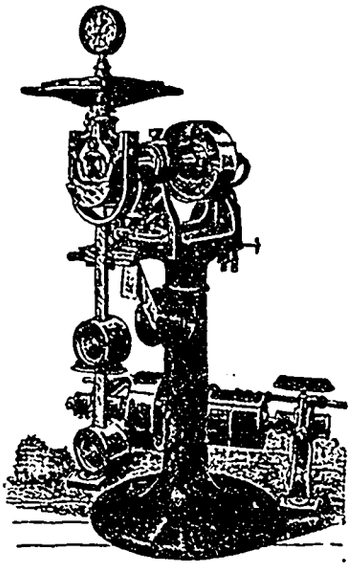
OIL TESTING MACHINE.

The machine illustrated herewith has been designed to ascertain by mechanical means, and under various conditions, the lubricating qualities of oil, and to register the same by means of diagrams, so as to afford valuable and reliable information to oil manufacturers, testing laboratories, and to all who use oil in large quantities or to those who lay special stress upon great uniformity in the lubricating quality of the oil.



As seen from the illustration, it will be noticed that the machine consists of a frame mounted on a pillar; a shaft mounted in bearings in the frame, which shaft carries a hardened and ground pin, on which rides a pendulum provided with two special bearings. There is an arrangement for regulating the temperature by means of water, and an apparatus which registers the throw of the pendulum on a strip of paper.

The main shaft is hollow, and contains a water pipe, the outside diameter of which is somewhat smaller than the hole through which it passes, and the end of which leads into the hardened pin, and is provided with a spraying head. Cold or warm water can be forced through this to cool or warm the pin, as may be desired. This water afterwards flows away through the space round the pipe. By this arrangement, in comparative tests, the temperature of the pin can be regulated as desired. This is very important, as the co-efficient of friction is dependent to a great extent upon the temperature of the lubricant, and in order to arrive at a correct result, only tests which are carried out under exactly the same conditions can be compared with each other. To guard against the stopping up of the spraying nozzle, an arrangement is made by which the water must pass through a finely meshed sieve. The diameter of the hardened pin is $3\frac{6}{16}$ in., and the length $2\frac{3}{4}$ in., and it is made, we understand, of the finest cast steel, carefully ground and highly polished. The pendulum hangs free on the pin, and has $\frac{4}{32}$ in. end play on same. It has, at the upper end, a fixed bearing on each side and a movable bearing on top, which latter is guided in the upper part of the head, and can be pressed against the pin by means of the compressor.

The pressure can be read on a pressure gauge, which is mounted on the compressor. The highest allowable pressure of 90 pounds per square inch corresponds to the highest possible pressure of about 3,000 pounds per square inch on the surfaces of the bearing, which is quite sufficient for the testing of all lubricants. The compressor and head of pendulum are exactly counterbalanced by a weight at the lower end of the pendulum rod. The bob, which is on the middle of the rod, can be moved up and down a scale, so that the throw of the pendulum can be regulated for the different oils, and the recording point of the registering apparatus will not be thrown beyond the strip of paper. During the test, which it is best should last from one hour to an hour and a half, and during which the variations of the speed of the machine should be as small as possible, the pin dips into a bath of oil that is to be tested. This oil bath, as has been mentioned before, can be cooled or warmed, and its temperature measured by a loose thermometer, while immediately under each of the side bearings a thermometer can be introduced so that the temperature can be measured as near as possible to the rubbing surfaces.

The throw of the pendulum during the test indicates the co-efficient of friction for the observed pressure and temperature, and this motion is by means of a cam, transferred to a slide carried by rollers, which is provided with a scale, in which the constants of the machine are taken into account.

The throw of the pendulum is marked upon the paper of a registering apparatus attached to the machine, by means of a pencil fastened to the slide. The comparison of the curves obtained in this manner in testing various kinds of oil, with the curves obtained from refined acid free linseed oil under the same conditions, gives a clear representation of the value of the oils under test.

This machine is made by Ludw, Loewe & Co., of Berlin, Germany.

Apropos of the improvement in manufacturing in the States, referred to elsewhere, it is worthy of note that the rates on ore from the head of Lake Superior to the Cleveland iron district jumped from 60 to 80 cents. At the same time there has been a rush of furnaces into blast. In the Mahoning and Shenango valleys, where 3 furnaces were in operation on the 1st of August, 19 were working at the close of the month.

An English inventor proposes an improved system of wheel construction, claimed to be of special value in the case of heavy fly-wheels, but not of exclusive adaptation. It is proposed to avoid the expensive machinery commonly required for such wheels, and the ordinary wheel arms are replaced by wrought iron rods which are U-shaped and lap around the hub of the wheel, the ends of the U being secured to the rim by nuts. The driving power is transmitted to the spokes entirely by friction, and as the arc of contact of the spoke on the rim is fairly large, the principle of band friction comes into play, so that very great torques can be transmitted without any risk of slipping. For a twenty-ton wheel the plan is to use thirty-two spokes, each two inches in diameter, secured to the rim by split nuts. Such a fly-wheel as usually built would, it is remarked, have six or eight arms, and when running at high speed the centrifugal force tends to bend the rim between, such bending being a serious addition to the direct circumferential tension due to the same force; but the numerous spokes of the new construction greatly reduce this bending, while at the same time the wrought iron spokes are so much stronger that the wheels can be run at a much higher speed.