

HISTORICAL NOTES

Apropos the Historical Note on Page 3 of our last issue, Lieutenant L.H. Longley-Cook, R.N.V.R. writes :-

"I should like to amplify the Historical Note in your last issue. There is no water available at Lythe Hill to provide the necessary power for gun making. A furnace was set up by Lord Montague about 1570 at Imbhams, about half way between Haslemere and Chiddingfold, on land leased from Thomas Quennell of Lythe Hill. It was here that the royalist Peter Quennell later made the "guns and shott" referred to in your note, and not at Lythe Hill.

The iron industry of the Weald dates back to long before the Roman era, but it did not spread to West Sussex until a much later date. In the immediate neighbourhood of Haslemere, traces of the industry can be found at Imbhams (referred to above), West End (about a mile nearer Chiddingfold), Shottermill and Pophole (about a mile west of Shottermill). I can find no evidence that Waggoners Wells was a hammer pond, but I have not visited the site myself."

On the same subject, Lieutenant E.G. Ewing, R.N.V.R. writes :-

"V/S SEMAPHORES.

Haslemere, and district, can claim to be much more directly connected with Admiralty in the past than the instances quoted in the last issue of the Bulletin.

Soon after the discontinuance of old telegraphs in 1816, Admiral Sir Home Popham took an active part in the improvement of Naval Signalling and the adaptations of the Semaphore System. A line of communication between London and Portsmouth was established by erecting a chain of semaphore stations on selected sites ; viz: at the Admiralty, Chelsea, Putney Heath, Cooper's Hill, Chatley Hill, Pewley Hill (Guildford Bannicle (Witley), Haste Hill (Haslemere), Holder Hill, Beacon Hill, Compton Down, Portsdown, Lumps Fort, and Portsmouth.

The Haste Hill semaphore station was in fact part of the Whitwell Hatch Mansion, one of the buildings at present comprising Admiralty Signal Establishment.

A Lieutenant Daniell Carpenter, R.N. (inter alia) was one of the first officers to be appointed officer in charge of this station in March, 1822.

It is interesting to remark that after at least a century's absence, an Admiralty Department should reinstate itself on the same site as a result of a policy of decentralisation occasioned by this war.

Views of the old Haste Hill semaphore station as it appeared about 1822 are given in the book "Old Haslemere" by E.W. Swanton.



THE RADAR OFFICER'S REFIT DREAM

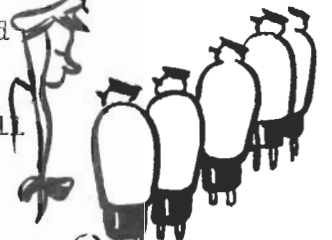
(With apologies to Lewis Carroll)

He thought he saw the R.D.R.
Beneath his cabin bunk
He looked again and found it was
An Armoured Cable Trunk
"We're playing squash in here", he said
"Or else this Cruiser's shrunk".
He thought he saw some R.P.O's
Rotating on the AUK
He looked again and found they were
Condensers made of cork
"We'll teach them how to plot", he mused
"In chinagraph and chalk".

He thought he saw the Toothwright's drill
Let loose in 281
He looked again and found it was
A spiral waveguide run,
"I'm baffled by the morse", he gasped,
"We'll try a Charlie One".
He thought he saw some R.C.5's
That fed on Telcothene
He looked again and found they were
An ancient L48
"We're sending you ashore", he said
"Get all lined up to clean".

He thought he saw the Skiatron
Filled up with orange peel
He looked again and found it was
A pyrotenax seal
"You're 'Bubbly' down inside", he gulped
"The Dockyard's not much zeal".
He thought he saw a 253
Beneath a pile of socks
He looked again and found it was
A quasi junction box
"Switch to Distress", he bellowed out
"I think we're in for shocks".

He thought he saw a Bearing Tube
Provided with a chime
He looked again and found it was
A mast he couldn't climb.
"Strike while the iron's hot", he yelled
"We're running short of time".
He thought a Petty Officer
Had somehow joined the ship
He looked again and glimpsed instead
An unconfirmed Cal. Pip
"Full and Bye and Large", he said
"I think I've lost my grip".



RADAR FITTING AND MAINTENANCE NOTES

TYPE 277

(Extract from H.M.S. SWIFTSURE'S Report).

Owing to the fact that a failure of the low power supply puts Type 277 completely out of action an emergency battery supply has been installed.

A Pattern W.6357 follow-up switch has been installed for the azimuth stabiliser in Type 277. Since then, the stabiliser has given much less trouble.

Silica-gel driers have been fitted in the AUK aerial pedestal. Since then, the insulation of the slip-rings has remained satisfactory.

The transformers in rectifier unit S.E.6 (Types 293, 277 and 274), have been separately fused.

EMERGENCY REPAIR OF CRACKED VARIAC SHAFT INSULATING SLEEVES

It sometimes occurs that the Bakelite insulating sleeve on the shaft of a Variac which carries the brush-holder disc becomes cracked due to attempts being made to tighten the grub-screws excessively.

A good and quick emergency repair can be effected by obtaining a suitable diameter of Jubilee worm-drive hose clip and clamping it completely over the cracked part, grubscrews and all. The setting of the grubscrews which caused the boss to crack should not be altered before fitting the clip as they will be pressed home into the shaft by the tension on the clamp.

SKIATRON

It is often desirable to use the Skiatron as a hand plot for exercises in harbour. In order to be able to do this without switching on the Type 281 alternator, it is suggested that a 220 volt D.C. electric light bulb should be installed in the Skiatron desk. A switch should be included in the circuit. Don't forget to switch off the bulb when using the skiatron with a Radar set if you want good contrast !

A NOVEL SOLDERING TOOL.

We have been supplied with details of a novel soldering tool used by a contractor employed upon the "Bubbly" series of modifications to P.P.I.s.

Fundamentally the tool is similar to that used for resistance welding and is shown diagrammatically in the figure. A step-down transformer operating from A.C. Mains has a secondary winding capable of supplying some 150 amps at 10v. (as used by the contractor).

