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TRADING

BYLOCK SUCTION
CLEANER
FERGUSON 989T TV
INVICTA 33
CASEBOOK

BYLOCK 'CENTURION' SUCTION CLEANER

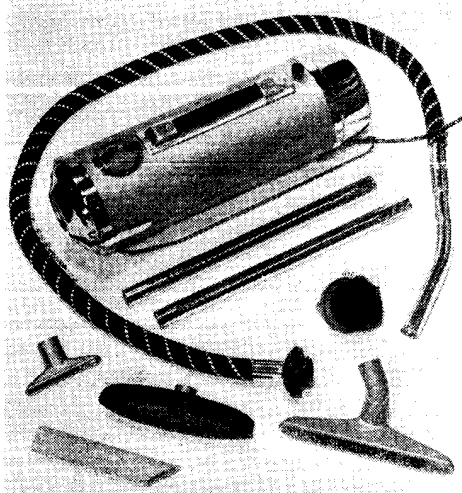


Fig. 1—The "Centurion" cleaner with the accessories supplied. The cylinder is finished in oyster green Dimenso

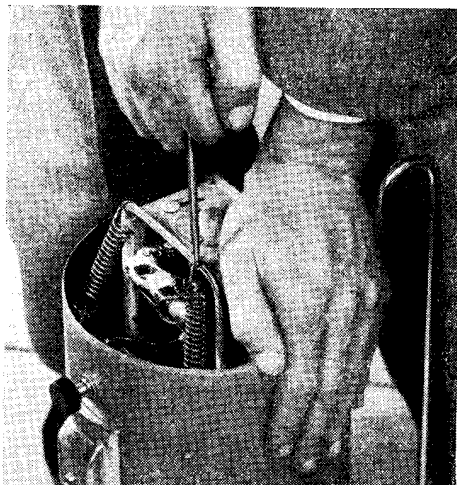


Fig. 2—The floating power unit is held by springs against a rubber cushion. To remove the unit, the springs are unhooked from the motor frame

Cylinder suction cleaner with two stage impeller giving an air flow of 80 cu.ft. per minute and 39-42in. water lift. Supplied complete with accessories. Models available for 100-110, 110-120, 125-135V and 200-220, 210-230, 230-250, 240-260V AC/DC. Manufactured by Bylock Electric Ltd., Enfield, Middx.

THE Bylock "Centurion," model M31, suction cleaner (Fig. 1) is a modern-styled cylinder machine with internal dustbag. The body (Figs. 2, 3) is formed by a 6½in. diameter 20SWG sheet steel cylinder, with lapped and welded seam, across approximately the centre of which is spot welded a pressed steel baffle plate (Fig. 3).

Interior and exterior surfaces are rustproofed and sprayed with oyster green Dimenso stoving enamel. Cylinder is supported on two chromium plated steel sledge runners attached to brackets bolted to underside (Fig. 3).

A rubber-encased spring-steel carrying handle mounted on a highly polished cast aluminium support plate is bolted along top. Ends of cylinder are enclosed by chromium plated 22SWG pressed steel caps. Motor end cap, which is the deeper of the two, is held by two self-tapping screws, whilst dust bag compartment end cap is retained by two chromium plated pressed steel snap-fasteners.

Both end caps are provided with threaded centre holes into which can be screwed the moulded Bakelite swivel coupler attached to end of hose.

The series-wound universal motor has an armature speed of 12,500 rpm and is fitted with a two-stage fan unit (Fig. 4). Motor frame consists of a U-shaped pressed steel rear section, in which are mounted field coil assembly, rear bearing and adjustable brush gear. To it is bolted a circular cup-shape end plate supporting front bearing and also forming first section of fan housing (Fig. 5).

Rear bearing at commutator end of armature shaft is a self-aligning oil retaining type with felt pad reservoir housed in pressed steel bearing cups fastened to frame by three screws (Fig. 2). Front bearing at fan end of shaft is a grease-packed ball-race journal bearing enclosed by dust shields secured to end plate by three screws (Fig. 4).

Brushholders, which have adjustable tension springs, are mounted on a circular Bakelite plate which, by means of slotted fixing screw holes in frame, can be rotated about 15 degrees to enable brushes to be set for optimum commutation.

Fan units (Fig. 4) are fabricated from aluminium pressings and are clamped on motor shaft, one between slide-on flanged collar adjacent to motor front bearing and slide-on flanged spacer, and the other between outer end of spacer and large washer under spring locking washer and securing nut on extreme end of shaft. Fans are enclosed in a sectional housing formed by end plate of motor, a press-in aluminium centre baffle, positioned between the fans, and an outer press-on steel end cap (Fig. 4).

