

# Machinery Maintenance

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IT is quite possible that when the dinosaurs ate off the tops of the grass people noticed that it grew better and looked better. This might have been the beginning of machinery maintenance of turf. Later came the sheep and goats. They weren't so hard on the grass and made a neater and smoother cut, resulting in a more beautiful turf. However, it was not until the Greeks had invented and put to use the man-power scythe that grass began to come into its own as the thing of beauty and joy that it can be when properly grown and cut. Now, as you know, there is an almost universal love for green fields. But many years passed before it was practical for the average man to enjoy his own lawn.

In the 1800's came the development of the reaper, which was essentially a machine for cutting grass after it had grown tall. Our first lawn mowers were of the sickle-bar type. They were satisfactory for tall grass or grains, but not so good for short grass. Then the inventors began looking around for another type implement. One inventor had a circular device similar to the circular saw, with the flat surface presented to the ground. The width of the cut varied with the diameter of the disc. This device had a whetstone attached to keep the edge sharp at all times.

## First Patent in 1812

The first patent appears to have been granted to Peter Galliard, a resident of Pennsylvania, in 1812. But it was forty years before Aultman and Miller applied for and obtained a patent upon a mower having two wheels, adjustable cutter bar, and revolving reel—all the essential parts of the present-day machine. Of course, there were trick designs brought out, but they seemed unable to catch on with the user-public. So, the mower industry ran for years without much improvement, though the manufacturing art had forged ahead by leaps and bounds. In fact, one company used to advertise that it hadn't changed its design in 40 years, so there

certainly wouldn't be any trouble getting parts.

The lawn mower replaced the sickle for cutting grass, but there the substitution stopped, and for eighty years it has held its place in the sun with no indication of losing it. Of course, continual improvements and refinements are being made to produce lighter, faster, better-built units holding to the ground.

The smooth-cutting ability of a mower depends upon the number of knives in the reel and the frequency of the reel rotation. The strength of the mower and the time it is to be used in cutting must be considered. Also the adjustments must be checked frequently. By this I mean the cutter-bar should be checked for waves, the reel for nicks caused by gravel and stones, and the reel bearings for any slight play which would allow the reel to raise from the cutter-bar at high speeds, thus mashing or tearing the grass, rather than shearing it off clean.

## Improper Adjustment Causes Trouble

The scalloped bed knife is sometimes said to be due to soft and hard spots by some service men. This is true in some cases, but it is mostly the result of improper adjustment, and the reel knives have gouged out these waves. This can be proved on the lapping stand by setting the machine too tight against the cutter bar. Vibration sets up and we have the same effect, only in both the reel and cutter bar. The same is true in improper grinding. By having one or two blades in the reel high we have the same condition. Therefore, these are important factors in the correct maintenance of a mower.

Proper test of a mower may be had by simple instructions, as follows:

1. Set knife away from reel.
2. Adjust reel shaft or replace worn reel bearings to eliminate any play.
3. Inspect set screws in reel spiders which hold reel to shaft. Tighten when reel is in old position.
4. Adjust the cutter bar so it just wipes one or all the blades. Revolve the reel slowly and mark the spot when one of the blades wipes the cutter-bar.

\* At Denver Greenkeeping Conference.

Tentative draft of the Rules and Regulations of American Golf have been prepared by William R. Stone, inventor and director of American Golf. The draft is printed in 28-single-spaced mimeographed pages.

Demonstration course is being constructed at Halpine, Md. Although completion of the first American Golf course has been retarded by serious drought, the course is expected to be in operation in July.

misses, check for the following: a cracked or flat ball in bearings, a flat roller if roller bearings, a loose bushing revolving around shaft. If it is a self-adjusting mower with cones, the trouble is likely to be caused by a loose or broken cone.

Bearing trouble is caused by dirt or moisture, so they should always be kept clean and properly oiled. The less dirt on the repair bench, the less trouble will be had in making repairs.

#### **Don't 'Dip' Mowers in Cleaning**

Mowers should never be dipped to clean them. Either air or a brush should be used, as water often creeps in only a drop at a time, until the damage is done. In replacing bearings, they should never be forced directly with a hammer. Some other object should be used, such as a hardwood block or a piece of brass. A press is really the correct process.

