7/39

BMW AG

MANUAL

FOR THE

BMW MOTOR CYCLE R 23

MANUAL

FOR THE

BMW ONE-CYLINDER

MOTOR CYCLE R 23 (250 c.c.)

BAYERISCHE MOTOREN WERKE AG. – MUNICH 13

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Contents

Codes: ABC 5th and 6th Edition and Rudolf Mosse.
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Controls

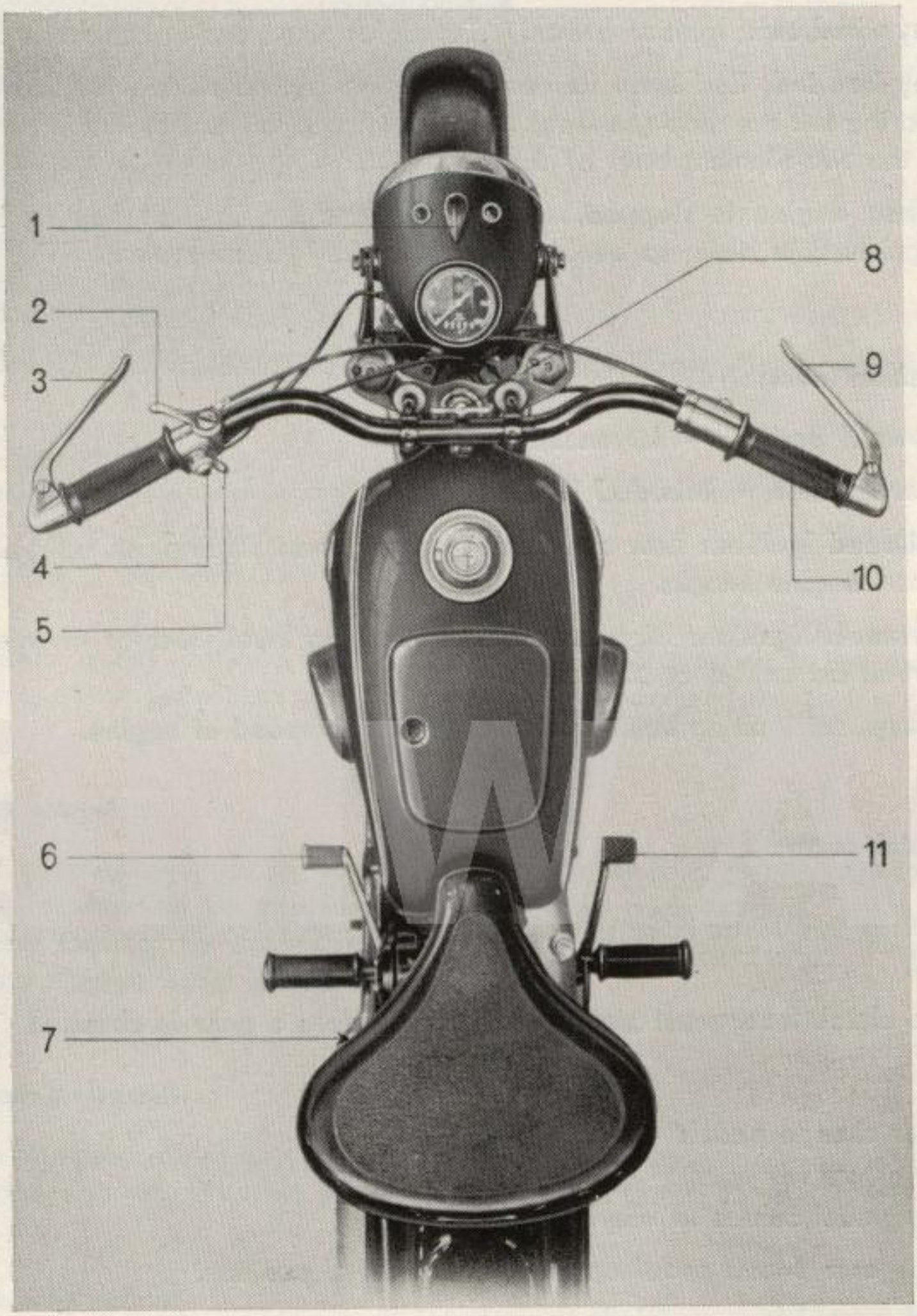


Fig. 1

1. Ignition key
2. Ignition lever
3. Clutch lever
4. Button for horn
5. Dimming switch
6. Gear change pedal
7. Kick starter
8. Steering damper
9. Hand brake
10. Rotary grip gas control
11. Foot brake

1. Ignition key:

Key withdrawn: Ignition current is cut off, engine stops or cannot be started.

Key inserted: Red lamp flashes up, engine can be started. By turning the key to the left the stop (parking) lamp is switched on and by turning it to the right the two-filament bulb of the headlight.

When engine is stopped, always withdraw the ignition key (red lamp extinguishes) **in order to avoid damage to the ignition system.**

2. Ignition lever:

Forward position = **Advanced ignition.**

Rear position = **Retarded ignition.**

Retarded ignition: Low speed of engine (when starting, on up-gradients) or when engine knocks.

Advanced ignition: High speed of engine (on level road, or when engine is revved up on 1st or 2nd gear).

Always set ignition lever in accordance with speed of engine.

3. Clutch lever:

Pulling this lever interrupts the power transmission from engine to rear wheel.

The clutch lever must always be pulled before a gear is changed.

4. Gear change pedal:

This pedal serves to change the gears.

1st gear: Move pedal upwards from neutral position.

2nd gear: Move pedal downwards to stop.

Top gear: Move pedal downwards past stop.

When **changing to slow** (from top to 2nd and from 2nd to 1st gear) the pedal must be moved upwards accordingly.

Before **changing to a higher gear** (from 1st to 2nd or 2nd to top) always declutch (pull clutch lever on handle bar) and shut off gas by turning rotary grip at right end of handle bar. When **changing to slow,** declutch and slightly open gas control.

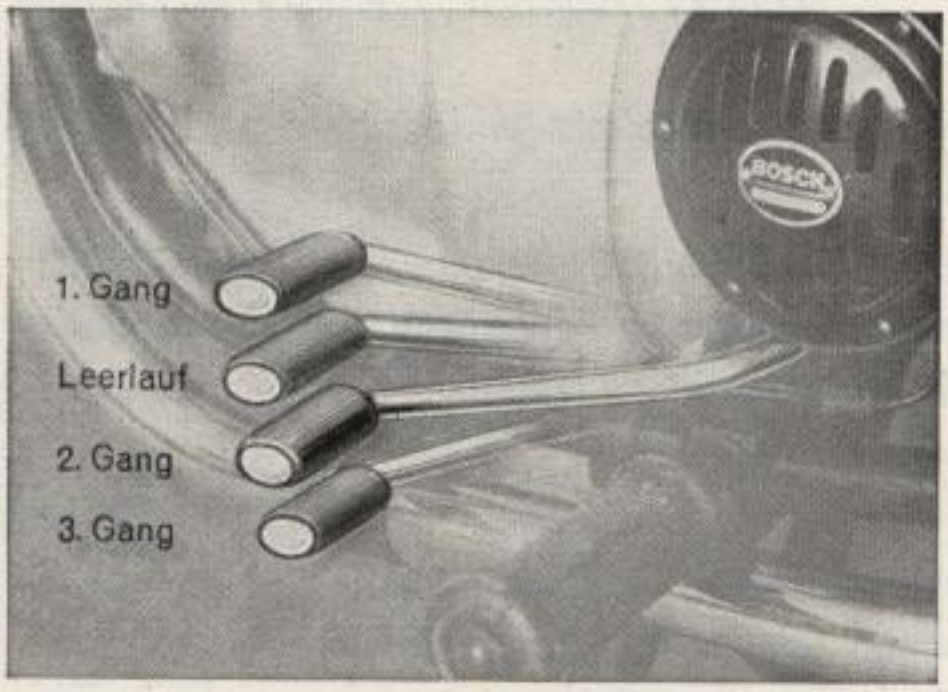


Fig. 2. Gear change pedal

1. Gang = 1st gear
Leerlauf = Neutral position
2. Gang = 2nd gear
3. Gang = Top gear

If there is any difficulty in switching in the 1st gear, push the machine forwards, at the same time pulling the pedal upwards, until the gear engages.