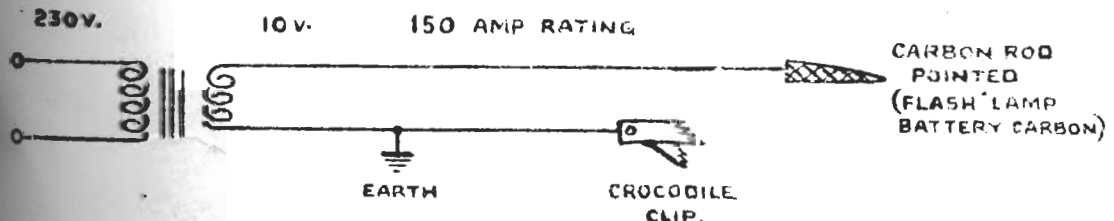
One secondary lead terminates in a pointed carbon rod - a flash lamp battery carbon can be used - and the other in a large crocodile clip. In operation the crocodile clip is made fast to the chassis, wiring or other convenient point while the carbon completes the circuit at the point to be soldered. Heat is generated at the carbon's contact point due to "contact resistance". The joint becomes hot very quickly and solder is applied.

A useful application of the tool on the "Bubbly" job was to connect the crocodile clip to the chassis of the P.P.I. and, holding the carbon rod in one hand, a soldering tag could be placed in any desired position on the chassis and held there by the carbon rod. As soon as the tag and surrounding chassis became hot enough a spot of resin-cored solder was applied and the carbon removed.

Advantages of this tool - which can easily be made up - are said to be:-

- (a) Heat throughout the joint and not only on the surface.
- (b) A more solid joint in heavy work, as tags etc. get solder underneath the joint and not only around the edges.
- (c) Points which an ordinary soldering iron will not reach can be got at.
- (d) The process is quicker.

It is stated that there is no danger of shock - presumably because of the low voltage employed - or burns - since the carbon rod remains relatively cool.



SUGGESTED MODIFICATION TO TYPE 273Q AERIAL.

The following is an extract from a letter received from The Radar Officer, H.M.S. LARGS.

"A case has recently arisen in which the vertical stabiliser for the Type 273Q aerial system has failed to operate owing to a defective gyro. The operators closed upon the set have no means of checking the correct working of the system at the moment, and in the above case, they continued to operate for about two hours at least without the vertical stabiliser in correct working order, thus greatly minimising the effectiveness of the Type 273.

The modification takes the form of a lamp warning system installed between the fixed and the movable parts of the aerial, utilising the 24 volt supply already taken to the aerial lantern for driving the transmitting box 9Q blower motor.

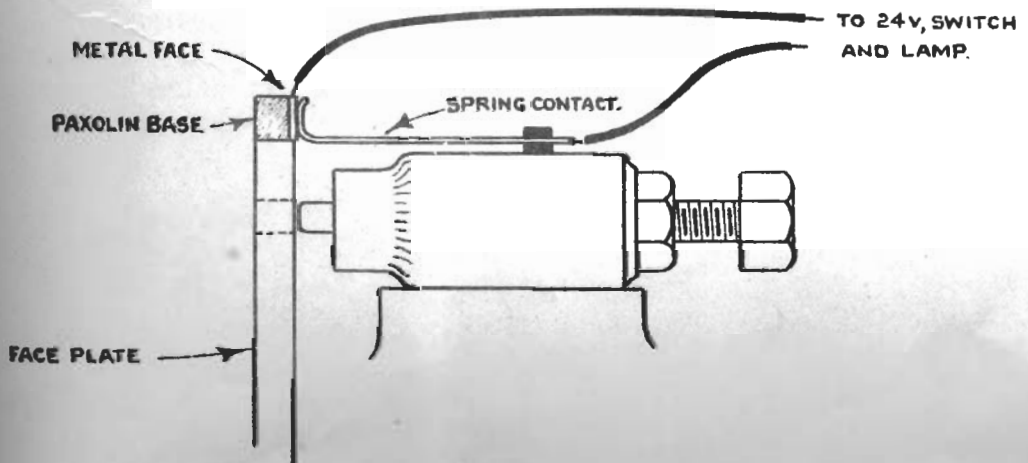
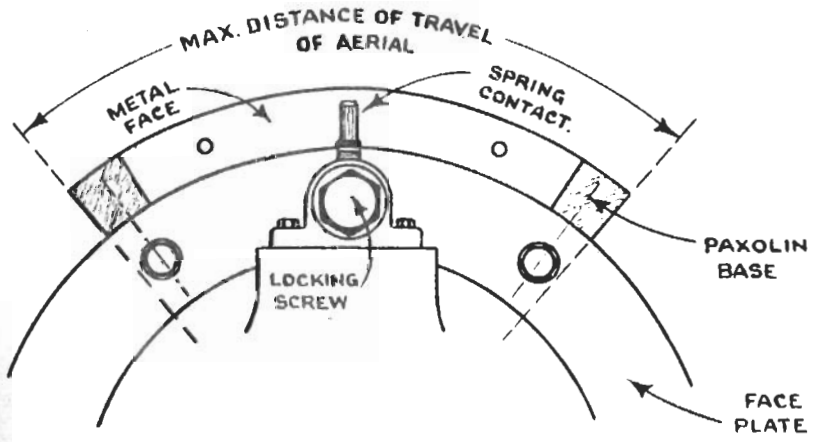
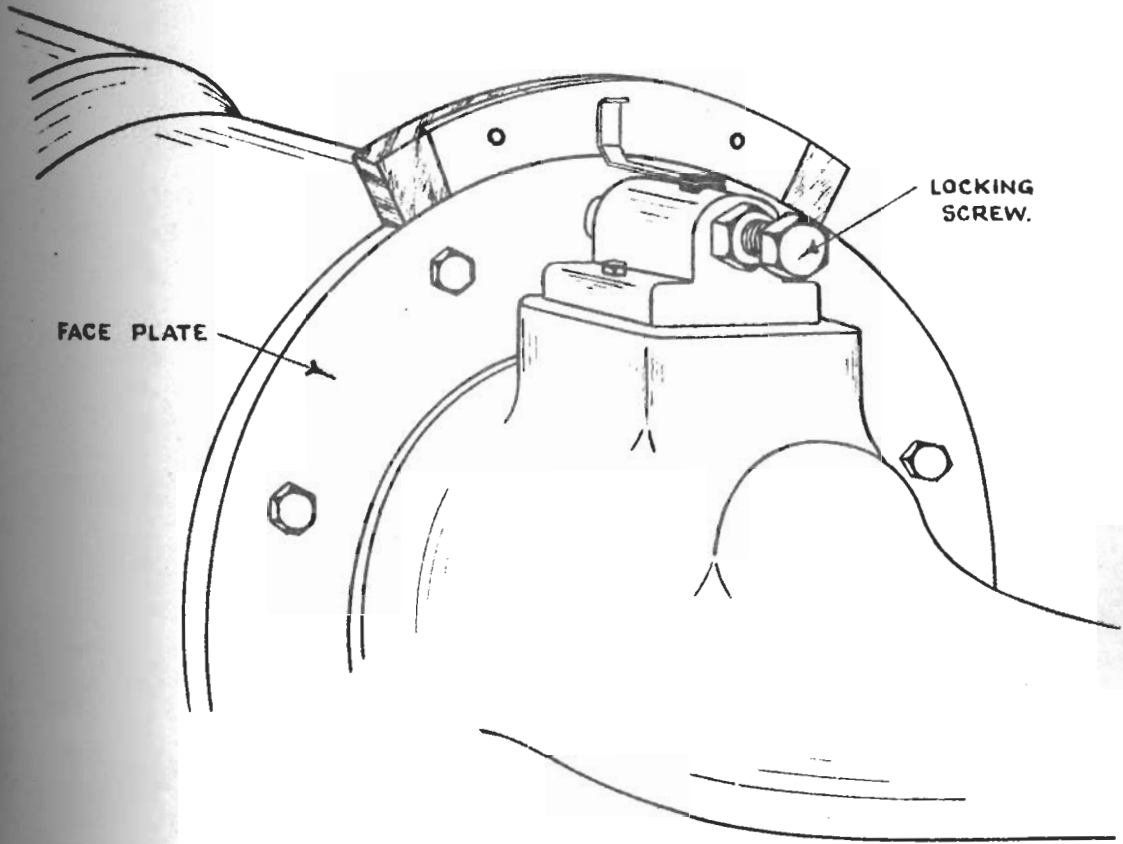
A bent strip of metal, faced on to paxolin or other insulating material and shaped as shown in the accompanying sketch, is attached by means of lugs around the upper half of the outer edge of the face plate. The metal strip is of such a length that a spring contact just fails to close the 24 volt circuit when the aerial falls back to its rest position, i.e. when the stabiliser becomes inoperative. The spring contact is soldered or welded in a suitable holder on top of the band securing the locking nut in position.

