

LATEST NEWS OF THE AUTOMOBILE TRADE AND INDUSTRY

SPECIALISTS DESCRIBE THE CONSTRUCTION OF SWITCHES AS FOUND IN THE ELECTRICAL EQUIPMENT OF THE AUTOMOBILE

(By Special Permission from Motor Age.)

The primary purpose of a switch in any electrical circuit is to provide a means of controlling the operation of the circuit by opening and closing, or completing the circuit just as a valve in a hydraulic circuit or pipe affords a means of opening and closing the circuit of which the pipe is a part. Electrical switches assume many different forms and sizes, depending upon the service for which they are designed primarily, which places certain requirements upon the switch in order that it operate successfully.

Thus, a switch that is to carry a heavy current must be constructed with large contact surfaces in order that the resistance of these contacts be low; the surfaces of the materials which come into contact with each other must be smooth and should be in actual contact over as large an area as possible; the operation of the switch should be as positive as possible, and all connecting terminals and parts should be of ample size to meet the ordinary requirements to be imposed on the switch when in actual service.

In a great many cases certain parts of the switch are made up of a number of thin pieces of copper instead of one single heavy piece. This construction gives much better contact and also a surer contact in the majority of cases. A switch of this kind is said to be laminated. The selection of the material to be used at the breaking points of the switch will depend upon how severe the arc is likely to be and the probable destruction or damage resulting from such an arc.

The breaking contacts are in some cases made of carbon, but in the great majority of cases metal is used. Switches that are to carry a small current, such as those ordinarily found in the lighting circuits of a motor car, are much smaller and require smaller contacts and smaller parts as a whole, but their operation should be quite positive to reduce the tendency for arcs to form at the points of contact when these contacts are being made and broken in the operation of the switch.

Must Stand Pressure
If a switch is to be used in a high pressure circuit, such as the secondary circuit of an induction or ignition coil, it must be constructed in such a manner and of such materials that it will stand the electrical pressure to which it will be subjected under all ordinary working conditions. The construction of any switch is influenced greatly by the location in which it is to be mounted and the manner to be employed in operating the switch.

Quite often a switch is used to change the connection of the various elements of a circuit rather than to serve as a means merely of opening and closing the circuit. A good example of this requirement, as imposed upon a switch, is found in those systems where the connections of the various sections of the battery are changed from a multiple connection while the batteries are being charged to a series connection when the batteries are being used in operating the starting motor.

In some cases a switch is introduced into a circuit merely for the purpose of reversing the connection of a certain part of the circuit with reference to some other part. Thus, in certain ignition systems we find what commonly is called a polarity switch, its purpose being to reverse the connections of the interrupter points with respect to the battery or generator in order that the wasting away of the two interrupter points may be equalized. If the direction of the current through an interrupter remains unbalanced in direction there will be quite a difference in the degree to which the two contact points are worn away. The metal naturally tends to travel in the direction of the current, and as a result there is a much greater wearing away of the positive contact than there is of the negative contact. An inspection of a set of contacts that have been in service for some time will convince you of this fact.

A single pole switch is one in which provision is made for opening the electrical circuit in which the switch is connected at one point only. An example of a switch of this kind is shown diagrammatically in Figure 1. The positive terminal of the battery is connected in this case and the starting motor and its series field winding are connected permanently in series to the positive or grounded terminal of the battery. The starting switch is introduced in the lead connecting the negative terminal of the battery and one terminal of the armature of the starting motor. The lighting switches in this figure are also single pole and their connections are very similar to those of the starting switch. Current for the lights flows through the series field of the generator and serves to raise its voltage, which increases its output the required amount to take care of the lamps when they are turned on.

