Handbook for the MGA

Piet Olyslager MSIA MSAE

(Not the original Cover)

Contents

LEGAL NOTE

Every care is taken to ensure accuracy and completeness in compiling this publication, however no liability can be accepted for damage, loss or injury caused by any omissions in the information given.

Preface

THE PIET OLYSLAGER MOTOR MANUALS have been known to Continental motorists and garages for ten years and have proved their worth many times over. We consider that they are unique in their compact completeness and contain all the information needed to service, maintain and repair all makes of cars.

The manuals are presented in two forms in the English language, in these handy small books covering individual models and in cumulative loose-leaf form keeping abreast of all alterations and developments.

These two services set out to cover all that a motorist or garage man needs to know to get the best out of motoring, and the series will eventually cover all popular makes of cars in the world.

The manuals were described, after considerable research by the International Commission on Automobile Documentation as 'The best automobile documentation so far in the world'

We are grateful to the manufacturers for their kind and enthusiastic co-operation in the production of this manual.

Fig. 1. MGA 1500 Roadster, 1955-1959

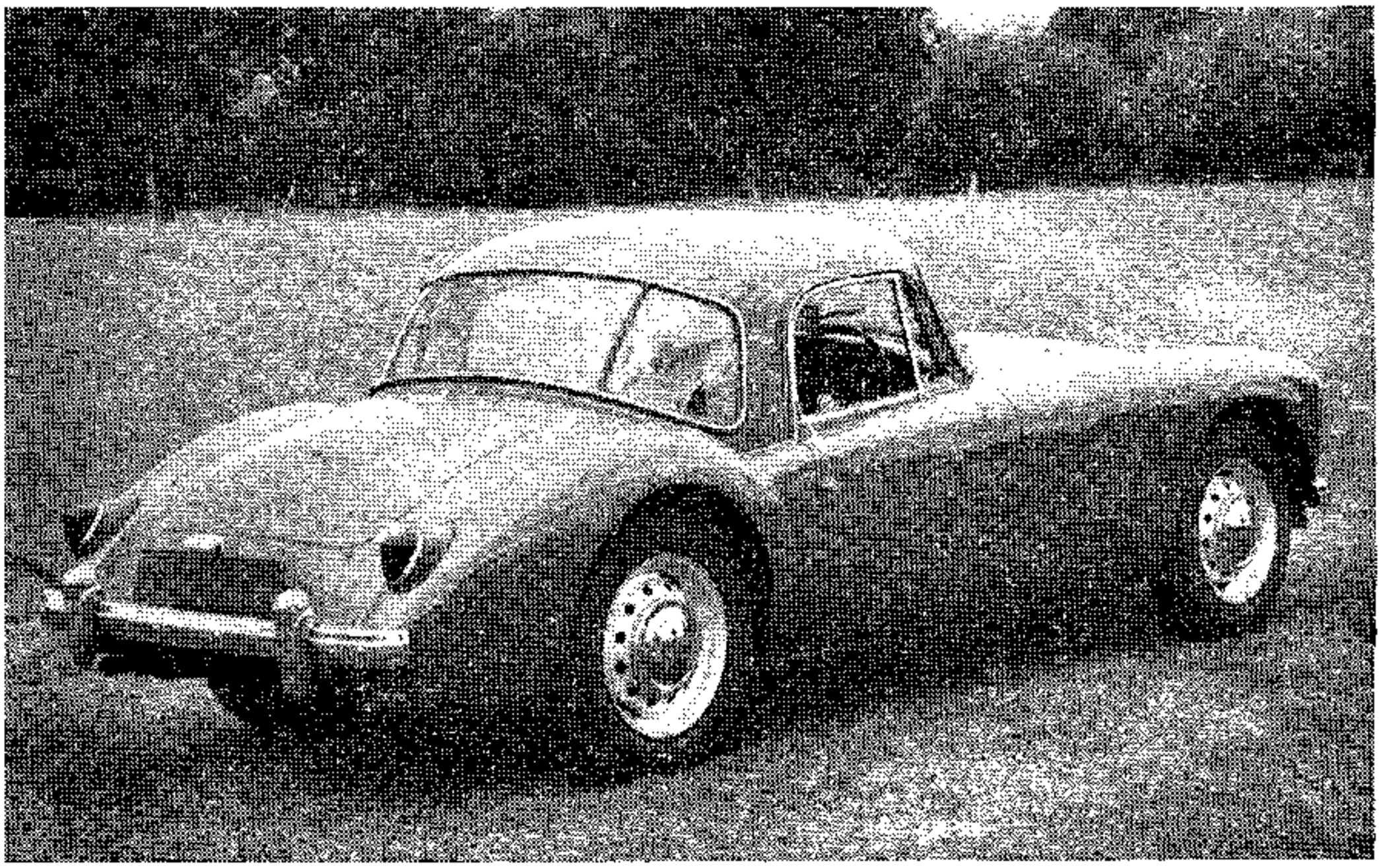


Fig. 2. MGA 1500 Coupé, 1956-1959

MGA

1500, 1600 and
1600 Mk II
COUPES and
ROADSTERS
1955-1962

General

INTRODUCTION

The M.G. Series MGA sports car was introduced in September 1955, to replace the Midget TF model. It was inspired by the M.G. record-breaker, EX 135, which was used by Captain Eyston when he captured International Class records at the Utah salt flats in the U.S.A., and by the later record-breaker, EX 182, which was driven at Le Mans, by George Phillips, in 1951. This car consisted of a prototype body on a modified contemporary TD chassis.

Altogether there have been four variations on the MGA theme: the 1500, the Twin Cam, the 1600, and the 1600 Mk II. The Twin Cam model featured a special engine with twin overhead camshafts, and is not dealt with here. The 1600 Mk II was discontinued in September 1962, and replaced by the new MGB model. Although there have been modifications to the original model, the essentials, such as the suspension, chassis frame, and basic body structure, remained the same. Over 100,000 MGA's were built.

The MGA is a sports two-seater, either open (Roadster) or closed (Hardtop Coupé), with full-width body, and sloping bonnet and radiator grille. The engine is a four-cylinder overhead valve BMC 'B' Series unit, with various modifications. A four-speed gearbox with central remote-control gear change is fitted. Front suspension is independent with coil springs and wishbone-type links. At the rear a rigid axle is used, in conjunction with semi-elliptic rear springs. Steering is by rack and pinion.

Summary of models:

Model	*Type*	*Symbol*	*Period*
MGA (1500)	Roadster	(MGA)	September 1955–July 1959
MGA (1500)	Coupé	(MGA)	September 1956–July 1959
MGA 1600 (Mk I)	Roadster	GHN	July 1959–March 1961
MGA 1600 (Mk I)	Coupé	GHD	July 1959–March 1961
MGA 1600 (Mk II)	Roadster	GHN2	June 1961–September 1962
MGA 1600 (Mk II)	Coupé	GHD2	June 1961–September 1962

IDENTIFICATION

Model identification:

For identification of models, see Figs. 1 to 10 and *Summary of models.*

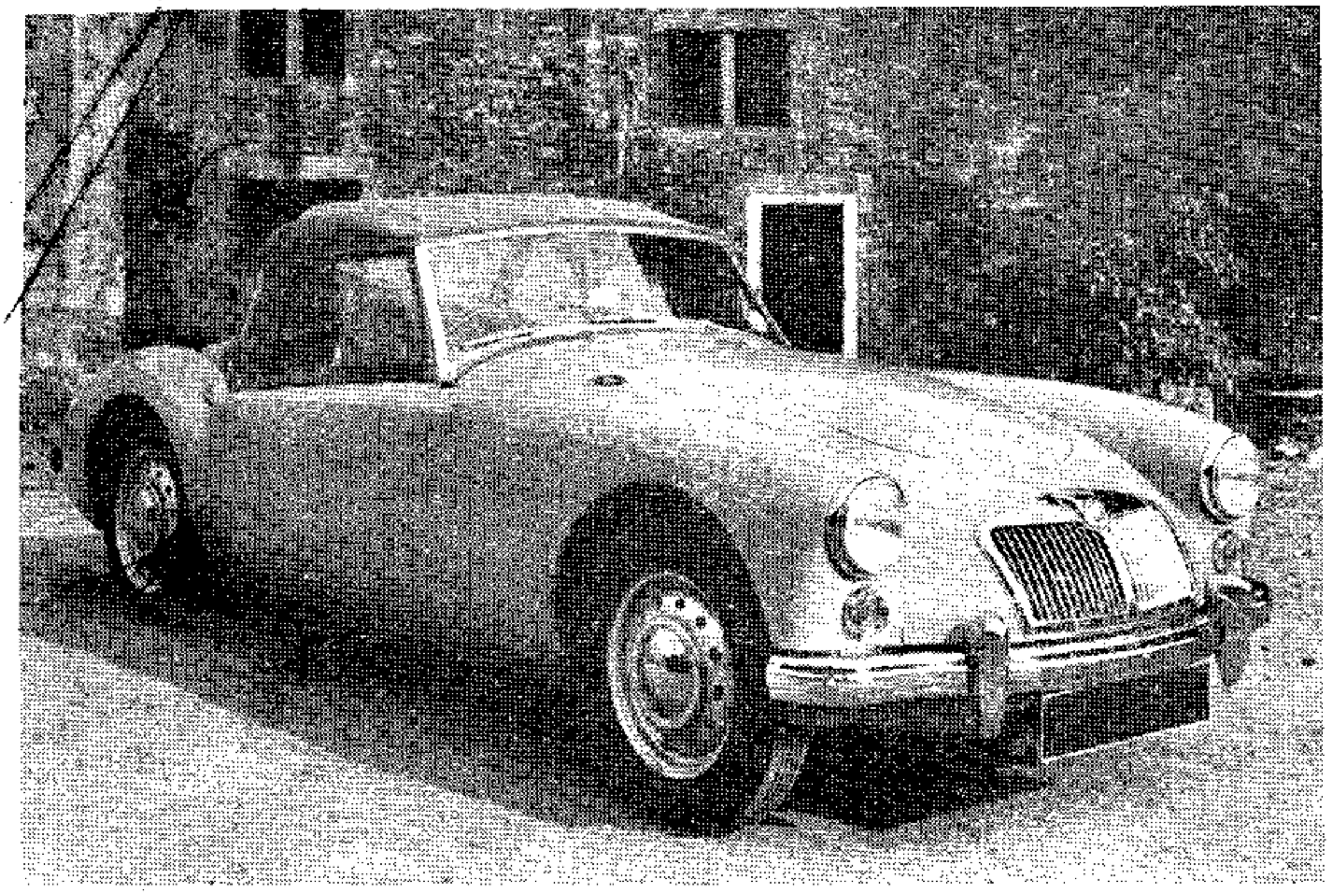


Fig. 3. MGA 1600 Roadster, model GHN, 1959-1961

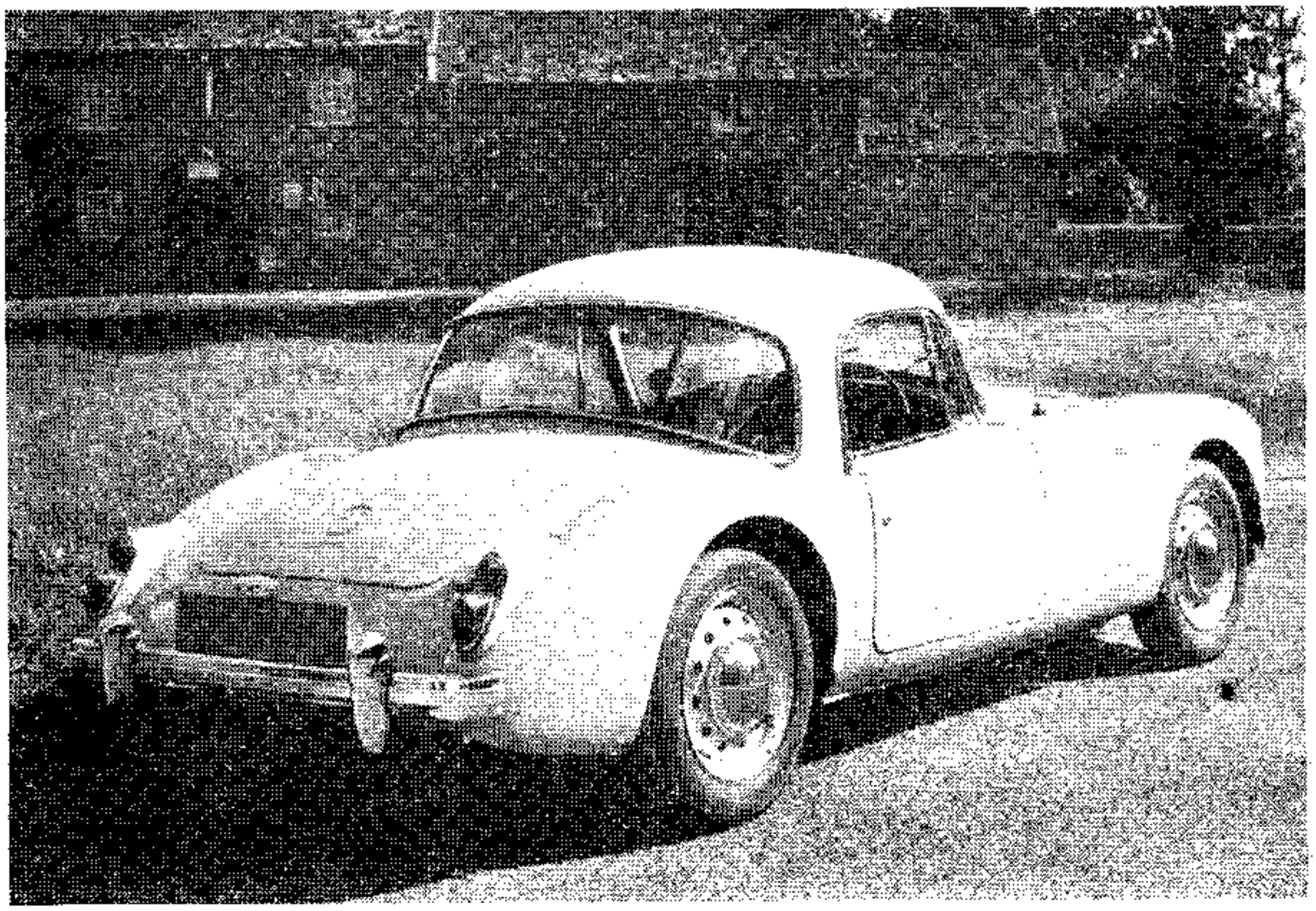


Fig. 4. MGA 1600 Coupé, model GHD, 1959-1961

Identification plate:
The identification plate is fixed to the bulkhead, in the engine compartment.

Engine number:
The engine number is stamped on a metal plate, mounted on the right-hand side of the cylinder block. This number consists of a series of letters and numbers, which represent, in code, capacity, make, and type of unit, ancillaries fitted, type of compression, and actual serial number.

Example: 15 GB–U–H 123445, in which the prefix is explained as follows:

15 = 1500cc
G = M.G.
B = Variations of engine type (A–Z)
U = Central gear change
H = High compression

See also *Engine type* on page 20

For reconditioned engines a suffix is used, consisting of two letters, which indicate bore oversize and crankshaft journal undersize.

Car serial number:
This number is stamped on a plate fixed to the bulkhead, in the engine compartment. It is prefixed by the model identification symbol, as indicated under *Summary of models.*

Explanation of model identification symbol:
G = M.G.
H = Engine group (1400–1999 cubic capacity)
N = Two-seater roadster
D = Coupé
2 = Series of model, used to record major changes
L = Left-hand drive (if applicable)

Serial numbers (approximate, and for guidance only):

	Roadster	*Coupé*
September 1955 (starting):	10101	—
January 1956:	11170	—
September 1956:	20165	20670
October 1957:	39500	39550
January 1958:	44850	44800
January 1959:	61100	60900
July 1959 (1500, final):	68850	68850
July 1959 (1600, starting):	68851	68851
January 1960:	83085	83090
June 1960:	91250	91240
January 1961:	99950	99835
March 1961 (1600, final):	100351	100319
June 1961 (1600 Mk II, starting):	100352	100352
January 1962:	105930	105650
June 7, 1962 (final):	109070	109070

Body number:
The body number is stamped on a metal plate, fixed to the engine bulkhead, between right-hand bonnet hinge and fuse unit.

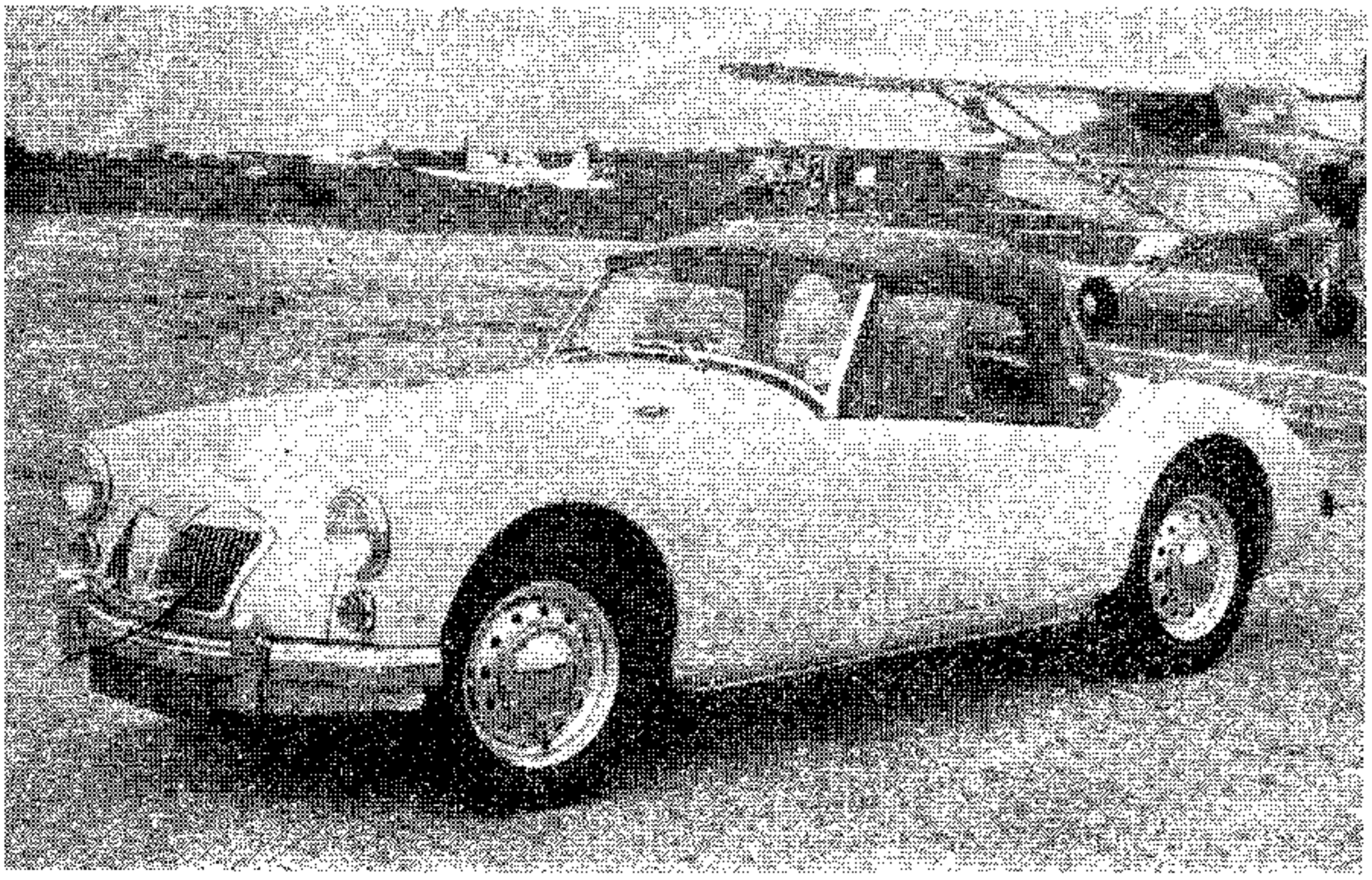


Fig. 5. MGA 1600 Mk II Roadster, model GHN2, 1961-1962

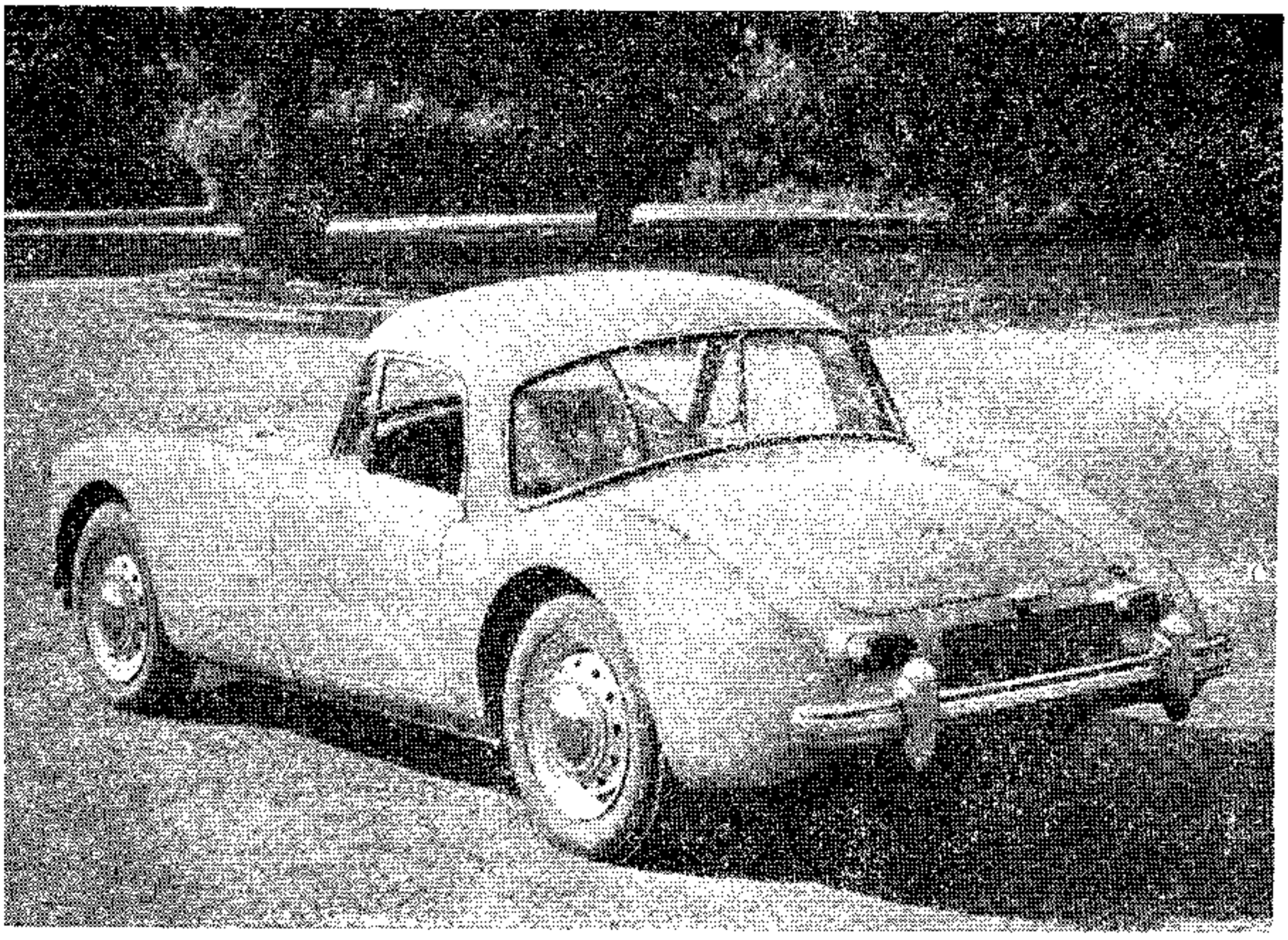


Fig. 6. MGA 1600 Mk II Coupé, model GHD2, 1961-1962

Gearbox number:
This number is stamped on the top of the gearbox, to the left of the dipstick and filler plug.

Rear axle number:
The rear axle serial number is stamped on the front of the axle casing, adjacent to the left-hand spring seat.

MODIFICATIONS

For modifications of a purely technical nature, see *Repair data* and *Technical specifications*.

1956 (September): Detachable hardtop introduced as optional extra. Standard hood modified, with transparent rear quarter panels. Fixed-head hardtop Coupé model introduced, with wind-up glass side windows.

1959 (July): 1600 model introduced, featuring 1588cc engine; Lockheed disc type front brakes; restyled front and rear sidelights, incorporating amber-coloured direction-indicator flashers; sliding side-screens and '1600' motifs on scuttle and luggage compartment lid. Rear deck cut back behind seats on Coupé model to give more storage room.

1960 (May): Dunlop disc brakes all round, centre-lock disc wheels, and Road Speed tyres (standard on the Twin Cam model) introduced as optional extras.

1961 (June): 1600 Mk II model introduced, featuring 1622cc engine, raised rear axle ratio (4·1 : 1), horizontal rearlight clusters, moved from the wings to the body, leather-cloth covered facia, re-designed radiator grille, with recessed vertical bars, built-in anchorage points for seat belts, and '1600 Mk II' motifs on scuttle and luggage compartment lid.

PRICES

UK prices are rounded-off home retail ex-works prices, as at October of each year. US prices are suggested retail prices at West Coast ports of entry, including US Customs duties and Federal Excise tax, but excluding inland freight, local and state taxes, where applicable. East and Gulf Coast P.o.E. prices are generally slightly lower than those at West Coast P.o.E.

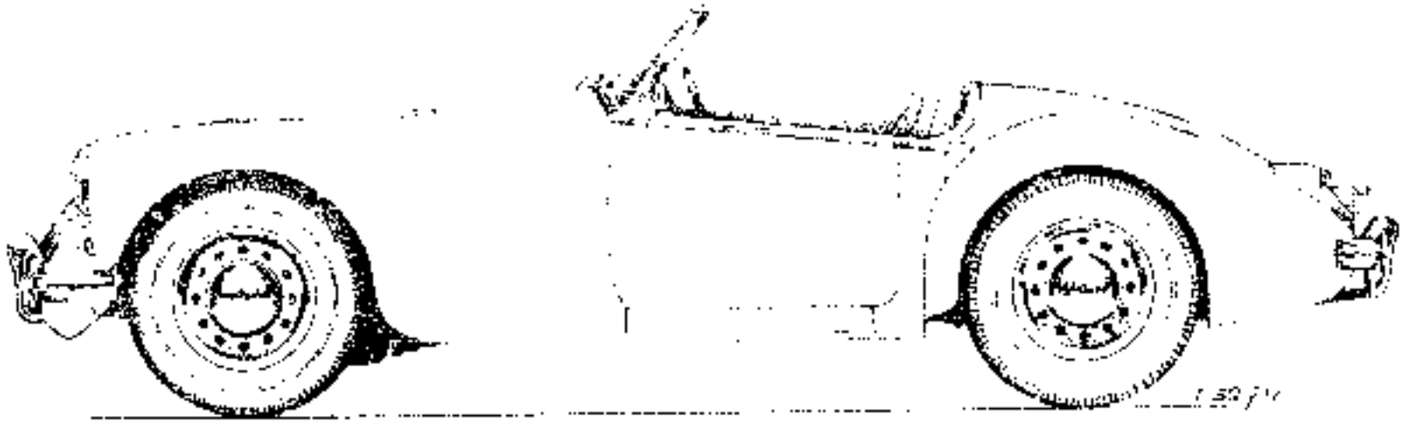


Fig. 7. MGA 1500 Roadster

	UK Basic	*UK Total*	*USA*
1955:	£595	£844	—
1956:	£640	£961	$2195

	UK Basic	*UK Total*	*USA*
1957:	£663	£996	$2345
1958:	£663	£996	$2498
1959:	£663	£940	$2238
1960 (1600):	£663	£940	$2485

Fig. 8. MGA 1600 Coupé

	UK Basic	*UK Total*	*USA*
1957 (1500):	£724	£1087	- -
1958 (1500):	£724	£1087	$2750
1959:	£724	£1027	$2450
1960:	£724	£1027	$2734

Fig. 9. MGA 1600 Mk II Roadster

	UK Basic	*UK Total*	*USA*
1961:	£663	£968	$2499
1962:	£663	£913	$2499

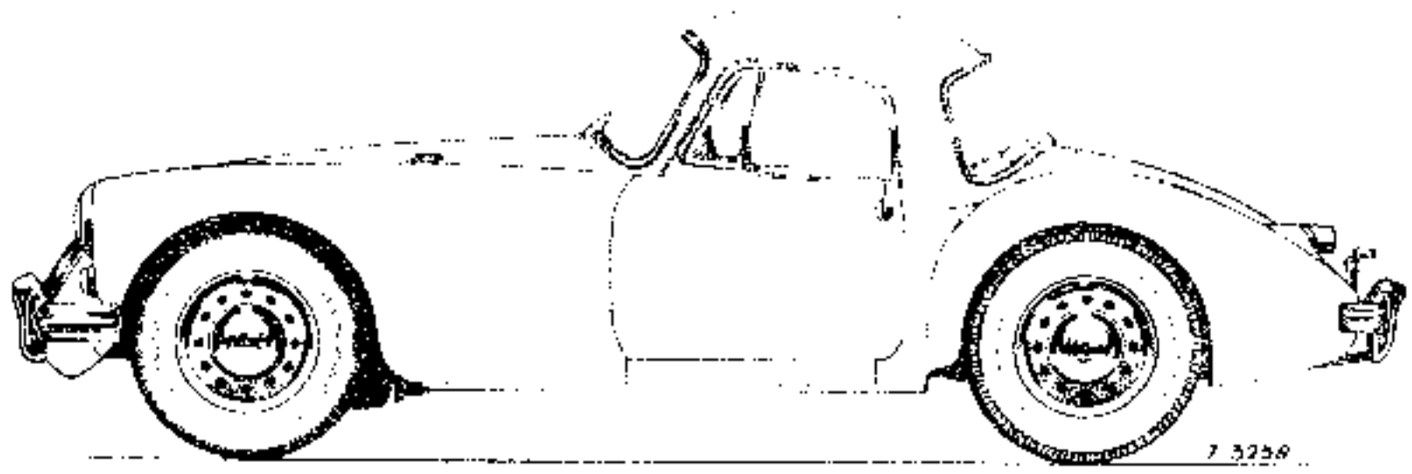


Fig. 10. MGA 1600 Mk II Coupé

	UK Basic	*UK Total*	*USA*
1961:	£724	£1057	$2759
1962:	£724	£997	$2759

Optional extras, UK (April 1962, total prices):

Heater:	£16.16.10
Adjustable steering column:	£2.15.0

MGA

Headlamp flasher:	£2.15.0
Fog lamp:	£5.10.0
Radiator blind:	£6.3.9
Wing mirror:	£1.10.11
External luggage carrier:	£14.12.2 (incl. mirror)
Windscreen washer:	£2.15.0
Competition seats:	£9.2.2
Twin horns:	£1.17.9
Cold air ventilation kit:	£14.8.9
Wire wheels:	£37.2.6
3·9 or 4·55 : 1 Rear axle:	£9.5.7
Roadspeed tyres:	£11.10.3
Tonneau cover:	£8.8.5
Oil cooler:	£8.18.9
Anti-roll bar:	£2.12.3
Close ratio gearbox:	£7.11.3
Hardtop, fitted:	£82.10.0

