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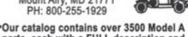
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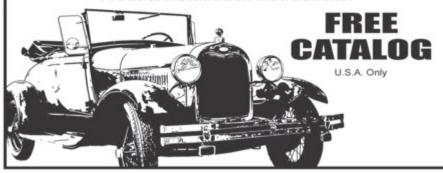
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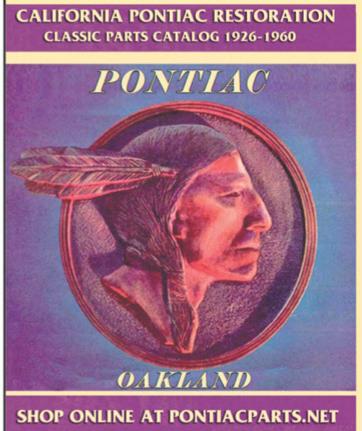
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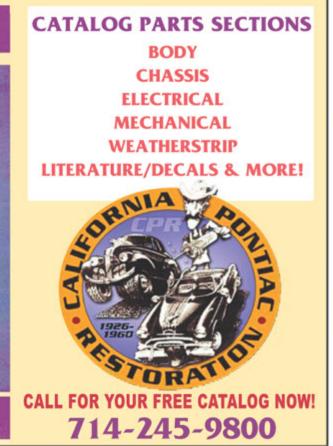
78 **SOUTHERN WHEELS**

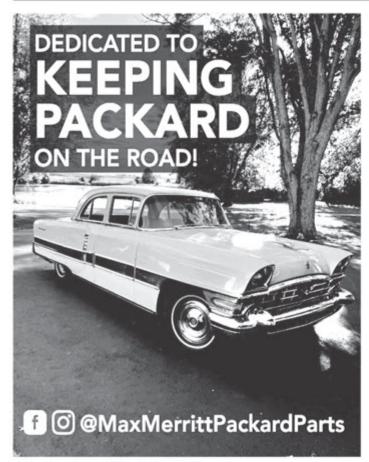


The Lincoln-Zephyr for 1940 is bigger inside than the car has ever person next to the driver does not cramp him. There has always been. Seats are wider, in front and rear. There is more room over- been plenty of space up front; there is more now, with the Finger-Tip head, more around the feet, more shoulder room and elbow room. Gearshift on the steering post. Journeys begin and end in comfort, Six people ride in comfort—each has all the space required. The with dispositions unchanged, when six travel the Lincoln-Zephyr way.











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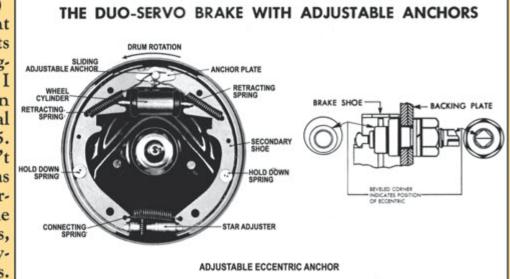
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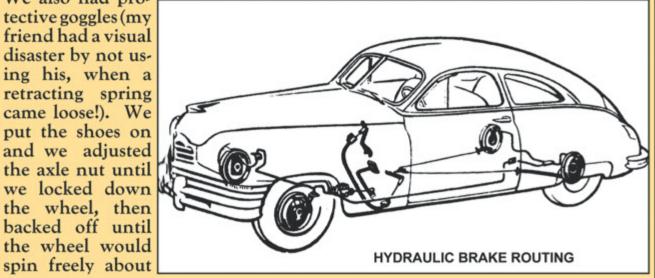
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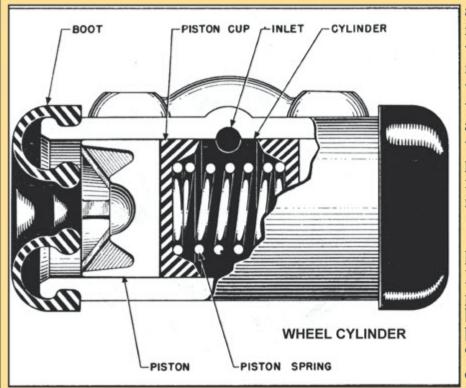


round 1966, I did my first brake job on my '56 Chevy. A friend helped me and all that was involved was a set of brake shoes (asbestos,

course) bought from a local parts store in Lexington, Kentucky. 1 had a Craftsman box of tools (metal box) for \$39.95. There weren't any brake tools as such, but we survived with some needle nose pliers, vise grips and several screw drivers. We also had protective goggles (my friend had a visual disaster by not using his, when a retracting spring came loose!). We put the shoes on and we adjusted the axle nut until we locked down





