

Examine all bearings thoroughly and see if any need replacing or adjusting; if so, *attend to it right then and there.*

Remove the cylinder head, being careful not to damage the copper gasket. Clean out all carbon. Examine the pistons, piston pins, and rings, making such replacements as necessary. Examine valves and valve seats and, if pitted, re-grind them before replacing the cylinder head.

Drain all of the old oil from the crankcase and other gear housings and flush out with kerosene to clean out all sediment. Then refill with fresh oil and grease.

Refill the motor crankcase with clean, fresh oil; start the motor and run the machine until you are sure all of the gears, bearings, and parts are covered with the new oil.

Pour one pint of oil on top of the warm water in the radiator; then drain so that the inside of the radiator and water jacket in the motor will be coated with oil.

Pour one-half pint of motor oil on top of each piston. Then crank the motor over by hand until the pistons and cylinder walls are covered with oil.

Remove the magneto breaker box and fill with vaseline; then replace. This prevents rust and corroding of breaker points.

Your machine will then not only be in good shape for winter storage, but, with a little cleaning when spring comes, ready for another season's work.

Your interest in having the machine perform continuous service is no greater than the manufacturer's. They are ready to serve you on notice. Do not trust your machine in the hands of the average garage mechanic. First tell the manufacturer your troubles.

While doing this work, it will be well to give the same human consideration also to your cutting units, putting-green mowers, and all other equipment.

Handling Plugs: A Discussion

W. J. ROCKEFELLER AND LYMAN CARRIER

(*Mr. Rockefeller opens the discussion with the following contribution.—*
EDITORS.)

At Inverness, where we have handled at least 10,000 plugs this year, we wonder where Carrier and Connellan "get that stuff" when they say that the soil removed with a hole cutter will not completely fill a hole, and that a greenkeeper should go around with a bucket of earth to supply the deficiency.¹ Maybe so, but we don't do it that way.

Our equipment consists of the following:

1. A sheet, say, 18 inches square, of heavy tin, with a round hole in the center about 5 inches in diameter.
2. A hole cutter.
3. A hook to remove cups.
4. A loose handle on the hole cutter, say 2 feet long, and thick enough to fit loose.

Our operation of changing a cup consists of the following:

- (a) Removing old cup with hook.
- (b) Laying plate of tin on the spot where new hole is to be cut. The tin simply prevents damage to the turf while the hole is being cut.
- (c) The first cut on the new hole with the hole cutter is as deep as it can be made, say 4 inches, so as to remove as much soil as possible around

¹ See article, "Changing the Cup," in the September BULLETIN.

the roots of the grass. This cut of turf is then laid for the moment on the plate of tin.

(d) The second cut is about as deep as it can be made, and this cut of earth is transferred by the hole cutter, put in the old hole, and tamped to firmness with the end of the handle of the cutter removed for that purpose.

(e) The last cut is made deep enough to get the necessary earth for the old hole, the depth being gauged by the hole cutter and experience. This earth is placed in the old hole and tamped.

(f) The last operation is to slip the cut of turf into the old hole by hand and tamp to surface.

We never find it necessary to water plugs by hand, and it would seem that this should not be necessary if the soil under the greens is kept in proper condition. Once in a while a plug is handled carelessly and a noticeable depression is created, but that result is due to pure carelessness, and it occurs so infrequently that a little "jacking up" is all that is needed to get the plugs put into a true surface. Guessing at the number of plugs handled in moving holes four to five times a week and in plugging out pearlwort and chickweed, we estimate the number handled this year at 10,000.

No greenkeeper ever took too many pains to get the best result, and this comment is in no respect a criticism of the care used in the method described by Prof. Carrier. We have been getting good results by our method, and we believe it is not quite so fussy.

(Prof. Carrier, who has reviewed the above contribution from Mr. Rockefeller, comments thereon as follows.—EDITORS.)

Careful consideration of the above, together with a visit to Inverness, where a cup-changing demonstration was put on for my pleasure and profit, fails to convince me that the Rockefeller method is preferable to the Connellan, or that Inverness has reached 100 per cent efficiency in this important detail of putting green upkeep. This criticism of Mr. Rockefeller's and the details of his method of changing a cup are doubly welcome, as they may help to call attention to the serious injury that is being done on a great many greens by careless workmen. Top-dressing will cover and correct a multitude of these faults committed in the past, but there is no way to prevent the damage that is continually being done except with more care in the operation.

Fortunately the question of fact raised (whether the dirt taken out by a hole cutter will or will not completely fill the hole), is capable of mathematical proof. The cutting rim of a hole cutter varies in thickness from one-eighth to one-quarter of an inch. If the unbroken plug of soil is put back into the hole from which it has been taken there is an open space of this thickness about it. Figured at one-eighth of an inch, if the hole is 6 inches deep, this open space amounts to over 9 cubic inches. The area of the hole is about 12 square inches; so if the dirt is thoroughly tamped back in the hole there will be a depression of three-fourths of an inch. This is what we get here in actual practice. The man who changes the cup at Inverness does not do a thorough job of tamping, and I believe he would get better results if he used a hammer or mallet and drove this dirt down firmly. Right here it is well to caution against putting dirt in the old hole if there is water in it, or in

using the dirt from the new hole if it is water soaked; for no matter how carefully the tamping is done the plug is sure to be puddled. I have seen plugs which after a few days' drying could be pulled out of the hole with the fingers. There is a strong advantage in having the pail of soil along to use in case it is needed.

