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SERVICE ELECTRICAL and RADIO TRADING CHARTS

SWIRLUX 504
WASHING MACHINE

Cabinet domestic washing machine with 20½in. diameter vitreous-enamelled steel tub, power-operated draining pump, 11in. powered wringer, and automatic wash timing device. Finished in white or cream stove enamel with polished aluminium tub lid and vitreous-enamelled steel top cover. Capable of handling up to 11lbs. dry wash. Models available for 200-220, 230-240, and 250V 50c/s AC, or for other voltages and frequencies to special order. DC models are not available. Manufactured by The Universal Boiler and Engineering Co., Ltd., Fulledge Works, Burnley, Lancs.

THE Swirlux model 504 de-luxe washing machine (Fig. 1) is a domestic cabinet model with 20½in. diameter tub taking up to 11lbs. dry wash in 12 gallons water. Tub is fitted with an improved design tangent-fin agitator which, it is claimed, provides greater water motion giving speedier washing and less buffeting with consequent reduction of wear on clothes.

A feature of the machine is a timing device which switches the washer off at the end of any predetermined period between 1 and 15 minutes according to setting of dial on control panel. Incorporated in the timer is a position for manual control, which is normally required for using wringer or pump.

The washer is fitted with a standard plug-in 11in. Acme A75 power-driven wringer with adjustable pressure central, quick release pressure safety bars and separate off-forward-reverse control. A power-driven pump is provided to empty tub.

A round, polished aluminium lid, with rubber beaded edge and central moulded knob, is provided to enclose tub and over this fits a vitreous-enamelled mild steel cover which allows the machine, when not in use, to be employed as a table (the wringer remaining in position). The washer measures 35ins. high by 23ins. square. With wringer in position overall height is 47ins. Mains consumption on load is approximately 500W.

CONSTRUCTION

Four curved mild steel corner panels (Figs. 1, 4) are lapped and bolted to a steel front top panel and to pressed aluminium rear and side panels. Steel plates welded across bottom of each corner panel, and bolted to flanges of side and rear panels, give rigidity and provide fixing for four hooded aluminium castors.

A pressed mild steel control panel (Figs. 2, 4), with chromium-plated front frame, is bolted to front under top panel and below it is a pressed mild steel door fitted with recessed plastic knob and held closed by rubber pips projecting through holes in left hand and top edges.

A die-cast light alloy wringer support and position locating socket is attached to a mild steel bracket across top of rear left corner (Fig. 4). A white or cream vitreous-enamelled mild steel surround to the tub is held by eight screws into Spire nuts clipped over slots along upper edge of panels. Bottom of cabinet is enclosed by mild steel baseplate held by four bolts ; adjacent to door, baseplate is curved to allow a pail to be placed below emergency drain (Fig. 2).

Interior and exterior of cabinet, and caster hoods, are given a rustproof undercoat and finished in white or cream stove enamel.

The mottled-grey or white vitreous-enamelled mild-steel tub is supported by its rubber bead protected rim on four hook-on brackets fitted over top edges of cabinet panels. Bottom of tub is swaged for additional strength and to ensure thorough draining into outlet positioned close to die-cast aluminium agitator column in centre of tub (Fig. 3). Tub is held by agitator column fixing bolts tapped into casting of gearbox and clamping centre of tub between an inner die-cast aluminium locking ring (Fig. 3) and top of die-cast aluminium drain outlet seated on base flange of agitator column (Fig. 4). Joints on either side of tub and between drain outlet and base flange on agitator column are sealed with fibre gaskets and white lead paint.

A die-cast aluminium extension pipe is bolted to drain outlet, the end being fitted with a screw-on cap which allows tub to be emptied into a bucket exclusive of pump action. It also facilitates cleaning of outlet should this become choked. Inlet to pump is taken from a branch on extension pipe and is coupled by ribbed rubber hose to pump (Fig. 2).

A high-tensile steel agitator drive shaft rotates in an Oilite bearing in top of agitator column and

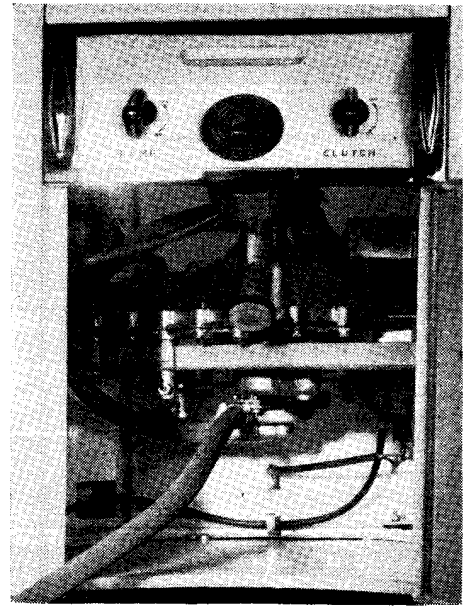

Fig. 1 (above, left).—The model is holding the table top that fits over the machine, the tub having its own polished aluminium lid. Fig. 2 shows the illuminated control panel and the mechanism revealed when the door is open for use of the drain pump

Fig. 3.—A filter plate guards the drain inlet. Below the filter are four bolts securing a clamp plate. When top surround, clamp plate and gasket are removed tub can be lifted out

is fitted with a cast-iron square drive collar (Fig. 3) to engage with socket in top of tangent-fin die-cast aluminium agitator. Drive shaft is designed to allow " whip " at end of each sweep.

