

HERE'S THAT PAN AGAIN—THE GMC Crankcase-Ventilating System

Poor fellow. Buck over there was once a normal guy. A guy who liked his beer dark—his women often—and his trucks running smooth and regular. But lately, his 2½-ton 6x6 GMC jobs started acting spooky, like something from Horror Stories Quarterly. They'd throw quarts of oil out the crankcase breather and slop it all over the side of the engine. They'd stop dead, right in the middle of Somewhere, then start up a few moments later as though nothing had happened. Buck's struggles to dope out the reasons for those failures started the medic measuring him for an olive-drab straight-jacket.

Buck's mistake was that he kept looking for a big and important reason for the engine acting up. The trouble was so serious, he figured it had to be something like a carburetor, or a distributor. Nothing simple. Nope, nothing so obvious as that hunk of plumbing coming out the valve cover on

IF YOU'RE STILL SWEATING OUT ITS MYSTERIES, CHANCES ARE YOU NEVER SAW THIS EXPLANATION IN DEC. 43

the 2½-ton 6x6, or the crankcase breather (Fig. 1). He didn't give the crankcase-ventilating system a second thought. It's clear our friend didn't know why Army trucks have the ventilating system, or how it works. Once you do, you'll know that if the system isn't treated kindly, it can cause these troubles.

Ever since the crankcase-ventilating system was put on, the picture inside the engine has become less gruesome. The system does the job of drawing off the water vapor before it can condense. Fig. 2 shows you how. It's sucked out of the crankcase up to the valve chamber, through the ventilator valve, and over into the intake manifold. Cool, sweet air pours

into the crankcase through the breather and replaces the vapors vented out. That's the only way air is supposed to get in, so it's cleaned by a filter on the filler pipe before mixing with the moving parts. Air sneaking in through leaks in the valve cover, valve push-rod covers, or other places in the crankcase, comes in loaded with dust and other corruption. Leaks in the system are bad for another reason—the ventilating system pulls in air through them instead of pulling out the vapors from the crankcase. You can see that the ventilating system can't do a good job unless the engine's sealed as tight as a Jap's future.

How good a job the system does also depends on that little ventilator valve on the side of the manifold. The valve controls the amount of blow-by that will be pulled out of the crankcase when the engine's running. This valve in turn is controlled by the vacuum in the manifold.

When the engine's idling and the vacuum in the manifold is **strongest**, the valve stays **closed**. Just a fine sliver of air from the crankcase is pulled through the valve into the manifold. There isn't much ventilating to be done anyway when the engine's idling—not much blow-by is coming down past the rings into the crankcase. It's another story when the engine is at **full throttle**. Then the vacuum in the manifold is at its **weakest**, and the crankcase is stuffed full of blow-by. That's when the ventilating valve opens widest to take out as much of blow-by as it can. So the ventilating system gives you a sweet

