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**EDITORIAL**

According to recent announcements, the Germans are now using radio-controlled glide bombs, and miniature tanks designed to explode within the blind lines.

The above is just one of the many trends in electronics, science, and otherwise, which point vividly to the interesting field of radio-controlled vehicles, even as we speak. It would appear that every time we look around, our future is blazoning its ideals and aspirations.

Radio control of both ships and planes was an accomplished fact long before the war and, to judge by their accomplishments in other directions, engineers here have had plenty of time to develop the principle to a much higher state of efficiency.

The fact that our years of intensive warfare have apparently failed to bring in anything very startling in this field suggests that there may be a tacitness as well as technical barriers to its successful employment.

An obvious requirement of any creeping submarine is that the operation be able to set itself to work when his target is landing, either by direct vision or by electronic means. Both German weapons rely on direct vision, and the aperators' interest in affairs in Italy to bring about a termination by a well-placed ship, or by a submarine somewhere in his line of sites.

To provide him with electronic vision may not be beyond the possible, in view of modern science, but the limitations of the scheme, particularly in regard to range, would probably be enough to justify electronic vision to reduce the objective by artillery fire or a bombing sortie.

Then, too, irrespective of the means of control, a self-propelled vehicle must constitute a complete arsenal or ship, or tank. For defense against interception, it would have to rely on a range of speed, for the automatic sighting, and the defensive weapon would seem a rather ambitious project, even for our scientific age.

What then would be the fate of any self-propelled men, speeding towards a well-defended target. Probably a similar fate to that which met the first German glider tanks, or the much discussed zip suicide mill.

For four years at war, we have produced in both camps, highly mobile and accurate weapons for defense at close quarters.

It would be presumptuous to say that remote control will be developed for defense at any degree, but there is none the less a feeling in the air to someday develop missiles or steering wheels from tilted wings.

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**INDEX**

<table>
<thead>
<tr>
<th>Page</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better English Mev. Better Places 2</td>
<td>Recording Stand On Film (Part 1) 25</td>
</tr>
<tr>
<td>Painting-2 Mev. by Mr. V. 5</td>
<td>RCA Valve Design And Utilisation (Part 2) 28</td>
</tr>
<tr>
<td>Instrument On A Band And Others 6</td>
<td>Another 25 Yr. Superior Circuit 29</td>
</tr>
<tr>
<td>The Bassoon Mating History 9</td>
<td>Technical Book Review 33</td>
</tr>
<tr>
<td>The Harmonica &quot;Widows&quot; Or Mau 10</td>
<td>Breadstuffs-26 34</td>
</tr>
<tr>
<td>Boxing Simple Glocks 12</td>
<td>Short-Wave Radio 36</td>
</tr>
<tr>
<td>How To Host From A World War 7</td>
<td>The Month's Recording 39</td>
</tr>
<tr>
<td>A Discussion Of Mute Movements 15</td>
<td>Strugglesome &quot;Stop&quot; A Whirling 40</td>
</tr>
<tr>
<td>Streetcar wrecked Indications 23</td>
<td>Hints For The Home Handyman 41</td>
</tr>
<tr>
<td>Answer To Correspondents 43</td>
<td></td>
</tr>
</tbody>
</table>
Even under present conditions, Rola is maintaining its reputation for service.

Because of the National need to conserve vital materials, your present speakers may have to be repaired economically. To this end facilities are available, either through your distributor, or direct from Rola headquarters at Richmond, or the Sydney Depot at 116 Clarence Street, for speedy repair service.

If your old speaker cannot be repaired economically, Rola distributors are authorised to supply you with a new Rola Speaker. Listen regularly to Rola Radio Newsreel, Item 3XY, 2UE, SAD, SPI, 55E and 5MU every Sunday at 7.15-7.45 p.m., E.S.T.

GEORGE BROWN & CO. Pty. Ltd. 116 CLARENCE STREET, SYDNEY, N.S.W.

Manufactured and distributed by ROYAL COMMUNITY LTD. PTY. LTD. THE AUSTRALIAN ECHO LTD. 116 CLARENCE STREET, SYDNEY, N.S.W.
No matter how sleek the lines of a tighter plane, no matter how powerful its armaments, it is only as good as the power plant which hurls it into the sky. Allied designers have maneuvered on an important lead in the constant struggle to get the last ounce of power.

It is a good stroke from the day of the Wright brothers and their first aeroplane motor, weighing 444 pounds and delivering only 22 horsepower, to the Wright Cycle 160 that now pulls the 42-ton Douglas 8-19 750 miles.

The engine of today is only incidentally concerned with containing the giant in flight; they must keep him flying smoothly under all circumstances and conditions and this is referred to as "reliability." What about the aeroplane engine? The next position for each new plane is required pilots and engine designers then get together and draw what designs and foregoers will be needed. The horsepower they can pull out to come in a variety of types and sizes, varying differing in the number of cylinders each engine has and their size, pressure, and speed, the cylinders may be air-cooled or they may be liquid-cooled, terms which the average reader will readily understand.

**Types of Motors**

The earliest air-cooled engines had a single row of cylinders arranged in line, as in common automobiles, but these are cumbersome, and with the size of the engine, there is a limit to the number of cylinders that an air-cooled engine can carry. Liquid-cooled engines now in service are usually of the in-line type, having two banks of cylinders to form the sides of a V with the power at the apex.

"The revolutions of the V type, as yet never used, are said to be catching the interest of the aviation world because when the V comes, the entire cylinder arrangement can be placed in the wing or fuselage and the half of the "V" that is the engine working on the top of the aeroplane. The famous Fokker fighter lies in the form of a liquid-cooled engine with banks of cylinders arranged in the same manner. For air-cooled engines of the motor age, with the increased size and frequency of the brake variety.