Tub is provided with a loose fitting perforated aluminium filter plate to prevent solids entering drain.

Agitator gear box (Figs. 2, 4, 5) has a die-cast alloy case and lid with brass insert bearings. Motor shaft is connected by flexible hose to drive shaft of a steel worm gear which drives a large worm wheel fitted with eccentric boss on which is pivoted one end of a steel rack arm. Other end of rack arm has machine-cut gear teeth which engage with pinion rotating about agitator drive shaft. Rack and pinion teeth are held in mesh by a phosphor-bronze slipper pivoted on pinion shaft.

Wringer drive shaft is fitted with a pinion engaging with a reduction gear formed on upper section of worm wheel. The shaft is coupled through a phosphor-bronze knuckle joint to a mild steel drive bar which, in turn, is coupled by a similar knuckle joint to an upper drive bar rotating in a brass bearing inside wringer support and positioning socket at top of cabinet (Fig. 4).

Agitator clutch mechanism consists of a driven dog attached to pinion rotating about agitator drive shaft, a driver dog attached to bottom end of agitator drive shaft, a sliding spring-loaded dog clutch operated by a pivoted clutch lever actuated by a push rod through base of gearbox. Push rod bears against rotating eccentric cam on a spindle mounted on a die-cast alloy bracket bolted to gear case. The cam spindle is coupled by torsion wire to clutch control knob spindle on control panel.

When knob is moved into ON position, the cam forces push rod down and, through the clutch lever, the sliding dog clutch on agitator shaft is moved upward to engage with driven dog on pinion. When control knob is moved to OFF position, the cam allows push rod, clutch lever and sliding dog clutch—under pressure of dog clutch spring—to return to disengaged positions.

Gearbox contains 2½ pints of Wakefield ST oil. Joint between case and lid, which is held by 18 hexagon bolts, is sealed by fibre gasket.

The ¼HP 1425 rpm single-phase induction motor is attached by resilient end mountings to a cradle secured by position-adjustable bolts to a cast aluminium bracket bolted to side of gearbox (Figs. 4, 5).

Gearbox and motor are supported on a chassis formed by two mild steel cross stays bolted to semi-circular cast alloy end brackets. These end brackets slide into, and are bolted to, semi-circular receptacles held in opposite corners of cabinet by castor fixing bolts (Figs. 2, 5). Cross stay and receptacle fixing bolt holes are slotted to allow chassis to be correctly positioned below tub.

Pump unit consists of a die-cast light alloy housing fitted with inlet and outlet pipes and containing a rotary impellor, the shaft of which is fitted with a rubber tyred drive wheel. Pump is mounted

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ACE 'MAYFAIR'—*Continued*

AERIAL signal is fed through C1 to IF filter L1 C2 and then switched by S1 to SW aerial coupling coil L2 or to bottom end of MW and LW grid tuned coils L4 L5. R1 is static drain between aerial and earth sockets.

Grid coils L2 (SW), L4 (MW), L5 (LW), trimmed by T1 T2 T3, are switched by S2 to aerial tuning capacitor VC2 and to gl of triode-hexode frequency changer V1. Cathode V1 is connected down to chassis, a small standing bias together with AVC voltages, decoupled by R14 C3, being applied through R2 S1 and grid tuned coils and S2 to gl.

On gram position of wavechange switch, aerial and gl of V1 are disconnected from tuned circuits, the latter being connected down to AVC line by S2 to maintain bias. Screen (g2, g4) voltage is obtained from R6 decoupled by C13. Primary L11 C10 of IFT1 is in the hexode anode circuit.

Oscillator is triode section of V1 in a shunt-fed anode-tuned circuit. Anode coils L7 (SW), L9 (MW), L10 (LW), which are trimmed by T4 T5 T6-C7 and padded by C5 C6 C8 respectively, are switched by S4 to oscillator tuning capacitor VC2 and thence coupled by C9 to oscillator anode, of which R3 is the load. Grid reaction voltages, developed inductively from L6 (SW), L8 (MW) and capacitively from padder C8 on LW, are fed through limiters R25 R26 R27 to S3 and switched through a common limiter R4 to oscillator grid of V1, R5 being leak resistor.

