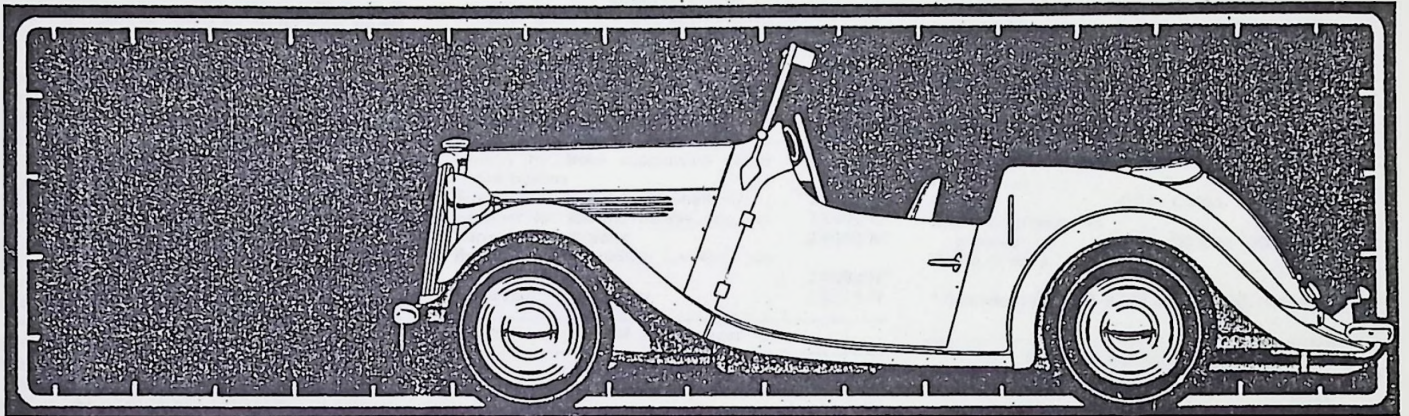


Mini Manual

The Mini-Manual is based on the original survey of the car conducted by Motor Trader when the model was still current



Singer SM Roadster Series 4AD, 1953-54

Manufacturers: Singer Motors Ltd, Coventry Road, Birmingham 10.

ALTHOUGH the long line of Singer roadster models has suffered little change in external appearance for many years, maintaining the "traditional" styling, there have been a number of radical changes in the chassis. These changes have taken place in stages.

The post-war A series Nine roadster continued the pre-war model, having a 1074cc engine, three-speed gearbox and rigid front axle. The series was changed to 4A with the adoption of the four-speed remote control gearbox hitherto used on the Super Ten and Twelve. Then came the 4AB, with independent front suspension by coil springs, similar in principle to that of the SM 1500 saloon, but differing in layout. The 4AC existed only in prototype form, and never came into production. The latest form, introduced during 1952, is the 4AD, on which the SM 1500 engine is used. The stroke of the engine has been reduced from 90mm to 89.4mm to reduce the capacity from 1506cc to 1497cc for competition purposes. The only noticeable external difference between the 4AB and 4AD models is that the latest model has twin stop/tail lamps mounted on long extension housings on the rear wings.

Engine and chassis serial numbers are prefixed 4AD and have a suffix letter. Both serial numbers started at 1, but do not necessarily correspond. The chassis number is stamped on the side of the offside chassis frame member under the front wing near the bumper bracket. The engine number is stamped on the offside top of the flywheel housing, and on twin carburettor models has an extra prefix "T". The car number, which is the same as the chassis number, is stamped on a plate fixed to the off side of the scuttle under the bonnet.

Such engineering changes as have taken place affecting servicing are listed here.

A number of special tools have been designed to facilitate certain operations. Those considered essential for their particular operations are listed here. B.S.F. threads and hexagons are used

throughout except on the Salisbury rear axle, which has Unified threads.

ENGINE

Mounting

At front, water pump housing, bolted to front of cylinder block, rests on bonded rubber block on arched support member bolted to frame. At rear, feet on gearbox rear cover rest on rubber mounting units bolted to chassis frame, with moulded-in nuts. Tighten all nuts and setscrews fully.

Torque reaction taken by arm bolted to flywheel housing on off side and resting between rubber buffer stops on chassis frame. Adjustment need not be upset when engine is removed, but if parts are renewed, set upper stop so that pad of engine bracket can be forced in.

Removal

Engine and bell-housing can be removed, leaving gearbox in place.

Detach bonnet top, radiator grille and core. Disconnect all pipes, wires and controls. Push seats right back and lift out. Take up carpets and rubber gearbox cowl. Detach pedal pads from levers (nuts at front can be reached from below) and remove floor and toe-boards. Detach engine torque reaction lug from flywheel housing, and disconnect clutch pedal rod.

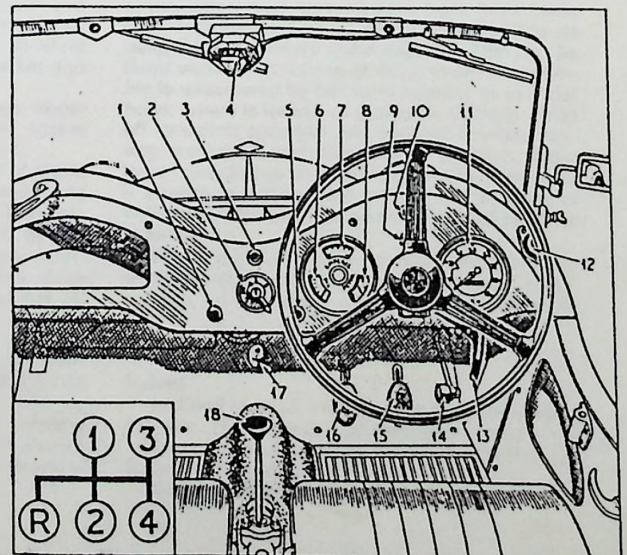
Take weight of engine on slings behind crankshaft pulley and below rear of bell-housing. Detach front support bracket from chassis and from water pump. Remove six nuts holding gearbox to bell-housing. Raise engine slightly and support gearbox while engine is drawn forwards and upwards.

To remove radiator grille on cars before chassis No. 4AD 2355W take out three screws

Instruments and controls:

Instruments and controls:

1. Starter switch
2. Lighting and ignition switch
3. Beam warning light
4. Screenwiper switch
5. Starting mixture control
6. Oil pressure gauge
7. Ammeter
8. Petrol gauge
9. Panel light switch
10. Ignition warning light
11. Speedometer
12. Horn push
13. Handbrake lever
14. Accelerator
15. Brake pedal
16. Clutch pedal
17. Dipper switch
18. Gear lever



each side to bonnet side panels and four screws below to front apron. If crossed stay rods are fitted behind radiator grille, slacken lower nuts and push rods out of slotted brackets. Grille can then be removed.

On later cars, grille has brackets extending from bottom corners. To remove, take off bumper and slacken wing stay setscrews. Take out three screws each side holding grille to bonnet side panels. Remove front apron and number plate (two screws below to grille, two each side wings. Pull wings outwards to release apron). Take out bolts holding grille to radiator strut on each side, and bracket bolts to chassis, releasing grille.

