

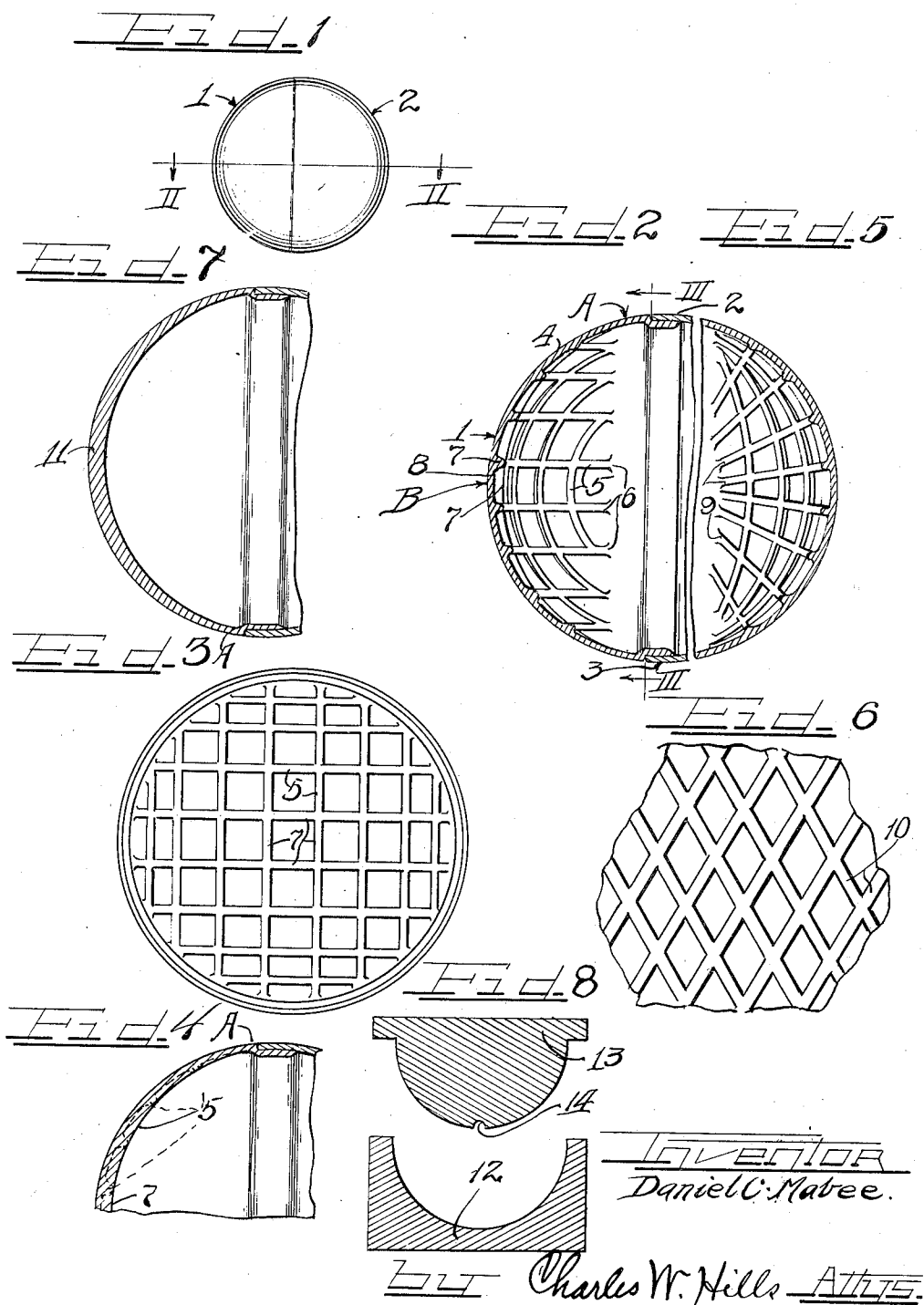
Aug. 31, 1937.

D. C. MABEE

2,091,684

TABLE TENNIS BALL

Filed April 17, 1936



UNITED STATES PATENT OFFICE

2,091,684

TABLE TENNIS BALL

Daniel C. Mabec, Villa Park, Ill.