IF amplifier operates at 472 kc/s. Secondary L12 C11 of IFT1 feeds IF signal, AVC voltage and a small standing bias, decoupled by R13 C30, to gl of IF amplifier V2. Cathode and suppressor electrode are connected to chassis. Screen voltage is obtained in common with that of V1.

Primary L13 C14 of IFT2 is in the anode circuit.

Signal rectifier. Secondary L14, C15 of IFT2 feeds signal to one diode anode of V3. R8 is its load and R7 C16 C17 an IF filter.

AVC. Signal at anode of IF amplifier is fed by C18 to second diode anode of V3. Bottom of load resistor R15 is connected to junction of R16 R17 in negative HT return to chassis to provide AVC delay voltage and standing bias for grids V1 V2. Bias is decoupled by R18 C22 and AVC is decoupled by R13 C30 and R14 C3.

Pick-up. Sockets are fitted at rear of chassis for connection of pick-up on auto-changer unit. Signal is fed to S5 which in Gram position switches it through C19 to volume control R9. Radio breakthrough is prevented by disconnecting aerial, gl and oscillator grid and anode of V1 from their tuned circuits.

AF amplifier. Rectified audio signal across R8, or alternatively pick-up signal, is switched by S5 through C19 to volume control R9 in grid triode amplifier section of V3. Cathode bias is by R10 decoupled by C21. R12 is anode load and C24 anode RF by-pass capacitor. HT feed is decoupled by R11 C20.

Output Stage. Signal at anode V3 is fed by C25 through R20 to grid of beam-tetrode output amplifier V4. Cathode is earthed to chassis, hence valve is biased by connecting bottom end of grid load R19 to R16 R17, decoupled by C23, inserted in negative HT return to chassis. Screen voltage is from HT line to V1-V3, decoupling being by C27.

Primary L15 of output matching transformer OP1 is in the anode circuit.

Variable top-cut tone control is by R23 in conjunction with R22 C26 which are shunted across L15. Secondary L16 of OP1 feeds a 10in. pm speaker L17.

Sockets fitted to L16 allow connection of any low-impedance extension speaker.

HT is provided by indirectly-heated fullwave rectifier V5. Anode voltages are obtained from HT secondary L18. Heater current, in common with that of other valves, from LT secondary L19.

Resistance-capacity smoothing is by R24 C28 C29 and by R21 C27. RF decoupling of HT line to V1-V3 is provided by C12. Reservoir smoothing capacitor C29 should be rated to handle 100mA ripple.

Primary L20 of MT1 is tapped for inputs of 190-210, 210-230, 230-250V 50 c/s.

S6, ganged to volume control spindle, is the ON/OFF switch.

Auto-changer. Model MRG635 is fitted with a Garrard RC70 single-speed changer fitted with plug-in standard magnetic pickup and suitable for playing ten 10in. or ten 12in. records. Model MRGS635 is fitted with a Garrard RC72 three-speed changer with turnover plug-in high-fidelity magnetic pickup having permanent sapphire stylus. For maintenance and adjustments to either of the above units reference should be made to the appropriate Garrard booklet.

Chassis removal. Pull off four control knobs and remove rear panel by undoing six wood screws. Unsolder LS leads from tags on speaker. Loosen two chassis and base-cover fixing bolts accessible from front of cabinet through opened auto-changer drawer. Undo nuts securing rear section of chassis shelf to support rails on sides of compartment.

With auto-changer drawer fully open and record spindle removed, carefully slide chassis with rear panel attached backward sufficiently to give clearance to control spindles. Then lower and tilt chassis and withdraw from cabinet. Finally, unsolder gram motor leads—one from OP1 tag panel and the other from ON/OFF switch.

TRIMMING INSTRUCTIONS

Apply signal as stated below	Tune receiver to	Trim in order stated for maximum output
(1) 472 kc/s to gl of V1 via .01mF	S/C VC2	Cores L14, L13, L12, L11
(2) 150kc/s to aerial socket via dummy AE	2000m	Core L10, L5
(3) 300kc/s as above	1000m	T6,T3
(4) 600kc/s as above	500m	Cores L8/9, L4
(5) 1.5mc/s as above	200m	T5, T2
(6) 6 mc/s as above	50m	Cores L6/7, L2/3
(7) 15mc/s as above	20m	T4, T1

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on a mild steel platform pivoted on a bracket held in place by the two lower motor cradle fixing bolts. Platform is spring retained in its OFF position and coupled by Bowden cable to pump control knob on control panel (Fig. 5). When control knob is moved to its ON position the pump platform is pulled over to make rubber-tyred drive wheel engage with outer face of pulley fixed to motor shaft.