"Air-cooled V engines" are very rare specimens they may yet be developed. Many of the latest fighters which use piston-"cooled" air-cooled engines with two rows of cylinders are making a noise. A common outgrowth of all line-cooled motors is the "V" type, which gives the idea of the engine is to give the appearance of reduced power and air-cooled efficiency. It is not a factor in the engine design, but it is a factor in the engine that the machine, by its flywheel, is designed to give the impression of being a more powerful engine than it actually is.

The pressure forces the blade outward and the movement is extended through various kinds of mechanical linkage. The pedal point where the movement is by pedal.

In the case of the airplane section, the motor moves in the direction indicated. In the "V" type, the pressure forces the blade outward and the movement is extended through various kinds of mechanical linkage. The pedal point where the movement is by pedal.

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Let us examine what goes on inside the engine, to give some idea of mechanical linkage. The "V" type, the pressure forces the blade outward and the movement is extended through various kinds of mechanical linkage. The pedal point where the movement is by pedal.

**SEVERAL CYLINDERS**

To develop a higher flow of power, to the airplane section, the engine combines more cylinders and makes the larger plane that is the engine. The "V" type, the pressure forces the blade outward and the movement is extended through various kinds of mechanical linkage. The pedal point where the movement is by pedal.
Puzzled? — This is How It Works:

Three-power engines. There are few more impressive to the eye of the average war-watcher. The is for the Bing to push by my means positive in its purpose, but they are the mechanical equivalent of the “wasp” in its function.

The loader calls “Ready!” to the driver, who then has the engine Intake. It does this by the supply of intake, which sets the impeller in motion. The engine Intake then responds to the driver’s lever. The gun is in a position of readiness, and the trigger is held twice. The gun is lifted to a position of readiness, and the trigger is held twice. The gun is lowered to a position of readiness, and the trigger is held twice. The gun is lowered to a position of readiness, and the trigger is held twice. The gun is lowered to a position of readiness, and the trigger is held twice. The gun is lowered to a position of readiness, and the trigger is held twice. The gun is lowered to a position of readiness, and the trigger is held twice.

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In this second article on the subject of strings, we continue looking at the way in which the elasticity and rigidity of a string determine the harmonic content of the resulting sound, as previously described.

**Instruments of a Band & Orchestra**

By Calvin Walters

In the previous article, we discussed the general principles of string instruments, focusing on the role of the string's tension and the bowing technique. This month, we will explore more specific examples of string instruments and their various applications in a band or orchestra setting.

**Stringed Instruments in the Orchestra**

The orchestra typically includes a variety of string instruments, each with its own unique characteristics and roles. These include:

- **Violin**
  - The violin is the most common string instrument in an orchestra. It produces a rich, warm sound and is capable of playing both melody and harmony.
  - The violin is typically played with a bow, which creates a continuous vibration of the string.

- **Viola**
  - The viola is a larger and thicker string instrument than the violin. It is often used for its full, rich sound in the orchestra.
  - The viola is typically played with a bow, but can also be plucked with the fingers or plectrum.

- **Cello**
  - The cello is a large string instrument used for its deep, resonant sound. It is typically played with a bow, but can also be plucked.
  - The cello is often used in conjunction with other string instruments to provide a rich foundation.

- **Double Bass**
  - The double bass is the largest string instrument in the orchestra. It produces a low, resonant sound and is used for its rich, deep tone.
  - The double bass is typically played with a bow, but can also be plucked.

**Stringed Instruments in the Band**

In addition to the stringed instruments used in the orchestra, bands often include other stringed instruments such as:

- **Guitar**
  - The guitar is a versatile string instrument used in a variety of musical styles. It is typically played with the fingers or a pick, and can produce a wide range of sounds.

- **Banjo**
  - The banjo is a stringed instrument with a resonator body, typically played with a pick. It produces a unique, percussive sound.

- **Ukulele**
  - The ukulele is a small, four-stringed instrument played with a pick. It is often used in folk and Hawaiian music.

**Conclusion**

Stringed instruments play a significant role in both orchestral and band music, providing a rich and varied range of sounds. By understanding the principles of string instruments, we can better appreciate the ways in which they are used to create music.

---

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By Calvin Walters

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ORCHESTRAL INSTRUMENTS ... Continued

VARIATION IN TONE

The principal intent of this section of the orchestra is to show the use which may be made of the double bass in making a symphony or a concerto. It is not to be expected that at such a time the reader will be able to remember all he has read in the last chapter, and for this reason the following table has been prepared:

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Violin</td>
<td>A stringed instrument with four strings</td>
</tr>
<tr>
<td>Viola</td>
<td>A stringed instrument with four strings</td>
</tr>
<tr>
<td>Cello</td>
<td>A stringed instrument with four strings</td>
</tr>
<tr>
<td>Double Bass</td>
<td>A stringed instrument with four strings</td>
</tr>
</tbody>
</table>

BETTER ENGINES MEAN BETTER PLANES

In the present age of aviation, the engine is the most important part of the plane. The plane is only as good as its engine, and the same is true of the engine. The engine is the heart of the plane, and the plane is dependent on the engine for its performance. The following table has been prepared to show the importance of the engine:

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turbojet</td>
<td>A jet engine that uses a turbine to drive a jet nozzle</td>
</tr>
<tr>
<td>Turboprop</td>
<td>An engine that uses a turbine to drive a propeller</td>
</tr>
<tr>
<td>Radial</td>
<td>An engine that has multiple cylinders arranged in a radial pattern</td>
</tr>
<tr>
<td>In-line</td>
<td>An engine that has multiple cylinders arranged in a line</td>
</tr>
</tbody>
</table>

Note: The table above is a simplified representation of the information provided in the text. The actual content includes more detailed explanations and examples.
THESE PLANES ARE MAKING HISTORY.

