

Golf Without a Caddy

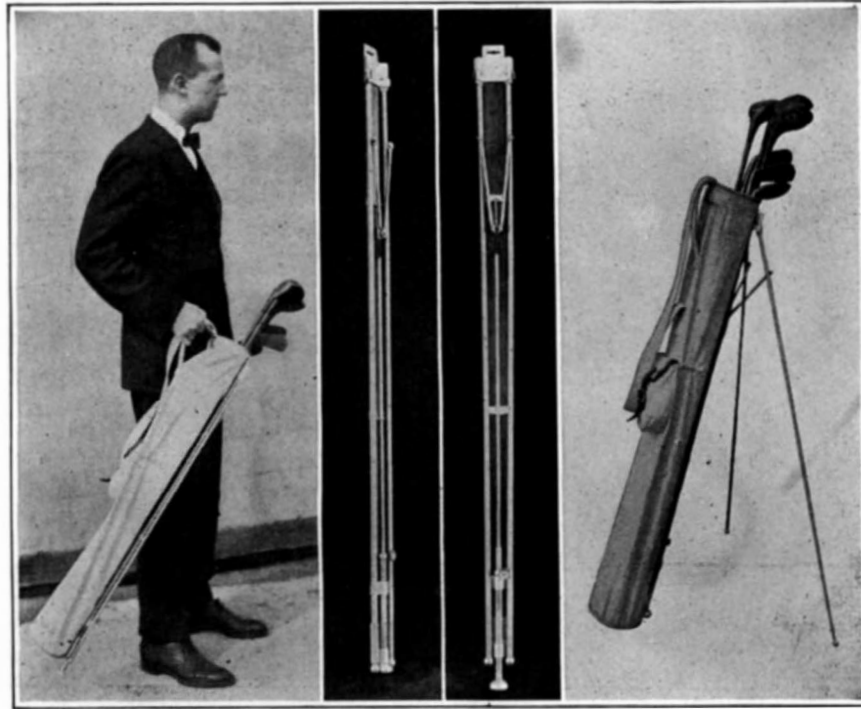
By Elmer A. Sperry

GOLFERS are being made faster than caddies. Nature apparently has little to do with the former, while we are compelled to leave it very much in control of the latter. It is more and more difficult to get caddies and those who do get them find them of little account. Some seasoned golfers absolutely refuse to carry their own bag over the course. No matter how experienced they may be, they are probably far wiser than they know; there is a decidedly startling and quite unsuspected reason why caddiless golf is exhausting. An analysis of the underlying causes is of more than ordinary interest.

Everyone knows that he gets tired in toting his own golf bag, much more so than seems at all reasonable. An abundant reason for this fatigue is revealed, however, in the *dynamics* of the proposition, which involves elements heretofore neglected. Analysis reveals the fact that it isn't toting the bag that makes one tired; in fact, we are quite familiar with the energies that this factor involves. It probably requires, in the great economics of nature, about 30 watt-hours per ton-mile to cover this part of the work. This means, where a player averages $2\frac{1}{2}$ miles an hour, $2\frac{1}{2}$ times 30, or 75 watt-hours to be multiplied by the tonnage of the bag, which equals roughly $1/200$. This equals $100/266$ or for two hours a total of $200/266$ watt-hours, which, being interpreted, means about the power required to raise about one ton through the distance of one foot or about one foot-ton of energy. This may seem staggering, but it is quite an unimportant factor as compared with one other of much greater magnitude, and it is this latter which really saps the energy of the player, namely, picking up his bag and its constant repetition. This tires him far more than has been supposed, actually over 24 times as much as toting the bag.

In lifting, it isn't the bag that weighs, but the *man*. We have lost sight of the player's own weight which is involved in this process. Suppose the player's center of gravity is lowered 2 feet at each pick-up and raised again, and his weight is 150 pounds. He thus exerts 300 foot-pounds of energy in lifting his own weight regardless of any other factor. Again the muscular energy involved in lowering himself is understood very well and is about $\frac{1}{4}$ of the above amount, or 75 foot-pounds. Again another quantity occurs in the small amount of stooping and rising again in the act of lowering the bag to the ground before making his shot. No player drops his bag any great distance—the clubs are too valuable for this. This factor averages about 85 foot-pounds. He of course also lifts the bag itself, say 10 pounds, through three feet, giving 30 foot-pounds additional for this item. Let us now add these items and see what it amounts to—300 plus 75 plus 85 plus 30 equals 490 foot-pounds. Now let us suppose the course is an average hard course and our average player requires 100 strokes to go around; he will use up no less than 49,000 foot-pounds of energy or the amazing effort of $24\frac{1}{2}$ foot-tons—more if he is a tall man, again more if he weighs in excess of 150 pounds, and doubly more if he is both, as many men are. And this in only one round. No wonder the player feels himself "all in" in toting his own bag in the old way. Here is an enormous store of energy that should be conserved for the game itself instead of being utterly and uselessly wasted—and what a waste! The kind that causes exasperating delays upsetting one's own game, and what is most exasperating, often that of many others as well.

