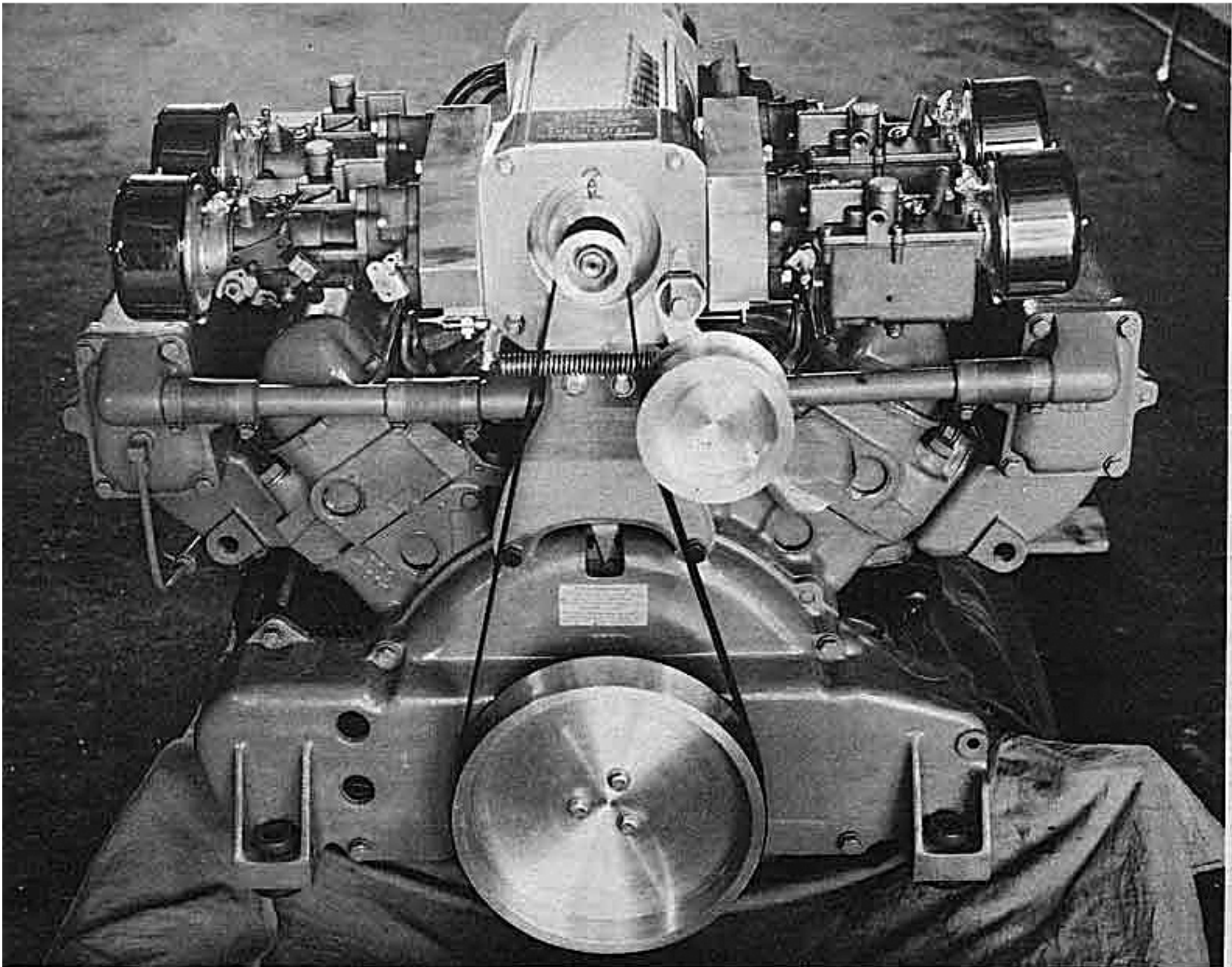


## Superchargers for the Street. By Roger Huntington

A reproduction of the article in the June '65 edition  
of "American Rodding" magazine.



*Latham installation on 480-cubic inch Chris-Craft marine conversion of big Lincoln V8. Latham blowers are widely used on high-performance boat engines where conditions are ideal at steady-speed, high-load operation. This kit has four Carter carbs and wide belt, pulls well over 400 horses.*

# SUPERCHARGERS FOR THE STREET

A blower can be, dollar-for-dollar, your best and least expensive hop-up path

BY ROGER HUNTINGTON, ASAE

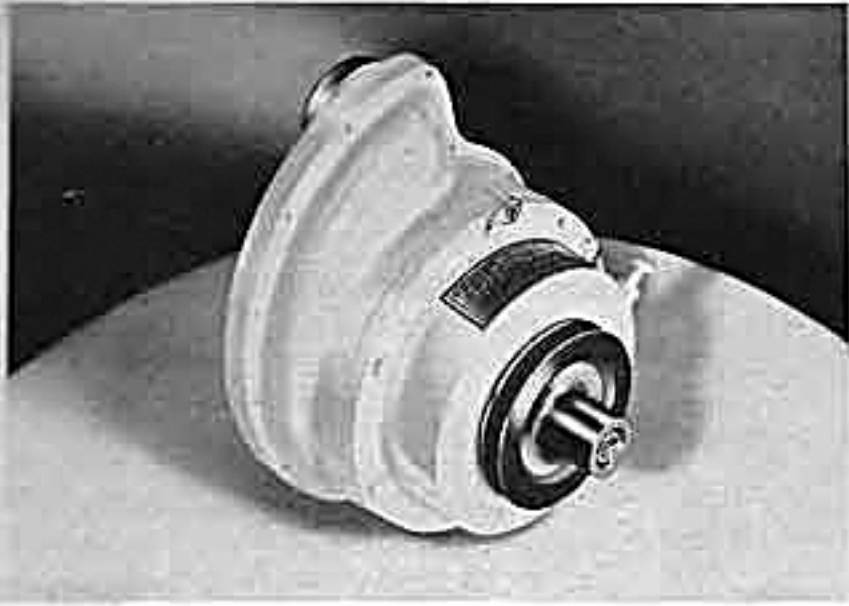
It has always seemed strange to me that there is not more interest in superchargers for street machines in the hot rod field. They're practically standard equipment (where class rules permit them) on all-out competition machines—and have been for years. But interest in "street blowers" seems to go in cycles. It was high in the mid 1950's when the McCulloch supercharger was used by several Detroit companies. There was a flurry of interest in the early '60's when Detroit experimented with exhaust-driven turbochargers for certain high-performance models. (Only Corvair still retains a turbo.) But it seems like interest is down again today. Everybody is thinking about big cubes, big valves, hot cams, etc.

