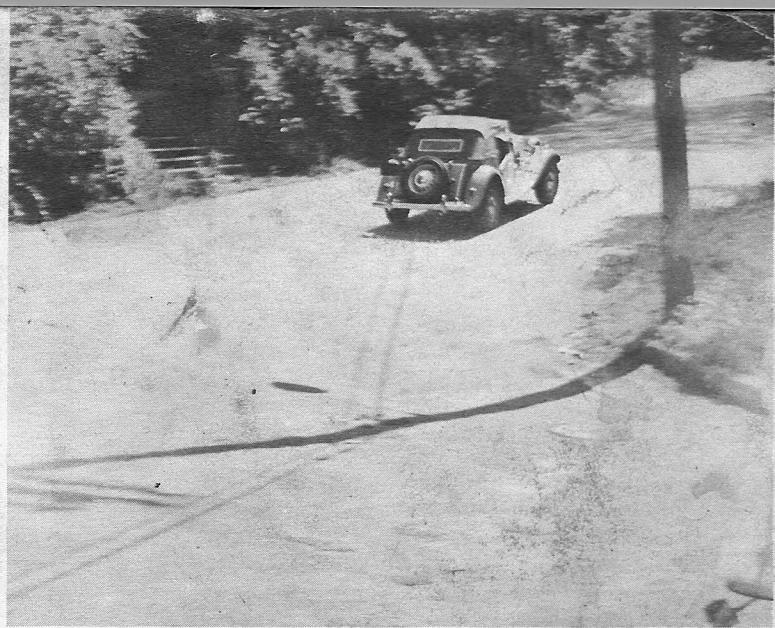


BOLT-ON POWER

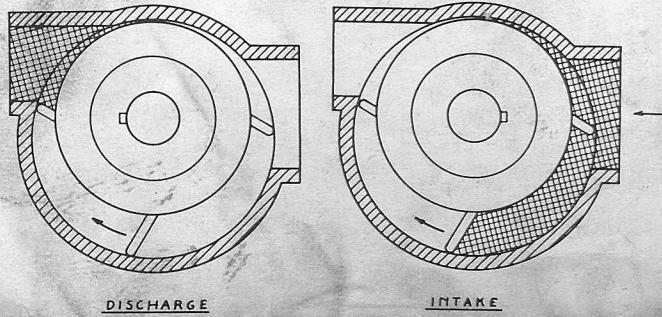
By JOSEPH B. DALE

Photos by BILL SCHROEDER

Reprinted from
October 1954 Motorsport



Joe Dale's MG TD levels winding hill with ease after installation of a Judson supercharger. Actual working time to install blower was less than four hours.



Rotating drum in supercharger case is eccentric to the axis of case. Mixture enters the intake port when the volumetric capacity between the two (of four) rotor blades at that point is greatest. As the rotor rotates, the volumetric capacity between the two blades is reduced thereby compressing the mixture. When the volumetric capacity between each two blades reaches a minimum, the lead blade passes the exhaust port and releases the pressurized mixture.

► "Supercharging gives your engine more power . . . increased torque . . . faster acceleration . . . less gear shifting . . . extra power when you need it." These words from the Judson Research and Manufacturing Company literature sounded sweet if somewhat optimistic at first reading, but that was before mounting their new positive displacement rotary-vane supercharger on my 13,000-mile-old MG TD. After putting it through its paces and comparing notes on its present vs past performance, there can be no doubt about the value of blowing.

Of course, supercharging the automobile engine for more power is not a recent development. The principle was understood and was translated into practice in automobiles and airplanes in the early 1900's. From the first supercharged Chadwick Six in 1906 to the last blown Graham in 1941, many stock production American cars were equipped with one type or another of the power-adding devices. Despite a long record of successful use all over the world, however, a number of un-

founded myths seems to have delayed public acceptance of the blower.

Basically, the performance potential of any internal combustion engine depends on its volumetric efficiency, or ability to take in air and fuel in the proper explosive mixture. In the stock engine this efficiency falls off drastically just as it is most needed as engine rpm climb. In addition, the unblown engine relies solely on the suction created by the intake stroke of each piston to move the explosive mixture, or charge, into each cylinder.

There are several types of blowers for automobile engines including centrifugal, lobe and rotary vane designs. The centrifugal supercharger forces the mixture into the manifold by rotating a fan-like disc at high speed. Because of its design, the centrifugal blower seemed destined to be considered only for high rpm, constant-speed applications. Until the introduction of the McCulloch variable-gear supercharger none had proved satisfactory for stock engine use. The lobe-type blower builds up pressure within the manifold and its

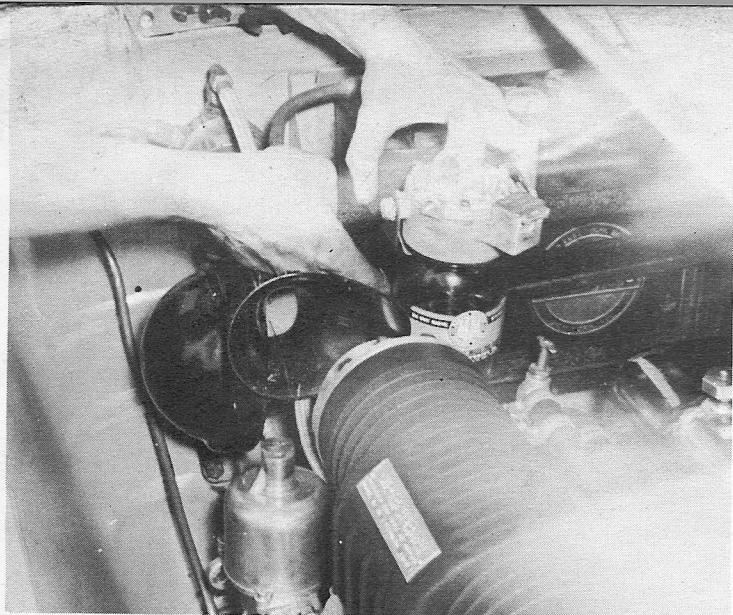
effectiveness fades as the engine's demands grow greater at high rpm. The rotary-vane blower compresses the mixture within the supercharger case itself insuring high efficiency throughout the engine's speed range.

