

Graphite in Boiler.

I saw an article in a power magazine recommending the use of graphite in steam boiler. The writer said that as the boiler expanded and contracted that the scale cracked and that the graphite kept working in farther all the time, till finally the scale peeled off altogether and the graphite formed a thin coating on the inside of the boiler so that no more scale could stick, and that it protected the tubes and plate from the effects of acids in the water. Anyone who has had graphite on their hands will know how it will stick.

1. Is this a theory or fact?
2. Where could a person get boiler graphite, what grade, and what is the price per pound?
3. Would it make the water glass so black that a person couldn't tell the height of the water?

J. I. C.

Ans.—1. It is both theory and fact, we understand, but some don't like it for various reasons.

2. It can be secured, we believe, from the United States Graphite Co., Saginaw, Mich. There is only one grade, and price is about 15 cents per pound.

3. It does not bother the water gauge. R. R. G.

Size of Pulleys for Grinder.

Gas engine with 12-inch pulley, running 400 r.p.m. My 8-inch grinder has 5-inch pulley. I wish to run grinder 2,500 r.p.m.

1. Would a 25-inch pulley on engine be the best way to do this?
2. Would this reduce the power of engine?
3. Would it be better to run from 12-inch pulley on engine to line shaft, and run grinder from pulley on line shaft?
4. If so, what size of pulleys should I have on line shaft?

R. M.

Ans.—1. Yes.

2. No, except that if the grinder runs faster the engine has to develop more power in proportion, but the 6 h.-p. is capable for this work at grinder speed of 2,000 r.p.m.

3. No, not unless you require a line shaft for transmitting power of engine to various stationary machines.

4. That depends on speed on line shaft. If it runs same speed as engine, say 400 r.p.m., then 12-inch and 25-inch pulleys would be required, the former connected to engine.

R. R. G.

Water System.

I would like to get some information regarding a water system that I intend to install. I have a windmill for pumping water out of a well 129 feet deep; depth of water in well about 80 feet. The hill where the proposed tank is to be built is on a level with top of wheel of windmill and 140 yards distant from well. The house and barn are between the well and proposed tank, which is to be built of cement and buried in the ground. The barn is 80 yards from well and house is 100 yards distant from well. The wheel of windmill is 10 feet in diameter. Can I pump water with this windmill up this hill to the tank to furnish dwelling and also barn containing 50 head of cattle and 5 horses? If not, can I do so with a gasoline engine, and what size of an engine will I require? Can you give me an idea of the size of piping required and the cost of same?

C. D.

Ans.—Your windmill will pump the water to the proposed tank quite satisfactorily, or a 1-h.-p. gasoline engine would do it easily. The pipe should be 1½ inch. The cost of galvanized piping of this size is about \$22.50 per 100 feet at present.

R. R. G.

Engine Pounding.

What is the cause of my 8 h.-p. engine pounding? I have examined all the bearings and found them all in good shape; it sounds as though the piston was hitting the back end of the cylinder. I have tried different spark plugs, and we also took the engine apart and cleaned it thoroughly without beneficial effect. I then wrote the company who made it, and they said it must be pre-ignition, caused by too high compression, and they said the engine would run with the switch off after the engine got hot, and I tried this but it never exploded once with the switch off, although it boils the water in a short time. I have the spark timed as their instruction book calls for. The company advised me to have the connecting shaft shortened one-quarter of an inch, do you think this advisable?

F. B.

Answer.—If it is found that the cooling system, mixture and timing are not at fault, it could be advisable to shorten the connecting rod ¼ inch as suggested by the company.

R. R. G.

Capacity of Water Wheel.

How many horse-power water wheel will it take to run fifty electric lights and two three-h.-p. motors and a ten-h.-p. motor?

J. S.

Ans.—Fifty 20-Watt lights would consume power equivalent to 1.34 electrical h.-p., and if generator were driven by water wheel the wheel would need to develop twice that or rather better than 2½ h.-p.; the rule being that 1 electrical h.-p. is equivalent to 2 water wheel h.-p. A 3-h.-p. motor would require about 6 h.-p. water wheel to drive, a 10-h.-p. motor, about 20 h.-p. wheel.

