NEW ELECTRIC CHRONOMETER FOR TIMING AUTOMOBILES.

BY THE PARIS CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

The Mors Company, of Paris, has lately brought out an ingenious electric chronometer apparatus which is intended to replace the ordinary method of timing races by the stop-watch. It is especially designed for automobile records, where the need of an accurate method has been felt for some time past. The device consists essentially of two instruments, one of which is placed at the start and the other at the finish, with a single wire running between them. The instrument at the receiving station unrolls a band of paper like that of a telegraph apparatus. When the start takes place a current is sent through the line, thus causing a needle point to be brought momentarily against the paper and to make a dot. When the automobile comes to the finish, a second dot is made, and the time of the run is deduced from the length of the paper which has been unrolled. The apparatus, which was designed by M. Pottier, is illustrated in our engravings. In Fig. 1 is seen the complete outfit. On the left is the apparatus at the starting end, which consists mainly of the device for making the contact. This is accomplished by means of a wire stretched across the course in a suitable manner and attached to a contact device for sending a current through the line. When the front wheels of the car pass over the wire, it is stretched and operates the contact, registering the moment of the start in the receiver. At the other end of the course is a similar wire which registers the exact moment of the finish. The receiving apparatus is seen on the right. The horizontal box of this apparatus, seen in Fig. 1, acts as a table and is similar to that of the apparatus at the start. Both contain a call bell and telephone outfit for signaling between the stations. The chronometer apparatus is contained in a portable case which is placed upon the horizontal box.

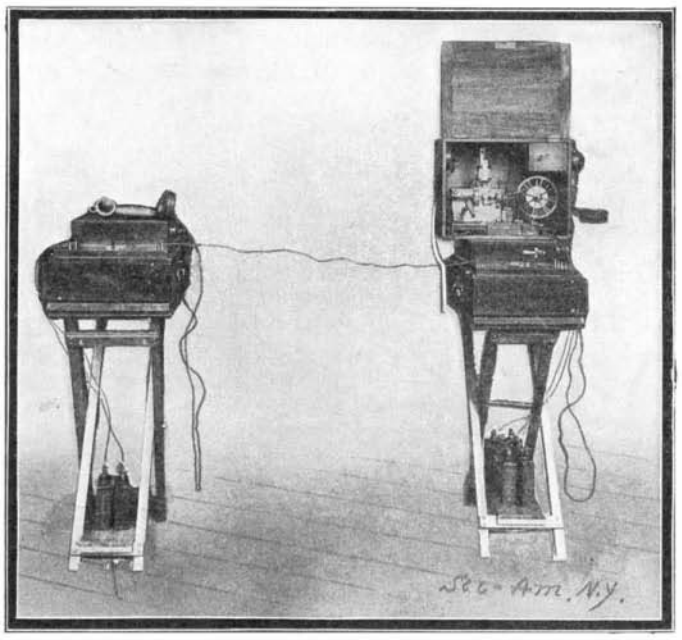


Fig. 1.—The Complete Timing Apparatus.

The horizontal boxes contain telephones and the contact device for making and breaking the electrical circuit when the machine crosses the line.

