

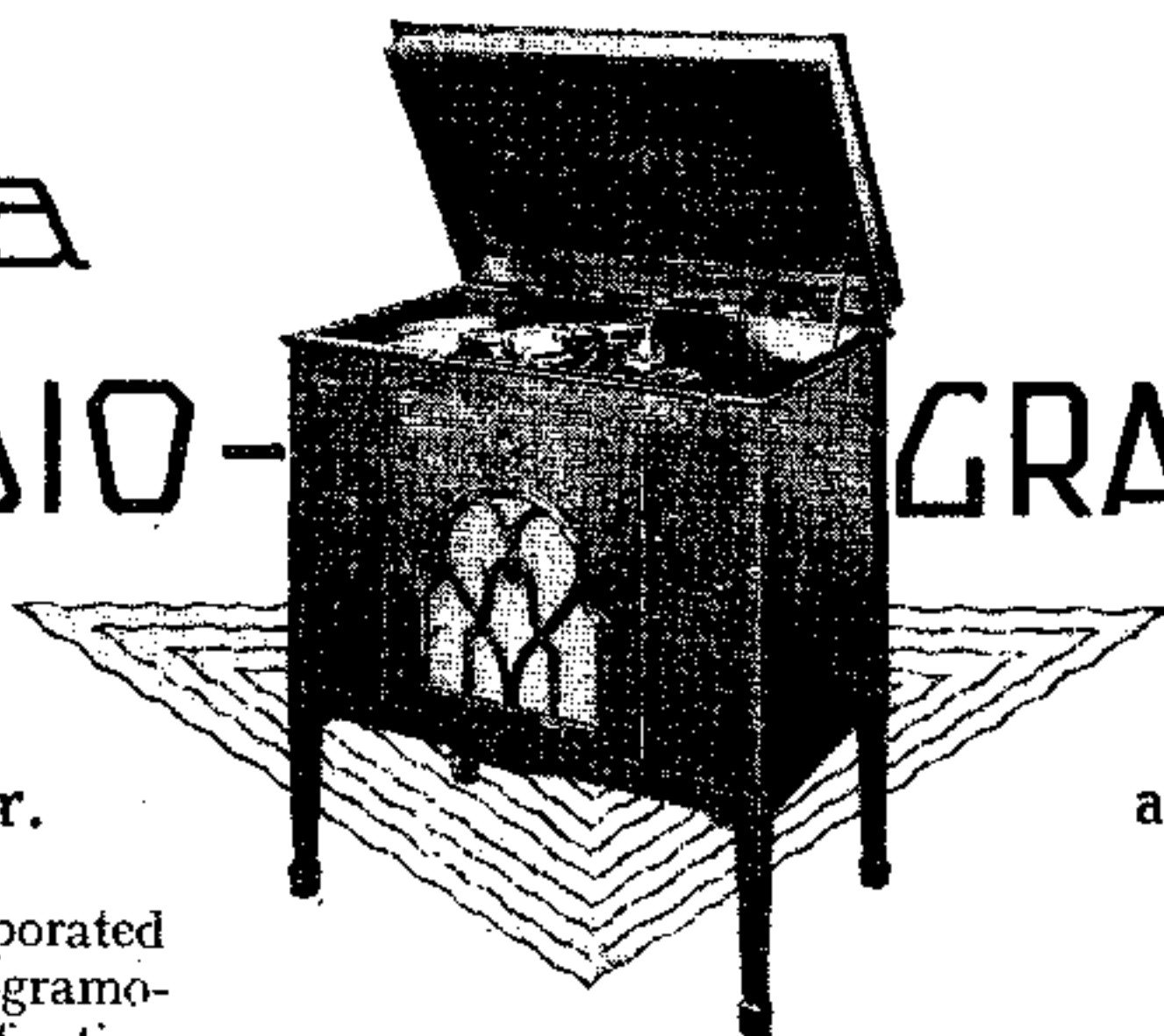
Columbia

MODEL 602

RADIO-GRAMOPHONE

Band-pass Tuning,
Screen-grid Detector.

Combined Radio
and Gramophone Volume
Control.



THE receiver chassis incorporated in the Model 602 radio-gramophone has a circuit specification which places it in the front rank of the numerous receivers of advanced design which were the outstanding feature of this year's Olympia Show. For a three-valve set the performance is remarkably good, the selectivity in particular being exceptional. On the gramophone side the volume and quality of reproduction are quite up to the standard one expects from Columbia products. The controls are easy to handle and smooth in action, and no more skill is required to obtain the maximum performance from the wireless section of the instrument than from the gramophone equipment. In fact, from every point of view, including appearance and price, the Model 602 represents all that is best in radio-gramophone design.

