THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies and the Continent.

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The "Motor Fire-King," built by Messrs. Merryweather and Co. *(see page 198)*.

THE AUTOMOTOR JOURNAL.

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DIARY OF FORTHCOMING EVENTS.

The Automobile Club of Great Britain and Ireland.

1902.

June 14 ... Automobile Races and Gymkhana at Ranelagh.
*June 21 ... Run to Folkestone.
*June 28 ... Run to Eastbourne.
*July 5 ... Hill Trial Run to Tunbridge Wells.
July 7–12 ... Electric Vehicle Trials.
*July 19 ... Run to Bexhill. Informal Speed Trials.
Aug. 4 ... Speed Trials at Bexhill.
Aug. 9 ... Speed Trial at Welbeck.
Sept. 1–6 .. The 1902 Big Event. Last day for entry, Aug. 2.
Sept. 1–27... Trial of Tyres.

* These are runs over the proposed routes for the Big Trial.

General and Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1902.

May 4–June 22 ... Turin Salon.
June 13 ... ... French Automobile Fête at Earl's Court.
June 27–28 ... Gordon-Bennett Cup.
June 27–28–29 ... Paris-Vienna.
July 5–11 ... Royal Agricultural Society of England Show (Carlisle).
Sept. 22 / Nov. 1 ... Birmingham Sports and Pastimes Exhibition.
December ... Paris Automobile Salon.

1903.

Jan. 16–24 ... Stanley Club Motor Show at Earl's Court.
Jan. 30–Feb. 7 ... Exhibition, Crystal Palace.
March 21–28 ... Cordingley and Co.'s Exhibition, Agricultural Hall.

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PASSING EVENTS.

"EDISON'S LATEST TRIUMPH."

WE are glad to be able to congratulate Mr. Edison on at length having employed his nickel-iron accumulator in the propulsion of an actual electric car. Hitherto the only battery made on this principle by Mr. Edison has, we understand, been in the enjoyment of dignified repose on a velvet cushion under a glass case. We are glad, therefore, that he has at length given some demonstration of what it can do. The first accounts that appeared in the daily Press as regards the exact distance run, the weight of the battery, and other important details were so mutually inconsistent that it is satisfactory to learn that the definite statement made by Mr. Edison to a reporter of the *New York Herald* puts a more reasonable complexion on what he claims to have accomplished. Mr. Edison merely states that his battery will weigh about 70 per cent. of the weight of the best existing lead batteries for the same weight-distance run. This claim, as our readers will see, is very different from the sensational statements put forward in the morning papers. While it is more modest, however, it is scarcely more definite, as we do not know what the weight capacity is of the lead batteries with which comparison is made. As much as 15 watt-hours per pound of cell has been obtained in this country with the Leitner batteries employed by the British Electromobile Company, who are now contemplating making a run of 120 miles on a single charge. We do not think that any of the batteries in use in the United States give quite as high a weight of efficiency as this, so that we are unable, at present, to decide whether Edison's new battery gives results superior to those obtainable with the lightest types of lead accumulator. We must say that more care and discrimination on behalf of the daily Press in accepting and publishing unverified and sensational statements in regard to new inventions would be welcomed by those who have the real interests of the automobile industry at heart.

English and French manufacturers have been doing good solid work in regard to the development of the electromobile, and it is certainly not calculated to benefit them when exaggerated statements as to the wonderful results obtained with some new invention are put forward in the reckless manner to which we have referred. The British Electromobile Company, as our readers are well aware, made a run of 95 miles on a single charge as much as a year ago, and M. Krieger a little later accomplished the still greater distance of 180 odd miles. We do not gather from any reliable source that Mr. Edison has exceeded or even approached either of these records, nor does he claim to have done so.

FURIOUS DRIVING AT 3¾ MILES PER HOUR.

AN interesting side-light on the magisterial mind—that mysterious power before which the automobiiist is so frequently arraigned—is afforded by certain proceedings at Margate last week. On a road known as Fort Road, down which run the electric trams, occurs a gradient which the Board of Trade, in the exercise of its official wisdom, has prescribed shall not be traversed at a greater pace than two miles an hour. The trams are provided with electric brakes, and to make these brakes grip properly in wet weather a certain amount of momentum on behalf of the car is essential. In wet weather, therefore, two miles per hour actually becomes a more dangerous pace than four. This was proved in evidence by experts, and admitted by the Chairman who—an unusual circumstance—happens himself to be a technical man and an engineer. It was contended that under these circumstances the driver was merely exercising a wise discretion in travelling at the higher speed. Nevertheless, a majority of the Bench convicted him and he was fined £5 and costs. Next time the road is wet the driver will probably remember his conviction and travel at the slower and more dangerous speed. If the brakes fail to act and the car runs away and it *should* happen that some of the enlightened "Justices" who voted for the conviction are inside it or just in front, and the laws of Nature take their course, few who know the facts will feel disposed to place a large order for sackcloth and the usually accompanying ashes.

MOTOR FIRE ENGINES.

LAST week we referred to the gradual introduction on the Continent of self-propelled fire engines, and to the fact that the London Fire Brigade were regarding the innovation with a favouring or, at any rate, unprejudiced eye. It is, therefore, with satisfaction that we draw the attention of our readers to the illustrated description of the most recent development in this direction which has just been completed by Messrs. Merryweather, of Deptford. In commenting last week on the motor fire engine question generally, we pointed out the great advantages in freedom from sparks presented by the oil-fired motor fire engines. In Messrs. Merryweather's engine, which uses the Clarkson burner, this difficulty is absolutely got over. There is one trouble to which ordinary horse-drawn fire engines are liable from which we fear that motor fire engines, as at present constructed, are not likely to be exempt. This is the danger of skidding. This danger is certainly not less in the case of a self-propelled vehicle; but doubtless some method of overcoming it will ultimately be devised; at present there can be little doubt that the difficulty exists. Experiments directed to showing how far it can be controlled by methods of driving and the employment of rubber tyres would prove of general interest.

STRANDED OBSERVERS.

CAPTAIN BOWMAN MANIFOLD, D.S.O., was one of the Observers appointed at the recent Consumption Trials and Dashwood Hill Climb. When Captain Bowman Manifold attended at the Lillie Hall as arranged, there was no sign of the car to which he had been appointed, and he was therefore prevented from taking part in the run, either with his own car or as an Observer. He has since very reasonably proposed that some monetary penalty should be enforced from those entering cars and failing to give adequate notice of their intention not to run them. This suggestion has borne fruit, and a new rule embodying it was adopted for the first time at Tuesday's 100 Miles Trial. The entrance fee for these trials has been raised from four guineas to ten guineas, of which six guineas is returnable, provided the car is at the starting place, is started in time, and that the driver does his best to conform to the regulations and complete the journey. Car owners failing to give adequate previous notice of their intention not to run lose the whole of the entrance fee.

WE are very glad that the sensible suggestion of Capt. Manifold's has been adopted. It has been adopted none too soon. The *sang froid* with which at previous Club competitions competitors have omitted to turn up if it suited their convenience, quite regardless of the fact that Observers have been provided for their cars, had presented themselves at the starting point often at considerable inconvenience, and were in consequence subsequently left out in the cold, occasionally produced a highly chaotic state of affairs. The competing motor bicyclists in the case of the Dashwood trials were assigned to Observers who it was arranged should travel on certain cars. When the car on which the bicyclist's Observer was to travel, failed to turn up, the unfortunate bicyclist was put in the position of having to arrange for some other Observer to observe him. On more than one occasion consequently at Lillie Bridge motor bicyclists could be seen wandering about endeavouring to get Observers who were provided with cars to observe them, while the stranded Observers had to walk home again with no compensation for annoyance and loss of time. The new rule should have the effect of preventing in the future the indiscriminate entry of cars which there is very little prospect of running.

THE APPROACHES OF LONDON.

THERE is no doubt that the problem of the thoroughfares and highways leading into and from London will have to be seriously faced, and before very long too. It is a tremendous problem, but its satisfactory solution is vital not only to the future of automobilism, but practically to all traffic except that running on rails. The approaches of the great roads into London were none too adequate even in the old coaching days. They are preposterously inadequate now. They might within recent years, at any rate as far as the suburbs are concerned, have been rendered much less inadequate than they are. In no other capital in the world has the speculative builder been allowed to run riot in the suburbs, and to cover wide expanses not only with hideous wastes of bricks and mortar, the inartistic appearance and closely packed character of which would be tolerated nowhere else, but

he has been allowed so effectively to absorb the space which might have been successfully used for widening the main roads, or making alternative thoroughfares to them, that the needful alterations can now only be effected at enormous trouble and expense. They will have to be effected all the same. Not only do the main roads approaching London all converge, but they have to take up the suburban traffic in addition to that which is conveyed from a distance. To be anything like adequate therefore, their width ought to increase four or five times through the suburbs, instead of remaining the same or actually narrowing, as is sometimes the case. Failing this, corresponding thoroughfares ought to be made parallel to them. If something of this kind is not done, all organised attempts to develop automobile communication, either for goods or passenger traffic between London and the surrounding country, will be rendered, if not absolutely nugatory, at any rate of little value as regards their general industrial effect.

AND THE TRAMS.

THE prevailing state of affairs in this respect, bad as it was and is, is being made a great many degrees worse by the development of suburban tramway enterprise, both electric and other, but particularly electric. It may be beneficial to the working and other employed classes to have a nice procession of trams following one another, at intervals of about twenty yards, from their residences to the scenes of their labours, but added to the already existing congestion it results in producing every morning and evening in certain suburbs a practical standstill of all other traffic. The tramcar is as inflexible as fate. Nothing deflects it from its course, and it has not even the scanty capacity for accommodating itself to the requirements of other vehicles possessed by the 'bus or the brewer's van. It is characteristic of the short-sighted, happy-go-lucky, anarchical methods by which affairs of local administration are misconducted that this scandalous absorption of the already congested high roads by private companies should be allowed. It has been proposed, and very reasonably, that where a tramway company wants to run a tramway, they should be compelled to widen the thoroughfare at their own expense, by the amount which the tramway would take up. This, at any rate, would prevent the tramways from dislocating and further congesting the street traffic where they are built. The expense might be considerable, but as things are at present, the profits reaped by the companies appear to be out of all proportion to the original expenditure involved. They obtain a practical monopoly of the suburban passenger traffic in many districts, and they are doing that not by building roads of their own, as the railway companies have been compelled to do, but by taking slices off the roads which belong of right to the public.

IT is pleasing to note the increasing comprehension of automobile matters displayed by the daily Press. Quite a number of sympathetic and intelligent appreciations of Mr. Chaplin's speech proposing the abolition of the speed limit have appeared. The proposal, however, to use names instead of numbers for the purpose of identifying cars is no new one. This proposal, put forward a long time ago by ourselves, was actually adopted by the Automobile Club as long ago as last November, on all the vehicles that took part in the anniversary non-stop run to Southampton. In addition a number of private owners have had names attached to their cars for a year or more.

THE PRESENT POSITION OF THE INDUSTRY.

THE present position of the industry gives rise to a variety of reflections. To some of these we have already given expression. Perhaps the most important of them has reference to the general position of the automobile industry in the British Islands at present. No one who inspected the magnificent display of exhibits shown at Islington a few weeks ago can avoid coming to the conclusion that the British automobile industry has, during the past year, made more than gratifying progress, at any rate from the technical point of view. The number of excellent cars, the variety of accessories and parts designed for use by car manufacturers, the general excellence of design and improvement in workmanship manifested, are in every way highly satisfactory. Let us enquire, in the light of these facts, what is the general position of the industry in this country at the present moment and what in the near future it is likely to be. Automobiles cannot be manufactured at a reasonable profit without capital, and plenty of it. This is just what British manufacturers have so far stood in need of.

Those engaged in the manufacture of self-propelled vehicles have triumphantly shown that they are capable not only of turning out work that is first-class, but work which will bear comparison with the best products of Continental manufacturers. At the same time, the general feeling that English manufacturers are not in as satisfactory a position as the ability they have displayed entitles them to be has a foundation in fact.

The customer for motor cars has largely abandoned the desire to get as cheap a vehicle as he can that will run about and hold together. He now wisely demands a first-class article, and is, in general, willing to pay for it. The prices, to the outsider apparently high, are, in reality, competition prices, and have practically been fixed by the competition of the great Continental makers. An English firm may rival in the excellence of its product the best Continental makers, but it cannot expect to obtain a higher price. At the same time, while selling at the price which this foreign competition has fixed, the English firm is unable (except in the case of a few who are exceptionally situated) to extract as much profit as falls to the share of its Continental rival. The reason of this is want of capital. The automobile of the present day, if not a sample of the highest mechanism existing, is at any rate a product in which the best workmanship has to be employed, and to do this and leave a margin of profit, the most advanced labour-saving—perhaps we might also say brain-saving—machinery has to be made use of. The most ingenious machine tools have to be adopted, and though, when once introduced, they enable one man frequently to do the work of ten under the old conditions, the outlay attending their acquisition is necessarily very heavy. It can only possibly prove remunerative where the works in which it is incurred are organised so as to produce a large number of machines and vehicles practically simultaneously. In addition, works organisation has to be considered, and where a type, say, of car, has been adopted, the standardisation of parts and the construction of expensive jigs is a necessity. Where, as has been generally the practice in the best engineering works, drop-forgings are employed as far as possible to replace castings, extensive arrangements with manufacturers must be entered into. Where a firm is in a position to engage in the simultaneous manufacture

of 250 cars of the same model at once, as some Continental firms are now doing, arrangements of this kind can be made. But with a few exceptions, such as the Wolseley Company and the Daimler Company, in this country such an output would be hopelessly beyond the existing works capacity.

What is wanted, therefore, at the present moment to really develop the industry in this country is adequate capitalisation of concerns which have shown that they are capable of manufacturing a first-class article, but which, for want of really adequate *working* capital are unable to adopt such arrangements as we have above described.

Most industries, at any rate in this country, have gone through pretty much the same experiences between the period when they first emerged from the experimental stage and the time when they became a regular staple manufacture. The first period has generally been an inflated boom. Company promoters with unlimited aspirations, and generally unlimited audacity, have attempted to obtain monopolies for themselves, and at the same time force the progress of events at an unnatural and impossible rate. Disillusionment has then followed, and from being over anxious to invest in such concerns, the public, having frequently been bitten by rash ventures, become unduly anxious. Just as the industry is getting adequately organised on a sound technical basis, the work of the unscrupulous promoter bears its unpleasant fruit in rendering it difficult, and sometimes almost impossible, for *bonâ fide* manufacturers to obtain the amount of financial assistance necessary. It is at this point that the investing public, by careful discrimination, can succeed both in obtaining valuable investments for themselves and generally helping forward an industry upon sound lines. Such investors, must of necessity, be content with reasonable returns. They will probably long ago have dismissed the exaggerated anticipations which were flaunted before their gaze by the earlier promoters; but, with discrimination, they may reap a very valuable harvest. They must decide whether the concerns in which they propose to invest are giving evidence of being able to make good use of capital when they get it; and assuming that they are satisfied on this point, they should further convince themselves that the capital provided is really working capital, money down, that is to say, to be used for actual works development and bears a reasonable proportion to the paper capital of the concern, or of any proposed company into which it is to be converted. The present moment is an auspicious one for judicious investment on these lines, and the investor who carefully bears these considerations in mind will probably find that in a short period he is doing very well for himself and has contributed to promote, in a very high degree, the welfare of an important national industry which is just now, in all probability, at its turning point.

THE registration fee for motor cycles under the Competition Rules of the Automobile Club has been reduced from 1 guinea to 5*s*.

THE Welbeck Speed Contests have been postponed from August 2nd to August 9th, and the next Bexhill meeting will take place on August Bank Holiday. If possible, a hill-climbing trial on a private road near Welbeck will be held on August 8th in conjunction with the Lincolnshire and Nottinghamshire Automobile Clubs.

A TRIAL OF TYRES.

THE test for pneumatic tyres, which has been for a considerable time under consideration, is likely to be carried out by next autumn. A Special Committee, including Lieut.-Col. Holden, R.A., F.R.S., Lieut.-Col. Crompton, C.B., Mr. E. S. Hutton, Mr. Staplee Firth, and Mr. Claude Johnson, Club Secretary, has been deliberating upon rules and regulations. As a result of several sittings and careful consideration, it is recommended that a trial should be definitely announced to take place under the following conditions:—

Distance.—3,000 miles; with option of extension at the Judge's discretion.

Duration.—About 150 miles per day for five consecutive days in four consecutive weeks.

Route.—The route to begin and end each day at or near the Club-house. The cars to be started simultaneously, and to run each day over the same route.

Control.—The cars to be stored under Club supervision.

Speed.—Maximum speed as in Glasgow Trial. Minimum speed in open country, an average of twelve miles per hour. In ascending hills, if the road is clear, the maximum speed to be employed.

Observers.—On each car the owner is to provide two seats, one for the Official Observer and one for a Competitors' Observer. Official Observers will change cars each day in rotation.

Competitors' Observer.—Every competitor shall appoint an Observer, who shall travel on every competing car except the one entered by the firm he represents, and may lodge complaints as to the conduct of the trial with the Official Observer, provided that such complaint be made on the day of the incident and in writing.

Cars.—Competitors will provide the cars on which their tyres are to be tried. Also drivers, and will pay the cost of, and will be responsible for the running of the same.

The cars must not weigh, with passengers when ready for the road, less than 30 cwt. They must be driven by internal combustion engines of not less than 10-brake horse-power.

Record of Car.—The maker of the car shall be entitled to a report for publication of what stops, other than tyre stops, were made on the journey of 3,000 miles, their duration, and cause.

Breakdown of Car.—If the car fails, the tyres may be transferred to another car to be supplied by the competitor provided that it complies with the conditions, and is forthcoming within two days of the failure.

The Tyres.—(*a*) The tyres shall fit wheels of 910 mm. or 870 mm., or if a maker does not make these sizes the Committee may accept other sizes.

(*b*) The tyres shall be the ordinary tyres sold to the public, and shall be selected by the Committee out of stock.

(*c*) Six outer covers shall be selected, of which four shall be run and two be in reserve in case of a tyre being destroyed by a bad cut, &c.

(*d*) The sectional diameter of the tyre shall be such as the maker may consider suitable for a car weighing with load, &c., not less than 30 cwt.

(*e*) At the end of the trial the tyres run shall become the property of the Club in order that they may be cut for examination.

(*f*) Before the trial a section of a similar tyre shall be supplied by the maker to the Committee.

Entry Fee.—The entry fee to be £21 per set. No limit to the number of sets entered. Any balance of receipts over expenditure to be returned proportionately to competitors.

Judging to be effected by Judges, the following being factors:—

(*a*) One mark to be deducted for every minute spent in tyre inflation or repair, whether in the control or on the road.

(*b*) Price of tyres. (*c*) Loss of weight.

(*d*) Condition as shown by periodical examination and by photographs taken during the trial and by examination at end of trial.

Judges.—The following with others are to be invited to act as Judges:—Lieut.-Col. Holden, R.A., F.R.S., Capt. Lloyd, R.E. Captain Nugent, R.E., Professor Hele Shaw, LL.D., F.R.S.

Date.—The trial will take place during the first, second, third and fourth weeks of September, the runs in the first week will thus coincide with the runs of the big trial.

Mr. Alfred Harmsworth has offered, in connection with these trials, three prizes, amounting to £250, on behalf of the *Daily Mail*.