Reel clearance or bevel plays the main part in cutting, but this goes hand in hand with the cutter bar, which should be properly ground with a precise revolving stone machine. After this is completed and the machine is reassembled, then comes the lapping process. This can be done by revolving the reel opposite its cutting rotation and applying carborundum compound with oil. Care should be taken not to set the machine too tight as waves will appear as I have mentioned before. The final test for a proper lapped job is done by inserting a piece of thin paper between the cutter bar and the reel and revolving the reel in cutting direction. If the proper clearance has been obtained, the paper will be cut rather than torn.

The last step is cleaning, which is done with a squirt-oiler and gasoline. Care should be taken not to wash the compound into the bearings. These are sealed, but yet the compound will work in from time to time if caution is not observed to prevent it.

Greasing is very important, not only from the standpoint of any easy operating unit, but from overdoing the job. Often this happens, and sometimes the

greenkeeper is criticized for the brown spots where the grass has been killed, when in reality it is the fault of the repair man.

Now for our fairway mowers, which are often trouble makers. Sometimes there are many causes that can be eliminated. The first one is difference in height of cut in a gang unit. This may be due to cut grass collecting on the rear roller, but it can be eliminated by attaching a scraper bar on the mower to remove this accumulation of grass while cutting.

Ridges in cutting, or gaps, may be caused by a bent guide-arm or an out-of-line draw-bar on the mower. However, there remains the wheel tracks and the solution again is the rear-wheel drive mower.

The waves which often occur are from the roller in the rear of the mower striking a hard spot or object. The mower may bounce, leaving several depressions by striking just one object. Then the next time around it is worse, and so on. This is due to high-speed cutting with a slow-speed unit.

The following is a point which I wish to stress—when the grass has a brown color at the blade ends. While some will confuse this with different diseases of grass, it is in reality the result of a dull mower and the blade ends are mashed off, bruising the grass. Then, again, the blame falls upon the greenkeeper, when it is the repair man's fault. A person is well paid in the long run to be alert and prevent this condition from occurring.

Now for our main power unit, or tractor. I have known some courses to drive their tractors for many weeks without changing the motor oil. In comparison with an automobile, the revolutions per minute would equal some 25 to 35 miles per hour, or some 275 to 350 miles per day. So why neglect the tractor? This does not apply to the later tractors with the modern oil filter, but the hour check should be held just the same. The average life of a tractor on a golf course is seven years, when properly maintained.

#### **Centrifugal Pump Most Common**

Let us now consider our watering problems. Most clubs use the centrifugal pump and this type pump is most commonly installed in an underground room with very poor or no ventilation. Moisture is machinery's worst enemy, yet we say what swell service we get from this type installation. Why not use the proper, well

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**Machinery Maintenance**

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ventilated installation and prolong the life of the machine?

The four principal parts of a centrifugal pump are the housing, impeller, shafting and footvalve. Often the trouble is very simple, but the greatest trouble is caused by airlock, or leak. I remember a Chinese saying: No suckee, no pumpee—which is very true. If we check the suction side of this pump, there is often where the trouble lies. Secondly, the throat, where the impeller travels. Often this is worn, and unless it is closely inspected it will pass unnoticed. This can be easily repaired by drilling some small holes and tapping for cap screws, then insert a piece of Monel of fairly heavy gauge. This will increase the gallons per min. 10 to 25%.

Another place of trouble is the impeller. If it is worn excessively look for sand near the foot valve, as this should be above the sand drawing point. Now for the shafting and packing. It is a wise

stunt to pull the packing from your pump the first thing in the fall, after the irrigating season is over. This practice eliminates any corrosion. Then install or overhaul the pumps last in your routine as this preserves the lubricant in the shaft packing, thus preventing excessive heating when first starting. Another point is this: repacking this type pump twice in a season adds greatly to the life of the shaft as any sand particles lodging in the packing causes an emery paper effect on the shaft.

I must not forget to mention the golf clubs' model repair shop. This is at the Denver CC. It is a pleasure to work in a well-lighted and well groomed shop. It takes time to complete the proper arrangement of tools, but there is a lot of satisfaction in knowing they will be where they belong when you want them. This shop, to my knowledge, is the only one in golf-dom equipped with both electric and acetylene welding, wood working machines, and engine lathe and mower conditioning equipment. And it is well lighted.

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