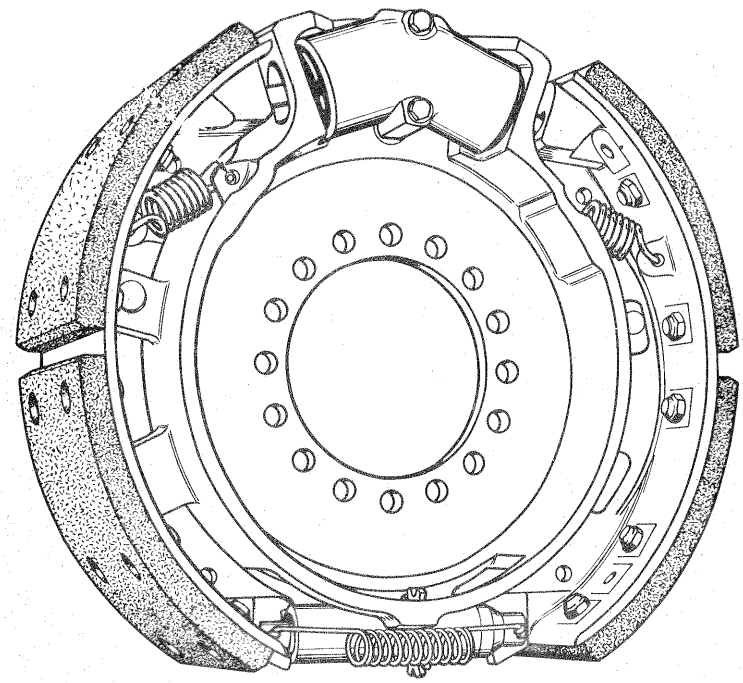
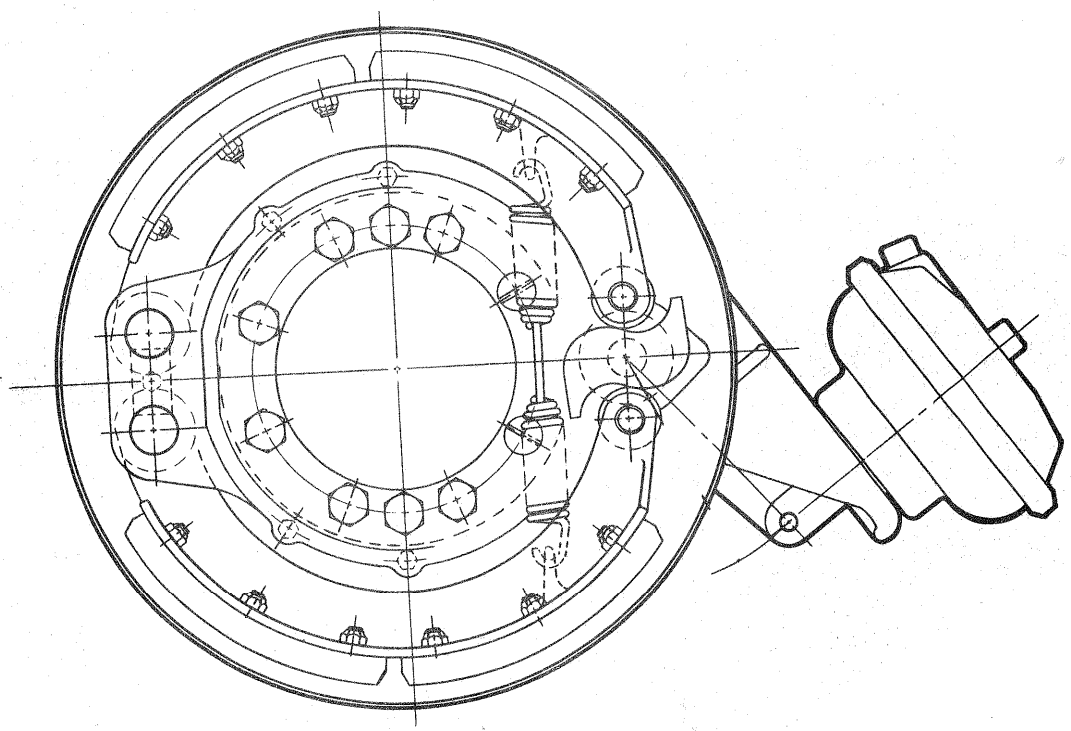
SERVICE RECOMMENDATIONS FOR CLARK HYDRAULIC AND "S" CAM BRAKE ASSEMBLIES





