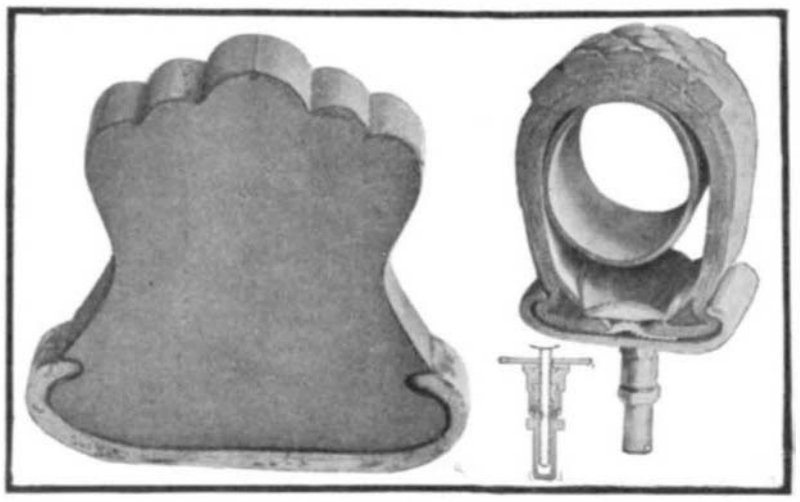
SOLID AND NON-SKID TIRES FOR AUTOMOBILES.

The accompanying illustration is a cross-section of a solid cushion tire that has received a thorough test during the past year, and has shown itself to have numerous advantages. The Swinehart solid clincher tire can be used on any wheel fitted with the standard clincher rim. The concave sides of the tire, the inventor has found, give it a considerable increase of resiliency over the ordinary solid tire, while the large rounded rib in the center of the tread carries practically the whole load on level roads, and, being made of the best grade of rubber, absorbs all the vibration caused by small stones and obstructions. As the tire is now made, the blow received from an obstacle projecting an inch or so above the roadbed is practically all absorbed in the tire. Those who have used this tire claim that it rides as easy as a pneumatic, is faster (which has been demonstrated by tests on electric vehicles), and is of necessity much more durable, besides the constant dread of a puncture being eliminated. A car fitted with these tires was driven in the New York-St. Louis run last summer, and the driver claims he was able to drive for miles through sand on the high gear, where the cars fitted with pneumatics had to go on their intermediate or low gears on account of the increased resistance. A solid tire will likewise cut through mud and find bottom, on which it rolls with less resistance and without withdrawing a lot of the soil, as does a pneumatic, especially when the earth is of a clayey nature. The cost of this new tire is no more than that of a good pneumatic, and for any ordinary touring car it will save much annoyance and expense.



SWINEHART SOLID CLINCHER TIRE AND GOODRICH DETACHABLE NON-SKID TIRE WITH TWO-PIECE UNITED LUG.

About a year ago there was a great agitation on the Continent regarding tires and tire protectors for the prevention of skidding. A test of these various devices was made in France, and the result was duly reported in our columns. Descriptions of some of the non-skidding tires were published in the June 25, 1904, issue of this journal, and also in Supplement No. 1474.

An American device of this character, which is being made by some of the leading tire companies, such as the Goodrich, the Diamond, and the Fisk, is illustrated herewith. The Bailey "Won't Slip" tire has found favor wherever used. Owing to the raised buttons on the tread, it will not slip or skid on slippery asphalt or greasy roads. Nor is there any loss of power from slipping wheels. A new type of double bronze nut and lock nut, shown in cross-section in the illustration, is used for securing the lugs on the Goodrich tires. Being made of brass, these nuts will not rust and be difficult of removal. Furthermore, as the inner end of the lock nut is larger than the hole in the first nut, through which the lock nut stem is passed, it cannot separate from the nut proper and become lost, although it can be unscrewed separately.

A typical non-skidding tire built on the lines of most French tires of this kind is made by the Republic Rubber Shoe and Tire Company, of this city. The tire has vulcanized to it a leather band filled with steel rivets that stop all skidding and protect the tire.