A two pole switch is one provided with two sets of contacts. Two pole switches may be so connected that one set of contacts is introduced in one circuit and the remaining set in another circuit, which really amounts to two single pole switches mechanically connected together, and both circuits are operated at the same time. In the great majority of cases, however, the two sets of contacts of a two pole switch are introduced in the same cir-

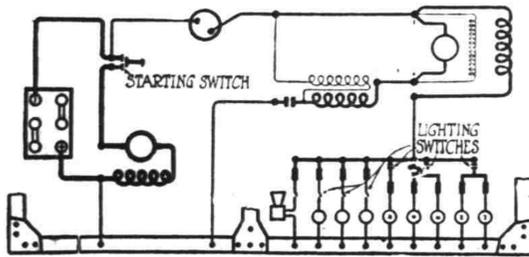


Fig. 1. - Wiring diagram of Gray & Davis grounded system, illustrating application of single-pole switches

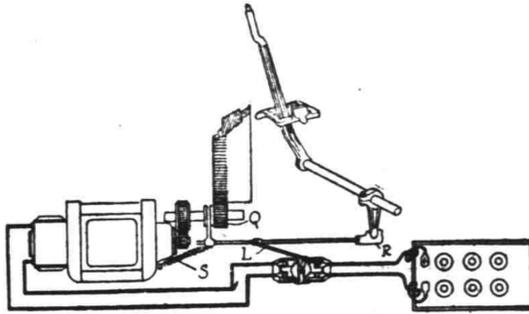


Fig. 2. - Connections of two-pole rotary switch on the 1913 Haynes car. The letters are for later reference

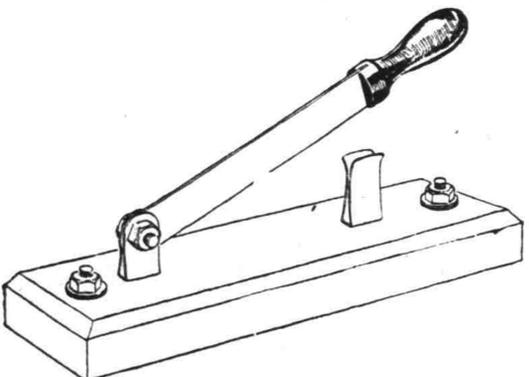


Fig. 3. - Here is a common form of the single-pole blade switch

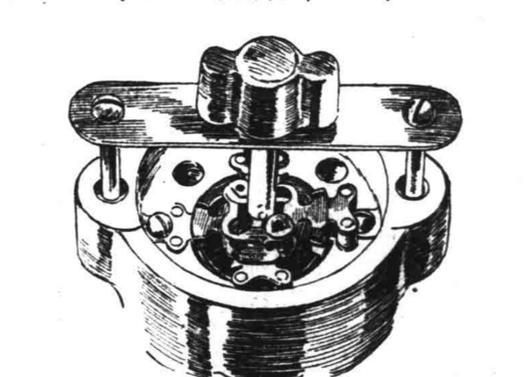


Fig. 4. - Interior mechanism of two-pole snap switch

STANDARD RIMS AND TIRES ARE PROOF AGAINST RIM CUTTING

Under-inflation and Excessive Loads Among Causes of Fabric Trouble

"Protection from rim cutting is not to be obtained by any particular type of tire but depends rather upon design, quality and usage. No good tire of any standard type will be cut by any standard rim if properly used. On the other hand, any type of tire will be injured if subjected to abuse. Underinflation, dented and irregular rims, excessive loads, tire fillers and stiff rollers are the common causes of cutting and breaking," says Arthur Wayne of Smoot and Steinhauser, Firestone distributors.

"The flanges of a rim may be battered down and become rough from running a tire deflated for a considerable distance; the next tire, applied, is sure to get cut above the beads. 'Tires, carrying heavier loads than cut, one set being introduced in one side of the line and the remaining set in the opposite side of the line. A good example of a two pole switch is shown diagrammatically in Figure 2, which represents the connections of the rotating starting switch on the 1913 Haynes car.

Multiple switches are those having more than a single set of contacts. A very good example of a multipole switch is found in early models of the Delco systems, in which the switch was used for connecting four sections of a storage battery in parallel for charging and in series for operating the starting motor.

Knife Switches
A blade switch is one in which the connection is completed by a metal blade which may be caused to move in contact with the side of a metal jaw or between two metal jaws. A common form of a single pole blade switch is shown in figure 3.

