

AIR PUMP FOR RAISING SEWAGE.

Mr. Ernst Hahn, engineer, of Stuttgart, exhibits at Vienna, says *Engineering*, a transportable air pump for the emptying of the open cesspools which are still in use in many of the continental towns. This sewage pump, of which we give illustrations herewith, is one of those adopted by the authorities of the city of Stuttgart; the *modus operandi* consists in pumping, by means of this machine, the air out of the wooden tubs or vessels in which the sewage has to be removed from the different houses; and, the tubs being brought into connection with the open cesspool by a flexible pipe provided with a screw valve, the sewage is forced into the tubs. The machine, as will be seen from the illustrations, is mounted on a wooden platform carried on two pairs of wheels and mounted on springs, and is arranged for being worked by manual power. In our engravings, E is the air pump, A is the safety vessel for preventing any liquid from entering the air pump, and B is a small furnace through which the air and gases, exhausted by the air pump, are passed before escaping into the atmosphere. The air pump, E, which works without dead space, is connected with the safety vessel, A, by means of the pipe, C, while the vessel, A, which, as we said, prevents the fluid sewage from passing from the tubs into the air pump, is provided at the top with a flange to which is fastened the suction pipe for the tubs. The air-discharging pipe, D, is connected to the furnace, B, as shown.

With the apparatus we have described, a vessel of 432 gallons can be filled, as stated by the manufacturer, within five minutes by two men. The machine, with carriage complete, weighs about 12 cwt.

Photography at Vienna.

A correspondent of the *British Journal of Photography* awards to Kurtz of New York the merit of presenting the best specimens of portraiture that are to be found in the exhibition. He, however, finds fault with the practice of retouching the negatives, which he thinks is badly done by the Americans, and is seen in nearly all of their exhibited pictures. The prints of the magnificent series of the Yellowstone region and California are in some cases marred by the stopping out of the sky in the negative; in other examples, an imitation of cloud effects in the sky by painting on the negative has been attempted, with poor success.

On the whole, thinks this critic, the American exhibits, both in portraiture and landscape, evince a lack of fine artistic feeling.

[From *Engineering*.]

Reaping Trials at Vienna.

The great expectations originally created by the liberal programme, prepared by the Committee of the Agricultural Department at the Vienna Exhibition, have been doomed to disappointment. The determination at which the English makers had arrived, to decline entering into competition, entirely ended all chances of any valuable trials, and the only part of the programme which has been even partially carried out are the reaping and mowing trials at Siebenbrunn, which took place on Wednesday, the 9th of July. Of course, English implements were entirely absent; and with the exception of a few German "improved" copies, the reapers and mowers on the ground were American. Altogether there were eighteen reapers ready for competition, single and combined, and sixteen mowing machines, including nine of the combined implements, were tried. The site selected was upon the estate of a local proprietor, Herr Schwartz, at Siebenbrunn, about 20 miles from Vienna; and the ground, which was good and almost level throughout, improved from the stations occupied by No. 1 machine to the lots numbered 15 to 18, that lay on the opposite side of a small stream which divided the ground. Everything was so consistently favorable that the operations scarcely constituted a trial at all; the weather was dry and hot, the crop allotted to the reapers was a thin growth of rye, every stalk of which was set bolt upright in the field, while the mowers operated upon a mixture of peas, grass, green oats, etc., which might have sprung from an autumn sweeping of a barn floor, and, though closely lying, was soft and moist in the stalk. An acre and four tenths of each crop was allotted to the reapers and mowers, the lots being of course divided by clearings made for the implements to take their first cut.

As we have said, eighteen reapers were entered for the trial, but only seventeen competed, the missing one being the chain rake reaper, manufactured by Walter A. Wood, of Hoosick Falls, New York. Of the German implements, one was an "improved" Samuelson, by Messrs. Hopherr & Co., of Vienna, and two by Messrs. Siedersleben & Co., of Bernberg, Anhalt; one of these machines was also an improved Samuelson, and the other, in which were combined selec-

tions from details of the leading English makers, broke down from some cause or another.

The American manufacturers were admirably represented and their presence at Vienna in such force shows how successfully they compete with English makers, especially in the corn-growing districts of east Europe. * *

One of the striking features of the American implements is the Johnston rake, of which many different varieties are used, the leading principle of course being the same in all, namely, the means of controlling the action of the rakes, and causing them in each revolution to follow the platform

was sold on the ground to Prince Schwartzburg. Wood's New Champion, from the makers of the chain rake, also did good work. It is a well designed, well made implement, with four rakes coupled together in pairs, and which can be arranged at will to be thrown out of gear in pairs. The rakes are mounted on a revolving bonnet, which is driven by gearing, and beneath which is a fixed cam, against which the end rollers of the rakes take their bearing and direction. The McCormick implement was on the field, and worked well, but the pattern, so long and so deservedly celebrated, now looks very antique when compared with many of the later patterns.

