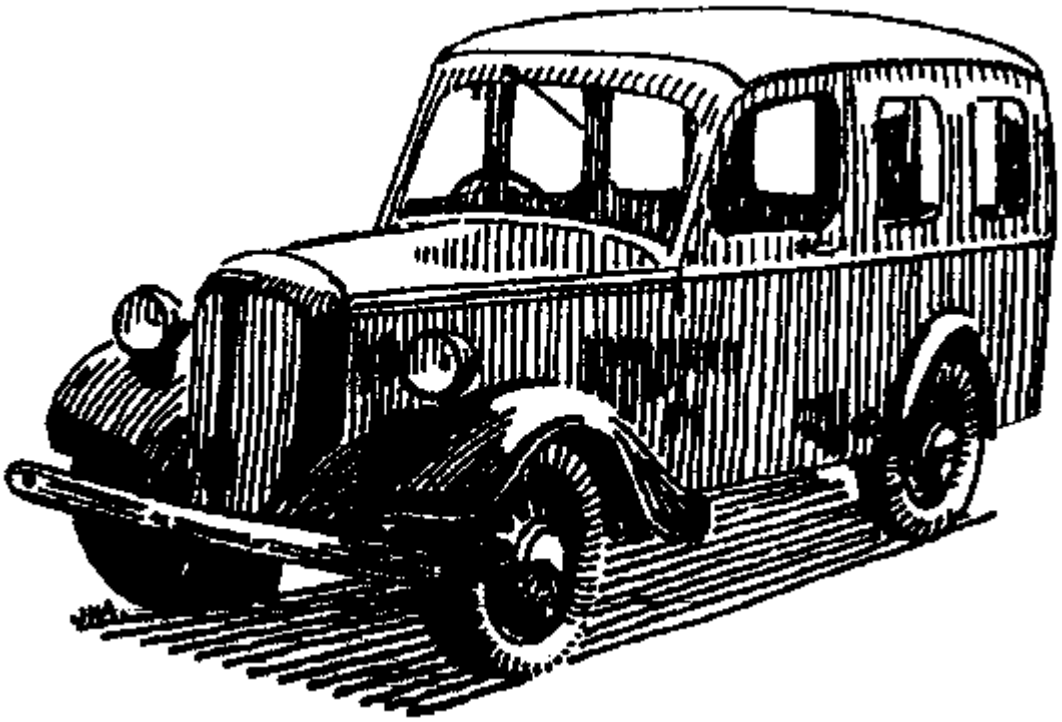
Technical Information for

The Bradford



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INTRODUCTION

The Bradford range of commercial vehicles was introduced in 1946, and was a direct development of the 7ft. 6 in wheelbase 8 HP van introduced in 1938.
Three models were made between 1946 and 1953, respectively type CA, CB and CC. Various types of body were available, including Van/ Utility, Utility de-luxe (with chrome radiator lamps etc,) and lorry and the vehicle was also available in Chassis form for special bodywork.
Given reasonable care, and correct and adequate lubrication, the 2-cylinder engine of the Bradford van will give reliable and economical performance for a very long time. As a further assurance of this, certain simple adjustments should be made from time to time, and are described later.
The engineering changes made to overcome various faults, which developed during widespread use of the Bradford van, are included in their latest form.

SPECIFICATION

Dimensions: all models

Overall length	12’ 0”	Length of floor	5’ 3½
Overall width	5’ 0”	Width between arches	3’ 3¼”
Overall height	5’ 9”	Width of door opening	3’ 11”
Internal width	4’ 6”	Height of door opening	3’ 4”
Max length inside	9’ 0”	Loading height	1’ 10½
Internal height	3’ 9½	Capacity behind seat	78 cu. Ft.
Length behind driver's Seat	4’ 9½	Lorry platform area	5’ 6” x 4’ 11” 27 cu. Ft.

Engine	CA	CB	CC
Cubic Capacity (CC)	1005	1005	1005
Bore and Stroke (all models) 79.4mm x 101, 6 mm (3 1/8” x 4")			
Max b.h.p.	19	19	25
At r.p.m.	3500	3500	3500
Max Torque	43 ft.lbs.	43 ft.lbs.	43.5 ft.lbs
At r.p.m.	1400	1400	2000

Pistons: all models

Type:	Heplex or LAC 10
Clearance at top of skirt	0.00003”
Clearance at bottom of skirt	0.003”
Gudgeon pin diameter	¾
Piston length	3.01562”
Standard diameter (max)	Heplex 3.1220", LAC 10 3.1213”
Weight of complete piston	17 oz I dr.
Oversizes available	0.010, 0.020, 0.030, 0.040."

Piston rings: al1 models

	Compression	Oil Control
Number of rings	2	1
Gap	0.003-0.005 in	0.003-0.005 in.

Side clearance in groove	0.002 in	0.002 in.
Width	3/32 in	5/32 in

(Note - some pistons have 2 oil control rings. One above and one below the gudgeon pin)

Crankshaft:	CA/CB	CC
Main bearing diameter Front	1 3/8"	1 ¾"
Rear	1 3/8"	1 ¾"
Crankpin diameter	1 ½"	2"
End-float	0.002- 0.006"	0.004-0.005"
Undersizes: Mains	10, 20, 30, 40 thou.	10, 20, 30, 40 thou.
Big ends	5, 10, 15, 20 thou.	10, 20, 30, 40 thou.
Thrust	5,10, 15, 20, 25, 30 thou.	

Fuel System

AC mechanical pump, pressure l¼ - 2 lb.
Air cleaner fitted to export models and de Luxe Utilities, Vokes Type C1A.

Carburettors:	CA	CB	CC
Zenith Type	30 VEFH	30 VM	30 VM
Choke	26	25	25
Main	95	95	95
Compensator	75	80	70
Slow running	45	50	50
Progression	150	100	120
Needle seat	1.75 mm	1.5 mm	1.5 mm
Screw over capacity tube		2.8 mm	2.4 mm

(Note - Early CC models had Compensator 50. Capacity tube screw 2.0 mm, and a deflector.)

Electrical System

CA/CB - 6 volt
CC - 6 volt up to Engine No EO/CC 29146, then 12 volt.

Ignition:

Advance range	- 34 degrees
Max, advance at r.p.m.	- CA/CB 2150, CC 1050
Firing point	- at T.D.C (All Models)
Contact Gap	- 0.010-0.012
Plug type	- Lodge F 50 See Appendix
Plug Gap	- 0.020-0.025 in.

Clutch

CA/CB	- Jowett S.D.P 6½ diameter
CC	- Borg & Beck S.D.P. 71" diameter.

Gearbox

CA/CB	- Jowett 3 speed, non-syncromesh	
CC	- Jowett 3 speed, syncromesh	
Ratios:	CA/CB	CC
1st.	18.1:1	19:1
2nd.	9.3:1	9.3:1
3rd.	4.89:1	4.89:1
Reverse.	24.7:1	19:1

Rear Axle

(All Models) Jowett Spiral bevel drive, Semi-floating.

Steering

Bishop Cam and Lever	CA/CB - 1 2/3 turns lock to lock CC - 2 turns lock to lock
Turning Circle 34 ft.	
Toe in	0-1/8”
Camber angle	2 deg.
Castor angle	2½deg.

Brakes

(All Models.)	-- Girling rod operated
CA and CB up to D9/CB.17008	-- 8" drums Some CA:Bendix-Cowdrey
CB from D9/CB.17008 and CC Linings:	-- 10" drums.
Linings:	
CA/CB	Ferodo MR
CC	Ferodo MR 41.

Suspension

Springs:	Semi-elliptical, front and rear Rear springs 8 cwt. or 10 cwt. (optional)
Shock Absorbers:	Luvax Girling type PR 5, CA. Armstrong lever type hydraulic dampers, CB/CC

Acceleration on two upper ratios	TOP	2ND
10-30 m.p.h.	16.2 sec.	9.2 sec.
20-40 m.p.h.	20.3 sec.	9.2 sec.

30-50 m.p.h.	36.8 sec.	9.2 sec.

Acceleration through gears

0-30	10.4 see.
0-40	21.0 sec.
0-50	47.6 sec.

