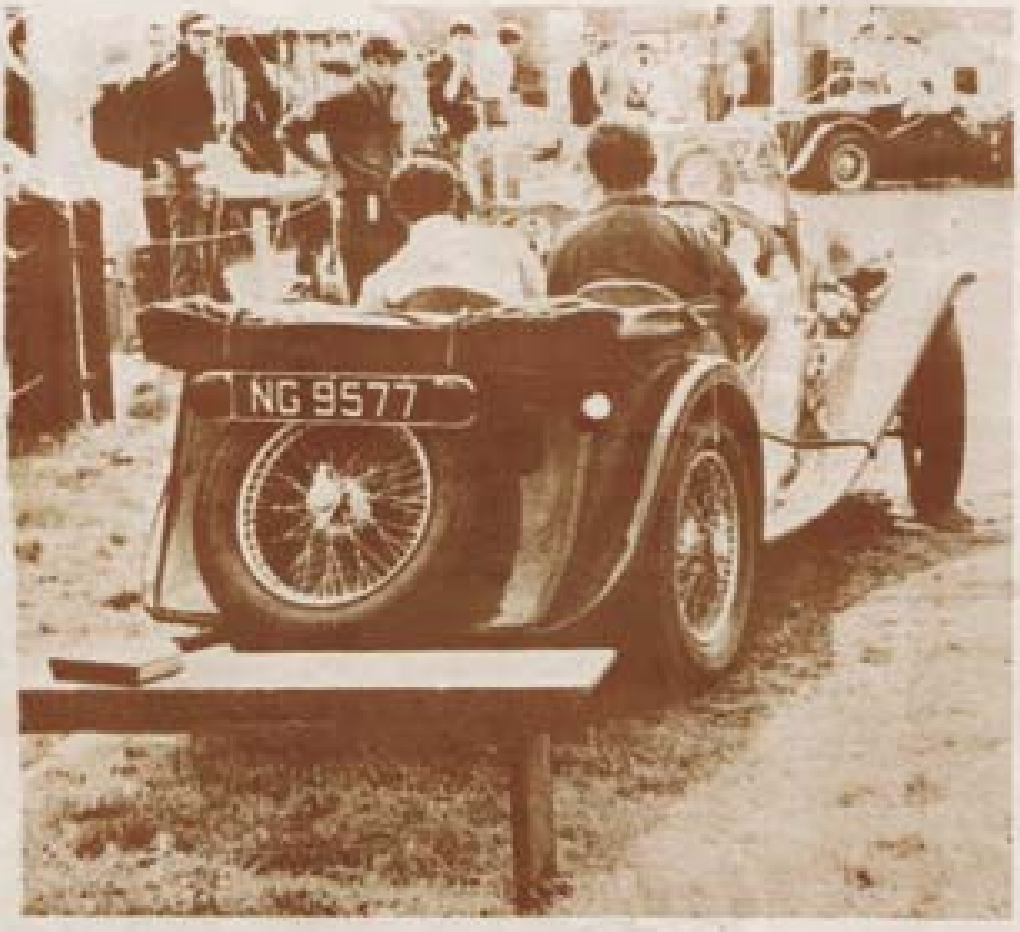
CAR MG CLUB

TRIPLE M REGISTER YEAR BOOK 1971



FRONT COVER
"Car of the Year" Award winner 1970: Alan Simpson's highly desirable 1934 model J2 at Beaulieu.

LEFT
John Kidder's NA tries the parking test at Beaulieu. This car was second in the Car of the Year.

BELOW
Portent for the future? Shall we see an R-type winning soon? This one photographed at Brooklands in 1935 is now owned by Syd Beer.

I N D E X

IDLE CHAT

My first duty is to welcome you back to the Register for another year - or if you were not a member last year to welcome you to membership.

Naturally, I hope that you find your membership worthwhile, in that we provide the service you want - if not, please let us know. On the other hand, however, I hope that you will help us keep the Register going by putting just a little bit back to compensate for what you receive.

How can you help? Well that's quite simple, for there are many ways. But the simplest of all is to remember that the Register is a small part of a world-wide organisation, the M.G. Car Club, and that anything that helps the Club helps the Register. This may sourd silly 'how can my helping 'him' and his MGB help me with my J2?' Reasonable - but it all boils down to a question of finance; The Club finances the Register. So, New Year's Resolution No 1: 'help the Club'.

How? Well you could compete at suitable meetings. Register cars are seen at all types of Club event, trials, gymkhanas, driving tests and concours all appear fairly popular. Racing, speed trials and hill climbs can also be 'done', even by the humblest MG. The key note must be good preparation though, and be prepared for heart aches, although with luck nothing expensive will happen. A five lap race is less exacting on a car than 50 miles of road driving, and irfinitely more pleasurable.

Other ways of helping include marshalling. If you cannot, or do not want to, compete, then please marshal. Experienced marshals are always required, and you can only get experience by trying. Don't be put off if you don't have a flag or fire-extinguisher first time out but you will eventually rise to these exalted

positions if you turn out regularly. Safety Fast carries details of all wants - so remember if you can't compete - marshal.

Having said all that, I hope I haven't stopped you from coming along just to watch, for there are those who, for business reasons connot get to a venue early enough to compete or marshal, then please come and spectate - you may have to pay for the privelege, but it won't be expensive, and you are contributing to the wellbeing of the Club, and, indirectly, the Register. If paying frightens you off, its back to marshalling I fear - that <u>is</u> free!

Thank goodness something is!

May your MMM motoring in 1971 bring you success - I hope to see you all during the year.

Mike Allison

CHAIRMAN'S SUMMARY

Some months ago I wrote a controversial article in which I estimated that there might be 4000 MMM cars surviving, with many unknown cars stored in old barns and outhouses around these islands. I cited the statistic that 5 Cream Cracker P types existed out of 6, therefore why not 4000 cars out of the 12,000 total MMM production?

My good friend Wilson McComb of the Vintage Register quickly shot me down in flames, saying that my estimate was surely wishful-thinking, for had not the M.O.T. tests decimated the ranks?

He is probably quite right, that many cars were put off the road at this stage, but I would hope that at least 50% of such cars would have been put in mothballs rather than broken for spares.

In support of my theory it is interesting to read Colin Butcher's (registrar MMM) article in these pages, which relates that in nearly ten years of the Register there has been a steady stream of new car discoveries, which has continued to the present time, without the anticipated levelling-off which was supposed to happen about 5 years ago.

It seems probably that there is quite a lot of iceberg under the visible MMM tip therefore, though against this we must deduct a number of cars which have met with disasters and have subsequently been canabilised for spares.

I won't make general sporting wagers in case I get 300 takers, but my guess is that we shall see our 2000th car registered in the next decade, and I daresay another C type or K3 may re-appear to excite us all for good measure. (Hope I find it before all you lot anyway!)

I think it would be appropriate here to record a big vote of thanks to Mike Allison who will complete ten years as MMM secretary this year. Mike is the only member of the four who formed the original MMM committee to be still holding office, and holding it moreover with unabated enthusiasm for the MMM cause.

Mike is now, of course, also Editor of the main club magazine 'Safety Fast'.

We hope to welcome one of our most enthusiastic members Mike Hawke, back from Singapore later this year after three years abroad.

Mike, who was technical adviser to members before his posting, has achieved the unique feat during his absence, of becoming Editor of the Malaysian Vintage Register Bulletin within about a month of his arrival; he had located, and rebuilt a derelict Fiat Balilla sports

within a further few months, and has followed this up by finding great lumps of a K3 which was taken out there before the war. I can think of no other chap I have ever met, who could have been predicted to achieve such an unlikely hat-trick! The K3 engine moreover, is one which was at one time in the special K3 raced by R.T. Horton. Well done Mike, and we hope you can sneak all that rusty machinery back home without paying ancient relic customs duty, if there is one.

Steve Dear

THE GREAT N-TYPE MYSTERY

One or two dyed-in-the-wool cammy owners (Sounds like long underwear, doesn't it?) looked a little startled when, a few weeks ago, I asked them the capacity of the N-type Magnette. Hell, everybody knows it has a bore of 57 mm. and a stroke of 84 mm., so as a six-cylinder it must be 1286 or 1287 c.c., depending on the amount of play in your sliderule. One or the other figure is quoted in the workshop manual, the catalogue, the 1934 Motor Show literature, and everywhere else. Also in the Portrait Gallery series which I wrote for the original 'Safety Fast' some ten years ago; there weren't too many references available in those days, but I'd used the most 'official' figures I could find.

