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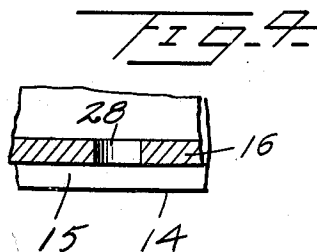
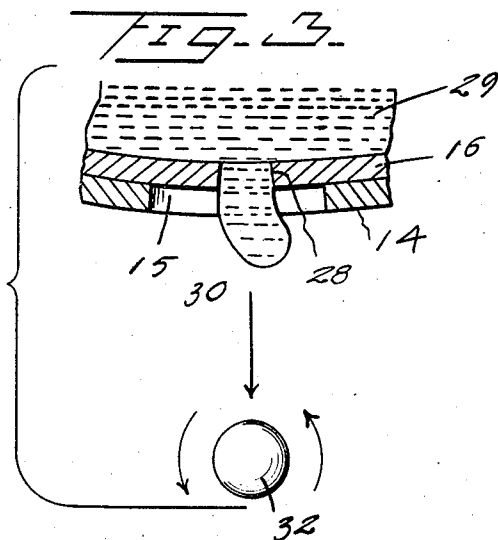
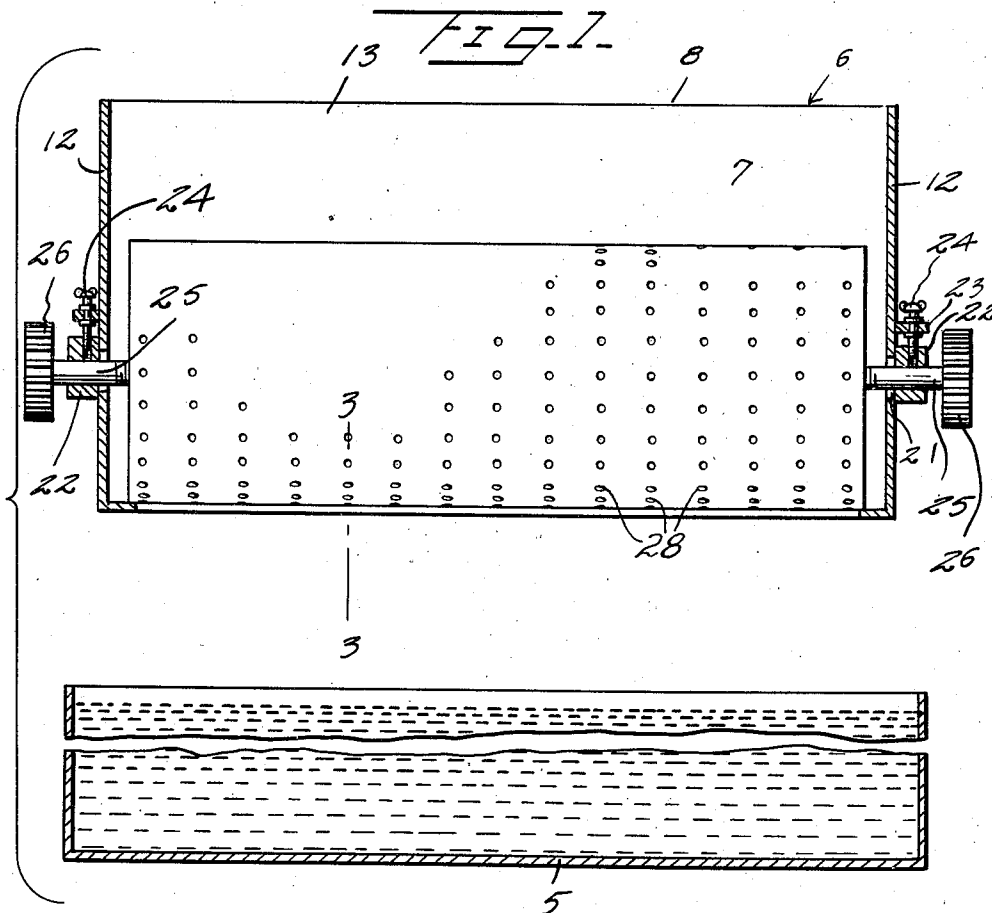
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2,436,211