The three stages in the receiver chassis are arranged on the customary H.F.-det.-L.F. plan, but the employment of a screen-grid valve in the detector as well as in the H.F. stage is a novelty in a set designed for commercial production. The possibilities of the screen-grid detector have already been discussed in this journal.¹ In a ganged circuit the practically constant input impedance of the screen-grid detector is of the greatest possible value, since it is much easier to maintain accurate alignment of the ganged circuits over the whole of the tuning range. The sensitivity when worked as a grid detector is excellent, and the L.F. voltage developed in the anode circuit is much higher than in the case of the triode detector. The high overall amplification provided by the screen-grid detector and the pentode output valve obviates the necessity of providing a voltage step-up between the detector and output stages. Choke coupling is employed, and to obtain adequate low-note response with the comparatively high A.C. resistance of the detector valve, the choke has been assigned an inductance of 300 henrys. To keep the dimensions down a nickel-iron

core is used, and to reduce self-capacity the winding is sectionalised.

The moving-coil loud speaker—of Columbia design—is mounted separately from the chassis, to which it is connected by a four-pin socket fitting into a valve-holder near the rectifier valve. Two of the pins carry the field current, which is taken through a limiting resistance from the rectifier, i.e., in parallel with the H.T. supply to the set. The remaining pins take the output from the AC/PEN valve to the transformer attached to the loud speaker chassis. A resistance-capacity shunt inside the set itself limits the current in the transformer primary at very high frequencies.

Mixed Filter Circuit.

The rectifier valve is a Marconi U.12, and is connected in the normal manner. The method of adjusting the primary of the mains transformer to the supply voltage is, however, noteworthy. Three coarse tappings are provided for 195, 215, and 235 volts, and there are, in addition, two separate tappings (0 and +10), giving a further 10 volts for intermediate voltages. The connections are

made by means of brass shorting plugs and the aerial lead A₁ may be detached from the back of the aerial terminal panel and connected under either of these plugs for mains aerial reception.

Reverting for a moment to the high-frequency stage, it will be observed that a band-pass filter precedes the screen-grid valve. The coupling is "mixed," i.e., a combination of inductance and capacity. To preserve the ganging of the grid and anode-tuned circuits a condenser of similar capacity to that employed for coupling is connected in the earth return lead of the H.F. transformer secondary circuit.

The principle of the volume control is interesting. A single 50,000-ohm potentiometer serves for both radio and gramophone control. When the switch is in the radio position the potentiometer

SPECIFICATION.

CIRCUIT: Three valves and rectifier. Metallised screen-grid H.F. valve with transformer coupling and band-pass input filter. Metallised screen-grid detector, choke-coupled to power pentode output valve. Combined radio and gramophone volume control.

