NEWSLETTER

GOOD THOUGHTS AT ODD MOMENTS

By Charles O. Normandy

BE PERSISTENT: Stick-to-it-iveness is a virtue. Everything is gauged by laws and will obey reason and perseverance; it is up to you.

BE CONFIDENT: It is a bulwark of strength, and when supported by a definite vision it is a goad to spur us on to a completed accomplishment.

BE GENEROUS: Selfishness is a defect and defeats its own objectives; altruism in the conduct of life brings dividends in character, contentment and increased worldly store.

—Boston Business.

MARCH

1936

This NEWSLETTER is published monthly by the Greenkeepers Club of New England, and sent free to its members and their Green's Chairmen. Subscription price ten cents a copy, or a dollar a year.

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March, 1936 Vol. 8, No. 3

MARCH MEETING

The March meeting was held on March 2nd at the Hotel Statler. Equipment dealers of Boston and vicinity were invited guests and staged a program with R. E. Bradley of the Ideal Mower Sales and Service Co. as chairman. President Farrant acted as co-chairman to represent the club.

In speaking on new developments brought out this year, Chester Sawtelle of the Worthington Mower Co. brought out that this year their tractor has a four speed transmission so that a power take-off pulley can be used. A sickle bar up to five feet in length can also be used. In the Overgreen, the extent of cut has been increased to 18 inches per mower, total cut of 50 inches. Detachable rims are optional on fairway units as some clubs desire to use rubber rims to mow around greens.

John Nyhan, Pennsylvania distributor, spoke of the 59 years of service in which his company has been manufacturing lawn mowers. In 1932, change was made to malleable iron which gives an unbreakable unit. With a 7 inch reel, less friction on bottom knife is claimed. Reel and bed knife are of oil tempered steel. Unit has adjustable bearings. Changes in greens mowers are mainly changes that have been suggested by various greenkeepers.

Stephen Berecz of the Power Lawn Mower Co. spoke of the Locke Triplex Mower which cuts a swarth of six feet. Tests made on tees show it to be practical, as frequent turns are not necessary. Can be used on approaches, accommodating machine to various widths of approach, can be used on mounds in many cases, has been used on greens; can be used on wet fairways, where tractor is unable to operate. In addition to this mower, his firm also handles a complete line of Jacobson mowers, the National fairway mower, National Sickle-bar mower, etc.

Orville Clapper of the New England Toro Co. pleased us when he said that most new products have been and are being advertised in the NEWSLETTER. These new products include a 20 inch power lawn mower, a Duplex green mower, operating on a new principle, a short wheel base tractor, and a folding type frame for fairway cutting. Some minor changes have also been made in other equipment.

R. E. Bradley brought out that anyone should "shop before buying", as no one manufacturer makes, nor does any one dealer handle the best in every line. He also spoke of a new mower which consists of a series of rapidly rotating blades, which will cut anything which grows annually on rough ground.

The remainder of the program consisted of questions asked the greenkeepers by the dealers and of questions asked the dealers by the greenkeepers. A few observations from these questions and answers are appended.

Problems confronting the greenkeepers are financial.

Rubber tired tractor is easier on the tractor rider.

Seven blade fairway unit wears out bedknife faster than five blade unit; there is a greater draft on the tractor; cut is not affected materially. For short cut fairways use the seven blade mower, for longer cut, five blade is better.

A seven gang fairway hook-up is practical, and by actual experience has shown a big saving. The type tractor now in use can pull this gang whereas the old type tractor could not.

Hand greens mowing gives the personal touch that power doesn't.

Secret of snow plowing is to start with it and keep going.

Of tractors sold golf courses last year here in New England, between 90 and 100% were rubber tired equipped.

REPORT OF LIBRARY COMMITTEE
March 2, 1936

The committee has investigated the possibilities of a library from three angles.

1. What should it consist of?
2. How can it be made available to the members?
3. What will it cost?

Books, magazines, and paper (all other printed material) compose the greater part of a library. Magazines and papers present the current events

of the year and are available in keeping one posted on what is going on in the profession. They do not lend themselves to frequent handling and mailing, and should be read soon after publication. There is a great variety of such material and to select a few such publications would present considerable difficulty. The cost of one yearly subscription, mailing, and replacement of lost or damaged copies would be greater than that of one book.

For the above reasons we feel that this is not a type of reference material that our library should contain at present.

It is suggested that the librarian might canvas the Club membership to obtain a list of trade magazines the members subscribe to and keep on file. This might increase the scope of the usefulness of the library.

Books seem to be the only practical reference material for us.

They may be made available to the members by mail and by personal delivery.

Mailing costs run from seven cents for the first pound to one cent additional per pound for each extra pound. Insurance costs five cents per parcel up to five dollars in value. The small books will weight over a pound and the large ones such as Gray's Botany from four pounds up.

There would be some expense connected with the establishing of the library, such as, a rubber stamp for marking all books as the property of the Club, cards for the records, mailing cases, and for correspondence. A fee of fifteen or twenty cents per book, covering mailing to the borrower, would probably provide sufficient funds to take care of the operating expenses.

The committee believes this to be a worth while project and recommends that the Club appropriate the sum of one hundred dollars ($100.00) to start the library.