Standing Quarter Mile 28.5 sec.

Maximum Speeds

Flying Quarter Mile

Mean of 4 opposite runs	53.4 mph.
Best Time	53.9 mph.

Fuel Consumption

46 m.p.g. at a constant 20 mph.
48 m.p.g. at a constant 30 m.p.h.
40 m.p.g. at a constant 40 m.p.h.
33 m.p.g. at a constant 50 m.p.h.

Speed in Gears

Max, speed in 2nd. gear 37 mph.
Max. speed in 1st. gear 19 mph.

Weight

Unladen kerb weight 17 cwt.
Front/Rear distribution 45/55
Weight as tested (laden) 20½cwt.

Hill Climbing (at steady speeds)

Max. Top gear speed on 1 in 20	33 m.p.h.
Max. gradient in Top gear	1 in 13
Max. gradient in 2nd gear	1 in 9

Brakes at 30 m.p.h.

0.72 g retardation (41¼ft. stopping distance) with 100 lb. pedal pressure.
0.64 g retardation (47 ft. stopping distance) with 75 lb. pedal pressure.
0.44 g retardation (68 ft. stopping distance) with 50 lb. pedal pressure.
0.21 g retardation (143 ft. stopping distance) with 25 lb. pedal pressure.

Performance factors (at laden weight as tested)

Piston area	15.0 sq.in. per ton
Brake lining area	85 sq.in. per ton
Specific Displacement	1,920 lt: per ton mile.

Gearing

15.3 m.p.h. in Top gear at 1,000 r.p.m.
Piston Speed (57.3 m.p.h.) 2,500 ft. per min.

Price £475. plus P.T. £265.7.6. Total £740.7.6.

GUIDE TO MODEL IDENTIFICATION

Engine Number

This is stamped on a brass plate fastened to the right hand side of the timing case.

Chassis and Body Numbers

These are stamped on a plate, fixed to the scuttle, on the right hand side.

Sample Number D9/CB.20274

This denotes a commercial vehicle of the second series, manufactured in 1949 thus: -

D = 4
9 = 9
C = Commercial vehicle
B = Second series
20274 = Individual vehicle number.

The series A, B, and C denoted the first, second and third respectively.
A fourth series, the CD was to have been introduced but never went into full production.

MAINTENANCE & LUBRICATION

Lubrication:

The following lubricants are the latest to be recommended by the manufacturers, and supersede all previous recommendations.

Engine and Gearbox, General Lubrication, e.g. door hinges, locks etc.

Climatic Conditions.	Wakefield	Duckham's	Esso	Prices	Shell	Mobil	Filtrate
U.K. All year	Castrol XL	N.O.L.30	Essolube 30	Energol	X100 SAE 30	Mobile-oil A	Medium Filtrate SAE 30
Overseas Over 90°F.	Castrol XXL	N.O.L. 40	Essolube 40	Energol	X100 SEA 40	Mobile-oil BB	Heavy Filtrate SAE 40
20°F. - 90°F.	Castrol	N.O.L. 30	Essolube 30	Energol	X100 SAE 30	Mobile-oil A	Medium Filtrate SAE 30

Rear Axle and Steering Box:

Wakefield	Castrol ST
Esso	Esso Gear Oil 90
Prices	Energol SAE 90
Shell	Spirax 90 EP
Mobil	Mobilube CW
Duckham's	Adcol N2

Filtrate	Filtrate Gear Oil SAE 90
Grease:	Chassis lubrication:
Wakefield	Castrolease Heavy
Esso	Esso Grease
Prices	Belmoine C
Shell	Retinax R.B. Grease
Mobil	Mobil Grease 4
Duckham's	Adcol HBB
Filtrate	High Pressure Filtrate Solidified Oil

Shock Absorbers:

CA - Special LUVAX Piston type Fluid
CB/CC - Armstrong Super Thin Fluid.

Use of Colloidal Graphite:

There is no objection to the use of Colloidal Graphite in Bradford engines and gearboxes, after the running-in period has been completed.

Guide to Maintenance:

Every 100 miles	Check level of oil in engine, and water in radiator.
Every 500 miles	Replenish oil in steering box. Grease 14 nipples (LHD 15), i.e. Swivel pins, brake compensators, etc.
Every 1,000 miles	Check oil levels in Gearbox and back axle. Oil brake and clutch pedal linkages, adjust brakes if required. Top up battery, check tyre pressures.
Every 3 000 miles	Lubricate distributor. (CC: change oil filter element)
Every 5,000 miles	Drain engine oil, wash sump filter in paraffin, and replace with clean oil. Drain gearbox, and refill. Drain rear axle, and refill. Replenish fluid in shock absorbers. Grease Hubs. Lubricate trafficators. Inspect distributor contact breaker. Take up any slack in timing chain. Check valve clearances and adjust if necessary.
Every 10 000 miles (Yearly)	Lubricate dynamo.

Inspect dynamo and starter brushes and commutator

CAPACITIES & CLEARANCES & TORQUE SETTINGS

Capacities:	Engine Sump	4½pints
	Gearbox	1½pints
	Rear Axle	1 pint
	Radiator	12 pints
	Petrol Tank	6 gallons
Clearances:	Distributor points	0.010 - 0.012 in.
	Plug Gap	0.020 in.
	Tappets	0.006 in. (all) COLD
Torque Settings:	Cylinder Base Nuts	3/8" BSF 33 lbs/ft.
	Connecting Rod Bolts	3/8" BSF 30 lbs/ft.
	Backplate Nuts	5/16" BSF 25 lbs/ft.
	Cylinder Head Nuts	3/8" BSF 42 lbs/ft.
	Timing Case Cover Nuts	5/16" BSF 21 lbs/ft.
	Flywheel Bolts	3/8" BSF 33 lbs/ft.

When assembling these components, it is essential that the securing nuts and bolts are tightened with a torque spanner to the above

LUBRICATION

Oil Pump: The oil pump is situated submerged at the front of the sump and is driven by a skew-geared shaft from the camshaft. To remove the oil pump, remove the cover plate, and identify two blind holes threaded B.S.F. Screw two bolts into these holes, and tighten up to break the seal. The pump will then be drawn out

Loss of oil pressure: Fluctuation or loss of oil pressure is usually caused by air leaks on the suction side of the oil pump. With these complaints the following points should receive, attention.

a) Fit of oil filter flange (sump filter) to crankcase. This must be airtight, and the use of liquid jointing compound is advised. Ascertain that the two, crankcase studs are firm.

b) Fit of two external oil gallery plugs. These should also be treated with liquid jointing compound.

c) Fit of oil pump into crankcase. A SLIGHT smear of liquid packing on the body and flange is advised. Do not apply excess or it will enter the oil ways.

d) If the above points have been checked and have not rectified the trouble, check the fit of the timing chain adjustor pivot in the crankcase - there may be a leak, from the delivery side of

the lubrication circuit. The pivot can be checked by removing the timing cover, and if loose, can be tightened by turning the locknut from the front. If the head requires to be held it will be necessary to remove the offside cylinder and connecting rod.

e) Isolated cases of oil pressure loss occur when the sump oil filter becomes blocked with rag, usually after the loss of the oil filler cap. Rag used to close the filler will be sucked into the crankcase when the engine runs, and owners are warned not to use such methods even in emergencies

Rear Oil Seal CC: Prior to engine No EI/CC/31010 two types of rear oil seal were fitted to the crankcase the earlier one a thrower and scroll, the later an oil seal in an adaptor ring. The flywheel boss requires modification to take the later type of oil seal and adaptor ring, which is superior. The boss requires machining. Then remove the oil thrower ring from the bearing housing, and replace it with the adaptor ring and oil seal (i.e. remove Part No 7601) replace with Nos 7823 and 50838.

Fitting Oil Filter CB: On early models the cork float of the oil level indicator may be damaged by the removal of the sump filter if the oil level falls. To prevent damage, it is necessary to hold the wire of the float up while the filter is removed. On later models the oil float is prevented from dropping so low, and no special precautions are necessary.

Dipstick: The Oil Level Indicator assembly on CB models after Engine No D8/CB/16319 was replaced by a conventional dipstick, Part No 6578.

