

(EXPORT EDITION)

OPERATION  
MANUAL  
FOR THE  
MORRIS  
TEN-FOUR  
SERIES "M"



PRICE 2/6

PUBLISHED BY

NUFFIELD EXPORTS LIMITED  
Cowley : Oxford : England

## WARNING

The water impeller prevents complete draining of the cylinder block by means of the radiator tap. A drain tap is fitted at the centre of the cylinder block on the off-side through which the water in the block should be drained as a precaution against freezing.

For those who have not the time to read this book in full, and to enable them to give their car adequate attention, we have underlined those paragraphs which must be read and attended to.

OPERATION MANUAL  
FOR THE  
**MORRIS**  
**TEN-FOUR**  
SERIES "M"

A copy of this book is included  
with every Morris Ten-Four car  
exported.

**ENGINE AND CHASSIS NUMBERS**

The engine and chassis numbers of Morris cars  
are located on a plate mounted on the dashboard  
under the bonnet.

Please remember this in case you ever write to  
our Service Department.

Published by

**NUFFIELD EXPORTS LIMITED**

**COWLEY : OXFORD : ENGLAND**

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## General Data

### MORRIS TEN-FOUR

Number of cylinders	...	...	...	...	Four
Bore	...	...	...	...	2.5 in. (63.5 mm.)
Stroke	...	...	...	...	3.54 in. (90 mm.)
Cubic capacity	...	...	...	...	69.57 cu. in. (1140 c.c.)
R.A.C. rating	...	...	...	...	9.99
Firing order	...	...	...	...	1, 3, 4, 2
Number of gears	...	...	...	...	Four and reverse.
Gear ratios	First	...	...	...	20.087 to 1
Synchronesh	Second	...	...	...	11.849 to 1
	Third	...	...	...	7.292 to 1
	Fourth	...	...	...	5.286 to 1
	Reverse	...	...	...	20.087 to 1
Turning circle	...	...	...	...	{ R.H. 39 ft. (11.89 m.) L.H. 37 ft. 3 in. (11.35 m.)
Wheel size	...	...	...	...	3.00 by 16
Tyre size	...	...	...	...	5.00—16
Wheelbase	...	...	...	...	7 ft. 10 in. (2.39 m.)
Track	...	...	...	...	4 ft. 2 in. (1.27 m.)
Petrol tank capacity	...	...	...	...	7 gallons (32 litres)
Engine oil capacity	...	...	...	...	8 pints (4.5 litres)
Gearbox oil capacity	...	...	...	...	1½ pints (.7 litre)
Rear axle oil capacity	...	...	...	...	1½ pints (.85 litre)
Total water capacity	...	...	...	...	14 pints (8 litres)
Weight	Saloon (F.H.)	...	...	...	18½ cwt. (939.8 kg.)
	Saloon (S.H.)	...	...	...	18¾ cwt. (952.5 kg.)
Ground clearance (front axle)	...	...	...	...	6⅞ in. (163.5 mm.)
"	"	(silencer)	...	...	7⅝ in. (193.7 mm.)

(For list of tools in tool kit, see page 62)



# F O R E W O R D



**I**N the compilation of this book an attempt has been made to give in a concise form all the information normally required for the efficient management and upkeep of Morris Ten-Four cars, and to give instruction on how to effect those minor but all-important operations that mean so very much to the operation of the car and to the satisfaction of the owner. It must be remembered, however, that in a book of this nature it is impossible to deal in full with every aspect of car maintenance and that this publication is confined to essentials.

Nevertheless, this book contains a considerable amount of material which will naturally take some time to absorb, and to assist those who cannot afford the time to make themselves familiar with its full contents, we have underlined those paragraphs to which the owner **must** give attention if he wishes to obtain trouble-free running.

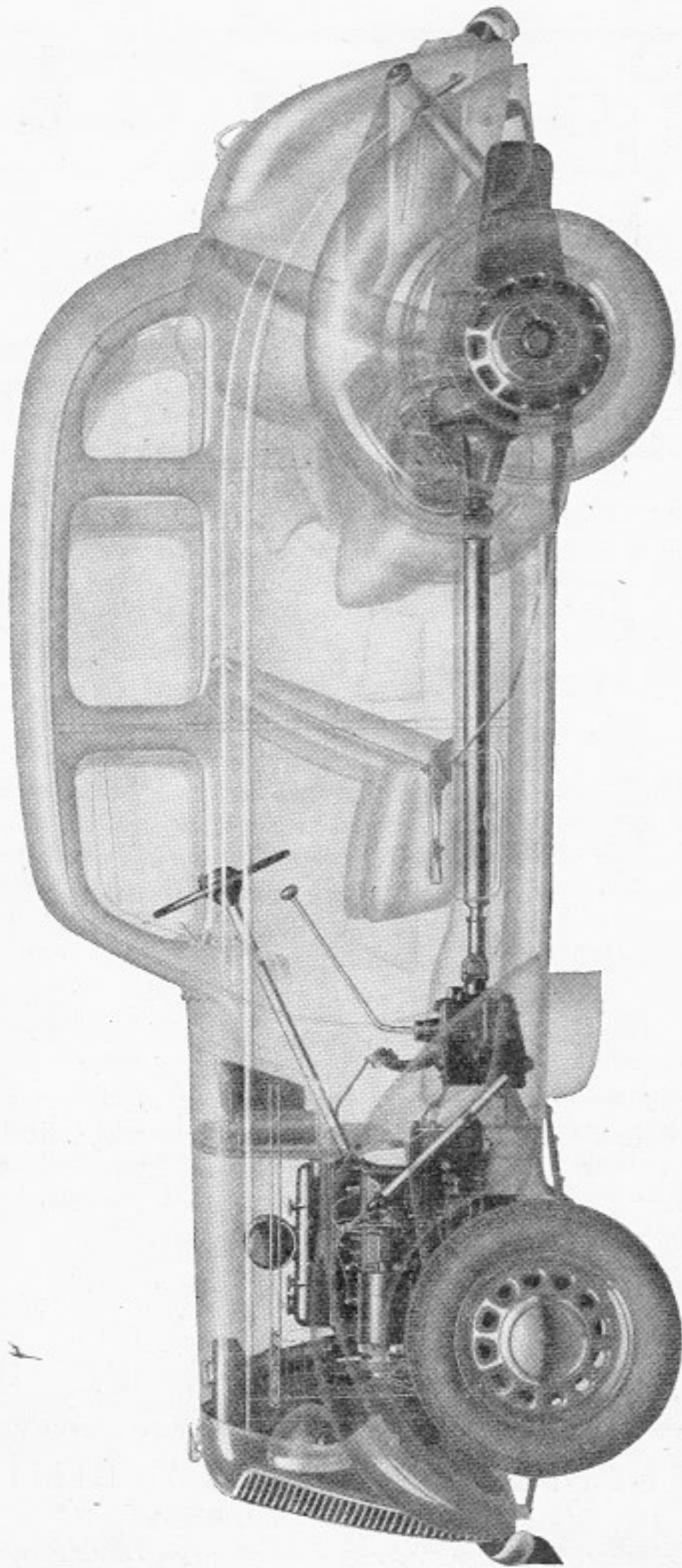
We know that every Morris Ten-Four car that leaves the Works can give absolute satisfaction, if proper attention is given to the essential maintenance features outlined in this book. In case of trouble, first study this *Operation Manual*; then, if still puzzled, write to your Dealer, who, if necessary, will submit a report to us.



