Reprinted with Permission of Journal of Recreational Mathematics**, "**Some Interesting Properties of Spherical Motion"**, JRM, V 5 No. 4,** Fall, 1972 pp-275-276. *(This worked well with pool table balls, Fig. 2, but I don't know of anyone selling it as a commercial item)*

Some Interesting Properties of Spherical Motion

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Here are some surprising and unsuspected properties of motion of two or more spheres in contact. The first property deals with two spheres constrained between two rigid parallel planes.

In Figure 1 the two planes are shown as lines in a side view. The spheres are shown as circles. Super balls are excellent for this purpose because of their very high coefficient of friction. The bottom ball is in contact with the lower plane while the top ball is in contact with the upper plane. The balls are also in contact with each other in the center as shown. If the planes are held rigid with respect to each other, the balls will stay together. No matter how the top ball rolls, the bottom ball will roll with it. This property also holds if the balls are not directly on top of one another but are off set somewhat. When this is the case, the top ball appears to defy gravity by staying on the bottom ball without falling no matter how they roll. It is best to use a plexiglas sheet for the upper plane so that you may observe the goings on.

Another interesting property of rolling spheres in contact may be observed with

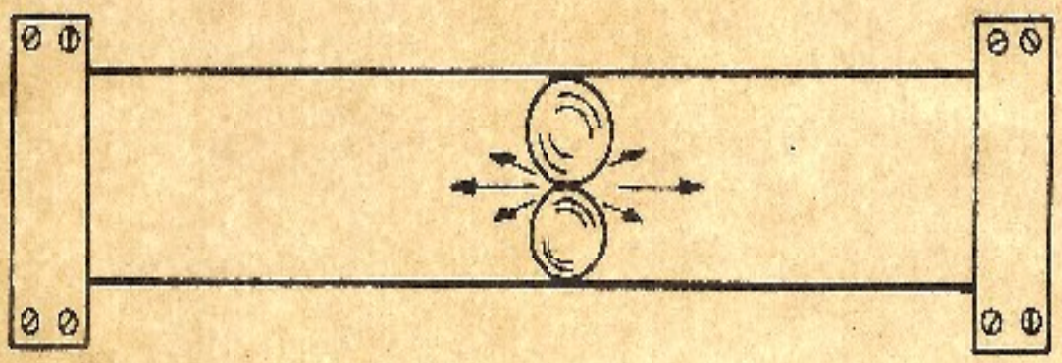

FIGURE 1

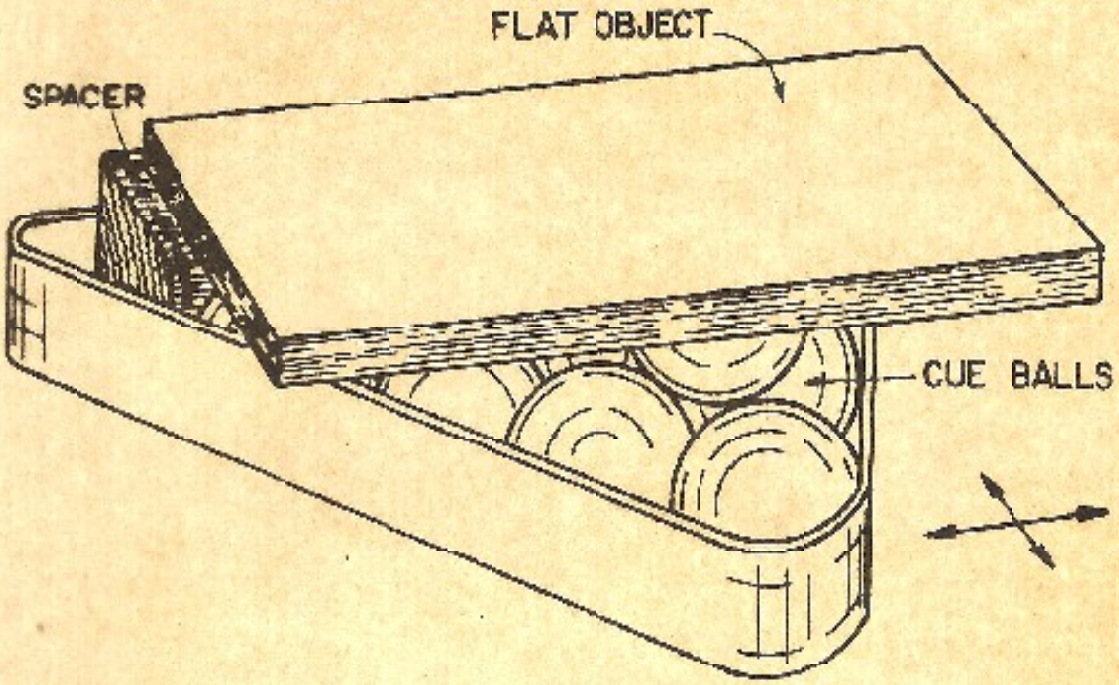

FIGURE 2

cue balls. Make a spacer to go into the triangular cue ball frame. This will hold a bunch of the cue balls in a triangular pattern. The balls should be loose enough to roll when the frame is moved around on the table. Three cue balls may now be placed on top the triangular pattern of balls. The complete set up is shown in Figure 2.

If a book or other flat object is now placed on top these balls the above property may be observed. No matter how the triangular frame is pushed around under the book it will stay in the same position with respect to the table. This property is based on certain mathematical principles of rolling motion. Undoubtedly some industrial application for this unique property could be thought of. Any suggestions would be welcomed by this writer.