TIMING AUTOMOBILE RACES.

Timing an automobile race is no simple task. Cars that are traveling at the rate of 80 and 90 miles an hour cover a long distance in a second. Even a fifth of a second represents a distance of from 20 to 25 feet, so that in comparing the records of two machines, the slightest error in timing might place two cars on an equal footing which, had they raced together, would have been separated by a considerable space. Now, since even the most experienced of timers are apt to vary somewhat in the timing of a race, an error of a fifth of a second being of frequent occurrence, it is not strange that the inexperienced men usually called upon to time automobile races should record variations of an entire second or more. The need of an automatic errorless timing system is thus plainly made apparent. Such a system called the Mors system was recently described in these columns. This apparatus, however, possesses the fault of being rather too complicated for an unskilled man to understand and operate. We illustrate herewith a simpler system invented by Mr. Alden L. McMurtry, of this city. This system was used recently in modified form at the hill-climbing contest at Eagle Rock. It is also being used during the present week at Ormond Beach, Florida.

Briefly, the system comprises a line circuit running along the course, which is closed by automobiles in passing over wires stretched across the course, at the start, quarter mile, half mile, kilometer, etc., or at any other intervals required. The impulse sent over the line on closing the circuit operates, through a relay circuit, a series of stop watches at the main timing station. At the start all the watches are set running, and thereafter, under the control of a "distributor," the watches are successively stopped as the different timing points of the course are reached by the machines. The distributor consists of a metal arm adapted to be moved over a distributor plate provided with radially-disposed rows of perforations. Contact pins are fitted into these perforations in any desired combination, and the rows of pins are successively engaged by contact fingers projecting from the distributor arm. Each contact pin of a row has electrical connection with a solenoid, which operates one of the stop watches, so that as the distributor arm is moved around by the closing of the line circuit at the timing stations, the different watches will be started and stopped according to the positions of the pins in the distributor plate.

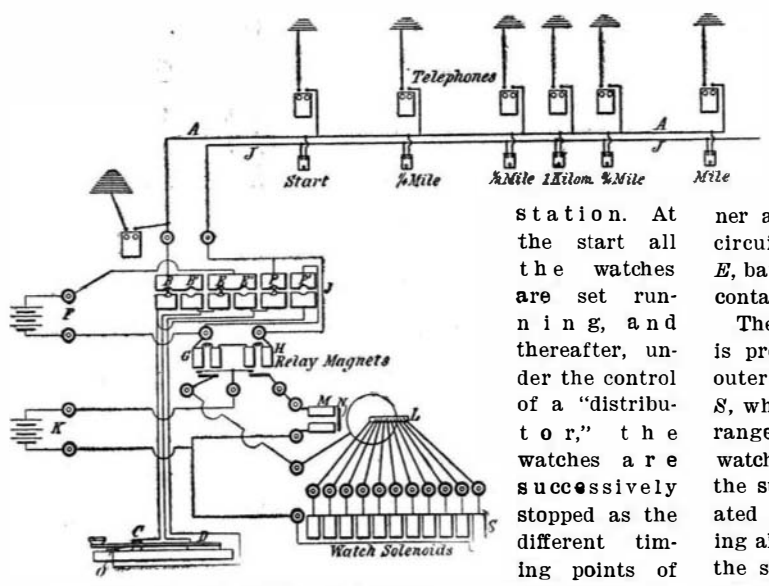


DIAGRAM OF THE ELECTRIC CIRCUITS.