APPARATUS FOR PRODUCING DROP SHOT

Filed Dec. 17, 1945

2 Sheets-Sheet 1



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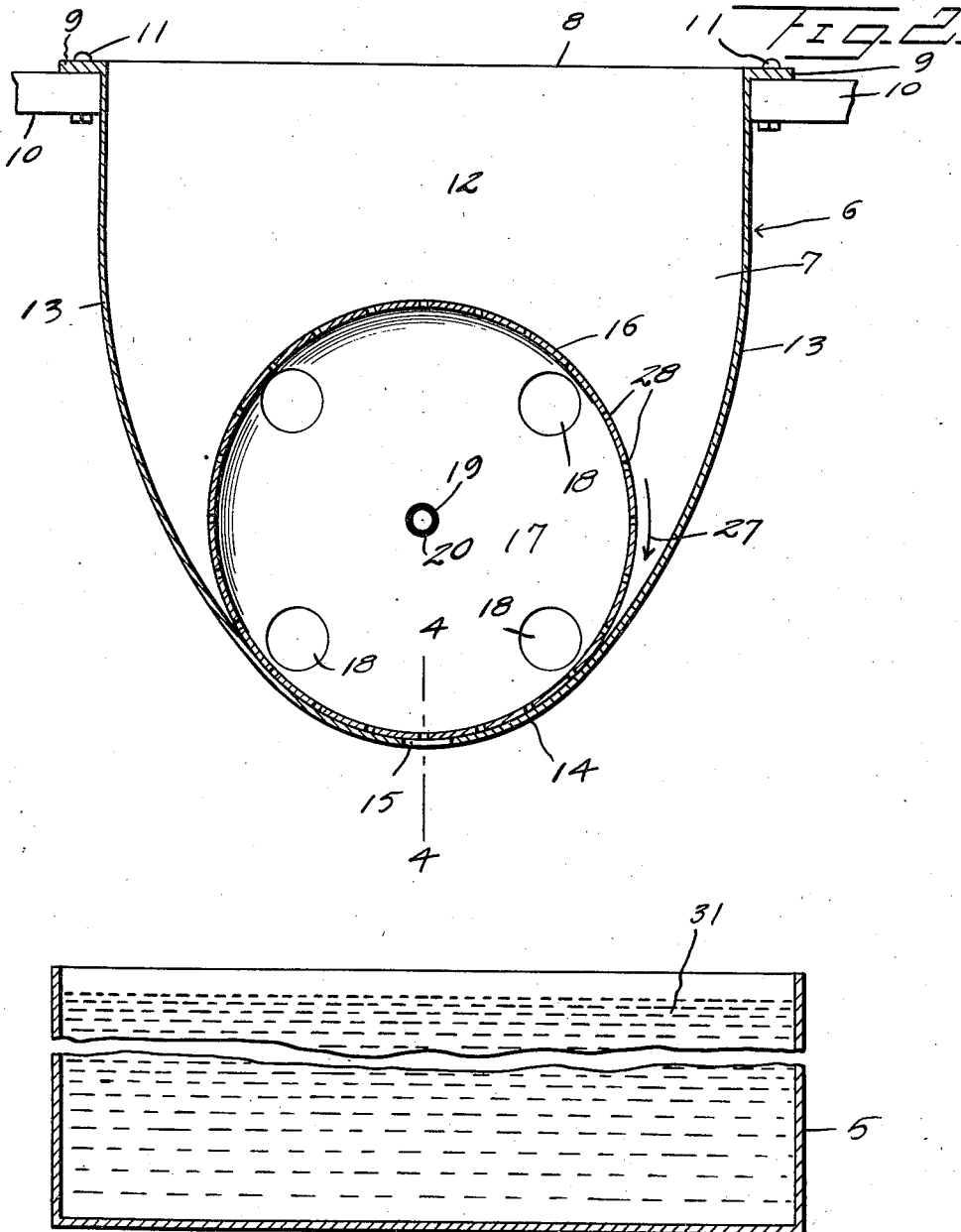
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APPARATUS FOR PRODUCING DROP SHOT

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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APPARATUS FOR PRODUCING DROP SHOT

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3 Claims. (Cl. 18—2.7)

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This invention relates to an improved apparatus for producing drop shot wherein the shot is dropped from an elevation into a container of water, said invention being distinguished by the provision of means for imparting a rotary motion to a falling globule of molten lead.