Radiator core rests on rubber buffers on cross-member and is supported by two struts at rear. When reassembling, tighten self-locking nuts on mounting studs so as just to nip rubber. Nuts are then usually flush with ends of studs.

Crankshaft

Three main bearings. Thin-steel-backed, white-metal-lined shells located by tabs. End float controlled by split thrust washers on either side of rear bearing, cap half tabbed.

All main bearing shells are interchangeable. It is possible to change main bearings and thrust washers with engine in place, but this should be done only in extreme emergency. No hand fitting permissible. Regrind shaft only to standard undersizes.

Flywheel, with shrunk-on starter ring gear, spigoted on rear flange, located by two offset dowels and retained by four setscrews. Ring gear is shrunk into .010in recess in flywheel and cannot be pressed off for renewal. Make saw cut between teeth and break with chisel. Oilite clutch spigot bush floating fit in end of crankshaft.

Timing sprocket (flat face to rear) and pulley keyed to front end of shaft with separate Woodruff keys, oil thrower disc between. Assembly retained by hand started dog setscrew and tab washer, with shims to position starter dog at 45 deg from vertical with crankshaft at TDC 1/4. Pulley hub has oil return thread working in clearance (.006-.012in) in timing cover, which is dowelled to crankcase.

Oil return thread on rear end of crankshaft works in clearance (.004-.008in) in rear cover, secured and dowelled to crankcase and continuing sump flange over rear bearing gap.

Connecting rods

Big ends thin-steel-backed, white-metal-lined-shells located by tabs.

Small ends have wrapped bronze bushes. Replacement bushes must be finished by broaching.

Pistons

Hepolite aluminium alloy, oval ground, tin plated. Gudgeon pins located by spring rings.

Big ends will not pass through bores, nor will pistons pass crank throws. To remove, push piston up as far as it will go with big end in recess in bore, push out gudgeon pin and extract rod downwards. If pin is tight, warm with rag soaked in boiling water.

Camshaft

Overhead, driven by two duplex roller endless chains in two stages. Intermediate shaft on off side drives distributor and oil pump through skew gears.

Camshaft (upper) chain tensioned by jockey sprocket backed by spring-loaded plunger. To adjust tension, secure tensioner locknut (nearer head) and remove thimble. Slacken locknut and adjust threaded sleeve until distance between end of plunger and end face of sleeve is exactly 1/16in.

Intermediate shaft runs in bronze-lined steel bushes in cast iron sleeve at front end, and directly in crankcase behind skew gear at rear. Sleeve, trapped between sprocket and shoulder on shaft, controls end float, and is located by setscrew with locknut from outside. Driving sprocket, keyed with Woodruff key, has flange with three equally spaced dowels, on which driven sprocket fits. Assembly retained on shaft by nut and large washer.

To remove intermediate shaft, remove engine from chassis. Remove crankshaft pulley and timing cover. Undo nut on intermediate shaft and remove large sprocket with chain and crankshaft

ENGINEERING CHANGES

	Chassis No.
Radiator filler cap changed from near to off side to avoid spilling (Core interchangeable)	4AD597
Radiator grille slats reduced in width to improve cooling (Grille assembly interchangeable)	4AD721U
Cooling system pressure raised from 4lb to 7lb	4AD900V
Radiator grille brackets added at lower corners (Affects removal and assembly)	4AD2355W
Alternative rear axle assembly introduced (Moss or Salisbury)	4AD2439W
	Engine No.
Water outlet pipe redesigned to accommodate thermostat (Thermostat fitted with twin carbs. only)	4AD1548V
Air cleaner changed from T-type to flat type.	
Carburettor settings changed	4AD1876V

SPECIAL TOOLS

	Part No.
Tools for fixing synchromesh female cones	14692 N*
	14693 N*
	14696 N*
Broach and burnisher for gudgeon pin bushes	17892 N*
Broach for front suspension lower link bushes	21197 N*
Spanner for gearbox mainshaft nut	23678 N*
Spanner for starting handle dog nut	23905 N*
Valve spring extractor	24083 N*
Broach and burnisher for king pin bushes	24092 N*
Front spring compressor	25278 N

* Suitable also for SM 1500 saloon

ENGINE DATA

No. of cylinders	4	
Bore x stroke : mm	73 x 89.4	
in	2.874 x 3.52	
Capacity : cc	1497	
cu in	91.36	
RAC rated hp	13.22	
	Single carb	Twin carb
Max bhp at rpm	48 at 4200	58 at 4600
Max torque (lb/ft) at rpm	72 at 2200	77 at 2600
Compression ratio	7 : 1	7.47 : 1

NUT TIGHTENING TORQUE DATA

	Bolt size	lb/ft
Cylinder head	1/2in BSF	58-66
Main bearings	1/2in BSF	58-66
Big ends	1/2in BSF	33-42
Flywheel	1/2in BSF	33-42
Crown wheel (Salisbury)	1/2in UNF	40-50

sprocket. Take off rocker cover and cylinder head front cover. Detach camshaft sprocket and lower until chain can be disengaged from intermediate sprocket. Take out sleeve locating setscrew, and draw out shaft with sprocket and bush.

Camshaft runs in three split bearings, lower halves machined on head. Caps carry rocker shaft. Centre bearing controls end float.

Camshaft sprocket spigoted on end of shaft, located by three equally spaced dowels and retained by setscrew and large washer. Two sets of three holes in sprocket are offset 6 deg to each other and sprocket has 28 teeth. Intermediate shaft driven sprocket also has three dowels and alternative sets of holes, but has 30 teeth.

To reassemble timing chains, turn crankshaft to TDC 1/4, and camshaft until groove on front flange is in line with machined face of boss on off side.

To check timing, set rockers to running clearances and turn engine slowly. Inlet valves 1 and 4 should open when 1/4 mark on flywheel is 1/16in before mark on flywheel housing.

CRANKSHAFT and CONNECTING ROD DATA

Diameter	Main Bearings			Crank-pins
	No. 1 2in*	No. 2 2 1/2in*	No. 3 2in*	
Running clearance :				
main bearings				.001-.0025in
big ends				.0005-.002in
End float : main bearings				.001-.008in
big ends				.006-.008in
Undersizes				.003-.010in
No. of teeth on starter ring gear/pinion		112/9		
Con rod centres		6.25 ±	.001in	

* Machining limits : plus -.0000, minus -.0005in

PISTON DATA

Clearance	.001-.002in*	
Oversizes	.005, .015, .030in	
Weight with rings and pins	13oz 5dr	
Gudgeon pin :		
diameter	.6249 ± .0001in	
fit in piston	Easy push, hot	
fit in rod	.0002in clearance	
Compression height	1.7225 ± .002in	
	Com- pression	Oil Control
No. of rings	2	1
Gap	.003-.013in	.003-.013in
Side clearance in grooves	.0015-.0035in	.0015-.0035in
Width of rings	1 1/8in	1 1/8in