But are they correct? The historian should never take anything at its face value.

The N-type Magnette was announced at the end of March 1934, less than a month after the P-type Midget. 'Autocar' quoted the stroke as 83 mm. and gave the capacity as 1271 c.c. 'Light Car' didn't mention the stroke, but said the capacity was 1250 c.c. 'Motor', published by the same company as 'Light Car' gave an 83 mm. stroke and quoted two different

capacities (1250 and 1200 c.c.) in the same article. Both 'Light Car' and 'Motor' said the new six-cylinder had been designed with the same engine dimensions as the new four, so that the same rods, pistons and other components could be used. Later in the year, however, all three magazines gave the stroke as 84 mm. when they published road tests of the N-type. By this time the racing NE had appeared, with its tweaked N-type engine. The programmes for both the 1934 Relay Race and the 1934 Ulster T.T. give the stroke as 84 mm., the capacity as 1287 c.c.

Also in late 1934 the KN model appeared with, as we know, an N-type engine. All the Press announcements said it had a stroke of 84 mm., a capacity of 1287 c.c. Again the NB of 1935 is given the same engine dimensions in the motoring magazines, the catalogues, and the M.G. booklet for the 1935 Motor Show.

On the face of it, this looks like a tremendous weight of evidence in favour of the longer stroke. But you have to assess the authenticity of the evidence. If somebody publishes an inaccurate figure and everyone else copies it, you will find a great many references quoting the wrong figure. It's better to work backwards, not forwards.

Now, the N-type engine was preceded by four K-type units, three of which used the 71 mm. stroke which gives a capacity of 1087 c c - - that of the early K series cars, the K3, and the L-type Magna. The fourth was the KD. This was often referred to, in the catalogues and elsewhere, as a 1286 c.c. engine, but I'd been suspicious of that figure for many years. The original M.G. Drawing Office specification sheets gave the capacity as 1271 c.c., indicating a stroke of 83 mm. instead of 84. A bit more excavation produced a copy of the actual KD crankshaft drawing. The stroke was 83 mm.

So the capacity of the KD engine was definitely quoted incorrectly in MG's own catalogues and Show Literature. But how about the N type? This engine was certainly based on that of the KD, with a different cylinder head and other changes, but the changes might have included a lengthened stroke -- though there seemed no good reason to make such an alteration. What I needed was the N type crankshaft drawing, but unfortunately no trace of this could be found.

Syd Enever referred me back to the Drawing Office, who produced two specifications sheets headed N and NA. The first said the stroke was 83mm. and the capacity 1271 c.c. The second said it was 84mm. and 1286 c.c. But the similar sheet for the NE quoted 83 mm and 1271 c.c. -- entirely different from the figures given in the actual race programmes ! Moreover H.N. Charles had also quoted the shorter stroke and lower capacity for the NE in a paper he delivered early in 1935.

At this stage I started asking around. Syd Beer hadn't a clue what it said in the reference literature (he keeps telling me he can't read), but from working on the engines, he reckoned the stroke was 83mm. Mike Allison agreed that the KD actually had an 83mm. stroke but said the N type crank was different at the front end; it could well be different in other respects, and he favoured the 84 mm. stroke. He pointed out that the engine of the winning NE would have been measured after the race by the 1934 T.T. organisers. As for H.N. Charles, he very understandably couldn't remember, but he thought the N type might have been lengthened in stroke for the NE to give increased capacity. Personally, I didn't feel that a capacity increase of 15 c.c. was worth the trouble or a re-machined crankshaft. As for post-race measurement -- well, the difference between an 83 and an 84 mm. stroke is only half a millimetre in terms of piston travel, top or bottom -- which is approximately 0.020", or less

than the gap of a sparking plug. Very precise measurements are called for to detect a difference of that order.

Fortunately Mike was just about to remove the head of his own N type, and also had another engine available. He kindly agreed to measure both. Over the two, on a total of 12 bores, the longest stroke reading he could get was 83.02 mm. Syd Beer also agreed to measure several engines, including that of his NE. He, too, made the stroke 83 mm.

One swallow doesn't make a summer, and half-a-dozen engines don't make conclusive evidence. The one piece of paper that would settle the matter beyond argument is the missing N type crankshaft drawing ((which is M.G. 489/201, in case you've got one in the bottom of your wardrobe). Meanwhile it is my contention, ladies and gentlemen of the jury, that for some 37 years the capacity of the KD,NA, KN, NE and NB has been quoted incorrectly in all the leading works of MG reference. What do you think?

F. WILSON McCOMB

P.S. P type and N type connecting rods are identical - but that isn't conclusive, either!

WHY 'TRIPLE-M REGISTER' ?

I am sure that most of you know how our Register was born, out of the enthusiasm of a handful of young M.G. Car Club members who met occasionally for a drink in London, to discuss in addition to the more usual subjects, the shortcomings of the Club in respect of the Older M.G. models. From these discussions which took place in 1961 our 'Club within a Club' was formed, to foster the interests of owners of Midgets, Magnas and Magnettes using the famous M.G. overhead camshaft engines produced between 1929 and 1936. As I say, I am sure that most of you already know this, but I wonder how many of you have asked yourselves why it was called a 'Register' and just what form this takes. Well kiddies, if you are all sitting comfortably I will now bore you with the dreary details of the clerical side of the business, which is or certainly should be the focal point of our organisation, being as it were our 'raison d'etre'.

The word register probably conjures up to all of you who have attended school at some time or other, a large book with hard covers in which details are entered, and this is precisely what was originally envisaged, to provide a record for posterity, of those cars which are substantially in original condition. Each car was given a register number, and full details of the car were entered, such as chassis and engine numbers, type of body, modifications if any, and any competition or other interesting history, together with the owners name and address.

This was in 1961 when it was thought that there would be something like 50 or so cars involved, but by the end of 1962 over 100 cars had been registered and over 250 by the end of 1963. The number reached 400 by the end of the following year, and despite all of us being convinced that each year would be 'saturation year', the cars have been turning up year after year, so that at the time of writing, at the beginning

of 1971, we have reached 1250. What I find most encouraging is the fact that cars now being added are still substantially in original condition - there has been no lowering of our standards - and there is no sign whatever of new membership slowing down. What is probably most rewarding of all to those who have been involved with the Register since it's beginning, is the number of well prepared Triple-M cars which now turn up for competitions whether they be races, driving tests, trials or concours event - particularly the latter, where the standard of many of the cars is as high as it can possibly be in the vintage car world.

All of this is getting off the point somewhat, but the increasing membership led to the development of a card index system, to facilitate keeping the Register completely and accurately up to date. We now keep three sets of cards, the first being merely a numerical set containing brief details of each new car added, whilst the second comprises a name index of members giving details of each car owned. The third and most important of the cards is the register card proper, filed in chassis number order, and this gives every available detail of the car and it's history, together with the current owners name and address. On the question of history, I would add that with the exception of the famous cars with works or other authenticated histories, we have little or no information about the exploits of the majority of the cars unless individual owners have been able to tell me themselves, and I have no doubt that many cars have indulged successfully in pre-war club races or trials, the details of which will never be known to us.

Now I think it is time for some facts and figures:

Type	No. Built	Total Registered since 1961	Total Registered by current members.
M	3235	185	69
D	250	18	6
C	44	11	5
J1	80	19	7
J2	2083	250	90
J3	22	9	3
J4	9	6	5
PA	2000	298	131
PB	525	140	46
QA	8	5	2
RA	10	7	4
F1	1122	65	28
F2	41	6	2
F3	87	3	2
L1	486	40	20
L2	90	24	15
K1	180	19	7
K2	20	7	4
K3	33	17	5
N	745	91	33
KN	165	14	4
ND	24	9	4
NE	7	7	4
	11,266	1250	496

According to my records, the 496 cars are owned by 363 members who have paid their subscriptions up to the 1st February 1971.

