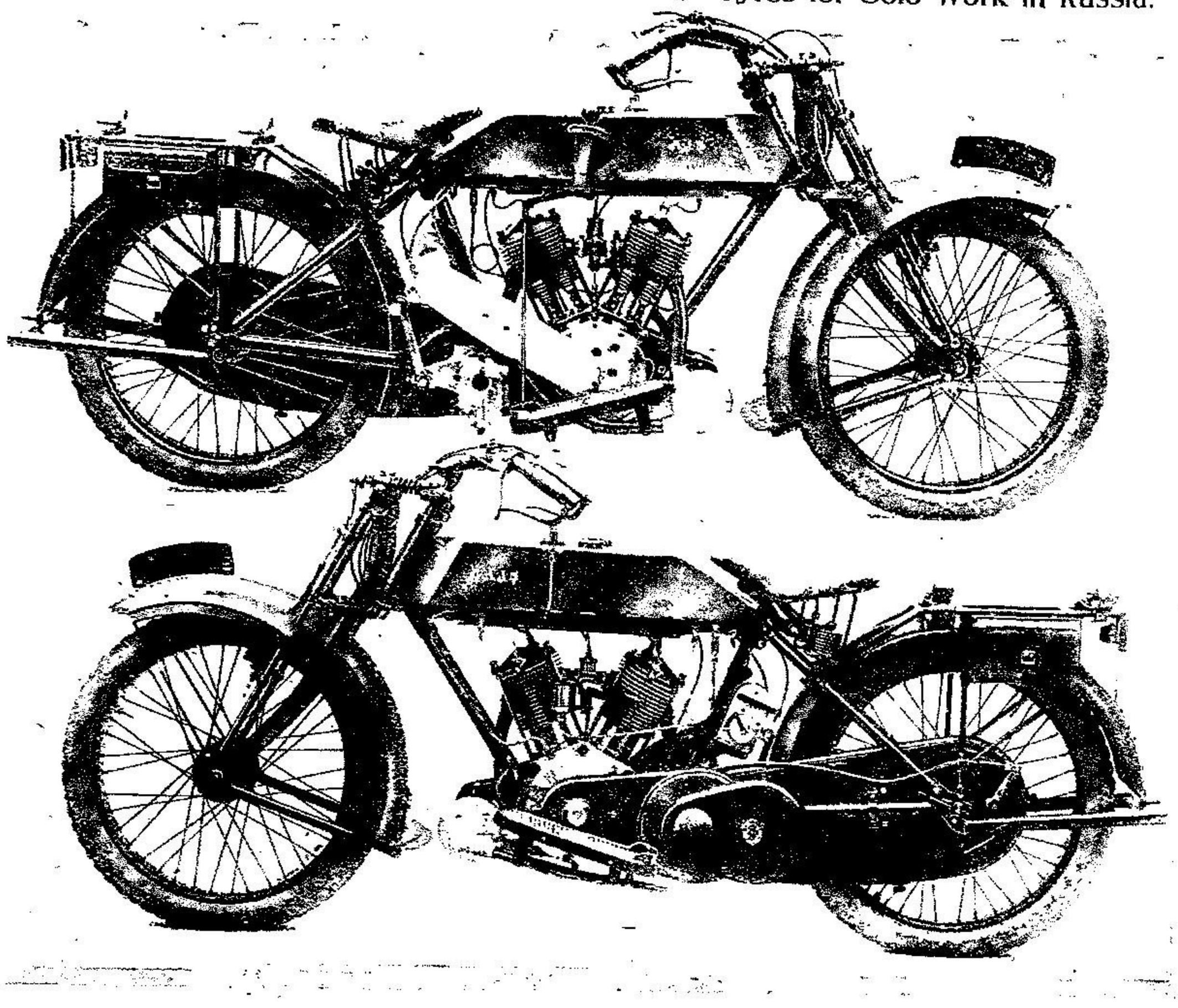
A.J.S. FOR MILITARY WORK.

The Special Design of 6 h.p. Mount with 28"×3" Tyres for Solo Work in Russia.



A TWIN A.J.S. FOR THE ALLIES.

A specimen of the 6 h.p. three-speed A.J.S. machine, a large number of which are being supplied to the order of the Ministry of Munitions for the Russian Army.

AMONG firms favoured with orders for the hundreds of British-made bicycles now being produced in this country for the Russian Army are the manufacturers of the A.J.S. This make of motor cycle has not hitherto been used extensively in war work, but it has many strong claims for consideration, its record for reliability and speed being well-known. We illustrate a specimen of the machine intended for the Russian Army, and it will be noticed that there are quite a number of departures from the standard specification. The model is the 6 h.p. twin (74×87 mm.), and by reason of the difficult conditions under which the machines will be used, the Russian Government stipulate certain features, including a 6in. ground clearance. Again, the magneto must not be placed in close proximity to the exhaust arrangements, which requirement has necessitated the A.J.S. transferring the magneto to a position at the back of the seat tube, where it should be well protected from mud or foreign matter, though a long chain drive is the result. The frame has a horizontal top tube, whereas the standard A.J.S. slopes rearwards. In most details the standard type conforms to the special requirements of the Russian Government. One of these, which will particularly appeal to Overseas riders, is the demand for oil bath chain cases. The 6 h.p. machine illustrated will not be used as a sidecar mount as many may have imagined. The Russian authorities stipulate 650 c.c. as the minimum capacity for solo machines and an engine in the neighbourhood of 1,000 c.c. for sidecar work, which will alone serve to show the extremely difficult conditions under which the machines will be used. The magneto, by the way, is a Thomson-Bennett, and the plugs Sphinx, so that the whole of the machine is British made in every part.

The tyres fitted to this machine are 700×80 mm. light car pattern Dunlops.

Since the first military A.J.S. was produced, both the handle-bars and seating arrangements have been slightly lowered, giving the machine a symmetrical appearance, which will be appreciated by reference to the accompanying illustrations.

"Tank Minor"—a Suggested Featherweight Monocar.—

easily be fitted, and can be arranged so as to be operated while standing on the footboards, and the back part of the vehicle could then be closed in if desired, but, as the three-wheeler would be very little, if any, heavier than an ordinary 3½ h.p. machine, a running start would be easier.

The Body.

The body, seat, and back mudguard (with toolbox on top) would be made of three-ply wood, and the mudguards and toolbox would be made to slide off for tyre repairs. The top and sides of the so-called "body" are fixed to each other and are free to revolve round the front cross tube, which runs through the two ash members and also through the two sides of the body, so that the body can be lifted over for engine adjustments, being fastened down at the rear with two thumbscrews, one on each footboard. A removable U-shaped metal shield fits over the engine, while the remainder of the sides of the "tunnel" in which the engine is placed is enclosed with enamelled leather or waterproof fabric.

By lengthening the framework a seat for a second passenger could be placed between the driving seat and the rear mudguard, the seat being placed cross-ways but inclined so that the passenger is facing half-front with both feet resting on one of the footboards.

Suspension.

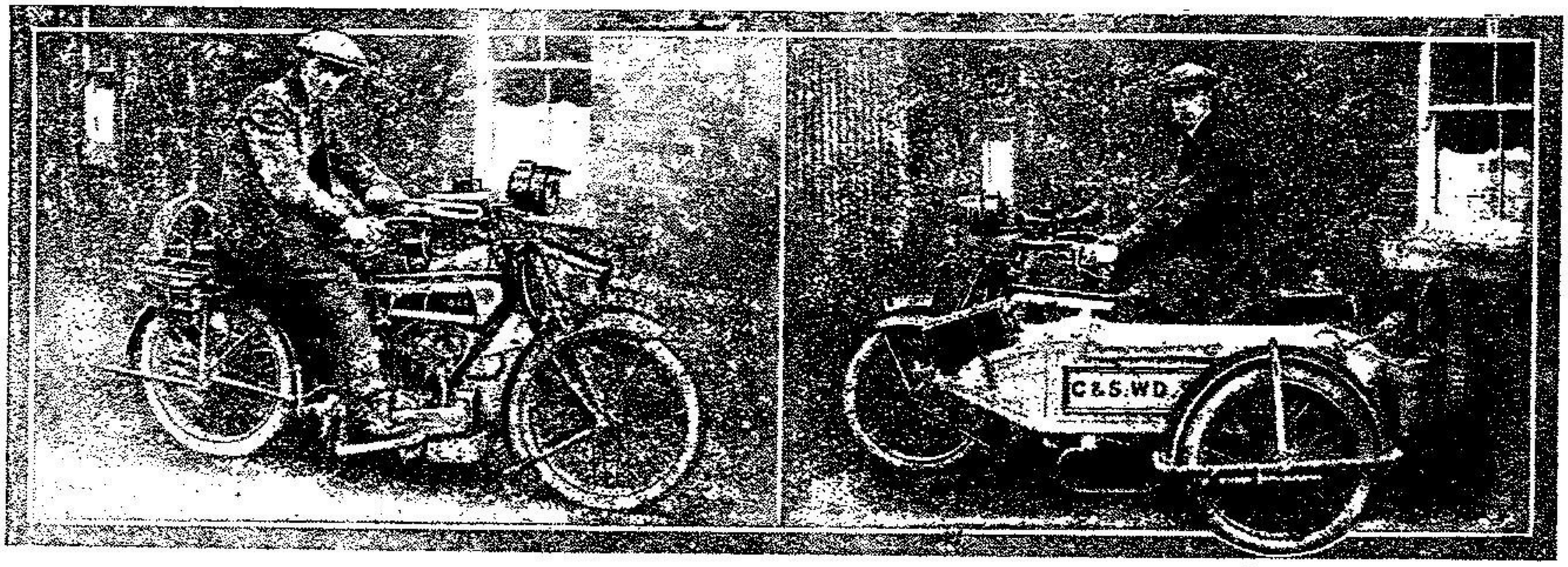
The suspension is by opposed coil springs fore and aft—two each side at the rear and two each side at the front, the latter being placed outside of the body between the axle and the projecting front cross tube. Steering would be by wheel and bobbin or direct, the throttle and air levers being placed on the steering half-wheel, ignition control on the steering column (or also on the wheel), front and rear brakes operated through Bowden wire by left and right pedals—or, if a clutch be fitted, this would be operated by left pedal and hand brake fitted to front wheels instead.

This vehicle would be a real featherweight monocar, following motor cycle lines as far as possible. I should be glad of criticism, sympathetic or otherwise. I had intended to try and build some such runabout this winter had time been available. It would be interesting to know if other readers think there is a likelihood of any post-war demand for vehicles such as these, specially designed by motor cycle manufacturers so that their particular power unit can be readily transferred to it for winter riding.

EAST COAST.

Sidecar for Business Purposes.

A HOME-MADE CONVEYANCE FOR GOODS AND SAMPLES.



