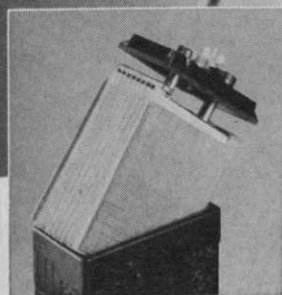
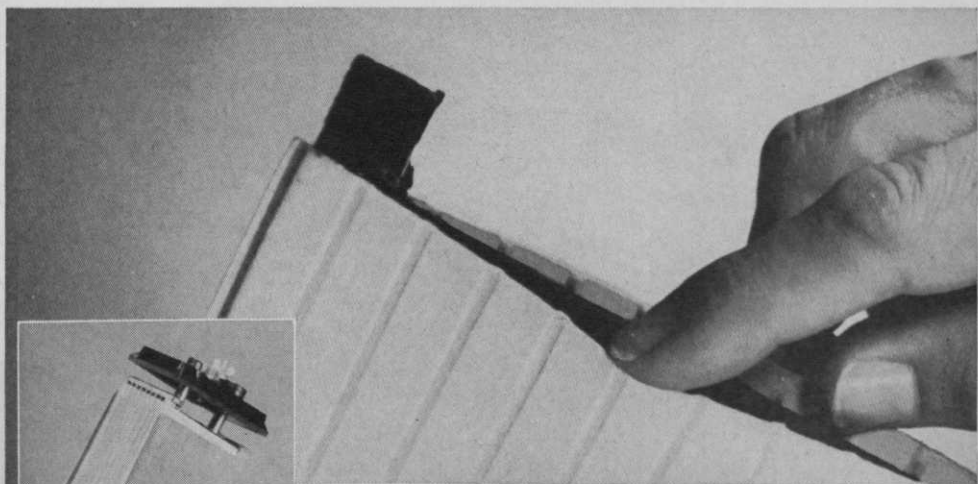


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Demonstrator shows one group with plates "PolyKlad" protected



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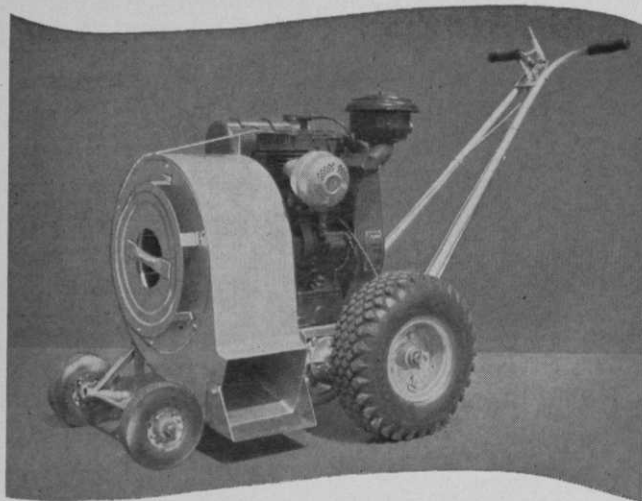
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## Tractor Maintenance

(Continued from page 36)

proved design has raised the engine's power output without increasing the engine's weight and bulk. A few years ago, the average tractor engine compression ratio was 4 to 1; now it often exceeds 7.7 to 1. Diesel tractors go as high as 23 to 1.

A complete cycle — intake, compression, firing and exhaust — takes place in less than 1/5 second at only moderate engine speed. A few thousandths variation from the specified "valve lash" can change valve timing, result in valve failure and loss of power.

### High Combustion Heat

Exhaust valves and seats are exposed to combustion temperatures of as high as 4,000 degs. F and normally operate at *Cherry Red heat*. The exhaust valve temperature at high engine load ranges from 1,200 to 1,400 degs. F. A valve weighs about 5 ounces and must keep its true form in order to make a complete seal.

Considering the magnitude of these

temperatures and the fact that exhaust gases are highly corrosive, it is apparent that the exhaust valve operates under extremely severe conditions.

Intake valve operation is similar to that of the exhaust valve. But because of the low temperature of the incoming charge, the intake valve temperature is much lower than that of the exhaust valve. It follows that the cooling system plays an important part in valve life. It should be kept in mind that "shutting off" a tractor without a short idling period can lead to short valve life.

Failure by burning nearly always is the result of incomplete valve sealing. This permits high temperature gas leakage between the valve and seat, and both face and seat are subjected to extreme temperature in the area surrounding the leak. Improper valve lash frequently is the cause of valves burning.

