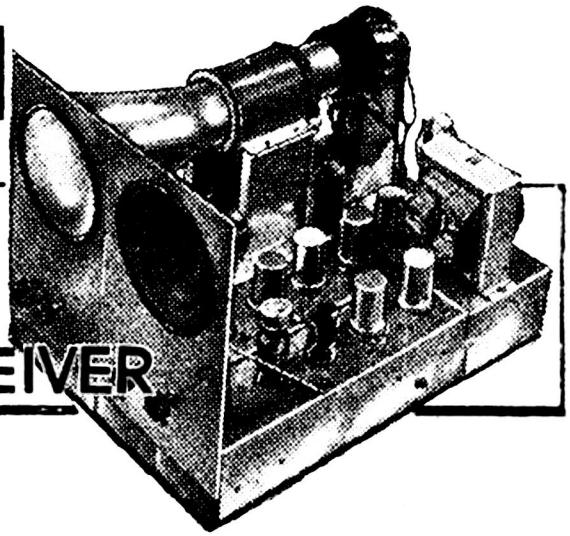
The "ARGUS"

BUILDING OUR Free Blueprint TELEVISION RECEIVER



MAKING THE CHASSIS, AND FURTHER CONSTRUCTIONAL NOTES

The Time Base

THE time-base circuit is given in Fig. 6. It follows normal practice and has been proved to be very reliable in operation.

The input is taken via C40, and V12 forms the D.C. restorer. V13 is the phase splitter, the picture signal for the C.R.T. being taken from its cathode while its anode supplies a correctly-phased signal for the sync separator.

An SP61 is used in this position with screening grid, suppressor grid and anode connected together to give normal triode conditions. This type of valve is used merely as a convenience; they are cheap and easy to obtain and its use in this position makes the top of the chassis layout appear uniform.

The coupling condenser C41 cuts off the D.C. component of the signal provided by V12, but as the cathode of V14 is directly earthed, the valve works on the lower portion of its curve and the D.C. component is thus artificially restored.

C58 is made variable so as to obtain the best amplitude of line sync pulse to trigger the line oscillator. The pulse obtained from V14 is fed to the line oscillator via the differentiating circuit. The frame pulse is obtained from the junction of R39 and R40 and is fed to the frame oscillator via the integrating circuit.

Both oscillators are of the Miller integrater and transitron type and each is accompanied by a companion valve to provide paraphase amplification and hence an output which is in push-pull for application to the deflector plates. V16 works in conjunction with V15 and the outputs are obtained at C54 and C55. Both these condensers need be only 450 volts working for the reasons explained later.

