COL. J. J. ASTOR'S VIBRATORY DISINTEGRATOR.

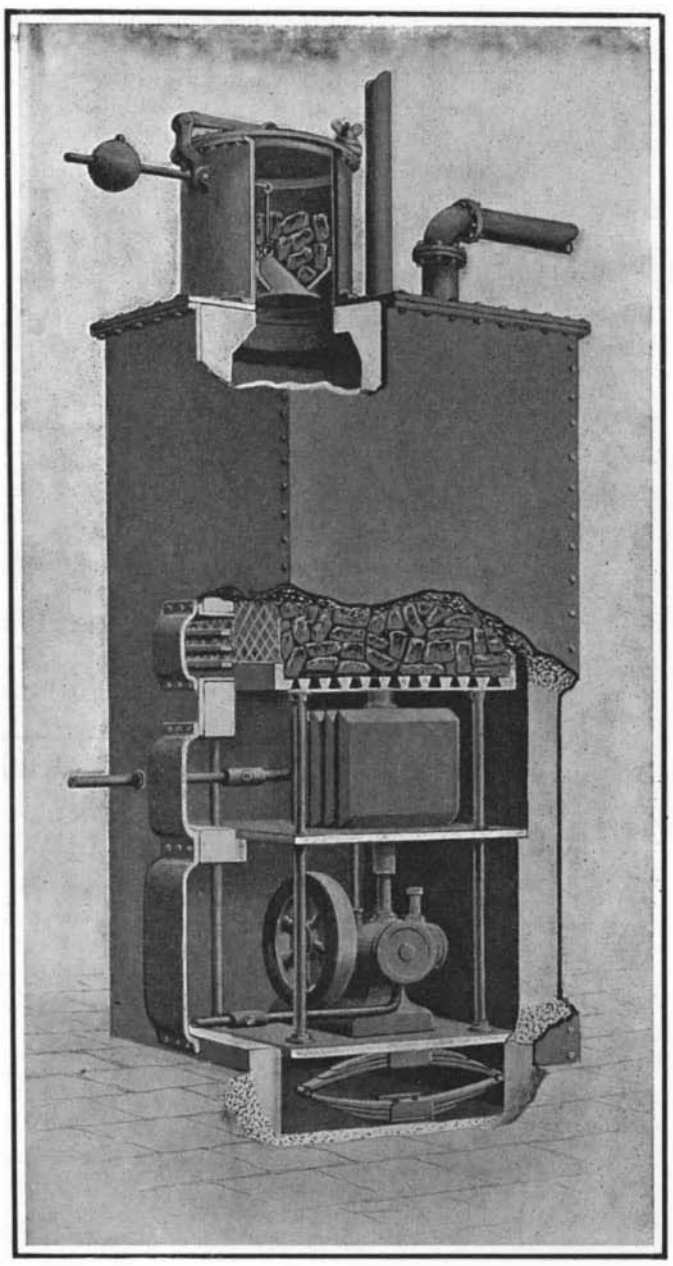
AN INGENIOUS DEVICE WHICH MANUFACTURES PRODUCER GAS FROM PEAT AND THE PATENT COVERING WHICH WILL BE GIVEN TO THE PUBLIC.

Col. John Jacob Astor of New York city has appeared more than once as an inventor of practical and useful devices on the Patent Office records. He has devised and patented in past years an ingenious bicycle brake, a novel pneumatic road improver, and an efficient marine turbine, the patent covering which last invention he gave to the public. Col. Astor's latest invention is a means for practically and successfully utilizing as a fuel for power the vast deposits of peat found in this country and in other parts of the world.

