Jan. 17, 1956 R. NEILSON 2,731,266

MAGNETIC BALL GAME

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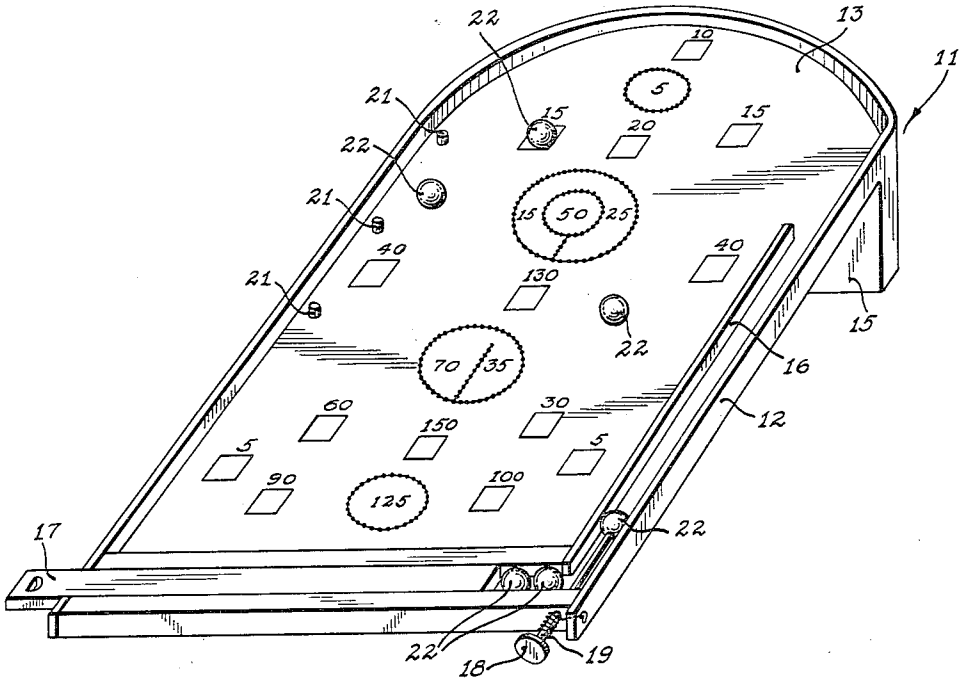


Fig. 1

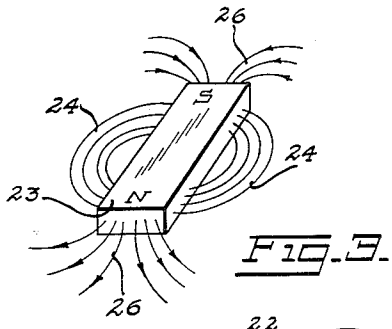


Fig. 3.

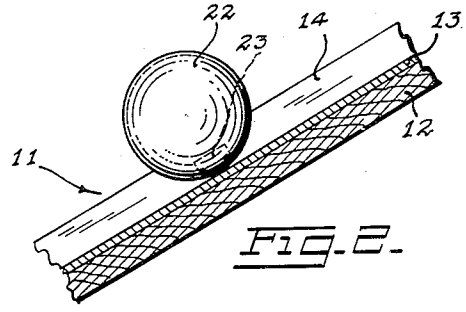


Fig. 2.

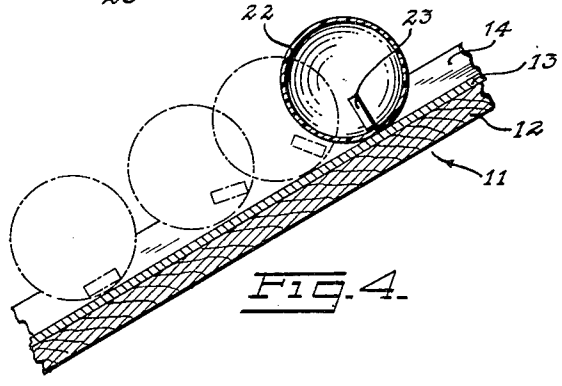


Fig. 4.

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MAGNETIC BALL GAME

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3 Claims. (Cl. 273—121)

This invention relates to new and useful improvements in magnetic devices for scientific equipment, games of skill or chance, and the like.

More particularly, the present invention proposes the construction of an improved magnetic device which can be rolled on a magnetic platform by gravity or other force and which will adhere to points on the platform seemingly at random.

Another object of the present invention proposes forming the magnetic device with a thin outer non-magnetic shell housing a free unanchored bar magnet, the strength of the bar magnet and the thickness of the shell wall being such that the shell will freely roll on a magnetic surface until the magnet tumbles into a position where the maximum strength of its magnetic field is disposed adjacent to the magnetic surface.

Still further, the present invention proposes constructing the bar magnet rectangular in shape so that the hollow non-magnetic shell will "freeze" magnetically to a magnetic surface when the magnet has its flat sides disposed parallel to the magnetic surface on which the shell is rolled.

As a further object, the present invention proposes arranging the magnetic device so that the hollow shell is rollable on a horizontal or tilted surface and tilting the magnetic surface at an angle preferably over thirty degrees so that the shell will roll back down the incline when rolled up, until it is magnetically stopped by the magnet freely enclosed inside the shell.

The present invention further proposes a novel arrangement of a magnet unanchored and freely contained in a rollable hollow shell with the magnet and the shell constructed and arranged so that no two such shells will magnetically adhere either when rolling or when still.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a perspective view illustrating the magnetic device of the present invention as incorporated in a bagatelle game.