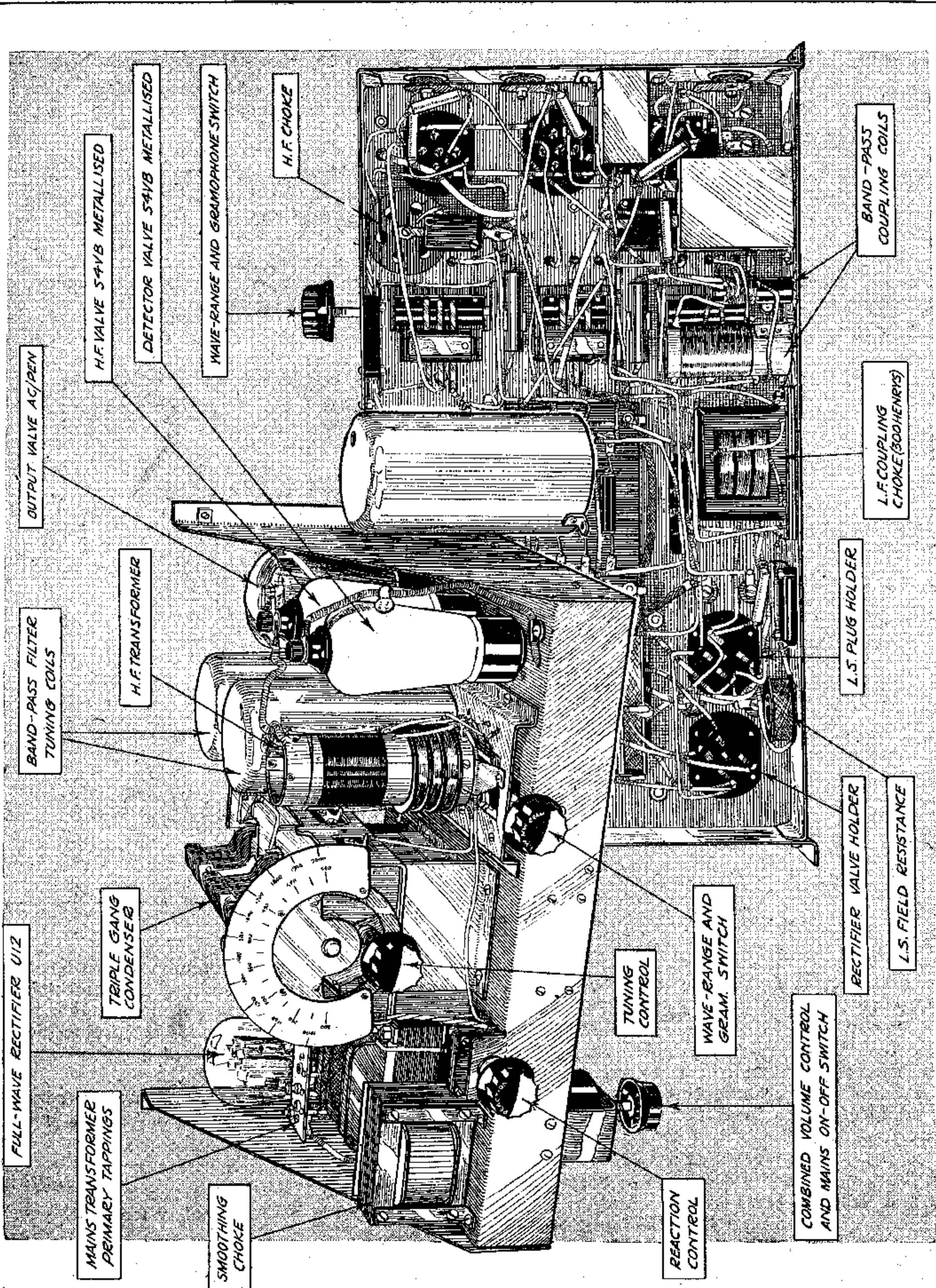
CONTROLS: (1) Triple-gang tuning control. (2) Reaction. (3) Wave-range and gram. switch. (4) Combined volume control and mains on-off switch.

GENERAL: Moving-coil loud speaker. Induction-type gramophone motor with automatic stop switch.

PRICE: 32 guineas.

MAKERS: The Columbia Graphophone Co., Ltd., 98/108, Clerkenwell Road, London, E.C.1.

¹ The Wireless World, August 12th, 1931, page 153.



H.W.D.

Constructional details of the all-metal chassis in the Columbia Model 602 radio-gramophone.

Columbia Model 602 Radio-Gramophone.