Practically all of these 24-odd foot-tons of energy per man per round can easily be saved by the simple expedient of an upstanding or stabilized bag. Put a spike in the bottom of your bag and drive it into the turf. Do anything rather than drop your sticks. Personally, I was appalled at the results of these simple calculations. Accurate information as to the



The bag as it appears with the tripod out of action; front and side views of the supporting members; and the way in which the bag stands "on its toes"

Mr. Sperry's up-standing golf bag that saves the caddiless player 25 foot-tons of energy per round

real seat of a difficulty allows us to engineer around it, in fact, in this case to avoid it entirely. In my own case it is very gratifying to know the real reason for "that tired feeling" after caddiless golf and to find it not wholly due to advancing years after all. I am happy to say that I have experienced complete relief from the extra fatigue, finishing a round fresh and ready for more, by employing this simple device of the upstanding, stable bag.

In my case I have been able to accomplish this by a little attachment which I designed for my light "Sunday" bag. It weighs only a few ounces and can be readily attached or detached. This was made by my boys at the works, who seem to take extra pride in providing the boss with an energy-saving device. This

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Keeping in Step

By Ralph Howard

THE latest departure in synchronous motor application is the installation of a very small self-starting motor in a clock, where it is used, in connection with a high grade clock movement, to compare the speed of a synchronous generator with exact time, in order to give a continuous check on generator frequency. Since any change in the speed of the generator is reflected in the speed of this small motor, whereas the clock speed remains constant, the combination forms an accurate method of maintaining constant average frequency.

These small motors can also be used on the system in place of clock mechanisms to drive graphic recording instruments, demand meters and time switches. By the use of this motor the synchronization of records from graphic meters and demand meters will be made possible; something that has always been desirable, but somewhat difficult of accomplishment heretofore.

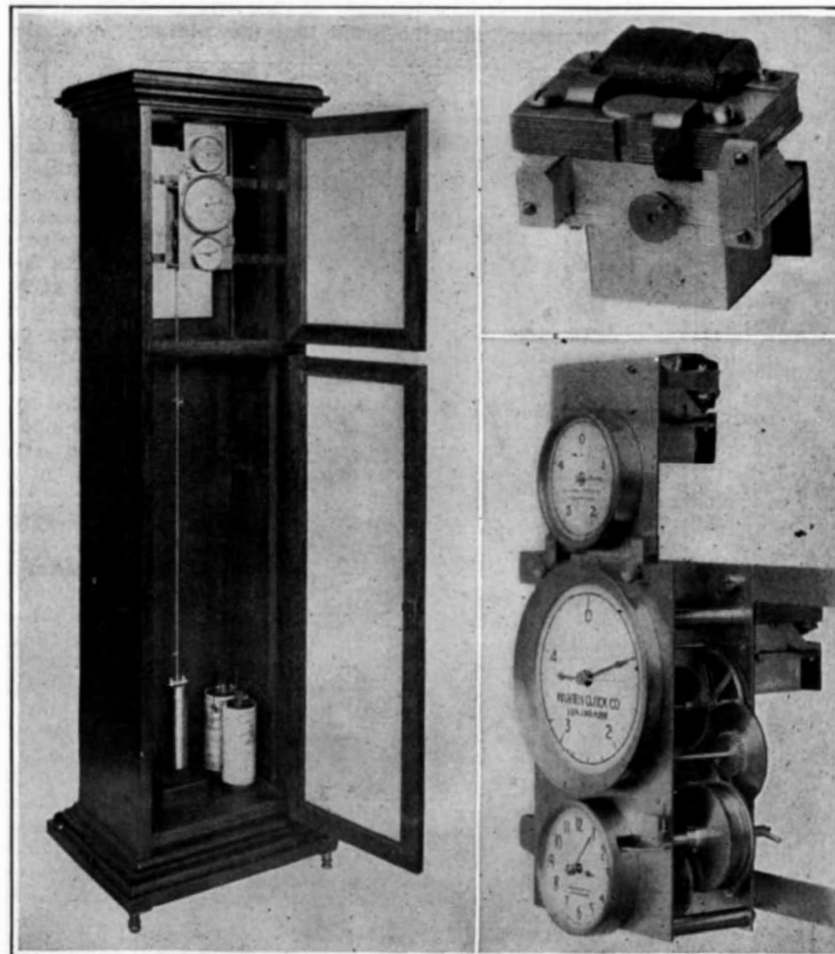
In practice, a master clock containing two movements, one electrical, and one pendulum-operated, is located near the switchboard. The face is equipped with two pointers, one black, the other gold, rotating independently about the same center, on a dial, called the operating dial. The black pointer is so geared to the pendulum clock, as to make one complete revolution every five minutes. The gold pointer is geared to the small synchronous motor, so that when the frequency is correct it will rotate at the same speed as the black hand. All that the operator has to do is to hold the two pointers together—he will then have a fixed relation maintained between standard time, and generator speed, or cycles and time. This can be done by adjusting the speed governors of the prime movers. The master clock does not obviate the use of a frequency meter, or indicator, since it will not show instantaneous fluctuations in speed. Moreover, by using a frequency indicator near the master clock, the latter may be used as a constant check on the accuracy of the former.