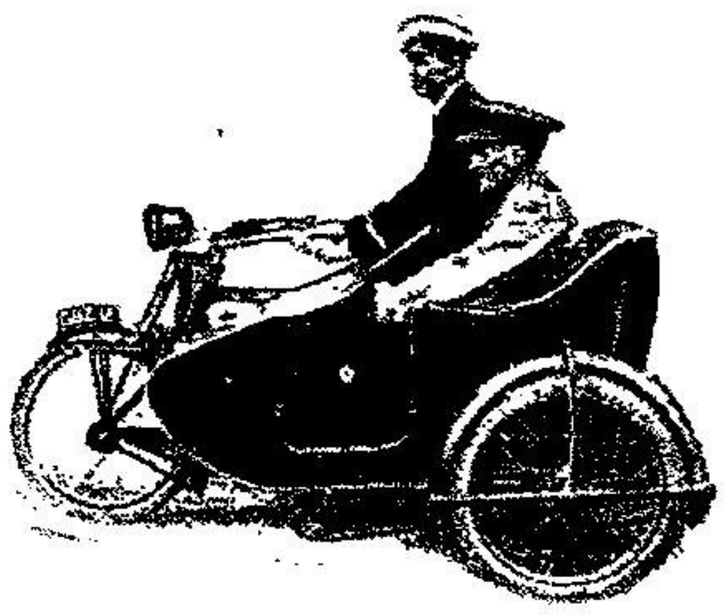
An A.J.S. commercial outfit, the sidecar of which was "home made." The way the spare petrol and oil are carried is worthy of notice, the tins being held by part of an old chain and a spring, which hooks on to a screw head.

MR. J. S. BOUSFIELD, of Westbury, Wiltshire, writes us as follows: "I have tried all sorts and kinds of motor cycles, but never had such good service as from the A.J.S. shown in the accompanying photograph. I have now had three of this make, a 2¾ h.p., a 4 h.p., and 6 h.p.; the last-named I am now running on half petrol and half paraffin. This machine has run 15,000 miles, and I have had very little trouble except for tyres, petrol pipe blocked up, magneto points requiring cleaning, etc., and such can only be regarded as incidents. I remove cylinders for decarbonising and grind valves in every 1,000 miles. This appears to keep the engine in perfect order, and I believe in plenty of oil. Never have too little oil is my principle. My average running is about 250 miles per week—all weathers. The sidecar fitted is my own make out of old tea chests, etc., and is about half the weight of the average body of the same type. I do not carry a passenger—only samples and small packages; in fact, the machine is used for business purposes only."

A Sixty Mile Trip along the Most Southerly Coast of Europe.

FOR many months I had been stationed at Gibraltar, and had rarely seen a motor cycle during that period, the exceptions being two or three 7-9 h.p. Indians, a 3½ h.p. Rudge Multi, and a couple of Douglases. No motor cycles from Spain appear to penetrate so far as Gibraltar, though there are a fair number of cars to be seen —especially sporting models of the Hispano-Suiza.

Imagine, then, my joy as a motor cycle enthusiast on seeing a brand new 1916 6 h.p. A.J.S. and sidecar buzzing merrily along an open stretch of road at a good 30 m.p.h. I soon found that this new importation belonged to Mr. Drew, of the E.T.C. cable ship *Amber*, and the latter gentleman lost no time in suggesting a trip to Tarifa, the most southern point in Europe, so that I might judge the paces of the A.J.S. for myself.



The A.J.S. outfit on which the journey was made.

We started early, as we wished to do a little exploring on foot, and had to be back by evening gunfire, but I soon had a taste of the speed of the A.J.S. On arriving at the Spanish Customs House in Linea, the smiling official, nodding a friendly recognition to my host, glanced at the pass and waved us through.

From here we had to make our way right round the bay to Algeciras, which lies directly opposite Gibraltar, and is connected by a service of steamers. Until a few months ago the new road to Linea had not been completed, and motorists had to leave their cars in Spain or have them hauled along the beach by mule and donkey power. Now, however, the road is roughly laid, and only waiting for the rains to set it. In England we would think it an execrable stretch of cobbles and pot-holes, but we were only too thankful for it here.

The historic town of Tarifa, showing the old fortress on the right

I, as the passenger, can vouch for the extraordinary comfort of the A.J.S. sidecar over this stretch, which we traversed at about 25 m.p.h., passing Campamento with its racecourse and polo ground, and striking a long, winding stretch of country lane inches deep in heavy white dust.

We crossed First River and Second River by elaborate iron girder bridges, and ran through two exceedingly picturesque fir tree plantations, and past quaint little roadside inns built of wood and thatch, one of which had an outside shelter covered by a thatch extended from four fir trees. We passed some Spanish infantrymen busy with a machine gun course, and, proceeding through the outskirts of Algeciras, we turned sharply to the right, where we struck the Cadiz road—a military road of wonderful engineering ingenuity and excellent surface. This road is excellently graded, and in places it winds for miles with a mountain on one side and a precipice on the other; at other points one can see it only for a few yards ahead as it winds its tortuous course between boulder and precipice. At one place the road drops very suddenly for several hundred feet, then follows a complicated S bend between two rocks. This danger point is indicated by one of the excellent Spanish road signs—a conspicuous white S on a black background.

To Tarifa.

After a steady climb of several miles from Algeciras the sea comes in view once more—a magnificent sight from this altitude, which makes the horizon appear so high that what one imagines to be sky is really sea, with the coast of Morocco across the Straits and Tangier at the water's edge. Soon after this the long descent to Tarifa begins, the little white town coming into view very suddenly between two cliffs.

Just before reaching Tarifa we stopped to take a photograph of the cemetery. The honeycomb in the far wall, which can be seen in the photograph, is used for the storage of coffins, and here they are allowed to remain as long as an annual payment is kept up. The moment these payments cease, however, the coffins are ejected and thrown on to the common heap —rather a brutal custom.

In addition to being famous as the most southern point in Europe, Tarifa is interesting for the part

In Spain with a Sidecar.—

it played in the fighting between the Moors and Spaniards, and its fortress is a magnificent old building.

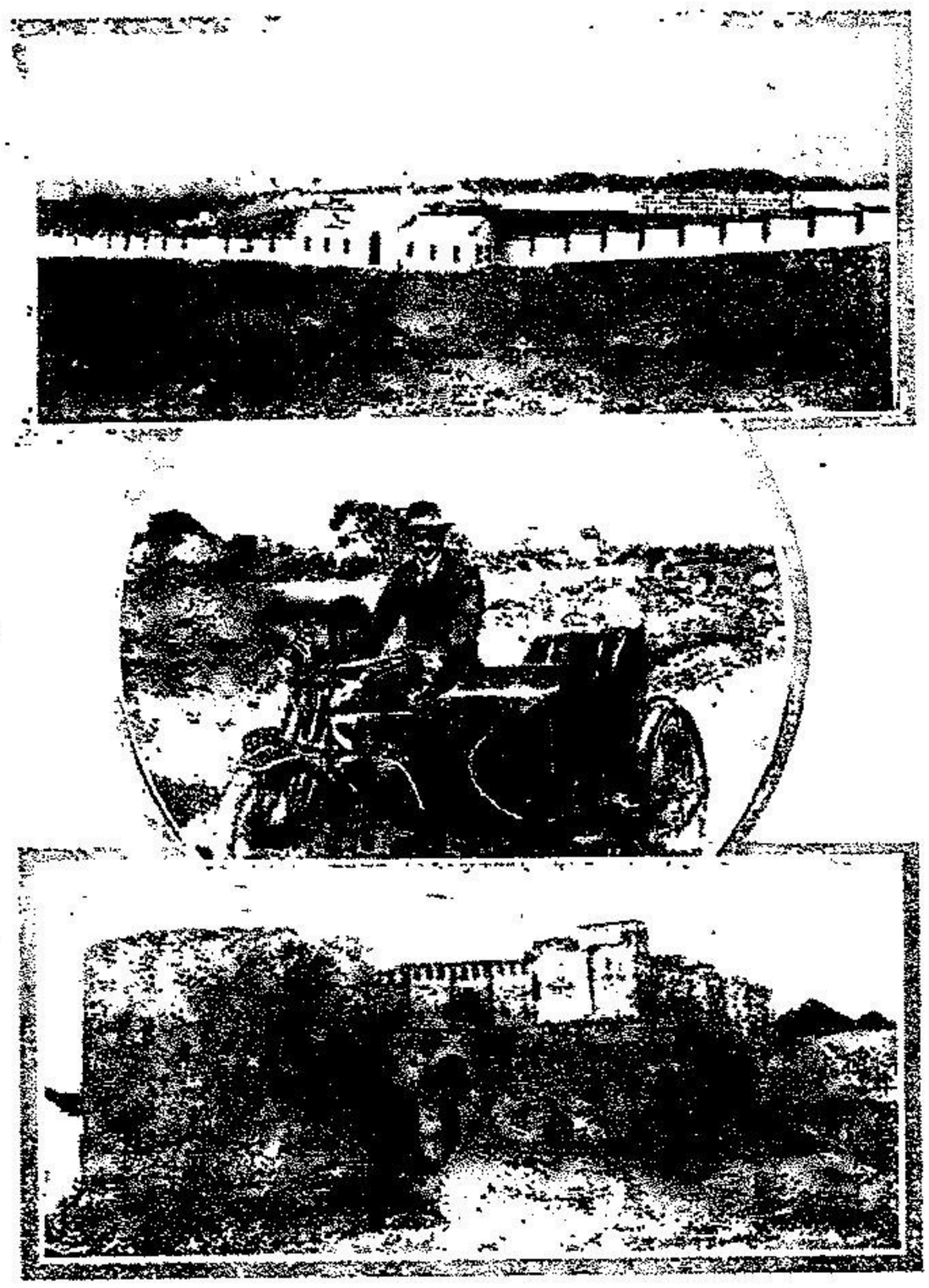
The town itself is a pretty little place, where dark fir trees show to advantage the quaint white buildings, and the mountains form an effective background.

Civility and Good Food.

The hotel is a crude place as compared with any English inn, but we were treated with great civility, and brought course after course of Spanish dishes, all well cooked and cleanly served.

After lunch we strolled round the town, and were pursued by a horde of children clamouring for "pennies"—the only English word they seem to know.

After a lounge and a smoke we returned to the outfit, and, starting up the engine at the first kick, were soon burbling up the hill out of the town on second gear. The wind that met us as we climbed the hill was terrific. This pass in the mountains is an outlet for gales blowing from the north or north-east, and has been known to blow the heavy A.J.S. outfit to a standstill—even when coasting downhill. To drive hard against such a gale is unsafe, especially downhill, as a sudden lull causes a most disconcerting acceleration which might prove disastrous on a bend.



(Top) The burying ground at Tarifa. For a yearly payment the coffin is left in one of the honeycomb partitions seen in the background, but if the payment is neglected the coffins is thrown on to a common heap.

(Centre) The A.J.S. sidecar in open country.

(Bottom) The old Moorish fortress at Tarifa, the scene of many historic and dramatic incidents in Moorish and Spanish history.

It was not long before we reached the crest of the ridge of mountains above Algeciras and were dropping down the long winding road that brings one back to something nearer sea level. Afterwards we made short work of the villainous road from Algeciras round the bay to Linea. After the atrocious surfaces of the roads that wind among the hills in a most tortuous fashion we found the fast going of the plains much to our satisfaction; and we let the engine have full throttle on the few straight stretches we encountered.

On the homeward journey, with the setting sun behind us, the hills and valleys looked their very best, and my only regret was that I had used all the films I brought with me.

Behaviour of the Natives.

