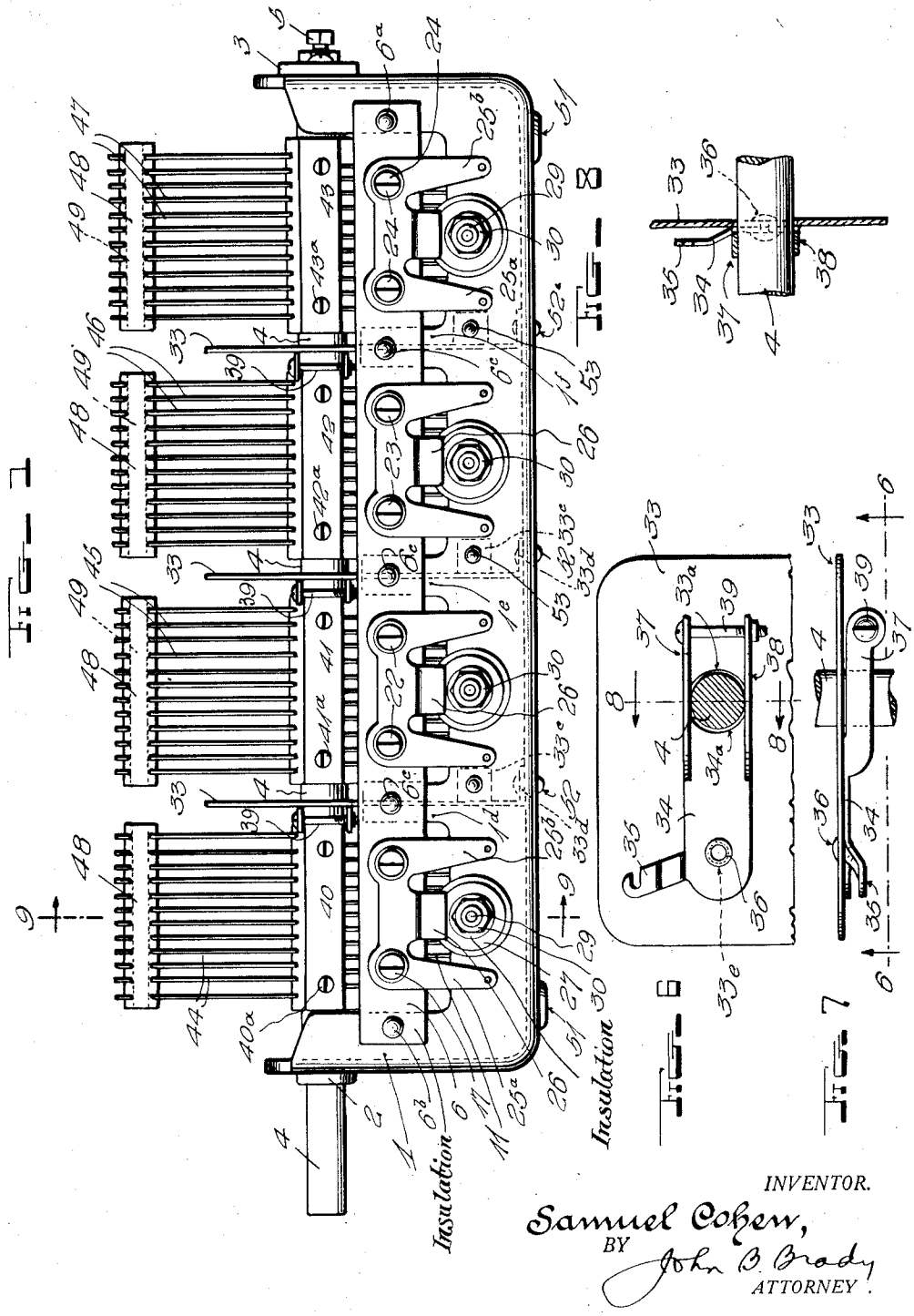
May 14, 1935. S. COHEN 2,001,600

MULTIPLE UNIT GANG CONDENSER

Filed Nov. 21, 1929 4 Sheets-Sheet 1



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MULTIPLE UNIT GANG CONDENSER