* Cylinder bore dia 2.8735 plus -.0000, minus -.0005in

INTERMEDIATE SHAFT DATA

	Front	Rear
Journal : diameter	.9360-.9365in	.623-.624in
length	2in	1 1/8in
Bearing clearance	.0005-.0022in	.0008-.0025in
End float	.004-.008in	—

CAMSHAFT DATA

	No. 1	No. 2	No. 3
Bearing journal : diameter	.9357in*	.9357in*	.9357*
length	1.605in	1.5025in	1.33in
Bearing clearance	.0015-.0035in		
End float	.0015-.005in		
	Primary	Secondary	
Timing chain : pitch	1 1/2in	1 1/2in	
no. of pitches	46	86	

* Machining limits : plus -.0000, minus -.001in

To alter timing, remove cylinder head front cover, disconnect oil feed pipe from front camshaft bearing, disturbing set of pipe as little as possible, and remove chain adjuster. This can be done without alteration of adjustment if assembly is unscrewed by hexagon nearest to cylinder head, which is locked to sleeve by thimble. Prise off camshaft sprocket and support it while setting crankshaft and camshaft in position. Then lower sprocket so that chain can be worked over it a tooth at a time until second set of holes is in line with dowels and nearside run of chain is in tension.

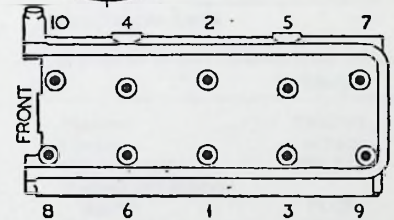
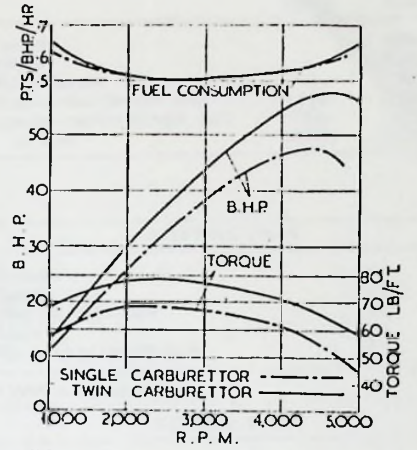
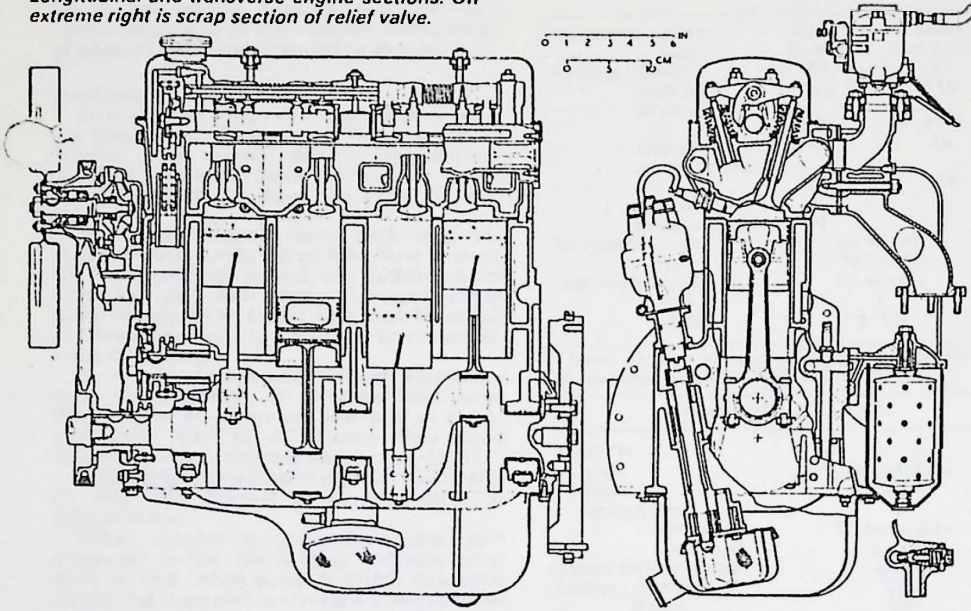
When removing cylinder head, detach camshaft sprocket and hang it by wire hook to radiator cap, so that chain position is not disturbed.

Valves

Inclined in head, inlet to near side, exhaust to off side. Not interchangeable, inlet larger than exhaust. Split cone cotter fixing, double springs. Renew springs in pairs.

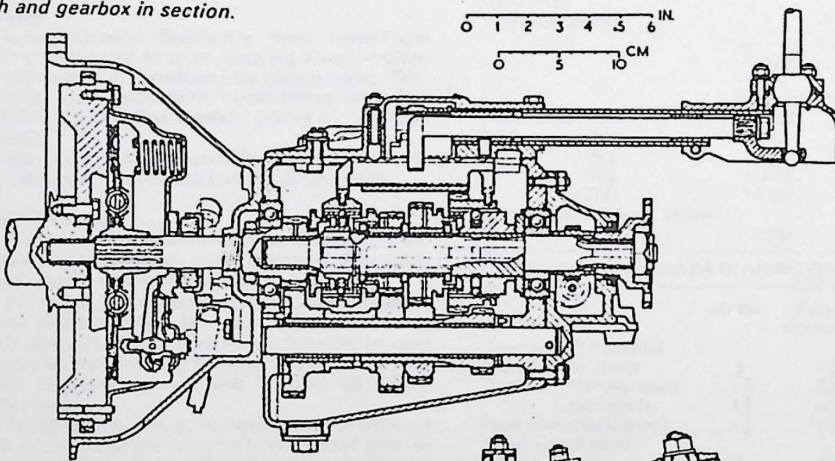
Valve guides shouldered.

Longitudinal and transverse engine sections. On extreme right is scrap section of relief valve.

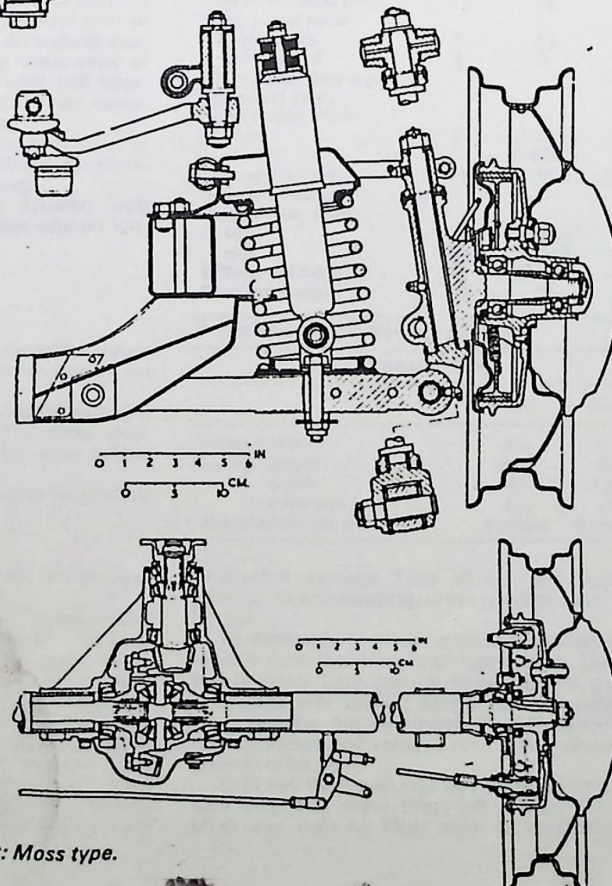


Top: Valve timing diagram. Below: Diagram showing order of tightening of cylinder head nuts.