OPERATION.

Whilst the aerial is stabilising correctly, the spring contact (joined to one end of the 24 volt supply) makes contact with the strip of metal, which is attached to the other end of the supply. As the supply is taken through a lamp, suitably placed in the Type 273Q Office, it follows that a ready visual indication is available as to the effectiveness of the stabiliser system.

When the aerial is at rest, i.e. not stabilising correctly, the spring contact is no longer in contact with the metal strip, and the light is extinguished. The spring contact is insulated from the aerial chassis. A switch is in the circuit for convenience. (See diagrams on page 41).

MODIFICATION TO 273Q AERIAL



TYPE 272P - LOCAL OSCILLATOR.

The failure of the Type 272P L/O to produce sufficient power at the far end of a cable longer than allowed by Specification is well known. The following extract from a report by P.R.A.D.O. Simonstown on a modification carried out in H.M.S. RACEHORSE gives details of a method of overcoming this trouble:-

"On the arrival of the ship for refit, the set was reported to be operating very inefficiently, and on test, the maximum range obtained was land at 7,000 yards.

The aerial for the set is at the top of a specially constructed foremast with the Type 272 Office at deck level on the starboard side. This resulted in a local oscillator lead of 100 ft. from the office to the mixer box in the lantern.

The trouble was obviously in this length of lead, the proper maintenance of which was exceptionally difficult at sea. It was decided to move the local oscillator from the L21 Panel to the lantern, in a specially prepared panel (see diagram on page) in which was installed a suitable power pack. This panel was mounted alongside the mixer box on top of the Transmitter.

The local oscillator tuning control was arranged by "M" type transmission. The control knob was fitted on the L21 Panel in the normal local oscillator tuning position and the "M" type transmitter was fitted inside the Panel. The "M" type receiver was attached to the local oscillator control spindle in the new panel in the lantern.

24v. D.C. was obtained from the transmitter blower motor supply keeping the set independent of the ship's low power system, and was controlled on Panel L21 by an "On/Off" switch.

This enabled local oscillator tuning from the office, and reduced the local oscillator lead to the mixer, to 3 ft.

