

A BRIEF HISTORY OF THE CARDWELL CONDENSER CORPORATION



Every radio man, whether he be an engineer, operator or technician, has sometime in his career used a Cardwell condenser. AWA feels it most appropriate to print a brief history of this pioneer manufacturer. The material was received from Cardwell's president, Norman Kjeldsen. —Ed.

fathers invented and founded the Gray Telephone Pay Station in 1885, which is used world wide. Cardwell Manufacturing Company moved to Plainville, Connecticut.

During the period of 1944 to 1952 Cardwell developed the facsimile equipment used by United Press International, the GMD meteorological unit which is in use world wide for tracking weather balloons.

1896 ... Dr. G. A. Cardwell manufactured telegraph keys and sounders for Western Union Company, a factory in New York City.

1907 ... G. A. Cardwell founded the American Telegraph Typewriter Company with offices at 27 William Street, New York City, and a factory at Prospect Street, Brooklyn, New York.

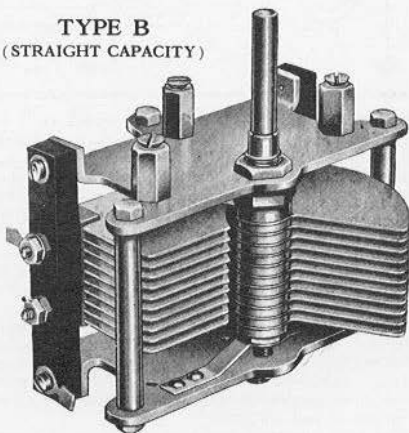
1907 ... Allen D. Cardwell started working for his stepfather, Dr. G. A. Cardwell.

1908 ... Allen D. Cardwell Manufacturing Company started at Prospect Street, Brooklyn, New York.

From 1908 to 1944 Cardwell developed and manufactured variable air capacitors, telegraph sets, designed, manufactured and installed the first automatic stock quotation system at the New York Stock Exchange. During World War II, Cardwell developed the famous test sets: AN/TS173, 174, 175, and BC221.

1944 ... A. D. Cardwell sold interest out to Grenby Manufacturing Company, of Plainville, Connecticut, a manufacturer of machine tools and the Grenby cylindrical grinder. Grenby was owned by Carl Gray and Ralph Soby, whose

TYPE B
(STRAIGHT CAPACITY)



The all-time favorite developed in the early 1920's.

1952 ... Cardwell owners sold out to Chesapeake Industries, a holding company, taking back a mortgage on the entire factory. Chesapeake also owned Pathe Films and several other large factories.

(Cont. next page)

DR. G. A. CARDWELL, President

GEORGE S. McALPIN, Vice-President

AMERICAN TELEGRAPH TYPEWRITER COMPANY

EXECUTIVE OFFICES
27 WILLIAM STREET
NEW YORK

TELEPHONE 3637 BROAD

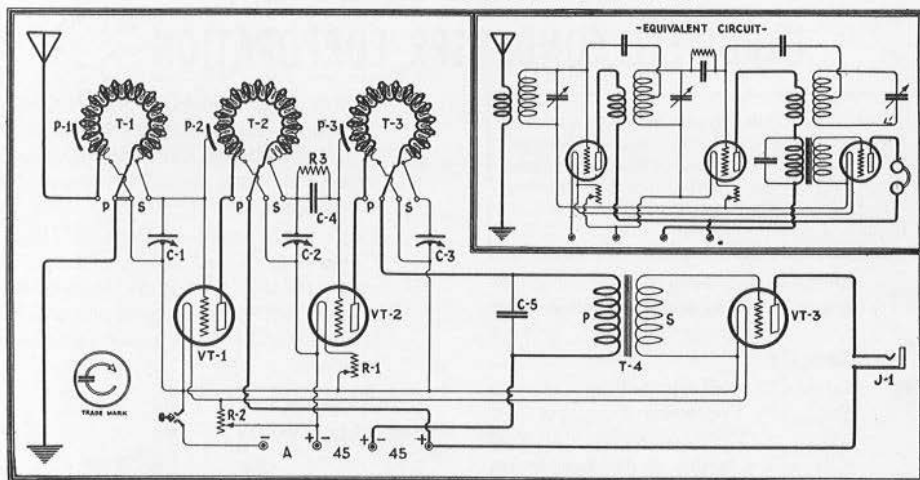
PHILADELPHIA

FACTORY
PEARL AND PROSPECT STS.
BROOKLYN, N.Y.

NEW YORK

Letterhead from G. A. Cardwell's Telegraph Typewriter Co. (1907).

THE CARDWELL TORODYNE CIRCUIT



IN developing the Toro-Tran for tuned radio frequency circuits, the Cardwell engineering staff has devised a circuit which affords the utmost simplicity in construction and operation and is designed to meet the standards of the best engineering, yet requiring the least number of parts to give as good results as any 5- or 8-tube receiver ordinarily constructed by the amateur.

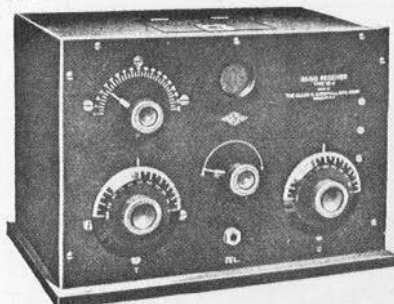
The Cardwell Torodyne Circuit uses one stage of tuned radio frequency. By means of the potentiometer feature of the Toro-Tran, which nullifies tube and stray capacity by varying the voltage transferred to the preceding grid, a very convenient method of "neutralization" is secured. Owing to the low-losses of the Toro-Tran, the tubes will tend to oscillate when grids and plates are tuned unless a stabilizing element is introduced. The potentiometer gives this desired control and yet permits the tubes to operate at peak efficiency.

