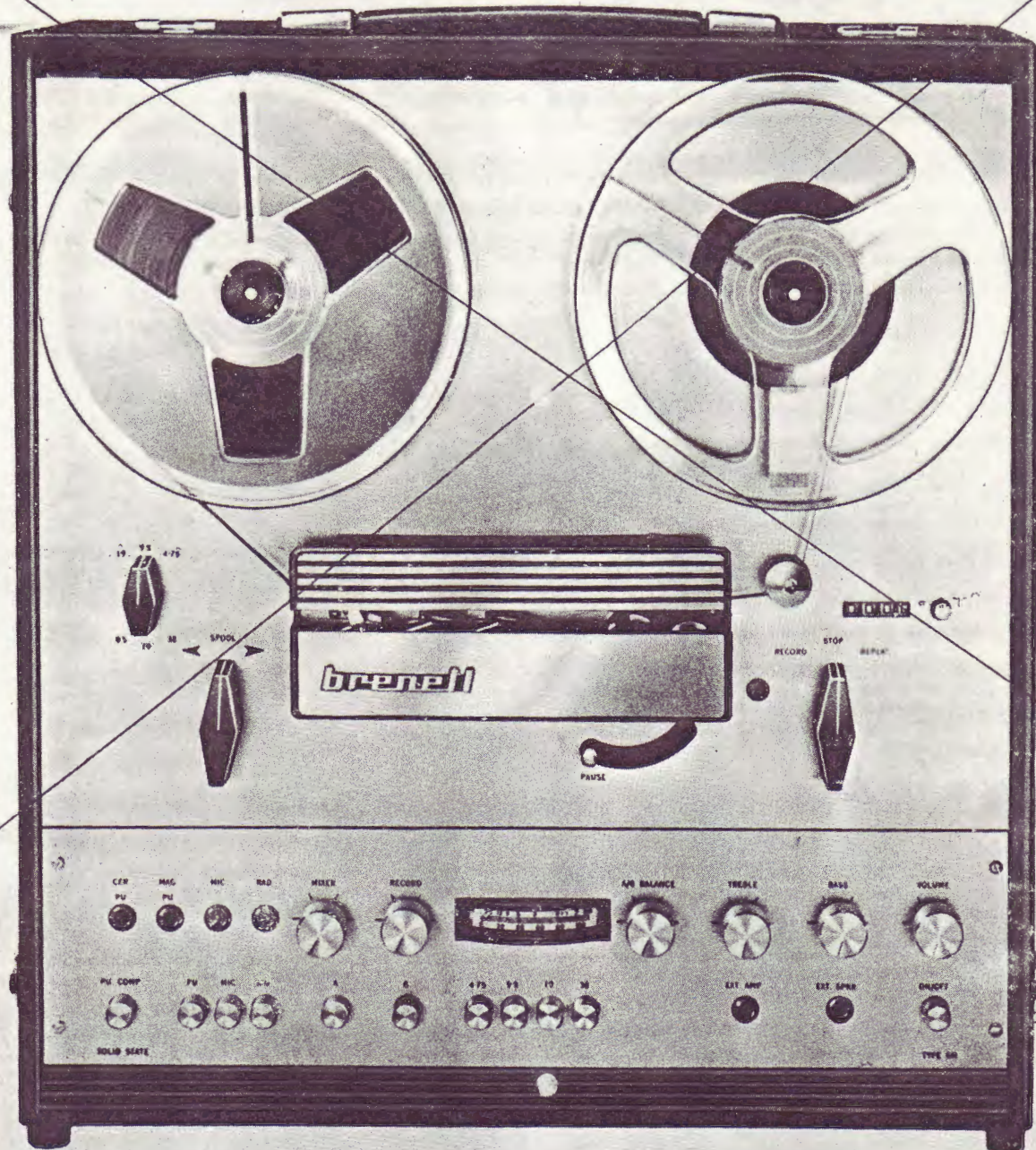


BRENELL MK 6 M



The recording requirements of many people have not developed beyond the elementary stages of making the recording, rewinding the tape and then listening to the recorded programme, but others are far from satisfied with such a procedure and the ability to hear the recording as it is made is an essential facility. This latter system must, of course, employ an extra head and amplifier for Playback purposes thus adding to the cost of the machine—an additional cost which is worth while in order to know immediately the quality of the recording.

