

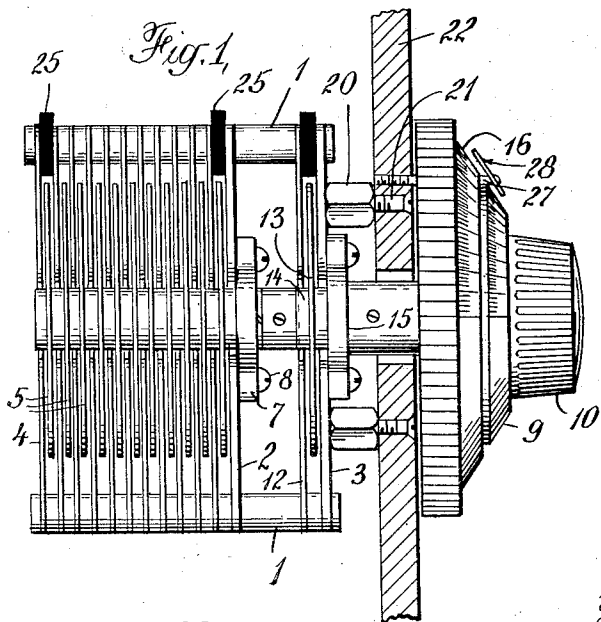
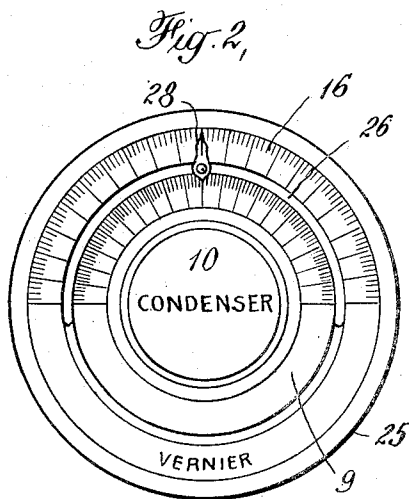
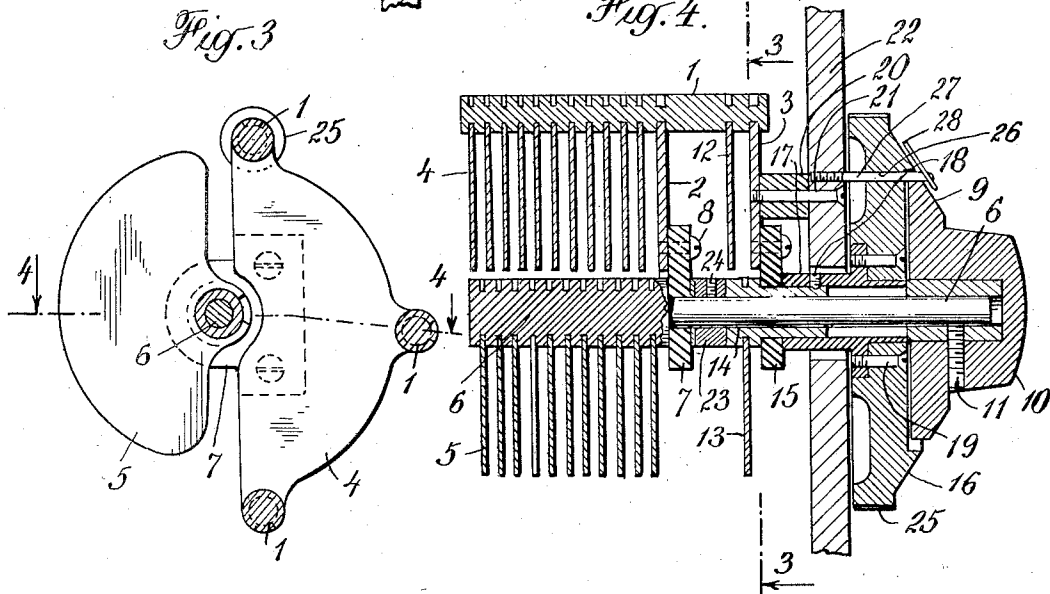
July 13, 1926.