Maybe we're making a mistake in forgetting the supercharger. Let's have another look right now and see what

the possibilities might be for a hot street machine in today's changed hot rod picture . . .

In the first place, I'm sure you all understand the basic principles of a supercharger. It's nothing more than a high-capacity air pump that forces the air/fuel mixture into the cylinders under a pressure of anywhere from 5 to 25 lbs./sq.in. This increases the engine's power and torque by letting it burn more fuel per revolution. Actually, a supercharger makes a very practical hop-up weapon. With a good kit it can be bolted on the outside of the engine with a minimum of time, tools and know-how. You don't have to tear your engine down to make expensive internal changes. Also, the supercharger adds power and torque without hurting other areas of the engine's performance—like giving poor throttle response, low-end flexibility, rough





*Paxton centrifugal supercharger unit is belt-driven from crank, has unique ball-type planetary step-up drive to raise impeller speed to around 30,000 rpm at top engine speed. Gives 5 to 6 lbs. pressure.*

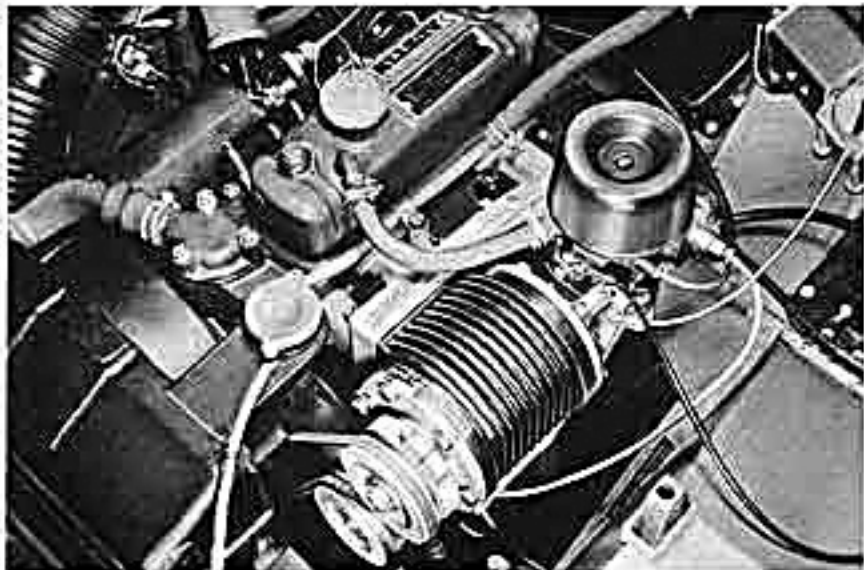
idle, more noise, hard starting, low gas mileage, etc. So often you get these by-products when you use the more conventional hop-up tricks like hot cams, multiple carburetors, etc. Finally, I think you'll even find that the price of supercharging is reasonable—if you look at it from the standpoint of horsepower increase *per dollar*. Anytime you can buy a 30 or 40% boost in horsepower for \$200 to \$400, you've got to take a good look!

But it's not all gravy. Superchargers require constant maintenance. You've got to look after belts, bearings, lubrication. If you take care of a blower installation it will do the job—but if you're looking for something you can bolt on and forget, better forget it first! Also, currently-available supercharger kits are not too suitable for our late 400-cubic inch, 400 horsepower high-performance street engines. They just don't have the air flow and pressure capacity to properly supercharge these big engines. You won't, therefore, get much of a percentage horsepower boost. These available blowers are better confined to basic engines of less than 350 cubic inches and less than 300 horsepower original stock rating. This will probably take in 80% of you anyway—but keep it in mind.

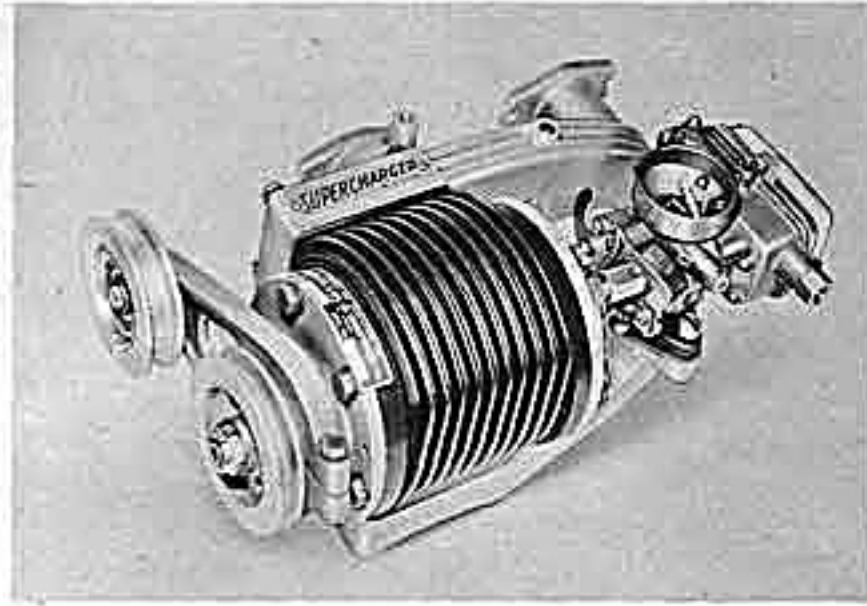
Now let's take a closer look at the currently-available bolt-on supercharger kits on the American market:

#### PAXTON

Paxton Products bought out the McCulloch supercharger business in the mid 1950's, then was bought out by the Granatelli brothers—and they were just recently taken over by Studebaker. This is all by way of saying that the com-



*Judson kit on a small Sprite 4-cylinder . . . extremely neat and compact. Said to knock eight or nine seconds off 0-60 mph time!*



*Judson vane-type supercharger for small American and foreign engines, gives 5 to 6 lbs. boost and up to 45% horsepower boost. It is belt-driven from crank and uses stock carb on special adaptor manifold.*

pany has a backlog of experience with this product, they're well established and have excellent financial backing today. I understand they've sold nearly 100,000 kits in the last 10 years!

The Paxton supercharger is probably the most highly engineered design in the field. It is of the centrifugal type, where we have a bladed impeller that rotates at very high speed—scooping air in at the hub and hurling it off the tips of the blades at high velocity. This velocity energy is converted to pressure when the air slows down and packs into the outlet duct. We're talking here of about 30,000 rpm impeller speed and 750 feet per second blade tip velocity. This will build up a pressure of 5 or 6 lbs. in the intake manifold and boost horsepower 30 or 40%, depending on engine size.

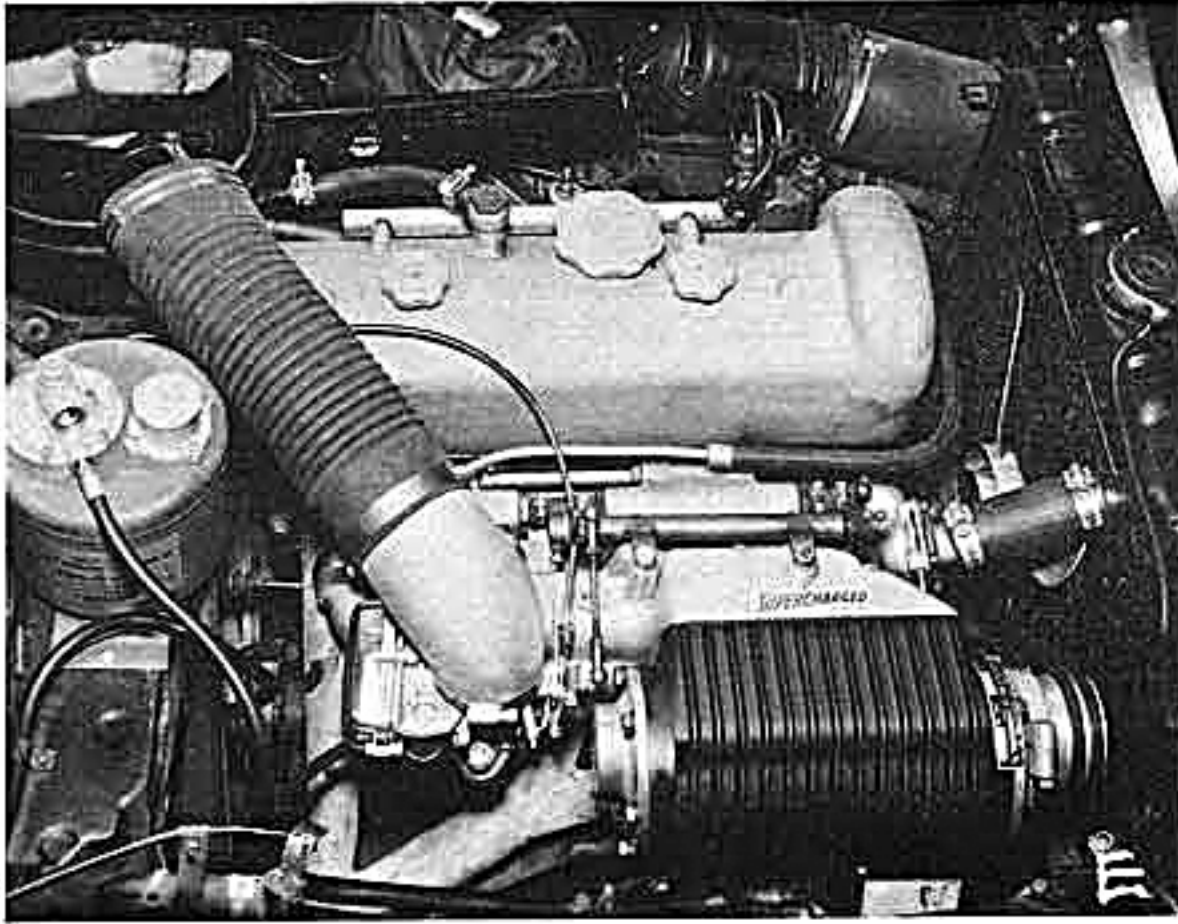
The most unusual thing about the Paxton supercharger is the unique ball planetary impeller drive. Most centrifugal blowers in the past have been handicapped by the need to step up impeller speed to four to six times crankshaft speed, to get the necessary tip velocity to build up pressure. They often used gear drives to do this, and these got noisy and wore out fast. But the Paxton design has four steel balls that roll between inner and outer "races" and step up impeller speed 4.4 times on the same principle as a planetary gear drive. The power is transmitted through the rolling friction of the balls. The whole deal is beautifully lubricated by a special oil pump inside the blower housing, drawing from an oil sump in the bottom of the casing. If you don't

*(Continued)*



*Judson supercharger installation on Chev Corvair rear engine. Uses special crossover pipe to opposite bank, with larger 2-throat carb.*





Standard Judson kit fits all models of the Mercedes 190 SL without any modifications—inside or out—and will cut 5 seconds off its quarter-mile time.