Now a word about the behaviour of the people one meets on the road. It is well known that at Linea children run in front of horsemen and horsewomen galloping along the beach to polo or hunting and claim damages if knocked down, and the military are very quick to put any foreigner into prison if an accident occurs.

In the country everyone gets out of the way quickly enough—whether out of politeness or fear I cannot say. Horsemen jumped the gulley at the roadside in order to give us the road in several cases, and the men in charge of the long trains of pack mules and donkeys were most anxious to get the animals on to the extreme edge of the road. As the average Spanish car is driven all out most of its time, this may have something to do with it, but the country people almost always gave us a wave of the hand and shouted "Adios" as we passed. They seemed extremely courteous — a great contrast to the townspeople.

The Iniquitous Mule.

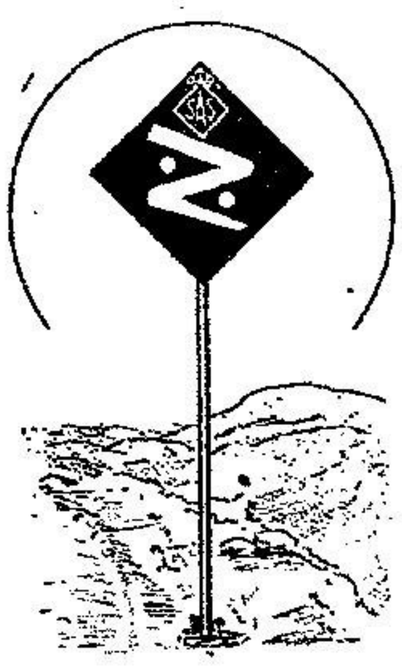
Dogs, too, have a very bad name, but here again their bark seems worse than their bite, and though they look a very fierce tribe, they caused us no trouble beyond running alongside.

The only other animals to show signs of unfriendliness were a young bullock, which lowered its enormous horns, and a mule, which turned away with a characteristic anxiety to present its heels to anything dangerous, and threatened to put a hind leg through the sidecar wheel.

There are many old remains of historical buildings scattered about Southern Spain, most of which are associated with that turbulent period when the Moors and Spaniards were frequently in conflict. Antiquarians will find these districts prolific with objects of interest. The country is steeped in romance; but ever at its side stalks poverty, yet never that poverty that one might term wretched. The nature of the people prevents one getting that impression. Even the poorest of the poor seem to have philosophy which leads to a contentment with their lot that some people might envy, but many despise.

Altogether it was an enjoyable run, and if people choose the best roads—which they can have almost entirely to themselves—Spain is a most attractive country for a tour.

R.F.M.



A Spanish A.C. road sign indicating a descent with hairpin bends.

In Spain with a Sidecar.—

it played in the fighting between the Moors and Spaniards, and its fortress is a magnificent old building.

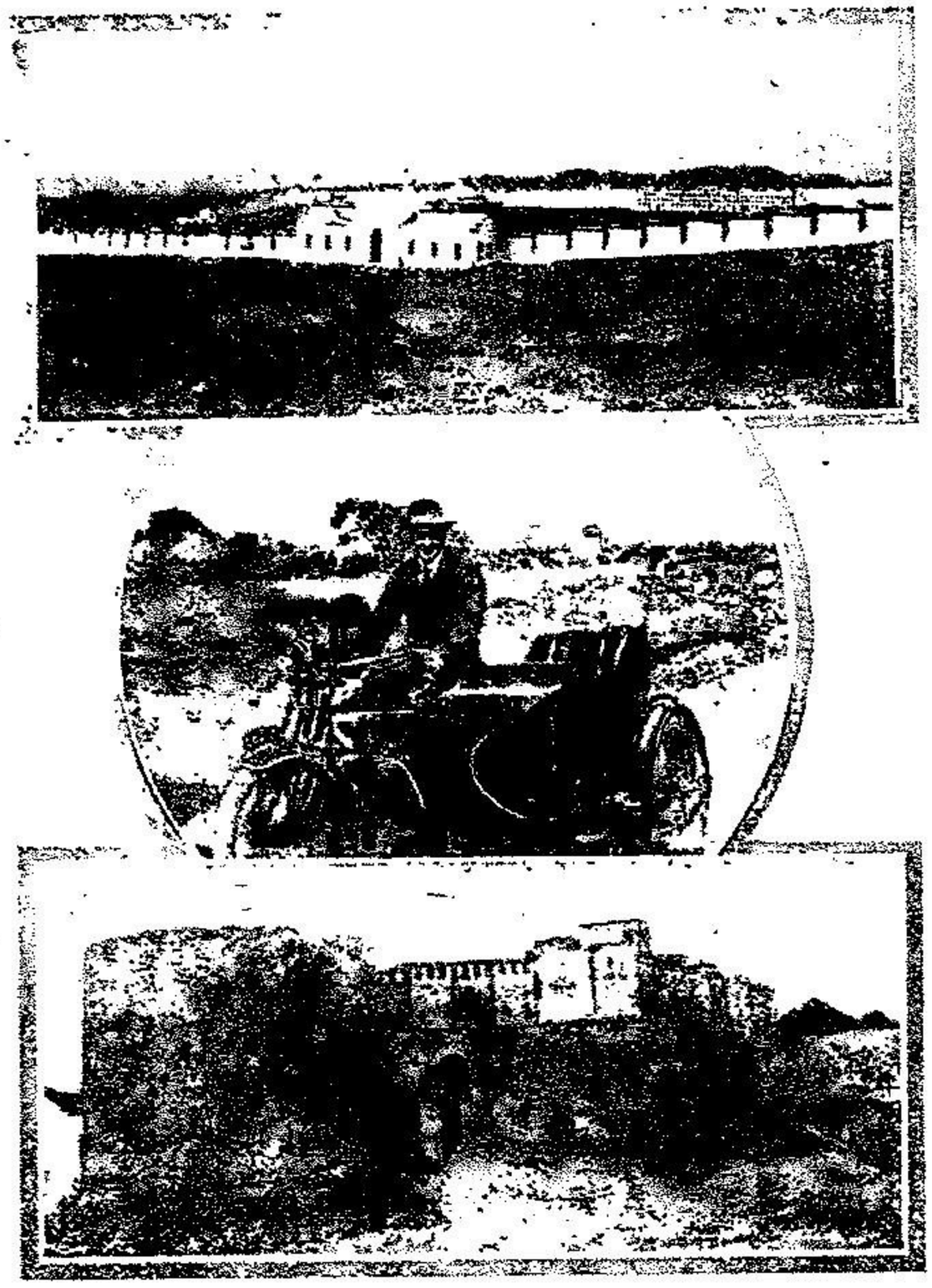
The town itself is a pretty little place. where dark fir trees show to advantage the quaint white buildings, and the mountains form an effective background.

Civility and Good Food.

The hotel is a crude place as compared with any English inn, but we were treated with great civility, and brought course after course of Spanish dishes, all well cooked and cleanly served.

After lunch we strolled round the town, and were pursued by a horde of children clamouring for "pennies"—the only English word they seem to know.

After a lounge and a smoke we returned to the outfit, and, starting up the engine at the first kick, were soon burbling up the hill out of the town on second gear. The wind that met us as we climbed the hill was terrific. This pass in the mountains is an outlet for gales blowing from the north or north-east, and has been known to blow the heavy A.J.S. outfit to a standstill—even when coasting downhill. To drive hard against such a gale is unsafe, especially downhill, as a sudden lull causes a most disconcerting acceleration which might prove disastrous on a bend.



(Top) The burying ground at Tarifa. For a yearly payment the coffin is left in one of the honeycomb partitions seen in the background, but if the payment is neglected the coffins is thrown on to a common heap.

(Centre) The A.J.S. sidecar in open country.

(Bottom) The old Moorish fortress at Tarifa, the scene of many historic and dramatic incidents in Moorish and Spanish history.

It was not long before we reached the crest of the ridge of mountains above Algeciras and were dropping down the long winding road that brings one back to something nearer sea level. Afterwards we made short work of the villainous road from Algeciras round the bay to Linea. After the atrocious surfaces of the roads that wind among the hills in a most tortuous fashion we found the fast going of the plains much to our satisfaction; and we let the engine have full throttle on the few straight stretches we encountered.

On the homeward journey, with the setting sun behind us, the hills and valleys looked their very best, and my only regret was that I had used all the films I brought with me.

Behaviour of the Natives.

Now a word about the behaviour of the people one meets on the road. It is well known that at Linea children run in front of horsemen and horsewomen galloping along the beach to polo or hunting and claim damages if knocked down, and the military are very quick to put any foreigner into prison if an accident occurs.

In the country everyone gets out of the way quickly enough—whether out of politeness or fear I cannot say. Horsemen jumped the gulley at the roadside in order to give us the road in several cases, and the men in charge of the long trains of pack mules and donkeys were most anxious to get the animals on to the extreme edge of the road. As the average Spanish car is driven all out most of its time, this may have something to do with it, but the country people almost always gave us a wave of the hand and shouted "Adios" as we passed. They seemed extremely courteous — a great contrast to the townspeople.

The Iniquitous Mule.

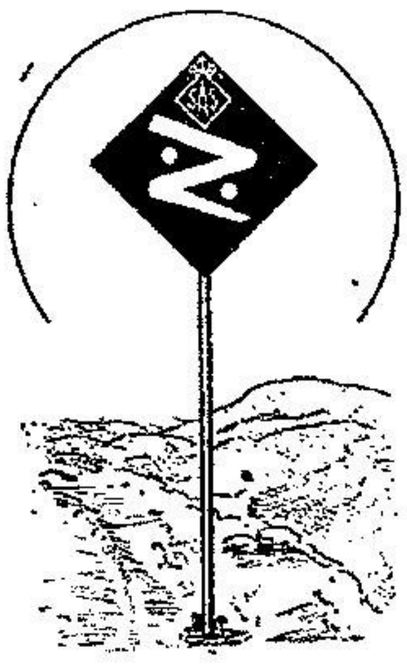
Dogs, too, have a very bad name, but here again their bark seems worse than their bite, and though they look a very fierce tribe, they caused us no trouble beyond running alongside.

The only other animals to show signs of unfriendliness were a young bullock, which lowered its enormous horns, and a mule, which turned away with a characteristic anxiety to present its heels to anything dangerous, and threatened to put a hind leg through the sidecar wheel.

There are many old remains of historical buildings scattered about Southern Spain, most of which are associated with that turbulent period when the Moors and Spaniards were frequently in conflict. Antiquarians will find these districts prolific with objects of interest. The country is steeped in romance; but ever at its side stalks poverty, yet never that poverty that one might term wretched. The nature of the people prevents one getting that impression. Even the poorest of the poor seem to have philosophy which leads to a contentment with their lot that some people might envy, but many despise.

Altogether it was an enjoyable run, and if people choose the best roads—which they can have almost entirely to themselves—Spain is a most attractive country for a tour.

R.F.M.



A Spanish A.C. road sign indicating a descent with hairpin bends.

THE DISABLED.

—of such conversions. Some users speak most enthusiastically of their adapted machines, whether sidecars or "auto-chairs," and any reader more happily situated can well imagine the appreciation and delight of a disabled soldier, or civilian, who had thought that solo trips and progress by motive power were beyond him.

There will be those men who have had the misfortune to lose only a hand or foot, and who will be able to consider the purchase of, or the conversion of, an ordinary type of motor vehicle, and enjoy practically all the benefits to be obtained from them.