Brenell have found such machines to be in great demand so it is not surprising to find in their range of new equipment a superb model giving such a facility—and in addition this model (MK 6 Type "M") has switching provided to enable the recorded material to be immediately compared with the programme material being fed to the recorder (a system known as A/B comparison). In addition to facilities for recording from microphone, Radio, etc., special compensation circuits are incorporated in the recording amplifier to enable recordings to be made *directly* from magnetic and ceramic gramophone pickups (normally one has to feed pickups via separate pre-amps) and mixing facilities between microphone and pickup is possible by means of a cross-fade system (a single control fades out one signal as it fades in the other).

Modern transistors and techniques have enabled high powered amplifiers to be designed at a fraction of the weight of their valved counterparts, it is not surprising therefore to find in this superb portable recorder, a power output of 15 watts available. Wide range Bass & Treble control circuits are also incorporated. Whilst we think principally of this machine as a tape recorder, it must be remembered that its amplifier may be used independently of the recording facilities for reproduction of Radio, Gramophone and microphone signals in the home or hall (Public Address).

The tape deck incorporated in the Brenell MK 6 "M" recorder has 3 motors, 4 tape speeds, pausing mechanism, digital revolution counter, end of tape (or tape breakage) stop and 3 heads of the highest quality. The low wow and flutter content, wide frequency range and excellent signal to noise ratios are all important factors which make this machine so technically superior.

TRANSPORT SYSTEM (DECK)

3 outer rotor motors (Hysteresis Synchronous Capstan Drive for utmost speed Stability).
Large Dynamically Balanced Flywheel (for minimising wow and flutter in the transport system).
4 Tape Speeds — 15, 7½, 3½ and 1½ i.p.s.
Reel sizes — up to 8½ in. (21cms.) diameter.
Heads — 3 heads (Erase, Record, Replay), ½ track mono.
Tape Tension — Light friction brake (adjustable from top of deck, to ensure correct tension for all reel sizes).
Fast Rewind + Wind-on times — under 60 secs. for 1200ft. (360m.) tape.
Braking System — Positive, reliable system, self compensating with lining wear.
Pause Mechanism — Robust, simple to operate, lockable.
Position Indicator — 4 digit revolution counter. Push Button cancellation.
Wow and flutter measured on Gaumont Kalee wow and flutter meter.

15	i.p.s.	less than	0.05%
7½	"	"	0.08%
3½	"	"	0.01%
1½	"	"	0.12%

End of tape or tape breakage auto-stop.

TAPE AMPLIFIERS

Separate record and replay amplifiers.

Record Amplifier:—

Inputs for magnetic Pickup.

Ceramic Pickup.

Microphone (Sensitivity 100 microvolts — overload 55dB).

(Optimum mic. impedance 200-250 ohms).

Auxiliary Signals (Sensitivity 5 millivolts — impedance 250K ohms).

(Radio — Hi Fi Pre-amps, etc.)

Compensation for pickups selected by single push button.

Mixing of inputs — by pressing appropriate buttons, mic and pickup signals may be mixed for recording and P.A. purposes.

Record Level Metering — A large, edgewise scaled, illuminated meter enables precise recording levels to be maintained.

P.O. MAG. 4MV 47K.
P.O. CER. 160MV 1.5MΩ

Replay Amplifier:—

Power Output — 15 watts into 8 ohms @ 1% distortion.

8 watts into 15 ohms @ 1% distortion.

Bass Control — 18dB to +18dB @ 50Hz (c/s).

Treble Control — 15dB to +15dB @ 12KHz (Kc/s).

Output Sockets for Ext. Speaker (8 to 15 ohms) Type BS666.

Ext. Amplifier (220mV from fully modulated tape) BS666.

GENERAL

Frequency responses (Record/Replay):—

15 i.p.s. (38cms.) 40Hz to 22KHz ±2dB.