## SUPERCHARGERS

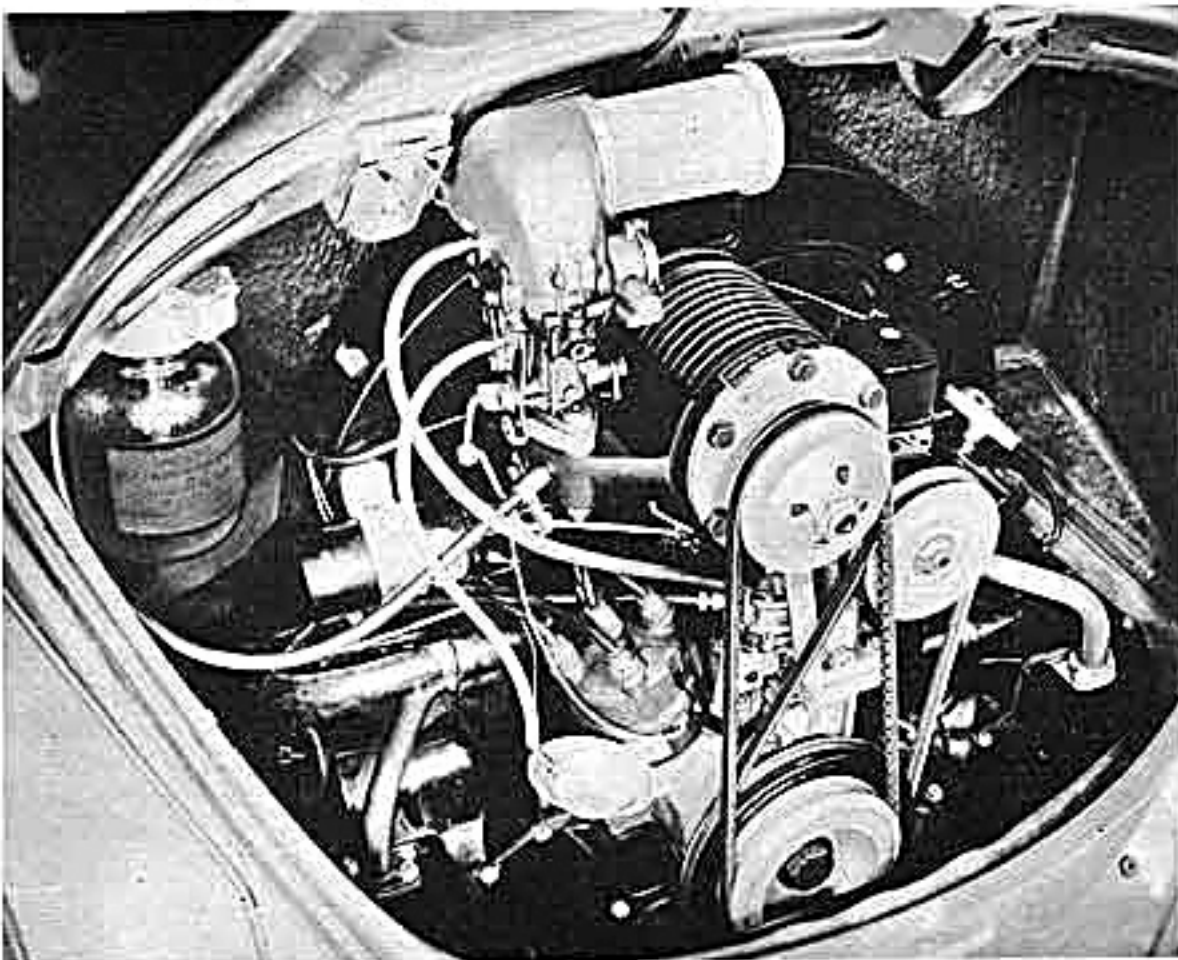
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overwind your engine and cause the balls to slip, this drive should last 100,000 miles!

Another unique feature of the Paxton kit is that the pressurized air is pumped through the carburetor, rather than mounting the carb on the suction side of the blower. This greatly simplifies the installation because you can use your

original carburetor mounted right on the original manifold. But, of course, it's necessary to make the carburetor pressure-tight—otherwise the blower pressure would just blow fuel out the vents. This can be done in several ways. Paxton supplies special kits to seal carburetors (gaskets, plugs, etc.) or, for some 4-barrel carbs, they have a big cast aluminum casing that goes right around the carb, so blower pressure would act on both sides of the stock carb

*A Judson supercharger can take a full 15 seconds off a Volkswagen's 0-60 time while reducing gas mileage by a small 2 miles per gallon.*



vents. This makes a little simpler installation. Or, for an extra \$41, you can get the Carter AFB 4-barrel that was designed for the supercharged Studebaker Avanti, which has been sealed and pressurized at the factory (it also has jetting matched to the blower). There are several alternatives here.

Paxton supercharger kits are now available for most Big Three models of the last 10 years, both Sixes and V8's, and for Studebaker V8's and International Scout sport trucks. (Kits for foreign cars have been discontinued.) These kits will include the supercharger unit, all necessary mounting brackets, bolts, screws, gaskets, hoses, fuel pressure regulator, pulleys, the notched V-belt for the drive from the crankshaft, air filter, carb pressurizing equipment—and a very good instruction booklet. Everything is there, ready to bolt on and go. The standard list price is \$365—with minor variations for certain models and accessory combinations.

It should be mentioned here that for an extra \$40 you can get a supercharger unit that has been specially modified for competition, with higher spring tension on the ball drive to allow higher blower speeds without slippage. Also, you get different pulley sizes to put the impeller speed up to around 50,000 rpm and give 8 to 12 lbs. boost pressure. These Paxton competition blowers give pretty decent power; but remember that the high spring tension on the balls will cause faster wear in normal street driving, so the modified unit is recommended *only* for track competition.