In the blown engine all cylinders receive a uniform mixture regardless of engine speed and the induction of the charge no longer depends on the suction of the piston. Rather the mixture is forced into each cylinder under a pressure greater than the normal 14 pounds per square inch available at sea level. A stock engine, blown to produce a boost of six pounds, should show at least a 30 percent horsepower increase.

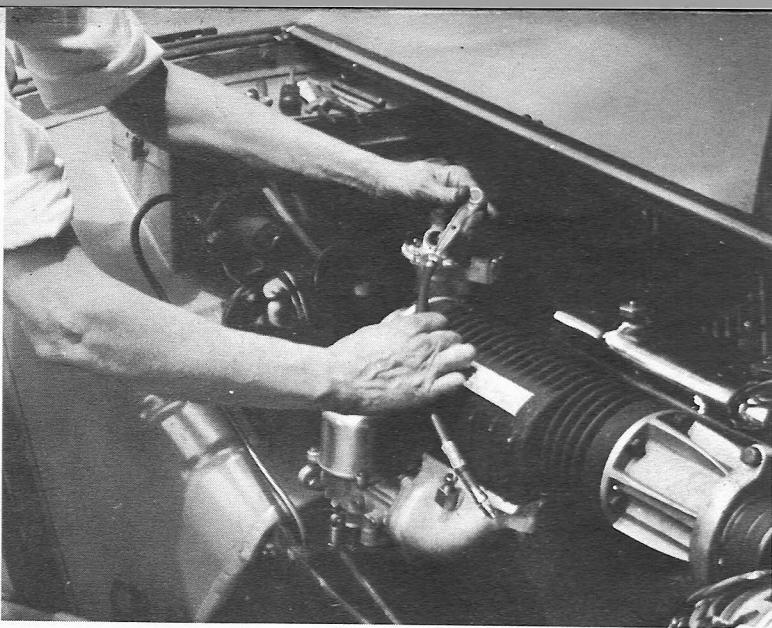
In effect, a supercharger is a mechanical device for increasing an engine's compression ratio without requiring the use of special fuels. The increased compression ratio is achieved in two stages; the first within the blower, the second within each cylinder.

The actual compression ratio increase is dependent on the amount of pressure boost produced by the supercharger and

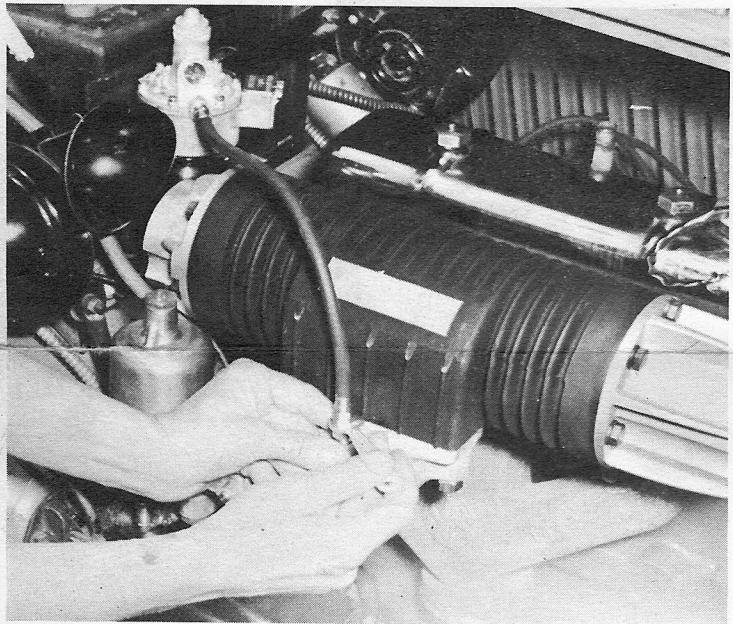
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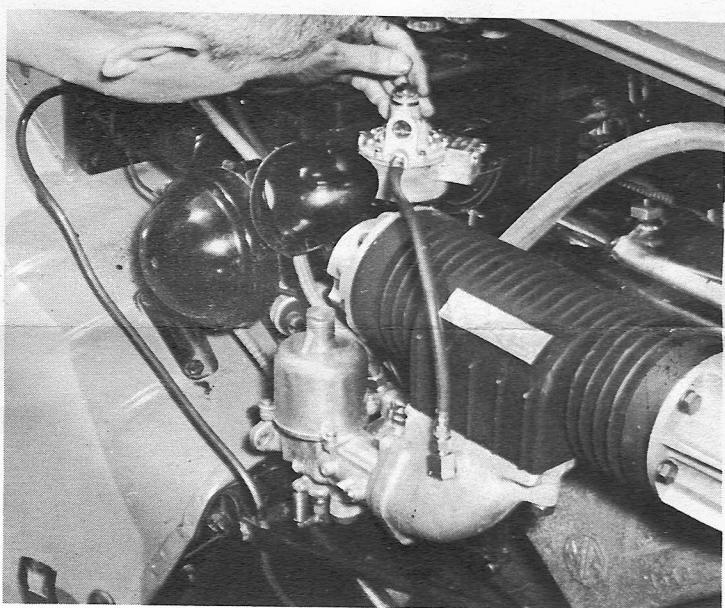
12. Loosen support bar holding battery and insert flat plate on the oiler bracket between the battery and support bar. A special . . .



13. . . . flex hose, also supplied with the supercharger installation kit, is next mounted between the oiler and the fitting in the . . .



14. . . . supercharger, providing lubrication to the bore of the case. The main rotor bearings are greased and sealed at the factory.



15. . . . start the engine and adjust lubrication rate of the oiler to approximately one drop of oil every five seconds at idle speed.

Bolt-On Power

the horsepower output of a blown engine will increase in direct proportion to the amount of boost. The Judson MG-26 supercharger operates at a controlled pressure of 6 to 6.5 psi, raising the actual compression ratio in my MG TD to 10.1-1. The turbulence caused in the passage of the fuel-air mixture through the supercharger permits operation at this compression ratio without difficulty.

In order to compare the performance of my MG TD in both the blown and unblown versions, several standing-start runs were made up a half-mile-long, steep and winding hill. The hill could be negotiated in 55 seconds by the un-

blown MG at a constant 2000 rpm in third gear for most of the run and 3000 rpm in second for the last few hundred feet. In another run, the unblown version climbed the hill in second gear all the way, turning a constant 3000 rpm, in identical time—55 seconds.