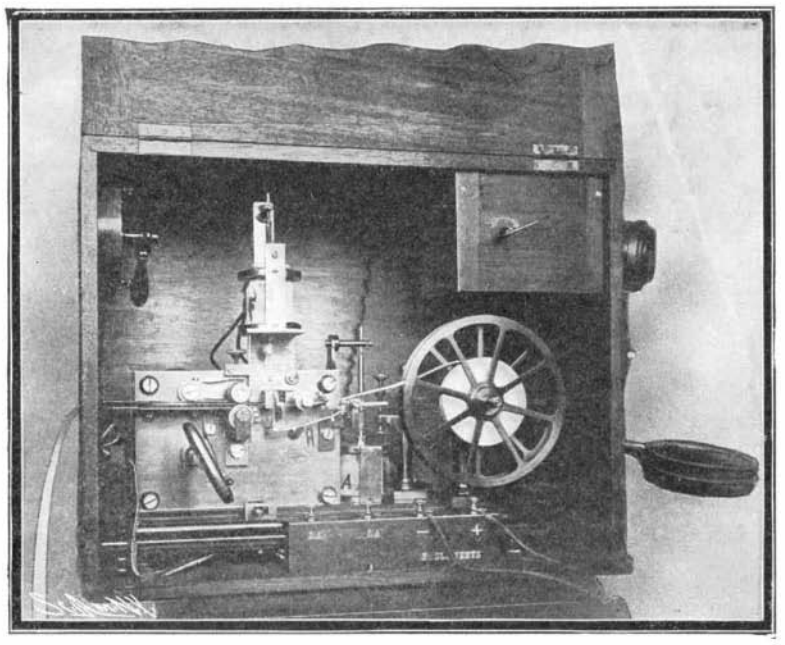


Fig. 2.—The Registering Part of the Mors Timing Apparatus.

The details of the chronometer are shown in Fig. 2, which shows the receiving apparatus in the vertical box. A clockwork mechanism draws a band of paper from the drum on the right by means of a set of rollers. The paper passes through a slot in the cubical brass piece. The band can be punctured from below by a needle which is mounted on a lever. The lever is operated by the solenoid, *A* (Fig. 2), and is controlled by a spring and a pair of thumb screws above the solenoid. A chronometer contained in the box sends current impulses through the solenoid, *A*, at intervals of 1-5th second, and the needle point thus punctures the paper from below. When the band unrolls normally the space between the dots is about a quarter of an inch, which represents the time of 1-5th second. The passage of the car is registered by the upper solenoid, *F*. It contains a core which is held up by a spring. On the lower end of the core is a long needle which passes through a hole in the cubical piece and comes just over the band. When current is sent through the solenoid, *F*, the needle makes a puncture in the paper, which registers the time of the start. The paper continues to unroll while the car is being timed, and the time of the finish is registered by a second puncture. The exact time from start to finish is obtained by counting the number of spaces and fractions which have been unrolled between the two punctures. The position of the dots representing the start and finish can be easily estimated to within 1-20th of a space, and as each space represents 1-5th second, the time can be accurately registered to within 1-100th of a second. Besides all this, the band forms a perinanent record of the time. Although the unrolling of the band is not absolutely uniform, the spaces between the dots are practically alike, and the error due to this cause is negligible. M. Pottier has devised an ingenious apparatus for measuring the exact position of the dots showing the start and finish. It consists of a brass plate, *A* (Fig. 3), which slides in a second plate, *B*. The latter holds the paper band in a fixed position by the clamps, *C*. Over the band passes a fine wire, *W W'*, which is held below by the fixed piece, *F*, and above at the second point, *E*. The other end of the wire is held in the sliding piece, *D*, which is adjusted by a thumb screw. To find the exact position of the dot, *n* (representing the start or finish), with reference to the chronometer dots, *m* and *o*, which include the space equal to 1-5th of a second, the plate, *A*, is slid until the upper edge of the band coincides with division No. 20 on the vertical scale. The paper is also shifted so that the point, *o*, comes under the right-hand wire, which is at right angles with the scale divisions. The left-hand wire is then brought over the point, *m*, by shifting the slide by means of its thumb screw. This adjustment is necessary, seeing that the distances, *m o*, are not always exactly equal. The plate, *A*, is now slid so as to bring the wire, *W*, over the point, *n*. If the place where this occurs is at division 14, as shown, the point, *n*, is 14-20ths away from *o*, according to the well-known proportional method. This ingenious and compact device gives a rapid reading of the time between the two punctures, and is one of the essential features in making such a system practical. The Mors apparatus can be also operated by contacts made by hand at the start and finish. In the competitive tests of automatic chronometer apparatus, which were held on the road near Paris, the present device carried off the first honors, as it was considered the best for practical use.

Fig. 3.—Diagram Showing Method of Reading to Hundredths of a Second the Time Registered.

A NEW ENGLISH ALUMINIUM WELDING MACHINE.

BY FRANK C. PERKINS.