A snap switch is one in which the opening and closing of the electrical circuit or circuits which the switch is to control are performed by a snap action in the switch. This snap action is produced by a coil spring which winds up as the handle of the switch is turned. After a certain movement of the handle the spring is released and allowed to cause the contacting mechanism of the switch to rotate through a fractional part of the revolution. This rotation of the contacting mechanism is performed in a very short time, thus reducing the tendency for electrical arcs to form at the points of make and break. An example is shown in figure 4, in which the switch cover is removed partially so that the interior is somewhat exposed to view.

A plug switch is one in which the switching action is performed by moving a plunger in or out of an opening in the top of the switch cover. This plunger may be made of metal or insulating material, and if made of metal it may form part of the electrical circuit when the switch is closed, although not always. The plug itself may be so constructed that it can be removed and the switch made inoperative until the plug again is inserted. Plug switches usually are confined to the operation of ignition and lighting circuits.

those for which they are designed, may develop breaking at the beads where engaged by clinches of the rim.
"If rims become rusted from water working around the beads when tires are run soft or through neglected cuts in the tire, or from neglect to put proper fitting on the valve stem, the rust should be removed with emery paper and rims painted with a coating of aluminum, graphite and oil or other good preservative solution. When applying a tire, be careful that the flap does not slip underneath the bead and crowd it in the clinch of the rim.
"It is not uncommon for tires to be applied to rims of wrong size—for example, using a 36x4 1/2 tire on a 36x4 rim. The diameter of this rim is approximately 28 inches and the diameter of the beads of the tire approximately 27 inches (4 1/2 inch diameter) or approximately 26 inches (regular clincher type), therefore it becomes necessary to stretch and strain the beads considerably. Another thing, the 4 1/2-inch beads are not constructed to fit a 4-inch rim and will not engage properly in the clinches. Good results cannot be secured when the beads are strained and crowded in this manner. The correct oversize tire for 36x4 rim is 37x4 1/2.

"In some instances, 38x5 1/2 tires have been fitted to 36x4 1/2 rims. The diameter of a 36x4 1/2-inch rim seat and the diameter of 38x5 1/2 beads are the same, approximately 27 inches, but the rim cross section in the clinches is not suitable to accommodate the beads of the 5 1/2-inch cases. Rim cutting, pinched tubes and unsatisfactory service will result.
"When removing tires from rims, do not overlook pushing the valve stem of the tube far enough so that it will not be necessary to pound the fastening device of the rims in order to release the beads of the cases. Rims are sometimes dented from pounding them in this way.
"When chafing, cutting or breaking extends all around the beads on both sides, repairs are expensive and not to be recommended. If the injury only extends for a short distance over one or both beads, a skillful repair man can make a good job at a remarkable cost."

AUTOS COULD MOVE MILLIONS OF ARMY TO MEET INVASIONS
"Motor cars and the improved roads for which they are responsible, will prove crucial factors in case the Germans succeed in bringing the war to American shores," says John D. Mansfield, general sales manager of the Dorr Car company.
"The three million and a half automobiles now running in this country could move an army of fifteen million men. Europe has had no such advantages and it is well worth the study of our military authorities as to just how this wonderful force could be best mobilized and used in case of necessity.
"This thought is also worth the consideration of civilians. What cars might do in war is indicated by the wonders they have accomplished in peace. They have been the creators of wealth and conservators of health of any utility we can boast."

AUTOMOBILE PATROL FOR DEFENSE OF UNITED STATES IS ADVOCATED

Major Phillips Would Have 2500 Armored Cars and 15,000 Men for Duty

During the early stages of the European war practically all the combatants placed a great deal of reliance on machine guns mounted on motor cars. Within the first year, however, the guns were all dismounted and are now being carried exclusively by hand, according to Maj. M. J. Phillips, writing in the Power Magazine. Military experts smile when armored motor cars are mentioned, and declare that actual warfare has proved them impractical. It is conceded that their usefulness was one of the big disappointments of the war.