Inlet of pump is coupled by ribbed rubber hose to tub drain outlet. Pump outlet is fitted with 6ft. of hose terminating in a chromium-plated tap union, which can be attached to hot water tap for filling tub.

Three-core rubber-covered mains cable is fed through rubber-bushed brass grommet at bottom of rear panel to terminal junction block on side of pump bracket. From thence mains wiring is continued by rubber-covered cable to Venner time switch and to motor. A 15W miniature BC indicator lamp of same voltage as motor is wired to time switch to show when power is on to motor —it also provides illumination of control panel.

Wringer is a standard Acme model A75 with 11in. rollers. Drive shaft inside support column below gearbox is slotted to accept flat on end of wringer drive bar inside socket on washing machine.

Wringer support column is fitted with spring loaded stud, operated by a small knob on outside, which fits into any one of five locating holes around socket flange, permitting wringer to be locked in any of these positions.

MAINTENANCE

Lubrication. Since gearbox is oil filled and motor has oil reservoirs, these components should not require attention throughout normal life of machine. If, however, washer is used every day, as in boarding houses or hotels, the motor oil-pad reservoirs should be replenished every 2,000 hours with Shell Vitre 27 oil. To do this it is necessary to remove tub as described below to give access to motor.

Oiling is carried out by removing grub screw in periphery at each end of motor and slowly filling with oil until it seeps out through overflow holes on end faces.

Should replacement of any part become necessary it can be removed for return to the manufacturers by the procedure outlined below.

Removal of tub. First remove wringer, tub lid, agitator and filter plate. Undo and remove the eight surround fixing screws and lift off surround. Finally undo and remove the four hexagon-headed bolts in bottom of tub and carefully loosen and ease up clamp plate and sealing gasket and withdraw them from agitator column. Tub can now be lifted out. With tub removed access is available to motor and wringer drive bar and socket, etc. (Fig. 4).

Removal of motor. Undo nuts and remove bolts and half clips securing flexible hose coupling to motor shaft and gearbox drive spindle. Lay machine on its back, remove baseplate and disconnect motor leads from terminal box. Finally loosen fully the screw securing each motor end clamp—slip off clamps and withdraw motor.

Removal of pump unit. Lay machine on its back and uncouple hoses from pump inlet and outlets by loosening screws in Terry hose clips. Undo and remove hexagon-headed bolt to which tension spring is anchored on pump platform—this also allows Bowden cable to be withdrawn from its

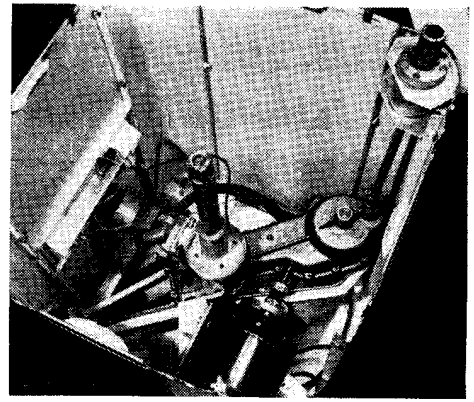

Fig. 4.—With tub removed access is available to the motor, the wringer drive shaft and drive socket

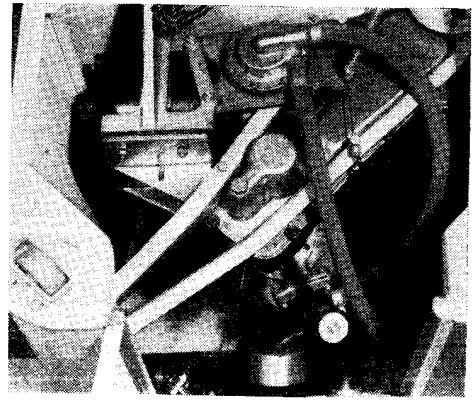

Fig. 5.—This view of the mechanism with the washing machine inverted shows the pump and the method of mounting the gearcase

hole in hexagon post. Remove nut and lock nuts on the bottom left and upper right guide bolts and finally undo and remove nut and lock nut on pivot bolt at bottom righthand side of platform. Pump on its platform can now be withdrawn.

Removal of gearbox and chassis. With machine upright remove circlip around bottom knuckle joint on wringer drive bar and push out connecting pin. Lift drain outlet assembly from agitator column. Lay machine on its back, remove Bowden cable from guide and stop post on underside of upper chassis stay. Undo and remove the two bolts securing terminal box from pump support bracket. Remove the two hexagon bolts clamping chassis end brackets to semi-circular receptacles in bottom left and top right corners of cabinet.

Place machine upright, lift wringer bar knuckle joint off gearbox drive shaft and allow it to hang loosely in corner. Gearbox and chassis can now be withdrawn through top of cabinet. If gearbox oil is to be replenished the gearbox must be unbolted from chassis to give access to gearbox lid bolts.