THE AUTOCAR

A Journal published in the interests of the mechanically propelled road carriage.

EDITED BY H. WALTER STANER.

No. 417. Vol. XI. SATURDAY, OCTOBER 17TH, 1903 Price 3d.

THE AUTOCAR.

(Published Weekly.)

EDITORIAL OFFICES:
COVENTRY.

PUBLISHING OFFICES:
3, ST. BRIDE STREET, LONDON, E.C., ENGLAND.

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"THE AUTOCAR" SUBSCRIPTION RATES.

British Isle, 16s.; Abroad (thin paper), 22s. 8d. per annum.

Notes.

The Popularity of Speed Trials.

No one who witnessed the motor speed trials at Southport, excellent and interesting as they were, can deny that before this meeting is again promoted some thought will have to be taken as to the means by which the various courses amongst the cars of different classes can be made more spectacularly attractive to the public who come to look on and to be entertained by something in the shape of visible contests. It cannot be denied that the large majority of the heats in all the events except those including the racing cars were more or less of a processional nature. True, the automobiles were competing against each other on the watch, but as the times made by the winning car did not go up on the few boards there were available until some little time after the heats had closed, the public were far from being kept in close touch with what was going on. It needed continual reference to the programme, too, to discover which event was in course of competition. We think it will be agreed that the scheme of price classification which was adopted and served well enough for the 1,000 miles reliability trials is not at all successful when applied in connection with such speed trials as were carried out at Southport. If the public are to be interested and drawn in their thousands year by year to witness these trials, the public must be afforded some visual entertainment, something in the character of close finishes. That a close finish does excite the keenest regard was evidenced clearly enough at the moment when Jarrott, by supreme judgment, passed Iden on the post, and when Edge and Hutton flew side by side at terrific speed over the finishing mark of the kilometre. The roar of voices which accompanied the cars on their progress up the course, and which lasted for some minutes after they had passed from view, showed clearly how keenly the spectators appreciated something in the shape of a race. Mere speed, though exciting enough in itself, is not sufficient, for speed by itself must nowadays be something abnormal to attract remark. On the Southport course anything under fifty miles per hour looked like crawling, and as the rate of progress of many of the competing cars fell very much below this, there were times when things fell very flat indeed. How to avoid this apparent lack of competition remains for those who are most closely connected with the promotion of the Southport speed trials in 1904. There are about them the makings of a great annual meeting which will attract spectators from far and near, but there must be visible competition, and that evidently cannot be provided by such classification of vehicles as obtained last week. Also, those organising next year's trials will have to devise some fuller and readier means of keeping the watching public acquainted with results, the three hand painted boards in use at Southport being totally inadequate for the purpose.

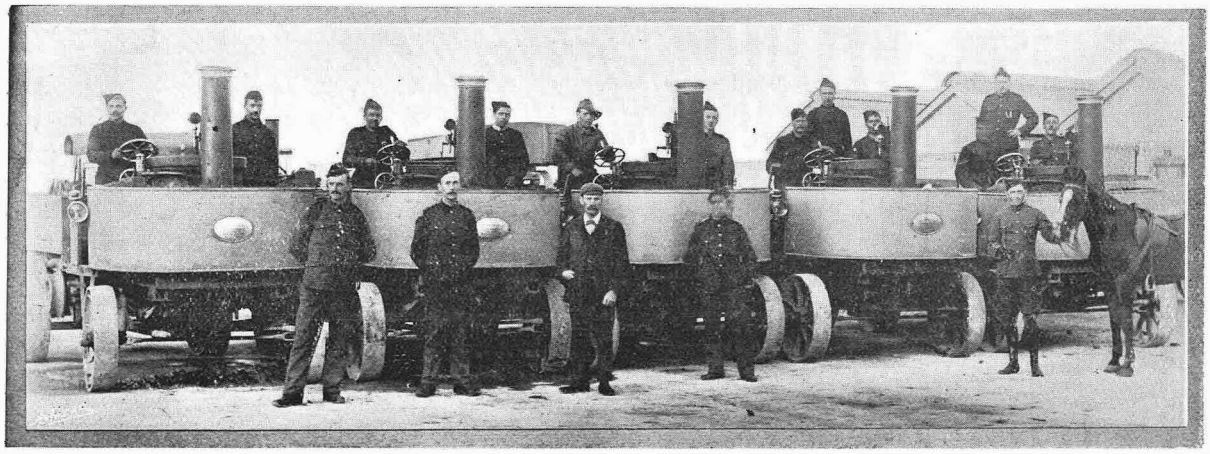
Other Ways of Increasing Interest.

Interest in the trials from the automobile if not the public point of view could also be increased by instituting some events on the Deauville plan. That is to say, the cars should be started from the mark and stopped on the mark, the winner being the one which made the start and the stop, as well as the intervening distance between the two points in the shortest total time. This is a good test in every way, not only of brakes, but also of judgment and skill, as it requires a strong combination both of man and machine to get away quickly, make fast time, and yet pull up dead on the line without

having to back, or put in the clutch again to move the car a foot or two. On the other hand it would be perfectly ridiculous to introduce the racing car pure and simple into this trial as was done at Deauville. It should be reserved entirely to cars of the touring type, as it can serve no good purpose to run a racing vehicle in such an event, except to demonstrate the skill of the driver. Another thing which would greatly add to the value of speed trials, so far as roadster or tourist vehicles are concerned, would be a hill climb which should take place as soon as possible after the speed event, and, of course, without the gearing of any of the cars being altered. There is always a chance that a speed trial on the flat, or at any rate on a course with only a very slight incline upon it, will be deceptive, as in some cases higher gears are fitted just for the speed trial alone, and occasionally this will account for a car performing altogether beyond its form, and we may see—in fact, we do see—a more powerful machine defeated for no other reason, and if the two were to meet again upon a hill against the watch, the apparent mystery would then be cleared up at once, as it would be found that the high-geared winner on the flat was hopelessly out of it when it came to a hill test, and if the time of the two tests were added together and divided by two it would be found that the more powerful machine had won. This, of course, is an instance. There would be many other interesting comparisons which might be made between the level speeds and the hill climbing capacities of the competing cars, particularly if an observer were taken on each and the hill measured out, so that it could be stated how far up the hill the car climbed on each gear before it was necessary to change down, or before the engine picked up sufficient power to change up. To apply the matter to Southport, Parbold Hill, one of the steepest ascents in the district, about twelve miles out on the Ormskirk-Preston road, would be a suitable incline for such hill trials to be carried out. It is not exceedingly steep, but quite sufficiently so to make an interesting comparison on the lines we have suggested. Its length is 1,240 yards, average gradient 1 in 14, and steepest portion 1 in 8, and the section of it was published in *The Autocar* of January 24th, 1903.

The Maidenhead Bridge Tolls Again.

The agitation for the abolition of the Maidenhead Bridge tolls still continues, though it has apparently almost reached its final stage. The Corporation, who have been levying the tolls and applying them to the general expenses of the borough, have admittedly been acting illegally in so doing, and have not a leg to stand upon. Indeed, they are under a pledge to free the bridge. We have previously recounted the various points in connection with the controversy, and have reported from time to time incidents of the struggle between Mr. Joseph Taylor and Mr. Joseph Fullbrook on the one side and the Corporation on the other, so that there is no need to recapitulate them. We would only add that Mr. Taylor has been delivering a series of lectures on the subject, and in so doing has thrown considerable light upon the dark doings of the Corporation in connection with the matter. In his last lecture he pointed out that seventy years ago a similar struggle took place, but without effect, when a burgess of Maidenhead (John Green Bishop by name, a member of the Corporation) sought to get the bridge freed. He took the opinion of an eminent counsel of that day, Mr. William Reader, afterwards Recorder for Nottingham, who was clearly of opinion that, though the Act of Parliament under which the bridge was erected vested the bridge tolls in the Mayor, Bridge Masters, and burgesses of Maidenhead for the time being, yet it did not give them the beneficial interest therein; but that the Corporation are merely trustees for the purposes in the Act directed, namely, for the support and maintenance of the bridge, and that they can in no case apply the tolls otherwise than in furtherance of that object, as building or repairing the bridge, or defraying the interest on any debt contracted on its account, or other expenses necessarily contingent on it. "Should they be so ill-advised as to apply the proceeds of the bridge to any other purpose than its reparation and maintenance," continued counsel, "I am of opinion that a Court of Equity, upon application for that purpose, would grant an injunction against them for so misapplying the proceeds." This opinion appears to have been forgotten or overlooked until Mr. Taylor unearthed it, and it is satisfactory to note that it supports the present action.



AT THE ARMY MANŒUVRES. A group of five Thornycroft steam waggons, a few of the many employed during the recent manœuvres on Salisbury Plain. They are all of the Colonial type, having high-powered engines, special gearing, and extra wide tyres. We understand that these vehicles accomplished an almost incredible amount of work.

USEFUL HINTS AND TIPS.

Governors: Their Use and Action.

The Governor Described.

As this page is primarily written for novices in motor matters, we make no excuse for explaining in detail the action of the governors generally used in motor vehicle engines to-day. Such governors are on the centrifugal principle. It is one of the natural laws that a swiftly-rotating body tends to fly from its centre. This action is taken advantage of, and the centrifugal governor constructed in a very simple manner. As a rule it will be found that this mechanism is mounted upon the camshaft, or layshaft, of the engine, though in one or two instances it is attached to the forward end of the engine crankshaft. Whichever shaft it is put upon it will be found that it consists essentially of two arms at opposite sides of the shaft, which are hinged to a lug firmly keyed to the shaft. These arms carry weights at their opposite ends, and are connected by links to a sleeve, which is free to slide on the shaft. The centrifugal action of the weights is counteracted by means of a spring, the tension of which may be so regulated that the governor may be set to function at any predetermined time. So that when the centrifugal force overcomes the resistance of the spring the governing of the engine begins to take place. There are various forms of the centrifugal governor, but all function in precisely the same manner.

Governing on the Inlet.

In the majority of governed engines of to-day the governor acts upon a valve placed in the induction pipe. This valve regulates the amount of gaseous mixture which is allowed to pass through to the cylinders. Many of these throttle valves take the form of a butterfly valve, consisting of a disc, which will close the induction pipe completely when placed at a right angle to the centre line of the tube, but which, when in its normal position, *i.e.*, horizontal with the tube, causes practically no resistance to the passage of the gas, excepting that which is offered by the thickness of the disc and the spindle upon which it turns. This spindle is fitted with an arm on its outer end, and is connected to the governor sleeve by suitable connections, so that when the governor has overcome the first resisting pressure of the spring it gradually closes the valve. As the engine speed still increases the governor still further compresses the spring, and in so doing closes the throttle valve by bringing the disc more towards a right angle position in the induction pipe. It will be seen that this is a very simple and effective method of reducing the speed of the engine, preventing it from over-racing by simply reducing the volume of mixture passed to the cylinder. Other methods of reducing the cylinder charge are (1) By means of one circular chamber working within another, the inner chamber having two orifices, which correspond with those in the outer chamber, which is inserted in the induction pipe. By revolving the inner chamber the apertures are varied by the inner one reducing their area. (2.) Another means is by inserting a chamber in the induction pipe, in which works a mushroom type valve, the lifting of which regulates the amount of mixture passed.

Governing on the Exhaust.

Many of the engines in the older type cars which are still in existence are governed on the exhaust valves. In this case a hit and miss arrangement, controlled by a centrifugal governor, permits the exhaust valve to be raised as usual when the engine is working within its maximum speed limit. When this latter is attained the governor causes a digger to be withdrawn from the valve plunger, so that the exhaust valve fails to be lifted, thus the spent charge is retained within the cylinder. This sufficiently reduces the speed of the engine so that when the next exhaust stroke comes in its sequence the exhaust valve is opened, the charge expelled, and the usual cycle of operations is resumed. This method of governing is not embodied in present day engines.

The Need of the Governor.

The ideal conditions for the working of an internal combustion engine are those in which the speed of the engine shall be such as shall develop just sufficient power to enable it to run smoothly and at its most efficient speed. When the speed of the engine is reduced the power decreases in relation to the reduction in speed. In like manner power increases with the increase of the speed of the engine. It is to prevent the production of more power than is actually needed for the propulsion of a vehicle that the governor is fitted. When the car is running on level ground with a good surface the engine is working in an economical manner, because the governor only allows of the admission of sufficient gaseous mixture into the cylinders to produce the amount of work that the road conditions call for. So that when the speed of the vehicle, and with it the engine, is reduced, as when surmounting grades, the governor opens wider and admits more mixture, thus keeping up the speed of the engine.

The Accelerator.

For the purposes of hill-climbing it is necessary and desirable that the engine should exert its maximum power, and to enable this to be done an accelerator is fitted. This is under the control of the driver either by means of a lever fitted to the steering column or by a small pedal projecting through the footboard, this latter being the more frequent method of operation. This accelerator is simply a combination of such levers, or lever, with wire cable and spring, which prevents the governor weights from exerting their power and actuating the throttle valve, which therefore remains open, allowing the speed of the engine to increase above its normal rate. The engine thus produces its maximum power, which it is very obvious is required for the negotiating of steep grades without the necessity of changing gear. If it becomes necessary to change the gear on account of the vehicle not being able to surmount a hill upon the higher gear, then the governor should be allowed to work, as with the lower gear ratio its normal power would, in all probability, be sufficient to enable it to overcome the remaining portion of the hill. To use the accelerator under such circumstances would only mean unnecessary development of power.

