NOTES ON THE CONSTRUCTION AND HANDLING OF SMALL PORTABLE UNITS FOR FIREWOOD CUTTING

By T. DONOVAN.

Most people know that timber in the round is one of the most troublesome and expensive commodities to move about, and generally speaking every mile further the wood is from a saw mill, the less the timber is worth to the owner till a limit may be reached where the margin of profit may disappear altogether. This applies particularly where the woods are not very extensive or the supply sufficient to make it worth a merchant's while to erect a mill for the conversion of timber in the wood. With a small portable mill, however, fencing posts, firewood and even smaller types of scantlings could be easily manufactured and readily sold. Besides, the value of a particular scantling when sawn may often exceed the price of a tree containing several such pieces of timber. In short, properly constructed portable mills of the smaller type could manufacture a great variety of materials in constant demand by different trades thereby utilizing the smaller and rougher types of timber.

The erection and maintenance of suitable portable mills are not such expensive nor elaborate undertakings as is generally supposed and are within the means of the majority of estate owners. In order to appreciate their importance and advantages, it is necessary to know something of their structure and care; hence the following suggestions which it is hoped may be of some little interest.

The writer's experience has been gained while working with the Forestry Division of the Department of Lands under Mr. Swords—for whose advice and instructions he acknowledges his gratitude.

Of portable mills there are several varieties—from heavy and cumbersome outfits to complete units not exceeding one ton in weight. Comparatively little progress has been made in bringing so important an article as a small mill to something more in accordance with the vast improvements which have taken place in almost every other variety of mechanical contrivance. The following notes are merely a plain record of observations based on experiments recently carried out in the construction and care of small saw units for firewood production. With certain alterations these are capable of manufacturing various types of smaller scantlings, though their primary use is for the manufacture of firewood blocks. They can be transferred from place to place with comparatively little trouble and expense.

Choosing a Site.

Because of the weight and size of these units choosing a site may not seem of any importance, still the following requirements are worthy of consideration :—

(1) The unit should be placed as near to the timber as possible, thereby favouring haulage operations.

(2) For obvious reasons special attention should always be given to ensure that the desired locations are always as near as possible to existing roads, tracks or passages of any kind.

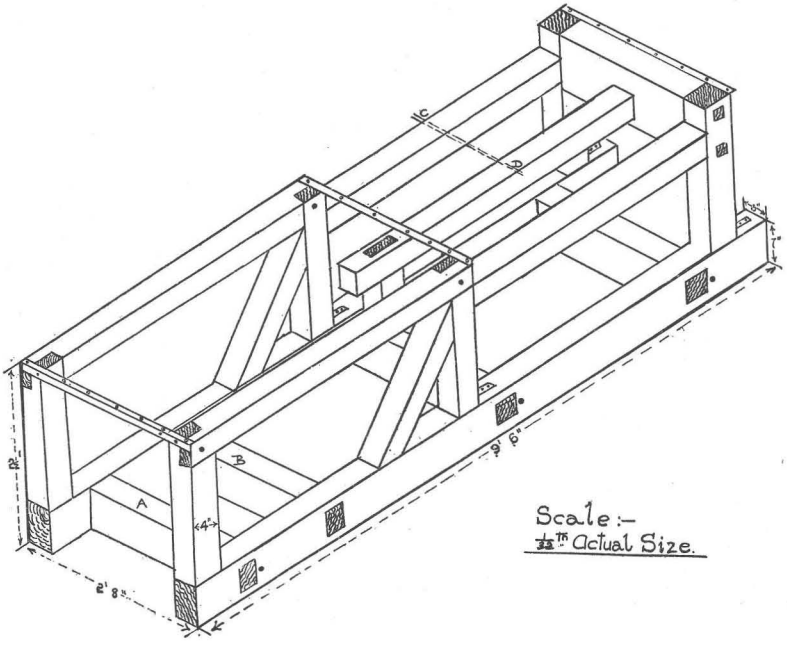
(3) The actual Mill site must be level and always so placed as to minimise haulage operations against the hill.

Construction of Frame and Unit.

Equipment, to be serviceable, should be properly balanced for the work and to comply with the three main factors governing construction, i.e., the size, weight and power of the unit.

The accompanying plan is intended to illustrate a type of frame considered suitable for a small firewood unit, though, where it

—PLAN SHOWING FRAME OF SMALL PORTABLE UNIT—



is desirable to have one capable of sawing small scantlings, stakes, etc., a frame of similar design has given excellent results—the width in this case being reduced to 2 feet and the length increased from 16-20 feet to allow for the erection of the necessary Rollers and Bench. In principle, however, the two are almost identical, performing the same work in pretty much the same manner ; the requisite power being also very nearly the same. The essential point is to ensure that any particular type of frame should be designed so as to provide a suitable foundation for the engine and caw bench. It should be so constructed as to have the necessary stability with the minimum amount of weight and to meet these requirements scantlings of the sizes illustrated—see plan—have been found most suitable. These are further strengthened by the addition of three or four half inch round iron crossbars threaded at the ends and fitted to the sides of the frame. The 4″ by 3″ uprights are more firmly secured when bolted to the frame by ordinary 3″ iron brackets as shown on plan and ordinary 1½″ angle iron will be found most useful for securing the engine cover and table to the frame. The type of timber generally used in construction is good, well seasoned Scots Pine, except for the table, for which clean Elm, Beech or Sycamore is recommended. To afford the necessary protection against wear and tear of these wooden tables the application of 1½″ angle iron fitted to their outer edges has given excellent results and tables so fitted have given as good if not better results than the more expensive and heavier type of metal table. A pair of rubber shod wheels 14″ to 18″ diameter fitted with roller bearings and mounted on an axle 1½″ square will greatly facilitate the transport of the unit from one location to another with the least possible delay.