Optional extras, USA (all P.o.E.) (1962):

Heater:	$65.00
Tonneau cover:	$35.00
Whitewall tyres:	$35.00
Road Speed tyres:	$45.00
Wire wheels, roadster:	$100.00
coupé:	$90.00
Windscreen-washer:	$15.00
Hardtop (for roadster):	$275.00

INSTRUMENTS AND CONTROLS

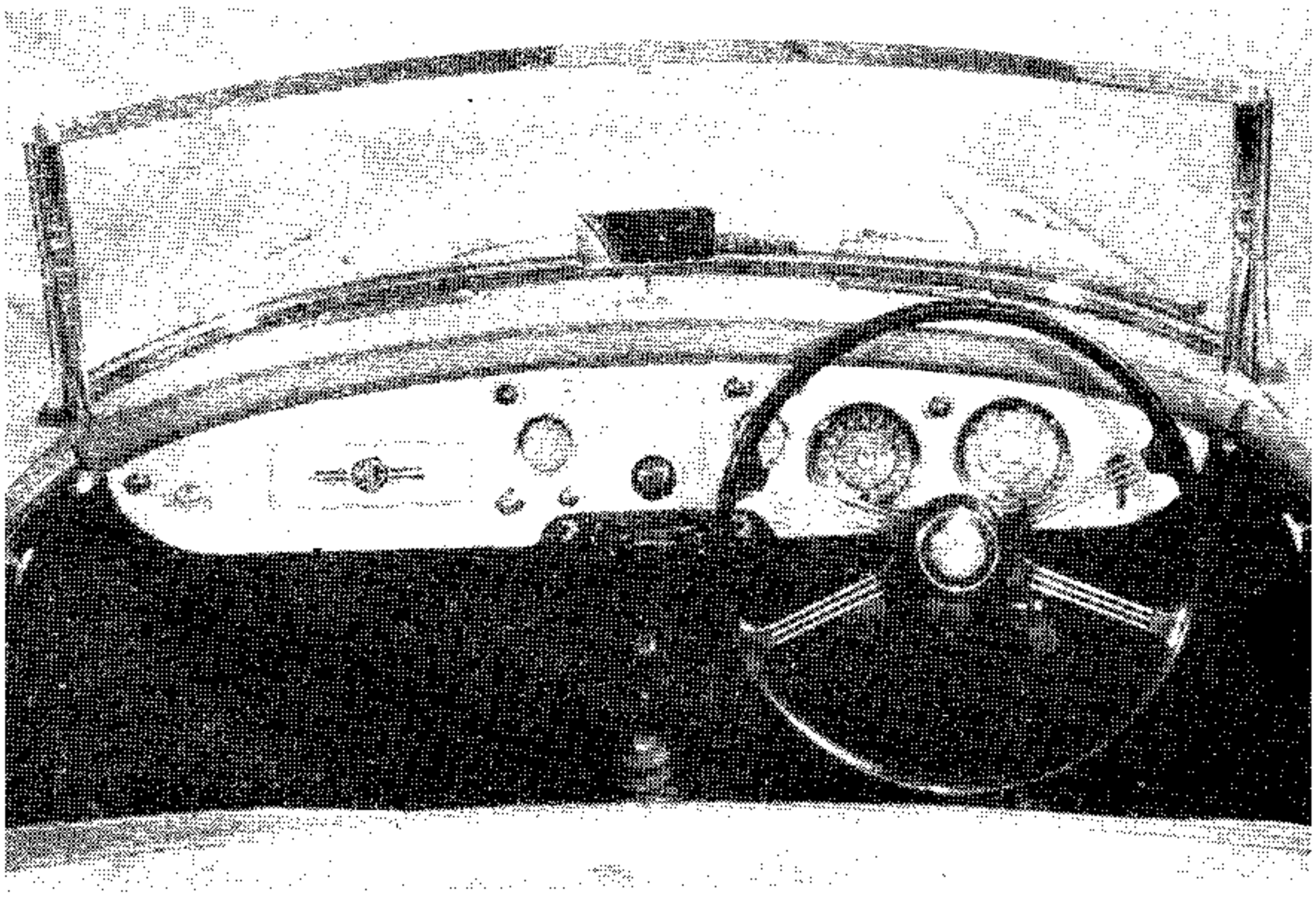


Fig. 11. Instruments and controls, MGA 1500 and MGA 1600 roadsters

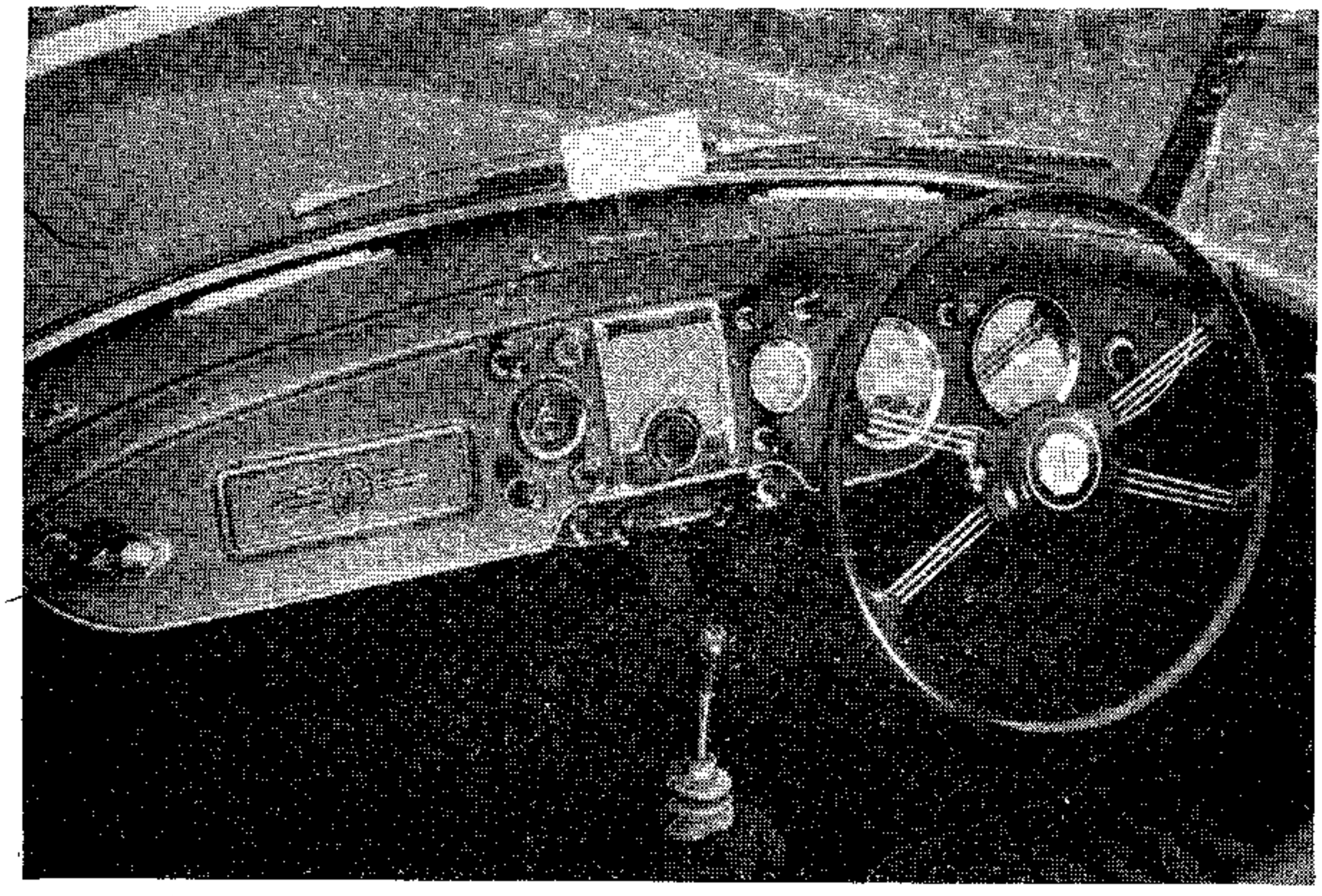


Fig. 12. Instruments and controls, MGA 1600 Mk II and all coupé models

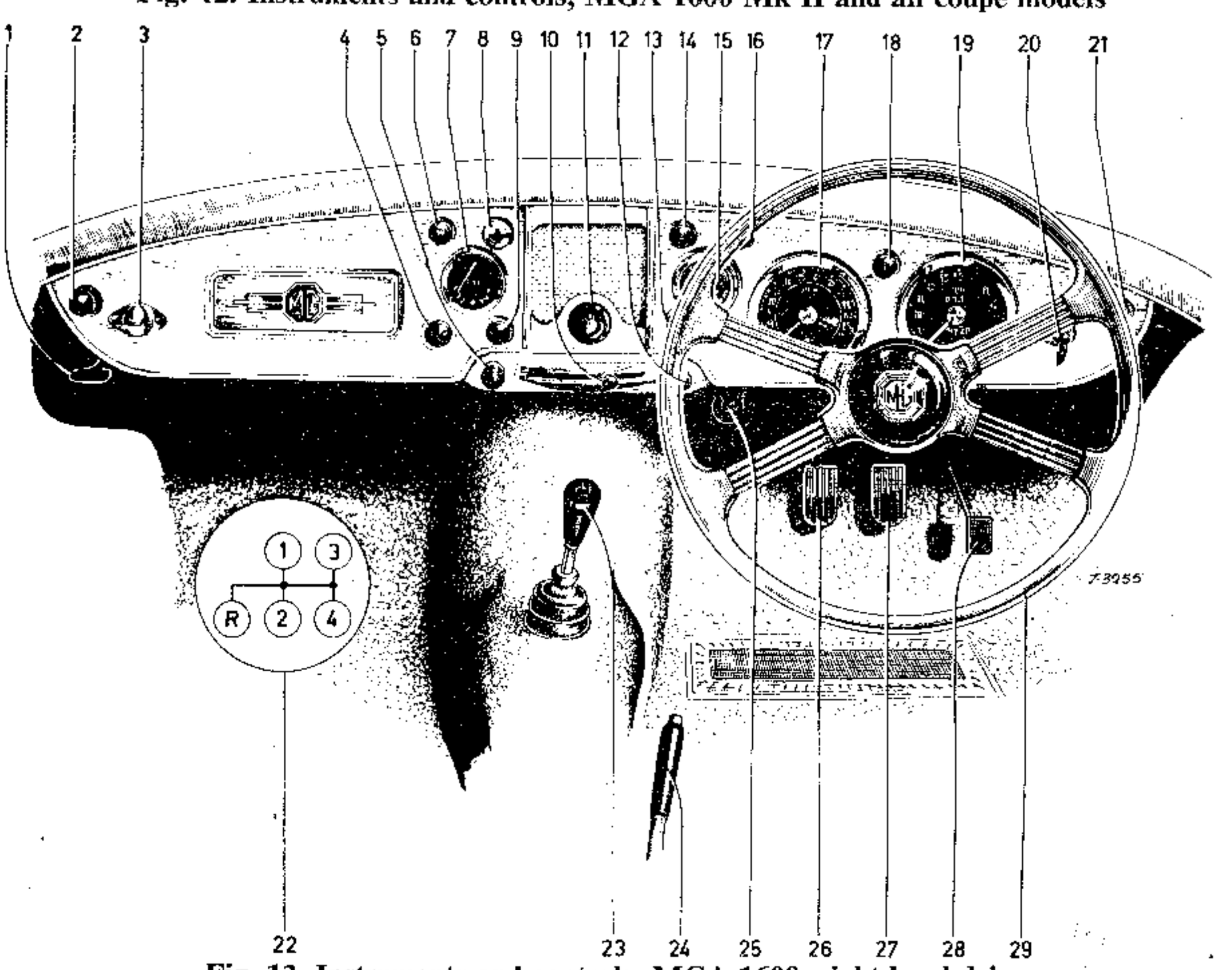


Fig. 13. Instruments and controls, MGA 1600, right-hand drive

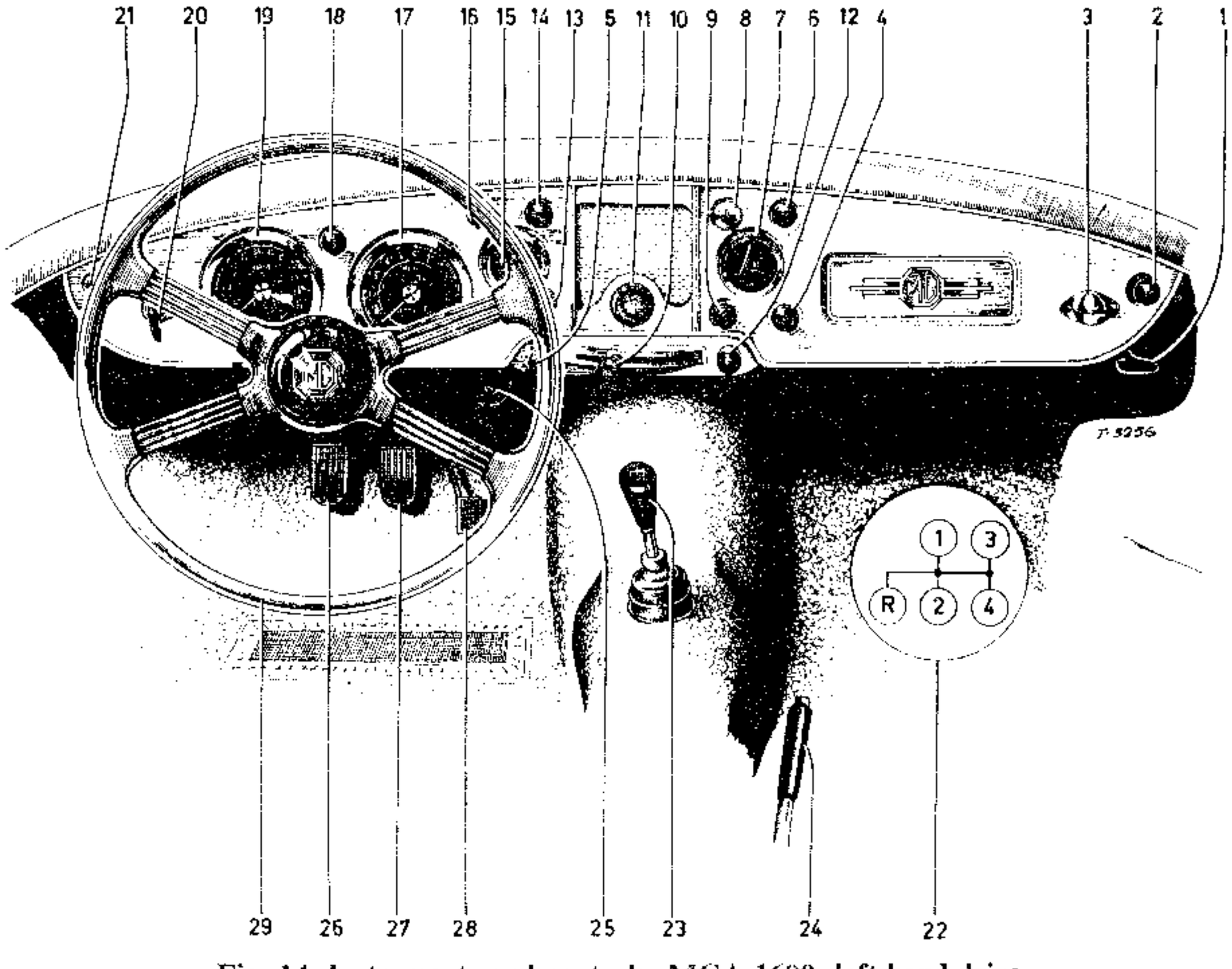


Fig. 14. Instruments and controls, MGA 1600, left-hand drive

1 Bonnet release
2 Map-reading switch
3 Map-reading light
4 Windscreen-washer control (optional)
5 Air control (optional)
6 Windscreen-wiper switch
7 Fuel gauge
8 Ignition switch
9 Choke control
10 Blower switch and temperature control
11 Horn button
12 Demister control
13 Starter switch
14 Lighting switch
15 Water temperature gauge
16 Fog lamp switch
17 Revolution counter
18 Panel light switch
19 Speedometer and mileage recorder
20 Direction-indicator switch
21 Flasher warning light
22 Gear pattern
23 Gear lever
24 Parking brake lever
25 Headlamp dip switch
26 Clutch pedal
27 Brake pedal
28 Accelerator pedal
29 Steering wheel

ELECTRICAL EQUIPMENT

12 V system. Two 6 V batteries. Capacity 58 Ah (20-hour rate), positive (+) terminal connected to earth.

The batteries are mounted one each side under a cover behind the seats. Double dipping headlamps with prefocussed bulbs. Foot-operated dip switch. Headlamps

vary, according to the regulations existing in the country concerned. Separate sidelamps and flashing direction-indicators. Twin stop/tail-lamps with flashing direction indicators and rear reflectors, horizontally grouped (Mk II); on earlier models vertically grouped. Rear numberplate lamp. Self-parking windscreen-wipers. The direction-indicators are operated by a time-switch on the end of the facia (operating time adjustable).

Warning lights for: headlamp high beam, ignition and direction-indicators.

BODY

Exterior:

The streamlined body encloses a luggage compartment which carries the spare wheel and tool kit. The one-piece bonnet hinges at the rear.

The open roadster has a folding hood with flexible rear window and detachable side-screens. The windscreen is of safety-glass. A detachable hard top is available at extra cost.

The fixed-head coupé has a full wrap-around rear window and deeply curved windscreen. All windows are of safety-glass. The doors, with wind-down windows and swivelling quarter-lights, have lockable exterior door handles which must be pulled out to release the door catches.

Interior:

The two forward-hinged doors of the roadster have open pockets for maps and small articles and are opened by a cable inside the door pocket; the coupé has interior handles but no door pockets. Both leather-upholstered seats are mounted low on each side of the propeller shaft. The hand-brake lever is of the 'fly-off' type, with a spring-loaded button to be used to retain the lever and not to release it.

The gear lever is centrally placed on the transmission cover, with an ashtray behind it.

Optional extras:

Radio, fresh-air heater and demister, white-wall tyres, wire wheels, 590–15 Road Speed tyres. Dunlop disc brakes front and rear, centre lock disc wheels, external luggage carrier, tonneau cover, windscreen-washer, detachable hard top, adjustable telescopic steering column. Twin horns, wing mirror, fog lamp, radiator blind, de luxe side-screens, headlamp flashers, competition windscreen, badge bar, close-ratio gearbox, alternative axle ratios and other special equipment for competition use.

COLOURS

Various colour combinations for body, upholstery and hood were available.

Dimensions and Weights

EXTERIOR DIMENSIONS

		inches
1	Wheelbase:	94
2	Track, front:	$47\frac{1}{2}$
3	Track, rear:	$48\frac{1}{4}$
4	Total length:	132

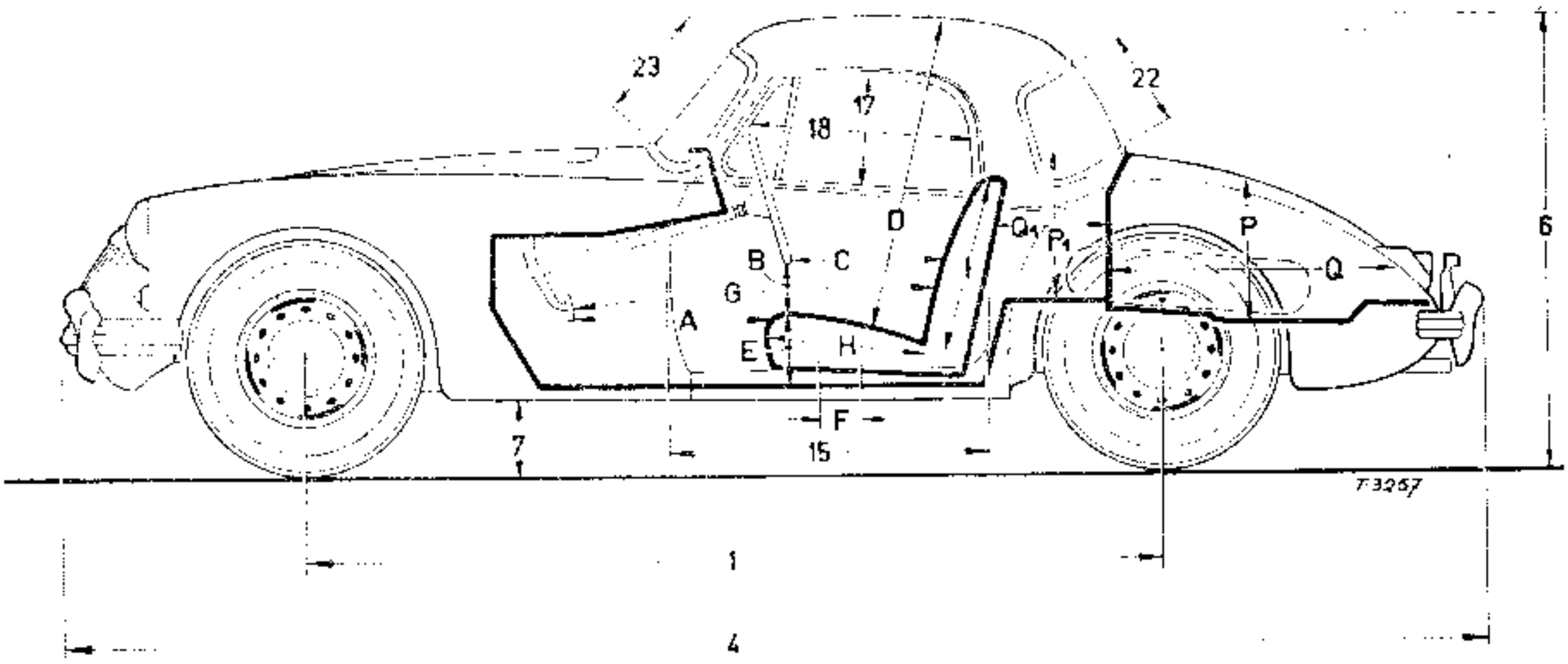


Fig. 15. Dimensions, Coupé

		inches
5	Total width:	58
6	Total height:	50
7	Ground clearance:	6
8	Turning circle:	29 ft
17	Width of door window:	21¼
18	Height of door window:	11¾
23	Height of windscreen:	12½
24	Width of windscreen:	44

INTERIOR DIMENSIONS

		inches
A	Pedal to front of seat:	17–22¾
C	Steering wheel to seat back-rest:	13
D	Height over front seat:	37
E	Height of front seat:	7
F	Maximum adjustment of seat:	5¾
G	Pedal to seat back-rest:	37–42¾
H	Depth of seat:	20
P	Height of luggage compartment:	14
Q	Depth of luggage compartment:	30
W	Width of seat:	17
Z	Width of luggage compartment:	39

WEIGHTS

	MGA	*MGA* 1600 1600 *Mk. II*
Complete car, ready for use:	1988 lb	2015 lb
Dry weight:	1935 lb	1960 lb
Weight distribution, front:	53%	53%
rear:	47%	47%

Technical Specifications

Figures in the following tables are based on measurements and weights according to the Imperial system, as used in Great Britain, i.e. the Imperial Gallon and Long Ton. Figures in parentheses represent measurements and weights according to the American system, i.e. the US Gallon and Short Ton.

ENGINE

	MGA	*MGA* 1600	*MGA* 1600 *Mk II*
(1) Type:	water-cooled, four-stroke, ohv, in-line engine		
(2) Number of cylinders:	4	4	4
(3) Bore and stroke:	2·875 × 3·5 in (73·02 × 89 mm)	2·968 × 3·5 in (75·39 × 89 mm)	3·0 × 3·5 in (76·2 × 89 mm)
(4) Piston displacement:	90·88 cu in (1489 cc)	96·9 cu in (1588 cc)	99·08 cu in (1622 cc)
(5) Compression ratio:	8·3 : 1	8·3 : 1	8·9 : 1 (or 8·3 : 1)
(6) Stroke/bore ratio:	1·21	1·18	1·16
(7) Total piston area:	25·94 sq in	27·66 sq in	28·26 sq in
(8) Volume of combustion chamber:	2·4 cu in	2·36 cu in	2·6 cu in

PERFORMANCE

	MGA	*MGA* 1600	*MGA* 1600 *Mk II*
(1) Max. bhp (gross):	72 at 5500 rpm	79·5 at 5600 rpm	90 at 5500 rpm
(2) Brake mean effective pressure (bmep):	130 lb/sq in (9·1 kg/sq cm) at 3500 rpm	135 lb/sq in (9·5 kg/sq cm) at 4000 rpm	148 lb/sq in (10·4 kg/sq cm) at 4000 rpm
(3) Max. torque:	77·4 lb ft (10·71 kgm) at 3500 rpm	87 lb ft (12·03 kgm) at 3800 rpm	97 lb ft (13·1 kgm) at 4000 rpm
(5) Bhp per sq in piston area:	2·8	2·9	3·2
(6) Bhp/litre:	48·4	50	55·4
(7) Max. mean piston speed:			
at 5500 rpm	2995 ft min	—	2995 ft min
at 5600 rpm	—	3050 ft min	—

GEAR RATIOS

	Gearbox	*Overall* (*MGA*–*MGA* 1600)	*Overall* (*MGA* 1600 *Mk II*)
First gear:	3·640	15·652	14·924
Second gear:	2·214	9·520	9·077
Third gear:	1·374	5·908	5·633
Top gear:	1·000	4·300	4·100
Reverse gear:	4·760	20·468	19·516
Rear axle ratios (standard):	4·3 : 1 (MGA–MGA 1600)		
	4·1 : 1 (1600 Mk II)		
Tyre size:	5·60–15		

SPECIFIC PERFORMANCE DATA

(dry weight)

	MGA	*MGA* 1600	*MGA* 1600 *Mk II*
(1) Piston area per ton (sq in):	32·1 (28·6)	31·5 (28)	32·2 (28·6)
(2) Litres per ton:	1·84 (1·64)	1·81 (1·61)	1·85
(3) Bhp per ton:	89·3 (79·5)	90·9 (80·9)	102 (90·8)
(4) Brake lining area per ton (sq in):	166·7 (148·4)	—	—
(5) lb/bhp (SAE):	26·8	24·6	21·8
(6) lb per cc piston displacement:	1·3	1·24	1·21
(7) Road speed in top gear (mph):			
at 5500 rpm	93·5	—	97·3
at 5600 rpm	—	95·2	—
(8) Road speed at 2500 ft min piston speed in top gear (mph):	72·8	72·8	76

THEORETICAL ROAD SPEEDS

(Road speeds in mph, piston speeds in ft min)

Rear axle ratio 4·3 : 1 (MGA MGA 1600)

	rpm	*1st gear*	*2nd gear*	*3rd gear*	*top gear*	*piston speed*
a	1000	4·7	7·9	12·4	17·0	545
b	3800	17·7	29·2	47·0	64·6	2070
c	5600	26·1	43·0	69·3	95·2	3050

Rear axle ratio 4·1 : 1 (MGA 1600 Mk II):

	rpm	*1st gear*	*2nd gear*	*3rd gear*	*top gear*	*piston speed*
a	1000	4·9	8·0	12·9	17·7	545
b	4000	19·4	32·0	51·5	70·8	2178
c	5500	26·7	44·0	70·8	97·3	2995

b = max. torque; *c* = max. power.

ROAD TEST

	MGA	*MGA* 1600	*MGA* 1600 *Mk II*
(1) **Maximum speed:**	100 mph	100 mph	102 mph
(2) **Cruising speed:**	75 mph	75 mph	75 mph
(3) **Cruising range** (approx.):	300 miles	300 miles	300 miles
(4) **Speed in gears:**			
1st gear:	26 mph	28 mph	29 mph
2nd gear:	42 mph	46 mph	48 mph
3rd gear:	68 mph	77 mph	78 mph
(5) **Acceleration times** (through gears):			
0–30 mph	5·0 sec	4·5 sec	4·4 sec
0–50 mph:	10·8 sec	10·3 sec	9·7 sec
0–80 mph:	32·1 sec	26·6 sec	24·6 sec
0–90 mph:	50·1 sec	36·4 sec	36·1 sec
Standing ¼ mile:	19·8 sec	19·3 sec	19·1 sec

(6) **Braking efficiency** at 75 lb pedal load (30 mph):	0·83 g	0·74 g	0·82 g
(7) **Climbing power:**			
max. gradient in 2nd gear:	1 in 4·5	1 in 4·5	1 in 4·0
max. gradient in 3rd gear:	1 in 7·3	1 in 7·3	1 in 7·1
max. gradient in top gear:	1 in 10·9	1 in 10·9	1 in 10·3
(8) **Fuel consumption:** (approx. normal range)	25–34 mpg	24–31 mpg	21–35 mpg
(9) **Speedometer correction:**			
at 30 mph:	accurate	accurate	6% fast
at 60 mph:	accurate	1·6% fast	6% fast
at 90 mph:	accurate	3% fast	6·5% fast
at 100 mph:	1% fast	3% fast	7% fast
Mileage recorder:	accurate		

Lubrication and Maintenance

RUNNING-IN SPEEDS

During the first 500 miles do not exceed 45 mph.

Avoid long periods of idling and do not over-rev the engine.

Never overload the engine; change down to a lower gear when necessary and avoid fierce acceleration.

GENERAL DATA

Engine: Sump capacity (including oil filter): 8 Imp pints (9½ US pints).
Oil viscosity: down to 32°F (0°C): SAE 30
32°F (0°C) to 10°F (—12°C): SAE 20W } or Multigrade 10W-30
below 10°F (—12°C): SAE 10W
Oil dipstick: on the right-hand side of the cylinder block.
Oil filler: on valve rocker cover.
Oil drain plug: on the right-hand side of the sump

Oil filter: Full-flow type. Renew filter element every 6000 miles. Element: AC AC32A, Fram CH814PL, Purolator CE.176A, Tecalemit FG2471.

Fuel tank: Capacity 10 Imp gallons (12 US gallons).

The fuel tank is located under the luggage compartment.

Fuel pump: Every 6000 miles clean pump filter in clean petrol with a stiff brush. Do not use rag.

The fuel pump is fitted beneath the luggage compartment floor and is reached in the following way: raise the hood and remove spare wheel. Remove floor by releasing the two quick-release screws.

Air-cleaner: Every 3000 miles clean elements. Wash filter elements in petrol and allow to dry. Re-oil the elements with SAE 20W engine oil and allow to drain before reassembling.

Cooling system: Capacity (including heater): 10 Imp pints (12 US pints).

The engine drain-cock is fitted on the right-hand side of the engine. The radiator drain-cock is fitted on the left-hand side of the radiator bottom tank.

Under winter driving conditions, the cooling system must be protected by an anti-freeze solution.

Gearbox: Capacity: 4 Imp pints (5 US pints).
Oil viscosity, all conditions: SAE 30 engine oil.
Drain plug: at bottom of gearbox.
Oil filler plug: the combined filler plug and dipstick are located beneath the rubber plug in the gearbox cover.

Rear axle/differential:

Capacity:	MGA:	2¾ Imp pints (3¼ US pints)
	MGA 1600	2 Imp pints (2·4 US pints)
	MGA 1600 Mk II	
Oil grade:	EP gear oil, down to 10°F (—12°C):	SAE 90 EP
	below 10°F (—12°C):	SAE 80 EP

The combined filler and level plug is located on the rear side of the differential housing.