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W. J. THOMPSON

VARIABLE CONDENSER

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UNITED STATES PATENT OFFICE.

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VARIABLE CONDENSER.

Application filed July 13, 1923. Serial No. 651,243.

This invention relates to variable condensers and more particularly to condensers of the so-called vernier type. This invention is particularly directed to the provision of means whereby it is possible to secure a very fine adjustment of the vernier element of the condenser unit.

As heretofore constructed, condensers of the general type to which this invention relates, consist of a frame carrying a plurality of condenser plates fixed thereto, and a rotating member carrying a plurality of condenser plates. The several parts are arranged so that the condenser plates carried by the rotatable member may be rotated into juxtaposition with the plates carried by the frame. The vernier attachment generally comprises one or more plates which may be rotated with respect to plates carried by the frame, independently of the rotatable plates included in the main part of the condenser unit. A small knob usually arranged coaxially with respect to the main condenser dial, is provided for the purpose of actuating the vernier element. After a rough adjustment is effected by turning the main condenser knob, or dial, a fine adjustment is secured by turning the vernier knob.

The common construction above described is open to the important objection that it is very difficult, if not impossible to turn the vernier element through a very small angle by turning the small vernier knob or dial. If a very large dial were used in connection with the vernier attachment, it would be comparatively easy to secure a nice adjustment, for when the circumference of such a large dial is moved through an appreciable distance, the angular displacement effected is very small in comparison with the angular displacement of a small knob or dial, the circumference of which is turned or moved through the same distance. Accordingly, one of the principal objects of the present invention is to provide a relatively large dial connected to the vernier element. The preferred embodiment of my invention comprises a condenser unit having a knob of ordinary dimensions fixed to the main condenser shaft, and having a dial connected to the vernier element, the diameter of the dial being substantially larger than that of the knob or dial connected to the main condenser shaft. The two dials are preferably constructed and arranged so that the over-all

dimensions are substantially the same as those of an ordinary single dial.

This invention will be better understood by referring to the following detailed description which is to be considered in conjunction with the accompanying drawings, which illustrate one embodiment of this invention, including a number of improved features of construction. In the accompanying drawings:

Fig. 1 is a plan view of a condenser constructed in accordance with the present invention.

Fig. 2 is a plan view of the dials shown in Fig. 1.

Fig. 3 is a transverse section taken on line 3—3 of Fig. 4, illustrating the various details of construction.

Fig. 4 is a longitudinal section taken on line 4—4 of Fig. 3.

In the embodiment of the invention illustrated in the accompanying drawings, the condenser unit comprises a framework, a main condenser element, a vernier element, and dials connected to the main condenser element and to the vernier element. The framework comprises three posts or rods 1, of ordinary construction, these rods being interconnected by means of two plates, 2 and 3. A plurality of condenser plates are fixed to the rods 1 in any suitable manner; for example, the plates 4 may have holes provided therein, so that the plates may be slipped onto the rods 1, suitable spacers being placed between adjacent plates, or the plates may be notched and then slipped into grooves formed in the rods. A plurality of condenser plates 5 are fixed to the shaft 6, the plates 5, together with the plates 4 forming the main condenser element of the unit. The plates 5 may be fixed to the shaft 6 in any suitable manner, such as that described in connection with the condenser plates 4, which are fixed to the rods 1 of the frame. A suitable bearing 7 is provided for the shaft 6. As is shown in the drawings, the bearing 7 consists of insulating material, and it is secured to the plate 2 of the framework by means of screws 8. A dial 9, provided with a knob 10 of ordinary construction is fixed to the shaft 6 by means of a set screw 11.

