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S. G. GOSS

2,008,278

EMBOSSED WHEEL

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Fig 1

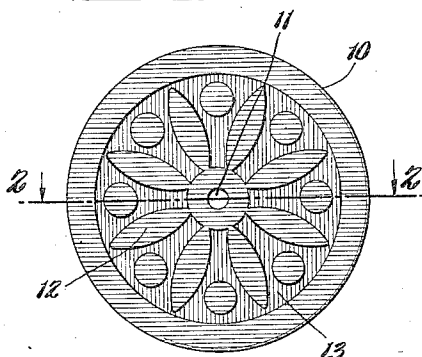


Fig 2

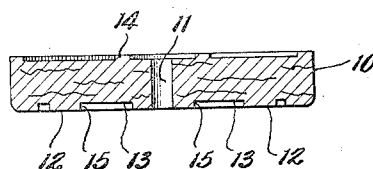


Fig 3

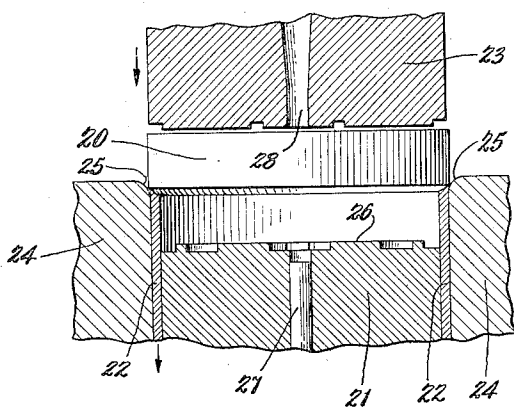


Fig 4

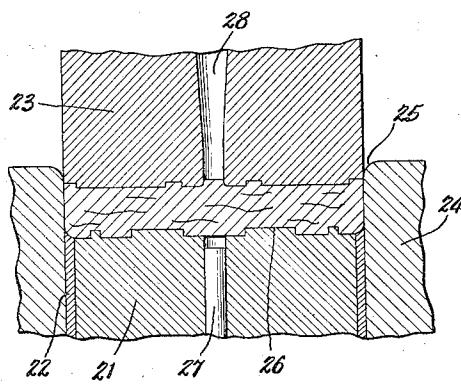


Fig 6

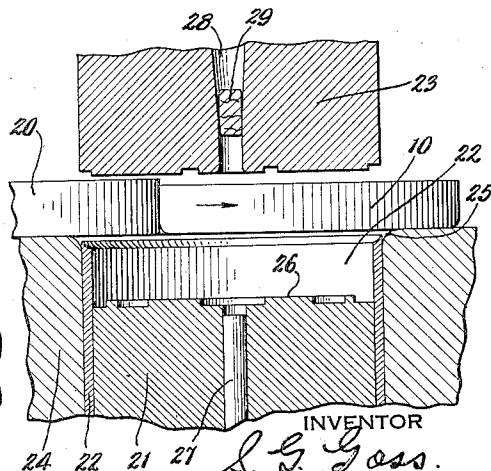
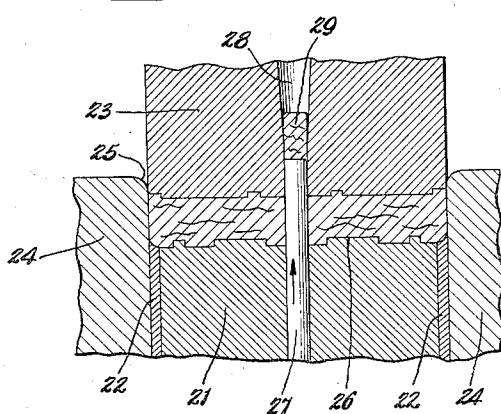


Fig 5



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## UNITED STATES PATENT OFFICE

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## EMBOSSSED WHEEL

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7 Claims. (Cl. 41-24)

The present invention relates to a novel and improved method of making wheels for toys and other ornamental discs.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the steps and instrumentalities pointed out in the appended claims.

The invention consists in the novel steps, methods and improvements herein shown and described.

The accompanying drawing, referred to herein and constituting a part hereof, illustrates one manner of carrying out the invention, and together with the description, serve to explain the principles of the invention.

Of the drawing:

Figure 1 is a plan view illustrating a completed wheel in accordance with the present invention.

Figure 2 is a section taken on the line 2-2 of Figure 1; and

Figures 3 to 6 are diagrammatic sectional views illustrating several steps in the method of the present invention as applied to the making of wheels.

The present invention has for its object the provision of a novel and improved method of making small wooden wheels for toys and other disc like objects. A further object is the provision of an extremely simple and economical method of producing small ornamental discs, such as wheels for toys, which will be very attractive in their appearance and will be durable in use. Still another object is the provision of a method of forming wheels for small toys which will run true and will have little friction.

In accordance with the present preferred manner of carrying out the method of the present invention, a wheel for small toys is produced which may present areas of three different colors, is provided with a hard, wear resisting tread, an accurately formed axial hole, and a narrow, low-friction bearing surface to contact with a non-rotating part of the toy with which the wheel is used.

It will be understood that the foregoing general description and the following detailed description as well are exemplary and explanatory of the invention but are not restrictive thereof.