NUFFIELD EXPORTS LIMITED  
COWLEY, OXFORD, ENGLAND



THE MORRIS TEN-FOUR (SERIES "M")



THE OPERATION MANUAL FOR THE

# MORRIS TEN-FOUR

## General

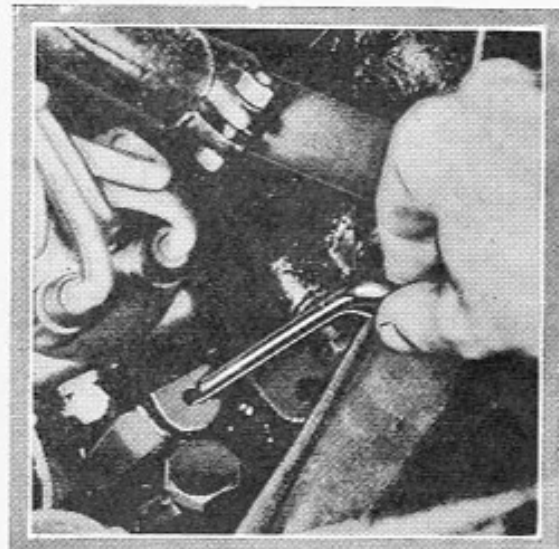
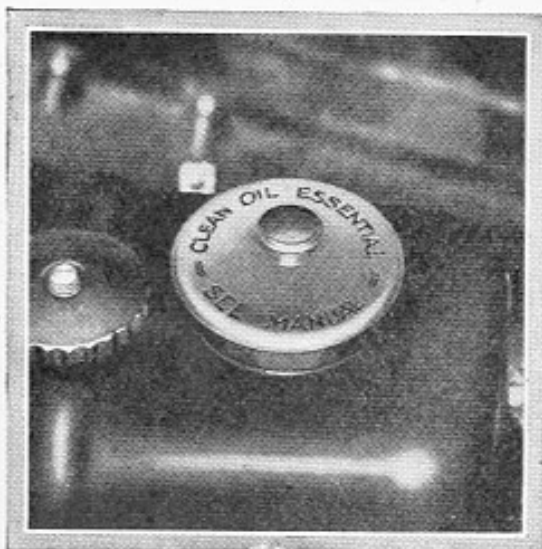
### FILLING UP

#### (1) PETROL

Before starting out for a run always make a point of seeing that the tank contains sufficient petrol. This can very easily be checked by noting the level of petrol shown on the scale on the instrument board. Remember that the gauge only indicates the quantity of petrol in the tank when the *ignition is switched on*. The tank capacity of the Morris Ten-Four is 7 gallons (32 litres). It is mounted at the rear of the chassis.

#### (2) OIL

Before starting out see that there is a plentiful supply of oil in the engine sump. To check this, remove the dipper rod which projects from a boss in the left-hand side of the cylinder block, next to the oil filter. Carefully wipe the lower portion of the rod, reinsert it and withdraw. The oil will cling to the rod, thus showing the actual quantity present in the sump. The engine should not be run for long periods when the oil has dropped below the low mark.



The oil filler and dipstick oil level indicator of the Morris Ten-Four.

*When filling with oil it is imperative only to use perfectly clean oil, preferably that bought in sealed tins. Nuffield Exports Ltd. cannot hold themselves responsible under guarantee for crankshafts or bearings that are damaged or scored as a result of the use of dirty oil.*

We advise the use of N.O.L. Engine Oil in the Morris Ten-Four engine (see page 47).

*Do not mix oils of different makes in the sump.*

### (3) WATER

The radiator when cold should be filled with clean water to a point within  $1\frac{1}{2}$  in. (38.1 mm.) of the top of the filler-cap funnel. If filled above this level the additional water will be forced out through the overflow pipe by expansion as the engine warms up.

The water should always well cover the bottom of the upper radiator tank.

#### **TOOLS, JACK AND STARTING HANDLE**

When owners are in need of the tool kit and accessories, they will be found in the following positions :—

**Starting Handle**—In the bottom front corner of the luggage boot.

**Jack**—Under ledge of rear seat.

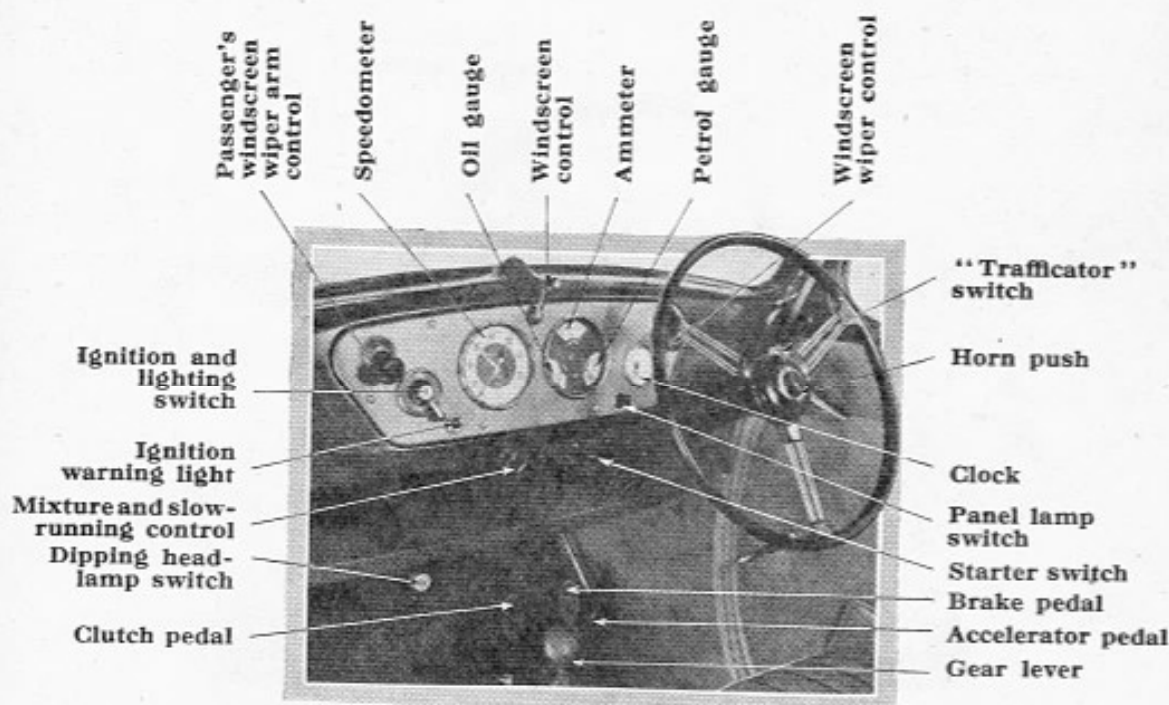
**Tool Kit**—In the container situated underneath the passenger seat, access to which is obtained by lifting the cover plate in the floor.

**A**N INDEX AND OILING CHART are provided for your convenience at the end of this book. Details of the 500 Miles Service are to be found on page 99.



## Controls

On the Morris Ten-Four car every necessary type of control is provided, not only for the car itself but also for the engine and its auxiliaries. In the centre of the floorboards will be found a lever ending in a round black knob; this is the gear lever. To the rear of this is a lever with a release ratchet handle—the hand brake lever. It pulls upwards to apply the hand brake and will stay on until released, which is done by pressing the ratchet catch and at the same time taking the weight of the pull before letting go.



The controls.

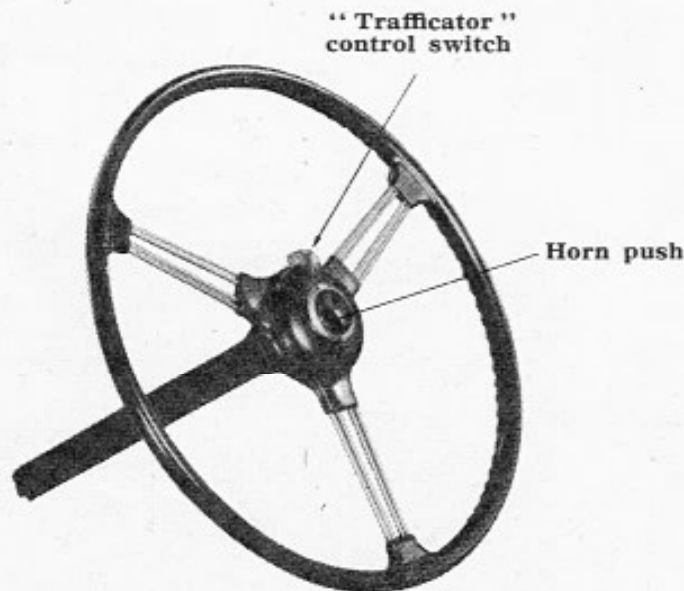
Projecting through the floorboards to the right of the car, in front of the driver's seat, will be found three pedals, two with large oval heads of a similar size and, to the right of these, a smaller one with a roller head. These, from right to left, are the accelerator pedal, the foot brake and the clutch.

### Switches

At the bottom right-hand of the instrument panel is a brown knob bearing the letter "S." This is the starter switch and is operated by pushing it inwards smartly. It should also be returned smartly to the "off" position as soon as the engine fires.

In the upper centre of the steering wheel will be found a switch for the "Trafficators." The switch is of the self-cancelling type, returning the "Trafficators" to the "off" position when the wheel is moved back to the straight-ahead position.

On the left-hand of the instrument panel will be found a large switch. This controls the lights. When the switch head is rotated anti-clockwise to the "Off" position, all lamps are extinguished. The rest of the switch scarcely needs explanation. When the switch is rotated clockwise so that the word "Side" appears, the sidelamps and tail-lamp are switched on. When the switch is further rotated so that the word "Head" appears, headlamps, sidelamps and tail-lamp are all switched on.