The final results are appended hereunder:-

Land - 80,000 yards. Signal to noise ratio = 7 : 1

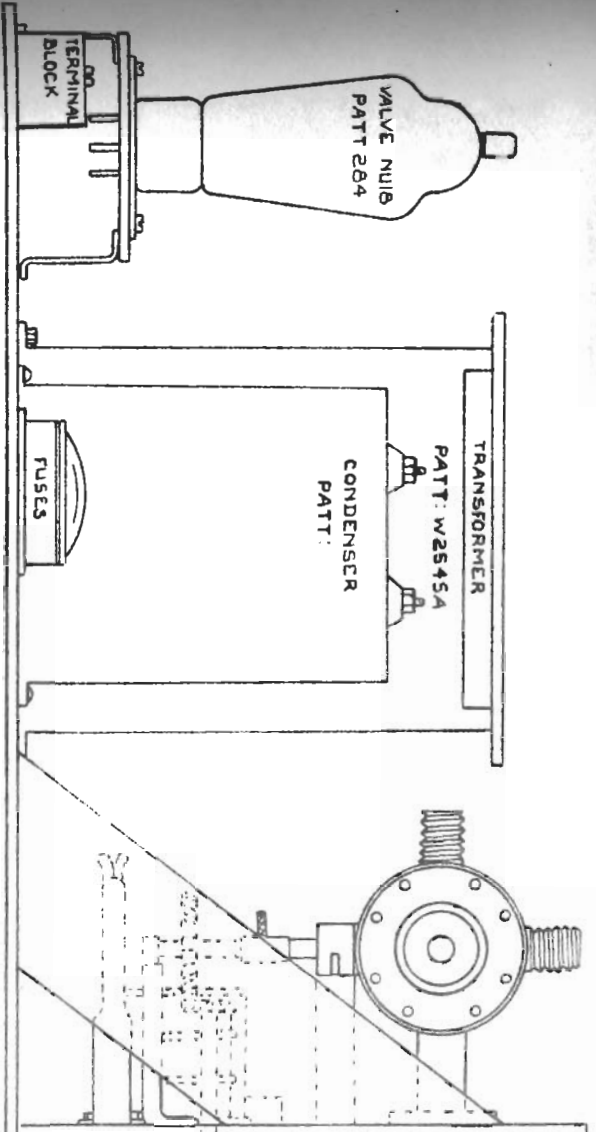
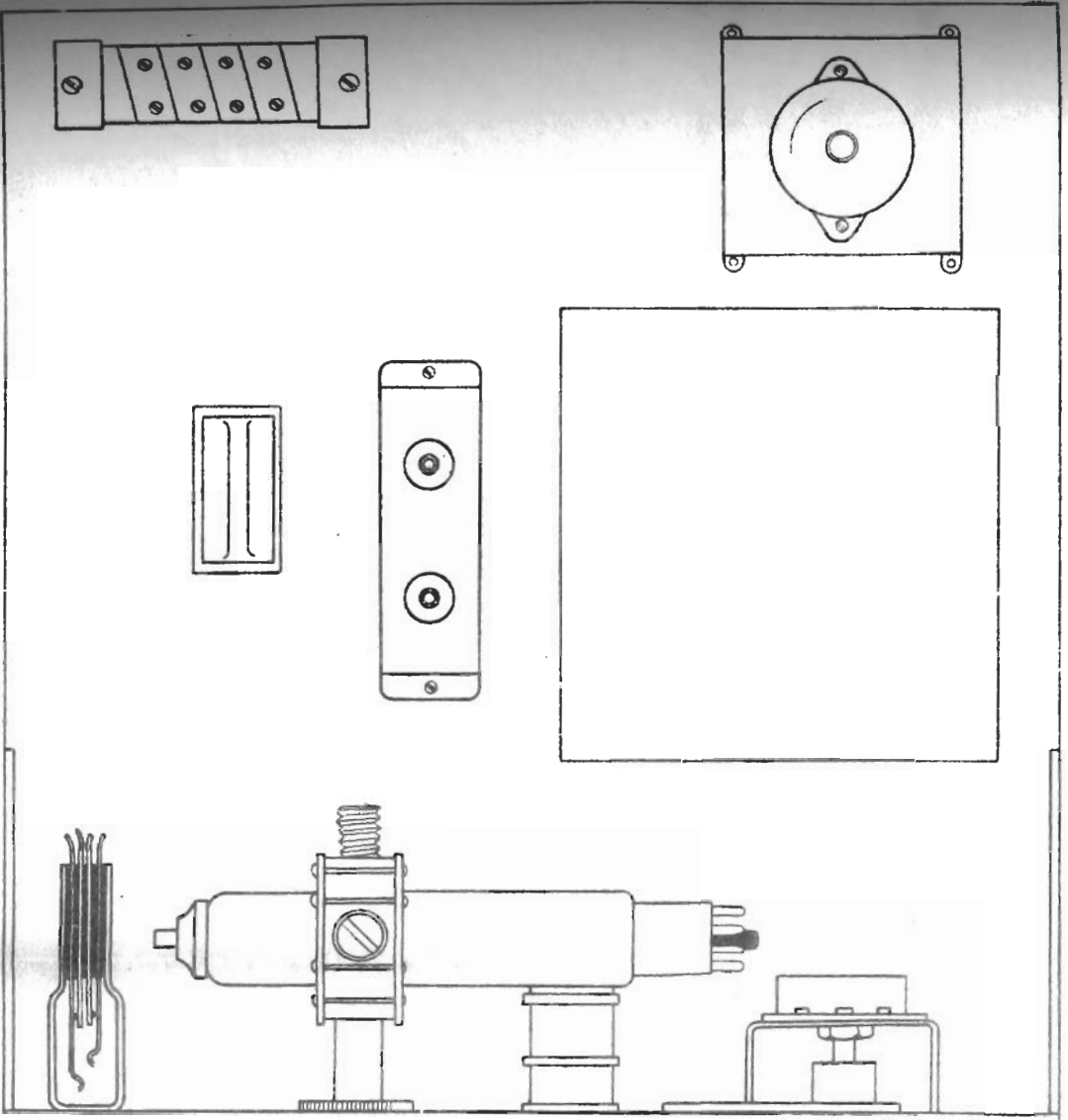
Seal Island Radar - 15,600 yards. Signal to noise ratio = 20 : 1
Ranging Tower.

During Sea Trials the set continued to give very good results."

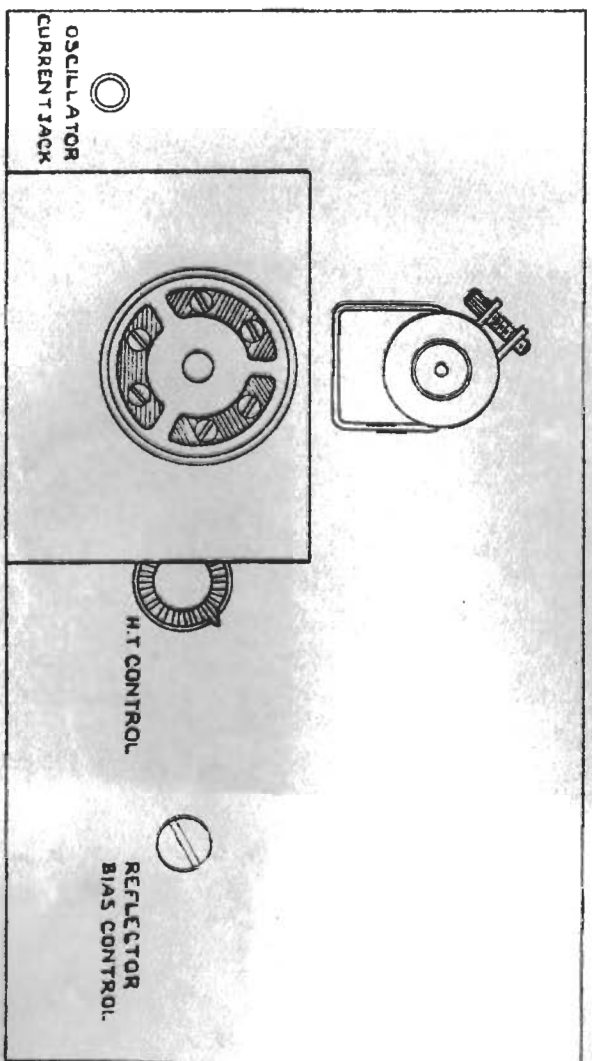
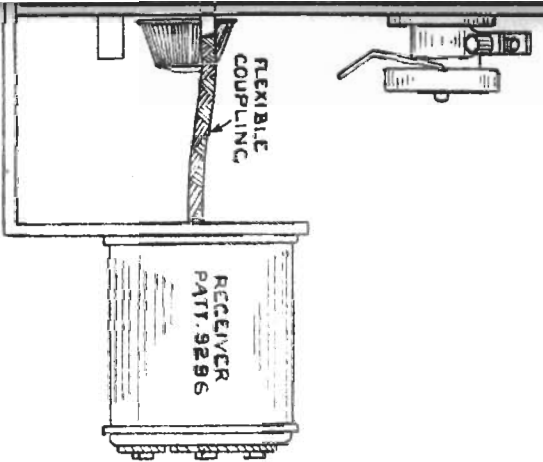
A.S.E. COMMENT.