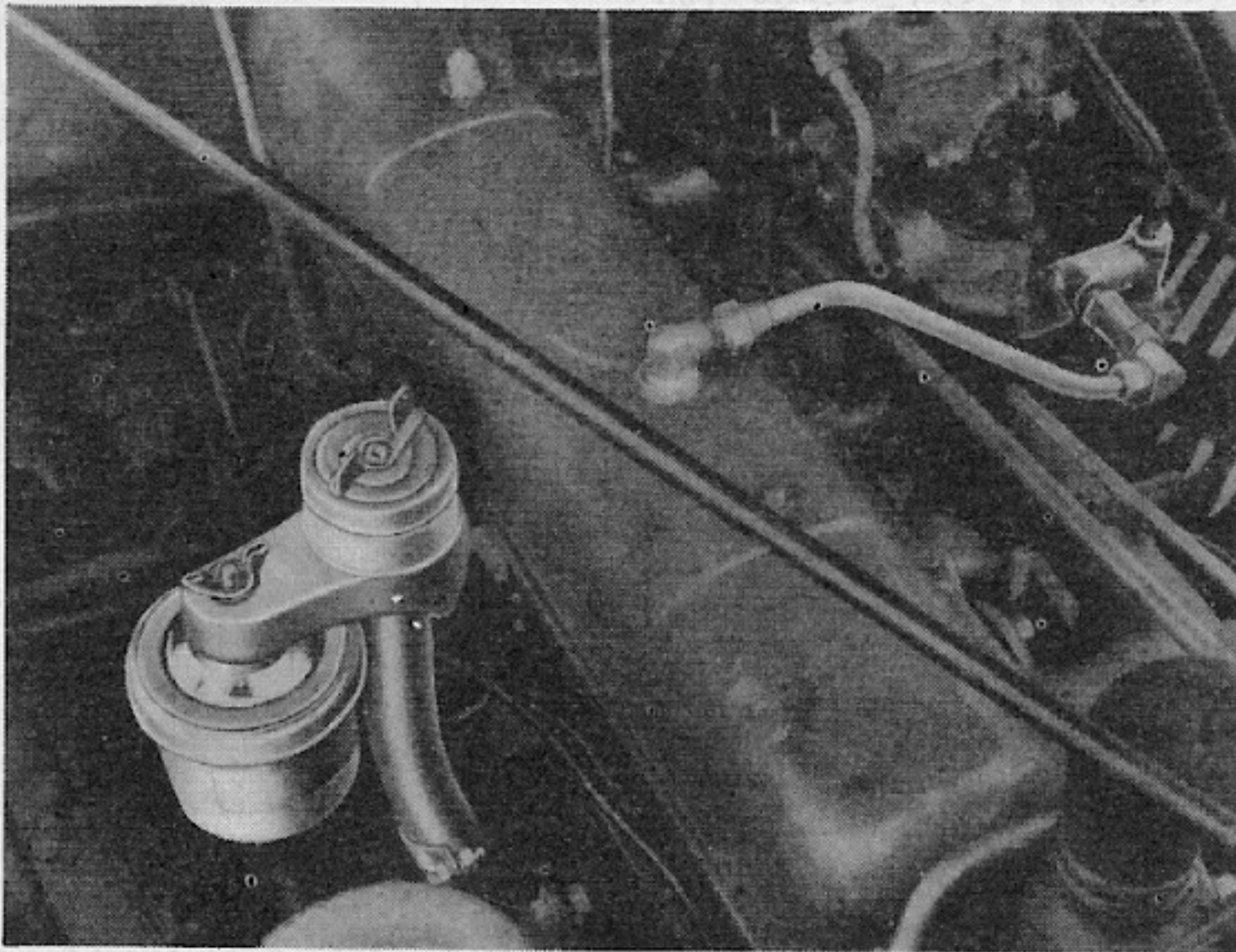


Fig. 1—(Right) Ventilator valve and tube from manifold to valve cover. (Left) Crankcase breather and filler pipe.