Clutch and gearbox in section.



Front suspension part-sectioned, showing scrap views of upper and lower link outer pivot bearings. Top left is relay arm pivot bearing.



Alternative rear axles in section. Left: Moss type. Right: Salisbury type.

VALVE DATA

	Inlet	Exhaust
Head diameter	1 1/2 in	1 1/2 in
Stem diameter	1/8 in	1/8 in
Face angle	45 deg	45 deg
Tappet clearance (hot)	.004 in	.006 in
	Inner	Outer
Spring length : free	1.828 in	2.109 in
fitted	1 1/8 in	1 1/2 in
at load	25 lb	55 lb

IGNITION DATA

	Single carb	Twin carb
Advance range :		
centrifugal (crank deg)	20-23°	16-19°
vacuum (crank deg)		22°
Advance starts (crank rpm)	400-300	1400
Max advance (crank rpm)	3000	4600
Cam angle (closed period)		30° ± 3°
Contact spring tension		20-24 oz
Condenser capacity		.2 mf
Firing point		See text
Firing order		1 3 4 2
Contact breaker gap		.014-.018 in
Plugs : make		Champion
type : single carb		N8B
twin carb		NAB
size		14mm
gap		.025 in

Setting before TDC in deg and in on flywheel

	Standard petrol	Premium petrol
Single carb	4-5°	11-12°
	(1/8 - 1/16 in)	(1 1/8 - 1 1/4 in)
Twin carb	9-10°	14-15°
	(27/32 - 1 in)	(1 1/8 - 1 1/4 in)

Rocker Gear

Rockers are bushed, and are all alike, carried on hollow shaft located in centre camshaft bearing cap by setscrew. Each pair of rockers for a cylinder separated by thick washer. Inlet rockers of adjacent cylinders separated by springs.

Lubrication

Gear pump in sump, with integral drive housing spigoted and flange-bolted in crankcase. To remove pump, detach delivery pipe (flange-bolted at both ends). Skew driving gear, slotted at top for distributor drive, will come out with pump.

To dismantle pump, bend back tabs and detach strainer. Undo nut on lower end of shaft, with distance piece behind, and detach bottom cover. Tap shaft, with integral skew gear, out of pump driving gear, taking care that Woodruff key does not tilt and foul housing. Shaft runs directly in housing.

Bowl-shaped gauze intake strainer located on pump cover by tabs. Oil delivered from pump through pipe to gallery on near side of crankcase, with lead to AC bypass filter (type 1530451, with detachable element No. M11).

Adjustable spring-loaded plunger relief valve on near side. Normal pressure 30-35lb at 30mph, warm.

When assembling pump in engine, turn crankshaft to TDC No. 4 firing, and turn pump shaft so that, when pump is fitted, distributor driving slot is parallel to crankshaft, with smaller segment towards engine.

Ignition

Anti-clockwise distributor with centrifugal control, spigoted in drive housing flange-bolted to crankcase, and retained by clamp plate. Distributor used with twin carburettors also has vacuum control. Set contact points to break as follows:-

Clamp plate has elongated hole for drive housing setscrew, which also locates timing scale.

Cooling system

Pump and fan. Thermostat on cars with twin carburettors. System pressurised to 4lb, later 7lb. Pump has carbon and rubber seal unit.

Pump can be removed with radiator in place. Undo shaft nut and fan nuts, pick off locking plate and detach fan. Tap pulley forward to give access to nuts holding bearing housing to pump body. Remove bearing and housing assembly with impeller.

To dismantle pump, remove impeller locknut and screw impeller off shaft, with seal unit in recess at back. Draw off pulley (Woodruff key) and extract spring ring retaining outer race of front bearing in housing. Shaft, with ball bearings and distance-piece between inner races, can then be pressed out of housing.

Water distribution pipe inserted into cylinder head from rear, through hole closed by plate. Notch on rear end engages with peg.

Adjust fan belt by swinging dynamo until there is about 1/2 in movement either way on longest run of belt.

TRANSMISSION

Clutch

Borg & Beck single dry plate. Graphite thrust release bearing. Forked release lever pivoted on bracket inside bell-housing.

Only adjustments are on pull-rod, to give 3/4 in free movement at pedal pad, and on pedal stop. Pedal must come in contact with stop before touching floorboard.

Access to clutch for servicing after removal of gearbox and bell-housing.

Gearbox

Four-speed. Syncromesh on 2nd, 3rd and top gears. Remote central control.

To remove gearbox from car, leaving engine in place, push seats right back and lift out, take up carpets and remove rubber gearbox cowl. Detach pedal pads from levers (nuts at front can be reached from below) and remove floor- and toe-boards. Disconnect propeller shaft front end and clutch operating link, and remove engine torque reaction lug from flywheel housing. Take out two rear mounting setscrews and raise engine slightly by slings or jack after inserting thin board between fan blades and radiator core

FUEL SYSTEM DATA		
	Single carb	Twin carb*
Carburettor: make	Solex	Solex
type	30 FAI	Two 30 FAI
Settings: choke	24	21
main jet	125	110
air correction jet	230	220
pilot jet	45	45
starter petrol jet	115	115
starter air jet	4	4
Emulsion tube	0	0
Air cleaner: make	AC oil-wet	
type	7222378	
Fuel pump: make	SU electric	
type	L	
pressure	1/2-1lb	

* Same settings for single carburettor with flat air cleaner after Engine No. 4AD 1876 v.

TRANSMISSION DATA		
CLUTCH		
Make	Borg & Beck	
Type	8 A6-G	
Springs: No.	6	
colour	Cream/lt green	
free length	2.22in	
Centre springs: colour	Black	
Linings: thickness	1/2 in	
dia ext	8in	
dia int	5 1/2 in	
GEARBOX		
No. of speeds	4	
	Single carb	Twin carb
Final ratios: 1st	14.53	13.25
2nd	9.45	8.62
3rd	6.12	5.58
Top	4.875	4.44
Rev	14.53	13.25
Crown wheel/bevel pinion teeth	39/8	40/9

BALL and ROLLER BEARING DATA			
	Int dia.	Ext dia	width
	(in or mm)		
Journal Ball Bearings			
Water pump (two)	5/16	1 1/8	3/8
Gearbox: Primary shaft	1 1/2	3 1/2	1 1/2
mainshaft	1 1/2	2 1/2	1 1/2
Rear wheel hubs (two)	1 1/2	2 1/2	1 1/2
Front wheel hubs:			
inner (two)	1	2 1/2	1 1/2
Outer (two)	1 1/2	2	1 1/2
Taper Roller Bearings			
Moss rear axle:			
Bevel pinion shaft:			
front	1	2.375	.781
rear	1	2.6875	.875
Differential (two)	1 1/2	2.844	.8125
Salisbury rear axle:			
Bevel pinion shaft:			
front	1	2.441	.715
rear	1.312	2.717	.785
Differential (two)	1 1/2	2.838	.885
Rear hub (two)	1 1/2	2 1/2	1 1/2

* With spring ring groove in outer race

BRAKE DATA		
	Front	Rear
Drum diameter	9in	8in
Lining: length	8 1/2 in	8in
width	1 1/2 in	1 1/2 in
thickness	1/8 in	1/8 in
No. of rivets per shoe	Bonded	Bonded

to prevent damage. Take off six nuts holding gearbox to bell-housing, draw gearbox back and lift out.