Application April 17, 1936, Serial No. 74,915

5 Claims. (Cl. 273—58)

My invention relates to a new and improved ball to be used in playing the game known as table tennis. The table tennis balls now in use are made of Celluloid or similar material. They are made in hollow spherical form, each half of the ball being formed separately. The halves thus formed are joined together along a circumferential seam.

The material forming the wall of the ball, which is a hollow sphere, must be thin in order to make a ball of light weight. Balls of light weight are preferred by the more experienced players.

In the table tennis balls of the prior art, this effort to reduce the weight, combined with the necessity for making the balls in sections, joined along a circumferential seam, has resulted in producing balls which are not uniform in weight distribution, are not uniform in shape, and the surface does not present a uniform resistance, with the result that the movement of the ball through the air, after it has been hit by the player, is variable, depending upon which portion of the ball has been struck by the paddle.

A further disadvantage of the present ball is that when the player strokes the ball with his paddle, the effect of his stroke will vary, dependent upon whether the paddle hits the ball on or near the seam, where, because of the double thickness of the wall of the ball, the surface offers substantial resistance, or he hits the ball at a point on the surface farther away from the seam, where the resistance is materially less.

The primary object of my invention is to overcome this variation in resilience of the surface of the ball, and, by strengthening the weaker or unseamed portions of the surface, without materially increasing the weight, to provide a ball which will react uniformly to the stroke of the paddle.

Another object of my invention is to provide a ball in which, by the addition of material in the portions of the ball away from the seam, the ball can be more evenly balanced. A materially improved ball will result from the accomplishment of my primary object, even though this desired second object be not incorporated in it, but it is preferable that both objectives be realized.

A further object of this invention is to provide an improvement in the game of table tennis which comprises the provision of a table tennis ball which is of substantially the same weight as the conventional ball but which is more uniformly balanced and rigidified and the strength

of which is predetermined so as to be ample to resist the impact force of a paddle striking the same irrespective of the position of the ball or the angle of the path of the ball with regard to the striking surface of the paddle.

Another object of the invention is to provide a dynamically balanced table tennis ball presenting a uniform outer or striking surface.

In order to accomplish the foregoing objectives, I have invented the new and novel constructions of the ball which will now be set forth.

In the drawing:

Figure 1 shows the ball, in finished form, as it will appear.

Figure 2 is an enlarged fragmentary sectional view taken as indicated by the line II—II in Figure 1.

Figure 3 is an elevational view taken as indicated by the line III—III in Figure 2.

Figure 4 is a fragmentary sectional view taken through a rib adjacent the seam of the ball shown in Figures 2 and 3.

Figure 5 is a view similar to Figure 3 but showing a modified form of reinforcement.

Figure 6 is a fragmentary developed view of another form of reinforcement.

Figure 7 is a view similar to Figure 2 but showing another form of the invention.

Figure 8 is a view, in cross section, of dies which may be used in the manufacture of the ball of my invention.

In Figure 1 the finished ball is shown as viewed from the outside. So far as outside appearance is concerned it may look just like the regulation or usual table tennis ball heretofore in use, or it may have a uniformly rough or any other appearance desired. It is spherical in shape and is hollow. The two halves, 1 and 2, have been formed separately and have been joined together along the seam 3.

In Figure 2, the thin shell like construction of the ball is shown. The thin material forming the wall of the ball is shown at 4. Where the two halves of the ball are joined together at the seam, 3, it will be seen that the wall of the ball has an increased thickness. This increased thickness along the seam takes the form of an equatorial band. The weight is materially increased along this band.

The double or otherwise increased thickness along this band also gives greater strength along the band, and, unless the supporting ribs are used as herein disclosed, the resilience of the ball will vary over its surface. When struck by the player

at points along or adjacent to this band, such as indicated by the arrow A, the surface supporting effect of the seam will provide comparatively greater rigidity than if a ball, not possessing the advantages of my invention, is struck at the points indicated by the arrow B, for example.

In the balls of the prior art, this difference in surface resiliency is so great that balls which have been hit with great force at points such as indicated by the arrow B, have had this portion of the wall driven inward, in which condition the wall of the ball remained, thus causing the ball to move through the air in an erratic manner and rendering the ball useless.

I propose to overcome these faults in the prior art balls by strengthening the unseamed portions. In accordance with the invention, I form ribs on the inside of the wall of the ball to give the portions of the wall away from the seam a rigidity substantially greater than such portions of the wall would otherwise have and approaching more nearly to the rigidity of the ball along the seam 3.