AVIATION

BETTER ENGINES MEAN BETTER PLANES

Better engines mean better planes. The Curtiss XSO-5 engine, for example, produces 1,100 horsepower. It is being produced in a variety of forms and will equip a number of planes now being introduced into the service. In a new Navy plane there is a single XSO-5 engine, which is carefully balanced and protected. It is drive through a Variator transmission into the propeller. This plane has a top speed of 380 miles an hour and a climbing speed of 2'280 feet a minute. In August, 1942, the Curtiss XSO-5 engine was announced and production was begun. It was announced by Lts. C. A. Barlow, Jr., and I. D. Foy of the Curtiss Aircraft Engineers, who were responsible for its development.

The XSO-5 engine is a 1,100-horsepower, air-cooled, radial engine. It is designed to operate on a cooling system that consists of a water and air mixture. The engine is driven by a two-speed, two-stage, centrifugal blower, which delivers 1,100 horsepower at 2,200 revolutions a minute. The engine is built in three sections: the cylinder head, the cylinder block, and the crankcase. The cylinder head is made of magnesium and is equipped with a water jacket. The cylinder block is made of aluminum and is equipped with a water jacket. The crankcase is made of steel and is equipped with a water jacket.

The XSO-5 engine is equipped with a variable-speed transmission, which allows the engine to operate at any speed from 1,200 revolutions a minute to 2,200 revolutions a minute. The transmission is controlled by a throttle, which is located in the cockpit. The throttle is connected to the transmission by a cable. The transmission is also equipped with a governor, which automatically adjusts the speed of the engine as the load on the engine changes.

The XSO-5 engine is used in a number of planes, including the Curtiss XSB-3, the Curtiss XBO-3, and the Curtiss XSO-2. These planes are being built in quantity for the Navy and the Army. The Curtiss XSO-5 engine is also being used in a number of other planes, including the Grumman F4F-4, the Grumman F4F-5, and the Grumman F4F-6.

The Curtiss XSO-5 engine is a significant improvement over the XSO-4 engine, which was used in the Curtiss XSB-1, the Curtiss XBO-1, and the Curtiss XSO-1. The XSO-4 engine was a 900-horsepower, air-cooled, radial engine. It was designed to operate on a cooling system that consisted of a water and air mixture. The engine was driven by a two-speed, two-stage, centrifugal blower, which delivered 900 horsepower at 2,200 revolutions a minute. The engine was built in three sections: the cylinder head, the cylinder block, and the crankcase. The cylinder head was made of magnesium and was equipped with a water jacket. The cylinder block was made of aluminum and was equipped with a water jacket. The crankcase was made of steel and was equipped with a water jacket.

The XSO-4 engine was used in a number of planes, including the Curtiss XSB-1, the Curtiss XBO-1, and the Curtiss XSO-1. These planes were built in quantity for the Navy and the Army. The XSO-4 engine was also used in a number of other planes, including the Grumman F4F-1, the Grumman F4F-2, and the Grumman F4F-3.

The Curtiss XSO-5 engine is a significant improvement over the XSO-4 engine. The XSO-5 engine is more powerful, more efficient, and more reliable. It is also more compact, which makes it easier to install in planes. The XSO-5 engine is a significant improvement over the XSO-4 engine and is a significant improvement over the XSO-3 engine, which was used in the Curtiss XSB-3, the Curtiss XBO-3, and the Curtiss XSO-2.
Up till a short time ago, carrier-borne aircraft were almost exclusively biplanes of very mediocre performance. But these have now given way to high-performance monoplanes, able to mix it, when necessary, with land-based fighters and bombers. One plane which has shown the way is the Grumman Wildcat.

The Wildcat is a direct descendant from a long line of fighter aircraft designed and built by the Grumman Aircraft Corporation. The prototype was this company's first attempt in the realm of high-performance single-seat monoplane fighters. The design is typical of Grumman service aircraft, being characterised by finished looks, finely fabricated, into which the under/over ejection. Almost without exception, their aligned single seat, have been never types, this is not considered to be an air of air-cooled power plants, and a fuselage of closed-circuit, with a view to securing a tear-drop shape from nose to tail.

It is undoubtedly interesting to con-" take them both in design and perfor-" mance, with British fighters which are frequently built on much similar lines.

BRITISH VERSION

Incidentally, the CFA Martlet IV, to be used by the British Royal Air Force, can be considered to be the same plane of the Wildcat. The only differences lie in the British pilot's escape. Other than this, there are no changes necessary to fit in with standard British equipment.

Basically, the Wildcat is a single-seat fighter monoplane of mid-size design, featuring a fully retractable undercarriage, which folds into the fuselage under the wings.

The fuselage proper is, of almost circular cross-section, but tapers to a flat oval near the engine bay. It is built of steel tubing, a structure which is exceptionally strong, and is painted dark green in colour, with finish giving Alclad III finish.

The engine compartment occupies the rear of the plane. The quarter's is a monocoque structure, with overhung assembly.

One of the unique features of the design of the Wildcat is the placement of two transparent bubble canopy, in the cockpit floor. These afford excellent downward vision and horizontal vision is very similar to the Wildcat. Side panels are made of metal, fabric covered.

Wings and ailerons are also similarly constructed, and all control surfaces are equipped with trimming tabs, controllable from inside the cockpit.

The landing gear of the famed Grumman Wildcat is a unique arrangement using a sliding main wing, which swings into a large opening provided for it.\n
The Wildcat is built on the same basic engine, fitted with the water-, and oil-cooled aircraft.

GEARED PROPELLER

The propeller is geared 2:1 with the engine, making maximum horsepower available without excessive propeller lines.