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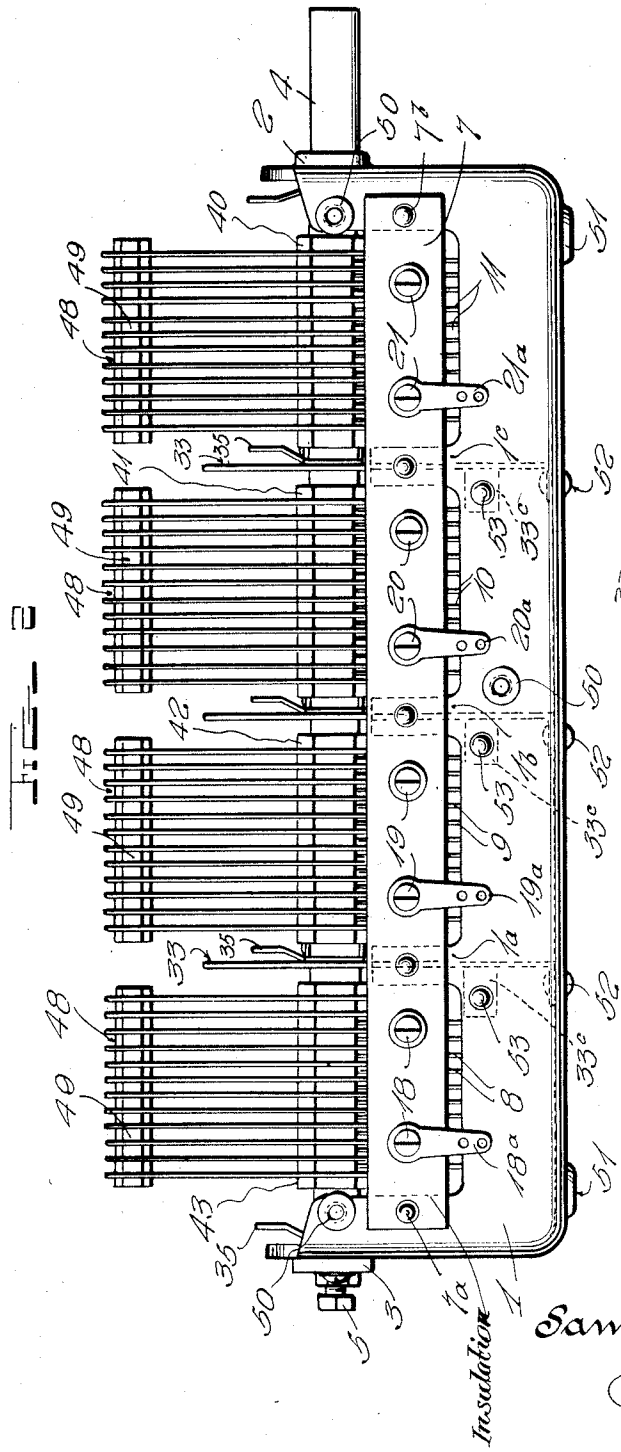


FIG. 2

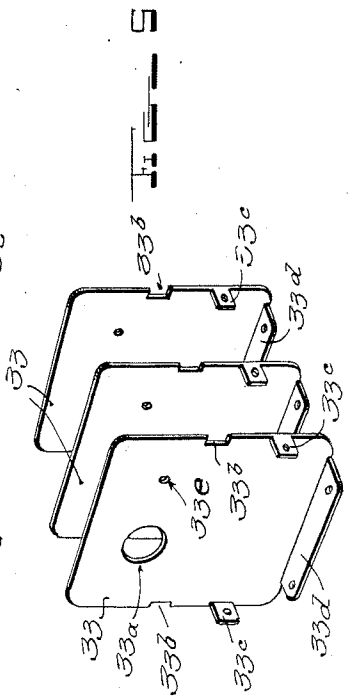


FIG. 5

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MULTIPLE UNIT GANG CONDENSER