7½ i.p.s. (19cms.) 40Hz to 20KHz ±2dB.

3½ i.p.s. (9.5cms.) 50Hz to 15KHz ±3dB.

1½ i.p.s. (4.75cms.) 60Hz to 8KHz ±3dB.

Signal to noise ratio — 56dB unweighted.

A/B Switching — Provision is made for "off the tape" monitoring and direct comparison of recording with the original signal. The replay signal level may be independently controlled by the A/B balance control in order to obtain the correct replay level at all speeds for critical comparison of recorded signal with the original.

Internal Speaker — A high quality speaker is fitted—this will be automatically disconnected when ext. speaker is used.

Amplifier Tape Speed Compensation — 4 push buttons are provided to enable the correct recording and replay compensation circuits to be selected. These are deliberately not linked to the speed change switch so that individual requirements of operators may be met.

STRAIGHT AMPLIFIER

By pressing the "A" button the preamplifier circuits of the recording amplifier (prior to recording compensation circuits) are coupled to the main amplifying circuits of the replay amplifier, thus there becomes available a versatile, powerful Hi-Fidelity amplifier such as one would normally purchase as a separate unit. The Specifications under these conditions are as follows:—

Power Output — 15 watts into 8 ohms for 0.02% distortion.

8 watts into 15 ohms for 0.02% distortion.

Input sensitivities for above output levels:—

Mic. 2 millivolts

Mag. P.up 3 " 47K ohms

Cer. " 160 " 1.5 megohms

Radio 95 " 250K ohms

Bass Range @ 50Hz — 18dB to +18dB.

Treble Range @ 12KHz — 15dB to +15dB.

HEADS 1/2 UC 192
UA 128
UK 104

Overall Frequency Response (with Bass and Treble controls to central (flat) position):

±2dB 20Hz (c/s) to 30KHz (Kc/s).

Signal/Noise Ratio of Straight Amp. — Auxiliary position 78dB.

The recorder is designed for vertical or horizontal operation.

Size of Cabinet — 17½ in. X 16½ in. X 8 in.

Weight — 37 lbs. nett.

Brenell Engineering reserve the right to alter the specification as modifications are made.

Brenell Engineering Co. Ltd.

231/235 Liverpool Road, London, N.1

Tel. No.: 01-607 8271

BRENELL MARK 6 TYPE "M" AND MARK 610 TYPE "M" TAPE RECORDERS

Operating Instructions

THIS MACHINE IS FOR USE ON A.C. SUPPLIES ONLY

Mains Adjustment Plug

Before connecting the recorder to the A.C. mains supply check that the mains adjustment plug, situated in the circular recess at the rear of the cabinet, is set to the correct position, i.e.

240v for mains of 220v to 250v

210v for mains of 200v to 220v

115v for mains of 100v to 125v

Mains Cable

This is a three cored cable stored in the pocket situated near the carrying handle. To this cable a suitable 3 pin plug should be connected as follows:

Earth pin to Yellow/Green

Live pin to Brown

Neutral pin to Blue

Lacing the Tape

Fit the full reel of tape to the left hand spoolholder so that the tape feeds from the left hand side of the machine through the slot between the head covers and via the adjustable tape guide to the empty reel which should be fitted to the right hand spoolholder.

If correctly laced, the glossy side of the tape will be facing the operator and the tape will lie between the heads and pressure pads and also between the two pins near the left hand tape guide, i.e. in front of the auto stop pin which moves in the slot but to the pad side of the pin which is attached to the erase (L.H.) pressure pad arm.

Care should be taken to ensure that the tape does not become twisted when attaching it to the empty reel. i.e. the coated side of the tape must face the hub.

Spool Retaining Screws

Screws are supplied for retaining the reels of tape on the spoolholders. It is advisable to fit these screws even though the machine may not be used in the vertical position.

Adjustable Tape Guide (Mark 6 Type "M" only)

The extreme right hand tape guide may be moved in the vertical plane in order to feed the tape to the take-up reel without it touching the edges of the reel.