An aim of this invention is to provide an improved apparatus intended to be located in the top of the shot tower and to contain molten lead and to impart a rotary motion to the portion of the molten lead which is discharged in the form of globules, for thereby causing the globules to revolve during their descent through the atmosphere.

Other objects and advantages of the invention will hereinafter become more fully apparent in the following description of the accompanying drawings, wherein:

Figure 1 is a longitudinal, vertical sectional view partly in side elevation showing the apparatus for imparting rotation to the portion of the molten lead as it is discharged therefrom in the form of globules and showing a receptacle of water therebeneath into which the globules descend;

Figure 2 is a transverse vertical sectional view of the same;

Figure 3 is an enlarged transverse sectional view of a portion of the apparatus taken substantially along the plane of line 3—3 of Figure 1; and

Figure 4 is an enlarged longitudinal sectional view of a portion thereof taken substantially along the plane of the line 4—4 of Figure 2.

Referring more specifically to the drawings, wherein like reference characters designate like or corresponding parts throughout the several views, 5 designates generally a container which may be of any suitable size and shape which is adapted to be located in the bottom of a shot tower, not shown.

The apparatus, designated generally 6 and comprising the invention, includes a vat or tank 7 which is adapted to be mounted in the top of the shot tower and which is provided with an open top 8 having outwardly projecting flanges 9 on opposite sides thereof which are adapted to rest on beams or other suitable supports 10, as illustrated in Figure 2, and forming part of the top of the shot tower, which provides means for supporting the tank 7 therein. Suitable fastening means 11 may be provided for securing the flanges 9 to the beams 10. As illustrated in Figures 1 and 2, tank 7 is relatively long and is provided with substantially parallel end walls

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12. The side walls 13 of the tank 7 join to form a round bottom portion 14 having an elongated slot or gap 15 in the bottom, center portion thereof which extends to points adjacent to the end walls 12.

A hollow cylinder 16 is rotatably disposed in the tank 7. As seen in Figure 2, the cylinder 16 is provided with end walls 17 having openings 18 formed therein adjacent to the circumferences thereof. Each of the end walls 17 is also provided with a central opening 19 in which is located an internally threaded sleeve or boss 20. The cylinder 16, when located in the tank 7, extends to adjacent the ends thereof and beyond the ends of the slot 15.

End walls 12 are provided with corresponding vertically elongated openings 21. Bushings 22 are slidably disposed on the outer sides of the end walls 12 over the openings 21, in any suitable manner for vertical movement relatively thereto. As illustrated, this may be accomplished by providing internally threaded brackets 23 which project outwardly from the end walls 12 and in which setscrews 24 are adjustably arranged. The shank ends of the setscrews 24 swivelly engage in the bushings 22, as illustrated in Figure 1. A stub-shaft 25 extends through and is journaled in each of the bushings 22. Said stub-shafts extend loosely through the openings 21 and are provided with threaded inner ends for engagement with the sleeves 20. The outer ends of the shaft 25 are provided with cogs or sprocket wheels 26, either or both of which are adapted to be suitably connected to any conventional means, not shown, for imparting rotary motion thereto for revolving the cylinder 16 in a direction as indicated by the arrow 27 in Figure 2.

As clearly illustrated in Figures 1 and 2, the periphery or cylindrical wall of the cylinder 16 is provided with a plurality of small apertures or openings 28 which are arranged in rows longitudinally and circumferentially thereof. As best illustrated in Figure 3, the individual openings 28 converge outwardly and are therefore of greater diameter at the exterior than at the interior thereof.

The tank 7 is adapted to be partially filled with molten lead, as illustrated at 29 in Figure 3, which lead may be heated and poured through the open top 8 of the tank 7 in any suitable manner. As seen in Figure 2, the bottom portion of the tank 7 is shaped so that a substantial portion thereof is in bearing engagement with the periphery of the cylinder 16, such portion consti-

tuting preferably a distance the equivalent to 6 or 7 circumferentially spaced openings 28.