The vernier element illustrated in the drawings comprises two stationary plates 12 and 3 and a rotatable plate 13, which is

carried by a sleeve 14 encircling the shaft 6. The sleeve 14 is supported in a suitable bearing 15 carried by the plate 3, the sleeve of course being insulated from the plate 3. A dial 16 is fixed to the sleeve 14 by means of a bushing 17, carrying the set screw 18. The dial 16 has the general outline of a disc and it is preferably provided with a recess in the face thereof adapted to receive the innermost portion of the dial 9. The bushing 17 is fixed to the dial 16 by any suitable means, such as screws 19.

A plurality of tapped studs 20 are affixed to the plate 3 and are adapted to receive screws 21 which serve to fix the unit in position on a panel 22. In the embodiment illustrated in the drawing, a bushing or collar 23 is provided on the shaft 6, between the sleeve 14 and the shaft bearing 7, this bushing being held in position by means of a set screw 24.

In assembling the several parts of my improved condenser unit, the parts comprising the framework are first secured together in the well known manner. The rods 1 are secured to the plates 2 and 3 and the condenser plates 4 are fixed to the rods 1, as above described. If it is so desired, suitable stops 25 of insulating material may be provided on one of the rods with a view to preventing the condenser plates from coming in direct contact with each other, when the rotating member is turned to an extreme position. After the condenser plates 5 are fixed to the shaft 6, this shaft may be inserted through the bearings 7 and 15, the bushing 23 and the sleeve 14 being slipped onto the shaft 6, as it is being passed through the bearings 7 and 15. The dial 16 is slipped onto the sleeve 14 and fixed in this position by tightening the set screw 18. The dial 9 is then slipped onto the end of the shaft 6 and fixed to the shaft by tightening the set screw 11.

I prefer to make the edge 25 of dial 16 quite wide and to provide this edge with a knurled surface, so that the dial may be readily turned by placing the fingers on the edge thereof. The friction of the sleeve 14 on the shaft 6 should be considerably less than that of the bearing 7 so that when the dial 16 is turned, the shaft 6 will remain stationary. Also the friction of the bearing 15 should be great enough so that when the knob 10 is turned, the dial 16 will remain stationary.

My improved condenser unit may be readily manufactured in large quantities at

very low cost, for the main condenser element is composed of substantially standard parts, the shaft 6, the framework and the condenser plates being of ordinary construction. The vernier element and the dial associated therewith are merely interposed between the main condenser dial and the main condenser element in such a manner that the usual construction of the main condenser parts need not be altered in any way, and the arrangement is such that it is possible to secure a much finer adjustment of the vernier element than has been heretofore considered possible. It is quite important that the diameter of the dial or its equivalent which actuates the vernier element should be as large as possible; and this invention provides a construction such that the diameter of this dial may be made as large as desired. Throughout this application it is of course to be understood that in speaking of the relative sizes of the condenser dials, I am referring to the over-all dimensions of the portion or portions of the dials which are grasped by the hand when the dials are turned.

The dial 16 may be provided with an arcuate slot 26 disposed near the edge of the dial 9 connected to the main condenser element. This slot 26 is adapted to receive an index support 27 carrying a suitable index or pointer 28. The index support may be mounted on the panel 22 so as to project through the slot 26 in the dial 16. The index 28 may extend radially with respect to the dials 9 and 16 so as to form a convenient reference mark cooperating with the graduations on both of these dials.

The size, proportions and arrangement of the several parts may be varied without departing from the principle of the invention, which is not limited to the particular embodiment illustrated and described, but is intended to include such modifications thereof as fall within the scope of the appended claim.

I claim:

A composite condenser dial of the type described, comprising a dial adapted to be connected to a condenser element, and a second dial arranged coaxially with respect to the first dial and adapted to be connected to a second condenser element, the said second dial being provided with an arcuate slot disposed near the edge of the first dial and adapted to receive an index support.

In testimony whereof I affix my signature.

WILLIAM J. THOMPSON.