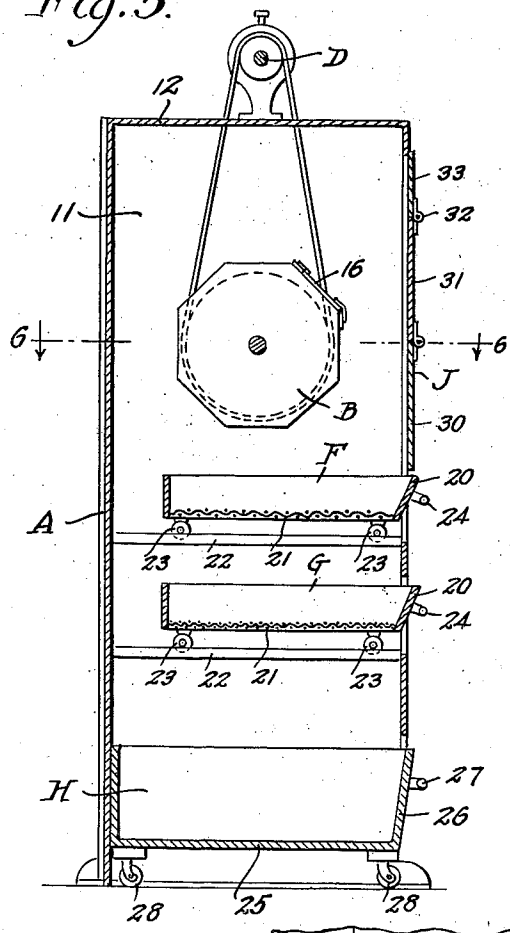


Fig. 6.

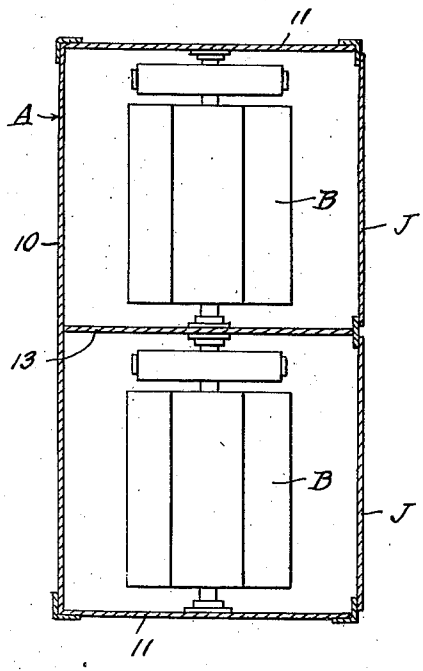
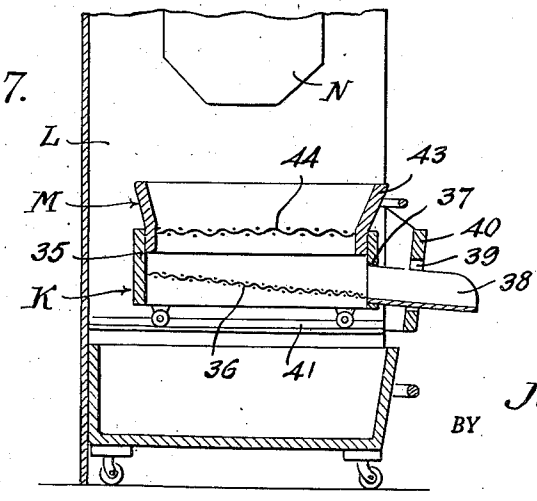


Fig. 7.



INVENTOR.
Joseph Lupo
BY
Clark & Ott
ATTORNEYS

Patented Oct. 3, 1944

2,359,322

UNITED STATES PATENT OFFICE

2,359,322

TUMBLING APPARATUS

Joseph Lupo, Mount Vernon, N. Y.

Application March 11, 1943, Serial No. 478,757

6 Claims. (Cl. 51—164)

This invention relates to tumbling apparatus for cutting down, smoothening, burnishing, polishing or imparting the desired finish to the surfaces of articles which are tumbled in a tumbling barrel constituting a part of the apparatus, as well as for deburring the articles tumbled.

According to the practice which is now and has been in general use heretofore, the articles to be tumbled are placed in the barrel or equivalent tumbling apparatus together with a tumbling mixture of the type which includes chips, pegs, leather scraps and/or other similar tumbling elements and a compound composed of comminuted materials such as sawdust impregnated with a binding substance and coated with an abrasive. After tumbling the articles with the mixture for a predetermined length of time, the entire contents of the barrel are dumped into a receptacle and taken to a screening room where they are screened to separate the articles from the tumbling mixture and the articles are then replaced in the barrel together with a supply of clean tumbling elements and the tumbling operation continued so as to burnish or impart any other desired finish to said articles. The articles and tumbling elements are then removed from the barrel and separated. The first batch of tumbling mixture is then screened to separate the compound from the tumbling elements and after screening the tumbling elements must then be cleaned to remove the residue of the compound which adheres thereto so as to render the same adaptable for further use.