5. Kick starter:

The engine is started by forcibly depressing the kick starter. The **ignition must of course first be switched on** and the **fuel cock opened.**

When starting the engine, always see to it that ignition is retarded and the gear change pedal is in the neutral position.

6. Steering damper:

The damping effect is increased by turning the damper screw in a clockwise direction. High speed and poor roads necessitate increased damping.

7. Dimming switch:

This switch controls the **dimming light** and the **distance light** of the two-filament bulb. The ignition key must of course be first set to the appropriate position.

8. Hand brake:

This lever actuates the front wheel brake by means of a cable. **This brake should be used only in conjunction with the foot brake.**

9. Rotary grip gas control:

Turning this grip towards the rider opens the gas slide valve and turning it away from the rider shuts off gas.

During the **running-in period** the opening of the gas valve is **limited by a stop** in the carburettor. **Therefore never try to force the grip beyond the point where resistance to motion is felt.**

10. Button for horn:

When the ignition key is inserted, the **electric horn** can be operated by pressing on this button.

11. Foot brake:

This pedal actuates the rear wheel brake through the medium of rods. **Never apply the brake harshly** so that the wheel jams, i. e., stops rolling; the braking effect is in this case comparatively small, the wear of tyres on the other hand extreme.

Short running instructions

BEFORE STARTING:

Replenish fuel:

Employ good quality petrol only, for which the engine is attuned.
Capacity of tank: about 10 litres ($2^1/_4$ gallons).

Check oil level:

The oil should reach to the upper mark on the oil gauge rod (on no account fill in more oil) and must **never be allowed to sink below the lower mark.**
The oil gauge rod should be pushed in but not screwed in.
In summer: Gargoyle Mobiloil BB.
In winter: Gargoyle Mobiloil Arctic.
Renew oil every 1300 miles (see also under heading "Running-in Period").

Check tyre pressure:

	Front	Rear	
Solo	20	20	lbs. p. sq. in.
With companion	20	27	lbs. p. sq. in.

STARTING THE ENGINE:

Open fuel cock:

This cock has three positions: Z = closed, A = open, R = reserve.

Insert ignition key:

Red lamp flashes up.
When engine is stopped, the ignition key should always be withdrawn (red lamp extinguishes).

Adjust ignition lever and open gas control:

When engine cold, retard ignition, open gas control slightly and **depress tickler** of carburettor.
When engine warm, retard ignition, open gas control slightly, but **do not depress tickler.**

Start engine with kick starter:

Depress kick starter with short and powerful strokes.

Allow engine to warm up before moving off:

This is important, as otherwise excessive wear of cylinder will result. **Let engine warm up on medium speed, never with gas control fully open.**

ON THE ROAD:

Declutching:

Pull lever at left end of handle bar.

Changing gear:

Employ 1st gear when starting and on steep gradients, both up and down hill, in the latter case braking with engine.

2nd gear in congested traffic and on medium gradients, both up and down hill.

Top gear on the open road and on light gradients.

Changing gear from slow to fast (1st to 2nd or 2nd to top):
Close gas control, declutch, shift pedal.

Changing from fast to slow (top to 2nd or 2nd to 1st):
Open gas control slightly, declutch, shift pedal.

Letting in the clutch:

Release clutch lever **gradually** and at same time **slightly open** gas control.

Adjust ignition:

The higher the speed of the engine, the more should the ignition be advanced.

Retard ignition when engine is started, when engine is running slowly, on hills and when engine knocks.

The following maximum speeds should never be exceeded:

	1gear	2nd gear	Top gear	
0 to 600 miles:	**5**	**15**	**30**	**m. p. h.**
600 to 1200 miles:	**10**	**20**	**40**	**m. p. h.**
and after:	**20**	**40**	**up to 60**	**m. p. h.**

STOPPING:

Shut off gas.

As soon as machine has slowed down, declutch and apply brake gradually.

Shift gear change pedal to neutral position.

Stop engine by withdrawing ignition key.

Close fuel cock (position "Z").

The Running-in Period

is of the greatest importance for the life and trouble-free service of the machine. It is therefore in your own interests to pay careful attention to the following instructions:

Maximum admissible speeds:

0 to 600 miles		600 to 1200 miles	
1st gear:	**5 m. p. h.**	**1st gear:**	**10 m. p. h.**
2nd gear:	**15 m. p. h.**	**2nd gear:**	**20 m. p. h.**
Top gear:	**30 m. p. h.**	**Top gear:**	**40 m. p. h.**

(The above speeds refer to solo riding on level roads.)

In order to have a certain guarantee that these speeds are not exceeded, a sealed limit stop is fitted to the carburettor. This stop will be **shortened after the first 600 miles** and **removed after another 600 miles** by the next BMW agent.

Unauthorized adjustment of this stop or interference with the limit stop seal or the seal on the speedometer will result in cancellation of the guarantee.

The above speeds are maximum speeds and should never be exceeded. It is of course neither necessary nor desirable to always open the gas control as far as the stop permits; on the contrary, the best way to run in engine and all parts of the machine is to ride a short distance (about 500 yards) with the admissible maximum speed and then to close the gas control and to let the machine roll and to keep on repeating this process.

Even after the first 1200 miles have been completed we strongly recommend at first not to ride long distances with the maximum speed, but to gradually increase the average speed until the machine has done about 2000 miles.

After the running-in period the following speeds **should not be exceeded** in the individual gears:

1st gear	2nd gear	Top gear
20	40	up to 60 m. p. h.

The above speeds are by no means the highest **attainable** speeds, they are, however, based on the highest admissible engine speed and **going beyond these speeds,** for instance, on down-gradients, would mean an **inadmissible overrevving of the engine.**

Lubrication:

During the running-in period special attention must be paid to engine lubrication. **After every 300 miles** the oil in the crankcase must be entirely drained off at the drain screw of the oil well, the engine rinsed with **scavenging oil** (but in no case with petrol or petroleum) and fresh oil filled in to the **upper mark of the oil gauge rod. The oil in the gearbox and in the rear axle housing** must be entirely drained off at the end of the running-in period and fresh oil filled in until the oil level reaches to the screw threading of the filling-in hole.

Lubricants:

Employ only **good brands of oil** which guarantee uniformity of quality. The choice of lubricant should be made according to viscosity; we recommend:

Engine:	**Summer:**	Gargoyle Mobiloil BB,
	Winter:	Gargoyle Mobiloil Arctic.
Transmission gear:		Gargoyle Mobiloil BB.
Rear axle housing:		Gargoyle Mobiloil Ep.
Spring fork:		Gargoyle Mobiloil BB.
Frame:		Gargoyle Mobilgrease No. 5.

Changing Tyres:

Disassembling the front wheel:

It is recommended to place a block of wood or the like under the engine housing so that the front wheel is free of the ground. Clamp screw (**1**) at the end of the left fork half must now be slackened and axle (**2**) screwed out by turning in a **clockwise** direction (left-hand thread). When axle (**2**) has been entirely screwed out, the front wheel can be removed.

Fig. 3. Disassembly of front wheel

When again assembling the front wheel, care must be taken that the noses on the brake cheek holders engage properly with the appertaining grooves in the fork half end. After axle (**2**) has been screwed in and tightened up, the front fork should be forcibly sprung up and down several times, after which, and not before, clamp screw (**1**) at the end of the left fork half must be tightened up.