Oil Relief Valve Plunger: On CC models there are two versions of the plunger both carrying the same part number (2009 x 6). The standard part had four holes drilled radially round the skirt, the alternative part had two groups of four holes similarly drilled. Both are interchangeable.

Oil Leak at Distributor Mounting CC: In case of oil leaks from this point and provided the crankcase breather valve is fully operational remove the distributor and fit two rubber sealing rings to the shank in the groove. The rings are Part No 50629 and it was intended lo replace two rings with one Part No.CC 7984.

FRONT AXLE, SUSPENSION & STEERING

FRONT AXLE

The adjustments possible to the front axle consist only of wheel alignment. When correctly set the front wheels should be parallel or should have a slight "toe-in" of up to 1/8” measured at the height of the hub at the wheel rims. To adjust, slacken off the nut on the locking sleeve on the right hand end of the track rod (left hand end on LHD models), and uncouple the track rod from the steering arm. Screw the adjustable end along the track rod until the correct adjustment is achieved, and replace.

STEERING

The Steering Gear is of the Bishop cam and lever type, and requires periodic lubrication of the box, using the appropriate oil, and the felt bush at the top of the column, just beneath the steering wheel boss, oil this lightly.

On CA and CB models, adjustment for wear was by shims between the side-plate and the steering box housing, which when removed, pressed the follower further into mesh with the cam. Shims are of two thicknesses 0.003" and 0.005". Movement of more than ½ on the steering wheel indicates excessive play and shims should be removed one by one until the play is eliminated. It should be noted that wear takes place more in the centre of the cam than at the two extremes, care should be taken to ensure that the full range of wheel movement is obtained after adjustment.

On CC models, a modified side plate was fitted, having a grub screw, fixed by a locknut, which bears on the end of the follower. Adjustment is made by slackening the locknut and screwing in the grub screw until play is eliminated on full lock.

Castor and Camber Angles: Castor angle is incorporated in the design of the road springs and is 2⅛%. Camber angle is allowed for in the layout of the stub axle and is 2°.

Steering Wobble: This may be experienced even if the steering gear seems to be in good order and without perceptible signs of wear. In such cases a cure may be effected by fitting tapered wooden packings between the front axle and the road springs. The taper should be from 3/8" down to zero and should be fitted with the 1/8" end to the front. Some cars suffer from excessive castor and in such cases the wedges should be reversed.

BRAKES

Adjustment of brakes, CA (Bendix-Cowdrey) fitted until July 1946

The brakes are fully compensated with mechanical operation, and adjustment for wear is made at the wheels. The need to adjust the brakes is apparent when the pedal movement is within 2" of the floorboard or if braking is unequal.

To adjust the brakes, release the handbrake and tighten each brake shoe adjuster as far as it will go without forcing, in a clockwise direction. Then slacken back each one, six notches or clicks. Always make adjustments with the drums cold.

Adjustment of brakes CA (Girling) CB and CC:

These brakes are also fully compensated with mechanical action and similarly adjustment is made at the wheels. The need for adjustment is apparent when the pedal movement is within 2" of the floorboard or if braking is unequal.

To adjust the brains, release the handbrake, and tighten each brake shoe adjuster as far as it will go without forcing in a clockwise direction. Then slacken back each one, one or two clicks and check the free movement of each wheel. Always make adjustments with the drums cold.

Uneven braking:

If the vehicle has a tendency to pull to one side, it does not necessarily mean that adjustment is incorrect. It may be caused by a seized part and grease liberally. It may also be found that oil from

the hub bearings has been thrown on to the, brake shoes. Replace any oiled shoes with new ones: they cannot satisfactorily be cleaned.

Seized Hub Expanders:

If these are found to be "sticky" they should be dismantled cleaned and reassembled with "white grease".

Setting of Compensators:

The transverse rods should be adjusted so that tire front and rear axle compensator steel arm to which the fore and aft brake rods are attached, gives the maximum leverage when the brakes are applied. The maximum leverage is when the arm is at an angle, of 80°-90°. On no account should the arm be allowed to go beyond 90°.

The bronze arm should be parallel with the fore and aft brake rods when the transverse rods are correctly adjusted. If either of the transverse rods is too long or alternatively too short, the bronze arm will not be parallel with the fore and aft rods.

The fore and aft brake rods should then be adjusted so that the centre compensator levers are central. This can be tested by disconnecting the rod to the front axle and verifying that the rear brakes operate, when the brake pedal is applied. Reconnect the front rod, disconnect the rear rod and verify that the front brakes operate.

NOTE: Adjustments on brake rods should only be taken up when the expander units are "right off".

Movement of Expander Units:

The expander units of Girling brakes must be free to slide on the backplate if full bracing force is to be maintained. The expander unit studs pass through slotted holes in the backplate and are retained with Simmonds nuts. These nuts should be tightened down to their fullest extent and then slackened back until the expander unit can move freely.

BODY

The Bradford's basic problem is the wooden cube-frame, which sits on the chassis and is jointed into the main body sides by tongued-and-grooved joints. The chassis does not support these joints because the outriggers are too short, and consequently when the joints rot there is nothing else to support the main body frame. It drops in a similar way to, an oversize top hat. When looking for this trouble, open the, back doors and look at the back edge of the floor. You may find that the chassis is pushing up through the floor. If this is the case, the best way is to reconstruct the body as follows: -

Support the body very carefully and then remove the floor, which originally were 3/8" ash tongue-and-grooved boards. This will expose the wooden sub-frame. You should now see that the chassis outriggers need lengthening. The best thing for this is 1/8" angle iron or Dexion. Replace the old sub-frame with ash or oak. The easiest wav to relay the sub-frame is half lap them at the crossing points, creosote and screw them together. Then instead of cutting new joints to lap them into the

body sides, butt them. Support with the angle iron going, from the chassis right out, to the aluminium side panel underneath the original outrigger. Fix a coach bolt through and tighten up on all six outriggers. Slowly the body will come up to its original height. When renewing the floor, use two sheets of 3/8" plywood and join them in the middle, unfortunately one standard sheet is not 1arge enough.

Bonnet: If the vehicle has been standing out for a long period, the bonnet tends to rust and when opened, rips the hinge off completely. The best cure is to free the hinge and replace the steel hinge pins with brass ones. The best prevention is to oil the hinge regularly.

Service Bulletin Item No.4 - Rectification of Water Leaks on Mouldings July 1946.

Leakage into the body may occur through faulty panel joints. These are weather proofed with sealing cement and covered with closed down mouldings, fixed in position with serrated nails.

To eliminate this trouble remove the moulding from the body panel and apply Bostik or any other good weatherproof cement evenly between the panels.

Whilst the jointing, is still tacky an entirely new moulding must be affixed and closed down in position.

Service Bulletin Item No. 7 - Rectification of Water Leaks on Indicator July 1946.
The trafficator metal housing has a depression at the base of the indicator arm, it is here that water collects and finds its way into the body of the vehicle.

The application of a small pad of weatherproof cement in this depression will effectively seal any leakages. Care being taken to ensure free movement of the indicator arm.

FUEL SYSTEM

Fuel is supplied by an AC mechanical fuel pump, driven by a cam via the camshaft, to the carburettor. The action is completely automatic, but care should be taken to keep it free of dirt, and to ensure that all connections are tight, The pump contains a screen, or filter, which can be removed for cleaning by undoing the pump cover Wash in petrol, blow out with air to remove any dirt. When replacing ensure that it is located centrally and that the cover gasket is not broken. Check the petrol pipe for leaks at the unions.

The carburettor may require, re-adjustment after the first 500 miles running in, and this is done, by adjusting the air regulator screw and the throttle stop screw. The former enriches the mixture when it is turned clockwise (screwed in) and weakens when turned anticlockwise (screwed out). Make all the adjustments when the engine is at operating temperature. Increase the idling speed by screwing in the throttle stop, so that the engine runs evenly without hunting. Reset the throttle stop to give a suitable tick-over, and repeat the adjustment till the engine idles at a 3low speed. Ensure that the butterfly is in the fully closed position when adjusting the slow running.