AIR BRAKES

80-120 (Rev: 5-80)

wagner

A Division of Allied Systems Company

FORM #80-120
Rel: 1-7-74
Rev: 1-31-75
Rev: 9-20-76
Rev: 5-14-80

SERVICE RECOMMENDATIONS FOR CLARK AXLE HYDRAULIC & "S" CAM BRAKE ASSEMBLIES

Extensive tests and analytical data gathered from a cross section of machine job functions have resulted in the following "Brake Service Recommendations". This knowledge is worthy of study by all maintenance personnel and operators who desire maximum performance and service life from their units braking system at the lowest possible cost.

For example, a brake problem experienced in 1974 developed into gigantic proportions that required the combined efforts of our supplier (knowledgeable brake people of the industry), our dealers service staff and our own service staff to correct the problem. The problem was corrected, the brakes were improved and we all gained a wealth of knowledge in the process.

Too few operators remind themselves that gross vehicle weight (G.V.W.) is a major factor in brake effectiveness. One should remember how much quicker a Lumber Jack will stop without a load as compared to one that is fully loaded; yet, it is not uncommon to find little consideration on the demands of the brakes by trying to stop as quickly whether loaded or not.

Brake effectiveness (deceleration) is affected by several factors. Three notable factors on our units are: G.V.W., rolling radius (wheel diameter) and the number of brakes being applied. Operators must realize that heavy equipment of our type generates tremendous wheel loads. Operators must operate within the limitations of the braking system and must adjust to each operating condition accordingly. OPERATE YOUR UNIT WITHOUT THE NEED OF A "PANIC STOP". Reserve that action for emergencies only. It must be remembered that Lumber Jacks and Material Handlers have only two wheels equipped with brakes and that the wheel assembly may have as much as a seven foot diameter. Thus, the wear and maintenance schedules are more than twice as critical as units incorporating four wheel brakes. If one brake becomes inactive or does not function equally with the other - you have a disaster. Also, the one wheel brake situation can occur easily when one wheel has friction footing and the other wheel slips.

Generally speaking, maintenance procedures are basically the same for hydraulic assemblies or "S" Cam Assemblies in regard to fasteners, lubrication, actuators and inspections. We feel that the major difference is the inspection interval and the specific components. We discovered an inspection negligence on brake drum fastenings for proper torque, for brake drum cracks and even brake shoe wear. Determine the type brake you will be servicing from the following list and study the recommended troubleshooting and maintenance procedures.

The 20 x 7" air over hydraulic brake assembly uses a wheel cylinder similar to the automotive type. The wheel cylinder hydraulic pressure is factory set at 1000 psi. It is essential that this pressure does not exceed the factory setting, otherwise premature lining wear, drum deflection and loosening of drum capscrews can result. Actuating pressures are determined by the lining friction coefficient, and substitution of either can result in total brake destruction. Pressure checking and adjustment of the 20 x 7" hydraulic brake is as follows:

1. Install a hydraulic pressure gauge in the 3-way tee inside the chassis. The tee can be located by tracing back from the wheel cylinder on the brake schematic.

2. The instrument panel pressure gauge must read 100-120 psi. With the assistance of a helper, depress the brake treadle valve as far as it will travel. Your test gauge should read 1000 psi. It is not necessary to check both wheel pressures when ADJUSTING, as the master cylinders are supplied by the one air supply.