Shock-absorbers: The front shock-absorbers should be topped-up every 6000 miles. The filler plug is located on top of each shock-absorber. The rear shock-absorbers should be topped-up every 12,000 miles and for this purpose must be removed from the chassis.

Use Armstrong Super Shock Absorber Fluid No. 624. (If not available, use a good-quality mineral oil to specification SAE 20/20W. However, this is not suitable for low-temperature operation.)

Lockheed brake and clutch system: Every 1000 miles check fluid level in the combined hydraulic brake and clutch master cylinder. The master cylinder is mounted on the dash panel below the bonnet on the driver's side. The fluid level should be ¼ in. below the bottom of the filler neck.

Dunlop disc brakes: Separate brake master-cylinder reservoir and clutch cylinder reservoir.

Recommended for use: Dunlop Disc Brake Fluid in the brake master cylinder and Girling Fluid in the clutch cylinder.

If not available, use a fluid conforming to specification SAE 70 R3.

TYRE PRESSURES (cold)

	Front		*Rear*	
	lb/sq in	*kg/sq cm*	*lb/sq in*	*kg/sq cm*
Normal:	17	1·20	20	1·4
Full load:	21	1·50	24	1·7
Sustained high-speed driving:	23	1·60	26	1·8
Road Speed tyres:				
Normal:	18	1·27	20	1·4
Full load or fast driving:	22	1·55	24	1·7
Competition work, sustained high-speed driving:	24	1·70	26	1·8

ROUTINE MAINTENANCE

Daily: Check oil level, radiator, petrol, tyres and lights.
Weekly: Check battery and tyre pressure.

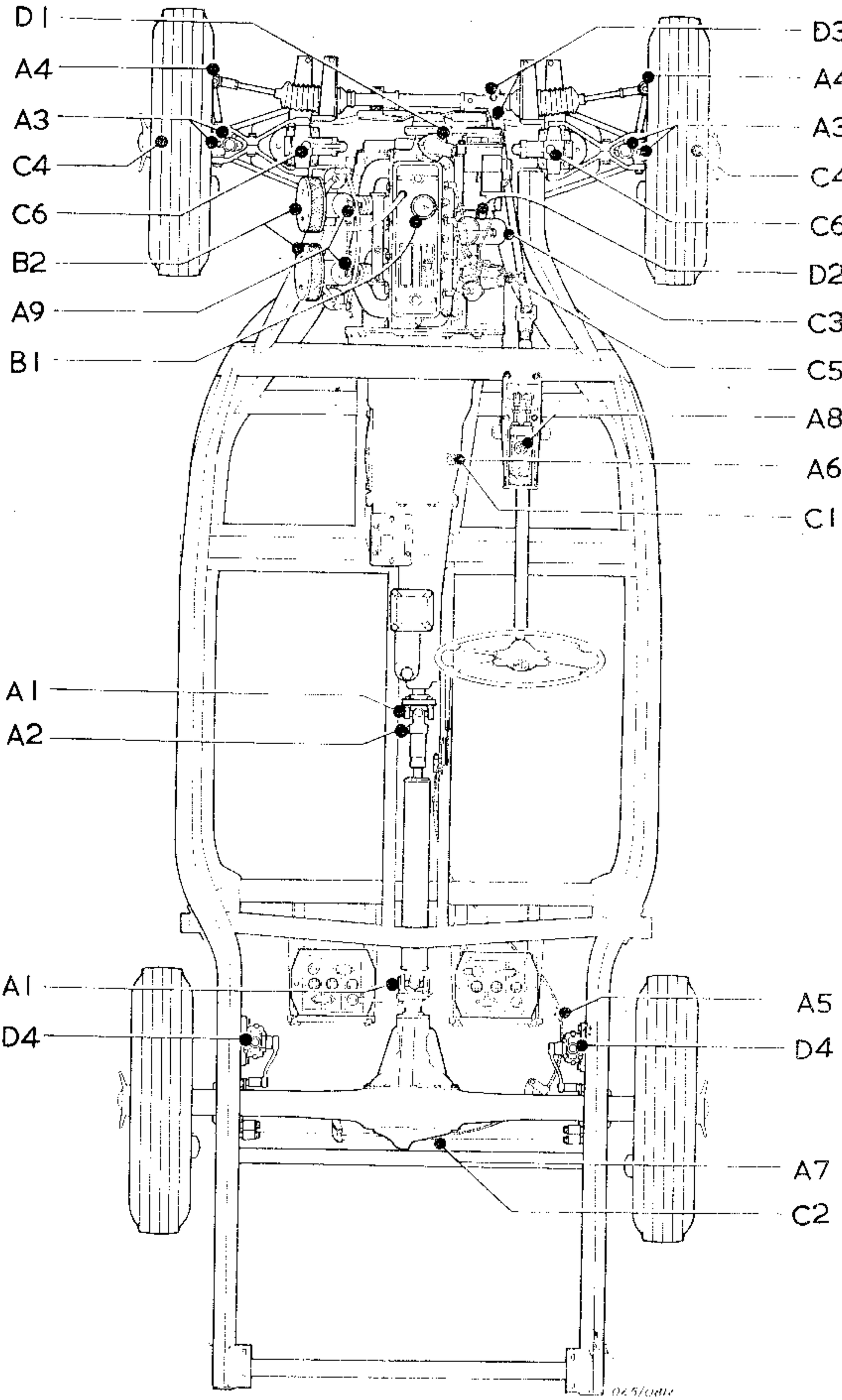


Fig. 16. Lubrication chart

Running-in period: After the first 500 miles (free service):

Change oil in: engine, gearbox and rear axle.

Check tightness to recommended torque figures of: cylinder-head and manifold nuts, valve rocker-shaft brackets, universal joint nuts, spring clips, bumper bolts and wheel nuts.

Check and adjust if necessary: valve rocker clearance, fan-belt tension, all water connections, spark plugs, distributor points, working of automatic ignition control, clutch pedal free movement, front wheel alignment, steering connections, braking system, doors and locks, tyre pressures.

Check and top-up if necessary: brake and clutch master cylinder, battery. Check hydraulic shock-absorbers for leaks.

A. Every 1000 miles:

A1 to A5 Lubricate with grease-gun.
A1 Propeller shaft universal joints (2 nipples).
A2 Propeller shaft sliding joint (1 nipple).
A3 Kingpins (4 nipples).
A4 Steering tie-rods (2 nipples).
A5 Parking brake cable (1 nipple).
A6 Gearbox: check oil level, top-up if necessary.
A7 Rear axle/differential: check oil level, top-up if necessary.
A8 Brake and clutch fluid reservoir: check fluid level, top up if necessary.
A9 Carburettors: top-up dashpots and lubricate controls.
Brakes: check pedal free play and make visual check of lines and pipes.
Shock-absorbers: check for leaks.
Wheels: check wheel nuts for security.

B. Every 3000 miles:

As for 1000 miles, and in addition:
B1 Engine sump: drain and refill.
B2 Air-cleaners: wash elements in petrol and re-oil.
Door locks and safety catches, hinges, bonnet lock and operating mechanism: lubricate with engine oil.
Ignition distributor: check and if necessary adjust contact breaker points gap.
Spark plugs: clean and reset electrode gap.
Generator: check drive-belt tension.
Brakes: check and if necessary adjust (if disc brakes are fitted, check friction pads for wear).
Wheels: change round diagonally to even-out wear.

C. Every 6000 miles:

As for 3000 miles and in addition:
C1 Gearbox: drain (when hot) and refill.
C2 Rear axle/differential: drain (when hot) and refill.
C3 Engine oil filter: clean housing and renew element.
C4 Front wheel bearings: repack hub caps with grease (do *not* overfill).
C5 Ignition distributor: remove rotor and apply a few drops of engine oil on screw thus exposed. One drop on breaker-arm pivot and a few drops on automatic

advance mechanism through gap around cam spindle. Lightly smear cam profile with grease or oil. Check contact-breaker points gap and check automatic ignition control.

C6 Shock absorbers (front): check fluid level, top up if necessary.
Valve rockers: check clearances, adjust if necessary.
Carburettor and fuel-pump filters: clean in petrol.
Rear road springs: check seat bolts for security.
Door hinges and striker plate screws: check for security.
Battery: check specific gravity of electrolyte.
Front wheels: check alignment.

D. Every 12,000 miles:

As for 6000 miles, and in addition:

*D*1 Water pump: lubricate sparingly with grease (remove plug).
*D*2 Generator: lubricate rear bearing (current recommendation: every 6000 miles).
*D*3 Steering rack and pinion: lubricate with oil-gun (10 strokes to nipple on rack housing and 2 strokes to pinion-shaft nipple).
*D*4 Shock-absorbers (rear): check fluid level, top-up if necessary (remove from car).
Speedometer and rev counter drive cables: lubricate with grease (withdraw cables from outer casings).
Carburettors: remove suction chambers and pistons, clean, reassemble and top-up. Remove float chambers, empty sediment and refit.
Ignition: renew spark plugs.
Steering: check moving parts for wear.
Engine sump: drain, flush out with flushing oil and refill.
Cooling system: drain, flush out and refill.
Headlamps: check beam setting, adjust if necessary.

E. Every 24,000 miles:

Engine sump: remove sump and pick-up strainer, clean, reassemble and refill with fresh oil.

Repair Data

Repairs are usually best performed by authorized dealers, who possess the necessary experience and special equipment. These data have been compiled from the official workshop manuals and other manufacturers' information, which were supplied through the kind co-operation of the British Motor Corporation.

ENGINE

The engine is built in unit with clutch and gearbox.

Engine type: MGA 1500: 15 GB
From car No. 61504: 15 GD
MGA 1600: 16 GA
MGA 1600 Mk II: 16 GC

Removal of the engine (single unit):

(1) Drain engine and gearbox, remove the upper and lower radiator hoses and remove the radiator. Remove the bonnet.

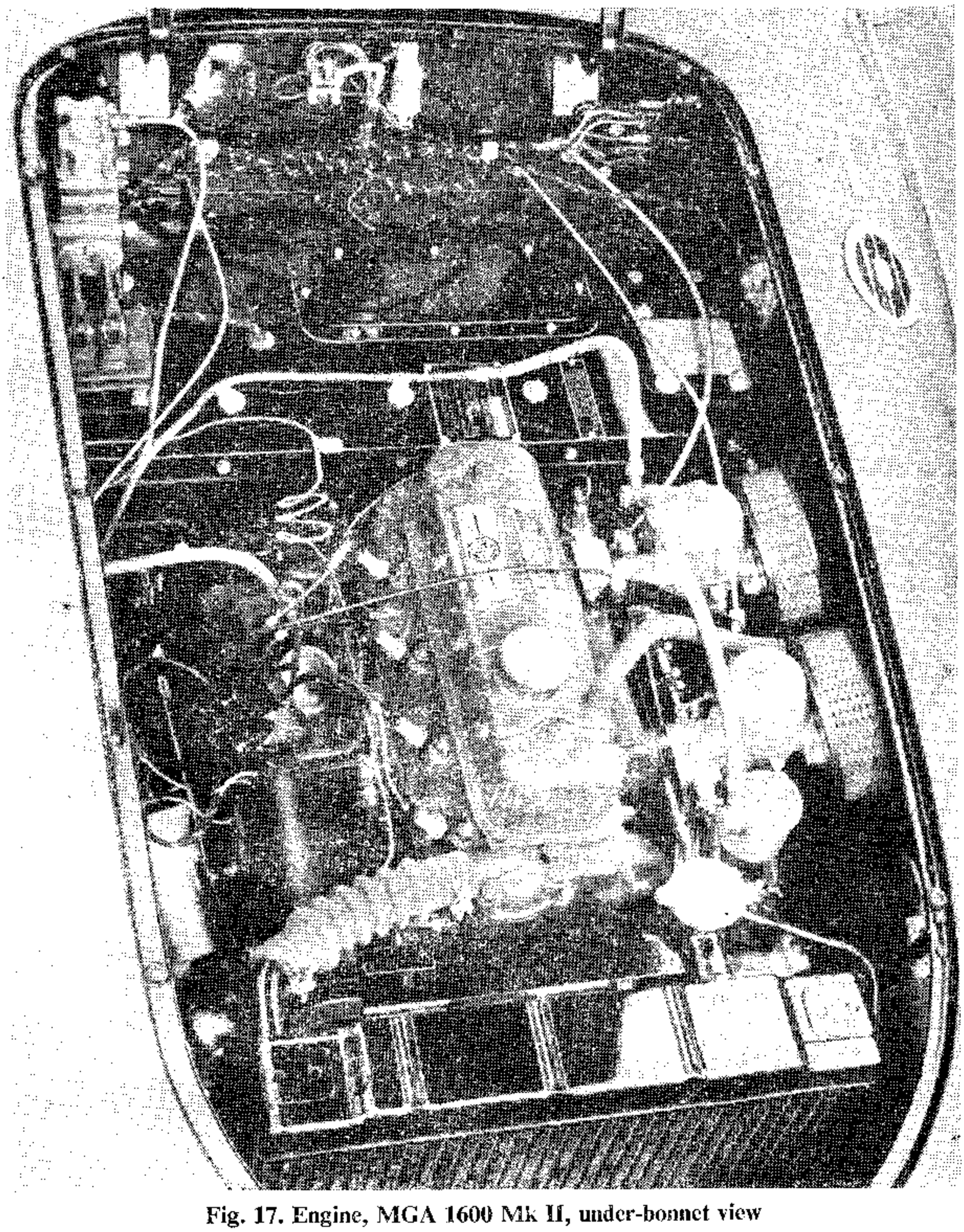


Fig. 17. Engine, MGA 1600 Mk II, under-bonnet view

(2) Suitably mark the rear universal joint flange and the pinion flange, and disconnect the propeller shaft. Mark the parking brake lever and the splined shaft, unscrew the clamping bolt and remove the lever from the shaft.

(3) Remove the reinforcement bracket from the inside of the propeller-shaft tunnel. Remove the seats, floor boards, toe-boards, and gearbox and propeller-shaft covers. Remove the remote-control housing from the gearbox extension. Disconnect the speedometer drive cable. Disconnect the hydraulic pipe from the clutch actuating cylinder.

(4) Remove the carburettors, disconnect the tachometer drive cable, and disconnect the exhaust pipe from the manifold and from the bracket at the rear engine mounting plate.
(5) Unscrew the water temperature transmitter unit from the cylinder head and detach the conductor from the support clip. Disconnect the oil pressure gauge pipe from the union at the right-hand side of the cylinder block.
(6) Disconnect the wiring from generator, coil, distributor and starter motor. Hang the engine in a suitable tackle and take the engine weight. Release the engine from the front engine supports and remove the rubber mountings. Release the gearbox from the mounting on the chassis cross-member. Carefully hoist the engine from the car.

Reinstallation is done in the reverse order of removal.

Engine compression: Compression pressure with a warm engine at cranking speed with wide-open throttle should be 130-150 lb/sq in.

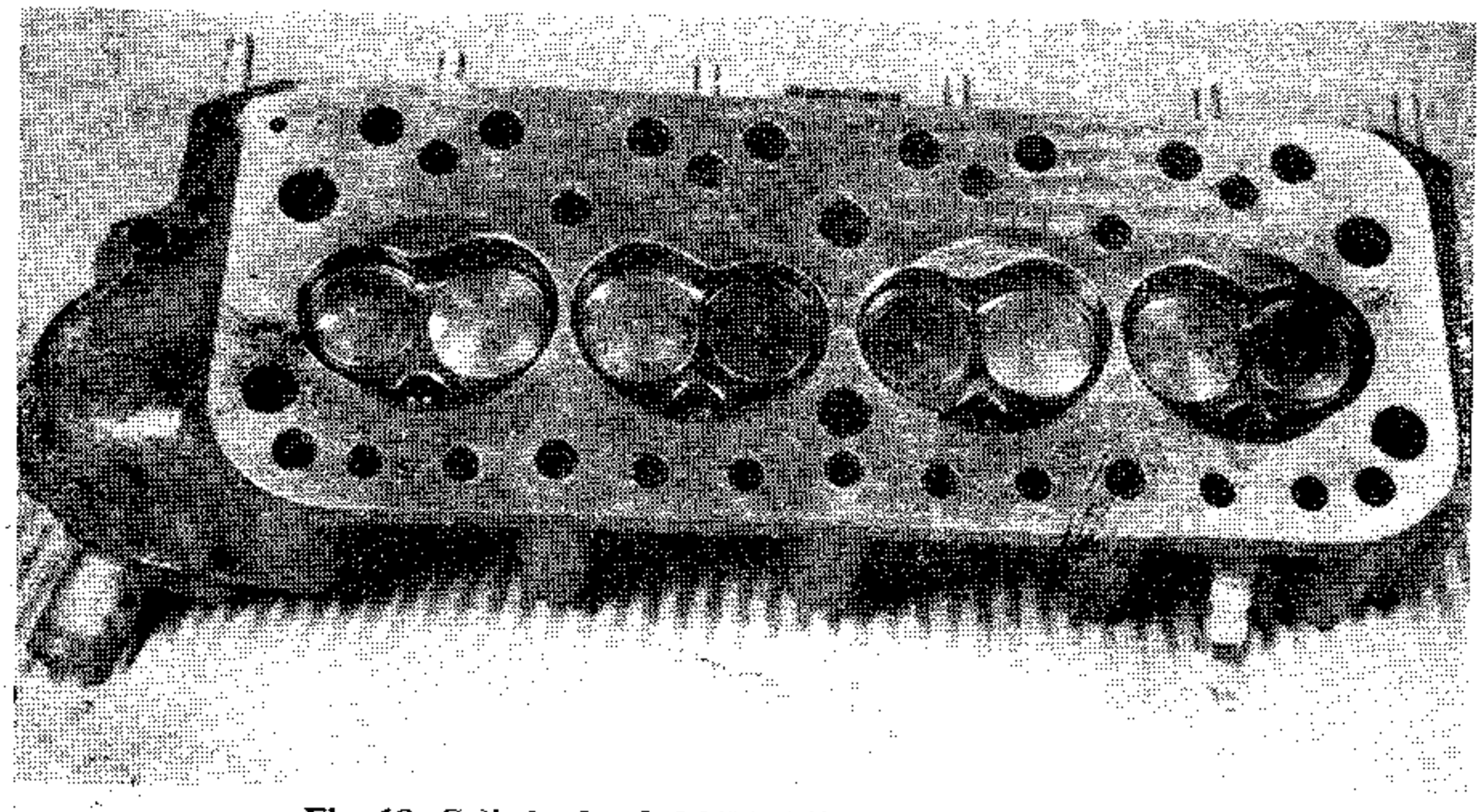


Fig. 18. Cylinder-head, MGA 1600 Mk II, bottom view

Cylinder head: Cast-iron cylinder head, carrying the valve gear. Unscrew and tighten the cylinder-head nuts in the sequence given below. Tightening torque 50 ft lb:

```
          7     3     2     6
11 —  ———————————————————  10  Front
          8     4     1     5     9
```

The cylinder-head nuts Nos. 7, 3, 2 and 6 also secure the rocker-shaft supports.

Cylinder-head gasket: The cylinder-head gasket is marked 'Top' and 'Front' to facilitate installation. The copper side should face upwards.

Cylinder block: Cast-iron cylinder block, integral with the upper half of the crankcase. No separate cylinder liners are used, but when the cylinder bores are unfit

even for the installation of 0·040in oversize pistons, dry liners can be pressed in.
Standard bore diameter, MGA 1500: 2·875in
MGA 1600: 2·968in
MGA 1600 Mk II: 3·0013in

Cylinder liners: The cylinder block must be bored-out to the dimensions given under *Specifications* to provide the necessary interference fit. When the liners are pressed into the block, the pressure must be released several times during the first inch. This will allow the liner to line-up properly. Cylinder liners must be installed with the chamfered end downwards. Press the liners in until the upper edge is flush with the cylinder-block mating face.

Specifications:	*MGA* 1500
Bore diameter in cylinder block:	3·0165–3·017in
Outer diameter of liner:	3·0185–3·01925in
Inner diameter of liner, pressed in and reamed:	2·8745–2·876in

Inlet and exhaust manifold: Separate inlet and exhaust manifolds. There is no provision for pre-heating the mixture.

Engine sump: The removable engine sump is a steel pressing, having an uninterrupted mating face.

Crankcase ventilation: Positive crankcase ventilation by means of a pipe between the valve rocker cover and the front air-cleaner. The air enters the engine via a pipe on the left-hand side of the cylinder block.

Pistons: Solid-skirt pistons of anodised aluminium alloy. The pistons are equipped with three compression rings and one oil control ring, all fitted above the piston pin. Pistons and connecting rods are removed upwards from the cylinder block. The crown of each piston is marked 'Front'.

Oversize pistons are identified by a number enclosed in an ellipse. The number on each piston denotes the actual bore size to which it must be fitted.

Always stamp the size of each piston on the cylinder-block mating face, adjacent to the cylinder bore, whenever pistons differing in size from those removed are installed. Piston diameter is measured at the bottom of the skirt, at right angles to the piston pin.

Starting with engine No. 15 GB/U/H 38484, new pistons with modified piston pins having a reduced internal diameter were installed. The later type piston is only interchangeable with the original as a set. From engine No. 15 GB/U/H 40824, pistons having compression ring grooves of reduced diameter were installed. These pistons are also interchangeable as a set only.

Pistons are available in standard size and in 0·010, 0·020, 0·030 and 0·040in oversize.

Specifications:	
Piston clearance at top of skirt:	0·0035–0·0042in
Piston clearance at bottom of skirt:	0·0017–0·0023in

Piston rings: Three compression rings and one oil control ring are fitted above the piston pin. The top ring is plain, the other two are tapered and should be installed with the side marked 'T' facing upwards.

From engine No. 5682 onwards a chromium-plated top compression ring was installed.

Starting from engine No. 15 GB/U/H 40824 the piston rings are of increased radial thickness. The new compression rings must not be used in pistons having the larger groove diameter. When installing piston rings, make sure that the ring gaps are equally spaced around the piston circumference. Piston rings are available in standard size and in 0·010, 0·020, 0·030 and 0·040 in oversize.

Specifications:

	MGA 1500 (*inches*)	*MGA* 1600 (*inches*)	*MGA* 1600 *Mk II* (*inches*)
Hight of compression rings:	0·0615–0·0625	0·0615–0·0625	0·0615–0·0625
Thickness of compression rings:	0·111–0·118	—	—
from engine No. 40824:	0·119–0·126	0·141–0·148	0·125–0·132
Fitted gap:	0·008–0·013	0·009–0·014	0·009–0·014
Clearance in groove:	0·0015–0·0035	0·0015–0·0035	0·0015–0·0035
Height of oil control ring:	0·1552–0·1562	0·1552 0·1562	0·1552–0·1562
Thickness of oil control ring:	0·111–0·118	—	—
from engine No. 40824:	0·119–0·126	0·135–0·142	0·125–0·132
Fitted gap:	0·008–0·013	0·009–0·014	0·009–0·014
Clearance in groove:	0·0016–0·0036	0·0016–0·0036	0·0016–0·0036

Piston pins (gudgeon pins): The hollow steel piston pins are clamped in the connecting-rod small ends. Each piston pin should be a hand-push fit through the piston; this can be checked by holding the connecting rod and piston assembly in a horizontal position. The connecting rod should turn the piston by its own weight. From engine No. 15 GB/U/H 38484, a new piston pin, having a reduced internal diameter, was fitted. The later type piston pin is only interchangeable with the original as a set.

NOTE: When, during dismantling or reassembly, the piston pin clamp bolt is loosened or tightened, it is essential to clamp the piston pin in a vice by means of the special clamping plugs which are available for this purpose. In the absence of these clamping plugs, a steel rod may be clamped in a vice and the hollow pin slid over it. *On no account* should the connecting rod be clamped in a vice when the bolt is loosened or tightened. Such practice will always result in distorting the connecting rod.

Specifications:

	MGA 1500–*MGA* 1600	*MGA* 1600 *Mk II*
Outer diameter:	0·6869–0·6871 in	0·7499–0·7501 in
Fit in piston:	0·0001–0·00035 in	0·0001–0·00026 in

Connecting rods: The connecting rods are steel forgings of I-beam section, equipped with replaceable steel-backed bearing shells.

Connecting rods, bearing caps and shells should never be filed or scraped.

The connecting rods are numbered 1 to 4 from front to rear; the big-ends of the connecting rods are offset; the wide side of Nos. 1 and 3 connecting rods face the rear; those of Nos. 2 and 4 connecting rods face the front.

When reinstalling the connecting-rod and piston assembly, take special note of the following: the number stamped on the connecting rod and bearing cap must correspond with the cylinder bore in which the piston is to be installed; the bearing shell locating notches in cap and rod must be on the same side and the oil squirt hole must be towards the thrust side of the engine, i.e. must be facing away from the camshaft. Tighten the piston pin clamp bolt to 25 ft lb.

Specifications:

Length, centre to centre:	6·498–6·502 in
Big-end bore diameter:	2·0210–2·0215 in
Connecting-rod end-float:	0·008–0·012 in
Big-end bearing clearance:	0·0001–0·0016 in; MG 1600–1600 Mk II: 0·0010–0·0025 in

Connecting-rod big-end bearings: Thin-wall, steel-backed lead-indium or lead-tin bearing shells for the MGA 1500, and steel-backed lead-indium bearing shells for the MGA 1600 and 1600 Mk II. The bearing caps and shells should on no account be filed or scraped.

Bearing shells are available in standard size and 0·010, 0·020, 0·030 and 0·040 in undersize. Tighten the big-end bearing cap bolts to 35 ft lb.

Crankshaft: Forged-steel crankshaft with integral balance weights, running in three main bearings. End-float is controlled by semi-circular thrust washers on both sides of the centre main bearing. The oil grooves in these thrust washers must face outwards. From engine No. BP15GB/6615 onwards, the oil-return thread was reduced in diameter. (Old, 2·139–2·1405 in; new, 2·138–2·1385 in.) The clearance between the crest of the thread and the housing should be 0·003–0·006 in.

Specifications:

Standard journal diameter:	2·0005–2·001 in
Minimum regrind diameter:	1·9605–1·961 in
Crankpin diameter:	1·8759–1·8764 in
Minimum regrind diameter:	1·8359–1·8364 in
Crankshaft end-float:	0·002–0·003 in

Main bearings: Replaceable thin-wall, steel-backed, white metal bearing shells. The bearing caps must never be filed or scraped. The horizontal joint faces of the rear main bearing cap must be lightly smeared with jointing compound to ensure a perfect oil-seal when the cap is bolted down. Tighten the main bearing cap bolts to 70 ft lb.

Specifications:

Length of bearing caps:	1·375 in
Axial clearance:	0·0005–0·002 in

Flywheel: The flywheel is bolted on to the crankshaft rear flange. The starter ring gear is shrunk on. A new starter ring gear should be heated to 300–400°C (575–752°F) (light-blue surface colour) before it is placed on the flywheel. To facilitate the reinstallation of the flywheel, the crankshaft rear flange is stamped with a timing mark, which should be in line with the timing mark on the flywheel. Tighten the flywheel bolts to 35–40 ft lb.

Camshaft: The camshaft is situated in the left-hand side of the engine and runs in three bearings. Camshaft end-float is taken by a thrust plate behind the camshaft sprocket.

Specifications:

Diameter of front camshaft journal:	1·78875–1·78925 in
Diameter of centre camshaft journal:	1·72875–1·72925 in
Diameter of rear camshaft journal:	1·62275–1·62325 in
Camshaft end-float:	0·003–0·007 in

Camshaft bearings: The camshaft runs in three steel-backed, white metal bearing bushes. To remove the bearing bushes, the use of a special extracting and refitting tool is strongly recommended.

Specifications:

Inner diameter of front bearing, pressed in and reamed:	1·790 in
Inner diameter of centre bearing, pressed in and reamed:	1·730 in
Inner diameter of rear bearing, pressed in and reamed:	1·624 in
Radial clearance:	0·001–0·002 in

Camshaft drive: The camshaft is driven by means of a duplex roller chain.

From engine No. 259 onwards, the chain is kept at the right tension by means of spring-loaded, synthetic rubber tensioner. To free the tensioner from spring pressure, the bottom plug is removed and an $\frac{1}{8}$ in Allen wrench is inserted. Turn the wrench in a clockwise direction, until the synthetic rubber slipper is free (between one half and one full turn). The tensioner is released for operation by turning the plunger in a clockwise direction, until the slipper moves against the chain.

Never turn the wrench in an anti-clockwise direction or force the slipper head on to the chain by external pressure.

When reinstalling the camshaft drive, make sure the sprockets are properly aligned. If necessary, align the sprockets by adjusting the number of shims behind the crankshaft sprocket. The timing marks should be in line and towards each other.

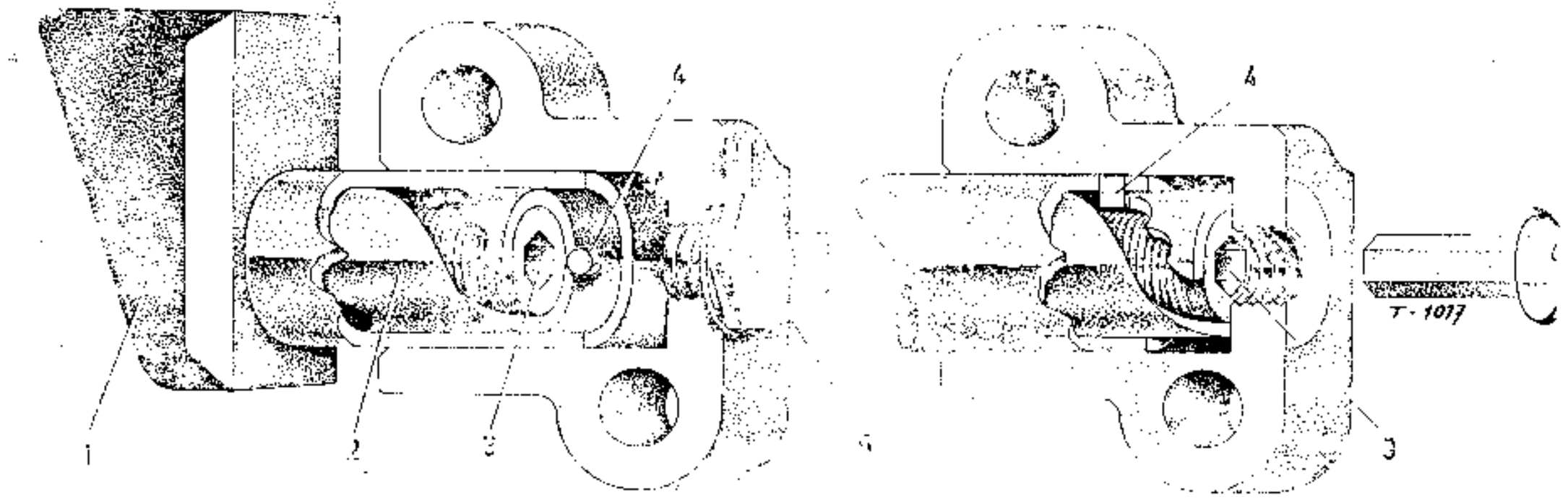


Fig. 19. Timing chain tensioner

1 Rubber pad
2 Sleeve with non-return helical slot
3 Sleeve retractor
4 Stop pin
5 Plug

Specifications:

Chain pitch:	$\frac{3}{8}$ in
Number of links:	52
Number of teeth on crankshaft sprocket:	20
Number of teeth on camshaft sprocket:	40

Valve timing: When checking valve timing, adjust the valve rocker clearance to 0·060 in; this is necessary to bring the opening position of number one valve to TDC.

