

Popular Science

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RADIO SECTION
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How you can build a simple 1-tube set for distance and quality.

Jack Binns on broadcasting—Useful new hints for everybody.



MAY

Gigantic engines foreshadow new era in transportation

25 CENTS.

How you mistreat your car—p. 71

Important Things I Have Learned about YOUR CAR

How to Save Big Repair Bills by a Few Simple Precautions

As Told by
a Garage Owner

A FEW days ago a car-owner from out of town paid me a bill of about \$125. The bulk of the work for which the charge was made consisted of reboring a scored cylinder and refitting it with piston and rings. To me, though, the most interesting item on the bill was the last, and one of the smallest:

"One fan belt and fitting same, \$1.25." For neglect to supply that car with a new fan belt—even a new lacing might have been enough—was the cause of all the trouble.

The owner of the car had noticed that the metal lacing of the belt was cutting through the leather—a sure sign that sooner or later they would part company—but instead of replacing the belt, or the lacing, he merely tightened up the belt with the adjusting device. This, of course, just put an additional strain on the weakening leather, and one day the lacing cut clear through the belt, and the fan ceased to revolve.

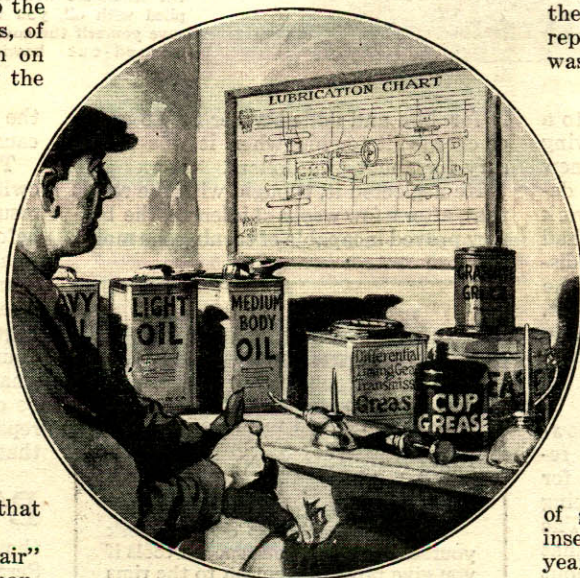
THIS happened somewhere on a country road. Just where, the owner doesn't know. Eventually, though, he saw steam issuing through his hood, and when he got out to investigate, he found that a couple of gallons of water had boiled off from his radiator, the steam being forced out through the lower hose connection. He had no materials with which to make repairs—not even a piece of wire—so he attempted to hold the fan belt together with a couple of hairpins that he borrowed from his wife.

You can guess how long that "repair" lasted! By various makeshifts he managed to get the car to within a few blocks of my garage. Then the car stopped because one piston was "frozen" by expansion to its cylinder. That, of course, was the cylinder we had to rebore.

Neither was that an extreme case. Rather, I'd say, after handling many thousands of cars in the last several years, it was almost typical. For in nearly every case where a car is brought to this shop for extensive repairs, the fault lies not in the automobile itself, but in the ignorance or neglect of the owner. There is probably no article of equal value in the world that is treated so carelessly and so recklessly as the average automobile.

Take the matter of lubrication. There

are some 60 essential parts of an automobile that require either oil or grease at intervals that vary roughly between every few days and every few months. Every car-owner has received from the manufacturer an instruction book that explains by means of a simple pictorial diagram just where and just how often oil or grease must be applied to the car. Oil companies also send out similar charts, and publish booklets and advertisements telling exactly what grades of oil and grease are required by different makes of automobiles to get the best results.

