December, 1950.

J A G U A R

S E R V I C E A N D S P A R E S O R G A N I S A T I O N

SERVICE BULLETIN NO. 73.

XK.120 MODELS.

BRAKE SHOE RATTLE - REAR BRAKES ONLY.

If complaints of rattle at the rear of the car are received check by noting if the rattle is eliminated when the handbrake is lightly applied.

Rattle can be caused by the rear brake shoes butting against the back plate on rough surfaces.

The fitting of beehive springs located through the rear brake shoes to the brackets on the brake back plate effects a cure.

PROCEDURE.

Parts Required.

Part No. 21686	Beehive Spring.	Qty. 4 per car.
Part No. 21728	Bracket.	Qty. 4 per car.

These parts will be issued "free of charge" against a request quoting the chassis number of the car to which they are to be fitted.

Fitting.

Remove the rear wheels, slack back the adjusters to zero position, centralise shoes by applying foot brake and remove brake drums without disturbing the position of the brake shoes.

Note the hole in the centre of each brake shoe web and mark relative position of the hole to the back plate by scribing through the hole on to the back plate.

Remove the brake shoes.

Fit the brackets supplied to the back plate with the right-angle end of the bracket away from the hub centre and in line with the scribed mark. This will position the bracket approximately in line with the edge of the recess in the back plate and attach in position on the raised portion of the back plate by welding or drilling and fixing with two 2BA screws through the back plate.

Refit the brake shoes.

Fit the beehive springs through the hole in the brake shoe web and rotate into engagement with the hole in the bracket. This is most readily carried out by making up a 'T' spanner from two pieces of 3/8" (9 mm.) rod welded together with a slot cut in the end of the rod to fit over the lateral section of the beehive spring wire.

Refit the brake drums and adjust the rear brakes.

January 1951
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J A G U A R

S E R V I C E A N D S P A R E S O R G A N I S A T I O N

SERVICE BULLETIN NO.89

MK.120 MODEL

BRAKE LININGS.

A change in the type of brake linings used on MK.120 models has been introduced on the following chassis numbers:

Right hand drive: 660551 and future

Left hand drive: 671097 and future

The linings now used are Mintex M.14, these linings having a lower co-efficient of friction than the Mintex M.15 linings fitted on earlier cars.

When M.14 linings are fitted in place of M.15 it will be found that the amount of pedal pressure to operate the brakes is some-what greater than previously and if certain customers, for example lady drivers, should desire lighter operation of the foot brake, this can be achieved in the following manner:-

Remove the brake pedal and fill up the existing hole in the brake pedal through which the clevis pin of the master cylinder push rod yoke passes. Mark off and drill a new clevis pin hole at 2.5/8" centres from the brake pedal fulcrum. Refit the brake pedal and ensure that the push rod is in line with the master cylinder, to achieve which is may be necessary to draw the holes in the tie plate through which the master cylinder fixing bolts pass, to allow the master cylinder to be repositioned.

April, 1952.

JAGUAR

SERVICE AND SPARES ORGANISATION

SERVICE BULLETIN NO. 106.

XK. 120 MODELS.

Self Adjusting Front Brakes.

From Chassis Numbers:-

Super Sports	RHD.	660900.
	LHD.	672040.
Fixed Head Coupe.	RHD.	669003.
	LHD.	679622.

and onwards, cars are fitted with self adjusting front brakes, and a tandem type master cylinder fed by a divided fluid supply tank. A different type of rear brake adjuster is also fitted, and it should be noted that the direction of rotation of the adjuster stud to adjust the brake shoes to the drum is opposite to that for the adjustment of the brakes on cars prior to the above chassis numbers.

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Description of System.

The system comprises a 1" tandem type master cylinder which operates two 1.1/8" single ended wheel cylinders on each front backplate and a 1.1/8" wheel cylinder on each rear backplate. Adjustment of the front brakes is automatic, but on the rear brakes is carried out through an adjuster which is accessible through a hole in the brake drums.