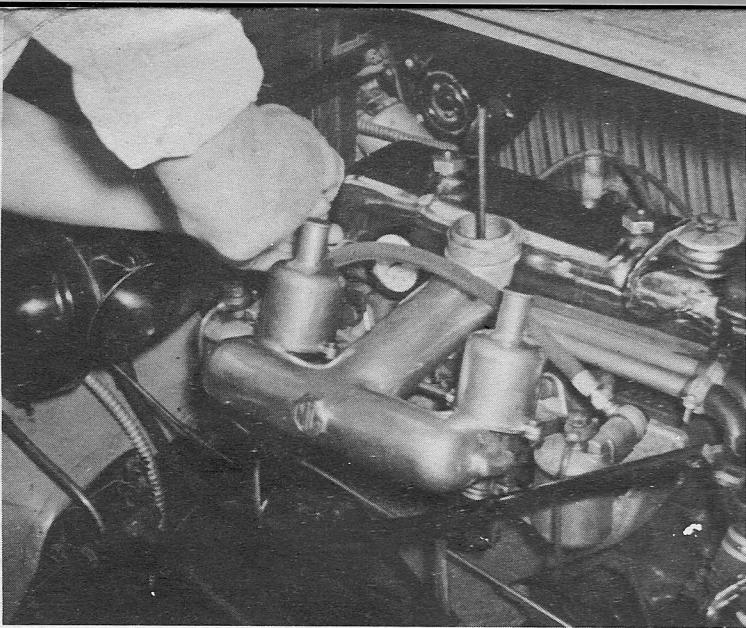
The blown MG levels the hill in 43 seconds at a constant 3000 rpm, using fourth gear all the way except for the last few hundred feet where I dropped back into third. In third gear it would be possible to rev to 5000 rpm with ease, but for comparison purposes engine speed was purposely held to 3000 rpm.

It seems safe to say that the Judson will produce an increase in performance in direct proportion to the performance of the engine before it was super-

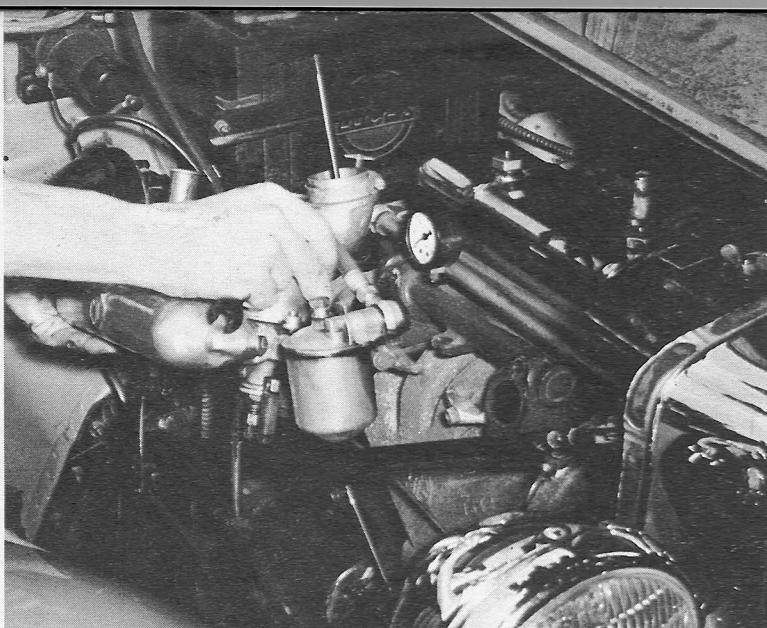
charged. Although the method used to compare the blown and unblown engine may vary, some preferring dynamometer tests for instance, the relative difference between the two is obvious.

As to whether a supercharged car is suitable for everyday driving, one need only check the statement in Judson's literature that "less gear shifting" is required. It's true. In normal traffic encountered in home to work driving, I've found considerably less shifting is needed to get the car from point to point.

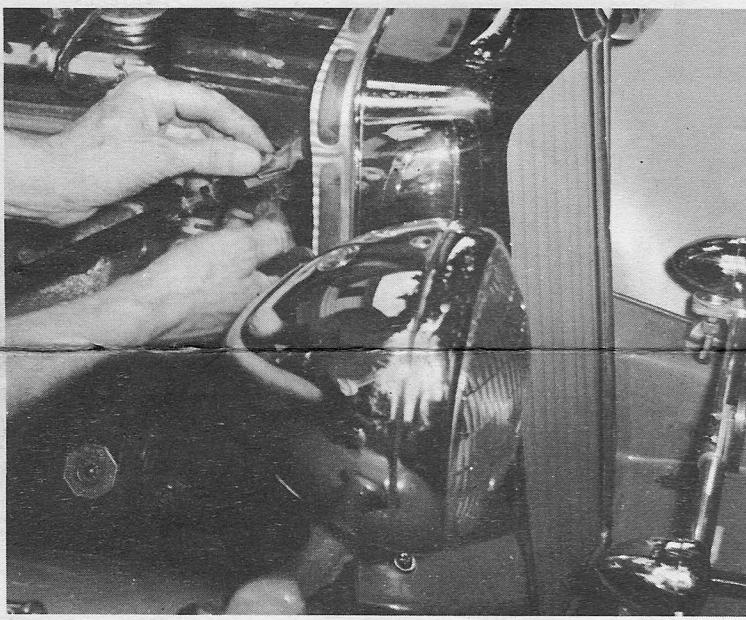
One Judson blower owner summed up the improved performance in his car this way, it's "like adding two more cylinders". He may not be precisely correct, but he is too close for much real argument. None from me, at any rate.



1. The MG hood may be taken off, by removing two screws at rear of hood, to provide working room but it is not necessary. The air . . .