In the second list will be men who will require a vehicle of quite a different character. The simple bath chair with an auxiliary power unit attached just sufficient to propel the vehicle at 5 or 6 m.p.h. will be all that is called for.

Converted Vehicles.

But the majority of lame men who have tasted the joy of the open road on a favourite mount will undoubtedly be most interested in details concerning its conversion into a vehicle fit for their use than in any special type.

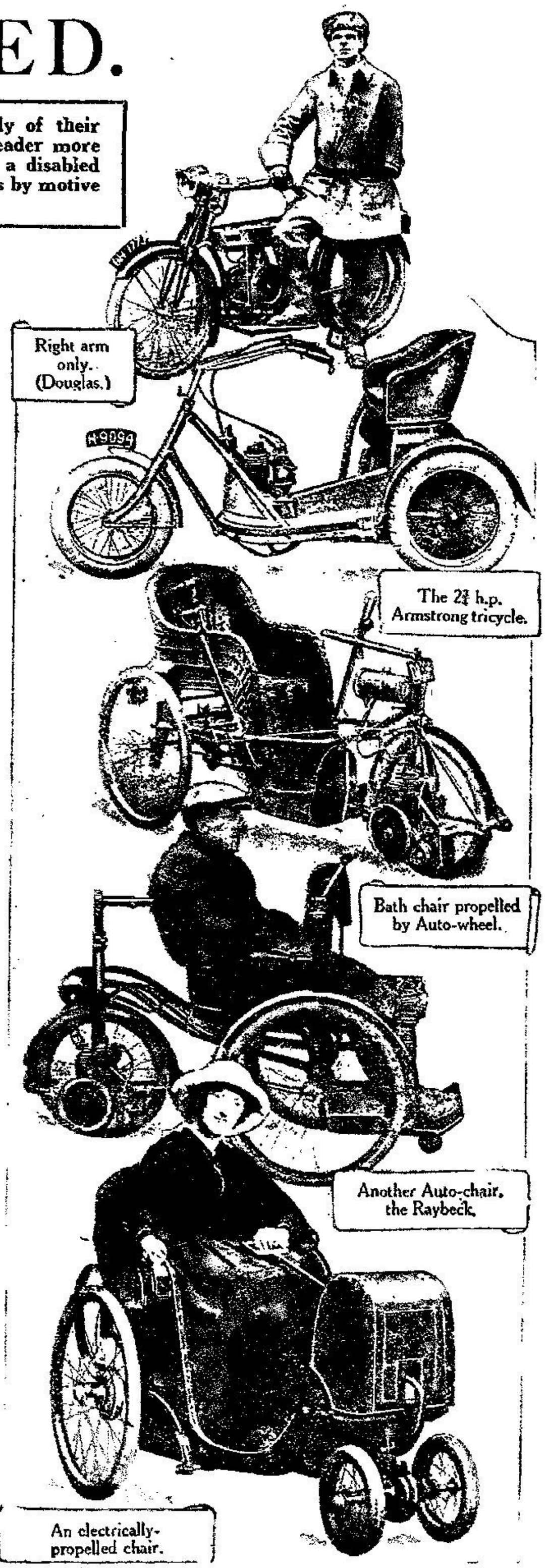
One of the illustrations shows an A.J.S. outfit so converted, and, although almost standard in appearance, it possesses one striking exception. In place of the orthodox handle-bar a hoop has been fixed, which enables the driver to steer with his body when changing gears or when attending to the lubrication, etc. The control levers to the carburetter, exhaust lever, and front brakes are within easy reach of the right-hand grip, the clutch and rear brake being operated from the right footboard.

The owner says he has accomplished some long runs and can easily steer and handle the machine. In this particular instance, the owner had never possessed a motor cycle before, which should surely convince any person, should any person require convincing, of the ease of the manipulation of a modern motor cycle. The difficulty of steering whilst operating levers has been overcome in a most novel though unconventional manner.

In the case where a rider minus an arm prefers to risk riding solo the problem is not easy, although two riders, Messrs. Davis and H. Winston, who have adopted this method are shown. There must always be an element of risk attached to it, perhaps too great a risk for any but experienced riders to take. The former rider had the controls of his two-stroke Sparkbrook brought to the left, leaving the right handle-bar clear. This he had straightened out, and a piece of steel screwed on to provide a rest for that part of the right arm, *i.e.*, to the elbow, which still remains.

Driving from the Sidecar.

By far and away the greatest possibility offered to lame men lies in adapting the controls of a motor cycle so that it may be driven from the sidecar seat. This idea is not new, the practice having been occasionally adopted by riders ever since the advent of the sidecar; but, strangely enough, the idea never became popular. One would have imagined those riders who habitually run their sidecars throughout the



Right arm only. (Douglas.)

The 2¾ h.p. Armstrong tricycle.

Bath chair propelled by Auto-wheel.

Another Auto-chair, the Raybeck.

An electrically-propelled chair.

COAL GAS IN PRACTICE.

SOME NOTES ON THE USE OF A FLEXIBLE GAS CONTAINER.

SOME little time ago we announced that we were procuring a motor cycle gas trailer, mounting a flexible bag for the purpose of a practical road test, and as three or four hundred miles have now been covered with the trailer in tow we are in a fair position to set before our readers a few notes concerning the results.

The gas trailer complete was supplied by Messrs. Douglas Cox, and was the smallest size produced by that firm, having a capacity of approximately 120 cubic feet. It was delivered to us complete in every respect, the connection from the bag consisting of a length of rubber hose with union and tap for leading gas direct to the carburetter of the machine. We have utilised this connection for filling, which takes about forty minutes, though the bag is provided also with a large trunk for connecting direct to the main. The end of this trunk, however, must be bound up after each refill in a way that will ensure a perfectly gas-tight joint, which promised to be rather a troublesome business, and, since the tap at the end of the flexible hose was of the same thread as the socket terminating the main from which we proposed to fill up, the use of this pipe suggested the simplest method.

The tests were made on a 6 h.p. latest model A.J.S.—an engine which, though remarkable for steady pulling, is of the low compression type, and it is conceivable that the difference in power developed between coal gas and petrol would not have been so marked had an engine having higher compression been used.

Carburation Arrangements.

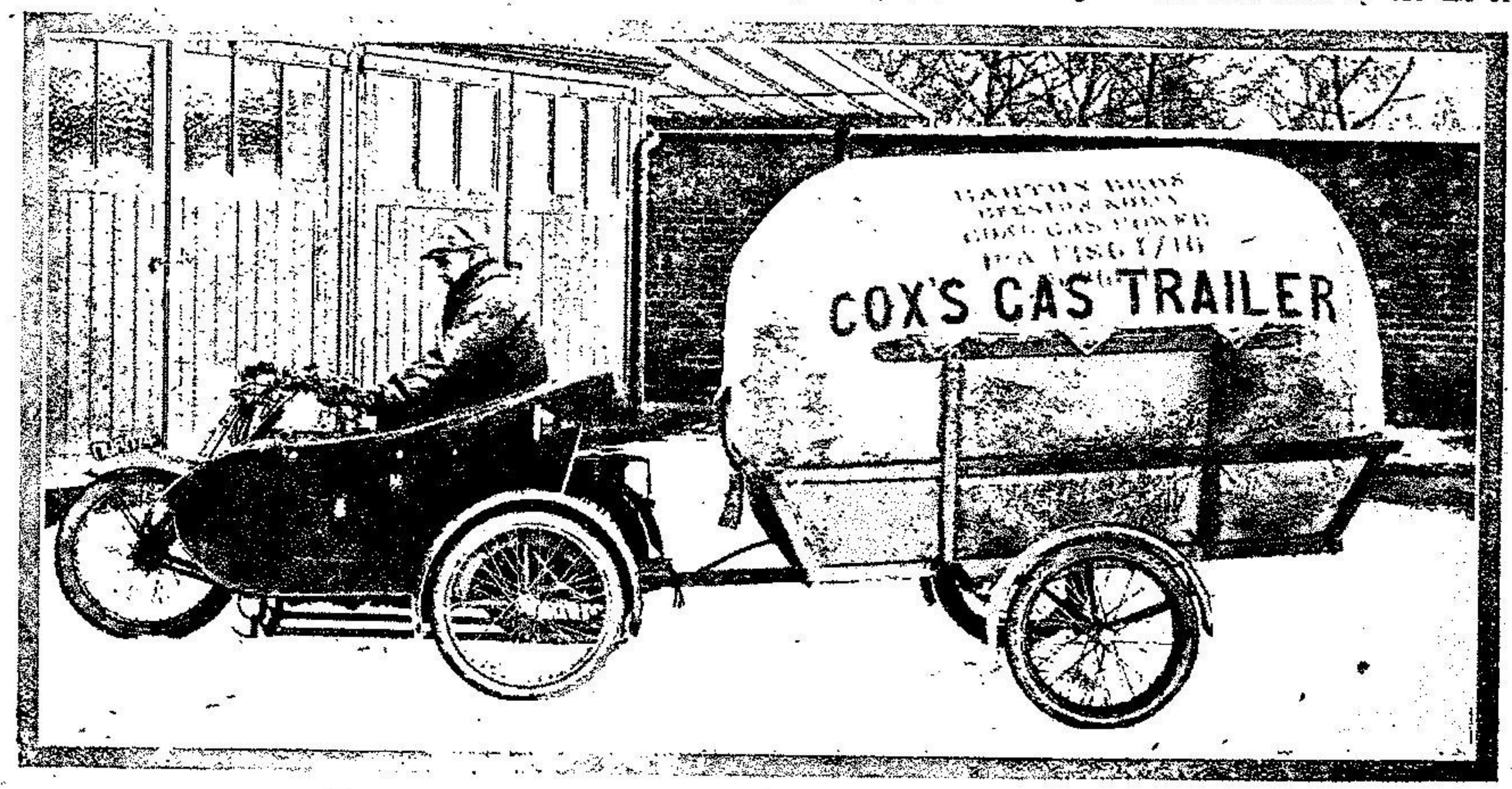
The existing carburetter was adopted for the gas as follows: The brass tap connection from the gasbag was screwed into the junction of an ordinary ¾in. cast iron T piece, the junction being ½in. in diameter. One end of the T was turned out so as to be a driving fit on the boss of the air intake of the Amac carburetter, and at the other end, by means of a nipple, an elbow was fixed to face the direction in which the machine travels, so as to reduce wastage by blow back. Immediately the engine is started the gas tap is turned "off" till irregular running, owing to too weak a mixture, sets in. The tap is then turned slowly on again, the point at which an even purr is resumed being taken as the correct mixture. All controlling is then done by the carburetter throttle, the air lever being fixed fully open, though for up grades or very flat going it is found advantageous occasionally to vary the mixture by the gas tap.

This is, of course, a very rough and ready method of using the gas, permitting a certain amount of wastage, but it is taken that the average rider will employ methods equally rough and ready. We have in course of manufacture a simply designed gas carburetter, and it will be interesting to note at a later date how this fitment compares with the present method.

The Gasbag.