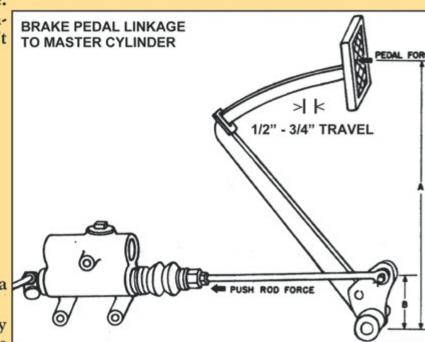


a turn and a half, put in the cotter pin and we were "Saturday night ready." All this was done in the driveway with a small jack and two jack stands, with me sitting on a plastic tray on loan from our friendly drive in restaurant. Simple times!

Now, many years later, here's what I have learned: The principle of hydraulic brake operation is based on Pascal's Law, "pressure applied to a confined body of fluid is transmitted equally

and undiminished in all directions throughout the liquid." Thus, foot pressure to the brake pedal is transmitted to each wheel equally and all four brakes are applied with equal force.

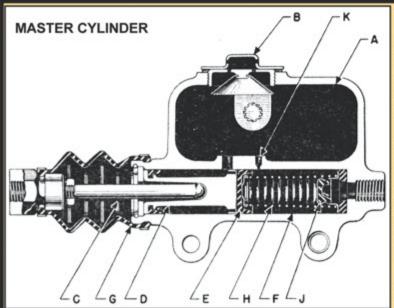
So that's what was happening in '66, I just didn't TO MASTER CYLINDER know it.



We will cover a 1946 Super Custom 8.

On the Packard, only the fronts were done, as the

rears were done and covered in previous DOC articles. First, a description of "duo-servo" self-energizing brakes which are hydraulically operated. Hydraulic brake operation is when the brake pedal is pushed and the shoes are forced against the drums. The turning of the drums rotates the shoes in the same direction. The wrapping action of the shoes uniformly



The brake master cylinder is bolted to a secondary member of the frame just forward of the brake pedal. A fluid reservoir [A] located above the cylinder is incorporated in the casting and its function is to compensate for minor losses, for any expansion or contraction of the fluid due to temperature changes, and to supply extra fluid as needed during brake application. It may be said then, that the brake master cylinder contains "compensating fluid" while the fluid in the cylinder and lines ahead of the master cylinder piston will be referred to as "working fluid" since it carries the pressure when the brakes are applied.

Brake fluid is added to the reservoir when necessary after removing the filler cap [B]. Small holes in the filler cap serve to keep the surface of the compensating fluid always at atmospheric pressure.

The piston push rod [C] transmits force from the pedal and linkage to the piston [D]. The primary cup [E] seals the piston in the cylinder [F] and, acting with the piston and cylinder, changes the push rod force into pressure in the lines while the secondary cup seals off the space in the cylinder behind the piston. This prevents the fluid which surrounds the piston from leaking into the boot [G]. The piston spring [H] serves to hold the primary cup securely against the piston head at all times and also to return the piston to its normal position when the brakes are released.

The check valve [J] is spring loaded to six or eight pounds and maintains a corresponding pressure in the lines after the brakes have been released and the working fluid has returned to its normal place in the lines. It also functions as a seal to prevent seepage and is instrumental in keeping air out of the system during the bleeding operation. On the pressure stroke, the working fluid passes through holes in the cup retainer or cage and past the lip of the cup. When returning, the fluid forces the cup against the cage and seals the holes. This allows the valve assembly to move from its seat and permits the working fluid to flow back into the master cylinder until the pressure drop is sufficient for the valve to close.

When the brake pedal is depressed, the piston push rod forces the piston, along with the piston cups, to the forward end of the cylinder. Shortly after the beginning of piston travel, the primary piston cup covers the relief port thereby starting the pressure stroke and as the piston progresses from this point working fluid is forced out through the check valve with a resulting pressure in the lines and wheel cylinders.

