

Implements.

DIFFERENT MODES OF DRAINING.

Tile, stone, brush and wood in different ways have been used—under certain conditions either may be useful—but unquestionably tile is the best of all and no other ought to be used where tiles can be obtained. A well burned tile is indestructible by any action to which it is subjectible in the soil, and will withstand the slow trickling of pure water through it as long as water continues to run. There is much more danger that the action of the elements will wash away the surface of a farm than the water flowing through good tile drains will wear them out. The only chance of danger lies in imperfect construction.

With such a knowledge of the subject as any farmer can acquire, and a judicious outlay of money, it is easy to drain lands in such a way that no further care is required than to see that the outlets remain unobstructed. When drains are so constructed as to need no repair, and when it is certain that they will last as long as the land lasts, all that is further necessary is to charge the land, as a part of its annual expenses, like rent or taxes, a sum that will cover the interest on the cost of the work, and there is an end of it. The benefit is permanent.

In many localities where there is suitable clay and no manufacturers of tile, the

The size of the tiles used in draining the park grounds in Buffalo, New York, were 1½ inches. The plots of ground were large, the drains thirty-five feet apart, three feet in depth, and the drainage so perfect that the grounds are dry immediately after heavy rains.

The tiles used in draining Central Park, New York, were two inch, and the drains forty feet apart. The drainage is thorough and the lawns in this park are a marvel of freshness and beauty during the severest droughts.

The present price of tiles in Albany, N. Y., varies from \$10 to \$12 per 1,000 feet. At the latter price the drains being 42 feet apart, requiring 63 rods of drain to the acre, the tile for draining one acre would cost \$12.46. The cost then of draining one acre may be estimated as follows:

Tiles for 63 rods, at \$12 per 1,000 feet, - - -	\$12.46
Cutting 63 rods of ditches with Carter's Ditcher, the maximum Price would be 5 cts. per rod - - -	3 15
Laying tile and finishing, 5 cts per rod - - -	3 15
	\$18 76

But as tile of the size named in the above estimate can be procured in many parts of Canada, at from \$5 to \$7 per 1,000, the cost would consequently be reduced one-third or to from \$12 to \$14 per acre instead of \$18.76.

The above expenditures ought to drain any ordinary clay lands. The increase in the first year's crop, of whatever kind it might be, according to all past experience,

work occupies the time; and if, finally, a day comes when they may be attacked, they offer ten times the resistance they would have done a week earlier. The operations of the farm are carried on more expensively than if the ability to work constantly allowed a smaller force to be employed. The crops which give such doubtful promise, require the same cultivation as though they were certain to be remunerative, and the work can be done only with increased labor, because of the bad condition of the soil.

In the cultivation of retentive soils, drainage is the key to all improvement, and its advantage is to be measured not simply by the effect which it directly produces in increasing production, but, in still greater degree, by the extent to which it prepares the way for the successful application of improved processes, makes the farmer independent of weather and season, and offers freer scope to intelligence in the direction of affairs.

Now that population and wealth are increasing, and becoming more valuable, a need of a better system of farming is felt such as will render cold, wet, clayey, retentive soils, porous, friable and productive, and avoid the risk of the failure of crops by reason of short, cold, unfavorable seasons. Such a system as will enable the farmer to reclaim the thousands of acres of our swamp lands that have hitherto engendered nothing but musketoes, reptiles, fevers and agues, and make them teem with vegetation.

The principal parts are an iron wheel four feet in diameter, eight inches wide, with two flanges of five inches in width projecting from its edges.

Between the flanges on the periphery of the wheel, are cogs corresponding in length to the width of the flanges, and arranged in couplets at distances between twelve inches apart around the wheel. In the rear and closely to the bottom of the wheel, is a spade or cutter, set in such a manner as to cut the earth and hold it within the flanges; as the wheel revolves the earth is caught by the cogs and carried to the top where the cogs pass through a comb which entirely removes the earth and discharges it through a bright steel spout which puts it at a convenient distance from the trench, to be replaced when required. The whole is connected with a car on which stands a driver, who manages the machine and regulates the cutter with the same ease that a reaper or mower is operated. The machine is drawn forward and backward in the same track, cutting from two to five inches each time until the depth required is reached.