In order to simplify and expedite the foregoing operations by eliminating certain unnecessary steps and details, the present invention comprehends an improved tumbling apparatus which is so constructed and arranged as to combine certain of the operations while obviating the necessity of removing the articles being tumbled or the tumbling elements from the barrel until the articles have been completely processed.

More specifically, the invention is directed to an improved tumbling apparatus in which the barrel is mounted for rotation within an open front housing and is provided with a charging opening adapted to be selectively covered by a solid cover or a screen mesh cover so that after the initial tumbling of the articles with the solid cover applied, the barrel is stopped and a screen mesh cover is substituted for the solid cover, after which the barrel is started again to gradually effect the expulsion of the comminuted material and abrasive making up the compound thereby retaining in the barrel only the articles and tumbling elements so as to impart the desired finish thereto without the necessity of removing the articles from the barrel until they have been completely processed.

As a further object, the present invention embodies the use of one or more screening trays disposed within the housing and mounted for reciprocation beneath the barrel to receive the articles and tumbling elements when discharged from the barrel after said articles have been completely processed so that the articles may be readily separated from the tumbling elements by agitation of the screening tray.

As a further feature, the apparatus includes a displaceable guard adapted to be disposed over the open front of the housing to prevent the escape and dissipation of the finer and lighter particles of the compound from the housing into the room, while the separation of the compound from the tumbling elements in the manner specified not only eliminates the necessity of their removal from the barrel for this purpose but obviates the time and labor incident to a subsequent cleaning of the tumbling element to remove the compound therefrom, and in fact the improved apparatus renders a separate screening room unessential as well as the time and labor involved in transporting the materials back and forth to and from the screening room.

With the foregoing and other objects in view, the invention is disclosed in greater detail in the following specification, particularly pointed out in the appended claims and illustrated in the accompanying drawings, in which:

Fig. 1 is a perspective view of a tumbling apparatus constructed in accordance with the present invention and illustrating the front guards respectively in opened and closed relation to their cells.

Fig. 2 is an enlarged collective perspective view of a tumbling barrel with the solid charging opening cover removed and in separated juxtaposition thereto.

Fig. 3 is a perspective view of a supplemental screen mesh cover for the charging opening.

Fig. 4 is a perspective view of another supplemental screen mesh cover illustrating a different size of screen mesh.

Fig. 5 is a vertical sectional view through the tumbling apparatus taken approximately on the line 5—5 of Fig. 1.

Fig. 6 is a horizontal sectional view through the apparatus taken on the line 6—6 of Fig. 5.

Fig. 7 is a vertical sectional view similar to Fig. 5 illustrating a modified form of screening tray arrangement.

Referring to the drawings by characters of reference, A designates generally an open front box-like housing structure which is supported upon the floor and which includes a rear wall 10, side walls 11 and a top wall 12.

The tumbling barrels B are mounted within the housing A to rotate on horizontal axes and are driven by any suitable means, the motive power in the embodiment disclosed being derived

from an electric motor C operatively connected by a pulley and belt drive to an overhead shaft which in turn drives a spur gear and chain to transmit power to a countershaft D.

In the present instance, the tumbling apparatus is illustrated as a two barrel unit although the same may embody only one barrel or any number thereof and, as shown, where more than one barrel is included, the barrels may be selectively driven by a belt and pulley connection from clutches E which are engageable with and disengageable from the overhead countershaft.

Where more than one barrel is mounted in the housing, as shown, a partition 13 is utilized to subdivide the housing into separate compartments or cells, one for each barrel.

Each of the tumbling barrels B is formed with a charging opening 15 for introducing thereinto the articles to be tumbled together with the tumbling mixture and for removing the same therefrom. Covers 16 of solid construction are displaceably associated with the barrel to close the charging opening 15. The instant invention utilizes in addition to the solid covers, one or more supplemental covers 17 which are provided with screen mesh panels 18, the mesh of which may vary in size in accordance with the character of the tumbling mixture being used and the purpose of the tumbling operations to be performed. For example, in some instances the mixture may include several types and sizes of tumbling elements such as chips of one size, wooden balls of another size or leather scraps of still another size together with a compound composed of comminuted material such as sawdust coated with an abrasive powder bonded thereto by an adhesive binder. The mesh of one of the screened covers 17 could be of such a size to allow only the compound to pass therethrough while the barrel is rotating without permitting the escape of the chips, wooden balls or leather scraps while the mesh of the screen of another cover could be of a size to permit of the passage of only the chips therethrough without permitting of the escape of the other tumbling elements. Obviously other variations of the screen mesh in still other covers could be utilized for other types of tumbling elements within the scope of the invention.