In Figures 2, 5, 6, and 7 I have shown different forms of reinforcements.

In Figure 2, I have shown reinforcing ribs 5 as beginning a short distance away from the seam 3. It would not be a departure from my invention to begin the ribs at the seam, but I prefer to have the ribs begin slightly away from the seam as at 6, in order to avoid adding any more rigidity along the seam. The seam adds sufficient rigidity to support the surface for a short distance on each side of it.

Beginning at 6 on the inside surface of the wall of the ball, the ribs 5 gradually increase in height until a point farthest away from the seam is reached, such as at 7. Each rib will have its greatest strength at the point where that rib is farthest away from the seam of the ball and, from that point of greatest height the rib will taper off toward the seam so that, before it reaches the seam of the ball, it will have disappeared.

In my preferred form, the ribs will be so constructed that the points in the wall of the ball farthest from the seam will receive the greatest strengthening effect from these ribs and that this strengthening effect will gradually diminish as the seam is approached.

The ribs may be reduced in height because the rigidifying effect of the seam 3 on the adjacent parts, A, of the ball will diminish toward the points B of maximum distance from the seam, and the combined effect of ribs and seam is that of a substantially uniform strength distribution.

These ribs can be moulded from a sheet of uniform thickness which is being used to make the ball. In such case, the wall portion 8 remote from the seam 3 may be thinner than the portion at A, adjacent the seam but the strengthening effect of the ribs will more than offset any weakness. In this way, the ball of my invention can be made without any increase in weight over the balls now in use.

However, if desired, the ribs which I have shown can be made wholly or partially of additional material, so as to leave the wall of the ball the same thickness at 8 as at A, or of only slightly less thickness. In this way the ball can be better balanced,—the added weight in the ribs serving to balance and offset the added weight along the seam.

In Figure 5 the ribs 9 and in Figure 6 the ribs 10 are in an arrangement somewhat different from each other and from that appearing in Figures 2, 3, and 4.

In Figures 2, 3, and 4 the ribs are disposed in right angularly related planes substantially parallel to similarly related diametral lines of the seam. In Figure 5 the ribs are disposed along arcs of great circles of the ball. In Figure 6 the ribs are arranged in a multiple diamond formation. The number and arrangement of ribs may be varied as desired within the principles of the invention. The ribs could be of uniform height if desired, or may vary in height.

Figure 7 shows a reinforcement construction by which the result achieved by ribs may be obtained without resorting to the use of ribs. In this form, the sections through the axis of the seam may be substantially identical, i. e., with the thickness at each "pole" of the ball increased as at 11 and gradually diminished uniformly to the area A adjacent the seam 3. This could be effected by molding or in any other suitable way preferably from a sheet of uniform thickness.

The thickness at 11 may be as great as at the seam 3 if desired.

The ball of my invention can be pressed from sheet material by dies shaped to form this sheet material into hollow hemispherical portions, adapted to be joined together to form a complete sphere. The female die can have a smooth forming surface so as to provide an outer smooth surface for the ball.

The inner, or male die, can have depressions in the forming surface, adapted to form the strengthening ribs of my invention upon the inner surface of the wall of the ball.

I have illustrated such dies in Figure 8. In this figure, 12 is the female die, and 13 is the male die. Both are shown in cross-section. At 14, in the male die member, I have shown one of the rib forming depressions. These rib forming depressions can be multiplied and arranged upon the forming surface of the male die as desired.

The sheet material is pressed between these two die members. The material to form the wall of the ball is caused to be in a condition to flow and accept a set and form impressed upon it by the dies, by the application of heat, if necessary, or by other known means adapted to place the particular material used in a condition to flow and to receive a shape and form impressed upon it by the dies and to retain that shape and form upon removal from the dies.

The dies are then separated, the formed and shaped section of the wall of the ball is removed from the dies, and then joined, in ways heretofore well known, to another section or sections to form the ball of my invention.

Any unevenness at the seams, appearing upon the outer surface of the ball may then be removed by any means heretofore well known and now being used in the manufacture of table tennis balls, and the ball is then ready for use.

It will be evident to those skilled in the art that, if desired, the material to be used in forming the wall of the ball need not be in sheet form, so long as it is in a condition to flow, to accept and to retain the shape and form impressed upon it by the dies.

