



GUS gives some pointers on . . .

Hunting Squeaks and Rattles

By MARTIN BUNN

GUS WILSON'S huge fists spun the steering wheel and the Model Garage service car, homeward bound, swung around in the loose sand at the foot of Steppe's Hill and started the long grind to the top.

"What makes these birds always break down in such out-of-the-way places?" Gus grumbled. "They might at least pick some place better than these deserted hills!" Joe Clark, his partner in the operation of the Model Garage, merely grunted and pulled his cap lower over his grease-stained face.

"The next call we get from out here," Gus rumbled on, "I'm going to—" The rest of his remark was drowned in a rasping cough from the service-car motor, followed by a bucking that ended in a stall.

Gus slammed on the emergency brake and leaned back with a grin on his face as he pulled out his pipe and started to fill it.

"Well? What's the matter now?" snapped Joe. "Dinner is waiting and I'm hungry. Let's get at the trouble."

"There's nothing to get at," Gus chuckled. "We're just out of gas! I forgot to take a look before we started out. Nearest gas station is about three miles down the road. If you want to 'get at' something, try bending a bit of shoe leather in that direction. Danged if I will. I'd rather wait here for a car. Jack Sisson goes by here every day on his way home from work. He ought to be along any minute now."

"That's like you, Gus," Joe smiled, sheepishly. "Taking the blame when you know it's my job to see that this bus has

gas in it. All right, if Jack doesn't show up in the next five minutes I'll start."

However, Joe was saved the trouble, for Sisson came along a few minutes later.

"Now," said Gus after the gas had been transferred, "Joe, you take the service car and beat it straight home before your missus gets out the rolling pin. Jack'll give me a lift as far as the garage."

"Glad to do that, Gus," Sisson offered at once. "And maybe you can spot which valve stem is making the infernal squeak I've been hearing."

Gus listened intently as Sisson started the car and drove it at various speeds. No noise was apparent at high speed, but when the car was running slowly, there was a pronounced squeak that seemed to keep time with the revolutions of the motor.

"It's going to be a cinch to fix that," Gus grunted, as they pulled in at the Model Garage. He lifted the hood, wiped a bit of grease from the steering-gear housing and touched it to the V surfaces of the fan belt. The squeak stopped almost instantly.

"A brand-new, bone-dry belt will sometimes do that," Gus explained. "It depends on the condition of the pulley surfaces."

"Gosh!" exclaimed Sisson. "As easy as that, eh? I wish it was as simple to spot the cause of other noises. You know, I'm a bug on trying to get rid of 'em."

"Lots of fellows are like that, these days," Gus agreed. "If you want to get rid of noises in your car, the main things you need are a whale of a lot of patience

and a nice long screw driver."

Sisson laughed. "Sure, you need patience—but what's the screw driver for? To tighten everything so it can't squeak?"

"There'll be times when you'll use it that way, but the principal use will be as a sort of doctor's stethoscope to help you locate just where the noises are coming from. Trouble is, so many noises sound like they are something else. Like this squeaking belt. You thought it was a valve stem binding. If you had held the end of the screw driver against the cylinder casting at different points near the valves, with the handle end cupped in your fist against your ear, you'd not have heard the squeak at all—which would have been pretty good proof that it wasn't a valve.

"Take a loose plate in the muffler," Gus went on. "That often rattles in such a way that it sounds just like a loose connecting rod. If you listened around with a screw driver a while, you'd hardly hear any trace of a clank from any part of the motor, but as soon as you started on the exhaust pipe you'd hear it—and I don't mean maybe!"

"I've heard of that screw-driver stunt," Sisson observed, "but I never could make much out of it. I've tried it several times, and all I hear is a jumble of noises loud enough to break your eardrum."

"That's because you don't hold the screw driver right," Gus asserted. "When you poke the end of a screw driver against any metal or wood part of the car, the vibrations that are traveling through the material shoot (Continued on page 126)

Build this ESKIMO CANOE

...It's one of the 20
FREE CASCO PROJECTS

The Eskimo word for this light, one-man boat is "Kayak." The woodworker of average ability can build it easily and economically. And it's lots of fun!

HOW YOU GET FREE PLANS

The green ticket in every 25c (or larger) can of CASCO entitles you to any one plan of these 20 projects, absolutely free. The plan comes to you complete in every detail. No extras to buy... you get exact working directions, plans, and list of materials necessary to build, in your own workshop, the projects you select. This free project service is designed for you... start to use it. Buy your can of CASCO today, at any Hardware, Paint or Lumber Dealer.



ILLUSTRATED FOLDER HELPS YOU SELECT YOUR FREE PLAN

Free! Stick the coupon below on a penny postcard. The mailman will bring you the folder that describes and pictures the 20 CASCO prize projects.