In order to eliminate the necessity of maintaining and the space required for a screening room as well as the time consumed by the operator in travelling back and forth to and from the screening room, the tumbling apparatus of the present invention also embodies a screening tray arrangement located in the lower portion of the housing A below the tumbling barrels B. As illustrated in Figs. 1, 5, and 6 of the drawings, this screening tray feature consists of horizontally arranged superposed and subterposed screening trays F and G located beneath each tumbling barrel, together with a trundle box H disposed below and underneath the screening trays.

In the embodiment illustrated the screening trays F and G which consist of a hopper-shaped frame 20 and a screen mesh bottom panel 21, are mounted for fore and aft reciprocation in horizontal channel shaped guide tracks 22, the trays being preferably provided with rollers 23. The trays are of slightly lesser length than the front to rear depth of the housing to permit of reciprocation of the same while wholly within the confines of the housing and the front rail of the frame of each tray is provided with a manipulating handle 24. The sizes of the screen mesh panels 21 of the trays will vary in accordance with the sizes and character of the tumbling elements and compounds making up the tumbling mixture. The trundle box H as disclosed in the embodiment illustrated may be of such a size as to receive the material from both tumbling barrels and as shown the same consists of a bottom panel 25 and upstanding marginal walls 26 with manipulating handles 27 provided on the front marginal wall to facilitate the removal and positioning of the trundle box within the housing. As shown the trundle box is provided with casters 28 for rolling the same into the housing and for withdrawing the same therefrom.

Inasmuch as the finer and lighter particles of the compound are put to flight during the separation thereof from the tumbling elements while the barrel is being rotated with the screen mesh cover applied to the charging opening means is provided to prevent the escape of said particles into the room and their dissipation in the form of dust. The means illustrated consists of a displaceable guard J for each tumbling barrel cell or compartment which as shown comprises hingedly connected panel sections 30 and 31 which are in turn connected by hinges 32 to a fixed upper panel section 33 secured to the housing. The operator has only to raise or lower the guards J when he desires to open or close the cells.

In use and operation, assuming the tumbling barrel B has been charged with the articles and the tumbling mixture including tumbling elements such as chips and a compound composed of sawdust covered with an abrasive, the tumbling barrel is rotated for a predetermined length of time to effect the cutting down and smoothening of the surfaces of the articles being tumbled. The solid covers 16 are applied to the barrel during this initial tumbling operation. When completed, the barrel is stopped and instead of dumping the contents and carrying the same to a screening room to screen off the compound, with the new apparatus, the operator merely removes the solid covers 16 and replaces them with the screen mesh covers 17 having a screen mesh panel in which the interstices are of such a size as to permit of the passage of the compound particles therethrough. The guard J is then lowered as shown at the left hand side of Fig. 1 and the tumbler is then started. Upon each rotation of the tumbler a quantity of the compound will be discharged as the screen mesh cover arrives at the bottom of the cycle of rotation. The guard will prevent the escape and dissipation of the compound particles into the room and will serve to deflect the same downwardly so that they will gravitate through the screen trays F and G into the trundle box H. It has been found in practice that the compound is gradually expelled during the initial stage of the second tumbling operation thereby leaving in the barrel only the chips and the articles to impart a burnishing and polishing finish to the surfaces of the articles. The front guard J is then raised after stopping the barrel and the screen covers 17 are removed with the discharge opening disposed downwardly to dump the chips and articles into the upper screening tray F. By agitating or reciprocating the upper tray F which has a mesh of a size to let the chips fall through it will be apparent that the articles will remain in the upper screening tray and the chips will be separated and fall therethrough into the lower screening tray G while the compound consisting of the abrasive and sawdust particles which is usually waste is now collected in the trundle box

H. It has also been found that the expulsion of the compound by the tumbling operation is so effective that it is unnecessary to subsequently resort to a cleansing operation to free the tumbling elements of the compound particles. Furthermore it has been observed that the tumbler at the end of each operation is so thoroughly scavenged as to render it unnecessary to cleanse the same except at infrequent intervals.