To dismantle gearbox, remove top cover with remote control and selector mechanism. Detach bell-housing. Lock box by engaging two gears, and undo rear driving flange nut and primary shaft bearing nut (left-hand thread). Draw off driving flange and remove rear cover. Draw off speedo drive gear.

Drift out front and rear ball bearings from inside box, and draw them off shafts. Primary shaft can then be lifted clear of layshaft and

SPRING DATA		
	Front	Rear
Length	—	43in
Width	—	1 1/2 in
No. of leaves	—	4
Free camber (length, coil)	12 1/2 in	4 1/2 in
Loaded camber (length, coil)	6 1/2 in	1 1/2 in
at load	786lb	357lb

STEERING DATA		
Castor	2 deg*	
Camber	1 deg*	
King pin inclination	7 deg	
Toe-in	1/4 in	
No. of turns lock to lock	1 1/2	

* With two passengers

GENERAL DATA	
Wheelbase	7ft 7in
Track: front	3ft 10 1/2 in
rear	3ft 10 1/2 in
Turning circle	33ft 0in
Ground clearance	6in
Weight (dry)	15 1/2 cwt
Tyre size	5.00-16
Overall length	12ft 7 1/2 in
Overall width	4ft 10in
Overall height (hood up)	4ft 10 1/2 in

ELECTRICAL DATA			
Lucas Equipment			
	Model	Service No.	
Dynamo	C39PV2	22258	
Starter	M35G	25022	
Starter switch	ST19/1	76423	
Lighting and ignition switch	PLC6	34006	
Control box	RB106	37138	
Fuse box	SF6	033239	
Battery	GTW7A	—	
Distributor:			
single carb	DKY4A	40167	
twin carb	DM2	40363	
Coil	Q12	45020	
Headlamps:			
RHD dip left	S700	50988	
LHD dip right	S700	50991	
LHD vert dip	S700	50990	
Side lamps	LBD 109A	52156	
Stop/tail lamps	488	53178	
Number plate lamp	467/2	53101	
Screenwiper (motor)	CW1	072759	
Horn	HF1235	069213	

BULBS			
	Voltage	Wattage	Cap
Headlamps:			
dip left	12	42/36	Prefocus
dip right	12	36/36	Prefocus
vertical dip	12	45/35	Prefocus
Side lamps	12	6	scc
Stop/tail lamps	12	6/18	sbcc*
Number plate lamp	12	6	mcc
Panel lamps	12	2.2	mes
Warning lamps	2.5	.2	mes

* Offset pin

FUSES	
Accessories	35 amperes

drawn out with floating spigot bush. Mainshaft assembly can be tilted and lifted out through top.

Tap out layshaft and reverse spindle locking pin. Remove reverse slider and locating plate (two nuts outside). Push out layshaft and reverse spindles to rear, with bushed reverse gear and locating disc. Lift out layshaft cluster with floating bushes, and loose and pegged thrust washers. Loose gears splined on layshaft and retained by spring ring at front end.

To dismantle mainshaft, draw off synchro assemblies. Extract spring ring inside 3rd gear

cone, releasing key, and turn splined thrust washer until it is free to slide off splines, releasing 3rd and 2nd gears with splined bushes and two other thrust washers.

To reassemble gearbox, reverse dismantling procedure, observing these points:-

Mainshaft: Three thrust washers are identical except that one has groove in one face. This is front washer. Slide one washer on shaft up to shoulder. Assemble 2nd gear and bush, then second thrust washer, 3rd gear and bush (bush has recess at front end) and third washer with groove to front. Turn washer until key can be inserted so that it engages with recess in bush, and fit spring ring. Slide 2nd gear synchro assembly on rear of shaft with distance-piece. (Do not omit interlock plunger and ball inserted into hub from centre bore. Sliding gear must be in neutral before hub can be slid on to shaft.) Assemble top and 3rd gear synchro with long inner boss to front.

Assemble reverse gear slider, bused gear, spindle and disc. Stick larger of two layshaft thrust washers in front of box with grease. Place recessed thrust washer on front end of layshaft cluster with plain face to front. Insert layshaft spindle from rear just enough to retain pegged and loose thrust washers, then lower layshaft cluster and drive spindle home, taking care that hole at rear for locking pin is in line with hole in reverse spindle.

Assemble mainshaft and primary shaft in box with floating spigot bush, and tap on front and rear bearings in position.

Refit remote control assembly to top cover, making sure that dowel holes in tube and bush line up (dowel can quite easily be driven right through top cover if force is used in bolting down cap). Control lever ball housing top retained by three self-locking nuts with double coil spring washers. Tighten only enough to hold lever firmly without making it stiff.

Insert locating plungers and springs in cover, noting rubber sealing washers in recesses. Assemble selector forks and bridge-piece. There are two adjustable stops in selector mechanism. One is grub screw in side of cover, limiting sideways movement of lever towards top and 3rd gears. Lever should move no farther than necessary to clear centre selector rod. Second stop is eccentric in front of top and 3rd gear selector, limiting movement of selector towards top gear. Make sure that plunger locates fully in groove, with slight clearance to stop.

Propeller shaft

Hardy Spicer needle roller bearing universal joints, series 1110. Nipples for lubrication of joints.

Rear Axle

Hypoid bevel drive, semi-floating shafts. Alternative axles used, either Salisbury 6HA with integral final drive housing and axle tubes, and detachable rear cover, or Moss, with detachable final drive assembly and rear cover welded to banjo casing.

To remove axle from car, jack up in front of

rear springs, disconnect propeller shaft, brake linkage and shock absorbers. Remove both wheels and check straps, lift axle assembly through frame sideways.

Moss axle - Half-shafts (interchangeable) carried on ball bearings retained against shoulder at outer end by nut and locknut with tabwasher between. Outer race of bearing carried in housing spigoted and bolted to axle tube flange with brake backplate. Lipped oil seal in bearing housing, lip to bearing. Outer end of half-shaft upset to form flange for wheel studs and brake drum. Shaft passes through lipped oil seal (lip inwards) inside axle.

Bevel pinion shaft carried in taper roller bearings pressed into final drive housing from front and rear. Distance-piece between inner races, with shims for bearing adjustment. Shims behind outer race of rear bearing for pinion mesh adjustment.