Now I am a mere clerical type and not a statistician, so I don't really know what all these figures mean, but I can tell you that the figure of 496 is a very false one, as it merely indicates these members who go to the bother of paying their 5/- (25p) annual fee. I am convinced that a great many

enthusiastic owners of Triple-M cars are merely lazy or forgetful when it comes to paying renewal subscriptions. I am sure that of the 1250 cars which have been registered since we started, the great majority are still alive and well, and furthermore there could well be that number again running about in the hands of people who simply don't want to join the M.G.Car Club or the Register, or whose cars are not quite eligible on the grounds of non-originality.

However, it could indicate that there has been something like an 80% mortality rate overall, with a higher than average percentage in the earlier models, - possibly as a result of a greater degree of mechanical frailty. On the other hand, as I get more new registrations from M type owners, than most other models, this could suggest that Ms are better at propping up chicken houses than other models! Who knows. I am quite convinced, however, that despite the havoc wreaked upon the second-hand car market by the munitions industry during the war, and subsequently by Ernest Marples and his 'ten year tests', there are still a great many Triple-M cars laying about in odd corners, and I always look eagerly through the next batch of new applicants to see what has turned up. It is quite exciting to find a rare delicacy amongst the mounds of bread and butter!

One important feature of the Register, which sadly has now disappeared, was the full Register list which at one time was circularised to all members. Bob Hudson who dealt with Registration from the early days of the Register until 1966, used to spend a lot of his time preparing beautifully detailed lists of all cars and these came out twice a year, I believe. When I took over from Bob, Mike Allison and I reluctantly agreed that the lists would have to stop, and the last set was issued at the beginning of 1965. There were a number of reasons for stopping this feature, partly in view of the cost of preparation - both in time and money - for a list which was taking so long for one

man to produce in his spare time that it was months out of date before it was issued. Also, a number of members apparently objected to their names and addresses being broadcast throughout the length and breadth of the country - I am sorry for these, as I feel that this is one of the most important of the functions of the Register to encourage communication between members. However, the one big reason for stopping it was that a dealer had somehow obtained a copy and was systematically writing to all owners of interesting cars making them offers! The last thing we wanted to do was to encourage the commercialisation and possible export of our cars, and so - the lists were no more.

Despite this setback, I am always happy to give details of local members, to any of you who write to me, and I will provide as much other information as I possibly can. I am afraid that the whereabouts of specific chassis numbers of the rare models, is restricted information now, following a certain abuse of this information at one time.

So there we are - I rely very much upon you to keep me fully up to date with every change of car, engine, address or whatever, and perhaps most important of all, I rely very much upon you all paying your Register Fee promptly! If you feel that I can help any of you at any time, please let me hear from you.

COLIN BUTCHERS
MMM Registrar

SOLVING THE J2 CRANKSHAFT PROBLEM

The J2 Crankshaft Problem

Put simply, eventually it breaks. I broke mine soon after pulling away from some traffic lights. The engine felt sluggish, and at about 40 mph in third gear a horrible clattering noise came from the engine coupled with zero oil pressure. When I declutched, the pedal kicked about quite a bit. Thus I joined the broken J2 crankshaft club.

Some Solutions to the Problem

i) Find another J2 Crankshaft.

This was to be my immediate solution. I had a crankshaft in my spare engine which I had bought a few months earlier from our Editor, John Reid. Unfortunately, when I removed it from the engine and tested it for cracks I found a fracture halfway round the fillet of No 3 big-end with two other cracks extending into the web. The method I used for crack detection was the dye penetrant method. This consists of spraying the cleaned metal with a penetrant containing a red dye, the dye is then washed from the surface with another spray. A developer is then sprayed on, which leaves a chalky layer on the surface when it dries. Any cracks will have filled with dye, which seeps out and stains the chalky layer in its vicinity and clearly indicates the cracks.

ii) Modify a Morris Crankshaft

My J2 was fitted with a Ford engine when I bought it. I obtained a box of J2 engine bits minus a J2 crankshaft. There was, however, a Morris O.H.C. Minor crankshaft. This was identical to the J2 crank-shaft with the exception of the rear end which was parallel instead of tapered. I decided to modify this crankshaft to the J2 shape. The crankshaft was pre-heated to 200°C, and the forward half of the parallel section was built up by laying beads of weld metal

along it, starting from the web, welding on alternative sides to avoid distortion. The welding was by arc, using Movex Armex 2 electrodes. The 1 in 8 taper was then turned on a lathe. The keyway had to be shortened, since the weld metal blunted the milling cutter when I tried to make a full length keyway. This was the crankshaft that I broke. Itdid not break on my modification, failure occured on one of the 40 thou undersized bigends. This raises a point. If your crankshaft is undersize on its big-end journals it would be worth while having it built up by the Kotoweld process. This welds round the crankpins while they are spinning in a lathe, and imparts strength which metal spraying processes lack. The journals could be made slightly oversize with advantage, possibly up to 1 9/16th".

iii) Buys Laystall Crankshaft

All you need is the cash. I could not afford one although I hope to get one eventually. The counter balancing is better than I could achieve in my own effort (see solution 4) but I would have needed a 4" thick piece of plate or a 6" round billet instead of the 2" plate which was available.

iv) Make your own Crankshaft

This is the solution I chose. It has been done before, see the article by the late Richard Purdie in Safety Fast, November 1961. He was able to obtain an original drawing of the J2 crankshaft but my efforts to locate a copy were fruitless, and so I prepared a drawing by measuring the broken crankshaft. I have subsequently been able to confirm that my measurements were correct.

I had originally be considering casting a blank in S.G. iron, to minimise the amount of machining S.G. Iron or Spheroidal graphite cast iron has its graphite in the form of nodules or spheroids. It does not exhibit the brittleness of ordinary cast iron in which the graphite is in the form of flakes, many of

which are interconnected and form discontinuities . . . make the cast iron brittle. The properties of S.G. Iron compare with those of forged carbon steel, coupled with improved fatigue resistance. S.G. Iron is used in the manufacture of the crankshafts of many of todays motor cars.

While I was considering a cast crankshaft a friend gave me a suitable piece of plate measuring 20" x 6" x 2", and I decided to machine my crankshaft from this. In selecting a piece of plate, cleanliness, i.e. freedom from inclusions, is an important factor. If the plate exhibits grain, this should be oriented along the axis of rotation.

My piece of plate had been flame cut, so its sides had to be trued square. Three centre holes were then drilled in each end for the main and two big-end axes. The shape was then roughly cut out by drilling and sawing, leaving sufficient metal at each end to retain the centre holes. I then acquired the use of a large lathe, 5" clearance being required over the saddle.

The crankpin diameter was increased from 1½" to 1⅝" and dumming webs were incorporated to provide a greater degree of counterbalance than the original crankshaft. I re-routed the oilways straight down the webs, instead of using the angled drillings of the original as these come perilously near to the big-end fillets, and fatigue fracture propogates from this point. The angled drilling from the rear main to No 4 pin gallery was retained. Milling the keyway for the location of the rear main bearing sleeve was tricky, since the web got in the way of the miller chuck, consequently, the end mill had to stick out a long way and was therefore inclined to wander off line during cutting. The two No 11 woodruff keyways in the front of the crank presented no problem.

The plate weighed about 70lb to start with or

finished crankshaft weighed 23lb, this was 10lb more than the original shaft. The flywheel was lightened from 21½ to 18lb to partially compensate.

At the time of writing, the crankshaft just needs oilway plugs, and then it will be ready to go to have its big-end journals ground, after which, it will be ready for installation. The photograph shows it prior to having its journals ground. The whole job has taken about nine months, usually on Saturday mornings. There was, and still is, the worry that something will go wrong. Anyway, I have my fingers crossed and hope that there will be no last minute snags. If anyone else is thinking of making a crankshaft, be warned, it is a horrible job, especially, if, like me, you are not an engineer, but good luck to you if you do decide to have a go. My thanks go to all those whom it would be inexpedient to name, who advised me, made the machine tools available for my use and gave me data to which access should have been impossible.