Inlet valve opens 16° BTDC
Inlet valve closes 56° ABDC

Exhaust valve opens 51° BBDC
Exhaust valve closes 21° ATDC

Valve clearance: The valve clearance should be adjusted when the engine is hot. Running valve clearance, 1500cc engine: 0·017in; 1600cc engine: 0·015in. Valve clearance for timing: 0·060in.

Valves: Overhead valves, operated by means of push-rods and rockers. The valve keepers are of the split cotter type. When replacing the valves, make sure that a new packing ring is correctly located at the bottom of the cotter groove.

Specifications	*MGA* 1500–1600	*MGA* 1600 *Mk II*
Valve head diameter, inlet:	1·5in	1·562–1·567in
exhaust:	1 9/32in	1·343–1·348in
Valve stem diameter, inlet and exhaust:	0·342in	0·342in
Valve lift, 1500cc engine:	0·357in	
1600cc engine:	0·350in	0·350in
Valve clearance in guide, inlet:	0·00155–0·00255in	0·00155–0·00255in
exhaust:	0·00105–0·00205in	0·002–0·003in
From engine No. 4045, exhaust:	0·002–0·003in	

Valve seats: The valve seats are integral with the cylinder head. If it should be necessary during an engine overhaul to install valve-seat inserts, the cylinder head must be machined to the dimensions given in Fig. 20.

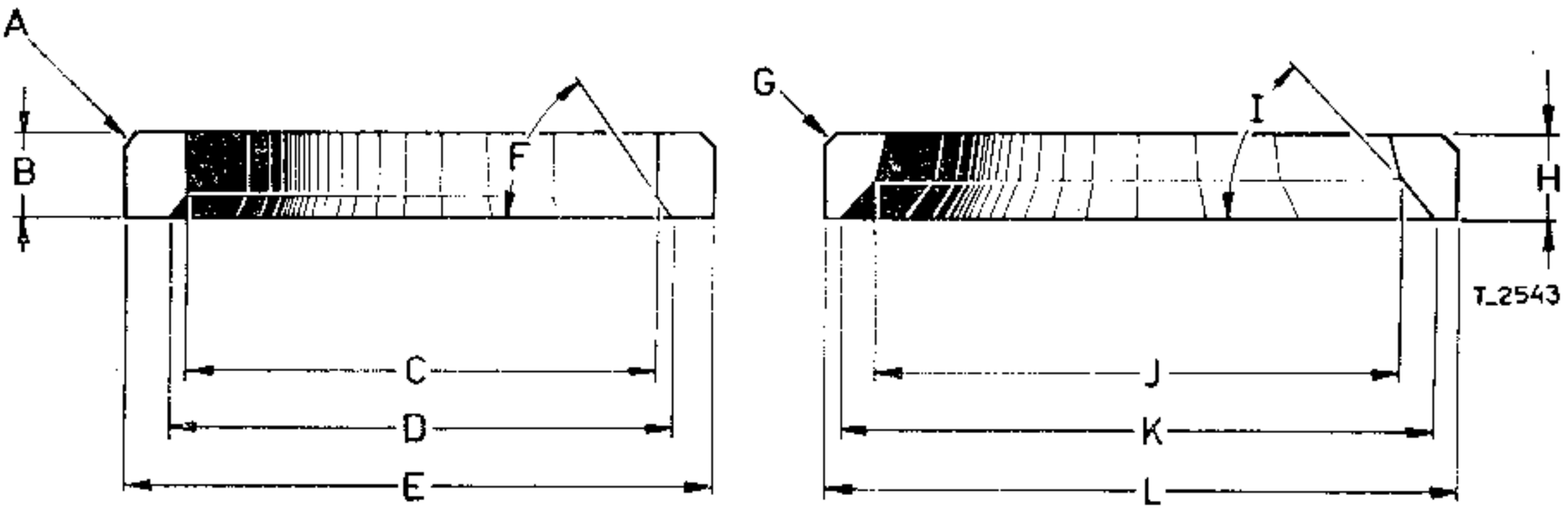


Fig. 20. Valve seats, machining dimensions

A Maximum radius 0·015in
B 0·186–0·188in
C 1·165–1·175in
D 1·268–1·288in
E 1·437-1·438in
F 45°
G Maximum radius 0·015in
H 0·186–0·188in
I 45°
J 1·302–1·322in
K 1·487–1·507in
L 1·530–1·531in

Valve springs: Double valve springs.
Specifications:

	MGA 1500–1600	*MGA* 1600 *Mk II*
Free length, inner spring:	1 31/32in	1 31/32in
outer spring:	2 3/64in	2 1/32in
Fitted length, inner spring:	1 7/16in	1 7/16in
outer spring:	1 9/16in	1 17/32in

Number of active coils, inner spring:	$6\frac{1}{2}$	$6\frac{1}{2}$
outer spring:	$4\frac{1}{2}$	$4\frac{1}{2}$
Spring pressure, valve opened,		
inner spring:	50 lb	50 lb
outer spring:	105 lb	131 lb
Spring pressure, valve closed,		
inner spring:	30 lb	28–32 lb
outer spring:	60–51 lb	77–81 lb

Valve guides: Cast-iron, removable valve guides. If it is necessary to replace the valve guides, the old ones must be driven out towards the combustion chamber.

The new valve guides must be pressed in from the top, the inlet valve guides having the largest chamfer at the top, and the exhaust valve guides having the counterbored end towards the bottom.

The valve guides must protrude $\frac{5}{8}$ in above the machined surface of the valve spring seat.

Specifications:

Length, inlet:	$1\frac{7}{8}$ in
exhaust:	2 9/32 in
Outer diameter, inlet and exhaust:	0·5635 in
MG 1600–1600 Mk II:	0·5635–0·5640 in
Inner diameter, inlet and exhaust:	0·3438 in
MG 1600–1600 Mk II:	0·34425–0·34475 in

Valve tappets: Valve tappets of the 'barrel' type. New tappets should be fitted by selective assembly; they must just fall down their bores by their own weight when lightly lubricated.

From engine No. 5504 onwards, the ball ends of the push-rods and the seats of the tappets are increased in spherical diameter. Push-rods and tappets are only interchangeable as a set.

Specifications:

Length:	2·293–2·303 in
Diameter:	13/16 in

Valve rockers: The valve rockers are assembled on a hollow valve rocker shaft, which rests in four supports on the cylinder head. The outer nuts of the rocker-shaft supports also serve to retain the cylinder head. It is therefore essential to drain the cooling system and to unscrew all the cylinder-head nuts (engine cold) in the sequence given on page 22 before the valve-rocker assembly is removed. To facilitate the removal and reinstallation of the valve-rocker bushes, the use of tool 18G226 is recommended. When new bushes are pressed in, the split must be just above the oil-hole in the rocker, on the adjusting screw side. Use a 0·093 in drill to drill the oil-hole on the adjusting screw side and a 0·0785 in drill for the oil-hole on the valve spring side. Plug the hole on the adjusting screw side.

Ream the bush to 0·616–0·620 in.

Specifications:

Bore of rocker arms:	0·7485–0·7489 in
Rocker ratio:	1·426 : 1

Engine lubrication: Full-pressure lubrication, by means of an oil pump of the eccentric rotor type. The oil enters the pump through a gauze screen; the oil is delivered via a pressure relief valve on the rear left-hand side of the cylinder block

and an external pipe on the right-hand side of the cylinder block to a full-flow oil filter. From the oil filter the oil is delivered to a high-pressure oil gallery, from which the main bearings receive their oil. The connecting-rod bearings are lubricated in the usual way; the second and third connecting-rod bearings receive their oil from the centre main bearing, and the first and fourth connecting-rod bearings from the front and rear main bearings respectively.

From the front main bearing oil is fed to the front camshaft bearing. The transfer drilling in the cylinder block feeds the oil in the front camshaft bearing to the timing chain tensioner, to lubricate timing chain and sprockets. From the centre camshaft bearing, oil is fed to a low-pressure oil gallery on the left-hand side of the engine. Oil from this gallery lubricates the oil-pump drive shaft. The rear camshaft bearing is lubricated by oil from the rear main bearing. From the rear camshaft bearing oil under reduced pressure is fed to the rear rocker-shaft support and the hollow valve rocker shaft. The valve rockers are provided with two oil-holes, one squirt hole for the valve stem tip and the valve springs, and one for the push-rod ball cup. The oil flowing down from the cylinder head lubricates the push-rods and tappets. The connecting-rod big-ends are drilled for additional cylinder-wall lubrication; the piston pins are lubricated by splash.

Oil pressure relief valve: At the rear left-hand side of the cylinder block a non-adjustable oil pressure relief valve is installed.

Specifications:

Free length of spring:	3 in
Fitted length:	2 5/32 in
Fitted load:	16 lb
Identification colour:	red spot

Oil pump: An eccentric rotor-type oil pump is mounted in the left-hand side of the crankcase and is driven by a short vertical shaft from the camshaft.

On later engines a new oil pump and oil strainer are installed; the new pump, strainer and cylinder block to oil pump studs can be used to replace the former model.

Oil pressure: The normal oil pressure at a warm engine should be between 30 and 80 lb/sq in for the 1600 and 1600 Mk II, and 15 to 50 lb/sq in for the 1500.

Oil filter: A full-flow oil filter is mounted on the right-hand side of the cylinder block. The by-pass valve opens at a pressure difference of 13–17 lb/sq in.

Starting with engine No. 15 GB/U/H 26661 to 15 GB/U/H 26700 and from No. 26933 onwards, a new type oil filter is installed.

Specifications:

Capacity: MGA 1500:	½ pint
MGA 1600:	1 pint

Ignition system: Ignition by means of battery and coil.
Firing order 1–3–4–2.

Ignition timing: The contact-breaker points should just start to open when the notch on the crankshaft pulley is almost midway between the centre and right-hand tooth on the timing cover, and No. 1 piston is almost at TDC on its compression stroke. This will be 7° before TDC. For the M.G. 1600 Mk II, the notch should be in line with the right-hand tooth (the longest tooth indicates TDC, the centre tooth 5° BTDC, the right-hand tooth 10° BTDC). To time the distributor, proceed as follows:

Turn the crankshaft in the direction of rotation until the crankshaft pulley is almost midway between the centre and right-hand tooth on the timing cover, and No. 1 piston is almost at TDC on its compression stroke. Check that the contact-braker gap is set to 0·014–0·016in. Insert the distributor into its housing and slowly rotate the rotor arm to engage the drive shaft. The vacuum control unit should be to the front and vertical. Secure the clamp plate to the distributor housing. Slacken the clamp plate bolt, take up any lost motion in the drive by turning the rotor clockwise as far as it will go, turn the distributor housing anti-clockwise until the contact-braker points are closed, and then turn the distributor clockwise until the breaker points just start to open again. Tighten the clamp bolt. The ignition is now timed to 7° BTDC. A slight readjustment to the distributor may be necessary to suit the particular type of fuel in use and the setting should be corrected after checking the timing as described above or during a road test. If necessary, the correction can be made by means of the vernier control on the distributor housing.

Distributor: Lucas DM 2; on later models Lucas DM 2 P4.
Contact breaker point gap: 0·014–0·016in.
Breaker-arm tension: 20–24oz.
Distributor setting: 7° BTDC; MGA 1600 Mk II: 10° BTDC.
Direction of rotation: anti-clockwise when viewed from above.
Condenser capacity: 0·2 microfarad.

	MGA 1500	*MGA* 1600	*MGA* 1600 *Mk II*
Advance degrees, centrifugal:	11/13	12	24
vacuum:	10	10	20
Advance begins (engine rpm):	300/550	300	400
ends (engine rpm):	1950	1900	1900

Spark plugs: Champion N5 (formerly designated NA8).
Spark plug gap: 0·024–0·026in.

Ignition coil: Lucas HA 12.

Fuel system: The fuel tank is mounted between the chassis side-members at the rear of the car; the capacity is 10 Imp gallons (12 US gallons).

The fuel is fed to the SU carburettors by means of an SU electric fuel pump.

Carburettors: Twin SU H4 semi-downdraught carburettors.
For description and adjustment details see separate section on SU carburettors.

Specifications:

Diameter:	1·5in
Needle, MGA 1500:	GS (standard), CC (rich), 4 (weak)
MGA 1600 Mk I, II:	6 (standard), RO (rich), AO (weak)
Jet:	0·090in
Piston spring:	red

Fuel pump: The electric SU fuel pump is mounted on a bracket on the right-hand side of the fuel tank, accessible from under the car. In Fig. 25 a partly exploded view of the fuel pump is shown.

Specifications
Delivery: 10 Imp gallon/hour (12 US gallon/hour).

1 Outlet union
2 Delivery valve
3 Valve cage
4 Spring clip
5 Fibre washer
6 Suction valve spring
7 Suction valve
8 Inlet union
9 Diaphragm
10 Armature guide rollers
11 Volute spring
12 Magnet coil
13 Outer rocker
14 Inner rocker
15 Spring blade with contacts
16 Earth terminal
17 Condenser
18 Cover
19 Terminal screw
20 Rocker hinge pin
21 Iron core
22 Push-rod
23 Steel armature
24 Filter

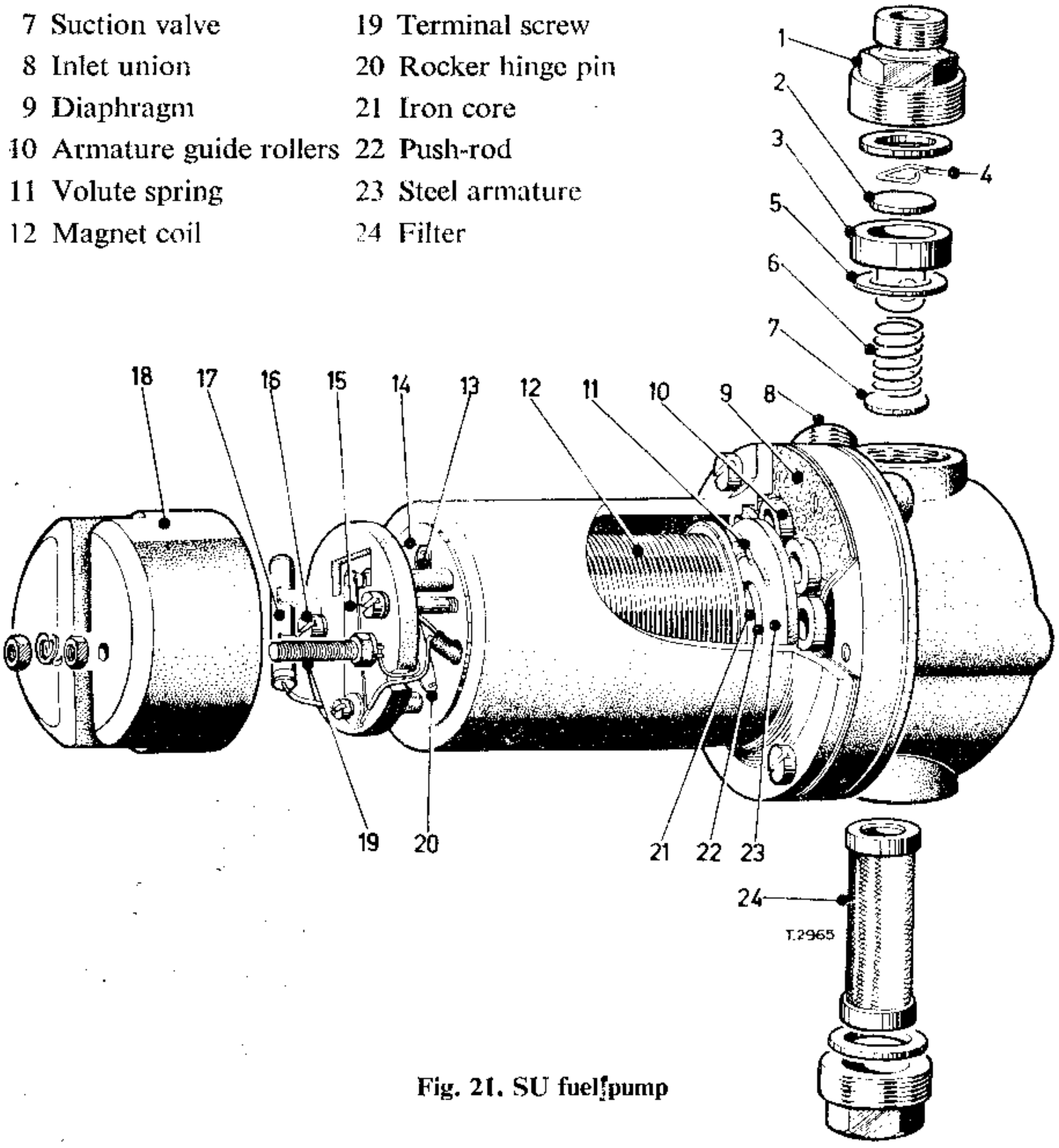


Fig. 21. SU fuel pump

Air-cleaners: Twin Vokes oil-wetted air-cleaners. For service instructions see page 16.

Cooling system: Pressurized water cooling with pump and fan; a thermostat is fitted in the water outlet in the front of the cylinder head.

When the thermostat is closed, the water circulates via a by-pass pipe.

Capacity: 10 Imp pints, 12 US pints.

The cooling system is provided with two draincocks, one on the right-hand side of the cylinder block, near the distributor, the other at the radiator base. As the cooling system is pressurized, the filler cap must be removed before the cooling system can be drained.

Water pump: Water pump of the impeller type. Up to engine No. 15 GD/U/H 39365 to 15 GD/U/H 39400 and from engine No. 15 GD/U/H 39526 onwards, a new water pump, which is interchangeable with the former one, was fitted.

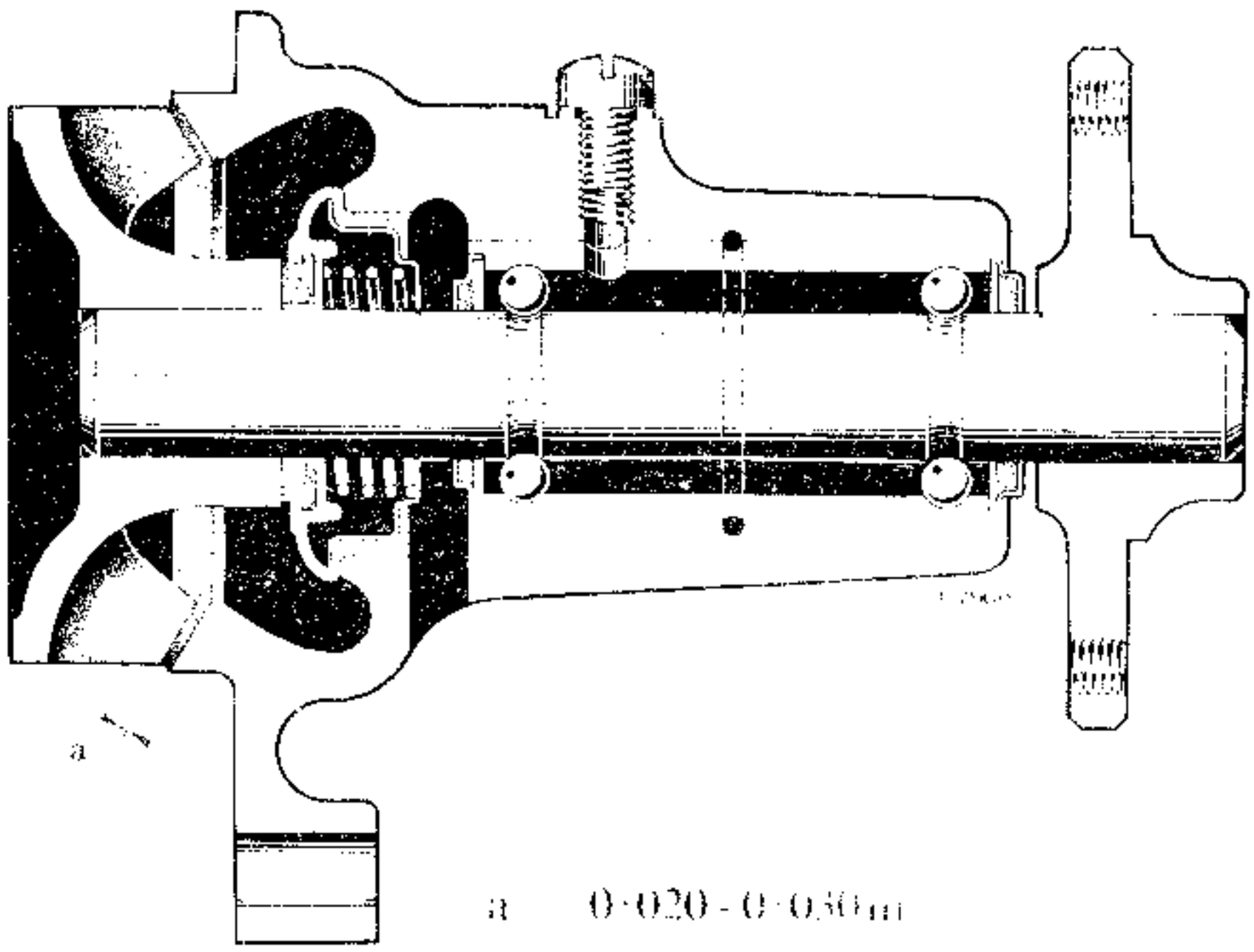


Fig. 22. Water pump, later type

The pump shaft of the old water pump was carried on two ball-bearings; these bearings could be replaced and were serviced separately. The water pump of the newer type has a pump shaft which is carried on a double-row ball-bearing; bearing and shaft are only serviced as a unit.

In Fig. 22 the water pump of the newer type is shown.

Thermostat: The thermostat is set to open at 70–75°C. This setting cannot be altered, but thermostats with alternative settings are available.

Frost protection: The cooling system is unsuitable for the use of anti-freeze mixtures with an alcohol base, owing to the high temperatures attained in the top radiator tank. Only anti-freeze mixtures of the ethylene-glycol or glycerine type should be employed. Use only anti-freeze of a reputable brand and mix it according to the manufacturer's instructions.

TRANSMISSION

Clutch: Borg & Beck single dry-plate clutch, hydraulically operated. The clutch-

release bearing is a carbon ring in a bearing cup; when worn, the complete bearing must be renewed.

Specifications:

Type:	A 6-G
Diameter:	8 in
Number of thrust springs:	6
Colour:	black and yellow
From engine No. 16225 onwards:	cream and light green.
Number of damper springs:	6
Colour:	white with light-green stripes.
Release lever ratio:	9 : 1
Maximum permissible difference in spring pressure when assembled:	10-15 lb

Adjustment: Since the clutch is hydraulically operated, clutch free-play should be measured at the master cylinder push-rod. There should be a clearance of 1/32 in when the clutch pedal is fully released.

NOTE: Do not rely on the free-play of the clutch pedal itself.

Master cylinder: Twin-bore master cylinder; when disc brakes are fitted to all four wheels, a separate brake and clutch master cylinder are used. Keep the fluid level at half an inch below the bottom of the filler neck by topping-up with Lockheed hydraulic brake fluid or another brake fluid conforming to SAE 70 R3. For an exploded view of the clutch master cylinder refer to page 53.

Gearbox: Four-speed gearbox with synchromesh on second, third and top gears. Top gear is a direct drive, third and second gear are obtained by constant-mesh pinions and first and reverse gear by sliding spur gears.

Removal and dismantling.

After removal from the car, the gearbox is dismantled as follows:

(1) Drain the gearbox, remove the dipstick and unscrew the speedometer drive. Do not withdraw the pinion from the bush, or the oil-seal will be damaged. Remove the remote-control housing and the extension housing top cover.

(2) Remove the interlock arm and plate from the extension housing. Unscrew the bolts securing the extension housing to the gearbox, pull the extension housing rearward and turn it to free the shifter/selector finger from the shifter dogs. Remove the extension housing.

The dismantling and reassembly of the gearbox extension and the remote-control housing is a straightforward operation which requires no special description.

NOTE: Do not remove the sliding joint bush unless necessary as removal will make it unfit for further use.

(3) Remove the gearbox side-cover and the overshoot stop. Cut the locking wire and unscrew the three shifter-fork set-screws.

(4) Unscrew the two cap screws securing the shifter-shaft guide block to the gearbox and remove the guide block, shifter shafts and dowels.

(5) Wrap the guide block in a cloth to prevent the detent balls from jumping out and withdraw the shifter-fork shafts. Remove the shifter forks from the gearbox in the following order: reverse, top/third, first/second.

(6) Remove the clutch fork and the clutch-release bearing. Remove the main

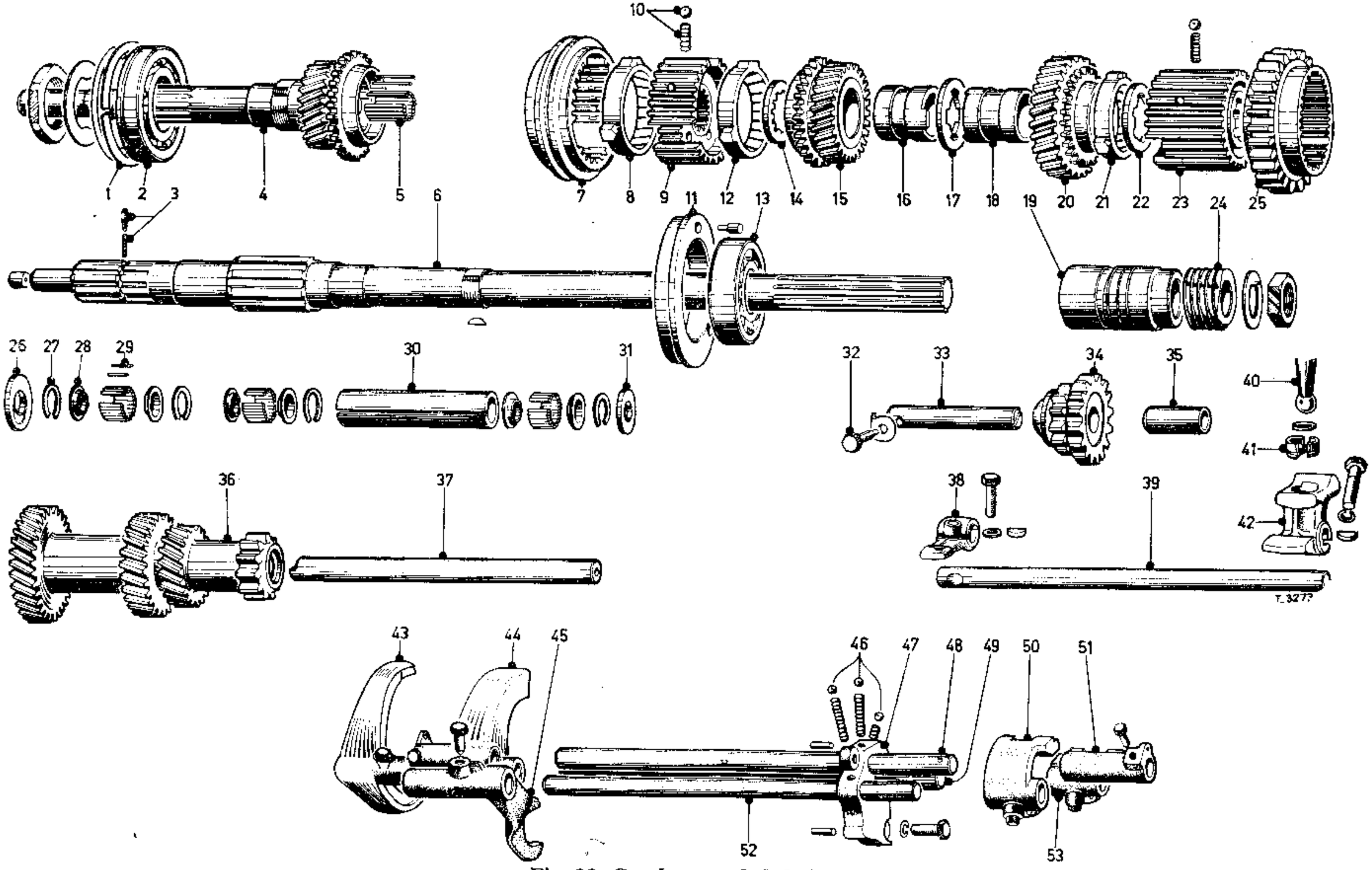


Fig. 23. Gearbox, exploded view

drive gear bearing cover, complete with oil-seal, taking care not to lose the shims between bearing cover and bearing.

(7) Gently tap out the countershaft and lower the gear cluster to the bottom of the gearbox. Unscrew the reverse idler-shaft set-bolt, drive out the shaft and remove the reverse idler gear.

(8) Withdraw the mainshaft assembly towards the rear and the main drive gear towards the front. Take care not to lose the 18 needle rollers. Remove the countershaft gear cluster and two thrust washers.

The mainshaft is dismantled as follows:

(1) Remove the top-gear baulk ring, synchronizer hub (together with the synchronizer sleeve) and third-gear baulk ring. When the shifter sleeve is separated from the synchronizer hub, care must be taken not to lose the balls and springs. Depress the small spring-loaded plunger in the front end of the mainshaft and turn the splined ring so that one of its splines covers the plunger.

(3) Slide the splined ring, together with the third-gear idler pinion and its bush, off the mainshaft; remove the plunger and the spring. Slide the interlock ring and the second-gear idler pinion, together with the bearing bush and baulk ring, off the mainshaft.

(4) Remove the rear thrust washer and slide the second-gear synchronizer hub and the first-gear sliding pinion from the mainshaft. Take care not to lose the synchronizer balls and springs when the first-gear sliding pinion is separated from the hub.

