

Improved Hilling Plow.

Those persons who have, early or late in life, been obliged to bend their backs over a hoe, know what fatiguing work it is, and how it tires every muscle in the body. Those who are *not* obliged to do it themselves, but have to pay others for it, know what an expensive and unsatisfactory piece of business is sometimes made of it. The ends of the rows, where the eye of the farmer naturally falls, are fair to view, but in the middle the slothful laborer has made a beggarly account of his time. The plow here illustrated is designed to expedite the labor and make it more thorough. The patentees say of it:—

"Being practical farmers ourselves, we think all will agree with us in saying that improvement in double mold-board plows has been very much needed. In this plow, which we have spared neither time, labor nor expense to perfect, and which is adapted to every kind of soil in which cast-iron plows are used, we have succeeded beyond our most ardent expectations. It will run as deep as may be desired without any extra exertion in holding; it holds easy and runs steady, and is not liable to clog; it will work different widths of rows by using it either with or without the long or short wings, A and B, thus making a large or small hill, as may be desired. It will allow a portion of the loose soil, and also lumps and stone, instead of being thrown upon the plants, to fall in the center of the furrow, leaving the ground perfectly loose and mellow between the rows, which is very necessary to allow the fibrous roots of plants, and especially of corn, to penetrate from one row to the other; and, also, very important in a drouth, as it allows the moisture to be absorbed more readily during the night. By using the plow with the center piece in it will prevent any soil from falling in the center of the furrow, and leaves the bottom clean and smooth, very suitable for ridging, surface draining, or for nursery purposes.

"In sections of country where quack grass is to be overcome, the guard colter, D, is used. The center piece, the wings and guard colter are held firmly in their places by means of wooden wedges behind. The wings are taken off, as required, and the others substituted, the lines, *a*, showing the place where they fit.

"By using this plow in the cultivation of the potato, hand-hoeing can be entirely dispensed with; this is no experiment, but an established method, which has been very successfully pursued by farmers, who prefer this way of working their potatoes to any other, believing that a better crop can thus be realized, and with less labor than by other management.

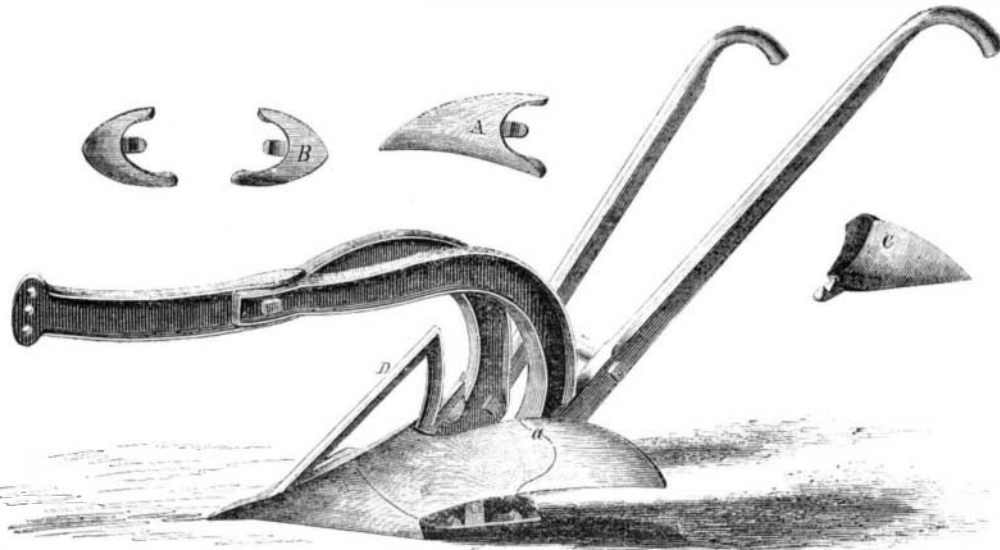
"After the ground is plowed and thoroughly harrowed, let the furrows be made deep and at equal distances apart; when the potatoes first make their appearance, or when they are one or two inches high, use this plow, arranged wide enough, and, if necessary, with the center piece or guard colter in, to bury the potatoes entirely under by passing once between the rows; then, with the harrow, drag over the same way (no danger of injuring the potatoes), which will leave the ground freshly plowed and harrowed. Very soon the potatoes will again make their appearance, free from grass, and with as much ground on the hill as is necessary, after which they may be cross-plowed with this plow as often as desirable.

"For a great variety of work, and thoroughness in it, we assert this plow stands pre eminent. It has been awarded the highest premium at every county fair at which it has been exhibited, and elicited the highest encomiums from the farmers present."