R.J.C. BATEMAN

*photograph on inside back cover

TUNING THE STEERING

The steering arrangments on the P type (and comperable models) are a bit casual for my taste. Perhaps if Ettore Buggatti had exerted an influence over the design, life would be different, but we are undoubtedly stuck with a system that suffers from inadequate stiffness of the moving parts and remarkable properties of generating excessive clearance at the joints. The system does have the merit of symplicity and high gearing and when backlash is minimised, the driver is encouraged to believe by his ability to command instantaneous changes of direction, that he is

at least, in partial control of the situation.

The persuit of backlash will no doubt have taken many people through the usual problems of wobbly wheel bearings, casual king-pins, sloppy steering joints and even loosely attached steering arms (ask Phil Bayne-Powell!) Having spent untold gold and effected only a moderate reduction in lost motion at the steering wheel, it is usual to then consider what kind of disaster is lurking inside the Bishop Cam steering box. Folklore has it that when correctly adjusted, with the roadwheels pointing straight ahead, there should be practically zero free movement at the steering wheel rim. On either lock 'some' lost motion should be felt. If, however, you find the reverse effect, with plenty of slop in the straight ahead position, reducing to substantially nothing on port or starboard lock, do not assume that the irreplaceable spiral cam has worn excessively.

Remove the steering column and box complete and take off the 'lid'. Unless you are most unfortunate, you will find that the hardened surfaces of the cam spiral are intact, in which case dismantle everything and clean. Now, reassemble the cam follower spindle into its hole. Wear will be apparent. The problem is that excessive clearance not only provides an obvious source of backlash but it can also subtly upset the geometry of the moving parts, so that the spindle when under load runs out of square to the lid of the box, causing, in extreme cases, the backlash on either lock to disappear. This renders it impossible to adjust out the 'straight ahead' backlash (by reducing the thickness of shi, under the lid) without causing tightening up on either lock.

The cure involves a little precision engineering for which you either pay up and look cheerful, or make use of whatever high quality engineering resources you can otherwise persuide to function on your behalf.

First, measure the spindle and decide if it can be trued up by grinding the diameter to, I suggest, no more than .010 undersize, as this involves reducing the depth of engagement of the serrations in the steering arm. (Incidentally discard the spindle and steering arm if the serrations are chewed up - this is the last joint that you want to fail!) If more than .010 needs removing, have the bearing surface only ground parallel, hard chromium plated and finish ground to a diameter not less than that of the serrated end.

The next stage is to exmine the hole in the housing and drive out any bushes that may be fitted. If unbushed, the hole must be bored approximately .060 oversize. In either case the hole should be parallel and reasonably well finished. Makes bronze bush (B.S. 369 Material is suitable), to give about an .0015 interference fit with the hole (leaving the bush bore round about 1/16th undersize) and press or draw in to assemble. Make certain that the lid face of the housing is flat and remove any burrs. Clamp the housing on a lathe face plate and bore out the bush to give a close running fit on the spindle (about .001 clearance) with the best possible finish. (there are other methods of finally 'sizing' the hole, but it <u>must be square</u> to the lid-face).

The rest is up to the individual, but obviously the cam follower conical peg and thrust bearings must be replaced if worn. Whilst you have everything in bits, who not discard that horrible felt sleeve next to the steering wheel boss which somehow serves as a bearing. A bronze bush here (don't forget a grease nipple) really does improve the 'feel'.

Obtain a sheet of 1/16th or 3/32th thick .002 laminated aluminium shim and make up two shims for the column flange and steering bix lid. Assemble the spiral cam into the housing complete with bearings and fit the column tube. Using a sharp knife, separate

a piece off the flange shim whose thickness is a little more than the gap between the column flange and housing. Assemble this and install the two bolts. Some steering column end float should be felt. Remove the shim, peel off .002 laminations and reassemble until there is no perceptible float and the column spins freely. Assemble the cam follower and rotate the column until the peg is in the position corresponding to 'straight ahead'. Offer up the lid and judging the shim thickness as before assemble the lid and shim and progressively adjust the shim thickness until there is virtually no free movement felt when the steering column is rotated about the straight ahead position and there is no tendency to tighten up at this point.

If at this stage you find that there is still excessive backlash 'straight ahead', it will all have been a colossal waste of effort and you may conclude that

A.) The writer has got it all wrong

or B.) The cam is abnormally worn.

(B is probably the right answer) You can, I think, anticipate this unlikely event by somehow gaining access to an engineers optical projector to check for wear on the flanks of the flat-bottomed 'V', or, make a template of the form and try it for size along the track before you start. I can't prove it, but despite what has been written in various sources, I doubt that the 'V' was 'relieved' at either end to give peg clearance on each lock, when new. I think this effect is most accidental and due purely to the fact that the peg traverses the cam in an arc, not a straight line.

I will cheerfully admit that this exercise was started in desperation, never anticipating the kind of success that resulted. It may not compare with a d modern rack and pinion or a traditional worm and wheel but in my opinion it transforms the steering properties of ones vehicle.

Two points when installing the machinery which, ignoring the cries of rage from the purists, are worth

considering.

1. Fit a separate pipe and nipple for oiling the 'box' to ensure positive lubrication. (Always S.A.E.140 OIL)

2. If your dashboard and scuttle will stand it (!) make a bracket, (all right, an invisible bracket), to secure the steering column tube to the dashboard. This has a remarkable stabilising effect on the column which otherwise has the approximate rigidity of a stick of rhubarb.

JOHN SEYMOUR-HOWELL
MMM 65

REBUILDING HINTS

On reading the previous articles I had written in 1965 and 1966 from copies of the bulletin kindly lent me by John Reid (mine were unfortunately accidentaly destroyed) I do not appear to have left a great deal to write about. However, there are some clearing up points, mainly about the chassis, so for what they are worth here they are.

Chassis frame

Our frames do not, as a general rule, rust a great deal largely through the fact that oil dropped by the engine at the front keeps them well lubricated! If you are stripping right down it is as well to have the complete frame sand blasted which gives a really good start, and you can then go to town with several coats of undercoat, rubbing down each time, and at least two coats of a good and durable paint - I use Valspar, which when rubbed down with cutting paste comes up like cellulose.

Before painting, check that the rear cross member in which the rear trunnions are located is not too worn away at the top through worn trunnions allowing the spring leaf to bear direct on the cross member. If so the only way of curing this is to have the ends built up by welding and then filing to fit. Also check up that the chassis is not bent by placing a square against the tubular cross members, and seeing that the frame members are at rig' angles. If otherwise the frame sits flat on the floor, it should be reasonably good and true.

Springs

First of all have a look at the rear spring front shackle pins. These will undoubtedly be badly worn, and they are not now obtainable. If you cannot get a new pair turned up, have the worn part brazed, and then have it all chrome plated - this will prevent further wear for a long while. Similarly the front spring shackles. A word of caution about the rear spring shackles. These are screwed into the cross member, and pinned, the pin going through the thread. The pin takes a bit of finding usually, as it is filed flush with the cross tube as a body mounting bracket goes over it.

Take the springs to pieces, and if there are no broken leaves, clean up thoroughly and put together with plenty of graphite grease. If you feel like hard work, tape up the springs with wide insulation tape, damping up the spring in a vice near where you are taping, and gradually move up towards the centre of the spring. This keeps the grease in and the dirt out.

You will probably find that where the spring went through the trunnions that the end of the leaf is worn with a raised line in the centre. File this flat and polish. If the leaf is too badly worn, the main leaf should be replaced, but again polish the ends so that the trunnion will not wear quickly.

When finally bolting up the springs to the axles, use a self locking nut, or ordinary nuts with a thin locking nut, and ensure these are really right. When you have run the car for a while re-check the tightness of these nuts.

Trunnions

These must be in good condition, and especially there must NOT be any lateral play. If you buy a new set you will probably find that when a pair of trunnion rollers is together and slipped over the spring leaf the slot will be wider than the leaf. You must therefore carefully file, or have turned off enough so that the spring leaf is a perfect fit in the trunnion slot. Then you must build up by flat washers between the trunnions and distance piece you will find under the large left hand threaded nut that screws on the end of the tubular cross shaft and holds the whole together. Do not make this too tight as the trunnions must rock when the spring flexes.

Shock Absorbers

The castellated nuts holding these in place on the pins must be really tight. Further, it is important to use the original type of nuts with a chamfer on the base of the thread, as this chamfer goes into a corresponding chamfer in the metal insert in the silentbloc bush. It is also most important to see that all the pin securing nuts are extremely tight.