The self-cancelling traffic indicator control in the centre of the steering wheel. The central knob operates the electric horn.

The dynamo is provided with compensated voltage control, which automatically regulates the output to suit the demands of the electrical equipment, and no manual control is provided.

### The Ignition Switch

In the centre of the lighting switch will be found the ignition switch.

The ignition switch serves the purpose of switching the engine on and off. It is operated by a removable key. Turning this key clockwise switches on the ignition.

When the key is turned to the "off" position and removed, the ignition is permanently switched off so that the engine cannot be restarted by unauthorised persons. *Care should therefore be taken not to lose the key.* When it is desired to start the engine, the key

should be inserted in the centre of the switch and turned to the "on" position. This not only switches the ignition on but causes the dynamo, when the engine is running over a definite speed, to charge the battery, and switches on the electric petrol pump. *This switch must always be returned to the "off" position immediately the engine stops, except momentarily, in order to prevent the discharge of the battery current through the ignition coil. Any such discharge will be indicated by the lighting of the red warning lamp in the left-hand lower corner of the panel.*

The switch for the panel lighting will be found at the bottom right-hand corner of the panel and is of the rotary type.

### Horn Switch

In the centre of the steering wheel is a black switch knob for operating the horn.

### Dipping Headlamp Switch

The dipping headlamp switch is situated in the centre of the toe-board and is of the single-acting repeating type. It dips the lamps with one depression and raises the lamps on the next depression. This obviates the necessity for keeping the foot continually on the switch.

### Windscreen Wiper Control

Push in the knob on the driver's side and rotate it to start the wiper and engage the wiper arm. The arm on the passenger's side can be engaged or disengaged at will in a similar manner, but only operates when the driver's arm is in action.

To stop the wiper, push in the knob, and while it is pushed in, turn it so that the wiper arm is parked on the top of the scuttle.

### Mixture Control

On the Morris Ten-Four a control is provided over the strength of the mixture (that is, the quantity of petrol in proportion to the amount of air) that is fed by the carburetter to the engine, by a knob on the left-hand side of the panel, right at the bottom. For starting up from cold this knob should be pulled out as far as it will go and partly rotated to wedge and hold the control in the open position. As soon as the engine has run a few moments it should be pushed in as far as possible without causing the engine to hesitate or splutter through the carburetter when the accelerator is smartly depressed. On no account whatever must the engine be run for any length of time with this control in the "rich" position. If this is done neat petrol may be drawn into the cylinders, which will wash the oil away from the working surfaces and may cause considerable trouble.

This control is interconnected with the slow-running control in such a manner that correct slow running is obtained automatically when the engine is cold, when the adjusting screw is correctly set (see page 33).

### **Petrol Tap**

The action of switching off the ignition also switches off the S.U. electric petrol pump, which ceases to function. No separate petrol tap is therefore necessary and none is fitted.

### **The S.U. Electric Petrol Pump**

The S.U. petrol pump is attached on the left of the dash, under the bonnet. Its function is to draw petrol from the main tank at the rear automatically, and thus feed a constant supply of petrol to the carburetter under slight pressure. Details of its maintenance will be found on page 37.

## **INSTRUMENTS**

The instruments provided indicate to the driver everything he wants to know. In the left centre of the panel is a large speedometer dial which gives the speed of the car in miles per hour and also shows the mileage it has run. Protruding from below the instrument panel is a flexible shaft with knurled end which can be pushed upwards and rotated in an anti-clockwise direction to set the trip mileage indicator to zero. At the right-hand side is the clock. This clock is electrically operated and needs no winding. The clock can be set by pushing the setting knob provided at the back of the clock inwards, towards the clock, and rotating the hands into the desired position. The large right-hand dial houses in its bottom left-hand segment the oil gauge. This indicates the pressure of oil that is being pumped through the engine to lubricate the bearings. It will naturally show a higher figure when the engine and the oil are cold and the latter is therefore thick. So long as it is registering approximately 30–60 lb. (2.1–4.2 kg. sq. cm.) when the engine is warm at speeds over 30 m.p.h. (48.3 k.p.h.), it can be taken that the oil circulating system is generally satisfactory. The right-hand scale is the electrical petrol gauge, indicating the quantity of petrol present in the tank. *It functions only when the ignition is switched on.* The upper scale is the ammeter. The vertical finger swings both to the right and to the left, showing either that the battery is being charged or discharged. When no lights are on and the car is running at 20 to 25 miles (32.2–40.2 km.) an hour it should swing to the left, indicating that the dynamo is functioning. The figure registered will vary with the condition of the battery, and so long as the needle swings to the left the dynamo output may be considered satisfactory.

## STARTING UP

Before starting up the engine make sure that the gear lever is in the central or neutral position, i.e. is free to move from side to side. The ignition control is entirely automatic and therefore needs no setting by the driver. When starting from cold see that the carburetter mixture control is pulled into the "rich" position and turned so that it is wedged in position. The mixture control is on the left of the instrument panel at the bottom.

The engine starting switch is controlled by the round brown knob in the bottom of the right-hand side below the instrument panel. When this knob is pushed in it closes the switch and allows current to pass from the battery to the starting motor. Always operate the starter switch smartly and firmly, both when switching on and switching off. The engine will be heard revolving, and after a second or two, with the accelerator pedal slightly depressed, turn the ignition switch key on the instrument board switch clockwise, when engine should fire. The starter switch must immediately be released. *With a new car or in cold weather the engine should be swung by the starting handle with the ignition switch "off" before the electric starter is used.* The starter may be further assisted by depressing the clutch pedal and thus releasing the starter from having to turn the gears in the gearbox.

**NOTE.—It is extremely bad practice to allow the engine to warm up from cold by letting it idle slowly. The correct procedure is to let the engine turn over fairly fast (approximately 1000 r.p.m., corresponding to a speed of 15 m.p.h. (24.1 k.p.h.) in top gear), so that it attains its correct working temperature as QUICKLY AS POSSIBLE. Allowing the engine to work in a cold state, however slowly, leads to excessive cylinder wear, and far less damage is done by driving the car on the road straight from cold than by letting it idle slowly in the garage.**

### Setting the Slow-running Control

In order to prevent the engine from stopping when the foot is taken off the accelerator *while the engine is cold* a slow-running control is provided, which is interconnected with the mixture control and thus automatically set.

The slow running when the engine is warm should be controlled entirely by the carburetter setting (see page 32).

### Accelerating

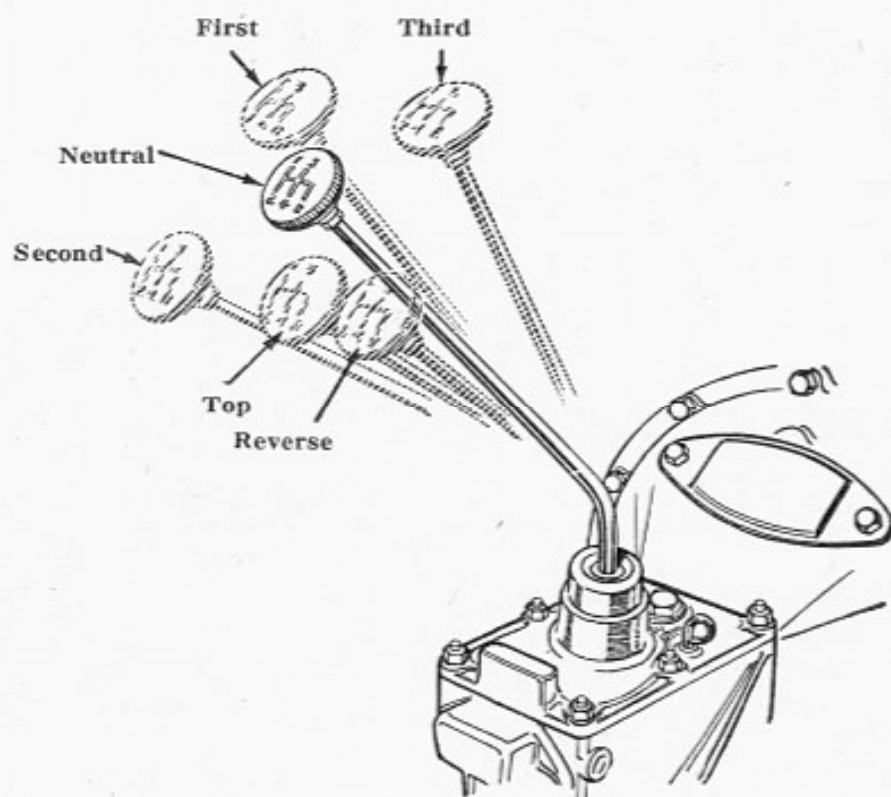
It is advisable not to accelerate the motor too suddenly, as it will pull better if the throttle is opened gradually.

