# The GENERAL RADIO EXPERIMENTER

VOL. X. No. 12 MAY, 1936


## ELECTRICAL COMMUNICATIONS TECHNIQUE AND ITS APPLICATIONS IN ALLIED FIELDS

### A PRECISION TUNING FORK

TUNING FORKS are widely used as low-frequency standards of frequency. These range in accuracy from the simple forks used as standards of musical pitch to the highly-accurate temperature-controlled instruments, driven by vacuum tubes and used as primary standards.

Much timing and low-frequency standardization work calls for a degree of precision intermediate between these two extremes. Tuning forks in this class are used for timing in geophysical exploration, in rating clocks and watches, in synchronizing facsimile transmission, and in 60-cycle standardization. For these and similar applica-


FIGURE 1. TYPE 815-A Precision Fork

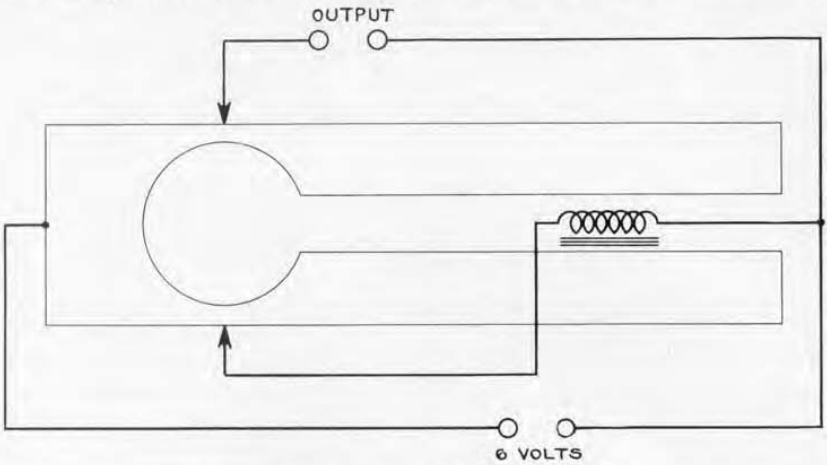



FIGURE 2. Circuit of the TYPE 815-A Precision Fork

tions the TYPE 815-A Precision Fork has been designed.

In this instrument high accuracy and stability have been combined with simplicity of construction and operation.

The fork is adjusted to within 0.005% of its rated frequency. The long period stability is of the same order since both temperature and voltage coefficients are low.

Figure 1 is a photograph of the TYPE 815-A Precision Fork. The fork itself is made of a low-temperature-coefficient steel alloy. It is mounted rigidly at the heel on a metal panel which also carries the driving magnet. This panel is attached to the main base by means of rubber shock absorbers to reduce energy dissipation through the mounting.

The decrement is extremely low. The two microphone buttons are mounted, one on each tine, near the heel of the fork where the amplitude of vibration is low. This minimizes the damping action which the presence of the microphones exerts on the fork. At the end of each tine adjusting screws are provided. Adjustment of these makes it possible to bring the frequency to the desired value and also to equalize the loading on the tines, which has a considerable effect upon the decrement.

Separate microphones are used for the driving and output circuits. No output filter or transformer is furnished since the different uses may require different circuit arrangements. The circuit is shown in Figure 2.

TYPE 815-A Precision Forks can be supplied for any fundamental frequency between 40 and 200 cycles per second.

## SPECIFICATIONS

**Frequency:** 50 cycles per second. Forks can, however, be supplied at any frequency between 40 and 200 c.p.s.

**Calibration:** The frequency is adjusted within 0.005% of rated value. The calibration temperature is supplied.

**Frequency Stability:** The over-all stability is better than 0.01% under normal room-temperature conditions.

**Temperature Coefficient:** The temperature coefficient of frequency is negative and less than 10 parts per million (0.001%) per degree F.

**Voltage Coefficient:** The voltage coefficient of frequency is positive and less than 150 parts per million per volt (0.015%).