Referring now in detail to the present embodiment as shown in Figures 1 and 2 of the drawing and illustrative of a completed wheel in accordance with the present invention, the wheel comprises a relatively thin disc of wood 10, or other

deformable material, having an axial hole 11 formed by punching the disc, said disc being radially compressed and axially embossed in the direction of the grain of the wood. On its outer side, the disc is preferably provided with an ornamental embossed design, comprising relief portion 12 and intagliated portions 13, while on its inner side it is preferably provided with a narrow annular portion 14, formed by embossing, adapted to bear against a stationary portion of the toy and insure easy rotation of the wheel.

The wheels or other ornamental discs of the present invention are preferably formed from axially-grained discs of wood which have had their surfaces impregnated with a dye of a color contrasting with that of the natural wood, this impregnation not being carried out sufficiently long to penetrate deeply into the body of the disc. As the discs are embossed, the intagliated portions 13 thereof are separated from the raised portions 12 by a narrow axially extending portion 15 of natural wood, contrasting with the color of the remainder of the disc. After the raised portions of the disc have been painted, as by means of a paint roller, an exceedingly attractive disc, ornamented in three colors is provided. After dyeing, and before compressing and embossing, the discs may be surface-waxed, which serves not only to guard against swelling of the embossed portions by moisture and thereby destroying the appearance of the wheels, but also protects the dye from being dissolved if a child puts the wheels in his mouth and further, serves to lubricate the ring 14 to reduce the friction of the wheels.

Figures 3 to 6 of the drawing illustrate diagrammatically the successive steps in the embossing and punching of the discs. As there shown, the blank discs 20, preferably of wood with the grain extending axially of the disc, and slightly larger in diameter and thickness than the required dimensions of the finished wheels, are fed one by one into position over the lower embossing die 21, which is provided with a flared or bell-mouth. The discs are supported over the die by means of a sleeve 22, at the peripheral edge of the disc, which supports the disc parallel to the face of the lower die. After the discs have been fed to the position shown in Figure 3, the upper die 23 is lowered against the disc and forces it into the sleeve member 24 through the bell mouth 25 thereof. This produces a powerful radial compression of the disc and serves to densify the wood, rendering its peripheral surface considerably harder than the natural wood

and absolutely true. Sleeve 22 is then lowered as the upper die 23 descends, and, as shown in Figure 4, finally assumes a position flush with the upper surface of the lower die. The two dies are thus forced towards each other to deeply emboss the flat faces of the disc. Due to the relatively sharp edges of the raised portions 26 of the die faces, the surface of the disc is broken and the relief and intagliated portions of the embossed flat faces are separated from each other by a narrow strip 15 of undyed wood.

After the upper and lower dies have assumed their position of maximum compression, the punch plunger 27, reciprocable in die 21, is raised and pierces the disc to form the central, axial hole therein. The punch plunger, after piercing the disc, enters a cooperating hole 28 in the upper die and discharges the punched out piece 29 into said hole. The punch plunger is then withdrawn leaving the punched out piece in the flared upper part of the aperture 28, the upper die 23 is restored to its original position, and sleeve 22 is raised to its original position where the embossed wheel 10 is displaced by the feeding-in movement of a new unembossed disc 20. Due to the fact that the disc is punched while under powerful radial compression, and the punching plunger 27 is unsupported for only a short distance, the axial hole may be formed with extreme accuracy, both as to size, centering and direction, thereby producing a wheel greatly superior to any produced by drilling.

After this embossing operation, the raised portion 12 may, if desired, be pointed to further ornament them.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What I claim is:—

1. The process of manufacturing ornamental wheels by embossing which includes radially compressing an oversize disc of deformable material, punching a hole in the center of the disc and axially embossing the disc.

2. The process of manufacturing ornamental discs by embossing which includes radially compressing an oversize disc, punching a hole in the disc while under radial compression, axially embossing the disc, withdrawing the punch and releasing the pressure on the disc.

3. The process of manufacturing ornamental discs by embossing which includes radially compressing an oversize disc of wood which has been previously surface waxed and colored, punching an axial hole in said disc while under radial compression, axially embossing the disc and coating the raised portions of the embossing with paint.

4. The process of manufacturing ornamental discs by embossing which includes radially and axially compressing an oversize disc to densify the material and ornament its flat surfaces and punching an axial hole in said disc while it is radially compressed.

5. The process of manufacturing ornamental wheels by embossing which includes impregnating the surface only of a disc of wood with dye of color contrasting to that of the wood, and deeply axially embossing the disc to provide light edges separating the raised portions of the embossing from the compressed portions.

6. The process of manufacturing ornamental wheels by embossing which includes impregnating the surface only of a disc of wood with dye of a color contrasting with that of the wood, deeply axially embossing the disc to provide light edges separating the raised portions of the embossing from the compressed portions and painting the raised portions with a third color.

7. The process of manufacturing ornamental wheels by embossing which includes impregnating the surface only of a disc of wood with dye of a color contrasting with that of the wood radially and axially compressing the disc and punching an axial hole therein while under radial compression, the axial compression being sufficiently deep to form areas of natural wood color between the high and low portions of the compressed disc and painting the high portions with a third color.

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