The only possible snag in this arrangement is the value of the "M" type step. A.S.E. believe that if a 24 step motor is used this should be quite satisfactory.

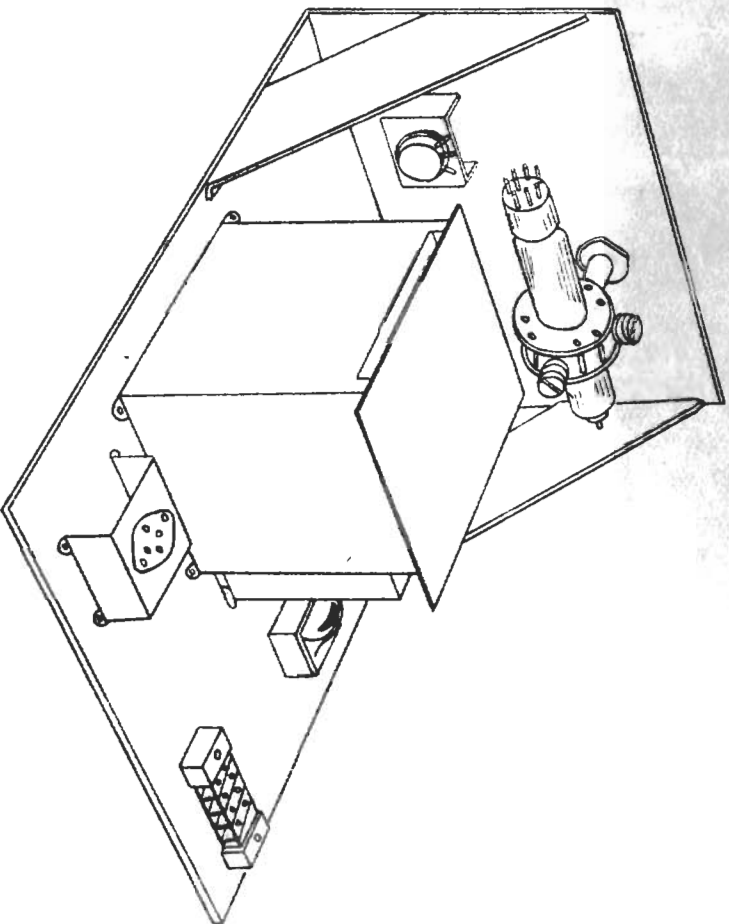
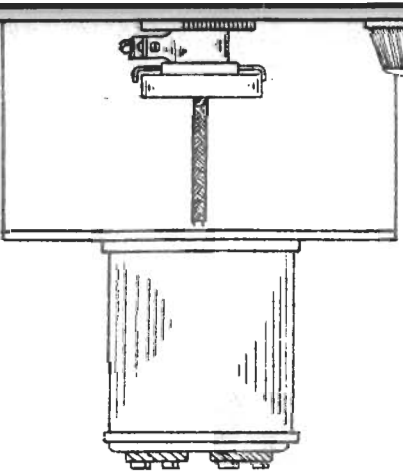
An alternative method of increasing local oscillator input into the crystal mixer box was described in Bulletin No.4, page 57 and attention is also invited to A.F.O. 1464/45 which describes a modification to the L/O circuit to simplify its setting up and provide more stable operating conditions.



Copyright © 1934 by General Electric Company
 Patent 2,111,111
 Patent 2,111,112
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DRAWING
NOT TO SCALE



GYRO BEARING REPEATER, PATT. W5212.

This instrument is in universal use in Radar offices for repeating the bearing of an aerial, and for general lining up purposes.

The pointer is set to zero by inserting a screwdriver in the centre hole of the dial and turning in the required direction, rather like the action in setting an ordinary 8 day clock.

The instrument is provided with a slipping clutch between the driving mechanism and the pointer to allow for this adjustment. It has been found, however, that if the instrument has been excessively lubricated on assembly oil creeps between the clutch faces, resulting in a gradual slipping of the pointer, necessitating frequent resetting.

The trouble can be prevented, or at least greatly minimised by increasing the tension of the clutch spring. This can be done in a few minutes, as the spring is readily accessible without dismantling the instrument. Simply proceed as follows.

- (1) Take off one M motor by slackening the 2 - 4 B.A. screws (no need to detach wiring). This will make the spring and spring retaining washer easily accessible.
- (2) Push down the spring retaining washer, pull out the $1/16$ " pin and remove the spring (don't lose the pin during this operation!). It is advisable to push against the pointer when removing the spring in this way.
- (3) Pull out the spring carefully and evenly to about $1\frac{3}{8}$ " long. Or, better still, if facilities are available make a stronger spring. This should be 16 S.W.G. steel, eight turns, free length $\frac{7}{8}$ ", ends ground flat, and internal diameter $9/32$ ".

(The existing spring is 18 S.W.G. hence the need for the greater length).

- (4) Replace the spring and retaining pin.

This will make the clutch much stiffer and less prone to the progressive creep which is so annoying, while not interfering in any way with the normal adjustment.

AUTOMATIC AERIAL TRAINING

FOR TYPE 271/3Q

The following report pays tribute to the ingenuity and skill of Electrical Artificer Third Class C.A. Dean, of H.M.S. RODNEY.

It is considered in A.S.E. that the time has come when no more A's and A's should be done to Type 271/3Q but it is suggested that the work described in the report could be undertaken by the ship's staff of large ships retaining Type 273Q.

"OBJECT OF THE EQUIPMENT"

It is evident, that, if the P.P.I. display unit A.P. W67067 is to be used in conjunction with Type 273Q W.S. set, it is desirable to have some form of automatic drive for the aerial rotating equipment. By this means, a continuously and regularly painted picture is obtained on the P.P.I. screen which is vastly superior to the picture obtained when the aerials are trained by hand.

The equipment described below was designed, made and fitted in H.M.S. RODNEY, in order to meet in a simple and effective manner, the requirement for automatically driven aerials for Type 273Q.

