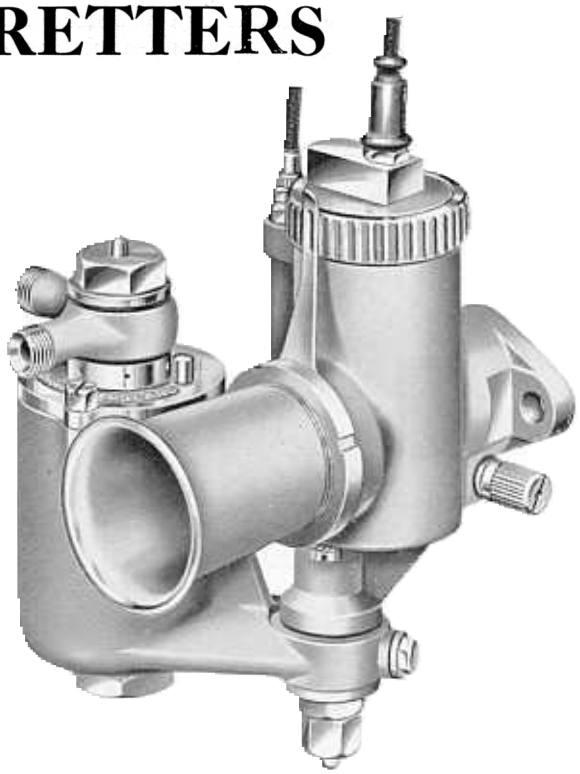
AMAL

THE CARBURETTER OF
RECORDS AND SUCCESSES.

GP CARBURETTERS

FOR USE WITH ALL GRADES
OF RACING FUELS.



PRICES

INCLUSIVE OF FIXED OR REMOTE TYPE 302 TOP-FEED LARGE CAPACITY FLOAT CHAMBER WITH DOUBLE OR SINGLE BANJO, BUT WITHOUT CABLES OR CONTROLS.

TYPE 15 GP	**£15 - 0 - 0**
TYPE 10 GP	**£15 - 0 - 0**
TYPE 5 GP	**£17 - 17 - 0**

FOR SPECIFICATIONS AND HOW TO ORDER, SEE PAGE 3.

(THIS LIST IS PRINTED IN ENGLAND, AND IS ISSUED SUBJECT TO PRICES RULING AT THE DATE OF DELIVERY).

AMAL LTD., Holdford Road, Witton, BIRMINGHAM, 6
ENGLAND.

TELEPHONE: BIRCHFIELDS 4571 (6 lines). TELEGRAMS: AMALCARB (PHONE), BIRMINGHAM.

THE GRAND PRIX CARBURETTER

features

UNOBSTRUCTED BORE — for maximum power at peak R.P.M.

Because the metering needle does not pass through the choke of the Carburetter, the only restriction to flow through the Carburetter when the throttle valve is fully open, is a small one caused by the protrusion of the spray tube, and this is overcome by a slight swell in the choke at this point. A taper returns the bore to its nominal diameter on the engine side of the throttle valve.

SHORT MIXTURE TRACT — for rapid acceleration

Although the needle does not obstruct the choke, it is positioned within the throttle valve diameter, and this results in a very short tract for the mixture to traverse from the needle jet to the choke. The benefit of this is felt in rapid and consistent acceleration throughout the range, and where megaphone exhausts are used an additional advantage is cleaner entry onto the megaphone at lower R.P.M. than with previous types of racing Carburetters.

PRIMARY AIR JET — for accurate depression control

The quantity of primary air that atomises the fuel issuing from the needle jet, is controlled by making it pass through a drilled bush. Its effect is that of a depression control for the main jet, and while the air jet as fitted by the factory with due regard to the bore size of the Carburetter would normally be left unaltered, it could be changed for one of different size for special purpose tuning. It may, therefore, be regarded as an additional tuning factor in exceptional circumstances.

FIVE TUNING FACTORS — for accurate tuning throughout the range

The established Amal principles are followed by incorporating :—

Easily changeable **main jet** controlling the fuel supply at full throttle ;

changeable **needle and needle jet** and adjustable **needle position** for control at smaller throttle openings ;

changeable **throttle valve** of which the amount of cutaway controls the mixture at still smaller throttle openings ;

A taper needle for independent control of the fuel supply to the **pilot jet** to control the mixture strength for idling.

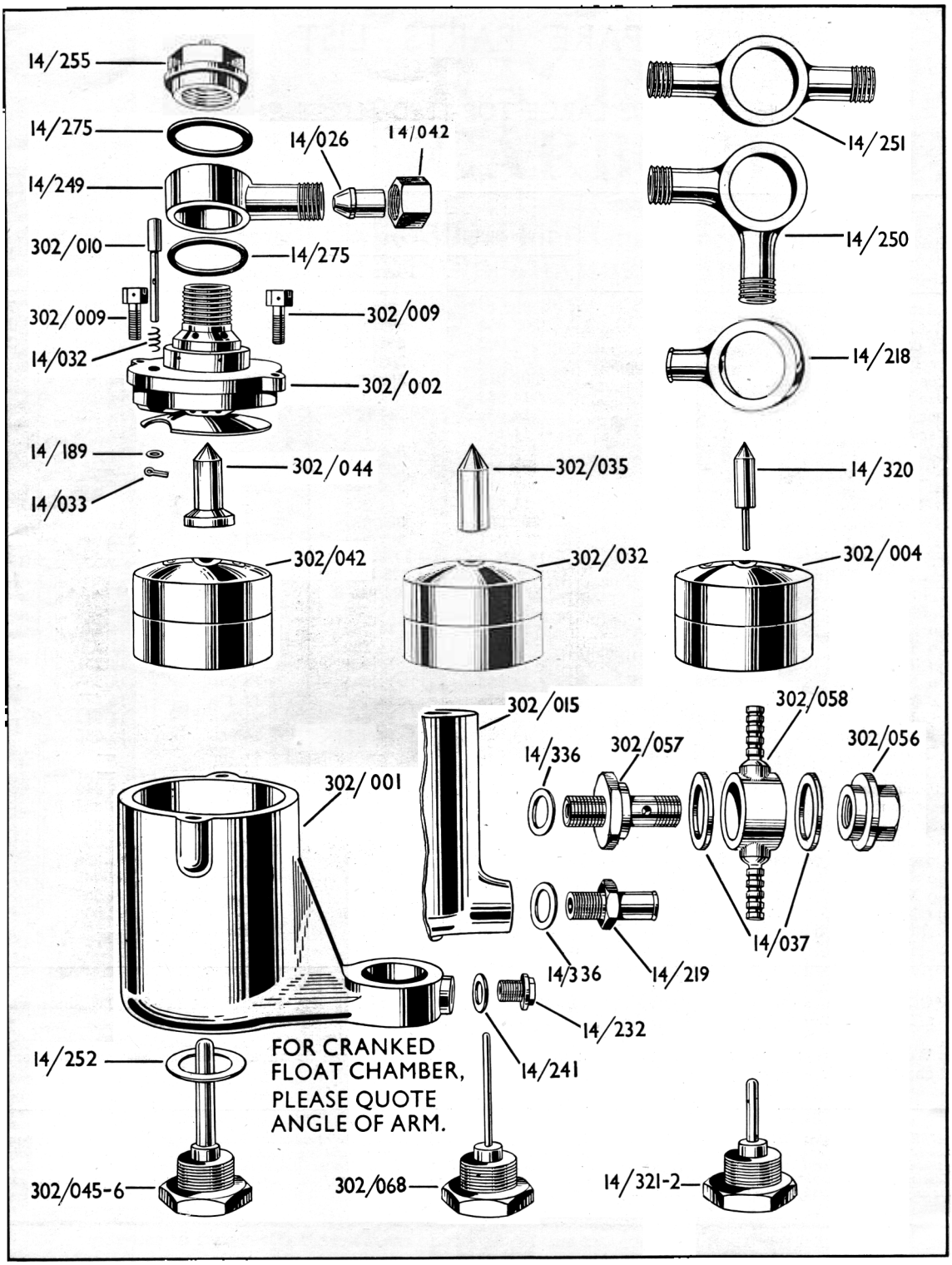
By using these tuning factors in the proper sequence, it is possible to obtain clean and consistent carburation at all throttle openings, with excellent progression throughout.