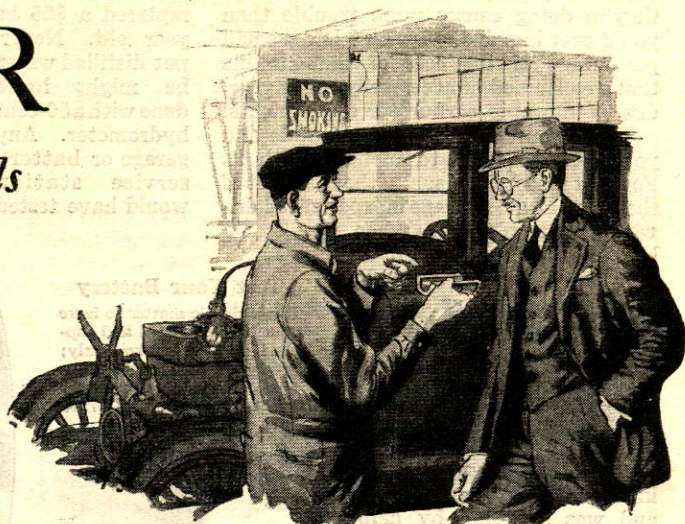


Where You Can Save Money

Don't let the dust gather in this corner of your garage. By following the lubrication chart that comes with your car and applying oil and grease where and when the chart specifies, you will save yourself a lot of unnecessary trouble and expense and keep your car in use longer.

There is, in fact, no reason why every car-owner should not know everything about lubricating his car, which is a simple job, though not the most pleasant in the world. Not more than three cars in 10, though, as far as I can judge from those I see, are properly lubricated.

Not long ago one of my customers noticed that the oil gage on his dash-



board was not working. He was in a hurry to go somewhere, so he paid no attention to what should have been a warning. He got through the day without mishap, and continued to drive his car for about a week. Then one day the car began to behave like a bucking broncho, and he brought it round to us for an inspection.

The reason the oil gage hadn't worked was that the pump gears were worn, and, of course, oil hadn't been circulating through the motor. If he had brought the car to us immediately, we could have repaired it for about five dollars. As it was, though, it cost him more than \$100 in labor and materials to replace burned-out bearings.

ANOTHER man heard a little noise in the rear of his car and paid no attention to it, even when it grew louder. In fact, he didn't run the car into the garage until it showed unmistakable signs of readiness to quit for good and all. We took down the transmission, and found what might be described as a pile of powdered steel sawdust.

It's almost unbelievable, yet this man, who had an instruction book telling him to fill his transmission case with a certain grade of grease every 3000 miles, had never inserted an ounce of grease in the two years he had owned that car. Small wonder that the gear teeth began to break off, circulate through the mechanism, and "chew up" everything within reach! His repair bill was about \$75—and less than a dollar's worth of grease would have saved it all!

Another man paid me around \$30 recently for a new spring and for resetting the spring on the opposite side that went out of shape when its mate broke. Another case of failure to lubricate! Any mechanic could have spread and oiled that spring in 15 minutes when it first began to squeak.

I sometimes think it's too bad that most cars aren't equipped with non-adjustable carburetors or with some kind of locking device that would make it

impossible to change the adjustment, once it was made by a competent mechanic. Haphazard tinkering with carburetors by people who don't know what they're doing causes more trouble than you'd ever imagine. I wish I had a small percentage of the cost of the gasoline that's consumed unnecessarily every year, due to improper carburetor adjustments!

The carburetor is easily accessible and you need no tools to monkey with it. For that reason it's usually the first part of the car that the average inexperienced driver starts to play with when his car begins to run badly.

A man in my town bought a second-hand car a few months ago. It was in good condition, and he drove it without trouble for several weeks. Then one day on the road the motor began to lose power and to miss and cough. The owner didn't know what to do about it, and was standing by helplessly when another motorist stopped beside him and asked if he could help. The man who was in trouble explained what had happened, and the other, without making an inspection or a test of any kind, announced immediately that the trouble lay in an improper carburetor adjustment and that he could fix it.

HE DID fix it, too. He gave the gas adjustment a couple of turns, and the car immediately began to hum like a racer. The owner completed his trip, then when he got home, related his experience to a neighbor. This latter had been driving for about a year, so, of course, "knew everything about automobiles." He decided that he ought to look over the work the volunteer repairman on the road had done, and was very gleeful when he discovered that the filter in the top of the vacuum tank was clogged with sediment. "See, your trouble wasn't in the carburetor at all," he reported, removing the filter to clean it.