3. If you are troubleshooting a brake problem it is MANDATORY to test both sides to determine if both master cylinders are operating properly. In testing both sides you may find a 50 psi differential which is normal and will not affect brake efficiency. If you have a differential greater than 50 psi, the master cylinder on that side is malfunctioning and in need of repair.

4. Pressure adjustment to the entire system is made by adjusting the air regulator mounted on the air tank. (Chassis mounted on the left side looking toward the axle). Adjust screw clockwise to increase pressure, counterwise to decrease. Remember, a maximum brake efficiency will extend service life.

5. Check and maintain the master cylinder oil level. NOTE: The brake fluid is a mineral oil base (Modil D.T.E. or equivalent) not the alcohol base brake fluid as used in automotive systems. The master cylinders are marked "Mineral Oil Only". A substitute may result in seal damage.

6. Visually inspect hub to drum capscrews for indications of looseness as the correct torque values are essential and critical in brake maintenance. The capscrews can be reached with a 1/2" drive universal joint, a modified socket and an extension. If any capscrews are found loose, remove wheel, hub and brake drum. Inspect components for wear, cracking and hole elongation. Replace defective parts.

7. If the hub and drum check out alright, thoroughly clean capscrews and components with a non-oil base cleaning agent. We recommend installing new capscrews with a "Loctite" application, Catalog #271, and torque the 3/4" capscrews to 300 ft/lbs; the 7/8" capscrews to 500 ft/lbs. IF HUB TO DRUM CAPSCREWS ARE FOUND LOOSE ON ONE BRAKE ASSEMBLY, IT IS PROBABLE THAT THE OTHER ASSEMBLY IS LOOSE. Take the precaution of checking both assemblies. Inspection time will be justified if you detect an early problem and corrections are made before damage results.

The "S" Cam two shoe air brake assembly is actuated by an air chamber (air can) connected by linkage to a "slack adjuster" assembly, which in turn is spline connected to the "S" cam shaft. The unit system air pressure maintains at 100-120 psi. General maintenance for this specific brake is typical for all heavy duty shoe type brake assemblies. Specific service recommendations are as follows:

1. One point often overlooked is the slack adjuster position in relation to the air chamber push rod. Maintain a 90^0 angle between the push rod and slack adjuster arm. This will allow the air chamber to produce maximum leverage and reduce the possibility of push rod "side loading" resulting in push rod breakage.

2. Evidence indicates that brake shoe "chatter" is a major factor in slack adjuster failure, and that excessive shoe clearance is the cause of chatter. Check the shoe clearance frequently (100_0 hours) and readjust to maintain the 90^0 angle to insure maximum slack adjuster service life.

3. Inspect the "S" cam and bushing located in the torque spider. Early assemblies were equipped with brass bushings requiring lubrication (frequently overlooked) while later assemblies have a non lubricated nylon bushing. Excessive wear in this bushing results in poor leverage and reduced braking action.