### Carbon Causes Trouble

Carbon prevents heat dissipation. Clean metal is a good heat conductor but carbon insulates and retains heat, increasing combustion chamber temperatures and causing



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valve warping and burning. Unburned carbon residue forms a gum on the valve stems and causes them to stick in their guides. Hard carbon deposits can become white hot and cause pre-ignition and detonation. Carbon formation can be minimized by proper fuel, correct mixture, proper engine temperatures and periodic valve adjustment. Additives in lubricating oils help keep carbon soft and harmless.

Correct tappet clearance gives quiet engine operation and long valve life. Insufficient clearance causes the valve to stay open too long, resulting in lost power and valve failure. Too much clearance upsets timing and reduces valve lift, preventing maximum intake and exhaust.

### Test for Valve or Ring Trouble

Low compression readings, of course, indicate valve or ring trouble. There's an easy way to determine whether the reading stems from valves or rings. If the compression tester shows a low reading, squirt a teaspoonful of heavy oil (SAE-40 to SAE-50) into the combustion chambers of the affected cylinders. Crank the engine several times to distribute the oil and repeat the compression test.

If the trouble is in the rings, there will be a definite increase in compression. The oil temporarily seals any leakage past the rings. If about the same readings are obtained, the rings are sealing and the valves are leaking.

Before testing compression, the engine should be brought to normal operating temperature. During the check, both throttle plate and choke valve must be wide open and all spark plugs should be removed. If, during the test, pressure remains the same for several strokes and then increases on succeeding strokes, a sticking valve may be the culprit.

The practice of checking an engine using air pressure is not recommended since it can be misleading and even dangerous. Stick to the compression tester and you won't get in trouble.

### Like A Lawn Sprinkler

The engine's lubrication system is similar to that of a lawn sprinkling system. Oil is pumped through oil passages to the various points such as crankshaft, camshaft, main and connecting rod bearings, where it escapes to be sprayed around in the engine to cool and lubricate. About

# NEW ROSEMAN

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*Thank you, Mr. Superintendent, for your valued comments.*

The new Roseman Hi-Cut mower, introduced at our recent series of Roseman Days, has been proclaimed the outstanding rough mower on the market today.

The design and performance characteristics that elicited this opinion were the "high-cutting" feature, the large, rugged, 4-bladed 10" reels, with heavy-duty blades, riveted — not welded; the non-breakable malleable side frames, and the puncture-proof laminated tires, with caterpillar-type lugging ability that gave positive, constant cutting action in the toughest, thickest and deepest rough grasses.

It was observed that the Roseman rear-

drive design eliminates bobbing of the cutting reel; allows faster mowing speeds with all grass cut to uniform height, and with substantial time and labor savings.

Also, the Roseman rear-drive design permitted trimming close to obstructions and over traps, bunkers, shrubby beds and curbs, with great economies in hand labor.

We are pleased with the wonderful reception you gave the new Roseman Hi-Cut mower designed to mow your rough areas in an improved manner and at far less cost. We invite you to make your next rough mower a Roseman Hi-Cut model.

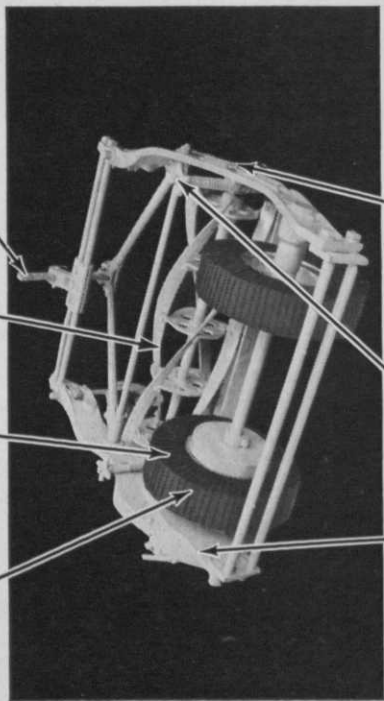
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**LAMINATED TIRES**  
Puncture proof. Trouble free, no bouncing, more traction.

