Westector WM26 (1933)

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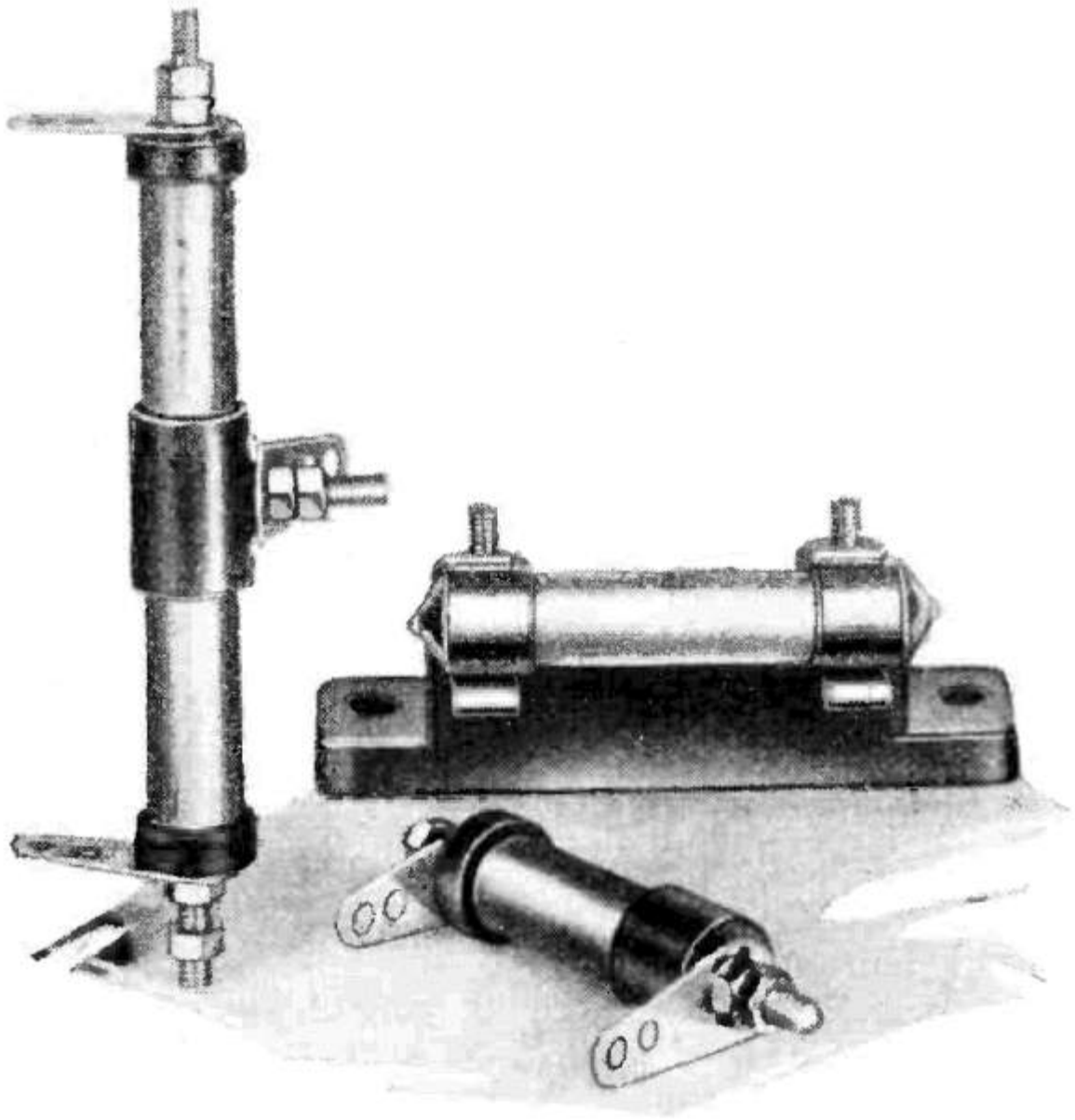
The Westector

A Copper-Oxide Rectifier for H.F. Currents



The new Westinghouse Westectors shown alongside a grid leak. The larger of the two is type W.M.26,
and the smaller one W.M.4

The use of metal rectifiers in H.T. supply units is quite familiar; it is a development of these which now threatens the supremacy of the valve. Metall rectifiers are now available for the rectification of radio-freqnency currents; in their physical dimensions they are strictly comparable with a grid-leak type resistance, as can be seen from the illustration ; they require n0 current or voltage supply, they need no adjustment, and, so far as short tests can determine, they are reliable.