Crown wheel spigoted and bolted to flange of one-piece differential cage by eight setscrews. Side bevel gears run directly in cage with flat thrust washers behind. Planet bevel pinions have spherical thrust washers and run on spindle retained by split pin.

Differential assembly carried in taper roller bearings in split housings with shims behind outer races for bearing and mesh adjustment.

Bearings should be adjusted by shims before bevel pinion is installed, until there is no play and no drag. After installation of bevel pinion, shims should be changed from one side to other to give .006-.008in backlash.

Salisbury axle - Hubs keyed on tapered half-shafts (interchangeable). Taper roller bearings in axle tube ends, retained by backplates with shims behind (-.003, -.005, -.010, -.030in thick) to adjust end float (-.006-.008in). Inner ends of half-shafts butt on floating thrust block round planet bevel spindle.

To remove half-shaft, draw off hub, detach brake backplate assembly with lipped oil seal in housing, and shims. Draw out shaft and bearing carefully through inner oil seal (lip inwards).

Bevel pinion shaft carried in taper roller bearings. Outer races pressed into final drive housing from front and rear. Shims (-.003, -.005, -.010, -.030in thick) between shoulder on shaft and inner race of front bearing for bearing adjustment. Shims (-.003, -.005, -.010in thick) between outer race of rear bearing and housing for mesh adjustment.

Pinion setting marked on face of pinion (bottom figure of four sets of figures) may be zero, plus or minus. This indicates amount in "thous" above or below nominal distance (2.000in) of face from centreline of crown wheel. Use mesh adjusting shims to obtain setting marked, and assemble pinion in bearing with original bearing shims, but *without* oil thrower or oil seal. Tighten driving flange nut and test for preload (8-12lb/in).

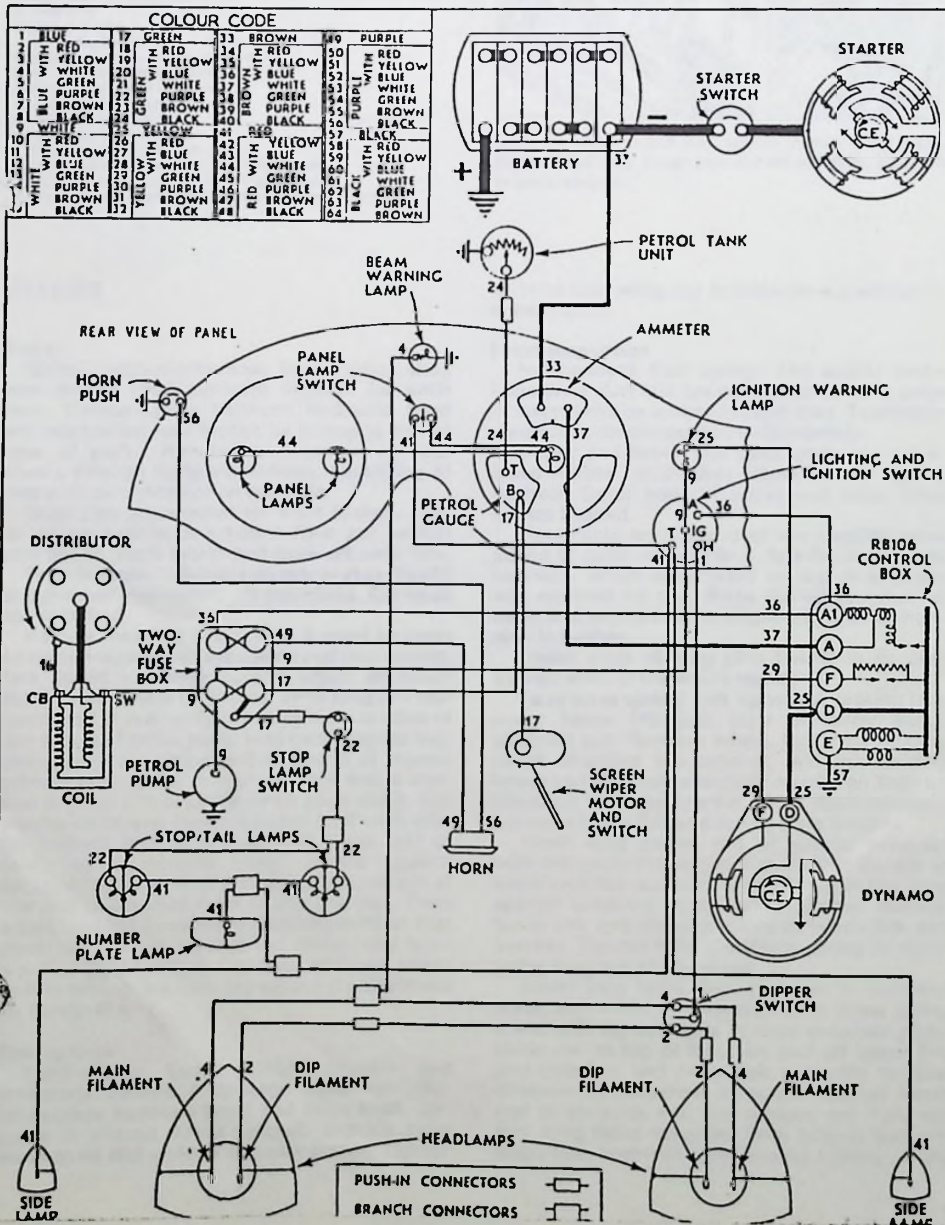
Crown wheel spigoted and bolted to flange of one-piece differential cage. Side bevel gears run directly in cage with flat thrust washers behind. Planet bevel pinions have spherical thrust washers, and run on spindle retained by pin peened to lock. Axle shaft thrust block round spindle.

Differential assembly carried on taper roller bearings in split housings with shims (-.003, -.005, -.010, -.030in thick) between inner races and cage for bearing and mesh adjustment. Install differential assembly *without* shims and with bevel pinion removed, and mount dial gauge on axle casing with button against back face of crown wheel. Move differential assembly to one side of housing with lever, and set gauge to zero. Lever assembly over to other side and note gauge reading (A). This figure indicates play in bearings, and thickness of shims needed to take up play. Add -.004-.006in to total to give preload. This total must be divided to obtain correct crown wheel mesh as follows:-

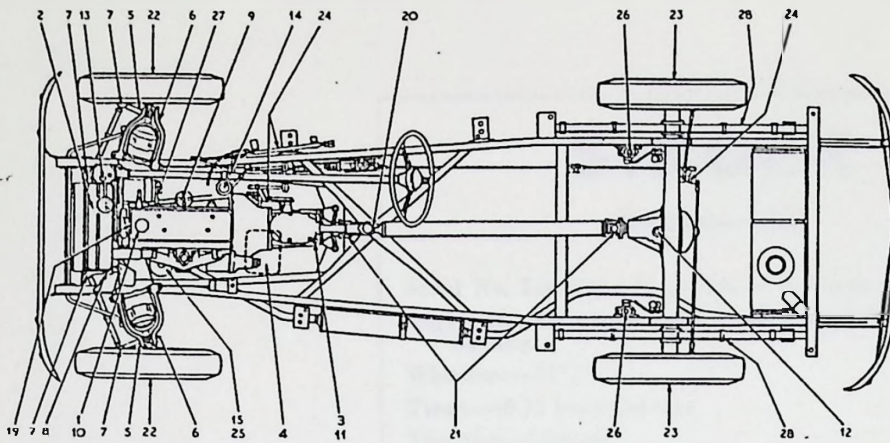
After installing bevel pinion, reassemble differential, again without shims. Lever away from pinion, set indicator to zero, and lever assembly towards pinion. Note reading (B). This, minus backlash figure etched on crown wheel, is thickness of shims to go behind crown wheel side bearing. Remainder of shims from total (A + .004-.006in) go behind offside bearing.