To adjust the Shockers

This may have been written before but is well worth repeating. Tighten the adjusting nuts up hard, then jack up the car off all four wheels. Taking each axle in turn, slacken off each adjusting nut a flat at a time until the axle just begins to drop. Then stop and all should be well, but mainly they should be

balanced which is important for good road handling.

Brakes

This has been thoroughly covered in previous articles, but a further word to those who use cable brakes (I cannot understand why as hydraulics are so much better) and who have overhauled them thoroughly. The springs on the shoes have probably weakened with age, so either have some stronger ones made, or put an extra spring on each position. Providing your pivots and cables are all free this will ensure that the brakes do not rub. Always use a very thin oil in the cables - I always use Redex.

Wheel Bearings

Ensure that the centre of all the bearings is a really good fit on the rear axle casing or stub axle. If it is in any way a loose fit, the only way to cure is to get the axle end or stub axle built up by weld or metal spraying and re-machined. When you purchase new ball bearings try and obtain a 'one dot' clearance.

Hubs

Always clean up the splines and tapers very thoroughly, and check there are no burrs on the tapers. Give these a light coating of grease and ensure that the tapers on the wheels are also clean and greased. This is a most important as when the hub nut is done up tightly there will be no movement between the wheel and hub and you will not wear the splines.

Half Shafts

Make sure there is no twist at the splined end and if there is get a new one pressed in the hub. They should be a really good fit in the hub, in other words you should not be able to push the shaft in, or even hammer it in, they are normally pressed in under high

pressure. You may find when you purchase a new half shaft that it is not machined along its whole length. It is a good idea to get this turned in a lathe to the correct diameter along its entire length and polish it. This adds to its strength and if you have cork seals in the end of the axle you will not damage them when finally putting the half shaft in.

Steering

Try and achieve minimal play in the box by correct shimming and/or filing of the box itself. It is still possible to obtain new sector shafts for the Bishops Cam box, in which case you will probably have to bush the bottom where the shaft revolves. If you do, have a steel bush inserted (with oil grooves inside) as this will stand the hammer the shaft gets in road use better than a bronze bush. Have the top plate of the box machined as it's almost certain you will find that the sector has worn grooves in this which makes it difficult to shim properly.

The Marles Weller box presents a rather more difficult problem as the hemispheres are no longer obtainable. I know a chap with a J2 who had a half round ground into a piece of steel, into which he stuck a ball bearing of the correct size with Araldite. He then ground four balls down to slightly oversize on a grinder, and it was most successful although I gather it took rather a long time. Another way is to tin the four receptacles for the half balls, but this does not last all that long, and you have to do it again after a few months. Apart from this correct and careful shimming and a new bush as described above will help a lot. It may be necessary to have your sector shaft built up and ground as you cannot get these shafts now.

I have already described the firmer location of the steering column and box in the December 1966 Bulletin, but in case new members have not seen this, I will repeat the instructions. A bracket should be made

to to fit on the bottom of the box and adjacent frame. All that is necessary is to make up a clamp to go round the casting through which the sector shaft pivots, i.e. the round part, and place this as near the bottom as possible. An extension of the clamp has a right angle to bolt to the chassis channel. The bracket should be about $\frac{3}{4}$" wide mild steel $\frac{1}{8}$" thick. Another idea to give the top of the column more stability is to make the fixing a three point by having two pieces of $\frac{1}{2}$" tube bolting to the column at top end at angles of about 45° bolting to the scuttle at each side. This also helps to prevent scuttle weave.

Track Rod Ends

It is most important that the steering balls should not have flats on them, otherwise replace, and make sure that they are really bolted up tight. Clean out the track rod ends thoroughly and make sure the springs are not broken. You will find that the screwed end has either one or two split pin slots, and if only one, put two blades in a hacksaw and cut another at right angles. Then re-assemble and screw the ends right up as far as they will go, and finally slacken off by a quarter turn. Try the steering with the car jacked up, and if tight find which one is binding and slack off by a further quarter turn. Then do not forget to split pin the end, and also check that the balls are also split pinned. Use a good quality thick grease for lubrication.

General

If you are doing a major rebuild, inspect all the bolts, and preferably use new high tensile bolts throughout. Another point to check is the various parts that are riveted to the chassis, with special emphasis on the front spring trunnion blocks. If these look as if they have worked loose which they do sometimes, replace with high tensile bolts of a good fit.

Some people have asked me if it helps to drill the chassis for lightness, and my strong advice to this is 'don't' ! The frame flexes quite a lot and any undue drilling would be disastrous.

Make sure that your hand brake lever and the brake cross shaft is completely free and lubricate this with thin oil or Redex.

Now for a few items of general interest, and which have occured to me through my capacity of Technical Adviser.

Copper Cylinder Head Gaskets

If you have made up a solid copper gasket, do not forget to get it annealed, and re-anneal it every time you lift the head to decoke, or to do any other job. Always ensure that the head and block faces are quite true and free from any burrs, especially around the stud threaded holes. It is advisable to chamfer these slightly on both head and block.

Oil Pipes

Copper pipes harden with age and vibration, especially the one that supplies oil to the OHV gear as this is rather long and thin. Anneal all the pipes occasionally.

J2's and the earlier OHC models had a peculiar union to the oil pump pipe that sucks from the sump. This union had swaged ends with a copper ring held into the pump by a union that screwed into the pump, and if it was not lined up properly was most subject to cracking which meant a loss of oil pressure. The best thing to do is to purchase a proper male and female union set, and have the end of the male union brazed on to the pipe to a permanent female union screwed into the pump. Use a copper washer here, and make sure it is annealed.

Water Side Plates

These are very slightly dished plates made of mild steel, bolting to the block. To give a little more cooling water round the bores, it is a good idea to have these built out by cutting the centre out and brazing in a half steel tube of suitable diameter, and then blocking the ends. This was a tip given me by Reg. Jackson many years ago.

Block

If you do not intend to carry out the water side plate modification, at least once a season, remove the side plates and clean out all the sludge that collects inside at the bottom of the bores. Many a block has cracked through this not having been done, in spite of draining the water, as the sludge always remains very moist, and can crack the block all too easily.

Engine Cooling

These remarks are directed to those people who run blown cars and have water pumps fitted. When blown there is far more liklihood of the head cracking between the valve seats, and Abingdon obviated this very largely by modifying the water flow through the head only. There were all sorts of variations on this theme, but mainly it meant taking the core plug out from the rear of the cylinder head, just under the rear oil drain, and having the head machined flat with four studs ⅜" BSF. Then a back plate has to be made up to correspond with this and a pipe brazed or welded on, with various curves so that it eventually faces towards the front of the engine, and in line with the water pump outlet. Regarding the blanking off of the head and block, it is possible to thread all the water holes and screw in blanking plugs of alloy, but either leave the front two open, or blank these off as the others and drill into the head water passage from the outside

just rear of the oil head supply boss and make up two ¼" BSF studs to screw into a face that you can file up. Then repeat this on the block below and connect up with pipes and suitable hose. The bore diameter need only be about ⅜" diam. It is much easier to leave the two front holes - the reason for all this is of course to allow water to get round the bores. This means that the water in the block is stagnant and all flow goes through the head. Some folk in pre-war days made a slight further modification by taking a tapping from the pipe going to the back of the head, and an adjacent tapping into the water side plate with a pipe of about ½" bore, and this ensured a slight flow in the block.

Cylinder Head Studs

If by chance you have replaced the head studs, before final assembly from the head down on to the block and see that the head face comes firmly down on to the block. If it does not you will probably find that a little filing of the locating stud at the bottom where it is of larger diameter, will allow the head to pull down easily. If you do not check this it can mean a blown head gasket, or considerable leakage. The heads and studs were all hand fitted at the works, and it sometimes happens that even by removing the studs and replacing th same studs, means that the head hangs up so closely were some fitted.

GEOFF COLES

USEFUL TIPS

You probably find that when you lubricate your brake cables, oil tends to come through the outer cable at various points along its length rather than go right to the ends where the inner cable comes out of the end of the outer cable.

