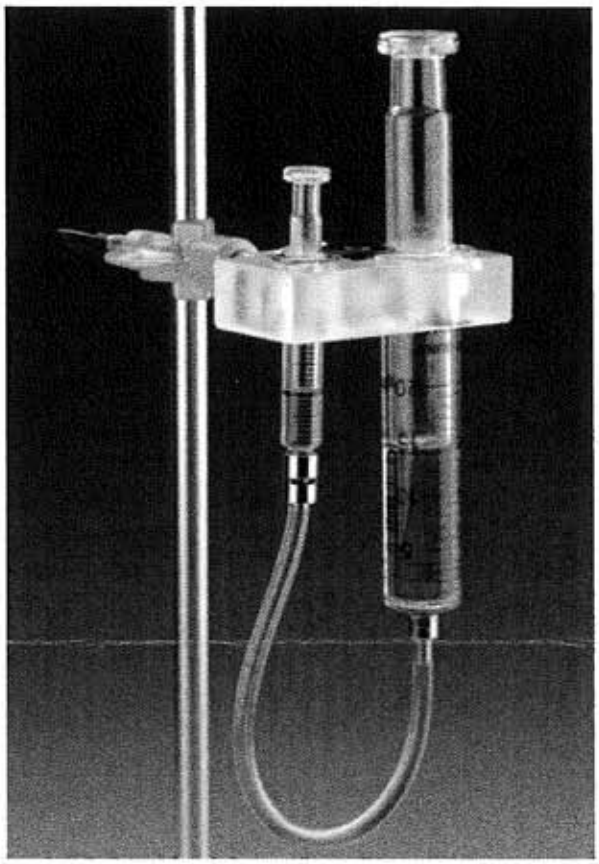
# Fluid pressure apparatus



This model illustrates the working of the hydraulic lever: When the pistons are pressed down, a small force on the small piston will balance a large force on the large piston.

The model consists of two glass syringes, connected by a piece of tube. The syringes are mounted in an acrylic block equipped with a steel rod to enable the model to be fastened to a retort stand.

The glass syringes must be lubricated using a few drops of oil – move the pistons up and down and rotate them to distribute the oil all over the frosted surface of the pistons.

**Filling the model**

Water is used as working fluid.

First, the large syringe is filled about half-way by sucking up the water from a small bowl. Eventually let someone help holding the piston to avoid too much water to run out. Likewise, fill the small syringe.

Next turn the model upside down to let the air bubbles collect in the tips of the syringes. Be careful not to let the pistons drop out of the syringes.

Fix the tube on the large syringe and press the water up to just fill the tube – it's alright if a few drops drip off. Equally, press the piston of the small syringe a little inwards till water is dripping out. Fix the tube at once on the small syringe.

**Use**

Had the pistons been without friction, the ratio between the forces would have been just the inverse of the ratio between the areas of the pistons. However, as friction is not negligible, you cannot get quantitative results.

The following two methods both give a good, qualitative demonstration of the mechanism:

Simply use your index fingers on each piston to press downwards and notice the difference between the two forces.

Place a small mass or the like, weighing 40-50 grams on top of the small piston. Press down the large piston until the weight rises. Move the weight to the large piston and press down the small one.

Don't press too hard on the pistons. To ease assembling and disassembling the model, the tube doesn't fit very tight on the syringes.