Disassembling the rear wheel:

Prop the machine up on the rear wheel crutch and remove cap screw **(1)** and seal ring **(2)** from the Cardan housing cover. Now unscrew the nut of axle **(3)** on the exhaust side and press the axle out. If the axle turns with the nut, switch a gear in. After the axle has been withdrawn, remove the distance sleeve on the left side of the wheel between wheel hub and bearing bush and pull the wheel to the left (looking towards the front) out of the spur gear and off the brake cheeks. Now tilt the machine over and withdraw wheel towards the rear.

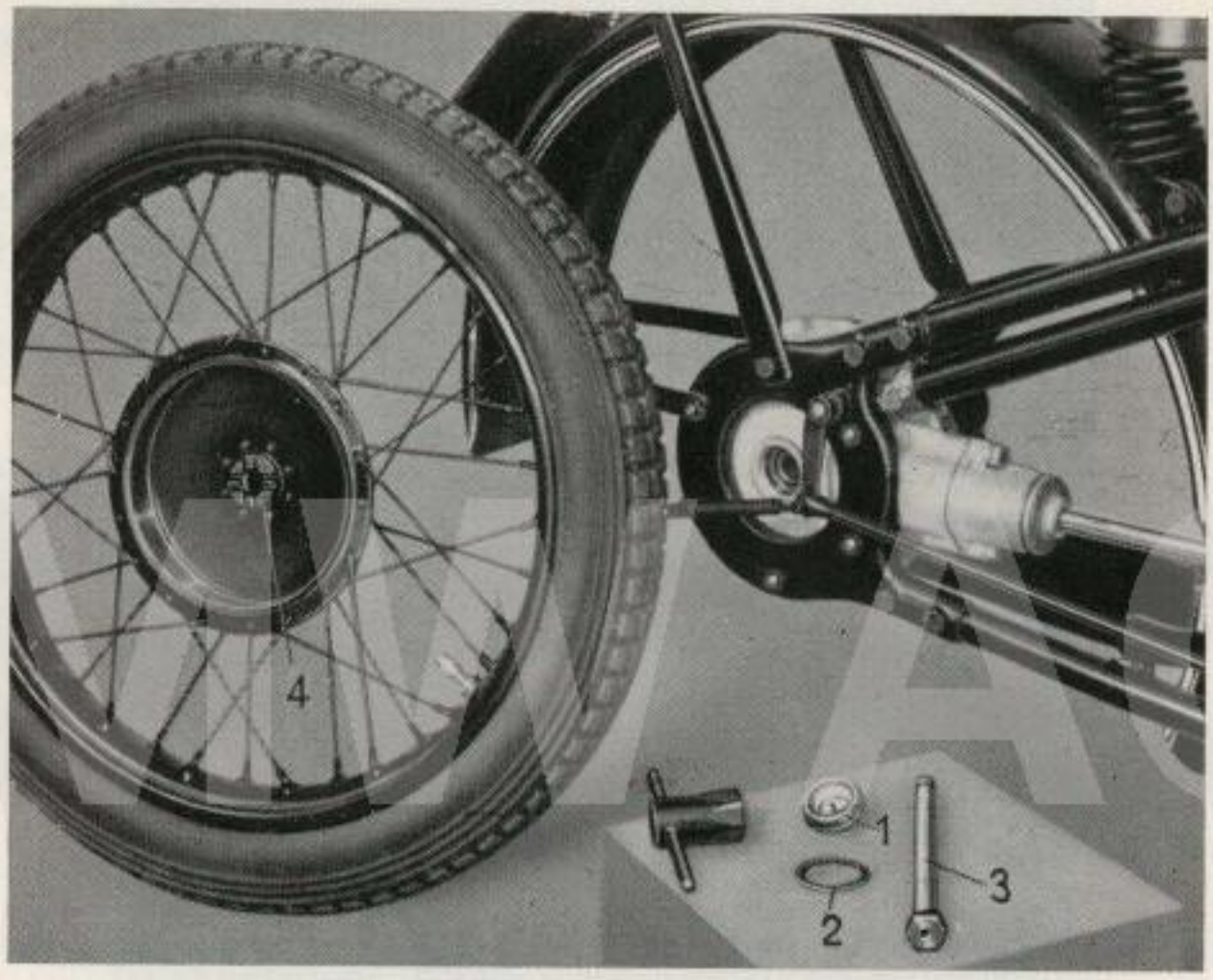


Fig. 4. Disassembly of rear wheel.

Caution: Never lay parts ot the axle and especially the driver toothing (4) on the ground in dust or dirt. Before reassembling clean all parts carefully and grease slightly.

Cleaning the Carburettor

It may happen, especially in a new machine, that in spite of unchanged position of the gas control the speed of the machine suddenly decreases, or the engine suddenly stops or will not start. If the **fuel cock is open** and there is **sufficient fuel in the tank,** this fault is generally to be sought in **clogging of the fuel pipe or the main jet.**

Fig. 5.
Cleaning the fuel cock

To remedy this fault, proceed as follows: Slacken screw **1** (Fig. 6) when the fuel cock is closed, after which the fuel pipe can be removed from the float housing (**5**). Now open the fuel cock on the tank and check whether fuel is flowing freely to the carburettor. If this is not the case, the shut-off cock must be dismantled and strainer (**3**) in the cock as well as the water retainer part (**2**) thoroughly cleaned. If all these parts are in order, but the faulty operation of the engine still continues, the carburettor must be disassembled and cleaned.

Screw **1** (Fig. 6) is slackened and the fuel feed pipe removed from the float housing (**5**). After loosening holding screw (**2**), the float housing itself can be removed from the carburettor body (**3**). Jet (**4**) now becomes accessible and can be screwed out and cleaned. **Cleaning the bore of the jet should be done by sucking at it or with the help of a horsehair or the like. In no case should a hard pointed object, such as a needle, be employed to clean the jet.**

To clean float housing (5), cover **(6)** must be screwed off after loosening clamp screw **(7)**. Float needle **(8)** can now be pushed down and out and float **(9)** drawn out, after which the float housing **(5)** can be cleaned.