To adjust, hold lower milled edge and then turn upper edge in an anti-clockwise (unscrewing) direction. You will then have two sections which may be relocked at the height necessary to feed the tape centrally to the take-up reel, by holding the lower section and screwing the upper section hard against it.

Deck Switches

The two large knobs control the Fast Wind, Fast Rewind, Record and Replay functions of the tape deck whilst the small knob is used for the selection of the tape speed.

Speed Changing

The switch provided has three positions but the tape speed will depend also upon the size of capstan sleeve in use.

If the head covers are removed (Push Fit) one may observe the brass capstan sleeve to the right of the tape heads.

The sleeve is a tight fit over the spindle and is retained in position by means of a grub screw (see side of capstan sleeve).

Two sleeves are provided with each recorder normally the larger sleeve is fitted and the smaller sleeve is stowed in the pocket in the top of the cabinet. When the larger sleeve is used the three speeds, 38cms (15 i.p.s.), 19 cms ($7\frac{1}{2}$ i.p.s.) and 9.5 cms ($3\frac{3}{4}$ i.p.s.) may be selected by means of the speed change switch (see switch positions marked 38, 19, 9.5) whilst with the smaller sleeve in use the speeds for each switch position will be halved (see alternate markings 19, 9.5 and 4.75).

Note that the switch has but three positions and the knob cannot be turned more than 60 degrees. Should a capstan sleeve be changed, ensure that there is a clearance of approximately $1/16$ th inch between the bottom of the sleeve and the top of the bearing which protrudes through the deck plate.

Revolution Counter

A digital revolution counter is fitted - pressing the button to the right of the counter resets all digits to zero.

Pause Control

A lever to enable the tape movement to be stopped. Move to extreme right hand side to lock control. Do not use this control when winding or rewinding the tape.

Mains Supply Switch

The mains supply to both the Deck and Amplifier is switched by means of the extreme right-hand button on the amplifier panel.

This switch is of the push-push type, i.e. push for on or off.

It is suggested that after loading the machine with tape, the operator should familiarise himself with the deck functions (not necessarily changing the capstan sleeve at this juncture.).

Check fast wind, fast rewind, playback and record, noting that interlocking prevents the large L.H. knob from being turned when the R.H. knob is in use and vice versa.

It is important to remember that the small black button to the left of the Record/Replay knob must be pressed before that knob can be turned to RECORD. This button will automatically return to the safety position when the record replay knob is returned to the 'Stop' position.

Amplifier Controls, Sockets and Push Buttons

Push Buttons (from left to right)

(1) P.U. Comp - This button enables the circuit characteristics for Ceramic (button down) or Magnetic (button up) Gramophone Pick Up cartridge to be selected. Action of switch is "Push-on Push-off" and no other button or switch is released when this button is used.

(2) P.U. - Press to bring into circuit the sockets marked "CER P.U." and "MAG P.U." Note that only one of the sockets may be used at any one time and the selected socket will be determined by the setting of Button 1 (P.U. Comp.) These sockets are for direct connection to a pickup and not for outputs from Hi Fi amplifiers, etc.

(3) Mic - Press to bring into circuit the socket marked "MIC" for use with a microphone of 200 - 600 ohms impedance.

(4) Rad - Press to bring into circuit the socket marked "Rad" for recording from Radio receivers and high level signals such as will be obtained from Hi Fi amplifiers, etc.

NOTE: Buttons - P.U., Mic and Rad - When one is pressed the other two will be released. However, mixing of microphone and P.U. signals may be obtained if both P.U. and Mic buttons are pressed. Under these conditions the MIXER CONTROL is brought into circuit (see notes on MIXING).

(5) "A" - When pressed, the signals fed into P.U., Mic and Rad will be fed 'Straight Through' the amplifier and speaker. Used when amplifying with or without recording and for comparison purposes when recording.

NOTE: Amplification of Mic signals will cause a howling sound if Mic and speaker are too close and the amplifier's volume control is advanced too far.

(6) "B" - This button is interlatched with "A". When "B" is pressed "A" will be released and signals from the tape will be passed to the amplifier and speaker.