Key to Fig. 23

1 Circlip
2 Main drive pinion bearing
3 Interlock plunger and spring
4 Main drive pinion
5 Mainshaft pilot bearing
6 Mainshaft
7 Third/top gear synchronizer sleeve
8 Top gear baulk ring
9 Third/top gear synchronizer hub
10 Detent ball and spring
11 Mainshaft bearing housing
12 Third gear baulk ring
13 Mainshaft rear bearing
14 Front thrust washer
15 Third gear idler pinion
16 Third gear idler pinion bush
17 Interlock ring
18 Second gear idler pinion bush
19 Spacer bush with oil scroll
20 Second gear idler pinion
21 Second gear baulk ring
22 Rear thrust washer
23 Second gear synchronizer hub
24 Speedometer worm wheel
25 First gear sliding pinion
26 Front thrust washer
27 Circlip
28 Needle bearing cage
29 Bearing needles
30 Spacer bush
31 Rear thrust washer
32 Lock bolt
33 Reverse gear idler shaft
34 Reverse idler gear
35 Bearing bush
36 Countershaft gear cluster
37 Countershaft
38 Selector/shifter finger
39 Selector/shifter shaft
40 Selector/shifter lever
41 Cup (two halves)
42 Trunnion
43 Third/top gear shifter fork
44 First/second gear shifter fork
45 Guide block
46 Detent balls and springs
47 Reverse gear shifter fork
48 First/second gear shifter fork shaft
49 Third/top gear shifter fork shaft
50 Reverse shifter dog
51 First/second shifter dog
52 Reverse gear shifter fork shaft
53 Third/top shifter dog

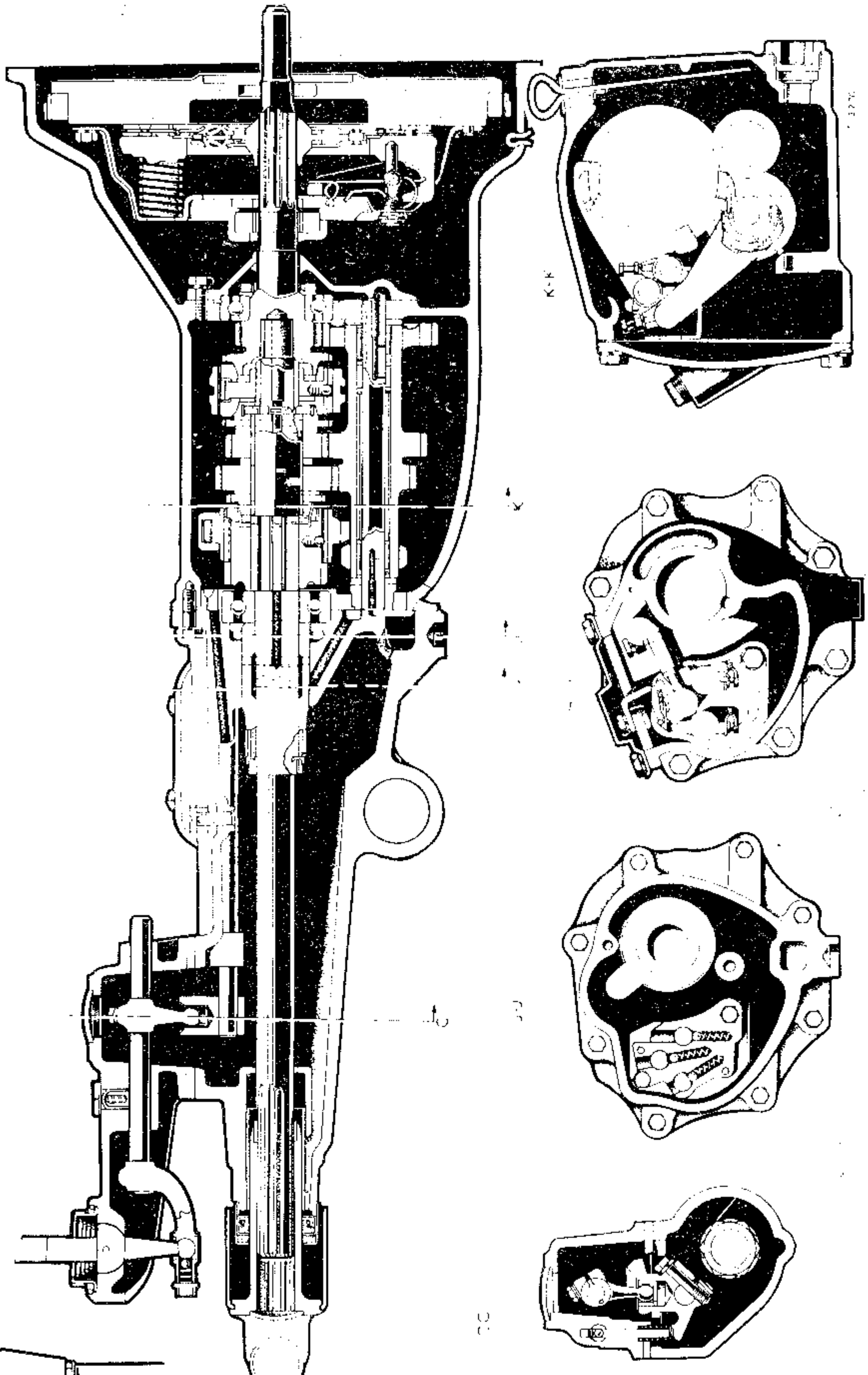


Fig. 24. Gearbox, sectiona view

(5) Bend back the lock-washer and unscrew the nut securing the speedometer worm gear. Remove the lock-washer, speedometer worm wheel, spacer bush and Woodruff key. If necessary, the mainshaft ball-bearing can be pressed off and/or the countershaft needle bearings and spacer bush can be pushed from the countershaft gear cluster after removal of a circlip. To reassemble the needle bearings, proceed as follows: install a circlip in the innermost groove of the gear cluster. Clamp the countershaft vertically in a vice (cut-away portion downwards) and assemble the inner roller bearing on its shaft against the vice jaws. Slide the gear cluster, with the large gear downwards, over the shaft and the bearing. Remove the shaft from the vice and push the bearing against the circlip. Install a circlip, the end roller assembly and another circlip. Insert the spacer tube into the other end of the gear cluster. Install the end bearing and a circlip. Remove the countershaft.

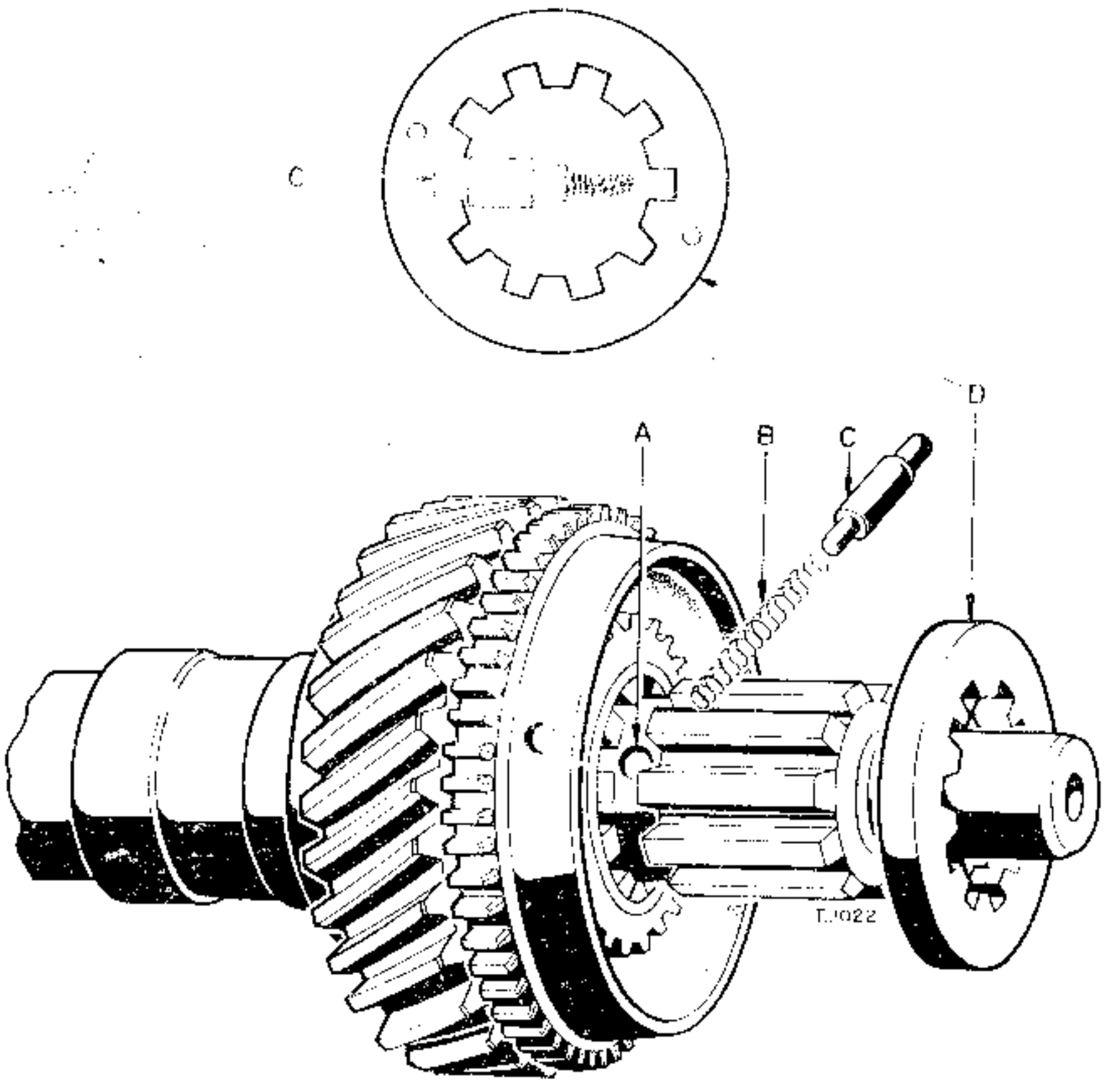
Carefully clean and inspect all parts and replace those that are damaged or worn.

Reassembly of the mainshaft:

(1) Slide the rear thrust washer, with the ground side towards the front, on to the mainshaft. Heat the second-gear idler pinion bush (the longer of the two) in warm oil and pass it over the mainshaft, notches towards the front, and make sure the oil-hole in the bush corresponds with the bore in the mainshaft.

(2) Install the second-gear idler pinion and its baulk ring on the bearing bush. The plain side of the gear must be towards the front.

(3) Slide the interlock ring and the third-gear idler pinion bush over the mainshaft. Locate the notches of both bushes in the interlock ring.



A Hole in mainshaft
B Plunger spring
C Plunger
D Lock ring

Fig. 25. Mainshaft, location of spring-loaded plunger

(4) Slide the third-gear idler pinion, flat face first, on to the bearing bush; install the spring-loaded plunger in the hole in the mainshaft. Depress the plunger and pass the front thrust washer, the machined face towards the gear, over it. Turn the thrust washer until the plunger is released and locks it.

(5) Assemble the synchronizer balls and springs to the third/top-gear synchronizer hub and pass over the synchronizer sleeve. Install the third/top-gear synchronizer hub assembly, together with the two baulk rings, on the mainshaft. The plain side of the hub must face the rear.
(6) Assemble the synchronizer balls and springs to the second gear synchronizer hub and pass over the first-gear sliding pinion.
(7) Install the second-gear synchronizer hub, the first-gear sliding pinion and the baulk ring on the mainshaft. Press the rear mainshaft bearing into its housing and press it on to the shaft. Slide the spacer bush over the mainshaft and fit the speedometer worm wheel. Tighten the nut and bend over the lock washer.

Reassembly of the gearbox:
(1) Insert a dummy shaft into the countershaft gear cluster, assemble the thrust washers and lower the complete gear cluster to the bottom of the gearbox.
(2) Replace the main drive gear, making sure that the bearing is correctly located. Stick the 18 bearing needles with grease in the pilot bearing bore.
(3) Insert the mainshaft into the gearbox and enter the spigot in the needle rollers of the main drive gear. Offer up the gasket fitted between the gearbox and the extension housing to position the dowel and bearing housing. Push the mainshaft right home.
(4) Lift the countershaft gear cluster into mesh with the mainshaft gears and the main drive gear, insert the countershaft and line-up the cut-away portion in the front end of the shaft with the locating groove in the front cover.
(5) Install the reverse idler gear and shaft and secure the shaft with the set-bolt.
(6) Install the main drive gear bearing cover, reinstalling the shimpack found during dismantling. Install the clutch lever and fork.
(7) Place the shifter forks in the following order in the gearbox: first/second, top/third and reverse. Bolt the shifter-shaft guide block to the rear face of the gearbox, replace the detent springs and balls and push the shifter-fork shafts through the guide block into their respective shifter forks. Tighten the set-bolts.
(8) Place the shifter dogs on the rear ends of the shifter-fork shafts; tighten and wire the set-bolts.
(9) If necessary, replace the extension housing oil-seal. Bolt the extension housing to the gearbox, making sure that the shifter/selector finger engages the shifter dogs properly.
(10) Reinstall the interlock arm and plate and refit the top cover. Bolt the gearshift extension housing and the gearbox side-cover to the gearbox.

Screw in the speedometer drive and fill the gearbox with the correct grade oil.

Propeller shaft: Open propeller shaft with Hardy Spicer universal joints. Up to engine type 15 GD the front yoke of the front universal joint was a sliding fit over the gearbox mainshaft splines. From engine type 15 GD onwards, a propeller shaft incorporating a splined sliding joint at its front end was fitted. The mainshaft was modified accordingly.

NOTE: Prior to removing the propeller shaft, the flange of the rear universal joint and the pinion drive flange must be marked, in order that the shaft may be refitted in its original position.

Specifications:

Up to engine type 15 GD:

Length of propeller shaft between centres of joints:	31 3/8 in
Overall length:	38 13/32 in
Diameter:	2 in

From engine type 15 GD onwards:

Overall length, fully extended:	32 11/16in
Overall length, fully compressed:	31¼in
Length between centres of joints, fully extended:	30 5/16in
Diameter:	2in

Rear axle/differential: Three-quarter floating rear axle with hypoid pinion and crownwheel.

In Fig. 26 an exploded view of the rear axle is shown.

Rear axle ratio, MGA 1500 and 1600:	standard	10/43 (4·3 : 1)
	optional	9/41 (4·55 : 1)
MGA 1600 Mk. II:	standard	10/41 (4·1 : 1)
	optional	3·9 or 4·55 : 1

Removal of a hub:

(1) Jack-up the car and remove the appropriate wheel. Remove the brake drum. Take precautions to prevent rear axle oil from leaking on to the brake linings when the shaft is withdrawn.

(2) Unscrew the drive-shaft retaining screw and pull the drive shaft outwards.

(3) Bend back the lip of the lock-washer and unscrew the bearing retaining nut. Remove the washer. On later cars the left-hand hub nut has a left-hand thread.

(4) Withdraw the hub with a suitable extractor. The bearing and grease-seal will come away with the hub. If necessary, the bearing and grease-seal can be pressed out; the grease-seal is fitted with its lip towards the bearing.

Reassembly and reinstallation is done in the reverse order of removal. The outer face of the bearing must protrude 0·001–0·004in beyond the outer face of the hub to ensure that the bearing is gripped between the abutment shoulder in the hub and the drive flange of the axle shaft. Later cars are equipped with a modified rear hub, with an additional oil-seal. The new hub may be fitted to earlier type rear axles.

If the car is equipped with Dunlop disc brakes all round, the removal procedure is as follows:

(1) Remove the appropriate wheel, take precautions to prevent rear axle oil from leaking on to the brake disc and unscrew the nuts securing the hub extension to the hub.

(2) Withdraw the hub extension and axle shaft, remove the welch plug and press the hub extension from the drive-shaft splines.

(3) Remove the brake calliper from the mounting flange.

Do not lose the shims found behind the calliper body but reinstall them in their original position.

(4) Bend back the lip of the lock-washer and unscrew the bearing retainer nut (the left-hand hub nut has a left-hand thread). Remove the washer.

(5) Withdraw the hub with a suitable extractor. The bearing and grease-seal will come away with the hub.

Reassembly is done in the reverse order of removal.

Removal and dismantling of the differential:

(1) Drain the rear axle. Disconnect the propeller shaft (mark the flanges to facilitate reinstallation) and remove the drive shafts as previously described.

(2) Unscrew the nuts securing the differential carrier to the axle housing and remove the carrier.

(3) Ensure that the differential bearing caps are marked; unscrew the bearing-cap nuts and remove the differential housing.

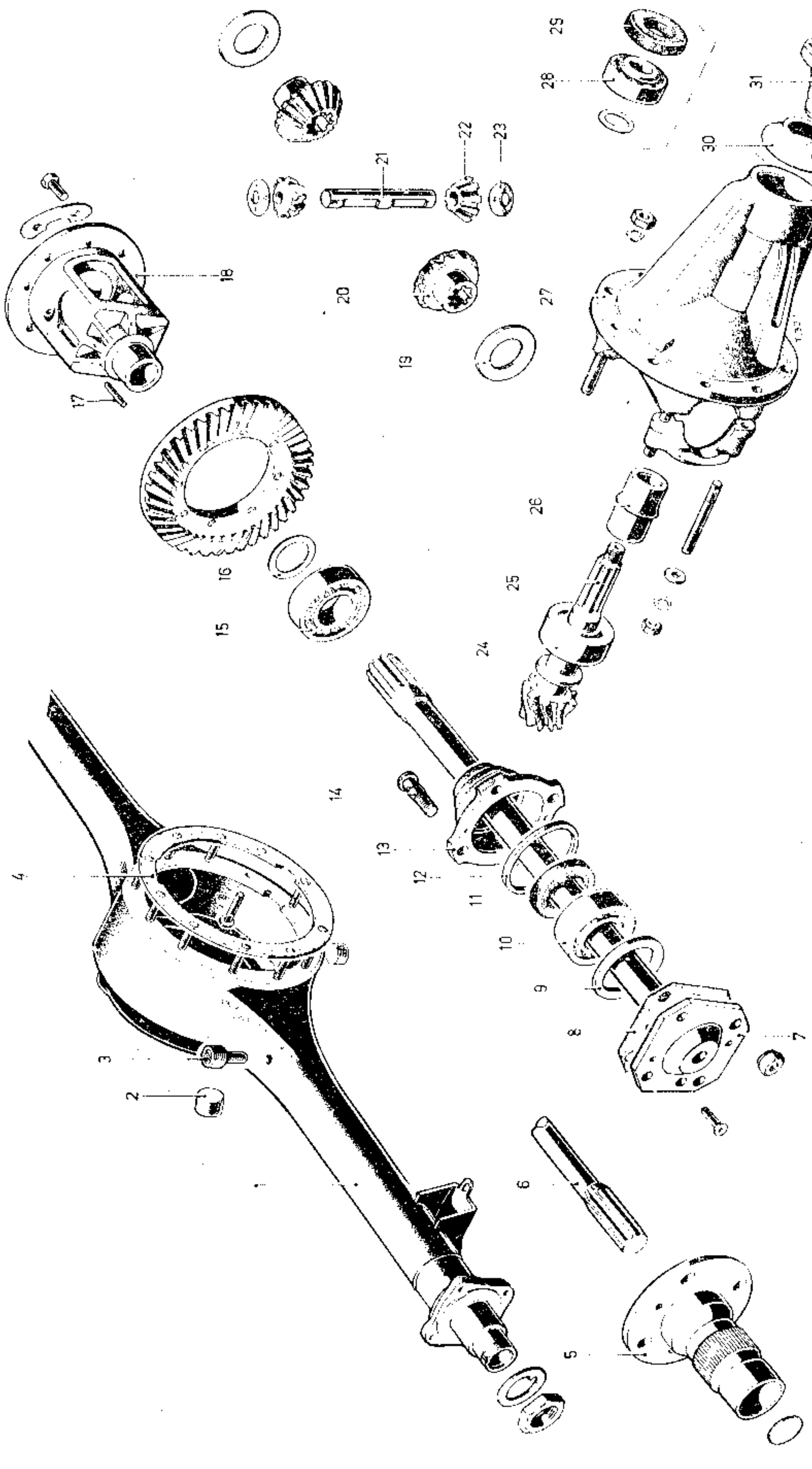


Fig. 26. Rear axle differential, exploded view

(4) Tap out the differential pinion shaft lockpin ($\frac{1}{16}$ in) from the crownwheel side and remove the differential shaft. the pinions, thrust washers and side gears.
(5) Remove the differential bearings with a suitable puller. Note that the bearings are marked on one side with the word 'Thrust'. Take care not to lose the shims fitted between each bearing and the differential housing.
(6) Knock back the tabs of the lock-washers, unscrew the crownwheel bolts and gently tap the crownwheel from the housing.
(7) Remove the pinion drive flange and dust cover and gently tap the pinion rearward. The pinion rear bearing inner race will come away with the pinion.
(8) Remove the pinion-shaft oil-seal and the pinion front bearing inner race. If necessary, the bearing outer races can be withdrawn with a suitable puller.
(9) Slide the spacer bush and the shims off the pinion shaft. Now the pinion rear bearing can be withdrawn.

Carefully clean and inspect all parts and replace those that are damaged or worn.

Reassembly and adjustment:

(1) Reinstall the pinion bearing outer races, place a shim of known thickness on the pinion head and press on the rear pinion bearing.
(2) Install the pinion in the carrier, fit the pinion front bearing and the drive flange and tighten the nut until a pre-load of 10-12 in lb is obtained. The oil-seal, the spacer bush and pre-load shims are omitted at this stage.
(3) Zero a dial gauge on the machined step 'B' of the large gauge block of tool 18G 191B. Remove the keep disc from the magnetic gauge block and position the magnet and the dial gauge. The base of the gauge must rest on the centre of the differential bore. Obtain the maximum depth reading and make a note of the difference from the zero position. Repeat this check in the opposite bearing bore and note the mean reading.
(4) The pinion head is in some cases marked with a minus figure.
   (*a*) If the gauge reading is minus, the gauge reading must be added to the pinion-head marking and the thickness of the shims be reduced by this amount.
   (*b*) If the gauge reading is plus, but numerically less than the pinion-head marking, the shim thickness must be reduced by the difference.
   (*c*) If the gauge reading is plus, but numerically greater than the pinion-head marking, the shim thickness must be increased by the difference.

Key to Fig. 26

1 Rear axle housing
2 Oil level plug
3 Breather
4 Gasket
5 Drive shaft, wire wheels
6 Hub extension, wire wheels
7 Drive shaft
8 Gasket
9 Spacer
10 Hub bearing
11 Oil seal
12 Oil seal (later types only)
13 Hub
14 Wheel nut stud
15 Differential bearing
16 Adjustment shim
17 Differential shaft lockpin
18 Differential housing
19 Thrust washer
20 Differential side gear
21 Differential pinion shaft
22 Differential pinion
23 Thrust washer
24 Pinion rear bearing
25 Pinion
26 Spacer
27 Differential carrier
28 Pinion front bearing
29 Oil seal
30 Dust cover
31 Drive flange

Example of (a):

Gauge reading:	0·003 in
Pinion-head marking:	—0·002 in
Amount to be subtracted from the shim thickness:	0·005 in

Example of (b):

Pinion-head marking:	0·004 in
Gauge reading:	+0·003 in
Amount to be subtracted from the shim thickness:	0·001 in

Example of (c):

Gauge reading:	+0·006 in
Pinion-head marking:	0·003 in
Amount to be added to the shim thickness:	0·003 in

If the gauge reading is plus and numerically equal to the pinion-head marking, no correction is necessary. This also holds true when an unmarked pinion is fitted and the gauge reads zero.

(5) The actual mounting distance (pinion depth adjustment) of the pinion is marked on the pinion head in a rectangular bracket. If the marking is a plus figure, the shim thickness must be reduced by an equal amount. If the marking is a minus figure, the shim thickness must be increased by an equal amount.

(6) Remove the pinion, install the correct number of shims under the pinion head and assemble the bearings, the new spacer bush, pre-load shims, oil-seal and drive flange.

(7) Tighten the pinion nut gradually to 140 ft lb. Check the pre-load frequently; this should not exceed 15 in lb, or the spacer bush will be distorted. If, however, the pre-load is exceeded, the pinion must be removed and a new spacer bush installed. If necessary, correction to the pre-load is made by adding or removing shims between the spacer bush and the pinion front bearing.

(8) Install a differential bearing on the small surface plate of tool 18G 191 B, the inner race of the bearing over the recess and the side marked 'Thrust' facing downwards.

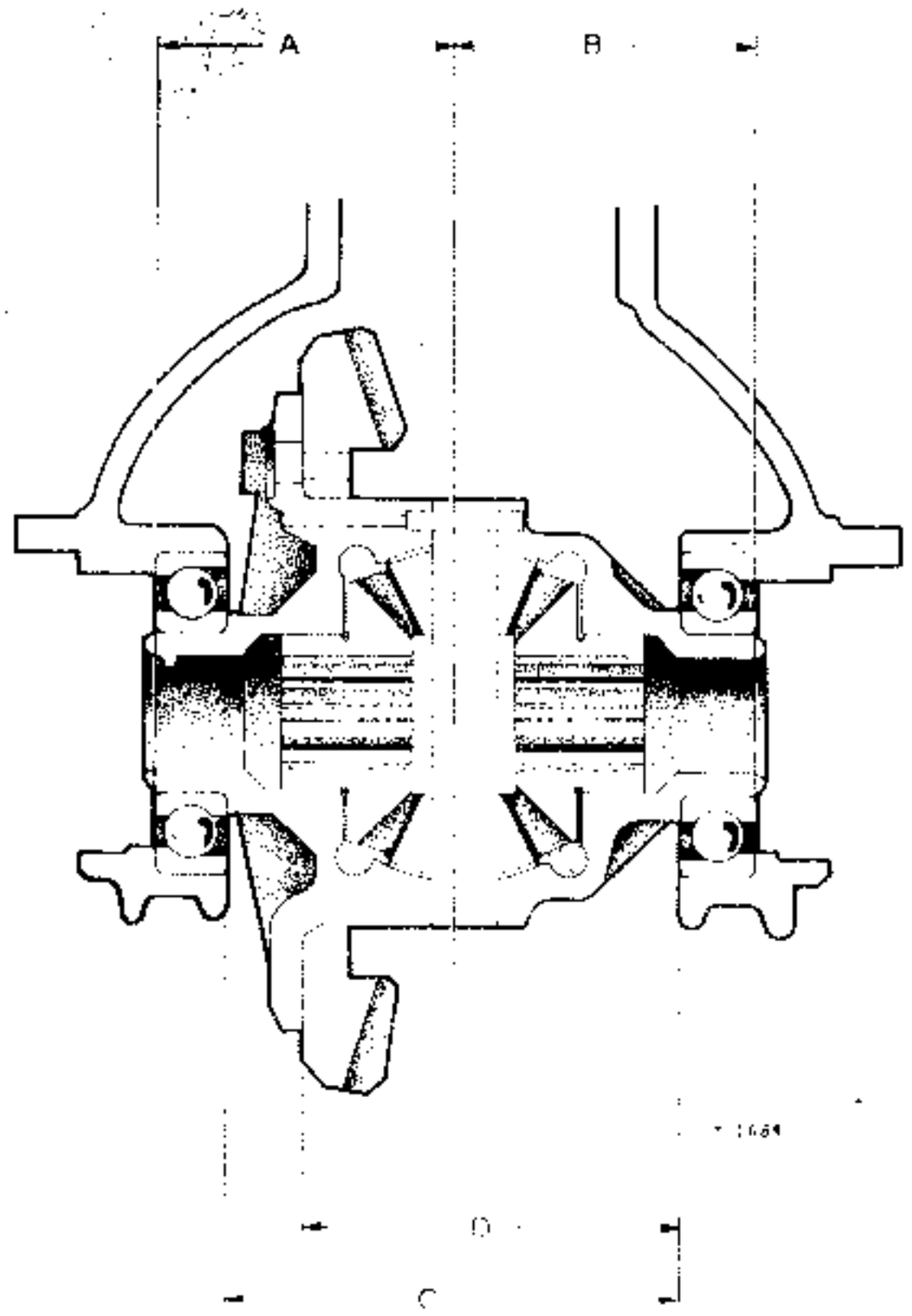
(9) Place the magnetic gauge block on to the surface plate and zero the dial on the machined step marked 'B' of the small gauge block. Transfer the pointer to the plain surface of the bearing inner race and press the bearing firmly against the balls. Make a note of the dial reading. A positive reading denotes the thickness of the shimpack to be subtracted from the shims at this side; a negative reading indicates the thickness of the shimpack to be added (variations from standard width of bearings, see also 10 and 11). Repeat this operation with the other bearing.

(10) Refer to Fig. 27. Variations of the dimensions *A* and *B* are stamped on the differential carrier, near the bearing bores. Variations of the dimensions *C* and *D* are stamped on the differential housing. The shimpack on the left-hand side is established as follows: $A + B - C + 0{\cdot}007$ in

The shimpack on the right-hand side is calculated as follows:

$$B - D + 0{\cdot}006 \text{ in}$$

The letters in the formula are to be substituted by the dimensional variations stamped on the carrier and the housing.



A Centre line of differential unit to bearing shoulder in carrier on left-hand side

B Centre line of differential unit to bearing shoulder in carrier on right-hand side

C Total width between bearing shoulders of differential housing

D Crownwheel mating face to bearing shoulder on right-hand side of differential housing

Fig. 27. Differential adjustment

(11) Compose shimpacks as described under (10) and add the corrections for the bearing height as established under (9). If the back of the crownwheel is marked with a framed number, this must be taken into account before assembling the shims and bearings to the differential housing. If the framed number on the crownwheel is, e.g., minus 1, a shim of 0·001 in must be transferred from the right-hand side to the left-hand side (crownwheel side). If the number is plus 2, a shimpack of 0·002 in must be transferred from the left-hand side to the right-hand side. Press the differential bearings (thrust face outwards) and the shims on to the differential housing.

(12) Assemble the side gears, the differential pinions, thrust washers, and the pinion shaft to the differential housing, insert the lockpin and peen over some metal to secure the lockpin in place.

(13) Bolt the crownwheel on to the differential housing (60 ft lb), but do not yet bend over the lockplates.

Place the assembly in 'V'-blocks and check the crownwheel run-out by means of a dial gauge. The maximum permissible run-out is 0·002 in. When the crownwheel runs true, the lockplates may be tapped over.

(14) Install the differential housing, together with the differential bearings, in the carrier, install the bearing caps in their original position and tighten the bearing-cap nuts to 65 ft lb.

(15) Check gear backlash with a dial gauge. The recommended backlash is etched on the crownwheel. Backlash should be within 0·004–0·007 in.

Backlash is adjusted by moving the crownwheel in or out of mesh by transferring shims from one side to the other. Do not alter the total number of shims. The transfer of a 0·002 in shim from one side to the other results in a variation in backlash of about 0·002 in.

(16) Further reassembly is done in the reverse order of removal.

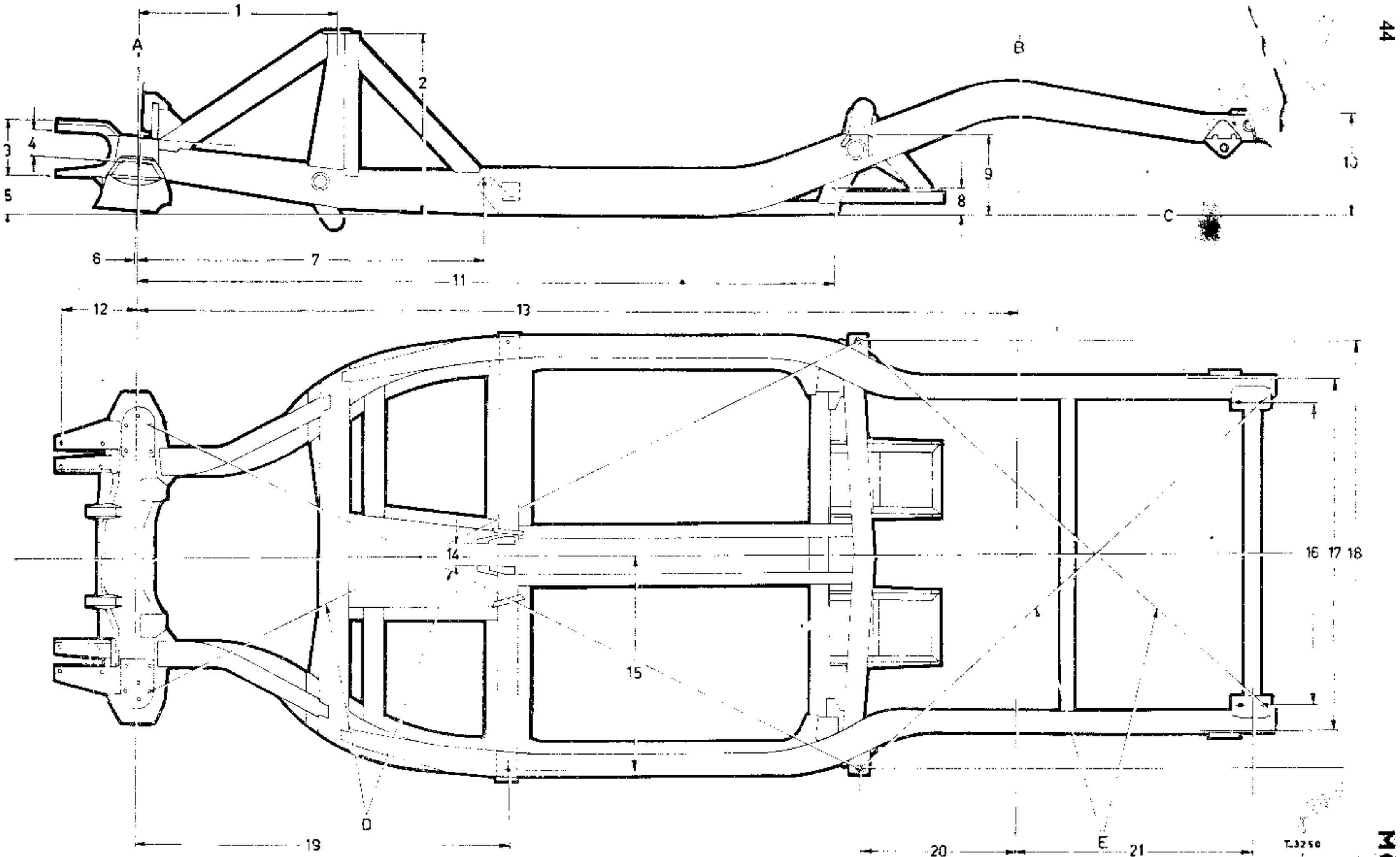


Fig. 28. Chassis frame, dimensions

CHASSIS

Chassis: All-steel chassis, consisting of box-section side-members and tubular and box section cross-members, are welded together. The front suspension mounting platform and the box section scuttle structure stiffen the frame at the front end, thus ensuring a unit with good torsional rigidity. For chassis frame dimensions refer to Figure 28.