LARGE CAPACITY FLOAT CHAMBER — to ensure adequate fuel supply

The type 302 Top Feed Float Chamber will pass 10 gallons of fuel per hour at 18 inch head, and its use does away with the necessity for double float chambers. A separate float chamber for remotely mounting is recommended, but where this is not possible, rigid float chambers are available with arms cranked at up to a maximum of 20 degrees to enable the Carburetter to be fitted in a downdraught position.

FOR OPERATION AND TUNING INSTRUCTIONS, SEE LIST NO. 469.

Type 302 T.T. Float Chamber



PRICES ETC., REFER TO PAGE FOUR.

SPARE PARTS LIST

for TYPE 302 LARGE TOP FEED FLOAT CHAMBER

Component	Type 302/1 Part No.	(Remote) Type 302/3 Part No.	Type 302/10 Part No.	(Remote) Type 302/11 Part No.	List Price s.	d.
Complete Float Chamber ..	302/1	302/3	302/10	302/11	70	0
Float Chamber Body only ..	302/001	302/015	302/001	302/015	30	0
Cover complete with Baffle ..	302/002	302/002	302/002	302/002	20	0
Cover Fixing Screws ..	302/009	302/009	302/009	302/009		4
Tickler	302/010	302/010	302/010	302/010		10
Tickler Spring	14/032	14/032	14/032	14/032		2
Tickler Cotter	14/033	14/033	14/033	14/033		1
Tickler Washer	14/189	14/189	14/189	14/189		1
Float	302/004	302/004	—	—	5	0
Float	302/032	302/032	—	—	5	0
Float .. .. (See note)	302/042	302/042	302/042	302/042	5	0
Float Needle	14/320	14/320	—	—	2	0
Float Needle .. .. (below re)	302/035	302/035	—	—	2	0
Float Needle	302/044	302/044	302/044	302/044	2	0
Base Plug and Guide (modification *)	14/321-2	14/321-2	—	—	3	0
Base Plug and Guide	14/322-302/036	14/322-302/036	—	—	3	0
Base Plug and Guide	302/045-6	302/045-6	302/045-6	302/045-6	3	0
Base Plug Washer	14/252	14/252	14/252	14/252		2
Banjo Single	14/249	14/249	14/249	14/249	3	9
Banjo Twin 90°	14/250	14/250	14/250	14/250	7	6
Banjo Twin 180°	14/251	14/251	14/251	14/251	7	6
Banjo Nut	14/255	14/255	14/255	14/255	1	6
Banjo Washers	14/275	14/275	14/275	14/275		2
Petrol Union Nuts	14/042	14/042	14/042	14/042		9
Petrol Union Nipples ..	14/026	14/026	14/026	14/026		5
Plug Screw	14/232	—	14/232	—		6
Plug Screw Washer	14/241	—	14/241	—		1
Float Chamber Connection ..	—	14/219	—	14/219	3	9
Float Chamber Connection Washer	—	14/336	—	14/336		2
Mixing Chamber Connection	—	14/218	—	14/218	2	6
Banjo Connection (for M/ch.)	—	302/057	—	302/057	2	6
Banjo Connection Washer ..	—	14/336	—	14/336		2
Banjo	—	302/058	—	302/058	3	9
Banjo Washers	—	14/037	—	14/037		2
Banjo Nut	—	302/056	—	302/056	1	6
Base Plug and Guide (Excelsior)	302/069-046	—	302/069-046	—	3	0

*Original part Numbers 302/004, 14/320, 14/321-2 were modified to 302/032, 302/035, 14/322-302/036 since when a further modification was made, *i.e.*, 302/042, 302/044, 302/045-6.

We suggest that parts prior to the last modification should be replaced as an assembly so bringing the float chamber to the latest setting.