But certainly the standard kit is worth \$365, if it will knock a couple of seconds off your 0-60 mph time and 1 or 1.5 seconds off your e.t.'s at the drag strip. The improvement may be even better than this on a weaker 6-cylinder model. Address to write: Paxton Products, 929 Olympic Blvd., Santa Monica, Calif.

### JUDSON

The Judson Research & Manufacturing Co. of Conshohocken, Pa., has been making small vane-type superchargers for smaller American and foreign engines for many years. Bolt-on kits are available for models like the Volkswagen, Chevy Corvair, Austin-Healey Sprite, MG's, Triumph TR's, Mercedes-Benz 190, Renault and Volvo. Prices vary widely from \$144 to \$365, depending on the size of the blower and the parts required to adapt it to the engine. All kits have the usual brackets, drive pulleys, notched V-belt, manifold adaptor tube, etc., but it's a relatively simple bolt-on installation. Clear instruction sheets help.

The vane-type supercharger has an eccentric drum rotating inside an outside drum, with sliding vanes working in the inner drum to scoop air around



from the inlet to outlet. It compresses by squeezing the slug of air as the drum rotates, and by packing it into the manifold faster than the engine displaces it. The vanes are cam-controlled and theoretically don't rub on the outer drum. There is a clearance between the vane tip and the drum of a few thousandths to give long life—but still not enough to cause excessive slippage of air back past the vanes. Your pressure output goes up swiftly with RPM from the low end, then stays steady from medium RPM on up. This gives very good mid-range torque—much better than the centrifugal blower with its deep drop-off in pressure at the low end.

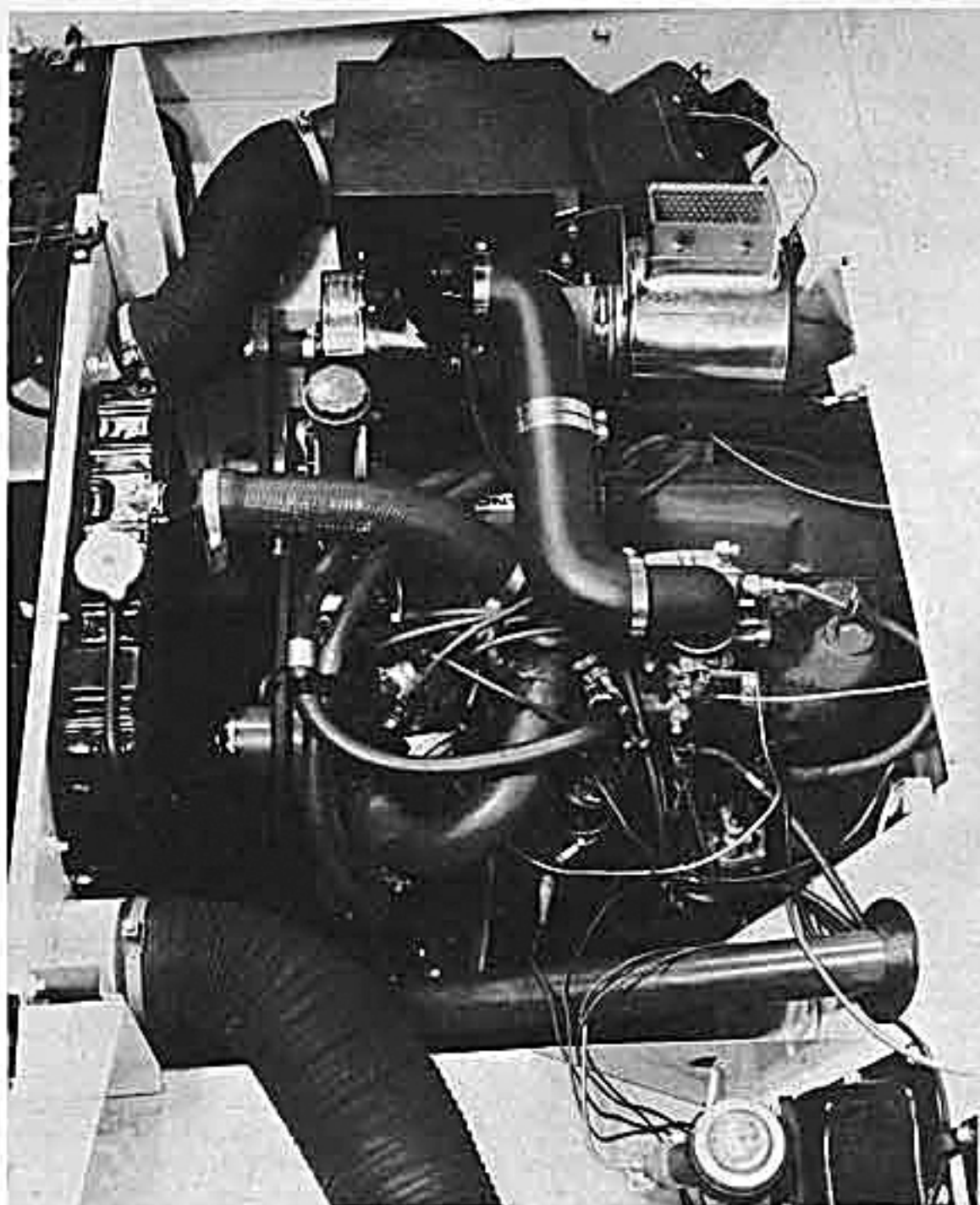
But these same limitations explain why we have vane-type superchargers only for small engines. Due to the eccentric nature of the mechanism, and the rubbing contact in the vane control cams, we can't turn the thing very fast—only about 6000 rpm on these sizes. This greatly limits the pumping capacity. The available sizes here can push 5 or 6 lbs. pressure on engines up to about 150 cubic inches—but you'd need a blower the size of an ashean to pump 6 lbs. on a 400-cubic inch engine! So we'll have to be satisfied with blowing only the smaller engines with the Judson vane supercharger. But you can still get at least 40% power boost on engines under 100 cubic inches—and with kit prices under \$200, it's a steal on the horsepower-per-dollar angle.