The little synchronous motor which is the vital part of the electric component of the clock is only $2\frac{1}{8}$ by $2\frac{5}{8}$ by $2\frac{9}{16}$ inches in size, and is wound for operation on a 110-volt circuit. It consumes less than 4 watts at 110 volts, 60 cycles, but can be made for any one of the standard commercial frequencies. It is self-starting under load, reaches synchronous speed in less than a second and holds speed as long as the current is uninterrupted. It is simple in construction, and since its gearing runs permanently immersed in oil it requires but little attention to keep it functioning properly for an indefinite period.

There have been developed two forms of master clock, known as the type "A" and type "B." The principal difference in operation of these two is that in the "B" type, both the motor and the clock mechanism act on the same index hand, through gearing, so that the synchronous motor tends to drive the hand in one direction, while the clock mechanism tends to drive it in the opposite direction.

If the rate of the clock and motor are the same the hand rests at zero on the scale, but if the speed of the motor varies the hand is moved slowly in a clockwise or counter clockwise direction according to whether the variation is a gain or loss in speed. In this way the clock is caused to indicate variations in average frequency. The "A" type is that first described, in which control of the two speeds comes from comparison of two hands.

The installation of these master clocks will not eliminate fluctuations which are dependent to some degree on load variations, speed governor response, or steam pressure — features of operation which are more or less constantly encountered; but it does insure the maintenance of a more uniform as well as correct average frequency.



Left: Front view of the master clock. Upper right: The motor for the master clock. Lower right: Movement of the master clock

The motor-controlled synchronizing clock

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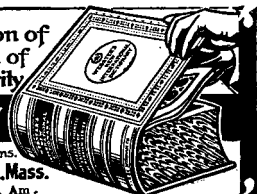
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stalled and these loaded directly upon dump cars which were hauled away by electric locomotives, trains being made up of five or six cars. Except where water was encountered in large volume, some of the tunnel crews made as high as 12 feet a day, and the work of drilling and mucking went on simultaneously. A heading, approximately 8 feet high and the full width of the tunnel, was carried approximately 7 feet ahead of the bench. As soon as the shooting from a preceding shift had been completed, the steam shovel men immediately commenced to load out the muck which had been blown back from the face. The machine men and chuck tenders at the same time start work on the top of the muck and shovel back the material which still remains on top of the bench. By carrying a short bench, it is possible to clear the same with a minimum amount of hand mucking, thus enabling the drilling in the face to proceed at the same time that the steam shovel is mucking out the heading. This makes it possible for the tunnel work to proceed through the entire 24 hours of a day.

At one of the tunnels a different method of work was adopted. Here the crews were divided into drilling and mucking gangs, and worked separately. A car was specially built upon which was mounted a column 17 feet high with a jack on each end, with 4 cross bars mounted on the same, the drills being mounted on the cross bars. By this method the entire face of the tunnel was drilled and shot before the steam shovel started to work, and each crew worked in shifts. By this method a maximum speed of 90 feet in one week was obtained. Considerable rivalry existed between the various crews, and as the progress made by each crew was posted, the men working in the different tunnels endeavored to outdo each other with the result that excellent progress was made in all departments.