LIKE many amateur repairmen, however, he forgot something—to re-adjust the carburetor to compensate for the greater amount of gas that was being fed to it through the clean filter. The result—one of them, anyway—was that the owner of the car ran out of gas about a week later 10 miles or so from home. The car had been giving from 15 to 16 miles to the gallon; now, though, with the new carburetor adjustment, it was giving only seven, and he found himself without gas when all his calculations indicated that his tank should have been half full.

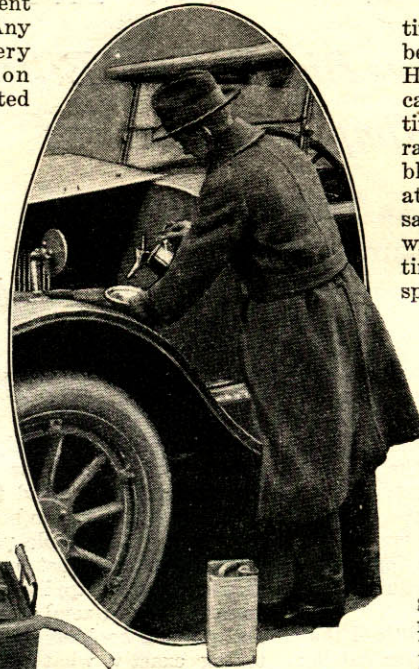
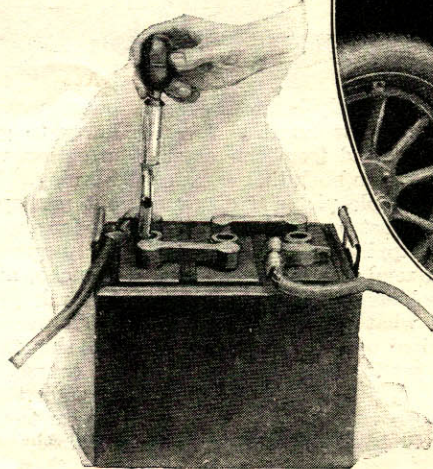
Of course, he had to pay for having his car towed in from the road; also for the removal of carbon from the cylinders, for the excessively rich mixture he had been using had caused his motor to carbonize alarmingly. All of that expense and trouble could have been obviated by spending about 75 cents to have that filter cleaned and the carburetor properly adjusted.

Batteries supply an enormous annual

list of unnecessary casualties. A good storage battery on a car that is run regularly ought to last for years. Few of them do, however. Not a week ago I replaced a \$25 battery that was only a year old. Never once had the owner put distilled water in it, nor tested it, as he might have done with a 50-cent hydrometer. Any garage or battery service station would have tested

Test Your Battery

It is a simple matter to have your battery tested and supplied with water regularly; yet by neglecting this, thousands of motorists cut short the life of their batteries



Oil Cheaper

By remembering to keep the crankcase well supplied with oil, you will save yourself the cost of burned-out bearings

list for him and added water for 25 cents, or charged it for him when it was necessary for about two dollars.

He neglected it, though, with the result that, after a few weeks of idleness, the battery proved incapable of turning the motor

Know Your Car

REMOVING tires from rims is a dreaded job that bruises hands and ruins good temper. Special tools have been devised to make it easier, but the average car-owner cannot afford them for individual use. He, therefore, leaves his tire-changing work to service stations.

Yet it is possible to do this work yourself easily without special tools if you give proper attention to the rims and lugs. The difficulty of changing tires depends almost entirely upon the condition of these parts, that ordinarily are neglected. To facilitate tire-changing, observe these precautions:

1—Sandpaper the tire bead surface of the rim and shellac it with a thin coat of shellac.

2—Rub the tire beads with flake graphite, applied with a cotton pad.

3—Clean the bearing surface of the rim, the wheel rim and the tire lugs, removing rust, and smear a thin coat of graphite grease on these surfaces, including the bolt threads.

With the surfaces prepared in this way, and the use of a well-oiled jack, tires will slip readily from rims.

over. When we inspected it we found its plates so badly sulphated that it was useless to attempt to charge it or repair it. Why any one should prefer to spend from \$10 to \$40 for a new battery rather than from two dollars to five dollars for needed battery service, I can't understand; yet they do it.