The gasbag is not of the more costly type produced by Messrs. Barton, but is one of the "ordinary" patterns supplied to meet popular demand, and we believe that the makers of it have experimented very considerably in their efforts to arrive at a way of treating the material which will render it quite gasproof. The bag in our possession, however, leaks considerably. If garaged overnight in a fully inflated condition, it will be found quite slack the following morning. The leakage in twenty-four hours we find to be over 25 cubic feet; so it may be taken that, if these bags are to give safe and efficient service, some more effective method must be contrived.

Not only is this loss wasteful and objectionable, but it brings about numerous difficulties. Servant girls are apt to wander about at night time with lighted candles, and in these days Sarah Jane is becoming scarce enough, without hastening her exit from earth by the use of a



The Cox 120 cu. ft. gas container attached to the 6 h.p. A.J.S. with which it was used.

Coal Gas in Practice.—

gasbag. The works manager informs us that the drayhorse will not eat his food if the gasbag is anywhere near; and sometimes when the trailer is left in a spacious warehouse, the whole atmosphere of the place becomes polluted. In these days one can overlook the fact that the fitment is unsightly in appearance and difficult to garage, but wastage of this kind must be eliminated or success for the scheme is impossible.

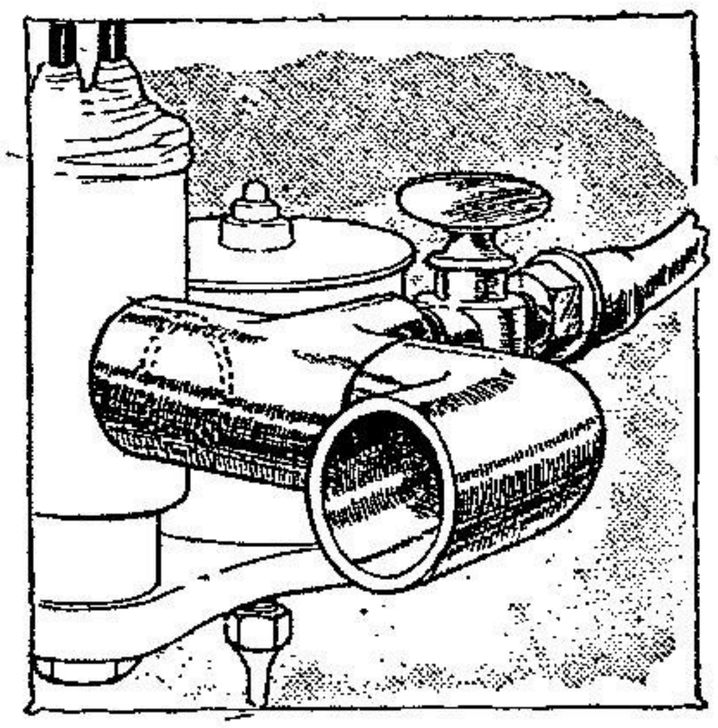
Incidentally it may be added that great care has been taken not to strain the seams of the bag by overcharging, but a good deal of mud is plastered on to the fabric by the rear wheel of the motor cycle, and we rather think that this does not increase its gas-retaining properties, just as mud on a canvas tent will cause rain to stream through. The canvas is rubber treated, and therefore a waterproof oil must not be applied.

On the Road.

Now as regards the actual running on coal gas, the results have proved to be equal to our expectations. The carburetter was tuned for high r.p.m., and therefore a slow tick over was not permitted with petrol. With the gas fitment, on the other hand, a most remarkable tick over is obtainable—no sound other than the steady working of the valves being audible. Given favourable conditions in the way of a following wind, the machine is capable of attaining the same road speed on gas as on petrol, viz., 48 m.p.h., but nothing like the same power is obtained. When running on coal gas the power falls off instantly with the revs., and a change down is necessary for quite small hills. Taken all round we should say that coal gas is about 4 m.p.h. slower than petrol.

We have experienced no trouble whatever with overheating, but slightly less oil is used. Similarly, we have had no trouble in starting, except on very cold mornings, when the engine does not become free after a few turns on the dry gas as it does after flooding the carburetter. Even an injection does not have the same effect, and it has proved necessary once or twice to flood the carburetter and start on petrol.

Owing to the high point (over 500° C.) of spontaneous ignition of coal gas, it is impossible to obtain a knock, however long a change down be postponed. The engine will flog itself to a standstill without a suggestion of a konk, which certainly does not apply when petrol is used. We found, indeed, when running on petrol and towing a full trailer, that if the faintest whiff of gas be turned on when knocking begins, the knock immediately ceases.



The gas carburetter attached to the air intake of the Amac. It consists of a cast iron ¾in. × ½in. T-piece, nipple, and elbow.

The best method of running has proved to be to turn off the gas at the tap as far as the engine permits, then run with the throttle wide open. Thus, though an economical mixture is used, a very full charge is drawn into the cylinders, giving the effect of high compression, and while this system of driving seems to be as economical as any, it further enables the engine to maintain a healthy bark and a reasonably high road speed.

So far our mileage per charge has proved to be about twenty-two, which is far from being satisfactory. Our riding has consisted of five-mile journeys, however, each consumption test extending over twenty-four or thirty-three hours, so that the poor results can be assigned mainly to leakage of the bag. This has prevented us from arriving at any useful data as regards comparative results, but the petrol consumption of the machine is approximately 70 m.p.g., so that we should obtain thirty-five miles per charge.

Reversing!

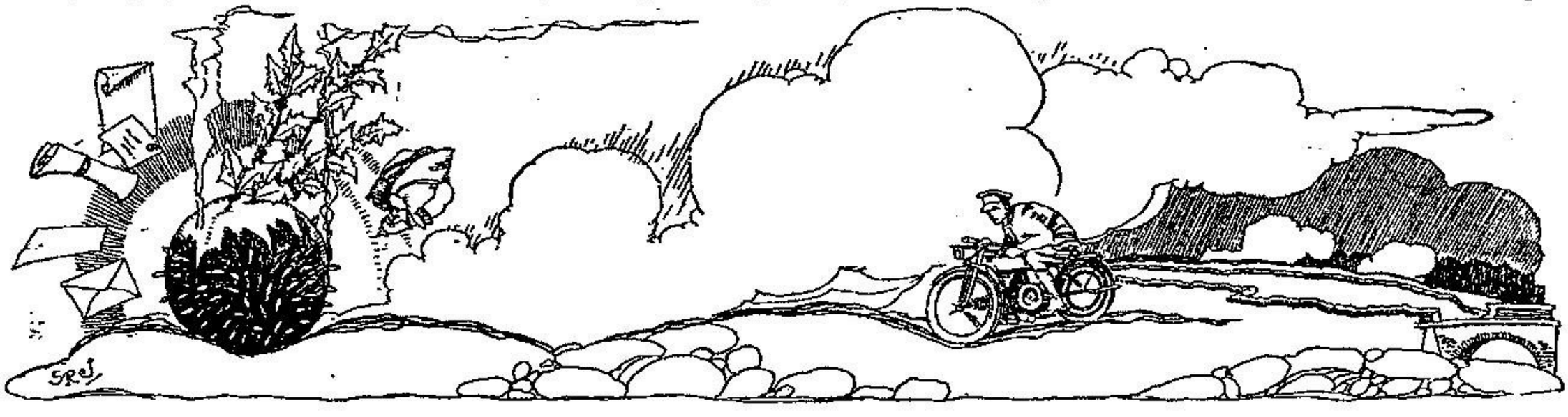
The trailer is a few inches wider than the sidecar, and when negotiating a right-angle corner care must be taken not to remove pedestrians from the corner of the kerb—otherwise no great difficulty has been experienced in town riding. All sorts of complications begin, however, if one attempts to push the outfit backwards, the trailer shooting off at the most unexpected angles. On one occasion we entered an hotel yard crowded with farm carts, and were promptly instructed to retreat by the way we had come—the only way. Such a retreat was impossible, however, till we had commissioned the hotel boots to carry the trailer bodily while we pushed the machine!

We tested the outfit on petrol with the gasbag fully inflated for wind resistance, and found that it made no difference to the speedometer reading, except against the wind. Then the resistance was very noticeable, and with a machine having a smaller engine it would present a real difficulty.

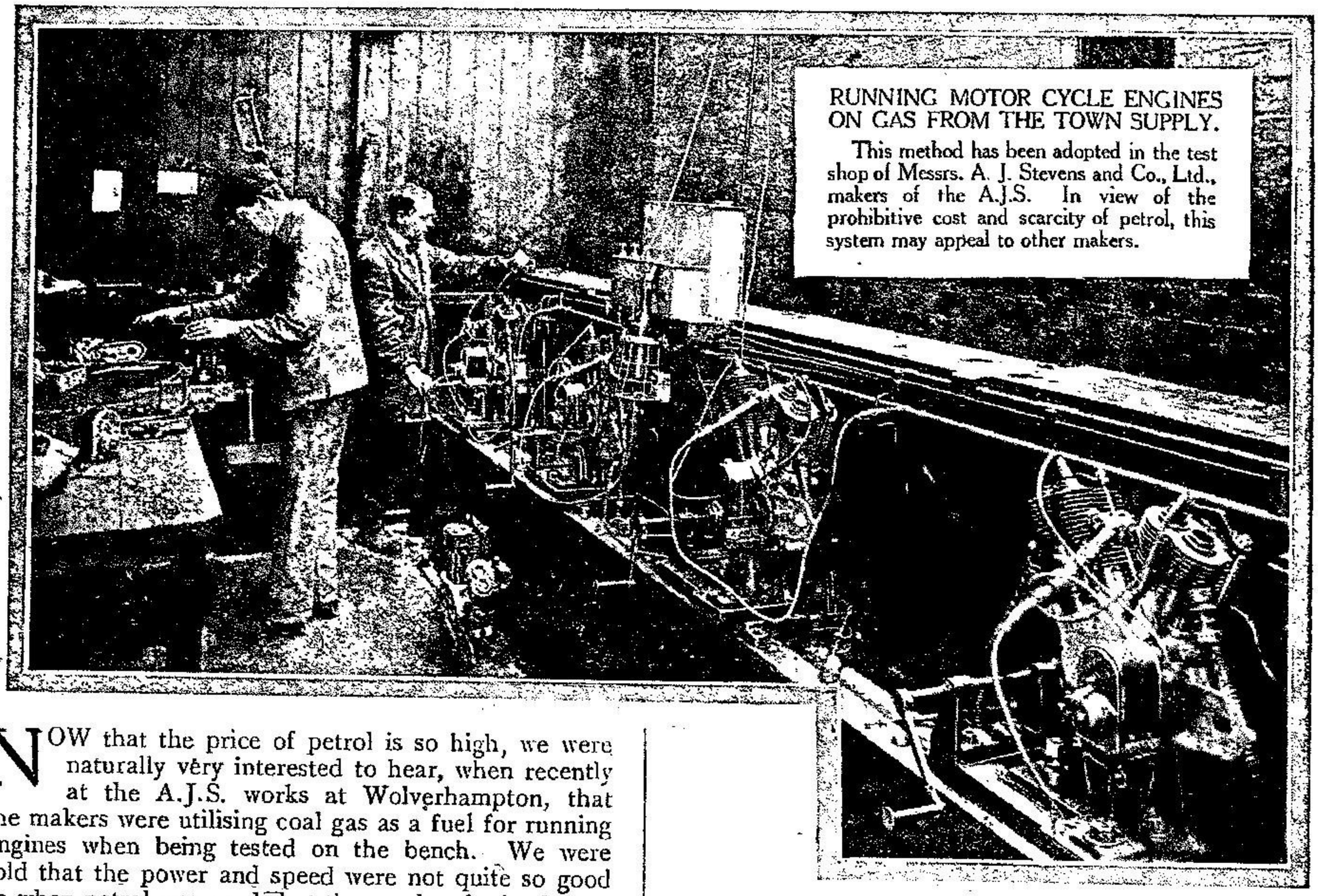
For some considerable time now the gasbag has enabled us to cover the five miles between home and business four times daily without trouble and without hold up of any kind. Given a really gas-tight bag we should be entirely satisfied with the result.