THE 10 H.P. MIESSE STEAM CAR.

THE FIRST PART OF THIS ARTICLE APPEARED IN *THE AUTOCAR* OF SEPT. 26TH, PAGE 379. THE GENERATOR, BURNER, AIR AND WATER PUMPS OF THE MIESSE STEAM CAR WERE DESCRIBED AND ILLUSTRATIONS OF THE CHASSIS AND THE GENERATOR WERE GIVEN, ALSO A PART PLAN OF THE CAR. WE NOW COMPLETE THE DESCRIPTION.

The Engine.

The engine is of the single-acting type, *i.e.*, each cylinder gives one impulse only to each revolution of the crankshaft, this impulse being given over one-half of the circle described by the crank. In the double-acting type steam engine, such as is ordinarily used, two impulses are given—one on the outward stroke of the piston and the other on the return stroke. Three open-ended cylinders comprise the principal portion of the motor, which, running at approximately 550 revolutions per minute, develops 10 b.h.p. The bore of the cylinders is $2\frac{5}{16}$in., and the stroke $3\frac{1}{2}$in. As to its location it will be seen on reference to figs. 1 and 3 that it is placed immediately beneath the footboard of the driver, and is lettered A, which letter also indicates the cylinders upon fig. 4, depicting the lower half of the crank chamber with the crankshaft in position and the pistons D, D^1, and D^2 in position in the sectional cylinder casting. It might be explained that this casting has been purposely cut in two, and is used for the purpose of verifying the position of the pistons and the setting out of the valve cams. The crankshaft C C C is a forging running in three suitable bearings, the cranks being connected to their relative pistons by connecting rods E, E^1, and E^2.

The Valves.

Each cylinder is provided with two horizontally placed mushroom type valves, the stems of which work in particularly long guides, this being necessitated by the horizontal position of the valves. The three upper valves, which are seen in fig. 3 lettered B, admit steam to their respective cylinders. The exhaust valves are located beneath the cylinder, and their positions are indicated by the letters M M^1 and M^2 (fig. 4), these being the orifices through which they are inserted, caps, of course, being placed over them when in position. The letters N N indicate the exhaust steam outlet. These valves are actuated by two camshafts working at the same speed as the crankshaft. A gear wheel is keyed to a layshaft running in the bearings K K, and gears with the spur wheel J J and the crankshaft C C C. The gear wheels on the crankshaft intermesh with this above and below. The exhaust valve camshaft is provided with the ordinary cams set at 120° apart.

The cam operating the inlet valves is of somewhat peculiar construction, as it has been arranged to give a cut off to the inlet valves. A shaded drawing of this camshaft is given in fig. 5. It must be understood that this camshaft is capable of end movement while it is still being rotated, such movement being directly under the control of the driver. When the driver places the lever controlling the cut-off in the central hole of the quadrant, the camshaft is moved to such a position that the diggers operating the inlet valves come directly opposite the channel at the bottom end of each cam, this being concentric with the shaft itself. It is thus very apparent that no movement can be given to the inlet valves, even though the machine were propelled by outside aid. With the cut-off lever at its opposite extremity, the camshaft is moved so that the broadest portion of the cams B B B comes underneath the digger. In this position the valves remain open for their greatest period on account of the cam being of a V shape. With the one side of the V parallel to the centre line of the shaft, it must follow that, as the shaft is moved to bring the narrower portion or the apex of the V beneath the valve digger, the valve itself must remain open for a lesser period. The actual shape of the cam is perhaps best indicated opposite the letter C on the shaded drawing. To reverse the engine the "cut-off" controlling lever is moved to the left, which causes oppositely cut cams to come into operation.

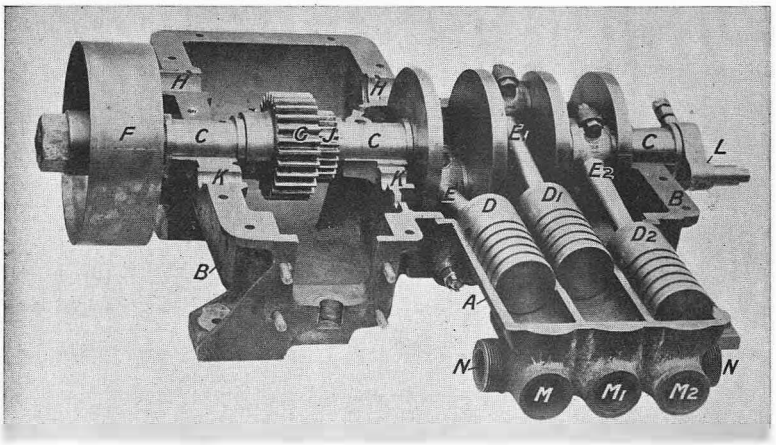


Fig. 4.—The Miesse steam motor, crankshaft, and pistons in position.

The crank chamber of the engine is of cast iron, and, of course, is provided with suitable bronze bushes for the shafts to run in. The countershaft with its differential gear is located in an extension

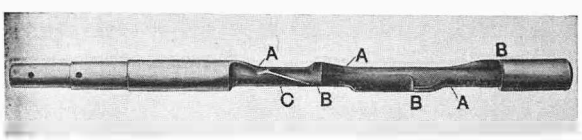


Fig. 5.—The inlet valve camshaft of the Miesse motor.

of the crank chamber proper, the countershaft bearings being placed in position in their recesses H H, and the gear wheel G intermeshing with the gear surrounding the differential box on the countershaft, the opposite ends of which carry sprockets from which power is conveyed to the road wheels by means of the usual side chains. Further bearings for the countershaft are, of course, provided at their outward extremities. The crankshaft of the engine is provided with a drum F, upon which a band brake acts, and with the crank pin L, to which a short connecting rod is attached operating the air pump E, fig. 1. The lubrication of the engine is effected by the usual splash method. A filling cup is provided in the top of the crank chamber, through which a measure of oil—quantity about one quart—is inserted every fifty miles. A tank on the dashboard gives an extra supply when necessary.

The Complete Car.

The whole of the mechanism is mounted upon a frame built of well seasoned ash, which is suitably supported by steel plates and cross members. It is supported upon the wheel axles by the usual semi-elliptical springs. Band brakes are fitted to the road driving wheels, these being applied by a side lever. Wheel steering is employed. The wheelbase is 6ft. 10in., and the track 4ft. 6in.

Starting and Control.

Many will be interested to learn the method of operating this car. This we are only able to explain briefly, owing to the limited space at our disposal. The water and fuel tanks being filled, an ordinary plumber's blow lamp is charged with naphtha and the pressure raised by means of the hand pump to vaporise the heater, and then the lamp is started. If everything is in order it will give a fierce blue flame which is hardly distinguishable in a strong light. The burner of this lamp is inserted into an orifice in the bottom of the generator casing, the lamp being placed upon the tray A^2 (fig. 1) provided for this purpose. As before mentioned, the flames are projected upon the second coil of the vaporising tube, which should be allowed to be thoroughly heated. This will probably take about ten to fifteen minutes to accomplish. The fuel controlling lever is then turned on, and paraffin is forced through the vaporising tube, where it is converted into a gas, this mixing with air in the mixing chamber, and becoming ignited at the burner. As soon as the burner is thoroughly alight and the fire burning strongly, the blow lamp can be removed and extinguished, but this should not be done until the generator burner is giving a good blue smokeless flame. If a yellow smoky flame is given off, the vaporising coil is not sufficiently heated. The oil should be shut off again until the blow lamp has raised the coil to a sufficiently high degree of temperature. To start the car the water bypass is opened by means of the lever in front of the steering column, and water is forced into the generator by means of the hand pump. While this is being done the steering wheel should be firmly held in the left hand, as directly the water is forced into the generator and sufficient pressure raised, the car will begin to move off. As soon as it does so, the automatic water pump comes into operation, and it keeps up the supply to the generator while the air pump maintains pressure upon the fuel tank. The speed is controlled by the amount of fuel passed to the generator, and this is regulated by the driver by means of the water bypass lever, which, as previously stated, is placed in front of the steering column. The greater the amount of water passed to the generator the more steam produced. There is consequently greater pressure, and this increased pressure passed to the engine naturally produces more power, with the consequent increase of speed. After some little practice the driver will find that the most economical method of operating the car is to use the smallest quantity of water consistent with the maintenance of a good working pressure, which should be about 180 lbs. to the square inch. A given pressure should be maintained for ordinary purposes, and the speed of the car varied by means of the lever actuating the camshaft, which, in its turn, times the cut off of the inlet valves as previously explained. This lever is situated beneath the steering wheel, and is provided with an inlet quadrant so that the lever may maintain a given position. With an early cut off a smaller quantity of steam is passed to the cylinders and the greatest advantage taken of the expansive properties of the steam. It should here be stated that after passing through the engine the steam is led from the exhaust valve chamber and passed through a series of radiators placed in front of the car, where it is so condensed as to permit no visible vapour. No attempt is made to condense and separate the water for the purpose of reconverting into steam, as the makers find it preferable to fit a large water tank rather than a condenser filter and separator.

When more power is required the cut off is decreased, and more steam admitted to the cylinder, by which means greater pressure is exerted upon the piston, though some of the expansive properties of the steam are lost. With the exhaust valve open to its fullest extent there is practically but little travel in the stroke of the engine to admit of the utilisation of the expansive properties of the steam. When running in this condition should still more power be required, the pressure of the generator is increased by admitting water. It will also be found that if the engine is running for any distance with the inlet valves opening to their fullest extent the ordinary working pressure of the generator will decrease, and to keep it up more water must be allowed to pass from the pumps to the generator. When used in very hilly districts it will probably be found necessary to employ an increased quantity of water, and that the burner flame will have to be strengthened by the admission of a small extra quantity of paraffin. After one has had some little experience, and carried out simple experiments in trying what a car will do with the levers in various positions, it will be found that long distances can be covered on a small consumption of fuel and water. In connection with the pedal-applied band brake to the countershaft, a throttle valve is fitted, which closes upon the application of the countershaft brake, so that it is practically impossible for the engine to be working against the brakes. Directly in front of the driver is a steam gauge J (fig. 3). This is fitted with a water column, above which is an air cushion actuating the pointer of the gauge. This is pre-

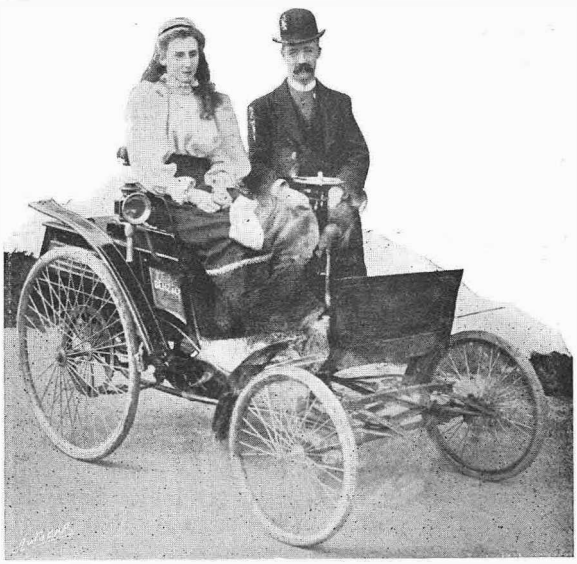
vided on account of the generator pressure varying slightly but rapidly as the water is flashed into steam. This would, of course, in the ordinary way mean that the pointer would never be at anything approaching stationary, so that actual pressure would be difficult to read; but by the adoption of this water column, which acts as a dash box, the indicator needle is very much steadied—a point which will be greatly appreciated by any driver who has operated a flash boiler provided with the usual type of steam pressure gauge. On the left of the dashboard is another small pressure gauge J[1], which registers the air pressure on the fuel tank.

The car should perform well on the hills, as the driver can always increase the volume of the fire and the steam pressure by first increasing the quantity of fuel passed to the burner, and then the amount of water injected into the generator.

At the time of our visit to Messrs. Turner's works there were several cars in the course of erection, and others about to be passed on to the coachbuilder's hands. We were particularly struck with the good, sound practice which obtains throughout the construction of this vehicle. The makers have very wisely realised the difficulties to be encountered in the operation of this class of vehicle—difficulties which find their equivalents in all other kinds of motor cars and mechanism—and they have endeavoured, not without success, to overcome them in the simplest possible manner without adding any complications to the mechanism. Leaving the actual control to the driver, they have made no attempt whatever to put brains into the vehicle, those of the operator being considered quite sufficient for the successful management of the Miesse steam car.

A PIONEER AUTOMOBILIST.

