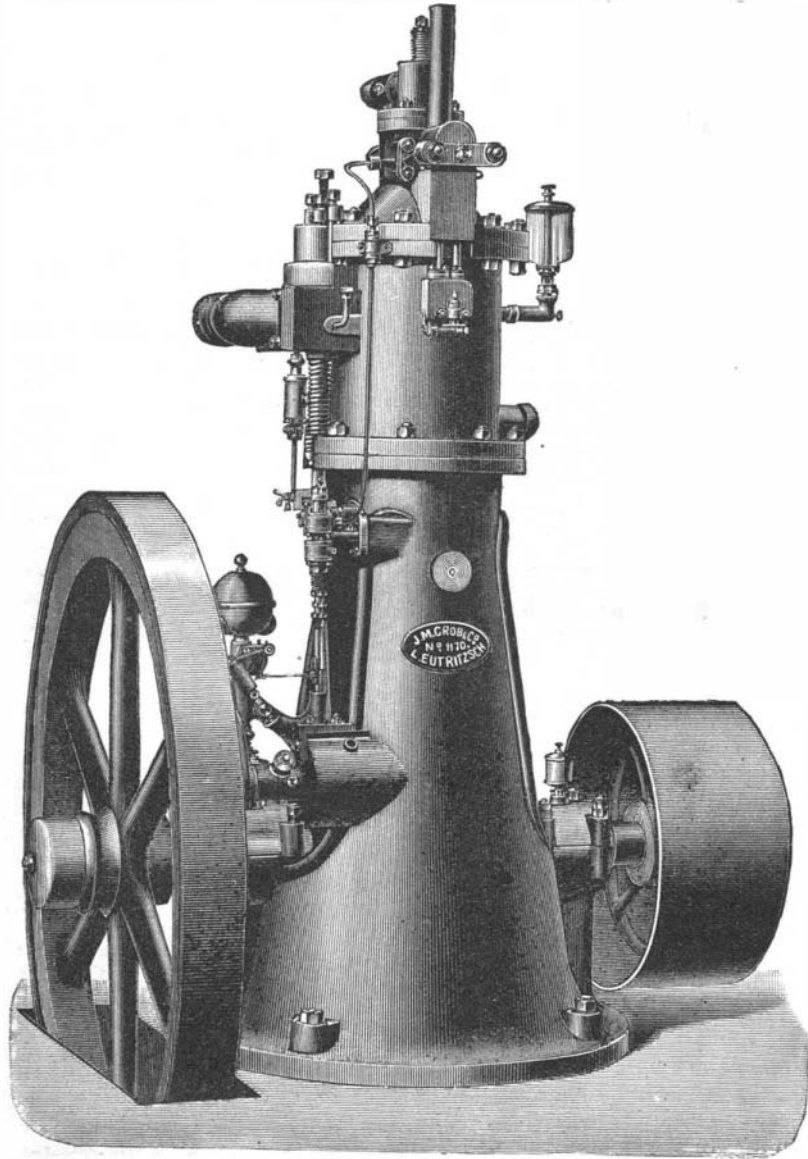


**PETROLEUM ENGINE EXHIBITS AT THE WORLD'S COLUMBIAN EXPOSITION.**

Among the interesting exhibits in the German department at the great Exposition in Chicago are some elegant specimens of engines operated by petroleum only, no steam boilers being used. They are from the famous establishment of Grob & Co., at Leipzig-Eutritzsch. The petroleum is heated and converted into



THE COLUMBIAN EXPOSITION.—Fig. 1.—J. M. GROB & CO.'S EIGHT HORSE POWER PETROLEUM MOTOR.

gas, so that the machines are, practically, gas engines. A machine of this kind is shown in the annexed engravings, in which Fig. 1 gives the general appearance of the stationary type; Fig. 2 shows a portable engine applied to wood sawing and splitting; and Fig. 3 shows a launch propelled by a 4 horse power Grob oil engine.

The power in these engines is generated by means of common kerosene oil such as is burned in lamps. This oil is atomized, gasified, mixed with a proper proportion of air, compressed and ignited behind a piston, producing the pressure necessary to propel the piston and parts connected therewith. The speed of the engine is regulated by varying the supply of oil. The ordinary speed is from 250 to 400 revolutions per minute, according to the size of the engine, but an attachment is provided by which the speed can be reduced to 150 revolutions per minute. These engines range from ½ horse power to 30 horse power. We understand that further preparations are being made for making larger sizes. The engine occupies very little floor space, as will be seen by reference to Fig. 1; and where the machine is designed for use as a portable engine, the engine and accessories are mounted on a platform wagon. The amount of oil consumed in engines of the larger size is about a pint per horse power per hour; for smaller engines, about a pint and a half per horse power per hour.