R. R. G.

Sparking at the Brushes of Generators.

EDITOR "THE FARMER'S ADVOCATE":

The following are causes of sparking at the brushes of generators:

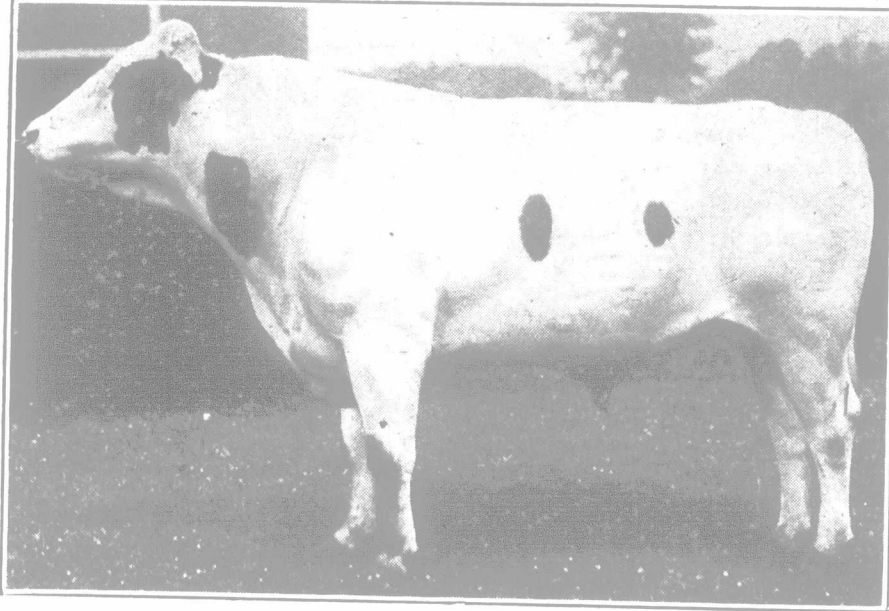
1. Brushes not set on neutral. Shift the brushes back and forth until sparking is reduced or eliminated.
2. Brushes not set diametrically opposite.
3. Brushes not in line. Adjust each brush until its bearing is on a line with the commutator bars.
4. Insufficient brush contact. Due to dirty commutator or poor tension, allowing the brushes to leave the commutator.
5. Commutator has high, low, or flat bars, projecting mica, or may be rough and worn. Grind with fine sandpaper and polish. If defect is serious it may be necessary to turn the commutator true in a lathe.
6. Open circuit in the armature. Sparking will occur only at one place on the commutator, thus locating the place of the break. Defective coil may be temporarily repaired by connecting to next coil across mica.
7. Short-circuited or reversed armature coils will cause the motor to draw excessive current, even without carrying a load. Reversing field coils can be located by a compass. Shortened coils will usually burn out under load, and should be removed, while reversed coils may be connected properly.

Commutators must be kept clean, as any oil or grease on the segments will collect carbon dust and produce short circuiting. In installing new brushes, always use replacements supplied by maker of generator, making sure the brush fits the surface of the commutator exactly over the whole area of the end of the brush. Never run the generator with the battery disconnected unless the generator is grounded or brush lifted off the commutator to prevent it generating.

R. L. T.

Size of Pulleys.

I have a gasoline engine 4½ h.-p.; it runs from 350 to 550 revolutions per minute and has a 9-inch pulley, and I would like to get a rip saw. What size of a saw can I drive with this engine in soft wood, and what size in hard? I wouldn't want to rip more than 4 inches



A Well-kept Herd Sire.

This well-bred Holstein bull heads a milking herd in Oxford County, Ont. Herd improvement is thus accomplished.

thick in hard wood, and can I use my cord-wood saw mandrel? My cord-wood saw has a flywheel that weighs about 150 lbs. and has a pulley 5 inches. Will I have to put a larger pulley on the mandrel? What speed should this saw run at and what gauge?