This means, of course, that only a short length of cable each side of the greasing point is being properly lubricated.

To overcome this, first get the cable outer thoroughly clean and then bind with a modern PVC adhesive tape, then apply a coat of Polyurethene varnish.

This is well worth doing particularly if you are fitting new cables.

You will now find that the oil stays inside and travels along to the ends.

JOHN KIDDER

SPICER TYPE 'G' AND 'IG' PROPELLER SHAFTS

Spicer type G Propeller Shafts have followed the same mechanical principle for more than twentyfive years. Naturally, they have been refined constantly to keep abreast of motor car improvements, and the fact that they are used on so many of the finest American and foreign cars is proof that they meet the strictest requirements of modern automotive engineering.

The latest development is the Type IG the new Sealed Joint. In this type the lubricant retention seal is positive regardless of the amount of lubricant and whether oil or grease.

The internal baffle cup has a knife edge contact with inner surface of main casing, and while made of extremely durable material, is sufficiently flexible to follow truly the contour of the main casing.

Lubricant is injected through channels in the yokes and stub ends exactly the same as so successfully done in the last several years.

To guard against possible damage to lubricant seal and main casings, in the event lubricant is injected by means of a high pressure power apparatus, a vent is provided in each joint and so located, namely throughthe neutral axis of the joint, as to eliminate any tendency to drain the joint when in operation.

Taken from Spicer General Parts Catalogue

SUGGESTIONS FOR REMOVING, REPAIRING AND ASSEMBLING TYPE 'G' AND 'IG' UNIVERSAL JOINTS AND PROPELLER SHAFTS

The Spicer Type G and IG Universal-Joints are so designed that a correct assembly is a very simple matter. No grinding, hand fitting or special tools are required. There is no 'trick' to the assembly, but the following suggestions will simplify the repairman's job if it becomes necessary to replace a part. The occasions for this are very rare, but when they do occur after long service or through neglect it will be noted that by replacing one or more small inexpensive parts the Spicer Universal Joint can be made as good as new.

1. When removing the propeller shaft from the car or truck do not let either end fall. The shaft should not be permitted to swing from one joint, as its weight will damage the mouth of the inner casing, which in turn will rapidly destroy the casing packing.

2. To dissemble, unscrew the dust cap from the sleeve yoke, then remove the casing spring retainer lock, which can be done with a screwdriver. The outside and inside covers can then be removed but care should be taken not to dent or distort them.

If the joint is IG type the baffle cup will now be visible and can be removed by slipping over the sleeve after which the baffle spring, retainer, and gasket can be removed in the same manner.

3. To disassemble the yokes and journal, remove the bushings first from the flange yoke. To do this remove the bushing lock rings with a screwdriver or similar tool. Remove the bushing. Drive out with a flat nose punch and hammer, tapping first one side and then the other. This leaves the flange yoke free. The bushings in the sleeve yoke and ball yoke are removed in a similar manner. Before re-assembling the joint see that all the parts are clean and that the bearing surfaces

are oiled, as grease may not reach the moving parts of the joint for the first few revolutions and the oil helps the grease work in quickly.

Care should be taken to drive new bushings in straight so that edges will not mar the journal bearing surface.

Use copper or other soft faced hammer to avoid chipping edges of bushings.

The journal must be inserted in the correct position in all yokes, making sure that the journal shoulders do not project above the yoke lugs. This permits the joints to operate at the maximum angle for which they are designed, and also permits the future removal of the bushings. The bushings are then driven into their respective places, but it should be kept in mind that when removing and replacing bushings, they should be coaxed rather than forced into place. Be sure to keep the bushings lined up with the journal lug. After each pair of bushings is in position, test the movement of the journal to make sure that it moves freely and does not bind in any way.

When replacing the baffle cup over the sleeve yoke, be sure and see that the spring, spring seat and baffle cup are free to slide on the sleeve.

6. When replacing the inner casing be sure to get the grease plug (not used on all models), opposite the space between the yokes so that grease can be inserted without difficulty.

7. Do not paint the spherical part of the inner casing. If the packing of the outside casing is forced to ride over a ridge of paint it will wear rapidly.

8. When replacing the slip joint on the tubular shaft, line up the grease filler hole in the front joint with

grease filler hole in the rear joint This insures having the yokes in their correct relation to each other. One some of the older models arrows are stamped on the sleeve and tubular shaft for the same purpose.

SPARES SECRETARY'S NEWS

In this Year Book I should like to take the opportunity to elaborate on the Spares Department, and its various functions; Also to bring out various ideas for the development of this part of the Register.

Basically, we operate a 'clearing house' for spares wanted and for sale. Those with parts they wish to dispose of are therefore asked to let the Spares Sec. know what they have so that other members who are restoring, rebuilding or just rerunning cars are enabled to be helped when they write in for various parts. In this connection, a list of parts is kept for reference, but because of the contents, is continually changing, it isn't feasable to send out the list as a duplicated sheet. It is therefore necessary that members state exactly what they need when writing in.

In addition, if a source of spare parts, new or second hand, is located, please let us know so that the items may be bought up by the club, on its meagre resources, and preserved for the use of other members or otherwise a note put in the Infoletter so that members can take advantage of the supply.

Generally we deal in secondhand parts, as there are quite a few firms providing new parts and we do not intend to duplicate their efforts. However

there are many items that we feel are important and are not stocked by these firms, so the club has had these items made up for members; for instance, J2 crankshafts, head gaskets, exhaust systems and now pistons. Various other parts are being produced and a list of what is currently available is now always to be found at the back of the Infoletter. If members are going to have parts made up for themselves please would theylet the Spares Sec know, so that a batch of a dozen or so may be taken off. Currently octagonal sidelights and P type water manifolds are available from this means. This also brings the cost of the item down.

Having mentioned the Infoletter at various times, I shall now explain its purpose and how it functions. Every two months this Infoletter is produced to pass on as much information as possible to members. This information consists of parts for sale, parts needed by members, forms recommended as being of use in undertaking various types of work for MMM cars, as well as passing on tips and hints from members; often one meets people who have come across and solved a particular problem, usually at Natters and Noggins, so how much more useful will this information be when passed on to a few hundred MMM members. By doing this all MMM owners will become better informed about their cars, so benefitting our cars in the long run. This side of Infoletter needs to be expanded, so that all communications that are not suitable for Safety Fast, which must be the clubs main literary production, are chanelled into Infoletter. This is your own Infoletter, and it is hoped that it somehow helps to replace the old Bulletin, which was such a favourite.

The reason we couldn't carry on with the Bulletin was that the expense involved, especially postage, was too high to be envisaged in the new M.G. Car Club situation, and also it was felt that a lot of money was being lost that could have gone to building

up the spares departments stocks. So to reduce the cost of Infoletter, every member who wishes to receive this Infoletter must send a stamped and addressed envelope to Rosemary Davis, Pike House, South Cerney, Cirencester, Glos. You may send as many as you please, but if your Infoletter doesn't arrive, then send Rosemary some more S.A.E.s that is all that is required from you, as we compile and print it at no cost to you. But of course, to make it feasable we need all kinds of information from you all, and don't worry how trivial or simple it may sound, let the Spares Secretary know about it.

The Spares Sec. will now sit back and wait for your flood of thoughts and information to come pouring in.

PHIL BAYNE-POWELL

We include the following notes from James Evans about his problems when rebuilding a PB, not because they are either very original, or indeed because they offer any new hints but they represent a typical account of a newcomer to the horrors of rebuilding old cars, and as such they should enable new members to identify with a kindred spirit, and therefore enjoy with him the bitter-sweet pangs of discovering crankshafts .060" undersized etc!

We older hands have of course learnt, that all cranks are either covered in fatigue cracks, or are .060" undersized, and sometimes .080" .....! Similarly, there must be far more horrific things to discover than that your PA engine has been bored out and fitted with PB pistons. The nasty bit is when you find that such engines have double-devon cream in the sump

S.W.D. (Deputy Ed.)

Due to the apparent lack of contributions to the MMM Annual, I have decided to write a few paragraphs that might entertain some of my more sadistic fellow enthusiasts.

