The Utilization of Peat in Germany.

BY ARTHUR P. HALL.

The inventors of most known processes of briquetting peat have attempted to treat the raw peat by means of pressure. In only two processes is the peat coked. Doubtless the briquettes produced are much better than the ordinary dried peat, and possess a far greater calorific power and specific gravity. But the use of such briquettes has been confined largely to the places of their manufacture, because of the expense of transportation and of the impossibility of successfully competing with coal in localities where coal is readily obtained. Even in Germany, which may well be regarded as the home of the briquetting industry, such peat briquettes have been displaced by other forms of artificial fuel. Of the two processes for coking peat referred to, one has already failed because of the expense incurred in evaporating the moisture in the peat before coking. The only process which has at all succeeded is the Ziegler process, which it is my purpose to describe in this article.

The purpose of this process is to convert the peat, which contains 90 to 95 per cent of moisture, into a good, compact, smokeless fuel. All the products which are contained in the peat itself are recovered, and all the heat generated is utilized, thereby avoiding the necessity of using any other fuel. The process is, therefore, continuous and self-sustaining.

The peat is assembled in the usual manner by the ordinary peat machines which mold and press the peat into squares. The peat is then allowed to dry in the open air until it contains only about 50 or 60 per cent of moisture. The product thus obtained is placed in drying chambers which are heated by the burnt gases from the furnaces. The peat slowly passes through these chambers and emerges quite dry, but still containing 20 to 25 per cent of water. It is now ready to be coked. By means of endless belts the dried peat is conveyed to the top of the furnaces, into which it is conveyed at regular intervals.

The furnaces are vertical and are air-tight. The peat, therefore, passes through them without coming into contact with the outer air. The gas is generated by the distillation of the peat and used as fuel. The products of distillation, namely, tar, tar water, and gas, are drawn off from the furnaces at different elevations by means of exhausters. They are then condensed so that the tar is separated from the tar water and gas. After passing a water-sealed valve, the gas is allowed to enter the furnaces and is there burned. There is an excess of gas, and this is used either to heat the boilers or to drive gas engines, which, in turn, furnish the necessary power required in the process.

From tests made in a German factory it seems that one ton of peat (90 to 95 per cent moisture) produces 700 pounds of coke, 800 pounds of tar water, 80 pounds of tar, and 420 pounds of gas (6,650 cubic feet). From the 800 pounds of tar water there are obtained 8 pounds of ammonium sulphate, 12 pounds of acetic acid, and 12 pounds of wood alcohol.

The tar is used in Germany for the impregnation of wood. The coke constitutes a very valuable fuel in large iron and steel factories. The dust from the coke is bought by the Russian and German governments and manufactured into smokeless fuel briquettes by a secret process, which briquettes are used on war vessels. Something of the comparative calorific power of this fuel and of other fuels can be gathered from the following table:

Wood	5,760 B. T. U.
Ordinary peat	6,840 "
Pressed peat	7,290 "
Bituminous coal	11,000 "
Ordinary gas coke	12,060 "
Peat coke	12,676 "
Semi-bituminous coal	13,000 "
Charcoal	13,804 "
Anthracite	14,600 "

The comparative compositions of peat, coke, and charcoal are given by the following table:

	Coke.	Charcoal.
Carbon	84.23	85.18
Hydrogen	1.93	2.88
Oxygen	6.28	3.44
Water	4.47	6.04
Ashes	3.09	2.46
Sulphur		
Nitrogen		

Each furnace is so constructed that in twenty-four hours there are produced from 33,333 pounds of peat (20 to 25 per cent moisture) about 11,668 pounds of coke, 13,333 pounds of tar water, 1,333 pounds of tar, and 6,999 pounds of gas (110,833 cubic feet).

A new type of bullet, known as the "D," is being served to the French infantry. This projectile consists of a cigar-shaped cylinder of bronze, instead of lead, and is cased with nickel, as is the old Lebel bullet. On being fired it revolves at the rate of 3,600 turns a second during its flight. At 800 yards it will penetrate the equivalent bulk and resistance of six men standing one behind the other. The new cartridge is absolutely smokeless. All the Lebel rifles of the French infantry are being refitted for the "D" bullet with fresh sights up to 2,400 meters.