Respectfully submitted,
Franklin Hammond.
Philip Cassidy.
Robert Mitchell.

(At March meeting, the club approved this report, and voted the $100 as recommended. Further reports will be given later. Editor.)

PUBLICITY

I suppose, we could have one of our more prominent members go to Reno, get a divorce, then go on to Hollywood and get "hitched" to some famous actress such as Reta Darbo. We could have headlines a foot high running something like this—"Prominent New England Greenskeeper gets himself Hollywood bride. After a short honeymoon they will settle at Chiselbottom-on-the-Hudson, where Mr. Greenskeeper will build a new golf course. Mr. Greenskeeper will dispense with the use of rollers, as Mrs. Greenskeeper, the former Reta Darbo, will confine her walks to the new golf course. Mr. Greenskeeper figures Reta's big feet will save the club enough money to build two extra traps. This shows the value of a greenskeeper, as he is always figuring ahead, on how to save money for his club.

This is an exaggerated example of the type of publicity I hope we do not want.

Publicity might be placed under three general heads—1. Advertising. 2. Propaganda. 3. Educational.

I think we are least interested in the first two.

Under educational publicity, we find human interest and scientific discovery.

For example: the recent announcement in the newspapers of the discovery by a scientist or dentist, of a substance which, when applied to the patient, alleviates pain in the filling of teeth. This was a step of progress in science, but nowhere near as important as the papers would have us believe. It opens a point for controversy in the newspapers, keeping dentists before the public eye. If every dentist gets one more customer due to this publicity his dues in the American Dental Association will be paid for one year. The American Medical Association has well timed sympton stories appear in the newspapers. Yet while these are mostly business creators, they are helping humanity to become more healthy. This; as far as I can see is perhaps about the best type of publicity for us, our parallel being experiments for the making of healthy grass.

We might have the debate type of publicity, in which two prominent greenskeepers, who truly thought very differently on some unsolved subject or phase of greenskeeping, might debate at a meeting. This debate could be printed in the newspapers or golf magazines.

Occasional garden or lawn hints in the local newspapers as coming from greenkeepers would help.

George Rommell.

OUTDOOR RECREATION CONFERENCE

In spite of floods and detours, several thousand outdoor recreation enthusiasts attended the third annual Conference at the Mass. State College on March 12, 13, 14, and 15th. Programs in various sections, Camping, Golf and Parks, Winter Sports, Community Recreation, Trails, Hotels, Archery, Nature, Hunting and Fishing, Mountaineering, Horsemanship, Water Sports, and Forestry, were as varied as were the sections of the conference. The Golf section was attended by probably the largest number of any section, and presented a program of interest for the last three days. In addition to the conference program, a large exhibit also filled the college cage. The golf portion of this exhibit was of great interest, and much of the rest of the exhibit resembled a Sportsman's Show.

It is impossible for us to give all of the talks given at the conference, but we will attempt to give some of the high lights and also publish, as space permits, several complete addresses.

The first part of the Friday morning program presented two members of the Winter School for Greenkeepers, with short papers. Clinton Robinson of the Sunnydale G. C., London, Ontario, spoke on "Why Argue, Nature Makes the Choice". Elmer Schacht of the Des Moines G. and C. C., Des Moines, Iowa, spoke on "The Efficient Greenkeeper and his Attack on Unproductive Time". Both of these papers were well thought out and presented food for thought.

Prof. L. S. Dickinson and his assistant, Miss Elfriede Klaucke, then presented "An Office Chat on Diagnosing Turf Troubles", an interesting skit showing the office life of a busy consultant.

The afternoon program opened with a fine talk by Wm. E. Perkins of the Yale Athletic Fields on "Lime for Turf". (We expect Mr. Perkin's paper for the next issue.)

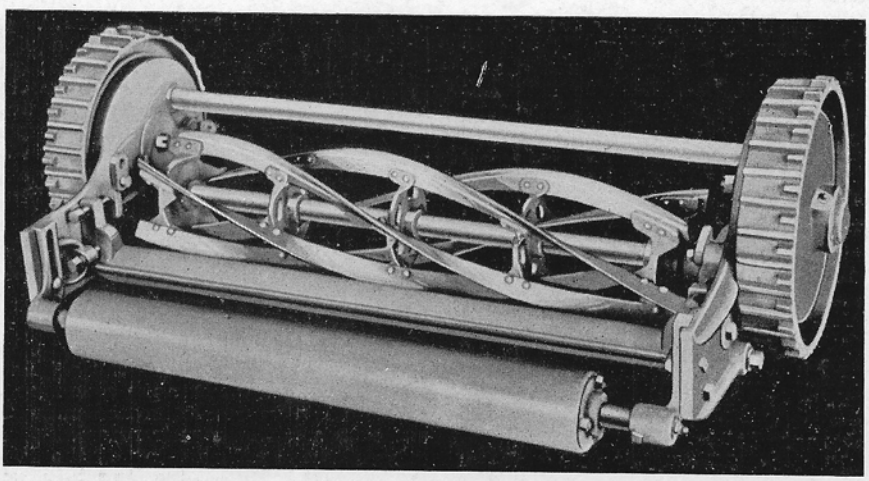
John Anderson of the Essex County C. C., West Orange, N. J., newly elected president of the National Association of greenkeepers, spoke on "the Greenkeeper's Ten Most Important Jobs". He gave them as: **Seeding and re-seeding,** soil conditions must be made right before seeding. **Top-dressing,** to level and true up putting surfaces; compost also used to correct deficiencies in soil. **Watering,** most important job of all; greens have to have water. Use minimum that the plants need to keep them healthy. Correct surface and underdrainage are worries. **Rolling,** is necessary evil. **Mowing,** greens cut closer than 1-4" will suffer, machine unevenly adjusted will give appearance of high cut when really low. **Fertilization,** any fertilization program should be preceded by examination of soil. **Applying fungicide,** small job, but important. Keeping the teeing grounds is important; tees are often too small. Care of sand traps is important. **Care of machinery,** must be up-to-date; a depreciation or sinking fund would be a good idea. Greenkeeper should know what to expect from his machinery. **Nursery,** whether it be turf, tree, or soil, or all three, is important. Do not start unless you can keep it. **Selection and training of labor,** very important. Power mowers and routine have done much to reduce personal touch on the putting green. The greenkeeper and his connection with his greens chairman and committee is important; the greenkeeper should keep the chairman posted in regard to the work.

