

IMPROVED GRUBBING MACHINE.

Farmers and others will find in the invention represented in the engraving a useful apparatus for grubbing up the stumps of trees of even considerable size, which will doubtless prove an efficient auxiliary in clearing land. It is constructed and operated as follows: At one extremity of the beam, A, is journaled a small wheel, B; near the other end is a second beam, C, a block being interposed between the two beams to bring them to the proper relative height. Beam, C, also has a wheel at its end at D, which wheel, however, is larger than that first mentioned. The journal of wheel, D, is hinged to the beam, so that said wheel may be turned back parallel with the beam, for convenience in drawing the machine from place to place. A loop secured to the ends of the hinged journal carries a hook, to which the harness of the horse is hitched.

At the rear end of beam, C, is a slotted guide, E, grooves in which receive the guide plate which is formed upon the upper part of the knife, F. The lower part of the latter passes through a guide slot in a bar, G, which also serves as a shoe for supporting the machine and as a brace to meet the draft strain upon the knife. By operating the lever, H, the knife, through the interposing connecting rods, may be raised from or lowered into the ground and held down to its work. To the rear of beam, A, in such position as to bring the knife at proper distance from the stump to be operated upon, is secured a loop, I, which encircles the stump, as shown.

In operating the machine this loop is first dropped in place, and a ring is placed above it. A wedge is then driven into the top of the stump so as to fasten the ring, the latter serving both to prevent the loop from slipping off, and also as a band to keep the wedge from spreading the lower part of the stump so as to tighten said loop. The knife is next forced into the ground for five or six inches, so that, on driving the horse around the stump, it cuts off such side roots as may lie in its path. At each round the knife is driven in deeper until all the roots are divided. The hook, J, is then dropped and held down by the foot until it catches upon a root. A few rounds twist off this last, and the stump may then be easily raised from the ground.

Patented through the Scientific American Patent Agency, October 20, 1874. For further particulars address the inventor, Mr. E. E. Reyner, Canton, Iowa.

IMPROVED HORSE DETACHER.

The object of the invention illustrated herewith is to provide a means of instantly detaching a pair or even three horses from a vehicle in case of their running away or becoming fractious. The advantages gained of course are the prevention of the injury or destruction of the vehicle, and of the greater risk of periling the lives of passengers.

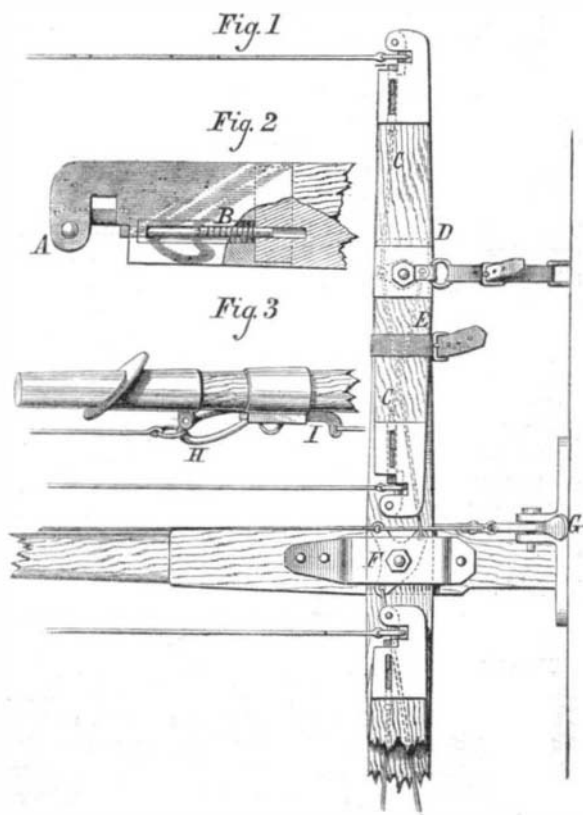
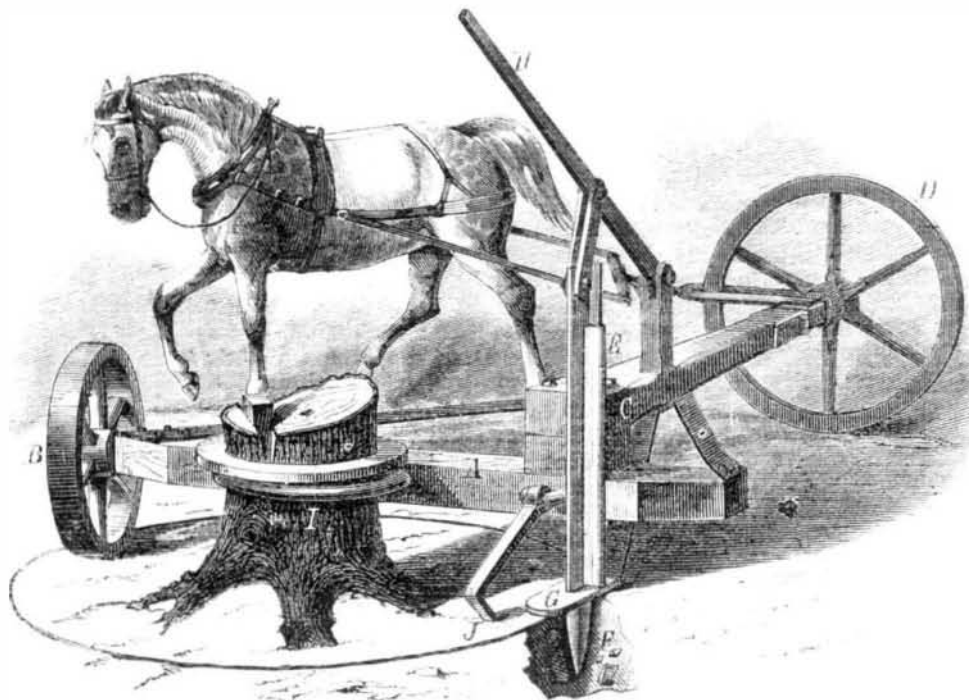