In the form of the invention illustrated in Fig. 7 of the drawings, a slightly modified type of screening tray arrangement is shown. In this modification, the lower screening tray K includes a marginal frame **35** and the bottom screen panel **36** is disposed at an incline and pitched forwardly toward a discharge opening **37** in the forward frame wall. A discharge spout **38** is arranged in the discharge opening and protrudes forwardly and downwardly at an angle for gravitationally discharging the chips or other tumbling elements therefrom. The spout or chute **38** extends through an opening **39** in a cross strip **40** arranged at the front of the housing L. The lower screen tray K is preferably provided with rollers engageable with guide tracks **41** extending forwardly and rearwardly within the housing. In this instance the upper screen tray M which is disposed below the tumbling barrel N consists of a marginal frame **43** and a bottom screen panel **44**. The frame **43** is of a size to telescopically fit within the upper portion of the marginal frame **35** of the lower screen tray K so that the upper screen tray M is supported by the lower screen tray and is designed to be agitated simultaneously with the lower screen tray.

What I claim is:

1. In a tumbling apparatus, an open front housing, a tumbling barrel mounted for rotation on a horizontal axis within the housing, said tumbling barrel having a charging opening for introducing thereinto the articles to be tumbled together with tumbling elements and a comminuted compound, a screen mesh cover for said charging opening adapted to be arranged over the charging opening, means supported within the casing below said barrel for receiving the compound when the barrel is rotated with the screen mesh cover applied thereto, and a displaceable shield arranged over the open front of the housing for preventing the escape of the fine particles of the compound from the housing and their dissipation outside thereof.

2. In a tumbling apparatus, a housing having top, rear and side walls and a displaceable front wall, a tumbling barrel mounted for rotation on a horizontal axis within the housing, guide tracks arranged within the housing below the barrel and extending forwardly and rearwardly and horizontally of the housing below the displaceable front wall, a screening tray mounted on said guide tracks beneath the barrel for reciprocatory movement and adapted to receive material discharged from the barrel, and a receptacle having an open top located within said housing beneath said tray for receiving material screened therethrough, said receptacle being displaceable from the housing for emptying the same.

3. In a tumbling apparatus, a housing, a tumbling barrel mounted for rotation on a horizontal axis within the housing, horizontally disposed guide tracks arranged within the housing below the barrel and extending forwardly and rearwardly of the housing, a screening tray displaceably mounted on said guide tracks for reciprocatory fore and aft movement and adapted to receive material discharged from the barrel, and an open top receptacle located within said housing beneath said tray for receiving the material screened therethrough, said receptacle having rollers for facilitating the movement of the same to and from its position beneath the tray.

4. In a tumbling apparatus, a housing, having a top, rear and side walls and a displaceable front wall, a tumbling barrel mounted for rotation on a horizontal axis within the housing, vertically spaced sets of guide tracks arranged within the housing below the barrel and extending forwardly and rearwardly and horizontally of the housing below the displaceable front wall, a plurality of screening trays having screen mesh bottom panels of relatively different sized mesh mounted respectively on said sets of guide tracks in superposed and subterposed relation for reciprocatory movement and adapted to receive and separate from each other the materials of relatively different sizes which are discharged from the barrel, and a receptacle having an open top located within said housing beneath said trays for receiving the finer materials screened therethrough.

5. In a tumbling apparatus, an open front housing including top, rear and side walls and an intermediate vertical partition extending fore and aft of the housing from the top wall downwardly and subdividing the casing into a pair of compartments, a tumbling barrel mounted for rotation on a horizontal axis within each of said compartments, said tumbling barrels each having a charging opening for introducing thereinto and for discharging therefrom the articles to be tumbled together with the tumbling mixture composed of tumbling elements and a comminuted compound, said tumbling barrel adapted to have solid and screen mesh covers selectively arranged over said charging opening for tumbling the complete mixture with the articles initially when the solid cover is applied and for expelling the compound when the screen mesh cover is applied so as to continue the tumbling of the articles with the tumbling elements alone and a displaceable guard adapted to be arranged over the front of the housing compartments respectively for preventing the scape of the lighter and finer particles of the compound from the housing and their dissipation outside of the housing when they are put to flight as they are expelled from the barrel by the tumbling operation.

6. In a tumbling apparatus, an open front housing, a tumbling barrel mounted for rotation within the housing, a charging opening in the tumbling barrel for introducing thereinto and for removing therefrom the articles to be tumbled together with a tumbling mixture composed of tumbling elements and a comminuted abrasive compound, said tumbling barrel adapted to have solid and screen mesh covers selectively arranged over the charging opening for initially tumbling the complete mixture together with the articles with the solid cover applied and for subsequently expelling the comminuted abrasive compound when the screen mesh cover is applied so as to continue the tumbling of the articles with the tumbling elements alone and a displaceable guard adapted to be arranged over the open front of the housing for preventing the escape of the lighter and finer particles of the compound from the housing and their dissipation outside of the housing when they are put to flight as they are expelled from the barrel by the subsequent tumbling operation.

JOSEPH LUPO.