There are several reasons for the failure of the motor-borne machine guns. This war is one of trench fighting. The armies were locked almost to immobility for months. There is practically no skirmishing in the ordinary sense of the term, no patrolling, little opportunity for surprising and annihilating small detachments of the enemy by means of machine guns and getting away before the artillery can unlimber.
Besides, the hovering aeroplane quickly spotted gun bearing motor cars near enough to the front to be a potential menace and signaled back to the formation. Very soon thereafter a battery or two would begin delivering shells in uncomfortable proximity. So the armored cars were trundled back to the rear and left at the base to await another turn in the wheel of fortune. It has not come yet.

Nevertheless, the combination of machine gun and motor if properly used will be invaluable in guarding the United States from successful invasion. It is as vitally necessary here as it is useless in Europe, since conditions of warfare there and on this continent are almost exactly reversed.
On the western European front the line is only 300 to 400 miles in length. The United States has 8,000 miles of coast line and hostile border. Soldiers face one another over every foot of disputed territory there. It is manifestly impossible to raise an army large enough to entrench to repel invasion along the ocean fronts and the Mexican border of the United States. There is no necessity of watching the Canadian border, since we have been at peace with Canada for more than a century.
Every harbor landing place on both our shores and each one of the 1,900 miles of our sun-baked southern line must be scanned if we would stop the invader's attack. How? By machine gun motor cars.
The army is awake to the necessity of a coast and border patrol and experiments have been going on in Texas during the last year to determine the best type of car for the purpose. Three distinct kinds of motor cars have been used. First a considerable fleet of small, light cars carrying two machine guns with their crews was employed. They did not prove satisfactory in the difficult Texas conditions. The engines, when the cars were compelled to go slowly "ran hot." There were many

breakages because, while the cars were designed for bad roads, they could not withstand the strain of going where there were no roads, and this was often necessary. Uncle Sam has a number of these cars on hand, but officers of the ordnance bureau say they will purchase no more.
The second type was a genuine armored car, but not adapted. It is a high-powered motor, of a make known for strength and sturdiness, but not remarkable for great speed or a quick "pick-up." Armor plating of a sufficient thickness to stop rifle bullets at any range formed the body and ran up to a height of 10 feet, where it was fashioned into a turret much like the manhole of a submarine. The sides were pierced for machine guns and small rams and the turret was fitted with a gun rest. There was room in the turret for two men and a gun. All told, this car would hold six men and three guns.
Objections to it were its great weight and height. It is too conspicuous and its center of gravity is too high for maneuvering in broken ground with safety. While the engine performed admirably and the car stood up better than the small, light, "mosquito" cars, its defects were too pronounced to secure serious consideration.

A third type, which gave the most satisfaction, was an open car about the size and shape of a seven-passenger touring car without the top. The body was of bullet-resisting steel and was divided into compartments for the guns when not in use, for gasolene, for water and for tools and supplies. This type of car was valuable, as it could be used for the transportation of machine guns with their crews to strategic points, and it is also a fighting unit, as there are gun mountings built into it.
This type of car represents an expenditure of about \$4,000. It has a speed of 60 miles an hour and carries eight men, four machine guns with ammunition, spare parts, tools and an emergency supply of gasolene and plenty of water. It is equipped with pneumatic tires.
Twenty-five hundred of these cars, manned by 15,000 men, would do more toward making our shores safe from invasion than half a million infantry.

The first requisite for their effective use is a motor highway running parallel to the borders of the United States in a gigantic "U" from Portland to Portland. A highway on the fourth side, the top of the "U" along the Canadian border, while not a defensive necessity, would prove of great value. A considerable share of the Atlantic and Pacific seaboard is now paralleled by excellent roads. These stretches could be linked up at a reasonable expense. The same is true of the Mexican border.
On the seacoast the patrols would be in communication with marine observation stations and with submarine patrols. As our principal danger is from enemy submarines, which might load aeroplanes and explosives in some isolated cove for raids on populous cities, it is necessary that no part of the coast be slighted.
Four cars to each 25-mile block means a total of 1,280 cars. Another thousand could be kept in reserve to carry troops from central points

NEWS OF SPLENDID TRIP COMES BACK FROM THE E. H. LEWIS AUTO PARTY

Story of Itinerary from Honolulu to Vancouver and Seattle—Many Honolulu Friends Met Already and Everybody in the Party Having a Good Time

Seattle, Wash., July 4, 1917.
Editor Star-Bulletin:

Dear Sir:
Enclosed you will find a little account of the E. H. Lewis party that left Honolulu June 23, per S. S. Makura, on their auto tour of the mainland.