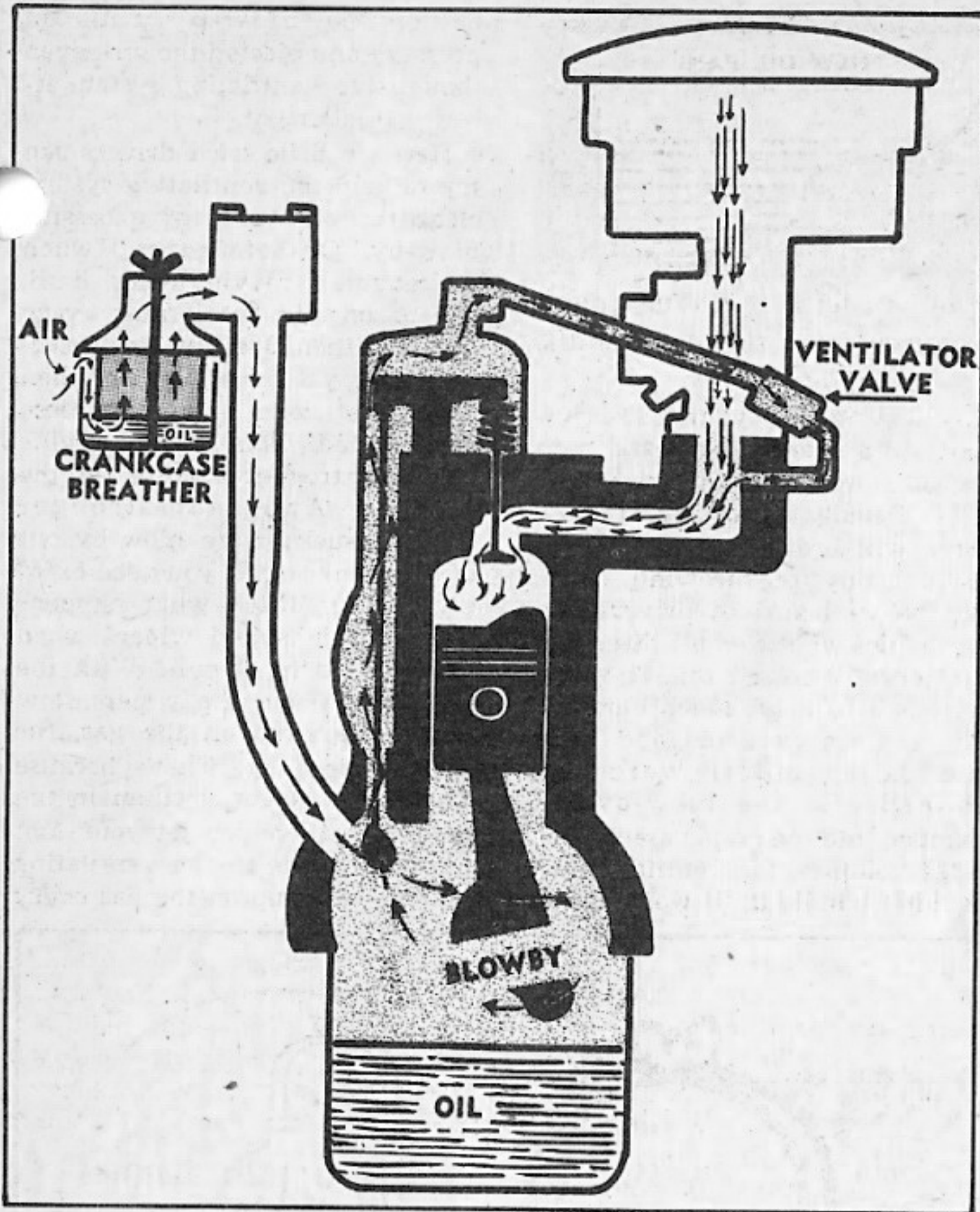


Fig. 2—Blow-by drawn from crankcase through vent tube and valve into manifold. Filtered air enters through breather.

crankcase—and that spells a healthier engine.

It's only when something goes wrong with the crankcase-ventilating system that the truck gets sick and starts to vomit oil out the breather, or to sputter and die out. Take the first one:

ENGINE THROWS OIL

It usually shows up when the truck's been on a tough pull, like up a cliff. The engine's in low and revving for all she's worth. You inch up to the top of the hill—whoosh, you're over and flying down the other side. Your foot eases off the gas. Just then you begin to see streams of oil trickle under the hood onto the top of the cowl. A couple quarts have let go out the crankcase breather.

Any one of four things (or a combination) could cause the flying oil: (1) Ventilator valve troubles, like a clogged valve or an incorrect spring tension; (2) overfilling the crankcase; (3) over-speeding; (4) excessive blow-by.

(1) A clogged ventilator valve shows up best on a tough pull. It really shines. There's plenty of blow-by and plenty of work for the ventilating valve. All during the hard pull the valve **should be** wide open. If it's clogged, the blow-by doesn't get pulled out by the system. It stays in the crankcase and builds up pressure. When you release your foot from the gas—look out! The pressure in the crankcase can't get out—remember that the valve closes when you take your foot off the

gas and let the engine idle. So the blow-by pressure takes the other way out—up through the breather—tearing pints of oil out along with it.

Servicing the valve can save you from this fate. The vehicle TM's call for taking the valve apart, dunking the parts in solvent, and blowing out the dirt with an air hose every 6000 miles. That's the official rule of thumb. You may find the valve gets clogged up sooner—say at 3000 miles. Hop to it. If after dunking, etc., you can't see through the valve—it's still clogged. Get a 1/16" drill. Hold it between your thumb and forefinger and twirl it around in the passage.

Even some clean valves can cause trouble. Especially when one of our inventin' mechanics gets to fooling around with the spring. He'll try s-t-r-e-t-c-h-ing it, or snipping off a few coils to get more draw or less draw from the system. But that spring's been engineered for a specific job. Changing it won't let the valve open at just the right time or close at just the right time. You won't get the best ventilating efficiency. The spring that came from the factory is okay—you can trust it.