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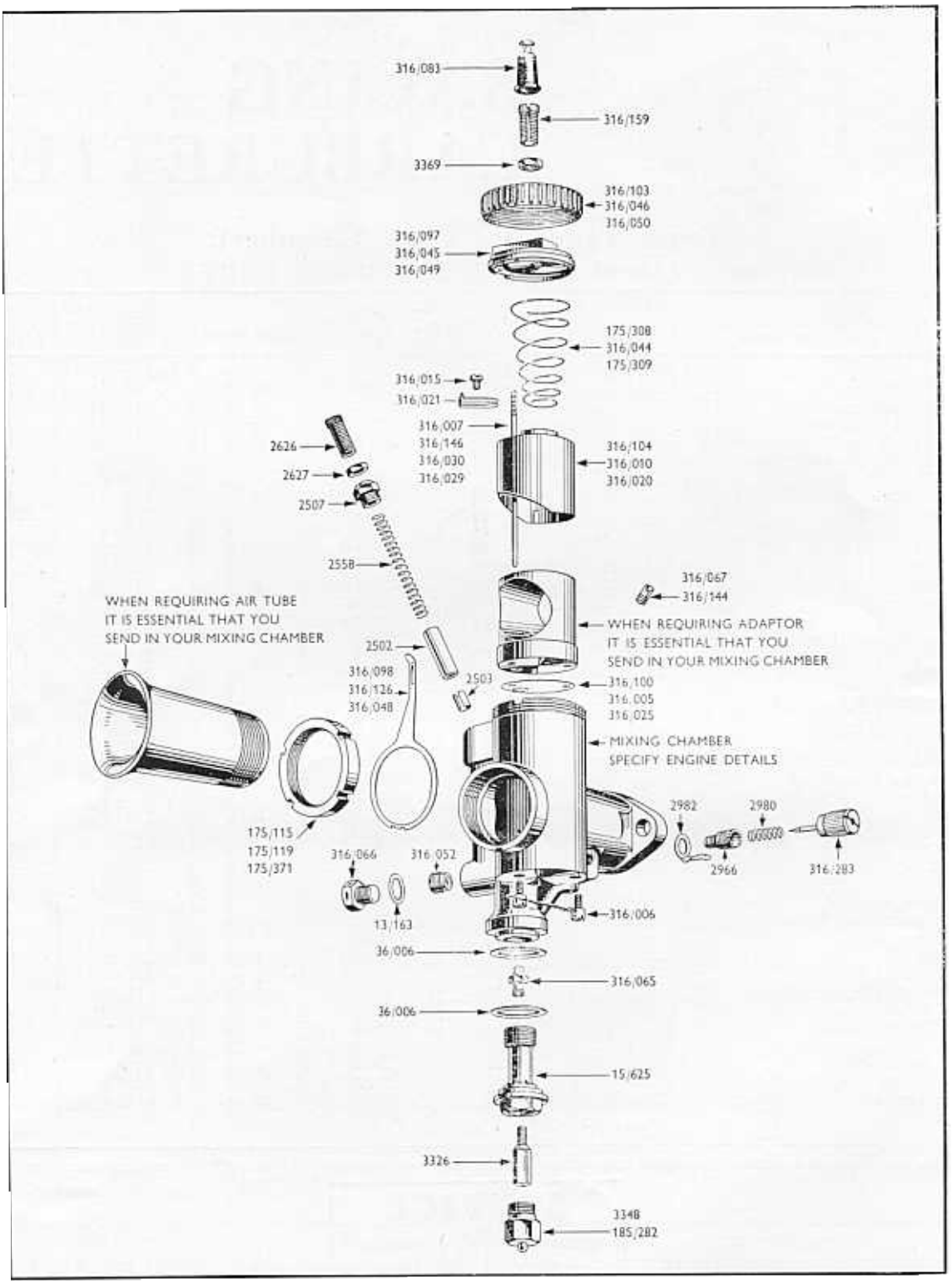
TELEPHONE: BIRCHFIELDS 4571 (6 lines). TELEGRAMS: AMALCARB (PHONE), BIRMINGHAM.

1,000/7/53. W.

G.P Mixing Chamber



PRICES ETC., REFER TO PAGE ONE.

SPARE AMAL PARTS

LIST No. D470.

GP

RACING CARBURETTER

(with Type 302 Float Chamber).

Price List of MIXING CHAMBER PARTS

Component	For T15GP	For T10GP	List Price	For T5GP	List Price
	Specify Engine	Specify Engine	s. d.	Specify Engine	s. d.
Mixing Chamber Body	Details	Details	120 0	Details	155 0
Mixing Chamber Top	316/097	316/045	6 0	316/049	7 6
Mixing Chamber Cap	316/103	316/046	6 0	316/050	7 6
Lock Spring for Mixing Chamber Cap	316/098	316/126	1 6	316/048	2 0
Adjuster for Throttle Cable	316/159	316/159	1 0	316/159	1 0
Lock Nut for ditto	3369	3369	2	3369	2
Throttle Cable Adjuster Sheath	316/083	316/083	1 3	316/083	1 3
Throttle Valve	316/104	316/010	12 6	316/020	15 0
Throttle Valve Screwed Nipple	5/204	5/204	4	5/204	4
Throttle Valve Spring	175/308	316/044	1 0	175/309	1 0
Jet Needle (Standard)	316/007	316/007	4 0	316/146	5 0
Jet Needle (Weak)	316/030	316/030	4 0	316/029	5 0
Jet Needle Clip	316/021	316/021	6	316/021	6
Jet Needle Clip Screw	316/015	316/015	3	316/015	3
*Choke Adaptor (Please state bore size)		—	30 0	—	40 0
Choke Adaptor Washer	316/100	316/005	2	316/025	2
Choke Adaptor Securing Screws	316/006	316/006	3	316/006	3
Spray Tube	316/067	316/067	3 0	316/144	4 0
*Air Tube (Please state bore size when ordering)	—	—	15 0	—	20 0
Air Tube Lock Ring	175/115	175/119	4 0	175/371	5 0
Main Jet	3326	3326	1 6	3326	1 6
Jet Holder	15/625	15/625	5 0	15/625	5 0
Jet Holder Plug Screw	3348	3348	1 6	3348	1 6
Jet Holder Plug Screw (Norton)	—	185/282	1 6	—	—
Needle Jet	316/065	316/065	2 6	316/065	2 6
Air Valve Cable Adjuster	2626	2626	6	2626	6
Lock Nut for ditto	2627	2627	2	2627	2
Air Barrel Top	2507	2507	1 0	2507	1 0
Air Valve	2502	2502	1 6	2502	1 6
Air Valve Spring	2558	2558	4	2558	4
Air Valve Nipple Holder	2503	2503	2	2503	2
Air Valve Nipple	2629	2629	2	2629	2
Air Jet	316/052	316/052	1 6	316/052	1 6
Air Jet Plug Screw	316/066	316/066	1 0	316/066	1 0
Air Jet Plug Screw Washer	13/163	13/163	1	13/163	1
Pilot Adjuster and Needle	316/283	316/283	2 6	316/283	2 6
Pilot Needle Spring	2980	2980	3	2980	3
Pilot Needle Click Spring	2982	2982	2	2982	2
Pilot Needle Insert	2966	2966	1 6	2966	1 6
Pilot Needle Plug Screw	2403	2403	3	2403	3
Banjo Connection for Remote Float Chamber	14/218	14/218	2 6	14/218	2 6
Banjo Washer	36/006	36/006	2	36/006	2

*These parts are not normally supplied separately as they are machined in position with the mixing Chamber Body.