Mr. Henry Hewetson was, we believe, the first to import a motor vehicle into this country. In any case, he bought a 1½ h.p. Benz at Mannheim in 1894, and imported it into England. The machine had electric ignition, but only two speeds, and no reverse, and its owner confesses that at the time he knew nothing whatever about it. All he did was to fill up the water tank about every twenty miles, and the benzoline he used to buy at any oil shop. Of course, petrol was an unattainable luxury in those days. Generally he had to warm up the benzoline before he could start the engine. All this, it should be remembered, was two years or more before it was lawful to drive an autocar on the road at a greater speed than four miles an hour, and even this velocity was not permitted unless a man marched in front with a red flag. However, Mr. Hewetson, at the time he kept his car at Catford, found the police quite friendly, and they often helped him to push it up the hill to his stables. Still some months before the Act was passed the owner of the car took it to Yarmouth, and after using it there sent it back by train to Liverpool Street. From the station he drove it in the middle of the day through the City by the Mansion House, down Cheapside, to Charing Cross. Here he was stopped by the police, and his name and address were taken, and he was threatened with a summons on four different counts. However, he went to Scotland Yard next day, and explained that he knew he was technically breaking the law, but he could only get the car to Charing Cross from Liverpool Street by road, and after an official warning not to repeat the offence he heard no more of the matter. The same car he exhibited at the Crystal Palace, and many of those who took an interest in motoring in the pre-lawful days will remember it. People were driven once round the terrace for one shilling a head. After the car had paid for itself somewhere about three times over it passed to a new owner in Liverpool, and we believe is still running. Mr. Hewetson has never had a serious accident. He has had some narrow shaves in side-slip, and once long ago when he stopped his engine in heavy traffic in Oxford Street he jumped out to start the engine, but he forgot he had left his belt on the fixed pulley. He took one powerful turn of the flywheel at the back, the engine started, and off ran the car by itself, with its owner sprinting after it. Luckily he did not miss his footing, and managed to pull it up within a few inches of a pair of 'bus horses. More remarkable still he has never been summoned, though he has covered thousands of miles. About the time autocars were legalised, Mr. Hewetson founded a firm in his own name for the importation of Benz



Mr. Henry Hewetson driving his 1894 Benz.

cars, and only the other week resigned his position as managing director of that company. It will thus be seen that as well as being a pioneer motorist he is one of the pioneers of the movement in other respects, as the number of Benz cars running in this country to-day is very great. Many of them are quite old, and to the modern motorist's ideas out of date, but they nevertheless continue in use, and to all appearances give satisfaction to their owners.

THE WIDTH OF HIGHWAYS.

By John A. Williamson.

IT WILL BE REMEMBERED THAT ONE OF THE SECTIONS IN THE NEW MOTOR CAR ACT GIVES LOCAL AUTHORITIES POWER TO CLOSE ANY HIGHWAY LESS THAN SIXTEEN FEET WIDE AGAINST MECHANICALLY-PROPELLED VEHICLES. AS THERE ARE MANY PORTIONS OF IMPORTANT HIGHWAYS UNDER THE MINIMUM WIDTH, IT IS INTERESTING TO KNOW THE POSITION OF LOCAL AUTHORITIES IN THE MATTER.

By Section 8 of the Motor Car Act 1903 the Local Government Board may, by regulations made under Section 6 of the Principal Act 1896, prohibit or restrict the driving of any motor car or of any special kind of motor car on any specified highway or part of a highway which does not exceed sixteen feet in width or on which ordinary motor car traffic would, in their opinion, be especially dangerous.

This clause has naturally given rise to a good deal of discussion, especially that portion which deals with the prohibition of motor car traffic on highways which do not exceed sixteen feet in width. No doubt many legal questions will crop up under this section. Perhaps one of the first will be as to the way in which the measurement of sixteen feet will take place.

A highway includes all carriageways, cartways, footways, and pavements, and it may therefore be taken that the measurement of a highway must practically be made between fence and fence. The macadamised portion of the roadway is clearly not the portion to measure if the sixteen feet limit is proposed to be adopted.

The insertion of this clause in the Motor Car Act leads us into an interesting reasearch amongst the Highway Acts as to the width of highways generally and, in case they are narrow, as to the means to be adopted in cases where they should be widened.

The Highway Act of 1835.

Section 80 of the Highway Act 1835 enlightens us on the point of the width of highways, and declares that the county or road surveyor shall, and he is hereby required to, make, support, and maintain, or cause to be made supported and maintained, every public cartway leading to any market town twenty feet wide at the least, and every public horseway eight feet wide at the least, and to support and maintain every public footway by the side of any carriageway or cartway three feet at the least if the ground between the fences, including the same, will admit thereof.

The learned editor of "Glen's Highway Law," commenting on this section, states that this section authorises the surveyor to make the highway fit for the traffic, and so to maintain it to the prescribed width "if the ground between the fences will admit thereof," but it does not authorise him to trespass upon private property for the purpose of widening a highway which is of narrower width than that prescribed. If it is considered desirable to throw more land into the highway for the purpose of widening it, either to the width mentioned in the section or to any other width, an order of justices may be obtained in the manner prescribed by Section 82, or the requisite land may be purchased under the Highway Act 1861, the Public Health Act 1875, or the Metropolis Management Acts 1855 to 1862.

The other section of the Highway Act 1835, which deals with the question of widening roads which are narrow, is Section 82, which provides that where it shall appear upon the view of two justices of the peace that any highway is not of sufficient width, and might be widened and enlarged, such justices shall, and they are hereby empowered within their respective divisions to, order such highway respectively to be widened and enlarged in such manner as they shall think fit, so that the said highway when widened and enlarged shall not exceed thirty feet in width, and that neither of the said powers shall extend to pulling down any house, garden, plantation, or avenue to any house or any enclosed ground set apart for building land, etc.

The section, which is a very long one, also contains provisions as to the manner in which the required land shall be obtained and the assessment of the value thereof and the levying of a highway rate, if necessary, to pay for the land.

Mr. Glen, in commenting on this section, states: "It is no part of the common law liability of a parish to widen a highway because it is narrow and inconvenient for increasing traffic. Where a parish was indicted for suffering a highway to be so narrow that people could not pass without danger of their lives the indictment was held to be bad for stating that the way was so narrow that people could not pass, which was repugnant to its being 'the King's highway,' for if it had been as narrow as alleged people could never have passed there time out of mind."

The Duties of Local Authorities.

On the other hand, it is only right to observe that the position of affairs may be considerably altered should a rural district council wish a road closed against motor car traffic under Section 8 of the Motor Car Act 1903. If the reason alleged by the local authority be that the highway does not exceed sixteen feet in width, or that the road is so narrow that motor car traffic thereon would be especially dangerous, then it is only right to point out to the local authority their duties as contained in Sections 80 and 82 of the Highway Act 1835.

It is hoped therefore that the Local Government Board will adopt a wise discretion in the matter, and point out to local authorities their duties as to keeping and maintaining highways to a proper width.

These two sections of the Highway Acts are exceedingly interesting reading at the present moment, and their presence on the statute roll may do more than anything else to counteract the zeal of rural district councils and county councils who, in their desire to restrict motor car traffic on their roads, petition the Local Government Board to close certain of their highways against motor cars.

In the schedule to the Highway Act a form of order of two justices for widening a highway is set out.

A PARAFFIN CARBURETTER. By Hugh Dolnar.

NO CARBURETTER WHATEVER IS NEEDED TO ENABLE THE ORDINARY CYLINDER-FIRED MOTOR TO SUCCESSFULLY BURN HEAVY OIL, AND I SHALL NOW SHOW EXACTLY HOW PARAFFIN, OR "KEROSENE" AS WE CALL IT IN AMERICA—ORDINARY COAL OIL, AS SOLD EVERYWHERE FOR USE IN LAMPS—IS BURNED EVERY DAY IN THE "SECOR" ENGINES, WITHOUT SMOKE OR SMELL.

THE Secor motor cannot start cold with paraffin, and in its first form, using almost exactly the same form of intake passage now employed, it was needful to heat the intake pipe with a torch to start the engine, although after the motor once started this intake air pipe rapidly cooled, and was always cold to the touch while the motor was working.

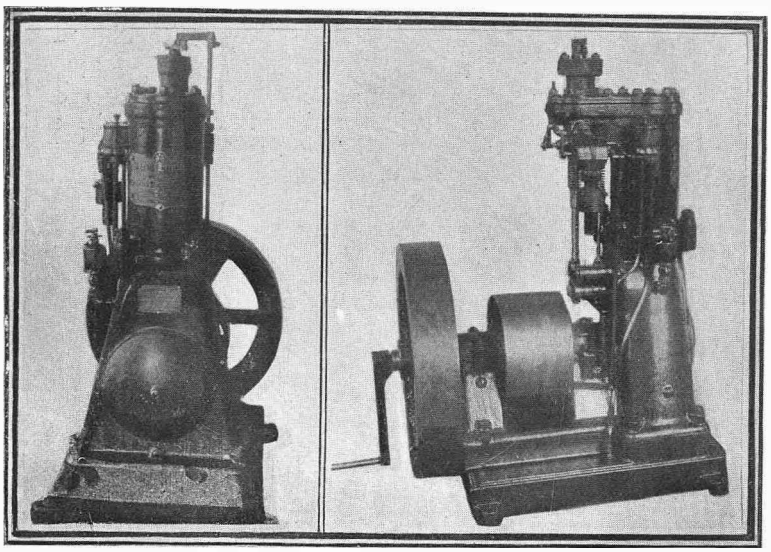


Fig 1.—The Secor engine. End and side views.

The truth of the whole matter is that the first cylinder-fired motors were gas-engines, using a fixed gas for fuel, and the liquid fuel users have not yet learned the principles of the art of burning heavy oil, because they adhere to gas-engine traditions.

Secor began with gas-engine theories, and endeavoured to vaporise paraffin for firing his engine, and, finally, not knowing what else to do, tried the direct introduction of the fluid fuel, heating the intake pipe to vaporise the liquid at the start. This heating was highly objectionable, as it involved the application of a torch with a large open flame for about fifteen minutes before the motor could be started. A carburetter having a fixed fuel opening projecting into the air intake close to the charge volume regulating valve has now been added, and this is charged at starting with a very small quantity of either alcohol, naphtha, benzine, or petrol. The motor invariably starts with a turn or two of the starting crank, and changes automatically to the use of paraffin fuel before the starting charge of more volatile fluid is exhausted.

I have been giving my personal attention to the action of the Secor motor at the factory in Harrison, New Jersey, U.S.A., where these engines are now being built on the interchangeable system, and I am not at all deceived in any particular as to the action of these fluid fuel fired motors.

Before referring to the illustrations, it is well that the reader should perfectly comprehend the true theory of burning fuel, which is so simple as to be clearly told in very few words. A certain bulk of air is required to burn a given bulk of any one kind of liquid fuel, and this bulk of air is very large in proportion to the bulk of the fluid fuel to be burned. The fuel must be measured very exactly to the air to ensure a completely combustible mixture. Too much fuel makes a mixture which is slow to light, and burns imperfectly, with the production of smoke and smell. Too little fuel makes a mixture difficult to ignite. The higher the compression, the more readily a poor mixture, containing but little fuel, can be fired. That mixture which contains almost exactly such quantities of air and fuel as will consume all the oxygen of the air by burning all the fuel present is the easiest to ignite, and gives the best results. Fuel completely burned gives no smoke and no smell. Hence all that is needed is to use air and fuel both at atmospheric temperature, neither one being either heated or cooled before reaching the intake valve, and to measure the bulk of air and fuel so that both shall be supplied to the cylinder in proper proportion at all times and under all

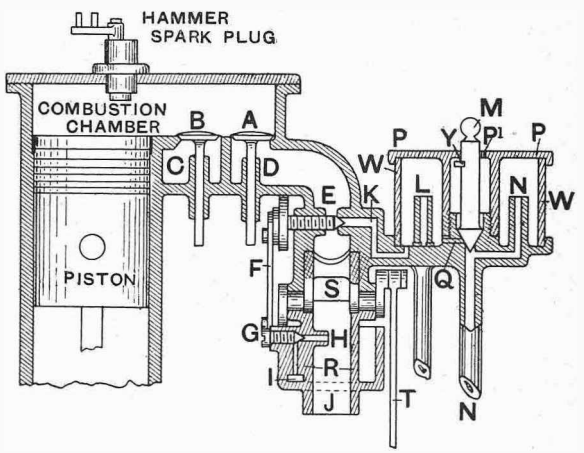


Fig. 2.—Diagram of the Secor engine.

A, inlet valve
B, exhaust valve
C exhaust outlet
D, inlet passage or port
E, paraffin valve
F, paraffin oil valve rod
G, starting valve
H, spirit delivery for starting
I, spirit passage to H
J, air intake
K, paraffin oil passage from oil cup W to valve E, which is regulated by the valve S
L, paraffin delivery to supply cup
M, oil cup throttle valve closing Q
N, oil return to tank
P, brass cover to W
P1, valve stem to M
Q, oil cup drain
R, spirit cup for starting
S, air volume valve
T, governor rod
W, paraffin oil cup
Y, valve stem pin

conditions. If the engine is regulated by varying the bulk of the cylinder charge (which is the correct method), then the volume of the air permitted to reach the intake valve must be accompanied by a very little less fuel than the air will burn completely.

It is not necessary that the liquid fuel should be vaporised before reaching the intake valve. Up to now it has been believed that the oil must be sprayed or atomised or vaporised in some way before it reaches the intake valve, and this is the error which has led to the use of the carburetter. No carburetter can be made to measure exactly the bulk of liquid fuel given to the air drawn into the cylinder under different degrees of heat; but if both the air and the fuel are about the same heat as that of the atmosphere, then they can both be measured, so as to form, not a mixture of absolutely constant proportions, but a mixture which will always ignite quickly, and will burn completely, so that the exhaust will be invisible and odourless.