W. Prince Smith, chairman at the Pittsfield C. C., gave his ideas on "The Value of a Long Term Program", speaking of the advisor idea as applied to golf courses.

Wesley E. Duncanson of Waltham gave a very interesting talk on the "Construction and Maintainence of Tennis Courts".

The Open Forum meeting on Friday evening was not so lively as usual.

A really inspirational talk was presented on Saturday morning by Dean Ernst Herman of Sargent College, "Leisure, Golf, and Creative Activity". Dr. Herman quoted Richard Cabot's book, "What Man Lives By", "Man lives by work, play, love, and worship". Put play into work, work into play, love into worship, worship into love, for success. There is a problem in knowing what to do with the leisure time, left after gainful occupation and sleep. One sport should not be allowed to exclude other sports. Golf should be started early; if boy has only golf, he will be physical illiterate. The creative instinct is the greatest instinct we have—the doing of something worth while. To excel in something is stimulating. It is more important to stimulate emotions than to stimulate internal machinery. We should see to it that the child gets a chance to excel in something; success stimulates the flow of the glands in the



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It is just as sturdy as it looks—it is the very acme of simplicity—and its design embodies the finest possible mechanical features.

The "Bulldog" mower which will produce the finest possible job of cutting is furnished in four frame combinations—3 gang, 5 gang, 7 gang and 9 gang.

We invite your inspection of this superior mowing outfit. Also remember that we operate the best equipped service station in the New England states.

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body. Golf is greatest game there is in building morality—will power and concentration. To make golf clubs a success, other activities must be included. Creative physical activity is necessary to make life interesting. We cannot live by golf alone. Learn the use of the hands. The hands have developed the brain.

A very fine paper on "Greenkeepers' Problems about Lawn Mowers" by A. E. Moyer was read by Kenneth Goit, and is presented in this issue.

The Saturday afternoon program was arranged and presented by the Greenkeepers Club of New England, as its contribution to the conference. President Farrant acted as chairman, and presented Director Fred J. Sievers of the Mass. Experiment Station as the first speaker. Dr. Sievers spoke on "The Greenkeeper and his Future", and pointed out that golf was an individualistic game; this is the game's biggest asset. Greenkeeper can do more to safeguard this asset than any other person who is connected with the game. The pro, instructing, is inclined to be too serious—a rule is a guide, never should be a religion—the golf pro has a tendency to standardize game. The greens chairman usually knows little of greenkeeping, often lays down rules instead of sense. The greenkeeper is specially trained to do particular job; he should know what works and what doesn't work, and should also know why it does or doesn't work. Golf is here to be enjoyed, don't let rules prevent it. Let's not destroy its individuality.

Dr. O. J. Noer next gave an interesting description of his trips around the country this past year, inspecting courses and advising clubs in their turf maintainence.

A Vox Viretorum Custodis hour proved of some interest and amusement to complete the afternoon's program.

In the evening the first annual banquet of the Golf section was held at the Lord Jeffrey Inn, and an entertainment was presented by the college dramatic club, "Royal and Ancient", depicting five centuries of golf.

On Sunday morning, two other papers were presented by members of the Winter School. Jack Welsh, Jr. spoke on "Our Native Vegetation on the Golf Course, and What it Indicates", and Charles W. Parker presented "A Greenkeeper takes a Second Look at the Mass. State College".

Prof. Dickinson presented a few ideas under "Things in General". He said that there is a need for a right turn in golf course maintainence; golf is no longer a pleasureable game, but a business, a highly competitive business. Golf now has a community responsibility. Average greenkeeper of today is looking for a panacea. The scientist should stop work on turf maintainence and consolidate that which we have. There should be less science and more business in next few years. The greenkeeper has best opportunity to bear community obligation; if he does not, next best man may.

On Sunday afternoon, President Charles Mason of the Mass. Golf Association told of the various activities of his association, and advocated anew the use of the club the year round.