SPECIFICATIONS.

Type	Choke Bores measured behind Throttle Valves	Throttle Diameter	Flange Bolt-Hole Centres
15 G.P.	$\frac{7}{8}$″, $\frac{15}{16}$″, 1″, $1\frac{1}{16}$″ *	$1\frac{1}{2}$″	2″
10 G.P.	$1\frac{1}{16}$″, $1\frac{3}{32}$″, $1\frac{1}{8}$″, $1\frac{5}{32}$″, $1\frac{3}{16}$″, $1\frac{7}{32}$″ *	$1\frac{5}{8}$″	2″
5 G.P.	$1\frac{7}{32}$″, $1\frac{1}{4}$″, $1\frac{9}{32}$″, $1\frac{5}{16}$″, $1\frac{11}{32}$″, $1\frac{3}{8}$″ *	$1\frac{13}{16}$″	65 m.m.

*Straight-through Bore with no swell.

DIMENSIONS—MIXING CHAMBER.

Type	Choke Bore Centre-line to		Throttle Bore Centre-line to	
	Top of rubber grommet	Base of Jet Plug	Tip of air tube	Face of flange
15 G.P.	$3\frac{5}{8}$″	$3\frac{7}{8}$″	$3\frac{13}{16}$″	All types optional $1\frac{3}{4}$″ or $2\frac{1}{2}$″
10 G.P.	$3\frac{7}{8}$″	$3\frac{15}{16}$″	$3\frac{15}{16}$″	
5 G.P.	$4\frac{1}{8}$″	$4\frac{1}{32}$″		

DIMENSIONS—FLOAT CHAMBER.

Type	Outside diameter	Rigid Float Chamber to Mixing Chamber Centre-lines	Overall Height
302	$2\frac{5}{16}$″	$2\frac{7}{16}$″	$4\frac{13}{16}$″

MATERIAL – – Light Metal Mixing Chamber and Float Chamber Bodies.
FINISH – – Bodies sprayed with durable and attractive metallic lacquer.
Float Chamber cover, polished light alloy.
Mixing Chamber Cap, plated and polished.
FITTING – – Flange fitting.
LOCKING DEVICES Spring blade lock to engage with serrations in Mixing Chamber Cap.
Banjo nut, Jet base nut and Choke Adaptor holding screws drilled for lock wires.

HOW TO ORDER.

When deciding on the correct choke size of a racing carburetter required for a particular engine, the main controlling factors to be considered are the engine capacity, peak R.P.M. and the inlet port diameter. Therefore when ordering, **give as much of the following information as possible,** so that a carburetter of correct size can be supplied with a suitable setting.

Make and capacity of engine.
Inlet Port diameter.
Peak R.P.M.
Compression Ratio.
Fuel to be used.
Dimension required from Mixing Chamber centre-line to face of flange ($1\frac{3}{4}$″ or $2\frac{1}{2}$″).
Whether remote or rigid float chamber required. If rigid, then state angle of inclination up to maximum of 20°, or Vertical.
Whether single or double Banjo required. If double, state whether 90° or 180°.
Whether cables required. If so, state lengths.
Whether controls required. If so, state type and handlebar diameter.
Whether any tuning spares required.

FOR TUNING SPARES AND OTHER RACING PRODUCTS, SEE PAGE 4.

G.P. TUNING SPARES.

Description of Part	15 G.P.		10 G.P.		5 G.P.	
	Part No.	Price	Part No.	Price	Part No.	Price
		s. d.		s. d.		s. d.
Throttle Valves, cutaway 3 to 8 ...	316/104	12 6	316/010	12 6	316/020	15 0
Main Jets	3326	1 6	3326	1 6	3326	1 6
Needle Jets, ·107", ·109", or ·125" dia.	316/065	2 6	316/065	2 6	316/065	2 6
Air Jets, ·10", or ·125" dia.	316/052	1 6	316/052	1 6	316/052	1 6
Metering Needles, Standard	316/007	4 0	316/007	4 0	316/146	5 0
Metering Needles, Weak	316/030	4 0	316/030	4 0	316/029	5 0

For full range of Spare Parts with Prices, see List No. 470.

OTHER AMAL RACING PRODUCTS.

	Type No.	Price s. d.
Positive Stop Racing Twist Grip, $\frac{7}{8}$", Short	210/101	21 0
Positive Stop Racing Twist Grip, $\frac{7}{8}$", Long	210/102	21 0
Positive Stop Racing Twist Grip, 1", Short	210/103	21 0
Positive Stop Racing Twist Grip, 1", Long	210/104	21 0
Positive Stop Racing Twist Grip, Double Rotor, $\frac{7}{8}$", Short	313/2	32 0
Positive Stop Racing Twist Grip, Double Rotor, $\frac{7}{8}$", Long	313/1	32 0
Standard Twist Grip, $\frac{7}{8}$", Short	16/117	11 0
Standard Twist Grip, $\frac{7}{8}$", Long	16/121	11 0
Standard Twist Grip, 1", Short	16/100	11 0
Standard Twist Grip, 1", Long	16/102	11 0
Dummy Grips to match, $\frac{7}{8}$", Short	16/069	1 6
Dummy Grips to match, $\frac{7}{8}$", Long	16/074	1 6
Dummy Grips to match, 1", Short	16/040	1 6
Dummy Grips to match, 1", Long	16/039	1 6
Single Lever Air Control, opening inwards on R.H. Bar, $\frac{7}{8}$" ..	12/161	9 0
Single Lever Air Control, opening inwards on R.H. Bar, 1" ..	12/163	9 0
Single Lever Magneto Control, opening inwards on L.H. Bar, $\frac{7}{8}$"	12/171	9 0
Single Lever Magneto Control, opening inwards on L.H. Bar, 1"	12/173	9 0
Junction Box for operating two cables from one control	244/104	5 3
Mid-way Cable Adjuster	3792/3/4	1 6
Throttle or Air Cable up to 4 feet in length		2 6
Throttle or Air Cable over 4 feet in length ..	per foot extra	6

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1,000/7/53. W.