Fig. 2 is an enlarged fragmentary sectional view taken on line 2—2 of Fig. 1.

Fig. 3 is an enlarged perspective view of the bar magnet indicated inside the hollow ball or spherical shell in Fig. 2 with lines of force diagrammatically shown.

Fig. 4 is a view similar to Fig. 2 but showing the hollow ball or spherical shell in cross section and indicating in dot-dash outline how the magnet is free to tumble as the ball or shell rolls down an incline.

Referring more particularly to the drawing, the magnetic device of the present invention is illustrated in Fig. 1 being used in a game board **11** but it may be used for other purposes besides toys and games, such as scientific equipment and demonstrations, exhibitions and utilization of magnetic phenomena of a round object or a curved body staying fixed magnetically to any spot, place or position after a throw or a roll upon an inclined magnetic surface or platform.

Game board **11** is a carom bagatelle board having a wooden or other nonmagnetic material frame **12** with a steel or other magnetic material surface or plate **13** set down in the frame so that a wooden edge **14** skirts the surface **13**. Surface **13** is lithographed or otherwise marked according to the game, the surface markings on surface **13** being those common on a carom bagatelle board.

Board **11** is inclined having a rear leg **15** thus making the magnetic surface **13** inclined or pitched preferably at an angle greater than thirty degrees.

A ball guide **16**, pusher **17** and plunger **18**, biased by spring **19**, and deflection posts **21** complete the game board **11**.

As best shown by Figs. 2 and 4, the ball for the game board is a hollow rollable shell **22** of non-magnetic material such as plastic. A bar magnet **23** is enclosed in the shell, the magnet being unanchored in the shell and free to tumble as shown in Fig. 4. Bar magnet **23** is rectangular in shape (Fig. 3) with a north pole "N" at one end and a south pole "S" at the other end with the magnetic field of greater intensity **24** lying between the poles so that the maximum magnetic attraction of the bar magnet for a magnetic material (such as magnetic surface **13** of game board **11**) occurs when the bar magnet is flat as shown in Fig. 3 and parallel with relation to the attracted material (see Fig. 2).

Shell or ball **22** has a wall thickness thin enough to pass the magnetic field of the magnet **23** so that when the shell **22** is tossed, thrown, or shot on the inclined magnetic surface **13** of the game board **11** and rolls down the board by gravity pull, the magnetic field of the magnet will pierce the wall of the shell to the magnetic surface **13** to retard the roll and finally bring the shell or ball **22** to rest on some spot on the surface **13**.

Magnet **23**, being unanchored and free to tumble in the ball or shell **22**, will tend to always remain at the "base" of the ball or shell inside it, and hence always adjacent to the magnetic surface **13**. Magnet **23**, being a rectangular bar magnet, will also have its strongest attraction for the magnetic surface **13** when it is flat and parallel to it as shown in Fig. 2 and in the last downhill dot-dash position in Fig. 4.

Ball **22** preferably should have a wall thickness of not more than .002 inch in order to afford the maximum inner space to house magnet **23** and to permit the magnetic fields **24** and **26** (Fig. 3) of the magnet to pierce the wall of the ball **22** to retard and stop the ball when it is rolling on magnetic surface **13**. Such a thin wall also makes the ball lighter in weight and permits magnet **23** to be as small and powerful as possible.

Magnet **23** preferably is a permanent magnet made of materials difficult to magnetize such as Alnico alloys or cobalt steel.

When ball or shell **22** is rolled up the inclined magnetic surface **13** and starts to roll down, the magnetic attraction of the tumbling magnet **23** inside the ball or shell **22** for the magnetic surface **13** retards the roll. When the bar magnet **23** tumbles into flat position parallel the surface **13** at a time when the attraction of the magnet for surface **13** is greater than the gravity pull and momentum of the rolling ball or shell **22**, the ball or shell **21** will come to rest on the surface **13**. The spot where it comes to rest on the marked game board will determine the score of the player.

When two or more balls **22** are on the inclined magnetic surface **13**, they will not be magnetically attracted to one another and will not bunch or adhere because the magnets

23 will always tend to be at the base of the balls 22 and not at their sides and the magnetic attraction of the magnets will be for the magnetic surface 13 and not for the magnets in the other balls.

It is apparent that the rollable shells 22 may be in other form than spherical and can be cylindrical, barrel-shaped, ovoid or in any other rollable form.

While I have illustrated and described the preferred embodiment of my invention, it is to be understood that I do not limit myself to the precise construction herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

1. A magnetic game device comprising a game board having an inclined surface of magnetic material, a ball shaped body rollable on said surface and having a thin wall of non-magnetic material surrounding an inner space, and a bar magnet confined in said space and having two pole ends resting on and contacting said wall simultaneously in the position of rest, said magnet being freely movable in said space whereby said magnet will tumble when said body rolls on said surface.

2. A magnetic game device comprising a game board having an inclined surface of magnetic material, a ball shaped body rollable on said surface and having a thin wall of non-magnetic material surrounding an inner space, and a bar magnet confined in said space and having two pole ends resting on and contacting said wall simultaneously in the position of rest, said magnet being freely movable in said space whereby said magnet will tumble when said body rolls on said surface, said space being empty except for said magnet.

3. A magnetic game device comprising a game board having an inclined surface of magnetic material, a ball shaped body rollable on said surface and having a thin wall of non-magnetic material surrounding an inner spherical space, and a bar magnet confined in said space, having a length considerably shorter than the radius of said space and having two pole ends resting on and contacting said wall simultaneously in the position of rest, said magnet being freely movable in said space whereby said magnet will tumble when said body rolls on said surface.

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