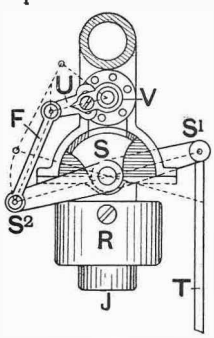


Fig. 3.—The Secor valve motion.

F, paraffin oil valve rod
J, air intake
S1, connection for governor and T
S2, junction between F and lever to S
T, governor rod
U, paraffin oil valve arm
V, paraffin oil supply index

Some fluid fuels are composed of lighter and heavier elements. Therefore it is an advantage to pump an excess of fuel and let some of it run back to the tank, always taking the pump suction from the bottom of the fuel tank, so as to be sure that the heavier portions of the fluid fuel are used first.

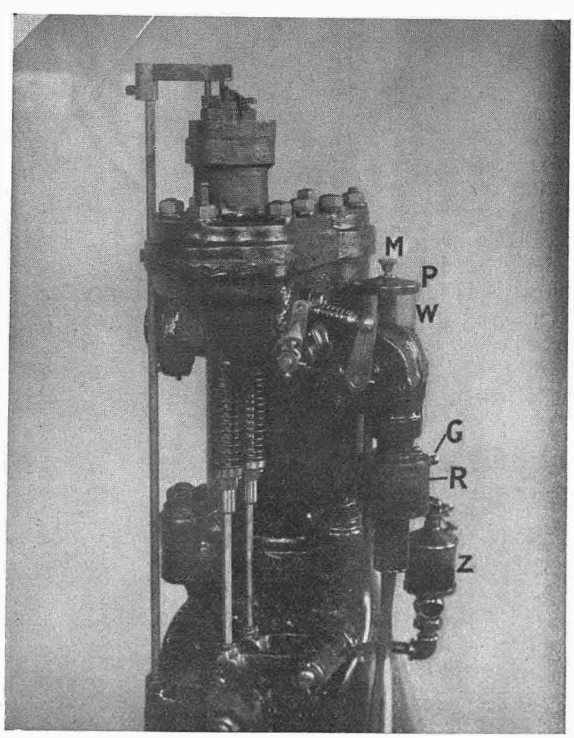


Fig. 4.—The Secor engine.

G, starting valve
M, oil cup drain valve
P, oil cup cover
R, starting cup for spirit
Z, lubricating oil cup.

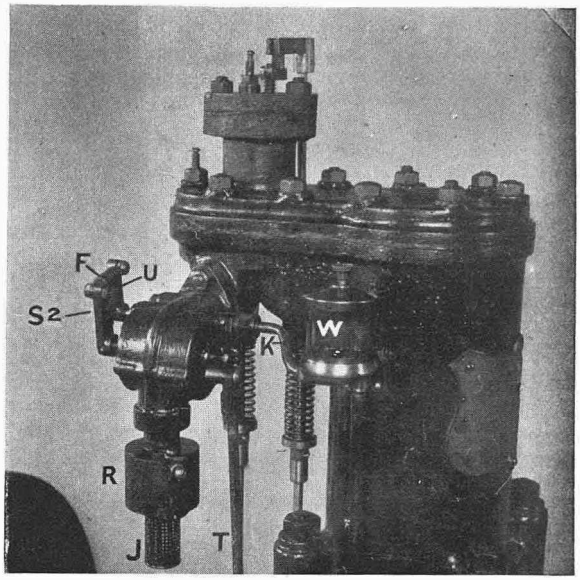


Fig. 5.—The Secor valve motion.

F, paraffin oil valve rod
J, air intake
K, paraffin oil passage from oil cup W
R, spirit cup for starting
S2, oil volume valve
T, governor rod
U, paraffin oil valve actuating arm
W, paraffin oil cup

The bulk of fluid fuel required for each cylinder charge of a small engine is so extremely small that so far no device, except a needle valve, screw actuated, controlling the flow of the liquid fuel under a very low gravity head into the air intake, has been found sufficiently accurate to give good results. The fuel must be under a very small constant pressure, and a low gravity head gives the most uniform delivery obtainable.

Fig. 2 is a diagram showing the action of the Secor kerosene motor, the arrangement of parts being changed and proportions varied for the sake of clearness. The other illustrations are reproductions of photographs taken from a 4in. bore motor.

A (fig. 2) is the intake valve. Both valves are mechanically operated and spring-closed in the usual manner. B is the exhaust valve, C the exhaust passage, D the intake passage, which takes air in at J, and in which the sector valve S can be moved to reduce the opening and regulate the volume of the cylinder charge. After the air passes S, it is supplied with the correct bulk of liquid paraffin by the greater or lesser opening of the passage K K from the paraffin glass cup W, which serves the purpose of the ordinary float chamber, and keeps a constant paraffin level, this being regulated by the height of the overflow pipe N. The paraffin is kept in a tank in the cast-iron engine base, and is pumped into W through the pipe L; the excess returns to the tank through the pipe N, the top of which is about one inch above the opening of K into the air intake passage marked D E J. A much higher gravity was first used, but the low head of about an inch gives the most uniform delivery.

The delivery of paraffin from K to the air intake is regulated by the needle valve F, which is moved by the arm U, rod F, and the arm fixed to the charge volume regulating valve S, which is moved through a second fixed arm S1, operated by the governor rod T (fig. 3). Opening and closing

the air valve S proportionately opens and closes the paraffin admission valve E; hence it is only needful to establish a proper relation between the areas of the air valve and paraffin valve openings to send a constant proportionate mixture into the cylinder, much or little in volume, as may be determined by the governor action. The paraffin needle valve is shown in fig 2 as being formed with an integral disc, in which six holes are tapped to take the screw passing through the segmentally slotted arm U (fig. 3), also through an index V, the combination being such that the governor can either close valve E on its seat in K, or leave it open as much as may

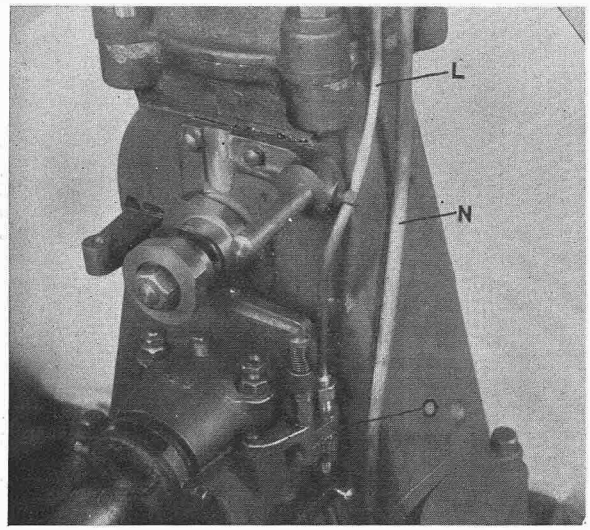


Fig. 6.—The Secor fuel supply.
L, delivery pipe to fuel cup. N, return pipe from fuel cup. O, paraffin pump eccentric and spring actuated

be desired when the governor is idle and the arm S^1 is in the high position shown in fig. 3. The needle valve thread must be coarse enough, and the needle valve point must be blunt enough to give sufficient opening with the screw movement available from the linkage employed. Suffice to say that these various proportions were obtained by the usual course of long trial, and that they have been found and work to perfection, so that in all positions of the valve S the exhaust is invisible and odourless, and the engine is perfectly controlled by the governor.

The paraffin cup is a glass cylinder W (fig. 2), supported on a metal base, and covered by a flanged brass cap P, having a long hollow stem by which it is screwed to the base. In the hollow stem of P the throttle valve M is placed, seated so as to close the cup drain passage Q, leading from the cup into the overflow pipe N. When M is seated as shown, Q is closed, and the action of the pump keeps the cup full up to the top of N, so that the top of K is under a small pressure. M has a pin Y, which can pass upward through a slot P^1 in P, and then M can be turned so that it will hang on Y, clear of its seat, leaving Q open to N, which keeps the cup empty and stops the engine.

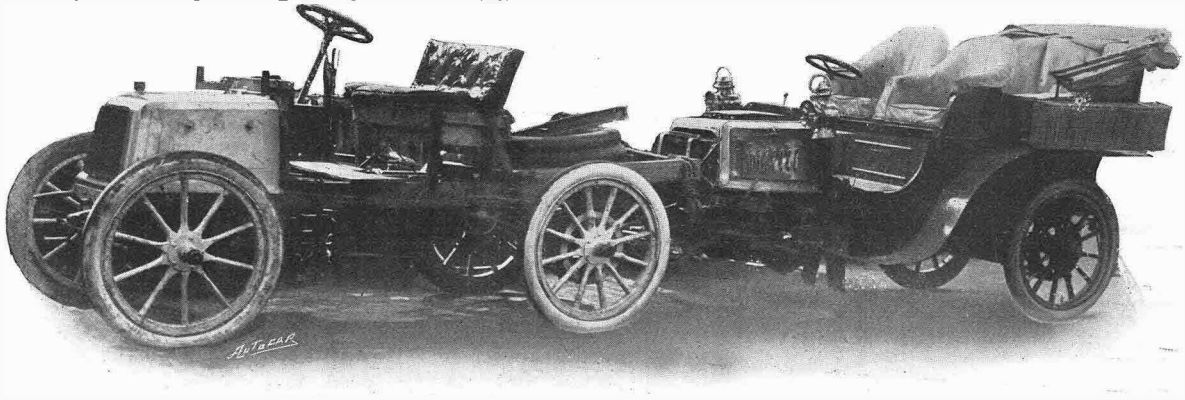
The starting cup R surrounds the lower part of the air intake J, and is an annular cup, interrupted by a narrow solid part, which has the passage I opening into the ring cup R, from which a small hole leads up to the fixed needle valve G, which governs the opening of I into the starting nozzle H, opening into the air intake J. The needle valve G is adjusted by trial, with R filled with alcohol, naphtha, or petrol, until when G is turned down hard just enough fuel will pass through H to start the motor, and never requires adjustment. H is a little below the top of R, so that if R is filled full of light fuel a little will run out of H.

To start the engine, M is hung up on P, off from its seat, so as to drain the cup W; then the starting cup R is filled with, say, petrol. (Alcohol is recommended, but petrol is used on the Secor testing stand.) Then the motorshaft is given a couple of turns with the starting handle, and the engine starts away, and in a few seconds the valve M is dropped down to its seat, and the engine, warmed by the starting charge, imperceptibly changes over to paraffin fuel.

The Secor motor does not foul the cylinder or valves, but the hammer spark plug works better than the jump spark. There is a slight soot deposit in the combustion chamber, but it occasions no inconvenience.

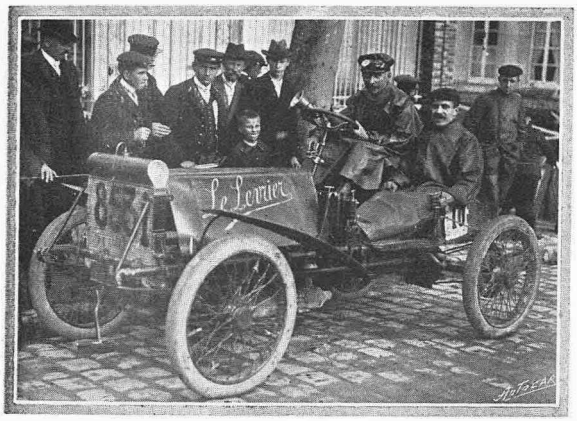
Paraffin is safe, is easily obtained everywhere, and is a more valuable fuel than gasolene, gallon for gallon. The price of gasolene has risen enormously in the past year, and is now nearly double that of paraffin, and must go still higher as its use increases.

On the score of safety and ease of procurement, kerosene is far the better fuel, and when price is considered it is clear that kerosene must very soon become the standard fuel for motor vehicles.



TOWING A PARTIAL WRECK. The above illustration depicts the method employed by Messrs. C. S. Rolls & Co. in bringing into their works a car whose front running gear had been damaged. A 12 h.p. Panhard is always kept in readiness to act the part of the automobiles' ambulance. The damaged wheels were taken from the axles, and the car slung to its rescuer by ropes round the dumb irons.

ceiving previous notice, so that they will be given no chance of changing chain wheels or otherwise altering the car for these special tests. The trials will take place in the second half of March, and will not last more than a fortnight. The cars must be fitted up as touring vehicles, with comfortable seats and room for small luggage, and they will be examined to see if they fulfil the required conditions before the trials. They will be classified according to the cylinder capacity of the motors, the first three categories up to two litres, four and a half litres, and seven litres respectively, and the fourth of more than seven litres. The results will be calculated by points. In the case of the chassis, for instance, the lowest priced frame will be taken as a basis and represent nought, and a point will be added for every twenty-five francs above this basis price. In the same way, the lowest consumption will be counted as nought, and ten points will be added for every hundred grammes above this quantity. There will also be a point for every second taken in the 500 metres speed test, a point for every centimetre beyond the smallest diameter of the circle taken in steering, and a hundred points for every hour of arrival after the closing of the control, this being calculated to allow of an average of eighteen to twenty-seven kiloms. an hour according to the class of vehicle, and the cars will also be penalised in a like manner for deficiency in the braking tests, comfort of the cars, and other factors required in a touring vehicle. In this way the winning car in each category will be the one with the smallest number of points. There is no doubt that the trials will prove very interesting, and will also be a delightful excursion for the competitors, who have been promised a particularly enthusiastic welcome in Italy. It is probable that they will be received in Rome by the King. The complete rules of the trials are published in the current issue of *La France Automobile.*



CHATEAU-THIERRY HILL CLIMB. A Decauville light racing car. It will be noticed that an extra water tank has been attached to the top of the radiator.