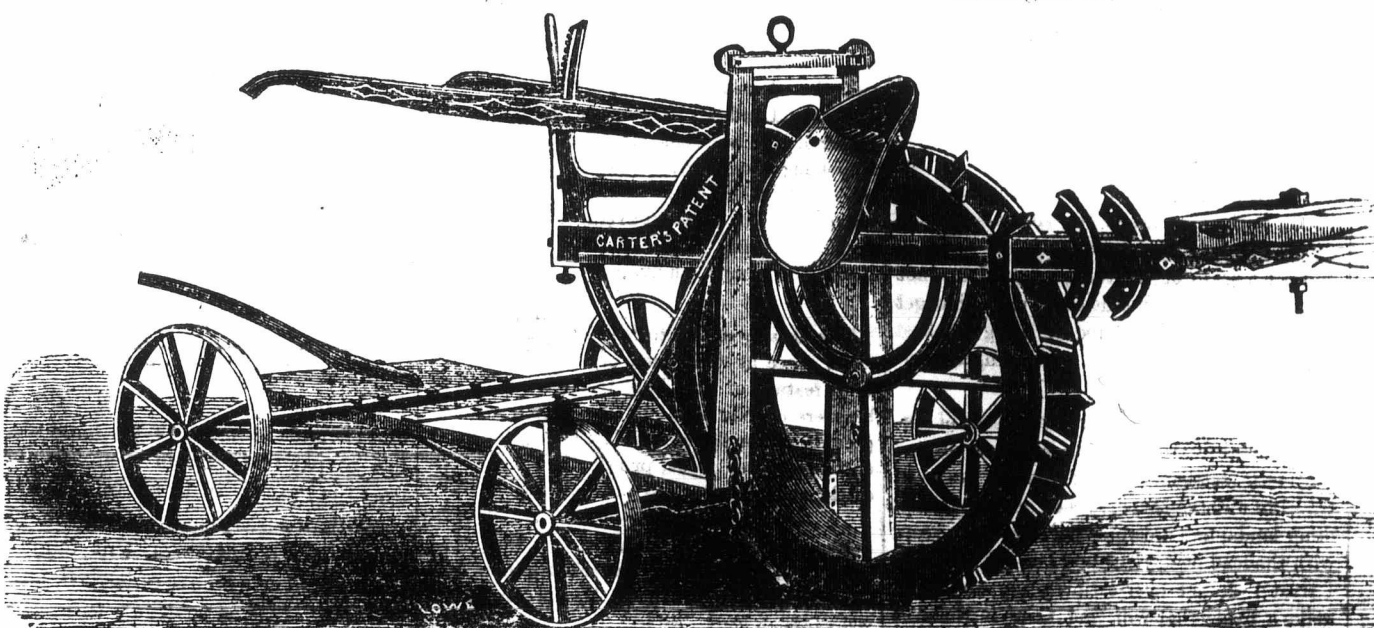
FARM IMPLEMENTS.

Plows naturally come first on the list. In a good plow we find, first, lightness of draught; next, strength equal throughout the structure; and third, facility of repair; and, indeed, the last two rules apply equally in the selection of every implement used in agriculture. We can confidently recommend steel plows as stronger, lighter, and, in the end, cheaper. We do not think it necessary to debate the oft disputed point as to the superiority of steel over iron plows as regards the excellence of work accomplished, and the first two qualities, in our eyes, fully establishes their superiority. Choose a plow that has a good clevis or hake, as it is often termed, one that will allow the speedy alteration of the line of draught higher or lower, to the right or to the left. In all well-made plows this is made of wrought iron. Carefully eschew cast iron at this point, as sure to give trouble sometime. If you use more than one plow, buy them all alike, that you may have less trouble ordering points and other wearing parts or in cases of breakage you may be able to use the corresponding part of another.

Drags should be selected with steel teeth, and are preferable when they (the teeth,) fasten in the beam with a nut. If you have the opportunity to try your drag before purchasing, draw it steadily over a dusty road, and see that every tooth makes an equi-distant mark. Heavy drags and cultivators are better constructed with an iron frame, and those which will allow the teeth or tines to be shifted, that they may be set closer together or wider apart, as the exigencies of the case require, are much to be preferred.

