



## LAND ROLLERS

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### HISTORY.

THE data on the early history of land rollers is rather meagre, but it is probable that crude forms of rollers were used before the domesticated animals were made use of as a means of motive power. The crude forms, which were made of round logs and pieces of stone, are found in use to-day. In Scotland, I am informed, large pieces of granite are worked into the form of a roller. The gudgeons are made of short pieces of iron rod, leaded into drill holes in the end of the stone roller. In case the roller is thought to be too heavy, plank staves are fastened about the roller, thus making the bearing surface larger in proportion to the total weight of the roller. It is nothing uncommon to see a land roller made of an old log. The log may be nearly straight and round, thus making a fair form of smooth roller. But it often happens that the log has several bumps, and knots on its surface. These together with bends in the tree from which the roller is made add greatly to the jerkiness of draft, and detract somewhat from the effectiveness of the roller.

The frames for these crude rollers were made in most part of wood, and in many cases showed more thought on the part of the designer than do the frames of some of our modern rollers. In case long rollers were needed the frames and rollers were built in sections so fastened together, as to allow each section to adapt itself to the unevenness of the ground.

In Volume 1, of Rural Affairs, published in 1873, is given a careful description of Crosskill's Clod Crusher. This machine was tested by the Royal Agricultural Society of Ireland sometime prior to 1873. It was pronounced a great success as a clod crusher. It was six feet in width and was built of twenty-four toothed iron wheels, revolving upon a single shaft. It corresponded closely to one of our modern corrugated rollers with this exception; the modern roller presents an edge in place of teeth to the clods. In the same book, we find a description of a drag roller. In this machine the round part of the roller does not roll. It is drawn by a tongue which is attached by lugs to the front of the roller. As the tongue is hinged to the lugs, the hitch adjusts itself to the line of

draft, thus removing the neck weight.

In many of the old rollers, the inventors took care to eliminate neck weight and to provide flexibility enough in the frames to allow the rollers to adjust themselves to very uneven ground.

### THE USE OF ROLLERS.

The early ideas in regard to the use of land rollers were based almost altogether on experience and not upon scientific knowledge of the principles involved. It was known that a roller would crush clods and in some cases it might help seeds to germinate. Its detrimental effects when unwisely used were scarcely understood at all. For this reason its use was often a source of loss rather than gain to the farmer. Consequently the roller was looked upon by many as a machine which was sure to bring only bad results to the user.

Of course such ideas arise from narrow experience and in many cases from a total ignorance of the soil and climatic conditions which should govern the use of the roller. To state exactly how, when, and where to use the land roller is an utter impossibility unless all the factors governing its use are known and thereby understood. These factors are many and they must all be taken into consideration if the best results are to be realized.

In the first place, if large clods are numerous in the fields they should be reduced to a finer condition. The roller will in all probably do this, but it should be remembered that there are methods other than rolling which will very effectually reduce the clods; the float or planker will rasp down the clods, but as the weight is small in proportion to the surface of ground covered, it is not likely to compact the soil nearly so much as a roller of sufficient weight to break the clods. A disk harrow or smoothing harrow may often be made to do the work in a more satisfactory manner than the roller, provided the soil does not need compacting.

But, on the other hand, if it is desired to compact the sub-surface and surface soil to any considerable extent, the roller is the only implement that will do the work easily and do it to just the desired degree. In connection with this statement it might be well to say that the proper loading of the roller is something that seldom receives enough thought or attention.

The compacting effect of the

roller is often completely overlooked by the farmer who wishes to crush a few unsightly clods. The compacted soil may often times do more harm than the clods could possibly do.

Owing to the fact that the particles of earth are brought into closer proximity to each other capillary action goes on more rapidly in the compacted soil. The moisture in the sub-surface soil is brought to the surface more rapidly and consequently the seeds in the dry surface layers—if these layers chance to be dry—receive more moisture than they would had the ground not been rolled. This is one of the best results which may be secured by the use of the roller. However, the moisture rises rapidly to the surface and is evaporated by the passing currents of air. If one wishes to bring the moisture to within a short distance of the surface of the ground and hold it there, all that is necessary is to roll the field with a properly weighted roller and then harrow the ground with a smoothing harrow. This prevents rapid loss of moisture by evaporation.

The farmer who would use a roller to the best advantage must also understand the puddling effect of rolling wet ground. As this effect varies so widely in different kinds of soil, only a thorough knowledge of the science of soils and the exercise of very good judgment can possibly enable the user of a roller to perform the work at the right time and in the right manner, unless, of course, the ground is always so dry that it will not puddle.

To go into all the details of how and when and where to use a land roller would take altogether too much time and only a man of world wide experience in the tillage of all kinds of soils under all conditions could possibly describe all the uses and misuses of the roller.

To go into a detailed description of all the different types of land rollers would also be a long and perhaps rather uninteresting task. The simplest form of roller, the drag roller, is not true to the name, in that it is simply dragged over the land and does not roll at all.

Where heavy rollers of small diameter are desired, the stone roller will no doubt prove satisfactory. The rollers which are made from hard wood logs are also fairly heavy when their diameters are considered. They are often made in short sections,

so connected that these sections may adapt themselves to the unevenness of the ground. In the construction of the good land roller this point of flexibility is of great importance and should never be overlooked. The log rollers are often built too long for good service, even on the artificially leveled fields of the irrigated sections. The same is true of the log rollers which are made by bolting plank staves to iron wheels. One often sees a roller which is built up by bolting eight or ten foot planks to some old mower wheels. The light construction of such a roller, together with its length, its large diameter, and its lack of flexibility makes a machine of very doubtful value. The necessary weight may be added, but when the total surface covered by the roller is considered, it is readily seen that the load necessary to accomplish such compacting will have to be great.

A roller built of reinforced concrete or cement is easily made and carries a considerable amount of weight within the roller itself. These rollers are easy to make and give as good satisfaction as a smooth roller could reasonably be expected to give, providing, of course, the length of the roller is not so great as to allow the low places to be passed over without being rolled.

A very good corrugated roller may also be made of cement, if a little time and thought is given to the matter. I built a six foot, corrugated, cement roller, which has been in use for the last season upon the Colorado Agricultural College Farm. It is built of fifteen cement wheels about nineteen inches in diameter and four and three-fourths inches thick. Although the roller was moved over hard, rough roads, bridges, and railroad crossings before the wheels were sixty days old, there has been no wheels broken or chipped sufficiently to require replacing.

An eight foot cast-iron corrugated roller used in the same manner has required the replacement of wheels each year it has been on the farm. It is unnecessary to discuss the different forms of commercial rollers other than to say that most of the smooth rollers are made of cast iron or of sheet steel. In case of the steel rollers, most of the weight must be placed upon the frame and carried by the axles.

There are numerous forms of corrugated rollers upon the market. They are somewhat more

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