The level of playback signal may be adjusted by means of the "A/B Balance" control. Alternate pressing of the A and B buttons whilst recording is taking place will enable the operator to make a critical comparison between the recorded and original signals; the A/B balance control should be used to bring the playback signal strength to that of the original.

- 7) 4.75 These interlatched buttons enable the correct
- 8) 9.5 recording and replay amplifier characteristics
- 9) 19 to be selected. Press the button which
- 10) 38 corresponds with the tape speed selected.

SOCKET EXT AMP.

Available at this socket is a signal for feeding to an external amplifier (Hi Fi or Public Address) Signals from this socket will not be affected by the Treble, Bass or Volume controls but the setting of the A/B Balance control will affect the Replay Level.

SOCKET EXT SPEAKER

For feeding signals to an external loudspeaker. The impedance of such a speaker should be 8 ohms or more. Internal Speaker will be disconnected when external speaker is plugged in.

BUTTON ON/OFF

Mains Switch. Push on/Push off for connecting and disconnecting mains power. Power on is indicated by the illumination of the meter.

MIXER CONTROL

Used for mixing of pick-up and microphone inputs. Operative only when "P.U." and "Mic" buttons are pressed down. See notes on "MIXING".

RECORD CONTROL

This control will be operative only when the deck is switched to Record.

Adjust levels as necessary to give a recording signal which at peak levels causes the meter needle to rise to 0 dB (the beginning of the red position of the scale.)

A/B BALANCE CONTROL

Adjusts only signal level from playback head. The adjustment will only be apparent when button "B" is pressed and the tape is in motion. See also (6) above.

TREBLE CONTROL

Affects the high frequency response of the signal in both "A" and "B" operating modes. The H.F. characteristic of the signal being recorded is not affected by this control. The range of adjustment covers -15 dB + 15 dB at 12 KHZ.

BASS CONTROL

Affects the low frequency response of the signal in both "A" and "B" operating modes. The low frequency characteristics of the signal being recorded is not affected by this control. The range of adjustment covers - 18 dB + 18 dB at 50 Hz.

VOLUME CONTROL

Adjusts the sound level from loudspeaker and is common to the signal from the recorded tape ("B" button pressed) and the original signal being fed straight through the amplifier ("A" Button pressed).

RECORDING PROCEDURE

1. Lace Tape on deck.
2. Select tape speed (the faster the speed, the better the quality of recording).
3. Reset Digital counter (Press button to right of it).
4. Switch on Mains Supply.
5. Feed signals to be recorded into appropriate input socket and press the appropriate selector button.
6. Press button "A" (To hear the programme you wish to record).
7. Adjust Volume control for normal listening level.

NOTE: If recording is to be made from a microphone do not advance this volume control otherwise feedback between the microphone and loudspeaker will cause a howl to build up.

Headphones may be plugged into the ext. speaker socket if microphone recordings are to be monitored.

8. Adjust Treble and Bass Controls as desired.
9. Press Button which corresponds to tape speed.
10. Switch Deck to Record Position (small black button must be pressed in order to permit this switching action).
Immediately operate Pause Control (lock by moving to right of slot).
11. Adjust Record level control until loudest signals cause meter needle to rise to 0 dB. Note position of knob pointer then turn control down to minimum position.
12. Release the Pause Control and advance the Recording level control to the position noted to cause peak signals to raise the needle to 0dB.
13. Press B button to enable the recorded signal to be heard.
14. Adjust A/B Balance control to give a recorded level similar to the original signal level heard when A button is pressed.

Alternate pressing of the A and B buttons whilst adjusting the A/B Balance Control may be necessary - the object being to obtain a recording which is similar to the original sound.

In some circumstances the level of the original signal may be too low or too great for critical comparison purposes.

A balancing of signals to the Radio input socket should be possible with levels ranging from 50 mV to 300 mV.

With lower input level signals than 50 mV the recorded signal from the tape will be greater than the original signal level even though the A/B balance control is turned to minimum. Conversely, higher levels of input signal than 300 mV will be greater with the A button pressed than can be obtained from the Tape with the A/B balance control set to maximum.

