

Oct. 29, 1957

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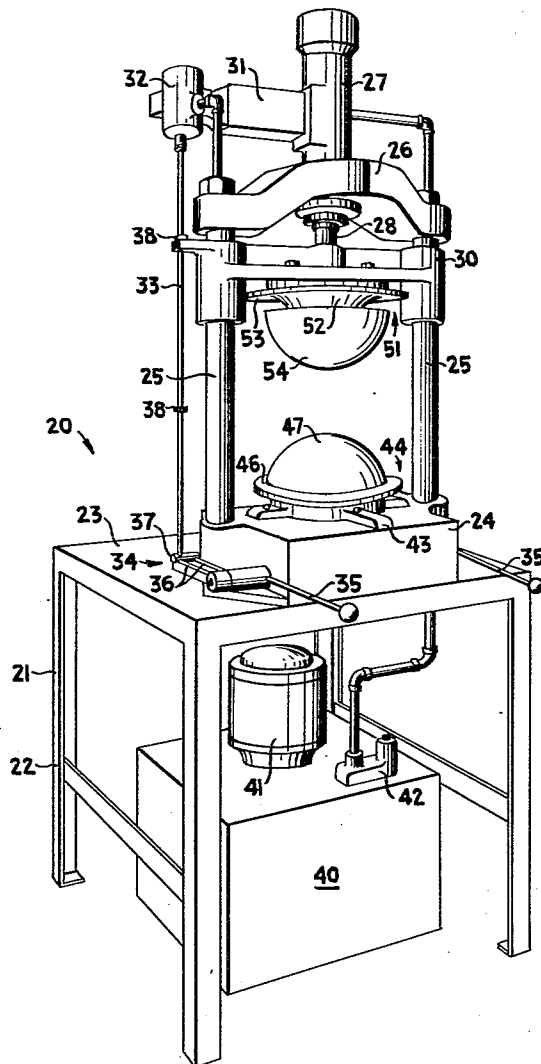
2,810,976

