

The Chalmers Automobile Newsletter

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The introduction of Chalmers four-wheel brakes is discussed in this issue. I will try to explain, in non-technical language, how they worked and some of the initial problems. Also included is some historical background on these brakes.

CHALMERS CLASSIFIED

The Chalmers Classified listing is intended as a service for members to advertise Chalmers cars and parts that are for sale and/or wanted. Please contact me regarding items that should no longer be listed and pass-on your new wanted and for sale items.

WANTED:

- 1922/1923 hubcaps (posted 4/2000) - contact Bob DuBois (#9).
- 1912-1914 Chalmers Model 12/18 "Six" (also 1910-1912 Model "Forty", 1912-1914 Model "36", or 1914-1915 Model 24/29 "Master Six") (posted 4/2000) - contact John Lehnert (#35).
- 1914 Chalmers Model 24 "Master Six" shop manual (posted 4/2000) - contact Jim and Donna Stamper (#52).
- Model T Splitdorf magneto for 1912 Chalmers Model 11 (posted 12/2000) - contact Al Shaw (#25).
- 1911 Chalmers Model "30" Pony Tonneau complete rear axle assembly (or any parts for it) (posted 7/2001) - contact Fred Hoch (#38).
- 1908-1909 Chalmers-Detroit Model F "30" radiator (posted 10/2001) - contact Alan Leclair (#42).
- 1923 Chalmers Model "Y" Jaxon disc wheels (one or more) for 24" tires (posted 2/2002)- contact Alan Maris (#56).
- 1913 Chalmers Model 36 front wheel hub and left side bail handle sidelight (kerosene and electric) or a matching pair (posted 2/2002)- contact Lloyd Elliott (#26)
- 1912 Chalmers Model 11 "30" rear spring and running board toolbox (posted 2/2002)- contact Mike Morris (#65)
- 1915 Chalmers Model 26-C "Six-48" Entz starter/generator, oil gage, distributor, steering wheel, crank, hubcaps, speedometer, and other parts & photos of wood framing (posted 7/2002) - contact Scott Sandersfeld (#69)

FOR SALE:

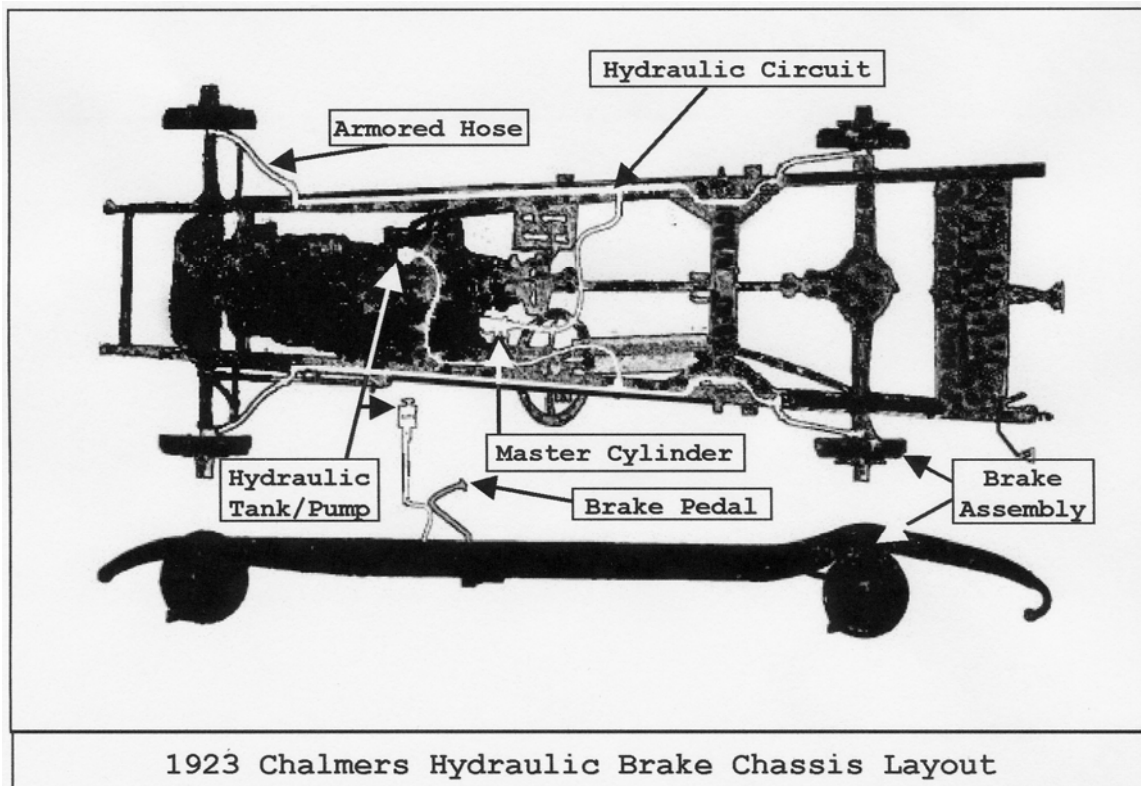
- 1916 Model 35-A "Six-30" parts and some sheet metal (posted 4/2000) - contact Don Ohnstad (#19).
- 1909 Model F "30" engine cooling fan assembly (includes fan, hub, pulley, and bracket) in good painted condition with no rust for \$95 or best offer (posted 9/2000) - contact Chuck Fanucci (#45).