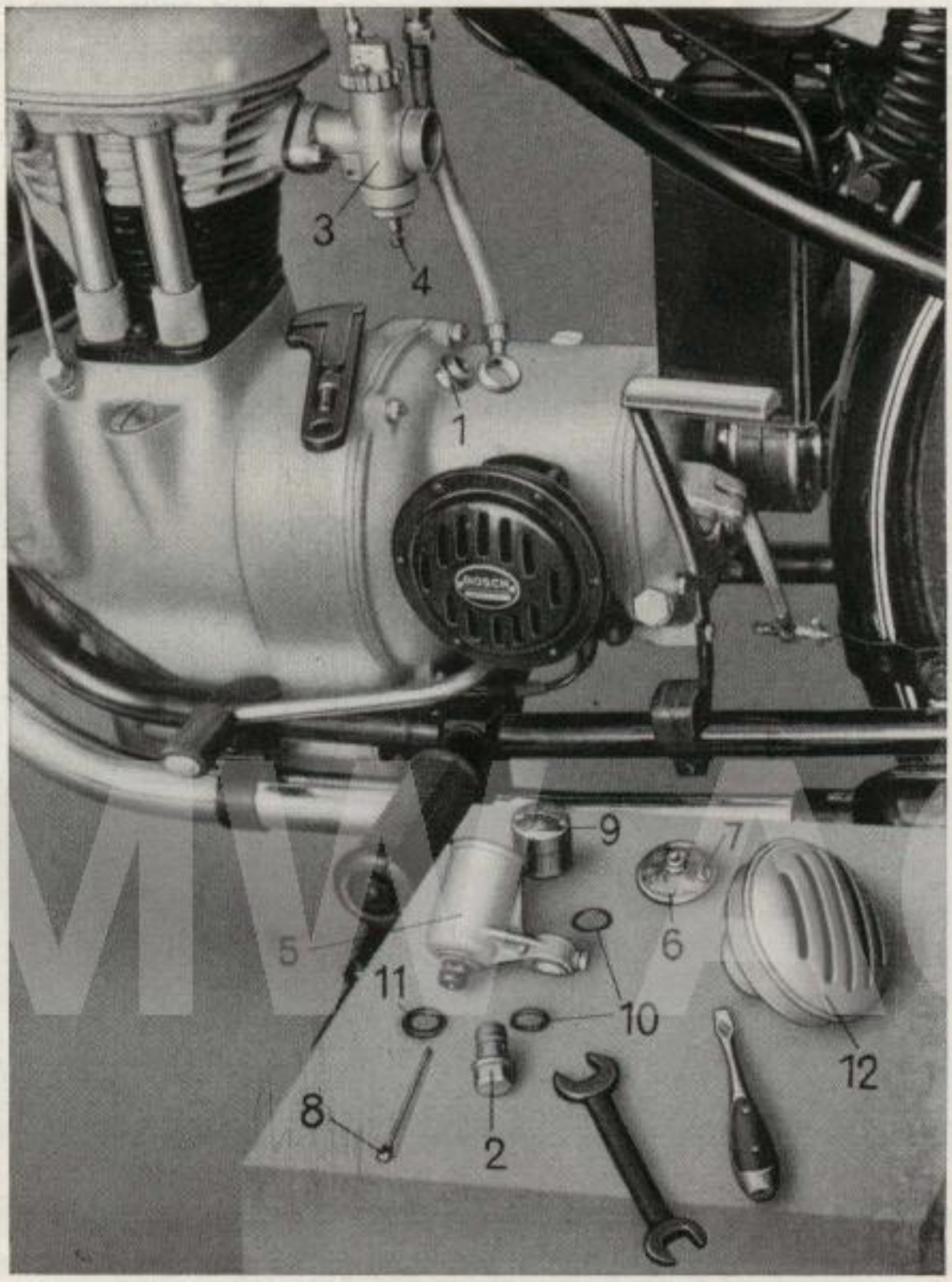


Fig. 6. Cleaning the carburettor

When reassembling, care must be taken that gaskets (10) on the float housing arm and gasket (11) between the float housing and the fuel feed pipe are not forgotten.

Wet air filter (12), which is attached to the suction connection of the carburettor, should also be removed from time to time after loosening the clamp screw, rinsed with petrol, then dried and dipped in thick engine oil. To prevent fouling of the sparking plug, remove all superfluous oil by swinging the filter at arm's length.

Care of the Machine

1. Lubrication:

Proper lubrication of engine and frame is of the greatest importance and it is in the interests of every owner of a BMW cycle to lubricate his machine at regular intervals according to the instructions given in the **„Lubrication Chart"** contained at the end of this Manual. **Also pay special attention to the rules given on page 10 for the running-in period.**

The **oil level in the engine** should be checked regularly **when tanking** and **at latest after every 250 miles** on the road. When necessary, oil must be added up to the prescribed level. The oil level is checked with the help of the oil gauge dip rod with hexagon head at the right side of the engine. The oil should reach to the upper mark on the rod. **Care must be taken not to fill in more and also never to let the oil level sink below the lower mark on the rod.** When checking the oil level, do not screw the plug in, but simply insert the rod as far as the threads.

2. Maintenance:

Proper care of engine and frame is indispensable for reliable service and permanent efficiency of the entire machine.

1. Engine:

Never let the engine run idle at high speed and never try to force a hill on top gear.

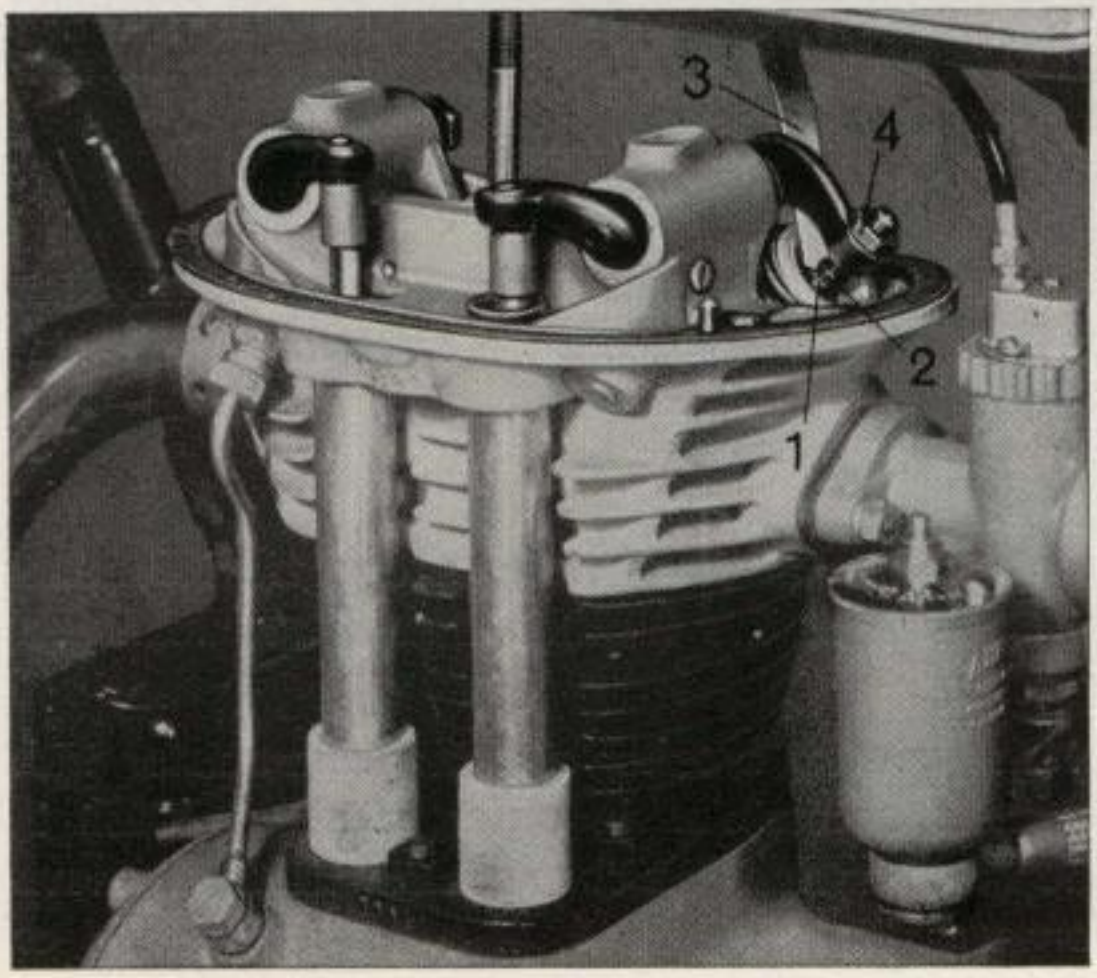


Fig. 7.
Adjusting the valve clearance

Therefore always change to the next lower gear before the engine speed falls too low; operation, even for long periods, on the lower gears is in no way harmful either to engine or transmission. From time to time the **fastening screws of the engine** and the **cylinder head screws** should be tightened up. At longer intervals the valve clearance should also be checked. When the engine is cold, the valve clearance should be about 0.1 mm (.004") or the thickness of notepaper.

To **check and readjust the valve clearance** the hood must be removed after slackening the fastening screw.