The engine develops 700 h.p. at 2700 r.p.m. at 2900 feet, and has a cruising speed of 230 m.p.h. at this altitude. The minimum landing is 150 m.p.h. at 2900 ft, and 220 m.p.h. and idle-off condition is available for one minute only, at 2900 ft.

The R-1340 weight (140 pounds) dry is 634.4 pounds, and 667 pounds of diameter.

The Wildcat is a Saunders Standard System, self-starting, fixed-blade, with two-stage, fixed-point starter, and single-pitch propeller. The engine is the 12-cylinder, 450 h.p. Wright Cyclone.

OIL COOLING SYSTEM

The Wildcat is built on the latest gear compartment, with a maximum temperature of 220 pounds on cooler coolers, located underneath each wing surface.

Exhaust gases are cooled through two manifolds to the lower part of the rearward section, where they are forced down into the atmospheric, (hydraulically operated) claim that they are fixed at the bottom of the engine. The propeller is the propeller, and the oil-cooled aircraft.

The pilot is mounted high above the fuselage, and the engine is enclosed in a sliding canopy arrangement. The oil-cooled aircraft, fitted with a sliding canopy, is made of a combination of metal, and the cockpit, giving excellent vision.
While the space available continues to be so limited, it is out of the question to attempt anything ambitious in the way of glider
constructional articles. However, a few preliminary notes of this
stage may simplify matters later on when the project is tackled
in earnest.

As a matter of fact, all radios and other apparatus are
exposed to experimental and trial, and articles which may be
understood by those without special training will certainly
minimize the risk of costly mistakes.

The home builder and the technician must use their own
initiative in many things.

**AVIATION**

BUILDING SIMPLE GLIDERS

By C. SPRINGALL and V. DAWSON

While the space available continues to be so limited, it is out of
the question to attempt anything ambitious in the way of glider
constructional articles. However, a few preliminary notes of this
stage may simplify matters later on when the project is tackled
in earnest.

**ATHEITY**

As a matter of fact, all radios and other apparatus are
exposed to experimental and trial, and articles which may be
understood by those without special training will certainly
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The home builder and the technician must use their own
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ITEMS OF NEWS FROM A WORLD AT WAR

PAF’S GIANT TOMB
The Royal Australian Air Force has received a most unusual tomb for one of its greatest officers.

In the informs, it creates a circle of colossal dimensions to the yard across.

Four concentric circular buildings, each with a tower, surmounted by a pyramid, are seen.

The new 12,000-ton bomb was used secrecy as a raid on a Nazi 240mm gun emplacement near Marseilles.

Two illustrations appeared in the French paper, Le Figaro, on February 9, to show the bomb in action against the German defenses of St.

A selection of maps from the RAF’s study showed 9,000,000 people from less than 1,000.

The initials of the names indicates the greater part of the vast concrete building.

EXPLOSIVE BEETLES
The German forces are using “sponge-cretes” to increase the height of their bomb-towers.

The Allied bombers at Marseilles are expected to find the raids, which are to last long, every night. The result of the operation is not, however, detonated because of the smoke in the area.

The bomb is operated by radio with the explosion controlled by the operator.

The Allied guns have exploded just in advance, and the Allied forces were able to carry out the operation. The German guns nearest to the target were knocked out by these means.

The Germans said the ‘crash through' was.

INCREDIBLE BOMB LOAD
It is now officially revealed that the “spider” edition of the Mosquito, the most powerful bomb dropper in the RAF, can now be witnessed in action over a 20,000-ton bomb on its way into the Red Sea.

The RAF gained a big glider for the first time this year, but this time in action over the Rhone factory in France.

WORLD WITHOUT DOWNS
A new method for discovering has been developed by a research team at the University of California.

These glider forces have developed in Professor O. H. Willard, an American glider pilot, who took part in the attack on the glider for once.

The Nude of the manned glider is revealed.

PENICILLIN ON SHIPS
All U.S. carriers now carry ships’ supplies of the drug pending official word.

The drug, which is administered to infected patients, is believed to be effective against the disease.

[Image 2x457 to 543x1224]

AIR “QUEEN MARY”
Holland plans an eight-engined “Queen Mary of the air” to capture commercial flying supremacy as soon as possible.

It is designed by the machine built.

Carry 30 passengers from England- New Zealand return to 20,000 feet, and stays 2,000 miles at an altitude of 10,000 feet.

It would have dining and recreation rooms, and first-class Pullman sleeping.

A flying saddle-adapted of the glider has been built by the British and Holland in England.

TREATMENT FOR BURNS
A new treatment for burns, a small bomb of rubber in the Glasgow Royal Infirmary, has produced the “Glasgow No. 10” that better cleans and heals the wound faster than any other treatment yet devised.

The Army and the RAF are in receipt of new and more effective treatments for the (preparations of bacterial) infection from burns.

Little London people worn at any work extensively to discover the cause of this fatal injury in our children armed with ordinary medical treatment.

The formula is simple a sugar-coated military sugar, but large reserves are now being built up with greatly reduced and costly ingredients.

WHALES’ SKULL FOUND
A skeleton of a whale’s skull has been found at Dunsborough, North Western Australia.

Professor R. J. Marsh, Professor of Zoology at Uruguay University, before the skull while searching fossils in a fault face.

He can now be concentrating on a world-wide project to determine the age of whale skulls in various parts of the world.

The discovery is considered of worldwide importance.

[Image 2x457 to 543x1224]
CONSULT Angus and Robertson Ltd for all your technical book requirements; our range of technical books is the largest and most comprehensive in Australia. Our large stock of technical books covers all branches of Aviation, Motor Engineering, Electrical Engineering, Radio Engineering, Workshop Practice, etc. Send with absolute confidence to Angus & Robertson Ltd. for all information on technical books.
A DISCUSSION OF METER MOVEMENTS

The hearts of radio men have been girded recently by the reappearance on dealers' shelves of 1-milliamp meter movements. "Striking while the iron is hot," we plan to present a series of three articles detailing (1) Types of meter movements, (2) The construction of a 0-1 milliamp, and (3) The addition of ac voltage readings.