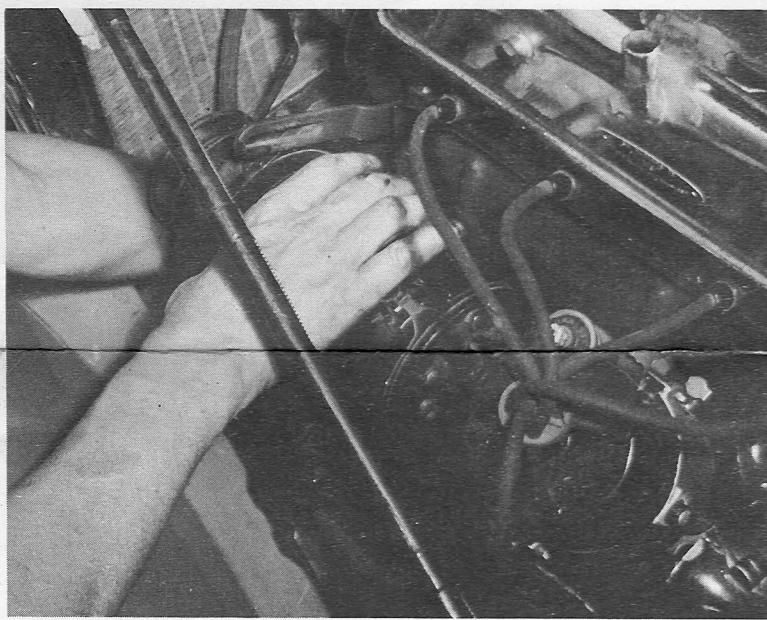


2. . . . cleaner, fuel lines and carburetor linkage are first removed. The stock carburetors are then unbolted and removed as a unit.



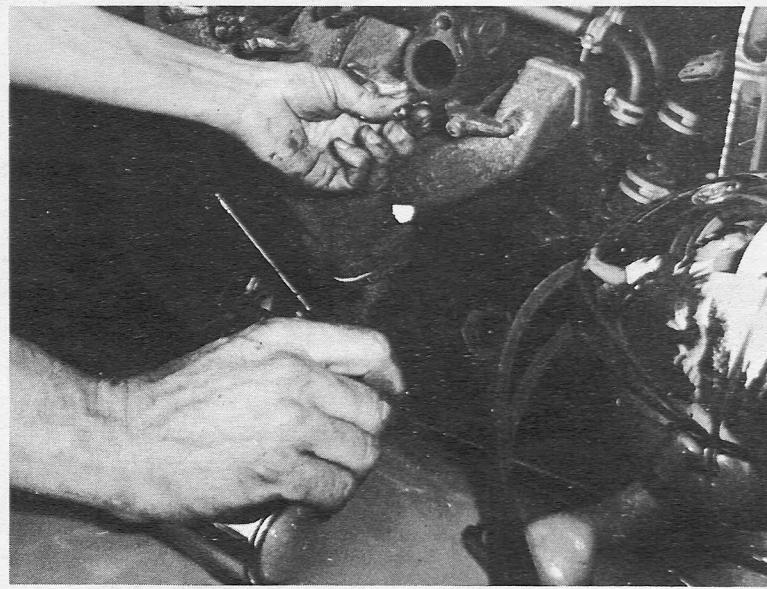
3. The radiator brace on the right side is removed from the top of the radiator only and is placed against the bottom of the fender.

5. . . . Judson pulley making sure original key is lined up with key-way in pulley. Replace original bolt and washers and tighten . . .



4. On left-side of engine: generator is loosened and belt removed. Crankshaft pulley bolt is removed and pulley is replaced with . . .

6. . . . with hand crank while car is in gear. Aligning stud is used to aid in mounting blower; discarded later. (Continued on Next Page)