Now shift the kick starter slowly by hand until the rocker of the valve under observation moves neither up nor down. In this position the valve is closed and the clearance between valve stem end **1** and set screw **2** should then be 0.1 mm or .004". With the help of a strip of notepaper, which has approximately the above thickness, the clearance can be easily checked. When necessary, the clearance must be readjusted, to do which lock nut **4** is slackened, the proper clearance adjusted with the help of set screw **2** and lock nut **4** again tightened up. Now repeat this process with the second valve.

Adjustment of valve clearance must be undertaken only when the engine is cold.

After about 6000 to 10000 miles on the road (in case of trouble perhaps earlier) the **valves should be checked for good seat** and, if necessary, **newly ground in.** The seats of the valves and valve heads must always be perfectly smooth and they must close tightly. Grinding in of the valves should be entrusted to one of our service depots; it is recommended to have the carbon deposit inside the cylinder head removed at the same time.

2. Care of ignition system:

Reliable service of the engine is in great part dependent on the condition of the ignition system. Regular attention to battery, sparking plugs, contact breaker and dynamo is therefore indispensable.

a) Battery:

The battery is delivered **uncharged** and **without acid.** Before the machine can be put into service, the battery must therefore be removed, filled with chemically pure battery acid and then charged.

b) Dynamo:

The carbon brushes and commutator of the dynamo should be inspected regularly after about every 3000 miles. The brushes should be clean and must move easily in their guides.

After removal of cover **1** the contact breaker and the commutator with the two carbon brushes becomes accessible. In order to check brush **2**, lift spring **3** which presses the brush against the commutator and try to move the brush backwards and forwards in the guide **4**. If a brush is fouled or

jams in its guide, it must be taken out and cleaned with a clean cloth and petrol. At the same time blow through guide **4** so as to remove any dirt. **Under no circumstances should the contact surfaces of the brushes be treated with emery paper or with a file.** When a brush is worn down so far that its copper flex abuts against the recess of guide **4**, it must be replaced by a new brush.

The second carbon brush, which is arranged vertically below the commutator, must also be attended to in similar manner.

c) Contact breaker:

The **contact breaker** is located below cover **1**.

The gap between points **5** and **6** of the contact breaker must be **checked regularly after about every 3000 miles on the road.**

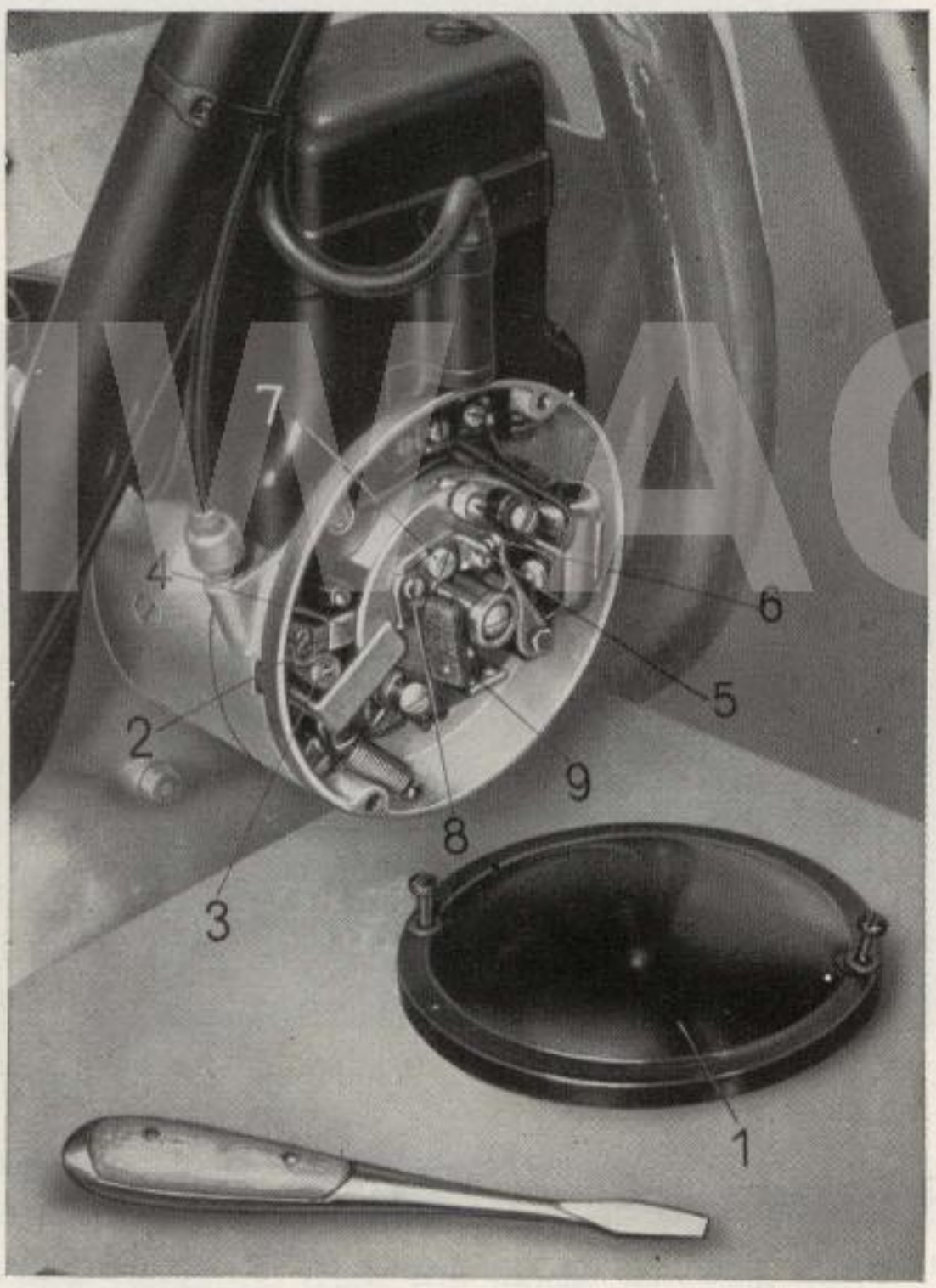


Fig. 8.
Dynamo and
contact breaker

When the circuit is broken, i. e., when the pressure piece of the contact breaker lever moves on to the raised portion of the cam, **points 5 and 6 should be 0.4 to 0.6 mm.** (.016" to .020") **apart.** If necessary, the gap can be readjusted with the help of point **5**.

To do this screw **7** must be slackened and eccentric set screw **8** turned until the correct gap is obtained. **Screw 7 must then be again well tightened up, because loosening of this screw would lead to ignition trouble.**

Every 6000 to 10000 miles clean the contact breaker points with a clean cloth and at the same time check whether they are pitted or burnt. Also apply a few drops of good quality oil to the felt lubricator **9** on the contact breaker shaft.

If the points are pitted or badly worn, they must be renewed at a "Bosch" Service Station.

Emery paper or emery cloth should never be employed to clean the contact breaker points.