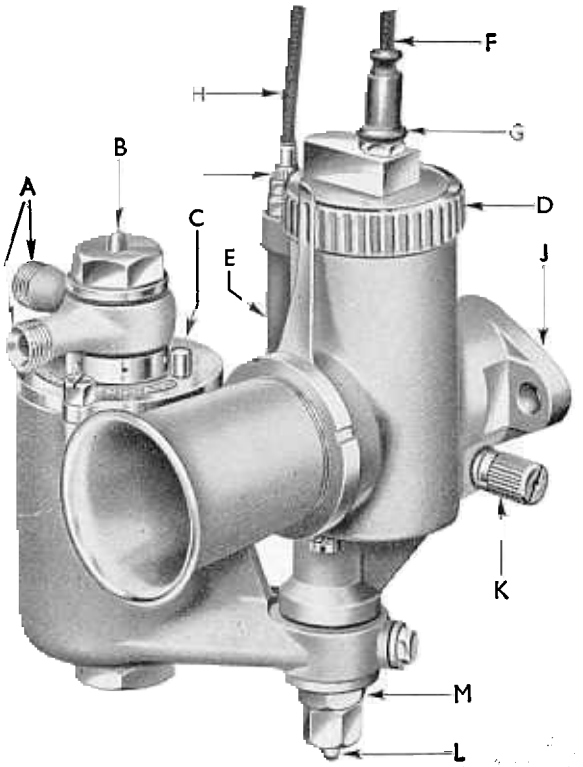
LIST No. D469.

INSTRUCTIONS FOR

The Carburetter of AMAL Records & Successes

CARBURETTERS (Series 316)

TYPES 15 G.P., 10 G.P., 5 G.P.



With fixed or remotely-mounted type 302 top-feed Float Chamber and SUITABLE FOR USE WITH ALL GRADES OF RACING FUELS.

KEY TO ILLUSTRATION

A. Banjo (Twin), 90°, *horizontal petrol pipe connections.*
B. Banjo Nut with hole *for lock wire.*
C. Tickler.
D. Mixing Chamber Cap. *A screwed ring.*
E. Lock Spring *for Mixing Chamber cap.*
F. Throttle Cable.
G. Throttle Cable Adjuster *with lock nut.*
H. Air Cable *for mixture control.*
I. Air Cable Adjuster *with lock nut.*
J. Flange Attachment to Engine.
K. Pilot Needle, *adjustment for slow running.*
L. Jet Holder Plug Screw, *remove to get at main jet.*
M. Jet Holder, *also holds float chamber to mixing chamber body.*

TECHNICAL INFORMATION.

TYPE	CHOKE BORES MEASURED BEHIND THROTTLE VALVES	THROTTLE DIAMETER	FLANGE BOLT-HOLE CENTRES	MIXING CHAMBER TO FACE OF FLANGE
15 G.P.	$\frac{7}{8}$″, $\frac{15}{16}$″, 1″, $1\frac{1}{16}$″ *	$1\frac{1}{2}$″	2″	$1\frac{3}{4}$″ or $2\frac{1}{2}$″
10 G.P.	$1\frac{1}{16}$″, $1\frac{3}{32}$″, $1\frac{1}{8}$″, $1\frac{5}{32}$″, $1\frac{3}{16}$″, $1\frac{7}{32}$″ *	$1\frac{5}{8}$″		
5 G.P.	$1\frac{7}{32}$″, $1\frac{1}{4}$″, $1\frac{9}{32}$″, $1\frac{5}{16}$″, $1\frac{11}{32}$″, $1\frac{3}{8}$″ *	$1\frac{13}{16}$″	65 m.m.	

*Straight-through Bore with no swell.—see note page 3.

TUNING SPARES.

TYPE	THROTTLE VALVES	THROTTLE NEEDLES		MAIN JETS	NEEDLE JETS	AIR JETS
		Standard	Weak			
15 G.P.	15 G.P. Cutaway 3 to 8 Part No. 316/104	G.P. Part No. 316/007	G.P.6 316/030	Inter-changeable Type T.T. Part No. 3326	Inter-changeable Type G.P. Part No. 316/065 ·107″ ·109″ ·125″	Inter-changeable Type G.P. ·10″ or ·125″ Part No. 316/052
10 G.P.	10 G.P. Cutaway 3 to 8 Part No. 316/010	G.P. Part No. 316/007	G.P.6 316/030			
5 G.P.	5 G.P. Cutaway 3 to 8 Part No. 316/020	5 G.P. Part No. 316/146	5 G.P.6 316/029			

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KEY TO SECTIONED ILLUSTRATION.

MIXING CHAMBER.

1.—Needle Jet.
2.—Air Jet.
3.—Air Jet Plug.
4.—Primary Air Slot.
5.—Air Valve Cable Adjuster Locknut.
6.—Air Valve Cable Adjuster.
7.—Throttle Cable Adjuster.
8.—Throttle Cable Adjuster Locknut.
9.—Needle Clip.
10.—Needle Clip Retaining Screw.
11.—Metering Needle.
12.—Spray Tube.
13.—Choke Adaptor Retaining Screws.
14.—Petrol Inlet Banjo.
15.—Main Jet.
16.—Mixing Chamber Cap.
17.—Throttle Valve Return Spring.
18.—Mixing Chamber Cap Lock-Spring.
19.—Air Tube Lock Ring.
20.—Jet Plug.
21.—Jet Holder.
22.—Choke Adaptor.
23.—Throttle Valve.
24.—Pilot Jet adjusting Needle.
25.—Pilot Adjuster Lock-Spring.

FLOAT CHAMBER.

26.—Petrol Outlet Connection.
27.—Baffle Plate.
28.—Base Plug and Float Guide Peg.
29.—Float.
30.—Float Needle.
31.—Tickler.
32.—Banjo Nut.
33.—Petrol Inlet Banjo.

TUNING SEQUENCE.

To get carburation for any stated fuel when the choke bore is correct for the peak revs. of the engine and the correct needle jet for the fuel to be used, the procedure is simple. Start off with an assumed setting, and then tune as follows. There are four phases :

(1)—Main jet for power at full throttle ;
(2)—Pilot jet for idling ;
(3)—Throttle cut-away for " take off " from the pilot jet ;
(4)—Needle position for snappy mixture at quarter to three-quarter throttle ; then final idling adjustment of the pilot jet.

Always tune in this order, then any alteration will not upset a correct phase.