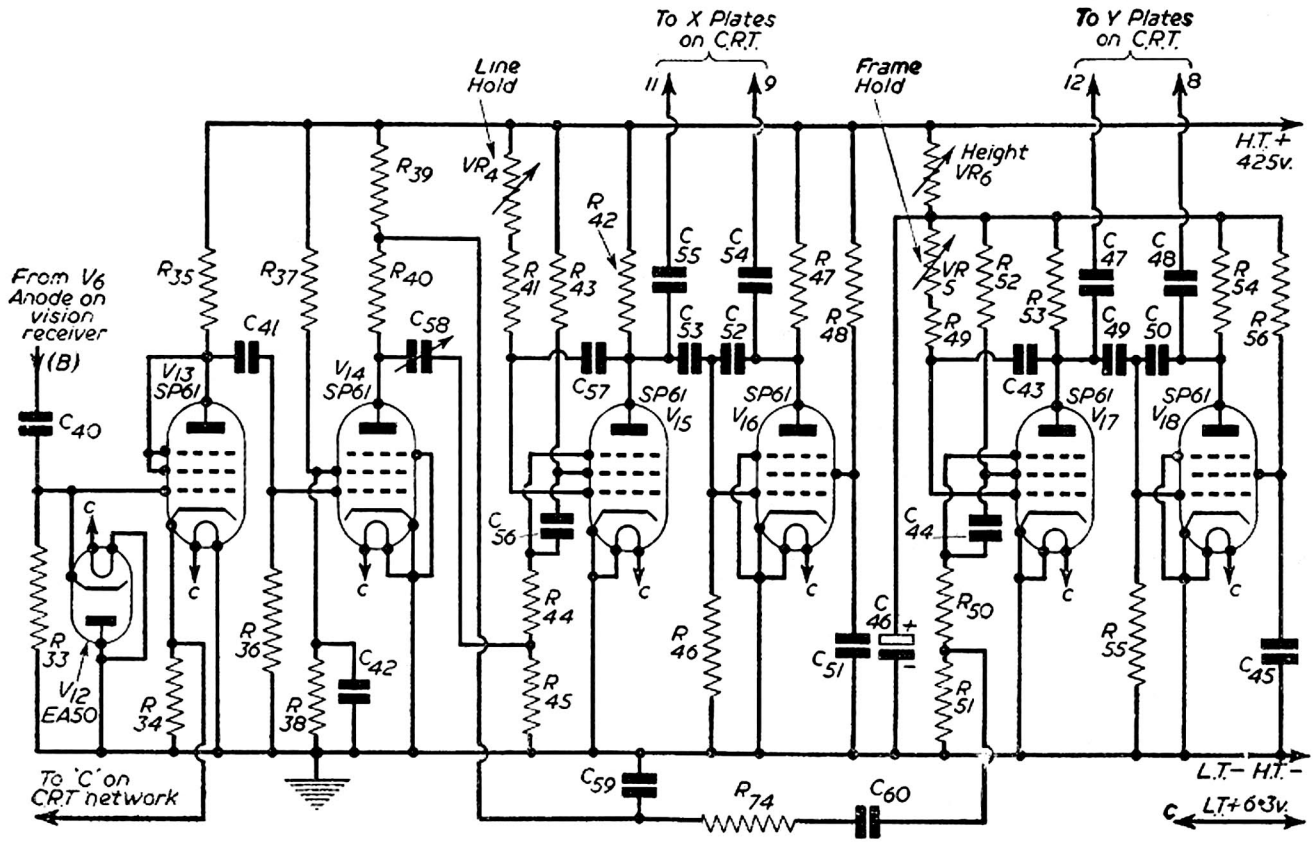


Fig. 6.—Theoretical circuit of the time base.

V18 performs the same function for the frame oscillator and the "Y" plate feeds are taken via C47 and C48. These condensers also need be only 450 volts working.

VR4 is the "Line Hold" control and VR5 is the "Frame Hold" control. The H.T. supplied to the frame time base goes through the variable potentiometer VR6, which thus exercises control over the height of the picture.

Building the Time Base

The chassis is constructed as shown below. After the holes have been drilled from the Blueprint and the chassis made up, the wiring can proceed.

The valveholders should be mounted first and then the component strip. This is formed by bending two pieces of soft iron strip ¼in. wide ⅛in. thick into an L shape and mounting on it tag strips, which are cut from a standard strip.

The filaments of the valves are wired first, the earthed side going to the valveholder fixing bolts. The components are fixed as shown in the diagram and those attached to the tag strip are fastened as the work proceeds. Start with the D.C. restorer, then the phase splitter, sync separator line time base, and frame time base.

The leads to the deflector plates are fixed at the bottom terminals of the tag strip and are taken out through the chassis and labelled one by one as they are wired.