My tale of woe begins in November 1967 when I made my graduation from Austin 7s to MGs by buying a 1938 TA. This car had reasonably sound bodywork, which I always find more difficult to restore than the mechanics. The price was reasonable, and as the car was attached to a 'desirable' registration number, I did not beat the price down more than a nominal £15. This was to cover the transport by trailer from Hampshire to Cornwall. I would point out that the car had been stored for four years and had no M.O.T., and although I heard it running I could not drive it.

Now for those of you who are wondering why I am writing about a T type and not a MMM car, I would explain that at that time I was completely bewildered by the multitude of different M.G. types. The important things were that the car should be cheap, and prewar, and of course I would have preferred an O.H.C. model. My father had an M type from new, though he changed it for a Riley after a few years. M.G.s were considered 'cheap' cars in those days!

Anyway, when my TA arrived, I drove it round the fields and was delighted with the sound and feel of the car; MGs were for me. In the course of rebuilding this car I found many horrible defects and bodges, none of which I will go into now, except that the cracked chassis would probably explain the reasonable price. The car subsequently gave me several thousand miles of most enjoyable, effortless and reliable motoring, but unfortunately the day came when I badly needed some cash. Since I was broke, all my time and money having been spent on the car, and as a friend had been trying to buy it for several months, I finally, reluctantly, had to sell. At least I knew

it was going to a good home, and the price covered the cost of all the materials used in the re-build. My labour had been amply rewarded by the pleasure gained.

Now a little later on my finances improved, and spurred on by the fact that my friend was taking my sister out in my TA, I decided that I would have to take action to preserve my self respect. The MG bug had bitten and I was powerless!

This time I had mastered the classification of the various MG models, thanks to the 'Blower' Manual which had come with the TA, and from meeting other enthusiasts. I had met several J2s with broken cranks so I decided to go for a P type 2 seater.

After several months I found just what I was looking for, a PB with good bodywork, but requiring attention to the clutch and brakes. It also needed new tyres and hood, but the latter was soon very low down the list of priorities. The price was unmentionable, but this is the result of growing popularity and scarcity; unfortunate from the buyer's point of view. It was just what I wanted, so I am now the proud owner of a heap of bits and pieces which a few weeks ago was PB 0330. As a result I am looked upon by my family as a 'nut-case' beyond salvation, but perhaps when it's finished they will see my point of view.

I was well aware that the clutch would have to be examined as it was both slipping and dragging, but by the time I had half the car in bits to do this and other jobs, I had discovered several dozen other small defects including the 'holey-washer' ailment. I therefore decided to take the whole thing to bits and work from the ground up. I was encouraged to do this as I had specially prepared a concrete floor on which to work, this as a result of many hours spent looking for tiny washers, springs, etc. lost while restoring the TA. In Cornwall all old buildings either have earth or

cobbled floors, which are impossible to keep clean.

Returning to the car itself, as I dismantled it I found that generally it was quite good, and that certain items were excellent. One small item which has occupied me for several days has been making new pins for the front ends of the rear springs, which were incredibly worn.

The engine was quite a different story. It seemed to run quite well, but I thought I would just remove the cylinder head and have a look! This I have regretted ever since, but it is best in the long run to know all the problems from the beginning. The cylinders showed no signs of wear and were fitted with +.030" pistons, one of which had an ominous dent in the crown. However, the cylinders had been lined and this set me wondering how many hundreds of thousands of miles this car had done? In great fear and trepidation I whipped off the sump: Oh dear .... the crank, though recently ground, was 62 thou undersize! The con rods too had been abused by being marked; also the timing case and flywheel housing were both cracked in several places. I always regret getting things too clean!

The hunt now started for a spare engine with a good crank, this I thought would be a good investment as I hope to keep the car for many years. I would not like to risk smashing a good crank-case by pushing my luck with the old shaft. My first attempt was a very derelict PA engine which had been lying for years with the cylinders full of water. The pistons were marked S.T.D. and the block had not been lined, so I took a chance. Woe-o-woe, when I opened it up the crank, though an improvement on my original one, was a disappointment: The reason; well imagine my horror when I thought I would just try the vernier gauge on the bores and ..... 60mm ! i.e. it had been bored out to the extent of taking S.T.D. PB pistons. At least after several days work I have salvaged an excellent set of

rods and original PB pistons. I am still looking for a suitable spare engine.

To end these notes of progress to date, one little point that amused me was that the engine number quoted in the Log Book is in fact the casting number of the crank-case. There may well be several hundred P types going around sharing the same engine as far as the Ministry is concerned.

JAMES EVANS
Cornwall.

HOW TO INSTALL ANDRE SHOCK ABSORBERS
Standard Types 502/2, 506/2, 502M/2, 506M/2

To obtain satisfactory results the Shock Absorbers must be carefully and properly fitted to the chassis. Study the blue print and special instructions supplied with every equipment. Place one Shock Absorber in position and secure lower bracket, then locate chassis bracket. Mark off the position of the bolt holes on the frame, and drill the bolt bracket into place. The double arm is attached to the axle, and the single arm to the chassis. In the case of the M. or Multiplex types, the reference would be the double and triple arms in their respective positions. The opening of the absorber arms should be approximately as shown on the blue print which should be always less than a right angle.

Single Arm Type

The special Single Arm models are designed for use on a number of cars to which the standard types cannot be easily applied. They are attached either

direct or by means of a fixing plate to the chassis frame and the single arm is connected to the front or rear axle by means of special link and axle brackets supplied. The arm and link is provided with 'Silentbloc' bearings exactly similar to the standard models.

THE 'SILENTBLOC' BEARING

The famous 'Silentbloc' Articulating Bearing is used in all Andre Shock Absorbers, and consists of an inner and outer steel sleeve, the space being filled with a special rubber material which is stretched in position and is therefore always under sufficient tension to prevent any movement taking place between the rubber and the outer and inner sleeves. The movement necessary to allow the Shock Absorbers to function takes place in the material itself without friction or slipping, therefore there is no wear, no lubrication or attention required, and further the elastic nature of the material also allows for the absorption of lateral strain and for the two parts to flex in relation to each other.

The 'Silentbloc' bearing has been adopted after extensive and exhaustive tests under all conditions of service, and represents a most important advance in the adaption of Shock Absorbers to motor cars as it not only provides a perfect type of flexible coupling, but also eliminates all wear and consequent rattle so common with other models used.

FITTING INSTRUCTIONS

The 'Silentbloc' Coupling at the end of the arms of the Shock Absorbers is to be fitted to the bracket pins. The centre tube is mounted on the chassis pin and locked in position by means of a special cone nut which registers in the chamfer provided at the end of the central tube.

SPECIAL NOTE

The cone nut must not be tightened until both arms of the Shock Absorbers are in position on the chassis so that the 'SILENTBLOC' joint is in the neutral position and any movement of the arms either up or down will, therefore, flex the elastic material each way from the neutral position.

ADJUSTMENT

Each Shock Absorber is set to a certain tension before it leaves the factory. No change in this adjustment should be made until the car has been driven about 100 miles on good and bad roads.

Carefully note the riding qualities of the car. If the spring action seems too free, increase the frictional resistance of each Shock Absorber by turning the centre adjusting nut to the right or clockwise by not more than one graduation at a time.

If the spring action seems too retarded and feels stiff, reduce the frictional resistance again by turning the adjusting nut to the left or counter-clockwise. Careful adjustment in this manner will produce an ideal condition. The springs will still have the required amount of flexibility for easy riding, but spring vibration will be reduced to a minimum, and violent rebound effectively eliminated.

Re-adjustment may only become necessary after several thousand miles of car travel, and should be made only when the spring movement seems too free and then the indicator should be moved not more than one half of a graduation at a time.

It should be noted that the full benefit of the Shock Absorbers will not be felt when the car is travelling at low speeds, as under these circumstances the spring movement is very limited, but as the speed

increases their effect becomes more pronounced, especially over bad roads when the spring action is most severe.

Testing should therefore be carried out at comparatively high average touring speeds and adjustments made to suit these conditions.

IMPORTANT

The frictional resistance required to effectively control the action of the springs is comparatively small, and care should be taken not to increase the pressure, when adjusting, more than is absolutely necessary to obtain the desired results. The initial Factory setting of the Shock Absorbers is approximately correct under normal conditions, but for fast Sports Cars and for Road and Track Racing, a considerable increase in pressure may be required.

