Construction of a Leyden jar

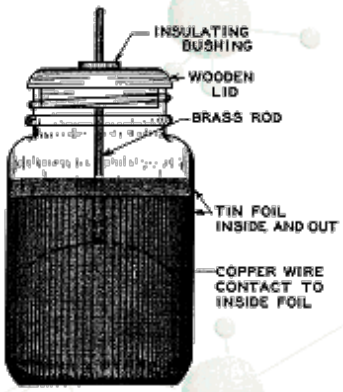
This is an article that appeared in Experimental Electricity for Boys by Willard Doan, published in 1959. This is part of a series of three pages, which also includes companion articles on building a secondary coil and a Tesla coil. All text and illustrations in this article are by Willard Doan. Links to the illustrations are listed at the end of this page. I am **not** expert in building these things, so I probably won't be much help answering your questions. This article is here primarily for historical reasons. Sorry this doesn't include metric dimensions, but this is an old book from the U.S., after all!

An efficient Leyden jar capacitor may be very easily made by the experimenter. The parts required are as follows:

- a l-pint glass jar
- one block of soft wood, 3 inches square, 3/4-inch thick
- a strip of tinfoil, 3 by 24 inches
- 1-inch length of 1/2-inch diameter polystyrene or hard-rubber rod
- 4 inches 1/8-inch diameter brass rod or copper wire
- 6 inches No. 18 gage bare copper wire
- paraffin wax

Take a pint jar with sides free of air bubbles in the glass. Some kinds of glass are not suitable but most any glass food container without any lettering on the glass should be satisfactory.

Coat the jar inside to the neck with paraffin wax, shellac, or service cement. Wax is cleanest and easiest to use. Warm the jar carefully until the wax melts when in contact with it. Then using a small brush, cover the inside with a thin coat of melted wax.



Press a strip of tinfoil smoothly around inside the jar, taking care to work out as many as possible of the air bubbles that may be trapped under it. The foil should extend from the bottom about two thirds of the way up inside. The wax, when hard, serves to hold the foil tightly to glass. It should not cover both sides of the foil, though what little runs out on the other side will do no harm. The outside of the jar is covered with foil in the same manner. The bottom of the jar is not covered.

Cut out a round disk of soft wood with a coping saw to fit the jar as a lid. Smooth it off with a file and drill a hole 1/2 inch in diameter in the center for the polystyrene bushing like that used in the electroscope *(which appeared earlier in the book -ed.)*. Cut a piece of polystyrene or a hard rubber rod 1-inch long and drill a 1/8-inch hole through it lengthwise. Cement this bushing in the lid with radio service cement. This much of the assembly is like the electroscope.

A piece of 1/8-inch diameter brass rod or copper wire about 3 or 4 inches long should have a piece of smaller copper wire, about No. 18 or No. 20-gage, soldered to one end. The other end of the rod is rounded with a file. Push it up through the hole in the insulating bushing so it will project out of the top of the jar. The wire on the lower end is bent so it will press against the tinfoil on the inside of the jar when the lid is in place. The Leyden jar is now complete. It should look like Fig. 2-8.

When the Leyden jar is connected to the Wimshurst machine*, one foil coat to each discharge wire, the nature of the spark discharge is entirely changed. Instead of the steady thin bluish spark, there will be a series of intensely bright sparks, the frequency of which depends upon

the length of gap they jump. When the jar is connected to the machine, it absorbs the charge until enough has accumulated to jump the gap or, in case the gap is too long, to leak off as formed. The shorter the gap, the less time is available to charge the jar before the spark discharge occurs. As a result, the sparks jump in more rapid succession but are not so bright. The discharge of a fully charged jar of this size through a human body is very disagreeable and should be avoided in some cases it might be dangerous. Capacitors of many other types are used in electrical equipment we shall learn more about them, their construction, and uses as we go along.

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*Note: there were plans included for constructing a Wimshurst machine, but they have not been include here, at least yet. There are plenty of other plans for Wimshurst machines available which use more readily available materials.

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