Secretary R. W. Treacy of the P. G. A. spoke on "Golf", treating in a general way of the present competitive angle of the game, and of its future.

To those of our members who were unable to be present at this conference, we would report that we believe that the program sponsored on Saturday afternoon was well received. Also that our booth, depicting the use of the country club in all seasons of the year, really showed the spirit of the conference to a marked degree.

Of interest also were the booths of the Connecticut Association, and of the Northeastern New York Association. It always is fine to note their cooperation and attendance at the conference.

GREENKEEPERS' PROBLEMS ABOUT LAWN MOWERS

By A. F. Moyer

(Read at Recreation Conference)

While certain problems connected with lawn mowers may be classified as purely mechanical, the fact remains that all mechanical problems in this field are incidental to the larger problems connected with the maintenance of turf. Therefore, even though the greenkeeper may not personally be called upon to solve the mechanical problems, the lawnmower manufacturer takes up those problems purely for the benefit of the greenkeeper, and to this extent he is solving the greenkeeper's problem. His success or failure will depend upon the degree of understanding and co-operation that he attains with greenkeepers as a whole.

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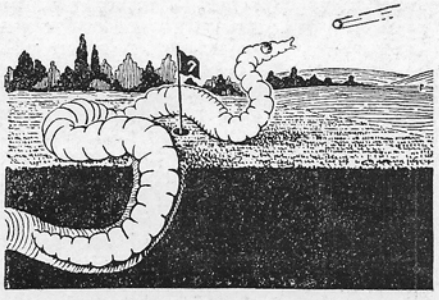

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Since the problems connected with the maintenance of different kinds of turf for diverse purposes are of widely different character, it follows that the mechanical features of lawn mowers best adapted to different purposes will differ widely. A consideration of these features and their relation to turf maintenance is therefore in order.

Classification by Work to be Done

The greatest single factor that distinguishes the various types of lawn mowers, as to their specialized uses, is the height to which the turf is to be mowed and the degree of smoothness that is required after the mowing is done. The usual requirement is that the turf which is to be mowed shortest must also be left smoothest. While all lawn mowers are made adjustable for the height of cut, it is not always understood that, merely to adjust a given mower down to a short cut will often defeat the desire to produce a smooth appearance rather than to accomplish the desire.

Figure 1 illustrates the reason for this seeming paradox, and shows why specialized types of lawn mowers are required to accomplish the results desired for widely varying purposes. In both views of this figure, the successive positions of knives in the act of cutting are shown spaced horizontally in accordance with the distance traveled between scissor clips as the successive reel blades revolve in cutting relation with the bed knife. The forward motion of the bed knife combined with the backward motion of the reel blades gathers the grass into a succession of transverse strips, in each of which the grass stems are bent in a wedge shape at the instant of clipping. Since the stems of grass that are bent over in either edge of the strip being clipped are longer as measured on the bent line than those that stand upright in the center of the strip, there will be, after the stems all resume an upright position, the wavy appearance of the mowed surface as shown at the left of each view.

Each of these views is drawn carefully to scale in order to illustrate the actual conditions. In the upper view the height of cut is shown equal to the distance traveled per clip, and in the lower view the height of cut is set down to one half the distance traveled per clip. Note particularly the very much more choppy appearance of the mowed surface that is produced by the same mower, when adjusted to produce such a low cut. With an actual mower on turf, this difference may be even more pronounced, as the longer stems left by the higher cut are less likely to faithfully reproduce the assumed conditions. The only means to avoid this choppy appearance when the cut must be low is to use a mower that has a relatively high speeded reel or a large number of reel blades, or both. All successful putting green mowers incorporate these features.

On the other hand, in order to mow tall grass, there can neither be too many blades in the reel, nor can the reel be driven too fast. If reel blades are too close together, they will not reach over the heads of tall grass and will fail to cut. If the reel is driven too fast tall grass will also be blown down by the wind produced from the fanning action of the blades, and there will be failure to produce a clean cut in the hollows of the turf. Consequently, mowers for rough cutting, leaving the grass tall, should preferably have reels of moderate speed, of large diameter, and with but few blades.

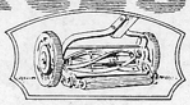
The speed of the reel at a given traveling speed in any given mower depends upon the following: 1. Drive wheel diameter, and 2. Ratio of the gearing or driving connections between the drive wheel and the reel. In considering these factors relatively to the distance in mower travel per clip of the reel blades, the traveling speed is disregarded. The only remaining factor in smoothness of cut is then, 3. Number of blades in the reel.

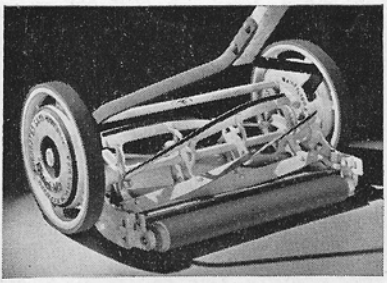
Figures 2 and 3 show tabulations of these factors for various types of mowers. A convenient final basis for comparison is the Smoothness Factor, expressed as the number of clips produced by passage of the reel blades over the bed knife during one foot of mower travel.