METHOD AND APPARATUS FOR ORNAMENTING CERAMIC WARE

Original Filed Dec. 28, 1951

3 Sheets-Sheet 1

FIG. 1



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3 Sheets-Sheet 2

FIG. 3

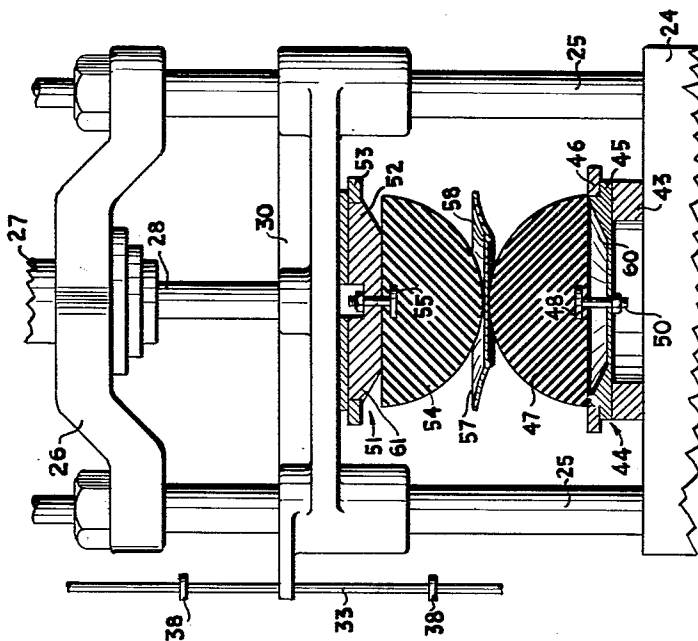


FIG. 2

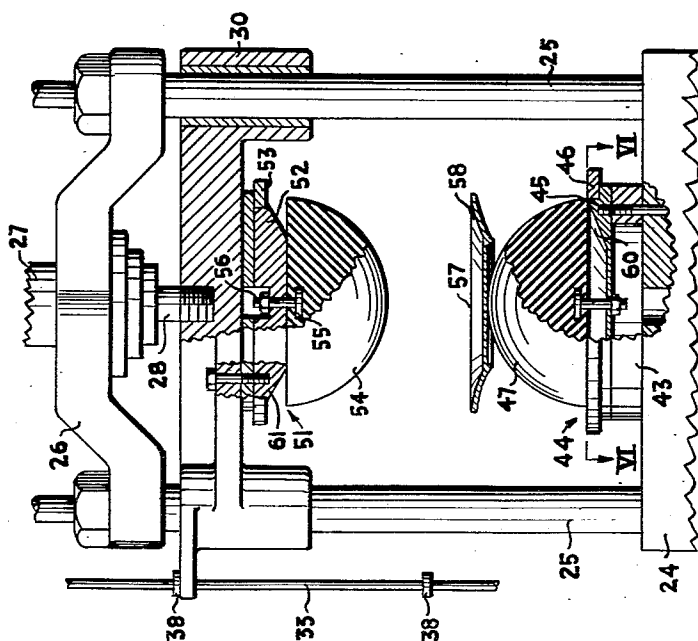
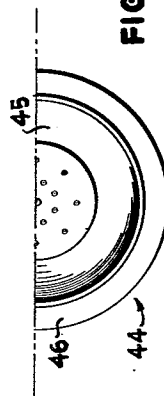


FIG. 6



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3 Sheets-Sheet 3

FIG. 7

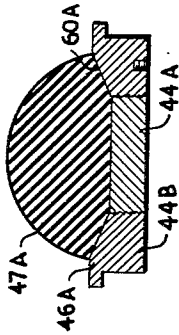


FIG. 5

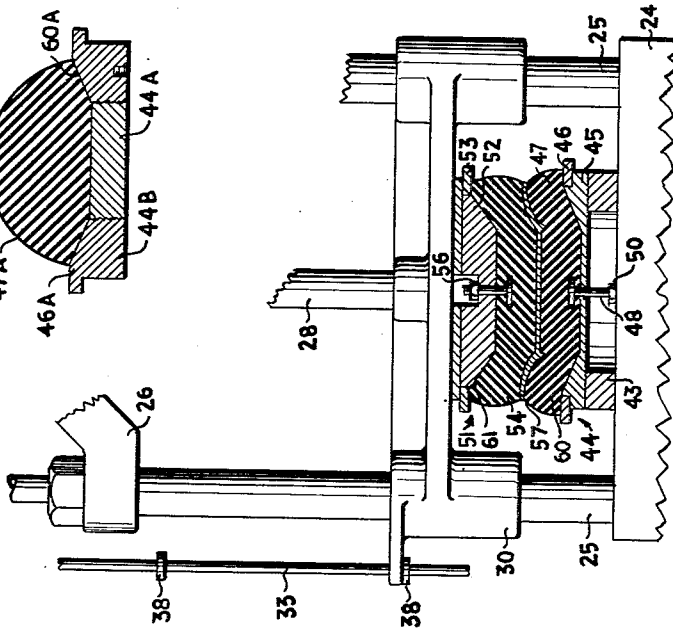
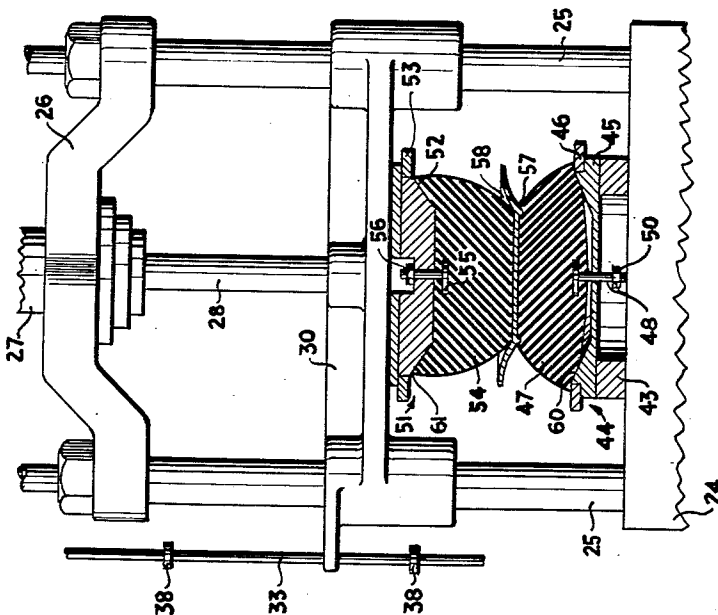