SPEED OF ROTATION.

The speed of rotation of the aerials obtained by this drive is 360° in 20 seconds, i.e. three complete all-round sweeps per minute. Each bearing is thereby covered three times per minute, a coverage which has proved to be completely satisfactory, and of great assistance both in the Action Plot and on the Compass Platform (N.B. both the Action Plot and the Compass Platform are fitted with remote P.P.I. displays).

It should be pointed out that in the gear chain, provision has been made for the easy alteration of the gear ratio so that the speed of rotation of the aerials can either be increased or decreased.

PHOTOGRAPHS OF EQUIPMENT.

- Photograph No. 1 General View of Control Switch and Tongue in Aerial House.
- Photograph No. 2 General View at Angle 45 Deg. of Motor Gear Box and Hand Clutch.
- Photograph No. 3 Top View of Control Switch.
- Photograph No. 4 General View of Control Switch and Tongue At Point of Reversal.
- Photograph No. 5 Underside View of Motor Gear Box (Coverplate Removed) and Hand Clutch Moving Member Removed.
- Photograph No. 6 Close Up View of Motor Gear Box (Coverplate Removed) and Hand Clutch.

METHOD OF FITTING AND DETAILS OF OPERATION.

In designing the equipment the following Permanent Naval Store Items have been utilised:-

- (1) Motor 1/10 H.P. A.P. W6292.
- (2) Follow Up Switch. A.P. W6357.

(a) General. The motor A.P. W6292 is mounted on a bracket secured on the upper side of the flange to which the aerial worm-gear box is secured, existing bolts being used to effect this (See (A) Photographs 5 and 6). The drive is through a worm reduction gear box ratio $16\frac{1}{2}$ to 1 (see (B) Photographs 5 and 6), slipping Friction Clutch (see (C) Photographs 5 and 6), thence through a gear train, to an extension shaft (see (D) Photographs 5 and 6), which is secured to the worm shaft of the Pedestal Unit. A Hand Clutch (see (E) Photographs 5 and 6) is inserted in this drive so that the power drive may be disconnected at will.

(b) Reversing Control Switch (Follow-Up Switch A.P. W6357).

The reversing control switch A.P. W6357 (see (F) Photograph 3) is mounted on the pedestal in the Aerial House and is operated by a simple lever (see (G) Photographs 3 and 4). This lever in turn is operated by a tongue (see (H) Photographs 1 and 4), which is secured to the coupling of the aerial shaft. It is evident that if the motor is so connected, that the aerial rotates in a direction, such that the tongue (see (H) Photographs 1 and 4) moves away from the lever (see (G) Photographs 4) after the movement of the lever, due to the pressure of the tongue, has reversed the motor, the aerial will be rotated through 360° until the tongue engages the lever on the other side, when again the motor will be reversed and the aerials caused to rotate in the opposite direction. This process then becomes continuous. Photograph 1 shows the tongue at Red 10° moving away from the lever and moving with the aerial shaft through direct ahead to the Starboard side, when it will again press the lever when it arrives at Green 180° thereby reversing the motor.

(c) Slipping Friction Clutch.

This Clutch (see (C) Photographs 5 and 6) is considered necessary for two reasons:-

- (i) To ensure a shockless reversal by allowing a slight slip at the time of reversal (i.e. when the tongue contacts the lever).
- (ii) To render apparent immediately an accidental overload such as foul trailing leads.

The construction of the Clutch is such that the 50-tooth 20 D.P. Gear wheel (see (I) Photograph 6) is frictionally held between two pressure plates one of which is spring loaded and tension adjustable to give degree of slip. Six in number cork inserts are provided in the gear wheel to increase the efficiency.

(d) Modifications to Follow-up Switch A.P. W6357.

In order to render this switch suitable as a control switch the "T" type Mark X Receivers were removed and one side of the differential locked. To operate the Cam pack the gear wheel (see (J) Photograph 3) is drilled to receive the operating pin (see (K) Photograph 3) which engages in a slot in the operating lever (see (G) Photograph 3). Two stops (see (L) Photographs 3 and 4) are fitted to limit the travel of the lever.

(e) The operating Tongue.

The base of the operating tongue is made adjustable through an arc of 5° in order to obtain the correct reversal point and is secured to the coupling of the aerial shaft. The tongue is pivoted about a pin (see (M) Photograph 4) and is capable of a free movement of 10° , this provides an overlap of the aerial beyond R.G. 180° at the point of reversal. Movement of the tongue is restricted beyond this 10° overlap by two spring loaded plungers (one of which is shown see (N) in Photograph 4). This restricted movement of the lever is necessary in the event of the aerial being trained by hand against the aerial stops, for in the absence of the plungers the lever (see Photographs 3 and 4) would be distorted or strained.

TESTS AND RUNNING HOURS.

(a) 8-hour Test.

When the equipment was first fitted, an 8-hour test was carried out. It was found that the consumption of the 1/10 H.P. motor A.P. W6292 was as follows:-

- (i) At commencement of 8-hour test.
0.34 to 0.42 amps on 370° cycle.
- (ii) At conclusion of 8-hour test.
0.30 to 0.40 amps on 370° cycle.

The variation of approximately 0.10 amps in consumption is due entirely to the position of the trailing aerial leads.

(b) Running time.