CASEIN COMPANY OF AMERICA, Inc.
350 Madison Ave., New York, N.Y., Dept. P. S. 636
Please send folder about Free Project Service.

Name.....

Address.....

Inventions Promoted

Patented or Unpatented. In business over 30 years. Send drawing and description or model, or write for information. Complete facilities. References.

ADAM FISHER COMPANY
183-D Enright, St. Louis, Mo.

UNPATENTED IDEAS CAN BE SOLD

We tell you how and help you make the sale. Particulars, with list of manufacturers and wanted inventions, sent free on request.

Write W. T. Greene
921 Barrister Bldg. Washington, D. C.

INVENTORS PATENT YOUR IDEAS SEND FOR FREE BOOK



HOW TO OBTAIN A PATENT,

written by a Former Member of the Examining Corps (1922-24) of the U.S. Patent Office. If you want to profit by your idea, you should take steps to apply for a U. S. Patent at once. Your first step is to get this Free Book. This interesting illustrated book contains valuable information you should have. It tells you fully how to obtain a patent on your idea in the quickest way. With this Free Book you will also receive a "Record of Invention" form on which you can easily record your ideas, Personal and Confidential Services. Your case will be personally handled only by a Registered Patent Attorney who is also a Former Member of the Examining Corps of the U. S. Patent Office. All communications will be strictly confidential.

MAIL COUPON TODAY FOR FREE PATENT BOOK and RECORD OF INVENTION FORM.

CARL MILLER
REGISTERED PATENT ATTORNEY
FORMER MEMBER EXAMINING CORPS U. S. PATENT OFFICE

1638 Woolworth Bldg., Dept. 56-C, New York
MILLER BUILDING, DEPT. 56-C, WASHINGTON, D. C.
Please send me your Free Book, "How to Obtain a Patent," and "Record of Invention Form."

NAME.....

ADDRESS.....

GUS TELLS HOW TO HUNT SQUEAKS AND RATTLES

(Continued from page 56)

right up the screw-driver blade, and you'll hear them loudest if the handle end is pressed as close to your eardrum as possible. If the noises you hear sound like bedlam let loose, naturally you won't be able to pick out any one sound, so the answer is to slide the screw-driver handle down in your clenched fist like this," Gus demonstrated, "squeezing tighter to close the air passage from the end of the screw-driver handle to your ear till the sound is just strong enough."

"Sort of a one-fist volume control, eh? I should have thought of that," Sisson commented, as he tried the stunt with the screw driver in his own hand.

"THAT'S the idea," said Gus. "But knowing how to use the screw driver is only a part of the job. The rest is where the patience comes in. The whole trouble with finding these darned noises is that most of the time they don't sound like what they are, and they always seem to come from where they aren't. That's because any noise is the result of a vibration and you can't hear it till the vibration has been put on the air so it can get to your ears. Now, the actual vibration nearly always starts inside somewhere, and the direction it takes in coming out through the metal parts depends on how easily they vibrate. That's where the screw driver helps, because it picks the vibration right out of the metal and carries it directly to your ear."

"Sounds all right, but how does it work out?" Sisson asked.

"I'll show you," said Gus, reaching for the screw driver. "Did you notice that funny little bumping noise that seemed to come from the door latch?"

"Notice it!" exclaimed Sisson. "I've spent hours trying to get that latch to stop thumping like that. I've got it so tight now you can hardly get the door open!"

The bumping that Gus had noticed occurred irregularly when the car was in motion, and also while it was standing still at certain motor speeds. Sisson worked the throttle up and down while Gus listened with the screw driver, first all around the latch, then at different points on the door, and finally at a number of points near its upper edge above the hinge.

"Must be right in here," Gus muttered, swinging the door open. "Yes, here it is. See that shiny spot on the door frame, and this bright spot on the door right where it closes on it? The latch buffers were set a little too tight in the first place, so the door was sprung over just enough to cause a metal-to-metal bumping right there. Tightening the latch buffers just made things worse."

"Well, it's a relief to find it at last, even if you do prove I'm dumb," grinned Sisson. "Now let me listen to see if I've got the hang of it."

"GO TO it," Gus suggested, handing over the screw driver again. "You'll hear the thump at any point on the door, of course, and quite loud too, but it'll be plenty louder right near where it's bumping."

"It certainly is," agreed Sisson, as he reached that spot with the end of the screw driver.