Of the German competitors but little is to be said. Hopherr's copy of Samuelson's reaper made fair time on the ground, but it was very heavy, and open to the objection, common to the type of implement, that there is no seat for the driver, who must therefore walk—a very wearying operation. Neither do the Siedersleben implements call for any special remark.

The chief points upon which the jury were to decide concerning the merits of the implements were: The time occupied, the length of stubble, and the throwing off of the sheaves. As we have already said, the conditions under which the reapers, and equally the mowers, were tried were such as to make a proper comparison of merit quite impossible, but it was evident, with the exception of the German Samuelson, which being a copy could scarcely be considered in the decision, that the trial, such as it was, was purely American. Of these implements we should, judging from the performance, place that of the Johnston Harvester Company first, the Wood New Champion second, and the Warder, Mitchell, and Company's Champion, and the Buckeye (Adriance, Platt, and Company), third and fourth.

The mowing trial may be dismissed in a few words. There were altogether sixteen competitors, of which seven were simple mowers, and nine combined machines. Of the whole number

there appeared little doubt that Wood's so called combined, but really single, mower did the best work. * * *

Returning for a moment to the trials of Siebenbrunn, we learn from them, incomplete and imperfect as they are, that German manufacturers will have to make great changes before they can compete with the American trade. How far this can compare with English productions, the absence of the latter from the trial prevents us from forming any conclusion.

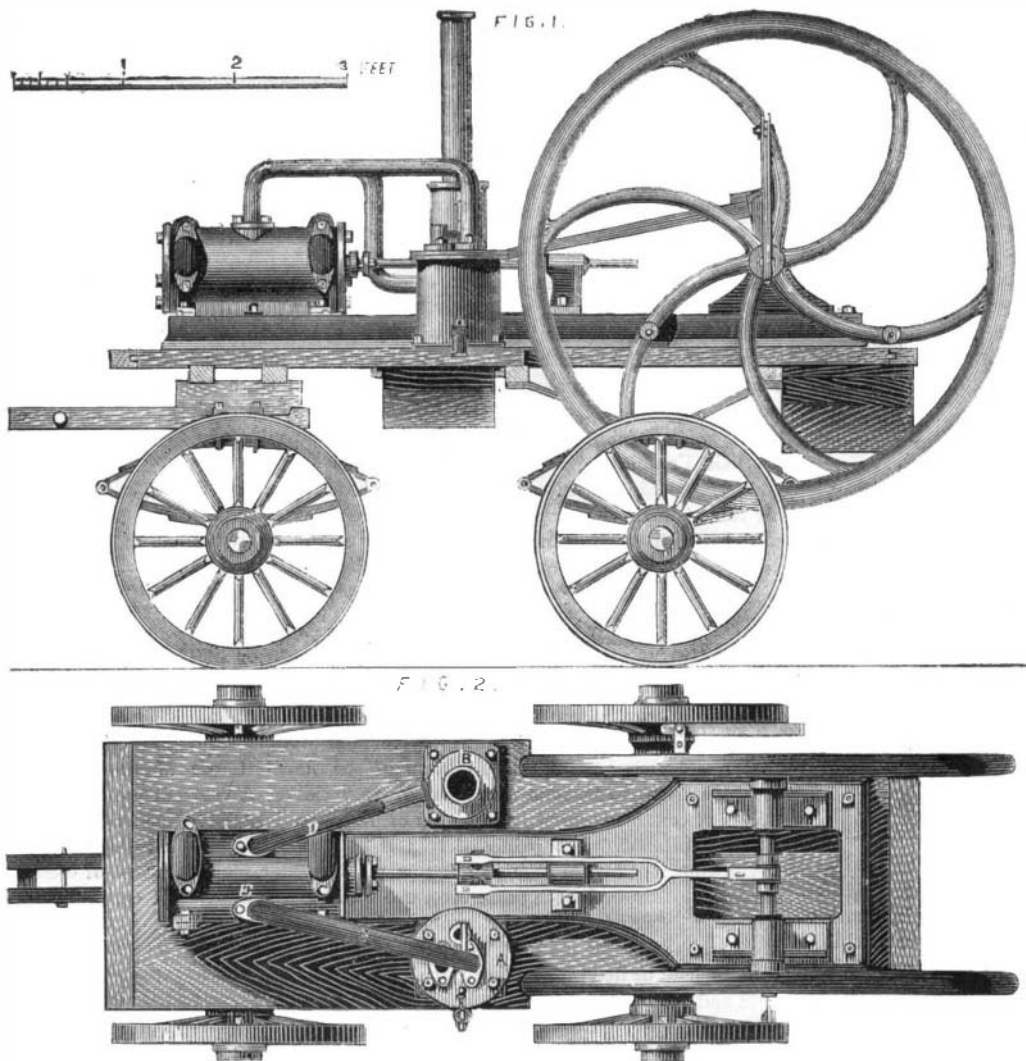
New Experiments with the Electric Current.