THE HOZIER ENGINEERING CO., LTD.

Extension of Works.

On Friday, the 9th inst., an interesting function was carried through in the new premises of the Hozier Engineering Co., Bridgeton, Glasgow. The company have found themselves so circumscribed since their car came to be recognised as a distinct success, combined with the limited extent of their premises, that they have been compelled to seek for more accommodation. The extension consists of one three-storey building about 40ft. wide by 120ft. long, and a single storey shop, corresponding in width with the length of the higher portion, and about 180ft. long. The ground floor of the three-storey erection is occupied as a showroom, about 40ft. by 70ft., the remainder being the upholstering shop. The first floor has been fitted up as a suite of handsomely appointed offices, including a general office, drawing office, manager's room, secretary's room, board room, etc. The third storey is in reserve for storage purposes. The single storey building is occupied by the coach or body-building, painting and finishing departments. The relief to the old works by the removal of these sections has enabled the firm to extend their engineering equipment, and it is estimated that their power of production will be about doubled. As the firm's recent output has been about thirty cars per month, the result of the extension should mean anything up to sixty cars for the same length of time. The function referred to was an inaugural luncheon given by the firm, at which a number of important West of Scotland people interested in the motor car movement were present. The Chairman of the company (Mr. William Alex. Smith) presided, and was supported by the Hon. the Lord Provost of Glasgow (Sir John Ure Primrose, Bart.) and by the Lord Advocate (Mr. C. Scott-Dickson, K.C., M.P.) The Lord Provost, in proposing continued success to the company, pointed with satisfaction to the improved methods that were being adopted by British automobile manufacturers, and their bearing on our commercial supremacy. The Chairman of the company, in replying, spoke of the indebtedness of their firm to the principle of free imports, as having enabled them to procure the best machinery and plant that the world could produce without having to pay one penny of import duty. This was an advantage which was enjoyed by no other country except Great Britain. Those ancient, musty, swaddling clothes of Protection, he said, which were cast off sixty years ago, and which some of their friends wished to envelop them in again, would prove nothing but the bonds and fetters of their industry, and would ultimately prove the strang-long cords of the British supremacy of trade. What they wanted to be protected from was ignorance and indolence. The only kind of protection they required or desired was protection from their faults and follies, and that was in their own hands.

Other toasts were drunk, including the health of the Lord Provost, which was proposed by Mr. C. Scott-Dickson, K.C., M.P., who also made references to the bearing of the fiscal proposals on the motor and kindred industries, and congratulated the company upon the success of the Argyll cars.

Correspondence.

The Editor is not responsible for the opinions of his correspondents.

SOUTHPORT SPEED TRIALS.

[3218.]—Can any reader inform me why small steam cars were so religiously kept out of the programme of the above trials? Why was there only one class, and that for cars costing up to £800? Is it that those who had the arranging of the trials are only interested in petrol cars? Steam is still the standard power of the world, and not to be despised. I have myself a small car that could beat any of the touring cars in the first three events over the flying start kilometre race, and it cost under £200. As the trials were only to test the speed in a short distance, why should any car be debarred from running as long as it was under the price specified? It looks very much as if the petrol car people were afraid of steam opposition. When properly handled, the steam car is the most charming and delightful car to drive. It would interest some of your readers to see some letters I have from an important late manager of a steam car company, which are most eulogistic in praise of steam. He said eighteen months ago that the steamer was, and would be, the only car. Things have changed since then. BOILER.

[3219.]—Referring to Mr. Cross's letter (3178), if I remember rightly, the "Astle-Wallis" petrol-electric car (long since scrapped owing to bad construction of engine and underframe) used to pass 20 ampères by 16 volts through the motor to run the engine (two cylinders, 4in. by 5in.) with inlets open, and from 45 to 50 ampères to run the engine with compression on. It was certainly more than double.

Cold mornings the engine used to be very bad to start, and I had often to run it from ten to twenty seconds with compression on before explosions commenced. I had therefore plenty of time to notice the reading of the ammeter. Until the motor had gathered speed the inlet valves were depressed to take compression off. We are now fitting an 8 h.p. De Dion with the petrol-electric system, so in the course of a week or two I shall be able to give you the exact readings. M. J. ASTLE.

ENGINE BRAKING.

[3220.]—I have been much interested in the discussion in your columns on the above subject. But to my mind some of your correspondents err in assuming that the engine acts as a brake to an equal extent under all circumstances.

Now, the actions of the piston in an engine working on the ordinary Otto cycle are as follows: 1. Suction. 2. Compression. 3. Expansion. 4. Exhaust. Of these the compression and expansion always balance each other, and so together have no braking effect, while the exhaust stroke obviously cannot act as a brake. (Of course, I assume that the current has been switched off.)

So it comes to this: If the engine acts as a brake at all, the first or suction stroke is entirely responsible for it.

Let us now consider this stroke under various conditions.

1. When the exhaust valve is opened (as can be done with motor cycles): Any braking effect in this case must obviously be due to friction.

2. When the throttle is wide open: Braking effect inappreciable, and only due to overcoming the resistance of the inlet valve springs.

3. When the throttle is partly closed: In this case there will be a braking effect, as there will not be a free flow of gas into the cylinder, and the descending piston will produce a partial vacuum in the inlet pipe and cylinder during each suction stroke.

4. When the throttle is wholly closed: The engine will act as a brake for the same reason as in 3, but to a greater extent.

From the above it seems that, when the current is switched off, the engine only acts as a brake when the throttle is partly or wholly closed, and if there is any braking effect when the throttle is open, it is solely due to friction in the engine.

I should be very glad to know from motorists how far the above theories are borne out in practice.

There is one other case which must be considered by itself. Some engines have a compression tap. If this is opened and the current switched off, the engine acts as a very efficient brake, for the following reasons:

During the suction stroke (if the throttle be closed) the piston sucks in air through the tap; this will cause a braking effect, since the opening in the tap is too small to allow the air to enter freely, and a partial vacuum is produced.

During the compression stroke the air in the cylinder is compressed, and some of it is driven out through the tap. This stroke also acts as a brake, while the expansion stroke acts in the same way as the suction stroke, also braking. So we get three out of the four strokes exercising a retarding effect.

This method, however, cannot be used on the majority of cars, as they have no compression taps, or, if they have, they cannot be opened from the driver's seat.

CHASSIS.

THE KREBS CARBURETTER.

[3221.]—I notice a letter (3213) in your last issue which states that the Krebs carburetter does not reduce the power of the engine, but that its action has an entirely opposite effect. I can only suppose this to mean that it increases the power of the engine. Surely your correspondent must be writing under some misconception. If the petrol and the air are properly balanced, naturally the engine must give more power than if an obstruction is placed in the way which prevents the cylinders getting their maximum quantity of gas on the suction stroke.

Obviously, from the user's point of view, it is desirable that the quantity of petrol and air should vary with the speed of the engine, and this, of course, Krebs does, but I think the following simple formula will show that it does reduce the power by one-twelfth, whereas the Napier system referred to by your recent correspondent does not suffer from this disadvantage, as the air inlet is opened by other power than by suction. The loss of power by using the Krebs carburetter is arrived at as follows: Assume ordinary air pressure of 15 lbs. a square inch. It is not reasonable to suppose that on the suction stroke one will get more than 13 lbs. to the square inch into the cylinder—11 lbs. or 12 lbs. is nearer the mark.

The air inlet of the Krebs carburetter is not likely to open with less than 1 lb. to the square inch. Therefore, the amount likely to get to the cylinders is, say, 12 lbs. or 13 lbs., less 1 lb. for opening Krebs air valve, and whatever loss of pressure there is in the initial filling of the cylinders—if that be one-twelfth—then the power is reduced by one-twelfth. There can be no question on this point. It is obvious to anyone who would take the trouble to work it out.

Krebs's invention is a most useful one to the automobile industry, but the English invention seems to be equally useful, and does not have the disadvantage of loss of power. CHAS. T. RIDDALLS.

[3222.]—With further reference to the letter which appeared in your issue of the 3rd inst. signed by Mr. W. Watkins, I enclose you a letter from the Chevalier Réné de Knyff, which is quite typical of him, and which bears out my letter which you so kindly published in your issue of the 10th. GEORGE DU CROS.

[COPY.]

October 8th, 1903.

Monsieur Georges Du Cros,
14, Regent Street, London, S.W.

Dear Sir,—I am in receipt of your letter of the 7th instant, enclosing the article from *The Autocar* re the Krebs carburetter, and also your reply.

I consider the latter most judicious; and when I see people like Mr. Watkins—whom I have not the honour of knowing—putting forward such extravagant notions I can but regret that this gentleman is not prepared to substantiate his statements with his money, as in such a case we could wager him a sufficiently large sum of money to prevent his forgetting the good qualities of our carburetter. Yours faithfully,

(Signed) CHEV. RENE DE KNYFF

A RELIABLE SMALL CAR.

[3223.]—Many enquiries are made as to the reliability of small cars for two persons at a reasonable price. My experiences after driving one over 1,000 miles may be interesting. The car I purchased in July is a two-seater,

made by the Ridley Autocar Co., Coventry, weighs 4½ cwt., has two speeds, gear drive, and ample brake power. The engine is a 4 h.p., made by Johnson, Hurley, and Martin from the Ridley Company's designs. I have driven it almost daily; the only stoppages have been to replace a small cotter pin in advance spark lever and a pin in one of the two to one gear wheels of engine. With these exceptions the mechanism of the car has required no adjusting; nothing but the usual oiling and cleaning has been done. The tyres—Dunlop 2½in. beaded edge—have not been punctured, and have very rarely needed inflation, and show no signs of wear at present. I can easily mount any ordinary gradient, with two up, on top speed. The car is particularly quiet and easily handled, and will average fourteen miles an hour comfortably. I should like to add that I am not interested in any way in the firm who made it. FRED J. HARKER.

A NEW PREDICAMENT.

[3224.]—Mr. F. G. Cooper's rather unmannerly letter does not help me much. He is, I suppose, one of those persons who boast of their frequent fines for furious driving, and who make an intimate companion of their chauffeur.

It is idle to talk of honesty when opportunity for dishonesty is boundless. What conceivable check have I of the petrol and oil my driver would use for his motor bicycle? I venture to say that nine persons out of ten would not hesitate to be dishonest under the circumstances—would probably fail to recognise any dishonesty in purloining the small quantity of each commodity necessary to them.

Again, since last writing to you, I have received complaints concerning my driver and his bicycle, which distinctly bear out my contention that if he offends I get part at least of the blame. It appears that two Sundays ago he dashed through the throng of people coming out of a village church a few miles off at a pace "estimated at thirty miles an hour" (I quote from a letter). Whatever his pace, he frightened various law-abiding citizens. Result: I get several letters which insinuate that I should keep him in better order. Perhaps Mr. Cooper is thick-skinned enough to enjoy this kind of thing. I am not, and the motor bicycle has duly departed. My boy (who, I may mention, has been with me for more than a year) stays on, which effectually disposes of the "twenty-four hours' work per diem" sneer.

As to the price, a glance through any recent number of *The Autocar* is enough to prove that second hand quads, tricycles, and bicycles are to be had at or about the figure I quoted, viz., £20. Naturally, I did not refer to new machines. Y. Z.

NON SLIPPING TREADS.

[3225.]—It would be very interesting if some of your correspondents would give their experience of non-slipping treads or devices besides Wilkinson treads and Parsons chains. Now that motor cars have been brought to their present state of reliability, and tyres are practically puncture-proof, it seems to me that the two great evils to be overcome are the dust nuisance and side-slip. In Ireland I fancy the roads particularly lend themselves to side-slip, partly, I fancy, on account of the large amount of limestone metalling used, and partly the very bad shape of great deal of the surface. In this county (Carlow) alone a few weeks ago three cars were more or less smashed in one week, and now I read of two cars being completely capsized in Ireland in the last few days. I, like many others, use my car in all weathers, using it entirely for attending hunting fixtures about four days a week, and often having long drives home in the dark, and I find the strain of continually correcting the car and watching for slip very trying after a long day's hunting. Of reliability I have no complaint. I have driven my new 12 h.p. Clement about 3,000 miles since the beginning of July, with only three involuntary stops, viz., two broken exhaust springs, and once to adjust trembler. In each case I could have driven on with three cylinders had I so desired. No tyre troubles whatever. Last winter I used a 9½ h.p. Clement also with most satisfactory results. I used Falconnet square treads last winter, which certainly are a help, and the hind tyres which I had first fitted were not even inflated between Nov. 1st and March 1st. W. E. GROGAN.