### Gear Changing

After getting into the car, press the left pedal down and keep it there for a few seconds, with the engine running slowly. The clutch is thereby released and the gear lever may then be swung to the left and forwards, which will engage the first or low-speed gear.

The gears should engage easily. Do not use force. Should the gears not engage readily, repeat the instructions in the previous paragraph.

*It should be remembered that the engine should have the opportunity of increasing its speed when changing to a lower gear, but must lose speed when changing to a higher.*



The gear positions.

The hand brake should now be released, and the clutch pedal gradually let up; at the same time the engine should be accelerated by gentle pressure of the foot on the accelerator pedal. The car will move off.

When the car has gained some headway change into second speed. To do this, again depress the clutch pedal, bring the gear lever into the neutral position and move it rearwards, keeping it to the left.

Second speed is provided with a synchromesh clutch which levels up the speeds of the components to be engaged provided the gear lever is moved reasonably slowly in order to give the synchromesh device the opportunity to function. Actually a slight resistance will

be felt between the neutral position and the fully engaged position, indicating the point where the synchromesh clutch members engage, and a slight pause should be made with the gear lever held in this position to give the synchromesh clutch time to do its work and enable the gear to engage easily ; it can then easily be moved into gear.

To change into third gear the same procedure is adopted, but the gear lever is moved to the right and forward after being brought back to the neutral position.

To change into fourth speed, or top, again repeat the foregoing instructions, but bring the gear lever straight back. This gear is also fitted with the synchromesh device and the same pause should be made between the neutral and fully engaged positions.

The reverse position is towards the rear on the extreme right side. Care should be exercised when changing from third speed into top to avoid pushing the gear lever into the reverse, as this will result in setting up a tremendous strain on the gear wheels, and might cause a serious breakdown. This is guarded against by a safety spring, the tension of which must be overcome before the gear lever can be moved into the reverse position. The same damage would result if the forward gear were engaged before the car had lost its backward motion.

*Never engage a gear which will reverse the direction of travel of the car until it has come to an absolute standstill.*

When changing *down* from second to first, the clutch pedal should be depressed, and after waiting for half a second *with the throttle remaining open for the engine to gain speed*, the change can be made noiselessly. The expert driver will have recourse to double declutching in this instance, but this requires a little tuition and practice. We advise all drivers, however, to take the necessary steps to become thoroughly familiar with this method of changing gear at the earliest possible opportunity.

### **Stopping the Car**

To slow down take your foot off the accelerator and if necessary apply the foot brake gently. To stop, slow down as indicated, apply brake gently and declutch as soon as the car speed falls below 6 m.p.h. (9.6 k.p.h.). Place the gear lever into neutral position, i.e. in the centre, and apply the hand brake. Always try to pull up as though the car had no brakes, when opportunity allows. This saves tyre wear and transmission stress, and helps to prolong the life of the car.

The brake pedal operates hydraulic brakes on back and front wheels, the hand lever operating on the brake-shoes in the rear wheels. The foot brake is intended for general use, and the hand brake for emergency and parking.

### Descending Steep Hills

On approaching a hill which is known to be steep, slow down the car and engage third gear before the descent is begun. The foot can then be removed from the accelerator and the clutch left in engagement. This will enable the engine to function as a brake, leaving the foot brake for additional braking and emergency. When using the engine as a brake it is unadvisable to switch off the ignition, as this is liable to cause the plugs to become oiled up.

Do not "coast" downhill with the clutch pressed out. There is no advantage gained, and this practice only causes needless increased wear on the clutch withdrawal mechanism.

**DON'T** :—Attempt to force the gears into mesh. If they do not engage easily, start again from the neutral position.

**DON'T** :—Imagine that the synchromesh is provided to enable you to make ultra fast changes. It must be operated reasonably slowly, and is mainly designed to give *quiet* changes.

When engaging the synchromesh gears the clutch must be pushed right out against its stop and a pause made after the lever has left the neutral position and as the synchromesh clutches are felt to engage.

### WHEN IN COMMUNICATION WITH THE WORKS

*The Address is: Nuffield Exports Ltd.  
Cowley, Oxford  
England*

*The Cable Address is:  
"Morex," Oxford, England*

*The Telephone Number is:  
77733 Oxford, England*

*The Telex Number is:  
Oxford Telex 7168*

*When writing ALWAYS quote model, engine  
and chassis numbers, and sign your name legibly*



# General Care of the Car

## New Engines

**W**HEN the car is given its first run it may be noticed that power is lacking for about 150 to 200 miles (241-321 km.). The reason for this is that the engine is stiff on account of being new. When the car is further used, however, this lack of power will gradually disappear as the bearing surfaces are run in. There will be a progressive improvement in the engine and the car generally for the first 1000 miles (1609 km.) if proper care is exercised. It is a great mistake to drive a new car either fast or hard (such as labouring up inclines on top gear) until it has completed its first 1000 miles (1609 km.). The addition of an eggcupful of engine oil or special upper cylinder lubricant to each gallon (4.5 litres) of petrol is particularly beneficial during the running in period.

**For the first 200 miles (321 km.), 35 m.p.h. (56 k.p.h.) must not be exceeded in top gear, 26 m.p.h. (42 k.p.h.) in third, 15 m.p.h. (24 k.p.h.) in second gear or 10 m.p.h. (16 k.p.h.) in bottom gear. In addition, the engine should never be raced when cold (see page 11). Engine speeds should then only be increased gradually and progressively until at least 1000 miles (1609 km.) have been covered, or preferably 1500 miles (2413 km.).**

New engines should be given proper attention during the first 500 miles (804 km.) in particular if they are to be ensured a long life. At the conclusion of the first 500 miles (804 km.), and when possible at 250 miles (402 km.) also, the valve rocker clearances should be checked and adjusted if necessary (see page 19). The cylinder head stud nuts also should be tightened and the valve rockers reset after the first 250 miles (402 km.).

## Wings

Tar spots may be removed by diligent application of eucalyptus oil. Karpol Cellulose Cleaner can be used for polishing.

## Radiator and Cooling System

It is of some importance that the radiator be filled only with clean rain water. The use of hard water for this purpose results in the deposit of the impurities which it contains on the surface of the water passages of the cooling system, reducing its efficiency. **You should flush out the system every 10,000 miles (16,093 km.) by inserting a hose in the radiator filler, leaving the radiator drain tap open and opening the drain tap on the off-side of the cylinder block. The capacity of the Morris Ten-Four cooling system is 14 pints (8 litres).**

**Frosty Weather**

If the car is not stored in a warmed building, steps must be taken to prevent the cooling water from freezing during frosty weather. Water upon freezing expands, with the result that there is a very considerable risk of bursting either the radiator or the cylinder block by the pressure generated. As a precautionary measure when frost is anticipated, the water should be drawn from the radiator before the car is stored for the night, not forgetting to open the drain tap on the off-side of the cylinder block.

Anti-freezing solutions may be used in the radiator to overcome severe climatic conditions.

We recommend owners to use Smith's "Bluecol" non-corrosive anti-freeze in order to protect the cooling system during frosty weather and reduce corrosion to a minimum.

Before introducing anti-freeze mixture into the radiator it is advisable to flush out the cooling system thoroughly, as indicated on page 15.

The recommended "Bluecol" size for the Morris Ten-Four is a No. 1A size.

With this anti-freeze in the cooling water it is unnecessary to drain the system, and one filling lasts the whole Winter.

"Bluecol" does not evaporate—therefore it is only necessary to top-up in the usual manner.

If the radiator should freeze do not try to thaw it by running the engine, but remove the car to a warm place.

In cold weather, it is a good plan to cover the radiator, when making a stop, with a rug. This helps to retain the heat, reduces the liability to freeze and renders restarting more easy.

**The Springs**

The spring clips which secure the front springs to the axles should be examined periodically to see that they are bolted up tight. It is essential, particularly when the car is new, to test the nuts on these clips to ensure that no slackness has taken place. The majority of spring failures are traceable to the fact that slackness has occurred at these points and has not been attended to.

The rear springs are interleaved with rubber, and no attempt should be made to lubricate the leaves. The front springs should be sprayed with lubricant at intervals of 3000 miles (4828 km.)

