

A. BURT.
ART OF MANUFACTURING BILLIARD OR POOL BALLS.
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979,397.
SPECIMENS.

Patented Dec. 20, 1910.

Fig. 1.

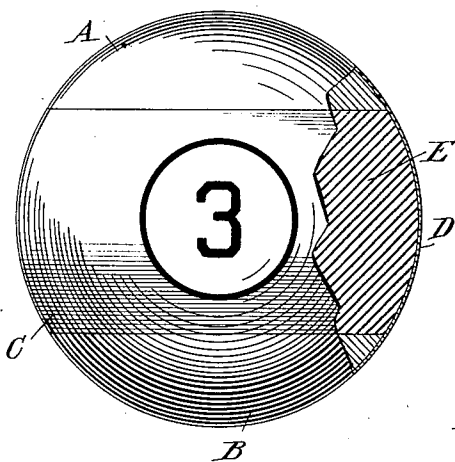


Fig. 2.

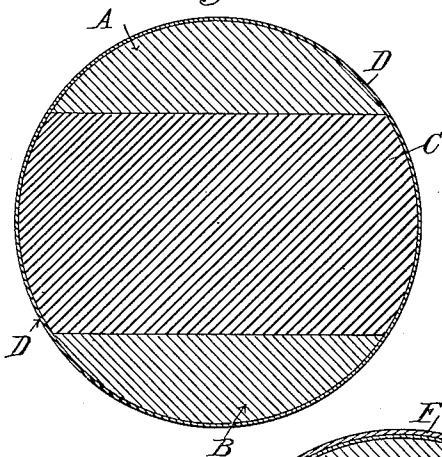


Fig. 4.

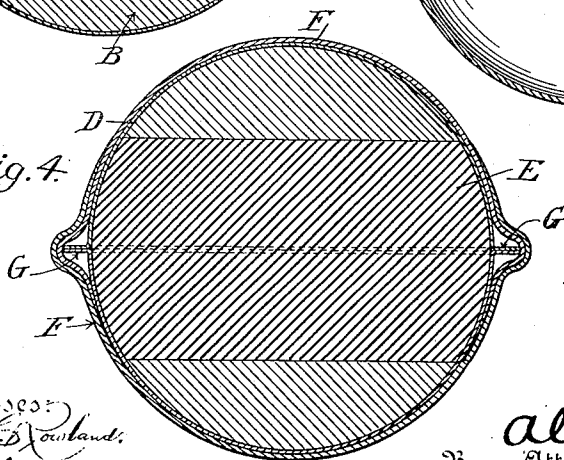
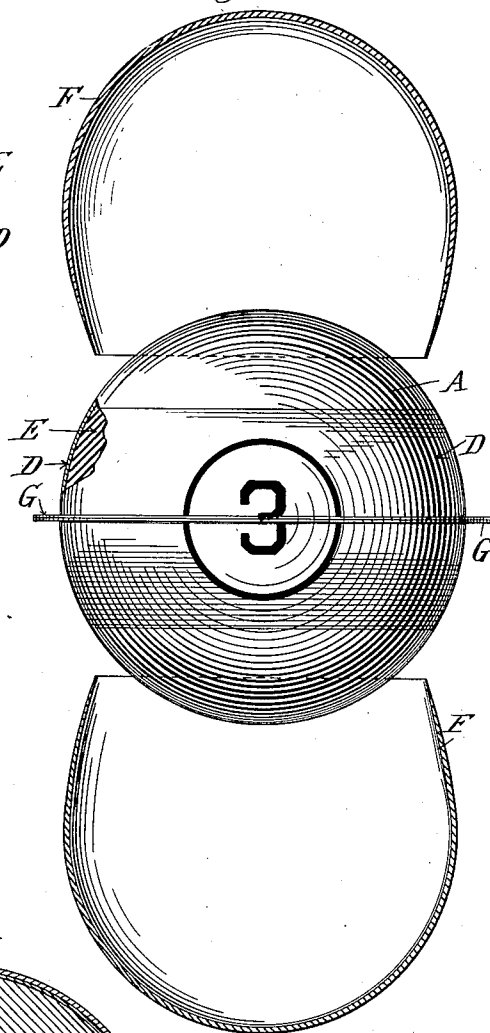


Fig. 3.



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UNITED STATES PATENT OFFICE.

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ART OF MANUFACTURING BILLIARD OR POOL BALLS.

979,397.

Specification of Letters Patent.

Patented Dec. 20, 1910.

Application filed August 26, 1909. Serial No. 514,806. (Specimens.)

To all whom it may concern:

Be it known that I, ALONZO BURT, a citizen of the United States, residing at Albany, county of Albany, and State of New York, have made a new and useful Invention in the Art of Manufacturing Billiard or Pool Balls, of which the following is a specification.

My invention is directed particularly to a novel method or process of forming or making composition billiard or pool balls of the pressed type, such balls being made usually of compositions of celluloid and other substances and in well known public use.