Front suspension: Independent front suspension by means of suspension arms of unequal length, coil springs and hydraulic shock-absorbers of the piston type. An anti-roll bar is optional equipment.

Removal of a suspension unit:

(1) Jack-up the front of the car and place stands under the chassis side-members. Remove the appropriate front wheel.
(2) Install a jack under the coil spring seat and jack-up until the shock-absorber arm is just clear of the rebound rubber. Disconnect the brake hose.
(3) Slacken the trackrod nuts and screw the trackrod out of the steering ball-joints, using a wrench on the flats in the rod.
(4) Remove the split cotter-pins and unscrew the nuts securing the two outer fulcrum bolts. Tap out the fulcrum bolts and remove the front hub and steering swivel assembly. Take care not to lose the thrust washers and rubber seals.
(5) Release the jack from under the coil spring seat. Remove the coil spring and unscrew the four bolts securing the coil spring seat to the suspension arms.
(6) Remove the split cotter-pins and unscrew the nuts from the ends of the inner fulcrum shaft. Remove the lower suspension arms, together with the rubber bushes.
(7) If necessary, the inner fulcrum shaft and hydraulic shock-absorber can now be removed.
(8) Unscrew the upper and lower trunnions from the steering swivel pin. The left-hand swivel pin has left-hand threads. It is not recommended to separate the steering lever from the stub axle. Carefully clean and inspect all parts and replace those that are damaged or worn.

Reassembly:

(1) Reinstall the shock-absorber and the inner fulcrum shaft. When fitting the latter, the front outer bolt is installed with its nut uppermost; the other bolts with their nuts down.
(2) Fit the rubber bushes (preferably dusted with French chalk) into the lower suspension arms. These bushes are a loose fit in the suspension arms but when the nuts are tightened, they will expand into their housings. It is therefore essential that they are installed with the suspension arm assembly in the centre of its arc of normal movement.

Key to Fig. 28

1 21 in
2 19·166 in
3 5 13/16 in
4 2 11/16 in
5 3 19/32 in
6 4° +1° —0°
7 36 15/16 in
8 2 21/32 in
9 8 7/16 in
10 11⅛ in
11 74⅜ in
12 8¼ in
13 94 in
14 2¼ in
15 22 11/32 in
16 32 in
17 37 in
18 45½ in
19 39 9/32 in
20 17 3/16 in
21 25 in

A Front axle datum line
B Rear axle datum line
C Chassis datum line
D Diagonals equal within ⅜ in
E Diagonals equal within ¼ in

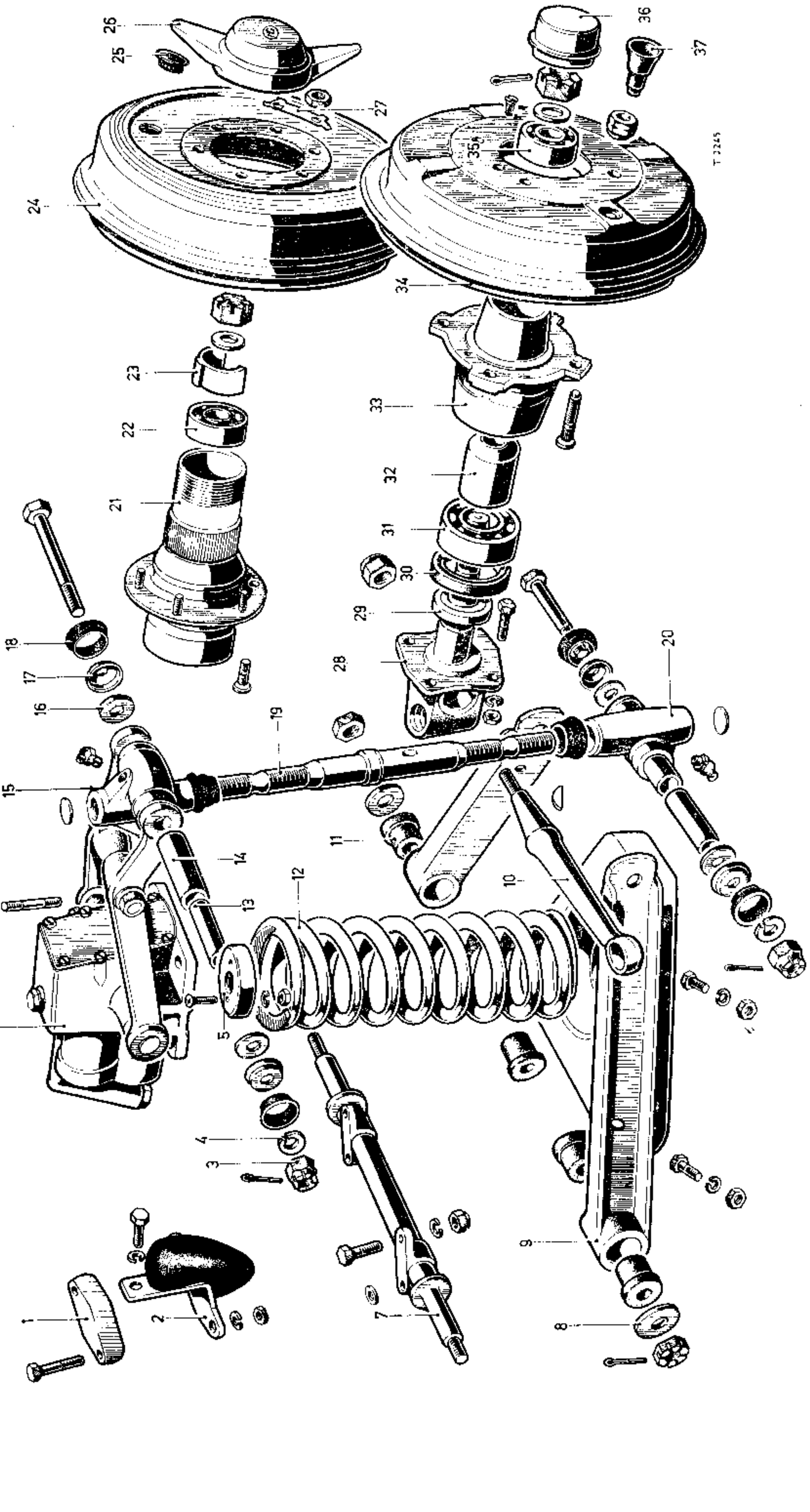


Fig. 29. Front suspension, exploded view

(3) Check that the bushes protrude equally from the suspension arms, hold the suspension arms in a horizontal position and tighten the castellated nuts.
(4) Bolt the coil spring seat to the suspension arms with the heads of the bolts inside the spring seat. Do not fully tighten up the spring seat bolts but leave them half a turn slack.
(5) Smear both ends of the coil spring with grease and install the coil spring on its seat. Push the coil spring up over the locating plate in the upper suspension arm.
(6) Jack-up the lower suspension arm until the arm is almost horizontal.
(7) Screw the upper and lower steering swivel trunnions on to the steering swivel pin and ensure that the bearing bushes can be inserted freely and are not fouling the threads of the swivel pin.
(8) Reinstall the swivel pin and front hub assembly, making sure the thrust washers and rubber seals are fitted correctly. Measure the end-float between the outer faces of the trunnion and the thrust washers; this should be within 0·008–0·013 in.
(9) Do not yet tighten the castellated nuts but leave them half a turn slack. Reconnect the brake hose. Screw the trackrod into the steering ball-joints, adjust and bleed the front brakes and refit the road wheel.
(10) Bounce the front end of the car up and down several times to allow the suspension fulcrums to settle down. Tighten the spring seat bolts, tighten the castellated nuts of the fulcrum bolts and install new split cotter-pins. Check and adjust front wheel alignment.

Specifications:	*Up to car No.* 15151	*From car No.* 15152
Spring coil diameter:	3·238 in	3·28 in
Diameter of wire:	0·498 in	0·54 in
Free height:	9·28 in ± $\frac{1}{16}$ in	8·88 in ± $\frac{1}{16}$ in

Key to Fig. 29

1 Mounting plate
2 Rebound rubber
3 Castellated nut, outer fulcrum pin
4 Spring washer
5 Coil spring locating plate
6 Shock-absorber
7 Inner fulcrum shaft
8 Washer
9 Lower suspension arm, front half
10 Steering arm
11 Rubber bush
12 Coil spring
13 Spacer bush
14 Upper trunnion bush
15 Upper trunnion
16 Washer
17 Seal retainer
18 Seal
19 Swivel pin
20 Lower trunnion
21 Hub, wire wheels
22 Outer hub bearing
23 Grease retainer
24 Brake drum
25 Rubber plug
26 Centre lock nut
27 Lock plate
28 Stub axle
29 Spacer
30 Oil seal
31 Inner hub bearing
32 Spacer
33 Hub, disc wheels
34 Brake drum
35 Outer hub bearing
36 Grease cap
37 Plug

Number of free coils:	7·5	7·2
Static laden length:	6·60±1/32 in	6·60±1/32 in
Static laden length at load of:	1·095±20 lb	1·095±20 lb
Maximum deflection:	4 in	4 in
Width of steering swivel trunnion, measured over the thrust faces:	2·327 in	
Inner diameter of fulcrum shaft bearing bushes:	0·750 in	
Length of spacer tubes:	2·337 in	
Clearance between trunnion and thrust washers:	0·008–0·013 in	
Inner diameter of lower suspension arm bushes:	0·625 in	
Length of lower suspension arm bushes:	0·924±0·005 in	

Front wheel alignment: When checking front wheel alignment, the car should be standing on an absolutely level floor. The tyres should be inflated to the correct pressure. Move the car up and down a few times so it will settle to the normal driving position and turn the wheels to the straight-ahead position.

Camber: 1° positive to $\frac{1}{2}$° negative on full bump.

Caster angle: 4°.

King-pin inclination: 9–10$\frac{1}{2}$° on full bump.

Toe-in: front wheels parallel.

The trackrods are adjustable in order to correct the toe-in.

Caster and camber are accurately set during production and no adjustment should be necessary.

Rear suspension: Rear suspension by means of conventional semi-elliptic leaf springs and double-acting hydraulic shock-absorbers of the piston type.

The front eye and rear shackle of each spring are fitted with rubber bushes. When fitting rear springs, do not tighten the spring eye-bolts or shackle nuts until the normal load is applied to the springs, so that the flexible rubber bushes are deflected to an equal extent in both directions during service.

Failure to take these precautions will inevitably lead to early deterioration of the spring bushes.

Specifications:

Number of leaves:	6
Width of leaves:	1$\frac{3}{4}$ in
Thickness of leaves:	7/32 in
Working load:	450 lb
Free camber:	3·60 in

Wheel bearings and hubs: The front wheel hubs run on two non-adjustable ball-bearings, pre-load being determined by collapsible spacer.

NOTE: If the front hub has been removed, the inner bearing, oil-seal and spacer washer must be removed from the stub axle and reinstalled in the hub before the hub is assembled to the stub axle. If this order is not followed, the oil-seal cannot be installed correctly.

Each rear wheel hub runs on a double-row, non-adjustable ball-bearing, which is fitted to the outer end of the rear axle housing. See also under *Removal of a hub* on page 39.

Shock-absorbers: Hydraulic shock-absorbers of the piston type. The dampers are

set during production and no attempt should be made to dismantle them without the use of special tools. Shock-absorbers which do not function properly must be replaced. Only Armstrong Super Thin shock-absorber fluid should be used for topping-up. If this fluid is not available, any mineral oil of a reputable brand conforming to SAE 20/20W can be used. This alternative is not suitable for low-temperature operation. The rear shock-absorbers must be removed for topping-up.

Steering gear: The steering gear is of the rack-and-pinion type; in Fig. 30 an exploded view is shown.

Removal:

(1) Jack-up the front of the car and place stands beneath the chassis side-members. Remove the wheels. Unscrew the castellated nuts and drive the trackrod ball-pins from the steering levers.
(2) Remove the steering rack damper and secondary damper assembly. Remove the lower pinion bearing, together with the shims and lower thrust washer, taking precautions to catch the oil draining from the rack. Turn the steering wheel to full lock (left lock on right-hand drive cars, right lock on left-hand drive cars) and remove the clamp bolt and nut from the universal joint, on the pinion shaft side. Withdraw the pinion.
(3) Unscrew the bolts and nuts securing the steering-rack housing to the chassis frame, taking care not to lose the packing shims between the rack and the frame brackets. Carefully manoeuvre the steering rack from the car.
(4) Bend back the lock-washer and unscrew the ball-joint assemblies. Remove the dust-boot clips and dust-boots. Install the rack housing in a vice with soft jaws and bend back the lock-washers securing the trackrod ball-housings. Unscrew the ball-housings, preferably with tool 18G313. Remove the lock-washers and withdraw the steering rack from the housing. Remove the pinion-shaft upper thrust washer. If necessary, the trackrod ball-housings may be dismantled. Take care not to interchange the shims and ball seats.

Reassembly and adjustment:

Reassembly is done in the reverse order of removal, but special attention must be given to the following points:

(1) The centre tooth of the rack should be in front of the pinion shaft.
(2) The trackrod ball-housing must be a tight sliding fit, without play. If necessary, the ball-seats can be adjusted by varying the thickness of the shims between the ball-housings. Shims are available in thicknesses of 0·003 and 0·005in.
(3) Adjust the end-float of the pinion shaft to 0·002–0·005in by varying the number of shims.
(4) When reinstalling the rack damper, the damper pad and cap must be screwed in position without the spring and shims, until it is just possible to rotate the pinion by drawing the rack through the housing by hand. Measure the clearance between the plunger cap and the seating on the rack housing. Add to this figure an 0·002–0·005in shim to obtain the correct thickness of the shimpack to be installed beneath the damper cap. Shims of 0·003in thickness are available. The secondary damper is installed without shims.

When reinstalling the steering gear in the car, care must be taken to align the pinion and steering column correctly. The centre line of the pinion shaft and the centre line of the steering column must pass through the centre of the universal joint. For this purpose the attachment holes in the support bracket at the lower end of

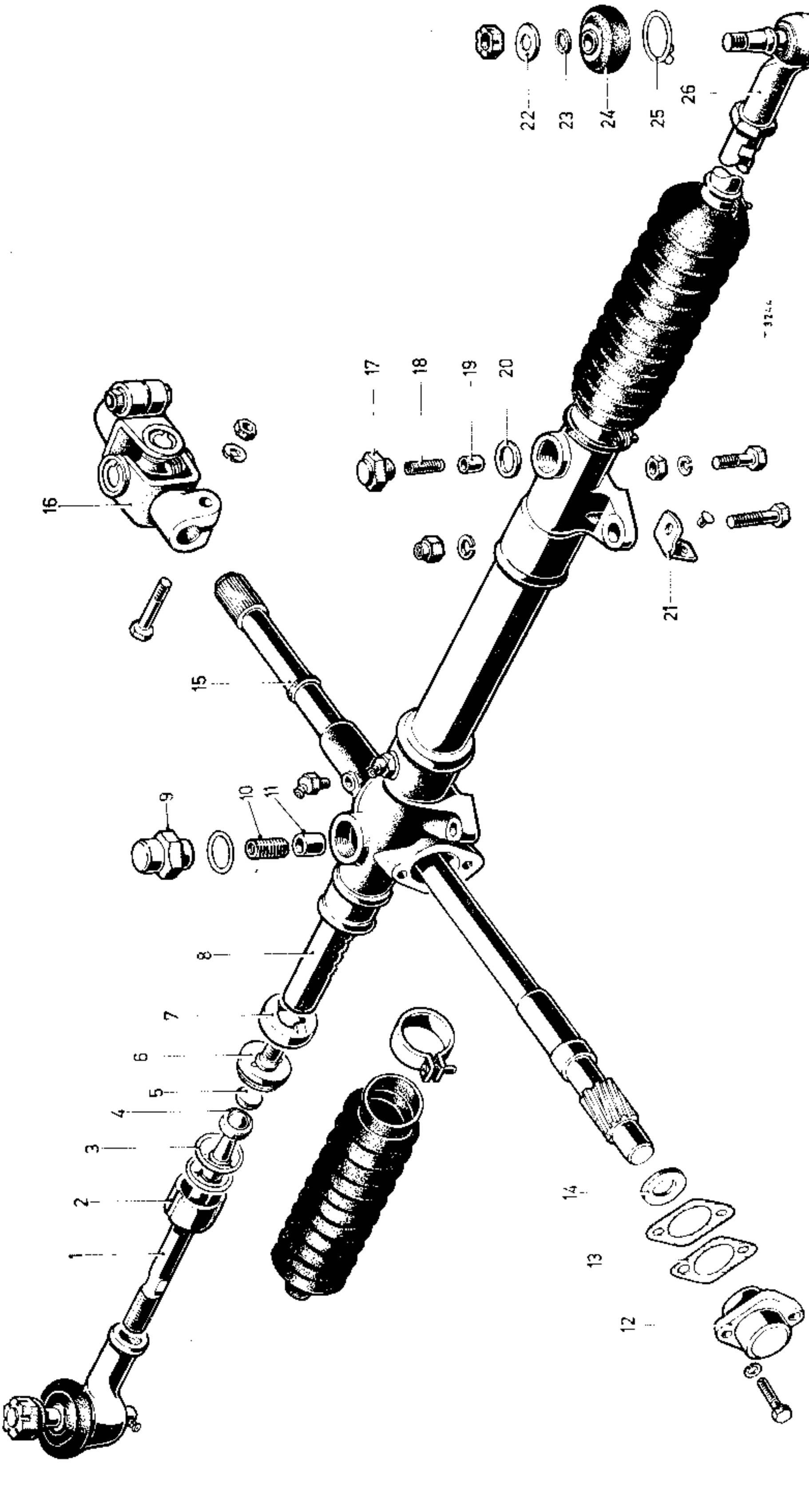


Fig. 30. Steering gear, exploded view

the steering column are slotted and packing shims are fitted between the steering rack and the frame brackets. Make sure that the cut-away portion in the pinion shaft is in line with the bolt hole before inserting the universal joint clamp-bolt.

Brakes: The MGA 1500 is equipped with Lockheed hydraulic drum brakes. The M.G.A. 1600 and 1600 Mk II are equipped with Lockheed disc brakes on the front wheels and drum brakes at the rear. Dunlop disc brakes to all four wheels were available as optional equipment on later models.

Drum brakes: The front drum brakes are of the two-leading-shoe type, operated by a separate brake cylinder for each brake shoe. Each rear brake has a single floating brake cylinder, operating one leading and one trailing shoe.

Specifications:

Drum diameter:	10 in
Length of brake lining, front and rear:	9·6 in
Width of brake lining, front and rear:	$1\frac{3}{4}$ in
Total brake lining area:	134·4 sq in
Lining material:	Ferodo DM 12

Brake adjustment:

Front brakes:

(1) Jack-up the car, spin the wheel and apply the foot brake hard to centralise the brake shoes. Remove the nave plate from the appropriate wheel. Remove the rubber plug from the adjuster hole.
(2) Turn the wheel until the adjuster hole comes opposite one of the adjusters. Turn the adjuster in a clockwise direction, until the brake shoe is in contact with the brake drum; then turn back the adjuster one notch.
(3) Repeat these operations on the second adjuster and adjust the brake shoes of the opposite wheel in the same way.

Rear brakes:

(1) Place a block in front of one of the front wheels and jack-up the rear of the car. Remove the nave plate and the rubber plug from the adjuster hole. Spin the wheel and apply the foot brake hard to centralize the shoes.
(2) Turn the wheel until the adjuster hole comes opposite the adjuster. Turn the adjuster in a clockwise direction until the brake shoes are in contact with the brake drum; then turn back the adjuster just enough to free the drum.
(3) Repeat these operations on the brake shoes of the opposite wheel.

Key to Fig. 30

1 Track rod
2 Ball housing, female
3 Adjustment shim
4 Track rod ball end
5 Ball seat
6 Ball housing, male
7 Lock washer
8 Steering rack
9 Damper cap
10 Damper spring
11 Damper plunger
12 Pinion lower bearing
13 Adjustment shims
14 Lower thrust washer
15 Pinion shaft with oil seal
16 Universal joint
17 Secondary damper cap
18 Damper spring
19 Damper pad
20 Washer
21 Packing shim
22 Washer
23 Ring for dust boot
24 Dust boot
25 Clip for dust boot
26 Ball joint assembly

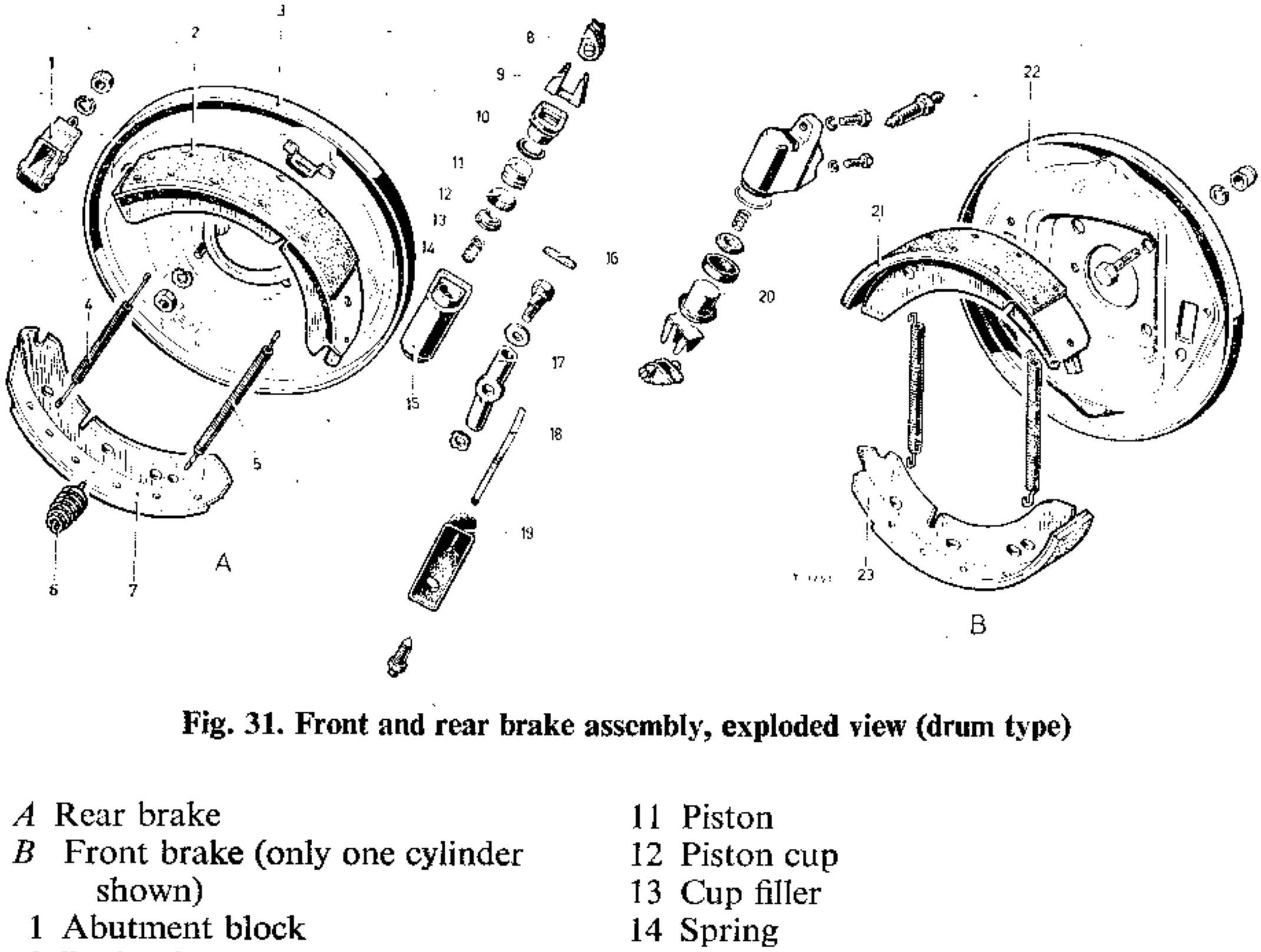


Fig. 31. Front and rear brake assembly, exploded view (drum type)

A Rear brake
B Front brake (only one cylinder shown)
1 Abutment block
2 Brake shoe
3 Brake backing plate
4, 5 Retracting spring
6 Steady spring
7 Brake shoe
8 Adjuster
9 Adjuster mask
10 Plunger
11 Piston
12 Piston cup
13 Cup filler
14 Spring
15 Wheel cylinder
16 Parking brake lever fulcrum pin
17 Banjo connector
18 Parking brake lever
19 Dust boot
20 Piston with seal
21 Brake shoe
22 Brake backing plate
23 Brake shoe

Brake master cylinder: The twin-bore master cylinder incorporates the brake and clutch master-cylinder piston assemblies. The fluid reservoir is built in unit with the master cylinders. The brake and clutch master-cylinder assemblies are identical, with the exception of the valve assembly, which is only fitted to the brake master cylinder. See Fig. 32 for an exploded view. Keep the fluid level half an inch below the filler-plug opening by topping-up with Lockheed hydraulic brake fluid or, when not available, with any other brake fluid of a reputable brand, conforming to SAE 70 R3.

Lockheed disc brakes, MGA 1600 and 1600 Mk II: The Lockheed disc brakes are of the two-calliper type; the rear brakes are similar to those of the MGA 1500.

Minimum permissible thickness of brake pads: $\frac{1}{16}$ in.

Description of the Lockheed disc brakes: The brake calliper, which consists of two halves bolted together, is mounted rigidly to an adaptor plate on the stub axle.

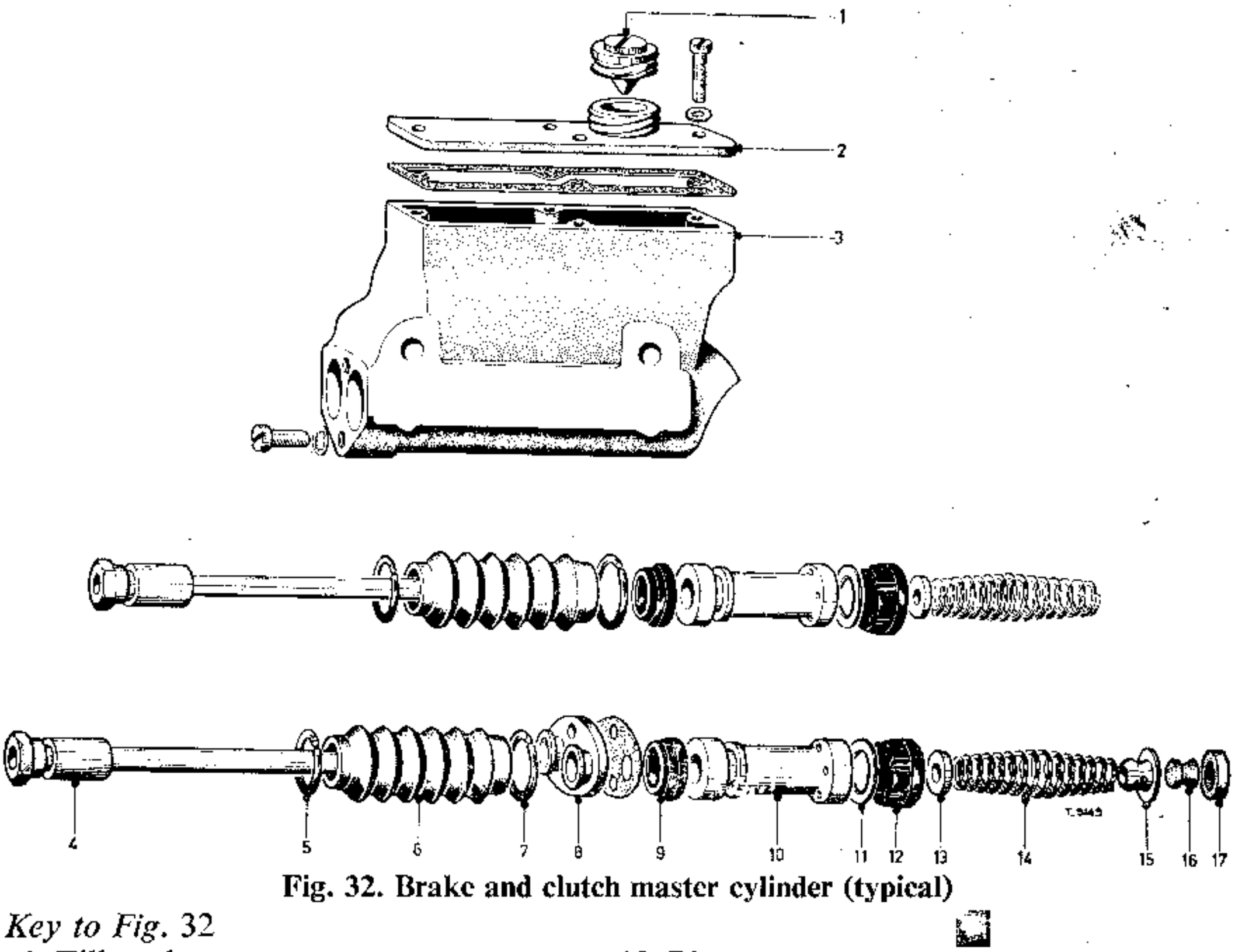


Fig. 32. Brake and clutch master cylinder (typical)

Key to Fig. 32

1 Filler plug
2 Cover for reservoir
3 Master cylinder housing
4 Push-rod
5 Circlip
6 Dust boot
7 Circlip
8 Cylinder cover assembly
9 Secondary cup
10 Piston
11 Shim
12 Primary cup
13 Spring seat (washer)
14 Spring
15, 16, 17 Foot valve assembly (brake master cylinder)

A cylinder in each calliper half contains a piston (21) with piston seal (18), dust seal (19) and dust-seal retainer (20). The piston is located by a guide post (12) over which are fitted a friction bush (11), which is a snug fit over the post, and the sleeve (13), which is a sliding fit over the friction bush, but which is held firmly in the piston. The friction pads float in the calliper and they are held in place by a retainer clip and pin.