The Engine.

When choosing an engine consideration should be given to three main points—namely, size, weight and power. It must be a handy convenient size and capable of being fitted to the standard type of frame—suitable engines are usually permanently secured to units and are bolted in the positions A-B on the accompanying plan. Engines should be capable of developing from 6-9 H.P. and have a speed from 800 to 1,500 R.P.M. The engine itself should be protected as far as possible from dust and when idle should not be exposed to the weather. To afford such protection sides and ends constructed of 3/8ths or half inch boards can easily be fitted to the frame by means of bolts or clips and if desired can readily be removed when the unit is working.

Spindle Bearings.

The type of Spindle generally used is 1½″-2″ diameter fitted with roller bearings. The positions of the plummer blocks are indicated B-C on accompanying plan from which it may be seen that the

positions of the driving pulley and belt are centred within the frame, thereby affording additional security against accidents. The driving belt recommended should not be more than 4 ply and 4″ in width and on no account should it be unduly tight. When fast and loose pulleys are used they should be so arranged that the belt is nearest the engine when working on the fast pulley and a similar arrangement should apply in the case of benches. Local circumstances will often decide on the size of circular saw to be used, though generally an ordinary gauge saw of from 36″-42″ will be found most suitable.

Fitting of Circular Saws.

No difficulty is experienced in fitting a saw except for the " packing " and unless this operation is skilfully carried out the saw will not work satisfactorily no matter how carefully it has been sharpened and set. All circular saws—unless designed for some special purpose—require " packing " on both sides of the saw, sometimes extending from the base of the gullets of the teeth right up to the collars of the spindle. In the case of cross-cut saws less packing is required. The primary object of packing a saw is to supply the necessary support to prevent " wobble " and to maintain the correct " tension."

Different types of material are used for packing, the most generally used being (1) felt sewn together to the required thickness ; (2) solid leather pared down to the proper fit ; or (3) square gland packing.

Saws : Setting and Sharpening.

Good saw performance is a necessity if production is to be economical, so a few notes on the subject may not be out of place here.

There is no worse economy than neglect of and indifference to the proper " sharpening " and " setting " of an ordinary circular saw. Simple matters as these may seem, still they require great experience and skill besides careful and constant attention. Setting is the method by which the teeth are adjusted so that the necessary clearance is given to the body of the saw in its passage through the timber. Without proper clearance the timber will close or tighten on the saw thereby generating heat and eventually causing the saw to buckle. A well-sharpened saw is useless unless it is properly set ; therefore it will be seen that " setting " is equally as important as " sharpening."

The amount of set which it is necessary to put on the teeth will depend to a good extent on the nature of the timber being sawn. Hard woods do not require as much set as soft woods—set is acquired by springing the points of the teeth with a saw set, but it is most important that only the extreme points of the teeth should be "sprung." In setting the teeth it must also be remembered that

every tooth is only pulled over to an equal amount because an evenly set saw will work with less set than one in which a few teeth have excessive set and the others too little or none.

Sharpening.

The main factor governing sharpening depends on whether the saw is to be used for " cross-cutting " or " ripping " as the function of the rip-saw is of a totally different nature from that of the cross-cut type. The rip-saw cuts its way longitudinally through the wood, whereas the cross-cut saw, cutting across the " grain," has to sever the fibres through which it passes or, in other words, scrape its way through the cut in the timber. Thus the teeth of a cross-cut saw instead of having a forward " hook " or " rake " have none at all, and the points of the teeth have a sharper angle than those of the rip-saw. The best results can only be got from any saw when all the teeth have an equal share in the work of cutting ; therefore it is of major importance that the tips of the teeth of all saws should form a perfect circle and no tooth should project beyond the circle. It is therefore, always advisable—and necessary—to have saws properly " stoned " down before removal from the Bench for setting and sharpening.

Proper mill files should always be used and attempts at sharpening the teeth by filing their tops instead of their fronts is not recommended, as such a practice rapidly reduces the saw diameter and it is always the front edges of the teeth that get most of the work.

Cutting of Firewood Blocks.

With most logs a certain amount of preliminary work is necessary preparatory to the actual cross-cutting into blocks. Generally speaking it is always well to have the logs cut into handy convenient lengths of from four to eight feet—depending on their size and weight—and properly stacked adjacent to the unit. Such preparation will afford easier and quicker handling of the material to be sawn thereby reducing much unnecessary waste of time and labour. Long ungainly length of logs carelessly stacked and strewn about in the immediate vicinity of the unit are sometimes the cause of serious accidents and attempts to have such lengths manufactured directly will only result in excessive wear and tear of the unit.

With units of the types described, it is always necessary to have the heavier logs reduced by splitting, though the extent of this operation depends entirely on the size of the saw and the power of the unit.