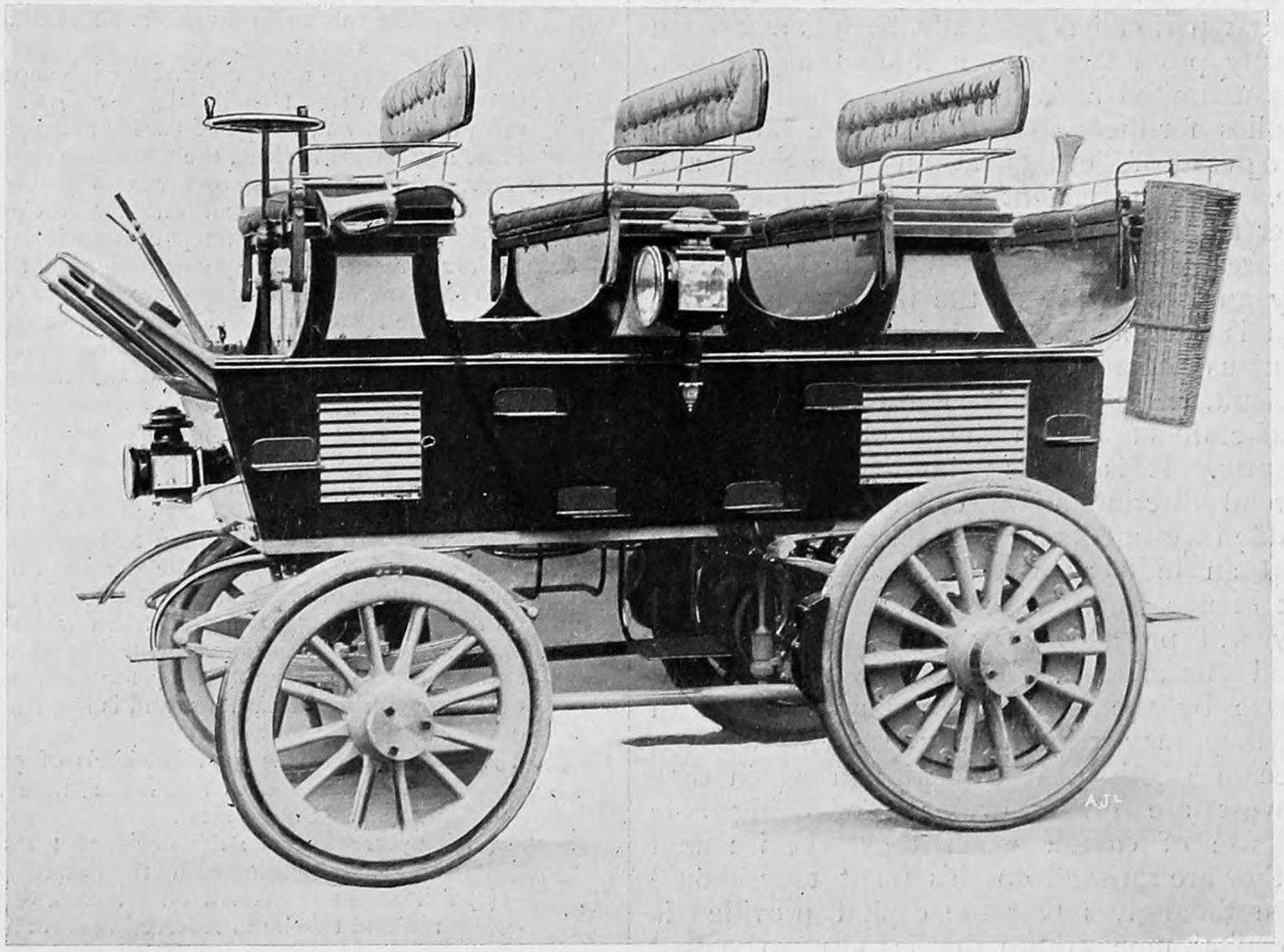
THE ACCUMULATOR INDUSTRIES ELECTRIC COACH.

ONE of the largest electrical vehicles at present in this country is the drag built by Accumulator Industries at Woking, a photograph of which we reproduce for the benefit of our readers.

The vehicle in question is designed to afford comfortable seating accommodation for twelve persons, including the driver. As will be seen from the photograph, it is very substantially built. It is provided with Leitner accumulators, consisting of 44 cells, each of 500 ampère hour capacity. This battery power is sufficient to enable the vehicle to run a distance of 80 miles on a single charge. The body of the vehicle is mounted in front on double elliptical springs and at the rear on semi-elliptical springs, reaches extending from the front axle to the rear axle. Two Lundell motors are mounted with rubber spring suspension on the rear axle and drive independently by pinions on their shafts on to gear rings secured to the spokes of the rear driving wheels. The motors develop normally 7½-h.p. each, but are constructed to bear 100 per cent. over load, and can consequently run up to 15-h.p., so that the full power available for the propulsion of the vehicle is 30-h.p. When on a flat road the coach is able consequently to attain a speed of upwards of twenty miles an hour. The motors are separately excited, each having two armatures. These can be coupled by means of a controller which has a handle arranged on the right of the driver's seat, so that the armatures can be put in series, parallel, or multiple arc. This gives the forward speeds; putting the separately exciting cells in opposition to the others enables further variations of speed to be obtained. Reversing is effected by means of the controller in the ordinary way. An emergency hand brake is shown near the dashboard on the right of the driver's seat, and the steering is of the vertical pillar and wheel Ackermann type.

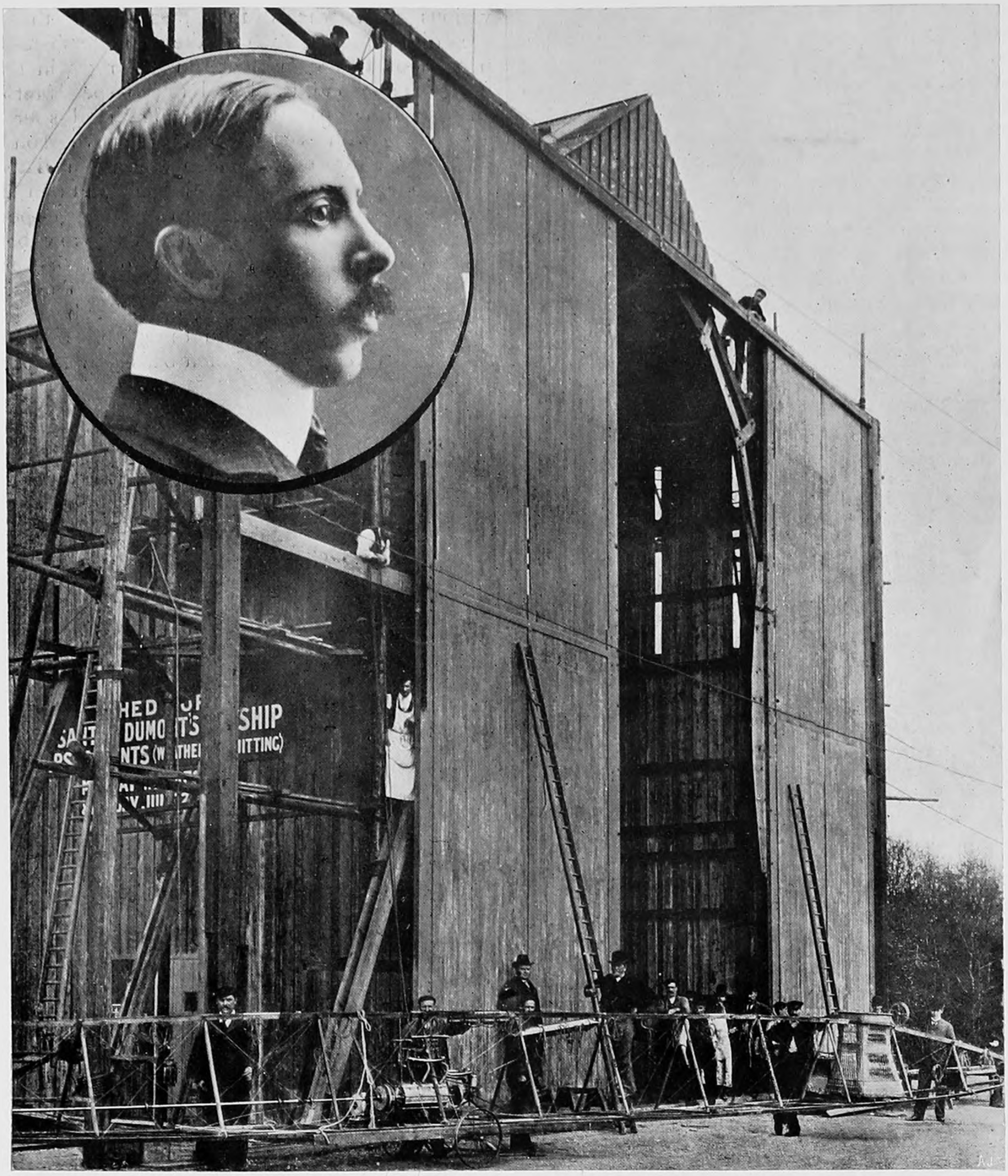
The wheels have hitherto been provided with Shrewsbury Talbot tyres, but owing to these tyres not proving quite adequate to the considerable weight of the vehicle, they are now being replaced by Goodyear solid tyres.

The vehicle has a very effective appearance, and runs with remarkable smoothness. We understand it will be in frequent evidence at race meetings during the coming season. The Accumulator Industries Company is to be congratulated on its latest vehicle. It is the largest passenger electromobile in this country.



The Accumulator Industries Electric Coach.

THE A.C.G.B.I.'s CONSULTING ENGINEER.—The appointment of a motor engineer to the Automobile Club, which has been on the *tapis* some little time, is now being definitely arranged, the gentleman selected being Mr. E. H. Lancaster, who is well known as Mr. Alfred Harmsworth's late chief engineer. Hardly a better selection could have been made, as the varied and practical experience which Mr. Lancaster has had with almost every make of car should prove invaluable to members who will be able to take advantage of his advice. The chief duties of the Club Engineer will be to examine and report on any vehicle which a member may contemplate purchasing, or to advise a member in regard to repairs or alterations necessary in a car. Special fees will be arranged for such consultations and advice, and a copy of the Engineer's report will be filed at the Club. All reports will be considered confidential, and only minor adjustments will come within the Club Engineer's province, so as not to interfere illegitimately with the scope of general repairers.



The above photograph gives a view of the large shed which was just completed at the Crystal Palace for the reception of M. Santos Dumont's air-ship when the injury to it took place. The mechanical portion of the air-ship, which we have frequently illustrated before, is seen mounted on a trolley in front of the shed. As will be seen from the photograph the shed was very nearly though not quite completed. A photograph of M. Dumont himself is shown at the top left corner.

THE newly-formed Lincolnshire Motor Cycle Club, with headquarters at the Albion Hotel, Lincoln, have now completed their appointment of officers, who are as follows :—Chairman, Mr. A. W. Foster ; Vice-Chairman, Mr. J. M. Goy ; Treasurer, Mr. S. Patton ; Committee, Messrs. H. W. Stones, S. Clegg, C. Nelson, and W. H. Grey, with the officers as *ex-officio* ; Hon. Solicitor, Mr. C. Nelson ; and Secretary, Mr. F. H. Sharman, 1, Colenso Terrace, Lincoln. Rules have been drawn up and adopted, a Club badge is being prepared, and it is proposed to endeavour to make a working arrangement with the Lincolnshire Automobile Club and the English Motor Cycle Club.

How serviceable and economical the motor wagon proves is demonstrated by the results of a month's trial of a Daimler model delivery van by a New York store. The figures work out thus :—Total number of hours worked, 247 ; gasoline used, 145¼ gallons ; miles covered, 1,463. It is the calculation of the firm concerned that the wagon did the work of six horses and two ordinary wagons. After liberally allowing for fuel, storage, and maintenance and wages of operator and boy, it is reckoned that the saving amounted to £43 per month.

THE WOLSELEY WORKS AND CARS.—Part III.

THE accompanying illustrations show a part of the 10-h.p. gear-box, the Wolseley steering gear, the double acting brakes, and the petrol gauge with regulating cock, as fitted to all cars made by this Company. The general design of the change-speed gear on the 10-h.p. car has already been dealt with. The internal appearance of one portion of this is shown in Fig. 14, where D^1 is the wide sprocket wheel which is carried on a bearing, concentric with the first motion shaft, D. The teeth of that portion of the jaw clutch which is rigid with the shaft, D, are shown at D^2. The shaft, which is rotated by the change-speed lever, is seen projecting from the gear box at B, but the cam which works the jaw clutch is hidden by the sprocket in this drawing. The internal cam, B^2, however, is shown, as also are the sliding forks which are operated by it, and which bring the various spur wheels into mesh with those fixed to the differential gear on the countershaft. The one portion of this cam (that on the right in the drawing) brings the second, third and fourth speeds into operation, and the other part brings the left-hand spur wheel into engagement with its corresponding spur wheel on the countershaft, either direct or through the intermediate wheels, H. In the one case the low speed results, and in the other a reverse motion is secured. In this change-speed gear ball bearings are fitted throughout. Three row bearings with $\frac{5}{16}$-inch balls take the sprocket end of the first motion shaft, and the two ends of the countershaft. The further end of the first speed shaft is carried in a similar bearing, but which has two rows of balls. In the 5-h.p. car $\frac{1}{4}$-inch balls are used and in the 20-h.p., $\frac{3}{8}$-inch balls. The spur wheels are

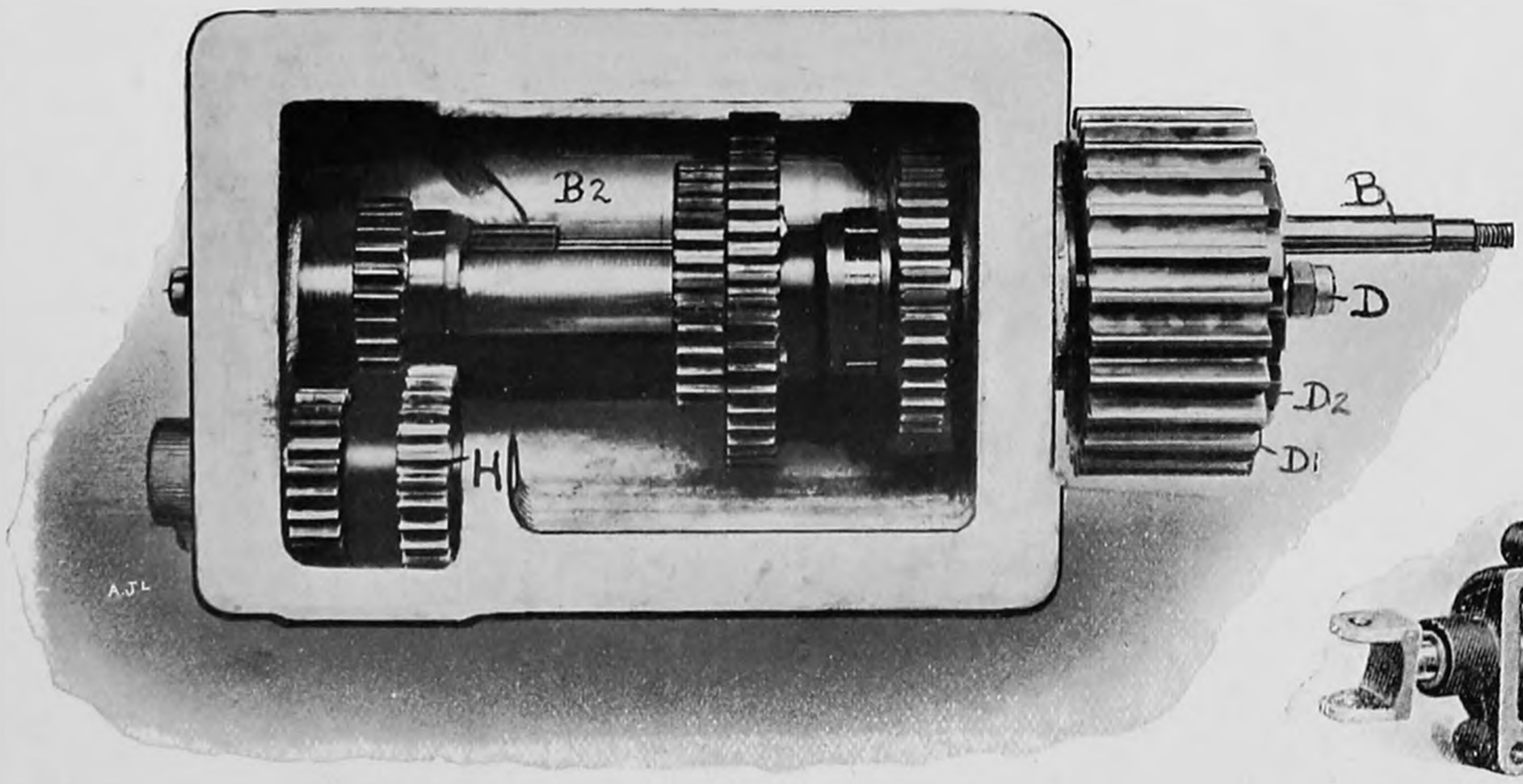


FIG. 14.—Part of 10-h.p. Gear Box.

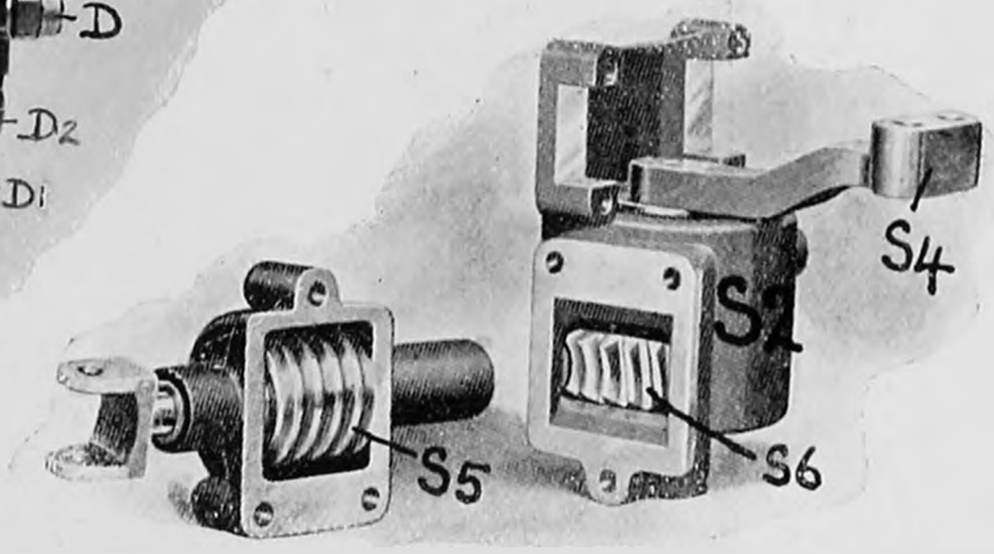


FIG. 16.—Worm Gear Box of Wolseley Steering Gear.