When the brakes are applied, the fluid pressure generated in the master cylinder is fed via the brake hoses and lines to the inner half of the brake calliper, and passes to the outer half via internal drillings. In this way an even pressure is exerted on both pistons, moving them inwards until the friction pads contact the brake disc.

When the brakes are applied for the first time after being assembled, the friction bush (11) and sleeve (13) move with the piston over the guide-post (12) as far as piston travel will allow, piston travel being determined by the clearance between the friction pad and the brake disc. The piston seal is deflected when the piston moves outward, but regains its static position when the brakes are released (see the inserts in Fig. 37), thus moving the piston and sleeve back over the friction

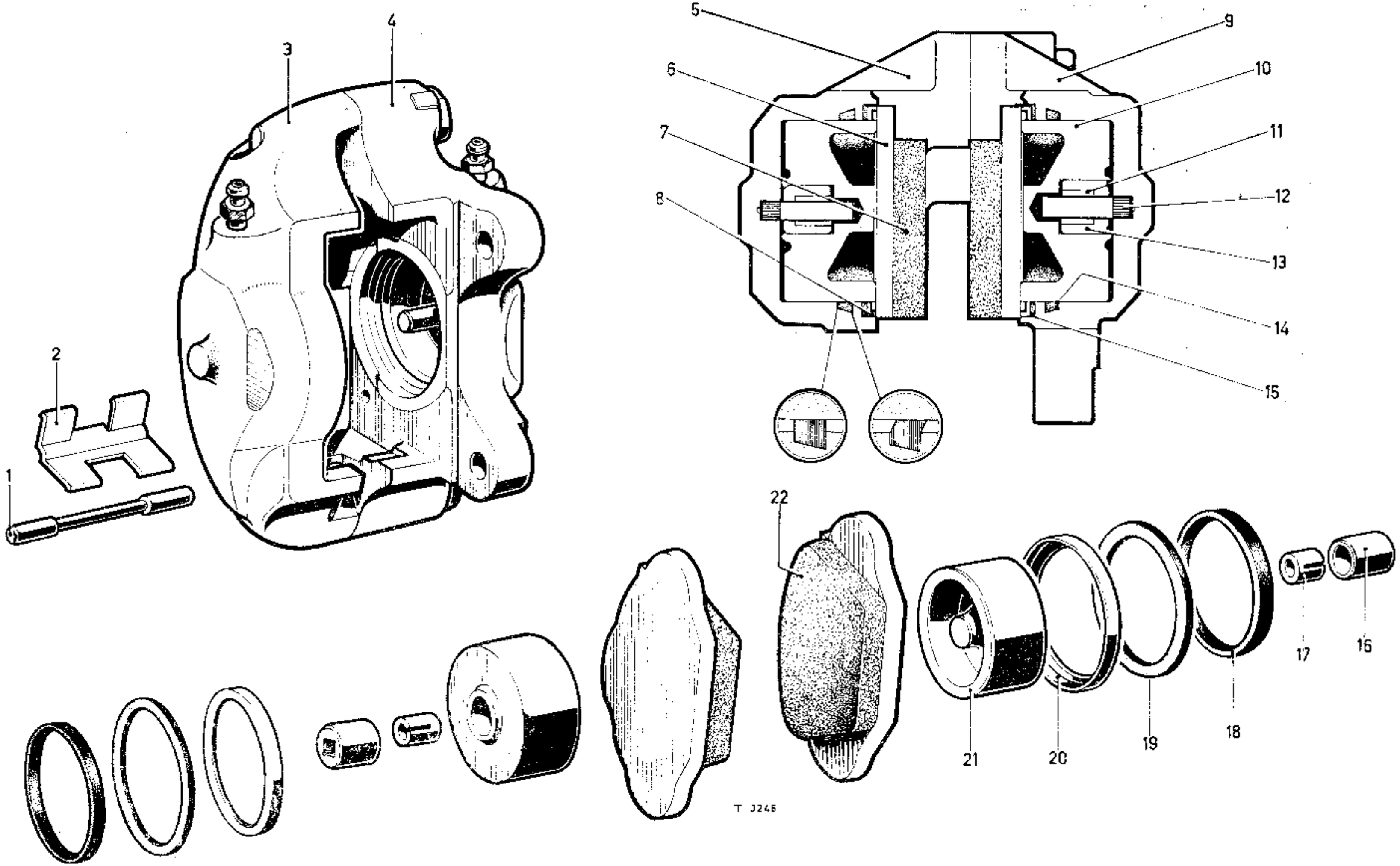


Fig. 33. Disc brake, Lockheed type

bush to provide clearance at the friction pads. As the friction bush is a snug fit over the guide-post, it cannot be withdrawn by the action of the seal and it remains in the position of 'brakes applied'. The difference in length between the friction bush and the sleeve bore depth represents the normal amount of piston travel to obtain the necessary clearance between friction pads and brake disc in the released position.

As the friction pads wear, the friction bush moves gradually outwards over the guide-post, providing a constant clearance between the pistons and the friction pads.

Dismantling and reassembly of brake calliper:

(1) Apply the parking brake and place a block in front of one of the rear wheels. Jack up the front of the car and remove the wheel.

(2) Push in the retainer clip and withdraw the pin, after which the friction pads can be removed. Remove the brake-hose support bracket and unscrew the bolts securing the brake calliper to the adaptor plate on the stub axle. Do not disconnect the brake hose if the calliper is to be dismantled.

(3) Suitably clamp one of the pistons in the calliper and gently apply the foot brake until the other piston can be gripped by hand. Take precuations to catch the brake fluid draining from the calliper.

(4) With the aid of a blunt tool, the piston seal can be removed from its bore. The dust-seal can be removed by carefully prising the retainer from the cylinder.

(5) Thoroughly dry a new piston seal and lubricate it with Lockheed disc brake lubricant before locating it in its groove in the cylinder, making sure that it is correctly seated.

(6) Thoroughly clean the piston and cylinder, if necessary cleaning with Lockheed brake fluid or methylated spirit.

(7) Coat the piston with Lockheed disc brake lubricant, open the appropriate bleeder screw and push the piston into the cylinder. The cut-away portion of the piston must be opposite the bleeder screw.

(8) Press the piston fully home with the aid of a clamp, taking care not to tilt the piston.

(9) Thoroughly dry the dust-seal and dust-seal retainer and lubricate them with Lockheed disc brake lubricant. Install the seal in the cylinder, offer up the retainer and press it fully home with a suitable clamp.

(10) Earlier types of callipers are equipped with a T-section dust-seal which fits inside the retainer. The later type of seal is interchangeable with the earlier type.

(11) Place a suitable clamp over the piston and gently depress the brake pedal until brake fluid flows from the bleeder screw. Retighten the bleeder screw.

(12) Repeat the operations (3) to (9) for the piston on the opposite side.

NOTE: The two halves of the calliper should not be separated unless absolutely necessary. If separation is necessary, the following points must be borne in mind:

Key to Fig. 33

1 Retainer pin
2 Retainer clip
3 Brake calliper, outer half
4 Brake calliper, inner half
5 Brake calliper, outer half
6 Brake pad backing plate
7 Friction pad
8 Dust seal retainer
9 Brake calliper, inner half
10 Piston
11 Friction bush
12 Guide post
13 Sleeve
14 Piston seal
15 Dust seal
16 Sleeve
17 Friction bush
18 Piston seal
19 Dust seal
20 Seal retainer
21 Piston
22 Friction pad

(1) New bolts, lockplates and a fluid channel seal must be used. The bolts are manufactured from high-tensile steel and only the correct replacement should be employed. Failure to do this could have serious results.
(2) Ensure that the calliper faces are clean and that the threaded bolt holes are thoroughly dry. Check that the new fluid channel seal is correctly located in the recessed face before assembling the two calliper halves.
(3) Thoroughly dry the bolts and tighten them to the correct torque: large bolts 65 ft lb, small bolts 10 ft lb.

At car No. 78144 (disc wheels) and car No. 78106 (wire wheels) improved friction pads were introduced. These pads are available in sets only and should be fitted to both left- and right-hand brakes. The later type pads can be distinguished by their red colour.

Brake discs: The brake discs are bolted to a flange on each front wheel hub. If a disc has been separated from the hub, run-out should be checked with a dial gauge. Run-out should not exceed 0·003 in. The minimum thickness of the brake discs after regrinding is 0·340–0·360 in. After regrinding, check that the faces are parallel within 0·001 in and that the run-out does not exceed 0·003 in.

Minimum permissible thickness of brake pads: $\frac{1}{16}$ in.

Bleeding Lockheed brakes: The brakes are bled in the usual way. The following sequence is recommended:

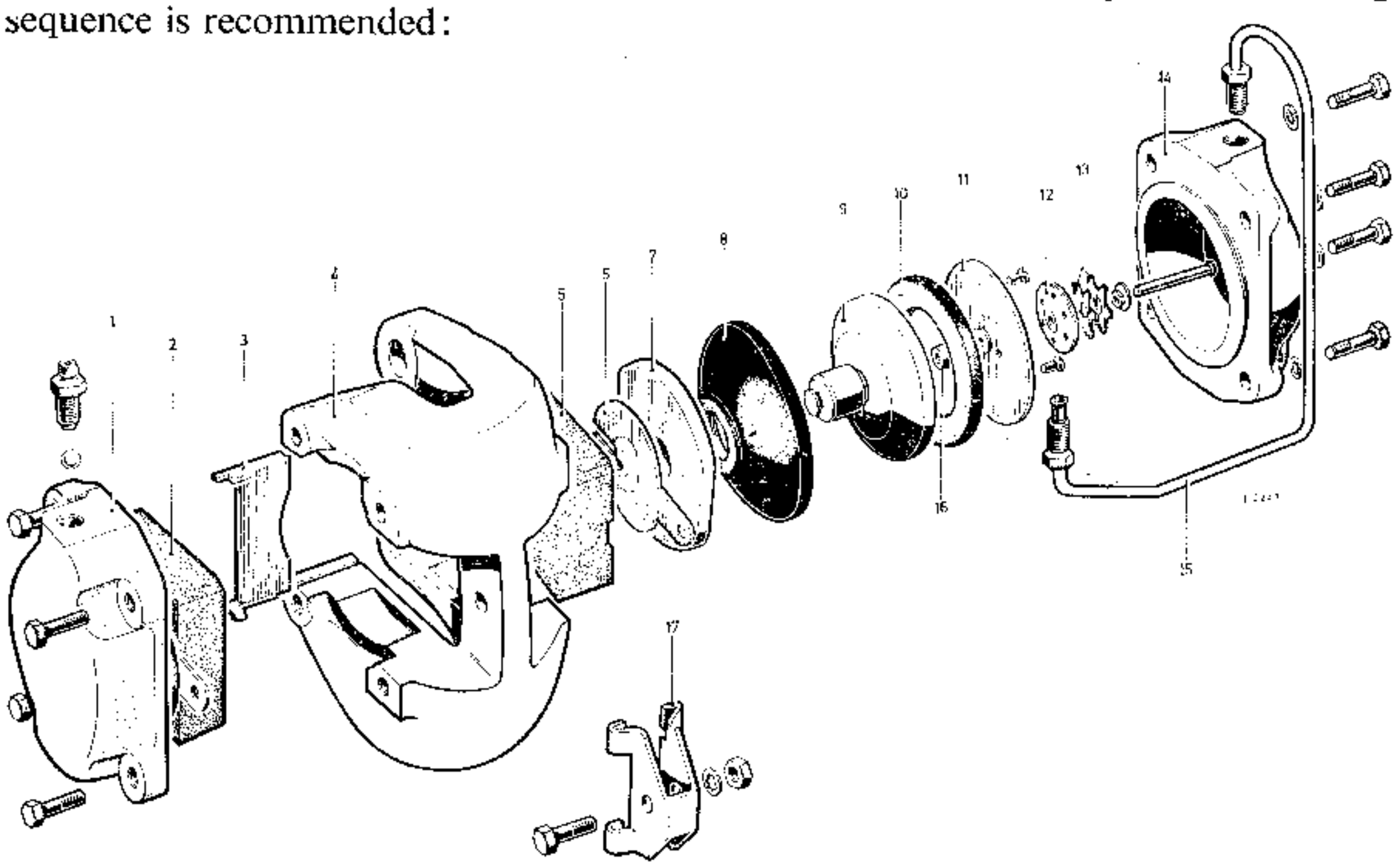


Fig. 34. Disc brake, Dunlop type

1 Cylinder block
2 Friction pad
3 Retainer plate
4 Calliper
5 Friction pad
6 Retainer plate
7 Friction pad backing plate
8 Dust seal
9 Piston
10 Piston seal
11 Retainer plate
12 Cap
13 Spring washers
14 Cylinder block
15 Bridge pipe
16 Friction bush
17 Friction pad retainer plate

(1) The rear wheel on the passenger's side.
(2) The rear wheel on the driver's side.
(3) The outer bleed nipple on the brake calliper on the passenger's side.
(4) The inner bleed nipple on the brake calliper on the passenger's side.
(5) The outer bleed nipple on the brake calliper on the driver's side.
(6) The inner bleed nipple on the brake calliper on the driver's side.

Dunlop disc brakes: Dunlop disc brakes were available as a factory-fitted optional extra. The brake system consists of four hydraulically-operated disc brakes of the calliper type and a mechanically-operated parking brake, mounted on top of the rear brake calliper.

As the principles of operation are basically similar to those described for the Lockheed disc brakes, no separate description will be given.

Minimum permissible thickness of brake pads: $\frac{1}{4}$in.

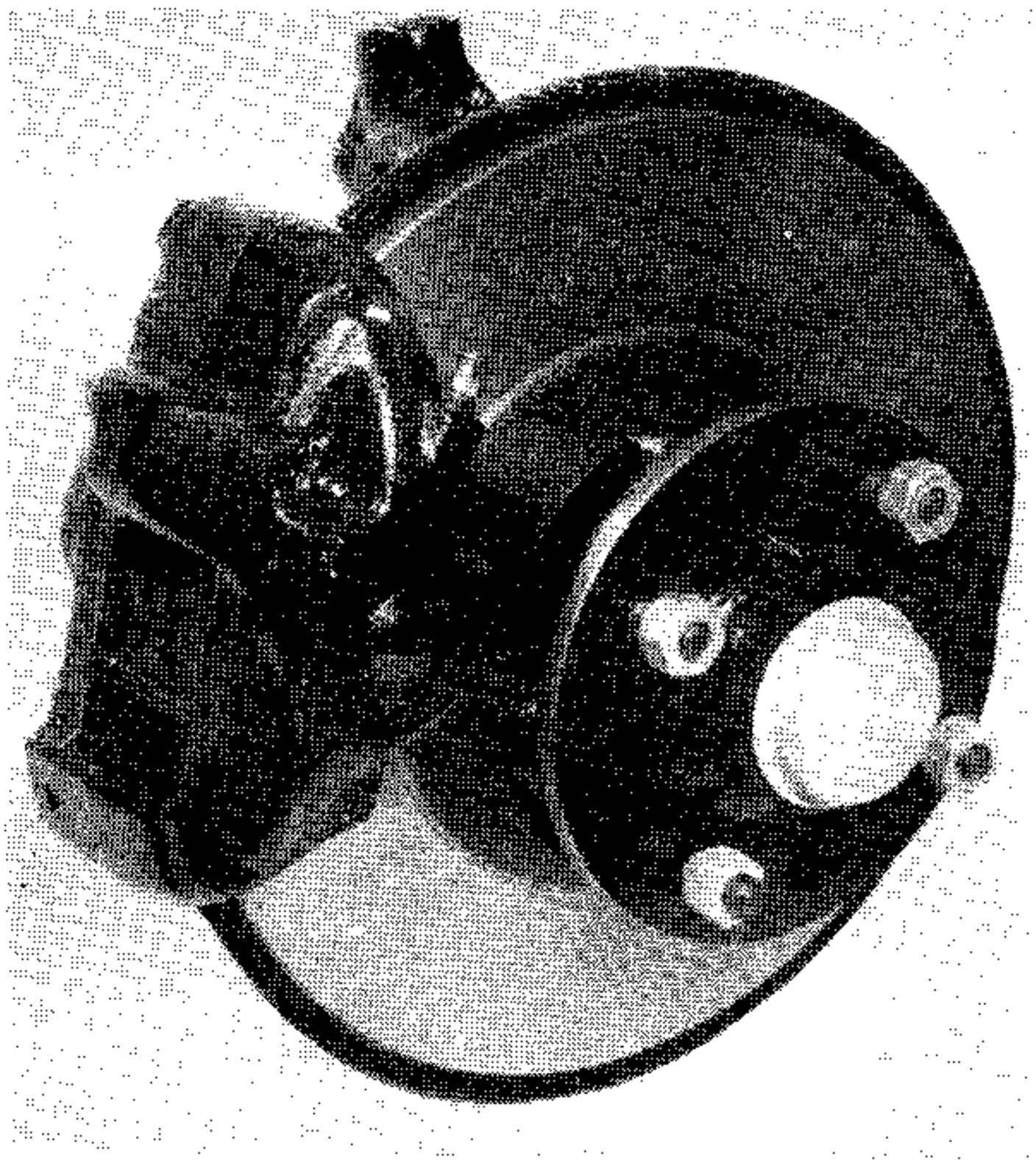


Fig. 35. Disc brake assembly, Lockheed

Removal and dismantling of a brake calliper:

(1) Jack-up the car and remove the appropriate wheel. Remove the plate securing the friction pads and withdraw the pads with a suitable wire hook.
(2) Disconnect and plug the brake hose. Remove the bridge pipe. Unscrew the bolts securing the cylinder blocks to the calliper and withdraw the cylinder blocks.
(3) Gently prise the dust-seal from the groove in the cylinder block, connect the cylinder to a fluid supply and gently apply pressure to remove the piston from the cylinder block.
(4) Unscrew the bolts securing the retainer plate to the piston, remove the retainer plate and the piston seal. Remove the friction bush from the piston bore. Remove the dust-seal from the friction pad backing plate.

(5) Suitably support the backing plate and press the piston out, taking care not to damage it. Carefully clean and inspect all parts and replace those that are damaged or worn.

Reassembly:

(1) Install a new dust-seal in the groove of the backing plate, suitably support the piston and press the backing plate fully home on it.
(2) Insert the friction bush into the bore of the piston, lightly lubricate the seal with brake fluid, install the seal and the plate, and peen over some metal to lock the screws in place.
(3) Install the piston assembly on the guide-post and gently press the piston assembly into the cylinder bore. Be careful not to damage the piston seal.

Further reassembly is done in the reverse order of removal.

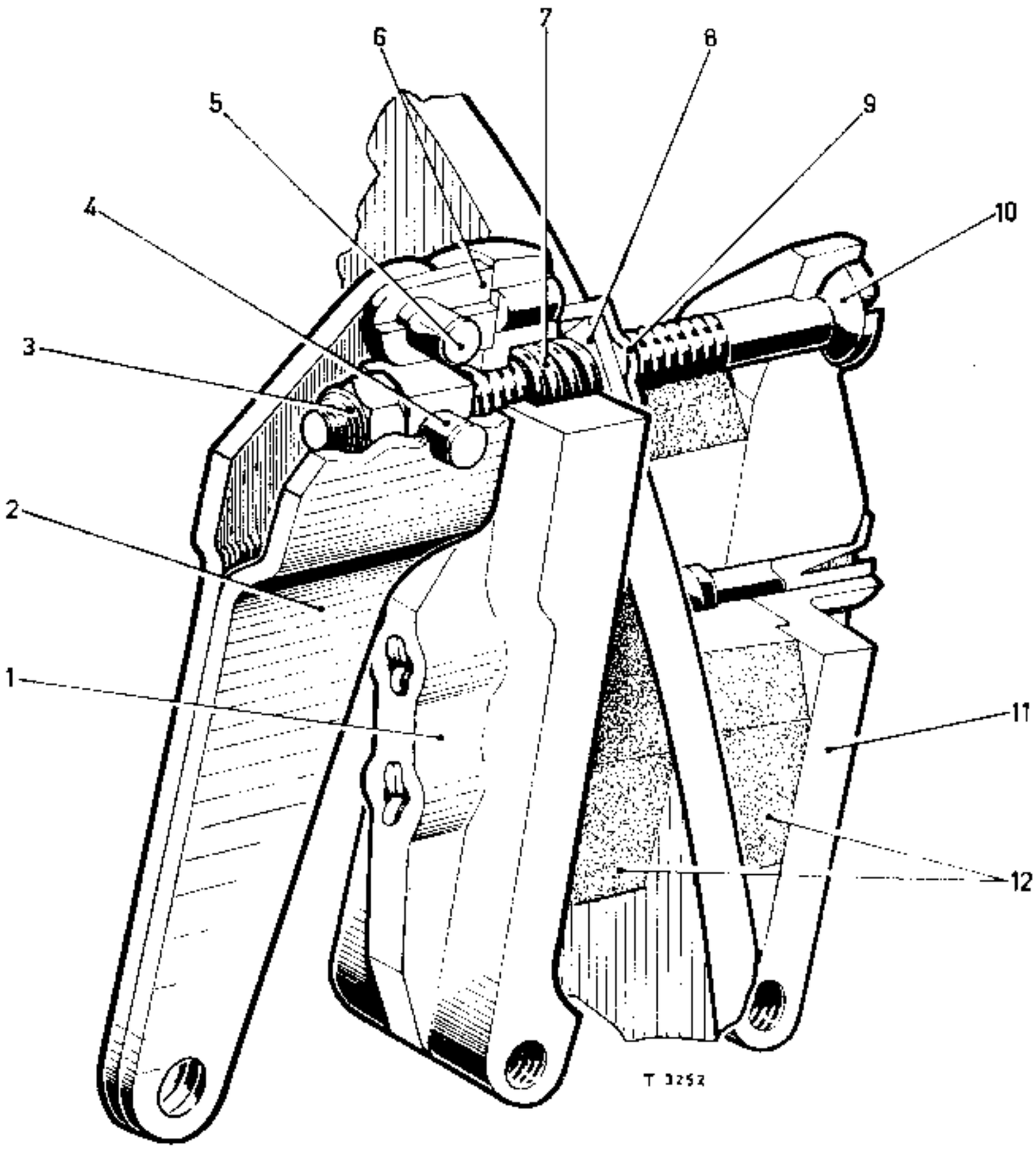
Measure the gap between each side of the calliper and the disc. Correct if necessary by selecting shims to bring the difference to within 0·010 in.

Refacing the brake discs: The minimum thickness of the brake discs after refacing is 0·330–0·340 in. After refacing, check that the faces are parallel to within 0·001 in. and that run-out does not exceed 0·003 in.

Minimum permissible thickness of the brake pads: $\frac{1}{4}$ in.

Bleeding Dunlop brakes: Bleeding the brakes is done in the usual way. It is recommended to start with the longest line (rear wheel on passenger's side) and to finish with the shortest line (front wheel on driver's side).

Brake master cylinder: The master cylinder is assembled in unit with the brake fluid



1 Inner brake pad carrier
2 Parking brake lever
3 Locknut
4 Trunnion
5 Fulcrum pin
6 Fulcrum pin seat
7 Spring
8 Spring retainer
9 Spring retainer plate
10 Adjuster
11 Outer brake pad carrier
12 Brake pads

Fig. 36. Parking brake, Dunlop type

reservoir. The brake fluid reservoir should be topped-up to half an inch below the bottom of the filler neck with Wakefield Crimson brake fluid or, when not available, an alternative fluid conforming to specification SAE 70 R3.

Parking brake: The mechanically-operated parking brake is mounted on top of each rear brake calliper. See Fig. 36 for a sectional view of the parking brake components.

It is possible to re-line the parking brake. The worn lining can be removed after removal of the bifurcated rivets.

Adjustment of the parking brake:

(1) Jack-up the rear of the car, place blocks in front of the front wheels and remove both rear wheels. Check that the parking brake lever is in the fully released position.
(2) Slacken the brass adjuster nut fitted to the relay lever; the relay lever is situated beside the front universal joint of the propeller shaft.
(3) Tighten each adjuster bolt until the brake pads contact the brake disc. Screw up the brass adjuster nut on the relay lever until all slack is taken up.
(4) Unscrew each adjuster bolt approximately one-third of a turn to provide the necessary clearance between the pads and the brake disc. Check that the brake discs rotate freely.

Wheels and tyres:

Pressed-steel disc wheels are standard equipment.

Centre-lock wire wheels are optional extra.

Some tyres are provided with balancing patches on the inside, these should not be removed, otherwise the balance of the tyre will be upset.

Maximum out-of-balance of wheel and tyre: 8–12 in oz.

When reassembling a tyre, make sure the white spot near the bead of the tyre and the spot on the inner tube coincide. The white spots indicate the lightest point of the tyre and the heaviest point of the tube.

ELECTRICAL EQUIPMENT

Electrical system: 12-volt, positive (+) terminal connected to earth.

Wiring diagrams: See Figs. 37 and 38.

Battery: Two 6-volt series, connected batteries are located just in front of the rear axle.

Battery type: Lucas SG 9 E
Lucas STGZ 9 E (dry charged, export only)
Capacity: 58 Ah at 20-hour rate.
SG of electrolyte: 1·270–1·285 at normal temperature 70°F (21°C), fully charged.
SG of electrolyte: 1·110–1·130 at normal temperature 70°F (21°C), discharged.

Add four points specific gravity for every 10°F (7·5°C) above 70°F (21°C). Subtract four points specific gravity for every 10°F (7·5°C) below 70°F (21°C).

Generator: Lucas G 39 PV2; Lucas C40/1 on MGA 1600, starting from engine No. 16 GA 6272.
Two-pole, two brush, shunt-wound.
Maximum output: 19A at 13·5V, at 1900–2150 rpm.
Field resistance: 6·1 Ohm.
Maximum undercutting depth of commutator insulation: 1/32 in.
Minimum permissible length of brushes: 11/32 in.
Brush spring tension: 15–25 oz.

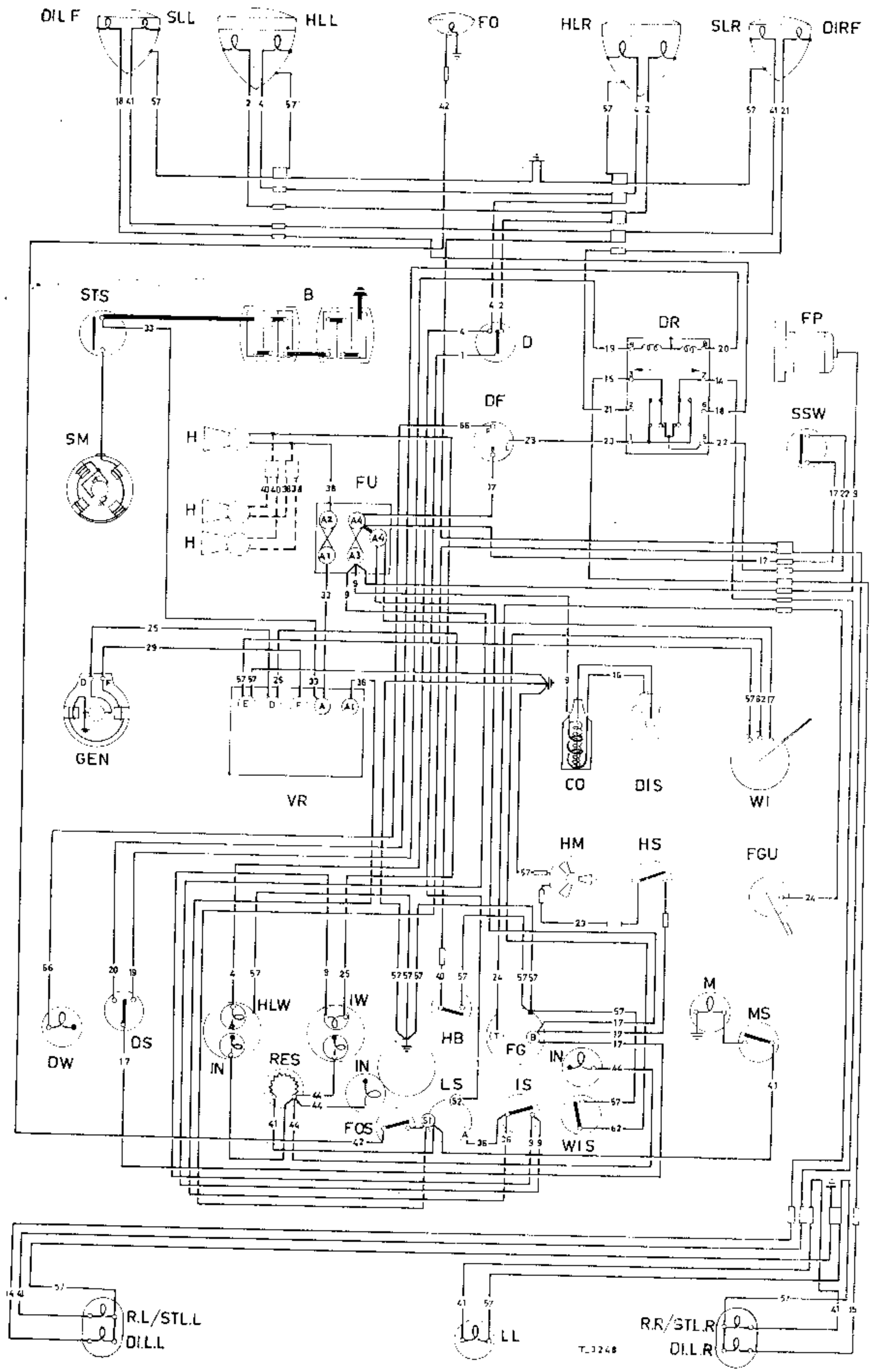


Fig. 37. Wiring diagram, MGA (1500)

Starter motor: Lucas M35 G1.
Number of brushes: 4, 4-pole series-parallel field.
Brush spring tension: 15–25 oz.
Lock torque: 9·3 ft lb with 370–390A at 7·7–7·3 V.
Torque at 1000 rpm: 4·9 ft lb with 230–250A at 9·3–8·9 V.
Minimum permissible length of brushes: 5/16 in.
Do not undercut the commutator insulation.

Control box: Lucas RB 106/2.
Cut-out: cut-in voltage 12·7–13·3 V.
Drop-off voltage: 8·5–11·0 V.

Open circuit setting at 10°C (50°F):	15·9–16·5 V
20°C (68°F):	15·6–16·2 V
30°C (86°F):	15·3–15·9 V
40°C (104°F):	15·0–15·6 V

Fuses: A fuse box containing two fuses and two spares is mounted on the scuttle, next to the regulator box.