The only other attention the carburettor will require is that of clearing any jets which nay have become blocked because of dirt in the petrol. Remove the bowl by undoing the two bolts,' and the

jets in its base can be undone by means of the squared end of one of the bolts The slow running jet can be remove. With a screwdriver when cleaning the jets do not pass anything through them. The recommended method is to wash in petrol and blow through with air alternately. Before replacing the jets, ensure that the bowl is thoroughly cleaned.

CARBURETTORS

Spitting-Back: In extreme conditions the size of main jet should be increased to 95 and progression jet to 150 the choke screw being replaced with the extended type. Always set the slow running with the butterfly closed It may be possible by Maladjustment of the slow running, to obtain tick-over with the butterfly slightly open and this will increase the tendency to 'spit-back' by causing an excessive drain on the capacity well It will also increase petrol consumption

Service Bulletin Item .No, 66 September 1949 - Accelerator Linkage

A new type accelerator linkage with a flexible cable connection is being fitted from Engine No.D9/CB/22147.

The assemblies can be interchanged, but when fitting the new type linkage it will be necessary to fit a metal strip across the lower end of the hole in the scuttle dash through which the accelerator lever passes, to prevent the lever returning too far. It will also be necessary to extend the hole upwards approximately ½ and to fit a pull-off spring (7585) between the air intake securing bolt and the end of the carburettor throttle lever, which should be drilled for this purpose.

ENGINE REMOVAL

It is essential that the chassis steering cross-member is clear of the crankcase sump as the engine is being lifted.

The cross-member should be swung forwards and downwards, using the bottom front bolts as pivots (first release top front and rear and bottom rear bolts from cross-member). Alternatively the cross-member must be removed.

Fitting of stiffer engine mountings: Due to the adoption of a floating clutch mechanism, both front and rear engine mountings were redesigned. New and old type mountings are interchangeable, and the method of fitting remains the same.

CRANKSHAFT AND MAIN BEARINGS

Removal of crankshaft: To remove the crankshaft, first remove the flywheel and crankshaft pulley. (CA/CB remove Woodruff key from rear taper, on crankshaft), Detach both cylinders and remove both connecting rods from the crankshaft. Remove the engine back-plate. On CC models this is facilitated by screwing in two BSF bolts into two extra holes in the back-plate to break the seal. With the crankshaft sprocket and its key removed, the crankshaft can now be extracted.

Main Bearings: These are press-fitted, the front into the crankcase the rear into the back plate. Care should be taken to ensure that the cut-out that prevents bearing rotation is properly engaged,

If the front bearing turns, it is possible to restrict the oil to the front big end bearing, which will fail. On CC models after No.E2/CC. 39605 the front main bearing and timing chain adjustor pivot were redesigned to minimise the chances of the bearing turning. The new bearing has a wider flange which engages on the timing chain adjustor pivot; there is no to locate the bearing. The rear bearing was not changed. Both bearings are made of aluminium with a 0.002" thick tinned bearing surface. When pressed correctly into the crankcase so that the oil- feed holes line up, the correct running clearance for the shaft is obtained. These bearings should not be line-bored or scraped.

CONNECTING RODS AND BEARINGS

When replacing connecting rod bolts (B24) ensure that the length of the new bolt does not exceed 2.425" on CA/CB models only. The length of these bolts was originally 2.4875" and the crankcase was chipped to allow clearance but this practice was discontinued.

From Engine No.EO/CC.28470 a new type of connecting rod was fitted. The mating faces of the new connecting rods (Part No.7887) were serrated and care should be taken to keep these surfaces scrupulously clean to ensure accurate re-assembly.

PISTONS AND CYLINDERS

When re-assembling pistons ensure that the ring gaps are evenly spaced around the piston, and not opposite each other, prior to fitting the cylinder. When replacing the cylinder, thoroughly oil the bore and piston, and gently compress each ring into the cylinder.

Loose Cylinder Base Nut. The knocking noise produced by this fault may be confused with damage to cylinder bores, big-end bearings, main bearings and flywheel. The cylinder base and crankcase should be clean and free of distortion, and when assembling cylinders, every care should be taken to ensure that the base beds well onto the crankcase. These nuts should be checked and tightened if necessary when servicing. Do not over-tighten, and use internally sprung shake proof washers.

TAPPETS AND VALVES

Adjustment of Tappets: CA/CB: Remove the valve covers, and rotate the engine until the corresponding valve of the opposite cylinder to that being adjusted is fully open. Hold the small nut, and slacken off the large one (ordinary right-hand thread). Insert 0.006" feeler, and adjust the gap to give a sliding fit. Hold small nut, and lock up the large one.
The engine should be cold when tappet -adjustments are made.

Adjustment of Tappets: CC: Remove the tappet covers by unfastening the two finger nuts. The valves are of different design to the CA/CB valve assemblies but the same procedure applies to adjusting. Allow a gap of 0.006" and ensure that the engine is cold.

Dry Exhaust Valve Stem: CA/CB: The oil flow to the valve covers can be increased by fitting an Inlet Tappet Guide (2909 X2, RH; 2909 X3, LH) to the exhaust tappet with the oil feed hole to the bottom. This may give excessive oil feed when the vehicle is used for short journeys, and if this is the case the guide should be changed for the reverse hand, so that the oil hole is at the top. The oil flow to the valve covers should be at the rate of one teaspoonful, every 1½ to 2 hours (approx.)

Indent on Tappet Heads; CA/CB: Tappet heads are hardened to Rockwell C42. Slight indent marks appear after a period of use, which have no detrimental effect. Replacement should only be considered if the marks are deep, or the tappets are excessively noisy with correct valve clearances.

Valve Guide Sealing Ring: CA/CB: A fibre-sealing ring (Part No.6444) was introduced to fit between the valve, guide collar and the cylinder block, to improve oil sealing. A sealing ring should be fitted when replacing valve guides. Care should be taken to fit the valve cover tubes as close to the cylinder block as possible to obtain the maximum advantage from this ring.

Excessive Wear on Valve Stems; CA/CB: If valve stem lubrication is adequate, the valve stem may be bearing on the side of the guide, caused by the ends of the valve springs not being square, or by wear on the top nut.

Valve Spring Fracture All models: The following may be the causes: -

1) Insufficient lubrication (CA/CB only)
2) Sticking or Dry Exhaust Valve Stem (for remedy, see above; CA/CB only)
3) Excessive wear in valve stems or guides.
4) Valve springs not seating square with the cylinder blocks.
5) Incorrect length of valve spring.

With the CA/CB type engine, it will readily be understood that lubrication to the valve assemblies is dependent on correct setting of the crankcase breather valve.

Lengths of Valve Springs; CA/CB CC

Inner	61/64" (Pt.No.4608X8)	
Outer	13/16" (Pt.No.4608X9)	
	(Pt.No.7544)	15/16"

Note: These measurements are Compressed lengths.

CAMSHAFT AND TIMING GEAR

Valve Timing (All Models): (See Fig.2 for timing diagram).
If replacement sprockets are fitted which do not carry the timing punch marks, the following procedure should be followed.

1. Fit new sprocket to Camshaft.
2. Turn crankshaft to T.D.C. position.
3. Set No. 1 inlet valve clearance to 0.012", with.No.2 cylinder's inlet valve fully open.
4. Turn the camshaft clockwise (view from front of engine) until the inlet valve on No. l cylinder is just about to open, i.e. until the 0 .012”, gap is just eliminated.
5. Fit the timing chain in this position, and recheck timing.
6. Reset valve clearance to 0.006" before running the engine.

Note: To obtain the best positioning of the camshaft sprocket, it may be necessary to fit the

sprocket to the camshaft last, before fitting the timing chain, it will of course be more difficult to turn the camshaft without it.

Removing Camshaft (All models). Before removing the camshaft, remove the cylinders (or prop all the valves open). Remove the timing cover and timing chain. Loosen the oil pump and withdraw it front the sump, far enough to allow the drive shaft to be disconnected. Remove the camshaft sprocket and distributor. Release the two nuts holding the front camshaft bearing to the crankcase, and withdraw the shaft and bearing complete. If the front bearing is a particularly tight fit, remove the flywheel, engine backplate and rear camshaft bearing locking screw. Punch the oil retaining disc in the rear bearing to make it concave, loosen and remove, using a soft drift, tap the camshaft out forwards.