The second feature of interest is the use of a tuned plate on the detector—which increases the efficiency of the circuit tremendously by placing a high tuned impe-

dance in the plate circuit and thereby forcing the tube to amplify at its maximum. As there is no magnetic feedback between the plate and the grid, and as the tube capacity (and all stray capacity) has been nullified, the circuit is not regenerative. At the same time it has all the advantages of regeneration.

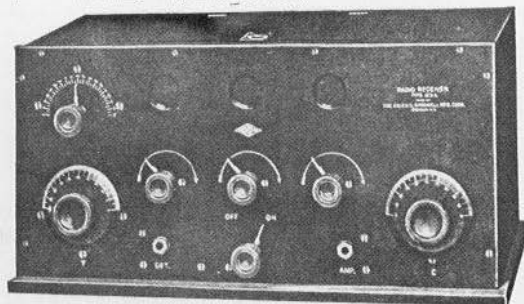
The third feature of the circuit is the use of the new Cardwell Audio-Tran (audio transformer). This has such efficient amplifying characteristics that it will afford loud speaker operation on one audio stage. The Audio-Tran is a "compound" transformer which may be used in either high or low ratio stages or in push-pull circuits.

The Torodyne Circuit operates with indoor aerial, or outside aerial, if desired. The advantages of the Toro-Tran in rejecting stray and local signals are enhanced by use of small aerials and short leads throughout the circuit. Loops may be used for locals. Tuning is synchronous, and by means of Cardwell condensers (vernier type suggested) logging will be found to be extremely simple and accurate.



112-A—Radio Receiver
Price \$50.00

Using detector; primary and secondary condenser; mahogany cabinet; range 200 to 750 Meters.



125-A—Radio Receiver and Amplifier. Price \$125.00

Double Circuit, using primary condenser; detector; two stages of audio and one radio frequency. Mahogany Cabinet. A highly efficient long distance set. Range, 200 to 700 Meters.

For a brief period in the 1920's, the Cardwell Corporation manufactured a line of broadcast receivers and related components. Early Cardwell receivers are highly prized by collectors.

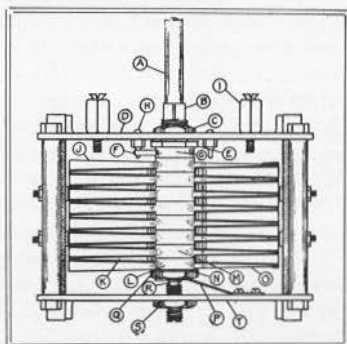
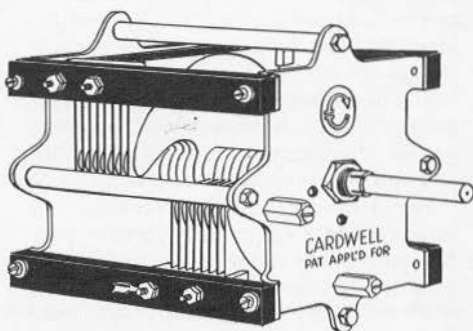
A brief History of the CARDWELL CONDENSER CORPORATION

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- 1956 --- Chesapeake Industries defaulted on the mortgage and the plant was returned to original owners.
- 1957 --- On January 16, 1957, Norman Kjeldsen purchased all of the stock of Cardwell Manufacturing Company.
- 1958 --- Cardwell purchased Schutter Microwave Corporation, Lindenhurst, New York.
- 1959 --- On June 17, 1959, Cardwell moved from Plainville, Connecticut, to Lindenhurst, New York.
- 1964 --- Cardwell purchased capacitor division of National Radio Company, Melrose, Massachusetts.
- 1964 --- Cardwell purchased Oak capacitor tooling.
- 1964 --- Cardwell purchased F. W. Sickles capacitor division at Chicopee, Massachusetts.
- 1967 --- Cardwell purchased Telerad Electronic Division, Lionel Corporation, Hillside, New Jersey.
- 1967 --- Cardwell purchased Lieco Incorporated, Syosset, New York, a manufacturer of microwave components.
- 1967 --- Cardwell purchased assets of Poly Repro Corporation, a manufacturer of microfilm reader printers.
- 1970 --- Cardwell purchased Pickard & Burns, Incorporated, Waltham, Massachusetts, a division of LTV Corporation.
Pickard & Burns was started in 1911 by G. W. Pickard, the inventor of the silicone crystal diode, the forerunner of all transistors.
Pickard & Burns manufactures submarine antennas, nuclear reactor temperature monitors, and antenna coupling equipment used world wide.
- 1971 --- Cardwell purchased Hammarlund Capacitor Company, Mars Hill, North Carolina. Hammarlund is a famous name in radio receivers and variable capacitors. The name "HAM" is a tribute to Oscar Hammarlund, the founder, who came from Sweden, where he worked for the LM Erickson Telephone Company. World War II saw thousands of Hammarlund receivers in use by the government.

MULTIPLE "C" TYPES

(SEMI-STRAIGHT WAVE LENGTH)



The Taper Plate Type "E"

The most unique and difficult condenser to manufacture. A "must" for the collector of variable capacitors.

- 1972 --- Cardwell purchased variable air capacitor division of Johnson Manufacturing Company, Boonton, New Jersey.
- 1973 --- Cardwell purchased E. F. Johnson variable receiver and transmitter capacitor division.
- 1980 --- Cardwell purchased Multronics, Inc., of Fort Lauderdale, Florida, a manufacturer of air inductors and high power switches used world wide in broadcasting stations.
- 1981 --- Cardwell today manufactures over 15,000 different items under approximately 25 different brand names.