CHALMERS OFFERS FOUR-WHEEL BRAKES

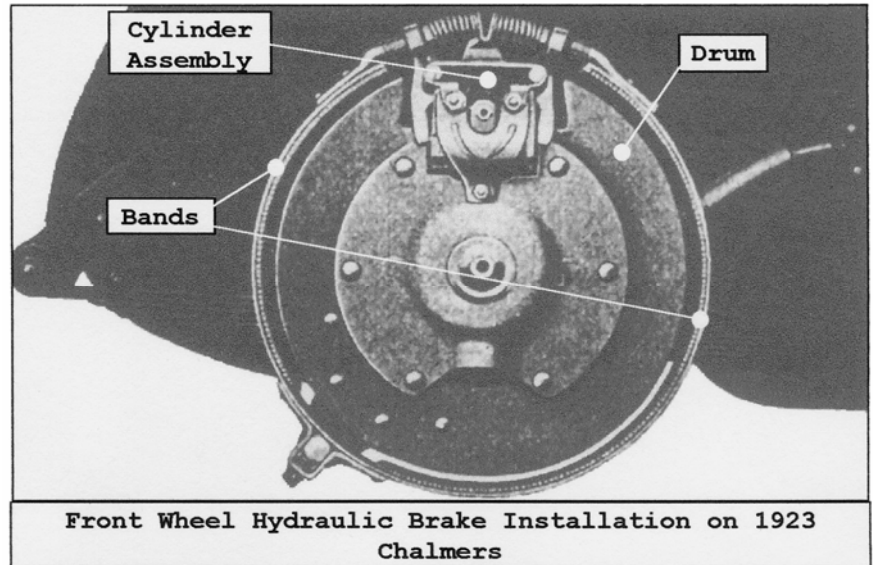
Chalmers introduced four-wheel brakes as an option on the Model Y for only \$75 in late 1923! The system, which operated on the principle of hydraulics, was composed of a master cylinder, interconnecting hydraulic lines, and brake assemblies at all four wheels. This was a very basic system, initially developed for the aircraft industry by Lockheed. Two years earlier, the 1921 Duesenberg became the first American automobile manufacturer to adapt the Lockheed brakes for their Model A. Hydraulic brakes were considered a risky innovation at this time. Hudson waited until 1936 to introduce the system on the Terraplane, which included a mechanical backup scheme for the rear wheels in case the hydraulic system failed! Chalmers, on the other hand, provided only a standard emergency hand brake that operated independently through mechanical levers on a brake drum mounted at the front end of the drive shaft.

The 1923 Chalmers-Lockheed System

The Chalmers master cylinder was mounted to a bracket on the left side of the clutch housing with a lever connecting it to the brake pedal. Mounted on the right side of the engine (and accessible by raising the hood) was a hydraulic tank and hand-pump assembly for maintaining hydraulic fluid in the system. The hydraulic circuit was composed of copper tubing connecting the master cylinder to each of the four wheel brake assemblies and hydraulic tank/pump. Armored hose bridged the final frame-to-brake gap at each wheel.



Located at each wheel was the brake assembly consisting of a brake drum, a pair of external brake bands (surrounding the drum), and a cylinder assembly. The cylinder assembly was a key element of the system. Open at each end, the cylinder had two opposing slave pistons residing within. On the inside of the pistons, leather cups were used as a seal to prevent leakage of the pressurized hydraulic fluid. Rubber covers protected against road dirt entering the cylinder from the outside.



The entire hydraulic circuit was filled with fluid consisting of 50% glycerin and 50% denatured alcohol mixture. This fluid's primary function was to be non-compressible, but it also had to have lubrication, sealing, and freeze protection attributes. Total capacity was 1-1/2 pints and small bleed valves at each wheel were used to eliminate air in the system. Air was compressible, which resulted in a spongy feel when braking and was generally detrimental proper operation.

When the brake pedal was pushed, the piston in the master cylinder caused elevated pressure in the copper lines connecting to the four brake assemblies. This pressure increase forced the two slave pistons in each brake assembly to move, which in turn, caused levers to contract the external bands against the drums resulting in braking action. Since the master cylinder piston had a larger surface area relative to the slave pistons, hydraulic mechanical advantage was created.

The braking action was a compression only function. This meant that when brakes were released, return springs forced the hydraulic fluid back into the master cylinder. This was accomplished by the slave pistons and their interconnecting lever-return springs forcing the fluid back; returning hydraulic pressure to normal and the brake bands to their "home", non-braking, position. When in the "home" position, the brake bands were held by the springs against a stop that provided proper, non-contact, band-to-drum clearance.

In theory, four-wheel hydraulic brakes provided advantages of:

1. More forceful braking action,
2. Shorter stopping distance with less pedal effort, and
3. Brakes were applied equally and in proportion to the pressure exerted by the driver on the brake pedal.

These advantages were not always achieved all the time, however.

Some Problems

In 1923, engineers did not know very much about hydraulic brake systems and the Society of Automotive Engineers was just beginning to publish articles on the subject. Some of the early problems found and corrected on the Chalmers-Lockheed brakes were:

1. Over heating causing sudden loss of hydraulic fluid,
2. Over heating causing deterioration of the leather cup piston seals, and
3. Brake pedal return spring causing inadvertent air infiltration.

All of these problems were fixed by 1924, just in time for the production start-up of the new Chrysler, successor to Chalmers.

Other Major U.S. Manufacturers

Chrysler's first car, the Model B-70, offered hydraulic brakes in 1924. General Motors delayed introduction of the new technology until 10 years later and Ford waited even longer - 1939.

That's all for now and I hope you enjoyed the article on Chalmers four-wheel hydraulic brakes. If you have any thing to add to this story, please send me your comments.

As customary, forward any questions, comments, or other items of interest for the next newsletter.

Dave Hammond