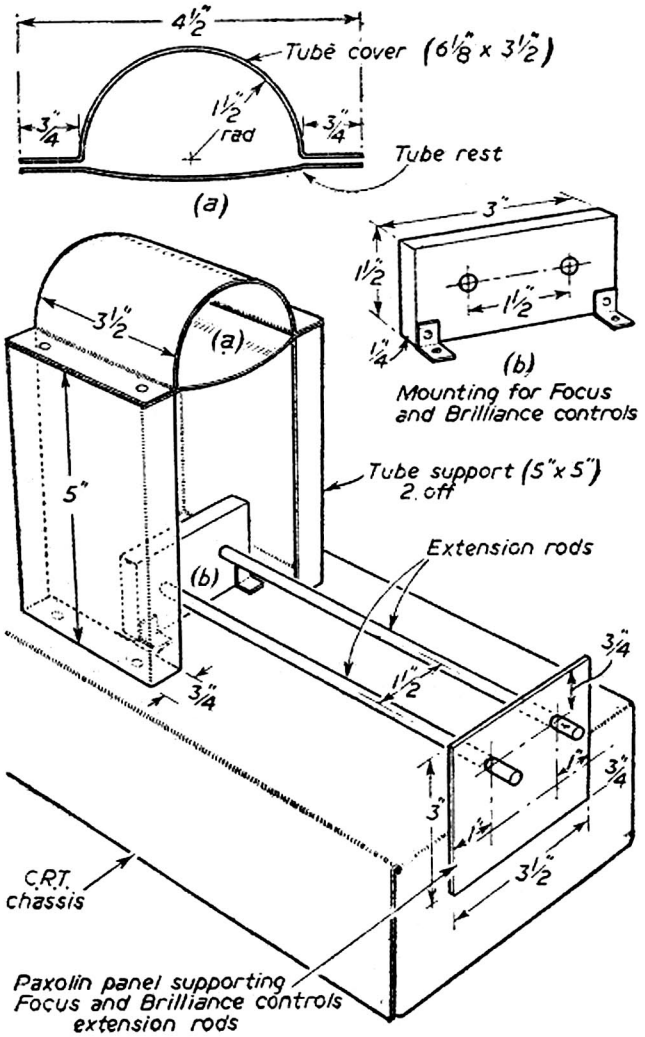


Fig. 7.—Details of the tube mount.

Finally the H.T. and L.T. leads are brought out of the chassis.

E.H.T. and C.R.T. Network

The circuit is shown on page 506. E.H.T. is obtained by using a transformer directly from the mains. The main advantage is that should the E.H.T. winding break down, one is faced with the cost of replacing a single small transformer, whereas if the E.H.T. and the rest of the power supply is obtained from one transformer, the cost of replacement in the event of a breakdown in the E.H.T. windings is very heavy.

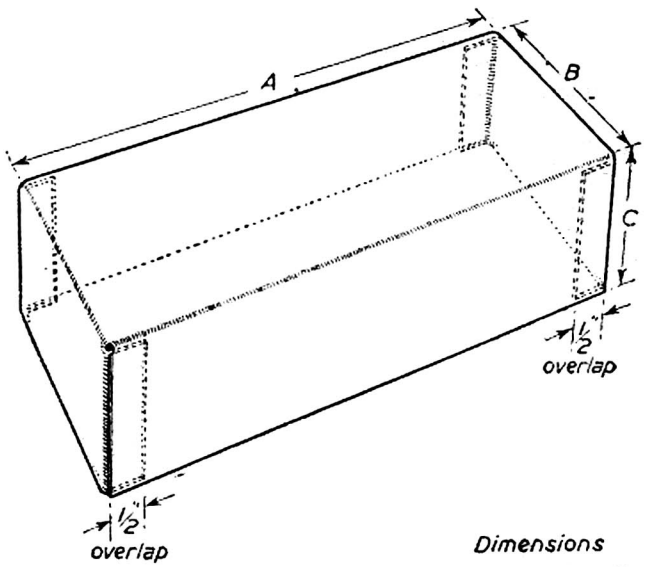
It should be noted that the E.H.T. positive is earthed and not the negative. The reason for this is that it keeps the peak inverse voltage (which amounts to 5,000 volts) away from the transformer and transfers it to the valve. This greatly reduces the risk of breakdown in the transformer.

A further advantage is that the coupling condensers to the deflecting plates need only be 450 volts working, and the time base H.T. supply can be used for biasing the plates.

One disadvantage is that the grid of the C.R.T. cannot be directly coupled to the time base and the condenser used for coupling (C61) must be 2.5 kV. working. Due to the use of this coupling condenser the D.C. component is lost and has to be reinserted by use of the EA50 diode.

It should be remembered when dealing with a circuit of this nature that the cathode and filament of tube and diode are at E.H.T. potential with respect to chassis, and care should be taken in the wiring and handling of these points.