When assembly is complete, check for backlash (-.004in minimum). Change shims from one side to other of differential bearings if necessary.

SINGER SM ROADSTER WIRING DIAGRAM



SINGER SM ROADSTER MAINTENANCE DIAGRAM



KEY TO MAINTENANCE DIAGRAM

DAILY

1. Engine sump Top up
2. Radiator

EVERY 1,000 MILES

3. Gearbox Top up
4. Battery
5. Front suspension pivots (4)
6. King pin bearings (2) Grease
7. Steering ball joints (6) gun
8. Steering relay lever pivot (1)
9. Distributor—Oil shaft bearing, auto advance and contact breaker pivot. Grease cam

EVERY 5,000 MILES

10. Engine sump—Drain and refill. Clean intake strainer
11. Gearbox Drain and refill
12. Rear axle
13. Steering box
14. Brake fluid reservoir Top up
15. Engine oil filter—Clean element
16. Air cleaner—Clean and re-oil
17. Petrol pump filter—Clean
18. Accelerator linkage—Oil can
19. Water pump bearings Grease
20. Propeller shaft splines gun
21. Propeller shaft universal joints
22. Front hubs—Repack with bearing grease
23. Rear hubs—Grease gun (bearing grease)
24. Handbrake, clutch pedal, control linkage—Grease

EVERY 10,000 MILES

25. Engine oil filter—Renew element (AC M 11)
26. Rear shock absorbers—Top up
27. Dynamo—Refill lubricator with H.M.P. grease
28. Rear springs—Clean and spray with penetrating oil
29. Door, boot and bonnet hinges and catches—Oil can



Left: Cylinder block and water pump drain taps. Right: Radiator drain tap. All on off side. System is pressurised.

top bracket to chassis frame. Bracket, spring and upper link assembly, with extractor, can then be removed.

Refit centre rod (using short setscrew in lower end) and see that nut at top is tightened against plate. Then remove two long bolts, and release spring compression by undoing nut on centre rod. Note rubber seat rings at each end of spring.

Stub axles have plain bushes for king pins, and thrust washers at top. Rubber sealing rings at top and bottom.

When removing and refitting lower link inner pivot bushes, slacken three bolts on each pivot bracket to allow rubber half-bushes to be removed and inserted. Tighten upper and lower pivot nuts fully when weight of car is on springs.

To adjust camber, which should be measured with two passengers in front seat, slacken three setscrews holding upper link pivot bracket to upper spring bracket, and add or subtract slotted shims.

Hubs run on ball bearings with distance-piece between inner races, and packing ring covering radius of stub axle behind inner bearing. Felt washer in retainer pressed into hub outside inner bearing bears on ring.

Three-piece track rod has sealed ball joints, sockets screwed left- and right-hand for adjustment. Outer sections are interchangeable, but joints are not same as for centre section. Centre section supported between drop arm and corresponding relay arm retained on tapered shaft by nut. Shaft turns in bushed housing with thrust washers at top and bottom, and is retained by self-locking nut at top.

To adjust track, turn steering to straight ahead and check that centres of ball pins at inner ends of outer track rod sections are same distance apart as centres of steering drop arm shaft and relay arm shaft. Adjust centre section if necessary. Then adjust toe-in equally on outer sections.

Steering gear

Burman type L3 cam and lever, with ball bearing peg.

To remove gear from car, remove radiator grille and core (see under "Engine-Removal") and detach bonnet side panel on steering side, after detaching trim panel inside scuttle for access to nuts on rear edge. Note that screw to scuttle on top edge is self-tapping screw, and top screw on rear edge is wood screw. Access to setscrews to wing from below wing. Remove toe-board and narrow board above. Screw off steering wheel centre (latest type with medallion is sprung in), detach bracket inside hub, unscrew nut and draw off wheel (parallel serrations). Draw off drop arm (taper serrations) and relay arm. Detach steering column support. Take out two setscrews holding relay arm pivot bracket to chassis frame, and setscrew at each end of steering support cross-tube. Slacken steering box bracket clamp and twist assembly so that cross-tube and relay arm bracket can be removed and steering column lifted out. On right-hand drive cars remove dynamo first. Note packing washers at either end of cross-tube.

Cam runs in cup-and-cone ball-bearings with loose balls (14 to each race) adjusted by shims under lower cover. Top end of column supported in felt bush.

Lever peg carried in ball thrust bearing with eight loose balls running directly in lever and retained by spring ring. Adjustment for end play of lever shaft and mesh of peg in cam by grub screw and locknut on top cover, covered by cap.

Shock absorbers

Front: Armstrong telescopic, with rebound stop incorporated.

Rear: Armstrong piston type DAS8.

Body

Composite body attached to chassis by eight bolts with insulating pads. To remove, detach front wings, bonnet valances, toe-board and floorboards.

Instruments mounted directly in wooden fascia panel. Access to wiring from below.

Petrol tank attached to chassis frame by one lug each side and one at rear, bolts inserted from below. To remove, disconnect gauge wire at top and pipe union at nearside rear, and drop tank out.

CHASSIS

Brakes

Girling hydro-mechanical. Two leading shoe front brakes have separate cylinder for each shoe. Compensation between hydraulic front and mechanical rear brakes by swinging link at base of pedal. Handbrake operates on rear wheels through footbrake linkage, consisting of rods with compensator on rear axle.

Snail cam adjustment for front brakes. Jack up wheel, turn each adjuster (two per wheel) until shoes touch drum, and back off until free.

Square-ended adjusters on rear brakes should be tightened and backed off two clicks. Car need not be jacked.

If brake linkage is dismantled, it must be reset for compensation between front and rear brakes. Jack up all four wheels, and adjust all brake shoes to bear hard on drums. With long rod disconnected at rear end from relay lever in front of rear axle, and brake pedal held back against toe-board by return spring, adjust length of master cylinder push rod so that pin at front end is towards front of slot in pedal when push rod is just bearing on master cylinder piston (pull back rubber bellows seal to check). Pull lower end of handbrake connecting lever forward against stop and adjust footbrake push rod so that pin at rear end is $\frac{1}{16}$ in from front of slip link slot. Then adjust long rod (previously disconnected) so that clevis pin can just be inserted when relay lever is pulled right forward. Readjust all brake shoes so that wheels are free. No separate adjustment for handbrake.