W. L.

Ans.—You could not run a saw larger than 16 or 20 inches in hard wood with 4½ h.-p. engine; a 16-inch would be 14 gauge, and 20-inch a 13 gauge. A 9-inch pulley on engine and 5-inch on mandrel would not run saw much more than 800 r.p.m., whereas it ought to run 2,000 or 2,400 r.p.m. This speed could be secured by using 24-inch pulley on engine and 5-inch on saw.

R. R. G.

Motors.

Which is the best balanced and most durable tractor motor, a four-cylinder running at one thousand revolutions per minute or a twin cylinder with both cranks on the same side of crankshaft and counter balanced, speed five hundred revolutions per minute? Both motors are four cycle, rated 20 h.-p.

A. McA.

Ans.—The former is generally considered to be the better balanced and most durable motor.

R. R. G.

THE DAIRY.

Grading up the Dairy Herd.

It is rather astonishing sometimes that one still sees so many inferior, or so-called "common" cows throughout the country. It is surprising that in spite of the very great deal of good work carried on by Departments of Agriculture, both Provincial and Federal, and the years of effort devoted to the elimination of the scrub dairy sire, and the raising of the general average in milk production per cow in Canada, that such comparatively small progress should have been made. It is true that even considerable progress has been made and that through the encouragement of cow testing and the use of milk scales, many useless and unprofitable cows have been eliminated from the herds of the country. Not only this but there have been notable improvements in feeding methods and some, though by no means phenomenal increases in the numbers of pure-bred stock. It would, of course, be a splendid thing in many ways if all our dairy cattle could be of pure breeding, because in the first place it is only natural to expect that the good qualities of a pure-bred animal are more likely to be transmitted to its progeny than the good qualities of an animal of less concentrated breeding. One would not go very far before realizing, however, the almost absolute impossibility of ever bringing this about for a very great number of years. Not only would it mean too large an expenditure of money to invest in pure-bred animals, but the number of dairymen is too large to ever hope to convince all of them that an investment in pure-bred females would pay, if it really would.

We must naturally conclude then—if pure-breds are more desirable and profitable on the whole than nondescript or even good grades, and if we dare not hope for a replacement of all our common cows with others of pure breeding and decided powers of milk production—that the pure-bred sire should be the obvious recourse of the dairyman who aims at increasing the average milk production of the members of his herd. One may say that just because an animal may be registered as a pure-bred sire he will not necessarily be a producer of high-testing progeny, and that there are many grade cows whose milk production is far in excess of that of many pure-bred cows. All this is very true, as will be proven later with regard to the sire and as has been demonstrated many times over as regards cows. But such instances are rather the exceptions which prove the rule, and there can be no possible sound argument as to the superiority in general of grades over pure-breds. In fact, it has been proven by investigation more times than can be enumerated

that as a general and plain truth, the use of pure-bred sires of only average quality is more profitable by a very considerable margin than the use of grade sires. One has only to study in the most superficial manner the results of the recent farm survey in Oxford County, Ontario, to realize this fact. The profit per cow over feed was just tripled, due to the use of pure-bred instead of grade sires, over a period of less than 15 years.

For some years now experiments in the grading up of dairy cattle have been conducted on the Dominion Experimental Farms System, using ordinary common cows and pure-bred sires with tested dams, as foundation stock. These experiments were undertaken to prove the ease with which milk production can be increased merely by the use of a sire of recognized good breeding, good individuality and out of tested dams. The latter point, by the way, is probably the most important single point in the selection of a desirable herd sire, because it is only by this precaution that the farmer can be reasonably sure that the bull he buys will possess those milking qualities which it is hoped he will transmit to his daughters. This point should not be sacrificed even for conformation, although the latter is important, much more so than is generally realized. Only partial results are available from the experiments of the Dominion Experimental Farms, partly because the work is not yet completed and partly because the figures for the work done so far are not yet tabulated. We hope to present further evidence from these experiments as they progress.

Probably the most complete results are available from the experiment station at Nappan, Nova Scotia, where Ayrshires and Holsteins have been used since 1912 in the grading-up work. Speaking of the results to date, W. W. Baird, Superintendent of the experiment station says:

"At the Experimental Farm, Nappan, N.S., an interesting and valuable experiment has been conducted since 1912 in grading up a dairy herd by the use of pure-

bred sires, been carried out by Holstein.

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