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FIG. 3

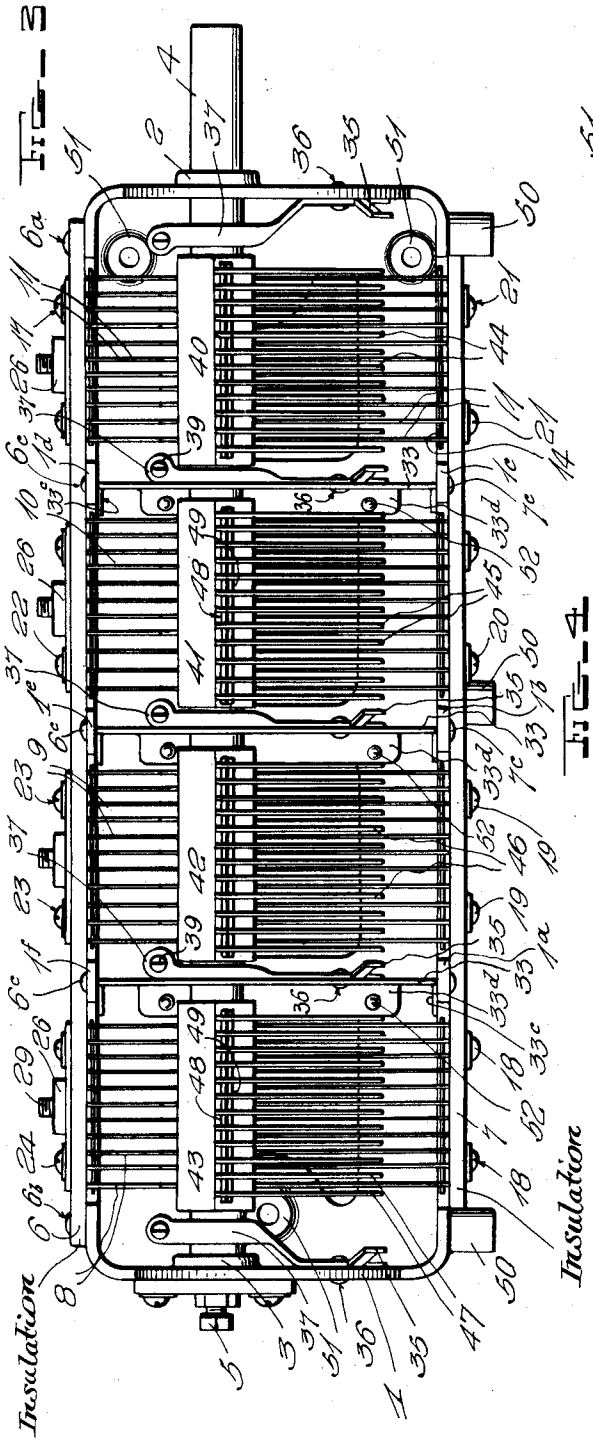
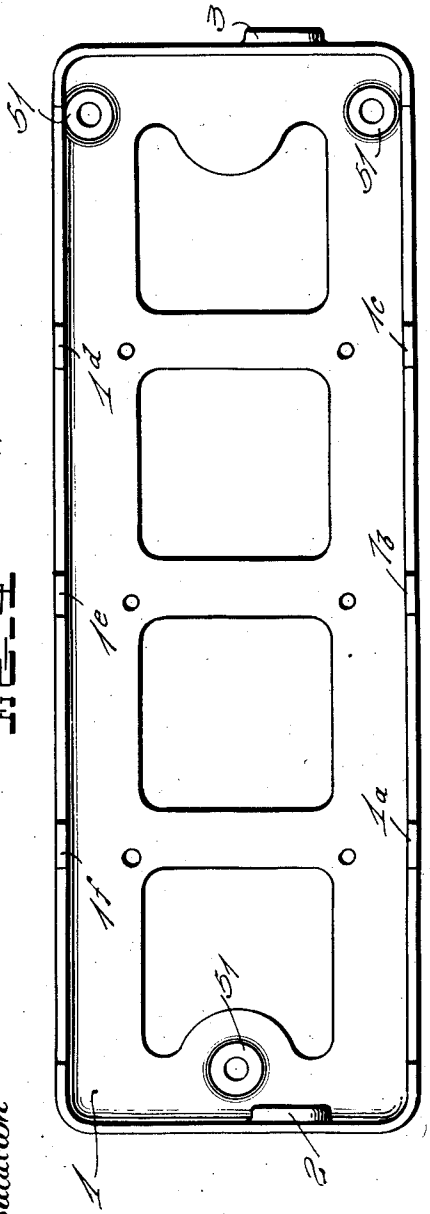


FIG. 4



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May 14, 1935. S. COHEN 2,001,600