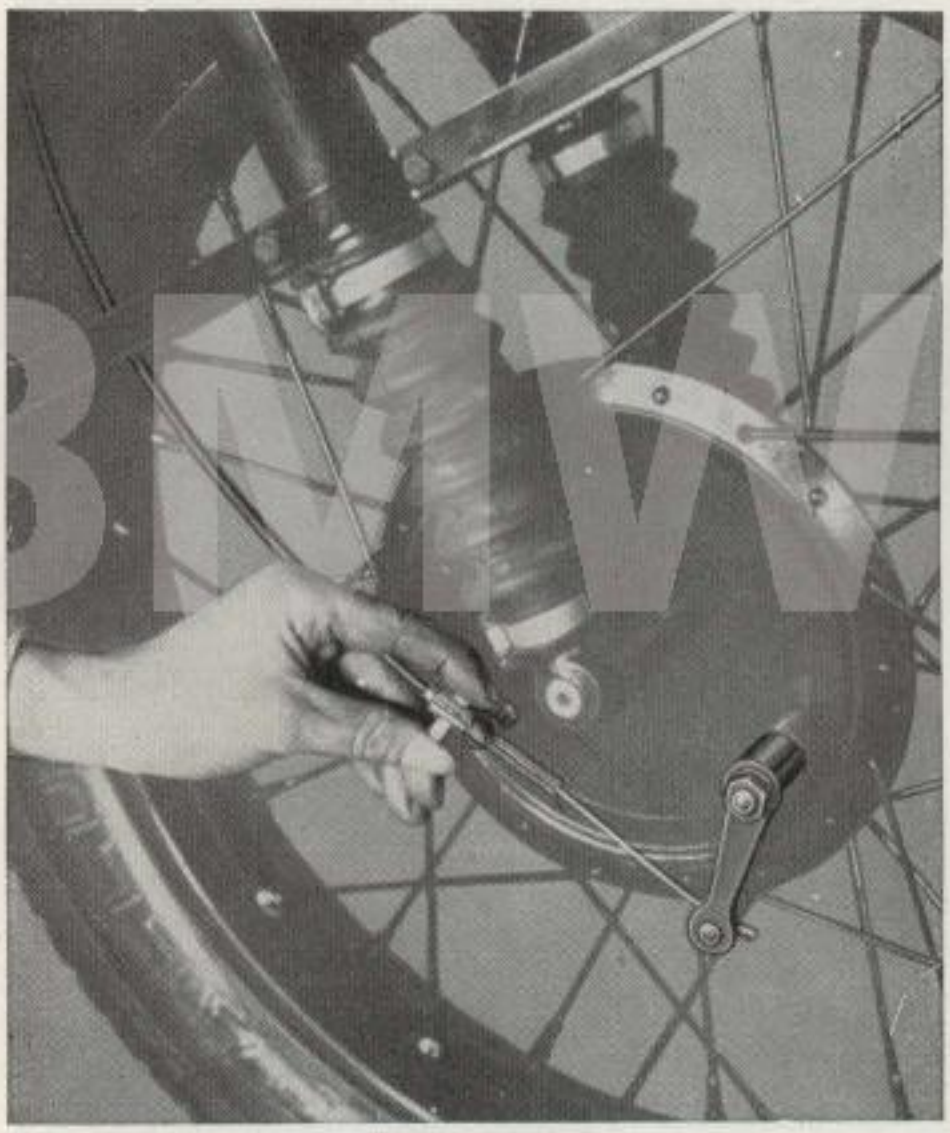


Fig. 9.
Readjustment of front wheel brake

3. Brakes:

Front and rear wheel are each equipped with an internally acting brake. The front wheel brake is operated by means of a Bowden cable and lever on the handle bar and the rear wheel brake by means of rods and a pedal.

Since the safety of the rider is in a high degree dependent on the condition of the brakes, they must always be kept in perfect working order.

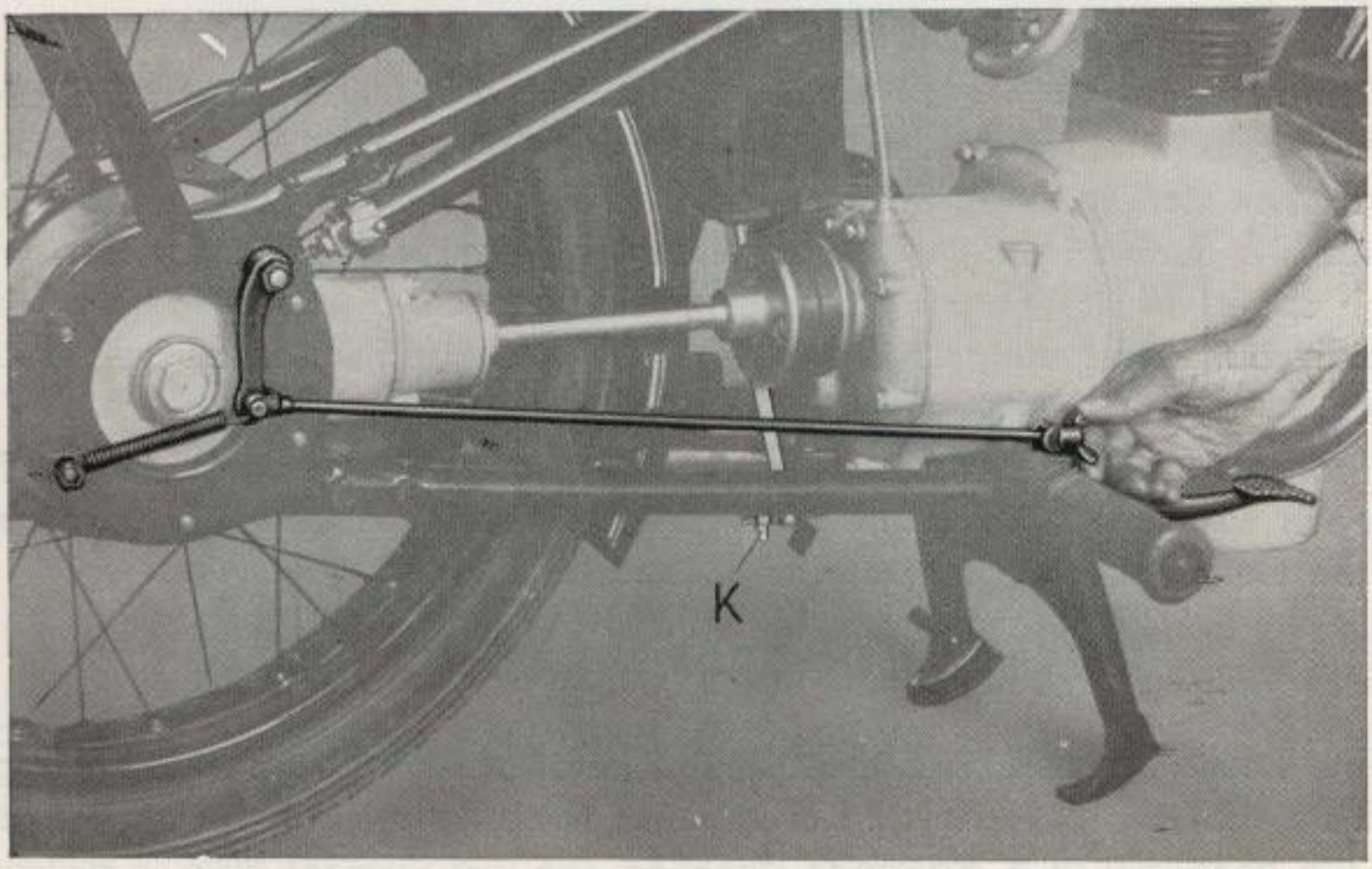


Fig. 10. Readjustment of rear wheel brake

Wear of the brake linings must from time to time be compensated by turning the screws provided for this purpose. In the case of the front wheel this is done by screwing the thumb screw in the centre of the brake cover a few turns out.

Adjustment of the rear wheel brake is effected by tightening up the thumb screw on the connecting rod.

When adjusting the brakes care must be taken that a **certain amount of play** remains between the beginning of the braking action and the rest position of the brake lever or pedal, as otherwise there is danger of the brakes dragging and heating up and thus becoming prematurely worn.

If after adjustment the braking effect is still insufficient, the brake linings are worn out and must be renewed.

When running down long hills, use the front and rear wheel brake alternately, so that each brake has time to cool down. It is a matter of course that **on all steep descents the power of the engine** in a low gear must be taken to aid.