(2) Overfilling the crankcase is a good way to get the oil whooped out. Normally there's lots of circulation and agitation of the oil as the truck drives. Too much oil invites too much agitation. So when you get an extra dose of blow-by in the crankcase and the pressure starts to go out the breather, it's more tempted to take the foam and whipped oil out with it. The remedy is to fill your crankcase **exactly FULL**. Even an 1/8" over the FULL mark is overfilling. Park your truck on level ground and give the oil a chance to run down for 10 minutes or so before you take a reading on the dipstick (or check the level before operation). That's the accurate way. You may notice that the oil pan has a new profile on the more recent GMC 2½-ton trucks. It's a deeper pan (Fig. 3).

This newer pan when FULL has an oil level nearly as low as the old oil pan did when EMPTY.

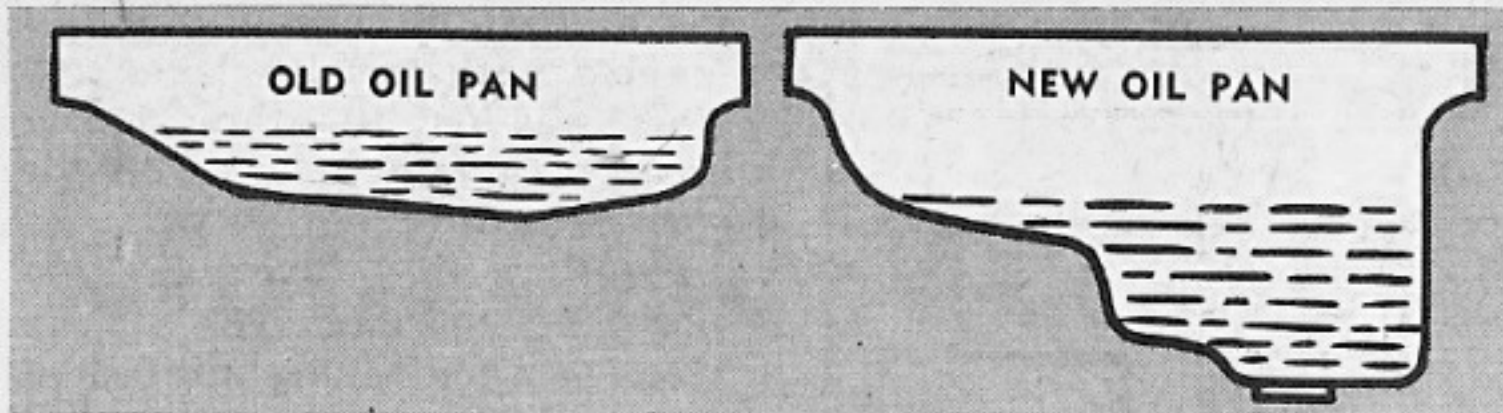


Fig. 3—Not so much splash in the pan with the new model. It's deeper, keeping the oil farther away from the crankshaft.

Notice the extra space between the crankshaft and the oil. And so—less agitation, and less chance of the oil whipping out. But the new pan was put on in production only. About the best you can do with the old pan is keep an extra close watch on the oil level. Fill it exactly to the FULL mark and not an eye-dropper over.

(3) Overspeeding has the same effect as overfilling. Even though the oil's no higher than the FULL mark, when you run the vehicle faster than the road-speed plate says, you're setting up a violent agitation in the crankcase. All it takes then is a little blow-by pressure in the crankcase, and blooie! the oil heaves. Go only as fast as the road-speed plate tells you for each gear. On level ground you shouldn't be able to go any faster than that—the governor won't let you. But on downgrades, it's a different story. Here the weight of the 2½-ton truck grabs hold and starts to roll the truck ahead. The governor steps out of the picture because the engine isn't controlling the speed any more. The wheels are driving the engine faster and faster. The rpm's go up till the engine's overspeeding. Things like this start to happen—the bearings go, they can't stand up under the super speed—the oil in the crankcase gets whipped into a frenzy and may go shooting out the crankcase breather. A little sense will stop this from happening to you. Follow this: Use the same gear **going down** a hill that you'd pick out to **climb** that same hill. The gear you select should hold the truck down to the figures on the road-speed plate for the gear you're in, when helped a little by applying the brakes off and on. That's the

easy way to keep your truck running till a ripe old age—and with the oil snug inside the crankcase.

(4) Usually doing one of those three will break your 2½-ton of its uncanny oil-throwing habit. But we've heard of drivers and mechanics who tried all three, yet the job still tossed oil. It was a serious case of too much blow-by. The engines were old and worn and the cylinders were egg-shaped. So the blow-by got pumped into the crankcase in such large volumes, the ventilator just couldn't handle it. It was a losing

battle. The blow-by built up pressure and ejected the oil—even though the ventilating system itself was all right.