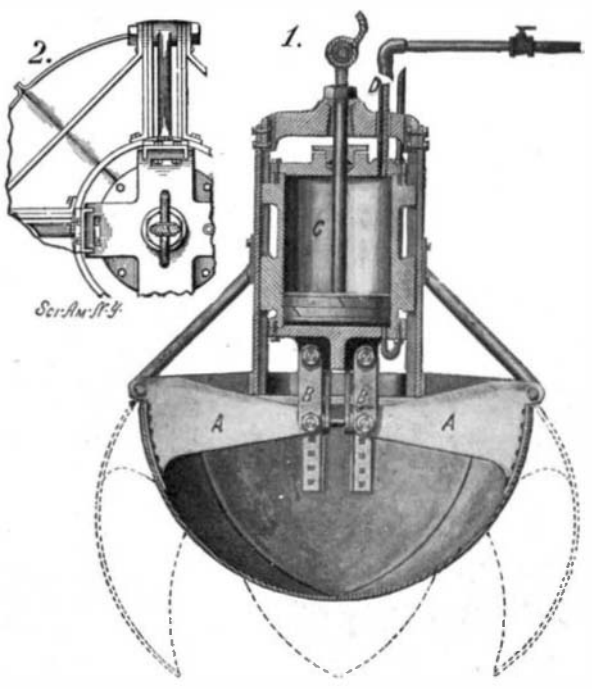
DEPTH GAGE FOR BRACE BITS.

The occasion often arises when it is desirable to drill a hole or a number of holes of a certain definite depth; but with the ordinary tools no means are provided for determining to what depth the drill or bit has penetrated. Mr. Edward J. Tiede, of 433 Johnson Street, Buffalo, N. Y., is the inventor of a simple attachment for bits, which will accurately gage the depth of the bore. This gage may be set to a certain mark and the hole drilled until the gage is reached, or the device may be used at any time to measure depth of the hole. The attachment consists of a simple clamp, which may be applied to the shank of the bit, and a gage bar adapted to be adjusted in this clamp. As shown in one of the engravings, the clamp is composed of two members hinged together at one edge, and adapted to be closed onto the shank of the bit. The members are held in this closed position by a spring latch, which snaps over a pin. By means of a thumbscrew threaded through one of the members and bearing against the shank, the clamp may be secured at any desired height on the bit. The gage bar passes through an opening in the other member of the clamp, and is fastened by a thumbscrew. This gage bar is graduated to inches, centimeters, or any other desired measure. The clamp should be so set that the zero mark of the scale comes in line with the upper face of the clamp, while the lower end of the bar reaches to the end of the bit. Then, if it is desired to drill a hole of say two inches depth in a block of wood, the gage bar would be raised until the two-inch mark came in line with the top of the clamp, and the brace would be operated until the end of the gage bar touched the surface of the wood. By keeping the gage at the proper adjustment, any number of holes of equal depth may be bored. The principal advantage of the attachment lies in the ease with which it may be applied to or removed from the bit shank.

DEPTH GAGE FOR BRACE BITS.

AN IMPROVED EXCAVATOR.