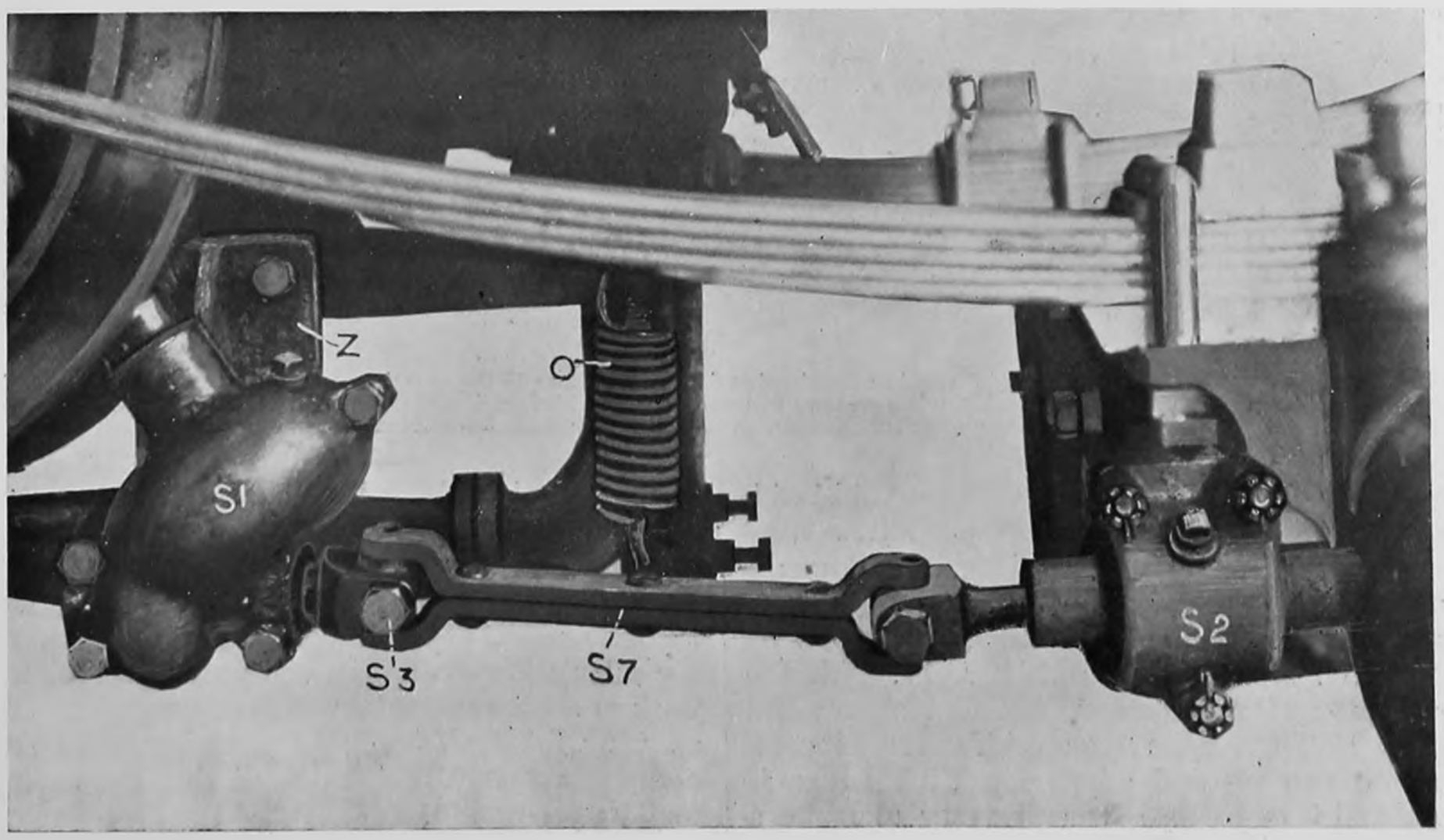


FIG. 15.—The Wolseley Steering Gear.

made of a special steel and are hardened. The differential gears are constructed with spur wheels instead of bevel wheels, two sets of intermediate pinions being employed[1] In the 5-h.p. car no cam actions are used for operating the change gear and no jaw clutch is fitted in the sprocket wheel. In this change gear the sliding wheels are all carried on one sleeve.

In the 20-h.p. car two chains are used for transmitting the power from the engine to the first motion shaft, one of these lying on each side of the car. Two friction clutches

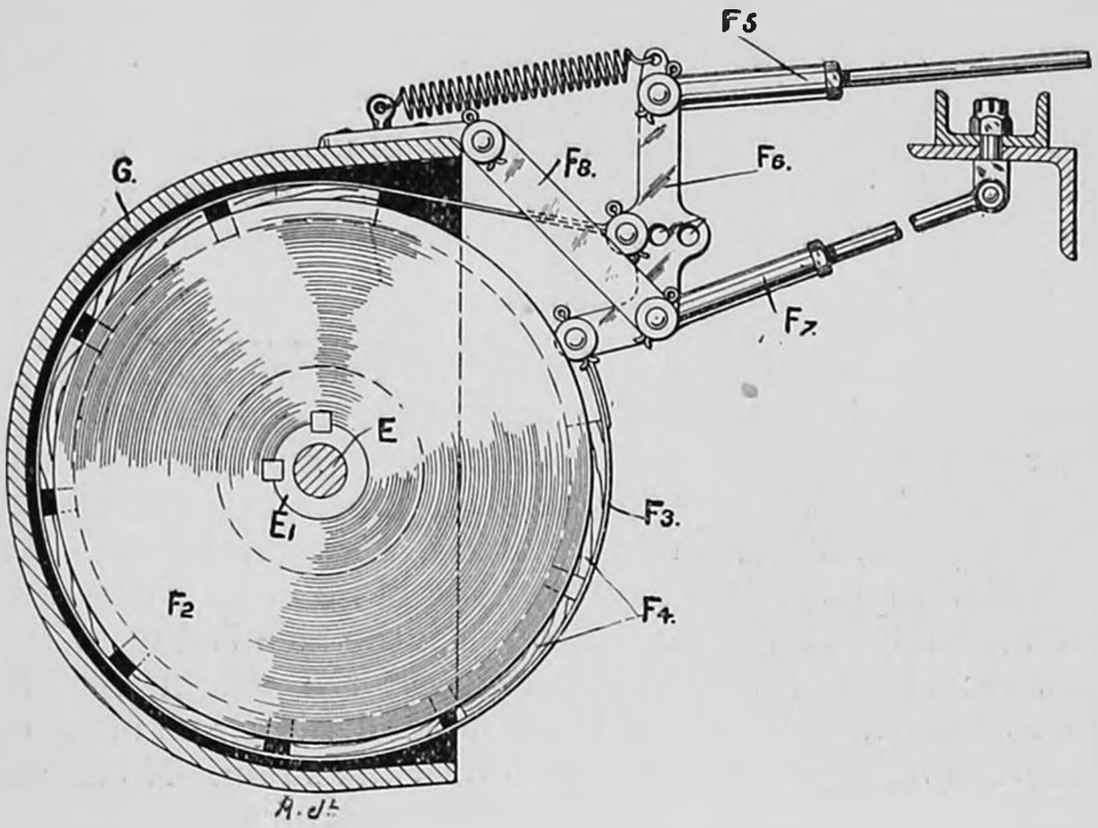


FIG. 17.—Wolseley Countershaft Brake.

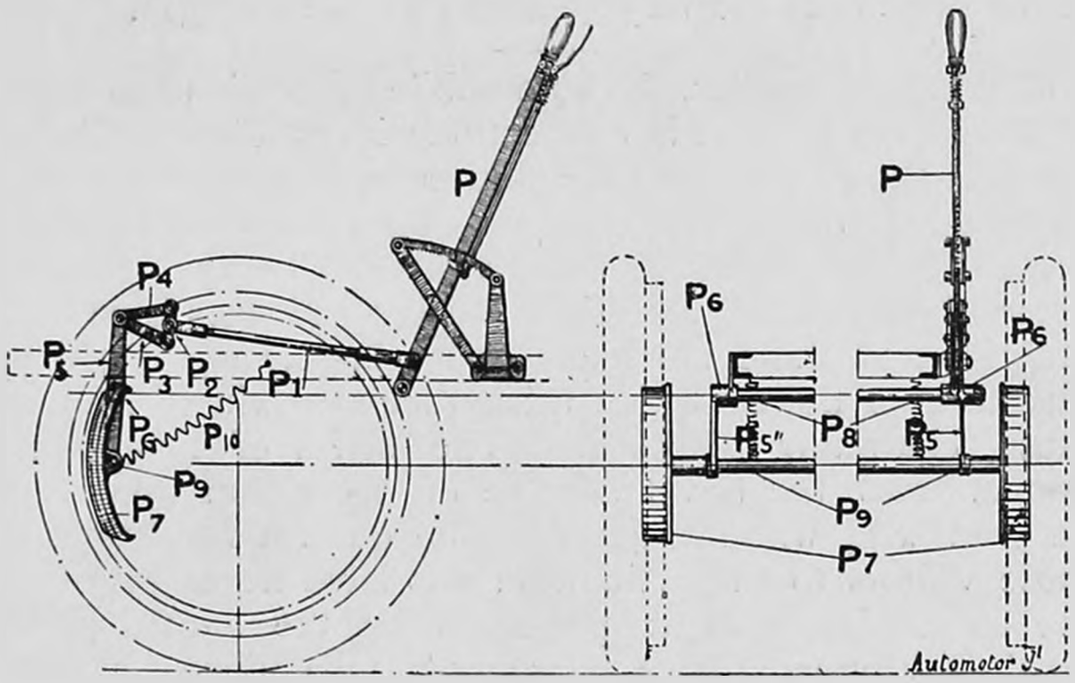


FIG. 18.—Wolseley Side Brakes—Side and End Elevations.

(in the two flywheels) are used, these being interconnected so as to be operated simultaneously by the pedal, A^2. A jaw clutch action is employed, but this is fitted in a different manner from that on the 10-h.p. car. The jaw clutch is of a two-way type, the sliding portion being mounted on, and otherwise rigid with, the differential gear itself. When moved to the right it engages the spur wheels which are mounted on that side of the differential, and when moved to the left it engages the spur wheels on that side. These spur wheels, instead of being fixed to the differential gear, are mounted freely about its sleeves, and are only made rigid with it through the jaw clutch. The jaw clutch is operated by the same composite cam drum which slides the wheels into mesh; the drum is carried inside the gear box and is rotated by the hand lever. It will be understood that the Renold chains, in this case, drive the first motion shaft whenever the friction clutches are in engagement in the flywheels, and that the sliding wheels are mounted about this shaft. They are brought into mesh with the corresponding wheels on the countershaft in much the usual manner, but these latter wheels are only rendered operative by means of the jaw clutch above described, after the spur wheels have been brought into mesh with their corresponding wheels. In this 20-h.p. change-speed gear the reverse is brought into play by sliding intermediate wheels into mesh instead of by sliding a wheel on the first motion shaft into mesh with them. The arrangement of the jaw clutch in the 20-h.p. gear not only gives the same effect that it does in the 10-h.p., but the actual shock produced when bringing the gear wheels into mesh with one another is even less than in the other case. It should be mentioned that in both types of gears the shaft which carries the cams, and which is operated by the hand-lever, makes one complete revolution for all combinations from reverse to top speed.

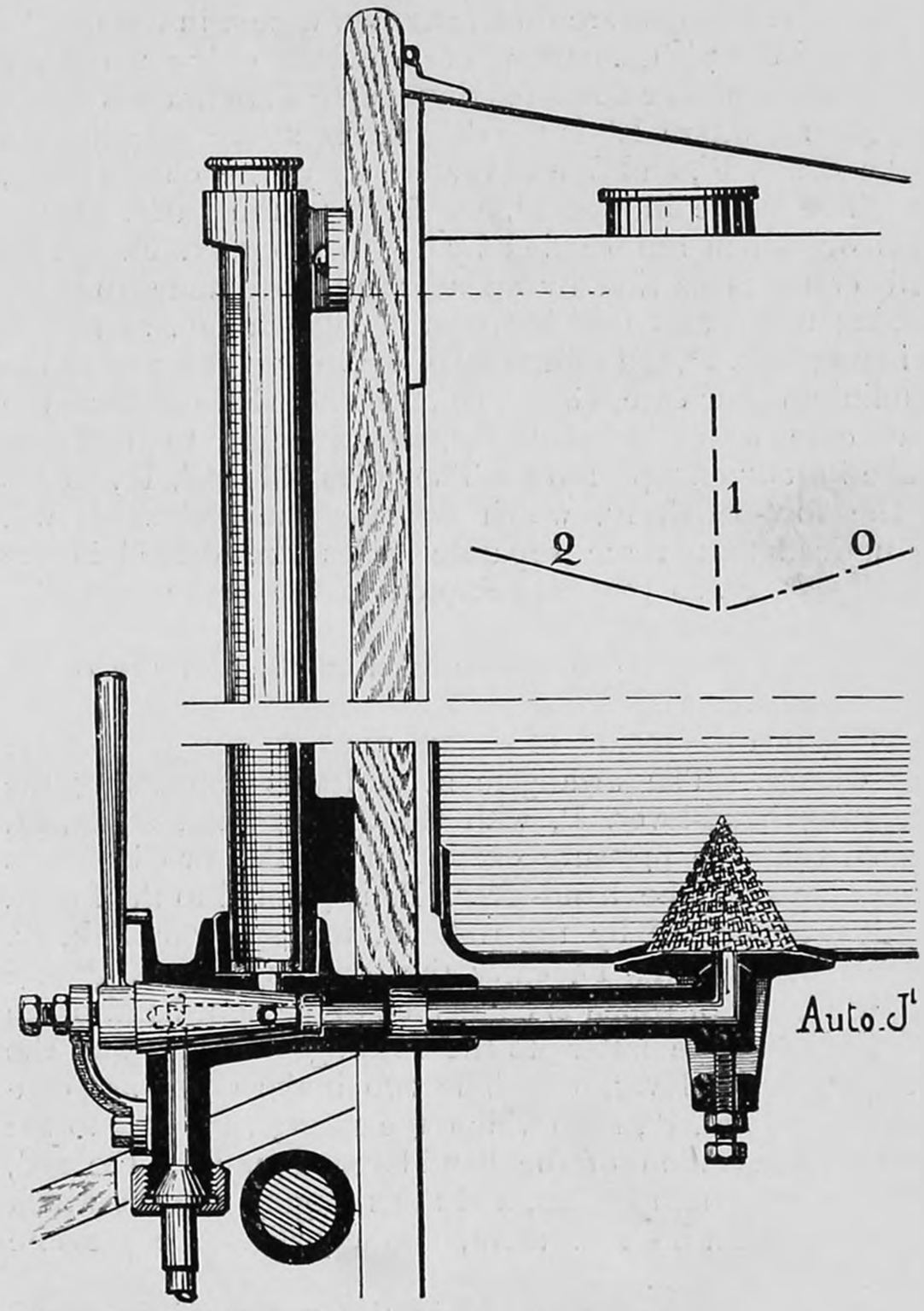


FIG. 19.—The Wolseley Petrol Gauge and 3-way Cock.

The steering gear (Figs. 15 and 16) is of the inclined wheel type, the pillar being fixed beneath to the bracket, Z (Fig. 10), on the engine and being secured above to the dashboard. The principle employed differs from that on any other vehicles, inasmuch as the advantages of an irreversible worm have been secured, whilst the steering is more sensitive and the lengths of the lever arms on the steering heads to each wheel are no shorter than they would

be with any direct form of steering gear. The hand-wheel is connected direct to a bevel wheel which is contained in the casing, S^1. This wheel is in mesh with a similar but smaller bevel connected with the universal coupling, S^3; a connecting link, S^7, transmits the motion of this smaller wheel to a worm, S^5, gearing with a worm wheel, S^6, in a casing, S^2, which is bolted to the front axle. The worm wheel, S^6, is rigid with the arm, S^4, and this in turn is coupled by connecting rods, formed of two bars, to the levers projecting from the steering heads. The bevel wheels gear up the motion given to the steering wheel and the worm gear reduces this motion considerably. The worm is, of course, the irreversible portion, and yet the relative angular movement of the steering wheel and of the arm, S^4, need not differ materially. In practice it has been found that the only back lash of any consequence which results after use is due to wear in the worm and worm wheel. In order to take this up, a paper joint is made between the two portions of the casing, S^2, this being reduced in thickness easily and the wear being thus compensated for.

The brakes, both on the countershaft and the rear wheels, of the Wolseley cars are double acting, except in the case of the 5 and the $7\frac{1}{2}$-h.p. cars, where the latter only act equally well both ways. The double-acting countershaft brake is shown in Fig. 17, where E^1 is the differential sleeve carrying the brake drum, F^2, and free to revolve about the countershaft, E. The brake blocks, F^4, are fixed to the band, F^3, the ends of which are carried by the bell crank, F^6. This bell crank is carried by an adjustable distance rod, F^7, passing to a cross member of the main frame, and by a swinging link, F^8, the other end of which is connected to the aluminium gear case, G. A spiral spring also connects the gear case with the piece, F^6, this tending to hold the brake in its "off" position. The adjustable rod, F^5, passes to the foot-pedal, F^1, which operates the brake. It will be noticed that three separate holes are drilled in the bell crank, F^6, so that any stretch in the brake band, F^3, can be compensated for.

The side brakes are shown in Fig. 18, and are of the shoe pattern, in which brake blocks having large surfaces press against the inside of drums fixed to the rims of the rear wheels. The arrangement of levers connecting the operating hand-lever, P, with the leather-lined shoes, P^7, is such that the pressure exerted upon the two brakes is always equal. The hand-lever, P, is pivoted to the frame, and it is connected by the rod, P^1, to a swinging link, P^2. The ends of the link, P^2, carry the swinging levers, P^3 and P^4, the former of which is connected to the right-hand brake lever, P^5, and the latter to the rocking shaft, P^6, and the left-hand brake lever, P^5. The two brake shoes are connected by a rod, P^9, from which the springs, P^8, pass to the frame. The action of the hand-lever, P, pulling the rod, P^1, is to apply both brakes, and the swinging link, P^2, which connects it with both of them, and equalises the pressure exerted upon them.

A petrol gauge is arranged in the centre of the dash-board in full view of the driver. This is connected with the petrol tank through a three-way cock which also establishes communication with the carburettor. This is shown in Fig 19. The gauge glass shows the level of the petrol in the tank and the three positions of the cock allow both it and the supply to the carburettor to be cut off entirely, the connection to the carburettor alone to be established or the gauge glass and the carburettor to be connected with the supply tank. The petrol fittings throughout have been very carefully designed in order to prevent leakage, ground joints being used in most instances and provision being made for tightening them securely.

The Wolseley Company manufacture the bodies and carry out the upholstery work themselves; in fact, every portion of the cars, with the exception of tyres, and a few minor parts or accessories, are made on the premises, and have been given the attention of those designing the machines, thus ensuring a satisfactory result in all respects. The completeness with which the work has been carried out, and the care which has been taken to ensure a reliable machine, is evident throughout the factory. The careful organisation of the business is highly creditable to those responsible, and is remarkably complete. In conclusion, we would add that the admirable book of instructions and the illustrated catalogue issued by the Company are of great use to owners of Wolseley cars, and cannot fail to attract purchasers.

FROM his experience in the recent Alcohol Trials, Mr. C. Jarrott considers that alcohol, both as fuel and owing to the character of the exhaust it produces, is an extremely unpleasant substance—at any rate for motor car propulsion. Ordinary petrol is, in his opinion, far preferable. Mr. Jarrott also considers that the main reason that so large a number of the starters failed to finish the race is due to the new racing rules, which have reduced the weight limit to 1,000 kilogs., a number of the troubles arising from many of the parts being made too light to bear the strain. No doubt exists, however, as to the ultimate benefit of this new rule to the public, as it will tend to cause the car of the future to be built in the lightest possible manner, whilst retaining at the same time the very greatest possible strength.