One thing to watch on Judson superchargers: They use drip-feed lubrication from an integral reservoir for the bearings and cams. Obviously you won't get much lubrication when the oil is cold and thick, since it won't drip properly through the orifice. Judson blowers have shown some bearing trouble in very cold climates. They're best in warmer weather.

#### LATHAM

Norman Latham has been building a unique "axial flow" supercharger for several years. The principle here is to have a number of fan-like vaned impellers rotating in a drum-shaped housing. There are 10-12 impeller stages (depending on the size of the engine on which the supercharger is to be installed) with stationary guide vanes between each one to keep the air going in a more or less straight axial motion. Without the stationary guide vanes, the air would flow through the housing in a swirling spiral that would prevent each succeeding impeller stage from getting a bite on the air mass. What the impellers actually do is to accelerate the air mass to a high velocity at the outlet chamber, in several steps or stages. Then the velocity energy is converted to pressure just like in a centrifugal blower. The principle is essentially the same. We're using air

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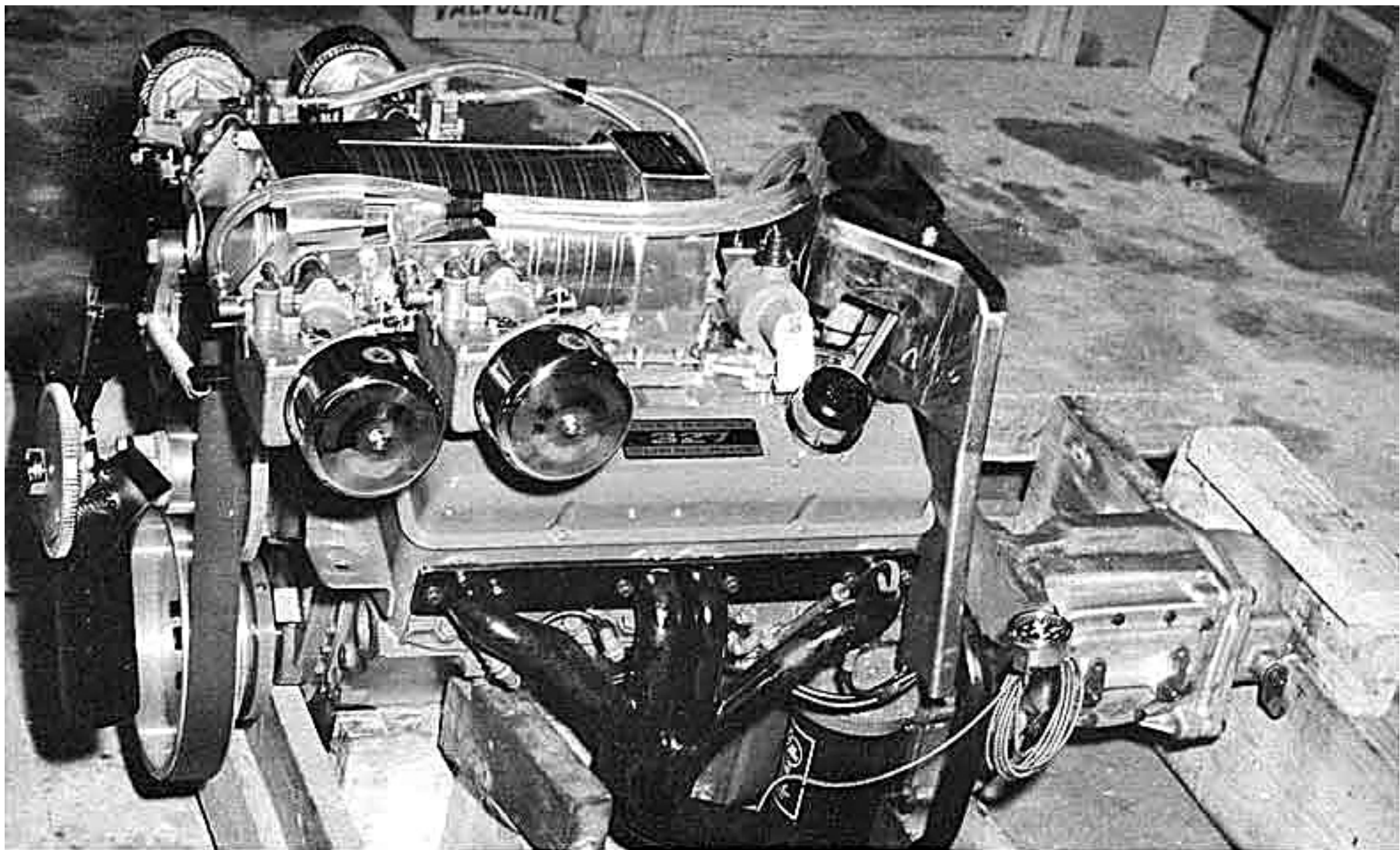
*Paxton supercharger kit on a Tempest slant four engine. Blower is bracketed on right side, belt-driven from crank, has air pipe feeding into stock carburetor and manifold. Pressurizing carb simplifies installation.*