Those mathematically interested in the method of calculating the Smoothness Factor for any given mower will be instructed by reference to Figures 4 and 5. In the application of these expressions to power mowers it should be noted that sprockets i and I are frequently on a power shaft. Also, there is sometimes an additional intermediate step sprocket or shaft which would necessitate introducing additional characters such as i' and I' in the expression of Figure 5.

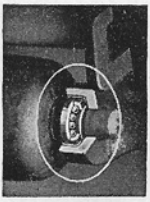
Just as the possible cutting smoothness denoted by the Smoothness Factor, varies widely in mowers adapted for

WORCESTER

Lawn Tested  *Quality Mowers*

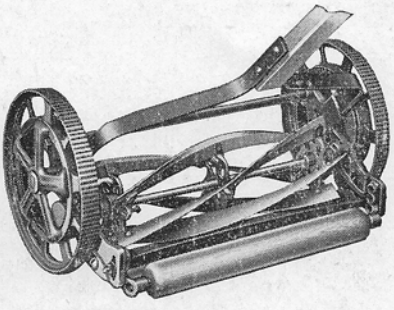


"Quiet-Mo" Delux



A high quality mower throughout. Perfect for tees and approaches due to its lightness of weight and strong construction. Full clincher rubber treads on the drive wheels provide much better traction. Cannot slip nor come off in service. Prevent breakage too. Rubber covered rear guard roller carried on ball bearings makes it exceptionally FREE RUNNING and QUIET. Specially treated blade steel for hard service. 10″ drive wheels. 5 blades.

Width of Cut	15″	17″	19″	21″
Weight	41	43	45	48 pounds
Price	$ 16.50	$ 17.50	$ 18.50	$ 19.75



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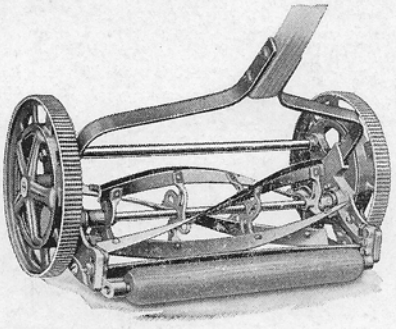
A high quality mower at medium price. Especially adapted for general trimming. First quality blade steel and lipped edge bottom knife. 10″ wheels. 5 blades.

14″	16″	18″
$6.75	$7.00	$7.50

INVINCIBLE 4 BLADE

Similar to mower on the left except has 4 blade cutting reel. Recommended for rough mowing around tees, bunkers, and mounds.

14″	16″	18″
$6.50	$6.75	$7.00



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① Six Extra Heavy Crucible Steel Blades double riveted to five Sturdy Spiders. (Assure uninterrupted service.)

② Lower blade with two raised edges is reversible. (Reduces maintenance cost.)

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④ Three machine cut gears on Both sides. (Assure even pull.)

⑤ Timken Bearings on Cylinder with positive adjustment to take up wear. (Makes for smoother operation.)

⑥ Alemite Lubrication Throughout. (Means Longer life.)

⑦ Dust-protected adjustable single Ball Bearing on ground roller. (Eliminates trouble spot common in other mowers.)

⑧ Adjustable ground roller. (Makes unit adaptable for use in rough.)

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30-INCH DELUXE PENNSYLVANIA FAIRWAY

This unit offers all the mechanical features of "The Giant" in the conventional 30-inch size. At $100.00 these units are available for gangs of 3—5—7 or 9.

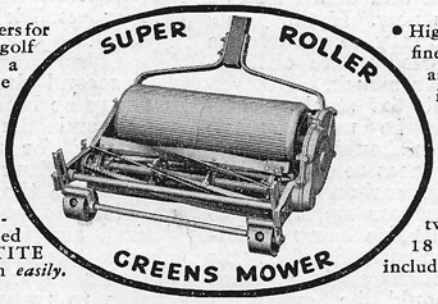
NEW LOW PRICE

Model "K" (cast-iron construction) is the greatest value in low-priced mowing equipment. At $82.50 per 30-inch unit it has every improvement to be found anywhere in its field —and costs less!

THE PENNSYLVANIA SUPER ROLLER GREENS MOWER

Designed by Pennsylvania engineers for *ONE* job—the close-cropping of golf greens, in a way that produces a putting surface uniformly true and ribless.

Numerous *competitive* tests on golf courses all over the world have won the Pennsylvania Super Roller Greens Mower an international reputation as a *precision* machine. Light running, easy-pushing and equipped with the exclusive STAYTITE Handle, it cuts an 18-inch swath *easily*.



- High speed cylinder with 8 blades of finest crucible tool steel, oil-hardened and tempered
- Aluminum Roller 7 inches in diameter
- Highest grade bearings, oil tight and protected from dust
- Train of 3 cut gears
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different purposes, so also will other features of successful mowers vary in order to better adapt each type to its purpose. A high smoothness factor for putting greens accompanies a very low adjustable cutting height, and also light weight with a drum drive in order to avoid damaging the tender surface of the green. Light weight is also particularly desirable in a hand mower to be used on rough ground where tipping and lifting of the mower are required; but for trimming tall grass in such places the smoothness factor should be low, accompanied by few reel blades, high wheels and a low gear ratio. Often a standardized general purpose mower can be adapted to a variety of purposes by varying only one of the several characteristics, such as the number of reel blades. For example, a four blade reel in such a mower will push easily and be suited for park trimming, while the same mower with eight blades may be preferred for golf tees, as compared to six blades for general purposes. This method of varying the adaptability of a mower is also readily applied in power mowers. As an additional means for cutting tall growths of weeds or grass, the reel is sometimes replaced on power mowers by a sickle bar attachment. Special mowers are also available for sickle bar work alone.