The Makura arrived off Williams' Head Quarantine station on the morning of the thirtieth of June, and all hands were ordered to be in their seats in the dining cabin at 5 o'clock for inspection. Very shortly after 5 a. m. both the Canadian and American officers came aboard and after looking us straight in the eye for a moment, we were passed by the Canadian authorities and the Makura passed on up to Victoria and we had less than 40 minutes stop there, but we took advantage of the short time and got in two machines and rode over the beautiful paved streets of Victoria, the Makura pulling out for Vancouver very shortly after getting on board. On our way the immigration and health inspectors looked us all over again and all necessary papers were attended to, so that when we arrived in Vancouver at 2 p. m. we were all ready to go ashore.

On arrival we found that Saturday was a half holiday and the following Monday being the Canadian national holiday, the custom house officials had left for the country for a little outing and we were told that the machines would not be released before Tuesday morning; not a very bright outlook.

Mr. E. H. Lewis and Mr. Reynolds got busy on the telephone and after locating the various custom officials, one was found that was willing to come in from the country and release the cars, which was done about 6 p. m., but only after Mr. Lewis and Mr. Reynolds had walked (so they say) something over 50 miles of wharf.

Very shortly after the autos were released, Mr. Lewis ran across a Mr. Wilkinson, who has made two trips to the islands and has very pleasant memories of the islands and of Mr. Eben Low and the good times he had with Eben while on his visit to Honolulu, etc. Mr. Wilkinson offered his services as guide, which was gladly accepted and we left on our trip about the city about 6:30 p. m., with the sun nearly two hours high and after sundown we had another two hours of twilight. Just think what the people of Honolulu would do with the setting the clock ahead one hour, if it were still daylight at 10 o'clock at night.

Sunday morning, with Mr. Wilkinson as guide, the two autos left Vancouver for the famous Chilliwack Valley, with an acreage of something over 40,000, said by a great many people to be the richest valley in the world and noted for the numerous dairy herds; some of the cows producing and clearing as much as \$15 per month.

Some Ins and Outs
We were warned by people beforehand on this trip that the roads were impassable in places, as there had been heavy rains in the mountains and that the melting of the snow had covered the road with some four feet of water, but we sallied forth and passed through several little ponds of water and we felt that our troubles were about over, when we came to a pond which looked almost too deep for the autos; but there was an Indian with his family not very far away and Mr. Lewis hailed him and asked him if he wanted to make some money. So Ed jumped in the Indian's wagon with the two horses and in going through the water it proved too deep for the autos so the party started back for Vancouver. Someone had the happy thought of leaving the autos at one of the railway stations and taking the train which we did and passed miles and miles and acre after acre of red clover, timothy, barley and various other grasses nearly ready for the harvest.

Mr. Lewis' uncle, Mr. I. Kipp, the pioneer white man of the valley, and owner of some 400 acres of the valley lands, told us that he received \$100 per ton for potatoes that he had raised last year and to his knowledge there had not been any fertilizer used on the lands in the past fifty years. We also had some strawberries from the same grounds that won first prize at the San Francisco fair.

Frank Misses the Diamond
The party left the Chilliwack valley to the scene of a threatened attack.
A motor patrol of less ambitious type than outlined above was established on the border when armored motorcycles mounting one machine gun in the sidecar worked out of Columbus, N. M. On these cars, however, there was no armor protection for the driver, so that a single bullet might disable the patrol and cause it capture. With an armored car carrying six men and moving rapidly, and equipped with machine guns to fight back effectively, only an ambushed surprise by at least a company of infantry would prove formidable.