Motor, with fan unit attached, is "float" mounted in body by four helical springs. The springs are hooked between lugs riveted to inside of cylinder and locating holes positioned at corners of end face of motor frame (Fig. 2). They hold motor and fan unit assembly securely against a moulded rubber mounting ring which is seated on perforated steel baffle plate approximately midway inside cylinder (Fig. 3).

The 18ft. of rubber-covered three-core mains cable is fed to motor and to press-on press-off foot switch on top of body, through a clamp retained rubber grommet inserted in hole on underside of cylinder (Fig. 3). Switch operating plunger is fitted with moulded rubber protector. Earth lead of mains cable is connected direct to body of machine by nut and bolt.

The linen dustbag, clamped between end cap and lip on end of cylinder, has a circular steel frame over which is placed a moulded rubber air-seal beading. Accessories supplied with the cleaner are: 6ft. fabric braided metal covered hose with Bakelite swivel cylinder coupler at one end and a chromium plated swivel swan-neck tool connector at the other end, two 18in. chromium plated steel extension tubes, large and small Dimenso stove enamel sprayed cast aluminium carpet nozzles—the large one fitted with swivel swan neck and agitator brush—a round and an oval shaped rubber bead protected brushes and a flexible rubber crevice nozzle.

MAINTENANCE

Lubrication. Motor bearings are of the grease packed and oil-retaining types and should not require any attention throughout life of machine.

Renewal of motor brushes. These should be replaced when worn down to less than half-an-inch. Undo the two screws positioned on opposite sides of motor end cap and carefully ease it off end of cylinder. Lift tensioning arm and withdraw brush from holder (Fig. 5). Disconnect brush connecting lead from terminal by loosening nut to release slotted tag. New brushes suitable for this motor are only obtainable from Bylock Electric Ltd., and under no circumstances should standard types be altered to fit the brush-holders.

When new brushes are fitted connect machine to mains, switch on and check for satisfactory working. Excessive arcing may be due to a dirty or pitted commutator and in this case the use of a "Com-Stick" to clean it may be necessary. If com-

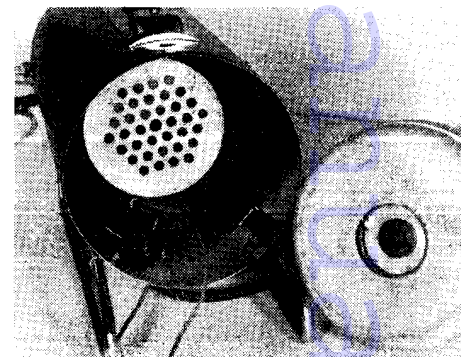


Fig. 3—Showing the baffle plate and the rubber ring against which suction unit is held by springs

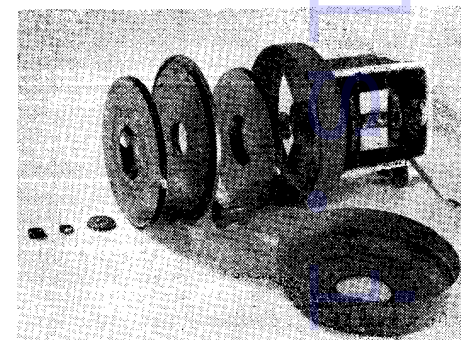


Fig. 4—The order in which parts assemble to form the turbine is given by this photograph

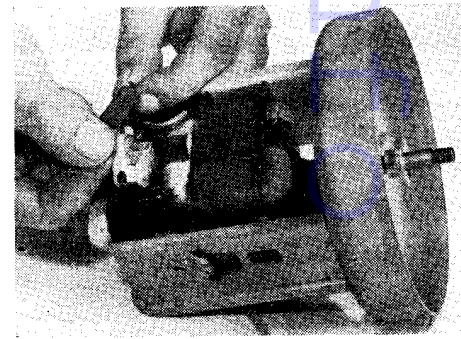


Fig. 5—Replacing the brushes. These are of special type and must be Bylock replacements

BYLOCK CLEANER—Continued

mutator is very badly pitted then it is advisable to remove the motor and return it to the factory for overhaul.

Removal of motor and fan unit. Remove end cover as described above and in addition remove rubber protector from switch plunger, undo and remove milled switch clamping nut and withdraw switch. Place machine vertically with motor end of cylinder at top—this should preferably be done on a suitably protected surface so as to avoid scratching plating of runners and end cap.