**Chromium Finish**

The chromium finished parts of the Morris Ten-Four should on no account be cleaned by the use of metal polishes (all of which contain a certain amount of abrasive matter), but by the simple expedient of washing the parts with plenty of water and, when the dirt has been removed, polishing the surface with a clean dry cloth, or with chamois leather, until bright. In short, chromium finish should be treated in precisely the same way as coachwork and no special polish of any description is necessary.

All that is necessary to maintain the original brilliancy of the chromium finished bright parts is that they should be wiped over once a week with a damp chamois leather. It is recommended that this is regularly carried out.

If the chromium finish has been neglected it may be restored to its original brilliance by careful washing with soap and water applied with a soft rag.

## CARE OF THE BODYWORK

### Care of the Coachwork Finish

The cellulose finish of Morris cars may be dusted with a dry cloth without in any way harming the surface, but it is always advisable to remove mud, either in the wet or dry state, by carefully washing off with an abundant quantity of water. Whenever possible, the mud should be removed while still wet and not allowed to dry. Tar which may find its way on to the surface can readily be removed with a cloth damped with eucalyptus oil. It is of considerable advantage to give the cellulose finish a thorough polish once a week with a special cellulose polish procurable from your Dealer. We recommend the use of Belco No. 7 Polish or Karpol Cellulose Cleaner.

### Care of the Upholstery

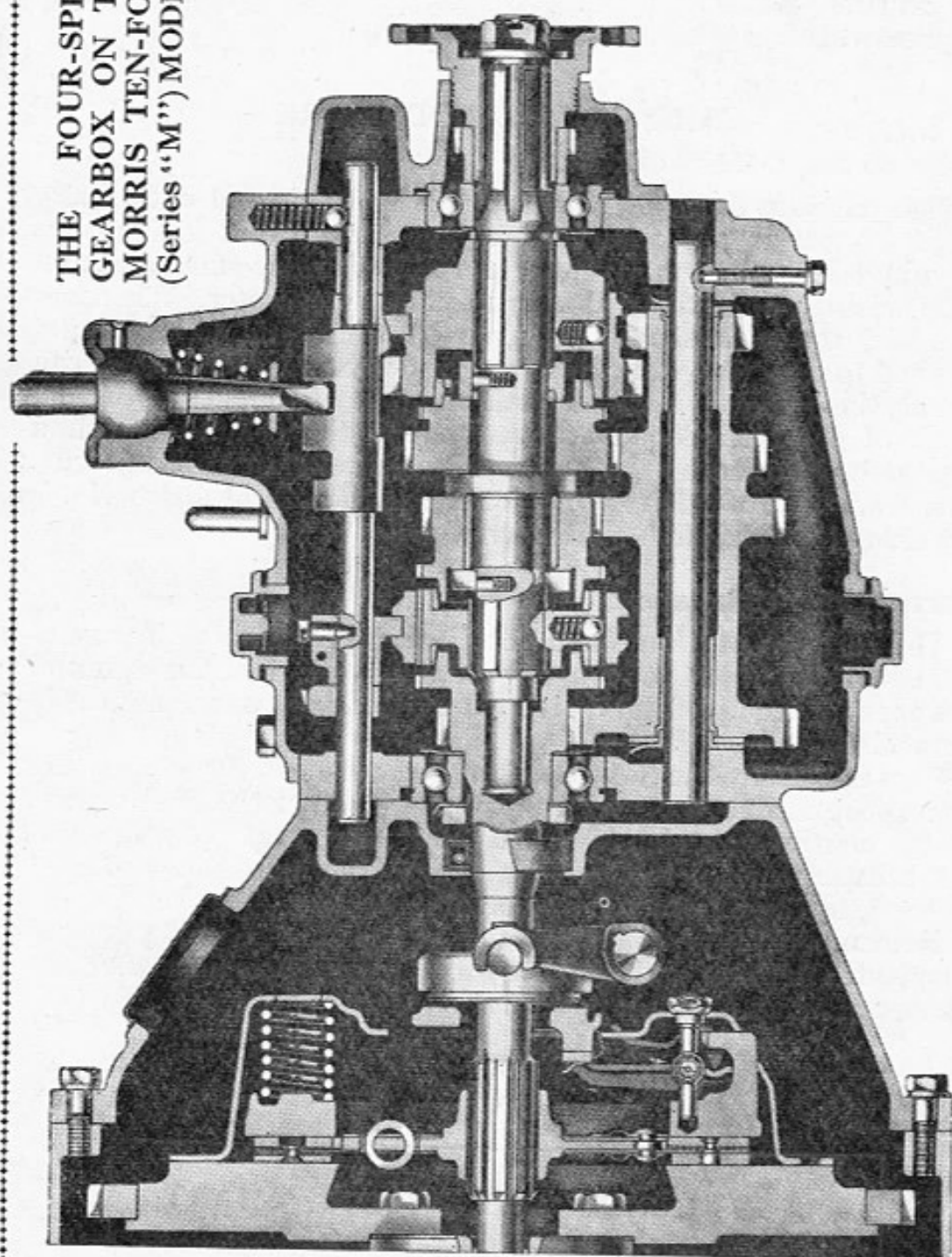
The cushions of a car should be cleaned periodically. Accumulations of dirt, if left too long, eventually work right through into the pores of the upholstery, giving it a soiled appearance not easily remedied.

Cars upholstered with leather can be kept clean by occasionally wiping the cushions over with a damp (not wet) cloth. If necessary, a little neutral soap such as "curd" or "toilet soap" may be used, but caustic soaps, petrol or spirit of any kind must on no account be used, as these have a very deleterious action.

Remember: It is always best to give the upholstery regular and frequent attention rather than leave matters so long that the leather assumes a dirty appearance.

**A**N INDEX AND OILING CHART  
are provided for your convenience  
at the end of this book.

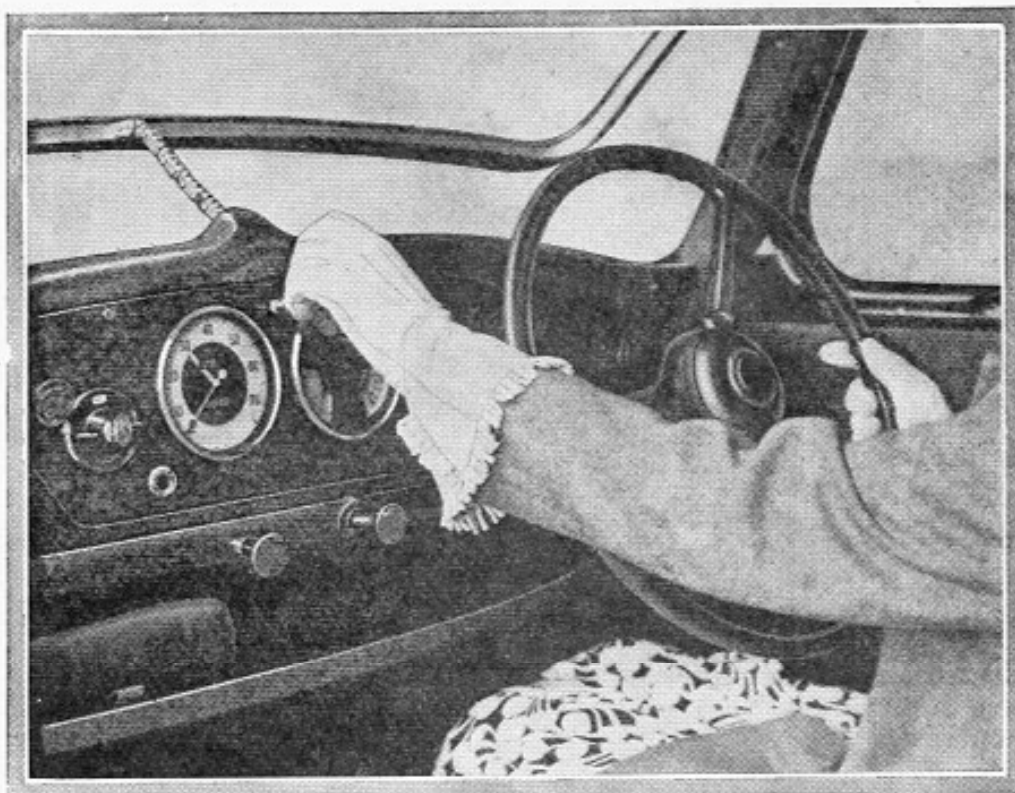
THE FOUR-SPEED  
GEARBOX ON THE  
MORRIS TEN-FOUR  
(Series "M") MODELS



# Adjustments

## Windscreen

THE single-panel windscreen fitted to the Morris Ten (Series "M") is provided with a single central adjustment of the winding type, which is self-locking.