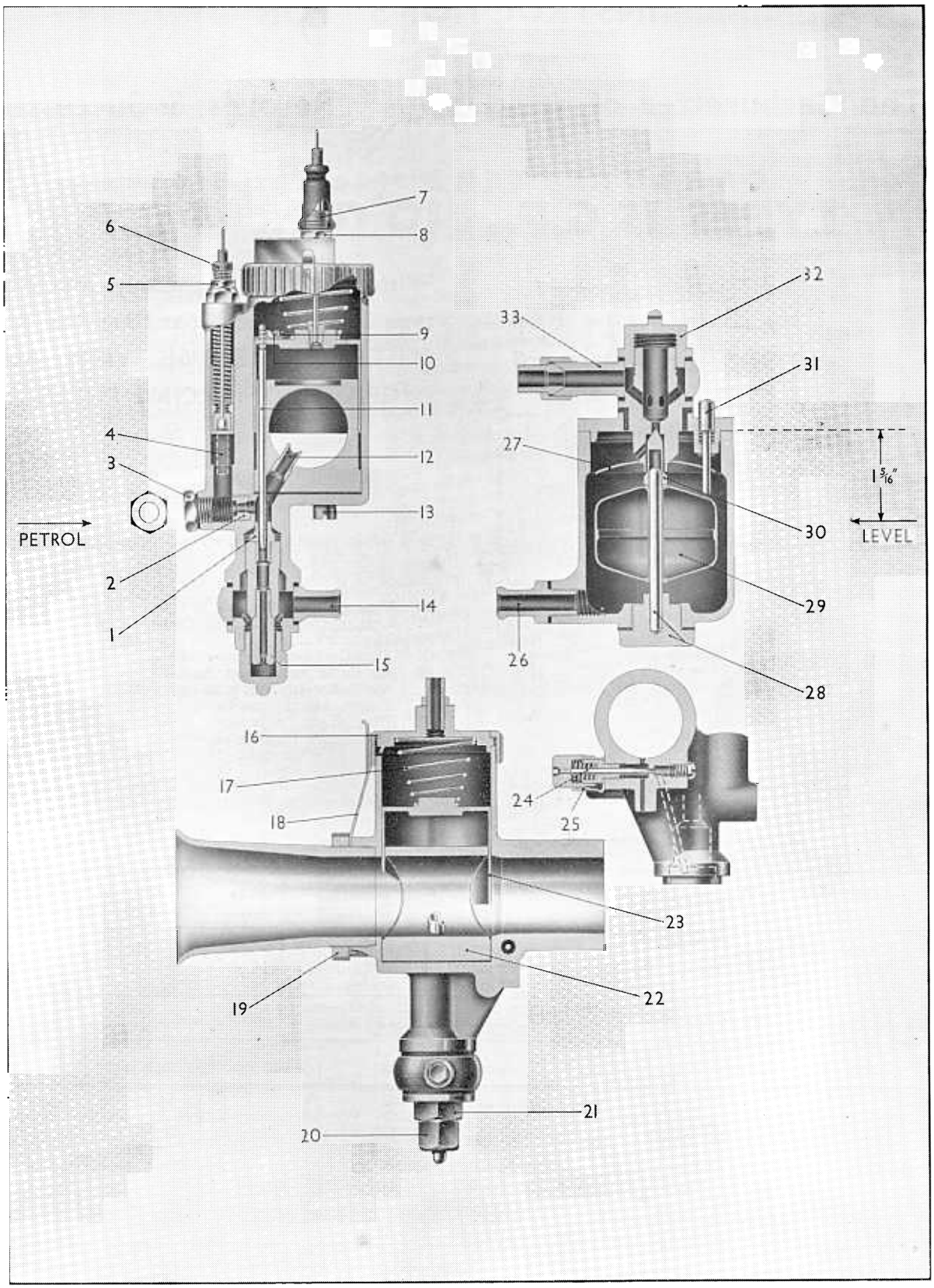
SEQUENCE OF TUNING. (1)—Main jet size. (2)—Pilot jet adjustment. (3)—Throttle valve cut-away. (4)—Needle attachment.

1.—MAIN JET SIZE. This should be determined first : the smallest jet which gives the greatest maximum speed should be selected, keeping in mind the safety factor for cooling. (*The air lever should be fully open during these tests*).

2.—PILOT JET ADJUSTMENT. Before attempting to set the pilot adjuster the engine should be at its normal running temperature, otherwise a faulty adjustment is possible, which will upset the correct selection of the throttle valve. The pilot adjuster, which controls the amount of fuel passed, is rotated clockwise to weaken the mixture, and anti-clockwise to richen it. Adjust this very gradually until a satisfactory tick-over is obtained, but take care that the achievement of too slow a tick-over—that is, slower than is actually necessary—does not lead to a " spot " which may cause stalling when the throttle is very slightly open.

3.—THROTTLE CUT-AWAY. Having set the pilot adjuster, open up the *throttle* progressively and note positions where, if at all, the exhaust note becomes irregular. If this is noticed, leave the throttle open at this position and close the air lever slightly ; this will indicate whether the spot is rich or weak. If it is a rich spot, fit a throttle valve with more *cut-away* on the air intake side (or *vice versa* if weak).

4.—JET NEEDLE POSITION. Tuning sequence 2 and 3 will affect carburation up to somewhere over one-quarter throttle, after which the jet *needle*, which is suspended from the throttle valve, comes into action and when the throttle is opened further and tests are again made for rich or weak spots, as previously outlined, the needle can be raised to richen or lowered to weaken the mixture, whichever may be found necessary. With these adjustments correctly made, and the main jet size settled, a perfectly progressive mixture will be obtainable from tick-over to full throttle. The jet *needles* are interchangeable in carburetters type 15 G.P. or 10 G.P., but a longer needle is required for the Type 5.G.P.


PETROL
LEVEL
1 5/16"
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33

GENERAL OPERATION.

DESIGN FEATURES.

The G.P. Carburetter has been designed with a view to obtaining the maximum possible power from the engine, at the same time maintaining a progressive and consistent acceleration characteristic throughout the throttle range.

As a result, this Carburetter gives maximum power equivalent to that previously associated with the remote needle type of Carburetter, with consistency over the throttle range equivalent to that previously obtained with the T.T. type of instrument.

The main gain has been effected by embracing the metering needle (11) within the confines of the throttle valve itself (23), which, although leaving an unrestricted bore at full throttle, also leaves a very short tract for the mixture to traverse from the needle jet (1) to the choke.

Resulting from these two points of design, it will be found that in conjunction with the maximum power obtainable, a much smoother throttle control is possible at the lower r.p.m. which has the result where megaphone exhausts are used, of allowing a cleaner entry on to the megaphone than was previously possible. Also the point at which the megaphone's effect occurs is appreciably lower which, of course, is an obvious advantage on the road.

CHOKE BORE DIAMETERS.