**Power Supply:** A 6-volt battery is used as the driving source. Driving current is less than 50 milliamperes.

**Output:** The power output is approximately 50 milliwatts. The impedance of the output microphone is 50 ohms.

**Mounting:** The fork assembly is mounted on a metal base for table or bench use.

**Dimensions:** 13 x 6 x 3 inches, overall.

**Weight:** 8 pounds.

**Code Word** (50-cycle model): FAUNA.

**Price:** $150.00.

## WINDING DATA FOR TYPE 677-U and TYPE 677-Y COIL FORMS

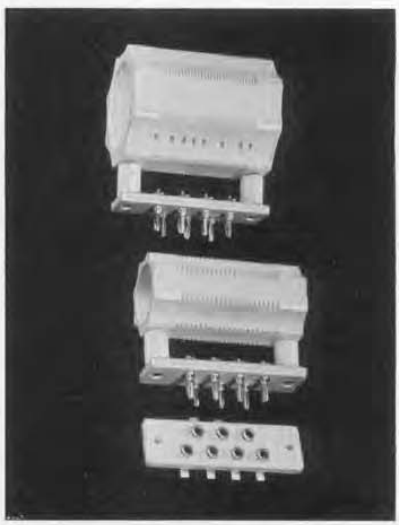
THE accompanying charts are for use with General Radio TYPE 677-U and TYPE 677-Y Coil Forms.

These coil forms are moulded of selected porcelain and are impregnated and coated with Victron lacquer in order to preserve the original high dielectric efficiency of the newly fired porcelain. Each form has eight longitudinal ribs notched to take up to 21 and 30 turns of No. 10 wire on the smaller and larger forms respectively.

The forms may be wound with bare No. 10 or No. 12 wire in each adjacent notch or, for low values of inductance, one or two empty notches may be left between each turn. These are the types of windings designated as "solid," "single spaced," and "double spaced" in Figures 1 and 2.

The values of inductance shown represent the increase in inductance added by breaking a short circuit between the plugs at the ends of the winding. In computations for the required number of turns in resonant tank circuits, allowance must be made for the inductance of the leads connecting the coil to its condenser and for the distributed capacitance of the coil. The charts shown are for coils wound with No. 12 bare copper wire.

(*See page 4 for Charts*)



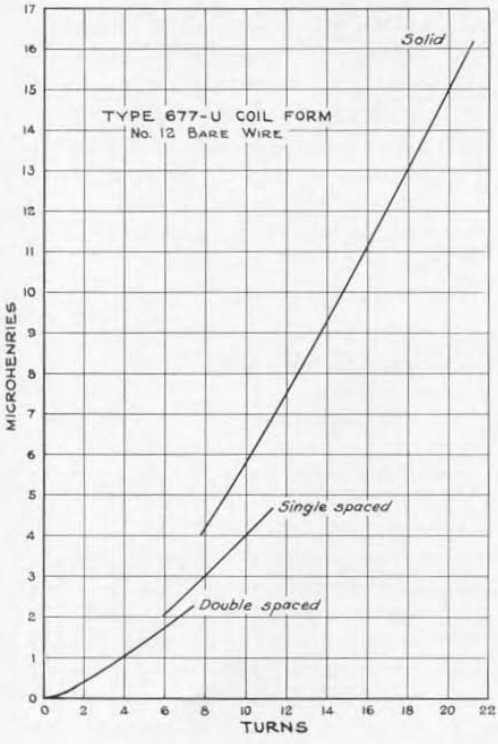



FIGURE 1. (*Left*) Winding data for TYPE 677-U Coil Form.

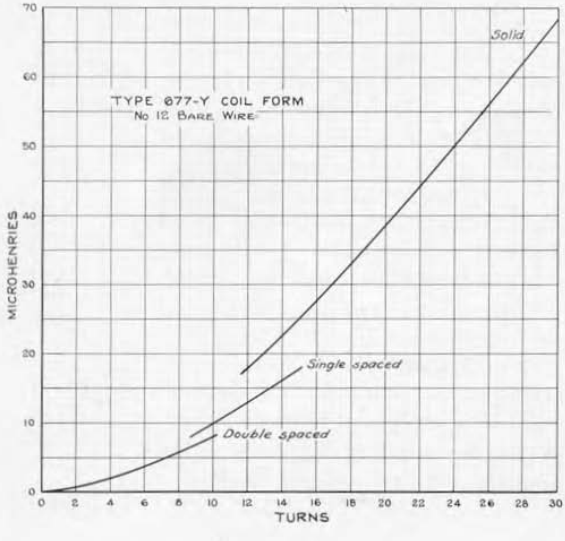



FIGURE 2. (*Right*) Winding data for TYPE 677-Y Coil Form.

# AN INDEX OF EXPERIMENTER ARTICLES

THE following pages contain the index for Volume X of the General Radio *Experimenter*. In the future, a similar index will be published each year in the May issue, each index covering one complete volume.

No yearly index of the articles appearing in the *Experimenter* has been published since June, 1931. Many requests have been received from *Experimenter* readers for index material covering the years since that date. A complete index for that period is now in preparation and will be available for distribution within the next few months. The exact date will be announced in a forthcoming issue of the *Experimenter*.

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