FIG. 4



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1

2,810,976

METHOD AND APPARATUS FOR ORNAMENTING
CERAMIC WARE

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Substituted for abandoned application Serial No. 263,926, December 28, 1951. This application December 27, 1952, Serial No. 328,173

8 Claims. (Cl. 41—1)

This invention relates generally to pottery making and is more particularly directed to a method and apparatus for decorating potteryware, especially the type designated as flat dinnerware.

This application is a substitute for my copending application Serial No. 263,926, filed December 28, 1951, now abandoned, directed to method for ornamenting ceramic ware.

One of the objects of this invention is to provide a method and apparatus for quickly and easily applying ornamental designs to dinnerware.

Another object of the invention is to provide a method of and apparatus for smoothing out and pressing design bearing transfers onto dinnerware, the method serving to expedite the decorating operation, improve the quality of the ware and decrease the handling of the ware during the operations of applying designs thereto.

A further object of the invention is to provide a method of decorating potteryware in which a design bearing transfer is placed on a piece of the ware then the ware with the transfer is exposed to a resilient pressing operation started at the center of the surface to be decorated and increased uniformly, or substantially so, in all directions from the center so that the transfer will be smoothed free of wrinkles and all air will be excluded from between the transfer and the ware.

A still further object of the invention is to provide a method of decorating potteryware in which a piece of the ware has a transfer placed on a surface then the surface is exposed to a pressing operation which starts at the center of the surface and, in effect, rolls radially outwardly from the center in all directions simultaneously to force entrapped air from beneath the transfer, roll out wrinkles if any are present in the transfer and securely engage the transfer with the surface to be ornamented.

Still another object is to provide a method of applying transfers to ceramic or other dinnerware in which the surface of the ware to be decorated is exposed to a resilient pressing action which starts at a spot which increases in diameter until a predetermined area is covered then decreases until the pressing action is discontinued.

It is also an object of the invention to provide apparatus for carrying out the foregoing method, the apparatus including a movable ram having a resilient ware engaging element so formed that, as the ram moves toward the ware, the element will engage the same at a point, then spread out over a predetermined area with substantially no slippage between the element and the ware, then as the ram retracts the area engaged by the element contracts until the element is finally disengaged from the ware.

An object also is to provide an apparatus of the type mentioned in the preceding paragraph with resilient means for supporting the ware during the pressing operation, the resilient supporting means being so designed and constructed that it will substantially duplicate the action of ware engaging element carried by the ram, that is, the supporting element will engage the ware at a point op-

2

posite that engaged by the ram supported element and spread out over an area substantially equal to that over which the ram supported element spreads; this form of apparatus serves to apply equal forces to the opposite sides of the ware and prevents breakage and mutilation of the ware.

A more specific object of the invention is to provide an apparatus for carrying out the method outlined above, the apparatus comprising a press having a support and a ram movable toward and away from the support, the ram and support being provided with opposed hemispherical elements formed from compressible rubber, the ware being placed on the element carried by the support then the ram advanced to squeeze the ware between the elements until the entire surface to be ornamented is engaged by one of the elements; the hemispherical shape and the composition of the ware-engaging elements providing for the equalization of contact areas and forces of engagement on opposite sides of the ware whereby better quality ware may be produced with a minimum loss through breakage of ware and time consumed in arranging it in position to be processed.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred form of embodiment of the invention is clearly shown.

In the drawings:

Fig. 1 is a perspective view of the press embodying the invention and designed for carrying out the method.

Fig. 2 is a fragmentary front elevation with parts in section showing the press illustrated in Fig. 1 in the first stage of operation.