MULTIPLE UNIT GANG CONDENSER

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FIG. 9

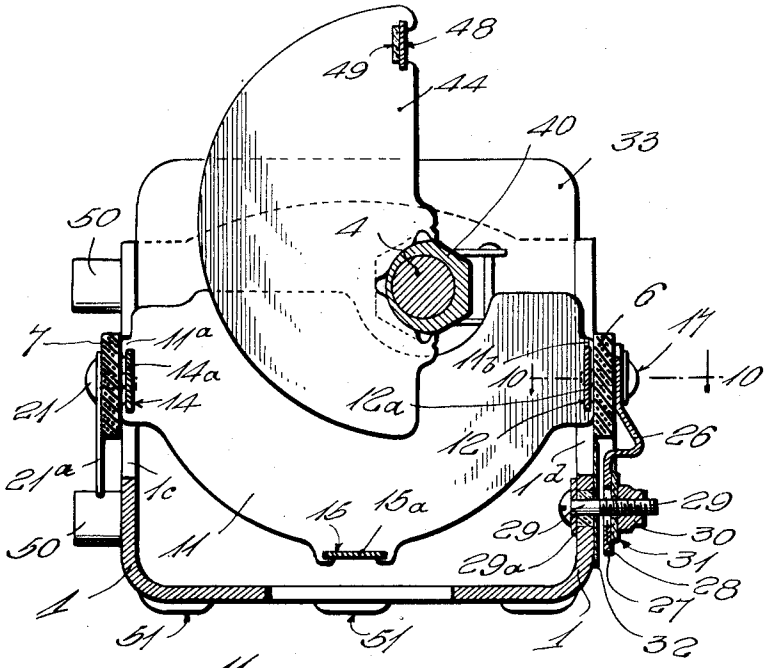


FIG. 10

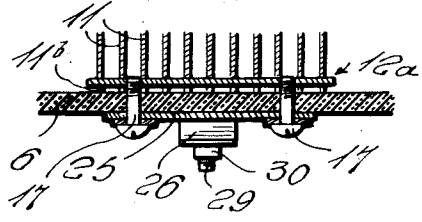


FIG. 11

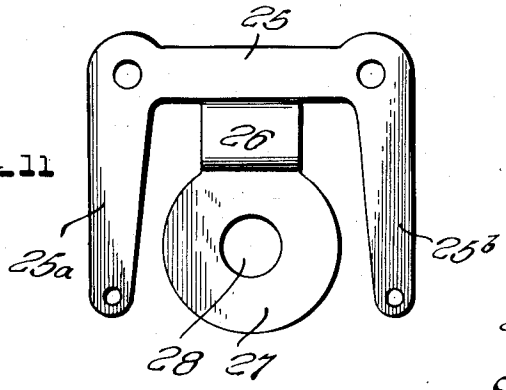
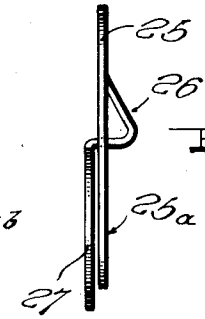


FIG. 12



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Patented May 14, 1935 2,001,600

UNITED STATES PATENT OFFICE

2,001,600

MULTIPLE UNIT GANG CONDENSER

Samuel Cohen, Brooklyn, N. Y., assignor to General Instrument Corporation, New York, N. Y., a corporation of New York

Application November 21, 1929, Serial No. 408,773

5 Claims. (Cl. 175—41.5)

My invention relates broadly to variable condensers and more particularly to a construction of multiple unit gang condenser system.

One of the objects of my invention is to provide a construction of multiple unit gang condenser which may be inexpensively manufactured on a quantity production basis.

Another object of my invention is to provide a construction of multiple unit gang condenser system in which provision is made for individually mounting the rotor of each of the units in the multiple variable condenser system.

A further object of my invention is to provide a construction of multiple unit gang condenser in which the adjacent units are individually electrostatically shielded one from another and the sets of rotor plates in each condenser unit grounded to an adjacent electrostatic shield.

A still further object of my invention is to provide a construction of multiple unit variable electrical condenser in which the condenser frame may be formed by a drawing operation for providing a cradle substantially enclosing the several units of the multiple unit gang condenser system.

Still another object of my invention is to provide a construction of auxiliary adjustable condenser which may be mounted adjacent each of the variable condenser units for matching the capacity values of the several units with respect to the several circuits in which the units are individually connected for facilitating the simultaneous adjustment of all of the circuits.