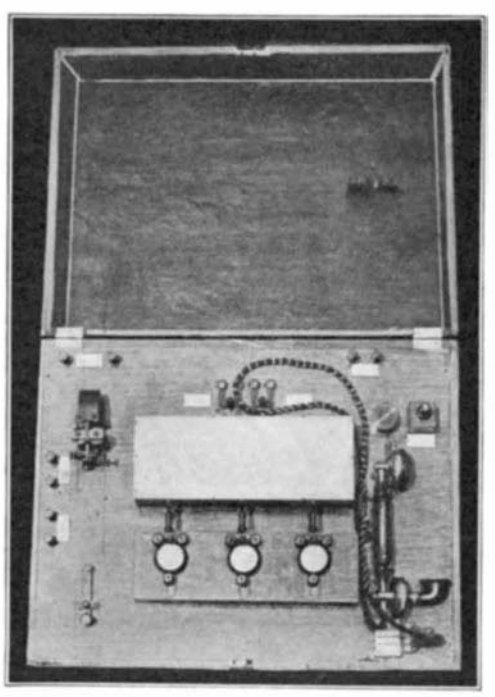
With this brief outline of the system in mind, we may proceed to a more detailed description of the operations. The wire at each timing station is stretched at the proper tension across the course, and held down by chains to within a few inches of the ground. One end of the wire is fixed, while the other end is attached to a latch which holds open a switch. When a car in passing over the wire trips the latch, the switch is closed by action of the spring, and at the same time a time-switch is set in operation, which opens the circuit again a moment later. The switch may then be reset if it is desired to time a second car at that station. When the circuit is closed, the course of the current may be traced along wire, *A*, through switch, *B*, strap, *C*, key, *D*, switch, *E*, to the battery, *F*, thence through relay magnets, *G* and *H*, along line wire, *J*, back to the timing station. When the relay magnets are energized, two circuits of battery, *K*, are closed; one by the armature of magnet, *G*, conveying current to the distributor arm, *L*, whence it passes through whatever pins it may be in contact with, to the corresponding watch solenoids, and back to the battery. The armature of each watch solenoid is connected with a spring plunger, which strikes the stem of a corresponding stop watch. The other circuit, closed by the armature of magnet, *H*, serves to energize the distributor magnet, *M*. The armature, *N*, of this magnet, when drawn forward, sets an escapement device connected with the distributor arm. When the line current is broken by the time switch above referred to, the relay circuits are also broken, releasing the armature, *N*, operating the escapement device, and causing the distributor to swing about over the next radial row of pins. The operation is then repeated, when the wire at the next timing station is crossed, and so on, until the finish of the course is reached. Before the start the distributor may be moved about to the desired position, and all the watches set by depressing the key, *D*, which governs the relay circuits in the same manner as do the switches at the timing stations. The circuit closed by this key may be traced through switch, *E*, battery, *F*, magnets, *G* and *H*, wire, *J*, switch, *P*, and contact point, *O*, of the key.

The arrangement of the pins on the distributor plate is preferably as follows: In the first two rows the outer pin only is inserted. This energizes the solenoid *S*, when the key is depressed, and this solenoid is arranged to operate all the watches at once. Thus, the watches were all set at the start of the race. When the starting line is crossed, the same solenoid is actuated through the pin in the second radial row, striking all the watches again and starting them. If desired, the solenoid, *S*, may be discarded and two complete rows of pins used instead, which will, of course, produce the same effect. The third row will contain a pin in the second perforation of the row only, so that when the first timing station is reached, the first watch solenoid only will be energized, and the corresponding watch will be stopped. The fourth row will contain a pin in the third perforation only, operating the second watch, etc. Each timing station is provided with a telephone, through which communication may be had with the main station. By this means the operator learns the number of the car which makes the time registered by the watch, and can mark this down on the record sheet. Preferably, the foremost car only is timed at the intermediate stations, but at the finish the records of the second and third cars are also taken.

To prevent fraud, the apparatus may be installed at each end of the line, giving a duplicate record. The apparatus is also so arranged that by opening switches, *B*, *E*, and *P*, and closing switches *B'*, *E'*, and *P'*, the system may be converted from an open circuit to a closed idle-circuit system. Batteries would then be installed at each timing station, and cut into the circuit by the cars when crossing the line. This would render it difficult for an unauthorized person to send false signals over the line by meddling with the wires. This system may also

(Continued on page 80.)

IMPROVED APPARATUS FOR TIMING AUTOMOBILE RACES.



A MODIFIED FORM OF THE TIMING APPARATUS.