

Bob Jewett



Putting Proper Spin On It

Learn the physics that dictate the English you apply to a cue ball.

If you practiced the shots from *BD* May, you have developed a feel for how much a particular amount of side spin will take on the rail. This month, we'll go over some basic physics of the shot and see some new drills that will help you perfect your extreme spin shots.

In **Diagram 1**, are two ideas from Ron Shepard's "Amateur Physics for the Amateur Pool Player." (If you don't already have a copy of this paper from the Internet, drop me a line, and I'll give you the electronic address.) On the left is a cue ball with "lines of equal English" shown. All of the points of tip contact on each straight line will produce the same amount of side spin relative to forward motion. This seems exactly wrong until you hear the one additional requirement: the spin is not used (or measured) until the cue ball is rolling smoothly on the table. Consider, for example, the points of contact near the cloth. Hitting the cue ball there will cause both left English and draw on the cue ball. As the ball moves away on the cloth, the draw will quickly dissipate due to the rubbing of the cloth, but the side spin will remain nearly constant. In effect, this multiplies the side spin. The amazing result is that the points for "constant side-spin-to-speed ratio when rolling smoothly" lie on a straight line. Where should you hit for maximum consistency if you want a particular amount of side? Well up on the ball is much better than down at the bottom, where the lines all converge and tip placement is critical for accurate control. Most players learn this subconsciously; now you know a little of the physics behind it.

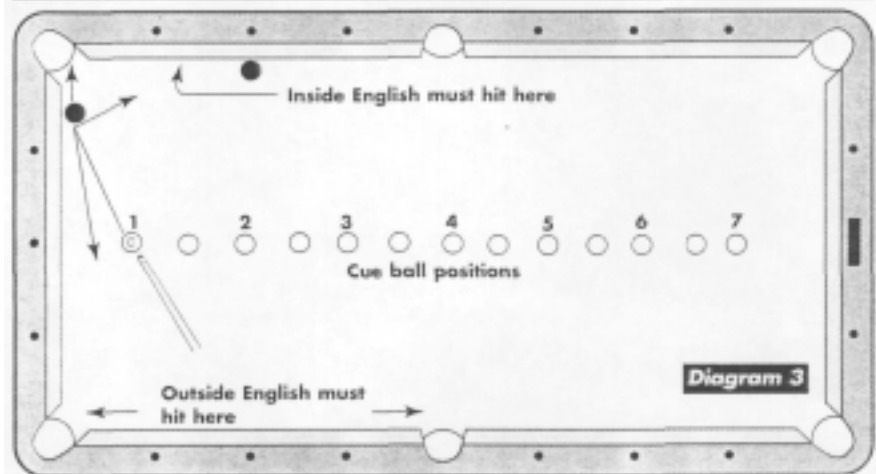
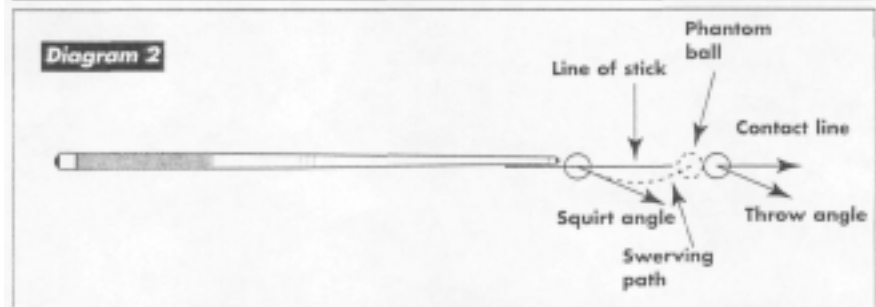
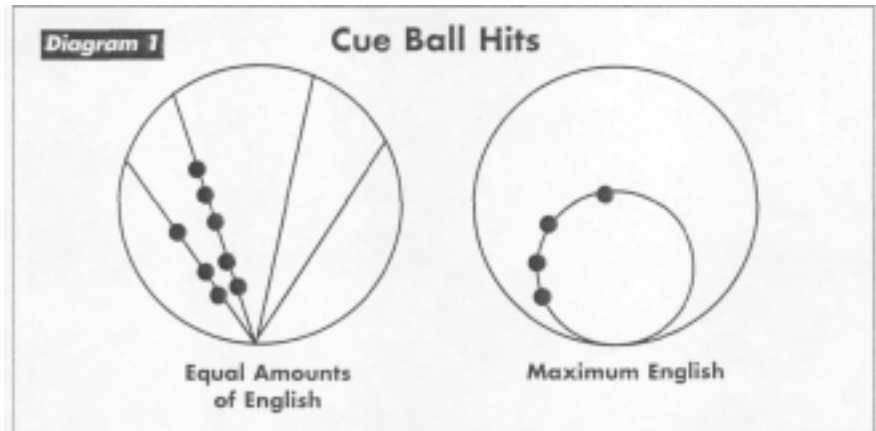
In the right view we answer the question. "For a given eccentricity of hit, what tip position gives the most side after normal rolling sets in?" The answer is again amazingly simple: on a small circle half as large as the cue ball, and resting on the same point. For very small amounts of English, hit nearly on the equator. For maximum effect, play the shot with roughly equal parts of side and draw. Although the addition of draw to the shot reduces the amount of side you can apply, the draw more than repays the loss by slowing down the cue ball and multiplying the spin effect.