Changing Camshaft Bearings: The new bearing should be a tight fit in the crankcase. They should be reamed out to suit the camshaft, allowing 0.00075" clearance on the diameter. Reamer in line with a pilot bar, so that both bearings are strictly in line. Refit the oil-retaining disc, which is convex and has to be expanded to fit. To do this, put a steel bar of the same diameter as the camshaft journals into the bearing space from the front, so that the bar ends level with the recess in the Bearing. Flatten the disc against the bar using two hammers. Apply liquid packing to obtain an oil-tight joint. Then remove the bar, the front bearing, and fit the front bearing on the camshaft. Fit the oil pump spiral gear against the shoulder on the camshaft, and check the end clearance between bearing and gear, (which should be 0.002"). Oil the camshaft journals, and fit the whole assembly into the crankcase. Finally, re-attach the oil pump drive, and fit the distributor.

Loose Camshaft Rear Bush: This, or a loose blanking disc can give rise to an unusual engine knock. The knock can be felt transmitted through the camshaft rear bearing locking screw on top of the crankcase. Tightening this screw may effect a temporary cure if the bush is loose. If the blanking disc is loose, this may be caulked with a long punch over the flywheel.

If the rear camshaft bearing is loose, and is discovered fairly soon after the symptoms occur, remove the locating screw, and drill a 3/16" hole to a depth of 1/8” to 3/16" into the bearing. Turn the end of the screw down to 3/16" for 3/16" of its length, preferably with a slight taper on the spigot. This may be effective, but in extremes cases only replacement of the bearing will effect a permanent cure.

Modified Timing Chain Adjuster CB: This consisted of a chain adjuster screw (Part No 7566) and a spring loaded adjuster rod (Part No.7565) fitted in place of the chain adjuster screw (Part No.6335) in engines before D8/CB/14460. Adjustment of both assemblies is the same, the new one providing finer adjustment. and both were interchangeable.

Timing Gear Adjustment CC: After Engine No.EO/CC/27543, the camshaft sprocket, camshaft, crankshaft sprocket and crankshaft pulley were redesigned, enabling the timing gears to be more accurately aligned by the insertion of shims between the crankshaft sprocket and its distance piece.

Starter Nose Fracture: Firing the engine before T.D.C. has led to fracture of the starter nose. It is imperative that ignition timing be set at T.D.C. and on no account before. The timing should be checked on both cams of the distributor.

Service Bulletin Item No.68 - Chain Adjuster Bush - September 1949

Further to bulletin Item No.58. From Engine No.D9/CB.22632, a rubber bush (7639) is being used in place of the double coil spring washer (DSW5) to tension the adjuster rod. The two parts are fully interchangeable.

SPECIAL SERVICING POINTS - CC MODELS

Crankshaft and Main Bearings: Before E2/CC/39605 when bearings are fitted to the crankcase they should be line reamered to the following dimensions: -

Front. 1.7505" + 0.0005"

Rear: 2.251 - 0.0005"

Adjustment for end-float is made by the addition of shims to decrease, or their removal to increase. Shims are fitted between the rear main bearing and the thrust plates located in a recess in the bearing housing. Normal end float is 0.004 to 0.005 in. After E2/CC 39605, the bearings are of different design and should NOT be reamered or scraped.

Main Bearing Oil Seals: Both are press fitted, the front into the timing cover, the rear into the bearing housing, The rear seal should be fitted with the leading edge of the rubber insert forwards.

Flywheel: Location and fixture are by dowel and four 3/8" BSF bolts located by internal shake proof washers. Ring gear is shrunk on, and has 119 teeth. Maximum permissible run-out on the rear face is 0.004".

Pistons: When fitting replacement pistons, or connecting rods it is essential that the piston is accurately aligned to the cylinder bore. A satisfactory test may be made with feeler gauges between either side of the piston skirt and the face of the crankcase on both throws of the crankshaft.

Tappets: CC tappets are free to rotate in the crankcase, and are fully interchangeable. When removing tappet assemblies, it will be necessary to relieve the corresponding valve as well.

Valve Spring Compressor - CC (See Fig.!): To use the compressor proceed as follows. Obtain maximum tappet clearance. Place the compressor between the valve tappet body and the valve spring retainer, as shown. (It will be noted that the compressor is slotted to fit over the flats in the tappet body and that it should be fitted from on top, then turned over, so that if the split cotters are dropped, they will be caught in the tubular section). Rotate the engine till the tappet is lifted; this will compress the valve spring. The supporting wires will hold the tool in position till this operation is complete. Tap the valve head to release the split cotters if they have, not already fallen out. If it becomes necessary to replace a valve spring, it is suggested that a draw bolt be used through the valve guide, with suitable washers placed against the valve facing. The valve spring compressor can then be removed and the valve spring released.

To reassemble, the sequence of operations should be reversed.

Breather Valve Modification: It is essential to prevent external oil leaks, particularly tappet oil leaks

for the breather valve to operate efficiently. When properly adjusted, the valve is inclined to be noisy. This noise can be overcome by flattening the end of the Breather Pipe to a fish-tail with a 1/16" gap. On no account should the breather valve be adjusted to reduce noise, or its efficiency will be impaired.

CC Breather Valve: Front Engine No.E2/CC.40625, a modified breather valve was fitted to improve performance, and minimise damage to the valve. The holes were enlarged and a washer positioned so as to prevent the excessive movement of the vanes. The parts are interchangeable but it is important that the old washer is removed, and a new washer (part No.7978) is fitted using Parker-Kalon screws part No.1553.

Testing and Servicing Breather Valve: The operation of the Breather Valve should be tested after a new one is fitted, by attaching a tube from a manometer to the Oil Level Indicator with the cap removed (on CA and early CB MODELS) or to a pipe sweated into the oil filler tube on late CB and CC models. The correct operating depression is ¾" of Mercury or 10-12" of upper cylinder lubricant measured at 2000 r.p.m. with the engine at operating temperature. The breather valve may be adjusted by prising the spider vanes up with a feeler gauge, or by lightly tapping the base of each vane with a ball-pein hammer. It is most important that the holes in the backplate are kept clean and free of sludge.
Correctly set the ends of the vanes should stand away from the crankcase (CA/CB) or backplate (CC) approx. 0.015" i.e. convex side to crankcase.

SPECIAL SERVICING POINTS - CC

Engine Lubrication: The oil pump intake is through a detachable gauze filter located on the left hand side of the crankcase. Delivery is through a Vokes full flow filter, mounted on the left-hand side of the crankcase. (RHD Models) and on top of the engine (LHD Models).

Oil Pressure Relief Valve: This is situated in a drilling in the front of the crankcase. The adjusting screw is located on the right-hand side of the crankcase, and should be screwed in to increase and out to decrease the release pressure. To dismantle the valve, release and remove, in the following order the Simmonds lock nut, the copper sealing washer, the adjusting screw, the plunger spring, the plunger and the distance piece. When reassembling, ensure that the slotted face of the distance piece is outwards, i.e. facing the plunger.

Crankcase Breather Valve: This is designed to act as a non-return valve and at the same time to restrict the intake of air into the crankcase. It consists of a baseplate located by a dowel, on which is mounted the valve with its tensioning vane. These are fixed by means of a brass hollow rivet. The diaphragms of the valve, should completely blank off the five 3/16" holes in the baseplate. The functioning of the valve should be tested by manometer as described earlier, and care should be taken to seal the tappet covers well, to prevent loss of crankcase depression, and to prevent the excessive flow of oil to the valves.

COOLING

The Thermo-siphon cooling system requires no maintenance except to keep hoses in good order, and to use a good quality antifreeze solution in winter. Jowetts recommended 2.4 pints for the Bradford.

Thermostat: In March 1950 a new design of thermostat unit was introduced. The new unit (Pt. No. 7835) fits all Bradford vehicles in place of the original unit (Pt. No. 1400/S). The new type has a valve lift restricted to a maximum of ¼" to increase the life of the thermostat bellows. The two are fully interchangeable.

