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Improved Device for Loosening and Pulverizing Soil.

It is well known to farmers—those at least who endeavor to understand the science of their business—that although the soil holds a certain proportion of the nutritious elements which form the constituents of plants, their roots as well as their leaves and blossoms, depend greatly upon the elements of the atmosphere for growth and development. Consequently the exposure of the soil to the atmosphere is a necessity in agriculture. But often its exposure is simply a reversal of the position of the soil, what was at the surface being placed at the bottom of a furrow from four to ten inches deep, that bottom being compressed hard by the weight and friction of

soil to a depth of from ten to fifteen inches the cylinder may be thrown out of gear.

A lever and quadrant in front of the driver's seat is used either to regulate the depth of action of the cultivator teeth, or to raise them from the ground a distance of from six to eight inches for driving over common roads to and from the place of labor. The lever operates the cylinder by means of chains and cams on the lever shaft at each end of the machine.

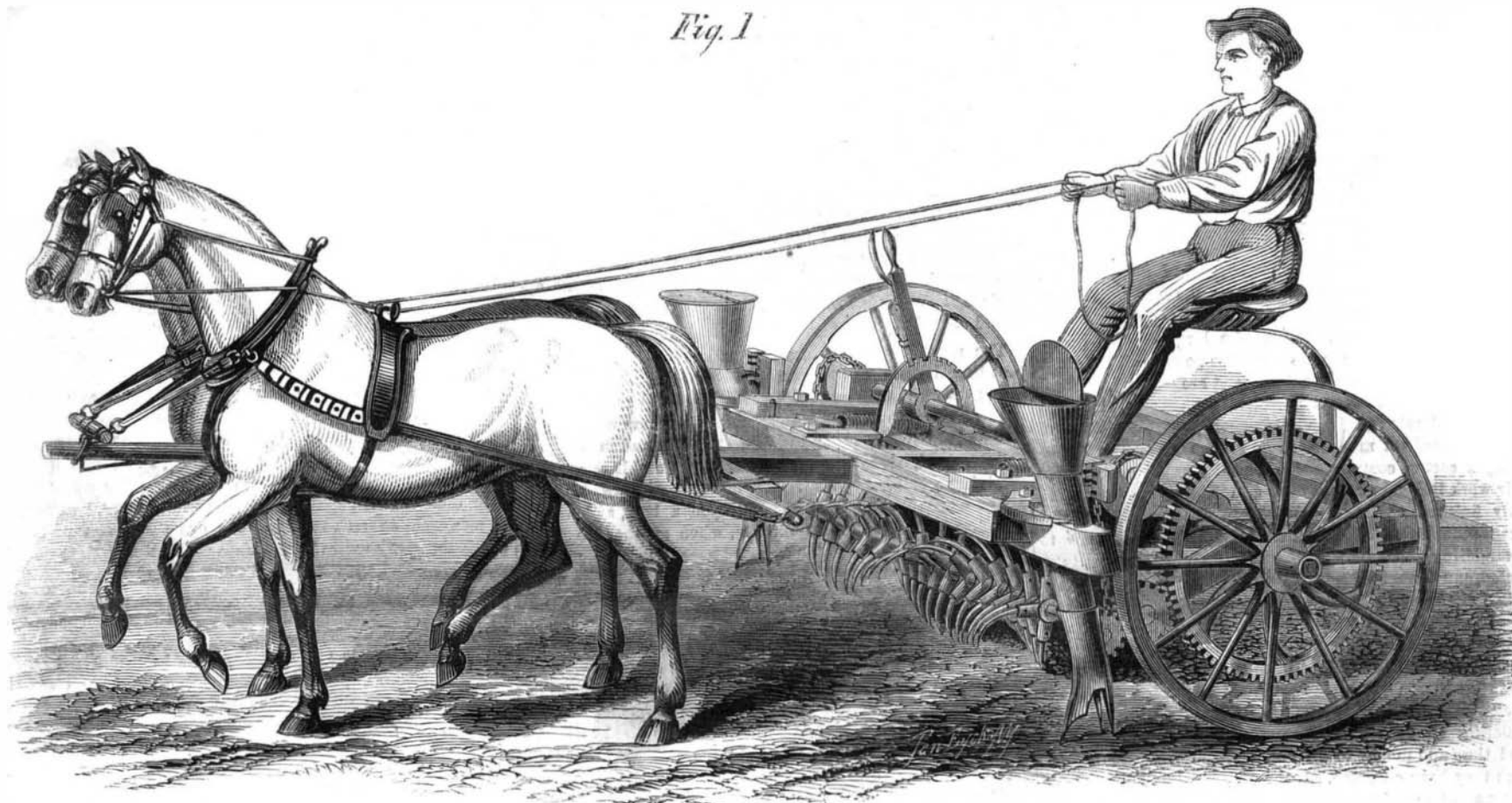
Fig. 2 represents a corn or other cultivator composed of two separate cylinders, with flanges at the inner ends, intended to protect the plant from dirt and to enable the operator to

the salts more or less injuriously affect the wood substance.

“My discovery consists in simply treating the wood with a boiling solution of borax in water, which easily and effectually dissolves and removes all those perishable substances, without injuriously affecting the wood fiber, which, on the contrary, becomes harder, impregnable to water, vermin proof, perfectly indifferent to the moisture or dryness of the atmosphere, and almost incombustible.