When the brake pedal is released the piston returns at a much faster rate than that of the working fluid as good brake design demands quick recovery of the system. The pedal retracting spring and piston return spring combine to return the pedal to normal position quickly while the master cylinder compensates from the reservoir to keep the system always full of fluid. In the meantime, the shoe retracting springs are returning the working fluid more slowly from the wheel cylinders and as this fluid returns it displaces the compensating fluid back into the reservoir through the compensating port [K].

increases the pressure at every point around the braking surface, which increases the stopping ability with less physical effort from the driver. The effect on the brake shoes is the Primary Shoe (short shoe to the front) follows the rotation of the drum for a short distance and pushes on the Secondary Shoe via the star adjuster at the bottom. With the forward rotation, the force on the Secondary Shoe is applied "ahead" of the pin connection, causing it to jam across the drum at a pressure much greater than that of the Primary Shoe. The action of the Secondary Shoe being far greater than the Primary Shoe makes it necessary for the Secondary Lining to be longer. This allows the Primary and Secondary linings to wear at the same rate. The duo-servo also applies to the backing of the car in stopping and backing. When backing, the Primary Shoe becomes the Secondary Shoe and the Secondary becomes the Primary, and the same duoservo principle applies.

The essential units of the hydraulic brake system and their functions are:

- 1. The Master Cylinder supplies the hydraulic force.
- 2. The Brake Pedal applies this force to the master cylinder and multiplies the driver's effort.
- 3. The Brake Backing Plate supports the brake parts at each wheel and transmits the braking force to the frame of the car.
- 4. The Brake Shoes support the lining and transmits the braking force to the brake plate.
- 5. The Brake Lining and Brake

Drum produce the friction and convert the power of the moving car into heat.

- 6. The Wheel Cylinders actuate and apply the pressure to the brake shoes.
- 7. The Steel Tubes and flexible hoses transmit the hydraulic pressure from the master cylinder to each wheel cylinder.

With these principles of the duo-servo brake system, I began work on my car. Jason and I started with the 1946 Packard Custom first. The '51 Chevy and the '51 Packard were on my two lifts and, you guessed it-fifty years after my first brake job, I was sitting on the driveway with a jack and two jack

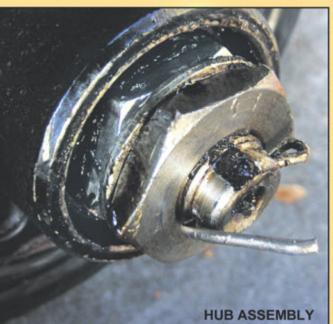
stands doing a brake job. Sometimes time can be so cruel.

The '46 rear wheels were chocked

and the front end was raised and secured with two jack stands. Movers' blankets were laid down, tools laid out and an air hose run to my impact gun to remove the wheel lug nuts. The hub caps have cloisonne medallions, so they were put into the garage on clean microfiber towels. The problem with this car's brakes was that the steering wheel would pull hard to the left when the brake pedal was pushed. I had replaced a leaky master cylinder a month before and I knew the lines all bled out okay, so it must be in the linings or drums. These Senior Packards ('41-'50 356 CID) had 2 1/4" linings and they had a rather unique lock nut assembly on the front axle hubs. When the hub and bearings were on, an inner hex nut was put on with a pin that faced outward. There is a groove in the axle and a lock ring with a series of holes in it, and a teat that fits into the axle groove. The lock ring slides on the axle teat in the groove and one of the holes lines up with the pin on the inner nut. This locks the inner nut and sets the hub so that it is not too loose or too tight. Then the outer nut goes on and is tightened up against the lock ring and the cotter pin goes in. The Junior cars such as

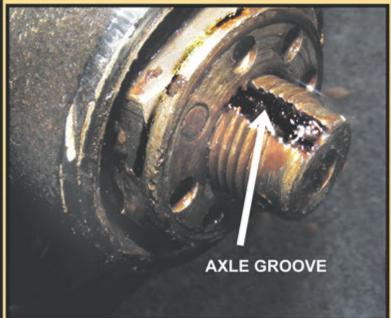
the '51 Packard Mayfair has the conventional one-nut arrangement.

Wearing our safety goggles, we removed the wheels' five CONTINUED





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out the back of the hub.

Next, we (1) removed the shoes' hold springs and clips, (2) removed brake shoe return springs (be sure to mark primary [front] and secondary [rear]). The secondaries are stronger. Ours our color-coded yellow and the primaries are orange. (3) Spread the shoes and removed the star adjuster and connector spring. The above will come off with the shoe.

It was a great time to undercoat the wheel well, strip and paint the backing plate and replace the brake hoses and wheel cylinders.