Here's a little trick drivers can try to help the ventilating system clear the crankcase of excessive blow-by. On a tough pull when the engine's revving over hard, let up on the accelerator every now and then. Just for a split second, ease your foot up and then down—not long enough to lose much speed. This lets the engine cause a stronger vacuum in the manifold. And that stronger vacuum sucks more blow-by out of the crankcase. If you need extra convincing, watch what happens to your windshield wipers when you're on a hard pull. With the gas pedal down the wipers slow down. Ease up on the gas, the wipers speed up. That's because there's a stronger vacuum in the manifold when you let your foot up. Apply this to the ventilating system—ease up on the gas every

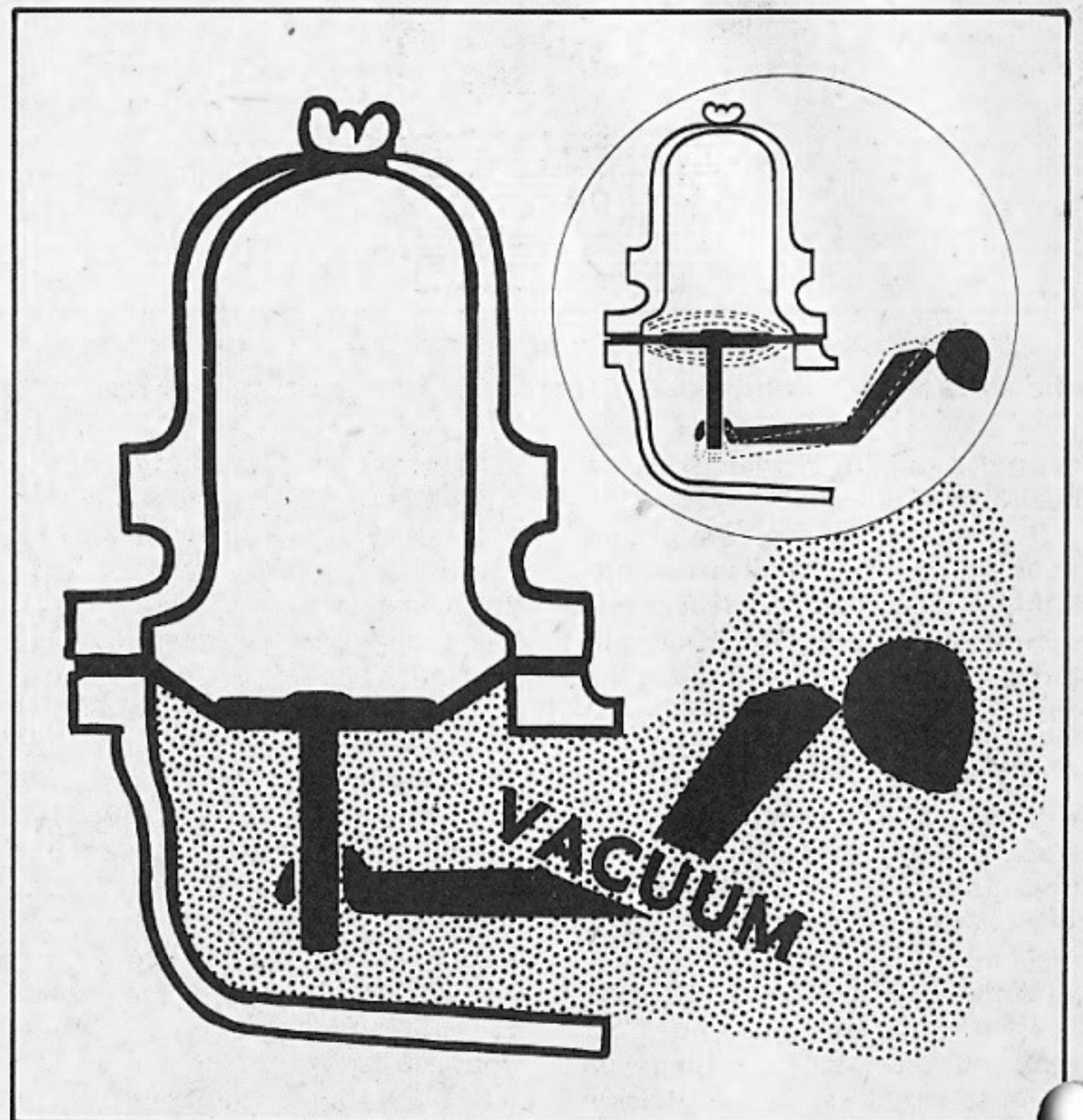


Fig. 4—You CAN keep a good fuel-pump diaphragm down by leaving out the crankcase-breather air-filter. See Fig. 5.

now and then on a hard pull, and keep your crankcase free.