The three penstock lines are of riveted steel pipe, 7 feet in diameter at the lower end and 8 feet in diameter at the upper end, at which point they are concreted into the mouth of the tunnel. A forebay 17 feet in diameter at the top, 80 feet in height and 40 feet in diameter at the top of the tunnel, has been excavated in solid rock a short distance from the outlet of the tunnel, where the penstock joins the same. The purpose of the forebay, from which a spillway leads to the river, is to take care of surges due to sudden increases and decreases in load at the plant.

From the power house a 110,000-volt transmission line about 75 miles in length carries the current to a point near Tulare Lake, where it is delivered to the distributing system for use where needed. Since the hydroelectric lines of all California companies have been connected up for emergency use, it is possible to send power generated at one point to any part of the State for use.

The "Super-Destroyer"

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the guns, including director aiming and firing mechanism. It is, however, doubtful whether all this cumbersome and intricate gear was suitable for vessels which were simply enlarged destroyers, and therefore exposed to the sort of rough and tumble fighting in which headlong dash counts for more than science. Moreover, experience in other navies shows that the 5.9-inch gun, with its 101-pound projectile, is much too heavy to be conveniently manhandled on the slippery decks of a boat which is moving all ways at once. In theory, the German "V-116" leaders ought to have made short work of any destroyers they were likely to meet in the North Sea; in practice they would probably have been beaten by the smaller British boats armed with the handy 4-inch and 4.7-inch gun.

A particularly formidable type of flotilla leader is represented by the five new

Japanese boats of the Akikaze class, building under the estimates for the current year. They will displace 1,900 tons and have a speed of 38 knots. Four, or possibly five, 5.5-inch 82-pounder rapid-fire guns will be mounted on the centerline, and all six torpedo tubes can be trained on either beam. A feature of these boats is their large fuel capacity, which is expected to give them a cruising radius of 3,500 sea miles at economical speed.

It will be seen that the modern flotilla leader approximates to the light cruiser in dimensions and armament. If the recent rate of progress is to be maintained, "boat" will soon become a misnomer, and we shall revert to the "torpedo cruiser" of thirty years ago, though on a much larger scale. In the destroyer and flotilla leader, as in every other type of fighting craft, each new demand for increased armament, speed and sea endurance involves a corresponding increase in size, and there is practically no limit except in the paying power of the nations concerned. But in every class of fighting ship there comes a stage of development which fulfils all reasonable requirements, and beyond which it is unnecessary to go. In the case of the flotilla leader this stage appears to have been reached in the smaller designs set forth in the table shown. War experience has demonstrated the all-round tactical efficiency of such vessels as the British Scott class, which, on the relatively modest displacement or 1,740 tons, combine in a high degree the essential qualities of a destroyer flagship. It is of interest to learn that a tentative design prepared at Washington last year provided for a vessel of 1,800 to 1,900 tons, of 37 knots speed, armed with four 5-inch rapid-fire guns and eight torpedo tubes.

Golf Without a Caddy

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in fact works out much more wisely than anticipated; when a few ounces can save upward of 25 tons as above, the ounces are certainly working at some high efficiency. Think of the perspiration and utter exhaustion that would overtake one were he compelled to go out and raise 25 tons to the height of 1 foot by hand twice a day. How much of either energy or inclination for golf would a man have after such an exertion, or by taking the stairs climb about 30 stories in one of our tall buildings twice a day? And this is exactly what caddiless golf has been doing to us without our ever suspecting it.

With the little device I have referred to, the simple act of resting the bag down on the ground causes it to develop legs which keep it upright and very stable, and with my eye on the ball and without looking around, I am able simply to reach back, grasping the bag, and the act of lifting it from the ground causes the legs to disappear and the bag looks like any ordinary "Sunday" bag and is little or no heavier.

Another point that I have found important is the following: We all know that "keep your eye on the ball" is even more necessary after the shot is made than while making it, if you have no caddy. It is then the player's job to watch the ball—certainly no caddy is watching it for him. Again, one often loses the lie of the ball in the rough while stooping down to get his sticks, thus causing exasperating delays. I have found that it is certainly of surprising convenience to have the sticks right at hand, standing upright "on their toes," so to speak; and to simply reach back, grasping the bag while watching your ball, and be off on the next stroke toward the drop long before the ball lights. This is of great aid in holding your position on the course and I find often aids a whole foursome to hold its position in play. The unerring location of, and getting right off on the ball is certainly an aid, both directly and indirectly, that can hardly be overestimated.