A man painting a sign will draw a bigger crowd than a sign exhibit of head masters.

ley at 6:20 p. m., the sun still two hours high, and arrived back to where we had left our autos in due time, and right here is where our confidence in Mr. Frank Lewis was destroyed. When our party got out of the cars, the station agent stepped up to Frank and asked him if he or any of the party had lost a diamond, and Frank said "No," missing a chance to be wearing a nice diamond. We arrived back at the Vancouver hotel around 10:30 p. m., after a very pleasant journey. One of the members of the party recited the following verse for the benefit of our guide of the day before, Mr. Wilkinson:

"They sing the glories of the man behind the gun,
And the books are full of stories of the wonders he has done;
It's rather thrilling as the flag is waving high,
And you sort of want to holler as the men go marching by,
But when you are in a strange land
On a dear old auto trip,
It's fine to have a friend that will give you the straight tip."

Honolulu Friends Meet
The party left Vancouver for Everett Monday morning about 10:30, arriving there about 6 o'clock, after passing over some beautiful stretches of road—some just road, and some very bumpy places, and roses, roses, everywhere, and farm after farm with their fine dairy cows and family orchards of cherries, apples and strawberries and blackberries. While the party was out picking some of the wild blackberries, who should come along but Mr. and Mrs. Cheatham, and little Mr. Cheatham with his little bucket of wild blackberries, on their way from Seattle to Vancouver to catch the Makura for Honolulu.
Talk about living in clover. Certainly the farmers and their cattle in Canada and on the American side of the line are living in clover.
Everywhere we have been so far, the buildings and trees and the stumps of the trees have been plastered with signs, such as "White Rose Laird," "Hardeman's Better Hats for Men," "Albers Oats for Miners," "No Water Soap," "Sight Draft Six Cigars," "Start Piano," "Feed Your Horses Hay," "Hotel Barber," "Mademoiselle Joe Cream," "Stop Dance and Forget Your Troubles," "Spend Your Fourth of July in Everett," "15,000 Mico Grease," "A. B. Newell, Real Estate."

The only thing which seems to be missing is something boosting the islands.
Accident to Surf Rider
The only real accident that we had up to the present time was the breaking of the arm off the surf rider on Mr. Lewis' machine.
On our arrival at Everett we found a "pasty" going on, as very much after the style of the show at Aala park during last carnival; in fact, there were several of the people that took part in the Aala park amusements in February last at Everett. The two little girls joined together, the Newlyweds, and the regular barbers that made so much noise during the carnival.

The party left Everett at 10:05 a. m. for Seattle. We first visited a salmon cannery, but the same was not working, it being a little early in the season. So we moved to the Weyerhaeuser Timber & Wood Co. mill and saw them sawing logs of Washington fir, weighing around fifteen tons, four and five thousand feet of good salable lumber in one log.
Soldiers Guarding Mill
Two mills of the company turn out three-fourths of a million feet of lumber per day or two hundred million feet a year. The machinery handled these immense logs about as easily as a man would handle a bath. The capacity of the mill is run by the labor market; labor is very scarce, as the I. W. W. people are causing lots of trouble and something less than a year ago labor riots around this mill caused the death of seven men, against only one man getting killed in the lumber business in the past seven years. At the present writing, the soldiers are guarding the road to the mill.

The refuse burner of the mill is 130 feet high and 44 feet in circumference.
On Concrete Highway
The entire thirty-three miles from Everett to Seattle is along the Pacific Highway, and paved with concrete or brick.

Yours truly,
ONE OF THE PARTY.

REGIMENT TO HAVE HORSE AND MOTORS
Col. R. P. Dickerson, Springfield, Mo., owner of the big Five Bar mule ranch in Webster, Wright and Green counties, is organizing a regiment of cavalry, every member of which he proposes to equip with motorcycles as well as horses. The colonel, says Motorcycling and Bicycling, is a veteran of San Juan Hill and a well known traveler and sportsman, and he has asked Washington for authority to organize a regiment to be known as "The Black Horse Riders" and to be assigned to active duty wherever the Stars and Stripes lead. He believes the motorcycle's importance in warfare cannot be underestimated. Especially is this true where extreme speed is necessary.