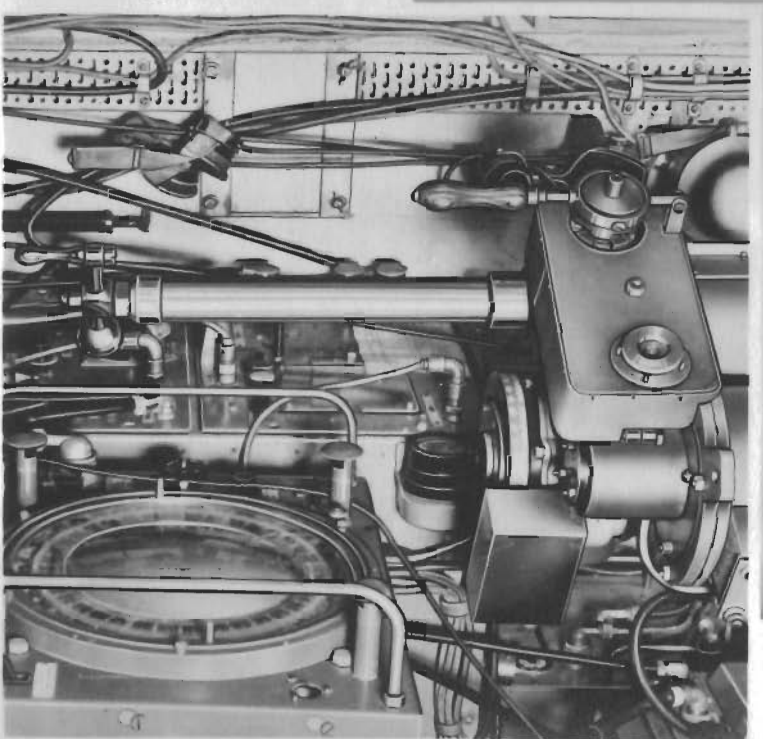
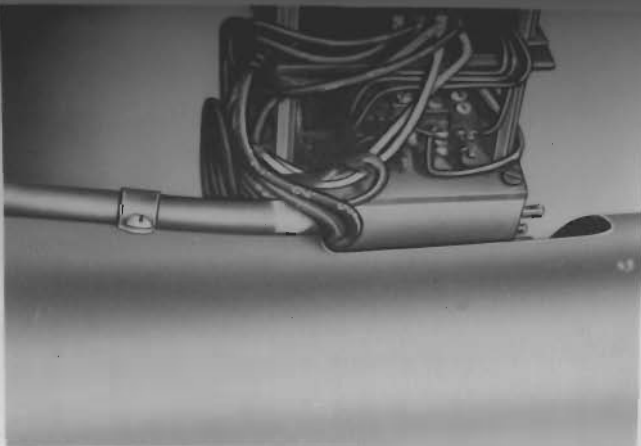
This automatic aerial rotating equipment has been used for approximately 400 hours - the longest operating period being 38 hours continuous running. No trouble or snags have been encountered to date.

CONCLUSION.

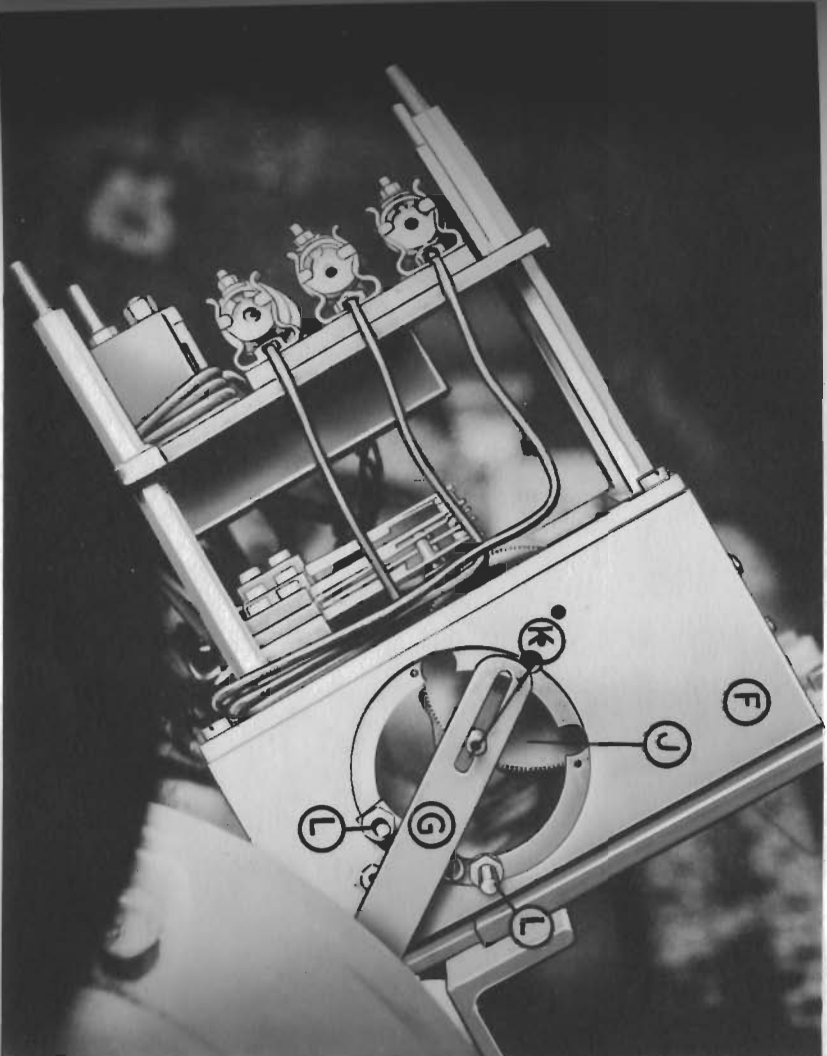
The equipment as designed has proved to be thoroughly reliable under all conditions. In conclusion the following further points to its advantages should be considered:-

- (i) If the equipment did break down the hand rotating system is still operative.
- (ii) The equipment can be removed from the set altogether within half an hour.
- (iii) If it is required to "hold" an echo, then by disengaging the drive by means of the hand clutch (see (E) Photograph 6) hand training may at once be assumed.