GERMANY'S FAITH IN ELECTRICITY.

INTERESTING discussions in Germany, of which reports have reached this country, indicate that great reliance is to be placed on intensive development of electric power as a chief agent of rapid reconstruction of industrial prosperity. One of our most eminent consulting engineers has favoured *Electrical Industries* with the following pithy and emphatic comment on these designs of our chief enemy: "It is true that Germany had before the war gained enormons economic advantage by public encouragement of electrical science, but a far greater cause of her advancement has been our gross neglect of our own opportunities. If the war has at last opened our eyes to the terrible dangers of national ca' canny, we may comfort ourselves with the following solid unassailable facts: England is the most favourably situated country in the world for deriving public and private benefit from electrical progress, and can, if she choose, have a supply of electricity laid on practically everywhere, like water, cheaper than Germany or any other big country on earth. With this priceless blessing England can not only defy competition in a wide range of manufacturing industries, but can bring about a wonderful revival of agriculture and abolish domestic drudgery. Whatever Germany can do we can do twice as well in this field, if only our people will drop their pettifogging parochial notions of electrical development and support the establishment of single-minded administration from a broad national standpoint."



PETROL ECONOMY.



RUNNING MOTOR CYCLE ENGINES ON GAS FROM THE TOWN SUPPLY.

This method has been adopted in the test shop of Messrs. A. J. Stevens and Co., Ltd., makers of the A.J.S. In view of the prohibitive cost and scarcity of petrol, this system may appeal to other makers.

NOW that the price of petrol is so high, we were naturally very interested to hear, when recently at the A.J.S. works at Wolverhampton, that the makers were utilising coal gas as a fuel for running engines when being tested on the bench. We were told that the power and speed were not quite so good as when petrol was used, but the results obtained were quite satisfactory, as the comparative results were much the same, while the saving of trouble and mess was quite considerable.

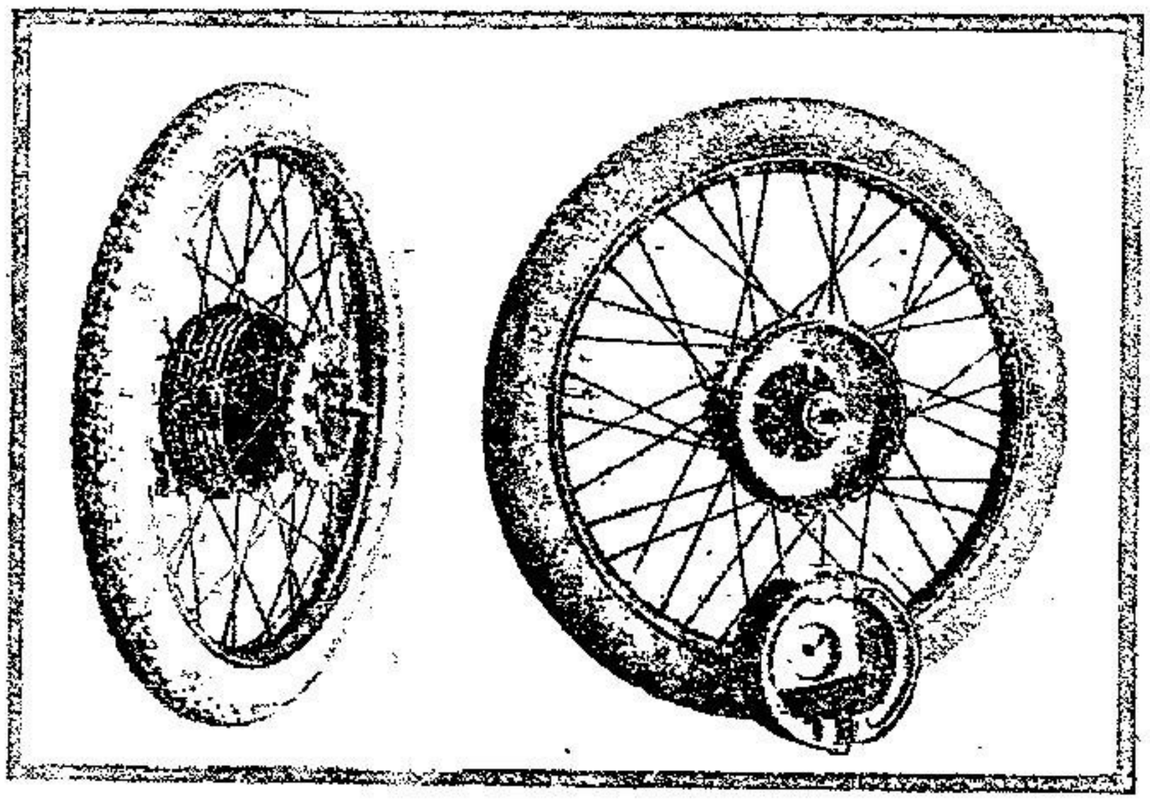
The method of supplying the gas is simple in the extreme. A large main gas supply pipe runs along the back of the test bench, and small branch pipes are taken off and lead direct to the engines. At the induction pipe entrance a bunsen burner attachment is fitted up, so that the quality of the mixture can be adjusted when necessary, while the speed may be varied by turning on or off the gas supply.

At first the gas was introduced directly into the ordinary carburetter. This worked quite satisfactorily but was not quite so convenient as the present arrangement. The engines show no signs of overheating, and start quite satisfactorily on the gas. We saw two engines running in this manner, one a 2¾ h.p. single, the other a 4 h.p. twin, and both appeared to run with perfect regularity.

AN A.B.C. IMPROVEMENT.

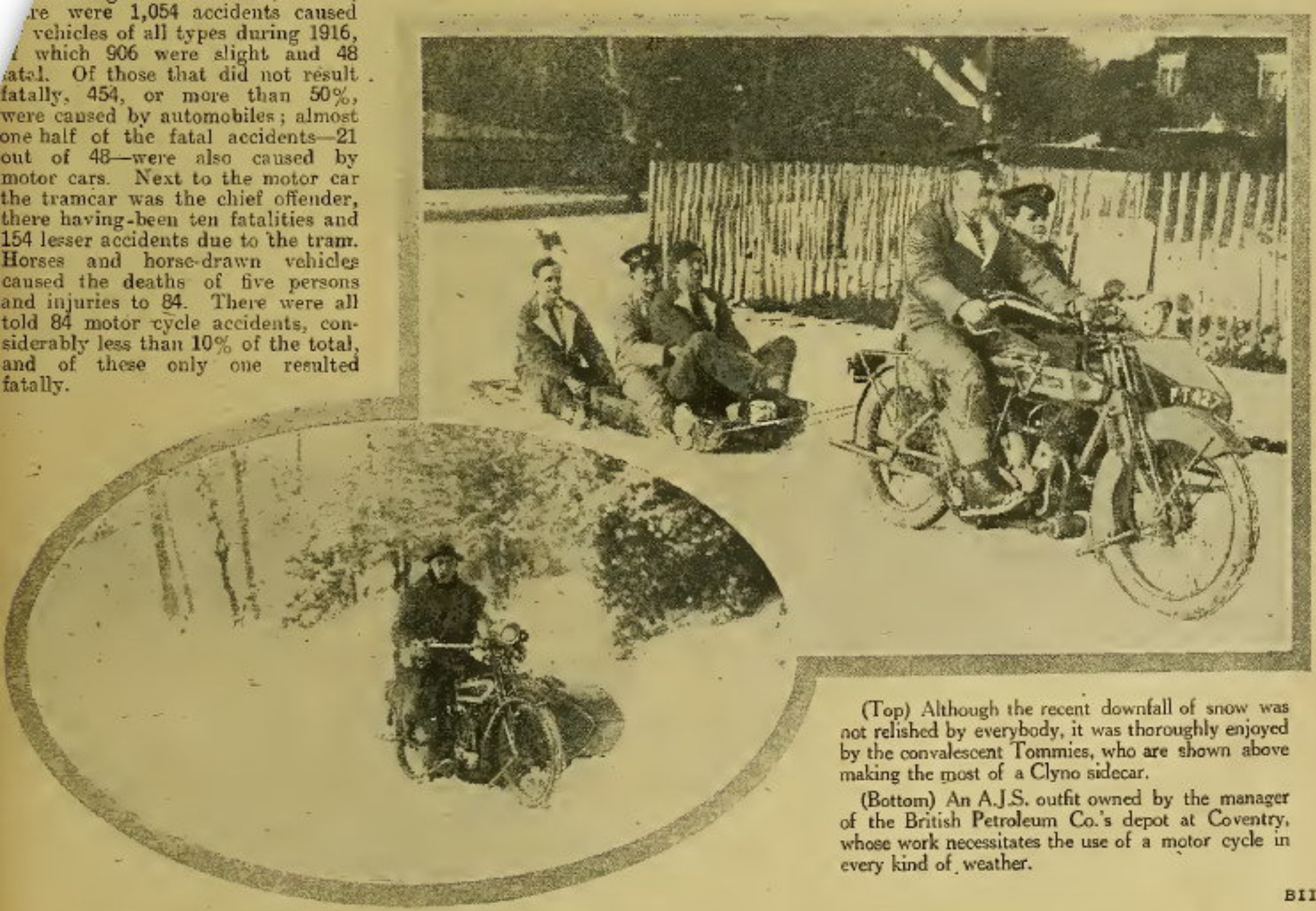
FEW firms are more up-to-date or progressive than A.B.C. Motors, Ltd. They have succeeded in producing one of the most ingenious and original, and at the same time practical, machines at present on the market, and only an excess of Government work prevents their supplying these to the public.

The latest development is the introduction of a new type of hub which contains two internal expanding brakes working independently, one of which is actuated from the handle-bar and the other by the pedal. The brake drum forms part of the hub, and thus the tendency to unscrew that arises with screwed-in brake drums is avoided. The brakes are made of a cast aluminium alloy, lined with Raybestos and provided with hardened steel plates where the cams make contact. It will be noticed that the brake drum is ribbed so as to assist cooling. Another point of interest in connection with this hub is that two separate and distinct transmission shock absorbers are fitted.



A.B.C. brake drum. The left view shows drum and sprocket in position, while that on the right shows the drums detached and the manner of their working side by side.