GIVEN fine weather, the automobile procession and Battle of Flowers to be held in connection with the French Charity Fêtes at the Earl's Court Exhibition on June 13th promises to be one of the main attractions of the series of entertainments to be provided for this excellent Charity. Already 50,000 bouquets for the grand Battle of Flowers have been ordered, and these are likely to be largely augmented by quantities of flowers which it is anticipated will be sent, by those charitably disposed. The series of magnificent banners and the novel scheme of decoration which will be seen will, without question, be quite a revelation to those visitors to the Exhibition who have never witnessed the extraordinary sight presented by the annual grand Battle of Flowers at Nice. Twenty-four magnificent banners are to be awarded to the automobile section of the Fête, and it is anticipated that about 150 automobiles will take part in the competition. The cars will be divided into six classes, viz., (1) two-seated cars driven by a lady; (2) two-seated cars driven by a gentleman; (3) three or more seated cars driven by a lady; (4) three or more seated cars driven by a gentleman; (5) two cars of a similar make decorated in a like manner; (6) four cars of a similar make decorated in a like manner. The procession will start at 4 o'clock in the afternoon, simultaneously from the Lillie Road and Northend Road entrances, and the judges will stop the procession after it has paraded thrice round the grounds and award the various banners. Automobilists or owners of cars willing to assist in this good work can obtain particulars from Mr. Imre Kiralfy, Tower House, Cromwell Road, The Eccentric Clubbers, who are also taking part in the festivals, will have a special "Eccentric Illuminated Pageant" all to themselves.



The German-made Thornycroft Lurry.

GERMAN AND AMERICAN-MADE THORNYCROFT LURRIES.

THE accompanying illustration represents one of the vehicles built by Messrs. Thornycroft's German licensees in Berlin. It is made to the English Company's standard design but with modifications suited to the special requirements of the German War Department. These machines took part in the war manœuvres in Germany last year and went through the whole of the trials satisfactorily, being highly commended in the official report. A similar vehicle was recently exhibited by the German manufacturers at the Copenhagen Show and was afterwards used to demonstrate its capabilities in the neighbourhood. The coal bunker has a capacity of 9 cwt., and two water tanks capable of holding 250 gallons are provided. The lurry weighs 6 tons in running order, but unladen, $3\frac{1}{2}$ tons of this being borne on the front axle. It has been found capable of carrying a load of $3\frac{1}{2}$ tons and of trailing a further $3\frac{1}{2}$ tons at a speed of 6 miles an hour on ordinary macadam roads. When using the low gear it successfully climbs a grade of about one in ten with this same load. Patent brickettes are used as fuel and the consumption of this is 29 lbs. per mile on full load, this being equivalent roughly to 2 lbs. per gross ton mile, which is certainly a good result with this class of fuel.

The American Thornycroft Company have built some twenty cars from the designs of the English Company, and these are running satisfactorily in the States. They are provided with a closed cab for the driver, this being in accordance with the usual requirements in that country. Altogether the Thornycroft machines seem to be meeting with general favour in various parts of the world.

To endeavour to subdue burning petrol by means of water is about the most disastrous proceeding possible. Whenever petrol does get alight, the most expeditious and safest method is to smother the flames with sand; but it is with the greatest difficulty that firemen and the public are persuaded of this fact. A very serious conflagration was very nearly produced a few days ago in the basement of the Long Acre Motor Car Company's premises by an attempt on the part of the firemen to throw water on some burning spirit which had become ignited. Happily the prompt action of the manager in removing the car into the street by means of the lift averted serious danger. Once in the street no argument could prevent the use of the hose by the firemen for extinguishing the flames. However, although considerably spread by this means, the flames took their natural course, and ultimately died out from sheer exhaustion of the petrol.

MANY of our readers will be glad to learn that Trial runs, with Rochet cars and Miesse steam vehicles, can be arranged by appointment with the new Automobile Company, of Cambridge Circus, Shaftesbury Avenue. These premises are exactly opposite the Palace Theatre.

THE HART ACCUMULATOR COMPANY AND THEIR WORKS.

THE Hart Accumulator Company are one of the concerns engaged in the manufacture of accumulators, whose business is going on in a thoroughly satisfactory way, and who pay a comfortable dividend to their shareholders. Hitherto they have been content to do a good substantial business with the heavier classes of accumulator cells, such as those supplied for lighting stations and the lighting of railway trains, while leaving the manufacture of the lighter types of cell required for the propulsion of electromobiles to other more speculative manufacturers. They are now, however, turning their attention to the manufacture of the latter class of battery—a fact which may be taken as a distinctly valuable recognition of the importance which the electromobile is gradually assuming amongst the other classes of self-propelled vehicles.

The Hart Accumulator Company are doing a very large business. They employ a large number of hands, and though they are to a certain extent cramped for space, they turn the amount of room which is at their disposal to account in an energetic and thoroughly well organised manner. The principal staple of their industry is the supply of batteries for train lighting on the Stone system, which, as our readers are aware, is at present adopted in a very large number of railway carriages, and employs a battery of accumulators slung underneath the car and charged by a dynamo which is driven by a belt from a pulley mounted on one of the axles on which the carriage runs. The system is supplied to the railway companies by Messrs. Stone and Co., but the greater proportion of the batteries which Messrs. Stone employ are built for them by the Hart Accumulator Company, and some idea of the magnitude to which this business reaches may be found from the fact that the Hart Company are supplying as much as 400 cells weekly to Messrs. Stone and Co.

We have on previous occasions referred to and illustrated the Hart accumulator. At present the Company are manufacturing two types of cell, that used in their heavier batteries for central station and train lighting, and that which they are now putting on the market for automobile purposes. The form of heavier battery, which we previously illustrated, was composed of both positive and negative plates with a latticed type of grid. In all their heavier batteries, and also in the train lighting and ignition cells, to which we shall refer presently, the latticed type of plate is only retained for the negatives, the positives being thinly-ribbed plates rather than grids pasted up level with their surface. The appearance of the unpasted positives is thus very similar to the plates employed some years ago by the Hagen Accumulator Company before their adoption of the Tudor type of positive, and were used by them about half filled with paste.

All the parts of their batteries excepting ebonite boxes are manufactured by the Hart Company on their own premises, and they even make their own casting moulds with machine tools specially designed by themselves. On the ground floor is an extensive and well-appointed casting shop (Fig. 2), in which about half a dozen moulds for different sized types of plates are in continuous operation. A special feature of this department is the admirable process by means of which the cross-bars and lugs are cast on to the assembled sections. Iron moulds are clamped in position with the vertical lugs of the plates projecting into them, and where vertical connecting pieces as in the train lighting sets are used, these are inserted through slots in the sides of the same moulds and superheated lead run in, thereby forming the bar connecting the plate lugs all together on one side, and the vertical connecting pieces on the other. All the parts to be connected in this process have, of course, to be scrupulously cleaned, and provided with as bright and new a surface as if they were to be united by means of the hydrogen flame, and considerable experience and skill has to be exercised in the casting, as the lead has to be brought to exactly the right temperature. If it is too cold, the joint is unsatisfactory; if too hot, there is a tendency to injure the connecting parts.

Next to the casting shop are arranged the pasting departments, where the grids are filled up with active material. There are no special methods employed in this department, litharge of specially pure quality being employed for pasting the negative plates, and red lead for the positive, mixed with dilute sulphuric acid. From the pasting room the plates pass to the drying room, which is also of the

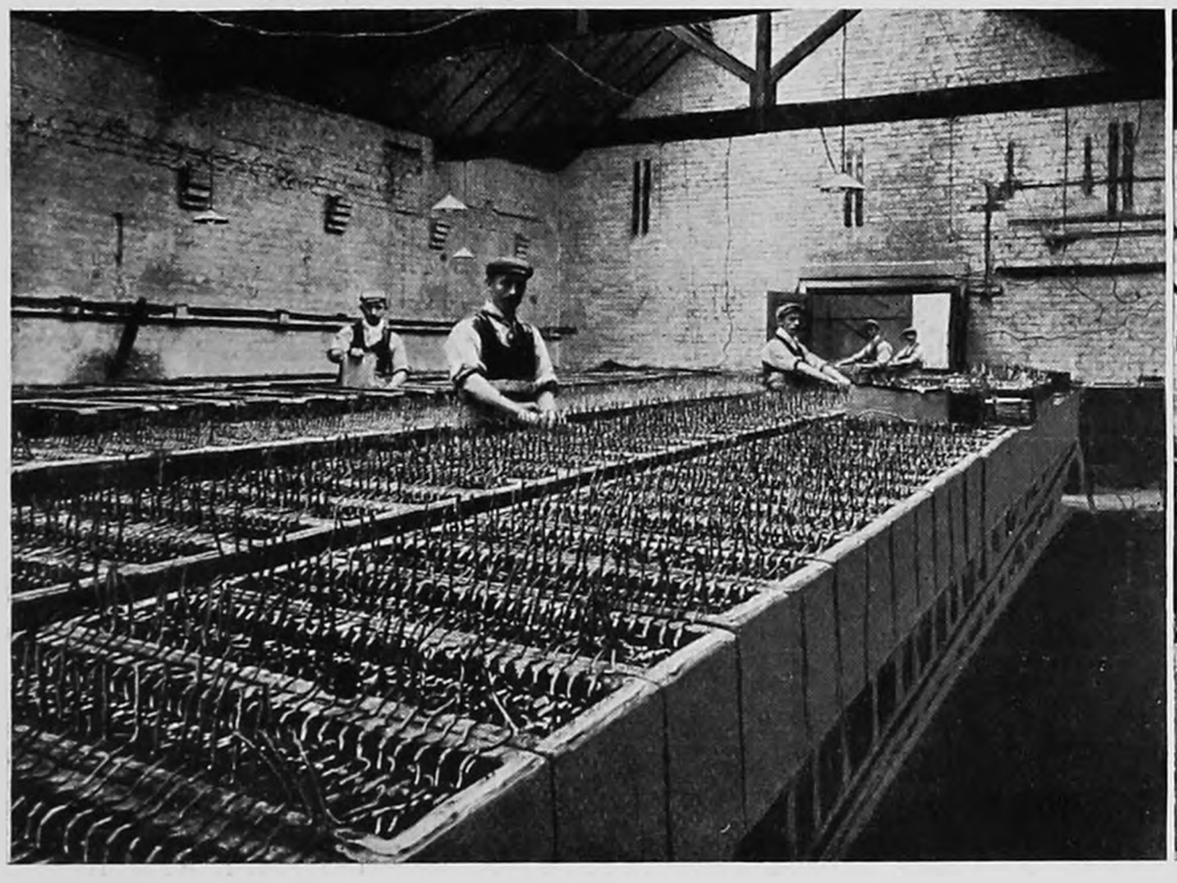


FIG. 1.—The Forming Room.

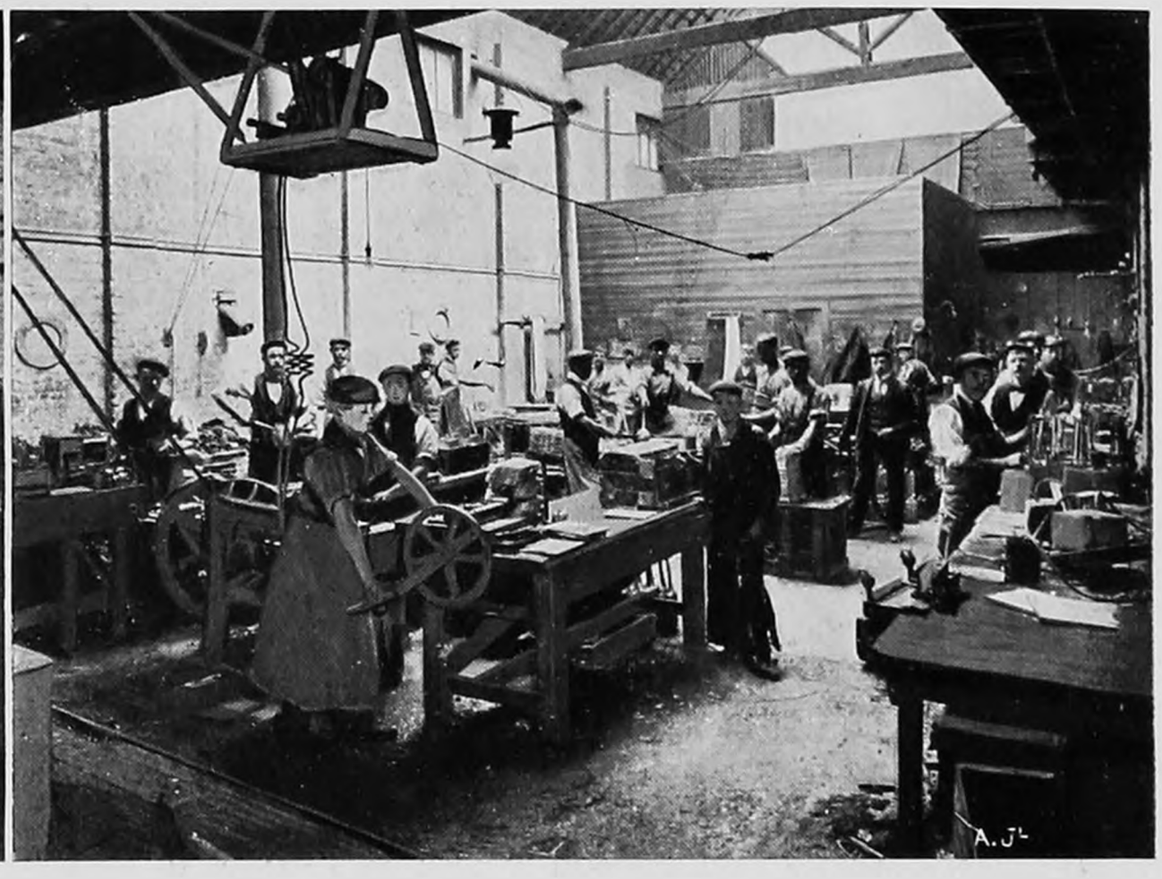


FIG. 2.—The Casting Shop.

THE HART ACCUMULATOR COMPANY'S WORKS.

recognised and well established pattern, the plates being arranged in racks, where they are dried at a temperature of about the same as that of a moderately warm Turkish bath. After drying in the drying-room the plates are formed in very dilute sulphuric acid in large forming-vats, of which there are two great batteries in each of the two large forming-rooms. One of the forming-rooms is reserved for the larger type of central station plate, and in the forming batteries in this room the plates are formed against "dummies," that is to say, plain plates of metallic lead, the connections to the plates being by temporary small leaden conductors, burnt on by a hydrogen flame. In the other forming-room, (Fig. 1), smaller plates are formed, the connections to them being made by thin leaden lugs which are cast on to the grids in the moulds, and are removed after formation. They are simply twisted together so as to unite pairs of plates (positive and negative) which are mounted in adjacent vats. This method of con-

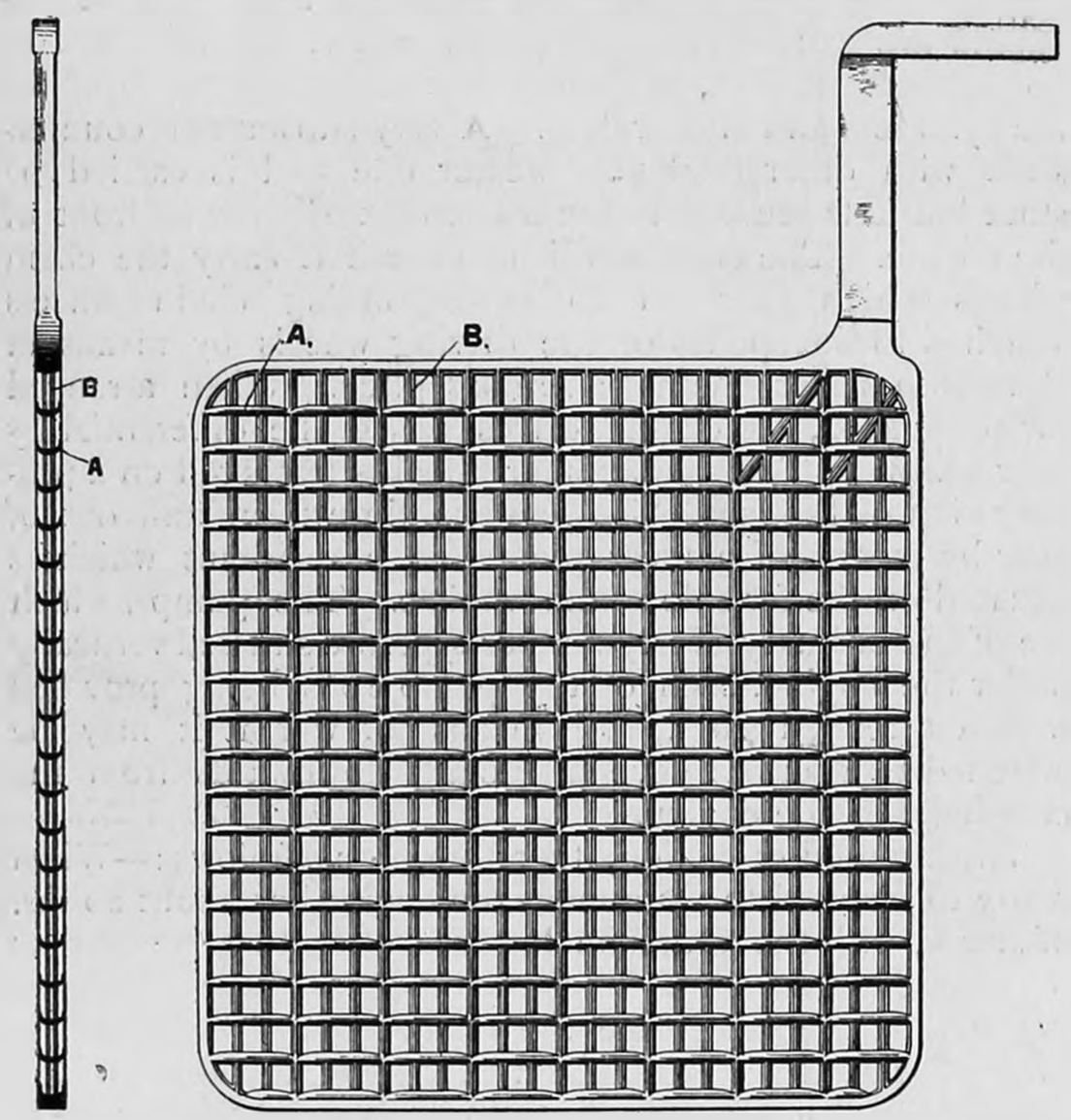


FIG. 3.—The Hart Light Traction Grid.

nection is very cheap and expeditious, and though it looks to the casual observer as if it might give rather haphazard results, is said to work very well in practice. Altogether the works have a capacity for forming 16,000 of their ordinary sized plates at once, including about 2,000 of the larger central station plates. At the time of our visit 8,000 plates were in actual process of formation, about 4,000 of these being for train lighting purposes.

The current for forming is supplied primarily from two large double-pole drum-wound dynamos, driven by a horizontal steam engine. The capacity of this plant is about 150 volts at 200 ampères.