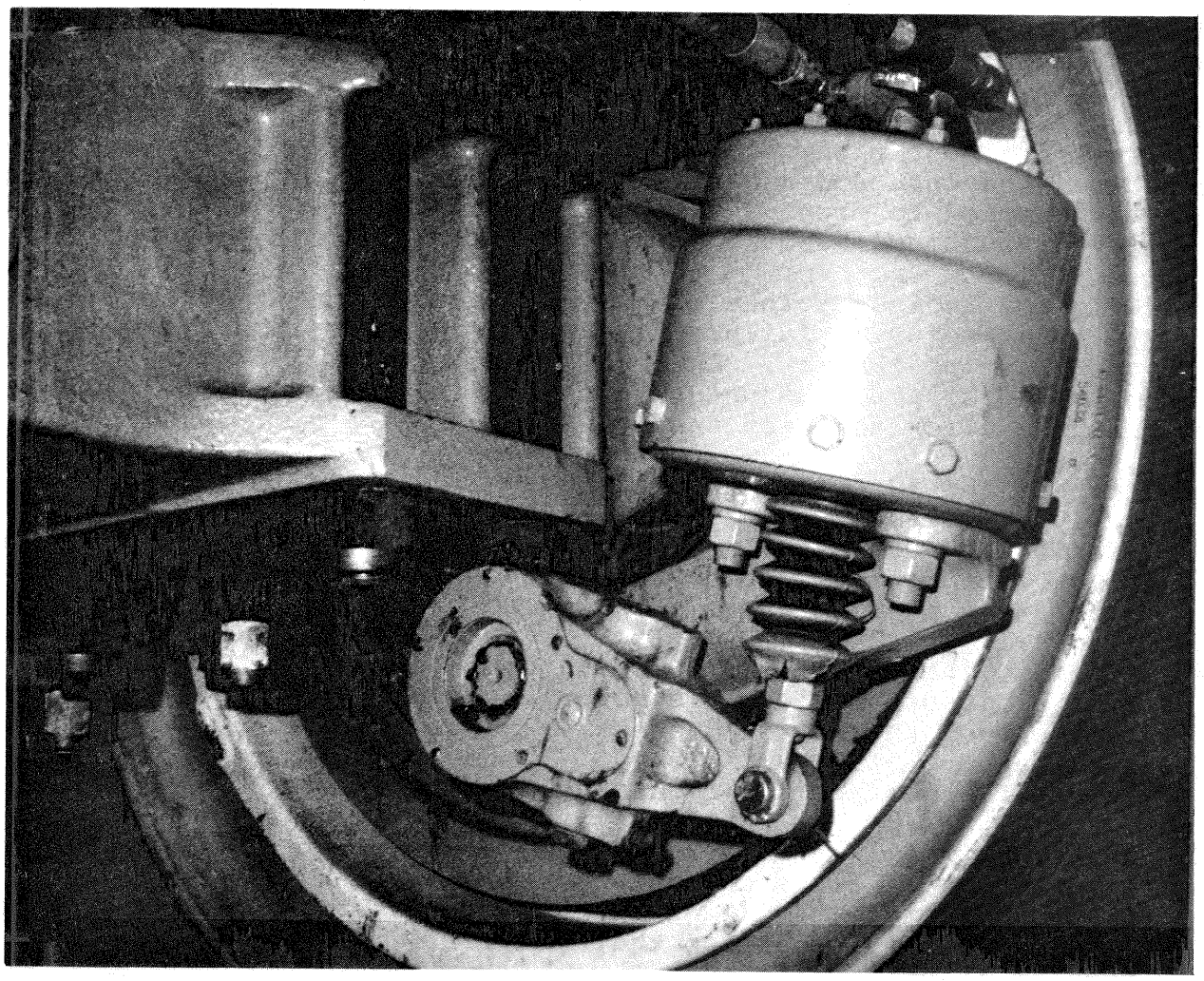
4. Periodic inspections (300 to 500 hours) of the cam rollers and pins to insure rollers are not flat or stuck, thus restricting movement of the shoes. Defective parts must be replaced to insure maximum brake efficiency. Inspect the return springs to insure that brakes are releasing properly.

5. Any time a wheel is removed for any reason, take the opportunity to examine all brake components for malfunction, proper drum fastening torque, and lining wear. Proper installation (use of Loctite) or any condition that you feel could possibly be a problem if not corrected.

Remember, brakes are as vital to your operation as any other part of your unit, and very costly to repair when a failure occurs. Therefore, they should receive equal or preferential maintenance consideration. Your maintenance program will determine the ultimate service life and cost of your brake system.

A listing of reference material concerning this article is as follows. Refer to your unit Service Book.

Clark Hydraulic Brake Service	- #A-GBS
B.F.G. Master Cylinder Service	FORM #80-109
Initial Lubrication	- S.B. 0025
Air Chamber & Slack Adjuster Maintenance	- S.B. 0094
Bendix Brake Adjusting for Clark 75503 Axles	- S.B. 0159



The illustration above shows the correct 90° angle between the Push Rod and the Slack Adjuster Arm, as referred to on Page 2, Items (1) and (2).