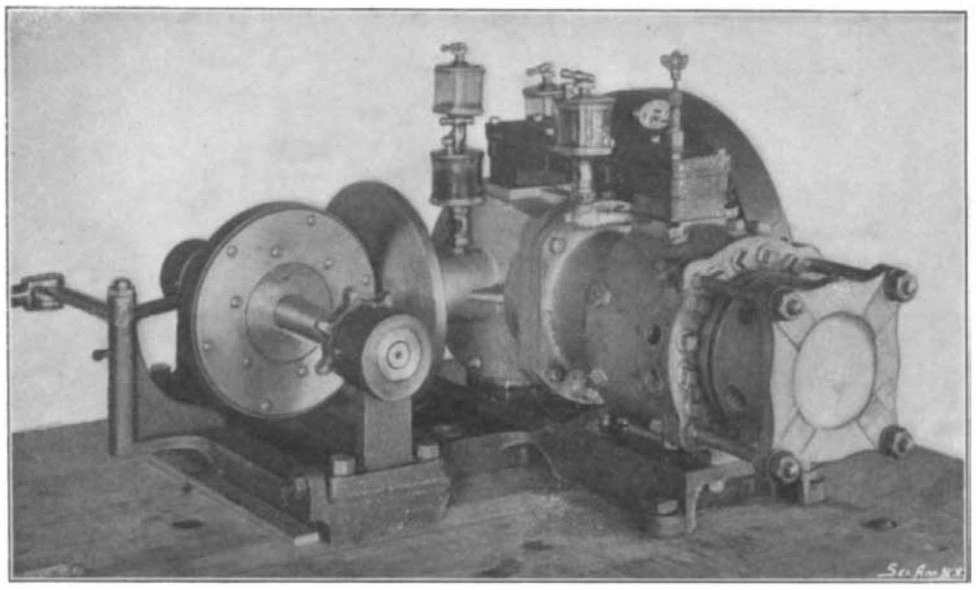
THE INTERNATIONAL KEROSENE OIL MOTOR.

The advantages of a motor for power purposes which can be run by kerosene instead of by gasoline, and that, too, without the most troublesome feature of engines of the latter type—the electric spark—are apparent. Such an engine can be started with but little delay, and, once started, will continue to run as long as the fuel holds out. Common kerosene can be obtained at any country grocery store and is always of a uniform quality. Besides being thus everywhere obtainable, its slightly lower cost renders it not only a convenient but also a less expensive fuel for automobile use.

The inventor of the International motor, Mr. H. G. Underwood, aimed to produce an engine for automobiles, auto-trucks, cars, and marine purposes which should be as simple and practical as possible in construction and operation and at the same time be much smaller in size, lighter in weight, and if possible more compact than any other engine on the market.



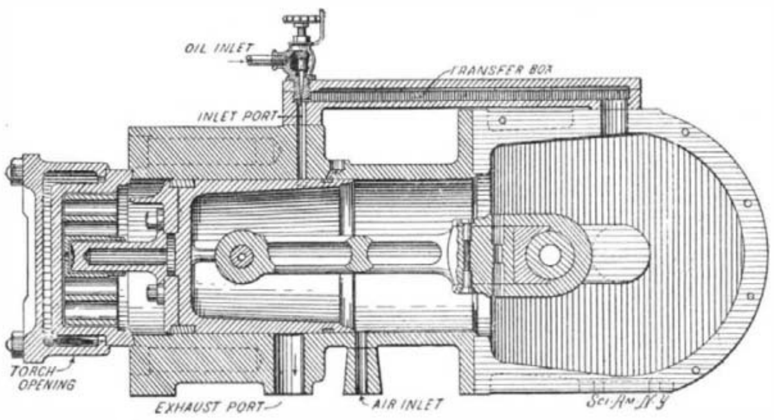
KEROSENE OIL MOTOR WITH FRICTION-DISK-TRANSMISSION FOR LIGHT AUTOMOBILES.

The engine is constructed on the two-cycle principle, and all valves are dispensed with by employing the piston to open and close the exhaust and inlet ports in the usual manner. In this particular engine the valve admitting the mixture into the crank case, where it is compressed slightly before passing through the transfer pipe or box to the cylinder above, is unnecessary, as the kerosene is fed through a needle valve (by gravity or air pressure) into the transfer pipe just opposite the point where the pipe joins the cylinder, and is carried directly into the cylinder by the compressed charge of air from the crank case. This air enters the crank case through a port uncovered by the piston when at the top of its stroke, and shown open in the sectional view. The company has also patented a two-cycle motor which does away with the crank case as an air chamber, thus making it possible to construct a multicylinder motor without dividing partitions in the crank case, which need not necessarily be inclosed. This is a distinctly new feature in two-cycle engine construction.