The Connellan method calls for the top piece of turf to be cut 1 inch thick, while Rockefeller makes the first cut to a depth of 3 or 4 inches. As a matter of fact, both get live turf of exactly the same thickness. In all of the soils that I have had a chance to observe the plug begins to rotate with the cutter after the cut is an inch in depth. This means, of course, that all of the roots are broken below that top inch of turf. It is much easier to gauge the proper height to fill the hole with dirt so that the piece of turf when put in place and pressed with the sole of the shoe fits exactly into the surrounding sod, when the first cut is 1 inch instead of 3 or 4 inches in thickness.

Of course, the quart of water added as the last detail in the Connellan method is not always necessary. But quite a little experience in transplanting grass and shrubs leads me to believe it is pretty good life assurance for the plug. In a hot day that piece of turf might become sufficiently dry to weaken its vitality even if it was not completely killed before the green was watered in the evening.

The charge that the Connellan method is "fussy" will scarcely hold. The workman need make but one round trip between the old and the new hole. With the Rockefeller method he makes two or three. Then by the Rockefeller method of conservation of energy in tamping there frequently is a little dirt left over which has to be gathered up in the hands and carried off the green. I would guess that a man with the same experience with the two methods would complete the operation by the Connellan method in less time than by the other.

(Further comments by Mr. Rockefeller.—EDITORS.)

I can not agree with Mr. Carrier's statement that if an unbroken plug is replaced there is an open space of 9 cubic inches. The cutting edge of the hole cutter is at the extreme outside. By cutting the plug the exact size of the hole, the plug is compressed and elongated in the operation and when removed to the old hole and tamped sufficiently to retain its former compactness it fills the hole completely.

If it is necessary to pound the dirt in the old hole as hard as cement, why should not the whole green be packed in that manner?

I have changed holes for a good many years and find it much easier to do a finished job with a 3 or 3½-inch plug than with a 1-inch plug.

As for the breaking of the roots at 1 inch by rotating the cutter, in our soil we would not turn the cutter as you would an auger way around, but slightly back and forth, not over ½ inch, and pressing on the handle of the cutter. It cuts very easily to a depth of 3 or 4 inches.

As for speed, with our method, in comparison with Mr. Connellan's, we can move two to his one.

Comment by the Editors

(These two methods of changing the cup are given in sufficient detail in this and the September issue of "The Bulletin" so that any greenkeeper

who will may try them both and take his choice. We insist that bumps, depressions, and dead plugs of turf resulting from changing the cup are unnecessary. The question of whether the work can be done by one method in less time than by the other is of minor importance. It should be done right.—EDITORS.)

A Word of Thanks

The Green Committee of the United States Golf Association, with the close of the second year of its existence, takes this occasion to thank those who have given them encouragement in one way or another.

During the past two years the Green Section has grown from a mere idea to an organization of some consequence with a membership of 557 clubs.

It may be well at this time to remind our readers that this is a co-operative effort, designed to facilitate the work of Green Committees throughout the United States and Canada. It is the wish of the Green Committee to be helpful to all and particularly those who are obliged to conduct their courses at a minimum outlay of money. It is not always easy to make THE BULLETIN attractive or to obtain material that will be interesting to all, and the cooperation of our readers is eagerly sought.

We hope during the next year and from year to year thereafter to make THE BULLETIN more and more attractive and of greater interest, but to do this we must have the active cooperation of green committeemen and greenkeepers throughout the United States. Those who have problems can be helpful by submitting them to the Green Committee of the United States Golf Association for consideration—not that the Green Committee is equipped to solve all problems, but so that it can collect information and perhaps be helpful to others who may at some other date encounter the same problems.

Anyone having information that he believes will be helpful to others should send it to the Green Committee of United States Golf Association so that it can be published and made available for others. We should be glad to have articles written by those interested in the work of green-keeping, but when anyone has information that he thinks will be of value we should be pleased if it is sent to us in a letter or in any form, because if it contains only the germ of an idea it perhaps may be developed into something useful.

It must be borne in mind that the editor and the Green Committee of the United States Golf Association are not omniscient, and that in the territory covered by the United States and Canada golf courses are maintained under the most widely divergent climatic and other conditions, and it is not practical for us to cover all of these at once. Those who are interested in the conditions which prevail in the South and the Southwest, or the Pacific Coast, or in the North, should send us information and endeavor to be helpful. It frequently happens that some method or practice used in one section can be applied with advantage in another.

In closing the work for the year we offer our thanks to those who have given us aid and support, and we invite continued and further cooperation so that the Green Section can be of greater service to all.