1. GENERAL VIEW OF CONTROL SWITCH AND TONGUE IN AERIAL HOUSE

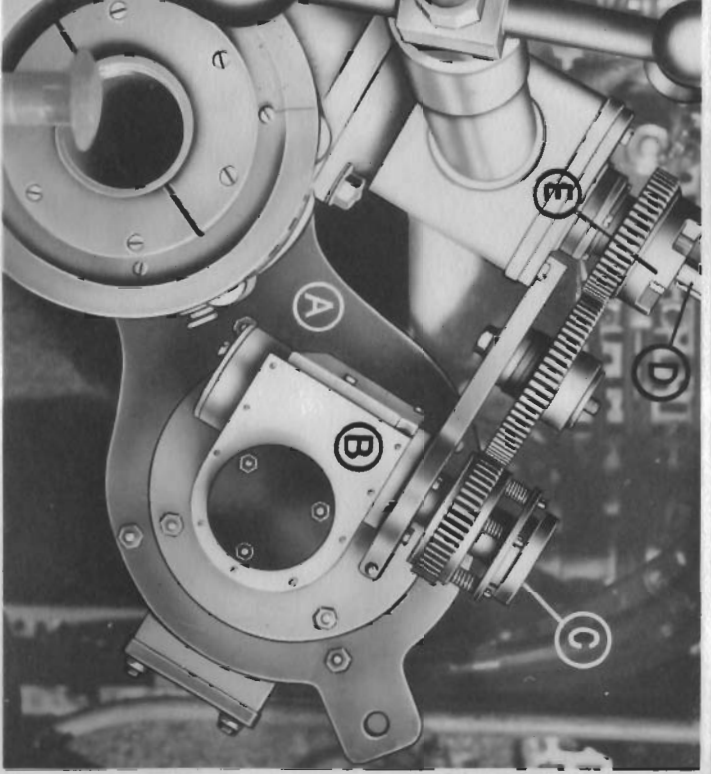
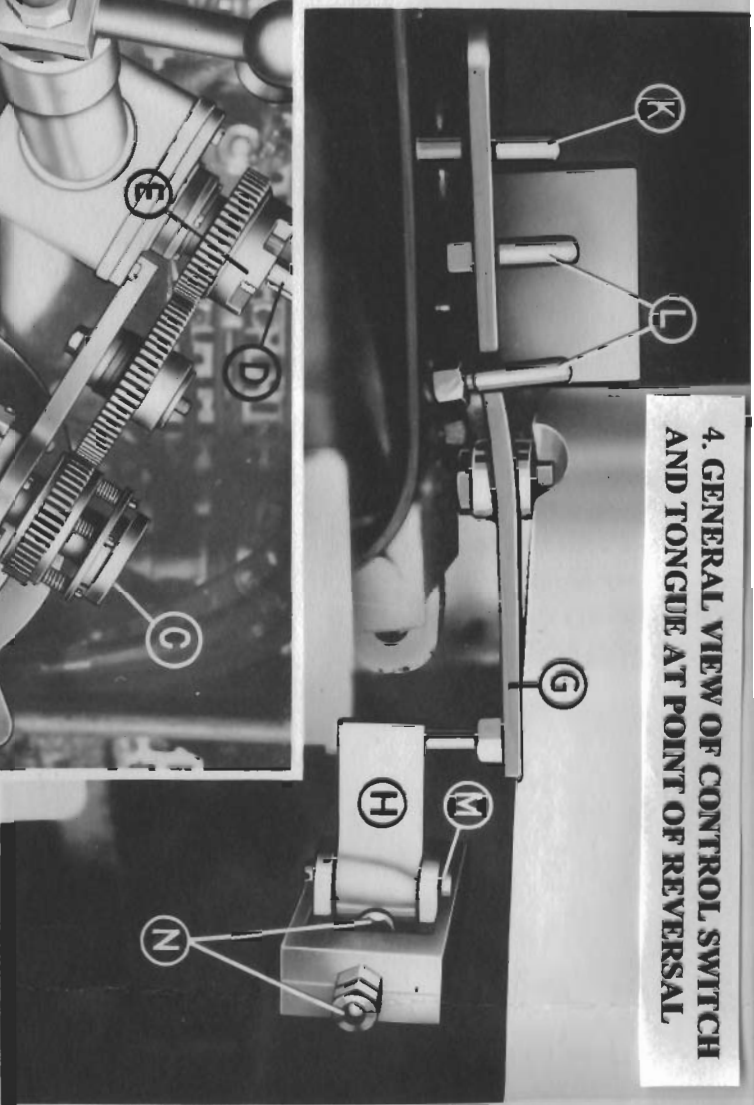


2. GENERAL VIEW AT ANGLE 45DEG. OF MOTOR GEAR BOX AND HAND CLUTCH

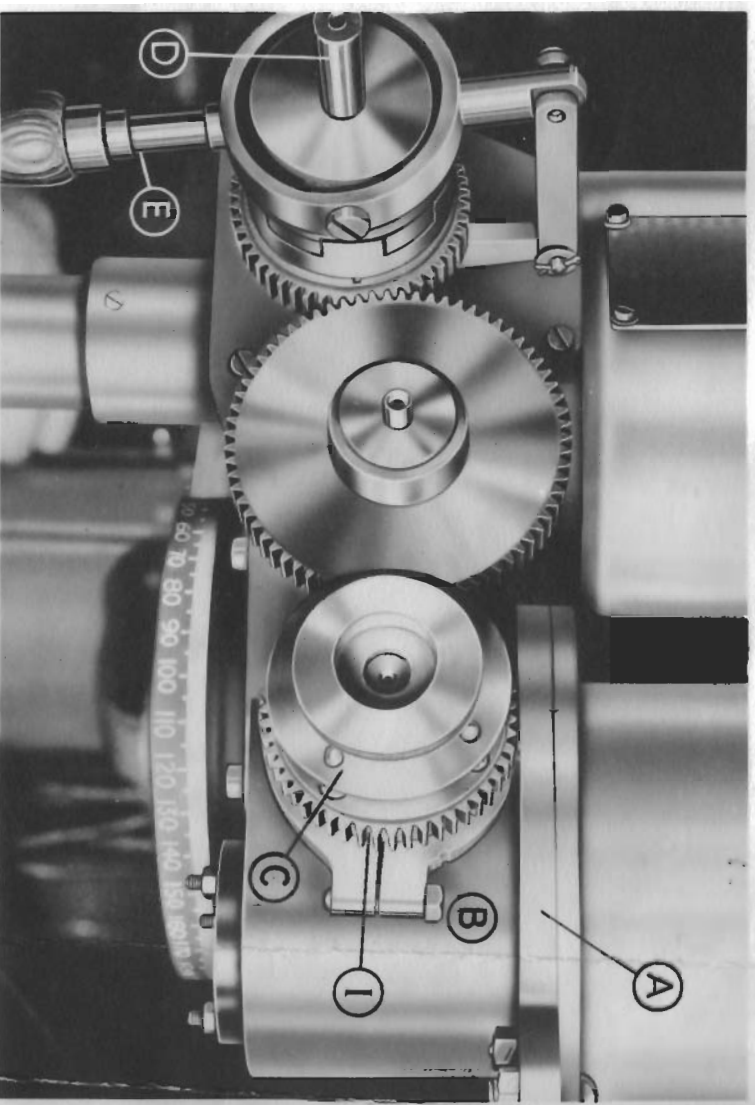


3. TOP VIEW OF CONTROL SWITCH

**4. GENERAL VIEW OF CONTROL SWITCH
AND TONGUE AT POINT OF REVERSAL**



**⑤ UNDERSIDE VIEW OF MOTOR GEAR BOX
(COVERPLATE REMOVED) AND HAND
CLUTCH MOVING MEMBER REMOVED**



**⑥ CLOSE UP VIEW OF MOTOR GEAR BOX
(COVERPLATE REMOVED) AND HAND CLUTCH**