**RUGGED, LARGE 10" REEL**  
Heavy-duty blades, riveted not welded.

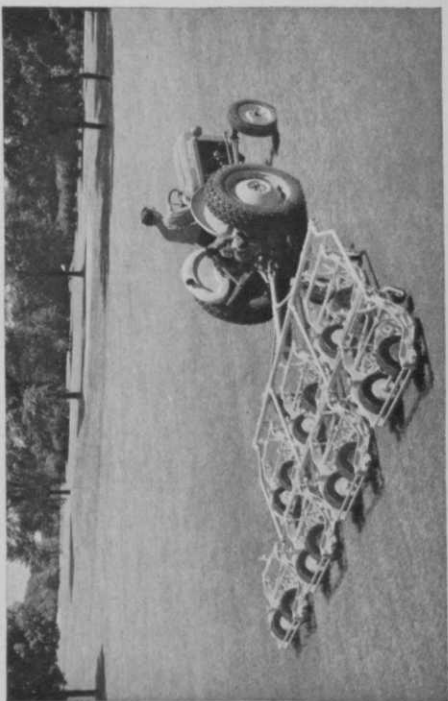
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Simple, no tools required.

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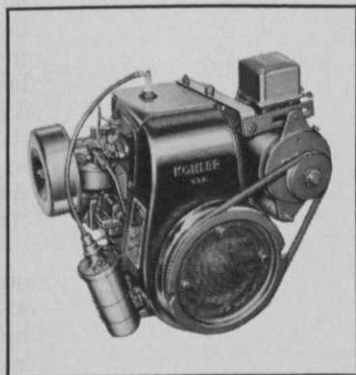
the same thing happens in a lawn sprinkling system. If no leaks develop, everything works satisfactorily in both systems.

The flow of oil through the main, connecting rod and camshaft journals is restricted by the running clearance between bearings and their respective journals. The smaller the clearance the smaller the volume of oil pumped through the bearing. The oil that escapes through the clearance sprays the inside of the crankcase and lubricates other moving parts such as camshaft lobes, cam followers and cylinder walls. The oil then returns by gravity to the crankcase where it is re-circulated.

Normal wear can knock the lubrication system out of adjustment. When this occurs, some parts of the engine may be overlubricated, causing increased oil consumption, or in case of lack of lubrication, excessive wear. Excessive running clearance of connecting rod bearings can cause too much oil to be thrown into the cylinder and the oil control ring is flooded and can't control the oil. Thus, too much oil is consumed, plugs are fouled, valves



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stick and perhaps power is lost.

The oil filter should be changed regularly. The screen and oil pump should be checked for plugging and cleaned at the first indication of low oil pressure.

### Operation Has Influence

Engine operation has an influence on the scuffing and scoring of pistons, rings and cylinders. "Lugging" an engine for sustained periods reduces its life and aggravates the scuffing problem. (Lugging is operating with wide-open throttle at low rpm). Lugging results in:

1. The drawing of a maximum fuel charge into each cylinder, resulting in more heat being generated in the combustion chamber;
2. The flow of coolant through the engine is at a minimum because the water pump is operating at reduced speeds;
3. The flow of air through the radiator is at a minimum for the amount on horsepower developed by the engine. The speed of the engine is low and the fan is not turning at sufficient speed to pull enough air



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MEN'S PAR	4	4	3	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
WOMEN'S PAR	4	4	3	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
1. <i>Bill</i>	4	4	3	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
2. <i>HARRY</i>	4	4	3	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
Wah + Last - Halved	I we		Hdcp		I we		I we		I we		I we		I we		I we		I we		I we		I we	
3. <i>Jim</i>	5	4	3	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
4. <i>FRANK</i>	5	4	3	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
Scorer																						
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Dr. Jan Steele-Perkins (l) accepts trophy from Frank Strafacci, following Bahamas' 13 to 11 victory over a Florida Metropolitan Amateur GA team in recent matches played in Nassau. This is the first time the competition was held.

through the radiator;

4. Due to the above condition there is a great tendency for detonation to occur. Detonation results in an added increase in temperature and pressure of combustion chamber gases, causing much higher piston, ring and cylinder wall temperatures;
5. The oil throw-off from connecting rod bearings and the flow of oil through the engine are reduced to a slower rpm. Since oil acts as a coolant as well as a lubricant, its reduction cuts down on the protection of these parts.

Kerosene is not detrimental to the lubricating quality of an engine oil. What is more, it is a big help in getting an engine started when the thermometer drops.

### Illinois Short Course

A short course in turf management will be offered for the first time by the University of Illinois, Urbana, this winter. It will run from Feb. 1 through Mar. 12, 1965. The student will have the choice of ten subjects and certificates will be awarded to those who complete the course. The estimated cost of the six weeks is from \$215 to \$270, including tuition, fees, housing and meals. Inquiries should be sent to Short Course Supervisor, 104 Mumford Hall, College of Agriculture, U. of Illinois, Urbana.