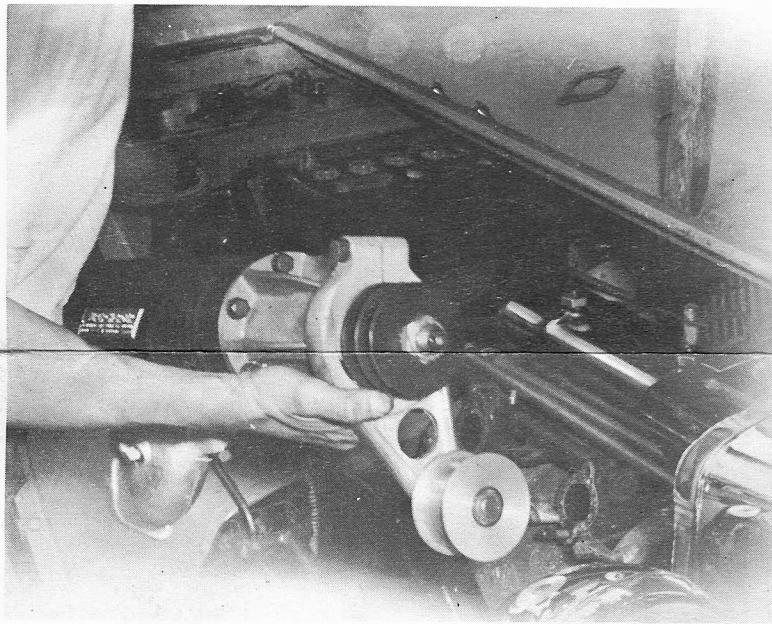


BOLT-ON POWER

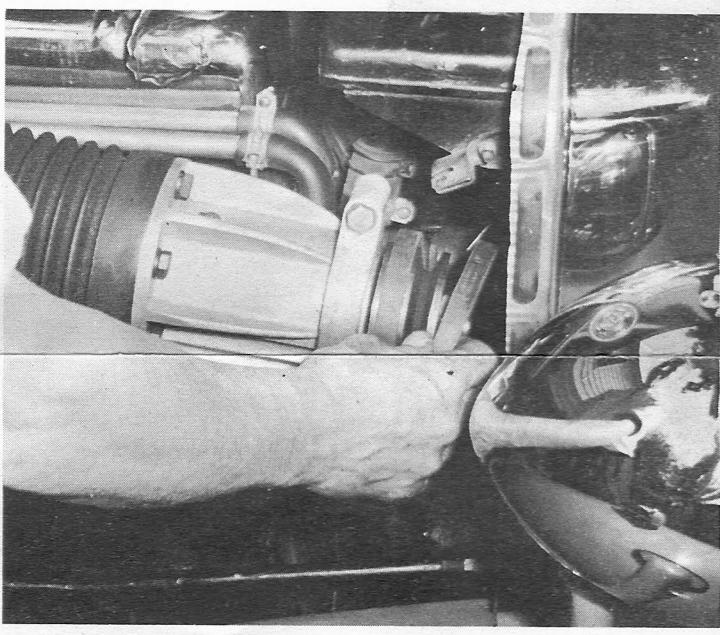
INSTALLATION STEP-BY-STEP CONTINUED



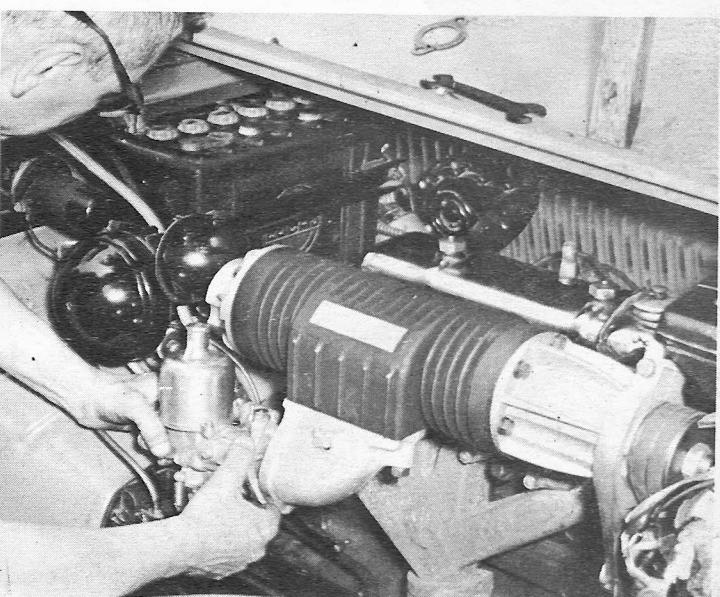
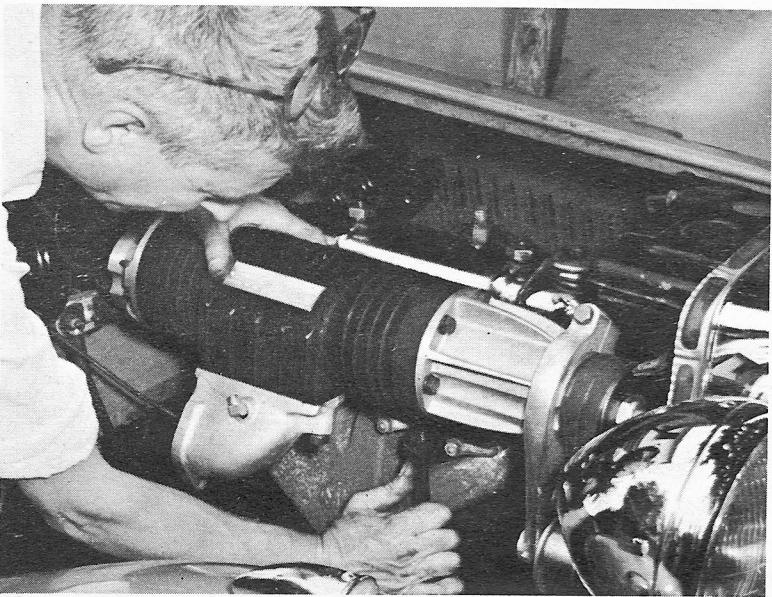
7. Remove all paper seals from the supercharger ports. Unbolt right-side horn and tilt up to provide clearance to mount the blower.



8. The supercharger is eased into position on the manifold using the aligning stud as guide. Use new gaskets between blower-manifold.
10. . . . out of way until supercharger is firmly bolted to manifold using original bolts and lockwashers. Adjust idler pulley tension.



9. Supercharger is tilted forward on stud to permit installation of blower drive belts. Idler pulley bracket is loosened; swung . . .
11. Carburetor, supplied with the supercharger kit, is installed using original throttle linkage. Connect fuel line to carburetor.



ADDENDA TO INSTRUCTIONS
JUDSON MG-26
SUPERCHARGER INSTALLATION

Screw 3/8" stud furnished in front bottom hole of manifold to act as guide and support for supercharger until first bolt is inserted as per paragraph number 7 of instructions. Discard stud on completion of installation. The original carburetor bolts which are used for mounting the supercharger on the manifold are of sufficient length to develop the full strength of the bolt and longer bolts are not required.

Refer to paragraphs 2 and 14 re radiator brace. Radiator brace on manifold side of engine can be removed completely and not replaced.

The throttle lever ball is used from the original carburetor throttle arm. In the event that the throttle will not return to idle properly or if the pedal pressure is sufficient, the throttle spring should be shortened approximately 1".

We do not recommend increasing the compression ratio beyond MKII specifications. If the head has been removed from the engine it is essential that the nuts be tightened with a torque wrench in accordance with factory specifications (50 ft. lbs.)

IDENTIFICATION PLATE: An identification plate for fastening to the side of the hood is included with the installation.

CARBURETION: The carburetor should be adjusted on the rich side for best performance and the proper setting will have to be determined by the performance of the car on the road. If an exhaust gas analyzer is used for tuning, the carburetion should be set between 70 to 75% of combustion efficiency.

IGNITION: The complete ignition system must be in good condition and properly set on a supercharged engine. Timing and points must be set in accordance with the MG factory specifications (top dead center, dwell 49 degrees on dwell indicator). The crankshaft pulley furnished with the installation is marked for timing.

LUBRICATION: Remove screw and place a few drops of oil in the top of front housing every time lubricator is serviced or every 300 to 500 miles.

NOISE: The supercharger may be very noisy when it is first started or within the first half hour of operation. This noise is nothing to be concerned about and will disappear completely within the first 20 to 40 miles of driving. A slight clicking noise will be heard from the supercharger on de-celeration after a long hard run on the engine. This same noise is also sometimes apparent when the engine is first started or when the engine is cold.

COMPETITION: The drive ratio used on the standard Judson MG-26 Supercharger installation gives a 6 to 6½ p.s.i. boost pressure in the manifold and is recommended when the car is to be used for every day driving. In the event that the car is to be used in competition, a larger pulley for the crankshaft is available, which increases the manifold boost to 8 p.s.i. Larger pulley is not recommended for MKII and TF models or where compression ratio has been increased beyond 7.25:1. Order competition pulley No. 833S. Price is \$4.75 postpaid.

MANIFOLD PRESSURE: A supercharger replaces the vacuum in the manifold with a pressure in proportion to the load placed on the engine. A correct pressure reading cannot be made without a load being placed on the engine.