Except in the maximum **CHOKE SIZES** of the three types of G.P. Instruments, it will be found that the effective choke diameter of the Mixing Chamber is on the engine side of the throttle slide (23), between it and the outlet of the Carburetter, and not in the centre of the choke adaptor (22) as might be expected. The reason for this is that exactly as the needle in the T.T. type of instrument caused obstruction across the choke, so, but to a much lesser degree, does the fuel emission from the G.P. spray tube (12). We, therefore, slightly swell the choke at this point which overcomes this fuel obstruction and then, by means of a taper, the choke diameter returns to its stipulated dimension before reaching the outlet of the Carburetter. Therefore, in referring to the choke size of a G.P. Carburetter, it is this smallest diameter in the Mixing Chamber which is of moment.

Naturally, when deciding on the choke size of a Racing Carburetter, the peak r.p.m. of the engine is the main controlling factor in conjunction, of course, with the inlet port diameter on the engine in question. Therefore, when ordering one of these instruments from us it is always safer, apart from mentioning the engine, to also give us the maximum r.p.m. and the inlet port diameter, when we shall then be able to assess exactly the correct choke size of the instrument.

FITTING.

Regarding fitting the Carburetter, although we are often asked what is the correct distance between the inlet valve centre line and the centre of the Carburetter Mixing Chamber, this is not a figure which can be laid down in hard and fast manner, as it varies enormously from one engine to another, although maximum efficiency is obtained in both cases. Broadly speaking, a distance of between 7″ to 9″ probably represents a fair mean dimension.

Flange fitting is standardised with the G.P. Carburetter to eliminate as much as possible the worrying source of air leaks which often persists with clip fitting instruments.

G.P. Carburetters are available for vertical and downdraught fittings, the maximum downdraught which we recommend being 20° as with anything in excess of this trouble is likely to be encountered because of the pilot fuel feed.

FLOAT CHAMBERS.

The Float Chamber fitted to the current model G.P. Carburetters is known as our type 302, and incorporates a top feed seating in conjunction with a large headed needle (30) ensuring a more than ample flow of fuel to the Mixing Chamber. This large top feed float chamber is capable of passing 10 gallons per hour of fuel at an 18″ head. Consequently, it has done away with the necessity for double float chambers as were previously used, except in special cases such as dirt track racing and sidecar use.

Wherever possible the Float Chamber should be remotely mounted, from the point of view of flooding due to vibration but, of course, where this is not possible we do supply rigid float chambers which are attached to the mixing chamber in the orthodox manner. These are either upright or cranked at the angle of the induction port of the engine in question, so that it is, therefore, necessary when ordering a Carburetter incorporating a solidly mounted float chamber to state the angle of the induction port.

PETROL LEVEL.

The petrol level in the Type 302 Float Chamber is $1\frac{5}{16}$″ below the cover joint face (see diagram, page 2). Where the float chamber is remotely mounted, it should be so positioned that this level lines up with the lowest point of the circular scribe-mark on the Air Jet Plug (3).

LOCKING DEVICES.

A spring blade locking device (18) held in place by the air tube lock ring (19) engages with serrations on the mixing chamber cap (16), which positively prevents the unscrewing of same due to vibration.

With regard to the jet base nut (20), banjo nut (32) and jet block holding screws (13,) these are fitted with drilled heads to enable same to be wired up in the orthodox manner.

TUNING.—GENERAL.

The tuning sequence of the G.P. Carburetter follows the well established Amal principles, inasmuch as there is a main jet (15) controlling the fuel supply at full throttle, a needle jet (1) the emission from which is controlled by the position of the taper needle (11) in same and at the lower throttle openings by the cut-away of the throttle valve (23) in question, an independently adjustable pilot fuel needle (24) controlling the mixture strength for idling. There is a new adjustment in the form of an air jet (2) which controls the amount of air which primarily atomises the fuel as it comes out of the needle jet (1) before going into the spray tube (12) and thence to the heart of the choke. This latter air jet (2) is a form of depression control for the main jet, and from normal experiences would appear to require a ·1″ diameter air jet for choke sizes of up to $1\frac{1}{16}$″ and ·125″ diameter for choke sizes in excess of this figure. Normally speaking, this air jet would be fitted by the Factory when the Carburetter was supplied, and would not be considered a likely component to change, but remembering that the main jet depression can be increased by fitting a smaller air jet, it may sometimes, for special purpose tuning, be found an asset to try a larger or smaller air jet according to which one is already fitted.

The **NEEDLE** control covers a range of the throttle opening from about one-third throttle up to seven-eighths throttle opening. The needle grooves in the G.P. needle will be found to number five instead of seven as previously on the T.T. instruments, due to the fact that the needle control of the G.P. Carburetter is rather more sensitive than on other types. Two types of needle (11) are available, what we call a standard taper needle and a much weaker taper needle. The needles in both Type 15 and Type 10 G.P. instruments are the same length. Consequently, the standard taper needle in these two instruments is known as the G.P. Needle : the weaker taper needle in these two types of instruments is known as the G.P. 6 Needle.

With regard to the large Type 5 G.P. Instrument, this needle is a longer one than in the two smaller types, and the standard taper is known as Type 5 G.P. Needle : the weaker taper needle is designated the Type 5 G.P.6.

Where megaphone exhausts are concerned, it will be found invariably advisable to use the weaker types of needle, and generally these can also be run at a fairly low position, namely,—needle position 1 or 2—that is, the first or second groove from the top of the needle.

It will then be found that the stability on the megaphone is much improved and any tendency towards weakness at the bottom of the throttle opening can, of course, be rectified by fitting a fairly low numbered throttle valve.

MAIN JET.

Always bear in mind, however, that whatever the type of needle used, or the position in which it is fitted, there will be no affectation of the main jet (15). This should be arrived at by fitting the jet which gives the best possible power on the bench or, on the other hand, the highest possible R.P.M. on the road, and once this has been obtained, under no circumstances should it be altered.

The main jet (15) can be very readily removed by taking off the hexagon cap (20) at the base of the Carburetter Mixing Chamber. The jet size is marked on the side of these jets, and represents the flow in c.c. per minute on our Amal Calibrating Machines at the Works. These jets are made in 10 c.c. increments, that is, for instance—250, 260, 270, etc.—up to and including 600, when, after this, 20 c.c. increments become standard.

It should be noted that on the G.P. range of Carburetters smaller main jets than usual are fitted. This is due to the fact that a higher depression main jet system is employed. For rough guidance, therefore, the following jet sizes should be approximately correct for the choke sizes in question :—

Using 80 Octane or Petrol Benzol Fuel.