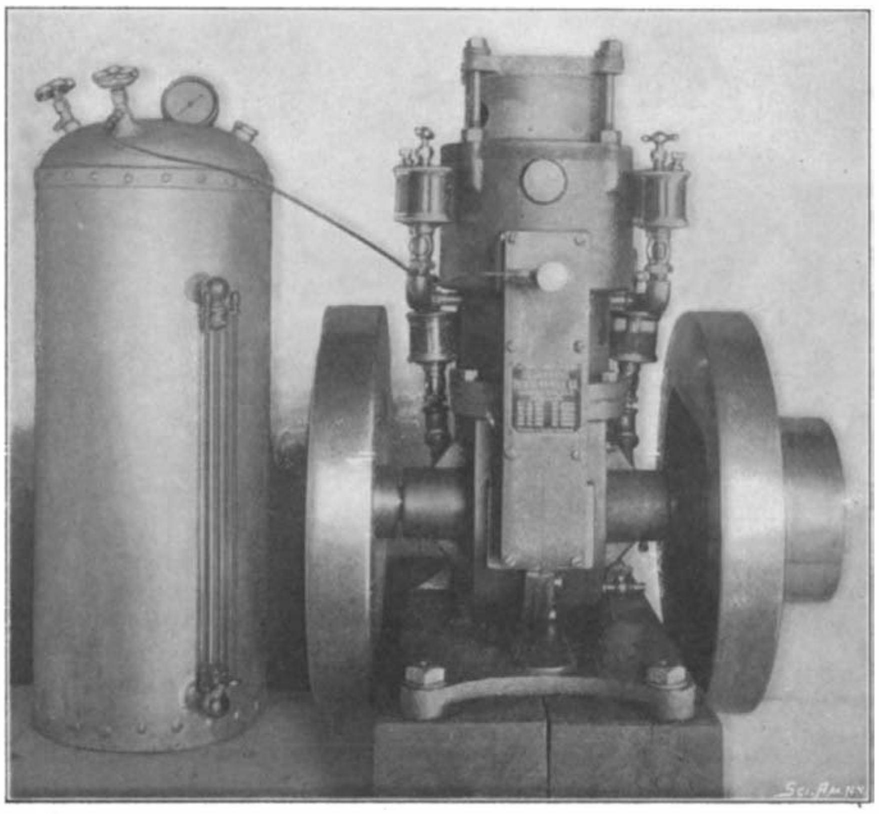
The charge enters the cylinder and is deflected upward by the deflector in the usual manner. A part of it is caught in the small auxiliary cylinder at the end of the cylinder proper when the auxiliary piston enters it after the main piston has traversed about half its stroke. This small charge is given a sudden, high compression by the auxiliary piston which fires it, owing to the head being in a heated condition. The flame passes through a small hole in the end of the auxiliary cylinder, then at right angles through a narrow passage communicating with a series of holes leading back to the cylinder proper. Passing through these holes it fires the charge in the main cylinder. By using the small piston to fire the charge, the inventor does away with the necessity of employing a high compression or a hot tube in the cylinder proper. The parts are sufficiently hot, after heating the head with a blow torch for five minutes, to explode the first charge, as a compression three or four times as great as that in the main cylinder is obtained in the small one, and after the first explosion the head is maintained in a heated condition by the constant firing of the mixture. The engine can be stopped and started again within fifteen minutes without reheating, but it is about as cheap to keep it running, as it consumes only a pint an hour per horse power, and can be run all day (a 2½ horse power motor) at a cost of about 25 cents.