### MODEL AVAILABILITY OF JUDSON SUPERCHARGERS

MODEL	FOR	LIST
VW-I	VOLKSWAGEN—36 HP	\$144.00
VW-II	VOLKSWAGEN—40 HP	\$144.00
VW-I-GHIA	KARMANN GHIA—VW—36 HP	\$159.00
VW-II-GHIA	KARMANN GHIA—VW—40 HP	\$159.00
SP	AUSTIN HEALEY SPRITE, MK II and MG-MIDGET	\$165.00
RD	RENAULT DAUPHINE	\$165.00
CO	CHEVROLET CORVAIR—ALL MODELS	\$232.00
TR	TRIUMPH TR-3, TR-3A and TR-4	\$232.00
VO	VOLVO PV 544 and 122 S (B 16)	\$232.00
MG	MG-A 1500, 1600 and MG II	\$248.00
190	MERCEDES BENZ 190 SL	\$365.00
	SUPERCHARGER GAUGE—complete with fittings	\$12.60

**PRICE COVERS COMPLETE SUPERCHARGER KIT**





*Latham axial-flow supercharger installation on 327 Corvette engine. This is the competition kit, with four side-draft Carter carbs and 1 1/2-inch flat belt. Pumps 8 to 12 lbs. pressure, gives 30 to 40% horsepower boost on engines up to 400 cubic inches.*

## SUPERCHARGERS

*Continued*

momentum or inertia to do the supercharging. And, by the same token, these impellers must rotate at high speeds just like the centrifugal. Working speeds run from 20,000 to 30,000 rpm on the Latham axial flow.

The biggest advantage of this type of blower is that it uses a long, low blower housing that is well adapted to mounting on top of a V-8 engine. The outlet chamber at the rear can adapt directly to the stock intake manifold, and the front is right in position for a belt drive from the crankshaft pulley. Latham does this with an unusual *flat* wire-reinforced rubber belt that runs on flat pulleys—a large one on the crank and a small one on the blower (ratio about 5-to-1). This flat belt seems to be more reliable and long-lived than a V-belt, and seems to have ample capacity to handle the 15 or 20 horsepower necessary to drive the blower at high speeds.

Carburetion is the toughest problem with the Latham layout. There is no practical way to utilize the stock carb. What they have had to do is put special stub manifolds on the front inlet housing of the blower unit, to mount from two to four Carter Type YH horizontal *side-draft* carburetors. (These were used on the early 6-cylinder sports en-

gines like the Nash Healey and Corvette six in the early '50s.) These side-draft carbs make a very neat installation with the long, low blower housing; but you need four of them to get adequate venturi area on a big-inch engine—and this kicks up the price of the kit.

Right now Latham can supply bolt-on kits for all Ford Motor Co. V8's since the old flathead (that one too), the Falcon six, all Chevrolet V8 engines, the Corvair six, Pontiac V8 and Tempest Four, all late Chrysler V8's, Valiant six, the large V8's from Cadillac, Buick and Olds, Rambler V8, and the 6 cylinder Jaguar and Mercedes-Benz 300 SL engines. The standard kits run from \$445 to \$595 and generally use the stock manifold, two Carter carbs and a 1 1/2-inch belt. The special competition kits use four carbs and 1 1/2-inch belt and range in price from \$565 to as much as \$995 on the more complex kits that require many special adaption parts. It should be noted here also that Latham caters a lot to the marine market with these axial flow superchargers. Many of the above car engines are manufactured in special marine conversions and Latham can supply kits for all these too.

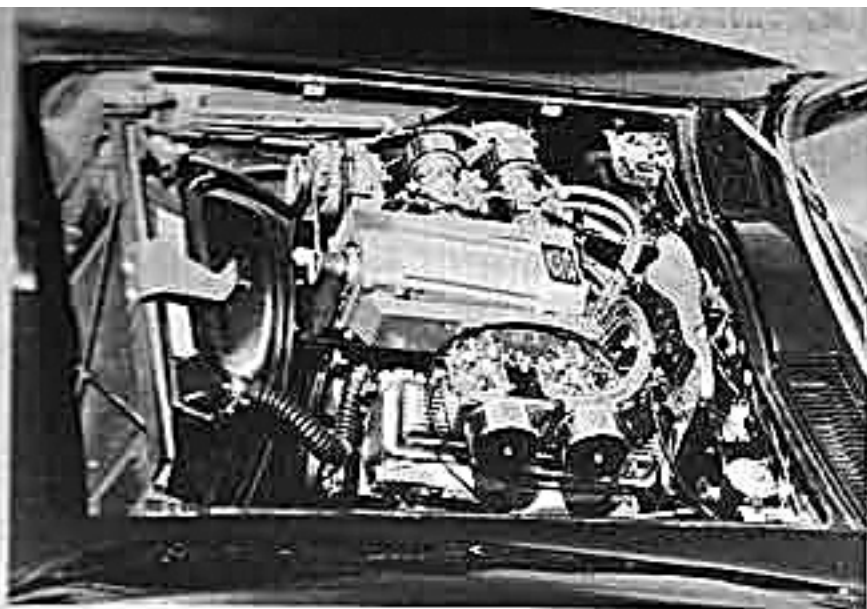
This is really a hefty supercharger with four Carter carbs. It will give usually 8 to 12 lbs. pressure at 5000-6000 rpm crank speed, and anywhere from

30 to 45% peak horsepower boost on various engine sizes. Also, the pressure seems to fall off less at lower speeds than with the centrifugal-type blower, so mid-range torque is helped more. Gas mileage is usually improved, under equal driving conditions, because the impellers act as atomizers to improve mixture distribution between cylinders. It's a good package. Address: Latham Manufacturing Co.; PO Box 165; West Palm Beach, Fla.

