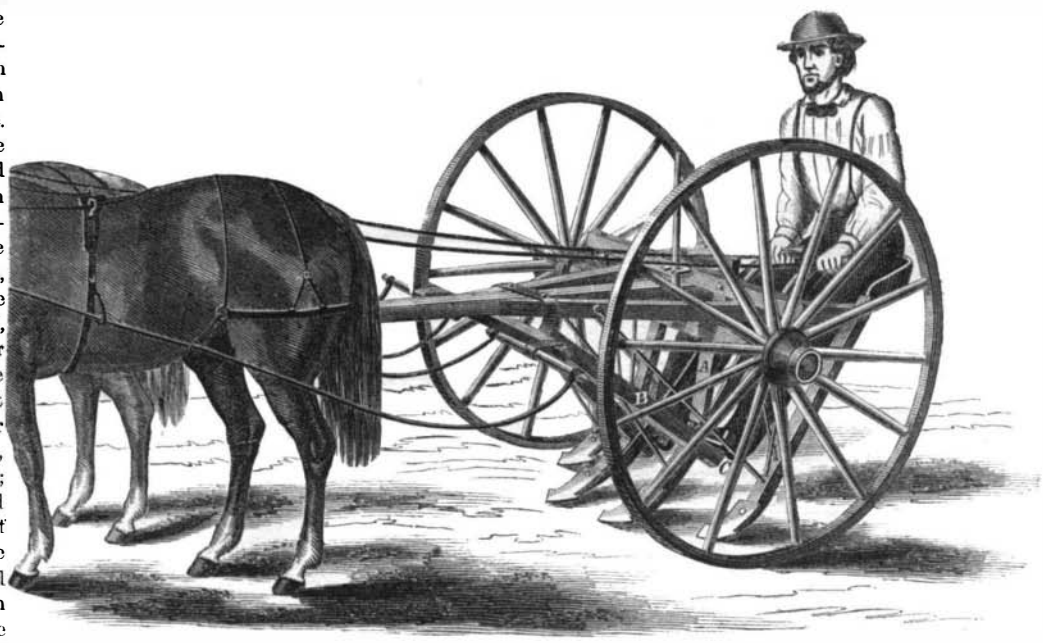
Improved Corn Cultivator.

Quite recently we ran up through the valley of the Mohawk River, where vast fields of corn are grown, and side by side, scarce twenty rods apart, were two men at work; yes, two men and one woman. One man had a cultivator, and as he drove he turned over the shining soil against the growing crops, and rode as he drove. The man and woman bent to their work, he earnestly, she in a stiff, ungainly way, as might be expected of a woman in an employment unsuited to the sex. The contrast between the two methods was too marked not to be noticed, and we wondered how any man could be so short-sighted as to use manual labor where machines are provided which will do better work than he can, in half the time.

In this engraving we illustrate a simple and efficient cultivator, which has met with much popularity at the West. There is no machinery about it, and any one that can drive can manage it. In brief, the axle has a triangular frame fixed to it, on one end of which is the draft pole, and on the other two vertical beams, A, which carry the plows, B; the cultivators attached to the plow beams are of any desired shape. The plow beams are so fixed as to be readily moved in any direction, and are capable of being easily guided between the rows. This is accomplished either by grasping the handles, as seen in the engraving, or by placing the feet on stirrups on the plow beams. In this way a vast amount of work can be done in a satisfactory manner, and the cost will be much less than by hand labor.



STOVER'S CORN CULTIVATOR.

It was patented February 27, 1866, by Andrew T. Stover, of Sandyville, Iowa.

RAIN GAGES AND RAIN FALL.

Scarcely a day passes in this section of the country but that cooling showers descend during the night, refreshing the earth, parched during the day by the glaring sun. This moisture, returned in the form of rain more rapidly than it was abstracted, is generally the result of the union of two or more volumes of humid air, differing from each other in temperature. When mingled in the mass, or rather cloud, it is incapable of retaining the same amount of moisture that each did separately. If the moisture is over-abundant it descends in showers; if but slight, it floats in the air as a cloud, and long before showers fall we see masses of vapor skurrying before the wind until all are mingled in one.

The average yearly rain fall varies greatly, being the most in the tropics. As a general rule, the higher the average temperature of a country, the greater will be the rain fall.

In tropical countries the average amount is 95 inches, in the temperate zone but 35. In hot countries the heaviest rain storms occur when the sun is at its greatest altitude, but the reverse is the case in the temperate zone, where dry summers are by no means exceptional, and long wet winters hold sway.

