

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.

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.

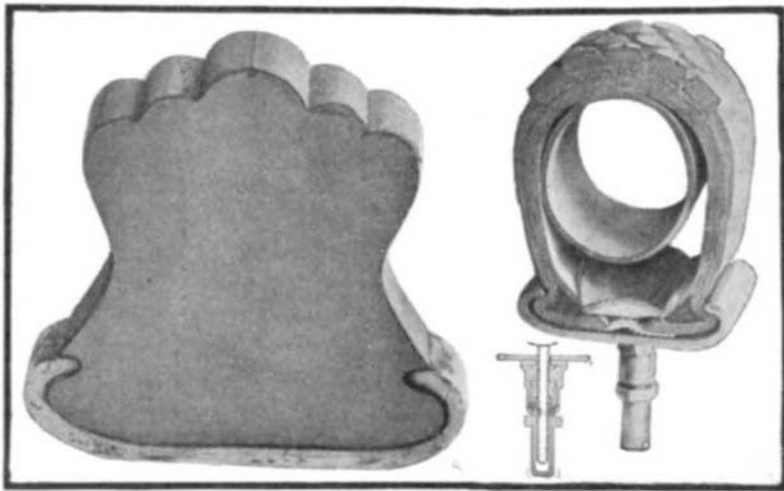
TIMING AUTOMOBILE RACES.

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 sys-

tem 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

different watches will be started and stopped according to the positions of the pins in the distributor plate.

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,



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

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

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 man-

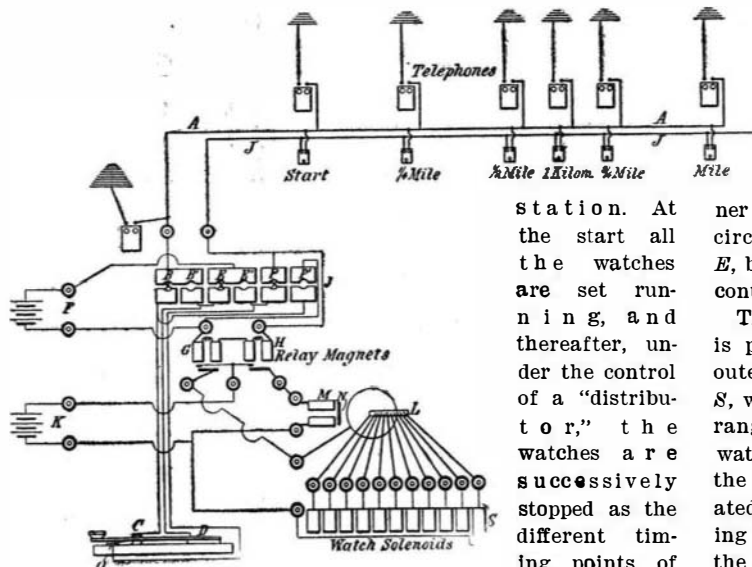


DIAGRAM OF THE ELECTRIC CIRCUITS.

ner 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.

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

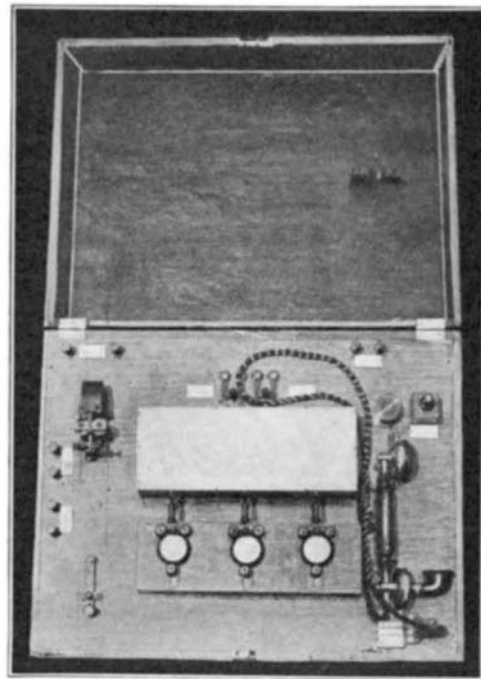
station. At the start all the watches are set running, and thereafter, under the control of a "distributor," the watches are successively stopped as the different timing points of the course are reached by the

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



IMPROVED APPARATUS FOR TIMING AUTOMOBILE RACES.