INSTALLATION DATA, MODELS TF-TC AND TB

IF MODEL ONLY: It is not necessary to remove the side panel to make the installation. The procedure for mounting the Judson Supercharger on the TF engine is the same as that required for the TD (both engines are type XPAG). Because of body changes however, the following additional steps are required:

1. Bend up or remove the corner of right angle radiator stiffner on back of radiator water tank. Approximately 3/4" in on corner is sufficient.
2. Notch out angle section on side panel of hood for pulley clearance. Notch is 3-1/2" long and starts 4-3/4" from rear of radiator shell.
3. Remove one bolt from fender brace bracket and rotate bracket to a vertical position to allow for belt clearance. Turn bracket so that fender brace just clears the fan.
4. Remove front hood latch from side panel and catch bracket from the hood.
5. Use four bolts included with installation to replace studs in the manifold. Insulators located between carburetors and manifold are not used on the supercharged engine.

TB AND TC MODELS ONLY: In order to install the Supercharger on these models the following additional steps are required:

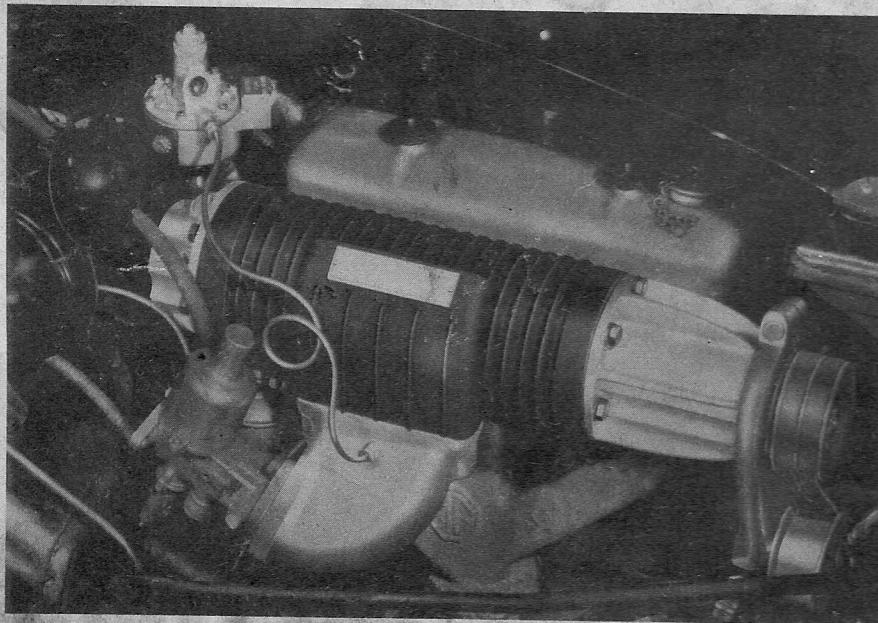
1. To remove and install the pulley on the crankshaft it is necessary to loosen the engine mounts and jack up the engine approximately 2".
2. Discard the radiator brace on the side of the engine that the supercharger is mounted.
3. Remove a small section of the radiator web near the top of the radiator where the brace was fastened to clear the idler bracket.
4. Bolt a spacer between the fan and fan pulley using longer fan bolts so that the fan will clear the belts. This spacer and bolts are standard on the MG-TB.
5. Slightly notch opposite corners of the fan blades to clear the radiator cross bracket which attaches to the headlamp brackets.
6. On right hand drive models, the fuel line has to be replaced with one 3" longer or an extension and fitting used.

JUDSON RESEARCH AND MFG. CO.
Conshohocken, Pa.

JUDSON

SUPERCHARGER MODEL MG - 26

INSTALLATION — DATA — SERVICE — PARTS LIST



MG Models, T3-TC-ID-MK II

INSTALLATION

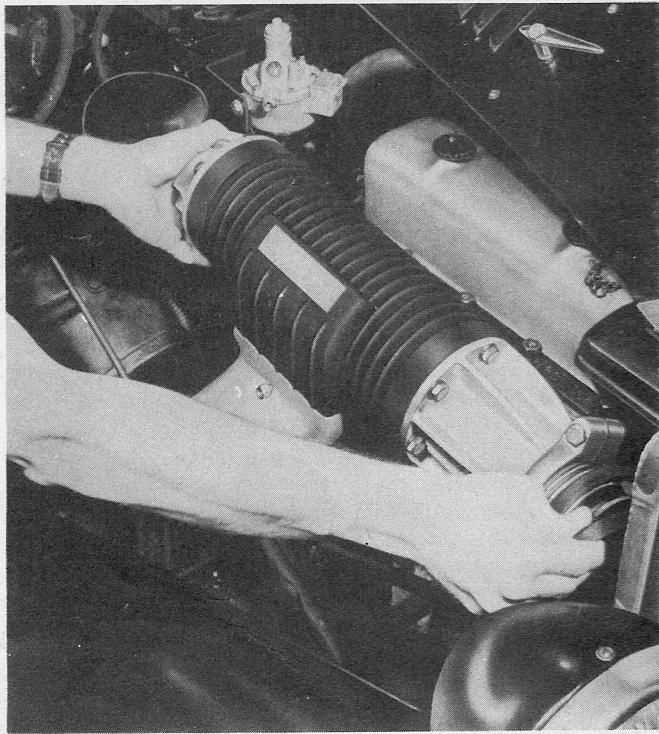
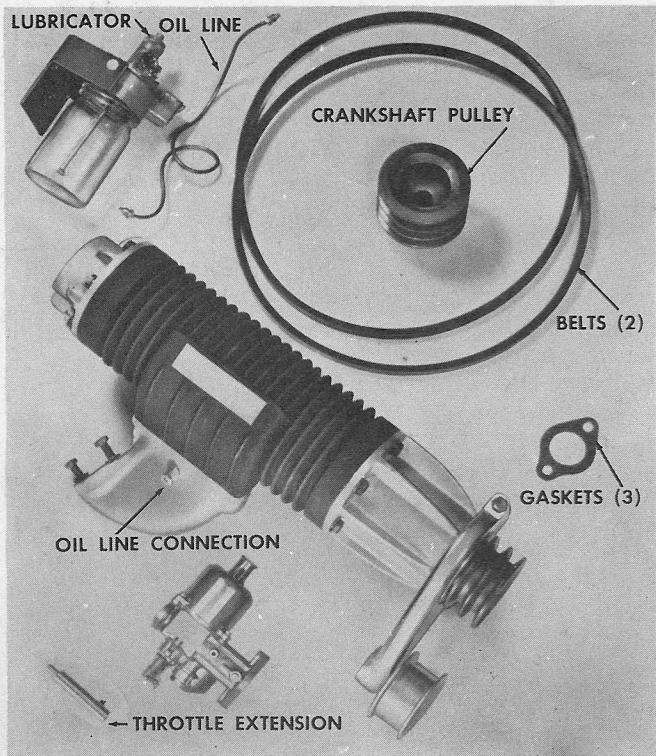
Read instructions and information under data thoroughly before proceeding with the installation. Instructions are presented in a step by step sequence.