Always apply the brakes gently, that is to say, exert pressure gradually, since the best braking effect is obtained when the wheel is still rolling and not when it drags.

4. Clutch:

The powerful single-plate clutch requires no lubrication, but on the other hand proper treatment of the clutch will considerably lengthen its life. Therefore when starting, open the gas control only slightly and engage the clutch gradually. Sudden and jerky engagement of the clutch in conjunction with high speed of the engine not only causes the clutch lining to wear very rapidly but also greatly stresses all parts of the transmission as well as the tyres.

From time to time the thumb screw on the cable must be adjusted so that there is always a certain amount of play between the point of engagement of the clutch and the rest position of the clutch lever.

5. Headlight and tail lamp:

The headlight contains a two-filament bulb for distance and dimmed light and an auxiliary bulb as stop or parking light. By turning the ignition key on the headlight **in a clockwise direction,** the two-filament bulb is switched on and by turning it in an **anti-clockwise direction** the parking light. The distance and dimmed light of the two-filament bulb are controlled with the help of the dimming switch at the left end of the handle bar.

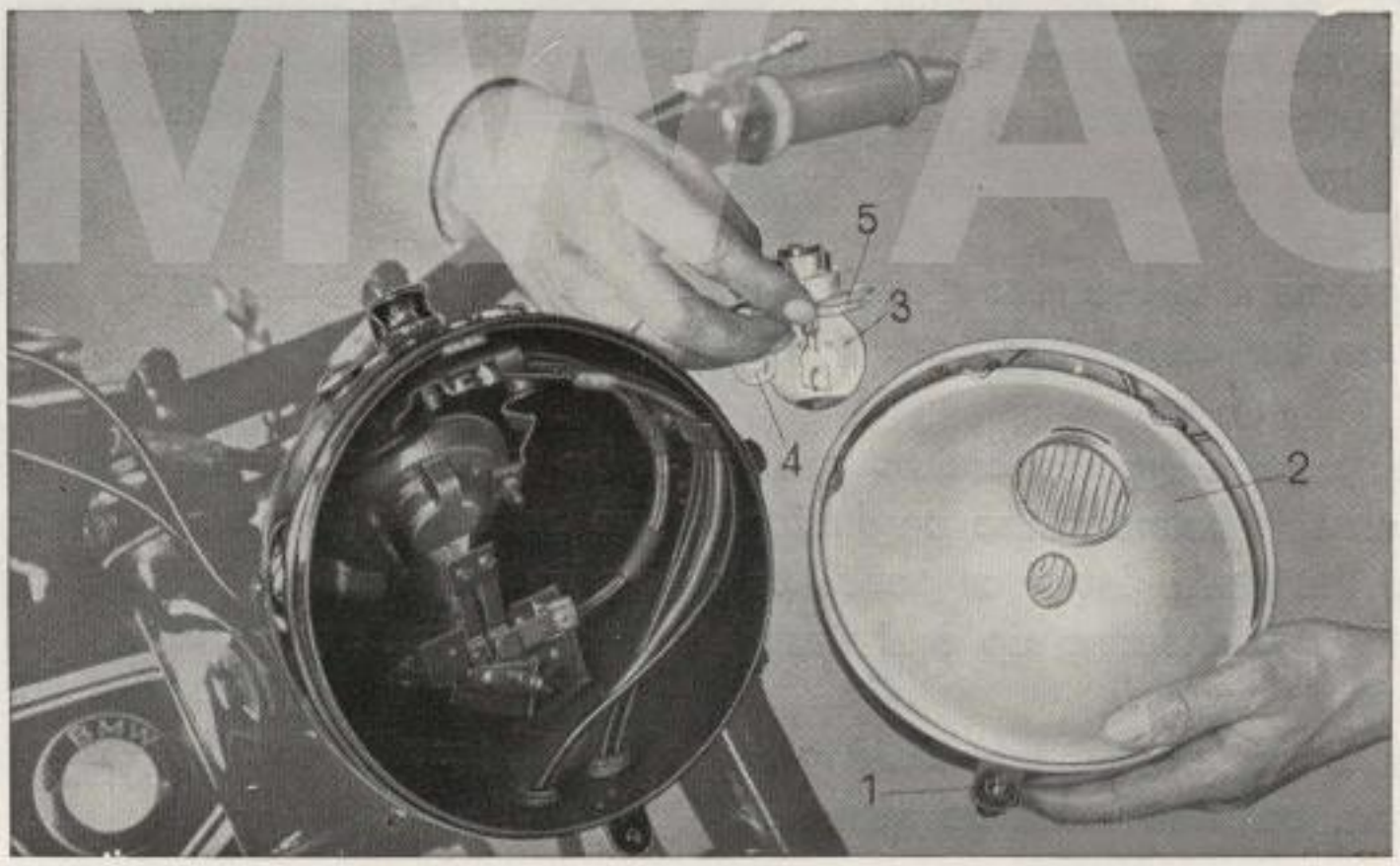


Fig. 11. Removing the bulb of the headlight

To exchange the bulb it is necessary to slacken the slotted screw **1** below the headlight. The reflector with glass and rim **2** can then be removed. The two-filament bulb **3** and the parking lamp **4** are fixed in the lamp socket **5** by a rotary catch. Lamp socket **5** is held in the centre of the reflector **2** by a simple clamp device.

Fig. 12. Removing the bulb of the tail lamp

Housing **1** of the tail lamp can be removed after slackening screws **2** and **3**. The bulb **4** is then accessible. This bulb is also fixed in its socket by a rotary catch.

Lock:

The eyes on the fork head and the lower fork bearing plate make it possible to secure the machine against unauthorized use with the aid of an ordinary padlock, which can be applied when the front wheel is turned as far as it will go to the left side.

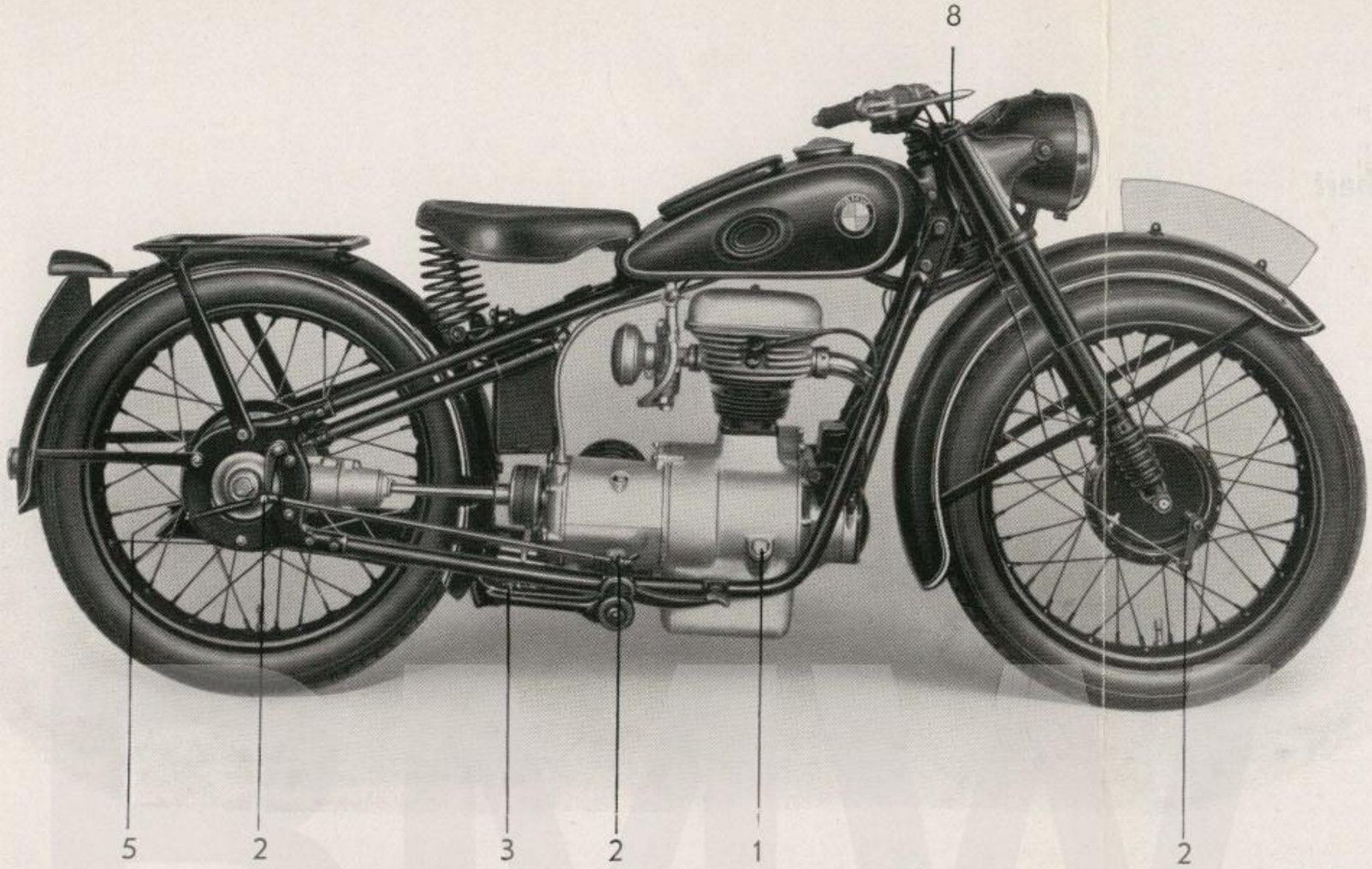
If you want your machine to operate reliably and smoothly, always have