It will be apparent that when the tank 7 is partially filled with molten lead the heat thereof will cause expansion of the metal forming the tank and the cylinder 16, which might ordinarily either cause the periphery of the cylinder to move out of contact with the bottom 14 or into such snug engagement as to prevent rotation of the cylinder. For this reason the bushings 22 are swivelly connected to the screws 24 to permit said bushings to be raised or lowered, as required, to maintain the proper contact between the bottom 14 and the periphery of the cylinder 16. Obviously, this could be accomplished by suitable yieldable means in lieu of the screws 24.

Assuming that the tank 7 is partially filled with molten lead and that one or both of the cogs or sprocket wheels 26 are connected to suitable means for imparting rotary motion to the cylinder 16, a portion of the molten lead 29 will flow through the openings 18 into the interior of the cylinder 16 and portions of said lead 29 will enter the openings 28. Obviously, the openings 28 which will be filled with molten lead 29 will be those which happen to be disposed adjacent to the bottom 14, and the lead 29, within these openings 28, will be prevented from escaping therefrom by contact of the portion of the periphery of the cylinder 16, surrounding said openings 28, with the bottom 14. As the openings 28 move into registry with the gap or slot 15, in the direction as indicated by the arrows 27 in Figure 2, the molten lead therein will drop through the openings 28 and form projections as indicated at 30 in Figure 3. These projections 30 of molten lead will, due to the rotation of the cylinder 16, be curved in a direction outwardly and away from the direction of rotation as indicated by the arrow 27. Consequently, globules or droplets which are released during the time that the openings 28 are in registry with the slot 15 will be released with a rotary motion imparted thereto. This action is augmented by the fact that the openings 28 diverge outwardly to permit the droplet 30 to more readily assume the shape as seen in Figure 3 and to better allow the formation of an air-gap in the leading portion of the opening to permit the release of the globule. This rotary motion which is imparted to the globule upon its discharge from the cylinder 16 will cause the globule to rotate during its descent from the tank 7 to the vat or container 5, which is disposed a substantial distance therebelow and which is filled with water as indicated at 31 and as illustrated in Figure 2, for the conventional purpose as is well known in the art. The rotary motion imparted to the globule or droplet will continue throughout its descent and will thereby cause the globule to assume a substantially spherical shape, as illustrated by the dropping sphere 32 in Figure 3 so that the globule will cool and set in a substantially spherical form, as distinguished from a droplet-shaped form which results when drop shot is formed in the conventional manner. As a result, with the apparatus as disclosed, it is possible to use scrap metal for producing the molten lead which was previously not considered suitable for forming drop shot.

Various modifications and changes are contemplated and may obviously be resorted to with-

out departing from the spirit and scope of the invention as hereinafter defined by the appended claims.

I claim as my invention:

1. In an apparatus for producing drop shot, a tank adapted to contain molten lead, a driven rotating cylinder disposed in the tank and having a plurality of apertures in the periphery thereof, said cylinder having openings in its ends for admitting the molten lead thereto from the tank, said tank having an opening in the bottom thereof extending substantially from end to end of the cylinder and of a width, in the direction of rotation of the cylinder, substantially greater than the width of the apertures in the same direction and with which all the apertures move into and out of registry during each revolution of the cylinder, whereby globules of the molten lead, contained in the apertures, are released therefrom to the atmosphere through the tank opening, the bottom portion of the tank being curved to substantially conform to the curvature of the cylinder and being disposed in substantially flush engagement with a substantial portion thereof on either side of the opening.

2. In an apparatus for producing drop shot, a tank adapted to contain molten lead, and having a restricted bottom portion provided with an elongated opening, a rotary molten lead dispenser mounted for rotation in said tank and having a substantial portion thereof in flush engagement with the inner side of the tank bottom on both sides of the opening thereof, said dispenser having a plurality of peripheral apertures each disposed to move into and out of registry with the opening in the tank bottom during each revolution of the dispenser and being in full communication with said opening during a portion of the travel of the dispenser in each revolution, said dispenser having additional enlarged apertures therein communicating with the interior of the tank for admitting the molten lead therefrom to the interior of the dispenser, and each of the first mentioned apertures of the dispenser being of an outwardly divergent shape to facilitate the separation of the globules from the dispenser through the apertures in registry with the tank opening, and the rotation of the dispenser functioning to impart a rotary motion to the globules upon release therefrom.

3. An apparatus as in claim 2, and means carried by the tank for adjustably retaining the dispenser with a substantial portion thereof in contact with the inner side of the tank bottom.

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