There is another very interesting installation of about the same watt capacity, built by Brown Boveri and Co., of Oerlikon. This consists of an alternating synchronous motor coupled to a four-pole drum-wound generator. The alternator is started on the split-phase principle by dividing the current and throwing one half out of step with the other by means of a condenser. This start enables charging current to be obtained from the local municipal alternating supply, which provides the Company with current at the singularly moderate figure of a little over one penny per unit.

The very large consumption of lead-lined teak boxes required by the Company for their large train lighting business is met by supplies manufactured on the works. For this purpose they have a very finely appointed carpenter's shop, fitted with the most improved wood cutting, planing, and finishing machinery. The items of most interest to the automobile community manufactured by the Hart Company are their ignition cells for motor cars and their special cells for traction work. The ignition cells are made in various sizes of from nine to ninety ampère hours' capacity, and their price is extremely moderate, varying from 4*s.* 6*d.* for the former to 19*s.* for the latter. They are put up in nice well-finished ebonite boxes, and can also be supplied in lead-lined teak. The type of plate employed is similar to that used for the train lighting sets, that is to say, the negatives are of the latticed type, and the positives of the ribbed and pasted pattern described above.

The traction cell has several very interesting features. In these cells the latticed type of negative is still preserved, but the positive plates, (Fig. 3), are quite different from those previously manufactured by the Company. They consist of an open latticework of cast lead, the flat horizontal portions of which, A, are united by vertical rod-like conductors, B, which when the grid is cast extend on either side of its general surface. The grid is then subjected to treatment between rolls so as to turn up the projecting edges of the extending horizontal portion, thereby forming a number of reticulated or basket-like recesses, which produce an excellent keying in effect of the active material when the plate is pasted and formed. These cells are manufactured in three different sizes of 80, 120, and 160 ampère hours' capacity at the 10-hour rate, the weight being 17, 24, and 33 pounds respectively. Thus the weight capacity comes out a little above 9 watt hours per pound. This, of course, is not an abnormally high result, but there is little doubt it will be improved upon in future. An interesting feature of these cells is the employment of a highly-porous thin cloth of silicious material, which is said to be wholly unacted on by acid. This is wrapped twice round the positive plates before they are put in position, after which they are additionally secured by perforated ribbed ebonite separators of the type fairly common in light traction cells.

THE Bristol Motor Company, of 5, Redcross Street, are in a position to execute any repairs in connection with motor cars very quickly. In addition to being official repairers to the A.C.G.B.I. they also represent the Motor Manufacturing Company, Limited, and the De Dion Bouton, Limited. The Company will be pleased to send a map showing the exact position of their depôt and works to any enquirer likely to be visiting Bristol.

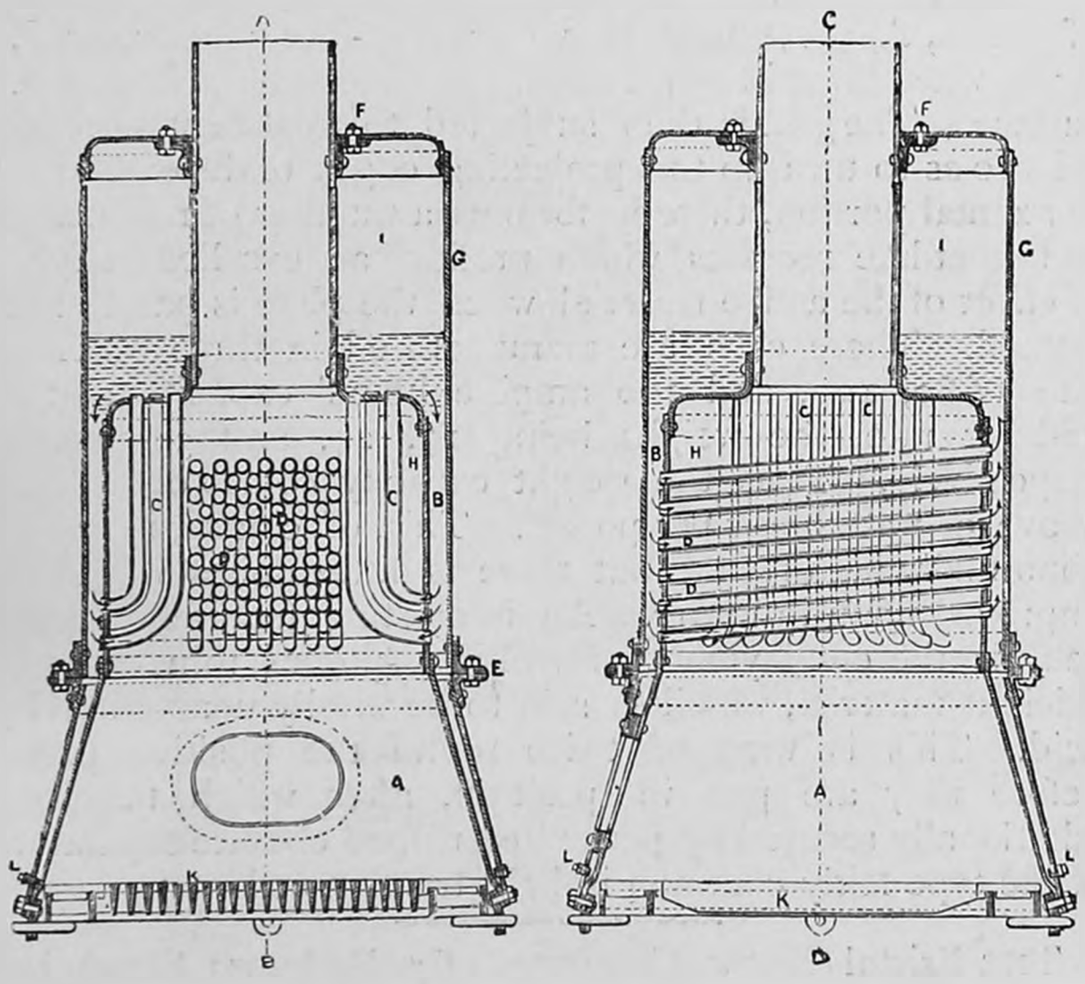
A BENZ car, owned by Mr. H. Hewetson, is to be driven for 100 miles per day for 50 consecutive days, completing thereby a total distance of 5,000 miles. Mr. Hewetson rightly opines that this should demonstrate the reliability of the Benz car. He proposes, subsequent to the completion of the trial, to offer the car by public auction, the amount realised to be handed over to the Prince of Wales' Hospital Fund. The first run is announced to commence on Monday next, the 9th instant, at 9 a.m., from the Carlton Hotel. An Observer will accompany the run each day in order to certify to the full run of 100 miles.

"THE MOTOR FIRE KING."

MESSRS. MERRYWEATHER, of Deptford and Long Acre, the well-known designers and builders of fire-engines, are now manufacturing motor fire-engines in which both the boiler and engine designed for operating the pumps at the scene of the fire are arranged for the propulsion of the vehicle from the fire-station itself to the place where its services may be required. Our illustration on the front page gives a view of the latest machine constructed by the firm on this principle, and named by them "the Motor Fire King."

The general appearance of this engine resembles the ordinary horse-drawn fire-engines constructed by Messrs. Merryweather, with which practically everybody is familiar. The only main difference noticeable on a casual inspection is the absence of means in front for adapting horse-traction to its propulsion, the presence of chain-driving to the rear wheels, and the arrangement of the pumping-engine and pumps in front instead of in rear of the boiler.

The boiler, of which we give two vertical sections, is of exactly the same construction as the boilers employed in the ordinary horse-drawn fire-engines. It is of the vertical water tube type, with a larger number of horizontal heating tubes and a smaller number of vertical tubes arranged in



two sets one on either side. Water tanks holding 100 gallons partially surround the boiler. At the lower part of the boiler the ordinary fire-grate is shown in section. In the engine illustrated, the fire-bars are removed, and the space designed for the reception of the coal is occupied by a large Clarkson 30-h.p. burner. This burner is heated to the vaporising point by gas, which, when the engine is at the fire-station, is kept permanently on, and, while keeping about 20 lbs. of steam in the boiler, maintains the Clarkson burner at a temperature which enables the oil to be immediately turned on as soon as the gas pipe is removed. The employment of gas in this way for maintaining permanent steam and heating the burner involves no additional expenditure in the use of liquid fuel, as the practice is practically identical with that adopted in existing coal-fired engines, the gas ring being employed in the grid above the banked fire while the engine is kept ready at the station. An intensifying steam jet is used in the Clarkson burner to draw in an additional amount of air with the vaporised oil. This works very effectively, giving an intensely hot blue and smokeless flame. The engine was being warmed with the gas jet when we inspected it, and we had an opportunity of estimating the time from the instant when the heavy oil was turned on and the gas-pipe pulled out, to the moment when the pressure gauge indicated 60 lbs. of steam, which is sufficient for starting, the extra pressure (up to 120 lbs.) required for pumping being easily raised on the road. The exact time in question was one minute and a half.

The framework of the fire-engine is of channel steel and the engine is mounted across it in front of the boiler and between it and the hose-pipe box, the front portion of which forms the driver's seat, the side supplying accommodation for the firemen. It is of the well-known Merryweather Gem pattern, being of the vertical double-cylinder high-pressure type with link motion reversing gear. All the parts of the engine are exceedingly well built, and it has an i.h.p. of 30 Steam pressure, sight feed, lubricators are employed for the cylinders and slide valves. A very substantial countershaft with differential gear nearer one end is carried by stout brackets secured to the framework slightly in front of the engine. The ends of this countershaft carry the chain wheels which gear on to corresponding chain wheels attached to the spokes of the driving wheels by means of Brampton roller chains of 2-inch pitch. When arranged for propulsion, the engine drives on to the differential by spur gearing. The smaller spur wheel is feathered on a prolongation of the crank shaft, and is thrown in and out of gear by means of a lever pinned in a quadrant which is situated on the far side of the vehicle. The pumps, which are of the ordinary Merryweather type, are situated vertically under the engine, each of the pump rods being provided with a threaded collar by means of which it may be attached to a screw sleeve projecting downwards from the crosshead of the engine.

The method of action, therefore, is as follows:—When ready to respond to a summons the engine has about 20 lbs. of steam, with the Clarkson burner so hot that the oil may be turned on at once in the manner we have described above. At the same time the crank shaft of the engine is in gear with the countershaft. As soon, therefore, as the required 60 lbs. pressure of steam is obtained the vehicle is ready to be started along the road to the scene of the fire. On arrival there the feathered spur wheel on the end of the crank shaft is slid out of gear, the crosshead lowered into its lowest position, each of the pump rods screwed on to it by means of the screw-sleeves described above, and the engine is ready to commence pumping. Disconnecting the engine from the countershaft and connecting it to the pumps can be done within 30 seconds, and the pumps, which are capable of pumping 300 gallons per minute, are consequently ready for action almost before the hose-pipe can be got out and unrolled.

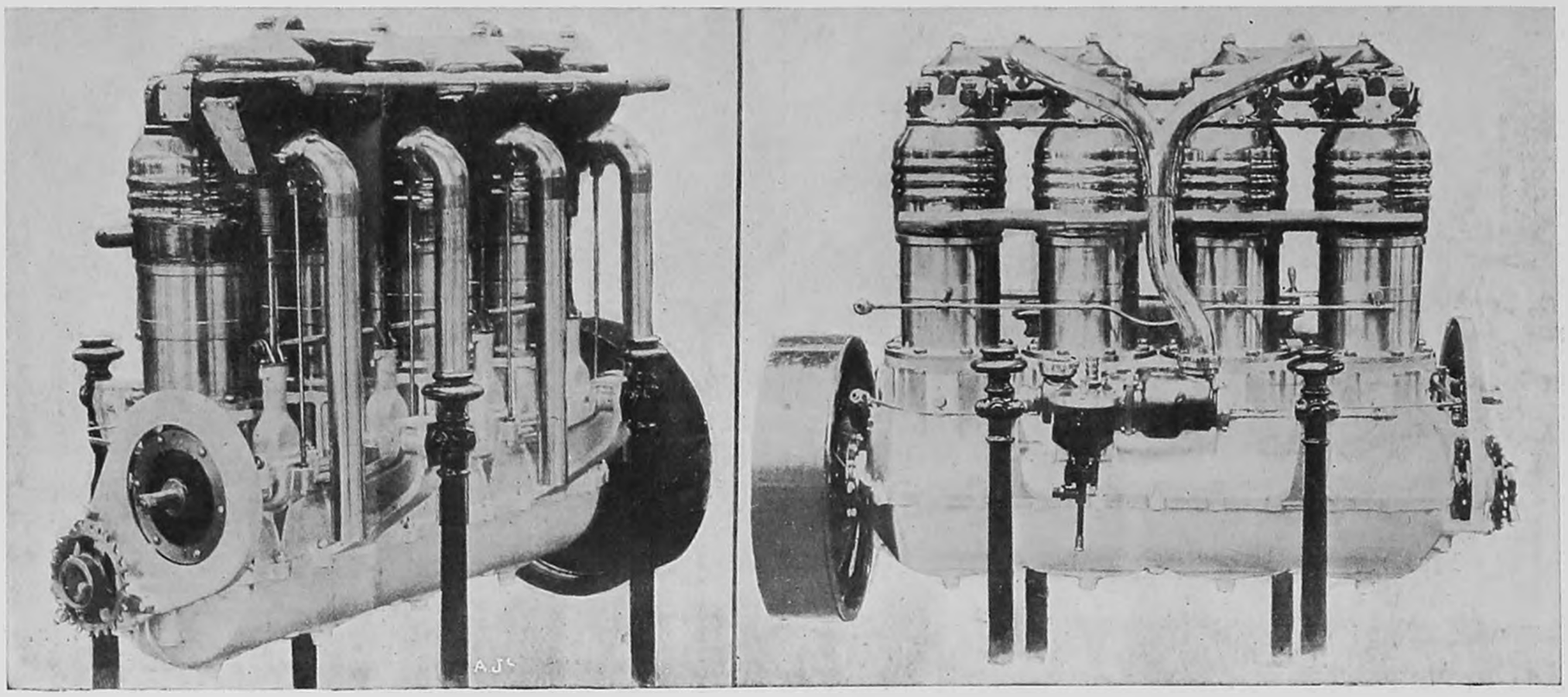
Two long cylindrical tanks, which may be seen underneath the driver's seat, serve for carrying 30 gallons of oil, and pressure at 40 lbs. per square inch is maintained inside them by an air-pump working off the crosshead of the engine. The driving is on the Ackermann principle, with vertical pillar and wheel, and the engine is controlled by the throttle and by "linking up" in the ordinary way. A band-brake is provided on the countershaft and also a screw rim-brake, which can be

applied on emergency by the attendant who travels on the rear of the machine. The wheels are of the artillery pattern and very stoutly built. They are shod with 3-inch solid rubber tyres, manufactured by the North British Rubber Company.

We had an opportunity of judging of the great controllability and easy running of the vehicle. It runs as smoothly and is as readily controllable as many pleasure cars, while on a level road it is capable of attaining to a speed of quite 25 miles an hour.

Altogether we think Messrs. Merryweather are to be very heartily congratulated on their new departure. We feel little doubt that the new fire-engine is capable of performing its services much more efficiently and at much smaller cost than is the case with horse-drawn machines. The high workmanship and finish, accompanied by solidity of design and substantiality of parts, which characterise all Messrs. Merryweather's manufactures, are conspicuous in this their latest creation, and we feel sure that it can only be a question of time, and a short time probably at that, before the majority of the engines they turn out will be built as motor fire-engines.

A noticeable feature during travelling was the total absence of anything in the way of sparking from the funnel —a most agreeable contrast to the phenomena presented by coal-fired fire-engines.



The New Centaure Motor.

THE NEW CENTAURE MOTOR.

MESSRS. PANHARD AND LEVASSOR have succeeded in building a very light four-cylinder motor for their new racing cars. This machine, which is nominally of 50-h.p., develops 70-h.p. on the brake at 950 revolutions a minute, and its weight, complete with flywheel, is but a few pounds ($5\frac{1}{2}$) over 6 cwts. The construction of the motor differs radically from their previous types, the cylinders being made out of forged steel, in much the same manner as that adopted in gun manufacturing. Each of the cylinders is entirely distinct, and is bolted to the crank chamber through a flange, which forms the lower portion of the cylinder. The crank chamber is made in two parts, divided horizontally on the axis of the crank shaft. Separate bearings are provided between each crank pin, there being thus five of these in all instead of only three as hitherto. The crank pins are arranged in the usual manner, the two outside ones being opposite the two inner ones. The cam shaft is carried by the upper crank chamber casting, and is driven by spur wheels, which are enclosed in a neat case.

The accompanying illustrations show the appearance of both sides of the motor. The water jackets are made of copper and are corrugated in order to render them flexible longitudinally, so as to accommodate themselves to the expansion of the cylinders. The cylinder heads are ingeniously designed and are separately water-jacketed. They carry special inlet valves, a large exhaust valve immediately beneath the induction valves, and an ignition plug which is placed vertically above the centre of the cylinder. These heads are fixed by bolts to the cylinders, and are also steadied by rods which pass from beneath the exhaust passage to the upper portion of the crank chamber. The heads are fixed together by a neat coupling, which renders them more rigid. The inlet valves are each made with three separate valves arranged in a triangle. The casting forming their seats screws into the cylinder head and a single bolt in the centre of each secures the branched supply pipe above them. The exhaust valves are operated by the same cam mechanism as that employed in previous Centaure motors. Provision is made by which the exhaust valves can be held open for facilitating starting. A Centaure carburettor is employed, this being connected with the governor in such a manner that it operates the throttle valve.

For ingenuity of design, lightness of construction combined with strength, and remarkable accessibility of all parts, this motor deserves careful study. One of these engines was fitted to Chevalier René Knyff's car in the recent Circuit du Nord, and their performance in the coming Paris-Vienna trials will be watched with interest.

DR. LEHWESS writes us from Paris that Mr. Brown, who proposed touring with himself and Mr. Max Cudell round the world, has seceded from the expedition, and that Dr. H. P. Kennard has taken his place.

CARBURETTORS AT THE PARIS ALCOHOL SHOW.

THE De Retz carburettor, which is made in several types, contains small revolving fans for mixing air and alcohol during their passage through it. The B model has a 16 mm. feed orifice and is constructed to be used in a vertical position as near the motor as possible. The C model is made in various sizes with orifices varying from 16 to 50 mm., and is of somewhat more substantial design. The D model is for pure alcohol or for petrol, and is somewhat more complicated. The first-mentioned is seen in Fig. 1, which will show the principle employed in all three. A fuel tap, A, is arranged at the lower extremity, this being in communication with the feed orifice in the body of the mixing chamber, B. The orifice is normally closed by a needle valve, C, which carries one of the fans, D, and which is lifted by the incoming air. A second fan, E, is arranged immediately above the first one, and it revolves in the opposite direction in the chamber. The body of the carburettor is jacketed, F, the jacket being connected with the exhaust pipe of the motor and thus kept warm. No float feed of any kind is employed, the lifting of the lever valve and the lower fan being relied upon to regulate the

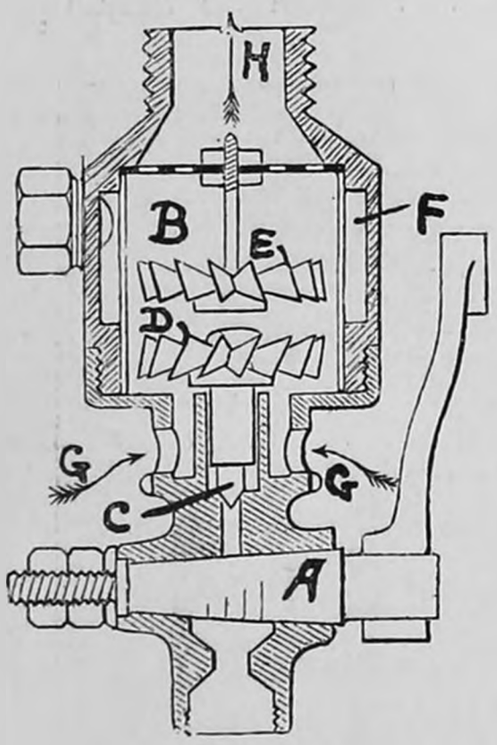


FIG. 1.