Rear Brake Adjustment.

Place chocks under the front wheels and jack up one rear wheel until it is free to revolve. Remove the wheel and revolve the brake drum until the hole drilled in it is in line with the adjuster stud which is positioned at the front end of the brake plate 30° above the horizontal. Insert a screwdriver and turn the stud in an anti-clockwise direction until both brake shoes bear hard against the drum. Then turn the stud the least possible amount (usually two clicks) in the opposite direction until the wheel is free to revolve.

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Repeat to adjust the brakes on the opposite rear wheel.

NOTE: The direction of rotation of the adjuster stud for adjustment of the rear brakes is opposite to the "Micram" adjuster fitted to cars prior to the chassis numbers quoted on Page 1 of this Bulletin.

Bleeding the System.

"Bleeding" the system - or expelling air - is not a routine operation and should be necessary only when some portion of the hydraulic equipment has been disconnected or when fluid has been drained off. As a tandem master cylinder is fitted the best result will be obtained by bleeding one front and one rear wheel cylinder simultaneously.

(1) Fill the supply tank with Lockheed Orange brake fluid (also known as Lockheed L.33 Fluid) and keep both compartments at least a quarter full throughout the operation, otherwise, air will be drawn in, necessitating a fresh start.

(2) Attach rubber tubes to the bleeder screws on one front wheel cylinder and one rear wheel cylinder and allow the free ends of the tubes to be submerged in a little fluid in clean glass jars. Open the two bleeder screws one complete turn.

(3) Depress the brake pedal slowly, allowing it to return unassisted, repeating this pumping action with a slight pause between each operation. Watch the flow of fluid in the jars and when all air bubbles cease to appear, hold the pedal down firmly and securely tighten the bleeder screws.

(4) Repeat at the remaining cylinders.

(5) Top up the supply tank with fluid ensuring that both compartments are filled and that the level is just above the compartment division in the supply tank.

NOTE: Clean fluid bled from the system should be allowed to stand for several hours, until it is clear of all air bubbles, before being used again. Dirty or discoloured fluid, if not contaminated may be filtered and used again.

THE MASTER CYLINDER.

Description.

This is a tandem type master cylinder and consists of two seperate and complete hydraulic systems in line, one operating the front brakes and the other, the rear. This duplication ensures that, in the event of one system being damaged, there will still remain an effective brake on the other.

The unit comprises a body bored to receive a primary piston and a secondary piston between which a spring is fitted, the secondary piston is also loaded by a spring which is retained by a stop and an outlet adaptor. The latter screws down on to a rubber seal and is chambered to admit a combined inlet and outlet valve which consists of a rubber washer against which a valve body, housing a cup, is urged by a spring.

A stop pin screws into the body, with a gasket under it head, and acts as a stop for the secondary piston; the primary piston is retained by a washer and a spring ring. Both pistons are grooved to admit taper seals, the primary also being formed with a deep depression to admit a push rod. A boot is fitted to the push rod and the body to prevent the ingress of foreign matter to the unit.

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The upper face of the body is internally threaded in three places to receive a combined inlet and outlet valve and two tilting type valve assemblies.

Each of the latter consists of an inlet adaptor which screws down on to a rubber seal and is recessed to admit a valve loaded by a spring, the parts being retained by a plate on to which the inner edge of the adaptor is peened; the tilting valve assemblies cannot be dismantled. The combined inlet and outlet valve is made up of identical parts to the one at the end of the bore and is housed in a similar adaptor.

Dismantling.

It should be noted that if it is necessary to dismantle the master cylinder, the tilting valve assemblies, that is the screwed unions to which the gravity feed pipes on the supply tank are attached, must be removed before the internal parts of the cylinder can be removed.

Secondly note that when removing the internal parts, the tapered seals of the secondary piston can be damaged unless attention is paid to the following instructions:-

When removing the secondary piston, observe the rearward movement of the piston through the rear tapped hole from which the tilting valve has been removed and when the rearward facing seal appears, depress the top edge of the seal with a blunt instrument such as a pencil to avoid the top edge of the seal being cut by the rear edge of the hole where it meets the bore of the master cylinder.