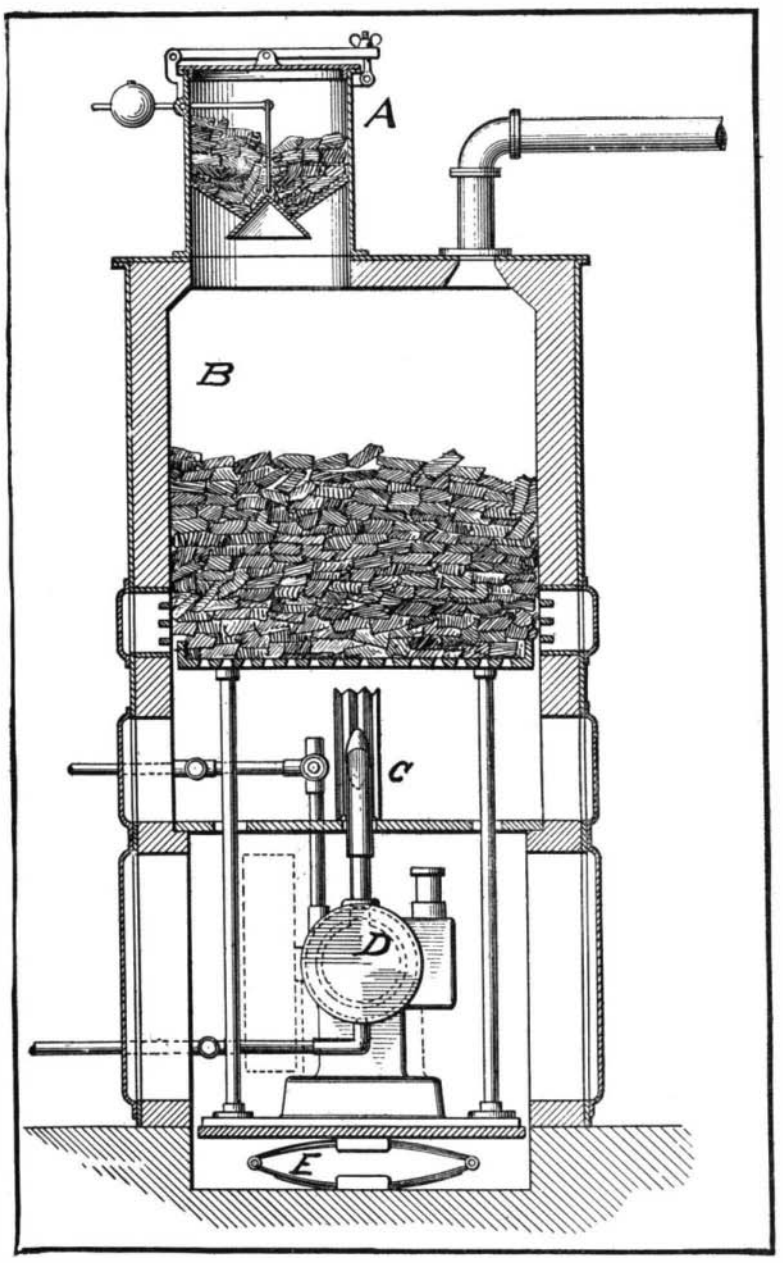
The economic utilization of the enormous peat bogs found throughout the temperate zone has been a problem baffling scientists and engineers for a great many years. Attempts at reclaiming the peat bogs to make arable farm land have met with partial success in Norway and Sweden. Peat has been successfully used as a fuel, but due to the large amount of water contained in the peat, it is necessary to dry it for a long time before it can be burned.

Peat constitutes a fairly serviceable fertilizer; but due to the large amount of tannin, organic acids, iron salts, and gases contained in the peat, it is necessary to cure it by long exposure to the atmosphere before it can be applied to the soil. The tannin and organic acids in the green peat act to kill and retard vegetable life rather than support it.

In Sweden attempts have been made to manufacture producer gas from peat, but these attempts have met with poor results, while the experiments made in this country have been unsuccessful. Inasmuch as the peat contains a considerable quantity of water and the solid portions are almost entirely carbonaceous, it is better adapted in some respects for the manufacture of producer gas than is bituminous coal. Ordinary peat is of a very porous and loose texture, and a great deal of gas is occluded among its fibers. It has such poor heat-conducting qualities that, when heated in a producer, a portion of the peat will be completely burned without heating other portions to any material extent.



Perspective view of Col. Astor's peat gas producer.



Sectional view of Col. Astor's peat gas producer.

A NEW INVENTION OF COL. ASTOR'S, WHICH THE PUBLIC WILL ACQUIRE BY GIFT.

The vibratory disintegrator which has been invented by Col. Astor and which, it is believed, will solve the problem of the commercial manufacture of producer gas from peat, utilizes the expansive force of the air and gases within the very porous peat to disrupt and disintegrate the latter, and to permit the peat to be thoroughly and uniformly heated. The gas generated may be supplied to an ordinary internal-combustion engine *D*, the engine muffler *C* being placed inside the gas producer. The sides of this muffler are thin, so as to permit them to be distended and drawn inwardly upon variations in the pressure within the muffler. The edges of the muffler may be fluted, corrugated, or accordion plaited, to facilitate this relative movement of the opposite sides, and one end of the muffler is connected to the exhaust pipe. The gas escaping from the engine cylinder after each explosion in the latter tends to expand the muffler, and as the exhaust gas escapes from the muffler, the sides will again contract. These vibrations of the side walls of the muffler cause the successive compression and expansion of the gas within the gas producer, and likewise the gas included in the pores and interstices of the peat. As a result, the cells and pores contained in the peat are disrupted, and the peat is broken up and disintegrated.