P.S.—I may add I keep no *chauffeur*, an ordinary stable helper cleaning and oiling for me.

[3226.] The very fair letter of your correspondent "Movolcap" on page 439 of your issue of the 3rd inst., is of great interest.

From the use of a *nom de plume* it is not possible for us to trace the number and date of manufacture of the Non-skid referred to. Were we able to do this an explanation could probably be given, but we can say that the chain used to-day in our Non-skids is giving the greatest satisfaction to users, owing to the new process of hardening and tempering each link, so that the link is very hard, yet if tested to destruction considerable deformation takes place before it will break. Difficulty has been experienced in obtaining the very best material, and in some of the early Non-skids brazed chain was used, being the best then obtainable, but this is not comparable in any way with the hardened and welded chain used to-day, and which will run four or five times the distance.

The manufacture of our chain is quite a special one, and every care is taken to ensure absolutely sound links. If, however, after considerable wear, or for any other reason, a link breaks, any single chain is easily replaced with a new one when convenient, and the Non-skid always thus retained in an efficient condition.

As an example of the protection afforded to the tyre, we enclose a short piece of motor cycle chain in one link of which a small flint is firmly wedged. This is quite a common experience, and cuts in the outer cover are largely guarded against, whilst the chains protect the cover and take the wear.

Many conditions may contribute to the breakage of a link, such as insufficient clearance between the side of the tyre and driving chain, running the wheel against a kerbstone, having the Non-skid too loose upon the tyre, too violent use of the clutch or brake, etc., but we have seen the present chain dragged along the ground through the wheel being locked by the brake without a single chain giving way, though this is highly inadvisable practice, and particularly severe upon our, or any other, non-skid.

It is as inadvisable to run the Non-skids too loose as too tight, but in any case they cannot come off accidentally if fitted according to instructions, and with the locknuts and safety chains fastened, provided that the right size Non-skid is used, and the driving chain is not so close as to break the hoop wire.

Finally, we are always glad to avail ourselves of the criticism of any user of our Non-skids, or to fit early pattern non-skids with the latest chain.

THE PARSONS NON-SKID CO., LTD.
HARRY PARSONS.

[The piece of chain mentioned is an interesting study. The four middle links of the chain, in one of which the flint referred to is tightly wedged, are worn down fully two-thirds of their sectional diameter. As to the two central ones, on the first and fourth link the wear is not quite so great. The next two links on either side show a slightly flattened surface on the two points presented to the road, and their companion links are only just touched, while the remaining ones down to the edge of the tyre show no sign whatever of wearing. As to the other side of the chain, it simply presents slightly polished surfaces at the points where it has touched the cover. The total area covered by such points when in contact with the cover is very small indeed: in fact, considerably less than would be imagined, this, no doubt, explaining why the chains themselves produce no ill effects on the tyres.—ED.]

[3227.]—I have been reading with interest the correspondence going on in your valuable paper in reference to this important subject, but have not noticed any reference to the new Dunlop non-slipping tread. Would any of your readers who have used this device kindly give their experience as to its non-slipping qualities and how it wears? In this district (Crieff, N.B.) where blue whinstone is used for road repairing, the grease is very treacherous in wet weather. W. KEITH MURRAY.

SATISFACTORY TREATMENT.

[3228.]—From letters in previous numbers of your paper, I notice complaints are made of excessive charges for replacements of parts of cars. As generous treatment by firms is worthy of recognition, I should like to state for the benefit of others my experience of the Swift Motor Co.

Whenever I have occasion to write them my letters are attended to promptly, and any parts required are also sent off promptly—generally by return—whilst the charges—when made—are most moderate.

On several occasions the parts have been sent absolutely free. To a purchaser of a car it is a very important matter to know what sort of treatment he will receive from the makers whilst he is running the car, and as an owner of a Swift I can confidently, from my own experience, assure any intending purchaser he will receive prompt and generous treatment from the Swift Co. May I add that everything about the car is sound and strong, and it is just the car for "the man of moderate means." I am a private owner and have no interest in the matter, except a feeling of gratitude for the treatment I have received.

W. E. HUDSON.

THE RELIABILITY TRIALS.

[3229.]—I notice in last week's *Autocar* a letter signed by Amateur Driver on the subject of the reliability trials. Mr. A. D. cannot see the use of trials as run at present, and advocates that all the drivers should be amateurs.

I also should like to have a reliability trial open only to amateurs, but this would have to be run in addition to a reliability trial under the present or similar rules.

Mr. A. D. overlooks the fact that the Automobile Club reliability trial is *not a sporting event* or a personal test, but is a test for motor vehicles, the result of which, to a great extent, influences the businesses of the successful firms during the coming year. Every firm being allowed to appoint its own drivers, it is only reasonable to suppose that each vehicle will be driven by someone thoroughly competent, and in this way all cars start on an equality.

If only amateur drivers were allowed this would obviously be unfair to some firms, as there are amateurs and amateurs, some being experts and some just the reverse.

It would be hard lines on a manufacturer to have his car condemned as a failure because some amateur duffer owning one of his cars entered for the trial, and, through ignorance or carelessness, was not successful.

With regard to cleaning the engine during the trials, I do not agree with Mr. A. D., as some cars have their engines much more protected from weather than others, and this is a very important feature, and the makers of the protected engines should reap some benefit.

ERNEST H. ARNOTT.

[3230.]—On considering the results of the recent reliability trials, I am much struck at the number of failures and the amount of trouble incurred by what I, as a mechanic and motorist of over five years experience, should consider as easily avoidable causes. The list of withdrawals on p. 429 of your October 3rd issue will be found to include twelve failures in gearing, inclusive of chains, cardan joints, and sprockets; four in pistons, connecting rods, or crankshafts; three ignition failures; and two failures in cooling appliances.

The majority of the above mentioned failures are English cars, which certainly does not show up the reliability of the home production to great advantage. In "Causes of Road Stops," p. 450, your October 10th issue, I find: Breakage of wires; nut coming off silencer; insufficient head between carburetter and petrol tank; cushions stopped up ventholes to petrol tank in two instances, both different makes; lost pin from propeller-shaft; and in four instances cotters of inlet valves coming loose or otherwise giving trouble. Here again the majority of troubles took place on English cars.

I contend that failures and troubles such as the above are due either to faulty designs, bad material, careless workmanship, or a combination of the three, and are therefore inexcusable.

No doubt the makers argue most of the road stops were caused by very little matters which were easily put right, but this is no consolation to the owner whose car is constantly stopping because a pin drops out here or a wire breaks there, or the petrol refuses to run into the carburetter when the cushion stops up the venthole, or the car is going up hill. An inlet valve cotter coming loose may appear a very trivial matter on paper, but should the cotter or any of the parts get into the cylinder the job of getting them out again and the state of the owner's feelings are much better imagined than described. And the most annoying part of it is that most of these troubles might, if the makers would only exercise a little care and common sense, be entirely avoided.

I notice one 18 h.p. car was withdrawn because it "could not run slow enough." This appears a most extraordinary reason, but if it is the correct one I congratulate its owners on their wisdom in withdrawing it, and should also think it would be as well if they were to withdraw it from the market and replace it by something that *will* go slower, as a car which cannot go at the speed of the trials, twelve miles per hour, is an absolute nuisance to other users of the road, and it is this class of car which has brought motoring into such disrepute in certain quarters, and raised up such a storm of indignation and prejudice against the motor in general.

Some of the excuses for not doing non-stops must be considered as very childish; the practical buyer, for instance, would not be at all influenced by the statement that had so and so not happened we should have made a non-stop run, neither will the hundreds or thousands of miles stated as having been done without trouble before or after the trials influence him in the slightest degree. What he will look at are the actual results attained by the cars during the trials, and from these he will form his own opinion as to the merits and shortcomings of each machine.

Further, I cannot look upon the fact of a car having to go into the trials untested, owing to its not being finished in time, as any excuse for bad behaviour. The maker should have arranged to finish it earlier and get it tested. My experience has generally been that the makers are given very much to being behind time, and the majority of cars are sent out to the public in an untried and experimental state, especially the English makes, and I firmly believe the preference given by many motorists to the foreigner is due to the home makers having disgusted their customers by putting untried and experimental machines into their hands.

On the whole the trials show a lack of attention to small details, and the makers would do well to look into this and remedy it, as little points like I have mentioned make all the difference between a car being a source of pleasure or a constant annoyance to its owner.

H. W.

HORSE DANGERS.

[3231.]—Having read your recent article in *The Autocar re* horses in country roads, I beg to give you our experiences coming from London. Between Bridport and Charmouth we met a man with one arm riding a bare-backed horse and driving another in front of him, with the traces and harness trailing on the road; the latter was quite loose, and although we trumpeted continuously he made no attempt to catch it. As we were passing it slowly it suddenly charged us, and broke the lamp with its head. We stopped, and asked the man where he came from, and he said "The Coach and Horses," Charmouth, but on enquiry there they told us they had no man out at all. Going from here to Brixham we met a boy of nine or ten years of age on a sixteen hand mare, with a loose foal. He could not get off, as he would never have got on again. The lane was narrow, and it was impossible to pass him, and we had therefore to stop until he turned into a farm some way up. Recently, going out of Brixham, we found a cart with a restless horse, and only a child (a girl) of seven or eight years of age holding the reins with one hand and a baby by the other, both right against the wheel; if the horse had started they would certainly have been killed. We were obliged to stop until the police came up and held the horse while we passed. Our car is a 10 h.p. Georges-Richard, and is very silent, and we are very careful drivers, but such incidents are most annoying. As for cows they are a positive nuisance, one man often driving twenty with no assistance, taking up the whole public highway. We are very pleased with our car, and although we are three up and luggage, we have not failed to get up any hill, and many of them in this part of the country are very stiff, long, and loose; in fact, like house roofs.

A. T. C. ACATOS.

[Several letters are unavoidably withheld.—ED.]

Flashes.

The Automobile Club has completed negotiations with Mr. Mundy, and the necessary documents have been signed and sealed in connection with the Purley racing track. The work will be started at the earliest date possible.

* * *

A 5 h.p. Oldsmobile car (of which Messrs. Chas. Jarrott and Letts, Ltd., are the sole agents for Great Britain) has succeeded in making a trip from San Francisco to New York. The distance travelled was between four and five thousand miles, over very bad roads, or no roads at all, in places over miles of sand, and across small streams. The car performed the whole journey without any serious breakdown. This is the most notable achievement that the Oldsmobile has done, especially as the trip was made on an ordinary stock car.

* * *

Last week, on page 457, we described a very ingenious form of electric ignition invented by Mr. Budge, and we intend to refer to our subsequent inspection of it at work. It will be interesting to add that Mr. G. Higginbotham, of Macclesfield, the well-known owner of a 60 h.p. Mercedes, tells us that he has had the arrangement, but in even a simpler form than described by us, on his car for some three months. He has found it a great convenience when touring, as he can start the engine himself from cold, and afterwards from the seat if it is necessary to stop for any reason while driving. Those who have attempted to start a 60 h.p. single handed will at once appreciate what this means.

* * *

On page 465 last week we reproduced a telegram from Southport mentioning that Mr. Higginbotham, when driving his 60 h.p. Mercedes back to Macclesfield after the races, had broken a wheel and had got into the ditch. It would appear that this telegram was not entirely correct. What actually happened was, in taking a rather sharp corner the connecting rod between the two front wheels became detached from the ball joint. This left one wheel free, thus causing the car to take a straight course instead of going round. The vehicle struck the hedge eventually, and was got out after some difficulty. After fastening the rod with some copper wire and leather laces, such as are used for splicing belts, it was driven home, none of the vital parts being damaged, only a few spokes, a mudguard, and one of the sides suffering. The report that the wheel was smashed is untrue; none of the tyres even were damaged. Mr. Cordingley and his wife and sister were following Mr. Higginbotham in their 40 h.p. Mercedes, but luckily managed to keep clear.

"THE AUTOCAR" DIARY.

Oct. 17.—Scottish A.C. (Western Section). Anniversary Run to Ayr. Start at 10.30 from Blythswood Square, Glasgow
" 18.—German A.C. Race Meeting at Berlin.
" 22.—A.C.G.B.I. House Dinner and Paper. "The Governing of Gas and Petrol Engines," by Mr Dugald Clerk.
" 29.—A.C.G.B.I. House Dinner and Paper. "Marine Motoring," by Mr. Bernard Redwood.
Nov. 1.—German Imperial War Office Competition for Alcohol-driven Trailers (entries close).
" 5.—A.C.G.B.I.—House Dinner and Paper. "Heavy Motor Traffic," by Mr. E. Shrapnell Smith.
" 12.—A.C.G.B.I. House Dinner and Paper. "The Limitation of Cylinder Capacity," by Mr. C. W. S. Crawley.
" 15.—German Imperial War Office Competition for Alcohol-driven Trailers.
" 19.—A.C.G.B.I. House Dinner and Paper. "Motor Vehicles at the Manœuvres," by Mr. J. F. Ochs.
" 25.—Aero Club Anniversary Dinner, Carlton Hotel, London.
Dec. 31.—Entries close for 1904 Gordon-Bennett Race.

Mr. E. Smith, of the Motories, Broad Street, Halifax, informs us that he has removed his garage to more convenient premises on the opposite side of Northgate, where he has room for twenty cars. He has also arranged for special stalls, where owners can keep their cars under lock and key.