There's only one other remedy, except for a higher-echelon overhaul, when excessive blow-by's the reason for blowing oil. It's a larger ventilating valve (ARMY MOTORS, Apr. 44). If you've tried the cures just mentioned and your truck still blows oil like a whale, take a compression test. If it shows abnormal blow-by, then order the larger ventilating valve, GM Part No. 1543341, through your regular supply channels.

That winds up the story of correcting the problem of over-enthusiastic oil. These angles will usually lick it, if followed by mechanics: Clean the ventilator valve, oftener than 6000 miles (or semiannually) if necessary; leave the ventilator-valve spring alone—don't cut or stretch its golden coils; test to see if the engine's rolling in excessive blow-by. Drivers can do their share by (1) not overfilling the crankcase; (2) not overspeeding; and (3) easing up on the gas for a split-second every now and then on a hard pull.

Then the only other headache you're liable to get, from the crankcase-ventilating system on the 2½-ton 6x6, is this:

ENGINE DIES ON YOU

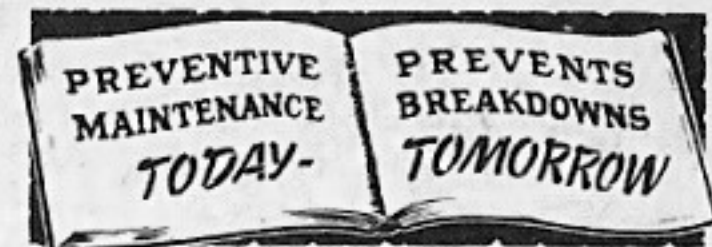
mysteriously, but after a few seconds, you can start it up. It'll have the same old vigor, too. Drivers tell those ghost stories about the truck slowing itself down. They hear a sucking sound, a wheeze, then a tired pftshshsss. The engine dies cold. Just as the driver starts to sweat, he tries the starter, just for the hell of it. Spooks. The engine starts. Then that little routine happens all the way back—the truck stops and starts and stops.

Scotland Yard reports that the trouble is in the crankcase breather—or closer still, it's with the drivers or mechanics who've been servicing the breather on the 2½-ton truck. According to the vehicle TM, the element in the breather should be taken out and lunked and blown dry and put back in every 1000 miles (or sooner under dusty conditions). That last part—putting the ele-

ment **back in**—is where the trouble begins. If the element's left out, or lost, or forgotten, or just plain not put in, you get a sealed crankcase. The element holds the shell of the breather away from the top and leaves a small space for the air to get into the crankcase. Leave the element out and the shell screws up and seats itself comfortably on the gasket in the top of the breather. That makes a nice airtight fitting—just as effectively as if you'd put your hand down over the filler pipe.

We watched a mechanic try his hand on the filler pipe the other day. He took off the entire breather assembly and started up the engine. Then the mechanic pressed his palm flat against the top of the filler pipe. The engine ran okay. After a few minutes, though, it suffocated and stopped. Of course, the mechanic took a piece of wire and fished down in the crankcase for the hunks of flesh that came off his palm. There's a mean cyclone going through the crankcase when it's working right.

The vacuum in the crankcase is what stopped the engine. When the air can't get in the breather, the vacuum in the manifold keeps emptying air out of the crankcase. A stronger and stronger vacuum builds up. Finally, the vacuum gets enough muscle to hold down the diaphragm of the fuel pump (Fig. 4). The pumping stops, no fuel goes into the carburetor, and the engine dies of undernourishment. Later, as soon as enough air seeps back in to fill the crankcase and let that diaphragm pump gas again, you're able to start the engine.



Next time the engine pulls this stopping stunt, take a close look at the crankcase breather. It's easy to tell if the element's been left out. With the element **in**, there are only a few threads sticking out beyond the wingnut on the top of the breather (Fig. 5). With the element **out**, notice how high the threads stick out. Scout around and find the lost element. Or requisition a new one. But don't go driving along without the element—unless you like to be stalled when everybody else is moving forward.