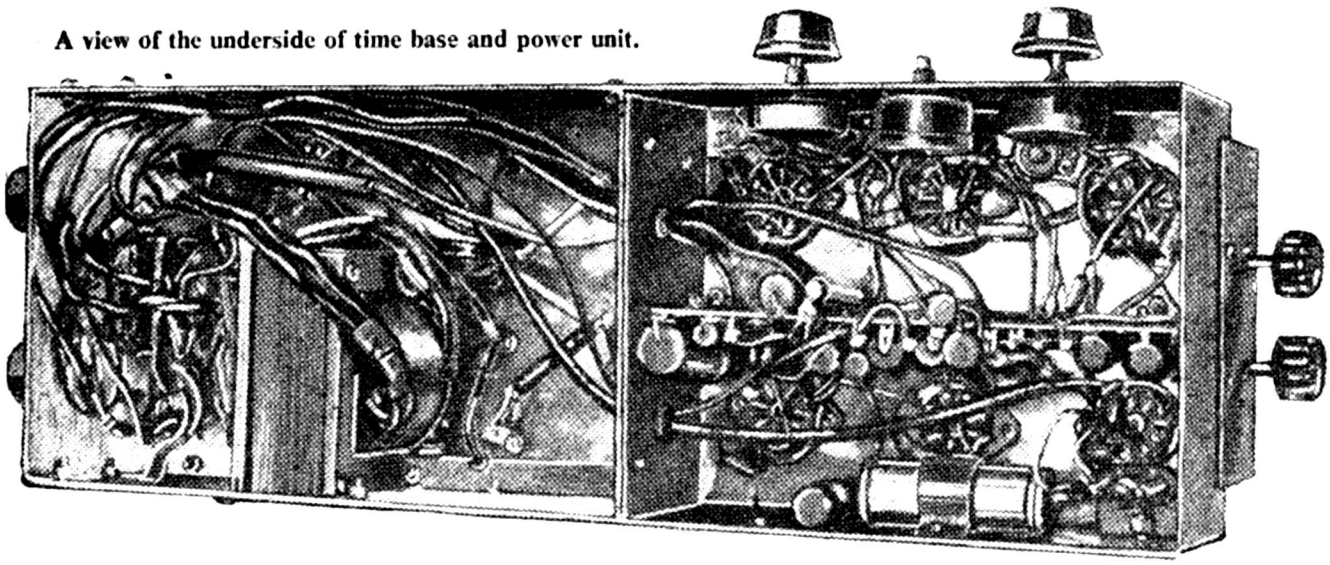
The bias on the C.R.T. is varied by VR9, which varies the cathode potential in relation to the grid. This control forms the Brilliance Control. The E.H.T. voltage applied to the second anode is made variable



Dimensions	A	B	C
Sound Chassis	13"	3½"	3"
Vision Chassis	13"	3½"	3"
Time Base Chassis	10"	6"	3"
C.R.T Chassis	8"	6"	3"
Power Pack Chassis	5"	7"	3"

Fig. 8.—Dimensions of all the 5 chassis.

A view of the underside of time base and power unit.



by the potentiometer VR10 and thus enables accurate focus to be obtained.

The X and Y plates are biased by voltage obtained from the time-base H.T. One X plate and one Y plate is provided with variable bias (VR7 and VR8), which form the shift controls to enable the raster to be accurately centred.

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Building the E.H.T. and C.R.T. Network

The chassis should be constructed as shown below, and Figs. 7 and 9 show the method of constructing the tube mount. It is in two parts, one for the tube holder and the other for the neck of the tube.

Most tubes have two rubber rings round the neck and they should be moved forward so that they act as a buffer between the metal of the tube holder and the glass of the tube. If you should happen to have a tube which has not got these rings, then a strip of sponge rubber can be used, or even a strip of felt.

The holder should not be clamped down too firmly or the neck of the tube may be fractured.

The E.H.T. transformer should be fixed first, followed by the bleeder network. The bleeder resistors (R68, R69, R70 and R71) are mounted so that they are ½in. clear of the chassis.

The Focus and Brilliance controls are mounted on a thick paxolin strip which is fastened to the chassis by L-shaped connectors, as shown in Fig. 7. This holder is mounted in the position shown and the controls fastened to it. Extension rods 10in. long carry the controls to the front panel, but are not fitted at this stage.

The tube holder should be mounted next together with the D.C. restoring diode, which is fastened to the tube holder by a small piece of L-shaped metal, using the existing screws on the tube side of the holder.

R66 is retained in its vertical position by the wiring.

After fixing all the components the wiring can proceed, bearing in mind that the R61, R62, R63 and shift control network is 450 volts above earth potential, but the rest of the circuit is at E.H.T. potential.

Commence the wiring with the biasing and shift control network. Room is left on the resistors R57, R58, R59 and R60 so that leads from the respective coupling condensers in the time base can be "teed" at these points.

R65 and C64 are mounted as shown in the wiring diagram, and the resistor R64 is mounted directly across the diode holder. All this part of the circuit should be wired with double insulated wiring, using 2 mm. sleeving over the bare wire and enclosing the whole in 5 mm. sleeving.