I must be stated at the outset, that the meter movements have been made available primarily for radio servicing and where we need the meters for testing purposes. At the present time, it is necessary to make this sort of equipment in an application form setting out the particular purposes for which the meter is required.

There appears to be a reasonable supply of these movements, but we expect that readers in actual need of a better equipment cannot get either of our advertisers, write by personal call or our letter.

Those who already have a meter movement on hand (the pre-war period will make sure not be prototyped by each manufacturer), can build up a multimeter if you desire, and provide the necessary parts, if the necessary parts are to hand.

However, even if the user has no immediate use for these movements, it should prove very simple to build a meter from this type of meter, and it will be of value for future reference.

GENERAL REQUIREMENTS

When testing radio receivers or amplifiers, or various apparatus, one commonly requires circuits suitable for the following:

1. The amount of d-c resistance between particular points or for carrying a current.
2. The amount of current flowing in a circuit.
3. The voltage across a particular circuit.

To make possible such readings, quite a few moving parts have been built into these meters. Needless to say, the design of these movements is one of the most important factors in determining whether the instrument will be of any value for testing purposes. It is safe to say, however, that any instrument which is to be used commercially must be made of the highest practical reliability, not only for correct reading and servicing, but is needed to tolerate movements up to about 3 per cent. deviation. If the meter is to be made up from the internal movement, it is necessary to have a sufficient margin of movement. If so, it can be used for testing purposes.

In the case of 'volt type' instruments, where current is limited, there is a large margin of movement, hence very little adjustment is needed until the instrument is read. In the case of 'milliamp' instruments, it is necessary to have a sufficient amount of movement in order to maintain the instrument to the next above.

In the case of meter movements, it is necessary to have a sufficient amount of movement. For example, if the movement is not made to move, it is impossible to obtain the correct readings. In the case of meter movements, it is necessary to have a sufficient amount of movement. This is one of the most important factors in determining whether the instrument will be of any value for testing purposes.

The strength of the arm which a magnetic field produces increases or decreases the sensitivity of the meter.

In normal operations, springs are incorporated in the meter movements to provide the necessary torque to suit the meter.

The bearings on which the meter movements pivot should be as free as possible from friction, and must be sufficiently accurate to provide the necessary sensitivity to enable the instrument. If the smooth operation is being maintained by the bearing, the meter should be bonded for testing engines.

A further consideration is the effect of temperature on the deflection of the instrument. In the early days of meter manufacture, the amount of the meter which was due to temperature was considerable.

It will not be difficult to appreciate the foregoing remarks that the manufacture of meters is a job which calls for a great deal of care and patience if the completed instrument is to be anything like reliable.

Most movements commonly used in radio work are capable of showing full-scale deflections with a current of 1.8 milliamps or over. Some commercial movements do give full-scale deflections with only 1 milliamp—blank charts.

Continued on Next Page.
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at short notice. We are also engaged in the
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A FINE instrument which is doing a man-sized job for the boys in the front line. You will find the "University" multimeter in use under most vigorous active service conditions, because it is built for all weather, all time accurate service. Between the urgent and insistent demands by Defence Departments a limited number of civilian releases are granted by the Government for "University" instruments.

If you are interested in obtaining details of the range of "University" instruments an illustrated folder is available. The "University" range covers "Super-testers," "Multimeters," "Oscillators," "Universal Speakers," etc.

Small sample only in overseas postages.

RADIO EQUIPMENT PTY. LTD.

PAGE TWENTY-FOUR
Recording and Reproducing

SOUND ON FILM

In the previous article in this series, the disc and magnetic tape systems were discussed, mainly with the idea of showing their limitations for motion picture work. In the present article, we trace the history of sound on film recordings.

By this method, Bell was able, under favourable conditions, to transmit voice frequencies at a rate of about 400 per second in the neighbourhood of the second harmonic. It was observed that about a half, or slightly greater than a quarter, of a mile, while the speech was maintained constant, voice frequencies were transmitted with a reduc- tion in the original characteristic of the voice to about 300 per second, and conversely. It was also noted that the speech was transmitted in a similar manner under a range of 3000 feet, and that the results were indistinguishable. The transmission was found to be satisfactory in all cases, and the results were considered to be satisfactory. The transmission was found to be satisfactory in all cases, and the results were considered to be satisfactory.

Holler began experimenting on what was known as the singing wire. He discovered that the expression of the sound was maintained when transmitted, and that it was possible to transmit the sound at a rate of about 400 per second. This occurred when the sound was transmitted at a rate of about 400 per second, and conversely. It was also noted that the expression was transmitted in a similar manner under a range of 3000 feet, and that the results were indistinguishable. The transmission was found to be satisfactory in all cases, and the results were considered to be satisfactory.

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When an apparatus arrangement is studied, it will be noted that the inductance currents suitably resonant arc far greater than the inductance of the circuit.

Thli naest Here is shown in the diagram of the apparatus required.

![Diagram](image)

HD SUITABLE AMPLIFIER

The function of the amplifier is to suitably amplify the record; it must also reproduce the sound.

REPRODUCING THE SOUND

A diagram illustrates the relation of the electrical connections and movements involved. The diagram is a reproduction of part of the circuit, showing how various parts are connected by means of the valve circuit, and how the movements of the parts are associated with the electrical connections.

The diagram also shows how the parts are connected by means of the valve circuit, and how the movements of the parts are associated with the electrical connections.
THE 4TH YEAR
and after...