MM. P. and A. Thénard communicate to *Les Mondes* the following conclusions derived from recent electrical researches:

1. The vapor of water does not hinder the production of the current, which decomposes it into its constituent gases.
2. The current, while determining the combination of nitrogen and hydrogen, decomposes equally ammoniacal gas; but, in both cases and without absorbent bodies, there is found in the gaseous mixtures a quantity of ammonia quite feeble but sensibly equal.
3. Nitrogen, under the influence of the spark and the vapor of water, disappears to produce an undetermined body which is believed to be nitrite of ammonia.
4. Gaseous phosphoret of hydrogen is similarly incompletely decomposed by the current, and this decomposition is accompanied with phenomena which prove first the formation of liquid phosphorus, then solid phosphorus, and lastly a body supposed to be the same substance in its amorphous state.
5. The current acting on a mixture of gaseous phosphoret of hydrogen and bicarburet of hydrogen reproduces one at least of the phosphoric alkalies.
6. Under its influence, the bicarburet of hydrogen alone condenses rapidly into an odorous liquid, soluble in ether but insoluble in water.
7. On the other hand, the monohydrate of methylene is transformed in presence of water into marsh gas, into pure hydrogen, into a powerful acid soluble in water, and into a resinous body differing from the viscous substance furnished by the bicarburet.

W. S. M. says: "I notice that some of your correspondents mention trouble with pumps which they require to draw water almost farther than is possible. I have succeeded in such cases by letting a very small portion of air in at the bottom of the pipe, which, passing up in bubbles in the water, lessens the gravity of the column of water so that the pump can raise it."

C. H. S. says: "My two line advertisement in the 'Business and Personal' column brought me about one hundred letters."



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closely, and so clear off the grain continuously, or to throw one or more rakes up after they have passed the cutters, and then allow the grain to accumulate upon the platform till a sheaf of the desired size is obtained.

In most of the competing implements, the same general features present themselves, namely, the revolving rakes, or rake and reel, and the side delivery, leaving a clear track for the horses. * *

An ingenious arrangement of throwing off was exhibited by Messrs. Aultman, Millar & Co., of Akron, Ohio. This is a Buckeye implement, with a circular throwing-off table, mounted upon the platform, and carrying a short vertical rake; the table receives a slow rotary motion, and the grain, which is received upon the front of the platform, is swept round by the rake and table, and delivered at the side. The performance of this implement at the trial was fair, and the sheaves were deposited sometimes exceedingly well, at others in a very straggling style, so that, even with such a light standing crop, the action was uncertain, and would probably be entirely unreliable under unfavorable circumstances. The last of the exceptional deliveries to be named is the chain rake implement of Messrs. W. A. Wood, of Hoosick Falls, N. Y. In this implement one short rake is employed, which is attached at one end to a chain running entirely round the platform, and hinged at the other end to the frame of the implement, there being an intermediate hinged joint in the arm of the rake to give it the necessary motion, by which it is swept over the table constantly and slowly, but at a uniform rate, so that the sheaves delivered are of uniform size.

The Johnston Harvester Company, of Brockport, New York, who are doing a very large business in Russia, were represented by two implements, a reaper and a combined machine. This is, to our mind, the most useful implement that competed, although, where the shades of difference are so fine, it is difficult to draw a clear distinction, especially after so poor a trial. This Johnston implement, however, has horizontal gearing throughout, and is actuated with a bevel pinion from the highest point of the bevelled driving wheel; by this arrangement the gearing is far less liable to become clogged; a vertical instead of a horizontal crank is used for driving the cutter bar, and an under as well as an upper bearing is given it, so that considerable steadiness is secured. The arrangement for throwing up the rakes is also extremely ingenious and practical. The Buckeye combined implement of Adriance, Platt & Co., New York, is an excellent one, and shows good work, with high ingenuity in design. The Champion, of Warder, Mitchell & Co., of Springfield, Ohio, also fitted with the Johnston rake, is full of good detail and excellent workmanship; this implement