A MODIFIED FORM OF THE TIMING APPARATUS.

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TIMING AUTOMOBILE RACES.

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be used on a single line wire with ground return. The telephones, owing to their high resistance, as compared to that of the relays, would not interfere with the operation of the system. However, a magneto call could not be used, and in place of it Mr. McMurtry uses a "hummer" call.

At the Eagle Rock hill-climbing contest, the distributor was not used, as it was not found necessary in that style of race. One of our illustrations shows the simple apparatus employed at this race. Our other illustration shows the complete apparatus. The distributor may here be seen at the rear of the board, and the five timing watches are shown in the immediate foreground. The operator with telephone harness applied is seen at the left of the apparatus.

BANANAS.

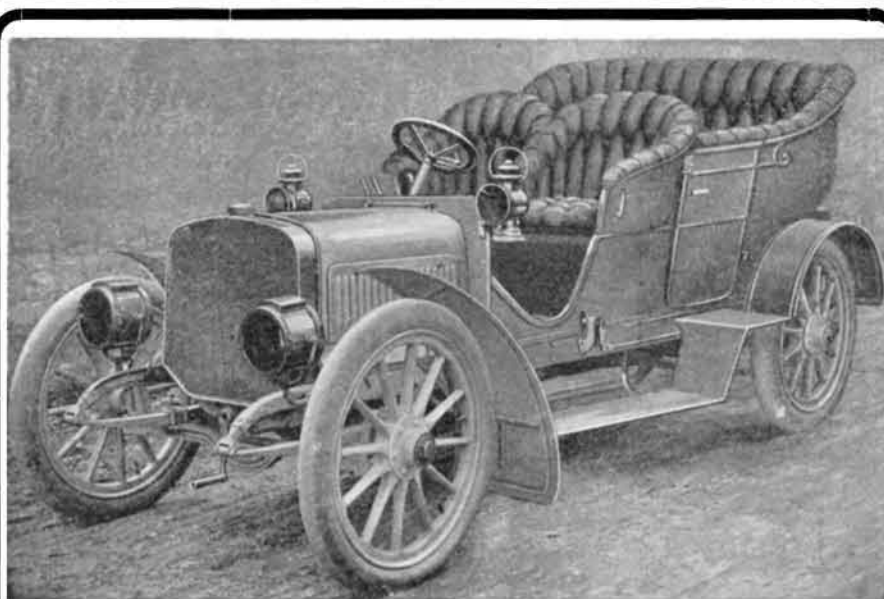
(Continued from page 78.)

taste when allowed to ripen on the tree!" But the contrary is the case, because the fruit will not mature to perfection on the tree; the skins burst, attracting innumerable insects and birds, and the weight of the bunch itself becomes too great for the tree, either one or both coming to the ground. So the bunches are cut when the fruit is half to three-quarters full, i. e., matured, though still green and hard as nails, according to the length of the journey it is to undergo. It continues to feed from the cut stalk, which contains a great amount of sap, until fully ripe, but should the cutting have occurred too soon, while the fruit will turn yellow, it will never attain the flavor or softness or flesh requisite.

With the cutting of the bunch ends the life of the tree, for it bears but once, and is usually cut down to obtain the latter, or succumbs a few days later to the cleaning process, which is merely bringing the spent trees to the ground. A new tree springs from the center of the old stump, and thus there is an everlasting succession without further effort on the part of the planter. Cutting the fruit itself involves the only careful labor on a banana farm, as the bunches weigh fifty to sixty pounds, and even slight knocks are followed by bruised spots, under which the fruit quickly ripens and decays. It is for this reason that land adjacent to a watercourse is most valuable for planting, owing to its accessibility and easy transport by canoe. However, by the liberal use of trash (dried banana leaves) the fruit is safely brought to the railroad on packhorses. Several of the large plantations in Costa Rica have been equipped with complete outfits of light portable railway imported from Germany, this being moved about as the cutting progresses.