The International Power Vehicle Company, of Stamford, Ct., who manufacture this engine, have constructed an automobile delivery wagon run by compressed air, which is obtained from a small air compressor driven by one of their engines. The air is stored in a tank, from which it passes through the jacket of the motor before being used in the air engines, thus warming the air and cooling the cylinder of the motor without the use of water. Warming the air increases its volume and so increases the power obtained from the air engine, while this method of cooling is better than the usual one, since it dispenses with water and the necessary weight thereof and secures increased power through the process of cooling the cylinder, the heat from which is not utilized ordinarily, and is, in fact, lost energy when the cylinder is cooled by water. Enough air is kept stored in the tanks to enable the air motor to exert as much as 10 horse power for a short time if necessary. This arrangement does away with the fire, boiler, and visible exhaust of a steam carriage, while giving all the advantages of this otherwise excellent type. It is adapted particularly to heavy wagons, and weighs complete 500 pounds. For lighter vehicles the company has an improved friction disk transmission which transmits power direct from the engine, the latter being in this case controlled by a governor. This transmission has been in successful operation in boats for some time, and is a distinct improvement over other power-transmitting devices of this kind.

Judging from its simplicity, economy, and ease of operating, the kerosene oil motor has a promising future and will, when its merits become known, be used to a great extent for light power purposes.



CROSS SECTION OF KEROSENE OIL MOTOR.



INTERNATIONAL KEROSENE OIL MOTOR.

The first award of the Osiris prize in 1903 will, we understand, be made by the French Institute. This prize is awarded to one who in the preceding three years accomplishes the most important work for science, industry, or literature, and is worth over $20,000.

The Inventive Genius of Connecticut.

The chosen home of Yankee notions, the State that takes out more patents than any other in proportion to population, reflects new luster upon its name in the census manufacturing returns, just published. Though forty-two States are larger than Connecticut and twenty-eight have more population, it was tenth on the list in the value of its manufactures in 1890; the statistics of the Twelfth census, when completed, are expected to show that the State holds its relative rank.

In 1890, says the New York Sun, to which we are indebted for the article, Connecticut beat all the other States in eleven important industries. In the last census period it has made a great advance in the production of all these commodities. There is little doubt that it retains its primacy in brass manufactures, for example, since it produced goods in 1900 valued at $48,526,868; with a product of only $22,309,894 in 1890 it had more than half the brass manufactures of the country to its credit. Everybody knows that this alloy of copper and zinc is surpassed only by iron in its general usefulness. It played a humble part in Connecticut, however, in the early days. When the Yankees there turned their attention to metal buttons they began to make brass, cutting the sheets up into buttons. That was the origin of the great brass industry of the State, Waterbury and other towns in the Naugatuck Valley turning out to-day more sheet brass ready for manufacturing than all the rest of the Union together. As the country had no need for all the buttons Connecticut was able to produce, brass wire was manufactured and worked up into pins; some inventive genius produced an automatic machine for making pins in 1841 and the industry thrived mightily. The State in 1900 made $1,761,806 worth of pins and needles, which is probably one-half or more of the country's production.

The histories of the State tell how Eli Terry, Chauncey Jerome, Gideon Roberts and other clock-makers, about the beginning of the last century, were accustomed to pack their saddle-bags with clocks and peddle their wares through the country. The great clock industry dates from those days of small beginnings. Connecticut now produces about three-fourths of our home-made clocks, the product being worth $4,545,047 in 1900. We are exporting now about three times the value of clocks that we import.

Elias Howe, Jr., invented the sewing machine, establishing his factory at Bridgeport; the Wilson and other famous machines also originated in Connecticut, which, in 1900, produced sewing machines and attachments valued at $3,170,137. Goodyear accidentally dropped a piece of rubber powdered with sulphur on a red-hot stove and thus discovered the art of vulcanizing rubber. He gave the impulse that started the rubber factories at Naugatuck, making Connecticut one of the great rubber-working States, the product increasing from $3,476,398 in 1890 to $8,246,240 in 1900. Over a century ago the making of nails and other articles of small hardware was pursued in the State as a household industry. These manufactures were long ago transferred to the factories, which in 1900 produced hardware valued at $16,301,198. From a small beginning in Hartford, where the process of electro-silver plating was invented about 1846, sprang the great plants at Meriden. Waterbury and other towns that in 1900 produced $9,538,397 of plated and britannia ware.

The total value of manufactured products in 1900 was $352,824,106, an increase of 42.1 per cent over the production of 1890. Large capital, abundant labor and good markets near at hand are among the advantages of Connecticut; but the State owes much of its success in manufactures to the frugality, industry and genius of the pioneers who laid for it the foundation of industrial greatness.

A judge has granted an order allowing a referee to take testimony as to the defective working of a voting machine in a Buffalo, N. Y., election district. It is alleged that the machine would not register a "split" vote.