Other and further objects of my invention reside in the construction of multiple unit gang condenser as set forth more fully in the specification hereinafter following and shown in the accompanying drawings, in which:

Figure 1 is a side elevation of the multiple unit gang condenser showing the adjustable condensers mounted adjacent each of the condenser units; Fig. 2 is a side elevation of the multiple unit gang condenser looking at the condenser in a direction opposite to the direction from which the condenser is viewed in Fig. 1; Fig. 3 is a plan view of the variable condenser shown in Fig. 2; Fig. 4 is a plan view of the drawn metal shell for the frame of the condenser; Fig. 5 is a perspective view of the several electrostatic shields which are employed between the units in the multiple unit gang condenser system; Fig. 6 is a fragmentary view on line 6—6 of Fig. 7 of one of the electrostatic shields showing the rotor shaft extending therethrough and indicating the means for grounding each of the rotor units to the condenser frame; Fig. 7 is a plan view of the fragmentary portion of the rotor shaft, electrostatic shield and grounding means shown in Fig. 6; Fig. 8 is a cross-sectional view through the electrostatic shield and grounding device of Fig. 6 and showing the rotor shaft for the variable condenser in side elevation; Fig. 9 is a lateral cross-sectional view taken through one of the variable condenser units on line 9—9 of Fig. 1; Fig. 10 is a cross-sectional view taken through one of the longitudinally extending stator plate supporting strips at one side of the condenser frame taken on line 10—10 of Fig. 9; and Figs. 11 and 12 are plan and side views respectively of the adjustable plate of the auxiliary condenser which is mounted upon one side of the variable condenser frame.

Referring to the drawings in detail, the multiple unit variable condenser system includes the drawn metallic shell 1 constituting the frame of the condenser which carries bearings 2 and 3 in opposite ends thereof for the journaling of rotor shaft 4 in the condenser frame. The position of shaft 4 is adjustable by means of adjusting screw 5 at one end of the frame 1. A pair of longitudinally extending insulation strips 6 and 7 are secured to opposite sides of the drawn metallic shell 1 by suitable securing means which I have designated 7a and 7b and 6a and 6b. The strips 6 and 7 are secured intermediate their lengths to each of the upstanding tongues on the drawn shell 1 which I have indicated at 1a, 1b, 1c, on one side of the drawn shell and 1d, 1e and 1f on the opposite side of the drawn shell. The strips 6 and 7 serve as supports for the sets of stator plates which I have shown at 8, 9, 10 and 11. The stator plates are more clearly shown in Fig. 9 as having cut away edge portions 12, 14 and 15, which receive strip members 12a, 14a and 15a. Screws 17 pass through the insulation strip 6 and are secured in strip member 12a for supporting one side of the stator plates. Screws 21 pass through insulation strip 7 and into strip 14a at the opposite side of the stator plates in such manner that the stator plates are suspended out of contact with the metallic walls of the cradle 1. In a similar manner I provide a suspension means for the sets of stator plates 8, 9 and 10. Stator plates 8 are suspended between insulation strips 6 and 7 by means of sets of screws 24—18; stator plates 9 are suspended between insulation strips 6 and 7 by means of sets of screws 23—19; stator plates 10 are suspended between strips 6 and 7 by means of sets of screws 22—20. The insulation strip 6 carries an auxiliary adjustable condenser for each condenser unit. The adjustable condenser for each unit comprises a plate shaped as shown in Fig. 11 with a bridging member 25 which is secured beneath the heads of the sets of screws 24—23—22—17. The bridging member 25 has depending lugs extending therefrom as shown at 25a and 25b. A central portion extends from bridging member 25 as shown at 26, which portion is resiliently formed and carries plate member 27 which is apertured at 28. Plate member

27 may be varied in spacial relation with respect to the side of the drawn metal frame 1 as shown more clearly in Fig. 9. A screw 29a insulated from frame 1 by means of gasket 29a passes through frame 1 and through an insulation gasket 32 through the apertured portion 28 of plate 27, through insulation gasket 31 and is engaged by adjustable nut 30 by which the resilient plate 27 may be adjusted toward the metallic shell 1 or moved away from metallic shell 1. In Fig. 1 the arrangement of the adjusting nuts 30 is more clearly shown. A tool in the form of a wrench is readily insertable over individual ones of the adjusting nuts 30 for changing the spacial relation of plate 27 with respect to the drawn shell 1 in order that the capacity of each of the condenser units may be accurately adjusted. Connection may be made through the resilient plates 27 through the lugs 25a and 25b. The other plate of the auxiliary condenser is formed by the metallic shell 1 and is grounded to the several sets of rotor plates as shown.