* * *

An automobilist of many years standing, who, for obvious reasons, wishes to remain anonymous, writes us as follows: "I have very often been stopped by the police, but have never been summoned. At one time I had cigars on the label of which my name and address were printed, and if a policeman wanted my name and address I would give him a cigar, and, of course, after he had handled it I could not take it back." Our sense of morality and our knowledge of human nature forbid us to comment on the communication.

* * *

We are often asked how many thousand miles a car will last, and we are compelled to confess that we do no know what is the life of a really good car. Some of the first that were ever made are still running, and beyond the renewal of chains, tyres, and a few small parts, they are the original machines. The active life of the main structures is apparently so long that the machines will be hopelessly out of date before they are really worn out, or so much worn that it will be less costly to buy new cars than to renew the worn parts of the old ones. Besides the Benz mentioned to-day we have some particulars of a De Dion which has been run 25,000 miles, and which the owners think is good for another 25,000 miles. The makers, however, disagree with the estimate, as they say that their experience shows them that a properly built machine, if intelligently looked after, will be good for at least 100,000 miles, and even then will be a very long way from being past repair.

* * *

We recently received from Messrs. G. T. Riches and Company, 4, Gray's Inn, W.C., samples of two qualities of high and low tension wire for electric ignition purposes. The cheaper quality is very good value for its class. The higher quality samples are really excellent. The low tension wire is thoroughly well insulated, being first wrapped with hemp, then coated with vulcanised rubber, bound with tape, and finally woven over with hemp, the whole being coated with good protecting material. The high tension wire is thickly coated in the first place with pure rubber, over which is a coating of black insulating rubber, then a third coat of grey rubber, over which is a very substantial coating of black rubber. The whole diameter of the cable is 5/8in. Though the price of this better quality wire is nearly double that of the second quality, we would strongly recommend the better quality, as one cannot be too careful in such matters

A constable at Highgate accused two persons of "using motor car talk." He explained to the puzzled magistrate that they were shouting "pip-pip."

* * *

One of the most interesting and at the same time most sporting matches in the Southport series was that between Mr. Higginbotham and Mr. Fletcher. Both had 60 h.p. Mercedes with the same gear. Mr. Higginbotham won handsomely, doing about four miles an hour better than Mr. Fletcher.

* * *

Under the heading "To Test Sparking Plugs" on page 449 in the last issue of *The Autocar* we mentioned a switch whereby any cylinder might be stopped firing by pushing a button. In reply to many correspondents who have asked where this useful instrument may be obtained, we may say that the one which we examined was supplied by Messrs. J. Lacoste and Co., of 176a, Shaftesbury Avenue, London, W.C.

REMINISCENT OF THE 1,000 MILES TRIAL. Some of the cars outside the Grand Hotel, Eastbourne. Photo.

* * *

The Motor Car Bill is now under the consideration of the Highways Committee of the London County Council, and a report may be expected shortly. Some of the rural councils have gone so far as to express the opinion that motor cars cannot be driven with safety to the public at a speed exceeding ten miles an hour on any of the roads in their district, although one may drive miles on some of them without meeting a living soul.

* * *

We are pleased to hear that Captain Cecil Mitchell-Innes, of the Queen's Own Cameron Highlanders, who was on Thursday appointed chief constable for Lincolnshire, is not likely to cause automobilists to be harried or persecuted, but that the new Act, in his hands, will be fairly and impartially administered.

* * *

Mr. H. H. Timberlake, of Wigan, has been driving Lord Balcarres through his constituency on a motor car in connection with a series of political meetings that have been held. The district is so wide and the gatherings so far apart that this mode of locomotion is found to be a great convenience and to afford a great saving of time. The car used was a 10 h.p. Cottereau.

The Sanyo Railway, an important Japanese line, has decided to open a service of motor cars between Nü Station (on the Bantan line) and Kinosaki—a distance of forty miles.

* * *

Mr. D. M. Weigel informs us he was stopped a few days since by Sergeant Jarrett on the Guildford Road. The sergeant said to Mr. Weigel, "You are going too fast," and Mr. Weigel at once admitted it, and on the sergeant enquiring why, he replied that it was ridiculous to ask anybody to do twelve miles per hour, and if the sergeant were a motorist he would comprehend it. The sergeant replied he had noticed that Mr. Weigel was always a very careful driver through towns and villages, and then wished him a pleasant good evening, and told him he would not hear any more about it. Mr. Weigel is of the opinion that Sergeant Jarrett is a much-abused person.

* * *

We learn on what appears to be very good authority that a prominent railway company, serving the Midlands and running into London, is seeking power from the Board of Trade for motor trains, which it will shortly adopt, to be stopped to pick up and set down passengers at level crossings as well as ordinary stations, as in the case of light railways. This would be a great benefit to the great mass of people who have no railway station near them, and the trains could serve branch lines splendidly, as they could run every hour or oftener if necessary, so filling up the gaps of two to four hours between trains, as is now too often the case. There is no doubt but that motor trains will effect a revolution, and do no little to bring back to the railway companies the flourishing conditions formerly enjoyed, but which other forms of travel have done so much to destroy. It is certain that few ordinary trains are above a tenth full, except on market days, and these could be well supplanted for the cheaper and, for the purpose, better motor trains.

* * *

Last Saturday the King journeyed to Kempton Park in his autocar to witness the race for the Duke of York stakes.

SOME QUERIES AND REPLIES.

We are always pleased to reply to queries, even if they be of an elementary and untechnical description, under this heading. Only a selection of those which are of general interest will be published, though all will be answered direct through the post, for which purpose a stamped and addressed envelope should be enclosed.

When advice concerning different makes of cars is sought, each vehicle should be given an identifying number.

Letters should be addressed The Editor, "The Autocar," Coventry.

A CLUTCH TROUBLE.

I drive a 14 h.p. car of modern construction. Latterly I have been much troubled by clutch slipping. The leather appears good, and it is impossible for oil to get on it. I have tried some of the patent preparations, which improve matters for a very short time, after which the slipping is worse than before. I have also tried castor oil alone and with glycerine, and at times fuller's earth. The clutch spring is good, and will not bear tightening, or the clutch would be too fierce. As I said before, the leather appears good. Do you think it advisable, however, to try what benefit can be derived from a new one? And then should you recommend using any dressing for it?—CLUTCH.

As you are unable to put any more tension upon the clutch spring without making it too fierce and having some difficulty in withdrawing it from action, it would be better to have a new leather put on to the face of the clutch. This should be made of the best sole leather or cut from a piece of good leather belting. Generally speaking, the latter appears to give the best results. The face of the leather would be improved by giving it a good coating of castor oil. The clutch spring will, of course, require readjusting with the new leather.

OVERHEATING: A NEW EXPERIENCE.

An experience and item for your interesting column—"Some Queries and Replies." I had an extra and adjustable air inlet put on the induction pipe of my 18 h.p. four-cylinder car, a good way from inlet valves, so that it would not upset the mixture. The car before adding this was going well, but I considered was using too much petrol. Now the extraordinary thing is that if this air inlet is at all opened the engine heats immediately. How is this?—J. J. R.

It would appear that the air inlet has never been sufficient to provide enough air to obtain the best mixture of petrol vapour and air for consumption in the engine. Since adding the extra air inlet the volume of mixture drawn into the cylinder has been increased, and at the same time the explosive or expansive properties of the mixture have also been increased. The result of this is that a higher compression is attained, and a higher pressure on ignition, both of which would tend to overheating. Previous to adding the extra air inlet the cylinder volume would be small, the compression not so high as at present, and the expansive force of the gas less, while the products of combustion would cause a malodorous exhaust and a high consumption of petrol.

CHARGING RATE FOR ACCUMULATORS.

Can you inform me how the correct charging rate for accumulators is calculated, as the rate appears to vary with the size or capacity of the accumulator? On my car I have a two-cell four-volt accumulator in lead cases, the pair weighing about 26 lbs. I cannot find any maker's name on them or any indication as to the correct charging rate. I charged them recently through two thirty-two candle-power lamps (one hundred volts), passing about two and a half ampères, and left them on for over two days, but no "gasing" occurred. Is the charging rate too low or the time too short?—J.A.H.

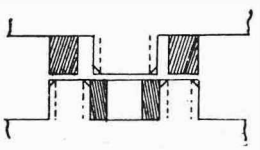
The average charging rate for ignition accumulators is two and a half ampères. As one thirty-two candle-power lamp passes one ampère you would be charging at the rate of two ampères with the two lamps connected in parallel. Some makes of accumulators will stand a higher charging rate than two and a half ampères, but this may be taken as a safe average. The most probable explanation of your accumulator failing to charge and give the usual indication of charging by gasing is that there is an internal short in the cells, probably caused by a particle of paste becoming dislodged and resting between two plates. Or it may be that you have not got the positive wire of the current connected to the positive wire of the accumulator, the result of which would be the accumulator would be reversed, charging would take place, and in all probability the plates would be so badly buckled as absolutely to ruin the accumulator. The accumulator should be completely charged in from ten to twelve hours, using a current of two and a half ampères.

TYRE INFORMATION WANTED.

Sir,—(1.) Have you any information *re* Perodeaud-Falconnet tyres; are they more durable than Michelin, Dunlops, etc.? (2.) Do they stop skidding? (3.) Do they fit an ordinary rim, and are they easily detachable? (4.) Is the device for stopping skidding, consisting of a small disc running on the ground on a hinge alongside the back wheel, more efficient than above devices? (5.) Is this device suitable for a 12 h.p. Humber tubular frame, cabable of thirty to thirty-five miles per hour on the level? I shall be very grateful for any information.—E. S. W.

NOISY GEARS.

Sir,—I should like to point out that I believe your reply to H. R. B. in *The Autocar* of Sept. 12th would be likely to mislead. I had exactly the same trouble, which took me a considerable time to find out, but I eventually did so, and have had no trouble since. The Govan changes are made by sliding clutches, and after a time the corners of the clutches wear off thus, and when the extra strain comes on they slide over one another, and slip into the next notch, making a very hard hammering knock; the forks which slide the clutches spring back enough to allow this. The remedy is to grind the clutches back on a small emery wheel so that they are dovetailed, then, instead of drawing out, they draw closer together. The dotted lines show to where they should be ground back. I may say that my gears are now absolutely noiseless. The corners only get worn off by careless changing.



I should like to hear if this remedy is successful in H. R. B.'s case. A. L. STENT.

FITTING A GOVERNOR.

Sir,—I have a car with 6 h.p. De Dion engine and Viet carburetter, and should like to fit a governing device to it. The only government it has at present is by the exhaust valve regulator, operated by the clutch pedal, but this of course is out of action with car standing, gear lever in neutral, and engine running free. Which would you recommend of the following ideas?

(1.) A governor of the centrifugal type arranged to operate a butterfly valve in the induction pipe, thus varying the quantity, but not the strength, of the mixture; or

(2.) An auxiliary air valve fitted to induction pipe (see *The Autocar* of Jan. 17th, 1903, page 55) which opens and admits pure air when the engine races, thus weakening the mixture without decreasing the volume of the cylinder charge.

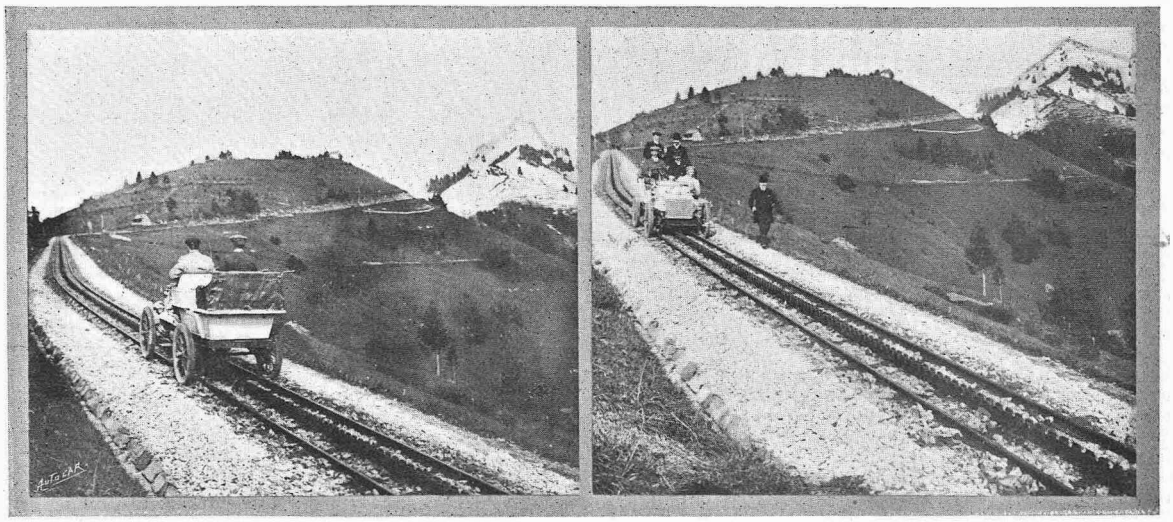
Compression, I take it, would with No. 1 arrangement be variable, and with No. 2 device invariable. I should be glad of your advice on this matter. Perhaps some readers of *The Autocar* have fitted similar devices to similar engines, and would give their experiences.