Assembling.

When reassembling the internal parts of the master cylinder, note that the two taper seals on the secondary piston face away from one another, that is the greater diameter of the front seal facing to the front and the greater diameter of the rear seal to the rear. The single seal in the primary piston must be fitted with the widest diameter facing the longer portion of the piston. When replacing the secondary piston in the master cylinder observe the passage of the front seal of the secondary piston through the hole through which the rear tilting valve has been removed and depress the top edge of the seal (in a similar manner to that described in the dismantling instructions for the rear seal) to avoid the possibility of damage occuring when the seal passes the front edge of the tapped hole.

Further note that it is most important that before refitting the tilting valve assemblies the pistons must be pushed forward so that the tilting valves are entered when the smaller diameter or waisted portion of the mater cylinder pistons are in line with the apertures into which the tilting valves are fitted.

To assemble the outlet adaptors ease the cups into the valve bodies and the rubber washers into the outlet adaptors. Position the valve bodies and the springs within the adaptors. Locate the spring in the secondary piston and enter the stop into the bore. To retain these latter parts, thread one of the outlet adaptors firmly home into the end of the bore. Now thread the other adaptor home between the tilting valve assemblies.

Attach the boot to the push rod and offer up both parts to the body, stretch the larger end of the boot into position on the body.

FRONT BRAKE ASSEMBLY.

Description.

The front brakes are of the self adjusting type, in that brake adjustment takes place automatically as the linings wear.

The assembly consists of a backplate to which two single ended wheel cylinders are rigidly attached in diametrically opposed positions. Each wheel cylinder carries a piston whose end is specially formed to provide an abutment for the toe of one of the brake shoes.

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The heel of each shoe finds a floating anchor in the slot at the closed end of the opposite wheel cylinder.

Two adjusting bars link each shoe with the other, one end of each bar being formed with a slightly elongated hole through which a bar anchor pin passes; the pin is threaded into the web of the shoes and secured by a nut and a spring washer, and the adjuster bar retained on the pin by a circlip which bears on a plain washer. A bolt, with a spring under its head, passes through the web of the opposite brake shoe and locates within a slot at the other end of the adjusting bar. The bolt is fitted with a nut to retain two pad plates, between which two friction pads and the adjusting bar are assembled, a ratchet spring surrounds the latter assembly and engages within teeth formed on the adjusting bar.

The shoes are retained on the backplate by two pull-off springs, one end of each being attached to the heel of a brake shoe and the other end being hooked on to a spring anchor pin which screws into the backplate and is secured by a nut and a spring washer. The three struts which are welded to each shoe, strengthen that part of the shoe which carries the lining, so improving the contact between the lining and the drum.

Principle of Operation.

As the linings wear, each adjuster bar is dragged through the friction pads by the shoe to which it is attached by a pin. The grip of the friction pads is such that any return movement of the adjuster bar is prevented, but a minimum clearance between the lining and the drum under all conditions is ensured by the clearance between the pin and the elongated hole in the adjuster bar.

The ratchet springs are fitted as a follow up device and are a safety factor in the event of oil being present on the friction pads, which might otherwise allow the adjuster bars to slip back.

The adjustment, however, if dependent upon the ratchet springs, would be much coarser owing to the formation of the ratchet teeth.

Removing the Brake Shoes and Front Wheel Cylinders.

Jack up the vehicle and remove the wheel and the brake drum. Unscrew the two adjuste bars, remove the circlips and plain washers and detach the adjusting bars from the brake shoes. Collect the pad plates and the friction pads and disengage the ratchet springs from the adjusting bars, excercising caution to avoid straining the springs.

Pull the toe of one brake shoe against the load of the pull-off spring and disengage the shoe from the slots in the wheel cylinder piston and the opposing wheel cylinder body, disconnect the pull-off spring from the brake shoeand the anchor pin. Repeat for the other shoe.