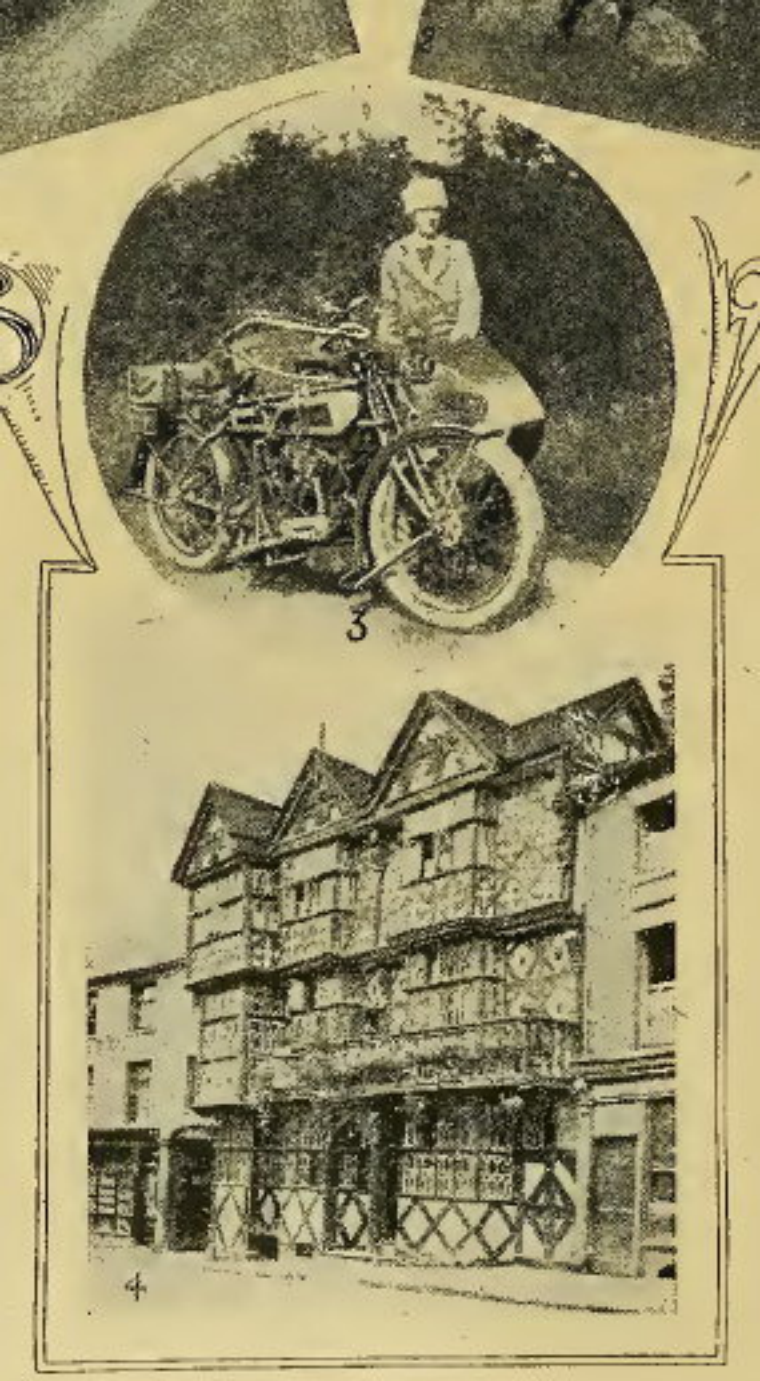
re were 1,054 accidents caused vehicles of all types during 1916, which 906 were slight and 48 fatal. Of those that did not result fatally, 454, or more than 50%, were caused by automobiles; almost one half of the fatal accidents—21 out of 48—were also caused by motor cars. Next to the motor car the tramcar was the chief offender, there having been ten fatalities and 154 lesser accidents due to the tram. Horses and horse-drawn vehicles caused the deaths of five persons and injuries to 84. There were all told 84 motor cycle accidents, considerably less than 10% of the total, and of these only one resulted fatally.



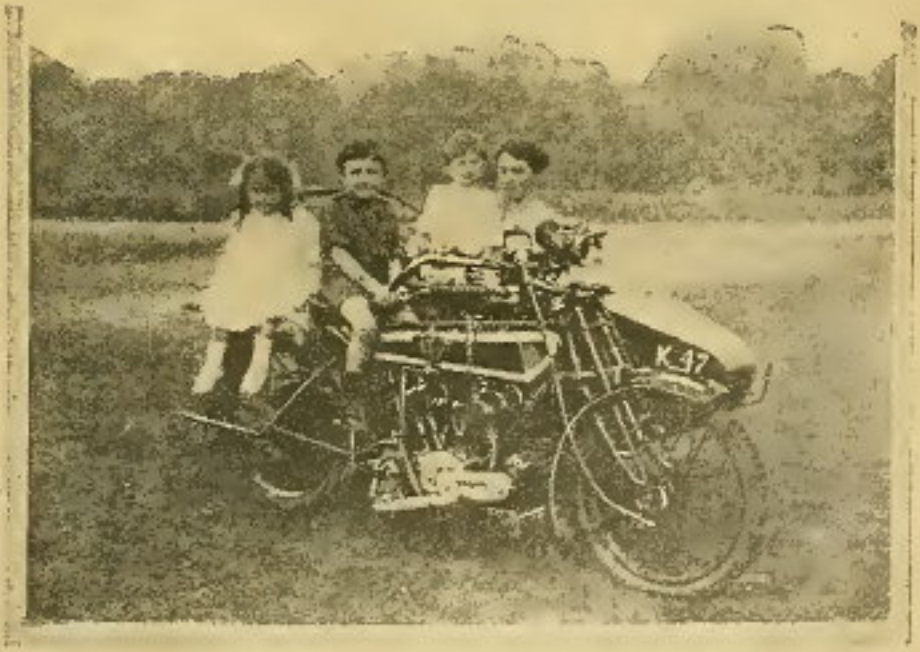
(Top) Although the recent downfall of snow was not relished by everybody, it was thoroughly enjoyed by the convalescent Tommies, who are shown above making the most of a Clyno sidecar.

(Bottom) An A.J.S. outfit owned by the manager of the British Petroleum Co.'s depot at Coventry, whose work necessitates the use of a motor cycle in every kind of weather.

BII



(1) A typical Welsh mountain road—the picture well conveys the desolation and loneliness of these highland districts. (2) Remains of the old Roman wall at Uriconium, near Shrewsbury. (3) The writer and the A.J.S. combination on which the tour was accomplished. (4) One of the most characteristic of the beautiful old half-timbered houses—the Feathers Hotel, Ludlow.



Rev. A. M. Walmsley, of Kandy, Ceylon, sends us the above pleasing photograph of his family aboard an A.J.S. outfit. On September 21st, 1916, an illustrated article, entitled "The Motor Cycle in Ceylon's Sunny Isle," appeared in these columns from his pen.

MOTOR VOLUNTEERS AND THE WOUNDED IN LONDON HOSPITALS.

On the 3rd inst. an entertainment for a thousand of Britain's wounded heroes was arranged at the Holborn Empire by the London Regiment of the National Motor Volunteers, who undertook the conveyance of the men. The ubiquitous sidecar was, of course, largely in evidence. The machines in the foreground are a 6 h.p. A.J.S. and a 7 h.p. Indian.

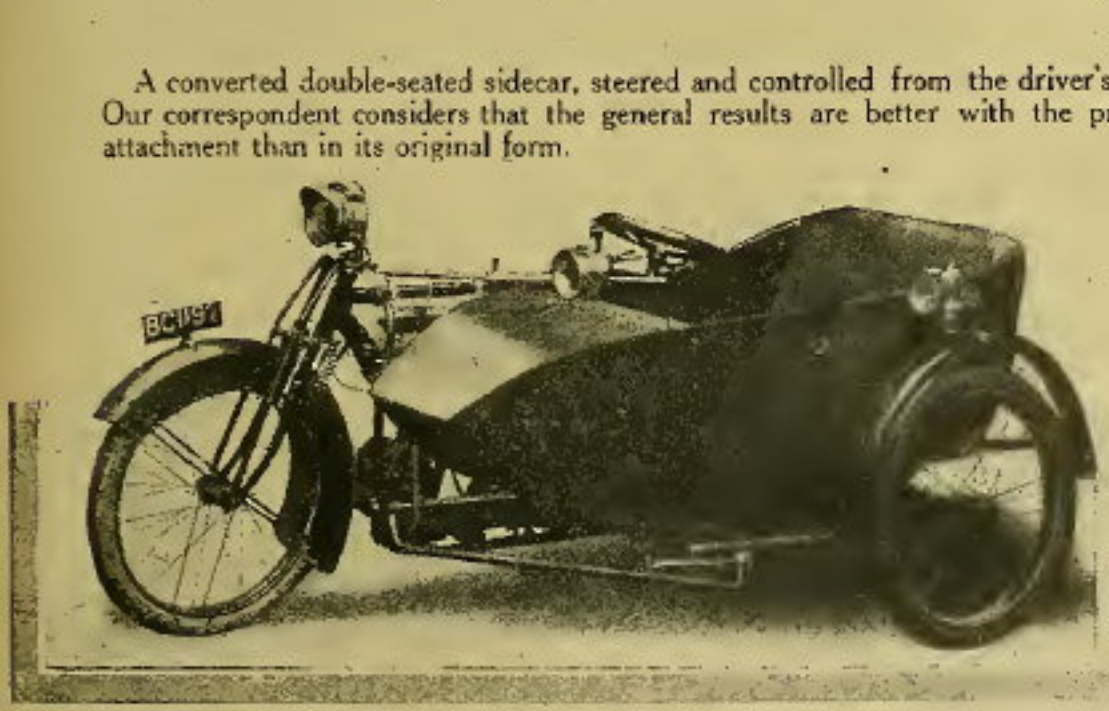
A Converted Double-seated Sidecar.

How a Reader obtained Protection for the Driver.