'Course Buck wouldn't mind. He's too far gone. Just remember he got that way from a little thing like refusing to maintain the system. Stay 'way from his bad example. Operate your 2½-ton truck according to regulations and service your ventilating system. And you'll keep your crankcase from getting cranky.

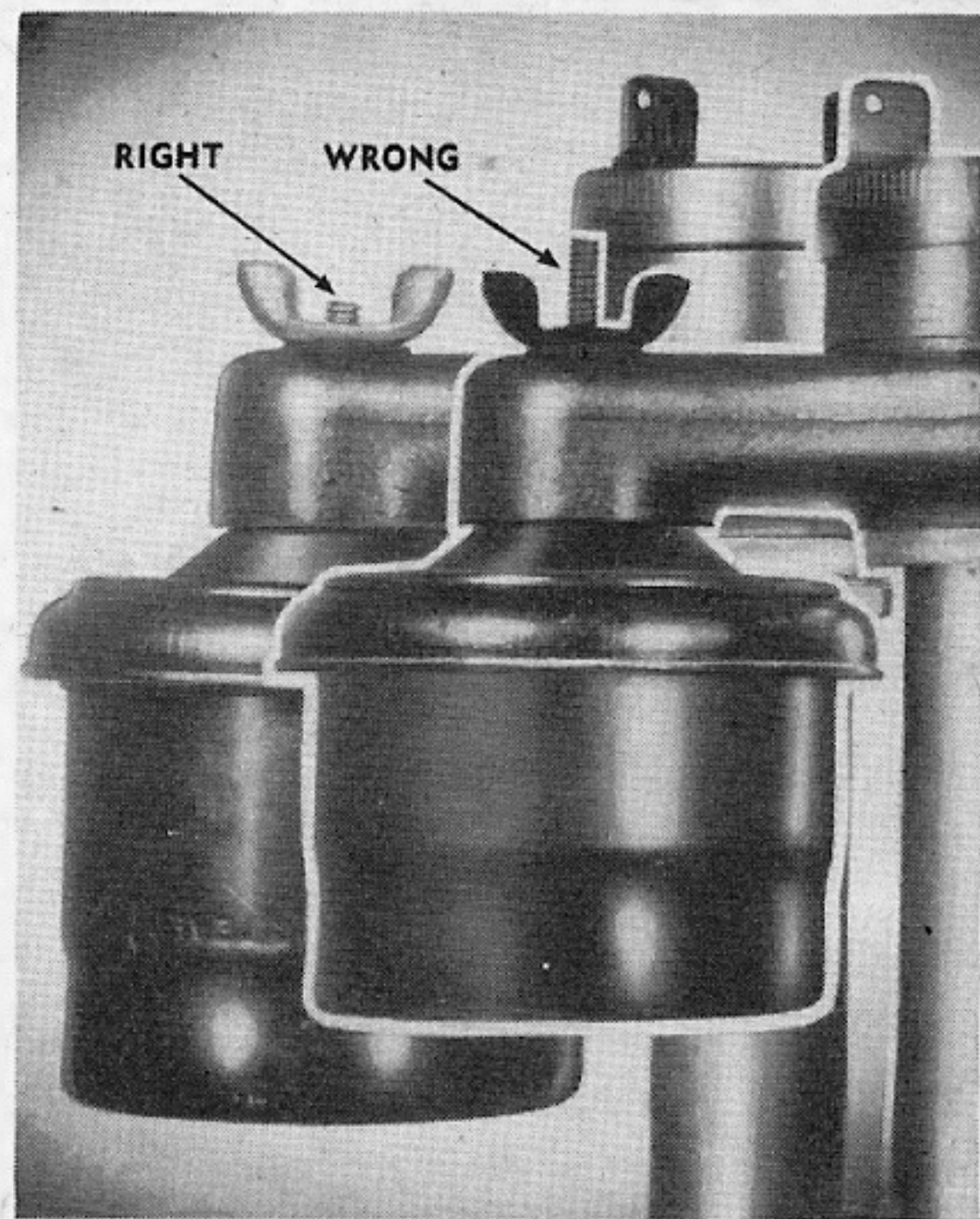


Fig. 5—Wanta stop your truck without using brakes? Just leave out the filter element.