Messrs. Grob & Co. claim to have been the pioneers in the construction of oil engines, and they have at Leipzig the largest oil engine factory in Europe. This engine is now being introduced into this country, and a number of them are on exhibition at the Columbian Exposition in Chicago, in Section F, No. 1,526.

The exhibit consists of 1 horse power, 2, 6, 8 and 10 horse power petroleum motors, a 2 horse power gas motor, a 4 horse power portable engine and one 6 horse power petroleum motor launch.

These engines are to be used for any purpose and in any place where a gas engine is applicable, also in places where gas is not obtainable and where steam is not allowable. Besides the economy in fuel, there is also great economy in attendance, as the engine requires no special engineer, and it is self-regulating in all respects, so that it runs for hours without any attention whatever.

Besides the uses already enumerated, it is specially applicable to small electric light plants, for pumping water and for driving the machinery used in small in-

dustries. It has also been applied to tramways, being put up in the form of a small dummy locomotive.

Further information may be obtained by addressing J. M. Grob & Co., manufacturers, Leipzig-Eutritzsch, Germany.

**The Proposed Lighthouse off Cape Hatteras.**

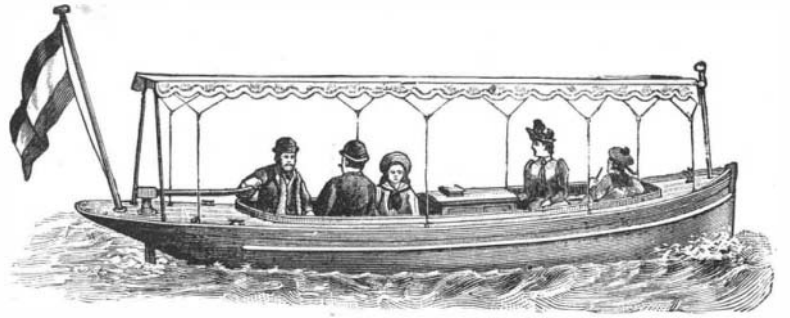
The Lighthouse Board of the Treasury Department has not given up the project of erecting a lighthouse on the outer Diamond Shoal, off Cape Hatteras. The shifting sands of the ocean bottom at this point, combined with the frequency and the violence of storms and the difficulty of getting material to the ground, conspire to make the erection of a lighthouse there more difficult than any undertaking of the kind that has ever been attempted in the world before. Since the firm of Anderson & Barr, after their unsuccessful attempt to sink a foundation caisson for the proposed structure, gave up their contract, the engineer officers of the Lighthouse Board have been studying very carefully the problem of how to combat the forces of nature which expend all their fury on the wide expanse of shallow sea that stretches out from Hatteras. When the attempt was

made to sink the caisson last year, it was taken for granted by the contractors that the most favorable months for work on the shoal were the summer months. The board has been looking into this and has found that the most unfavorable months in the entire year are from the end of May until the end of September. A graphic chart has been prepared from the records of the Hatteras weather bureau station for the twelve years that it has been in existence, showing the percentage of wind from all points of the compass for each month in the year. The most unfavorable wind is that from the south west, which is the prevailing wind in the summer months, reaching as high as thirty-two per cent of the whole during July and falling to eleven per cent in October. The most favorable wind is the off-shore wind from the north-west, which prevails only three per cent of the time during the summer months of May, June, July and August, and rises to nearly seventeen per cent in October. There is never much calm weather in that locality,

that is, there is not much time when there is not a perceptible wind blowing, but the percentage of calm is slightly greater in November than at any other time of the year. A careful study of the chart has led the Lighthouse Board officials to conclude that the best time to begin work on the shoal is during the mild Indian-summer weather of the late fall, when there is more probability than at any other time of the year that they will have light off-shore winds for a sufficient time to enable them to get a foundation caisson down and get the structure far enough advanced to withstand the buffeting of a severe storm.—*Baltimore Sun.*