The rectifier, of course, does not amplify, and it its efficiency be compaired with either an anode bend or a grid detector, it will be found greatly inferior. This is not a fair

comparison, however, for these methods of valve detection are really dual stages, in which a single valve gives both rectification and amplilication. To be fair, a Westector must be compared with a diode detector; in theory, it should give a practically identical performance, and practical tests show that the difference with correctly designed circuits is negligible .

Comparable with a Diode

There are two main types of Westectors, the W.4 and thc W.6; these are both half-wave rectifiers, strictly comparable with an ordinary diode detector. Each is rated to pass a maximum current of 0.25 mA, and the W.4 is designed tor a maximum input of 24 volts peak, whereas the W.6 can handle up to 36 volts. Full-wave typcs are also available, and these are comparable with the duo-diode; they consist of a pair of **W.4** or **W.6** rectifiers and are designated as types **W.M.24** and W M.26. Their characteristics are the same, but as the signal input is normally applied in push-pull, the permissible values are doubled, and a total of 72 volts peak can be applied to the W.M.26. As far as the output circuit is concerned, of course, the rectifiers are in parallel, so that the maximum current output becomes 0.5 mA.

In the design ot these rectifiers, every precaution has been taken to reduce the inevitable capacity to a minimum. In spite of this, however, the capacity is rather higher than that of a valve, and the rectifiers are, generally speaking, not so suitable for use directly on the medium wave broadcast band as in I.F. circuits. At 1,000 kc. (300 metres), the makers quote the equivalent load of the detector as 10.000 ohms. This is rather a low figure, and would damp any tuned circuit to which it might be conneted. Futhermore, it might necessitate the use of a power H.F. stage immediately preceding the detector.

These difficulties will probably be overome, but at present the chief practical use for the Westector undoubtedly lies in the superheterodyne. At the low intermediate frequency (110 kc. or so) generally employed the damping is much less, for the capacity of the unit is comparatively unimportant. As a result, the preceding tuned circuit can be of more normal effevtive efficiency, and the necessity for a power H.F. stage is avoided. Indeed, an ordinary variable-mu valve can be used satisfactorily to drive the detector.

In all respects, the Westector behaves as a diode detector in a superhetrodyne, and in the same why it may be used to provide automatic volume control. As a test on the operation, the type W.26 was substituted for a duo-diode valve in an A.V.C. superheterodyne with an intermediate frequencv of 110 kc., and, judged audibly, there was n0 difference whatever in the performance. A type W.6 was then substituted for an ordinary diode detector in an

A.V.C. superheterodyne of simliar type, and here again no audible change was detectable. The response is understood to be substantially linear, and this is borne out by the fact that during the tests distortion remained at as low a level as with a valve detector.