Desirable Features

Among the desirable features in all lawnmowers of the revolving reel variety are;

1. A reel that is structurally permanent in form, not easily thrown out of true. This requires that the joints be rigid and secure against slipping or twisting as well as that the reel structure be free from internal strains that are residual from the time of assembling the reel in the factory. A reel that is full of assembling strains when it is finished and ground will quickly go out of true in operation and cause trouble when the mower is new. If the joints are easily twisted, it may go out of true at any time when used where obstructions are likely to be struck.

2. A high quality of steel, preferably alloyed, should be used in the blades. The hardness should be as high as will permit toughness to resist nicking or clipping. High carbon alloy steel readily permits hardness up to 35-45 Rockwell C, the bed knife being preferably harder than the reel. Steel of this hardness can be filed slightly when necessary, and should be extremely tough.

3. The reel should revolve on high grade anti-friction bearings that are adequately lubricated and protected from dust, grass clippings or moisture. On hand mowers the protecting seal should be without packing to avoid friction. Felt packings are likely to become saturated with water and cause corrosion of the bearing. Non-adjustable ball bearings require the protection of oil tight housings with seals of cork, leather or plastic composition, and give a long satisfactory life when so mounted. In other mountings, adjustable bearings are preferred, of either ball or tapered roller type. There must be no radial play in a good reel bearing.

4. The mounting of the bed knife requires: First, a rigid bed bar that will hold the knife straight and not be easily thrown out of line. Second, a sensitive adjusting means that will securely hold the knife edge in cutting relation with the reel. Third, a certain degree of flexibility in the knife blade that will yield to slight irregularities in the reel and still cut tough or hard grass. (See Figue 6.) Fourth, the knife should be easily replaced when worn out.

5. Properly conditioned cutting edges on a new mower should include, as illustrated in Figure 6: First, bed knife ground both on top and on front edge to remove soft skin of decarburized steel. Second, top edge of bed knife ground true and straight with clearance angle to touch reel at front edge only. Third, reel ground cylindrical and straight. If blade edges are thick, bevel back side off at thirty degrees, leaving narrow contact surface to remain from the cylindrical grinding. Fourth, condition with emery and oil and adjust to cut thin paper without permitting blades to rub. Obviously, any paint that may be present on the cutting edges when received by the customer must be removed before the proper condition will be restored.

Economic Considerations

A second classification of lawn mowers may be based on the kind of power used, and the extensiveness of the operation for which the equipment is adapted. Hand mowers will be used only where the amount of work is insufficient to warrant power, where the desired quality of the job requires the closest possible attention from the operator, or where power equipment is unable to travel.

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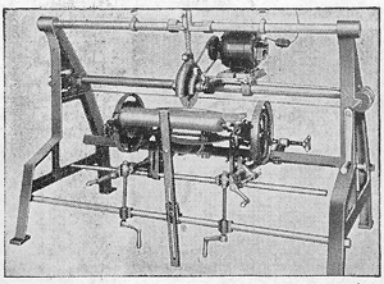

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small light weight gasoline engine, and behind which the operator walks or rides on a sulky, constitutes a distinct class of grass cutting machinery. Mowers vary between eighteen inch and thirty inch width of cut. Some are extended by auxiliary units to cut combined overlapping swaths up to five or six feet, and one type cuts parallel swaths leaving an uncut strip to be mowed on the return trip. Both wheel and drum drive power mowers are available with the smoothness factor and other details adapted to different purposes.

The next group and the most extensive in its grass cutting function is the tractor operated gang lawn mower. Here the operator rides on a tractor which propells a gang of thirty inch cutting units. Each unit is an independent lawn mower with the reel driven through gearing by drive wheel traction and weight. The tractor is of lighter weight than the farm type, requiring a rear axle structure equivalent to a ton-and-a-half truck. Automobile axles are not adequate for this work except for the smallest gangs. Wide faced steel drive wheels, closely studded with small conical lugs, provide ample traction, although low-pressure pneumatic tires of large tube size are coming rapidly into use. Dual-tired drive wheels should be used wherever conditions require more than average traction.

Mower gangs with units arranged to cut overlapping swaths are composed of three, five, seven or nine units. The units may be, 1. Connected and spaced from each other by a framework that is pulled behind the tractor while free to swing laterally as a whole relatively to the tractor, or the units may be, 2. Connected individually to spacing means carried on the tractor. The first mentioned arrangement of the gang has the advantage of being most quickly detached from the tractor, and, when used with a tractor of short wheelbase, is able to turn in the shortest space. When the second arrangement is used with units individually connected to the tractor, it is possible to mow swaths in advance of the tractor drive wheels, and generally bring the units closer to the operator so that he can observe the operation of the mowers. Early arrangements with units grouped around the front end of the tractor have given away to grouping around the rear end in order to permit readily narrowing the gang for passage through restricted places. Gangs having as many as nine units are now available, which can be narrowed to the width of three without disconnecting any of the units.