The condenser units are electrostatically shielded one from another by means of metal shields 33 shown more clearly in Fig. 5. The shields 33 are pressed from sheet metal and are provided with supporting tongues 33c and angularly disposed flange 33d and are cut away as shown at 33b and apertured at 33a and 33e. The rotor shaft 4 passes through the apertures 33a in the shields 33. Each shield is secured in position at the base thereof by means of angularly disposed flange 33d riveted at 52 through the base of the shell 1 and by means of rivets 53 which pass through opposite sides of the shell 1 and through tongues 33c. Notches 33b in the shields 33 enable the shields to clear the heads of the rivets 6c and 7c, which rivets serve to secure the strips 6 and 7 to the upstanding portion 1a, 1b, 1c and 1d, 1e, 1f of the shell 1.

The shields 33 each carry a grounding device 34 which is secured by means of rivet 36 to the side of the shield and which is cut away at 34a for the passage of shaft 4 between the resilient arms 37 and 38 which embrace opposite sides of the shaft 4 and frictionally wipe the same for establishing electrical connection therewith. The tension between resilient arms 37 and 38 is controlled by adjusting screw 39. The grounding device 34 has a connecting lug 35 extending therefrom to which connection is made for establishing connection with the adjacent rotor plate system.

The sets of rotor plates are each carried by sleeve members 40, 41, 42 and 43 which are cut in comb-like form to receive the sets of rotor plates 44, 45, 46 and 47. The sets of rotor plates are keyed together at one edge for the purpose of firmly supporting the plates by means of key members or strips 48. In order to prevent a short circuit between the sets of rotor and stator plates an insulation strip 49 is provided adjacent one side of strip 48 which prevents direct contact between the rotor plates and the edges of the stator plates. The position of rotor plates 44, 45, 46 and 47 with respect to the associated stator plates is fixed by means of screws 40a, 41a, 42a and 43a.

The shell frame 1 may be suitably mounted with respect to the adjacent parts of a cascade amplifier system in a radio broadcast receiver by foot members 51 which are struck outwardly from the material of the frame 1 and by means of bushing members which are riveted to the sides of the frame.

Electrical connection is established with the frame and with each of the sets of rotor plates through lugs 35. Electrical connection is established with the stator plates through lugs 18a, 19a, 20a and 21a secured to sets of screws 18, 19, 20 and 21, respectively. Connection is established to the auxiliary condenser through lugs 25a.

The variable condenser system of my invention has been found to be extremely practical in construction and successful in operation and while I have described one of the preferred embodiments of my invention I desire that it be understood that modifications may be made and that no limitations upon my invention are intended other than are imposed by the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is as follows:

1. A device for engaging the rotor shaft of a multiple variable condenser comprising an electrically conducting yoke member having a forked portion deeper than the diameter of the rotor shaft and comprising a pair of flat metallic arms having their parallel surfaces frictionally engaging said shaft, and a metallic web extending between said metallic arms for supporting said yoke member from the condenser frame.

2. Means for frictionally engaging the rotor shaft of a multiple variable condenser comprising a sheet metal member carried by the condenser frame having a pair of arms bent normal to the surface of said member and parallel to each other with their parallel bent faces frictionally engaging the rotor shaft, and means extending through said arms for controlling the amount of friction applied to said shaft.

3. Means for frictionally engaging the rotor shaft of a multiple variable condenser comprising a yoke member having a flat sheet metal base, a pair of strip-like arm members extending in planes normal thereto and engaging diametrically opposite sides of the rotor shaft of the condenser, and a screw device extending through the flat arms for varying the tension thereof against the rotor shaft.

4. Means for frictionally engaging the rotor shaft of a multiple variable condenser comprising a yoke member formed from a single piece of sheet metal and including a supporting portion having a recess therein deeper than the diameter of the rotor shaft of the condenser, a pair of flat arms extending in planes normal to said supporting portion and engaging opposite sides of the rotor shaft, means extending through the extremities of said flat arms for adjusting the tension thereon, and an electrical connector integrally connected with said yoke member.

5. Means for frictionally engaging the rotor shaft of a multiple variable condenser comprising a yoke member formed from a single piece of sheet metal and including a supporting portion having a recess therein deeper than the diameter of the rotor shaft of the condenser, a pair of flat arms extending in planes normal to said supporting portion and engaging opposite sides of the rotor shaft, means extending through the extremities of said flat arms for adjusting the tension thereon, and a solder terminal projecting from the supporting portion of said yoke member.

SAMUEL COHEN.