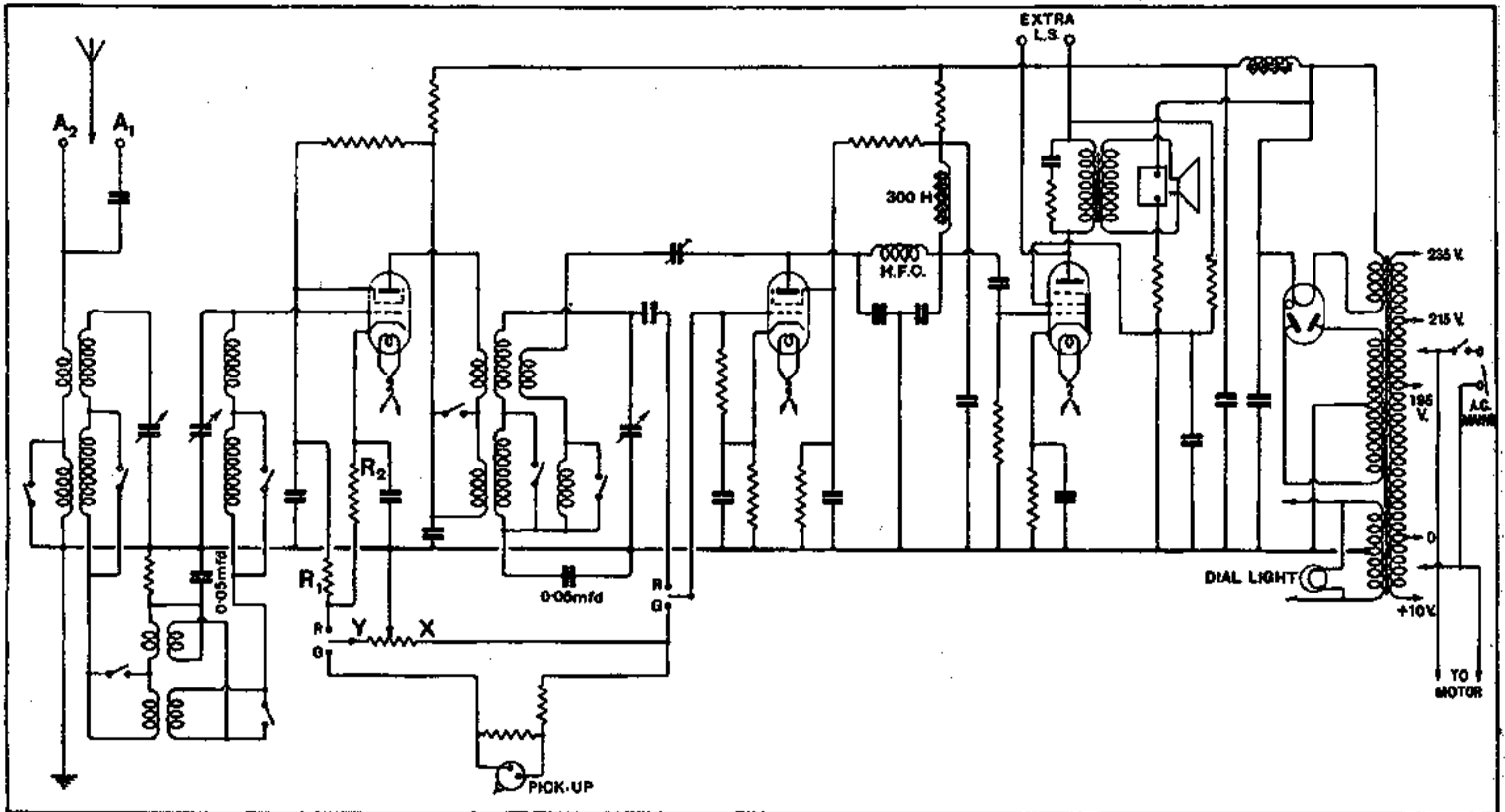
functions as a variable resistance in series with the grid bias resistance R_2 . At Y the valve receives its normal bias, but as the slider approaches X the bias is increased and the sensitivity is reduced. It will be noticed that the lower half of the screen-grid potentiometer is also in series with the control resistance. The effect of this is slightly to increase the anode current flowing through the grid-bias resistance, an arrangement which has been found to give a more even distribution of volume over the range of the control. Incidentally, the volume is reduced absolutely to zero in the minimum position. A further slight movement of the control switches off the set, as a quick-break switch is incorporated with the potentiometer.

The performance on the radio side is fully in keeping

Northern National, Bordeaux-Lafayette, Cardiff, Cra-cow, Paris (Radio Vitus), and Göteborg. There was also a considerable clear space below London National and five stations were received between 245 metres and the lower end of the scale. As further proof of selectivity, it may be mentioned that Sottens is easily separated from Midland Regional.

Absence of Needle Scratch.

Mains hum is noticeable when the receiver is tuned to a silent point on the dial, and is slightly more prominent on long than on medium waves. By comparison with other receivers in its class, however, it does not offend in this respect beyond the average, and no annoyance is experienced when listening to programmes of normal strength.



Circuit diagram of the Columbia Model 602 radio-gramophone.

with the advanced design of the circuit. The range is excellent, and 30 stations were logged on medium waves and 8 on long waves in just under an hour after dark. Of these, at least 12 required the use of the volume control to bring them down to a comfortable output level. In daylight, Hilversum, Sottens, Langenberg, and the Northern National were reliable stations on medium waves, in addition to the local B.B.C. transmissions and Midland Regional.

Tests of selectivity were made at a distance of five miles from Brookmans Park within sight of the aerials. Nevertheless, a band no less than 50 metres wide between the London Regional and National transmissions was absolutely clear of interference from either station. In this region the following stations were successfully received: Heilsberg, the British relays, Turin, Huizen,

The reproduction of gramophone records is very good indeed. The quality is round and full, and there is no lack of high-note response, yet needle scratch is entirely absent. An automatic stop is fitted to the induction-type A.C. motor, which is of massive construction and is assembled in a die-cast chassis.

Altogether, the Model 602 is a soundly constructed instrument with a performance that should satisfy the most fastidious.