"Zenith Carburetors"
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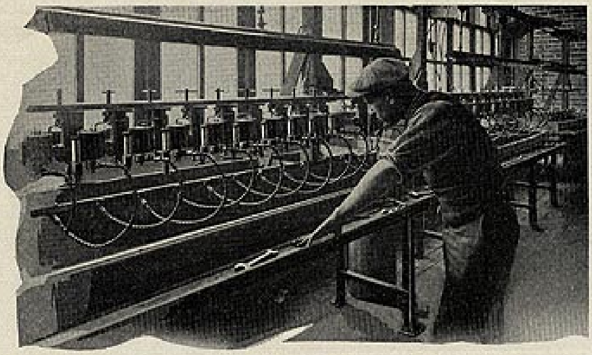

FIG. 1—TESTING FLOAT CHAMBERS UNDER ACTUAL SERVICE CONDITIONS

Zenith Carburetors In the Making

Accuracy to Within the Thousandth of an Inch is the Slogan of Managers and Workers

ACCURACY is the key-note in the manufacture of Zenith carbureters. When a MOTOR FIELD representative was recently taken through the immense steel, concrete and glass factory of the Zenith Carburetor Co. in Detroit he was impressed by the painstaking care with which each part of this well-known device is made and tested and afterward assembled. Nothing is left to guess-work, even the raw material used being required to conform to the specifications laid down by the company's engineers. It is this attention to manufacturing details that has made the Zenith so popular in Europe and which is rapidly enlarging its sphere in this country, where nine well-known makes of cars are already Zenith-equipped. Before the close of the present year several other prominent American cars will announce the Zenith as regular carbureter equipment. The Detroit factory has gradually enlarged its facilities until the daily output is rapidly nearing 500 complete instruments, although no particular effort is being made for quantity production, the watchword of the plant being "Accuracy!"

In the accompanying illustrations are shown some of the more important and interesting processes in the manufacture of the Zenith. Fig. 1 gives an insight into the care with which the float chambers are tested—under conditions identical with those which obtain while on the road. Each spun-brass float is immersed in hot water, which expands the air within it, and if any leaks exist they are immediately made apparent by the small bubbles which rise to the surface. When the floats are assembled in their respective chambers they are placed on the testing rack, and a gauge temporarily attached to each carbureter to indicate the level of the gasoline in the float chamber. The gasoline is contained in an overhead tank, and the float must occupy a certain position with respect to this level before it passes inspection.

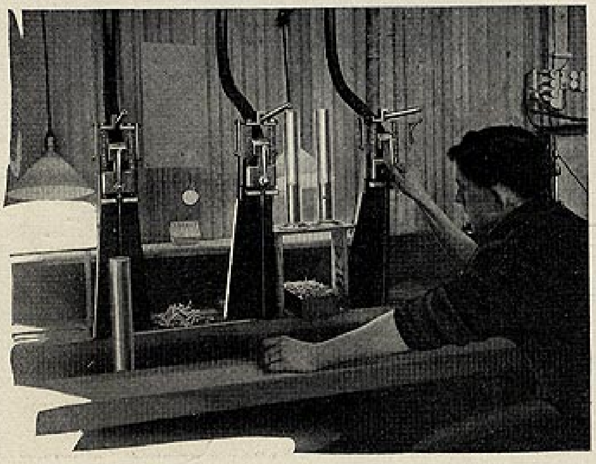

FIG. 3—TESTING NOZZLES WITH STOP-WATCH AND GLASS GRADUATE

The drilling of the air nozzle in the venturi tube must be performed with the greatest accuracy, for in the test the opening must not vary from the measurement set by more than two-thousandths of an inch. The openings of the nozzles are tested by means of a ball gauge, while the outside measurement is tested by means of a ring gauge, which must slip over the outside of the nozzle without any play. Any that fail to undergo the test are discarded.

In drilling the holes in the spraying nozzles it is absolutely necessary that they be uniform in size. Two jeweler's lathes are used in this delicate operation, the one at the right in Fig. 2 serving to center the nozzle, the small drill on the left being used to complete the operation. Despite the care with which these holes are drilled they sometimes vary very slightly, and to determine whether or not this variation is within the "limit of tolerance" each nozzle is tested by forcing through it a stream of water at a given pressure (Fig. 3), a stop-watch being employed when noting the level of the water in a graduated measuring tube. A very slight variation either way sends the nozzle to the "discard."

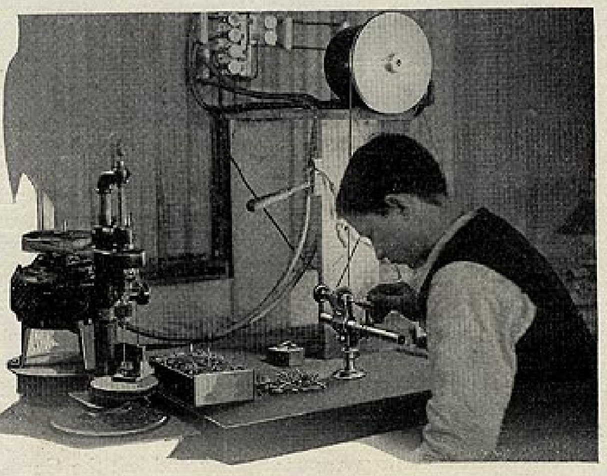

FIG. 2—GREAT ACCURACY REQUIRED IN DRILLING SPRAYING NOZZLE

The machining of the needle valves, which control the flow of gasoline from the float chamber, is another operation requiring extreme delicacy (Fig. 4). The finest jeweler's lathes obtainable are required for this miscoscopic work. Multiple spindle drills are used for drilling all of the holes in the barrel or air passage of the Zenith carbureter (Fig. 5). The part is placed in the jig, which then accurately locates the drill points for all of the twelve holes to be drilled. There are almost as many sizes of drills as there are holes, and they are so arranged that the drilling of all the holes with one side of the jig in position can be done in one operation, the other drills not interfering. All twelve holes are drilled in 2 minutes 20 seconds.

