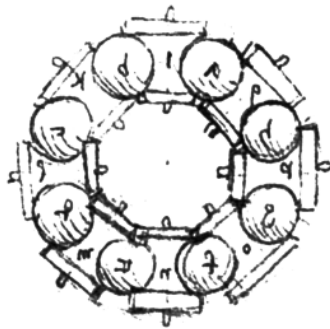


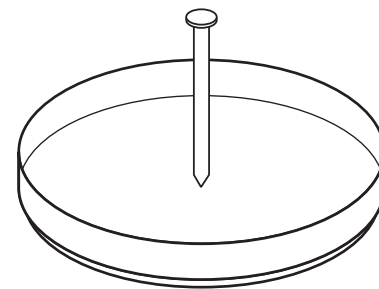
project 2 ball bearings

Things you need

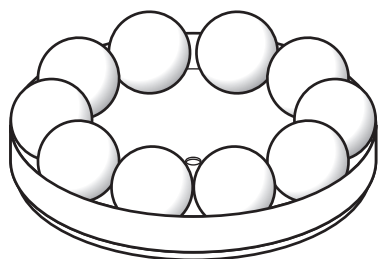
- 2 metal lids, 7 cm ($2\frac{3}{4}$ " dia.
- 10 marbles (of equal size)
- 5 washers, 2.5 cm (1" dia.
- 1 bolt & nut, 5 cm (1" x 2 mm ($\frac{1}{16}$ " dia.
- 1 nail, 2 mm ($\frac{1}{16}$ " dia. (to make holes in lid)
- hammer
- electrical tape
- scissors



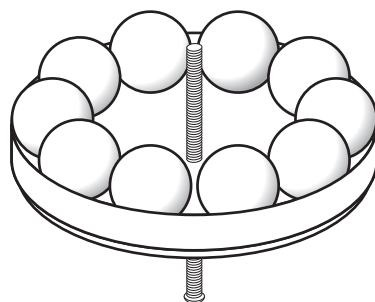
Here is a sketch of Leonardo's drawing for building a machine to move theatre stage sets. He uses ball bearings in order to minimize friction.



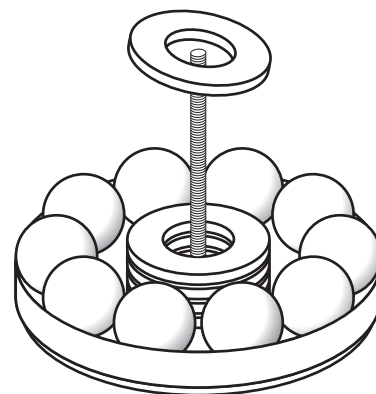
1 Find the centre of the lids and make a hole with a nail. (If the hole is too small, wiggle the nail around to make the hole slightly larger. Cover the hole with tape to avoid burrs, then make a new hole through the tape.)



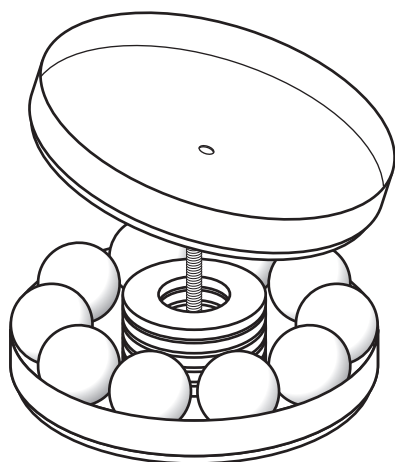
2 Place 10 marbles around the perimeter of the lid.



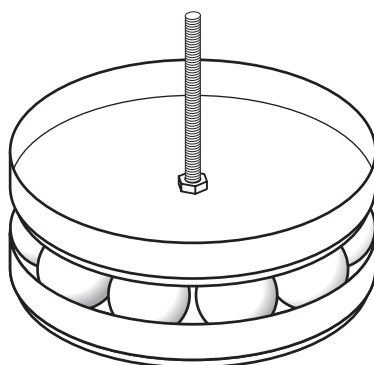
3 Insert the bolt through the centre hole.



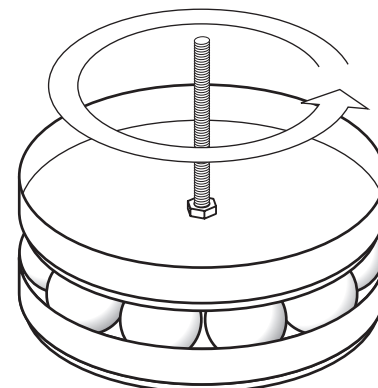
4 Place a stack of washers over the bolt and inside the ring of marbles.



5 Place the second lid on the bolt, facing up (like the first lid).



6 Use the nut to tighten the two lids together.



7 Check that the lids swivel easily over each other.