We illustrate in the accompanying engraving a recently invented excavator, which is of the sectional bucket type. The excavator has a very simple construction, and is provided with improved operating mechanism. It will be noted that no chains, or similar devices, are used for operating the bucket. Our illustration shows a section view of the excavator with the bucket in closed position, while the open position is indicated by dotted lines. The closed bucket has the form of a hemisphere comprising four segments. These segments. which have the form of spherical triangles, are pivoted at their outer edges to brackets extending from the frame of the excavator. Each segment carries a pair of arms *A* (shown also in the plan view, Fig. 2) and these are connected by means of links *B* to a cylinder *C*. The cylinder is formed with laterally-disposed lugs, which are received in channels or guides on the main frame of the device. This arrangement permits of vertical movement of the cylinder, to provide for the opening and closing of the bucket segments. Within the cylinder is a piston head carried on a piston rod, which extends through a crosshead at the top of the main frame. A nut on the piston rod rests on the crosshead, so that the piston head is suspended therefrom. The excavator is lifted by a cable attached to a bail on the crosshead. In use the excavator is lowered into the water, with the bucket open, as shown by dotted lines in Fig. 1. The segments naturally assume this position, as the cylinder slides by gravity down the tracks until it rests on the piston head. Then to close the bucket a valve is turned, admitting steam into the cylinder through the pipe *D*. The steam acting between the stationary piston and the upper cylinder head causes the cylinder to rise to the position shown in full lines in the engraving, and thereby closes the bucket. A small vent pipe at the lower end of the cylinder permits escape of the air below the piston. To open the bucket again, the valve is turned to permit escape of the steam from the cylinder, when the latter will drop to open position. A patent on this improved excavator has just been granted to Mr. W. H. Onion, 2518 Canal Street, New Orleans, La.



AN IMPROVED EXCAVATOR.

Official Meteorological Summary, New York, N. Y., November, 1905.

Atmospheric pressure: Mean, 30.04; highest, 30.59; lowest, 29.52. Temperature: Highest, 63; date, 29th; lowest, 19; date, 30th; mean of warmest day, 56; date, 29th; coldest day, 30; date, 14th; mean of maximum for the month, 51.1; mean of minimum, 36.6; absolute mean, 43.8; normal, 43.7; average daily excess compared with mean of 35 years, +0.1. Warmest mean temperature for November, 50, in 1902. Coldest mean, 37, in 1873. Absolute maximum and minimum for this month for 35 years, 74, and 7. Average daily deficiency since January 1, —0.1. Precipitation: 1.67; greatest in 24 hours, 1.42; date, 28th and 29th; average for this month for 35 years, 3.52; deficiency, —1.85; deficiency since January 1, —0.44. Greatest precipitation, 9.82, in 1889; least, 0.82, in 1890. Snow, trace. Wind: Prevailing direction, N. W.; total movement, 10.271; average hourly velocity, 14.3; maximum velocity, 48 miles per hour. Weather: Clear days, 11; partly cloudy, 13; cloudy, 6.

A New Process of Regenerating Rubber.

A European process for regenerating old rubber has for its principle the separation of the caoutchouc proper contained in vulcanized rubber from the mineral and other matter which have been incorporated into it, such as sulphur, etc. The first operation consists in dissolving the vulcanized rubber in one of the usual solvents, using petroleum preferably either alone or with benzine added to it. After treating for a certain time the insoluble matter is separated by filtering under pressure, or by a centrifugal machine. The solution when separated from the insoluble matter is evaporated to the consistence of syrup under a reduced pressure and is then taken up by acetone. The liquid which is thus obtained is first boiled and then decanted off and the rubber is again taken up by an alcoholic soda solution. After boiling and pouring off a second time, the rubber is treated with boiling alcohol. After the alcohol is taken off, the rubber is washed with water and then dried by superheated steam, which removes the last trace of alcohol and water it may contain.

The Current Supplement.

The current SUPPLEMENT, No. 1562, opens with what is perhaps the most exhaustive article which has thus far appeared on the electrification of the New York Central's terminal lines. The article is elaborately illustrated with views of power houses, stations, rolling stock, and track construction. Of interest to the amateur mechanic is an article on lathes. Mr. Ernest A. Dowson, whose name will ever be associated with the development of producer-gas, recently read a paper before the Birmingham Association of Mechanical Engineers on "The Use of Gas for Power and Heating." This paper may be considered an authoritative exposition of a most important subject. The first installment of the paper appears in the current SUPPLEMENT. Mr. R. von Lendenfeld discusses the relation of wing surface to weight, a subject of immense importance to aeronauts. The construction of a reinforced concrete power house is described. An interesting radial snow-plow has been invented, which is particularly effective on the curves of street railways. This snow-plow is described and illustrated. The usual formulæ and notes will be found in their accustomed places.