Figs. 3, 4 and 5 are similar views showing the press in later stages of operation.

Fig. 6 is a detail horizontal sectional view taken on the plane indicated by the line VI—VI of Fig. 2.

Fig. 7 is a detail vertical sectional view taken through a modified ware engaging element which may be used in the press shown in Fig. 1.

Referring more particularly to the drawings and especially to Fig. 1, the invention has been illustrated as applied to a hydraulic press. This press is designated generally by the numeral 20 and, while it may take many forms, the present illustration shows a two strain rod press which is particularly adaptable to the present invention. The press 20 includes a supporting frame 21 having legs 22 and a table section 23. This table section has a platen 24 secured thereto, the strain rods 25 extending upwardly therefrom. The upper ends of these strain rods support a yoke 26 to which is secured a power cylinder 27. This power cylinder is provided with a reciprocating ram 28, the lower end of this ram being connected with a cross head 30 which is received for sliding movement on the strain rods 25.

The power cylinder 27 has a laterally extending block 31 to the outer end of which is secured a control valve 32. This valve may be of any suitable design to effect the controlled flow of fluid to the power cylinder 27 and cause the desired movement of the ram 28 and cross head 30. In the present instance, the valve 32 has a shipper rod 33 extending downwardly therefrom to a valve actuating mechanism 34, this mechanism including a pair of levers 35 mounted for pivotal movement at the sides of the platen 24. These levers serve to actuate a pair of rearwardly extending arms 36 which engage a cross pin 37 carried by the lower end of the shipper rod 33. In the interest of safety, the connections between the levers 35, the arms 36 and the pin 37 are such that both of the levers 35 must be operated to effect the actuation of the control valve 32. The shipper rod 33 is also provided with a pair of spaced collars 38 which are disposed to

be actuated by the cross head in its movement to prevent the ram from traveling an excessive distance in either direction.

Fluid under pressure to effect the operation of the power cylinder is supplied by a pumping unit arranged in the frame 21. This pumping unit includes a reservoir 40, a pump (not shown), a motor 41 for actuating the pump, and a relief valve 42, all of these elements being of conventional types and forming no part of the present invention. Conduits extend from the pumping unit to the valve 32 and back to complete, in combination with ducts formed in block 31, a hydraulic circuit for the press. Through the manipulation of the levers 35, fluid pressure may be supplied to the power unit 27 to effect reciprocation of the ram 28 and cross head 30. The mechanism thus far described is conventional in construction and operation and forms no part of the present invention, the invention being directed to a method and apparatus which the press shown and thus far described is adaptable.

To carry out the present invention, the platen 24 is provided with an adaptor 43 on which a plate 44 is supported; this plate includes a circular body 45 and a flange 46. The plate in turn supports an inverted hemispherical ware engaging element 47, this element being loosely secured to the plate 44 by a stud 48 having one end embedded in the element and the other extending through an opening in the plate and being provided with a nut 50 to prevent complete separation of the element from the plate. A second plate 51 is secured for movement with the cross head 30. This second plate also has a body portion 52 and a flange 53. The plate 52 also has a second ware engaging element 54, the elements 47 and 54 being, in this instance, formed from a resilient material, such as rubber or a suitable composition thereof. The element 54 is also hemispherical, being disposed in opposed relation to the element 47, that is, the elements are disposed with the rounded surfaces facing one another. Element 54 is secured to plate 51 in the same manner as element 47 is secured to plate 44, that is, a headed stud 55 is embedded in the element 54, the shank of the stud projecting through an opening in body 51 and being provided with a nut 56 to prevent undesirable separation.