The central adjustment for the windscreen fitted to the Morris Ten-Four (Series "M").

## Valve Rocker Screws

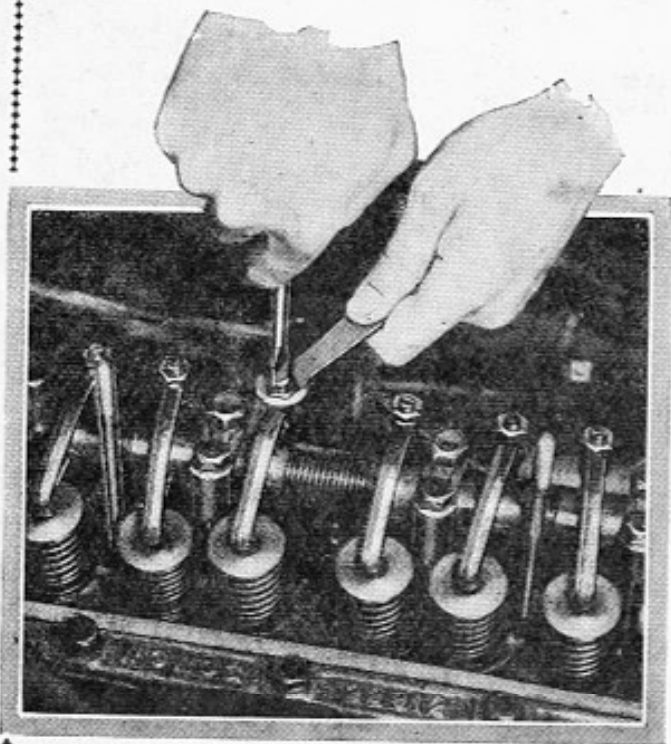
Adjust these to give a play of at least .019 in. (.482 mm.), for both inlet and exhaust valves, between the end of the valve stem and the head of the rocker screw when the engine is warm, an extra .001 in. (.025 mm.) must be allowed when the engine is cold.

*It is of importance to note while the clearance is being set that the tappet of the valve being operated on is bearing exactly on the heel of the cam.*

Once it is realised that, counting from opposite ends, the pistons are paired together and move in unison, and that while the valve of one is fully open the corresponding valve of the other is fully closed, no difficulty will be experienced in ensuring this, since it is only necessary to rotate the engine by the starting handle until the corresponding valve belonging to the other cylinder paired with it is fully opened.

To assist the owner and reduce the number of times the engine need be rotated, tables of the correct valve adjusting sequence are given herewith.

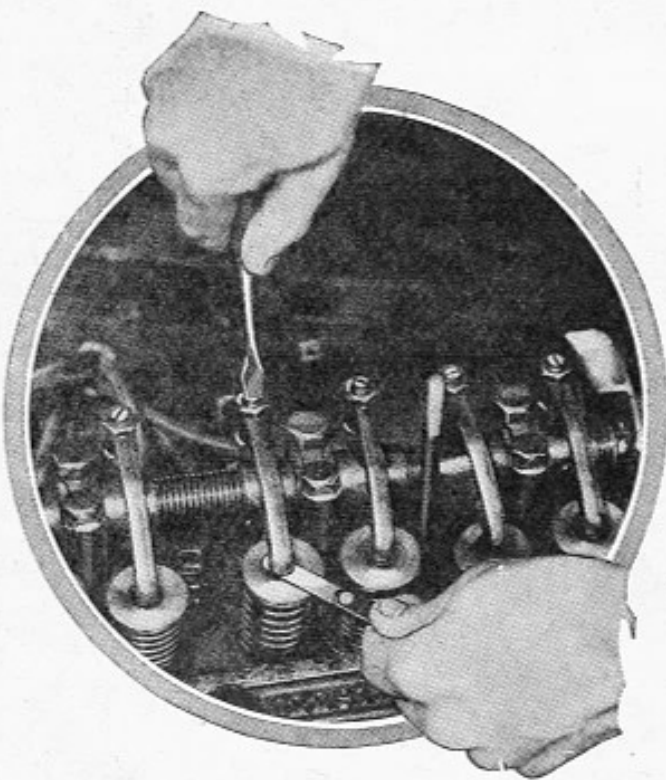
## ADJUSTING THE VALVES



To adjust the valve clearance the rocker screw lock nut is first released with a set spanner while holding the screw against rotation by a screwdriver.

When the lock nut is released the valve clearance can accurately be set by rotating the adjusting screw with a screwdriver and checking the clearance with a feeler gauge .019 in. (.482 mm.) thick.

Pressure must be maintained on the adjusting screw with the screwdriver in order to ensure a correct setting.



Set No.	1	rocker	with	No. 8	valve	fully	open
" "	3	"	"	"	6	"	"
" "	5	"	"	"	4	"	"
" "	2	"	"	"	7	"	"
" "	8	"	"	"	1	"	"
" "	6	"	"	"	3	"	"
" "	4	"	"	"	5	"	"
" "	7	"	"	"	2	"	"

No. 1 rocker is at the forward end of the engine.

When the valves are ground-in the rockers *must* be reset, and it is advisable *when the car has run 250 miles (402 km.) after resetting to again check the clearance, as valves have a tendency to "bed down" a little after having been disturbed.* Similar attention should be given whenever the cylinder head studs are tightened down.

### Connecting Rods

It should be understood distinctly by the owner that the connecting rod big-ends in the Morris Ten-Four engines are of the full-ring butted type—that is to say, the two halves of the rod completely encircle the bearing, and make contact with each other at their joint without leaving a gap and without the use of packing shims.

*On no account whatever must these bearings be closed together for any reason by the process of filing the caps or rods, as this will immediately render the whole bearing non-standard and render the connecting rod valueless for future bearing replacement. The steel-backed linings are replaceable and are made on a system which ensures a sufficient degree of accuracy to make it totally unnecessary for the caps or rods to be touched by a file or scraper, and, in fact, renders any hand fitting superfluous.* Under no circumstances can Nuffield Exports Ltd. recognise any trouble consequent on interference with these bearings by owners. Any attention required to connecting rods should be entrusted to a competent Morris Dealer.

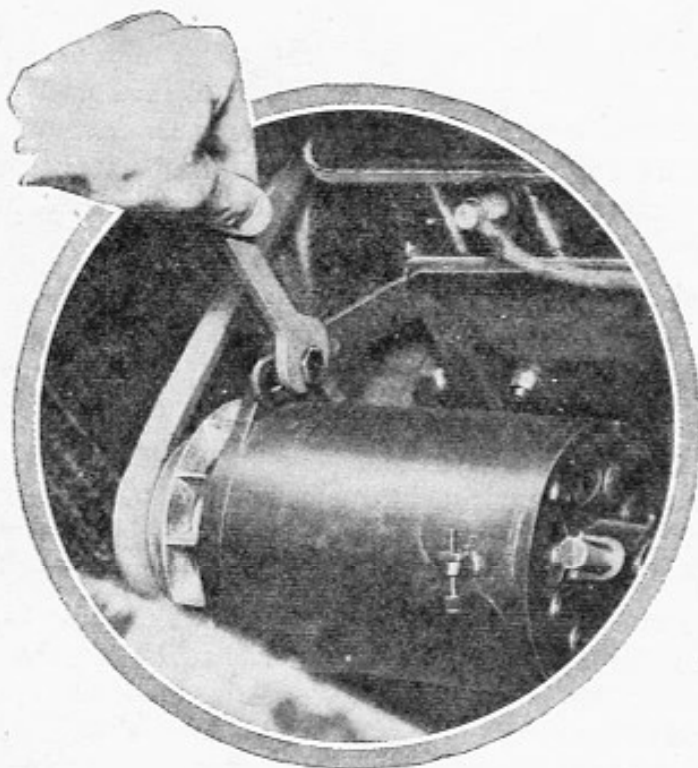
The correct working clearance between the big-end bearing and the crankshaft journal is appreciable. The correct clearance is automatically allowed for in the machining process, and no hand work whatever is necessary or advisable. This relatively large clearance permits a substantial protective film of oil to exist between the bearing surfaces, and the connecting rod under these circumstances should fall quite freely in its journal when the big-end bearing is bolted up quite tight.