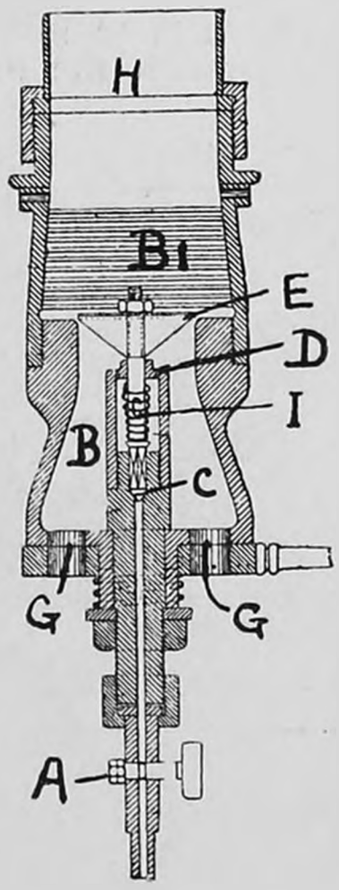


FIG. 2.

flow of alcohol. The extent of this lift is regulated by adjusting the vertical position of the fan, E, which acts as a stop. The air enters through adjustable holes, G, and the explosive mixture passes out of the pipe, H, to the engine.

In the Roubeau carburettor, Fig. 2, the fuel enters through an adjustable tap, A, to a jet, D, having several $\frac{1}{4}$ mm. orifices. The passage leading to the orifices is so shaped that the feed is controlled by a valve, C, inside it. The spindle of this valve passes through the centre of the jet, and carries an inverted cone, E, at its upper extremity. The valve is normally held on its seat by a spring, I, and the cone nearly closes the passage of the air which enters through the adjustable holes, G, at the bottom of the carburettor and flows out to the motor at the top, H. The mixing chamber, B, is somewhat narrower at this point, and the upper portion, B^1, is corrugated internally in order to assist the mixing action. The entrance of air is regulated by a perforated disc, the holes in which correspond with the holes, G, in the bottom of the carburettor chamber. As the air is drawn through the carburettor it lifts the cone, and at the same time permits the fuel to flow through the orifices. It then takes up the alcohol and forms an explosive mixture with it during its passage over the cone and the upper corrugated surface to the engine. The richness of the mixture is regulated by the tap, A.

The Henriot carburettor is shown sectionally in Fig. 3, and applied to one of his single-cylinder motors, where it is regulated by a centrifugal governor, in Fig. 4. The alcohol feed is regulated by the tap, A, through which it flows to the nozzle, C. This nozzle has a series of fine holes arranged circumferentially around it, the main feed to them being controlled by a needle valve passing down the centre of the nozzle. The needle valve carries a plate, N, which obstructs the free passage of air from the feed pipe, D, to the mixture supply pipe, H. The spindle of this valve passes through the carburettor at B and is limited in its upward movement by a stop. The action of this mixing device resembles those above described, although the details of construction are somewhat different. A throttle valve, P, is provided in the supply pipe, H. This, in the case of the Henriot motors, being regulated by a centrifugal governor on the end of the crank shaft.

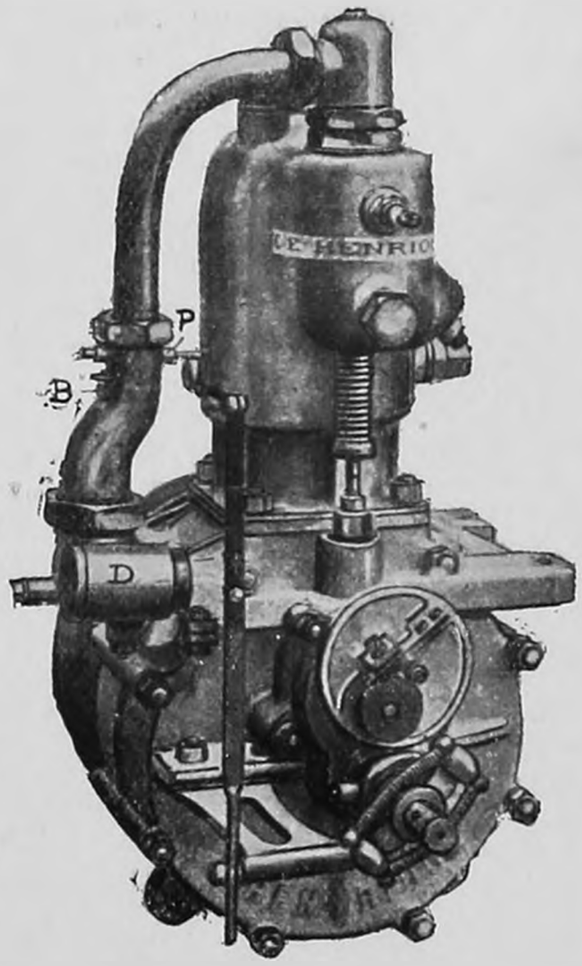


FIG. 3.

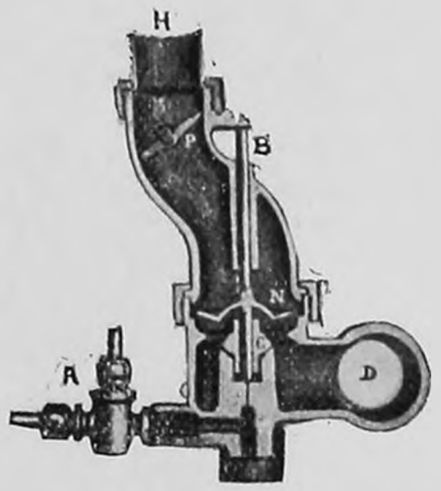


FIG. 4.

The Martha carburettor has been very successful with alcohol motors. It was illustrated and described by us in our notice of the Paris Automobile Exhibition in December last (Vol. VI., p. 169). Improvements have been made in these recently. Referring to Fig. 5, the two drawings to the left illustrate the larger type of carburettor, in which a float feed is employed. In the new form the differences appear to be in that the mixing chamber, A, contains a movable needle valve, D, which normally closes the orifice in the jet, B, and which is lifted a greater or less extent according to requirements, the adjustment being by the screw, E. A flat plate, d^1, is fixed to the needle, D, this being opened by the ingoing air and also assisting in mixing the alcohol with the air. An internal serrated sleeve, *a*, is fitted in the mixing chamber immediately below the plate, d^1. The mixture then passes, as before, through a spiral passage, H, around the central exhaust pipe, *h*, to the supply con-

nection, J. The difference in the construction of this part is that the spiral plate is now perforated with a great number of small holes and, doubtless, is more efficient both in warming the air and in completing the mixture of the gases. An auxiliary air supply, leading into the pipe, J, is regulated by a perforated ring, K. A smaller type of carburettor is shown in the drawing at the right of Fig. 5, this being specially designed for use on motor cycles. In this form the float feed chamber is dispensed with and the carburettor is intended to be used sufficiently near to the motor to obtain a warm air supply from it. The only other provision for warming the mixture is that a branch exhaust pipe is led through the chamber, F, at the top. Referring to the drawing it will be seen that a cock at the bottom regulates the flow of fuel to the mixing chamber, A, through the jet, B. A needle, D, solid with the plate, d^1, normally closes this opening. The upper portion of the needle is guided inside the sleeve, d, and a screw, E, enables the

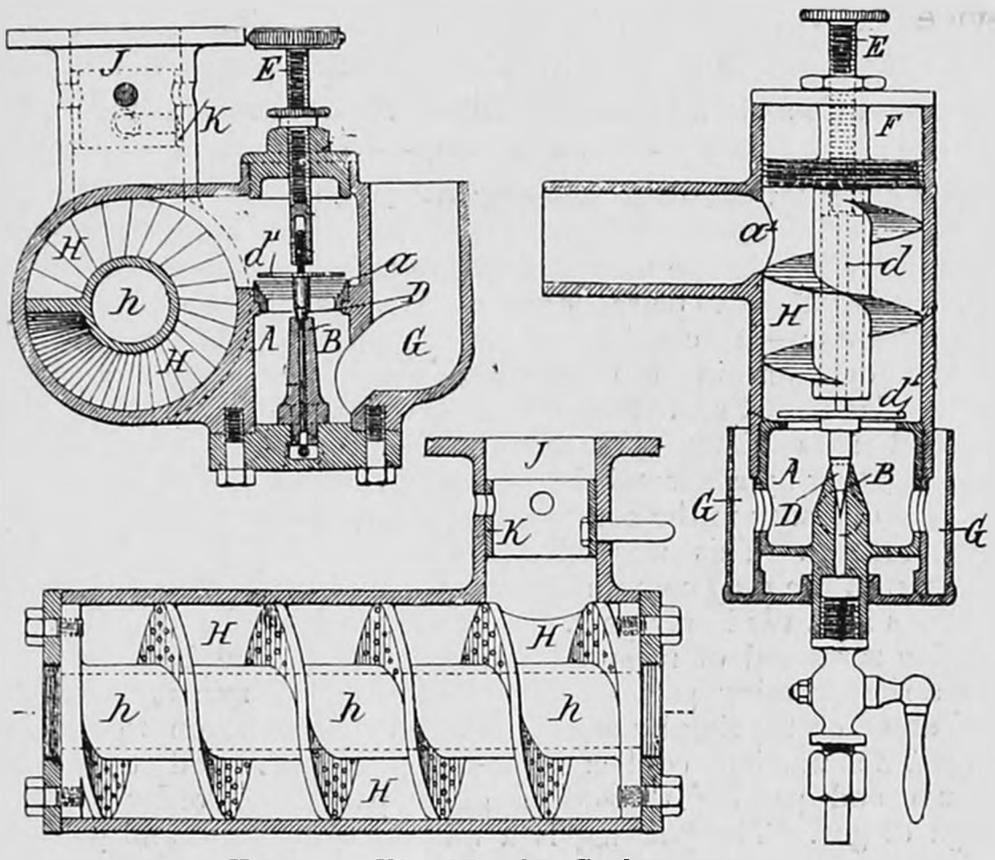


FIG. 5.—The Martha Carburettors.

degree of lift of the valve to be varied. The air enters through an adjustable opening, G, and after it has lifted the plate, d^1, it is further mixed with the fuel by its passage round the spiral baffle, H, before finding its way to the engine through the pipe, A^1.

Another interesting device shown at the Alcohol Exhibition was the Guillou igniter, this being a compact incandescent tube and burner working with alcohol and consuming about a litre in 20 hours. In this apparatus the burner, with its chimney, inspection window and vaporiser, are made in one piece, into which a porcelain ignition tube slides, and which is so constructed as to make a gas-proof joint with a connection fitting which fixes into the cylinder wall. The ignition tube, together with the burner, can be removed without the use of any tools by loosening a single thumbscrew, and a fresh tube can be slid into place in a very short time. The moment of ignition is regulated once and for all to suit the engine, this being adjusted by placing a greater or less number of displacement pieces in a side chamber branching from the passage between the cylinder and the tube.

A REALLY fine series of eight designs for motor car bodies appears in the current issue of the *Coachbuilders' and Wheelwrights' Art Journal.*

TYRES, AND REPAIRING THEM.

THERE is no doubt that the problem of tyre consumption and wear and tear is becoming one of the burning questions of automobilism at the present time. Car users are rather chary of disclosing actual figures and data, but there is no doubt that some are more or less unlucky than others. In any case, however, the question of wear and tear of tyres is a highly important one, and the cost involved is not by any means infrequently the principal item of expenditure involved in the up-keep of an automobile.

It is from this point of view that the methods of repairing tyres which are now being so successfully adopted by the Imperial Rubber Company, of Brook Street, Holborn, are distinctly worthy of attention. This Company has devoted very considerable attention to the problem of repairs, and is effecting repairs of a nature and efficiency such as to render the repaired tyre to a large extent as good as a new



one, and this is effected at about a third or a quarter of the cost of a new tyre. Recognising the importance of the question we recently paid a visit to the offices of the Imperial Rubber Company, with a view of ascertaining the nature and principal features of the method adopted by them in what is practically rejuvenating worn-out tyres.

There are two classes of repairs which are carried out by the Company—repairs of light tyres, and repairs of heavy vehicle tyres. Repairs of light tyres are effected by simply cementing on the outside of the outer case a vulcanised rubber band in the ordinary way. There is, of course, nothing special about this method of repair, for the same thing is done by a number of other manufacturers. It is in the method of repairing the heavier pneumatics, such as are used on wheels of large and heavy automobiles, that the process which the Company has been so particularly successful in developing, is employed. In this process the crude rubber, mixed with a sufficient percentage of sulphur for its vulcanisation, is laid on the surface of the tyre in strips. The outer case of the tyre is then mounted on a mandril, the whole tyre is bound round and subjected to a high degree of pressure, whereupon the freshly applied rubber is exposed for a lengthened period to a temperature of about

250° F. This vulcanises the crude rubber in position, and at the same time unites it homogeneously with the original substance of the outer case, so that the separation of one from the other is after that a practical impossibility and the tyre may to all intents and purposes be regarded as a new one. During this process particular care is taken and special means adopted to prevent the portions of the outer case which do not require repair from being subjected to the vulcanising temperature, which would otherwise have the effect of injuring the rubber. The fabric of the outer case, wherever injured or burst, is, of course, repaired prior to the application of the fresh rubber, and it is almost unnecessary to point out that where a tyre is only injured at one or two points the process can be applied without the renewal of the whole of the surface. Of course, in all trials of tyres there is a certain element of luck, and it may conceivably happen for a freshly repaired tyre in some particular instance to be injured or punctured soon after it is tried for the first time, but the same thing also happens not infrequently in the case of a new tyre, and the experience of a large number of users seems to show that this tendency is certainly not greater in the case of tyres repaired in the manner described above than in the case of new tyres that have just left the factory.

The accompanying illustration represents a damaged tyre before and after treating by the above-described process by the Imperial Rubber Company.

MESSRS. SPENCER'S NEW AIR-SHIP.

THE air-ship "Mellin," which Messrs. Spencer Brothers, of Highbury, have had on the stocks for some time, is now very near completion. In general outline it is similar to M. Santos Dumont's, differing slightly in the shape of the gas vessel which, in Messrs. Spencer's ship, tapers rather more towards the after part than in front, giving it, roughly, the form of a fish. The gas vessel is 75 feet long, and its greatest diameter 20 feet. It is provided with an automatic valve; this is situated at a point 25 feet from the motor, far enough, it is considered, to ensure safety from the possibility of explosion. Pure hydrogen is to be used for inflation.

A compensating air vessel is fitted with a tube leading to a hand blower, the function of which is to pump air into the vessel to take up any slackness which may arise from escape of hydrogen. A Simms' motor drives a steel shaft carrying a pinion meshing with a gunmetal spur-wheel, which, in turn revolves the shaft of the "tractor." For, unlike M. Dumont's, and most other dirigeable balloons, Messrs. Spencer have decided to alter the position of the fan from the stern to the bow, so that it can no longer be called a propeller. The motor is capable of causing the fan to revolve 200 times a minute, and the projectors of the ship reckon on a speed, in still air, of 15 miles an hour. The framework is 45 feet in length. It is made of bamboo, the car and the whole scheme of the ship being designed to carry two persons. The suspension of the frame to the air vessel is by means of Italian hemp lines. Steering is provided for by a rudder suspended at the stem between the framework and the aerostat.

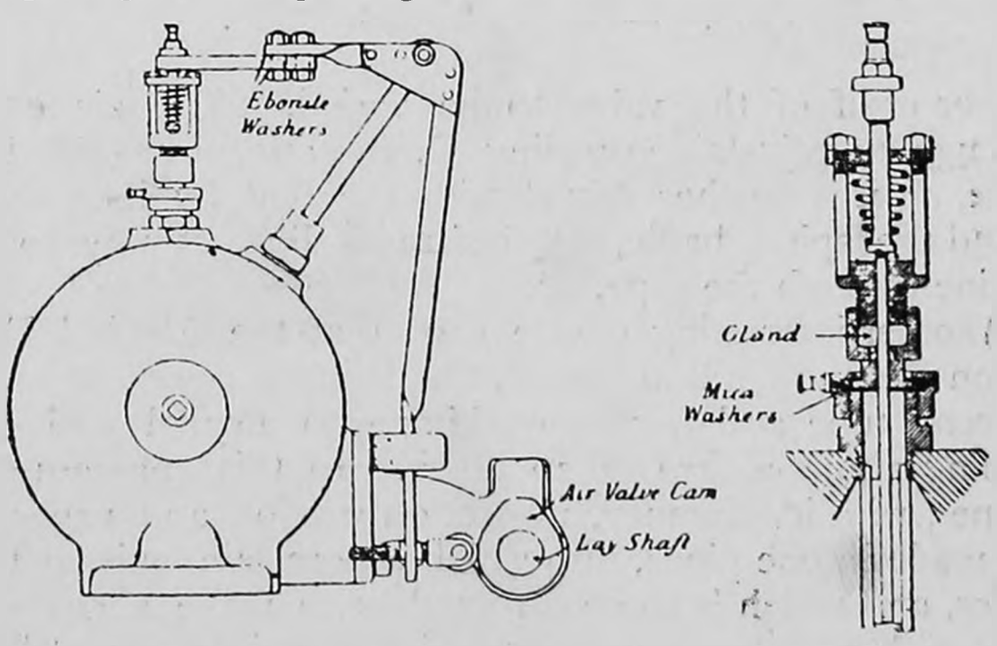
The ship, which a representative of this journal has been privileged to see, is within a few days of completion, and will be housed in an aerodrome, possibly at the Crystal Palace, and will make a number of more or less extended journeys, according as weather permits.

JUSTICES' JUSTICE.

IN the House of Commons last week, Mr. Norman asked the Home Secretary whether his attention had been called to the fact that, on the 4th inst., Mr. G. C. Ashton Jonson, driving a light motor car of small horse power, was stopped by a policeman upon the Ripley Road, and was charged before the Guildford Magistrates on the 10th instant with exceeding the legal limit of speed; that the policeman admitted that he had measured the distance over which he timed the defendant with a bicycle wheel; that he had taken the time with the seconds hand of an ordinary watch after looking to see the defendant pass a marked point 176 yards away; that there was no person in sight upon the road and no traffic whatever, and that the car was under perfect control; that Mr. Ashton Jonson declared upon oath that he had timed his previous two miles with a stop-watch, and they had been covered at the rate of 11 miles an hour; that he also swore, and his evidence was corroborated on oath by Mr. Arthur Blomfield, Architect to the Bank of England, who was a passenger upon the car, that it was impossible he could have been proceeding at the speed charged by the policeman; and that, nevertheless, the Chairman of the Guildford Magistrates fined the defendant, though it was the first charge of the kind against him, five pounds; and whether he would consider the propriety of taking any action in the matter.