Mechanical Features

Of all lawn mowers, the gang cutting unit has to operate in the worst shower of sand and clippings thrown back by the units ahead and it surely requires the best possible protection against the entrance of grass and abrasive dirt into the wearing parts of the mechanism. Aside from having full bearing protection, the gears should run in machine fitted cases, preferably oil tight with packings around wheel hubs. Anti-friction bearings, on axle, and intermediate gear, as well as reel, add the greatest durability only when cases are liquid tight and carry fluid oil. High grade gears are both machine cut and made from hardened steel. Unhardened gears require a wider face, but cannot be as durable. Desirable conditions are least to be found with the internal geared type of mower construction, since the gear teeth are commonly rough cast in the mower wheel and left uncut. Also, the wheel closes one side of the gear chamber, rendering a tight case impossible.

For the less severe requirements of hand mowers, gear hardening may be omitted, and cases need only to exclude clippings. Requirements of light weight sometimes dictate that the internal geared mower shall be used, notwithstanding its lower durability. The low first cost of this construction recommends it where the amount of use is insufficient to cause prematurely wearing out. The necessary distance between shaft centers on power mowers frequently dictates the use of roller chain without tight enclosures. Small sprockets should be of hardened steel, especially if the speed is high. Some adjusting means to take up slack is essential to successful operation of chains.

Knife Adjustment and Maintenance

In the successful operation of lawn mowers, the most important feature, as well as the feature most frequently misunderstood, is the proper adjustment of the knives. When the bed knife is of a stiff and rigid section, the difficulty of mastering this adjustment is increased. In the case of incompetent operators, the prevention of frequent tampering and the occasional setting of adjustments only by a competent person seems necessary. Knives that are properly adjusted run easily and retain

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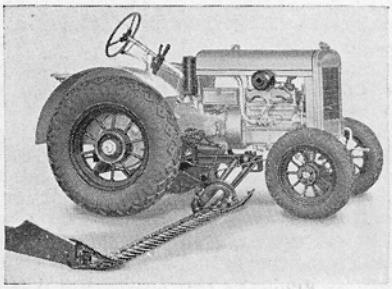

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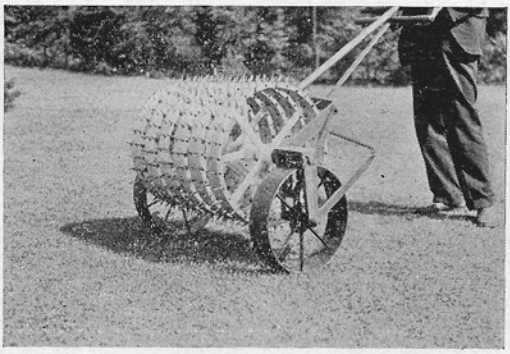

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a sharp edge, while improperly adjusted knives run hard, cause undue wear in the mower, and rapidly destroy their own cutting edges.

Proper adjustment can only be accomplished with reels that are true and preferably sharp, although slightly inaccurate reels can be made true and the sharpness improved by careful adjustment. Reel bearings without radial looseness are essential. First, adjust the bed knife carefully to contact the reel blade evenly throughout the entire length as the reel is revolved slowly by hand. If either end is too tight, this can be judged by the added friction either just after the reel blade has entered contact with the bed knife at one end, or just before it leaves contact at the other end.

After an even contact is obtained throughout the length of the knives, back off the adjustment slightly at each end until the knives touch only very lightly over the entire length. If the reel is true and sharp, perfect cutting can be done in many conditions without the knives touching at all. For hard and wiry grass, a slight pressure between the knives is required, but **any unnecessary pressure must be carefully avoided.**

Running of a sprung reel that has high spots, and with the bed knife pulled up into a tight contact, will harden the high spots by the hammering or burnishing action and cause the bed knife to develop hard ridges with hollows. This condition is the fault of the operator and not the fault of the steel in the knives. The operator has produced hard spots in the steel by the hammering action that accompanies a sprung reel run with too tight an adjustment. This type of hardening is known to metalurgists as hardening by cold work, such as hammering, bending or rolling of the metal when cold.

If a reel has been sprung enough to show bumps or tight spots, these should be carefully located and lightly filed, making sure that only the tight spot is reduced. If the condition is too bad to improve after this treatment, lapping should be used by revolving backward with emery and oil on the edges. Take care that no grit enters the bearings and see that all traces are wiped off with gasoline after the edges are conditioned. In extreme cases it may be necessary to remove the reel and have it ground on centers in a well equipped machine shop, in accordance with Figue 6. Cylindrical grinding is very readily accomplished with standard machine tool equipment, and the backing off or relieving operation can be omitted. Be sure that the machinist is cautioned about the necessity of bearing lands running true when the grinding is done.