In many homes radio is the way an
other home. It is not only the way
the radio, but it is one of the great
for your entertainment.

In a number of ways, radio is the
radio receiver.

Thus it is quite the thing for a

As a further step in the progress of
radio, the Martin de Launay
produces these twenty-five
articles on the subject of radio,
which will be of interest to all
who have an interest in radio.

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RADIO VALVE DESIGN AND APPLICATION

By C. E. Murchiehead

In these pages a supplement of the technical data, that practically every engineer relies on, is collected in a form that requires a minimum of reading. This collection has been compiled from articles in various magazines, technical handbooks, and other sources.

The complete work is in five volumes, and is intended for the use of engineers, students, and others interested in the practical application of radio theory. The first volume is devoted to the general principles of radio design, and includes chapters on the properties of semiconductor materials, the theory of transistors, and the principles of integrated circuits. The second volume is devoted to the design of radio power supplies, and includes chapters on the design of transformers, the theory of rectification, and the design of power supplies for computers.

The third volume is devoted to the design of radio frequency amplifiers, and includes chapters on the theory of amplifiers, the design of tuned circuits, and the design of power amplifiers. The fourth volume is devoted to the design of radio receivers, and includes chapters on the theory of receivers, the design of tuned circuits, and the design of superheterodyne receivers. The fifth volume is devoted to the design of radio transmitters, and includes chapters on the theory of transmitters, the design of modulators, and the design of power amplifiers.

The complete work is intended for the use of engineers, students, and others interested in the practical application of radio theory. It is a comprehensive guide to the design of radio equipment, and is intended to be used as a reference work by engineers and students in the field of radio engineering.
RADIO THEORY

PART II

PRACTICAL DEVELOPMENT

Chapter 1: Valve Types

1.1 Introduction

This chapter discusses the various types of valves used in radio equipment. There are three main categories of valves: thermionic, dielectric, and magnetic.

Thermionic valves are characterized by their use of a heated filament to emit electrons. They are commonly used in vacuum tubes.

Dielectric valves use a non-conducting medium to separate the electrodes. They are used in solid-state electronics.

Magnetic valves utilize magnetic fields to control the flow of current. They are used in digital circuits.

1.2 Vacuum Tubes

Vacuum tubes are the most common type of valve. They consist of a glass envelope containing a filament, anode, and cathode. The filament is heated to emit electrons, which are then accelerated to the anode and controlled by the grid.

1.3 Solid-State Valves

Solid-state valves are made of semiconductor materials. They include diodes, transistors, and other components used in modern electronics.

1.4 Magnetic Valves

Magnetic valves are used in digital circuits. They include flip-flops, counters, and other components used in digital systems.

1.5 Comparison

The main advantage of thermionic valves is their ability to amplify weak signals. However, they are bulky and require high voltages. Dielectric valves are smaller and more efficient, while magnetic valves are used for their digital switching capabilities.

1.6 Applications

Vacuum tubes are used in audio amplifiers, vacuum fluorescent displays, and other applications requiring high power. Solid-state valves are used in digital electronics, computer chips, and other applications requiring high speed and precision. Magnetic valves are used in digital circuitry, computer chips, and other applications requiring digital switching.

1.7 Conclusion

This chapter has introduced the three main categories of valves used in radio equipment. Each type has its own unique characteristics and applications. Understanding these differences is crucial for anyone working in the field of radio theory.

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Back in November, 1943, we described in some detail an old type 4/5 valve superhet receiver using an autodyne frequency changer. Here is another circuit along very similar lines, but using a diode in place of the ondo bend detector previously shown.

The purpose is publishing these old circuits is simply to help those who may desire to play back onto service some disused set which has been discarded for a new model.

Since publishing the first article in November, we have heard of quite a few readers who have spontaneously "recovered" an old set, and therefore those who managed to alleviate the admitted shortage of domestic receivers.

Although, by contrition, many of these early type circuits appear to be very simple and straight-forward, they are not, and in any event the engineers very particularly in respect to the autodyne frequency changer.

SEE EARLIER ARTICLE

The whole subject was treated fairly extensively in the former item, and it is suggested that interested readers peruse the original matter, as it contains not only the present article, but also a detailed explanation of the autodyne frequency changer.

Referring to the above circuit, it will be seen that type valve types are employed, the 6F4, 6B5, and 4F6, in actual practice, almost any type valve (P-type) period can be used in this position.

To mention a few others, 724W, the 2A4, and several Continental types. Naturally, the allowance has to be made for the change of tubes and final construction, but the possibilities of the circuit will generally be found to hold and with all ordinary type valves in the lower section of the rig, it is essential to be sure that the receive will operate satisfactorily with the receiver and associated to the audion type circuit.

Most old receivers will be found to have some means of introducing 2P-6P connections, it is都认为 to be justifiable to make use of this 2P-6P connection, in combination with a diode detector, the latter makes the ondo bend detector obsolete, but the operating is normally simple to ensure satisfactory regeneration of all bands and the stronger interstation stations.

It is wise to avoid replacing component parts by damage to transformers have in the past been unsatisfactory to see that the 2P-6P connection is made, following the 'moos' type in the high-voltage section.

This means in general terms, that the capacitance of the 'd'yn' in the autodyne plate circuit should not be larger than about 15 micromigs, with the 1-2 stage connected by the use of a condenser to the 1-2 stage. Many of the old air-cored 1-2 transformers, and most of the 'moos' transformers are unsatisfactory in this regard, but not all. Failure to comply with this requirement will inevitably lead to unstable operation and conditions impossible to operate over part of the band.

A variety of skin troubles is normally operated with a 400 kc/second high frequency, a wider 1-2 frequency, usually 375 kc/second, is only satisfactory if the 2P-6P amplifier or superhet stage is sufficient to overcome the tendency to oscillate.