We will continue with this next time.

ug bolts and laid the tires out separately. (If you lay a whitewall against another tire, it can leave a stain on the whitewall.) Then we took pictures of everything, removing the dust cap, outer bearings and, to get the inner seal out unhurt, we found a nut to fit the spindle, ground the edges round with a belt sander, and put it on the spindle. (Original hex nuts won't work because the round hub catches on it.) Then, we pulled the drum straight off and the round nut pulled the rear seal and bearing









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Fall and Winter is a great time to complete brake projects. Keep 'em driving!

BRAKE SYSTEM TYPES

This is from a 1954 book, so they end at '54, but many continued for years after that.

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BUICK		HUDSON	
1940-54Bendix (1).		1940 Except 112 Bendix (2).	
CADILLAC		1940, 112 Bendix (3) 1941-54 Bendix (1)	
	Bandin (1)	1941-54	Bendix (1)
1940 Except 75, 90		KAISER	
1941-54 Bendix (1).		1947-54	Bendix (4)
CHEVROLET		LINCOLN	
1940-50		1940-64Bendix (1).	
1951-54		MERCURY	
	······································		
CHRYSLER		1940-48	
1940-42 Except Front Brakes on			
1940-42 Eights Lockheed (1).		NASH	
1940-42 Eights—Front BrakesLockheed (2). 1946-54—Front BrakesLockheed (2).		1940 Model 80	Bendix (2)
1946-54—Rear Brakes Lockheed (1).		1940 Models 10, 20	
1949-52—Crown ImperialLambert			
1953-54—Crown ImperialLambert.		1948-54 Model 40	
C200000000		1950-54 Rambler	Bendix (4)
CROSLEY		OLDSMOBILE	
1940-48			Bendix (1)
		PACKARD	······ bendix (1)
			1. 11
DE SOTO		1940-54 Except models listed below	
1940-54 Except Front Brakes on 1946-54Lockheed (1). 1946-54—Front BrakesLockheed (2).		1804-5-7-8, 1904-5-7-8, 2004-5-7-8 Bendix (2)	
		PLYMOUTH	
		1940-54 Except Front Brakes on	
DODGE		1946-54Lockheed (1).	
1940-54 Except Front B	Brokes on	1946-54-Front Brake	sLockheed (2)
1946-54Lockheed (1).		PONTIAC	
	Lockheed (2).		
EDUCATION OF THE SECTION OF THE SECT		1940-41 and 1949-54	Bendix (1)
FORD		STUDEBAKER	(,,
1940-48Lockheed (1). 1949-54Bendix (1).			atas tasthant 01
1949-54	Bendix (1).		pionLockheed (1)
FRAZER			Lockheed (4)
1947-51Bendix (4).			Wagner
		WILLYS	
HENRY J		1940-46Lockheed (1).	
1061-64	Bendix (4).		



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1969 Mustang Mach I. Candy Apple Red Ext, Black Mach I (3A) Int, R Code 428ci Ram Air, Rebuilt Eng & Carb, 4 Spd Close Ratio (6C), 3.25 Axle (R), Build Date Jan 6 (06A), DS Buffalo (37), 61,000 miles. Combination of Orig & Restored. Rust Free. Excellent Condition. \$84,500



1956 Tbird, Wht ext, fiesta red & wte int, blk stop, 312ci Y block, 3 spd auto, p/steering, p/ seat. Full Resto completed 2021. Multiple Award Winner, \$126,500



Tbird, white ext, black &

black softtop, 312ci, 4 barrel carb, auto, p/steering, p/brakes, TC radio, skirts, & wide white wall radial tires. Frame-up restoration. Excellent condition. Great driving car. \$54,500



1956 Resto-mod tbird, tbird grn ext, grn & wte int, tan stop, wte porthol htop, p/steering, disc brk, auto, 312 eng w/FI, elec ignition, TC radio, ww radial tires on wire wheels. low #1 high #2 car. \$72,500



1967 Cadillac de Ville convertible. Ext. Venetian blue, white int, p/ 6 way, 340 hpv8, turbo hydra- Matic, p/steering, auto climate control, cruise control, door locks, Am/FM radio, leather perforated for Extra comfort \$31,500



1966 Dodge Dart GT Convt. Silver ext, blk int, bucket seats, blk convt top. 273ci eng. 2 barrel carb, auto. AACA 1st Jr & Sr. AACA Grand Nat'l Jr & Sr. \$62,500



1957 Pontiac Star Chief Convertible. Blk Ext, Red & white int, Blk Convt top, 347ci eng, 3x2 carb, auto, cont kit, p/steer, p/brk, p/top, radio& heater. Full body-off Resto. Award Winner. \$145,000

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