A number of machines have been designed in recent years for welding aluminium, which have given only partial success. Among the more important welding apparatus for aluminium should be mentioned the machines of Dick, Schmidt, Heraeus, and Emme. Schmidt designed apparatus for welding aluminium plates, and Jones for welding aluminium tubes, the plate welding being accomplished by an electric arc.

The new welding machine, as well as the new process for welding aluminium designed by the English engineer and electro-chemist, Mr. Sherard Cowper-Coles, is shown in the accompanying illustration, Fig. 1, and described below.

By means of this machine, no solder or flux is required, and the hammering of the joint when in the semi-fluid state is not necessary. It is stated that this process is particularly suitable for wire rods, tubes, and other sections which are drawn or rolled. The aluminium materials to be welded, after being faced off square, are placed in the machine shown in the illustration, Fig. 1, which is fitted with clamping screws capable of moving horizontally on suitable guides.

The machine consists essentially of a double-deck framework with a reservoir, *F*, located under the upper platform. This tank or reservoir supplies water under pressure for quenching the welds instantaneously by turning a handle attached to the screen, *A*. Turning this handle allows the water to run from the tank and be projected on to the welded joint. The pressure in the reservoir is maintained by an air pump, the handle of which is indicated at *E*. The levers, *D*, are arranged for controlling the movement of the clamping screws and the aluminium bar, *B*, which is to be welded. The benzine or gasoline lamp or torch is noted at *C*, and the flame

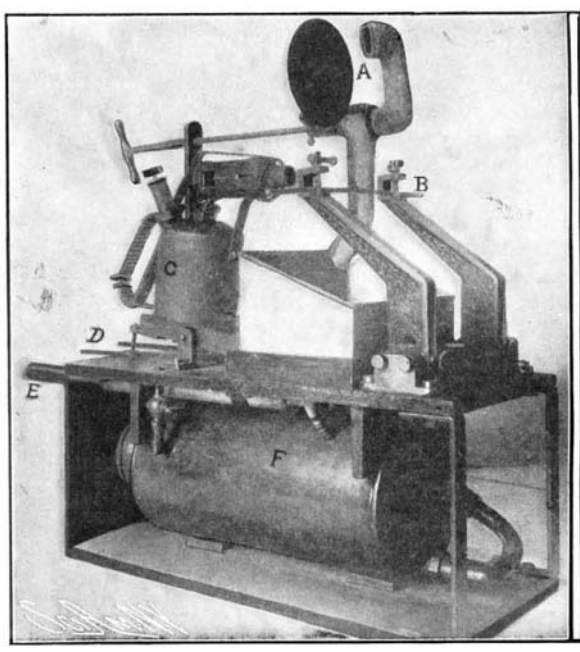
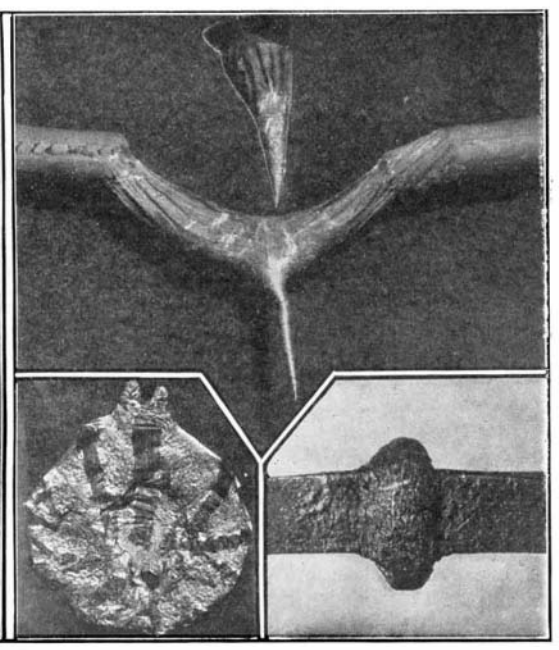


Fig. 1.—A NEW ALUMINIUM WELDING MACHINE.



Figs. 2, 3, 4.—THE WORK OF THE ALUMINIUM WELDING MACHINE.