15 G.P., $\frac{7}{8}$″ choke—Jet 180.	10 G.P., $1\frac{1}{16}$″ choke—Jet 210.	5 G.P., $1\frac{1}{4}$″ choke—Jet 270.
15 G.P., 1″ choke—Jet 200.	10 G.P., $1\frac{7}{32}$″ choke—Jet 260.	5 G.P., $1\frac{3}{8}$″ choke—Jet 310.

with, of course, the intermediary choke sizes, using a proportionate sized jet.

The rest of the throttle range should then be dealt with absolutely individually in steps by means of the needle adjustment, throttle valve cut-away alteration and pilot adjustment, with a possible check on the air jet fitted.

The **THROTTLE VALVE** (23), of course, which surrounds the choke adaptor (22) in the Carburetter, controls with its leading edge the amount of air entering the throttle bore at the lower throttle openings, at least that is up to the point where the cut-away starts to disappear up the Mixing Chamber bore, which, naturally, varies slightly with each number of throttle valve that is fitted.

The trailing edge of the throttle valve, of course, controls the volume of mixture passing to the engine.

These throttle valves can be supplied with various cut-aways from No. 3 up to No. 8, each number varying in its cut-away on the air intake side by $\frac{1}{16}$″.

The **NEEDLE JET** (1), which is of stainless steel to prevent wear, has been found for best all round usage on petrol or petrol benzole to require a diameter of ·107″ for choke sizes up to $1\cdot\frac{1}{32}$″, over this a needle jet of ·109″ diameter is necessary. For alcohol fuel, of course, larger needle jets are necessary : this is dealt with on page 6.

The **PILOT JET** on this Instrument is a taper needle (24) which controls the volume of fuel passing to the pilot assembly where it mixes with air from a permanent leak hole in the body, ultimately passing into the Mixing Chamber itself through a small hole at the back of the throttle slide. It mixes with air coming under the throttle valve through the main bore at this point and then passes into the engine as the necessary slow running mixture.

This method of fuel adjustment has a very wide effect on the lower end carburation, and it will be found possible to control to quite a large degree the initial pick-up by an accurate setting of this pilot screw. A word of warning should be given that it is a bad thing to set this as weak as possible which, with a warm engine, may result in a very good tick-over being obtained but it will be found that there is a tendency for a flat spot to persist when opening the throttle. In consequence of a really good tick-over not being of great moment where racing carburation is concerned, a slightly rich setting of the pilot screw is desirable, which will help towards obtaining a more perfect opening up.

COMPENSATION on this G.P. Carburetter is obtained through the medium of the primary air which passes through a slot (4) in the Mixing Chamber and then, via the air jet (2) previously mentioned, atomises the liquid fuel passing from the needle jet (1).

As the engine supply increases or decreases at a given throttle opening with a varying load, so compensation will take place. The mixture strength supplied to the engine will vary as the air supply falls off, or increases according to whether the R.P.M. decreases or increases, due to the lesser density of the air compared to the petrol. This damping effect on the flow of liquid results in a compensated mixture being maintained.

ALCOHOL FUELS.

Concerning Alcohol fuels, the G.P. range of Carburetters function perfectly satisfactorily on any alcohol blend up to and including straight methanol. It will be necessary to fit a ·125″ diameter needle jet (1) for any alcohol content over 50%. With this larger needle jet a standard taper needle (11) should be used, which means for the Type 15 G.P. a needle marked G.P. is required, for the Type 10 G.P. a needle marked G.P. is required (both these types using the same needle) ; for the Type 5 G.P. a needle marked 5 G.P. is needed. An approximately correct needle position will be No. 4, that is :— the fourth groove from the top of the needle.

Regarding main jet sizes, these have to be increased in the following proportions, taking the basic size as that used for 80 octane fuel or petrol benzol.

Straight Methanol	Increase the basic jet size by 150%.
J.A.P. Racing Fuel	Increase the basic jet size by 150%.
Esso No. 1 Fuel	Increase the basic jet size by 150%.
Esso No. 2 Fuel	Increase the basic jet size by 120%.
Esso No. 3 Fuel	Increase the basic jet size by 130%.
Shell A.M.M. Fuel	Increase the basic jet size by 150%.
Shell A.M.1 Fuel	Increase the basic jet size by 140%.
Shell A.M.8 Fuel	Increase the basic jet size by 120%.
Shell A.M.9 Fuel	Increase the basic jet size by 100%.
Shell A.M.12 Fuel	Increase the basic jet size by 50%.

NOTE.—When calculating the jet size on the basis of the jet size used for petrol-benzol mixtures—the per cent. increase must be added to the original jet size and the total is the new size of jet to be used for the particular fuel. EXAMPLE : If a Jet No. 300 was used for petrol-benzol and it was decided to change over to METHANOL, which requires an increase of 150% adding to the original jet size 300.

Calculate this way $\left(\frac{\%\text{ increase} \times \text{original jet size}}{100}\right) + \text{original jet size}$ namely $\left(\frac{150 \times 300}{100}\right) + 300 = 450 + 300 = 750.$

The answer is, use main jet 750 and the appropriate needle-jet for alcohol fuels as given in a paragraph above.

When using alcohol mixtures, the alcoholic content of which is not exactly known, " trial and error " will be necessary in finding the correct jet size, in which case it should be remembered that although quite an excessively over-rich mixture can be used on alcohol, the slightest weakness will result in trouble. Therefore, always err on the rich side for the start of the " trial and error " tests. On the other hand, if the exact composition of the fuel should be known and you get in touch with our Technical Department, they will be able to give you a fairly close approximation of the jet size required for the alcohol mixture in question.

The sparking plug, of course, is the focal point of the " trial and error " tests. This should be examined after each run after the throttle has been cleanly cut. Any suspicion of grey at the electrodes is a sign of weak mixture and larger main jets should be immediately fitted. A perfect plug condition is a rather polished jet black colour where mica plugs are used, with a rather harsher-looking brown colour where ceramic plugs are used.

A cross-check on the plug condition can always be effected by closing the air control during the run, when no appreciable increase should be noted in the R.P.M., and, ultimately, a decrease should take place. In the event of any increase being perceptible during the closing of same, this is a definite indication of a larger jet being necessary.

Normally, when changing over from petrol to alcohol on the G.P. range of Instruments, no alteration will be necessary to the air jets fitted.

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AMAL LTD., Holdford Road, Witton, BIRMINGHAM, 6
ENGLAND.

TELEPHONE: BIRCHFIELDS 4571 (6 lines). **TELEGRAMS: AMALCARB (PHONE), BIRMINGHAM.**

500/5/53. W.