Mr. Ritchie: The case as stated by the hon. member appears to have been fully put before the Magistrates. They heard the evidence, and I do not think I should be justified in attempting to review the decision of a competent Court in a case of conflicting evidence such as this.

Professor Burstall's Igniter.—In Professor Burstall's paper on "Gas Engine Research" is a description of an interesting ignition apparatus which, though designed for gas engine use, may probably be applied satisfactorily to petrol engines. His description of the appliance is as follows:—It consists of a threaded plug which screws into the cylinder in the position where the ordinary ignition tube is placed. From the lower extremity of this plug project two steel rods about 3 inches in length, the rods being connected together by a short bridge-piece, in which is fixed a platinum tip. The difficulty in the construction of the igniter was to insulate the moving contact. This was effected by insulating the whole of the upper part of the plug containing the gland through which the sliding rod moves from the lower part, which screws into the cylinder. The insulation is formed of mica discs, which are placed both above and below a ring forming part of the upper plug. These mica discs are forced down on the ring by means of a nut threaded on to the lower plug. The moving contact consists of a steel rod tipped with platinum and passing through a gland packing in order to prevent leakage of gas. The packing is a mixture of asbestos and plumbago.



End Elevation. Section.

The moving rod is forced down by a spiral spring and lifted by a bell-crank lever. Owing to the fact that the rod must be insulated from the body of the cylinder, the lever has also to be insulated; it is, therefore, made in two parts, which are fastened together by bolts passing through ebonite washers. The lower end of the bell-crank lever has attached to it a roller which presses on to the exhaust cam. The time of the passage of the spark is altered by fixing the roller at different distances from the cam. Current was obtained from four storage cells having a capacity of 50 ampère-hours; it was found that to obtain regular ignition the spark must be short and thick; any smaller number of cells did not in all cases produce ignition. As compared with the hot tube it has many advantages from an experimental point of view, and by means of the spark, charges which are so weak as to give irregular results with the hot tube, can be ignited with absolute certainty.

THE BATTLE OF THE EXHIBITIONS.

THE Exhibition question is still receiving considerable attention and causing an appreciable amount of uncertainty in the minds of many of the trade who are in a quandary as to the best course for them to take under the conditions which now exist following upon the withdrawal of the Automobile Club support from any and all Exhibitions. That one Exhibition only is the best thing for the trade in the present state of the industry can hardly be doubted, but which that Exhibition is to be is, of course, the main bone of contention. The proposed Exhibition at the Crystal Palace, to which the A.C.G.B.I. tentatively gave their support, is still being persevered with, and a formal agreement to this end has been placed in our hands by Mr. S. F. Edge, embodying the essential points of agreement which were come to at the meeting of manufacturers at the Automobile Club, when it was decided by vote to select the Crystal Palace, at the end of January next, for the 1903 Club Exhibition. The formal agreement in question is made between Mr. Paris Singer, of Niagara, York Street, and Mr. S. F. Edge, of 14, New Burlington Street, as Trustees on behalf of the several companies, firms and persons who shall execute the proposed agreement undertaking to support only one show in 1903, such Exhibition to be held at the Crystal Palace from January 30th to February 7th next, or some other date which may be mutually agreed upon between the several parties to the agreement. A penalty of £250 is attached to a breach of the agreement by any subscribing member. Mr. Edge writes us that the document is being signed by most of the principal firms in the motor trade.

Referring to the Exhibition which is to be held at the Agricultural Hall next March, under the management of Messrs. Cordingley and Co., we have received for publication the following copy of a letter addressed to Messrs. Cordingley and Co. by the Secretary of the Automobile Club:—

"Referring to the agreement between the Automobile Proprietary, Limited, and yourselves with reference to Exhibitions, I am directed to ask you to accept this letter as formal notice on behalf of the Automobile Proprietary, Limited, and of the Automobile Club of Great Britain and Ireland, of the termination of that agreement.

I may add that, in view of the public announcement made by this Club that it would not give its patronage or name to any Exhibition so long as the trade were not unanimous on the question of Exhibitions, the Committee would, in the ordinary course, have given this notice before now. They had, however, read in your Journal, on two occasions, that Mr. Charles Cordingley intended to terminate the agreement with the Automobile Club, and they believed that Mr. Cordingley, having made the statement, intended to act upon it. Seeing, however, that Mr. Cordingley is now advertising the Exhibition which is to take place at the Agricultural Hall next March as the Automobile Club's Exhibition, the Committee have to request that, in view of this formal notice, you will not repeat this advertisement."

In regard to Messrs. Cordingley and Co.'s Exhibition next year they have sent us the following preliminary list of exhibitors for publication:—

Allard and Co., Limited; Autocar Supplies, Limited; Bayliss, Thomas and Co., Limited; Birmingham Aluminium Castings Co., Limited; Birmingham Motor Manufacturing and Supply Co., Limited; Blake, F. C.; British Automobile Commercial Syndicate, Limited; British Power Traction and Lighting Co., Limited; Brown and May, Limited; Crossley Brothers, Limited; Dunhill, Alfred; Durham, Churchill and Co.; Firefly Motor and Engineering Co.; Friswell, Limited; Garrard Manufacturing Co., Limited; Graphic Cycle Syndicate; Harper and Holloway; Hewetson's, Limited; Horsfall and Bickham; Hozier Engineering Co., Limited; Iliffe and Sons, Limited; International Motor Car Co., Limited; Lancashire Steam Motor Co., Limited; Langdon Davies Electric Motor Co., Limited; Locomobile Co., of America; Joseph Lucas, Limited; Maison Talbot; Mann and Overton; Maudslay Motor Co., Limited; McLachlan, E. A.; Frank Morriss; Motor Car Co., Limited; Motor Manufacturing Co., Limited; New Coventry Eagle Co., Limited; New Hudson Co., Limited; Oppermann, Carl; Peto and Radford, Limited; Progress Motor Co., Limited; Rothschild and Cie.; Shippey Brothers, Limited; Speedwell Motor Car Co., Limited; Spyker Brothers; Star Motor Co., Limited; Steam Car (Houses Lifu System) Co., Limited; Dr. A. Sternberg; Straker Steam Vehicle Co., Limited; Thornycroft Steam Wagon Co., Limited; H. W. Van Raden; H. H. Waterson; F. F. Wellington, Limited; Weston Motors, Limited, &c.

PARIS-VIENNA RACE AND THE GORDON-BENNETT CUP.

AUTOMOBILISM in France proceeds gaily from one excitement to another. With hardly a breathing pause since the cry of "Vive l'Alcool" sent Paris in its thousands to Champigny to see the racers take their flight, the Parisian world of automobilism is now agog for the speed competition from Paris to Vienna. The race is fixed for the 26th, 27th, 28th, and 29th June. The course will be divided into four sections, one for each day: 1st day, Champigny to Belfort, 407 kiloms. (the section from Belfort to Bâle will be neutralised); 2nd, Bâle to Bregenz; 3rd, Bregenz to Salzburg, 370 kiloms.; Salzburg to Vienna, 350 kiloms. After the four days' race is finished there will be a final speed contest over a 2-mile course at Vienna, only those cars competing which contrive to persevere to the end of the cross-continent course.

In the big race several special prizes will be competed for. These will include three prizes of 3,000, 2,000 and 1,000 francs for the three vehicles, irrespective of their category, that achieve the best results using alcohol as a fuel, and Prince Pierre d'Arenberg also offers the d'Arenberg Alcohol Cup for competition. Several firms, too, will offer prizes to owners of cars using their tyres. It is proposed also to take advantage of the authorisation of the course to run off the Gordon Bennett Cup race over the section of the course that lies between Champigny and Fribourg-en-Brisgau. The race cannot extend into Switzerland, that part of the course being neutralised.

We know that the prohibition of the Nice-Abbazia race was mainly due to the reckless and inconsiderate

conduct of some of the competitors who, by way of trial spins, drove over the course several times at furious rates during the weeks preceding the fixture. There will be none of that in this instance. Any competitor who drives over the course before the race at a speed beyond the legal limit will be disqualified, and it may be the same penalty will be visited on the firm to whom the car belongs. Another rule places a ban on the "relief cars" that have been used in former races for the transport of fittings and appliances useful in case of a breakdown. Waiving the question of the absurdity of these arrangements in the case of an endurance test, these satellite cars have proved a source of annoyance and confusion, not to say danger, and any racing car having such a relief car in attendance will be disqualified. The new rule as to closed "parcs" will again be observed; that is to say, repairs may only be carried out on the road during running time. When a driver reaches the end of a day's stage he must house his car, being allowed only to shut off his electricity, turn off his petrol, and pump paraffin into the cylinders.

At the time of writing, the exact route for the whole distance is not settled. In France, however, it will pass through Nogent-sur-Seine, Bar-sur-Aube, Langres and Belfort, and after that one suggested route is by way of Stuttgart, Ulm, Augsburg and Munich. Some interesting information has been sent to Paris concerning this route by Prince Galitzin, who is travelling to Moscow in a car, by way of Vienna. He reports favourably, on the whole, of the condition of the roads. From Stuttgart to Ulm there is an alternation of good and bad stretches; a fair road connects Ulm with Augsburg, save in and near villages, where there are some killing corners and desperate gradients. By way of send-off from Augsburg, on the way to Munich, there is a splendid wide and straight run, which later becomes narrow and winding and is peppered thickly with villages. Generally speaking, the Prince says of the roads, that there are no reasons why the big race should not be run over them. The route may include the following Austrian towns: Feldkirch, Bludenz, Landeck, Innsbruck, Athein, Salzburg, Wells and Linz. M. Tampier, who has been appointed by the A. C. F. a kind of official scout to reconnoitre, reports that from Paris to Langres he finds the roads very good, speaking with particular enthusiasm of the section between Nogent and Troyes, as a fine piece of going ground, calculated to tempt the chauffeur to let his machine all out.

In the speed class there will be five categories:—motor bicycles, motor tricycles, voiturettes, light cars, and heavy cars. There will be, besides, a tourist class. The latest moment for entering for the great race is 6 p.m. on June 15th. With accursed coincidence the dates fixed for the race are exactly those of our Coronation festivities. This will probably prevent many English automobilists from entering.

Already 155 entries have been received for "Paris-Vienna." These include Maurice Farman, Circuit du Nord hero, who will again drive a Panhard; René de Knyff, for whom better luck may be hoped than fell to him a fortnight since in the alcohol speed trials; C. Jarrott, and Henri Farman. All these belong to the Panhard contingent. Many will look to this race to redeem the reputation of the 1902 Mors cars, which in the alcohol trials made anything but a good show. With Henry Fournier, Hon. C. S. Rolls, the Baron de Caters, and possibly W. K. Vanderbilt driving Mors cars, those vehicles ought not to lag for lack of skilful navigating. The Mercédès will be represented by Lemaître, Stead, and Degrais. M. Marcellin will steer a Darracq again, being doubtless in love with a make that served him so well in the alcohol test. Just the same team as guided Serpollet cars in the Circuit will again drive them in Paris-Vienna—Rutishauser, Chanliaud, Le Blon and Barbereau. Louis Renault will drive his namesake car, and Osmont and Bardeaux will bestride De Dion motor cycles. Mr. S. F. Edge will run his Napier car. Mr. Mark Mayhew, too, is amongst the entrants. One of the very latest is the Baron de Forest, who will drive a heavy English car. The members of the A.C.G.B.I. are invited officially by the Austrian Automobile Club to take part in a tour to Vienna in connection with this big race.

THE SUITABILITY OF DRESS IN APPEARANCE COMPETITIONS.—A question has been raised in regard to what constitutes suitability of dress, particularly in the case of feminine competitors, when taking part in competitions for the best appearance of a motor car. The question has been put forward by a correspondent more particularly in reference to the recent Bexhill Appearance Competition, and he gives that an instance in support of his objections to the present method of awarding the prizes. He points out that there took part in this year's competition a victoria (a Locomobile), a car obviously only suitable for town work in general, and Hyde Park in particular, hence the man on the rumble was in livery, and the lady in the front seat wore a light hat and boa, both quite in keeping with a car intended for London use, yet he understands these two facts scored against the car as a prize winner as not being "suitable dress."

Now this is simply absurd; the occupants of a car of this class should not be judged by the same standards as those of the high-speed touring car, whose occupants are forced in self-protection to wear heavy garments, hoods, goggles, &c. You might as well start a competition for the most smartly and suitably-dressed woman, and then judge by the same standards the lady dressed for lunch at the Carlton and a drive in Hyde Park, against the lady dressed for a long distance journey by rail. It is a most unfair ordeal to both, as each in her way is quite correct.

The cars should be judged, say, in classes—Class A, town use; Class B, touring; Class C, racing; then the problem of deciding as to the suitability of the costumes, &c., would resolve itself into a very easy one for both the judges and the judged.

THE London and India Docks Company have issued notices setting forth regulations for motors using the dock premises. No motor cars driven by explosion engines will be allowed on the premises, only those driven by electricity or steam generated by the use of coke being permitted. Under no conditions even then is a motor to be left unattended, and the maximum rate of speed anywhere in the docks is placed at four miles per hour. Under no circumstances will a car be allowed to enter any warehouse, shed, or other building, and special provision is made in regard to the cars being fitted with spark arrestors and ash boxes. Provision is also made in regard to stoking fire-boxes, cleaning, &c.

LAW REPORTS.

Motor Car Company, Limited.—Mr. Justice Buckley, in the Chancery Division on Wednesday, had in his list of Court summonses an application in the voluntary liquidation of the Motor Car Company, Limited, for the inspection of the books of the Company. Mr. Gore-Browne, K.C., stated that the parties to the summons had come to an arrangement, and by consent the summons would be withdrawn.

Mr. Justice Buckley asked if all the parties were *sui juris*, and on receiving an affirmative reply, allowed the summons to be withdrawn.

De Dion-Bouton and Co. *v.* **Brown Brothers, Limited.**—In the Chancery Division on the 29th ult. Mr. Justice Joyce had before him a motion in this action, by which the plaintiffs asked for an interim injunction until the trial of the action of further order to restrain the defendants from selling batteries under the name "De Dion" which were not manufactured by the plaintiffs.

Mr. Hughes, K.C., and Mr. Kerby appeared for the plaintiffs, and Mr. Younger, K.C., and Mr. Hart represented the defendants.

Mr. Hughes, in opening the case, said the plaintiffs had a large business in this country in connection with motor cars, and their name was very well known to the users of motor cars and accessories. Brown Brothers had been admittedly supplying goods under the name De Dion which were not manufactured by the plaintiffs. It was curious how often servants were inadvertent in these matters. The defence set up was an ingenious one. Defendants said plaintiffs had no patent, which might or might not be true, and therefore they were entitled to supply these goods under the name of "De Dion pattern," or "Imitation De Dion." If defendants used plaintiffs' name in connection with imitation goods it would lead to servants stepping over the line occasionally. It was clear in this case that in response to orders for genuine De Dion goods imitations were supplied. The injunction asked for was to restrain the defendants from selling as De Dion-Bouton or any description including those names or either of them in connection with the manufacture of motors or motor vehicles, batteries not of the plaintiffs' manufacture, and from representing, selling, or passing off on the trade or the public as and for the goods of the plaintiffs goods not manufactured by them.

Mr. Younger said he was prepared to give an undertaking till the trial as to the batteries.

Mr. Justice Joyce said plaintiffs asked him for an injunction to restrain defendants from selling or passing off batteries or any other goods of the plaintiffs.

Mr. Younger submitted they were not entitled to that.

Mr. Hughes: If the defendants are honest men I do not know why they object to it.

Mr. Younger: They are honest men, but plaintiffs are oppressive.

Mr. Hughes proceeded to read the affidavit of Mr. S. F. Edge, the managing director of De Dion-Bouton, Limited, who said the plaintiffs had for many years had a great reputation for motor vehicles and accessories for the same manufactured by them. They had obtained numerous awards at exhibitions. The batteries were known to the trade and to the public as De Dion batteries. They had large sales in the United Kingdom, and in all such sales the articles were described and known under the name De Dion and Bouton. His Company had advertised the goods under those names. It was brought to his notice that the defendants were offering for sale, under the name De Dion, accessories which were not manufactured by the plaintiffs. The use by the defendants of the name De Dion was calculated to lead the public to believe that the defendants' goods were those of the plaintiffs', and in purchasing defendants' goods they were obtaining those of the plaintiffs'. Mr. Gerald Mann, of Mann, Egerton, and Co., motor engineers, of Norwich, said on March 14th he ordered from the defendants one De Dion battery, and with the battery he received an invoice for "One De Dion battery complete." From his experience of the trade he thought that when anyone asked for a De Dion battery he expected to get one made by the plaintiffs. Mr. Simpson, the Hull district manager of the Sports Trading Company, of Coventry, also gave evidence as to ordering a De Dion battery from the defendants and receiving one which was not made by the plaintiffs.

Mr. Younger read the affidavit of Mr. Brown, who said it had been the practice of dealers in motors to keep in stock two kinds of De Dion accessories, those manufactured by the plaintiffs, and those made by others, but of the same type and size. It was open to anyone to manufacture and use parts and accessories of the De Dion type, and defendants claimed to be entitled to offer for sale articles not of plaintiffs' manufacture, using the name De Dion with the addition of the word "imitation" or "pattern." Defendants had never claimed to sell accessories not manufactured by the plaintiffs without the additional words. He had given strict injunctions to those in charge of the motor department that no parts not manufactured by the plaintiffs were to be sold as "De Dion" alone. The plaintiffs sought to restrain the use of the name De Dion altogether, notwithstanding that it was merely descriptive of the type or pattern of the goods. That claim would stop a legitimate trade.

Mr. Hughes said the defendants had stated that they had two classes of goods, genuine De Dion and those which were not genuine. Defendants did not stock plaintiffs' batteries, so there was no mistake between genuine and imitation in this case.

Mr. Justice Joyce: They evidently carry on a trade in which they ought to be very careful.

After some further argument Mr. Younger said he had no objection to giving an undertaking, without prejudice to any question, not to sell as and for the goods of the plaintiffs' batteries or other goods not manufactured by the plaintiffs.

On this undertaking the motion stood till the trial costs being made costs in the action.

Meyra Electric Company, Limited.—Last week Mr. Justice Buckley, in the Winding-up Court, heard the petition of Mr. B. Bridgwater for the compulsory winding-up of the Company. The petition was unopposed, but there was a question whether the Court had power to wind up a company where no shares had been issued. The Company was incorporated in September, 1900. There were seven signatories, and each agreed to take one share, but dissensions arose, and no shares were issued. His Lordship did not think the question as to the power to wind up need arise. The Company had been incorporated, and could be wound up in the usual way. Mr. Abrahams, for the petitioner, said the Company was formed with a capital of £10,000 to acquire certain electric patents, and in particular that of the Meyra battery patent. In September, 1901, petitioner ultimately recovered judgment for £657 odd. His Lordship made the usual compulsory order.

CORRESPONDENCE.

*** *The name and address of the writer (not necessarily for publication)* MUST *in all cases accompany letters intended for insertion, or containing queries.*

STEAM CONSUMPTION OF THE LOCOMOBILE.

To the Editor of THE AUTOMOTOR JOURNAL.

SIR,—I should be greatly obliged if you or any of your numerous readers would inform me what quantity of steam per indicated horse-power per hour the Locomobile uses.

I have looked through all accounts of trials, but cannot find a scrap of information on this point, which is of great importance to an engineer.