1. Remove the hood by removing the rear bracket on cowl and sliding the hinge out of radiator bracket. Remove the air cleaner and carburetors from the engine.
2. Disconnect the radiator brace on this side of the engine from the top of the radiator **only** and rest on the bottom of the fender.
3. Remove the bottom bolt holding the horn to the bracket. Loosen the top bolt and raise the horn to clear the supercharger and tighten the bolt. See illustration for approximate angle of horn. Lower bolt is not replaced and the one bolt is sufficient to hold the horn rigid.
4. **GO TO THE OTHER SIDE OF THE ENGINE.** Loosen generator clamp, release tension on belt and remove belt from the engine.
5. Remove the crankshaft pulley from the engine—in very few cases is it necessary to remove the radiator to accomplish this. The bolt on the end of the crankshaft holding on the crankshaft pulley can be removed with a standard $1\frac{1}{8}$ " socket or any large adjustable wrench. Car should be in gear while this

bolt is being removed and replaced. After the bolt has been removed the original crankshaft pulley can be pried off by using two screw drivers, one on each side of the pulley. Place the Judson crankshaft pulley on the crankshaft making sure that the original key is lined up with the keyway in the pulley. Replace the original bolt and washers to hold on the crankshaft pulley. Tighten crankshaft bolt with the hand crank and car in gear. Care should be taken in removing the original pulley so that the crankshaft and key are not damaged. A small amount of oil should be placed around the bore of the Judson pulley before inserting it on the crankshaft. Make sure that the stamped steel washer on the crankshaft bolt is centered in the pulley before tightening bolt.

6. Replace the original belt on the crankshaft, fan and generator. Use first pulley groove or groove next to engine which is the same size as the original pulley. Tighten the generator clamp giving the belt the proper tension.
7. Mount supercharger on original manifold using bolts and lockwashers that formerly held on the carburetors. Use gaskets furnished. The top front bolt should be inserted first so that the supercharger can be rocked down or tilted and the drive belts placed around the pulley on the crankshaft and the drive pulley on the supercharger (see illustration).

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CONSHOHOCKEN, PENNA.



NOTE: The idler pulley on the front end of the supercharger runs on the **back** of the belts. This idler pulley should be pulled free from the belts while the installation is being made by loosening the bolt at the top of the idler bracket. When the two drive belts are in place, the other three bolts should be inserted in the supercharger and manifold and drawn up tightly. All connections must be tight and there should be no leaks at the manifold connection. Connection between manifold and block should also be checked.

8. Push the idler pulley against the back of the two drive belts (the flat side) until the proper tension is obtained (approximately $\frac{3}{4}$ " of slack on other side of belts) and tighten bolt holding the idler bracket on the supercharger. Do not tighten the belts too tightly as this will result in damage to the supercharger.
9. Insert the throttle extension over the butterfly shaft of the carburetor and secure with the two screws furnished.
10. Fasten choke control wire and cable to carburetor before bolting to the supercharger. Bolt carburetor assembly to the supercharger as illustrated using two bolts, lockwasher and neoprene gasket furnished.
11. Fasten accelerator control to carburetor in same manner in which it was connected with the original carburetor. Use same rod between accelerator and throttle lever as was originally used. Accelerator pedal should be in proper position before tightening the throttle rod on the carburetor connection. (In some cases it may be necessary to bend the accelerator pedal lever slightly for proper height). Connect the fuel line to the carburetor.
12. Loosen the support bar (channel) holding the battery and insert the flat plate on the oiler bracket between the battery and support bar. Tighten bolt holding the battery support bar. Oiler bracket is now clamped between the battery and the battery support bar. (The battery on some TB and TC models was enclosed in a metal box and on these models the oiler bracket will have to be bolted to the battery container).
13. Connect the oil line furnished to the oiler and fitting on the supercharger as illustrated.
14. Fasten turnbuckle on end of radiator brace to radiator shell. Use the second hole down from the top of the radiator with the "U" of the turnbuckle between the radiator shell. Rubber strip goes on outside of "U" clamp. Turnbuckle will have to be adjusted to get proper length of brace.
15. Remove one hose clamp from hose of air cleaner. Place this clamp on hose that is furnished and place hose on hose connection at top of valve cover. Place other end of hose in general area of carburetor throat so that the fumes coming out of the valve cover will be exhausted through the engine as was done previously. Reinstall hood on car.
16. Fill the automatic oiler with a good grade of number 10 motor oil. Use Marvel upper cylinder lubricant if available.

INSTALLATION IS COMPLETE

Read Information Under Data Before Starting The Engine

DATA

IMPORTANT: Do not operate the engine prior to connecting the lubricator to the supercharger and having filled the jar with number 10 motor oil.

LUBRICATOR ADJUSTMENT: To adjust the lubricator proceed as follows: Start the engine, remove the top of the oiler by unscrewing the small cap on the very top. Here you will find a small brass screw and this should be adjusted with your fingers until the oiler is putting out approximately one drop of oil every five to six seconds at idle. This can be timed through the small window on the lubricator. Screw clockwise to decrease the amount of oil consumption. Oil consumption should run one pint to every 350 to 500 miles and the oil level in the lubricator should be checked visually every time the oil in the crankcase is checked by your service station. Engine and lubricator should be warm while adjustments are being made. If the car is to be used for hard driving or competition, the oil consumption should be increased to one drop every three to four seconds. The oil from the automatic lubricator is to oil the bore of the supercharger case only, the two main rotor bearings are greased and sealed at the factory for life.

ADJUSTMENTS AND TUNING: The condition of the spark plugs is very important on a supercharged engine. They should be removed, examined and cleaned or replaced if necessary. Stock ignition settings are recommended and the carburetion should be adjusted in accordance with the MG instruction book. The engine should idle at a minimum of 800 to 1,000 RPM. The correct settings will have to be determined by the performance of the car on the road.