W. J. LOWE.

CAPT. DEASY'S MOTOR MOUNTAINEERING EXPLOIT.

If any motorist were asked to drive his car up a gradient of 1 in 4½, he would be a little dubious of success; and if the hill to be climbed were covered with newly-laid stones, unrolled, he would say it was impossible, save on a car specially geared very low; and if, further, the route was the track of a cog-wheel mountain railway, with in many places only a foot of margin between the wheels and a precipice of startling depth, he would decline to take any part in so venturesome an exploit. Yet this is what Captain Deasy has accomplished on his 14 h.p. Martini car, and the performance is one of the most remarkable demonstrations of daring on the part of the driver, and power and strength of construction of the car, that has ever been conceived and carried to a successful issue.

Captain Deasy made his first ascent on October 5th. With M. Max de Martini he completed the whole ascent from the Palace Hotel at Caux, which is 2,200 feet above Montreux in Switzerland, to the terminus of the mountain railway line of the Rochers de Naye, 3,200 feet higher, and 6,640 feet above sea level. The Rochers de Naye, although not so well known as many other Swiss mountains, are some 800 feet higher than the Rigi, and only about 100 feet less than the altitude of Pilatus. The panorama at the top is one of the finest in Switzerland, and to reach it by the railway line from Caux nearly three and a half miles have to be traversed, with a gradient of 1 in 4½ for very nearly two miles. The accompanying photographs serve better than words to show the nature of the course, though they do not realise the severity of the slope; a more accurate idea is gained if they are held vertically. The camera, as is well known, rarely gives a true impression of a hill; and, indeed, one photograph which was taken of Captain Deasy on his car on a gradient of 22.6 per cent. made the declivity appear almost a level route. The camera also fails to include the precipices, the depth of which added forcibly to the thrilling character of the feat. A few figures will assist the imagination in picturing the scene. Between the rails was a distance of 2ft. 10in. From the rails to the wheels of the car was a space of about 7in., and from the wheels to the edge of the granite ballast was a varying distance which rarely exceeded 18in., and was most usually a foot. Of course, any motorist can steer his car with a margin of a foot. But when that margin borders a precipice, and the car is travelling up or down a gradient of 1 in 4½, newly metalled and crossed by railway sleepers, twelve inches seem a small allowance. Over this nerve-trying route Captain Deasy made his ascent without difficulty, the car climbing unfalteringly the whole way, save in the tunnel, 300 yards long, through the Col de Jaman.



The ascent with two passengers.

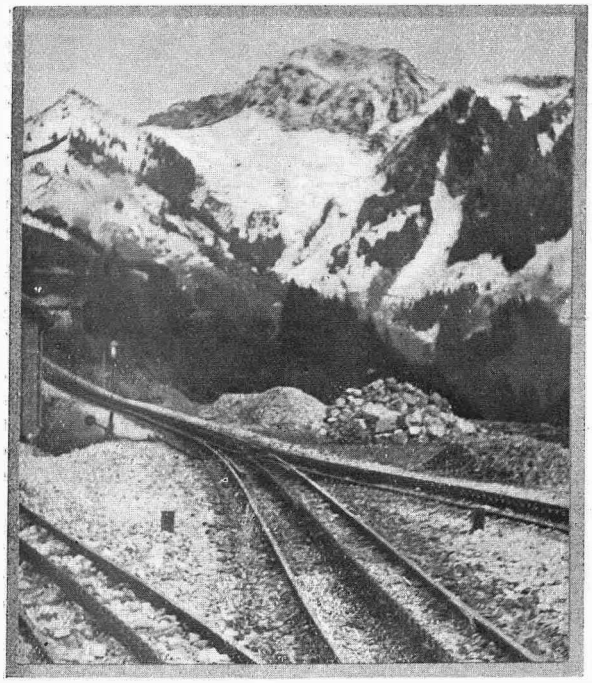
The descent with five up.

Here the oil from the railway engines and the water dripping from the roof had made the track so slippery that the wheels revolved without gripping, and a little assistance was given. But it was demonstrated immediately afterwards that the stoppage was due to no lack of power, for when a little further on skidding again began on the wet track, a third passenger was taken up on the back, and the added weight gave the wheels sufficient grip to complete the climb without difficulty.

Thus the ascent was accomplished, but the descent yet remained to be made. A declivity of three and a half miles, with a maximum gradient in the long tunnel of 1 in 4.8, an average of 1 in 5.6, and nearly two miles of 1 in 4.12, calls for extraordinary braking powers. The car weighs 19 cwts. It was driven down by M. Ernest Cuénod, the well-known French motorist, to whom it had belonged, and his passengers were M. Max de Martini, M. Eulenstein

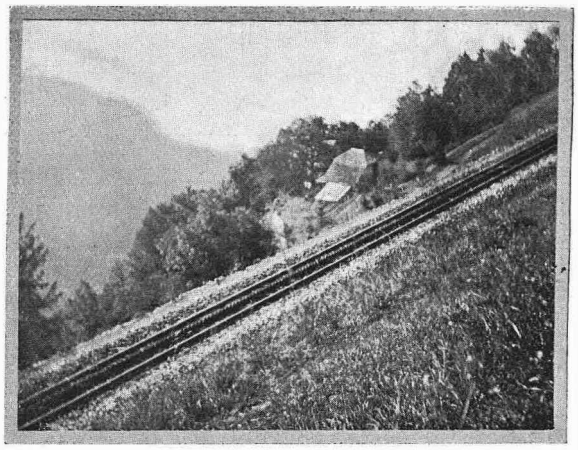
(manager of the Caux Palace Hotel), and Captain Deasy.

As in the ascent, so in the descent the tunnel proved most trying, for in addition to the wetness of the track, it was almost dark, the curvature of the tunnel preventing the light from the ends from illuminating a considerable portion of its length. Of course, the car was driven down with the engine as a brake, and there was never any question of the power to hold it on any part of the descent, although the wheels sometimes scattered the loose stones in an unpleasantly suggestive manner. The foot brake is water-cooled, and as it shared the labour with the engine, it never became unduly hot. So securely did the car travel down that at one of the steepest parts M. Cuénod was able to spare a hand from the steering wheel to return the salutes of spectators.



The end of the climb, Rochers de Naye terminus.

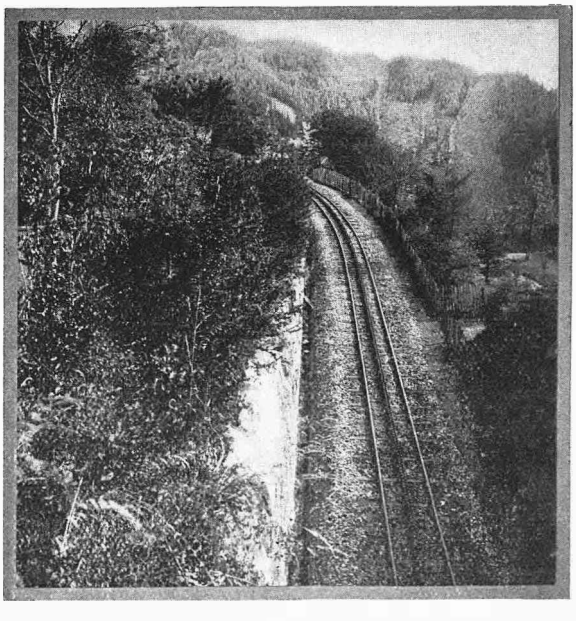
So phenomenal was the performance that it met with incredulity in some quarters. Captain Deasy, therefore, determined to repeat the exploit under circumstances which would remove all possibility of cavil. Heavy snowfalls on the upper slopes, however, prevented him from carrying out his intention in its entirety; but on Sunday last he accomplished a climb and descent which amply proved his ability to have achieved the whole trip if the snow had not intervened. He climbed from the Caux Palace Hotel to the Crêt d'Ybau, a distance of a mile and a quarter, the first halting place of the cog-wheel engines to replenish with water. The gradient for a mile of the route is about 1 in 4¼, but the car not only ascended readily with Captain Deasy and a London journalist on board, but was intentionally stopped and restarted without hesitation. Those who saw the struggles of some cars in the restarting tests at the Crystal Palace on a gradient of about 1 in 7 will realise that this performance of the Martini on an acclivity of 1 in 4½ was worthy of record. For the descent no fewer than five passengers boarded the car, namely, Captain Deasy, M. Max de Martini, M. Cuénod, H. Eulenstein, and the journalist. The car scales 19 cwts., and the total



A sample of the 1 in 4¼ gradient.

weight was calculated to be 26½ cwts. With this load the gradient was negotiated in perfect security, and the car was even stopped on the steepest part.

It may be of interest to note the following particulars: The engine gives 18 h.p. on the brake, and the car, which has a phaeton body, has been in use for touring in Switzerland and elsewhere during the past three months by M. Cuénod, from whom Captain Deasy acquired it for the purpose of the exploit. For use in mountainous districts a special



Looking up a portion of the mountain.

petrol reservoir had been fitted on the top of the dashboard, in order to ensure a flow of spirit by gravity to the carburetter at such times as the gradients encountered raised it above the level of

the ordinary tank. The normal sprocket has eleven teeth. For the climb from Caux a nine-toothed sprocket was fitted, the wonder being that a greater reduction of gear was not necessary. This was the only departure from the ordinary pattern of special significance for the feat, save that an extra long sprag was used, and a plate fitted under the forward axle to prevent its catching in the rack of the railway if the front of the car were dropped through the bursting of a tyre. Continental tyres of 100 mm. section were used, and although they were naturally badly scarred, especially through the skidding of the wheels in the tunnel, they stood the strain remarkably well, and Sunday's trip left them but little marked. The ignition is magneto, and all valves are mechanically operated. A honeycomb radiator is used, and its efficiency may be gauged from the fact that even in the long climb there were no signs of over-heating. On Sunday the throttle was never fully open, so that greater power was available had it been required.

An account of Captain Deasy's experiences would be incomplete without mention of a very narrow escape from disaster which he had on Sunday morning. He was descending a short stretch of 22.6 per cent. of the line passing through the grounds of the splendid Caux Palace Hotel. He had to cross a bridge over which the mountain train runs. This bridge is fully supported, so far as the rails for the train are concerned, but outside them are light planks for the use of the railway employees walking on the line. As Captain Deasy was driving the car over this bridge with M. Max de Martini, M. Cuénod, and M. Eulenstein on board, a plank suddenly broke. The car gave a terrific lurch, as first the fore and then the hind wheels dropped through. Captain Deasy kept calm, and the impetus of the car on the declivity carried it over the supporting beams. How narrow was the escape was not realised till afterwards, when it was found that the planks were rotten, and that the wheels had only been saved from sinking further by lodging on a projecting flange of the supporting steel joist. As it was, the drop was some five inches, and had the wheels been a couple of inches further out, they would have missed the flange, and in all probability the car would have overturned into the roadway fifteen feet below. That the wheels, axles, and springs resisted the tremendous shocks is a high testimony to their strength.

WON ABROAD. Owing to their freedom from restrictive legislation, the French and German constructors have had an immense advantage over the British in motor racing matters, so that when a victory is scored by an English firm it is particularly meritorious. The medal we show is the first prize which Mr. S. F. Edge has just received for winning the race at Trouville with his Napier launch. There are other prizes to follow, but they seem to be rather slow in arriving at their destination. It may be argued that launch racing is not a motor car competition, and that, therefore, the victory presents less significance than we are inclined to accord it, but we cannot endorse this line of reasoning, as it must be remembered that motor car engines were used on all the launches which made any real mark, so far as speed was concerned, in the French events.

CLUB DOINGS

Reading Automobile Club.

On Saturday last on Palmer Park cycle track, under the auspices of this club, Messrs. Starley and Co., of Coventry, gave a practical demonstration of their motor bicycle fitted with worm drive and two-speed gear. The motor cyclists present were very favourably impressed with this very clever device. Amongst those present who brought their machines to try on the track were: Mr. E. P. Collier, J.P. (2¾ h.p. Bat); Mr. J. V. Moinet (2½ h.p. Bradbury); Dr. Foster (2 h.p. F.N.); Mr. A. E. Newton, honorary secretary (2¾ h.p. De Dion tricycle); Mr. A Phillips (1½ h p. Royal Enfield); Dr. C. Truman (2 h.p Clément-Garrard); Mr. F. Gale (2¾ h.p Gaelic); Mr. Pennell (2¾ h.p. Excelsior); Mr. Pennell, jun. (2¾ Riley).

Sheffield and District A.C.

On Saturday the Sheffield and District A.C. spent an enjoyable afternoon at Sickleholme. Here they met a party of influential Derbyshire gentlemen, non-motorists, whom they invited to go for a short drive. Needless to say, they were favourably impressed.

Yorkshire A.C.

The winter season was opened on Thursday last week at the new headquarters, Great Northern Hotel, Leeds, with a "smoker," which was well attended by members and friends. The trophy presented by Mr. Kirk and the cup by Mr. Winn for competition annually amongst the members were on view. The former was won by Mr. Walter Jackson, and the latter by Mr. E. Faiers at the recent speed trials at Wentworth Woodhouse. Gold medals were also presented to the owners of the first and second cars in each class.

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