My invention has for its objects—first, to provide a composition or pressed billiard or pool ball which shall have at all times a perfectly polished or finished surface, and of such a nature that it may be readily cleaned, and when cleaned will assume substantially the polished appearance or condition of the ball when it leaves the factory; second, to provide a ball of this nature which shall very closely resemble well-known ivory billiard or pool balls; third, to provide a ball of this nature in which the surface thereof is of variegated colors, painted or otherwise coated with various marks or characters, and which characters or colors shall be located under the surface of a transparent outer coating or shell attached to the surface of the ball proper; fourth, to provide a ball of this nature in which the parts of such ball shall be located beneath a transparent surface; fifth, to provide a ball of this nature having a hard elastic practically indestructible surface which will not abrade or permit of the adhesion of fine grit or dust thereon.

In the manufacture of composition billiard or pool balls, such as are in well known public use, it has heretofore been customary to construct the same by compressing the material, such as celluloid, bone-dust, etc., into the proper form or shape, through the agency of hydraulic pressure, such balls being either solid white or made in sections of variegated colors with the numbers and number rings painted thereon. Or, such numbers and number rings have been constructed of individual parts sunken into the face of the ball. All such balls, however, when finally prepared for the market, after being molded, are turned down to proper spherical form, then glossed and waxed, un-

der which conditions they have the general glossy or shiny appearance of ivory balls. It is well understood, however, by those skilled in the art that when they are used they lose their gloss and the surfaces thereof readily receive and absorb small particles of dust or grit which cannot be wiped off, but as a matter of fact become embedded therein by constant use, thus greatly depreciating the perfect balance or equilibrium of the spherical mass thereof.

The present invention contemplates a decided improvement to the extent that I incase such balls, as heretofore constructed, with an exterior spherical shell or coating of a material which possesses the quality of resisting abrasive effect due to grit, dirt or the like, and this shell is of such a nature that it constitutes, when secured in place in the manner hereinafter described, a part of the ball proper, said shell being preferably transparent and of such dense material that it will retain at all times an exceedingly glossy or reflecting appearance.

For a full and clear understanding of my invention, such as will enable others skilled in the art to which it relates to practice my novel method or process and to manufacture or construct my novel billiard or pool ball, reference is had to the accompanying drawings in which all of the figures are upon an enlarged scale, Figure 1 being an elevation and part broken sectional view of a complete ball, and Fig. 2 a full sectional view taken through a great spherical circle of the ball illustrated in Fig. 1. Fig. 3 is a part side elevational, part sectional view illustrating the manner of proceeding in the preliminary steps of practicing my improved process, and Fig. 4 is a sectional view illustrating the relation of the parts shown in Fig. 3 after they have all been assembled and preparatory to applying the pressure which makes the complete ball shown in Figs. 1 and 2.

Referring now to the drawings in detail in all of which like letters of reference represent like parts wherever used, A, B and C represent the parts of a completed or pressed ball, indicated as a whole by the letter E. The polar sectors A and B are say white and the equatorial sector C red, with the number and number-ring either painted thereon or sunken into the body of the equatorial sector in a manner well understood by

those versed in the art, D representing the exterior coating or shell which, when united to the ball proper in the manner hereinafter described, constitutes the essential feature 5 of my improved billiard or pool ball.

In the preparation of compressed balls, such as have heretofore been in well known public use, it has been the practice to subject plastic masses of celluloid, bone dust, 10 etc., to hydraulic pressure by inclosing each one of them within two hemispherical soft rubber cups F F, Fig. 3, having each the contour of slightly more than half the ball, the equatorial edges of these cups when in 15 position on the ball slightly overlapping. After these cups are secured in position around the ball, by rubber cement, it is then immersed in a liquid, as water, contained in what is known in the art as the 20 "Hyatt hydrostatic gun" and subjected to such temperatures and additional pressures that the ball when completed has received the necessary pressure to make it a perfectly pressed spherical ball. In the practice of such method, however, it sometimes 25 happens that the liquid is admitted between the joints of such cups, thereby deforming the surface of the ball. To overcome this serious trouble, therefore, I have so constructed 30 these cups F, as illustrated in Fig. 3, that they are somewhat deeper than as before constructed and have gradually tapered the edges thereof, as shown, so that perfectly air and water-tight edges are obtained 35 which may be accurately cemented or sealed, as will be readily appreciated on examination of Fig. 4 of the drawings.

In the practice of my improved process I prepare, with shouldered male and female 40 dies in a manner well understood by those skilled in the use of dies, a pair of hemispherical cups D¹, D² (see Fig. 3) of pure transparent dense or hard celluloid, the same having each an outwardly turned rim or 45 flange G, shown as very much exaggerated in Figs. 3 and 4, which rims are constructed by shoulders on the male and female parts of the dies as will be apparent. After the cups are thus formed from circular disks 50 of celluloid and placed in the manner described and as shown in Fig. 3, completely encompassing or surrounding the ball E, the two soft rubber cups F are then successively drawn in opposite directions over 55 the ball and parts shown in Fig. 3, so that all of said parts assume the relation shown in Fig. 4.