“The process and operation are as follows: In a tank, of wood or iron, I prepare a saturated or nearly saturated solution of borax in water, sufficient to cover the wood. I then raise the temperature, by steam or otherwise, to the boiling

Fig. 1



STELLE'S COMBINED CULTIVATOR AND PLANTER.

the plow sole. Pulverizing, not breaking into masses, is what the soil needs to enable it to receive from the atmosphere and return to the agriculturist the greatest amount of good.

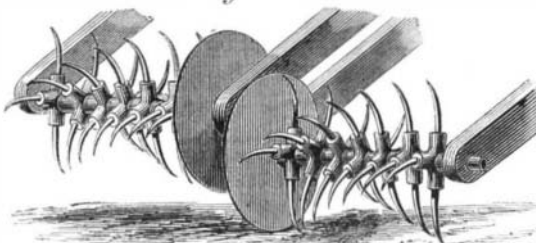
The object of the machine seen in the engravings is to save labor and time while it pulverizes the soil better than any other device. It will cultivate a space four feet wide, plowing and harrowing it ready for the reception of the seed, while the ordinary plow simply turns the soil upside down in a furrow of about nine inches in width. This machine pulverizes the soil to a depth of from one to ten or more inches. The teeth of the cylinder are placed in a spiral around the shaft, so that only four or five of them are in the same degree of contact with the soil at one time, making the draft very light, especially as the cylinder revolves in the direction of the draft.

The teeth may be made of any required form, harpoon-shaped, diverging from the hub, enlarged at the end with square or round edges, etc., to suit the work required and the nature of the soil.

Attached to the sides of the machine are two receptacles for corn or other seed placed directly in front of the wheels, which may have attached to their peripheries broad pieces to compress the soil above each hill, or the tread of the wheels may be made broad enough to act to the same purpose. Cut-offs similar to those used on a common shot pouch are actuated by a double cam on the main or driving shaft. The upper cut-off may be adjusted so as to permit few or many kernels to fall at one time. The driving wheels being about four feet in diameter, describe a distance in traveling one revolution, of about twelve feet, and by the double cams operating the seed-feeding cut-offs, deposit three hills to one revolution of the driving wheels. The operation of the seed planter may be suspended at will, so that the machine may be used only as a plow, cultivator, or pulverizer of the soil. When it is required to loosen the soil only to the depth of three or four inches, the gear may be used, the cultivating, cylinder in that case making nearly three revolutions to one of the driving shaft; but when it is necessary to open the

guide the implement. The action of this machine leaves the soil in better condition for drainage and better suited for the growth of crops than the ordinary plow and harrow. It was patented through the Scientific American Patent Agency, July 16, 1867, by D. D. Stelle, assignor to himself and Thomas

Fig. 2



E. McDonald, of New Brunswick, N. J. Patents have also been secured through this office in England and France. Applications for the purchase of rights etc., may be made to Johnson Letson, New Brunswick, N. J.

Process for Preserving Wood.

A recent patent granted to Sigismund Beer, of New York city, is as follows:

“Wood freshly cut is full of sap, composed of hygroscopic and very perishable organic substances. Heretofore, the idea has been, in seasoning and preserving wood, to wash out these substances, or to chemically combine and convert them into more durable compounds. Washing by steam only removes matter having great affinity for water, and soluble therein, leaving those that coagulate by the action of steam to fill the pores and stop further action. The chemical conversion of these substances is commonly produced by metallic salts, which combine with them, forming insoluble compounds of more durability. But this action is necessarily limited to the exterior, as deep impregnation is stopped by the newly formed products. Moreover, the cost is high, and

point, and keep it there from two to twelve hours, according to the porosity and thickness of the wood. I then repeat this operation in a freshly-concentrated solution of borax in water, but immersing the wood only half as long as before. The wood is then taken out, and, as soon as dry, it is ready for use, if its hardness and discolor are not objectionable, or it may be several times washed in boiling water, which will extract the absorbed borax in connection with the colored matter, and restore its former color and appearance, more or less, at will.

“It is not necessary to use a very strong solution, but I prefer it on account of the facility for re-using it.

“Simple as my process is, it may be advantageously altered in some cases. When thick lumbers are to be treated, it is well to steam them thoroughly in the ordinary way, and place them in the tank while still warm and wet. The denser and heavier liquid of borax solution will more quickly penetrate the pores of the wood, and shorten the operation considerably.

“If it be desirable to impregnate the wood with tar, coal-oil, or like substances, they are easily applied, after the wood has been thoroughly dried.

“If it be desirable to make the wood perfectly water-tight, shellac, or other gum, or resin, or substance soluble in a boiling solution of borax, and insoluble, after drying, in cold water, may be added to the liquid of the second operation.”

THE DUROMETER.—At the Paris Exposition an instrument was exhibited designed for testing the relative hardness of steel rails. This “durometer,” as it is styled, is virtually a small drilling machine, working by hand or machine power, which registers the number of revolutions of the drill spindle and also the amount of feed, the latter being given by the application of a known weight to the back of the drill spindle. The friction of the machine and the state of the cutting edges are supposed to be constant quantities and as such are thrown out of the calculation. The hardness of any rail is considered to be inversely proportionate to the depth of feed obtained with a given number of revolutions.