*It is important to note that when a connecting rod has been removed for any purpose it should be reassembled with the little-end clamp bolt on the opposite side to the oil pump.*

**Brakes** (see page 41).

### The Dynamo and Fan Belt

Morris Ten-Four cars are equipped with a cooling fan driven by belt from a pulley on the end of the crankshaft. The dynamo is mounted on the side of the cylinder block on an adjustable cradle and driven by the same belt. The belt tension may be adjusted by slackening the three bolts clamping the dynamo and moving the dynamo bodily outwards by hand until the required tension is



Fan belt adjustment is effected by raising the dynamo after slackening the bolt indicated by the spanner.

obtained. The dynamo cradle swings on its lower anchorage bolts and thus serves to adjust the belt tension. Tighten up the three bolts after adjustment, firmly re-locking it in position. Too great a tension on the fan belt is to be avoided as it places unnecessary load on the bearings. Only the tension obtainable by moving the dynamo gently by hand should be used.

**Dynamo** (see page 73).

**The Ignition** (for instructions see page 88).

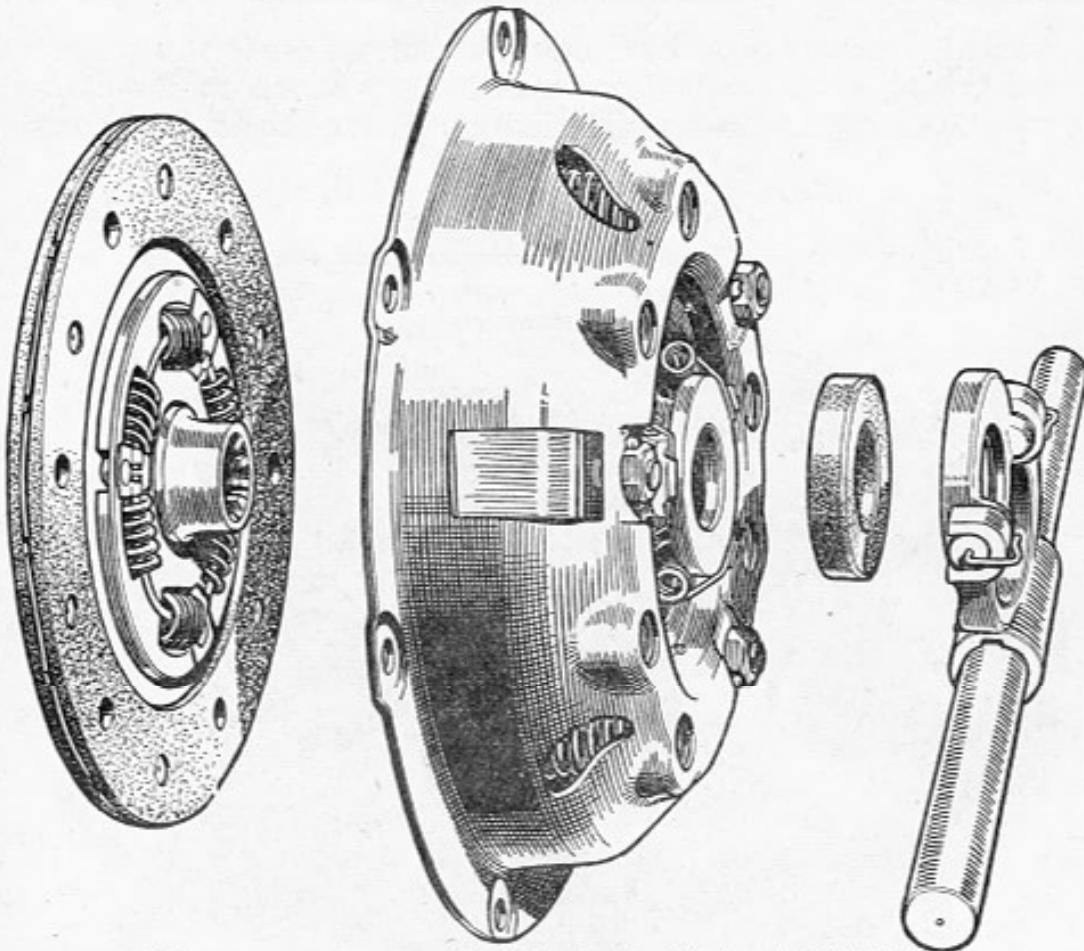
### Clutch and Clutch Pedal

The clutch is intended to run dry, and persistent slipping of the clutch is usually an indication that oil has found its way into the clutch compartment, in which case it will be necessary to ascertain



the cause. Since this entails the removal of the gearbox and expert diagnosis you are advised to entrust this work to your nearest authorised Morris Dealer.

If the clutch is allowed to slip continuously the centre driven plate very quickly becomes excessively hot, and the heat and friction will very soon destroy the surface of the fabric facings.



The component parts of the Morris Ten (Series " M ") clutch.

The clutch of the Morris Ten Series " M " is correctly adjusted at the Works before the car is delivered. In the early life of the car, however, a certain amount of bedding down of the friction surfaces takes place, which will permit the pressure plate to take up a position nearer the withdrawal mechanism, and thus reduce the necessary clearance between the withdrawal lever plate and the thrust bearing. If this clearance is completely taken up, the clutch cannot be fully engaged and clutch slip is produced, which rapidly wears the friction lining and further aggravates the trouble.

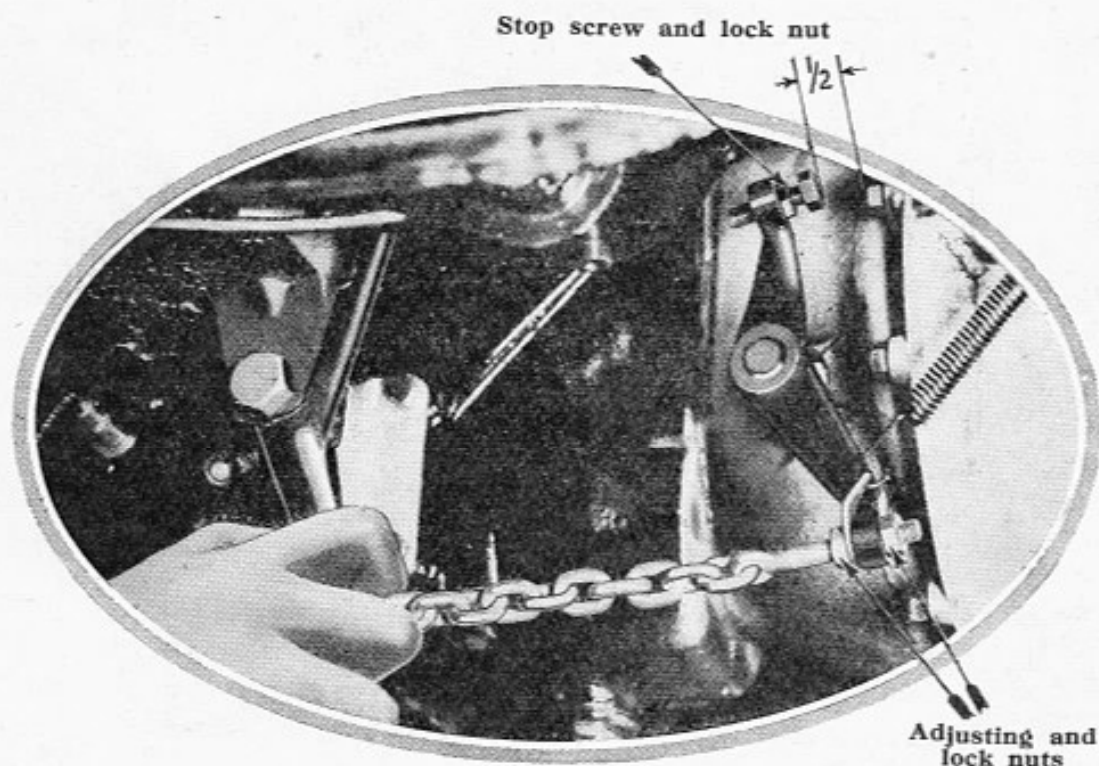
The maintenance of an adequate clearance between the thrust bearing and the release lever plate is an absolute necessity and is the only service attention required by this type of clutch.

The minimum clearance between the withdrawal lever plate and the face of the thrust bearing is  $\frac{1}{16}$  in. (1.58 mm.), which gives a free movement of  $\frac{1}{2}$  in. (12.7 mm.) at the clutch pedal, which should always be maintained.

When the clutch pedal free movement becomes less than this figure, it is essential to make use of the adjustment provided at the base of the actuating lever, so that it has ample clearance.

The adjustment consists of an adjusting nut and lock nut on the bottom end of the clutch actuating lever, and care should be taken to tighten up the lock nut firmly after adjustment.