Key to Fig. 37

B	Battery	HL.L	Headlamp, left
CO	Coil	HL.R	Headlamp, right
D	Dimmer switch	HLW	Main beam warning light
DF	Direction-indicator flasher	HM	Heater motor
DI.LF	Direction-indicator left front	HS	Heater motor switch
DI.LR	Direction-indicator left rear	IN	Instrument light
DI.RF	Direction-indicator right front	IS	Ignition switch
		IW	Ignition/generator warning light
DI.RR	Direction-indicator right rear		
DIS	Distributor	LL	Numberplate lamp
DR	Direction-indicator relay	LS	Light switch
DS	Direction-indicator switch	M	Map light
DW	Direction-indicator warning light	MS	Map light switch
		RL/STL.L	Stop/tail lamp, left
FG	Fuel gauge	RR/STL.R	Stop/tail lamp, right
FGU	Fuel tank gauge unit	RES	Resistor
FS	Headlamp flasher	SL.L	Sidelamp, left
FO	Fog lamp	SL.R	Sidelamp, right
FOS	Fog lamp switch	SM	Starter motor
FP	Fuel pump	SSW	Stoplamp switch
FU	Fuses	STS	Starter switch
GEN	Generator	VR	Voltage regulator
H	Horn	WI	Windscreen wiper
HB	Horn button	WIS	Windscreen wiper switch

Key to wire colours of Fig. 37

1 Blue	18 Green/red	24 Green/black	40 Brown/black
2 Blue/red	19 Green/yellow	25 Yellow	41 Red
4 Blue/white	20 Green/blue	29 Yellow/green	42 Red/yellow
9 White	21 Green/white	33 Brown	44 Red/white
14 White/purple	22 Green/purple	36 Brown/blue	57 Black
15 White/brown	23 Green/brown	38 Brown/green	62 Black/green
17 Green			

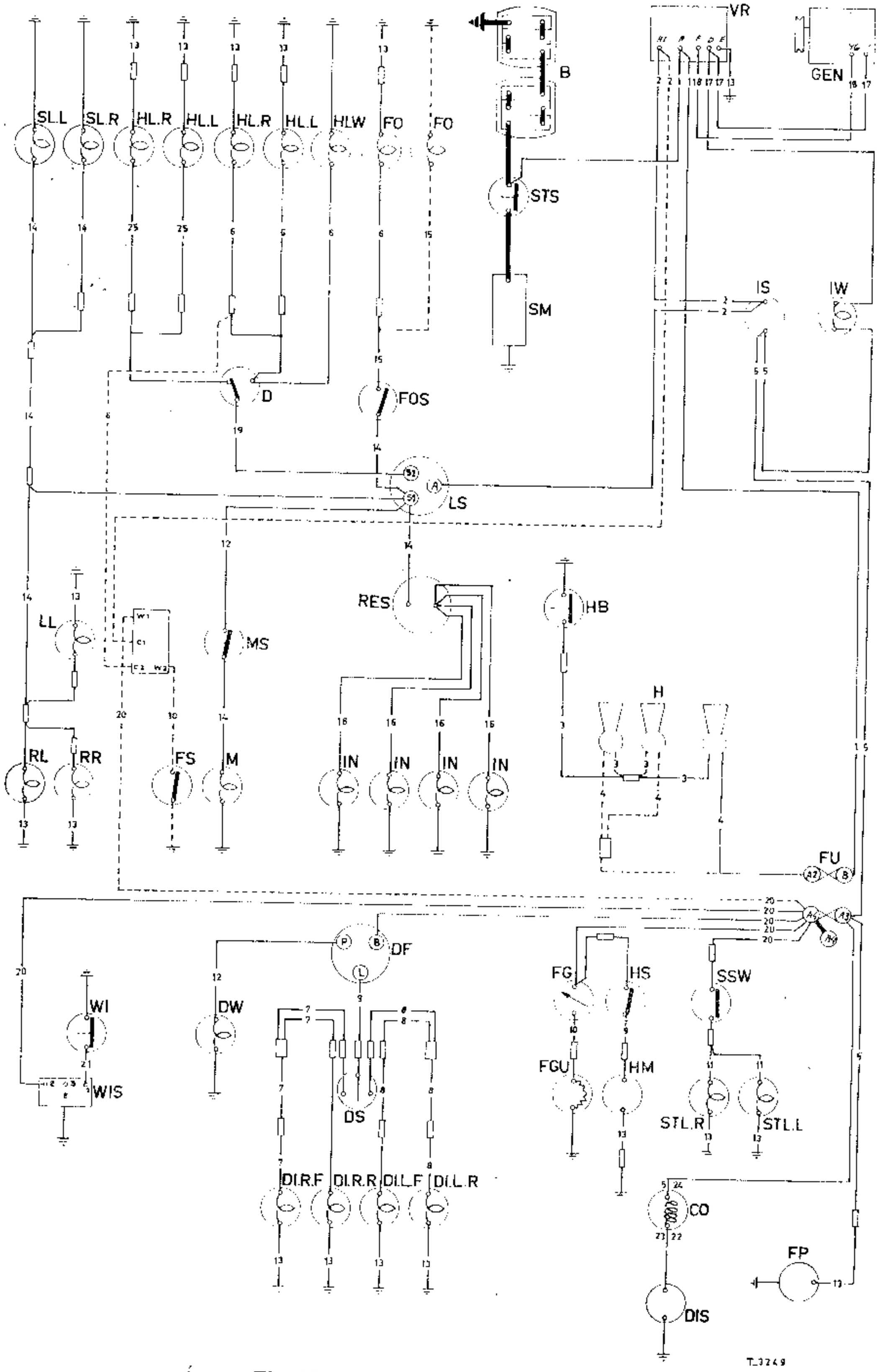


Fig. 38. Wiring diagram, MGA 1600

Flasher unit: Lucas flasher FL 3.

Rate of flashing: 60–120 flashes per minute.

Windscreen-wiper: Lucas model DR 2.
Total current consumption: 2·3–3·4A.
Field current: 0·9A.

Horns: Twin wind-tone horns, model WT 618.
Current consumption: 6–7A each horn.

Light bulbs:

Headlamps, home and export, right-hand drive:	50/40W, dip left
Headlamps, Europe and USA, left-hand drive:	50/40W, dip right
Headlamps, Europe, except France:	45/40W, vertical dip
Headlamps, France:	45/40W, vertical dip (yellow)
Sidelamp and stop/tail-lamp:	6/21W
Number-plate illumination:	6W
Panel lamps:	2·2W

Key to Fig. 38

B	Battery	HL.L	Headlamp, left
CO	Coil	HL.R	Headlamp, right
D	Dimmer switch	HLW	Main beam warning light
DF	Direction-indicator flasher	HM	Heater motor
DI.LF	Direction-indicator, left front	HS	Heater motor switch
DI.LR	Direction-indicator, left rear	IN	Instrument light
DI.RF	Direction-indicator right front	IS	Ignition switch
		IW	Ignition/generator warning light
DI.RR	Direction-indicator, right rear		
DIS	Distributor	LL	Numberplate lamp
DR	Direction-indicator relay	LS	Light switch
DS	Direction-indicator switch	M	Map light
DW	Direction-indicator warning light	MS	Map light switch
		RL/STL.L	Stop/tail lamp, left
FG	Fuel gauge	RR/STL.R	Stop/tail lamp, right
FGU	Fuel tank gauge unit	RES	Resistor
FS	Headlamp flasher	SL.L	Sidelamp, left
FO	Fog lamp	SL.R	Sidelamp, right
FOS	Fog lamp switch	SM	Starter motor
FP	Fuel pump	SSW	Stoplamp switch
FU	Fuses	STS	Starter switch
GEN	Generator	VR	Voltage regulator
H	Horn	WI	Windscreen wiper
HB	Horn button	WIS	Windscreen wiper switch

Key to wire colours of Fig. 38

1 Brown	8 Green/red	14 Red	20 Green
2 Brown/blue	9 Green/brown	15 Red/yellow	21 Black/green
3 Brown/black	10 Green/black	16 Red/white	22 Green/blue
4 Brown/green	11 Green/purple	17 Yellow	23 White/black
5 White	12 Light green	18 Yellow/green	24 Grey-white
6 Blue/white	13 Black	19 Blue	25 Blue/red
7 Green/white			

SU Carburettors

SU carburettors are of the variable-throat type; the fuel is metered by a tapered needle in the jet. The needle is secured to the sleeve, which determines the amount of throat opening; the position of the sleeve and needle are determined by the vacuum piston (the upper part of the sleeve), according to the throttle valve opening. In Figs. B and C a schematic view of the construction is shown.

Normally, the piston, the sleeve and the needle are in the bottom position when the throttle is closed, but for the sake of clarity these parts are shown in a raised position. The piston is a free fit in the vacuum chamber, with a very small clearance. A guide spindle is centrally located in the piston; this spindle is free to move up and down in the guide bore of the vacuum chamber, thus ensuring correct alignment of the piston and vacuum chamber at all times. When the engine is not running, the piston and needle assembly falls to the bottom position by its own weight and rests on the bridge in the throat. (Some SU carburettors are also equipped with a soft assist spring on top of the vacuum piston.) With engine running, the sleeve forms a restriction to the air-stream; thus a partial vacuum is created. This pressure drop also creates a partial vacuum in the vacuum chamber above the piston, causing the piston, the sleeve and the needle to rise a certain amount. The raised needle determines the amount of fuel emerging from the jet; thus the correct air/fuel mixture is automatically established. When starting a cold engine, the mixture may be enriched by pulling down the jet; the mouth of the jet will now be in line with the thinner portion of the needle, thus supplying a richer mixture. The jet is mounted in the jet retainer by means of two spring-loaded gland joints, thus ensuring a fuel-tight seal. In Fig. D an exploded view of the jet assembly is shown.

Fitting jet needles and centring the jets: Two varieties of jet needles are in use, one with straight-cut shoulder, the other with rounded shoulder, as shown in Fig. A. When fitting the needle, the portion of the needle which is marked with the dotted line must be flush with the vacuum piston sleeve. When assembling the carburettor, it is imperative to make sure that the jet and needle are correctly centred. This is done by screwing the adjusting nut all the way up; then lift the piston and needle assembly and listen for it to fall with an audible 'click'. If no 'click' is heard, the needle is fouling the jet, which will have to be recentred. This is done by loosening and retightening the jet retainer. Recheck whether the piston will now fall with an audible 'click'; if necessary, repeat loosening and retightening the jet retainer until the jet is centred correctly.

Float setting: When the float needle is seated, a 7/16in round bar should be an easy sliding fit between the arched fork of the float hinge arm and the edge of the float chamber cover. If adjustment is necessary, carefully bend the hinged lever fork; *do not* bend the straight portion of the hinge lever.

Adjustment:

Make sure that the vacuum chambers and pistons of both carburettors are clean, the needles properly fitted and the jets correctly centred. Check the dampers for correct oil level and top-up if necessary, then proceed as follows:

(1) Remove the air-cleaners and slacken the clamping screw on the throttle connector rod to enable the throttles to be set independently. Ensure that the idle adjustment screws are holding the throttles partly open and that the jet adjust-

ment nuts are not screwed all the way up (an average setting to start with is obtained by turning the idle adjustment screws down one full turn from the fully-closed position and the jet adjusting nuts one and a half turns down from the top-most position).

(2) Make sure the jet seats against the adjusting nut; if necessary readjust or disconnect the choke cable. On cars with linkage between choke lever and throttle (fast idle) unscrew the fast idle setting screw until it is well clear of the lifter.

(3) Warm-up the engine and adjust the throttles equally until an idling speed of approximately 500rpm is obtained.

(4) Listen to the hiss of air at each carburettor air intake in turn (the use of a piece of tubing of about $\frac{3}{8}$in diameter, one end held to the ear and the other end in front of the air intake, will make it easier to compare the sound of both carburettors).

(5) Adjust both idle screws until the hiss is equal on both units and the idling speed is approximately 500 rpm.

(6) Now turn off the ignition and with downward pressure on the rear throttle arm, tighten the throttle connector-rod clamping screw.

(7) Start the engine. While the engine is idling at approximately 500rpm, check the mixture of each carburettor in turn by lifting the piston by means of the piston lifter pin.

(8) If, when the piston is lifted, the engine speed increases, the mixture is too rich and the jet adjusting nut must be screwed up one-sixth of a turn. If the speed decreases, the mixture is too lean and the nut should be screwed down one-sixth of a turn.

(9) Continue adjusting each carburettor until, when the piston is lifted, there is no increase, or a very slight increase followed by decrease in speed. The mixture is then correct and the engine should run regularly.

(10) Reconnect and adjust choke cable. Adjust the fast idle adjustment screw on the connecting linkage between choke lever and throttle until the screw is just clear of the lifter; the clearance at this point should be about 1/64in (see Fig. C).

(11) Refit the air-cleaner. Recheck idle speed and mixture.

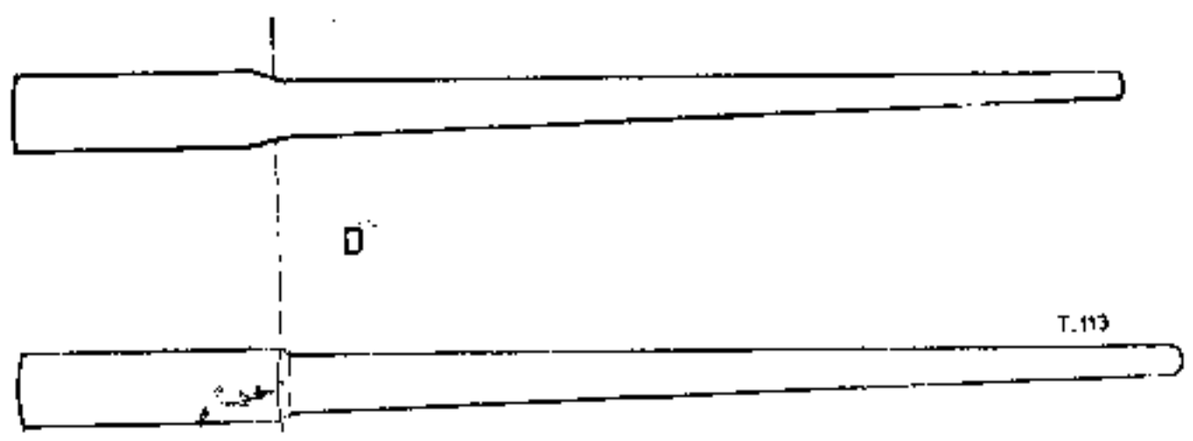


Fig. A. SU carburettor, jet needles

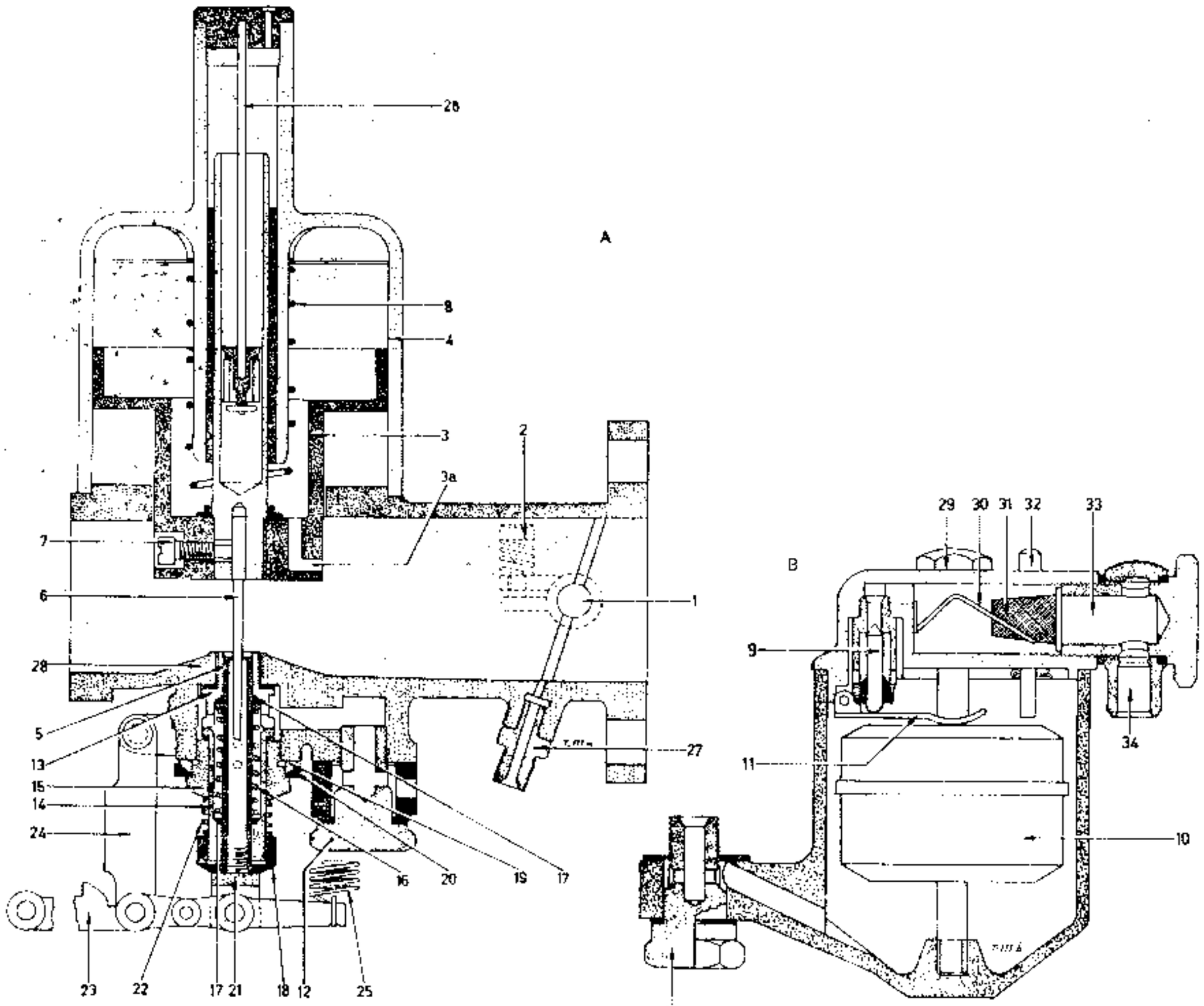


Fig. B. SU carburettor, schematic view (typical)

Key to Figs. B, C *and* D

1 Throttle valve
2 Idling speed adjustment
3 Vacuum piston and sleeve
3a Vacuum passage
4 Vacuum chamber
5 Jet
6 Jet needle
7 Needle clamping screw
8 Vacuum piston assist spring (not on all SU carburettors)
9 Float needle valve
10 Float
11 Float arm
12 Hollow float chamber attachment bolt
13 Upper jet guide with joint washer
14 Lower jet guide with joint washer
15 Jet retainer
16 Spring
17 Gland packing joint washer and thrust washers
18 Adjusting nut
19 Jet retainer joint
20 Joint retainer with bevelled bore
21 Jet (5 in schematic drawing)
22 Lock spring for 18
23 Jet lever
24 Jet lever link
25 Jet lever retracting spring
26 Damper valve stem
27 Connection for vacuum pipe to ignition distributor
28 Bridge
29 Float chamber cover bolt
30 Fuel strainer retaining spring
31 Fuel strainer
32 Float actuating pin
33 Fuel line connector
34 Fuel line

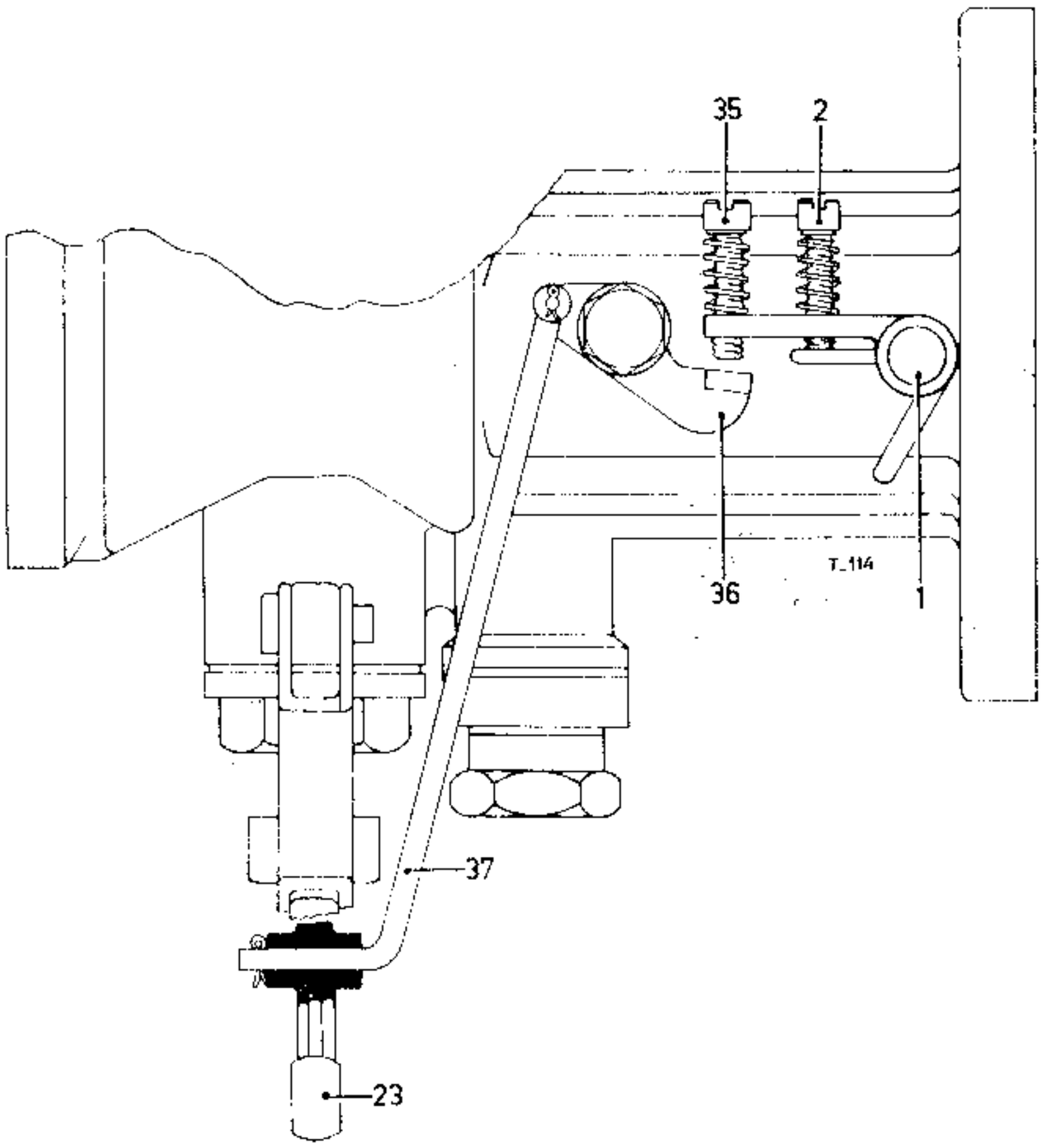


Fig. C. SU carburettor, fast idle mechanism

Key to Fig. C

1 Throttle valve
2 Idling speed adjustment
23 Jet lever
35 Fast idle screw
36 Fast idle cam
37 Fast idle rod

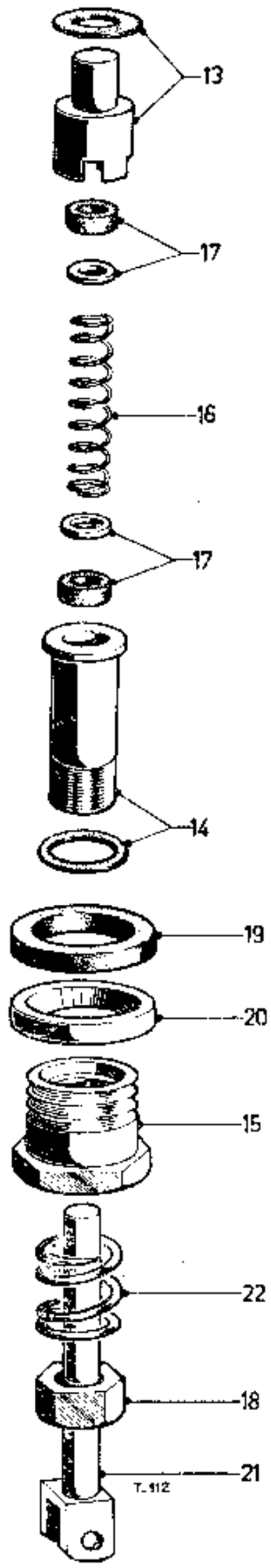


Fig. D. SU carburettor, jet assembly, exploded view

ENGINE FAULT FINDING CHART

Engine will not start

A. Starter does not crank engine	
Battery run down	*Recharge; replace if defective*
Battery posts and terminals loose or corroded	*Clean and tighten. If badly corroded, soak with water to facilitate removal and avoid damage to the battery posts*
Faulty starter switch or solenoid, if fitted; broken battery cable or loose connection	*Check wires and cables; check solenoid and switch, replace if defective*
Starter motor defective	*Repair or replace*
Starter drive stuck (starter will run, but does not crank engine)	*Clean and if necessary repair or replace*
Starter drive pinion jammed with starter ring gear	*Free by rotating squared end of starter spindle with a spanner*
B. Starter cranks engine slowly	
Battery , ly run down	*Recharge; replace if defective*
Loose or c rroded connections	*Clean and tighten*
Faulty starter switch or solenoid; partly broken cable or loose connection	*Check wires and cables; check solenoid and switch, replace if necessary*
Starter motor defective	*Repair or replace*
C. Starter cranks engine, but engine will not start	
Trouble in ignition system:	
No spark at plugs:	
Moisture on spark plugs, ignition distributor, coil and wires (this trouble often occurs after parking overnight in foggy or rainy weather)	*Clean and dry. Avoid recurrence by coating wires, distributor rotor, cap, coil and spark plug insulators with moisture-proof lacquer*
Spark plugs flooded, due to excessive use of choke	*Start engine on full throttle. If this does not help, clean plugs. With plugs removed, turn over the crankshaft a few times to blow the accumulated fuel from the cylinders*

Spark plugs oiled up	*Clean; if necessary replace*
Spark plug insulator cracked	*Replace*
Spark plug gap too wide or too close	*Reset gap*
No spark at distributor:	
Loose, broken or shorted low-tension lead between coil and/or inside distributor	*Check and tighten; also check internal leads in distributor. These leads sometimes break inside their insulation, and the break is not always visible. Pull carefully on one end; a broken lead will stretch*
Cracked rotor or distributor cap	*Replace*
Contact breaker points dirty, worn or maladjusted	*Clean and adjust; if necessary replace*
Carbon brush in distributor cap not making contact	*Free; if necessary replace*
Faulty condenser	*Replace*
No spark at coil:	
High tension lead loose or broken	*Replace*
Broken or loose low-tension leads or faulty ignition switch	*Check wiring, repair or replace; check switch, replace if defective*

D. Starter cranks engine, but engine will not start

Trouble in fuel system:	
No petrol in carburettor:	
Empty fuel tank	*Fill-up. If necessary, check and repair or replace fuel gauge*
Obstructed or damaged fuel pipe	*Clean; if necessary repair or replace*
Air leak in petrol line	*Check and repair or replace. Pay special attention to flexible fuel line (if fitted). If flexible fuel line is porous, a temporary 'get-you-home' repair can often be made by securely wrapping the line with friction tape or rubbing with hard soap*
Fuel filter clogged	*Clean and refit with new gasket. Always carry a spare gasket and a glass filter bowl, if so equipped*

Fuel pump defective	*Repair or replace. If electric pump does not function, lightly tap pump housing until ticking resumes*
Petrol in carburettor:	
Jets clogged	*Clean; blow out with air (never use wire to clean jets)*
Float needle stuck	*Clean or replace*
Carburettor flooded	*Clean float needle valve; if necessary replace. If this trouble persists, check fuel pump pressure*
Choke control faulty	*Repair or replace*
Air leak at inlet manifold or carburettor base	*Check nuts and bolts for tightness; if necessary replace gaskets*
Water or dirt in carburettor	*Clean. If this trouble persists, check rubber hose in fuel tank filler neck for damage or looseness, causing water to enter tank*

NOTE: *If ignition system and carburettor are in order, yet the engine will not start, check timing*

Engine starts but does not run properly

E. Engine misfires	
Ignition trouble:	
Spark plug or coil leads loose or damaged	*Tighten; replace if necessary*
Incorrect spark plug gap	*Regap*
Cracked spark plug insulator	*Replace faulty spark plug*
Spark plug oiled up	*Clean, if necessary replace with spark plug of correct type. If trouble persists, check for mechanical trouble*
Cracked distributor cap	*Replace*
Loose connection in primary circuit	*Check and repair. Also check, and if necessary replace, ignition switch. In rare cases the ammeter has been found to be the cause of this trouble, due to faulty internal connection*
Distributor otherwise faulty	*See* **C**
Trouble in fuel system	*See* **D**

Mechanical trouble:	
Incorrect valve clearance	*Adjust*
Valve sticking	*Try to free by pouring a gum solvent of good quality into carburettor air intake; if not successful, dismantle and repair*
Valve spring broken	*Replace. Usually the valve concerned will have to be ground*
Worn piston, piston rings and cylinder or burnt valve; cylinder-head gasket blown	*Test compression; if too low, dismantle for repairs*
F. Engine starts and stops	
Trouble in ignition or fuel system:	*See* **C** *and* **D**
Obstructed exhaust system	*Check and repair or replace*
G. Engine runs on wide throttle only	
Idle jet clogged or mixture improperly adjusted	*Clean idle jet and/or idle air bleed; adjust*
Valve sticking or burnt; valve spring broken; other mechanical trouble	*Check and repair. Pay special attention to heat riser, if so equipped, since a burnt heat riser tube will cause exhaust gas to enter intake manifold. This will sometimes cause backfiring in carburettor*
H. Lack of power	
Ignition too far retarded or other ignition trouble	*Check and correct* (*See* **C**)
Obstructed exhaust system	*Dented exhaust pipe and/or muffler* *Dislocated baffle plate or muffler* *Replace*
Trouble in fuel system	*Check and correct* (*See* **D**)
Loss of compression	*Test compression; if found to be too low, check valve clearance. If valve clearance is properly adjusted and compression is still low, check for other mechanical trouble, such as burnt valves and/or worn pistons, rings and cylinders*
Dragging brakes	*Check and correct. Essentially this is not an engine trouble*

I. Engine runs roughly	
Ignition timing incorrect	*Check and correct. Pay attention to possibly stuck advance mechanism, because the fixed advance may be correctly adjusted, yet the timing while running will be incorrect if the automatic advance is stuck*
Lean or rich mixture	*Check carburettor and fuel system,* (*See* **D**)
Improperly adjusted valve clearance	*Check and correct*
J. Engine knocks	
Ignition too far advanced	*Check and correct. Attend to possibly stuck advance mechanism,* (*See* **I**)
Excessive carbon deposit	*Decarbonize*
Loose bearings or pistons or other mechanical cause	*Check and repair*
K. Engine overheats	
Cooling system:	
Lack of water	*Top-up and check for leaks*
Fan belt loose or broken	*Check and adjust or replace*
Radiator clogged by insects	*Clean*
Cooling system clogged internally	*Clean with a cooling system cleaner of a reputable make and flush out according to maker's instructions. Inspect radiator hoses and replace if in bad condition*
Thermostat stuck or faulty	*Check and replace if necessary*
Ignition improperly timed	*Check and correct. Attend to possibly stuck advance mechanism*
Lean or rich mixture	*Check fuel system;* (*See* **D**)
Excessive carbon deposit	*Decarbonize*
Obstructed exhaust system	*Check and repair or replace*
Cylinder-head gasket of the incorrect type	*Replace*