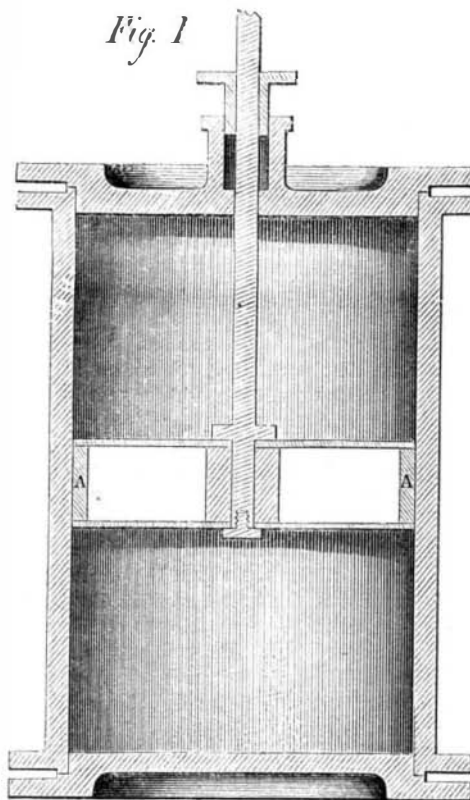
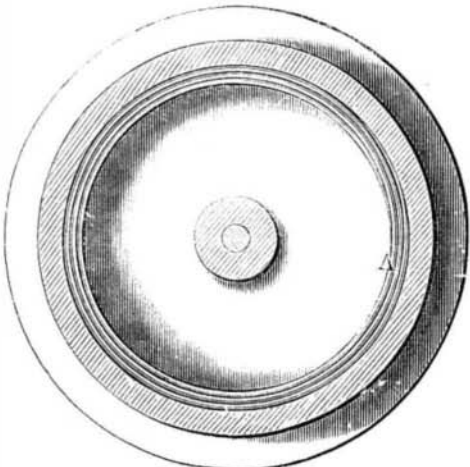
It was patented by Messrs. A. C. & R. L. Betts, of Troy, N. Y., May 17, 1864, to whom all communications in regard to town, county or state rights should be addressed.

KENDALL'S PISTON PACKING.

The engraving represents a plan for packing pistons to render them steam or water-tight. Instead of the usual metallic rings, the inventor provides a brass spring coiled in continuous circles and inserts

**BETTS'S HILLING PLOW.**

it between the heads or flanges of the piston, as clearly shown in the engraving. It is claimed that this method of packing a steam piston is cheaper,

**Fig. 2**

more expeditious and less liable to get out of order than that generally used, and that it requires no attention after it is put in until it is worn out.

The invention was patented through the Scientific

American Patent Agency on July 11, 1865, by Edwin Kendall, of New Lebanon, N. Y. For further information address him at that place. It is on exhibition at the Fair of the American Institute.

Rifle Trial.

A very interesting trial of rifled arms for one of our colonial governments took place at the Rifle Range, Woolwich Arsenal, on the 7th September, in the presence of Major Parley, R. E., the Military Commissioner for the colony, and other officers. The rifles, which were selected by chance out of 1,000 arms, were in pattern precisely similar to that known as the "oval-bore sapper rifle," except that the mountings are of iron instead of brass, and the caliber of the minor axis is .565 to suit the .550 ammunition; ratio of spiral, one turn in 36 in. The range chosen was 1,000 yards. Each rifle

was fitted into the machine rest and fired without altering the elevation or direction of the rest. Diagrams of twenty shots with each rifle were taken. These diagrams, which we have inspected, are really so extraordinary that we have great pleasure in giving to them the publicity they deserve. The rifles were "Lancasters," oval-bore, the bore being .565, quantity of powder $2\frac{1}{2}$ drams, R. F. G. The bullets were .55 boxwood plug, and the lubrication wax. The cartridges were rolled one cut outside, and the rifles were fired from a fixed rest. The hits made were 20, the misses 0, with each rifle; total, 100 rounds, the range being 1,000 yards. The deviations were as follows:—No. 1 rifle, mean absolute deviation 30.35 inches; No. 2 rifle, 28.35 inches; No. 3 rifle, 33.15 inches; No. 4 rifle, 26 inches, and No. 5 rifle gave a mean absolute deviation of 30.5 inches.—*London Mechanics' Magazine.*

NEW BOOKS AND PUBLICATIONS.

THE CADET ENGINEER.—This is an unpretending volume of 165 pages, treating of simple matters in engineering likely to be useful to neophytes or young engineers. It is illustrated with drawings of different details of marine engines and one or two examples of boilers. If we were to criticise any portion of this work it would be that which speaks of boilers. Generally speaking young engineers know (or think they do, which is perhaps the same thing) all about engines, while the boilers are something to put coal in. Of the benefit to be derived from the proper proportions; of the faults to be avoided in design; of the amount of fire surface per inch of cylinder and foot of stroke, much may be said, and we should have been glad to have seen some discussion of these things. It is well to make the calculations examples in simple arithmetic, for it renders the book more useful to those who have never pursued the higher branches of mathematics. Published by J. B. Lippincott, Philadelphia, Pa.

RAYS OF SUNLIGHT FROM SOUTH AMERICA.—This is a volume of 70 large photographs, representing places of resort, sites, public buildings, monuments, tombs, etc., in the city of Lima, with a number of panoramic views of the guano fields in the Chincha Islands. The book forms a magnificent collection of South American views never before published. Philip & Solomons, publishers, Washington, D. C. Baragwanath & Van Wisker, agents, No. 200 Broadway (up stairs), New York.

ELECTRICITY is distributed on the surface only of bodies; the conducting power of a wire or ribbon, however, is not in proportion to its surface but to its size—to the area of its cross section.

Don't stand near a rope under heavy strain; a man was recently killed in Connecticut by the breaking of a steamboat's hawser—the loose end flying over and striking him with great violence.