Place hook of special spring lifting tool under curl on one of springs (Fig. 2) and with right knee pressing against side of cylinder to steady machine and with palm of left hand firmly pressed down on

motor frame, pull spring upward sufficiently to allow it to be moved over edge of frame and released. Next remove the spring which is diagonally opposite and then the other two. Loosen cable protector clamping bolts and feeding cable through hole as required withdraw motor and fan unit from out of end of cylinder.

Motor complete with fan unit should be carefully packed up and despatched to factory for servicing.

Removal of fan. Normally fans should not require any attention. If, however, due to carelessness the dustbag should inadvertently be left out of cylinder it might be necessary to clean out housing and fans. To do this, carefully ease off end cover, remove securing nut on end of shaft, and slide off spring lock washer, large washer and first fan. Carefully prise out centre baffle and then remove spacer, second fan, and rear collar (Fig. 4).

Simple Errors Some Set Designers Still Make

LAST month we asked service engineers to let us know their "grudges" against manufacturers' practices. Here are some of the things that reduce reliability and increase service costs.

Safety in AC/DC receivers.—A number of universal sets still use knobs secured by grub screws instead of the push-on type.

IF transformers.—Especially in midget sets and personal portables, these usually have the core adjusters one on top and one below the chassis. The latter, centred between the out leads is usually difficult to adjust, mainly because they have no slot for screwdriver trimming.

All-glass valves.—In full-size table and console models Octal-base valves are better and are quite equal to the performance demands. Miniature all-glass types are fragile, have relatively poor pin contact, and a lower reliability and life.

Electrolytics.—In some makes (e.g. Philips) these are often either bolted down with the bolts inaccessible or machine pressed into the chassis, making their replacement difficult.

Personal portables.—In all sets of this category the lid-operated ON/OFF switches are as flimsy as bone china.

Loudspeaker leads.—Though there has been considerable improvement in this direction a number of new models still have the leads to the speaker, and/or the output transformer, too short to enable the chassis to be removed, and inverted, with ease. This fault also applies to leads from frame aerials which are wound on the cabinet backs.

Low wattage resistors.—In personals and portables, there is a tendency to use $\frac{1}{4}$ watt carbon resistors, which seem to go "high" after some time.

Rectifier valves.—In directly-heated types, e.g. U50 and AZ31, when the heater goes there is a good chance of the broken end shorting across to the anode with drastic results.

Scale illumination.—The majority of sets still have poor dial lighting. Especially in AC/DC sets, where voltage has to be "lost" there is certainly room for improvement. In this direction Ambassador have used ordinary electric light lamps for droppers and utilised them for scale illumination.

Inaccessible trimmers.—In a number of sets trimmers and padders are not readily "getatable" without chassis withdrawn. On many occasions, such as valve replacement, the trouble of chassis removal should not be necessary.

Battery plugs.—Though standard practice where combined LT and HT batteries are used, very few manufacturers fit withdrawing cords to the plugs for separate LT and HT portable type batteries.

GEC BT1093

ONE of the GEC BT1093 television receivers was brought in with the complaint that occasionally the picture would completely disappear although, if the brilliance control was advanced, the raster could be produced. It was obviously a fault in the vision section of the receiver and we put the set on for a soak test. After about three-quarters of an hour the picture abruptly vanished, and sound volume decreased.

No valve tapping would restore the picture but, on upturning the chassis, we found that R28, an 8.2K resistor, was rapidly heating up. Investigation showed that C19, the .01mF anode decoupler of V5, a Z77 vision amplifier, was completely shorted.

Since then we have had two other BT1093 models which had short circuits in anode decoupling condensers of the vision valves V4 and V5, so whenever we get one of these models in for service for any reason we change these condensers to a 500V working pattern.—G.R.W.

MAKING FAULTS PAY!

Maybe the boss does not give you a bonus when you do a particularly good job. We will—as payment for a Casebook item. Describe a fault to which a certain model is prone, a tricky trouble logically traced, or a workshop tip, writing as briefly as you like, on one side of the paper, and post to the Technical Editor, ELECTRICAL AND RADIO TRADING, 189, High Holborn, London, W.C1.

SERVICE CASEBOOK

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nection, which is by means of a tag between the capacitor and chassis (but insulated from chassis as this set has a biasing resistor in the negative HT line), was making poor contact with the capacitor can.

As such a large nut is difficult to tighten in a packed chassis I added a new connection from the clamp on the can holding the second electrolytic to it and connected this to negative.—K.D.