Rear springs

Semi-elliptic. Loose rubber shackle and anchorage bushes. Anchorage bolts have distance-piece between head and inner bush, spigoted in chassis frame bracket. Shackle bolts shouldered and welded to outer plates. Tighten

all bolts fully while car is laden (two passengers in front seat).

Front suspension

Independent. Coil springs and double wish-bone links. Anti-roll bar connected to front arms of lower links by rubber bushed links. Telescopic shock absorbers mounted inside springs.

Upper and lower link inner ends pivoted in loose rubber half-bushes (same as rear spring bushes). Outer ends of upper and lower links bronze bushed.

Upper links are made up of two identical arms joined at outer ends to form fork for outer pivot trunnion, which is spigoted on top of king pin and retained by nut. Arms bolted together at outer end with shims to adjust end float of trunnion in bushes.

Lower ends of king pins forked to fit over bushed ends of lower link rear arms.

To remove spring, jack up wheel, placing jack under lower link just clear of lower shock absorber nut. Remove wheel, four nuts holding shock absorber top bracket, and nut holding lower end of shock absorber, which can then be lifted out with top bracket. Note distance-piece between lower link and spring plate bracket.

Insert long centre rod of special extractor with top plate through spring, so that square at lower end fits recess in spring plate. Insert long special setscrew with spring washer through lower link and distance-piece between link and bracket. Tighten fully. Compress spring by tightening long nut on top of rod.

Insert long bolts through holes in extractor plate, screw into nuts welded on to lower spring plate, and tighten nuts against extractor plate. Undo nut at top of king pin, pull off upper link and trunnion, and allow hub assembly to pivot downwards. Unscrew setscrew holding lower end of extractor rod, and remove rod. Take out four long bolts (inserted from below) and one short bolt (inserted from above) holding spring

SINGER

Model—4AD

Serial No. Location—Right side of bulkhead under bonnet.

Engine No. Location—Right side of cylinder block flywheel-housing.

Wheelbase—91".

Tread—46.75 front and rear.

Tire Size—5.00x16.

Body Finish—Cellulose.

ENGINE

ENGINE DATA

No. of Cylinders—4.
Bore—73 mm.
Stroke—89.4 mm.
Piston Displacement—91.36 cu. in.
Taxable H.P.—13.2 (RAC Rating).
Developed H.P.—48 @ 4200 rpm.
Compression Ratio—7:1.
Compression Pressure—122 lbs. at cranking speed.

PISTONS

Material—Aluminum alloy.
Piston Length—3.148".
Clearance—Top of skirt .0013-.002; bottom .001-.0023.

RINGS

No. of Rings—Oil; Compr. 2.
Width—Oil—.1562-.1552; Compr. .0927-.0937.
Gap—Oil—.1577-.1587; Compr. .0952-.0962.
Piston Ring Groove Depth—Top .128, center .148.

PISTON PINS

Diameter—.625.
Length—2.5.
Type—Floating (locked by circlips).
Fit—Thumb press at room temperature; close push fit (moving) in rod.

CONNECTING RODS

Length—6.25" (center to center).
Journal Dia.—1.75-1.7495.
Bearing Dia.—1.7505-1.7515.
Clearance—.0005-.002.
End Play—.006-.008.
Bearing Material—White metal, steel backed.

CRANKSHAFT AND MAINS

Thrust Taken—On rear bearing.
Crankshaft End Play—.001-.008.
Bearing Dia.—2.001-2.002; length of all three bearings 1.375 each.
Journal Dia.—2-1.9995.
Bearing Material—White metaal, steel backed shell.
Clearance—.001-.0025.

CAMSHAFT

Type Drive—Duplex roller chain 86 links, .375 pitch.
End Thrust—Taken on center bearing.
Bearings—Chrome cast iron.
Valve Timing—
In. opens 10° BUDC.
In. closes 50° ALDC.
Ex. opens 50° BLDC.
Ex. closes 10° ALDC.

VALVE SYSTEM

Operating Tappet Clearance—In. .004, Ex. .006 (hot).
Lash for Valve Timing—.006.
Valve Seat Angle—45° In. and Ex.
Lift—.297 In. and Ex.
Stem Dia.—.311-.310.
Head Dia.—In. 1.375, Ex. 1.25.
Fit in Guide—.0002-.0017 In.; .0013-.0028 Ex.
Valve Spring Pressure—Closed, 38 lbs. @ 1.4375 (outer); 15 lbs. @ 1.3593 (inner). Valve open 55 lbs. @ 1.1406 (outer); 25 lbs. @ 1.0625 (inner).

LUBRICATION SYSTEM

Type—Pressure to main, rod, cam bearings, and timing chain.
Pump Type—Involute gears.
Adjustment—None.
Crankcase Capacity—3.75 qts.
Oil Filter Type—(renewable element). Partial flow.

FUEL SYSTEM

Tank Capacity—7 gal. (imperial).
Pump—Electric.
Carburetor—Solex.
Choke—Manual.

COOLING SYSTEM

Capacity—7.5 quarts.
Pump Type—Rotary.
Belt—42° V-angle, .625" cross section.
Hose—Upper, convoluted 1.5625 I.D. x 6.25; lower, 1.125 x 8.5.

CHASSIS

Front Suspension—
Caster—2°.
Camber—1°.
Toe-in—.1251-.1875".
Kingpin Inclination—7°.

STEERING GEAR

Type—Burman
Ratio—14:1.
Adjustment—Screw for worm and peg engagement.
Lubricant—SAE 90.

BRAKES

Type—Girling, hydraulic application on front wheels, mechanical on rear wheels.
Drum Dia.—9".
Lining Size—8x1.25x.1075.
Composition—Woven.
Brake Effort—45% on rear.

CLUTCH

Make—Borg & Beck.
Facing Size—8" Dia.
Release Bearing—Morganite.

TRANSMISSION

Type—Synchromesh to 2nd, 3rd and top gears.
Ratios—3rd, 1.255; 2nd, 1.97; low, 2.98:1.
Mainshaft Bearings—Ball with snap ring locks.
Lube Capacity—1 qt.

REAR AXLE

Type—Semi-floating, spiral bevel gear.
Gear Ratio—4.875:1.
Teeth in Ring Gear—39, pinion 8.
Pinion Adjustment—Shims.
Lube Capacity—1 qt.

ELECTRICAL

IGNITION

Distributor Make—Lucas.
Rotation—Anti-clockwise (looking at top of unit).
Breaker Gap—.012.
Spark Plug Gap—.025; size 14mm.
Firing Order—1-3-4-2.
Timing—4° BTDC.
Maximum Centrifugal Advance—20-23° (distr. shaft rpm).

STARTING MOTOR

Make—Lucas M45C.

GENERATOR

Make—Lucas C39-PV2.
Maximum Output—19 amps at 2100 dynamo rpm.

BATTERY

Capacity—38 amp. hrs.

BODY DATA

Type—Roadster body built from seasoned hardwood (well treated with preservative) and "skinned" with 18 S.W.G. .048" aluminum panels. Beeswing scuttle top and cut-away doors. Two bucket-type front seats adjustable range 4.5 inches.