Almost any set of standard tires sold today ought to last for between 15,000 and 20,000 miles. How many motorists, though, can boast of getting any such tire mileage? Once again ignorance and carelessness are to be blamed. To get 15,000 miles, at least, out of a tire, it is necessary only to supply yourself with a good gage, to keep the tire pumped up to the pressure specified by the manufacturer, and to repair all small cuts as soon as they occur.

RECENTLY an indignant customer came to me complaining that a cord tire I had sold him had blown out at the end of 4000 miles. I gave him a new tire, but actually he didn't deserve it. On one of his first trips he had gashed the side of the tire by running over a trolley switch. He made a great point of the fact that the blowout had not occurred at the place that was cut. Nevertheless, the cut was responsible, for moisture, entering the fabric through the break, had traveled along within and settled at the place of the blowout, gradually rotting the fabric away until at last a sudden jar caused the rubber casing to give.

Those small cuts, to which the average owner pays no attention, frequently result in expensive tires blowing out before the tread shows any appreciable wear. They are caused generally by sharp stones on macadamized roads, steel slivers in car tracks, and the rough edges of curbstones. You should inspect your tires at least once a week, and if any small cuts are disclosed, the break should be cleaned thoroughly with gasoline and repaired with rubber cement. Either that, or have the place vulcanized.

BACKING into a curbstone may bruise your tires so badly that a couple of thousand miles are taken from their life. Scraping the curbstone may produce a similar result. Misalignment of the front wheels, which causes the tires to wear on the relatively thin sides, likewise soon may make them ready for the scrapheap. A man who keeps his car at my garage recently destroyed an expensive balloon tire because his brake rods were improperly adjusted. The right-hand wheel was doing all the braking, with the result that the tire wore out in record time.

How many cars are ruined almost irreparably every year because ignorant owners drive them too fast when new, I wouldn't care to estimate. The man with his first automobile is more likely to "drive it to death" than the man who has owned cars before.

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The Most Up-to-Date One-Tube Set

(Continued from page 134)

After the rheostat is set properly, turn the right-hand dial until the signal attains maximum loudness. You will find that when dial *E* is turned too far, the signal will be broken up suddenly by a clicking and rushing sound. This indicates tube oscillation and you should be sure to operate your receiver at a point below oscillation so as not to radiate and spoil your neighbor's reception.

If the receiver seems dead and lifeless and the weak signals you hear are decreased in strength when you turn dial *E*, the chances are that you have wound coil *C* in the wrong direction or reversed the connections to this coil. If you find that the coil is wound in the wrong direction, you can rewind it or reverse the connections.

There is just one other point to watch out for. Do not mistake the end of coil *C* nearest coil *B* for the end of coil *B*, and vice versa. Such a change in the connections will render the receiver absolutely inoperative.

Things I Have Learned About Your Car

(Continued from page 72)

Manufacturers advise not to drive a new car faster than from 20 to 25 miles an hour for the first 1000 miles. I'd say don't do it for the first 2000 miles. You'll have plenty of chance to try your car out after that, and if you curb your impatience you'll find you have a faster and more efficient vehicle.

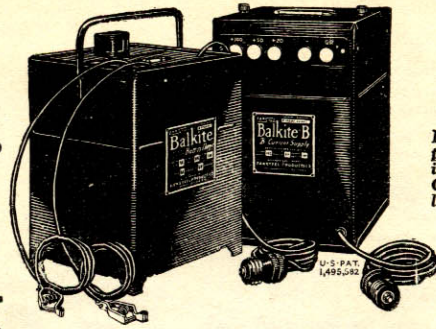
A man who bought a new model of a popular make of car the first of this year has been running between my garage and the service station of the manufacturer ever since, because he drove it too hard when he first had it. The bearings, of course, were excessively tight, and when he drove at high speed, naturally the bearings became "starved" for oil. Eventually they gave way, the "stiffness" disappeared from the car and the owner went on his way happily. But his happiness was short-lived, for he has had nothing but trouble ever since. The bearings are pitted, and almost daily some new "defect" discloses itself.