Fig. 1 shows the disconnecting arrangements located on the double tree and front portion of the wagon. Fig. 2 represents in detail the extremity of a single tree, and Fig. 3 is the end of the pole. The traces are provided with loops at their ends which slip over the hinged bolts, A, Fig. 2, at the extremities of the single trees. B is a spring catch which is held in front of said bolt, keeping the same position and thus confining the trace. Chains, C, connect the pair of spring catches, belonging to each single tree, to the sway bar, D; and chains, E, connect the sway bars to two

arms of a bell crank, F. The third arm of the bell crank communicates with the detaching lever, G. When this lever is pushed outward, it rotates the bell crank, which thus, by pulling on the chains, E, turns the sway bars; and the latter, through the chains, D, withdraw the catch bolts from before the trace pins, which then, swinging on their hinges, release the four trace loops simultaneously.

H, Fig. 3, is a hook pivoted, as shown, near the end of the tongue, and I is a sliding catch bolt, also operated by the detaching lever, G, through the medium of a connecting wire. This arrangement is for the purpose of detaching a third horse, which may be harnessed to the pole end. Pa-



REYNER'S GRUBBING MACHINE AND EXTRACTOR

tented through the Scientific American Patent Agency, November 10, 1874. For further information address the inventor, Mr. Anatole Ehret, No. 540 Washington street, San Francisco, Cal.

Hydrocarbons produced on Cast Iron and Steel.

Towards the end of the last century, a French chemist named Proust observed that hydrogen gas, evolved by the action of sulphuric or hydrochloric acid on cast iron or steel, was accompanied by a kind of ethereal oil, which condensed in drops on the sides of the bottle in which the gas was evolved, as well as in the tubes through which it was conducted and the vessels in which it was collected. He also found that not all of this oily product was carried off by the hydrogen gas, but that a considerable portion of it remained in the black carbonaceous residue left by the action of the acids on cast iron. To obtain this portion, it is only necessary to treat the residue with alcohol, and after filtration to add water to this extract, when it becomes milky and the oily substance all separates.