Unscrew the banjo bolts and detach the bridge pipe from the wheel cylinders. Unscrew the nuts, collect the spring washers and withdraw the wheel cylinders from the backplate.

Refitting the Front Wheel Cylinders and Brake Shoes.

Offer up the wheel cylinders in turn to the backplate and secure with the nuts and spring washers, then attach the bridge pipe, banjos and bolts to both wheel cylinders.

Pass the adjuster bar bolt, with the coil spring under its head, through the appropriate hole in one of the brake shoes and temporarily secure by partly fitting a nut. Hook a pull-off spring to the shoe and attach the other larger hooked end of the spring to one of the anchor pins. Using the closed end of one of the wheel cylinders as an abutment for the heel of the shoe, and exercising extreme caution to avoid damaging the wheel cylinder boot,

Continued on Page 5.

cylinder boot,

pull the toe of the shoe against the load of the pull-off spring and locate the toe within the slot in a piston: the heel can then be tapped into position in the slot of the opposing wheel cylinder. Repeat to attach the other brake shoe then centralize the shoes in relation to the backplate. Fit the ratchet springs to the adjuster bars, paying particular attention to ensure correct assembly. Remove the nuts, offer up one of the adjuster bars to the brake shoes and adjust the ratchet spring until the clearance between the anchor pin and the appropriate hole in the adjuster bar is on the outside of the pin, then remove the bar and position a friction pad and a pad plate within the ratchet spring on each side of it. Repeat for the other adjuster bar. Both adjuster bars can now be attached to the brake shoes, using the nuts and the circlips, fitting plain washers under the latter parts; the correct load on the bolts is obtained by screwing the nuts up tight and then slackening back two flats or 1/3 of a turn. The operation of the adjusters should now be checked by pulling the toe of each shoe so that the pin moves to the outer edge of its elongated hole. When released it is essential that the shoe returns promptly and unassisted to its fully off position.

REAR BRAKE ASSEMBLY.

Description.

The rear brake assembly comprises a backplate which is slotted to carry a wheel cylinder and to which an adjuster is rigidly attached. A rubber boot, through which a lever passes, is fitted to the wheel cylinder at the rear of the backplate, to prevent the intrusion of foreign matter to the unit. The wheel cylinder contains two pistons, the outer of which abuts the toe, that is, the more sharply tapered end of the leading shoe; the inner piston operates the outer when hydraulic pressure is applied, but when the handbrake is brought into operation the lever operates the outer piston without disturbing the inner one. The heel of the trailing shoe is located within a slot at the end of the wheel cylinder body, and the trailing shoe is operated by the movement of the cylinder assembly along the slot in the back plate as a result of the reaction of the leading shoe against the drum.

The adjuster carries an adjuster wheel into which a slotted adjuster screw is threaded to provide a location for the heel of the leading shoe; a slot at the other end of the adjuster provides a floating abutment for the toe of the trailing shoe.

The beehive springs and pull-off springs retain the shoes on the backplate, the pull-off springs being attached to the shoes and the beehive springs to steady pads which are welded to the backplate. Greater rigidity for the brake shoes is provided by three struts welded to each.

Removing the Brake Shoes, Rear Wheel Cylinder and Adjuster.

Place chocks under the front wheels, jack up the back axle, apply the handbrake and remove the wheel. Release the handbrake, back off all available adjustment and disconnect the handbrake linkage from the lever. Remove the screws securing the drum to the hub and remove the drum squarely.

Compress the beehive springs and, by twisting, disengage them from the steady pads on the backplate. Lever the upper shoe out of its slots in the wheel cylinder piston and adjust screw against the load of the pull-off springs; on releasing the load on the springs the lower shoe will fall away. Unscrew the banjo bolt securing the banjo connection to the wheel cylinder and ease the boot off the wheel cylinder and the lever. Withdraw the wheel cylinder from the backplate. Unscrew the bolts, collect the spring washers and withdraw the adjuster from the backplate.