MIXING Signals fed into the microphone and pickup sockets may be mixed if both Mic and PU buttons are pressed (steady, equal pressure on both buttons will cause them both to be latched down). When both buttons are down, the mixer control will be brought into circuit and when fully clockwise the microphone signals will be at maximum whilst turning this control in the opposite direction will raise the pickup signal to maximum.

When either signal is at maximum, the other signal will be cut off. With a little practice perfect fading in and out of these two signals and when required the mixing of them will be achieved.

Neither signal should cause the needle of the meter to enter the red position of the scale - govern this level by means of the Record Level Control.

The use of headphones will be invaluable in assessing the degree of mixing (remember that the loudspeaker should not be used whilst recording from a microphone). For speech with musical background to be clear the musical background should be very low.

ECHO EFFECTS

Whilst warning has been given that a loudspeaker should not be operative whilst using a microphone because of the howl which may arise, very careful use of the loudspeaker output may be used to create an echo effect.

The "B" button must be pressed, the Record level control adjusted for normal recording and when the echo is required very carefully advance the main volume control so that the microphone receives this sound which, being a fraction of a second after the original sound (due to the spacing of the record and replay heads) will be re-recorded as would a reflected sound. The delay time will depend on the tape speed so one may have delay times of $1/12$, $1/6$ and $2/3$ of a second over the four speeds of 38, 19, 9.5 and 4.75 cms. (15, $7\frac{1}{2}$, $3\frac{3}{4}$ and $1\frac{7}{8}$ i.p.s.)

REPLAY OF PREVIOUSLY RECORDED TAPE

1. Select the Tape deck speed.
2. Press button which corresponds to tape speed.
3. Press button "B".
4. Press mains switch button.

5. Switch Deck to Replay.
6. Adjust Volume, Treble and Bass controls as required.
7. Remember that the A/B Balance Control will alter the replay level - adjust as necessary.

WARNING: DO NOT SWITCH DECK TO RECORD OR ERASURE WILL OCCUR.

GENERAL INFORMATION

The recorder may be operated in the horizontal or vertical position.

Should tape break or run out during recording or replaying the Take-up motor (right hand) will automatically be switched off. The recorder itself, however, will NOT be switched off; therefore, make a point of ensuring that the deck's record/replay switch is turned to the "OFF" position when the recorder is not in use. Leaving the record/replay switch in the "ON" position with mains switched off could cause flats to develop on the rubber tyred pinch and idler wheels.

The back tension on the feed motor (left hand) may be adjusted by turning the small recessed screw situated between this motor and the speed change switch. Turning the screw in a clockwise direction will INCREASE the back tension. A change of tension is normally only required when small reels or reels with very small diameter hubs are used, such reels will require a REDUCTION of tension i.e. turn screw ANTICLOCKWISE. The normal setting for the screw is: "with a full 7" reel of tape on the l.h. spoolholder the back tension should be just sufficient to prevent the tape unreeling jerkily when passing the heads at a selected tape speed." The effect of excessive pressure will be to cause "WOW" towards the end of the reel.

Clean the tape oxide from the heads at frequent intervals. A strip of cloth dampened with water, or one of the many cleansing fluids available for cleaning tape heads, should be gently drawn to and fro across the faces of the heads - each head being treated separately until all trace of oxide is removed. The pinch wheel which presses the tape against the capstan sleeve and the tape guides should be regularly cleaned with dampened cloth (avoid using the cloth which will leave a deposit of fluff).

The meters will not operate unless the deck is switched to the record mode.

The tape movement may be immediately arrested if the pause control is moved to the full extent of its movement.

If good quality recordings are to be made, it is essential that the tape be fully and correctly modulated as indicated by the meter readings rising to 0dB points on peak levels.

