BUYING NEW EQUIPMENT!

This article will help you to decide the right additions to your machines this Spring

THE IMPORTANCE OF DESIGN

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The design of management equipment for sports and ornamental turf and for porous playing surfaces poses a problem for engineers, calling for precision results with a minimum of working components subject to wear and adjustment and to damage by use, weather, etc. These overall requirements can be met successfully and commercially only by simple principles, by robust construction without undue weight, and by adequate controls necessitating correctly proportioned components throughout.

Equipment, which includes both hand tools and machines and power operated implements, is now available in immense variety and price range and the problem of the prospective user is to make a correct selection from this range. The object of these notes is to suggest certain key factors which should receive attention at the time of selection.

The first need is to be entirely clear on what is required of any item of equipment. Thus, is it principally for fine turf, general sports field turf or merely a rough turf area? Will it be required to deal with any other condition such as an artificial playing area? Often, even in the smaller sports club, school or other recreational establish-
minimised. There will be relatively few lubricating points and these will have been made easily accessible. A sound, simple principle which has been carried to its logical conclusion will result in a complete product which will perform adequately without the need for supplementary parts or extra components. If the equipment is constructed on the outfit principle the various implements will be quickly and simply interchangeable with little or no use of tools as, for example, in the case of a tractor with three-point hydraulic linkage.

• Robust construction. This will again be apparent but will not make the article appear clumsy or bulky. Weight will be built in only where it is necessary, i.e., to produce durability and to assist the function or the control. If it does not assist in these ways there is a fault in the principle or in the detail of design and the article will be unnecessarily costly, or if cheap will be unable to achieve the required results.

The progress of motor mower design whereby machines have become successively lighter in recent years and have yet become both more efficient in cutting and easier in control is an example of this development of design principle. There was at one time a risk of this feature being carried beyond the optimum. An excessive reduction in weight in any unit of equipment will show itself in a lack of rigidity in construction resulting not in easier but in more difficult handling. This feature became apparent in some types of cultivator now mainly obsolete.

For long life and good service robustness should show in the proportioning of bearings, especially where these accommodate components which are in constant movement when the machine is in use. Such bearings should be easily and quickly replaceable if maintenance service costs are to be kept in check. It might be said that the bearings are a guide to the soundness of character of the designs.

Cost in relation to working life. It is important to consider at the time of selection what is required to be the working life of the equipment. Only where a definitely short period is certain should mere cheapness be a main consideration. In all other time considerations the relative value of the equipment and that of the operator’s wages should be thriftily related. Time spent using equipment in its proper function is productive whereas time necessitated in adjustments, service, or other attention improductive. Satisfactory machinery maintenance is one thing—constant adjustment and repair is another. All this is true even though the equipment may be only in seasonal use.

• Ease of control. Given a sound and simple functional design the next most vital aspect affecting efficiency of use is physical ease of control. In recent years this necessity has come to receive much closer attention. It is still not unusual, however, to find that what looks in the showroom to be an attractive tool or machine is rapidly found by the unfortunate operator, who is often not the purchaser, to be mankiller. More often than not this critically unsatisfactory feature is due to the neglect of the designer or maker to allow prototypes to pass through sufficiently protracted trials before handing them over to the production engineer. An enthusiasm for novelty on the part of the purchaser or of the designer should not be allowed to override the absolute necessity of ensuring that the more essential needs of functional design have been met.

• Three important components related to ease of physical control are handles, ground wheels, and remote controls.

It is worth remembering that both the former are fundamentally levers and must be adequately proportioned or mechanically assisted to allow the normal exertions of an operator to raise, lower, or propel the implement. Handle controls are sometimes, though not always, easy to check even in the showroom but the wheels and tyres should be carefully considered in relation to relatively soft (Concluded on page 16)
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ground conditions, or for use on other
types of surfaces. The degree of their
intended use for transportation, perhaps
over uneven surfaces such as golf fair-
ways, should be provided for.

Adequacy of design for these facilities
in regard to heavier items of equipment
may call for quite elaborate additions to
a unit but their omission may be fatal
to the success of the job. An example
is the development of tractor hydraulic
controls for otherwise unmanageable
implements.

The greater the diameter and the
broader the rim surface of the ground
or driving wheels, the easier it will be
to propel or control a travelling chassis.
This simple rule is often neglected in
the interests of initial economy, but the
result is loss of time and even undue
wear and damage to transmissions or
other mechanisms.

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Handles also are often reasonably
adequate for ground use but may be
found inconvenient or fatiguing when it
is required to use them for transporta-
tion of the machine.

Remote controls should be located
conveniently and in correct relation to
one another.

Most well designed equipment is
capable of certain necessary adjustments
and these fall into two main categories
—take-up adjustments for wear, and
change over adjustments for facilitating
variations in the functional results
obtained. These should be carefully
studied by the prospective buyer. It is
generally unsatisfactory to attempt to
design one adjustment mechanism for
both the above purposes. It is important
to note also that any adjusting mechan-
ism should be so located as to avoid
having any adverse effect on the rigidity
of construction or on the working com-
ponents of the equipment. Adjustment
mechanism should provide positive
means of setting components so that
having once been correctly related they
will remain so when the item is put to
work. Adjustments may also be neces-
sary to suit varying heights of operators,
but this feature is now rarely omitted.

Safety of operator. One further re-
quirement, especially of machines with
power driven components, is safety of
operator. This is a most difficult aspect
of design and is generally met by cover-
ing in or guarding moving parts (except
where it is better that these should be
under continual observation), by safety
cut-out controls and by the use of the
“dead man’s handle” principle. This
latter is a most effective and efficient
way of reducing risks to man and
machine and also to fine turf surfaces.

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Demonstrations. The practical opinion
of an operator is invaluable in the selec-
tion of equipment, especially hand tools
and machines, but he should be given a
budget for expenditure. There is little
doubt that control features are normally
the most difficult for purchasers to access
and in this respect the value of practical
demonstrations under working condi-
tions is inestimable. The operator him-
self, however, should be the final arbiter
and should take the opportunity to make
the demonstrator pass on to him the
know-how of handling. At the same
time, in the event of purchase, the
printed working instructions should be
requested and perused. The demon-
strator can be asked to point out im-
portant parts of the instructions. These
will have been prepared with the in-
tention of keeping down faults and mis-
understandings and attention to them
will be amply repaid. As much or more
of the designer’s intentions may appear
in well crafted instructions as in the
sales publicity for a product.

As a general rule simultaneous com-
petitive demonstrations should not be
arranged as this may merely prove em-
barassing for all concerned and will not
necessarily improve the presentation of
the products.

It should be understood that good
work is not produced so much by a
tool, implement or machine as by the
operator. Equipment should not be
expected to think for itself. The hand-
ling of it, however, should always be
sufficiently simple and physically un-
fatiguing as to leave the operator free-
dom of thought and attention to the
work in hand.

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