Continued on Sheet 6.

Refitting the Rear Wheel Cylinder, Adjuster and Brake Shoes.

Offer up the wheel cylinder to the backplate with the piston facing upwards, ensure that the cylinder is free to slide within its slot and fit the boot over the lever and into the groove in the wheel cylinder. Locate the adjuster on the backplate, with the adjuster screw upwards, and fit the adjuster securing bolts and the spring washers. Lay the brake shoes on the bench, with the toe of one facing the heel of the other, and connect the pull-off springs to them. Offer up the assembly to the backplate with the double formation spring nearer to the adjuster. Locate a beehive spring over the central hole in one of the brake shoes and by depressing and twisting engage the spring with the steady pad below it. Repeat the latter for the other brake shoe.

JAGUAR

SERVICE AND SPARES ORGANISATION

SERVICE BULLETIN NO.111

XK.120 MODELS

SELF ADJUSTING. FRONT BRAKES.

IMPORTANT

Fitted from Chassis Nos:-

Super Sports	RHD.	660980
" "	LHD.	672049
Fixed Head Coupe	RHD.	669003
" " "	LHD.	679622

Following a number of complaints of tandem master cylinder failures on recent XK.120 cars, investigation of these complaints have shown that the cause of the trouble is not always in the master cylinder, but is due to dealers or owners not having made themselves familiar with the correct method of adjustment for the rear brakes. In spite of a bulletin having been issued on this subject at the time the tandem master cylinder and self adjusting front brakes were introduced on the XK.120 model, it appears that in some cases rear brakes are being adjusted in a clockwise direction instead of anti-clockwise, resulting in excessively long pedal travel which has led people to believe that a fault in the master cylinder exists.

Secondly when dismantling the master cylinder, attention has not been paid to the instructions given in Bulletin No.106, the result being that both tilting valves and the master cylinder seals have been scrapped.

WILL ALL CONCERNED PLEASE NOTE that on XK.120 cars having the tandem type master cylinder and self adjusting front brakes, that the rear brakes are adjusted in anti-clockwise direction. This introduction does not apply to XK.120 models prior to the introduction of the self adjusting brake.

THE TANDEM MASTER CYLINDER SHOULD NOT BE DISMANTLED OR REASSEMBLED WITHOUT PRIOR REFERENCE TO INSTRUCTIONS GIVEN ON PAGES 2/3 OF SERVICE BULLETIN NO.106.

NOTE

On models fitted with self adjusting brakes all brake linings are MINTEX $\frac{1}{4}$".

August, 1949.

J A G U A R

S E R V I C E A N D S P A R E S O R G A N I S A T I O N

SERVICE BULLETIN NO. 54.

XK.120 SUPER SPORTS MODELS.

BRAKES

Lockheed full hydraulic brakes are fitted to all four wheels, the fronts being two leading shoe type.

ADJUSTMENT.

The necessity for adjustment of the brakes cannot be laid down on a mileage or time basis, but can best be judged by observing the amount of brake pedal free travel before solid resistance is felt.

When this free travel is three quarters or more of the total available pedal pad travel, adjustment should be made as follows:-

Fronts.

Jack up one front wheel until it is free to revolve. Remove the road wheel which will disclose two holes provided on the outer face of the brake drum through which access is gained to the two slotted adjusting screws. Pass a screwdriver blade through the hole in the brake drum and engage with one of the slotted adjusting screws, turn the adjuster in a clockwise direction until the brake shoe is in contact with the brake drum, then turn the adjuster back one notch (anti-clockwise) which should provide the correct clearance between the shoe and the drum. If closer adjustment is required spin the drum and apply the brakes hard. This will correctly position the shoe after which a further adjustment check should be made. Repeat these operations on the second adjuster observing that each adjuster operates on its individual shoe and therefore adjustment must be made at both points.

Repeat for the other front wheel.