**Utility of Celestial Investigation.**

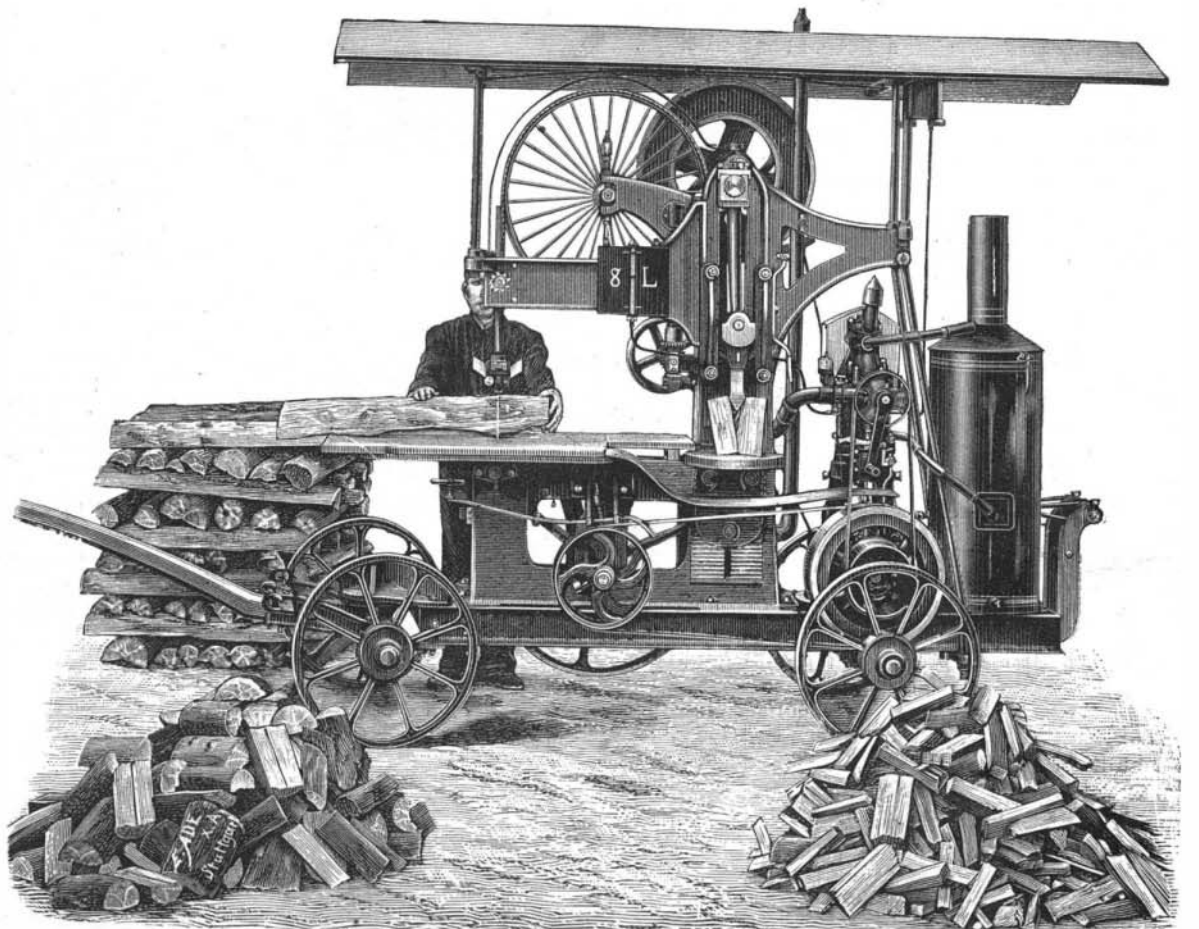
Sir Robert Ball, in his "Story of the Heavens," says: "It may be asked, what is the advantage of devoting so much time and labor to a celestial phenomenon like the transit of Venus, which has so little bearing on practical affairs? What does it matter whether the sun be 95,000,000 miles off, or whether it be only 93,000,000 miles, or any other distance? We must admit at once that the inquiry has but a slender bearing on matters of practical utility. No doubt a fanciful



THE COLUMBIAN EXPOSITION.—Fig. 3.—BOAT PROPELLED BY A FOUR HORSE POWER PETROLEUM MOTOR.

person might contend that to compute our nautical almanacs with perfect accuracy we require a precise knowledge of the distance of the sun. Our vast commerce depends on skillful navigation, and one factor necessary for success is the reliability of the 'Nautical Almanac.' The increased perfection of the almanac must, therefore, have some relation to increased perfection in navigation. Now, as good authorities tell us that in running for a harbor on a tempestuous night or in other critical emergencies, even a yard of sea-room is often of great consequence, so it may conceivably happen that to the infinitesimal influence of the transit of Venus on the 'Nautical Almanac' is due the safety of a gallant vessel.

"But the time, the labor, and the money expended in observing the transit of Venus are really to be defended on quite different grounds. We see in it a fruitful source of information. It tells us the distance of the sun, which is the foundation of all the great measurements of the universe. It gratifies the intellectual curiosity of man by a view of the true dimensions of the majestic solar system, in which the earth is seen to play a dignified, though still subordinate, part; and it leads us to the conception of the stupendous scale on which the heavens are constructed."



THE COLUMBIAN EXPOSITION.—Fig. 2.—PORTABLE TWO HORSE POWER PETROLEUM MOTOR COMBINED WITH WOOD SAWING AND SPLITTING MACHINE.