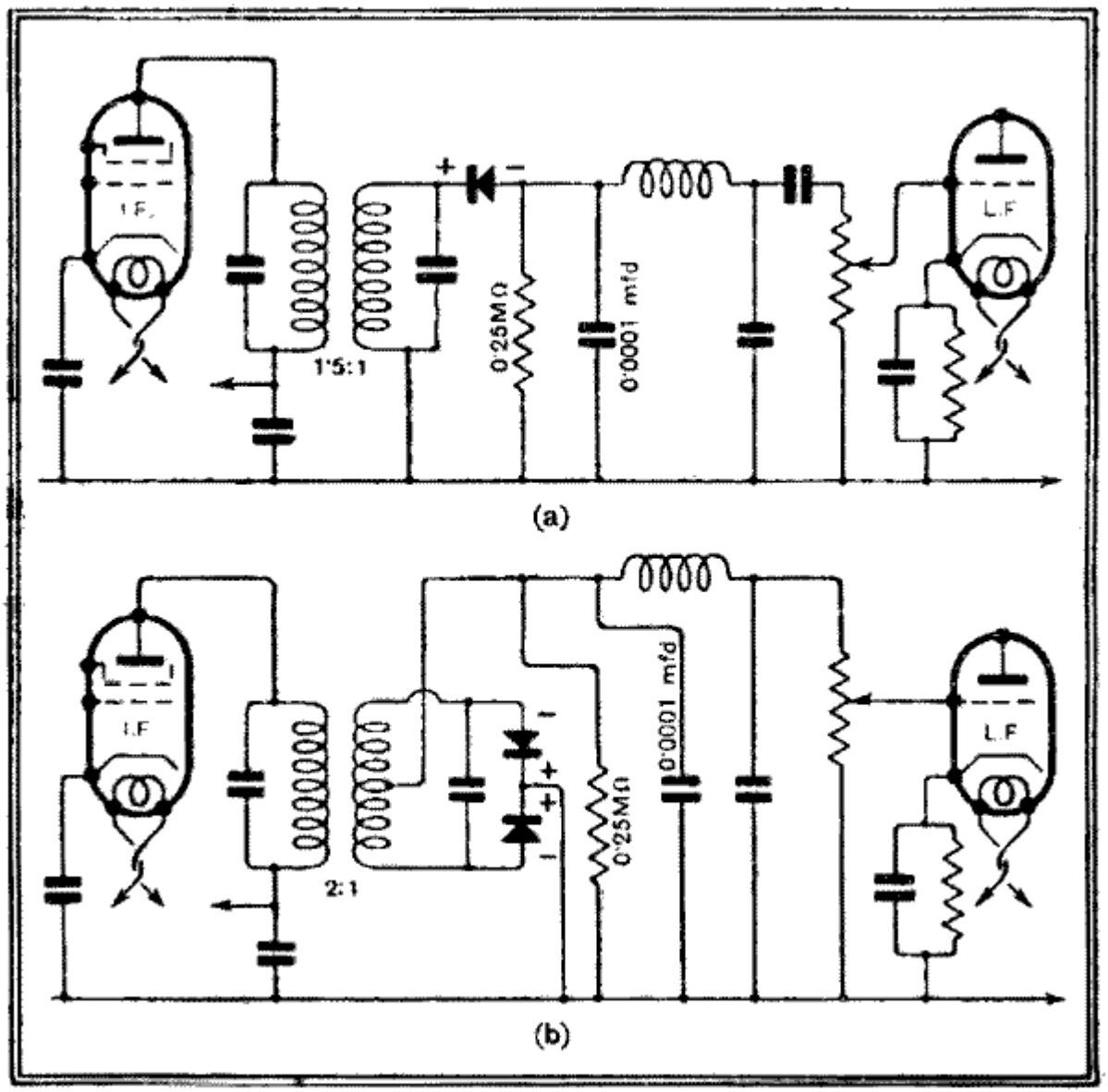


Fig. 1. The recommended connections of the Westector as the second detector of a superheterodyne are shown at (a) for half-waverectification and at b) for full-wave.

Owing to the fact that neither electrode need be at earth potential, modified circuits become permissible, and the makers advise the use of the arrangements shown in Fig.1 (a) and (b) for half- and full-wave rectification respectively. If A.V.C. be used, the polarity of the rectifier is important. It should be understood that the use of these circuits is not essential for the oidinary diode valve circuits can however, that, with the recommended arrangement, the I.F. currents in the output are ahout one-tenth of those with more normal circuits, so that less I.F. filtering is needed. In order to reduce damping of the tuned

circuits to as low a figure as possible, step-down ratios in the transformers are advised, and the ratios are marked on the circuits.

It would appear, therefore, that these rectifiers open up a useful alternative to the valve diode detector in superheterodynes, and it seems probable that one of their chief applications will lie in the development of simple automatic-volume-control systems.

The makers are the Westinghouse Brake & Saxby Signal Co., Ltd. *)

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