In many parts of the world it never rains, and the arrowy sheets of water, driving before the wind, are unknown; in others there are certain rainy seasons when the heavens open and the floods descend and cover the earth as of old.

The Island of Chiloe, and the country about the straits of Magellan are said to be the wettest places on the face of the globe. There it rains incessantly. In the northern part of the United States there are, on an average, 134 rainy days in the year; in the South not so many numerically, but the average rain fall is greater.

At San Luis, in the island of Maranham, the average rain fall is 280 inches, which is the greatest on the continent.

The quantity falling in a given time is measured by a gage. A common form of this instrument is a can with a floating piston and rod; as the rain falls it raises the piston, and the quantity is known by observing the graduations on the rod.

A better instrument is made by attaching a small tube to the side of a larger one, the two communicating at the bottom; the lesser being graduated shows the quantity which falls in any given time very clearly. Experiments made by the Smithsonian Institute show that a tube 6 inches long and 2 inches in diameter, connected with one half the diameter, gave the best results; a funnel-shaped plate inserted at the top improves it.

HOLT AND THOMPSON'S IMPROVED OILER.

In our issue of July 28th we illustrated a device, patented April 24, 1866, for preventing the oil from smearing the outside of the oiling can. We herewith present another form of the oiler, intended to maintain always an upright position. It can be used either with or without the globe-valve attachment, shown at A, which was fully described in the number referred to. The can is made of sheet brass,

silver plated, for the sewing machine, and weighted at the bottom, as at B, to bring it to an upright position when accidentally overturned. This is further assured by the form of the can. For common purposes the oiler can be cheaply made by constructing the lower section, from the line, C, of cast iron, thick as seen at D and B, which would further insure steadiness of position by increased weight.

Further information in regard to this neat contrivance can be obtained by addressing J. M. Thompson, 2d, or G. L. Holt, Box 1,058, Springfield, Mass.

PROTECTING BUILDINGS AGAINST LIGHTNING.

In our last issue we had an article on this subject but it did not exhaust the topic. We desire to say a few words additional in relation to ordinary protection against lightning.

Many buildings are now constructed, both in the city and in the country, with metallic-covered roofs, and very few are erected without metallic eaves troughs and conductors. In all such cases the efficiency of lightning protectors is impaired by the preponderance of conducting surface on the roof and down the sides of the building. This metallic covering, and these rain conductors, whether of tin, zinc, or lead, are better conductors of electricity than the building of stone, brick, or wood, and should be utilized as a means of protection against lightning. For this purpose strips of iron, zinc, or copper should connect the lower extremities of the water spouts with the damp earth, a well, or a running stream of water, and the eaves troughs should have a connection with the metal roofing and with the vertical conductors. Water is a good conductor of electricity, and when, in a thunder storm, the rain is pouring down the conduits of a building, their conducting properties are largely increased. Properly connected, these useful appliances can be made doubly valuable as harmless conductors of electricity.

In cities and enterprising towns there are systems of water pipes and gas conductors, of metal, ramifying in the interior of dwellings and other structures. Such buildings should be carefully protected outside. If the conducting medium, whether of water or gas pipes, preponderates in the interior of the building, the electric fluid may leave the external conductor and through a thick wall seek that which facilitates its passage to the earth. In such cases it seems that nothing but a rod, having numerous points for collecting the electricity and adequate means of conveying it innocuously to the earth, would be an effectual protection. Some authorities recommend a connection to be made between the system of water and gas pipes inside a building and the external conductor.

The question of insulation seems to be a disputed one, some insisting on thorough insulation of the rod, by means of a non-conducting substance interposed between it and the building, and others as strenuously maintaining its uselessness. It would seem to be unnecessary, if the conducting capacity of the protecting rod is greater than that of the building itself; and this, after all, is the most important requisite for a protector against the ravages of lightning.

THE *Mahroussee*, built by Samuda, designed by Lang; oscillating engines by Penn; obtained the greatest speed on trial trip ever known, viz., 21½ statute miles an hour. Length, 360ft.; breadth, 42ft.: depth, 29ft.; wheels, 33ft. diameter; tunnage, 3,141; horse-power, 800.—*Engineer*.

[This is in England. Our North River boats have frequently made 26 miles an hour. The *Chauncey Vibbard* ran from New York to Albany, 160 miles, in six hours and forty minutes. In deep water she averaged 24 miles an hour.—EDS.

A SINGLE establishment in Waterbury, Conn., uses 1,500 tuns of copper annually in the manufacture of pins, hooks and eyes, and other similar articles.