It is important in the construction of the hemispherical cups D¹ and in the construction 60 of the ball proper that the interior spherical contour of each of the cups shall be mathematically the same as the like exterior hemispherical contours of the ball which they are to cover, for the reason that 65 absolutely no air should be allowed to re-

main between the inner surfaces of the cups and the outer surface of the ball. I have ascertained that if air is permitted to remain therein an imperfect exterior surface 70 of the shell results and it assumes, under high pressure, a honey-comb appearance. After the cups F are drawn over the assembled parts in the manner shown in Fig. 4 the tapered edges are secured together 75 with rubber cement in such manner as to assure a perfectly air and water-tight joint, it being obvious that in the construction of a ball the united flanges G should have a minimum area, and it also being apparent 80 that any imperfections in the ball would occur at this equatorial diameter, where the mass of material would naturally be greater, so that it could, after the ball is pressed, be turned down in a lathe. The parts surrounding the ball as thus assembled are now 85 subjected to an enormous liquid pressure in a Hyatt hydrostatic gun, which pressure causes the two cups to be united to the outer surface of the ball E at every point so that 90 when subjected to sufficient pressure said ball assumes the form illustrated in Figs. 1 and 2. I have had most excellent results in thus constructing my improved billiard or pool ball in a Hyatt hydrostatic gun with 95 pressures ranging from 2000 to 2300 pounds per square inch; I prefer, however, to use the maximum pressure of 2300 pounds. The outer casing D is a thin transparent coating which, when polished in the usual way, has 100 for ordinary use an indestructible glossy appearance and resists any tendency to permit of the attachment of dust, grit or any substance of like nature, such transparent coating also effectually protecting the number 105 or numbers on the outer face of the ball and also giving to the ball a greatly improved elastic effect.

In the practice of my improved process of manufacturing billiard or pool balls, as 110 hereinbefore described, I have obtained remarkable results in the use of well known forms of composition balls in which celluloid constitutes the binding agent of the ball proper, and in the use of celluloid 115 shells or cups in the manner described, it being important, as I have ascertained, that the shell, to be secured to the ball proper, should have substantially the same coefficient of expansion as the ball, it being obvious 120 that should the shell have a less coefficient of expansion than the ball such shell would readily crack or break; on the other hand, should the shell have a greater coefficient of expansion there would be a tendency 125 to wrinkle or materially disturb the balanced condition of the completed ball.

I am aware that it has heretofore been proposed to form golf balls by compressing 130 together two different materials of different density, one of said materials being rubber,

and I make no claim hereinafter broad enough to include any such process, my invention being limited to the extent that my novel process embodies the union of two substances having substantially the same coefficient of expansion, the outer coating of the ball, when secured under such pressures as hereinbefore referred to, being effectually united to every part of the surface of the ball proper, so that every part of the ball having such casing is of substantially equal density.

I make no claim hereinafter to the novel form of ball which results from the process herein claimed, as this feature constitutes the subject matter of a divisional application filed by me in the United States Patent Office on the 7th day of February, 1910, bearing Serial No. 542,442.

Having thus described my invention what I claim and desire to secure by Letters Patent of the United States is—

1. The described process of providing a composition billiard or pool ball with a non-abrasive surface, consisting in compressing, at a minimum pressure of about 2000 pounds per square inch, a relatively thin coating or shell of celluloid around a basic ball having celluloid as one of its elements, and in simultaneously applying sufficient heat thereto until said coating and the ball are united at all points.

2. The described process of providing a composition billiard or pool ball with an outer surface which shall not abrade or tarnish in use, consisting in covering or surrounding such ball with a plurality of curvilinear cups constructed of a substance having substantially the same coefficient of ex-

pansion as the material of which the ball is composed; then subjecting the same to a minimum pressure approximating 2000 pounds per square inch, and simultaneously applying heat until such cups and the ball are united at all points.

3. The described process of providing a composition billiard or pool ball with an outer surface which shall not abrade or tarnish in use, consisting in covering or surrounding such ball with a plurality of curvilinear cups constructed of a substance having substantially the same coefficient of expansion as the material of which the ball is composed; then subjecting the same to a minimum pressure approximating 2000 pounds per square inch, and simultaneously applying heat until such cups and the ball are united at all points, and finally in turning or truing the ball at those points where the cups are united.

4. As an article of manufacture a compressible hemispherical shaped cup of celluloid adapted to fit with exact accuracy upon or about the surface of a ball to which it is to be attached, said cup having an outwardly turned rim or flange at its equatorial edge.

5. Means for use in compressing billiard or pool balls embracing a plurality of flexible cups having each a prolonged tapering edge and adapted together to overlap the ball when in place therearound.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALONZO BURT.

Witnesses:

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