The main jets are drilled at the rate of two a minute.

or 1,200 per regular working day. The outside of the jets are finished in the automatic machine, and the inside is then drilled, this operation being performed by fastening the jet in a chuck and pressing chuck and nozzle against the drill point. The finished pieces are dropped into a chute which carries them to a box under the machine.

The delicate miscroscopic operations herein described are characteristic of all the work done at the Zenith plant. In the assembly department, a corner of which is shown in Fig. 6, the same attention to details is observable. Each assembler has a vise to hold the instrument he is assembling, while within easy reach are all the component parts in steel trays. There is no lost motion. Everything proceeds in frictionless order. When the instruments are finally assembled and have undergone the last test they are sent to the shipping department, where they are carefully packed and boxed. A special shipping box for local delivery and holding twenty-five carbureters has been devised.

The extreme simplicity and economy of the Zenith carbureter are the factors responsible for its rapidly-growing popularity in this country. It will handle heavy fuels as well as the lighter grades. Nor it is affected by altitude, its use for aeroplane work having proven its ability to properly assimilate fuel in even the thinnest atmosphere. This renders it peculiarly adaptable to the demands of mountain travel in the West, where the roads wind over

FIG. 4—FINEST JEWELERS' LATHES USED IN MACHINING NEEDLE VALVES

the Rockies at elevations in excess of 11,000 feet in some instances and descend in places to a point well below the sea level, as in the Death Valley section.

Touring by Electric Automobile

If the day of the electric touring car has not yet arrived, it is certainly not far off. Already the electric has become more than a town car. It is now the ideal runabout in city and country. With its recent development it can make road runs of from 70 to 100 miles without recharging. Several notable 100-mile tours have proved that rough, muddy roads and bad weather are no real obstacle to the electric car.

Last summer a 500 to 600 mile tour was made in the Green Mountains of Vermont and the White Mountains of New Hampshire. The steep hills and rough roads offered no obstacle. The distance of 258 miles between Boston, Mass., and Burlington, Vt., was made at an average of 19 miles per hour, with the slowest rate 16.7 miles, and the fastest 23.7 per hour.

An even more notable run in an electric was that between Boston and Chicago last October in the worst

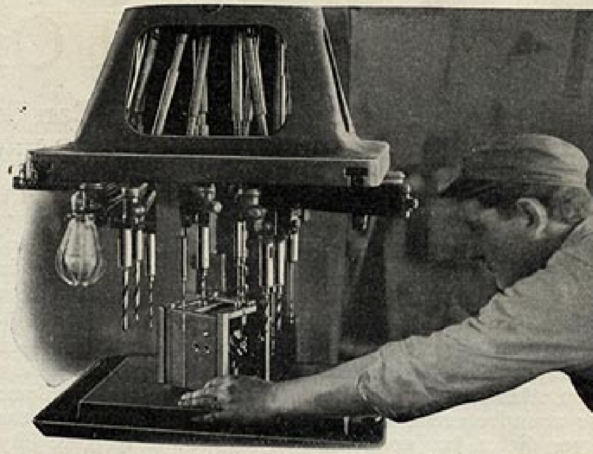

FIG. 5—DRILLING ALL TWELVE HOLES IN THE CARBURETER BARREL AT ONE TIME

weather of the season, over almost impassable roads. The average hourly speed was 15.6 miles per hour, with a highest hourly speed rate of 23.6 miles. Another remarkable trip was that recently made by an electric between New York and Boston, the first ever made in less than 24 hours by an electric.

If, then, the electric automobile has the speed and capacity to meet all roads conditions, what are the obstacles to its use for touring? The difficulty, everywhere evident, is that of getting charged on the road.

The electric, with the present inadequate facilities, takes longer to be charged than the gasoline car. The electric stations often lack the apparatus for quick charging. Only the large towns have the necessary apparatus. The smaller stations, few and far between, are usually equipped with the hopelessly inadequate 30 or 40 ampere rectifier, and in the well-equipped electric plant they are usually unprepared. The removal of these difficulties depends on the central stations, but they are still rare.

Where public charging stations giving at least 100 amperes at 125 volts are lacking, the electric plants should have the necessary apparatus, consisting of a switch, fuses and terminals to connect with the cable and charging plug. The resistance coil to control the current is unnecessary with the Edison battery. Measuring instruments are unnecessary with the cost depending on service rather than amount, and with the instruments on the car itself.

If the central station man does not secure the necessary apparatus, it can only be charged to lack of initiative. A general policy of readiness to serve and the passing of indifference and sluggishness will hasten the ultimate profit, already apparent, of the development of the electric vehicle.

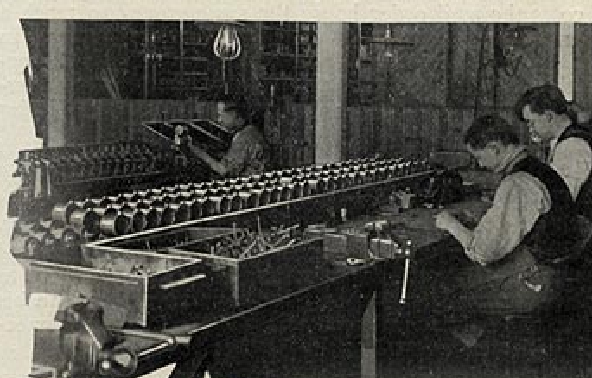

FIG. 6—PORTION OF ASSEMBLING DEPARTMENT OF ZENITH CARBURETER PLANT