In addition, care must be taken to see that there is not excessive pedal travel, as this will throw unnecessary strain on the carbon thrust block, leading to its early failure. There should not be more



The lower arrows indicate the nuts by means of which the clutch pedal position is adjusted. The set screw indicated by the upper arrow is the pedal stop and should not be interfered with, except when considerable wear has taken place. When checking the stop screw clearance the carbon block should be kept in contact with the thrust ring by pulling lightly on the lower end of the clutch pedal as shown.

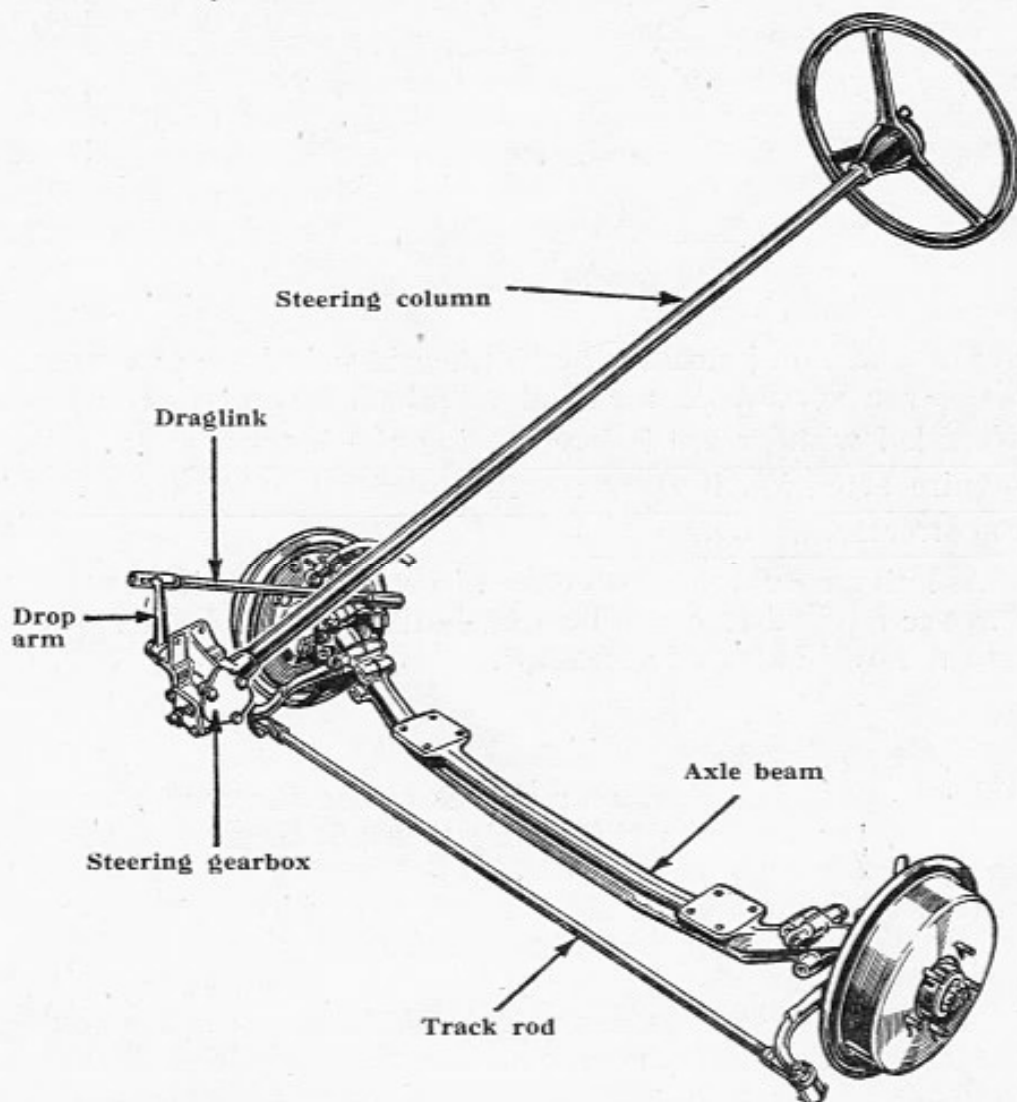
than  $\frac{1}{2}$  in. (12.7 mm.) clearance between the pedal arm and its stop screw when the pedal is lightly held with the carbon block in contact with the thrust ring by pulling lightly on the lower end of the clutch pedal. Need for this adjustment will be indicated when there is a tendency for the engine to stop when the clutch pedal is fully depressed.

The thrust bearing consists of a solid graphite block and therefore requires no lubrication, but it may be damaged if there is too much clutch pedal travel.

### Steering Gear

The presence of stiffness in the steering gear can be ascertained by jacking the front axle so that both the front wheels are clear of the ground, and rotating the steering wheel.

If stiffness exists, disconnect the front end of the draglink from the steering drop arm. It will then be an easy matter to locate if the stiffness is due to the wheel mounting and steering connections, or whether it is due to stiffness in the steering column and steering gearbox assembly.



The Morris Ten-Four steering gear assembly.

Stiffness in the wheel mounting and steering connections is usually due to lack of lubrication and should disappear immediately the steering joints have received an adequate charge of oil.

Slackness in the steering column assembly is due either to excessive clearance between the cam and the hardened end of the rocker-shaft, or end play in the steering column mounting.

The presence of end play on the steering column is easily ascertained by lifting the steering wheel in line with the column itself.

Any appreciable motion in this direction needs rectification inside the steering gearbox—a procedure which should be entrusted to a competent Morris Dealer.

If slackness is due to lost motion between the cam and the end of the rocker-shaft this may be rectified by removing the side cover-plate and removing one or more of the thin brass shims to be found between this cover-plate and the main casing. The cam gear is made so that there is *no appreciable backlash* at the outer end of the drop arm *when the gear is in the mid position*, although a varying degree of backlash is present in other positions of the drop arm.

Whenever reconnecting the drop arm to the gearbox spindle, should it be removed, care should be taken to see that the drop arm is in its correct position, permitting full lock in both directions, the wheel stub axles coming into contact with the stops provided on the axle beam in either direction. The drop arm and rocker spindle shaft are marked to facilitate their correct replacement.

### Front Wheels

These run on journal type ball bearings and are protected from dirt by a special dust excluder and oil retainer. The bearings are filled with grease before leaving the Works, and should not require attention if their routine lubrication has been attended to correctly. (See page 53.)

As hub removal entails the use of a special hub withdrawing tool, you are advised to consult an authorised Morris Dealer whenever hub removal becomes necessary.

### Rear Axle

The Morris Ten-Four rear axle is of the three-quarter floating type, where the driving shafts only transmit the driving torque but do not carry any of the load. The bearings are therefore not mounted on the driving shaft itself, but on the extension of the axle casing; and the wheel hub, with driving shaft attached, can be readily withdrawn.

Since withdrawal of the hub and rectification of oil leakage past the oil retaining device entails the use of a special hub withdrawing tool, you are advised to entrust this work to an authorised Morris Dealer.

### Bodywork Adjustments

*Lock Striker.*—The plate on the body pillar against which the bolt of the lock strikes, and the plate in which the pin on the door locates, are both adjustable, so that should the lock show signs of looseness owing to wear, this can be compensated for by adjusting the plates. To test whether this is necessary, shut the door, press the outside door handle inwards and then pull outwards. If the lock bolt can be felt hitting against the inside face of the striker-

plate on the outward pull, the plates should be adjusted. The striker and pin socket each consist of a back plate, fixed to the inside of the body pillar, and a top plate attached to it by two countersunk-headed set screws, so that adjustment can be effected. The two parts have their abutting faces serrated, and by loosening the set screws and moving the top plate inwards one or more serrations as required, the necessary adjustment can be effected, afterwards re-tightening the set screws. The lock striker-plate should first be set correctly and then the pin socket-plate moved so that it fits well up the pin.

### Wheel Hub Discs

The discs protecting the wheel stud nuts and hubs are held in position by a spring device and are easily removed by inserting the screwdriver end of the wheel brace in the slot provided between the disc edge and the wheel, and levering it off.

### Timing Marks

To facilitate checking the ignition and valve timing, when necessary, the crankshaft fan belt pulley is provided with a hole which coincides with a small arrow, stamped on the timing chain cover, at top dead centre position for cylinders Nos. 1 and 4.

### WHEN IN COMMUNICATION WITH THE WORKS

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Oxford Telex 7168*

*When writing ALWAYS quote model, engine  
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