Cloez, in his experiment on this subject, employed a beautiful spiegeleisen, which contained about 4 per cent combined carbon, 6 per cent manganese, some silicon and traces of phosphorus and sulphur. It was reduced to pieces of moderate size, and treated with hydrochloric acid diluted with twice its volume of water. The action of the acid or white iron in the cold is very feeble; to aid it, Cloez placed the iron and acid in a flask on a water bath, the temperature of which was 167° to 194° Fah. Under these conditions, the gas was evolved regularly, and about 600 grains of iron were dissolved daily in a single apparatus. The gas generated was first passed through two Woulfe's bottles with cold water, then through an apparatus containing pumice soaked in sulphate of copper, and afterwards through a two-necked bottle where it came into contact with bromine covered with a stratum of water. With this apparatus the following substances may be collected:

1. The oily liquid, which is condensed in the first two bottles, and which was first observed by Proust. According to Cloez's experiments, the quantity of this substance formed equaled about 1 per cent of the weight of the iron employed.
2. The bromated products formed by the absorption of the hydrocarbons, $C_{2n}H_{2n}$, by bromine. These products are very complex.
3. The liquid and solid products obtained by treating the insoluble residue with sulphide of carbon and alcohol.

The oily liquid obtained directly by condensation is lighter than water, colorless, and very fluid. After two days' contact with fused chloride of calcium, it was subjected to distillation, and began to boil at 248° Fah. About one third of the liquid distills over below 284°, a small quantity between 293° and 320°; and the boiling point of the remainder gradually rises to 392° Fah.

Cloez next endeavored to obtain a pure product out of the most volatile portion of the liquid by fractional distillation, but this was difficult, since he only had 20 to 30 grains of the liquid. He succeeded, however, in isolating a hydrocarbon which distilled completely between 240° and 248°, and had the composition and properties of caprylen or octylen, $C_{16}H_{32}$. Analysis gave: Carbon, 84.92; hydrogen, 14.17; total, 99.09

An examination of the bromated liquid discovered the presence of several homologues, $C_{2n}H_{2n}Br_2$. Cloez separated the bromide of propylen by distillation; but then he sought in vain for the bromide of ethylen, which boils at 444° Fah. The mixture of bromated compounds began to boil at 266°; the temperature rose rapidly to 284° and 295°, where it remained stationary quite a long time; it then rose progressively to 320°, where it again stopped for a while, and then rose gradually until finally it reached 374°. At this temperature hydrobromic acid was given off from the decomposition of the more condensed bromated hydrocarbons. The distillation was not carried any farther. The least volatile portion

of the bromated product, which did not distil over, was set aside to be treated with an alcoholic solution and thus converted into more permanent products of more simple composition. He succeeded in this way in obtaining bromide of heptylen, $C_{14}H_{28}Br_2$, boiling at 180°, and the next member of the series, bromide of caprylen or octylen, $C_{16}H_{32}Br_2$, boiling at 302° Fah.

In the first bottle through which the gas passed there was deposited on the sides, in addition to the oily product, a solid, perfectly crystallized body, which sublimed without decomposition. Cloez obtained it only in very small quantities, but hopes, on dissolving in hydrochloric acid the whole quantity of 150 kilogrammes of iron, to obtain enough of it to make some investigations and determine its composition.

Before taking up this white spiegeleisen, Cloez operated on ordinary gray iron, but obtained no oily hydrocarbon on dissolving 50 kilogrammes, and only very little of the bromated product, less than $\frac{1}{1000}$ part of the weight of the iron. This small yield represents only a very small fraction of the carbon which is present in a combined state in gray iron.

SHADE ATTACHMENT FOR PLOWS.

Every farmer who has trudged after a plow under a hot sun has doubtless wished for just some such an invention as that illustrated in the annexed engraving. It is simply an attachment readily applied to any convenient portion of the plow, the object of which is to support an umbrella and to allow of the same being adjusted so as always to throw its shade upon the plowman.

A cranked arm is secured in a socket by means of a set screw, and is free to revolve in a horizontal plane. The outer end of this crank is jointed, and provided with an adjusting brace, whereby it may be inclined and secured at any desired angle. A suitable socket, at the upper end of the arm, holds the umbrella handle, retaining the same by a simple spring catch.



The umbrella shade is largely used, in this city, by stage drivers, cartmen, and others whose labor requires them to be constantly out of doors, and it proves a very welcome comfort. It obviates, besides, by warding off the sun's rays, the danger from sun stroke, and is a convenient shelter in case of sudden showers.

This invention was patented through the Scientific American Patent Agency, October 27, 1874, to Jefferson G. Darby, of Fort Motte, S. C.