To further aid in breaking up and disintegrating the peat and permitting of its uniform heating, the peat chamber *B* of the producer is supported from the engine frame or base *E*, so that the jarring and vibrating of the engine frame is transmitted to the peat.

Any suitable form of gas engine may be employed, but preferably one running at comparatively slow speed, so that the successive charges of exhaust gas will have time to produce the desired expansion in the muffler. Preferably, an air-cooled engine is employed, and the air utilized in cooling the engine cylinder is delivered in part or in whole to the base of the producer.

Inasmuch as peat can be obtained by the farmers in many sections of this country for the mere trouble of digging the same, it is evident that producer gas could be manufactured at a very low cost. This would permit the farmers to drive various kinds of farm machinery by gas engines, to illuminate and heat their homes, and give them a very valuable fertilizer for their impoverished soil as a by-product in the peat residue.

Col. Astor is now erecting a peat-fuel producer-gas plant at his country place at Rhinecliff on the Hudson, in which the vibratory disintegrator will be given a practical test. The plant, of about 150 horse-power, is to run a stone crusher; and if the peat yields its gas, as it is confidently believed it will, it will mean an engineering advance that may have very far-reaching results.

The patent application is now pending, and on its being allowed, Col. Astor intends to present it to the public, in the hope that it may be of wide general use.

The Museum of Safety and Sanitation has announced that the United States Steel Corporation has organized a safety committee, consisting of twenty experts, whose business will be to examine their various plants, with a view to making suggestions for safeguarding machines or processes. Last year, according to their reports, the corporation spent $55,000 in following the recommendations of this committee.

Production of Artificial Pearls by the Oyster.

The earliest theory of the production of pearls was that they are congealed dewdrops, though no explanation was given of the manner in which the dew got into the shells of the oyster. Another early notion was that pearls are the eggs of the oyster; the difficulty connected with this view being the extreme paucity of pearl-bearing shells. The Chinese were the first to solve the problem and to find out that pearls are due to the irritation produced by the introduction of a particle of foreign matter, such as a grain of sand, into the shell of the oyster. This bit of irritating matter is coated by the oyster with nacre like that with which the shell is lined and the result is a pearl. The artificial production of pearls in this manner is carried on by the Chinese and Japanese to a considerable extent. The shells of the bivalve are separated gently and a small bit of mud or a tiny piece of lead is inserted under the flesh to serve as a nucleus for the pearl. The shells are then allowed to close and the oysters are placed carefully in a stream of water and fed on manure. After a proper interval the shells are opened and the nuclei, now coated with nacre, are removed. The nucleus is generally taken out and the cavity filled up with wax. In one of the provinces of Japan a large area at the bottom of the sea is devoted to the artificial production of pearls by oysters, four years being allowed for the process. Though the pearls produced in this way are not as fine as those found naturally in the oyster, they still possess beauty enough to be salable. The artificially produced pearls are not so beautiful nor so well-shaped as the natural ones, and their under side generally lacks luster entirely. Though this makes them unsuitable for necklaces, they can be used in other articles of personal ornament, where the whole pearl is not seen. Such pearls can hardly be termed "artificial," for they are genuine, though the method of production is not wholly natural. Yet, though the process is started artificially, it is carried on in a strictly normal, natural manner. So it is hard to find a quite exact name for the product.

A Novel Expansion Bolt.

Expansion bolts are made in many styles and sizes. They are used whenever an object is to be fastened to brick, stone, marble, concrete, tile, or slate. They are made in every conceivable size—from ⅛ inch to 2 inches in diameter—for use with wood screws, machine screws, lag screws, and machine bolts. A rather novel expansion screw recently introduced consists of two parts—one an ordinary screw proper, and the other an expansion sleeve of lead composition. After the hole is drilled, the expansion sleeve is inserted and the screw thrust into the sleeve. As the screw is turned in with the screwdriver, the inner end of the expansion sleeve expands, and buries itself firmly into the material.

A similar principle is adopted in a two-piece lag screw, which is used in large quantities by the government. This particular lag screw is designed for use with all coach or lag screws from 5/32 inch to 1/32 inch in diameter.