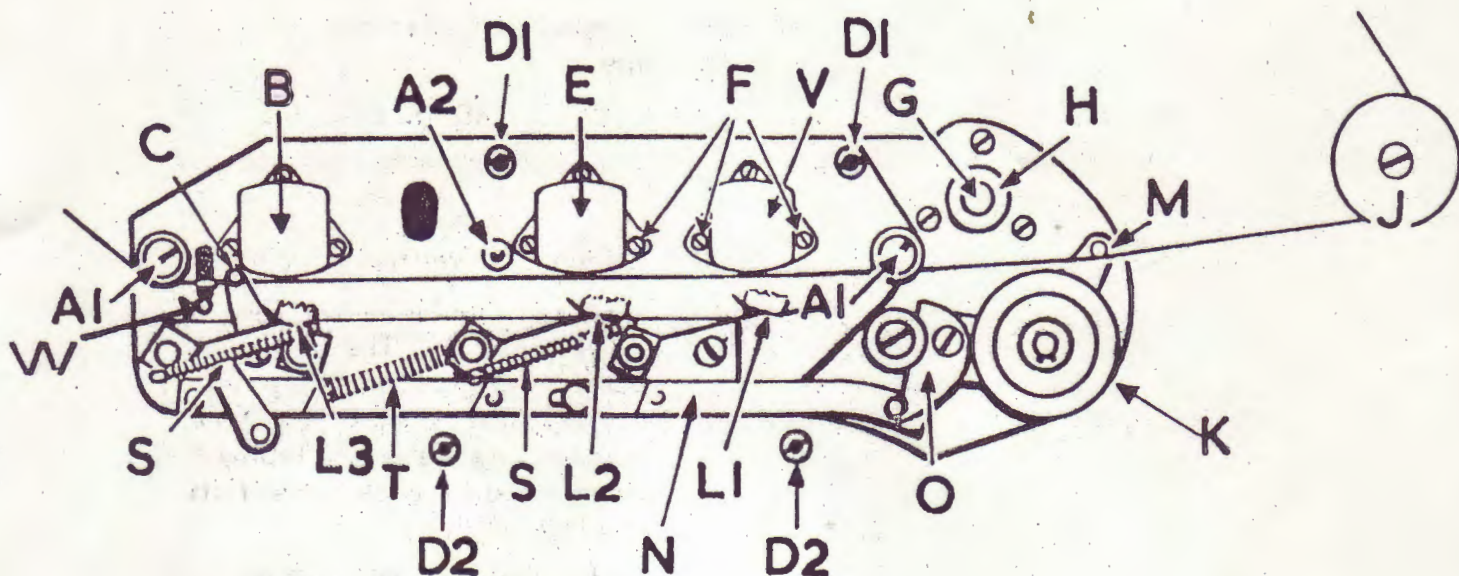
Fuses Two fuses are incorporated in this machine.

Mains Fuse A 2 amp cartridge fuse which is mounted within the mains adjustment plug. For access remove this plug (situated within the circular recess at the rear of the cabinet) and carefully prise off the plastic cover from the plug.

D.C. Fuse A 1.5 amp cartridge fuse (plus 1 spare) is mounted internally. For access remove the two domed screws from the sides of the cabinet (FRONT ONLY) so that the unit may be raised on its rear hinges.

The 1.5 amp fuses are mounted within the power unit in the rear l.h. corner of the cabinet.

Brenell Engineering Co. Ltd. 231-235 Liverpool Road, London N1 1LY.
Telephone: 01- 607 8271.



TAPE LACING CHART

- | | |
|---|---|
| A1. Tape Guides. | K. Rubber Finch Wheel. |
| B. Erase Head. | L1, L2, L3. Pressure Pads. |
| C. Superimpose Release Pin. | M. Take-up Pin. |
| D1. Retaining Post for clip-on Head Cover. | N. Pressure Pad operating lever. |
| D2. Retaining Post for fixed Head Cover. | O. Crescent-shaped lever. |
| E. Record Head. | |
| F. Azimuth adjustment Screws. | S. Pressure Pad Springs. |
| G. Capstan Shaft. | T. 'N' Lever Release Spring |
| H. Capstan Sleeve. | V. Replay (Playback) Head |
| J. Adjustable Tape Guide. | W. Auto Stop Pin |

Speeds available
with small capstan fitted to G

7½ 3½ 1½

7½ 3½ 1½



3½ 7½ 15

Speeds available
with large capstan fitted to G

3½ 7½ 15

Please note:—The speed selector switch does not rotate through 360°