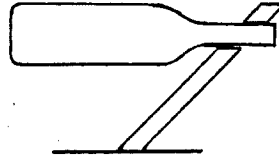
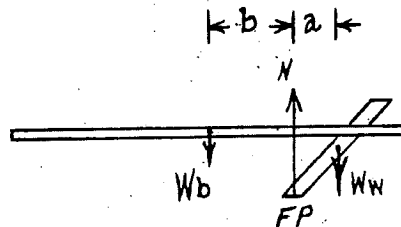


The "one-bottle wine cellar" - is a popular novelty item that is both educational and entertaining. It requires a piece of wood, a special drill bit, and some woodshop skill to make it. It works because of a fundamental principle in physics. It is a demonstration of center of mass (or gravity) with a two body system: a bottle and a piece of wood with a hole in it. The bottle is placed in the holder as shown. Yes, it is a balancing act.



With the system in static equilibrium, you are able to show that the center of mass or gravity is located directly above the "footprint" (FP) so it will not topple.

The explanation:



- Ww - weight of wood
- Wb - weight of bottle
- N - Normal force

$$\Sigma \tau = 0 \text{ (torques about FP)}$$

$$= b (Wb) - a (Ww)$$

thus, $b (Wb) = a (Ww)$ and the system is in rotational equilibrium, also.

Notes:

An empty wine bottle is much safer and easier (more stable) to work with than a full one. Something like a Heinz Ketchup bottle might work well, also.

The easiest wood to work with is 3/4 inch thick pine with no knot where the hole is to be drilled. 45° is a good angle for the base and the hole. It is not easy to drill a hole at this angle. To be safe and successful, you need a drill press and a good 1 1/4 inch drill bit. #09N65 Multi-Spur Bit (\$21.75 ppd.) from Woodcraft, ~~210 Wood County Industrial Park, P.O. Box 1686, Parkersburg, WV 26102-1686~~ (Toll-Free 800-225-1153) is the best I have found for this operation.