The invention is particularly adaptable to applying ornamental designs to flat, or relatively flat, ceramic or similar dinnerware. Some of this ware, namely plates, are provided with angularly extending rims to which ornamental designs are frequently applied. In some instances, ornamental designs are also applied to the flat bottom sections of such plates. While the invention as specified above is particularly adaptable to ornamenting flat ware, it may also be used in applying designs to other ware which may not be designated as flat ware. In the illustration, a plate is employed, this plate being designated by the numeral 57. To accommodate the apparatus to plate 57 which has the angularly extending rim 58, plates 44 and 51 are formed to include similarly shaped frusto-conical surfaces 60 and 61. The surface 60, which is formed on plate 44, is recessed in this plate to conform to the upwardly extending bottom surface on the plate rim 58. The surface 60 is formed on plate 51 and is an external surface, it being designed to conform to the upper surface of the plate rim 58. The angular surfaces 60 and 61 are employed to change the compression characteristics of the ware engaging elements as these elements are moved into compressive engagement with the plate 57. One of the features of the invention is to engage the ware on opposite sides with the same force so that the ware will not be broken or otherwise mutilated. Through the use of hemispherical elements with the same compression characteristics, the forces on the upper and lower sides of the plate conform and will be applied to substantially equal areas. By providing the inclined surfaces 60 and 61 this uniformity of force and area, contact will be the same even though the angular rim of the plate is affected.

The method and apparatus is particularly adaptable to the operation of applying design bearing transfers to dinnerware. In such operation, partially completed ware is coated with an adhesive and a transfer applied thereto.

In conventional operations, the ware is handled many times, the transfers being manually rubbed or smoothed out and pressed into contact with the adhesive. It is an object of this invention to eliminate handling and to secure more efficiency in the smoothing out and pressing of the transfers onto the ware. In carrying out the method, the ware is coated in the same manner with the adhesive then a transfer is placed on the ware and the ware disposed on the lower ware engaging element 47 as shown in Fig. 2. The press is then operated to cause the ram to move the second ware engaging element 54 into engagement with the ware. It will be obvious that, due to the spherical surfaces of the elements 47 and 54, the inherent adhesion of the molecules of rubber of which they are composed and their capacity to compress, they will first engage the ware at a single point then continued advancement of the ram will cause the areas engaged by the elements 47 and 54 to increase substantially radially uniformly. At the same time the elements 47 and 54 will distribute the forces applied by the ram and platen over the surfaces of the ware, the greatest amount of the force being applied at the points first contacted, the intensity of the force decreasing from such points toward the edges of the areas contacted. This spreading out of areas contacted will cause any air between the transfer and the ware to be excluded, the transfer being smoothed out by the rolling-like action of the elements as the areas contacted increase. When the areas contacted reach the rims of the ware, the elements 47 and 54 will have been compressed to a considerable extent, the element 47 being forced downwardly into the concave portion of the plate 44 which causes a stress to be introduced into the rubber element 47. This initial stress changes the compression characteristics of the element 47 making it compensate for the receding inclined portion of the plate rim 58. The element 54 has its compression characteristic changed also due to the receding surface 61. This surface, being inclined similarly to the plate rim 58, causes the element 54 to be adapted to the inclined portion of the plate rim 58. The areas of the plate rim contacted by the elements 47 and 54 will also increase uniformly due to the change in compression characteristics. After the entire area of the plate to be ornamented has been engaged by the elements 47 and 54, the press is operated to retract the ram and element 54 and the plate may be removed for further processing.

Due to the relatively loose connection of the elements 47 and 54 with the plates 44 and 51 and the provision of the flanges 46 and 53, the elements 47 and 54 may expand in external diameter as they are compressed, the elements being shown in this expanded condition in Fig. 5. As the compressive force is diminished, these elements will retract to their initial position. Plate 44 is provided, as shown in Fig. 6, with a plurality of holes to permit the escape of air between the element 47 and the plate 44 when the element is being compressed.

The lower ware engaging element and supporting plate may be modified to have the compression characteristics initially changed, as shown in Fig. 7. In this figure, the element 47A is vulcanized or otherwise secured to a central plate 44A then a plate ring 44B is applied to the plate 44A, the ring 44B having an upwardly and outwardly extending conical surface 60A formed thereon. This surface engages the underside of the element 47A and compresses it in the same manner in which element 47 is compressed during operation in the form of the invention shown in Figs. 2 to 5, inclusive. Ring 44B also has a flange portion 46A to permit the expansion of the element 47A during the transfer pressing operation. It should be obvious that the angularity of surfaces 60, 60A

and 61 may be changed depending upon the shape of ware to be operated upon by the mechanism.