OK, we are finally ready to hit an object ball while using English. Three major effects need to be remembered: squirt

and throw. These have been discussed, but as a reminder, look at **Diagram 2**, which is a view from above for a shot with left English. When struck with side, the cue ball does not start straight ahead, but instead starts off at an angle — the squirt angle. This can be up to four degrees for extreme English and poorly designed cues.

As the cue ball moves across the cloth, it curves or swerves back in, due to a minor masse effect. In theory, there would be no swerve back if you held the stick level, but you never do that because the rail and your knuckles won't let you.

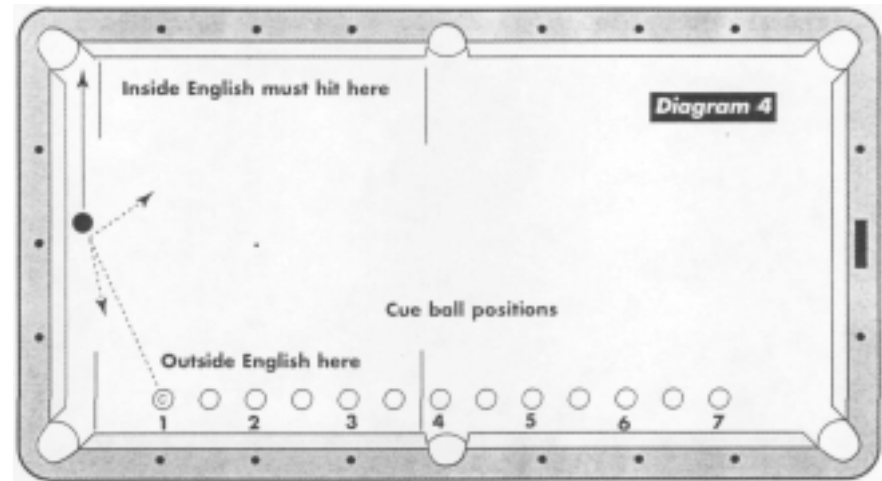
The third effect happens when the cue ball lands on the object ball: throw. The left spin



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will pull the object ball to the right of the contact line, which is the line joining the centers of the two balls at the instant of contact. If you also have a cut angle, throw becomes considerably more complicated. If you use no side spin, there will be some throw just due to the cue ball's rubbing across the object ball and dragging it a little in the direction the cue ball is moving. If there is just the right amount of outside English — **left** when cutting a ball to the right — the cue ball **will** roll across the object ball without any rubbing, and the object ball will be driven along the contact line. With excess outside, it is possible to increase the cut angle beyond the contact line, and a little draw with the side will help you get this extreme spin.

Diagram 3 is a spin drill. First consider the shot being played with inside or right spin. After pocketing the object ball, the cue ball is required to contact the side rail within two diamonds of the corner pocket. The extra object ball is at the second diamond as a sort of hurdle. Each time you make the shot, chose the next tougher cue ball position in half-diamond steps. If you fail to meet the requirements of the shot, play the next shot from the next easier position. The object ball is always returned to the marked position, which is half a diamond from the



corner pocket and a thumb off the rail. Try moving the hurdle closer to the pocket and use the English multiplication trick to get the extreme angle required. Once you have inside English mastered, try the same drill but with outside English — left for this shot — so that the cue ball contacts the near side rail before the side pocket.

Diagram 4 is a drill that requires considerably more accuracy in the hit on the object ball. The drill is similar to the drill above, but the object ball is two diamonds from the

pocket and a ball off the rail. The location of the cue ball is even with the corresponding diamond, and just far enough off the rail to make a comfortable bridge on the bed of the table. If you can get to position 7 for both inside and outside English, while meeting the cue ball requirement, you will be far above average on the use of side spin.

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