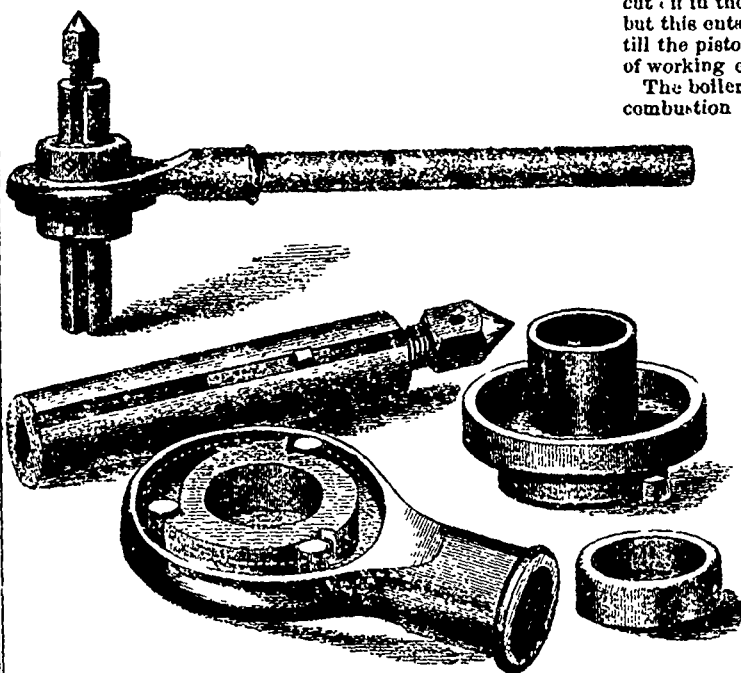


plement is well adapted for putting in manure or plowing grassground.

The seed potatoes are of course deposited by a suitable dropper or other convenient means. It is also claimed that a result of using the invention is that the digging of the hills, when the vegetables are ripe, is attended with much less labor than ordinarily. The apparatus is simple, very quickly attached or removed, and readily adapted to the plow. The patentee is a practical farmer, and informs us that he has found it in operation a useful and valuable tool.



IMPROVED CLUTCH DRILL.

Little explanation, in addition to our illustration for which we are indebted to the *Scientific American*, is needed to show the action of this invention. By communicating the motion of the lever to the drill spindle by means of a friction clutch, the strain is distributed all around the spindle, and the liability of the drill, when acted upon on one side only, to swerve from the perpendicular is prevented. The merest possible motion of the lever moves the drill; and it will be seen that the clutch can be slid lengthwise on the spindle, allowing the latter and the lever to work clear of obstructions. The inventor, Mr. Geo. W. Gill, of Philadelphia, claims that, by using cast steel as a material, he has produced the best and cheapest drill stock now in market, and the only one which uses friction as a means of communicating the motion, and which has, consequently, the advantages above mentioned.

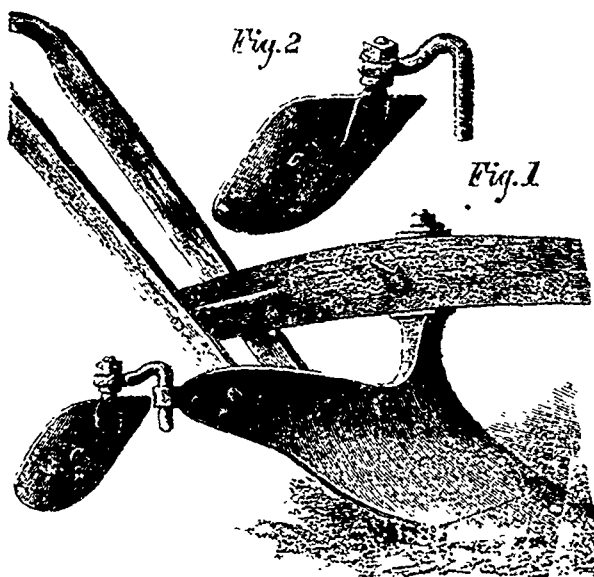
MORELL'S PATENT HIGH PRESSURE ENGINE AND BOILER

We illustrate on page 194, a little engine — which has at least the merit of novelty — of which the patentee, Mr. B. Morell, exhibits a drawing at the Vienna Exhibition. The inventor claims that the engine itself is the simplest that can be made, and will be, in consumption of fuel, the most economical form of engine for running at high speeds, and that in the boiler he has obviated two great objections to vertical boilers, namely the liability to prime, and the likelihood of leakage at the bottom of the tubes and the cracking of the tube plate. The engine is compound, with cylinders 3 in. and 6 in. in diameter respectively, and 9 in. stroke. The boiler is 3 ft. in diameter (3 ft. 6 in. over the steam casing), and 5 ft. high, and

contains 28 tubes $3\frac{1}{2}$ in. in diameter, besides one centre tube $8\frac{1}{2}$ in. in diameter. The total heating surface, not including the feed heaters, is 200 square feet, and the grate surface is 8 square feet. The boiler pressure is 90 lb. per square inch, and the engine is intended to work at 10 effective horse power with 350 revolutions per minute.

The two cylinders are cast together; they have no slide valves, but the distribution of steam is effected by the ports passing openings in the top of a semi-circular box on which the cylinder oscillates. It is expected that the face of this box and that of the cylinder will be kept steam-tight by screwing down the two levers which encircle the latter. The cut-off in the high pressure cylinder takes place at $\frac{1}{4}$ in. stroke, but this entails the disadvantage that the port is not opened till the piston is nearly at quarter stroke, rather a rough way of working expansively.

The boiler is set on a large brick furnace, the products of combustion passing through an opening in its roof, the bricks of which will be of course red-hot, before touching the boiler. This is an old method of preventing smoke, but we think it doubtful whether by it the gases can be freed from all materials which will exercise a deleterious influence in the bottom tube plate, as the patentee seems to expect. The furnace door has a hopper cast on it through which the fuel can be introduced and pushed into the furnace by a cross which can be turned round by hand. As this cross does nothing whatever in the way of distributing the fuel on the grate, the door would have to be opened every time fresh fuel was put on, in order that it might be arranged by a poker or shove in the usual way, so that the use of the cross is not very obvious. There is no means of admitting air above the level of the grate bars without opening the furnace door, a defect that ought certainly to be remedied. The boiler is a simple vertical cylinder traversed throughout its length by the tubes before mentioned. The centre tube is made larger so that the draught may be regulated by a damper over its upper end. The other tubes are ferruled at the top, the size of the holes in the ferrules depending on the nature of the fuel used. The way in which priming is prevented is by rivetting round the whole upper half of the boiler an outer shell, leaving between it and the boiler proper a space of about $2\frac{1}{2}$ in. A number of small holes round the top of the shell communicate with the annular steam chest, and any water that passes through



IMPROVED PLOW ATTACHMENT