At Bluefields the steamer goes up the river and ties up at the farm, moving to the next as soon as the crop is loaded, and so on until a cargo is obtained. But this is one of the few places so favored. At Port Limon, the outlet of the Costa Rican trade, which is of considerable importance, the farms line the railroad for a distance of almost fifty miles, and the bunches are piled along the track, as shown in the accompanying photographs, to await the banana trains. It is not unusual for snakes, tarantulas, and similar unpleasant customers to find a lodging in a bunch of bananas, and when discovered at the loading point, the fact "snake in this car" is usually chalked on the outside, and the carriers handle the bunches very gingerly at the wharf.

At the end of the second year a banana farm is well developed, and there are at least four trees where but one was set out, so that with even a moderately small acreage fruit may be cut practically every week in the year, and the income is continuous. Rotation of crops is unknown, and unless the land be subject to overflow, it is almost valueless at the end of ten years, but many a farmer has become independent before that stage is reached,



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and the risk of the land giving out seldom causes him much worry. A plantation of forty manzanas (about sixty-nine acres) will, after the second year, produce more than fifty thousand bunches annually, and these at the prevailing prices—thirty to fifty cents silver—will be worth between twenty and thirty thousand dollars, or more than double what it usually costs the farmer to buy the land, clear and plant it, and pay the first year's expenses. The cost of running such a farm after the first crop is almost wholly confined to the "cleaning," which does not exceed ten to twelve dollars per acre annually in the majority of banana-growing districts, and considerably less in some.

To the average northerner the banana is but a fruit, seldom eaten in any other manner than raw. To the native of the tropics it is a *multum in parvo*, often his entire sustenance for weeks at a time, his daily bread, and the uses to which he puts it are innumerable. Taken *in toto*, dipped in lye and afterward dried in the sun, it becomes a moldy, shriveled, and most unlovely-looking morsel, but thus prepared it will keep indefinitely, and is instantly ready for use by peeling and baking or boiling, whereupon it expands to two or three times its original size, and forms palatable food. This is a practice of the mountain natives of Nicaragua, and it forms a large part of their diet, supplemented by the inevitable *tortilla*, when on their travels. When almost ripe the fruit is cut into slices and placed in the sun, which causes a certain amount of its sugar to crystallize on the surface; thus prepared it is an excellent conserve. Baked, boiled, or fried in coconut oil, it is a staple article of diet the year round, and the last named is quite a delicacy, particularly fried plantains. Banana flour, or rather meal, as it is not ground to the consistency of the former, makes very acceptable cake and bread, and frequent mention is made of its use by the natives by Stanley in "Darkest Africa." The great value of the banana for this purpose is universally appreciated, and numerous attempts have been made to produce banana flour on a commercial basis.

A German firm was said to be about to undertake the production of banana flour, conserves and other similar products, in Nicaragua a few years ago, but whether the project was ever carried out is not known. However, there is little doubt that this will become an actual fact sooner or later. Thus it will be seen that it is only his ignorance of the value of the fruit other than in its raw state, that causes the northerner's lack of appreciation.

Engineering Notes.

An electric station which will be one of the largest and most modern on the Continent is now being erected just outside of Paris. It will figure among the stations which supply current for the city. A point to be specially noted is the use of steam turbines which drive the dynamos of the station. These turbines are of the type which has been lately brought out by the Swiss firm, Brown, Boveri & Co., and they are now coming into use in different countries, especially for central station use. In the present plant the turbines are designed to use superheated steam at 12 atmospheres pressure, heated to 350 deg. C. The tests show that the turbines consume 15 pounds of steam per kilowatt and per hour, at most. The turbines develop 7,000 horse-power each and are direct-connected with an alternating-current generator mounted on the same base. The speed is 750 revolutions per minute. Each unit thus formed is provided with a surface condenser. The circulation and air-pumps for the latter are operated by electric motors. Lubrication of the working parts is carried out by an oil pump. The alternators are all of the same pattern and deliver three-phase current at 5,000 volts and 25 cycles.

At the last general meeting of the Afri-