Radiator Cowl and Fan: From E0/CC.29452, a radiator cowl and fan were fitted to all vehicles operating under tropical conditions to ensure adequate cooling. The cowl retaining plates were fitted to the radiator block on certain vehicles, but on others they may be fitted as follows: -

Drill a 3/16" diameter hole on the top radiator bracket 1" from the tie-rod securing hole as shown in Fig. 2. Position the cowl and secure to the top bracket with a 3/16" screw and nut. Fit the cowl retaining plates to the radiator cowl; ensure that there is adequate clearance between the top hose and the cowl assembly. Mark the position of the plates on the radiator block. Remove the radiator, and solder the plates in position. Four 3/8" holes are provided to ensure even distribution of the solder. Refit the radiator and attach the cowl. When fitting the fan to the dynamo pulley, ensure that the mating surfaces are free from all foreign matter. Serious vibration with possible fracture of the dynamo securing lugs will result if the fan is running out of true.

In March 1952, fan assemblies were marked 'F' indicating the front.

CLUTCH

CA/CB: The Jowett S.D.P. clutch rarely needs attention, If there is any evidence of clutch slip, check that there is clearance between the toggle levers and the thrust race; this can be done from the engine side of the dash by holding each toggle lever and feeling whether there is any share present. If there is no free movement, it will be necessary to set the toggle levers so that there is 1/16" play between them and the thrust race. Slacken off the lock nut, and screw out the adjusting screw until the correct clearance is obtained. Set one lever first and then adjust the other two to the same clearance, which can be easily checked by pressing the thrust race lightly against the levers and feeling the play on each one. Remember to retighten the lockouts.

If clutch slip is still occurring in the presence of adequate play in the toggle levers, it is probable that oil has entered the clutch, usually by overfilling the gearbox or use of the wrong grade of oil. It can be overcome by, injecting a small quantity of petrol into the clutch with the pedal depressed, to wash the oil away.

CC: A Borg & Beck 7¼" S.D.P. clutch is fitted, and there should be 1" of free play on the pedal. To adjust, release the clamp bolt securing the clutch operating lever to the clutch shaft, fitted across the gearbox. Depress the pedal until it is l¼" from the floor, and hold in this position. Grip the clutch shaft on the left-hand side of the gearbox, and turn it forwards until the carbon thrust pad is in light contact with the thrust ring attached to the toggle levers. Now lock the operating lever clamp adjuster (on the clutch operating lever) so that the pedal can be pressed to of the floorboards and set the forward stop to contact the pedal as soon as the clutch is fully released.

Toggle Adjustment CA/CB: Insufficient attention is often given to this adjustment. The usual "clutch pedal play" test can be misleading when applied to Jowett clutches. It is essential to feel the actual

toggle lever play and adjust as necessary.

Clutch Spline Shaft Lubrication CA/CB: Lubrication to the splines of the clutch shaft (gearbox primary shaft) is supplied from the gearbox, through drillings in the shaft. This feed is controlled by a felt wick, which is inserted in the main drilling of the clutch shaft. (An extension of the main shaft spigot bore).

In order to replace the wick, the clutch shaft must be removed from the gearbox. The old wick should be extracted and the oil drillings checked for possible obstructions. The new wick should now be fitted, and the oil flow tested by holding the shaft in a vertical position and filling the main drilling with very light flushing oil or paraffin, which should just weep from the two 1/16" drillings in the splines. It is, of course, essential that the flow is very small indeed.

Lubrication of Clutch Cross Shaft: CA/CB: Two grease nipples for lubrication of the clutch cross shaft were fitted from Engine No. D8/CB.12494. They were located at each side of the gearbox casing and can be reached from underneath. Where necessary they can be fitted to earlier gearboxes, if the cross shaft is removed, two ¼" holes are drilled and tapped through the rear bosses on the gearbox casing horizontally, and the nipples fitted, care being taken on the left-hand side to locate the nipple so that it can be reached without having first, to remove the starter motor. The Part No. of the nipples is ND 1579.

Fitting Longer Clutch and Brake Pedals CA/CB: The length of the stock on the pedal arms was increased from 5¾ to 6¼", to provide extra movement on the clutch and brake pedals. This allows thicker clutch plates to be used, and also gives a longer period between brake adjustments

Rubber Cushioned Clutch Centre; CA/CB: After Engine No.D8/CB.18404, a re-designed clutch centre assembly was introduced, in which the drive is carried through square section rubber blocks fitted between dogs on the driving sleeve and the splined driven hub. Fitting details are as for the old type, and the two are interchangeable, but when fitting make sure the centre slides freely on the splines.

When reconditioning a clutch assembly, it may be advisable to remove the centre caps and inspect the rubber blocks particularly if there has been transmission vibration on the over-run.

To replace the rubbers, press out the hub from the sleeve, remove the rubbers and refit the sleeve on the hub. Cut a taper on the end of each length of rubber, feed between the hub and sleeve, and pull through until the square end of the rubber is slightly below the side face of the sleeve and hub. Three rubbers should be fitted on the over-run (square) side of each hub dog.

When all the rubbers have been fitted, they should be cut off level with the side face of the sleeve and hub so that longitudinal expansion of the rubber can take place when under compression. Reconditioned clutch centre assemblies can be obtained, Pt. No. R 4042 X 1.

Carbon Thrust Race CB: After Engine No.D9/CB.22219, a carbon release bearing, which operated against a thrust facing secured to the three-toggle lever by retaining springs was fitted.

This assembly can be interchanged with the type previously fitted, but it is necessary also to fit a new

type of throw-out fork (7643) in place of the existing thrust arms, and to grind the sides of the toggle levers to a parallel width of 7/16" for ¾ of their length at the inner end, so that each lever is an easy sliding fit between the lugs on the thrust facing.

When adjusting the clutch, set the toggle levers so that the face of the thrust facing is 13/16" (0.8129") from the inside face of the cover plate (2041 X 1) with 3/32" (0.09375.") free movement on the levers. It is most important that the levers be set evenly, with a maximum of 0.005" run-out on the thrust facing.

Heavier Flywheel: CB: From Engine No.D8/CB.11900 a heavier flywheel, Pt.No.2362 X2 was fitted in place of Pt.No.2917 X2. On the CB, the two are fully interchangeable but for use on a CA, either fit a CB rear bearing housing (Pt.No.2012 X 1B) or fit a CA type oil thrower sleeve (Pt.No.6202 X10) to the new flywheel.

GEARBOX AND PROPELLOR SHAFT

GEARBOX: The simple design of this component makes trouble a very rare occurrence. No adjustments are necessary, nor are any provided.

Special Points: CC: The CC gearbox has three forward speeds, and constant mesh helical gears, with syncromesh on second and third. Access to the filler and dipstick, is through an inspection panel in the left hand side, of the transmission cover.

The Clutch pedal shaft is mounted on two Reservoil No.101416 bearings. The Mainshaft and Stem Gear Bearings and Hoffman LS12K, held in position in the gearbox casing by external locating rings.

The layshaft is supported on Hoffman H 786 rollers, which were also used for the stem gear spigot. The latter was converted to phosphor bronze bushes (Part No.7949) owing to supply difficulties, but was fully interchangeable with the roller type, introduced at E2/CC.39951.

Reverse gear is carried on two Glacier No.2007 bearings on the spindle. The spindle, which is stepped at the rear end, should be fitted so that the cut away portion is flush with the rear face of the case and locates with the speedometer drive housing.

A groove in the front end of the layshaft locates with a locating plate, at the front end of the gearbox case immediately below the clutch-operating fork. The gear assembly is held in position on the mainshaft by a locking washer, which is retained by a spring-loaded locating pin and two Seager type circlips.

Synchronisation of the second and top gears is provided by bronze baulking rings actuated by baulking fingers which are held in tension in a groove in the second and top driving sleeve by internal spring rings inside the driving dog.

Selector Forks operate on selector rods, mounted on the gearbox cover and are located in gear by spring loaded plungers fitted in the body of the selector fork. The plunger loading is set during assembly and no adjustment is normally required. Wear on the plungers may cause the spring to protrude through the case hardened end, locking the selector fork and effectively preventing the gear

from being changed. Removal of the cover, and inspection of the selector will give the solution, and a new plunger is easily fitted.