FUEL: Because of the higher overall compression ratio obtained with supercharging, a premium grade gasoline is recommended for best performance.

AIR CLEANER: An air cleaner restricts the breathing of any engine especially a supercharged engine and for this reason we do not recommend their use when performance is a factor. In some sections, however, it is necessary that an air cleaner be used and a unit can be purchased from your local foreign car dealer. Any mesh type air cleaner bolting directly to the intake flange of the 1 1/2" SU carburetor is satisfactory.

DRIVE BELTS: Tension of the supercharger belts should be examined after approximately one hundred miles and an adjustment made on the idler bracket if the belts are too slack. In case of drive belt breakage the supercharger will cease functioning but the engine will continue to operate as a normally aspirated engine. The drive belts are standard and can be purchased locally.

FAST DRIVING: Under continued high speed operation such as a long trip on a super highway, it is advisable to release or reduce the pressure momentarily on the accelerator occasionally to increase the effectiveness of the oiler under this severe condition. The lubricator should also be adjusted in accordance to instructions prior to continued high speed running.

BREAK IN PERIOD: No breaking in period is required for the Judson Supercharger. We do however recommend that the engine be run slowly or at idle for at least fifteen minutes before placing the engine or supercharger under load. (So that the unit can be initially lubricated by the oiling device). When the engine is first started after the installation has been completed, a slight noise may be heard from the supercharger at idle or when the engine is placed under a heavy load. This noise is caused by the tightness of the blades in the rotor and the noise will disappear within a short time. The supercharger, like the engine makes more noise when it is cold than at operating temperature.

MG MODEL TF: The TF engine is also type XPAG and is the same as the TD. No alterations are required on the engine and the procedure for mounting the supercharger on the TF is the same as those required for the TB, TC and TD. It is necessary, however, because of body changes, to move the fender brace located behind the radiator and place a "bubble" on the side of the hood.

WARRANTY

The Judson Supercharger is warranted to be free from defects in material or workmanship under normal use and service. In case of failure of any part within three months from date of original purchase by user, due to defective material or workmanship, we will repair, replace the defective part or furnish a new supercharger free of charge, F.O.B. Conshohocken, Pa. Factory approval must be obtained before returning supercharger or parts for replacement. All transportation charges on supercharger or parts submitted for replacement must be borne by purchaser.

SERVICE DATA

JUDSON SUPERCHARGER

MODEL MG-26

Supercharger Should Be Disassembled In The Following Manner

1. Remove supercharger (with carburetor removed) from the engine and place on a clean bench.
2. Remove idler pulley bracket from front housing of supercharger by loosening the single bolt and sliding over the pulley.
3. Remove the six bolts holding on the rear cover.
4. Use two $\frac{3}{8}$ " USS bolts and screw into threaded bosses on the rear cover. These act as jack screws to remove the rear cover from the shaft. These two bolts should be tightened slowly and the same amount on both sides. First one screw a few turns and then the other so that the cover will be pulled off straight.
5. After the rear cover has been removed the vanes can be pulled out of the rotor. **IMPORTANT:** Before removing the vanes take special notice that the slots on the vanes are on the pressure side of the supercharger. Blades must be replaced in this manner or supercharger will not function.
6. To remove the rotor assembly, remove the six bolts holding on the front cover and the front cover can be removed from the case with the complete rotor assembly.
7. To remove the front cover from the shaft: Drive out the pin that holds the pulley on the shaft and remove pulley. Rotor shaft can then be driven out of the front bearing using a soft mallet or a hammer and a wooden block. The seals in the front cover will catch on the shaft snap ring destroying them. Continue to drive the shaft out of the bearing and in so doing the seals will have to be replaced with the snap ring.
8. To remove the bearing and seals from the front cover: Remove the snap ring, drive out the bearing from inside end, drive seals out in same manner and discard.
9. In replacing the bearing and seals in the front cover, make sure that the seals are placed back to back. (So that one lip faces in and the other lip faces out). In replacing the end cover on shaft, seals should be carefully worked over the snap ring groove in the shaft to prevent damage. Assemble in following manner: Press seals in cover, place cover over shaft, insert snap ring on shaft, press bearing on shaft and in cover housing, insert snap ring in housing. **NOTE:** Snap ring cannot be inserted in housing groove unless there is approximately .015 clearance between the rotor and the face of the end cover.
10. To remove bearing from the rear cover: Push out cap from inside of housing, remove snap ring from housing, push out bearing from inside of cover. In reassembling, the cover cap is forced into the groove in the rear cover by striking in the center. Edge of cover cap should be coated with Permatex prior to replacement.

VERY IMPORTANT

In reassembling the supercharger, make sure that the marks on the end covers (raised dots) and the "V" line on the end flanges of the main housing line up. The end covers must be bolted to the housing in this relationship.

PARTS LIST

Mention serial number on name plate of supercharger in ordering parts and any correspondence.

Part No.	Description	Part No.	Description
8	HOUSING	83	CRANKSHAFT PULLEY
13	FRONT COVER	218	OIL SEAL*
14	REAR COVER	316	OIL LINE*
1581	ROTOR ASSEMBLY	118	SHAFT SNAP RING*
206	BEARING*	224	HOUSING SNAP RING
19	IDLER BRACKET	683	OILER FITTING*
7	IDLER PULLEY WITH BEARING	84	EXHAUST GASKET
11	CARBURETOR MOUNT	848	INTAKE GASKET
82	VANE	59	PULLEY PIN
15Q	LUBRICATOR	2470	DRIVE BELT*
85	LUBRICATOR BRACKET	258	END PLUG
87	DRIVE PULLEY	88	THROTTLE EXTENSION

*STANDARD PARTS AVAILABLE LOCALLY

Bearing—Fafnir No. 206 KLL or New Departure No. C88506
Seal—Chicago Rawhide No. 21218 or National No. 50245

Snap Ring— $1\frac{1}{4}$ " External or Waldes No. 5108-118
Drive Belt—Gates No. 2470 or Gilmer No. 4L470
All Fastenings are Standard $\frac{3}{8}$ " USS

The Judson Supercharger is fully covered by Patent(s) and/or Patent(s) Pending

JUDSON RESEARCH AND MFG. CO.
CONSHOHOCKEN, PENNA.

Printed in U.S.A.