While the form of embodiment of the preset invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow:

I claim:

1. Apparatus for ornamenting dinner plates comprising a support; a ram guided for movement toward and away from said support; a solid rubber hemispherical element disposed on said support with the rounded surface thereof facing said ram; a second solid rubber hemispherical element carried by said ram with the rounded surface thereof facing the first-mentioned element; and means engaging the rubber elements on the surfaces opposite the rounded surface to modify the compression characteristics of portions of the rubber elements as the engagement of the latter with ware disposed therebetween is increased.

2. Apparatus for ornamenting dinnerware comprising a support; a ram guided for movement toward and away from said support; mounting fixtures on said support and ram, each of said fixtures having a planar surface and an annular inclined surface extending therefrom, said annular surfaces being inclined in the same direction; and a solid rubber hemisphere carried by each of said fixtures, the rounded surfaces of said hemispheres being opposed, the back of one hemisphere engaging the planar surface of one fixture and the back of the other hemisphere engaging the outer periphery of the annular inclined surface of the other fixture.

3. Apparatus for ornamenting dinnerware comprising a support; a ram guided for movement toward and away from said support, mounting fixtures on said support and ram, each of said fixtures having a planar surface, an annular inclined surface extending therefrom and an annular flange substantially parallel with said planar surface extending from the periphery of said annular inclined surfaces, the latter surfaces of said fixtures being inclined in a similar direction; and a solid rubber hemisphere carried by each of said fixtures, the rounded surfaces of said hemispheres being opposed, the back of one hemisphere engaging the planar surface of one fixture and the back of the other hemisphere engaging the outer periphery of the annular inclined surface of the other fixture.

4. A method of applying ornamental designs to dinnerware comprising the steps of placing a design bearing transfer on a piece of the ware; applying opposed resilient pressing forces to opposite surfaces of said piece of ware; progressively increasing the areas engaged by the pressing forces simultaneously on both sides of the ware; and changing the characteristics of the pressing forces during a predetermined portion of their application to the ware.

5. A method of applying ornamental designs to articles of dinnerware having irregular surface areas comprising

the steps of placing a design bearing transfer on a piece of the ware; applying opposed resilient pressing forces to opposite surfaces of said piece of ware; progressively increasing the areas engaged by the pressing forces simultaneously on both sides of the ware; and retarding the application of the pressing force at one side of the irregular portion of the ware and accelerating the application of the pressing force at the other side of said portion to effect the application of equal pressing forces to both sides of the irregular portion simultaneously.

6. A method of applying ornamental designs to articles of dinnerware having irregular surface areas comprising the steps of placing a design bearing transfer on a piece of the ware; applying opposed resilient pressing forces to opposite surfaces of said piece of ware; progressively increasing the areas engaged by the pressing forces simultaneously on both sides of the ware; and simultaneously changing the rates of application of the pressing forces at opposite surfaces of said piece of ware to effect the application of equal pressing forces to both sides of the irregular portion simultaneously.

7. A method of applying ornamental designs to dinnerware comprising the steps of placing a design bearing transfer on one surface of a piece of the ware; engaging registering points on the transfer and the opposite surface of the piece of ware with substantially hemispherical resilient pressing elements; pressing the piece of ware between said pressing elements and uniformly increasing the areas engaged thereby, the intensity of the effective pressing forces applied to the opposite surfaces of the piece of ware diminishing from such registering points radially outward toward the edges of the areas engaged thereby.

8. A method of applying ornamental designs to dinnerware comprising the steps of placing a design bearing transfer on one of the oppositely facing surfaces of a piece of the ware; applying pressing forces to such oppositely facing surfaces by engaging registering points on such surfaces with resilient force-distributing pressing elements; progressively increasing the areas contacted by said elements uniformly in all directions from said points simultaneously on both surfaces of said piece; and distributing the forces over the areas contacted with the intensity of the forces being the greatest at the points first engaged and decreasing toward the edges of the areas contacted.

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