From approximately Engine No.32273 a bearing sleeve (Pt.No.7832) was introduced to house the stem gear bearing. The fitting of this sleeve simplifies gearbox dismantling and assembling as the stem gear can now be drawn through the front of the gearbox, complete with bearing sleeve and oil thrower, after removing the four nuts and stem gear cover which locate the sleeve in position.

When reassembling the gearbox, the stem gear, bearing, oil thrower and sleeve can be assembled on the bench and entered through the front of the gearbox casing after fitting the mainshaft complete with gears in position. Another advantage is that the stem gear teeth and the cluster gear constant mesh teeth can be brought into perfect vertical alignment by adding or removing bearing sleeve shims (Pt.NO.7833) between the bearing sleeve rear face and the gearbox casing front face. Gearbox sleeve shims are supplied in the following thicknesses: - 0.0031", 0.005" and 0 010"

The new type gearbox is fully interchangeable with the previous type as a whole unit, but the following parts are NOT interchangeable as individual items: -
Gearbox casing (Part No.7946), Stem Gear Bearing Sleeve (Part No.7832), Stem Gear (Part No.7947)

PROPELLOR SHAFT

Correct Fitting: An arrow on the barrel of the propeller shaft immediately behind the forward coupling indicates the direction of rotation of the shaft. It is essential when fitting, that the arrow is at the gearbox end of the shaft.

REAR AXLE & SUSPENSION

REAR AXLE

This component of the Bradford commercial vehicle is of more than adequate proportions for the loads it encounters and should rarely give trouble or need adjustment.

Pinion Backlash adjustment: Test for pinion backlash by rotating the propeller shaft with the vehicle stationary. If there is more than ¼" movement on the rim of the f flexible coupling, it is advisable to adjust the wheel and pinion.

Drain the oil from the axle casing and detach the propeller shaft from the rear axle. Raise the axle on jacks and withdraw the axle shafts by removing the bolts around the flange behind the brake backplates, having first taken off the road wheels and disconnected the brake rods. Now remove the eight nuts holding the pinion casing to the axle pressing, and withdraw the unit complete.

At each side of the crown wheel will be seen the bearing caps and screwed rings slotted for location by the locking screw and peg. These screwed rings, bear on the tapered roller bearings supporting the crown wheel, the left-hand one has a right-hand thread, and vice versa. First remove the locating screws and pegs, and then move the right hand screwed ring one slot downward. Test for backlash and if still excessive move each ring another slot. When the required adjustment has been made,

replace the locating peg and screw and also the piece of stout wire through the head of the screw. Reassemble the axle and fill with lubricant.

NOTE: It is important to observe the handedness of the threads on the screwed rings. Reversal at the fitting stage will result in fracture of the caps.

Service Bulletin Item No.2 - Alternative Rear Springs - July 1946

For average commercial work, the rear springs Part No.6036 x 4 will be found to work quite satisfactory. These are the 10 cwt type fitted as standard on all models.

For work involving light bulky loads, a softer type may be used. This is the 8 cwt. spring Part No.6031 x 3.

Rear Axle Plug: Careless jacking can damage the rear axle drain plugs causing leaks. When servicing, check the plugs for oil leaks, and renew if necessary.

Lubrication: It is emphasised that only the recommended brands of oil should be used in the Bradford axle. In NO circumstances should HYPOID oils be used, owing to their adverse effect on certain axle components.

Axle Shaft Fracture: This may occur rarely, is recognisable by the failure of the vehicle to move, although the speedometer registers movement and the propeller shaft turns. To determine which shaft is broken, jack up both wheels and with the vehicle in gear and the engine running, feel which one produces more noise when its movement is prevented by hand. The side on which more noise is that of the broken shaft.

Remove the road whee1, brake backplate and bolts around the flange, as directed under "Pinion Backlash Adjustment". Withdraw the axle shaft, and examine to determine the site of breakage. Generally, fractures only occur at the extreme ends, where the shaft is weakened by the splines. If the outer end is broken, the inner fragment can usually be extracted from the axle case, but if the inner end is broken, further dismantling of the unit is necessary, to the point of removing the opposite shaft, and withdrawing the pinion casing, from which the stump of axle shaft can then be drifted out. Re-assembly is a reversal of the dismantling procedure.

Centre Compensator Spring: There is a possibility of braking efficiency being considerably impaired in the event of one of the brake rods becoming disconnected. In order to ensure that braking power is maintained at its maximum in these circumstances, the Centre Compensator Spring was introduced after Engine No.D7/CA.4200. The function of this spring (Part No.6388) is
To restrict the free movement of the compensator levers between the compensator flange spacing collars.

Where the diameter of the spacing collars is 7/16", this spring should be fitted. It is fitted from the bottom of the compensator and is so designed that its two arms clamp around each of the two spacing collars. (No action is necessary after Engine No.D7/CA.4400 as the diameter of the spacing collar was increased to 11/16".

Detachment of brake rods: The rear brake rod has occasionally become detached from the expander draw link socket. This is caused by incorrect adjustment. When adjusting it is most important that the expander draw link and the brake rod are screwed fully into the expander draw link socket, until the draw link and brake rod are in contact. Right hand adjustment must be at the wheels.

As an extra precaution, lock nuts were fitted to the rear brake rod.

Alteration to Drums: In December 1947, the width of the brake drums was reduced from 2 3/8” to 2 11/32", to avoid any possibility of the drum fouling the backplate. On early vehicles where this fouling has taken place, 1/32" turned off the edge of the drum, should normally provide adequate clearance.

The width of the groove on the edge of the drum was increased to 5/16" and the depth increased to 7/32" to eliminate any possibility of water entering the brake drums at low speeds.

From Engine No. D8/CB-17009 the diameter of the brake drums was increased from 8” to 10”. The assemblies are not fully interchangeable as the modification involves alterations to the stub axles and to the rear axle and flanges.

ELECTRICAL

Service Bulletin Item No.33 - Distributor Gear Failure; CA - October 1947

It is essential that distributor gears are packed with a good quality grease every 1000 miles. Provision is made for this in the dynamo end casting

Service Bulletin Item No.49 - Dynamo Charge CA and CB - February 1948

Under normal operating conditions and with the battery carrying only the ignition circuit load, the ammeter should show 7-8 amps charge on starting dropping to 2-4 amps after approximately one hour's continuous running.

Where the charging rate is found to be outside this range it may be necessary to alter the control box regulator setting, but before this is attempted it should be established that the fault does not lie in the circuits associated with it.

Points which can affect the rate of charge into the battery and which should be checked are:

Slipping dynamo belt (on CB models only)

Crossed over dynamo connections at the regulator or at the dynamo itself.
Faulty battery - liquid level low or specific gravity incorrect (1.280-1.300 at 60°F.)
Cell faulty: lugs sulphated
Bad earth connections from battery to chassis frame and from regulator to chassis frame.

When these points have been checked and the charge rate is still found to be incorrect, the following action should be taken.

Remove regulator cover and insert a piece of paper between the cut out points. The cut out is on the right of control box looking from the front.

Connect a moving coil voltmeter between terminals "D" and "E" on the control box or alternatively between the metal frame of the cut out and regulator and earth.

Start the engine and increase speed slowly until the voltmeter needle, which should be moving across the dial, flicks and settles down. Engine speed should not be increased beyond this point.

At normal workshop temperature the reading at which the needle settles down should lie between 7. 8 and 8.2 volts

When the vehicle is mainly used for short journey work as in the case of a local delivery van, the charge rate can be set up to the top limit (8.2 volts) alternatively for a vehicle which is to be run over long distances the lower rate (7.8 volts) should be satisfactory.

To adjust the charge rate, stop engine, slack off the lock nut on the regulator adjusting screw, which is located in the metal frame immediately above the regulator windings. Turn the adjusting screw clockwise (screw in) to increase and anti-clockwise (screw out) to decrease the charging rate.

When the voltage reading is satisfactorily set, the locknut should be retightened. The paper can then be removed and the control box cover replaced.

Service Bulletin Item No 51 - Dynamo - April 1948

From Engine No.D7/CB 10403 a new type dynamo was fitted with plug in type connectors in place of the screw type.