A semi-flexible section of bed knife, as illustrated in Figure 6 will help to run a damaged reel back into serviceable condition without removal for grinding. It is better still to avoid damage by keeping the course clear from debris such as sticks and stones and by avoiding excessive speed.

Also of great importance in the operation of lawnmowers, is proper attention to lubrication. Learn the grade of lubricant specified by the manufacturer, keep the lubricant clean, and use it at sufficiently frequent intervals, making sure that dirt does not get into the system. Liquid-tight gear cases usually require a fluid gear oil such as "600-W." Some cases carry a semi-fluid gear grease, while still other cases run empty, save for the grease or oil that enters the case from bearings. Pressure gun systems, when applied to lawn mowers, require a light-bodied pressure gun grease. If an "oil can" system is provided see that an oil can is used. Above all, do NOT put cheap cup grease or axle grease into a system that is designed for a uniform and good grade of lubricant. Failure is the only result that can be expected. Nothing is more costly than cheap lubricants of improper grade, when used on a good piece of machinery.

Treat roller chains frequently with stick graphite, the same as for bicycle chains, and do not use liquid oil or adhesive greases which only serve to catch the dust and cause both chains and sprockets to wear.

Get high grade motor oil of the correct body or S. A. E. number, for the engine of your tractor or power mower. Replenish the crankcase level every eight hours. Drain thoroughly and refill after every twenty-four hours of operation. While lubricating the engine, also service the carburetor air cleaner. Washable air filters in lawn mowing service require daily washing in gasoline, drying, dipping in engine oil, draining and replacement of the filter element. Operation without proper attention, or without the filter, causes rapid wear of the engine.

During the winter season, every piece of lawnmowing machinery should be overhauled. First clean the outside of

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the machine, removing all mud, dirt, and grease. Disassemble and wash the parts individually in gasoline, laying them out on clean paper to dry. Inspect parts thoroughly for evidence of wear and necessity of replacement, noting particularly whether packings, gaskets, etc., need renewal. Keep all parts clean and use only clean oil or grease when reassembling. All necessary parts should be obtained from the distributor or manufacturer in time to have the equipment ready before the outside spring work begins. Last minute requirements are certain to be caught in the rush of the producing and shipping season when mistakes are most apt to occur.

In conclusion it may be noted that the greenkeepers problems about lawnmowers consist principally in the following: 1. Selecting mowers that are adapted to do the kinds of work required. 2. Using power equipment where most feasible to meet the economic requirements. 3. Understanding the equipment mechanically and seeing that it is kept properly adjusted, conditioned and lubricated. 4. Keeping all good equipment in efficient operation year after year, and replacing worn out or inefficient equipment with new.

Smoothness Factor

$$S = \frac{12 \times N \times R}{3.14 \times D}$$

S = number of clips per foot of mower travel, (nearest whole number).

N = number of blades in reel.

R = gear or sprocket ratio, turns of reel per turn of drive wheel.

D = diameter of drive wheel or drum, in inches.

Gear or Sprocket Ratio

$$R = \frac{W \times I}{i \times r}$$

W = teeth in wheel or axle gear or sprocket.

i = teeth on intermediate engaging W.

I = teeth on intermediate engaging reel.

r = teeth in reel pinion or sprocket.

One of the joys of editing a paper of this sort is the number of letters from friends commenting upon the subject matter. Differing opinions are always of interest, and it has always been our policy to try to bring out varying ideas upon any subject discussed. We have received several letters commenting upon an item taken from our files, and run on page 10 of the last issue, entitled "Rhode Island Bent". Some of our seedsman friends feel that the attributes of this strain were stressed too strongly in this item. One states that the statement that "bent seed produced in Rhode Island is the most plentiful of all commercial bents" is incorrect. Another feels that the last statement is not true to what research has proven. It is not our policy to referee any squabbles between seedsmen, but we do enjoy knowing of differences of opinion!

To any clubs which may be in need of a greenkeeper, we would call to mind that there are now several proven greenkeepers either unattached or desirous because of conditions of making a change. Often, Green Committees desire a greenkeeper proven by experience. If a younger man, with less experience, is desired, to grow with the course, so to speak; we have several such men on our lists. We shall be pleased to help you and your club, Mr. Green Chairman.

Guy C. West, Chairman.

The Employment Committee has promises of support and cooperation from several sources. Prof. L. S. Dickinson has promised to keep us in touch with any vacancies of which he may learn, and the Mass. Golf Assoc. has promised any cooperation possible.

We have recently received an interesting reprint from the Journal of the American Society of Agronomy, "The Effects of Sodium Chloride on Some Turf Plants and Soils" by V. T. Stoutemyer and F. B. Smith of the Iowa Agri. Exp. Station.

Send us any changes of address, also changes in Green Chairman, so that we may keep our mailing lists up-to-date.

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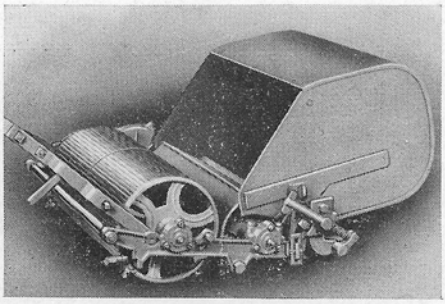

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