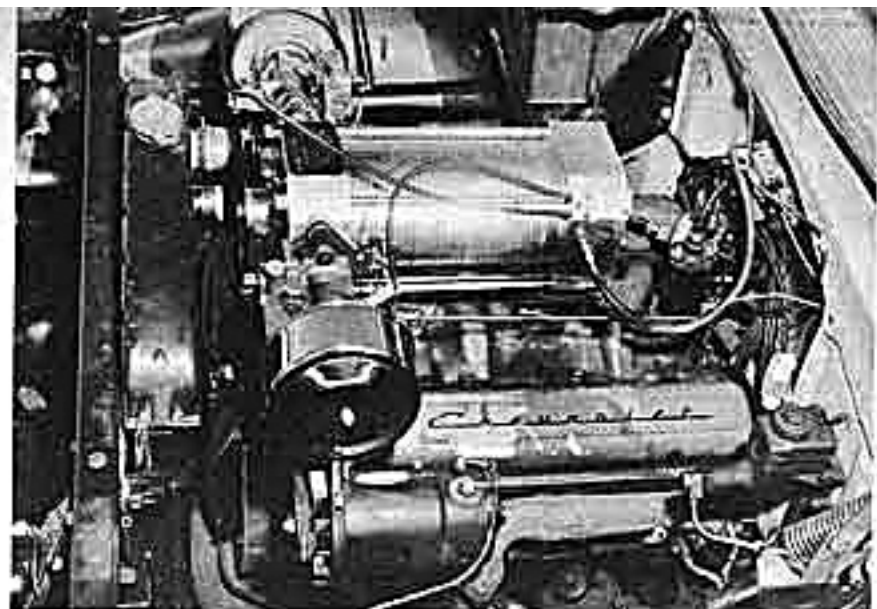
### FUTURE OUTLOOK

You're probably wondering what became of the famous GMC Roots-type supercharger on this list of bolt-on street equipment. This is all but standard equipment in the competition field. And there is little question that it would make a good base for a street blower system—as the unit itself is highly developed and will take hundreds of thousands of miles of abuse. (It was originally designed for diesel trucks.) The only trouble is that it's just too big to fit under the hood of a modern passenger car. There's no room to put it in front of the engine. You could put it on top of a V8, blowing directly into a special manifold, but then there would not be any room for carburetors to mount on top of the blower housing. The Cragar Equipment people have tooled up a special trunk-type curved carb adaptor to fit the top of a GMC blower and let the carb mount to the





Even the larger competition kit will fit under a Sting Ray's hood without any body modifications whatever. A special manifold (included with the kit) moves the carbs back over the engine where hood clearance is adequate.



Latham kit on a 1955 Chevrolet 265-cubic inch V8. This is the standard kit, with two Carter YH carbs and the 1½-inch belt. Note that the rear of the blower housing fits right over the stock manifold inlet, adapts directly with special plate.

left side of the housing. It looks good on paper, but a second glance will show that the gasoline has to run uphill into the blower. It doesn't like to do this on a cold morning! In fact, the throttle response under any conditions with this uphill manifold is quite poor. You could probably live with it on the street—but it wouldn't be much fun.

So, if you can figure a way to adapt the GMC supercharger to a practical

bolt-on kit for street engines, you might make yourself a million dollars!

However, I do feel there are many possibilities for adapting existing commercial exhaust turbochargers for passenger cars. These units can be placed anywhere in the engine compartment and only require special exhaust and inlet ducting leading to and from the unit. You could even use the stock carb on the stock manifold by pressurizing

it, like Paxton does. There have been persistent rumors of several hot rod supply companies experimenting with bolt-on turbocharger kits—and I would not be surprised to see some fireworks pretty soon. I certainly hope so. The turbocharger is inherently trouble-free, reasonably inexpensive and has no drive problems. We'll see.

END

### MODEL AVAILABILITY OF LATHAM SUPERCHARGERS

	Standard Kit	4-Carb Competition Kit
<b>FORD MOTOR CO. V8 Engines:</b>		
L-Head		
239 thru 312 c.i.	\$445.00	\$565.00
Early T-Bird thru 1957	495.00	650.00 #
352, 390, 406 c.i. (incl. late T-Bird and Dearborn Mar.)	---	650.00 #
383, 410, 430 c.i.	---	735.00 # *
Chris-Craft (Lincoln) 430 c.i.	---	735.00 # x
Dearborn Interceptor 272, 292, 312 c.i.	---	685.00
Dearborn Interceptor 221, 260, 289 c.i.	495.00	665.00 #
Fairlane 221, 260, 289 c.i.	495.00	595.00 #
Falcon and Comet Six	495.00	595.00 #
	595.00	---
<b>CHEVROLET V8 Engines:</b>		
265, 283, 327 c.i.	495.00	650.00 #
348, 409 c.i.	---	595.00
Corvette 283 and 327 c.i. (incl. Sting Ray)	---	650.00 #
Corvair-Six	495.00	---
Chris-Craft and MerCruiser 283, 327 c.i.	495.00	595.00
<b>PONTIAC V8, Tempest V8</b>		
Tempest-Four	495.00	610.00
	495.00	---
<b>CHRYSLER V8 Hemispherical Auto Engine</b>		
Imperial Marine	---	735.00 #
B Engines 361, 383, 413 c.i. and Marine	595.00	690.00 # *
Dodge, Plymouth 318 c.i. and Marine	---	650.00
	495.00	595.00
<b>OLDSMOBILE ROCKET V8</b>		
	495.00	640.00 #
<b>CADILLAC V8 (incl. '63 and later)</b>		
	595.00	690.00 x
<b>BUICK V8 (large c.i. engine)</b>		
	---	650.00 #
<b>GRAY MARINE V8 Model 188, 225, 238 (Rambler)</b>		
	495.00	595.00
<b>MERCEDES 300 SL (3 carbs)</b>		
	---	995.00 # x
<b>E-JAGUAR (3 carbs)</b>		
	---	995.00 #
<b>COMPRESSOR ASSEMBLY 11-Stage incl. carbs</b>		
	395.00	505.00
<b>COMPRESSOR Only 11-Stage and idler</b>		
	345.00	---

# Includes Special Intake Manifold

\* Includes Special Mallory Distributor With Latham Advance Curve

x Includes Stewart-Warner #240A Electric Fuel Pump