The leads from the primary of the E.H.T. transformer to the mains are brought out at the side of the chassis together with the time-base H.T. lead. The time-base H.T. lead is connected to the top end of R61, and this forms the common point for the H.T. to be connected to the time base itself.

When this part of the work has been completed, the time base and C.R.T. chassis can be bolted together. The X and Y leads from the time base should be connected to their respective resistors, and the L.T. for the time base extended through the side of the C.R.T. chassis.

H.T. for the time base is connected to the top of R61 in the manner mentioned previously.

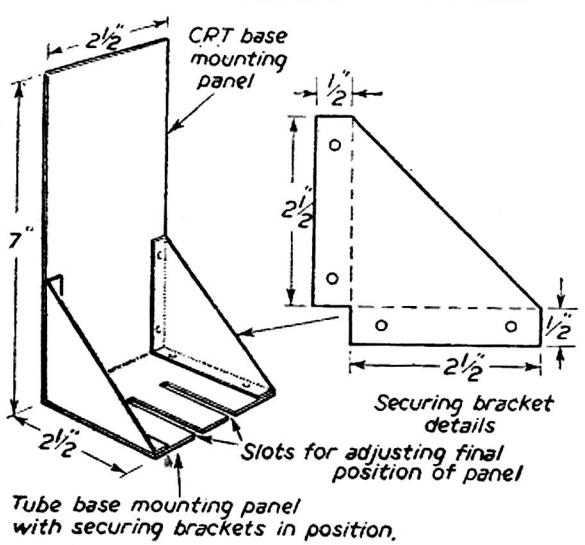

Fig. 9.—Details of the tube base support.

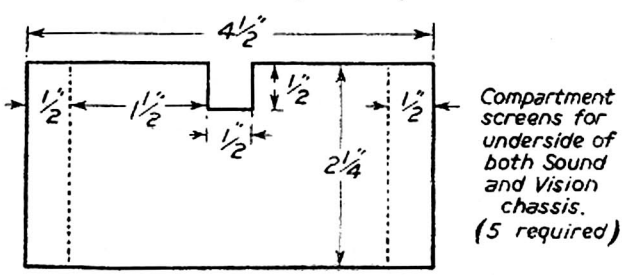

Fig. 10.—Details of the compartment screens.

A coaxial cable link is run from R34 in the time base to C61 in the C.R.T. network, and the screened covering should be earthed at both ends.

When the wiring has been completed it should be checked very carefully. Finally, the 10in. long extension rods should be connected to the Brilliance and Focus controls, the rods being insulated with P.V.C. covering from a length of coaxial cable. The front ends are supported by a paxolin strip. When the knobs are fitted the grub screws should be sunk well inside the knob.

Power Supply

The transformer should have an output of 425-0-425 volts and the time-base H.T. is taken directly from the receiver side of the smoothing choke. R72 and R73 feed the vision and sound receivers respectively. Adequate smoothing is applied and the raster will be found free from traces of ripple.

As an additional precaution an iron shield can be erected between the power unit and the vision and sound receivers, if desired.

The mains input is taken via the switch, and the transformer side of this switch is connected to the appropriate voltage tap on the transformer. The mains input to the E.H.T. transformer is wired directly across the power transformer, and thus comes under the direct control of the switch.

Building the Power Unit

The chassis is constructed to the dimensions shown in Fig. 8, and the components should be fixed and wired as shown in the blueprint.

After all the wiring has been checked, a test should be made to ensure that no contacts exist between H.T., E.H.T., L.T. or earth. The separate units can then be connected together by long leads, not forgetting the coaxial links from the time base to the vision receiver, and from the vision receiver to the aerial socket.

Do not bolt the units together at this stage, as it is much easier to make adjustments or correct faults with the units separate.

Insert the valves in their respective sockets and fit the C.R.T. in its mount.

Operating Instructions

Set all the controls to their minimum positions ; plug in the mains lead, and switch on. After allowing time for the televisor to warm up, advance the brilliance control until a trace appears on the screen. This should be roughly square in formation and is termed the "raster." Now adjust the focus control until the lines forming the raster are clearly defined ; the height control can then be adjusted to obtain a suitably dimensioned pattern, and the shift controls operated to bring the raster centrally on the screen.