"If that had been a loose body bolt or a bad rubber mounting," Gus explained, "it might have seemed to be coming from the door, or even the roof of the car, or any other place at any distance from the actual source of the noise; but when you get the screw driver on the job, you can soon get the trouble pretty well localized, and then it's just a matter of investigating everything in that area to find out what is wrong. After all, finding exactly (Continued on page 127)

MEN Wanted to Qualify for Positions in New Industries AIR CONDITIONING ELECTRIC REFRIGERATION

We want to personally interview, at our own expense, a number of ambitious men—aged 21 to 40—in various localities. We will select as many as possible to qualify for positions in America's two fastest-growing industries. The men we select will be trained for installing and servicing all kinds of domestic and commercial Air Conditioning and Electric Refrigeration equipment. Do not reply unless you are mechanically inclined, have fair education and are employed at present at least part time. Character references required. You must be willing to study during spare time for few months at some cost to you. Write giving full details of age, education and present occupation.

UTILITIES ENGINEERING INSTITUTE Est. 1927
400-410 N. Wells St., Dept. 356, Chicago, Ill.

PATENTS PERSONAL SERVICE

My Personal service assures strictest confidence on all your patent problems. Send me a model or drawing, or sketch and description of your invention, and \$5.00. I will make a search and report promptly as to its patentability and send you a copy of my 72-page booklet. Or, if you prefer to read my booklet first, write today for FREE copy. Registered Patent Attorney.

L. F. Randolph, 340 Victor Bldg., Washington, D. C.

PATENTS—TRADEMARKS

All inventions submitted held confidential and given personal attention by members of the firm. Form, "Evidence of Conception" and instructions, "How to Establish Your Rights"—FREE!
LANCASTER, ALLWINE & ROMMEL
PATENT LAW OFFICES
413 Bowen Building Washington, D. C.

Take Out Your Own Patents



Pay only patent office fees. Valuable manual by Raymond F. Vose tells how to write patent claims, prepare drawings, make searches, etc. Invaluable in securing inventor of a strong patent, when taken out by himself or his attorney. Postpaid, complete with all legal forms, \$1.00.

LIST OF NEEDED INVENTIONS FREE!
Don't waste time on inventions the public does not want. Write for free list of needed inventions with catalogue of books every inventor and mechanic should have.

Donley Publishing Co., 509 Fifth Ave., Dept. S-5, New York, N.Y.

WOODWORKER'S Turning & Joining MANUAL



This new manual is written especially for the man who likes to make things in his own home with power tools. Tells what

power machinery you will need to turn out beautifully finished furniture. How to use the cross cut saw, rip saw, miter saw, jointer, and band saw. How to bore and mortise by machinery.

Scraping method of wood turning fully explained—how to turn a plain cylinder, smooth cylinder, how to use a skew chisel to square ends, how to make shoulder cuts, taper cuts, convex and concave cuts. How to make a tilt-top table, occasional table, reeding and fluting, faceplate and chuck turning, turning rings, veneering. How to make the surface perfect, how to apply stain, wood fillers, finishes—wax, oil, shellac, varnish, lacquer.

Also, how to equip your home workshop, what hand tools you will need in addition to power machinery. All about wood joints.

Complete working diagrams with step-by-step instructions for intricate designs in cabinet making, 236 illustrations, 192 pages, full cloth bound, only \$1.00 C.O.D. Send order WITH NO MONEY for WOODWORKER'S TURNING AND JOINING MANUAL. Pay postman \$1.00 plus few cents postage when book arrives.

POPULAR SCIENCE MONTHLY
Dept. 56
353 Fourth Ave. New York, N. Y.

GUS TELLS HOW TO HUNT SQUEAKS AND RATTLES

(Continued from page 126)

where the noise starts is the hardest part of the job. Fixing it is the easy part.

"Of course," Gus went on, as he worked on the door, "there's lots of queer noises you may get in a car that a screw driver won't help you locate except to tell you where they aren't. Take a loose manifold bolt that lets gas escape in a sort of grunting squeak—it sometimes sounds mighty like what you'd hear if a piston ring was broken and jamming a little. Touching the cylinder wall just below the edge of the water-jacketed part with the end of the screw driver would bring such a piston-ring noise to your ear good and loud. If you didn't hear it on any cylinder, that would be finding where it wasn't. Then it would be a case of spotting the leaky gasket by sight, or actually feeling the blast of gas as it escaped from the manifold.

"SOMETIMES, a spark plug cracks or develops a gas leak in such a way that it makes a hissing noise like the hiss you get when you idle the motor slowly and the rings on one piston are broken. That's another case where the screw driver would tell you it couldn't be broken rings."

"In other words, the screw driver is no diving rod," laughed Sisson. "It's just a sort of extension car."

"That's it, exactly," Gus went on. "You've got to use your eyes, and plenty of common sense, as well as your ears and patience in finding car noises. And some aren't worth fixing when you do find 'em. Fellows come in here yelling that there's a squeak in the generator bearings. They don't know that a generator commutator and brushes can cause an unholy squeak that sounds just like a dry bearing. The best thing to do about a commutator squeak is to forget it; it's most likely to go away in a little while, anyhow."