Rears.

Place chocks under one front wheel and release the hand brake. Jack up one rear wheel until it is free to revolve and remove the road wheel. The procedure is as described for the front brakes except that there is only one slotted adjusting screw for each wheel.

Repeat for the other rear wheel.

N.B. Rotating the adjuster one notch off (anti-clockwise) may not be sufficient in all cases to allow the drum to revolve freely, being dependent on drum concentricity. The adjustment must not be such as to cause the drum to rub.

Hand.

Adjustment of the rear brakes will automatically adjust the hand brake, however, it may be found that with the foot brake in correct adjustment excessive hand brake free travel is obtained. The hand brake has an individual adjustment situated in the operating cable immediately behind the centre cross member. Rotate the hexagon adjustment nut clockwise until the hand brake travels one notch on the ratchet before being fully applied, ensuring that no tension exists in the cables when the hand brake is in the off position.

HYDRAULIC SYSTEM

This consists of a supply tank which must be maintained at its correct level of 1 in. (25.4 mm.) below the top surface with GENUINE LOCKHEED ORANGE BRAKE FLUID, a master cylinder in which fluid pressure is generated coupled by pipe lines to wheel cylinders which transmit pressure to the brake shoes. Efficient operation is dependent upon the complete absence of air from the system.

Normally the process of bleeding is necessary only when a portion of the system has been disconnected, or when the level of fluid in the supply tank has been allowed to fall too low, thus permitting air to enter.

First slacken back shoe adjusters to zero on all brakes. THIS IS IMPORTANT. Fill up the supply tank with fluid, exercising great care to prevent entry of dirt. Taking one brake at a time, remove rubber cover from bleeder nipple and fit rubber bleeder tube, allowing this to hang in a clean container or glass jar. Unscrew the nipple about three-quarters of a turn and operate the brake pedal its full travel a few times, allowing two or three seconds between each stroke. Pumping must be continued until the fluid is entirely free of air, care being taken to see that the reservoir is replenished frequently during this operation, for should it be allowed to empty, more air will enter. After expelling all traces of air, tighten nipple and replace dust excluder. Repeat procedure on other brakes. On completion, top up reservoir to correct level and reset brake shoe adjusters as described.

Do not on any account use the fluid which has been bled through the system to replenish the reservoir as it will have become aerated. Always use fresh fluid straight from the tin.

If at any time the fluid level in the supply tank is found to be low, examine system carefully for possible leaks.

The push rod connecting the master cylinder to the brake pedal must be adjusted so that there is 1/32" (0.80 mm.) free play between the end of the push rod and the socket in the master cylinder, when the pedal and draught seal are pressed against the toe-board by the pedal return spring. This must not cause the rubber draught seal to collapse.

The pedal assembly and push rod fork, when assembled, must work quite freely and return under the load exerted by the return spring.

This is all very essential as any stiffness or maladjustment will prevent the piston in the master cylinder from returning to the full off position. If this piston does not return it will not uncover the vent to atmosphere through the supply tank and will therefore leave the pressure line closed when the pedal is off. In this condition any expansion of fluid due to heat at the wheel cylinders or in the pipe lines will cause the shoes to move in to contact with the drums thus causing the brakes to rub continuously.

NOTE:- When replacing worn or greasy linings, use only GENUINE FACTORY MADE SHOES. These have the correct type of lining and are accurately ground to size.

INTERVALS.

Every 1,000 miles (1,500 kilometers) examine the fluid level in the brake supply tank and, if necessary, top up with the recommended grade of fluid. Never allow the fluid level to fall more than 1" (25.0 mm.) from the top of the supply tank.

Every 1,000 miles (1,500 kilometers) lubricate the nipple on the foot brake pedal boss with the recommended grade of lubricant.

Every 1,000 miles (1,500 kilometers) lubricate the two nipples on the hand brake cables with the recommended grade of lubricant. These are accessible from underneath the car and are located on either side of the propellor shaft.