On many farms we are glad to find a roller is now considered essential. In the construction of these implements the manufacturers on the other side of the Atlantic are yet far ahead of us, and we believe any manufacturer who would bring out a well-constructed iron roller, light, yet strong enough to bear well weighing when necessary, would find a ready sale for it. A cast-iron hollow cylinder made in two or three sections for convenience of turning, running on an iron axle, with a frame of hammered iron, light and well braced, would be weatherproof, cheap, and not easily broken or worn out.

A drill for sowing grain should be selected with extra caution. Here particularly avoid cast iron, these being implements often used in frosty spring mornings, when a jolt over a landfast stone will snap a casting and spoil your day's work. See that the arrangements for altering the quantity of seed are simple and correct. The instructions for setting the drill for depositing any given quantity of seed are generally faulty and compiled inaccurately. When at work, if one of the coulters comes in contact with a stone, something must give way, so observe what is contrived to prevent breakage. The drill-box is gener-



plan has been adopted among farmers who wish to get a tile yard established in their locality, to subscribe a certain amount and then advertise for a tile-maker, offering, as an inducement, to take the amount of their subscriptions in the first tile manufactured, thus insuring the manufacturer a sure and speedy market for his first labor. This so far has been found a prompt and effectual course for bringing tile makers where wanted.

DEPTH OF DRAINS.

They must be below the reach of the subsoil plow, for in the revolution which drains will work in the process of cultivating the soil, the subsoil plow will follow in its path. They must go beneath the reach of the frost, so that the water in the pipes shall not freeze. They must also be deep enough to remove the water in the soil below the reach of the roots of plants. A depth of from two and a half to three feet will accomplish all these purposes.

COST OF DRAINING

Heretofore the largest part of the cost of draining has been in the cutting of the ditches by the slow process of the pick and spade. With the aid of Carter's ditcher, they can be cut for five cents per rod, and the cost of laying the tile and "finishing" should not exceed this amount. The cost of tile, if tiles are used, will vary with the size, and the cost per acre, with the frequency of the drains.

would refund this cost, leaving at the end of the first year, the like amount to be added to the value of the soil. The minimum income on this would be 33 per cent. annually.

Draining makes the farmer, to a great extent, master of his vocation. With a sloppy, drenched, cold, uncongenial soil, which is saturated with every rain, and takes days, and even weeks, to become sufficiently dry to work upon, his efforts are continually baffled by unfavorable weather, at those times when it is most important that his work proceed without interruption. Weeks are lost, at a season when they are all too short for the work to be done. The ground must be hurriedly, and imperfectly prepared, and the seed is put in too late, often to rot in the over-soaked soil, requiring the field to be planted again at a time which makes it extremely doubtful whether the crop will ripen before the frost destroys it.

The necessary summer cultivation, between the rows, has to be done as the weather permits; and much more of it is required because of the baking of the ground. The whole life of a farmer, in fact, becomes a constant struggle with nature, and he fights always at a disadvantage. What he does by the work of six days, is mainly undone by a single night's storm. Weeds grow apace, and the land is too wet to admit of their being exterminated. By the time that it is dry enough, other pressing

Appreciating this need, Mr. Henry Carter, a Canadian mechanic, has spent years of patient thought, labor and experiment in efforts to produce a machine that will facilitate and cheapen the process of draining, relieve it of the slow, hard operation of the pick and spade, and transfer it to the stronger muscles of the horse, as the processes of reaping and mowing have been, and reduce the cost and labor to an almost nominal sum.

This machine has been rendered as near perfect as it seems possible to make it, and it is now offered to the public at such a price as will enable most farmers to purchase. It is simple in construction, strong, easily worked and not liable to get out of order.

With proper management, a team of two men and four horses, will cut a ditch from 1,000 to 1,500 yards long, 3 feet deep, 14 inches wide at top and 10 at bottom, in ten hours, according to the character of the soil.

This machine was first introduced to the public in 1869, and has in all cases in which it has been tried, fulfilled all the conditions of a first class ditcher. In every instance where it has been brought into competition with any other machine, it has proved itself far superior and has taken all the first prizes for such a machine, both in the United States and Canada.

The illustration hereto annexed will give a general idea of its construction.