Now reduce the Brilliance control until the raster just fades out. This is the normal operating position for the brilliance control. Advance the contrast control and a varying pattern should now appear on the screen. Adjustment of the line-hold control should resolve the pattern into a picture and adjustment of the frame-hold control should lock the picture vertically.

(To be concluded next month.)

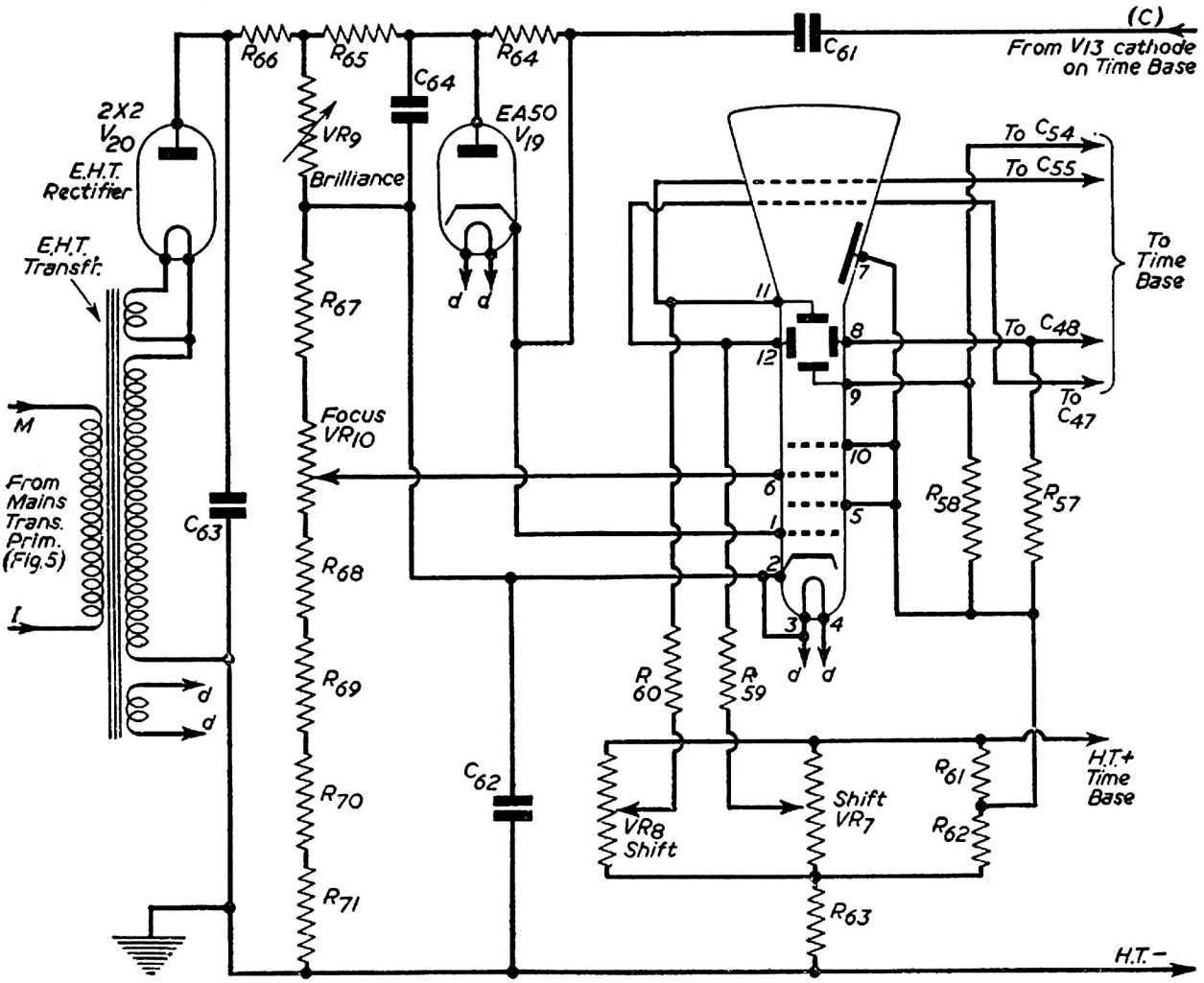

Fig. 11.—Theoretical circuit of the E.H.T and tube unit.