In actual use, the ball of my invention is greatly superior to any table tennis balls heretofore in use. When the player strokes the ball of my invention with his paddle, he will get a substantially uniform result, regardless of whether his paddle contacts the ball at one point or at another point on the surface of the ball, and regardless of whether he hits the ball directly to drive it without imparting spin to it, or strokes

the ball at an angle tangential to its surface, to impart spin to the ball.

When the player is careful to hit the ball exactly the same way in successive strokes, he will get exactly the same result, as distinguished from the variety of results which are obtained by use of any of the table tennis balls heretofore in use. The use of a ball made in accordance with my invention will add much to the game of table tennis by making uniformity and accuracy possible, and by eliminating uncertainty as to how the ball will perform even though it be hit perfectly.

The table tennis balls heretofore in use have been made of thin resilient material of uniform thickness. When made of such material, it has been very difficult to secure balls of uniform and true spherical shape. By the time such balls reach the user, many of them will be found to have assumed shapes other than true spheres.

At the point where the sections have been joined together, because of the added strength along the seam, that portion has a tendency to retain the intended true spherical contour, but the portions away from the point of juncture of the sections, have a pronounced tendency to become irregular in shape and cause the ball to become other than a true sphere.

This tendency of the ball to become untrue in shape, or "lop-sided," as the users commonly term it, is overcome to a substantial degree by manufacturing them in accordance with my invention.

In the ball of my invention, the strengthening and supporting means employed at points other than at the juncture of the sections, not only provides a ball which is uniform in balance and resistance, but also provides a ball which is uniform in shape and which will have a greater tendency to retain the shape of a true sphere.

The exact arrangement and character of the strengthening and supporting elements may be varied as good engineering practice and experience may dictate, without departing from my invention, and it is not my intention to limit myself to the specific measurements, arrangements or proportions of the parts as shown.

I claim as my invention:

1. As an article of manufacture, a hollow table tennis ball made of relatively thin flexible Celluloid or similar material comprising a plurality of sections joined together by a circular reinforcing seam of predetermined rigidity, each of said hollow sections being internally deformed in such a manner as to provide reinforcements of such character on opposite sides of the seam as to compensate for increased rigidity at the seam and to cause said sections to have substantially

the same rigidity as the seam, so that said ball is of substantially uniform flexibility throughout its spherical surface.

2. A hollow table tennis ball made of relatively thin flexible Celluloid or similar material comprising a plurality of sections joined by a circular reinforcing seam, portions of each section spaced away from said seam being formed with reinforcing ribs of such character as to provide said sections of the ball on diametrically opposite sides of said seam with rigidity comparable with that afforded by said seam, so that the ball has substantially the same degree of rigidity throughout its spherical surface.

3. A hollow table tennis ball made of relatively thin flexible Celluloid or similar material comprising a plurality of sections joined by a circular seam, each of said sections being formed with a reinforcing thickened portion leading away from the seam and of such area and character as to compensate for the increase in rigidity imparted to the ball by the seam and thus to provide the ball with substantially the same rigidity throughout the spherical wall of the ball.

4. A hollow table tennis ball made of relatively thin flexible Celluloid or similar material comprising a plurality of sections joined together by a seam, each of said hollow sections being provided with means for compensating for the increase in rigidity imparted to the ball by the seam, which means is provided by a thickened wall in each section which increases in depth radially outward and away from said seam, said progressively thickened portion being on the interior of the ball and of such character as to cause the exterior spherical surface of said sections on opposite sides of the seam to have substantially the same rigidity throughout as that provided at the seam.

5. As an article of manufacture, a hollow table tennis ball made of relatively thin flexible Celluloid or similar material comprising a plurality of sections joined together by a circular reinforcing seam of predetermined rigidity, each of said hollow sections being internally deformed in such a manner as to provide reinforcements of such character on opposite sides of the seam as to compensate for increased rigidity at the seam and to cause said sections to have substantially the same rigidity as the seam, so that said ball is of substantially uniform flexibility throughout its spherical surface, said reinforcements being disposed on the interior surface of the ball and being so located and of such extent as to cause the weight of diametrical portions of the ball wall on opposite sides of the seam to be in balance with that of the seam.

DANIEL C. MABEE.