These are only a few instances from thousands that have come under my attention of the harm done to cars and the unnecessary expense caused by the ignorance and carelessness of owners. Automobile engineering has advanced wonderfully since the days when a motor-trip, no matter how short, was a hazardous adventure, but engineers are not yet able to produce a car that is proof against flagrant misuse. They can and do produce cars, however, that ought to last a great deal longer and cost considerably less for upkeep.

Gas, oil, and grease, water for the cooling system, frequent inspection of the battery, the ignition system, and the tires and an occasional check up of the carburetor adjustment—if intelligent care is taken in these particulars, necessity for repairs is not likely to arise at all.

Balkite Battery Charger. Charges 6 volt "A" storage batteries.

Price \$19.50
West of Rockies \$20
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Balkite "B"—replaces "B" batteries and dry cells. Operates from light socket.

Price \$55
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An unfailing power supply for both circuits

Here at last is an unfailing power supply for your radio set. Balkite Radio Power Units furnish constant uniform voltage to both "A" and "B" circuits and give your set greater clarity, power and distance. The Balkite Battery Charger keeps your "A" storage

battery charged. Balkite "B" replaces "B" batteries entirely and furnishes plate current from the light socket. Both are based on the same principle, are entirely noiseless, and are guaranteed to give satisfaction. Sold by leading radio dealers everywhere.

FANSTEEL Radio Balkite Power Units

BALKITE BATTERY CHARGER — BALKITE "B" PLATE CURRENT SUPPLY

Manufactured by FANSTEEL PRODUCTS CO., Inc., North Chicago, Illinois

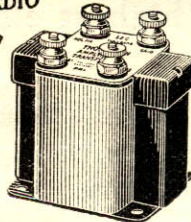
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EAGLE AND
MANY OTHERS
USE THORDARSONS!



Uniformity Guaranteed!

One reason that leading builders of fine sets use more Thordarsons than all competitive transformers combined is because Thordarsons run *absolutely alike, absolutely uniform*; always "match up" perfectly; always amplify evenly over the entire musical scale.

The following statement was made recently by a prominent set maker (name on request): "Any radio manufacturer who is sincerely desirous of producing an instrument of the volume necessary and of a tone superior to anything else on the market, must be absolutely forced to use Thordarson transformers sooner or later." Follow the lead of the leaders—build or replace with Thordarsons. They are unconditionally guaranteed. Any store can supply you. If dealer is sold out, order from us.

THORDARSON ELECTRIC MANUFACTURING CO.
Transformer specialists since 1895
WORLD'S OLDEST AND LARGEST EXCLUSIVE TRANSFORMER MAKERS
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THORDARSON Super AMPLIFYING TRANSFORMERS

Standard on the majority of quality sets

TYPES AND PRICES: Thordarson "Super" Audio Frequency Transformers are now to be had in three ratios: 2:1, \$5; 3:1, \$4; 6:1, \$4.50. Thordarson Power Amplifying Transformers are \$13 the pair. Thordarson Interstage Power Amplifying Transformer, \$8. Write for latest Hook-up bulletins—free!

THEY SAY OF THE OZARKA:

"Ordinarily a three step amplifier is noisy but we can guarantee the OZARKA to give the greatest volume possible with a tone reproduction that is satisfactory to everyone."

Ozarka amplifies with Thordarsons!

THEY SAY OF THE MASTER:

"The parts used are the best. Shielded, distortionless transformers insure perfect reproduction, unusual volume and tone."

Master amplifies with Thordarsons!

THEY SAY OF THE HARTMAN:

"The range, selectivity, volume, clarity and freedom from noises is remarkable."

Hartman amplifies with Thordarsons!

They say—

THEY SAY OF THE AUDIOLA "SUPER":

"Absolute elimination of distortion and foreign noises is attained . . . One stage of straight audio coupled with a stage of push-pull audio gives the volume of three audio stages with the clearness and distinctness of headset reproduction."

Audiola amplifies with Thordarsons!