GEC LOUDSPEAKER

A GEC battery set of some "fifteen summers" came in with information that volume was almost inaudible and had been fading over a period of some three months. The usual checks of valves, batteries, leads, condensers and resistors revealed nothing. Voltages and currents were normal.

In desperation the workshop speaker was plugged into the extension speaker sockets with surprising results. The set's speaker was removed and examined, and the permanent magnet was found to be no longer such. How this lost all its magnetism over a period of some three months is still a mystery.—P.G., Port Erin.

MURPHY B25

A MURPHY B25 battery radio sometimes worked for days, then would refuse to work for a time. Oscillator HT voltage was low when radio was dead but applying meter to oscillator anode coil would start radio working.

Anode coil and HT resistance were OK. Renewing the sleeving on coil leads, through holes in chassis, cured the trouble.

The old sleeving had absorbed damp and caused the HT to leak to earth; applying meter would cause HT to fluctuate and break leakage path.—W. LEAVER, Bishop Auckland.

TRY THE RING MAIN

THE ring circuit system for domestic wiring allows for up to 10 points using the BS 1363 13A socket with fused plug on each ring circuit. Even if there are three or four sockets and within feet of each other they must be part of the ring. For cable, 7/.029 twin TRS, plus earth, or 7/.029 VIR in screwed barrel are suitable. If more than ten points are required a second or even third ring must be formed, each ring returning to its own 30A fuse on live and neutral busbar.

See that red, live, conductors are connected to terminal marked L, black or neutral conductors to terminal marked N and earth (bare in the case of TRS) to terminal E. If there should be a cross-over, the 13A fuse inside the plug top will be on the neutral line; the fuse can blow and leave the live conductor still connected—which may be fatal.

Make sure that red again is connected to live on the main dis-board. I have had at least one installation where the supply people have connected the wrong way round.

Make sure that all connecting screws of plug bases are tight. These may be carrying considerable current and if loose can be dangerous.

Do not attempt to attach more than one appliance to each plug as that would have the effect of defeating the object of the system. I have found, when inspecting a 15A plug-switch that was getting hot, two 3kW fires and one 2kW fire connected to the same point through a multi-plug top!—E. J. P.

My Pet Grouse!

A GOOD many poor points of design are encountered by service engineers and we see them turn up year after year. As publicity may help kill them, perhaps other engineers will tell us what "errors and omissions" raise their ire?

I always remain surprised at the number of firms who turn out sets without mains fuses. Surely the cost of fitting a fuse in the centre-tap lead of the mains transformer would be negligible?

Carbon resistors, instead of chokes, for HT smoothing are a pet bugbear. These are a constant scourge and often inexcusable as there is space on the chassis for a smoothing choke—which is not such an expensive component.

—P. G. GALE, Port Erin, IoM.

PRODUCTION FAULTS

SEVERAL Ever Ready all-dry battery portables have been in and the trouble has been bad connections between the pigtailed of coil wires and the solder tags to which they anchored. In all cases the trouble has been due to the insulation not having been properly cleaned off the wires before soldering.

A GEC set came in with burnt-out frequency changer. Replacement produced results but it was noticed both dial lamps were burnt out. These were also replaced and, on switching on again, these were seen to be abnormally bright. Voltage check showed LT to all heaters to be high, though set was correctly adjusted for local supply voltage.

Close examination revealed mains tappings on transformer were taken out to wrong tags on adjustment panel.

An Alba battery superhet functioned normally except for cramping of all the MW stations at the high-frequency end of the band. Attempts at realignment were of no avail.

The box containing the coil pack was opened up and it was found the core of the MW oscillator coil had broken away from the brass thread and was floating in the coil. It was recemented to its thread.—P. GALE, Port Erin.

PHILIPS 1400, 1400U/F

NO sound though pictures were normal. Sound chassis was checked from stage to stage and full signal appeared across the secondary of the output transformer.

Whilst preparing to remove the speaker the fault was discovered. The leads from the output transformer to the speaker are "broken," connections being made by plugs and sockets, which are inside PVC sheaths. One of these leads had become broken, under the sheath.

Two 1400U/F receivers were recently installed and one soon went "dead." A check revealed the HT fuse was blown. Metering indicated dead short to chassis.

Examination revealed that the leads from the surge limiter resistors in the anode circuits of the two PY82 rectifiers were long and bare. As the valveholders allow a certain amount of "float," one of the leads could short to chassis.

Examination of the other receiver showed the identical connection to be dangerously close to the chassis. Needless to say, the leads in both sets were insulated.—P. GALE, Port Erin.