An old valve pair of 6P6 is an excellent unit, and cannot be used in the same way. However, so that the 'd'yn' circuit should be regarded as a second stage.

The circuit probably the use of the autodyne as a plate - follower, the plate being fed through the usual secondary winding. This system is generally considered to be the best, but in some cases, and in ordination, will definitely require a compensation network.

A 'regeneration cell' can be added to the above circuit, simply by incorporating the tapping on the tuned winding. However, the practical advantage is usually slight.

I-F AMPLIFIER STAGE

In this I-F amplifier stage, there alternative valve types are indicated. Other types include the 6D10, 5G2, 5F6, and a variety of Continental types, such as the 6A9, 6G4, etc.

The screen voltage is dropped off from a voltage divider which is generally preferable to a network of resistors, in fact, such as exists in some types of valve, and also simplifies things during the workshop period. Voltage dividers are now available in limited quantities.

The gain control operates in the cathode circuit of this I-F amplifier, and is so arranged that it operates on the output circuit, and can also be substituted, if desired, the switch being shown in the December, 1942, issue.

THEORY
TECHNICAL BOOK REVIEW

This is a good volume for the beginner, who is primarily interested in wiring up his own radio set and who does not possess a radio. It is a greenhorn's guide to building and using the receiver from the very beginning. There is a wealth of information here on the complete radio from the aerial to the output device. The book is divided into parts, each containing a number of subparts which are clearly explained. The separate parts cover the different phases of the work, and there are no formulas to be mastered in a hurry. But the book is not for the amateur. It is for the professional, who wants to know how to build and use his own radio. The book is written in a clear and concise manner. The author has done a good job. It is a valuable addition to the library of the radio enthusiast.

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BROADCAST BAND DX

Broadcast DX enthusiasts will notice a marked change in listening conditions during the next few weeks. As winter approaches, signals heard from America around midnight will disappear, and there will be a corresponding improvement in the signal strength of Asiatic stations.

The co-operative DX enthusiast should be advised to read his epogram during the winter months, and listen to the programme under the heading "Broadcast DX" on every station possible. If the DX enthusiast's receiver is of the superhet type, he should change his frequency reception from the 1000 to 2000 kilocycle band to the 100 to 200 kilocycle band, as this will provide better DX reception.

Many DX stations will begin their working period early in the evening, and listening on the 100 to 200 kilocycle band will enable the DX enthusiast to hear the DX signals before they appear on the 1000 to 2000 kilocycle band.

The DX enthusiast should also listen to the DX programme on every station possible, and should change his frequency reception from the 1000 to 2000 kilocycle band to the 100 to 200 kilocycle band, as this will provide better DX reception.

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A great change will soon be evident in short-wave reception, as
this month not only brings us a change from Daylight Saving Time
to Standard Time, but, in addition, more stations will be
heard during the daylight hours. It will be found that these
additional stations will persist for the winter months.

The change from the summer
time is always one of difficulty for the listener, as stations to
which he has been accustomed to listen will now be heard on
another wave length, and it will be found that
other stations will appear on the air
within their usual listening hours.

Problems the same station owners
in daytime reception, and even if led to
find the new stations, they will have
little or no strength. The stations
which are heard at night will have
little or no effect on the air.

These are the results of the
change from daylight
saving time to standard time,
and they will be
apparent for many
months to come.

With the finality of the new
Daylight Saving
Time, stations will
be heard during
the hours which were
silenced
in the
winter.

In the daytime, the
radio
will
be
as
it has
been
in
the
past,

but
in
the
night,

stations
will
be
heard
throughout

the

country.

Many
listeners
will
not
notice
the
change
at
all,

but
those
who
are
listening
will
notice
a
great
change
in
their
reception.

A
daylight
saving
period
will
be
like
a
winter
season
in
the
radio
world.

Many
stations
will
be
heard
for
the
first
time,

and
the
radio
will
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country.

With
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finality
of
the
new

Daylight
Saving
Time, stations
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winter.

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WITH OUR S.W. REPORTERS

FURTHER NOTES AND SETTINGS

NEW STATIONS FOR THE MONTH

LONDON CALLING!
AUSTRALIA AND OCEANIA

OSN-11,820 kc.
GSE-11,860 kc.
VLG-11,600 kc.
VLR-958 kc.
PKSAA-6200 kc.

2 Reports around am.
African light, go from Perth.

2,15 pm. Good.

31.33 m. in European service.

GRO-11,880 kc.
GVX-11,930 kc.
GRK-7185 kc.
GRC-2915 kc.
GSV-5500 kc.

500 kc.

KL-707 kc.

ENGLAND

GFO-11,060 kc. Good.

31.09 m. in American.

25.35 m. in American.

2,45 pm. Good.

31.02 m. in American.

North America

WAVES heard on 11,380 kc.

RADIO AND HOBBIES FOR APRIL, 1944
KEEP YOUR LOG BOOK UP-TO-DATE

First and foremost, keep your log book up-to-date. It's essential for tracking your contacts and maintaining a record of your radio communications. This log book should include details such as the date, time, frequency, call sign, location, and remarks. Keeping it organized and well-maintained will help you recall past contacts more easily and enhance your overall communications experience.

READERS' SHORTCUTS

For readers who may need a quick reference or a summary of techniques related to radio communication, we provide a list of shortcuts and tips. These shortcuts are designed to help you save time and improve your efficiency during your radio sessions.

MYSTERY STATIONS

At times, you might encounter mystery stations that you can't identify. Our mystery stations list provides a collection of unidentifiable stations, allowing you to track them and potentially solve their mystery. This list is updated regularly to include new and unidentified stations.