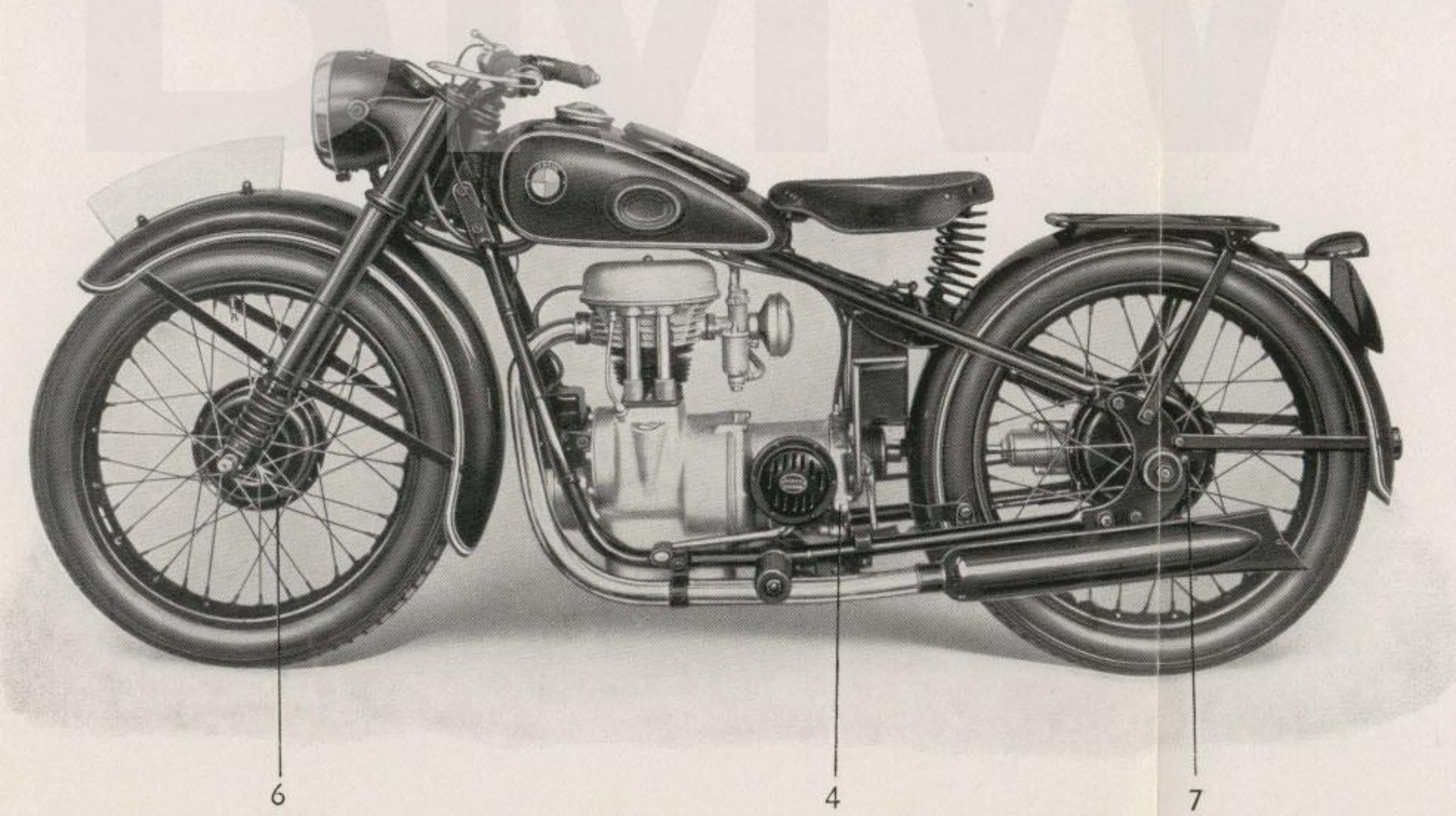
Original BMW Spare Parts

fitted.

The trade mark etched into every spare part is a guarantee for the same excellence of quality and fit as that of the original part.

Our trade mark BMW enables you to uphold the value of your machine.





Lubrication Chart:

1 **Engine:** Check oil level when tanking, at latest every **250 miles.**
Push gauge rod in, do not screw in.
Every 1200 miles drain off oil and fill in fresh oil.
Summer: **Gargoyle Mobiloil BB.**
Winter: **Gargoyle Mobiloil Arctic.**

2 **Brake joints:**
Lubricate **every 250 miles** with **engine oil.**

3 **Clutch lever:**
Lubricate **every 250 miles** with **engine oil.**

4 **Transmission gears:**
Check oil level **every 600 miles.**
Oil should reach to lower thread of filling-in hole.
Every 10000 miles drain off oil and fill in fresh oil.
Summer: **Gargoyle Mobiloil BB.**
Winter: **Gargoyle Mobiloil BB.**

5 **Rear axle housing:**
Check oil level every 600 miles.
Oil should reach to lower thread of filling-in hole.
Every 10000 miles drain off oil and fill in fresh oil.
Gargoyle Mobiloil Ep.

6 **Front wheel hub:**
Fill with grease gun **every 10000 miles.**
Gargoyle Mobilgrease No. 5.

7 **Rear wheel hub:**
Fill with grease gun **every 10000 miles.**
Gargoyle Mobilgrease No. 5.

8 **Front wheel fork:**
Drain off oil **every 10000 miles.**
Fill in about 1/3 pint **Gargoyle Mobiloil BB.**

	Check	Lubricate
Every 250 miles	1	2, 3
Every 600 miles	4, 5	
Every 1200 miles		1
Every 10000 miles		4, 5, 6, 7, 8

It is recommended to carry out all lubrication jobs at a tanking station, because all requisites, such as scavenging oil, grease gun, etc., are available there.

Lubrication Chart

BMW AG