I am experimenting with a 4-h.p. steam motor, and expect to get the steam consumption eventually down to 40 lbs. per indicated horse-power per hour, and would like the above information for the sake of comparison.

When my experiments are completed I hope to forward you an account of same.

Yours faithfully,

C. W. P.

Natal, May 5th.

THE ENGLISH DURYEA COMPANY.

To the Editor of THE AUTOMOTOR JOURNAL.

SIR,—Whilst thanking you for your paragraph anent the Duryea Company now forming, there is one little point which I would wish to correct. You speak of a "promoter." This is not quite so. Of course, in the sense that someone has to organise the Company it is all right, but "promoter," in the ordinary sense of the term, there is none. Duryea cars, as built for the British markets, are made under a series of patents, taken out, not only by Mr. Duryea, but by myself, and by the two of us conjointly, and in our mutual interests I am organising capital to manufacture them here, as it is quite impossible for the American factory to supply the demand both here and at home. No promoter is engaged, and no promotion fees are being paid, and I may add that the value of the purchase consideration will depend entirely upon the success of the Company, and that there will be no public issue, the organisation of capital being done entirely privately.

Yours faithfully,

HENRY STURMEY.

Coventry, June 2nd.

REVIEWS OF BOOKS.

"The American Electric and Automobile Patents Monthly." Compiled by JAMES T. ALLAN. (American Patents Publishing Company, Washington, D.C., U.S.A.). Price for England, $7·50 per annum, or 75 cents. monthly,

THIS monthly digest of automobile patents, and those dealing with air and gas engines, forms a most valuable publication for those who wish to ascertain what has been done in the United States in this connection. Some eighteen months ago Mr. Allan compiled a similar digest which dealt with automobile patents dating from 1789 to July 1st, 1899. The present monthly is intended to keep this record up to date, and an independent volume dealing with the intermediate period from July, 1899, to January of this year, also including air and gas engines, is in course of preparation. In order to make the record of air and gas engines equally complete, the work of including those between 1789 and 1899 has also been taken up. Both these new volumes are promised shortly, and applications for them will now be received. For the benefit of those who do not already know the original work, we may say that the information concerning all patents taken out in America, and relating to automobiles, is given in a systematic and convenient form. The first portion of the book consists of reproductions of all the original drawings filed with the specification. This is followed by a brief *résumé* of the specification, together with the complete claims; and at the end of the book is an index, alphabetically arranged in the names of the patentees, giving the pages on which the illustrations and the claims respectively appear, as also the name and date of any references which were originally cited by the Patent Office after examining the applications. Mr. Allan is an examiner in the United States Patent Office, and has had the authority and assistance of the Honourable Commissioner of Patents in the compilation of his book. The publications give in a small and compact space all the information which could be obtained concerning any particular types of automobile mechanism after many weeks of labour. The illustrations are carefully prepared; these, as also the type, are somewhat small, but are, nevertheless, very distinct.

WE have received from Mr. Letts the photograph which we now reproduce of the identical Locomobile car which took part recently in the A.C. of America Brake Tests, before the New York municipal authorities, when it stopped in 139 feet whilst travelling at 32½ miles per hour.



MOTOR WAGONS AS AIDS TO COMMERCE.

LARGE and rich tracts of territory in the remote places of the earth remain undeveloped because of the lack of means of communication. The absence of railways is a perpetual handicap to trading companies, some of which have begun to discover that in motor vehicles is to be found a solution of their transport difficulties. An instance is furnished by the progress of affairs in West Africa, where a belt of hinterland, five hundred miles wide, containing the promise of rich deposits of gold, forests yielding rubber and gum, and fertile areas of arable and grazing land, is by way of being opened up by the indefatigable and unconquerable motor wagon. In the Gold Coast Colony draught and pack animals have been tried and found wanting. They are slow and costly; moreover, the climate only permits them to live in some parts of the difficult region.

A recommendation has, in consequence, been made by the Governor of the Colony proposing wagons propelled by steam or gas as the best means of supplanting the ineffective pack animal. In point of fact the Governor's suggestion is founded upon the happy experience of a gold mining company in the eastern part of the Colony. The company's base of operations is Kibbi, sixty miles up country, and it was necessary to establish a system of transport between it and Accra, on the coast. The tropical forest was cleared, with the aid of a traction engine a presentable road was constructed, and a steam wagon was procured to do the carrying. Formerly the method of transport was primitive enough. Natives were employed to push rum-puncheons laden with goods, this being dignified with the title of "vehicular traffic"; or forty carriers took three or four days to transport one ton sixty miles at a cost of thirteen pounds. Now the steam wagon reels off the journey in one day at a cost of thirty shillings per ton. It is clear that the saving to the company is enormous, and will soon repay the capital outlay.

The motor wagon is destined to play an important part, too, in the immediate future of Madagascar. That is a particularly difficult country for transport. It is one of the most irregularly mountainous in the world. A railway has been begun, but it will be many years before complete and effective railway system is established. There are good canals, too, but necessarily these cannot penetrate the hilly regions. There remain the roads, the chief highway being the great macadamised road that connects the capital, Tananarivo, with the port of Andernante, a distance of 150 miles. Shoulder transport, oxen-drawn American wagons, mule-carts, and two-wheeled push-carts of the rickshaw type, have hitherto been the chief means used. But these methods prove inordinately sluggish and terribly expensive. Without a doubt, the vehicles demanded are motor wagons. They should be of not less than 25-h.p., for the gradients are steep. Such wagons would reduce the journey from the capital to the coast, which now occupies nearly a fortnight, to one of two days. A motor mail service, too, between Tananarivo and Tamatave would be of immense benefit, the tardy conveyance of mails last year by mule-cart costing no less than £27,000. There is a most promising field for motor service in Madagascar. The individual or company that establishes an efficient one on an adequate scale cannot fail to do a very large business.

In Burma the motor vehicle is making headway. The French Consul at Rangoon has forwarded to his Government some interesting information as to the importation of

cars into Burma. There is an *ad valorem* duty of 5 per cent., but no special license is required for driving an automobile. The trouble there is the climate, which precludes the use of petrol of the ordinary density of ·68. The oil found in Burma would doubtless be available for the purpose, but the lowest density obtainable there is from ·76 to ·77. The Consul especially recommends the importation of light voiturettes capable of using this or some heavier fuel.

A YOUNG MOTOR DESIGNER.—Infant prodigies, chiefly in the musical line, are by no means uncommon, though it is rarely one meets with a mechanical designer of tender years. But one such has been produced, and, of course, by America. Stanley D. Arnold is the twelve-year-old son of an eminent Chicago electrician, and this lad, working on information got from his father, and gained by experiments made by himself in a small machine shop at his home, where he has the use of a small lathe and drill press, has designed and built a model steam motor car, which is said to work perfectly. The complete car can be packed in a box measuring twelve inches long by eight deep. The water tube boiler is 4 in. by $3\frac{1}{2}$ in., and has a heating surface of 34 square inches, and the burner is $3\frac{1}{2}$ in. This combination failed to give sufficient steam, but a feed water heater was added, and it now gives steam in abundance. The engine cylinders are $\frac{3}{4}$ in. bore by $1\frac{1}{4}$ in. stroke, and the engine drives a countershaft by bevel gearing, the drive to the rear wheels being by side chains. The steam is controlled by a throttle valve at the right side of the seat. Wheel-steering is fitted and the body is supported by four semi-elliptic springs. The engine boiler, water tank, &c., are under a readily removable bonnet in front, and the petrol tank is under the seat. Every part of the machine (with the exception of two or three very small valves which he could not possibly make with the tools at his disposal) was made by the boy, and this fact becomes even more remarkable when it is remembered that he has had no ordinary mechanical training. A couple of photographs of the motor are reproduced by the Chicago *Motor Age*.

The Transport of Motors Across the Channel.—The following particulars which have been compiled by Messrs. Mory and Co., Butler Street, E.C., appear in *Notes and Notices*:—

Motor Cars in Cases.—Price per Car.

Car and case weighing up to	From London (ordinary limits) to				
	Paris (delivered).	Mentone (station).	Nice (station).	Cannes (station).	Biarritz (station).
1.—*Cars with two or four wheels, with one back seat and one in front.*					
Petite Vitesse, O.R. — 500 kilogs. ...	£ 3 4	£ 13 12	£ 13 8	£ 13 0	£ 11 0
Petite Vitesse, O.R. — 1,000 ,, ...	5 0	15 12	15 8	15 0	13 0
Petite Vitesse, O.R. — 1,500 ,, ...	6 16	17 8	17 4	16 16	14 16
Grand Vitesse, O.R. ...	8 8	25 8	25 4	24 12	21 8
2.—*Cars with four wheels, two back seats and two in front.*					
Petite Vitesse, O.R. — 500 kilogs. ...	3 4	16 12	16 8	15 16	13 4
Petite Vitesse, O.R. — 1,000 ,, ...	5 12	17 0	18 16	18 8	15 16
Petite Vitesse, O.R. — 1,500 ,, ...	7 8	20 16	20 8	20 0	17 8
Grand Vitesse, O.R. ...	8 8	29 16	29 8	28 16	24 12

Stamps, statistics, custom duties, and insurance, extra.

MR. HUGH WEGUELIN, Mr. J. F. Graham, the Rev. Arundel Whatton, and Mr. W. D. Astell have been added to the Races Committee of the Automobile Club.

THE next Club run will be on the 21st instant to Folkestone, this being one of the routes selected for the big trial in September.

THE Richmond Hill-Climbing Trials, fixed for to-day (Saturday), have been abandoned in consequence of the Richmond Park authorities refusing permission to the Automobile Club to use the test hill in the Park, after the cars have been timed on the Petersham Hill.

THE alterations at the new Automobile Club-house cannot be commenced in earnest until July owing to the upset caused by the erection of the Coronation stands. As about three months will be occupied in completing the alterations and furnishing, the Club-house will not be seen in its full glory until about October.

THE scheme for illuminating the Automobile Club by Bleriot lamps during the Coronation festivities is to be partially carried out, as it is proposed to have a large display of these lamps on the front, although, owing to the Fire Insurance Company's requirements they will only be illuminated with electric lights. However, the display will be somewhat unique and appropriate, provided a sufficient number are forthcoming from automobile owners who are invited to place their lamps at the disposal of the Club Committee.

THE question of motor servants is now being handled firmly by the Automobile Club. Too much stress cannot be laid on the importance of this subject, and it is something to be thankful for that the matter is being dealt with at this early stage of the industry, when there is still time to organise a complete system, and to educate motor servants on sound methods which will lead to lasting results, tending to the advantage and convenience of all who make use of the automobile. It is essential, however, that automobilists generally should co-operate with the Club in this matter. The unpleasant experiences which many automobilists have had to go through will be reduced to a minimum in future, and the really competent and deserving man will, without question, welcome the apparently somewhat drastic enquiry form, which is part of the system in vogue for checking the behaviour and competency of mechanics and drivers putting themselves forward as expert motor attendants and servants.

NANTWICH is one of the favourite runs of the Manchester Automobile Club members, being about forty miles away, and boasting a capital hotel capable of accommodating a large number of cars. To Nantwich the Club betook itself on Saturday, more than twenty motorists and friends dining at 6 p.m., at the Brine Baths Hotel. Soon after 7 p.m. a move was made for home. There were a few mishaps, but they were not serious. Mr. G. Higginbotham was much involved in a multitude of punctures, which were found on examination to be due to senile decay of the inner tube. Owing to these, and the loss of part of his pump, Mr. Higginbotham did not reach Manchester until 5.30 a.m. on Sunday. He was driving the 7-h.p. Daimler in which Mr. Sturmey journeyed from Land's End to John o'Groat's. Mr.

Stocks also had troubles with his tyres, the repairing of which he deferred until after most of the members had taken the road. He was unable to follow before 10.30 p.m. Mr. W. E. Rowcliffe sustained a broken inlet valve, and was fortunate in obtaining immediate assistance from Mr. Whittaker, who came up with him at the right moment. Amongst those present were Major Clifton (10-h.p. Wolseley), and Messrs. Herbert Bright (6-h.p. Daimler), C. Budenbury (9-h.p. Daimler), F. C. Chapman (5-h.p Marshall dogcart), Cameron (Locomobile), Dawson (12-h.p. Panhard), Norman Fletcher (10-h.p. Wolseley), F. Gresham (4½-h.p. De Dion), J. Higginson (4½-h.p. Empress), G. Higginbotham (7-h.p. Daimler), Adam Laidlaw (9-h.p. Daimler), C. H. Stocks (5-h.p. Wolseley), Frederick Smith (12-h.p. Daimler), J. Hoyle Smith, Hon. Secretary (12-h.p Belsize), J. W. Jones (6-h.p Argyll), V. O'Neill (6-h.p. Daimler), J. Whittaker (10-h.p. Wolseley), W. E. Rowcliffe (5-h.p. Century voiturette).

TWENTY-SIX Automobile Clubs have been already established in Germany.

FOUR Russian Grand Dukes are reported to be now enthusiastic automobilists.

MR. E. SHRAPNELL SMITH has consented for the time being to continue to act as Honorary Secretary to the Liverpool Self-Propelled Traffic Association.

AT the Coaching Club Meet last Saturday, Sir David Salomons had on his coach as guests Sir F. and Lady Dixon Hartland, Baron de Sternmand, and Mr. S. Kingley.

THE marriage of Mr. Mark Mayhew and Miss D. C. Fisher was solemnised at Lytham on the 28th inst., the honeymoon taking the form of a motor tour through Wales on one of the Hon. C. S. Rolls' Panhard cars.

SIR WILLIAM GEORGE PEARCE, BART., the well-known shipbuilder and shipowner, Chairman of the Fairfield Company, is having two of the latest Daimlers built for him, one being a standard 12-h.p. carriage and the other a Daimler "Estates" wagonette.

SEVERE tests have been made with light petrol cars for the Russian army, with the result that much more extended experiments are now to be undertaken to thoroughly ascertain the extent to which motor cars can be used for the military requirements of the country.

ON several of the Italian post-coaching routes automobiles are being introduced by the contractors, with the sanction of the Italian Government Postal Department. High-powered cars are being employed, having a speed capacity of 10 to 12 miles per hour.

ISLE OF WIGHT constables are to be supplied with stop-watches for the purpose of timing motor cars and bicycles. We wonder at whose expense this unnecessary proceeding is being carried out. We fancy if the ratepayers were consulted they would strongly protest against such unnecessary expenditure.

Two Wolseley cars, viz., a 10-h.p. and a 7½-h.p. tonneau, on show at Messrs. Hill and Boll's stand last week at the Bath and West and Southern Counties Agricultural Show at Plymouth, were the centre of considerable interest amongst the South of England agriculturists who thronged the Show from the opening to the finish, and for whose "education" the cars had been specially staged

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THE Westminster Garage at 19, Princes Street, Westminster, hitherto only available to members of the Automobile Club, is now open for the use of non-members, so that automobilists can avail themselves of either this West-End accommodation or the City branch of Garages, Limited, at 34, Queen Street. Mr. Harrington Moore, the manager, is erecting a grand stand at the Westminster Garage, giving probably one of the finest views of the Coronation ceremony to be obtained anywhere in London, as the premises are exactly facing the entrance to Westminster Abbey.

RECENT RACES AND TRIALS.

Long Island Consumption Trial.—The following is a summary of the consumption of fuel in the 100-mile contest of this Club:—

Steam Vehicles.—B. L. Wright, 4-h.p. Grout, 12 gals.; A. G. Southworth, 7½-h.p. Toledo, 12⅝ gals.; International M. C. Co., 7½-h.p. Toledo, 13⅞ gals.; Lane M. V. Co., 9-h.p. Lane, 17 gals.

Gasoline Vehicles under 1,000 *lbs.*—R. M. Owen, 4-h.p. Olds, 3⅛ gals.; Torbensen Gear Co., 5-h.p. Torbensen, 4⅝ gals.; Ward-Leonard Elec. Co., 6½-h.p. Knickerbocker, 5 gals.

Gasoline Vehicles between 1,000 *and* 2,000 *lbs.*—Ward-Leonard Elec. Co., 5-h.p. Knickerbocker, 4⅜ gals.; Ward-Leonard Elec. Co., 5-h.p. Knickerbocker, 4⅝ gals.; W. J. Stewart, — Autocar, 5½ gals.; Percy Owen, 8-h.p. Winton, 5⅝ gals.; Central Auto Co., 11-h.p. Peugeot, 5⅝ gals.; Patterson and Shaw, 5-h.p. Elmore, 5⅞ gals.; Peerless Mfg. Co., 16-h.p. Peerless, 6 gals.

Gasoline Vehicles over 2,000 *lbs.*—J. Insley Blair, 16-h.p. Panhard, 13 gals.

Namur Automobile Fêtes.—Namur Automobile Club is congratulating itself upon the success of its first automobile fêtes. They have been attended by the most favourable weather, and the races have resulted in some excellent times. The record for the Salzinnes Hill-climb of 2½ kilometres has been lowered by 23 secs. The following are the results:—

1*st Category* (*Cars from* 650 *to* 1,000 *kilogs.*),—1, 16-h.p. Déchamps, 3 mins. 26⅖ secs.; 2, 20-h.p. Germain, 3 mins. 43⅗ secs.; 3, 20-h.p. Germain, 3 mins. 50 secs.

2*nd Category* (*Light Cars*, *from* 400 *to* 650 *kilogs.*).—1, 18-h.p. Gobron-Brillié, 3 mins. 15⅘ secs.; 2, 16-h.p. Déchamps, 3 mins. 19⅗ secs.; 3, 16-h.p. Gobron-Brillié, 3 mins. 21⅘ secs.

3*rd Category* (*Voiturettes*, *less than* 400 *kilogs.*).—1, 6-h.p. Delin, 5 mins. 29 secs.; 2, 9-h.p. Vivinus, 5 mins. 48⅕ secs.; 3, 6-h.p. Schwanemeyer, 7 mins. 16⅘ secs.

4*th Category* (*Motor Tricycles*).—1, 5-h.p. Soucin, 2 mins. 48⅗ secs.; 2, 9-h.p. Kerhn, 4 mins. 16⅗ secs.

5*th Category* (*Motor Bicycles*).—1, 2¼-h.p. Antoine, 3 mins. 59⅖ secs.; 2, 2-h.p. Delin, 4 mins. 9⅗ secs.; 3, 2-h.p. Antoine, 4 mins. 16 secs.

In the kilometre course the winners were, in the 1st Category, Déchamps, 48⅗ secs.; 2nd, 18-h.p. Gobron-Brillié, 48⅘ secs.; 3rd, 9-h.p. Vivinus, 1 min. 5⅖ secs.; 4th, 9-h.p. Kerhn, 53⅖ secs.

NEW INVENTIONS.

Claiming particularly to apply directly or indirectly to Motor Vehicles, &c.

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PATENTS APPLIED FOR.

Abbreviations:—Impts., Improvements in; Relg., Relating to.

1902.		
May 22.	11,633.	J. KELLAND. Improved brake for cycles, motor cars, &c.
,, 22.	11,646.	G. A. B. LIVESAY. Frictional driving and speed gear for motor cycles.
,, 22.	11,665.	S. MILLER. Impts. transmission of power for motors, &c.
,, 22.	11,670.	E. KRAMER. Improved suspension for the driving axles of motor cars.
,, 23.	11,748.	E. KRAMER. Impts. the gearing for motor cars.
,, 23.	11,769.	D. STANGER. Impts. change-speed gears applicable to moto vehicles.