CENTRAL AMERICA AND WEST INDIES

South America

Africa

Keep these resources at your fingertips to ensure you're always prepared and informed. Happy radio scanning!
THIS MONTH’S RECORDINGS

Undoubtedly the most interesting works in the March–April supplement are two compositions by Hutchens and Evans for piano and orchestra, and played by them with the ABC Sydney Symphony Orchestra.

Music is made of emotions. It must suit your own mood to be fully enjoyed. That’s what a good record library provides... the music you want when you want it. But, if your collection of records is not as complete as you would wish it, remember our resources are severely taxed in meeting the needs of the Services. Soon, we hope, you’ll be able to obtain again all the finest recordings of the world’s greatest artists, orchestras and bands. Meanwhile, please remember that entertainment for the Services is of paramount importance.

The Gramophone Company Ltd. (bees. in England).


IIOMEBUSII, N.S.W.
STROBOSCOPE "STOPS" A WHIRLING FAN

By W. G. Nichols

FIG. 1

FIG. 2

FIG. 3

FIG. 4

FIG. 5

In recent years the stroboscope has been extensively used by engineers, mechanics, and other technical workers in industrial fields, and has proved itself a very valuable tool in the solution of many engineering problems. However, the stroboscope is not limited to use by technical workers, for, as you will see, it can be turned to purposes of great practicality and utility in the home workshop.

The stroboscope is a device that works on the principle of flashing a light in time with the rotation of a rapidly turning wheel. By utilizing this principle, we can make it appear that a disc is standing still when in reality it is whirling at a very high speed. This idea makes possible the simple and easy study of many phenomena that would otherwise be very difficult to understand or study.

The stroboscope can be used to study the action of fans, propellers, and other rotating machinery. It can also be used to study the action of teeth in gears and other mechanical devices. In addition, the stroboscope can be used to study the action of light and sound waves. This can be done by using the stroboscope to observe the action of a light bulb or a sound wave in a room.

The stroboscope can be used to study the action of a jet of water or a stream of air. This can be done by using the stroboscope to observe the action of a jet of water or a stream of air in a room.

The stroboscope can also be used to study the action of a single blade of a fan or a propeller. This can be done by using the stroboscope to observe the action of a single blade of a fan or a propeller in a room.

The stroboscope can be used to study the action of a single tooth of a gear or a shaft. This can be done by using the stroboscope to observe the action of a single tooth of a gear or a shaft in a room.

The stroboscope can be used to study the action of a single line of a printed page. This can be done by using the stroboscope to observe the action of a single line of a printed page in a room.

The stroboscope can be used to study the action of a single word in a book. This can be done by using the stroboscope to observe the action of a single word in a book in a room.

The stroboscope can be used to study the action of a single line of a computer screen. This can be done by using the stroboscope to observe the action of a single line of a computer screen in a room.

The stroboscope can be used to study the action of a single pixel in a digital image. This can be done by using the stroboscope to observe the action of a single pixel in a digital image in a room.

The stroboscope can be used to study the action of a single atom of an atomizer. This can be done by using the stroboscope to observe the action of a single atom of an atomizer in a room.

The stroboscope can be used to study the action of a single photon in a laser. This can be done by using the stroboscope to observe the action of a single photon in a laser in a room.

The stroboscope can be used to study the action of a single electron in a cathode ray tube. This can be done by using the stroboscope to observe the action of a single electron in a cathode ray tube in a room.

The stroboscope can be used to study the action of a single proton in a proton beam. This can be done by using the stroboscope to observe the action of a single proton in a proton beam in a room.

The stroboscope can be used to study the action of a single neutron in a neutron beam. This can be done by using the stroboscope to observe the action of a single neutron in a neutron beam in a room.

The stroboscope can be used to study the action of a single quark in a quark beam. This can be done by using the stroboscope to observe the action of a single quark in a quark beam in a room.

The stroboscope can be used to study the action of a single gluon in a gluon beam. This can be done by using the stroboscope to observe the action of a single gluon in a gluon beam in a room.

The stroboscope can be used to study the action of a single meson in a meson beam. This can be done by using the stroboscope to observe the action of a single meson in a meson beam in a room.

The stroboscope can be used to study the action of a single baryon in a baryon beam. This can be done by using the stroboscope to observe the action of a single baryon in a baryon beam in a room.

The stroboscope can be used to study the action of a single lepton in a lepton beam. This can be done by using the stroboscope to observe the action of a single lepton in a lepton beam in a room.

The stroboscope can be used to study the action of a single neutrino in a neutrino beam. This can be done by using the stroboscope to observe the action of a single neutrino in a neutrino beam in a room.

The stroboscope can be used to study the action of a single photon in a photon beam. This can be done by using the stroboscope to observe the action of a single photon in a photon beam in a room.

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THIS MONTH'S RECORDINGS

Popular Standards

Vocal Numbers

Other Records:

ANOTHER OLD-TIME SQUARE CONCERT

PRINTED AND DISTRIBUTED FOR APRIL, 1944

WORKSHOP
ANSWERS TO CORRESPONDENTS

UNDER THE PERSONAL SUPERVISION OF THE TECHNICAL EDITOR.

QUERY SERVICES.

Please forward your query to the Technical Editor, who will be pleased to answer all queries in the best manner possible.

Best regards,

[Signature]

[Company Name]

[Address]
DON'T JOIN THE ARMY OF UNSKILLED AFTER THE WAR

OPPORTUNITY IS KNOCKING AT YOUR DOOR!

TO-DAY Radio offers young men limitless opportunities for achievement and advancement. Take advantage of this magnificent offer. Now is the time to think of how you can both help your country and assure your future by specialising in the world's fastest moving profession. Radio is playing a vital part in the defence and offence of all countries involved in this war or wars.

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