These dynamos are fully interchangeable. The plugs have a simple loop connection to the wiring harness. All dynamos despatched as replacements will be issued with plug fittings.

Service Bulletin Item No 52 - Modification - Roof Lamp Circuit - April 1948
To avoid the possibility of damage should a short circuit occur in the roof the following wiring modification should be carried out on all vehicles up to engine No.D8/CB.12750.

Right Hand Drive - Disconnect the Body wiring green lead at the Ammeter, pass through the grommet on the offside scuttle dash, and connect to the A2 terminal on the control box.

Left Hand Drive - Disconnect the Body wiring green lead at the Ammeter, extend this lead by connecting a 30" length, pass through the grommet on the offside scuttle dash and connect to the A2 terminal on the control box.

The effect of this action is to connect the roof lamp wiring circuit through the auxiliaries fuse.

On vehicles after Engine No.D8/CB 12750 the wiring of the roof lamp is connected through the auxiliaries fuse and no action is necessary.

Service Bulletin Item No.62 Control Box - October 1948

RF/95/2/L8 6 v Control Box with LRT/9/2/LT 6v Regulator is now being fitted in place of the RF/91/L30 6v Control Box with LRT/9/1/L40 6v Regulator.

These Control Boxes are interchangeable but the fixing holes in the scuttle dash bracket must be redrilled when the new type box is being fitted.

Service instructions for the RG/91 type also apply to tae RF/95 2 type. In this connection refer to Bulletin Item No.49.

Service Bulletin Item No.67 - Change to 39 PV Dynamo - September 1949

From Engine No.D9/CB.21100 the C45 type Dynamo (ND1547) was replaced by the C39 type Dynamo (7657). Alterations were also made to the dynamo pulley, the stay spacer and the front support.

The dynamos which are supplied with the pulleys fitted, are interchangeable. If the stay spacer and front support are also changed, but if the dynamo cables have bayonet type connectors these should be removed and eye-lets to suit the terminals on the C39 type Dynamo fitted.

Service instructions remain as detailed in Bulletin Item No.49.

Service Bulletin Item No.69 - Starter Lead Grommet - September 1949

From Engine No D9/CB 22632 a rubber bush (7639) is being used in place of the double coil spring washer (DSW5) to tension the adjuster rod. Two parts are fully interchangeable.

Service Bulletin Item No 70 - Starter Lead Ferrule - March 1950

A new type starter lead ferrule (Part No.7771) has been fitted from D9/CB. 26329 in place of the rubber grommet 6180 x 2. No further issues of the rubber grommet (6180 x 2) will be made.

When fitting the new type ferrule, secure to the scuttle dash with two self tapping screws.

Service Bulletin Item No 75 Control Box - March 1950

Further to Bulletin Item Nos. 49 x 62.

The possibility exists of the generator developing a very high voltage output, with resultant damage to the control box, as a result of faulty earth connections.

The control box is earthed by the Black wire to the rear set screw securing the offside mudguard valance.

During the routine servicing make sure that there is a good earth and connections are secure.

LABOUR TIMES

The following labour times are those recommended by Jowett Cars Limited, for experienced trained Jowett mechanics. When work is done by inexperienced mechanics, extra time must be allowed. No allowance has been made for the ageing of components which can cause considerable delays in strip-down and additional costs due to breakage of decayed components.

	Engine	Man/Hours
1	Engine remove and replace, including tuning and testing (Including removing and refitting engine into case for despatch.)	8
2	Remove cylinders, fit reconditioned con-rods, rebuild engine and grind all valves, tune and test. (Engine in chassis).	12
3	Decarbonise and grind valves, including tuning, up and testing.	7
4	Fit new valve springs, touch up valves each side.	2
5	Refit new tappets - offside	3
6	Refit new tappets - nearside, including touching up valves.	3½
7	Fit new exhaust packings	¾
8	Fit new induction pipe (not replacing existing pipe)	2
9	Fit new breather valve diaphragm and stiffening plates and test by gauge,	¾
10	Fit front engine mountings.	1½
11	Fit rear engine mounting.	1
12	Fit complete speedometer drive (gearbox end)	4
13	Remove and refit flywheel (engine in chassis)	6½
14	Replace camshaft (engine in chassis)	5
15	Remove and replace starter motor.	¾
16	Remove and replace dynamo, including checking timing and testing	3½
17	Replace both cylinders and/or pistons.	5
17	If induction pipe has to be refitted due to new cylinders, add	1
18	Replace one cylinder and piston	4
18	If induction pipe has to be replaced due to new cylinder add	1
19	Fit timing chain and retime valves, including testing	3
20	Remove and replace oil pump (Average time allowing for some to be difficult).	2
21	Remove, refit oil release valve and adjust.	1
22	Adjust tappets	¾
23	Remove and replace carburettor, tune and test.	1
24	Remove and replace petrol pump.	½
25	Fit distributor, cheek timing and test.	1
26	Fit oil gauge pressure pipe,	¾
27	Remove carburettor, fit new jet setting, caulk dilution hole, tune and test.	1½
28	Check valve timing and reset valve clearances to normal.	¾
	Clutch & Gearbox	
28	Remove gearbox fit new clutch centre and test.	5
29	Adjust clutch and test.	1½
30	Remove gearbox lid. Fit new selector springs and refit.	1½
31	Remove gearbox clutch pressure plate. Fit guide pins and test.	5
32	Remove gearbox and replace, including testing.	4

Front Axle		
33	Remove and replace front axle including checking tracking, and testing. (Does not include balance of brakes).	2½
34	Fit stub axle pins and bushes (Axle on chassis)	5
35	Fit front hub bearing.	1
Rear Axle		
36	Remove and replace rear axle including testing. (Does not include balancing of brakes)	2
37	Fit rear hub	1
38	Remove and replace differential assembly, including testing.	4
Chassis		
39	Remove and replace radiator.	¾
40	Remove radiator, resoldor inlet -pipe and refit	2
41	Remove and replace road spring (each) Average time allowing for some tight shackle bolts.	2
42	Adjust brakes and test.	1
43	Completely overhaul braking system and test.	10
44	Fit replacement brake shoes and reset all brake mechanisms test and finally balance brakes.	5
45	Remove steering column and replace.	2
46	Remove propeller shaft and replace.	1
47	Fit propeller shaft disc	½
48	Remove headlamp weld wing, clean work refit headlamp (Re-cellulosing extra)	2
49	Remove and refit each front wing (Not allowing for rusted bolts and nuts)	1
50	Remove exhaust pipe and fit strengthening cones.	1½
51	Remove front wing stays, weld extra bracket into position and refit stays - both sides	2
52	Fit concertina hose and reduce length of radiator inlet pipe.	½
53	Fit petrol tank.	1½
54	Remove and refit set of four shock absorbers.	2
55	Remove and refit front door glass.	3
56	Remove wheel, brake drum, and rough up linings and rebuild each wheel.	1
57	Remove, ease and refit clutch and brake pedals.	2
58	Remove refit and reset front brake compensator.	1
59	Remove refit and reset centre brake compensator.	1½
60	Remove refit and reset rear brake compensator.	1
61	Remove brake drums examine expander boxes and connections etc, refit and adjust each wheel	1½

Engineering Changes

CA	4200	Centre compensator spring.
CA	4400	Diameter of brake compensator spacing collar increased to 11/16”.
CB	11900	Heavier flywheel.
CB	12732	Bonded metal/rubber silencer supports.
CB	14000	Spring loaded timing chain tensioner.
CB	16219	Dipstick introduced.
CB	17009	Increase in diameter of brakes to 10”
CB	18404	Rubber cushioned clutch centre.
CB	22219	Carbon thrust race introduced.
CC	22223	Shimming of timing gear sprockets.
CC	28470	Serrated con-rods introduced.
CC	28740	Heavy duty 6 volt battery introduced
CC	29146	Change to 12 volt system.
CC	29452	Radiator cowl and fan introduced on export models.
CC	31010	Rubber type rear oil seal introduced.
CC	32273	Bearing sleeve introduced for stemgear bearing.
CC	39605	New front main bearing
CC	39951	Bronze stem gear spigot bearing introduced.
CC	40635	Modified breather valve introduced.