"Another fellow came barging in here the other day and wanted to buy enough rubber hose to renew the windshield-wiper line because he said the wiper wouldn't work and he could hear the hiss of a leak in the pipe. It hissed all right, but when I pulled off the hose at the windshield wiper and held my thumb on the end of it, the hissing stopped, proving that it couldn't be the hose. The real trouble was in the wiper itself."

"That might have fooled me too," Sisson admitted. "Well, some day I suppose they'll get around to the point where they can make really silent cars."

"HUMPH!" snorted Gus, disgustedly. "You want a silent car, eh? By golly, there's no satisfying you youngsters! If the modern car wasn't so darn near completely quiet you'd never even hear any of the little mouse squeaks and trifling rattles that get your goat now. You'd appreciate how quiet the modern car really is if you had driven one of the threshing machines they sold for cars in the old days. Believe me, it had to be a man-size rattle or squeak to be heard above the general rumble and roar of those old-timers. But, even in those days, noises didn't always mean what they sounded like."

"I remember taking a ride one night with a fellow who'd had some trouble with the front-wheel bearings going dry and squeaking—they were plain buggy-wheel bearings, not ball bearings—and as we rounded a bend in the road his ears caught the shrill squeal that meant a dry front-wheel bearing to him. He slammed on the brakes and we came to a stop, but the squeal went right on. It was a combined concert from the crickets, katydids, and frogs in the batch of woods that bordered the road, and if there's anything that sounds more like a squeaking bearing, I don't know what it is!"

VALUABLE BOOKS FREE TO INVENTORS AND OTHER MEN WITH IDEAS

THIS BOOK Tells How To Protect an Invention

TELLS you exactly how the Patent Laws protect you. Why you need a Patent at all. Explains simple but important steps to take at once without cost to help establish your claim to your invention. Explains what kind of sketch, drawing or model is needed, the preliminary search, how Patent papers are prepared, assignments in return for financial assistance, etc. Also illustrates many interesting inventions, shows you 115 different mechanical movements that inventors have used in working out ideas, and much more. Inventors the world over have welcomed this book. We gladly send it with our compliments to any serious, interested man.

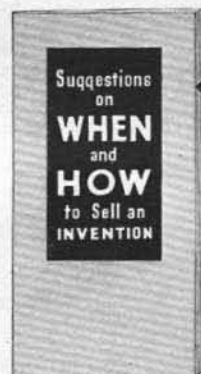


What is an Invention?

Many people have the impression that an invention must be something radically new or complex. Nothing is further from the truth. Most successful inventions of today are improvements on devices which have already been thought of before and many of which have been on the market for years. Whether your invention, or your idea for one, is something radically new or merely a sensible improvement on an existing article does not matter. If it will save time, save labor, make money or give pleasure, you should at least see about the possibility of protecting it.

THIS BOOK Tells How to Go About Selling an Invention

Tells you how in an inexpensive manner you can bring your invention to the attention of prospective buyers. Suggests the proper time to take such step. Outlines methods other inventors have used successfully in selling and marketing. Remember, an invention isn't enough. A Patent isn't enough. You must also know how to cash in. This book deals with that subject. Also sent to you free and without slightest obligation. Mailed the same day we hear from you.



37 Years in the Business of Helping Inventors

For 37 years—more than a third of a century—it has been our business to help inventors. We have represented thousands of them from all over the world in their dealings with the United States Patent Office. We answer questions. We study each device to bring out its best patentable possibilities. Also, we frequently advise inventors against going ahead with inventions which could not possibly have been protected. By carefully developed methods, we try to keep expense at a minimum, and arrange deferred payments when needed.

The booklets shown above may be the means of saving you time, trouble, expense and even later disappointment. They are yours for the asking. Write us today.

Strictest Secrecy— Write us in Confidence

With the booklets we will also send you a free copy of our "Evidence of Invention" form, on which you can sketch and describe your invention and establish a date of disclosure. Such a dated disclosure may later prove important to you. We send full instructions. Any letters, sketches, drawings or models which you entrust to us are held in strictest secrecy. You may write us fully and frankly. But first, KNOW THE FACTS. Sign and send the coupon now. Get that much done today.

VICTOR J. EVANS & Co.

REGISTERED PATENT ATTORNEYS
Main Office: 710-E, Victor Building, Washington, D. C.

Other Offices: 1445-C Monadnock Bldg., CHICAGO; 1007-C Woolworth Bldg., NEW YORK; 514-C Empire Bldg., PITTSBURGH; 1010-C Hobart Bldg., SAN FRANCISCO; 736-C Security Bldg., LOS ANGELES.

Send me FREE copies of your books, "Patent Protection" and "When and How to Sell an Invention."
(Note: Same books supplied by any of branch offices listed above.)

Name
Street and No.
City or Town.....

Mail this to
Washington, D.C.
today!