The following table shows the correct initial Shock Absorber tension for the various types and different weight of cars:

Type	Approx. Weight of car	Initial Tension
502/2	up to 20 cwt	20 lb
506/2	over 20 cwt	25 lb
502M/2 Multiplex	over 30 cwt	20 lb
506M/2 Multiplex	over 40 cwt	25 lb
220		28 lb

To reset and adjust, clamp one arm of the Shock Absorber in a vice and test the tension with a spring scale attached to the outer end of the other arm.

If the tension registered is different from that shown in the above table, turn the adjusting nut in the direction necessary to secure the required tension - to the right to increase, to the left to decrease. Mark

the ring or outer edge of the Shock Absorber opposite the pointer. Turn the adjusting nut to the left until the dial is free, counting the number of revolutions - complete turns - in doing so, and then move the dial so its zero (1) is opposite the mark previously made on the outer ring. See that the spider spring is in its place and tighten the adjusting nut giving the wrench the same number of turns as before, but in the opposite direction. The pointer should be at the zero (1) mark when the requisite tension is obtained.

This gives the original adjustment at which the Shock Absorbers were set at the factory. - Re-attach the Shock Absorbers to the car and move the indicator to the adjustment which was found to give the best results or re-adjust according to the instructions above.

By courtesy of Andre (Components) Ltd.

THE BASIS OF ENGINE TIMING

I am frequently asked: 'Please how do I time my engine when there are no timing marks on it?' Someone has turned the flywheel round on its mounting bolts because the starter ring is worn, and removed the existing marks during a flywheel lightening operation anyway. Not an uncommon state of affairs in a MMM Car.

The first requirement is to determine accurately the TDC position of No 1 cylinder.

The badger's method of a screwdriver down the plug hole just will NOT do, and if you have the lead off, turning the engine until the piston is at the top of the bore will not do either.

The reason the above methods are not satisfactory, is because, although the piston may be felt or seen to be at the top of the bore, this is not necessarily the TDC position as whilst the piston is at the top of the bore, the crank will be free to move, with the con rod pivoting about the big and small ends, whilst the piston remains stationary.

This means of course, that the piston is at TDC but the crank can be a few degrees before or after TDC. This movement is known as ineffective crank angle.

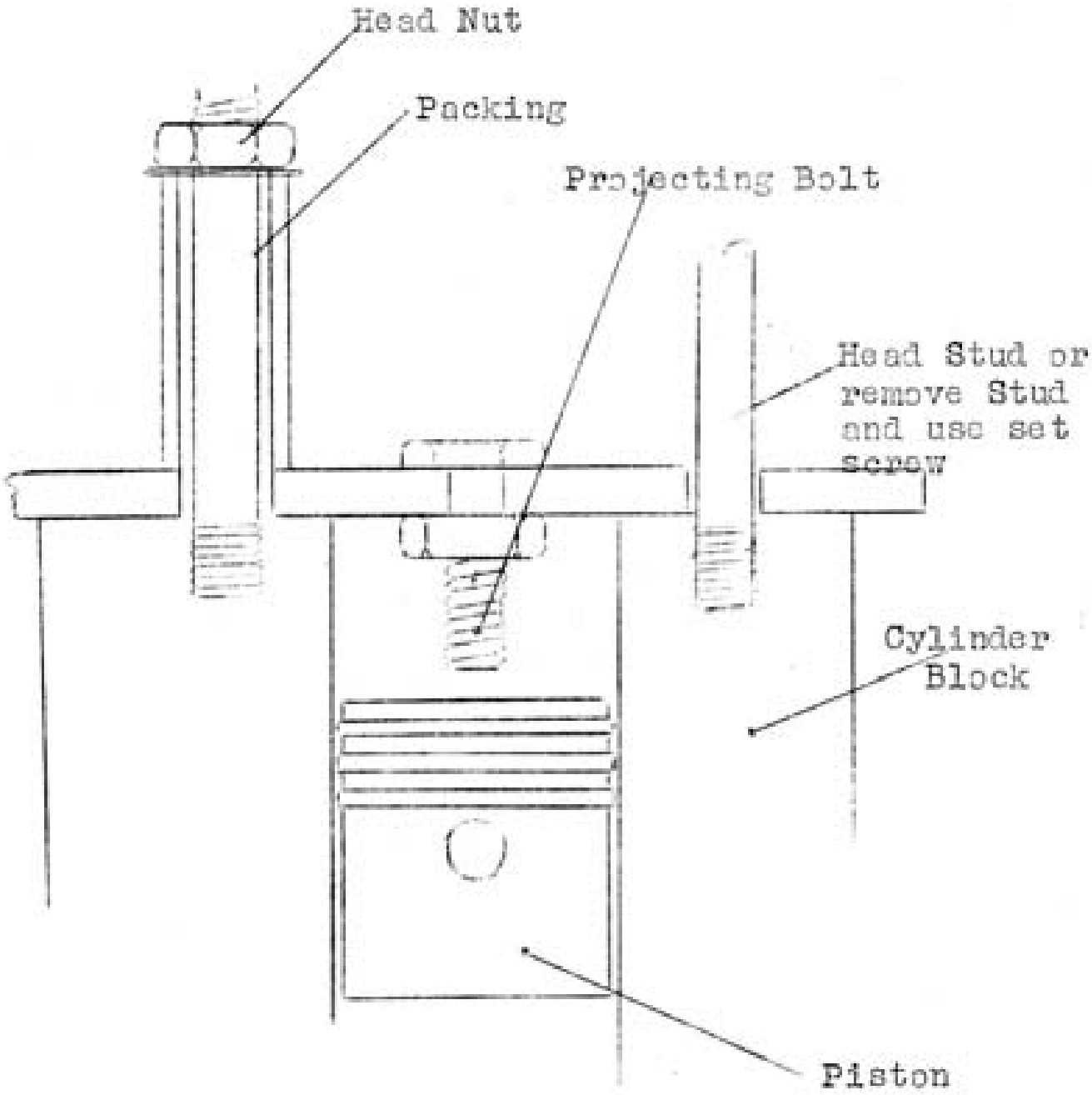
It is essential that TDC be determined accurately as all engine timing, in fact every function of the engine is based on TDC.

To find TDC accurately is best done with the head removed. Make up the jig as per sketch whether you remove a couple of head studs and use set screws to secure the jig or the existing head studs and packing pieces, does not matter as long as the jig is firmly down to the head face of the block. Any movement here will make the whole operation a waste of time.

Having secured the jig to the engine. Turn the engine in one direction until the piston touches the bolt projecting down the bore.

With the piston in contact with the projection mark the flywheel and the flywheel housing so that the marks are in line.

Now turn the engine in the opposite direction until the piston again touches the projecting bolt. Put another mark on the flywheel in line with the mark previously scribed on the flywheel housing. This leaves us with two marks on the flywheel and one on the housing.


Head Nut
Packing
Projecting Bolt
Head Stud or remove Stud and use set screw
Cylinder Block
Piston

Carefully measure the distance between the two marks on the flywheel and halve it. Measure this distance from either of the marks on the flywheel and mark the flywheel yet again. Put this mark in line with the one on the housing, and this is TDC.

Having found TDC it is a simple matter to mark the valve timing on the flywheel by either making a card protractor to fit the flywheel or calculate it in inches round the flywheel. This is done as follows:

Circumference of flywheel divided by 360 and multiplied by number of degrees applicable to valve timing e.g. Flywheel dia 9"

$$\text{Circumference} = \frac{\overline{II}D}{360}$$

Distance round flywheel of one degree will be:

$$\frac{\overline{II}D}{360}$$

Distance round flywheel of 15° will be:

$$\frac{\overline{II}D}{360} \times 15$$

$$\therefore \quad \frac{22}{7} \times \frac{9}{360} \times \frac{15}{1} = \text{distance in inches of } 15^{\circ} \text{ round flywheel}$$

$$= \frac{33}{28} = 1\ 1/7\text{th}"$$

N.B. If your flywheel has been machined on its outer edge do not use measurements given in any data sheets, use one of the above methods.

JOHN KIDDER

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RIGHT
The J2 crankshaft made by R. J. C. Bateman