IN our issue for March 29th we dealt with the subject of motor cycles for the disabled, and although the accompanying photographs were not submitted with the idea of showing a disabled man's machine, it is very similar to some we then described for such a purpose. Mr. E. Hulse's device may also interest riders who desire cleanliness and at the same time wish for a sociable outfit. He says:

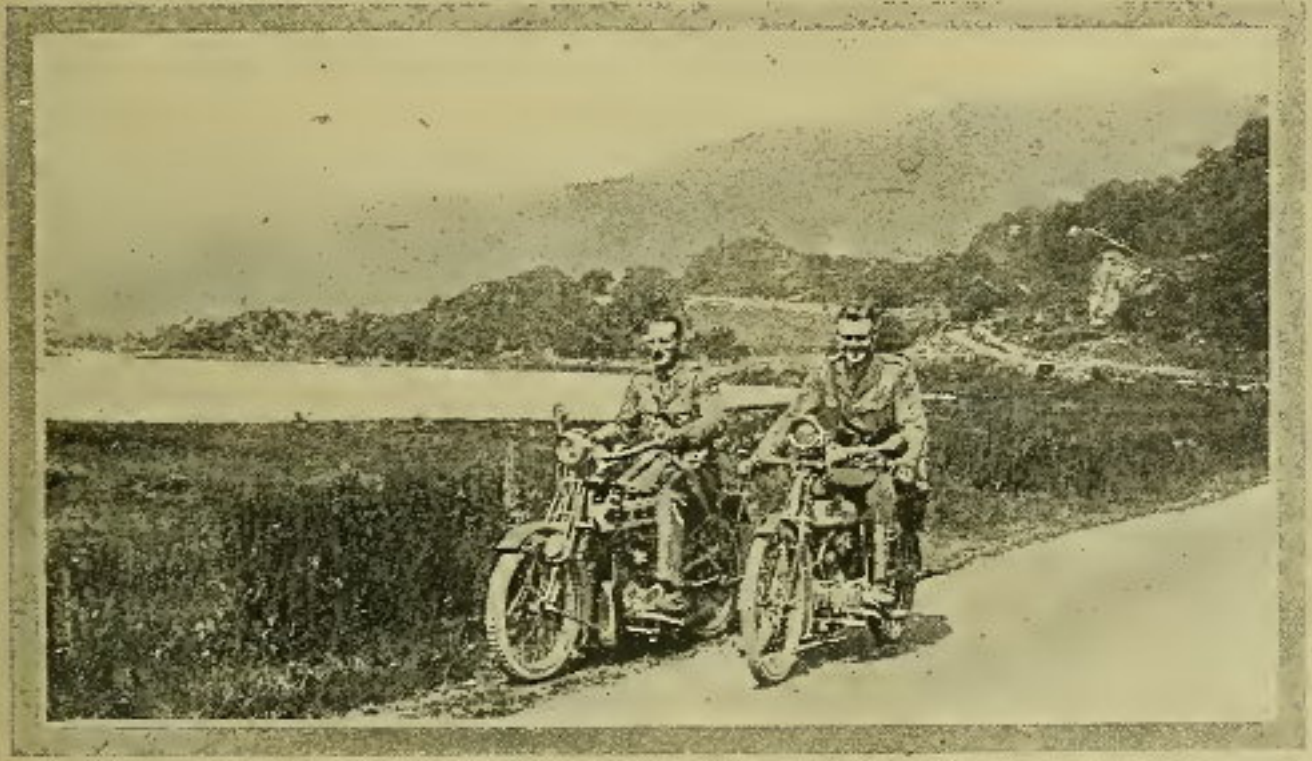
"I have made the sidecar up myself, which, as you can see, has wheel steering and pedal controls to clutch and brake. I can say that my old 1912 A.J.S., which is attached, has never yet given me a moment's trouble on the road. The body of the sidecar is built of three-ply wood, and, strangely enough, the engine seems livelier with the sidecar than it was before. Both chassis and body, also the sidecar wheel, are sprung, the body being on three coil springs under seat. I would be pleased to show the conversion to anyone interested who calls at my address, 34, Regent Street, Kingswood, Bristol."

A converted double-seated sidecar, steered and controlled from the driver's seat. Our correspondent considers that the general results are better with the present attachment than in its original form.



MOTOR CYCLISTS IN MOTOR VOLUNTEER PARADE AT LIVERPOOL.

The Fifth Lancashire Light Car Battalion Motor Volunteers held a parade in Shiel Park, Liverpool, on Sunday last, the 15th inst. Among the numerous motor vehicles were a number of sidecars, including a Sunbeam, A.J.S., and Triumph.



Officers of an R.E. training centre spending their few leisure hours 'midst the beautiful scenery of "Snowdonia," North Wales. The photograph, sent by Lt. A. G. Guthrie, R.E., was taken on the Carnarvon road, and shows Enfield and A.J.S. motor cycles.

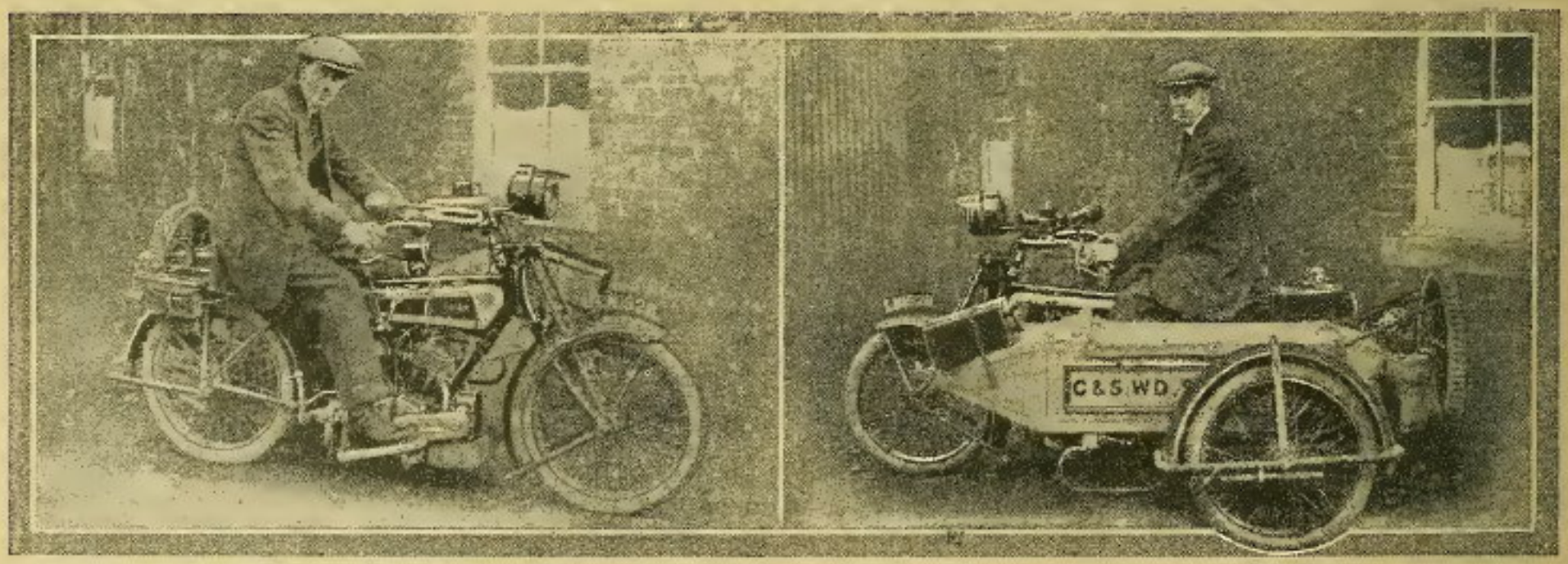
THE A.J.S. RUSSIAN MODEL.

AMONG the illustrated descriptions of Russian military models which have appeared in recent issues, it will be recalled that the 6 h.p. A.J.S. was reviewed. In detailing the departures in design, we stated that the frame has a horizontal top tube, which is not actually the case, for it declines rearwards as in the standard design, the tank being "saddled" over this tube to give it a large capacity—as a matter of fact, it accommodates approximately two and a half gallons of spirit. The two lower portions of the tank are connected by a pipe at the rear end. The A.J.S. was one of the first firms to standardise the straight top tube, and has a natural objection to any departure from an approved design.

Another item on the Russian model, to which we did not draw attention, but which is certainly worthy of a reference, is the improved method of actuating the clutch. In place of the perpendicular arm below the casing, the clutch is now actuated by a bell crank lever, neatly covered in, almost at the top of the casing, and which is operated by a Bowden wire. This system is not only to be preferred on account of its cleanliness, but has also effected an increased ground clearance.

Sidecar for Business Purposes.

A HOME-MADE CONVEYANCE FOR GOODS AND SAMPLES.



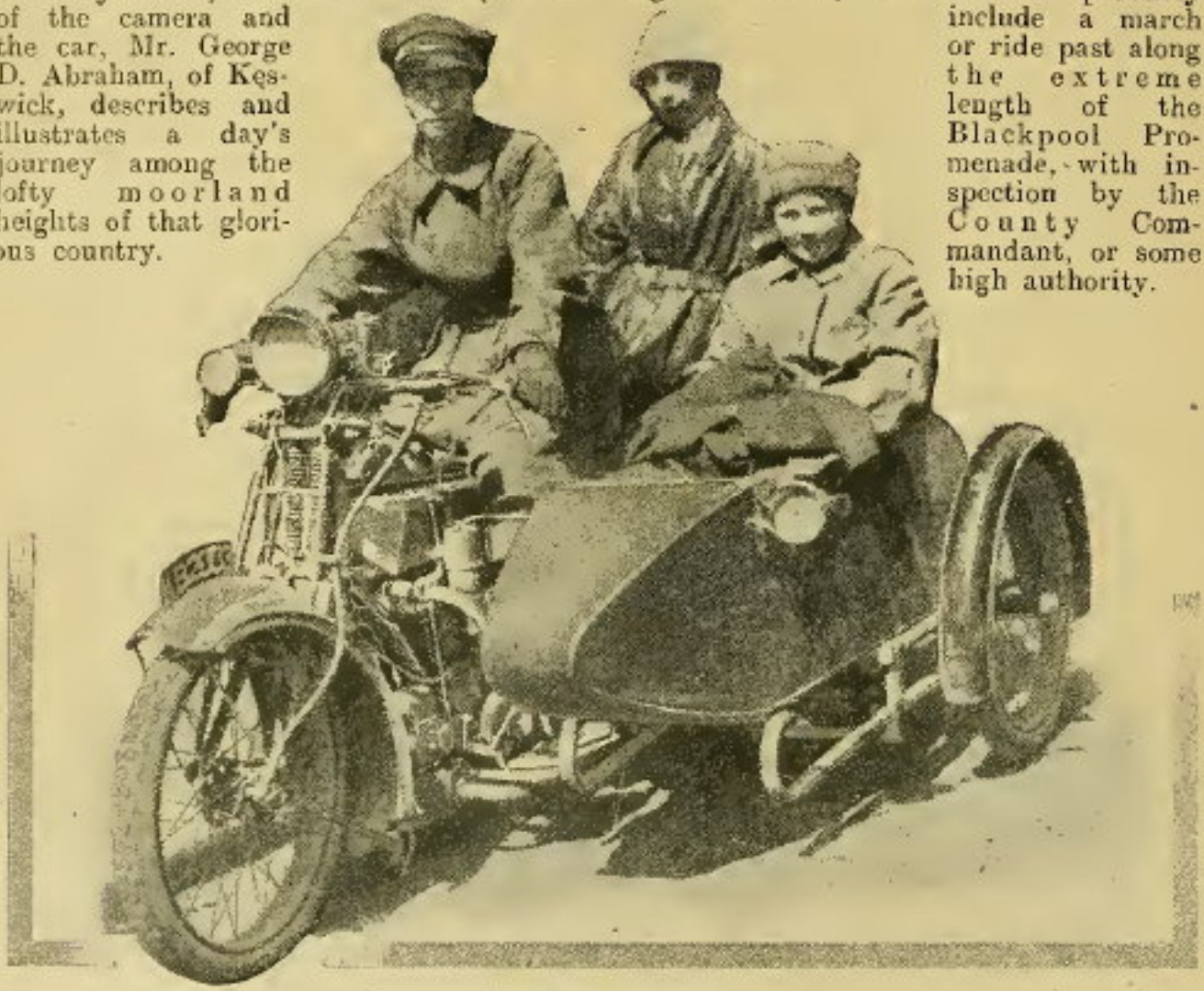
An A.J.S. commercial outfit, the sidecar of which was "home made." The way the spare petrol and oil are carried is worthy of notice, the tins being held by part of an old chain and a spring, which hooks on to a screw head.

MR. J. S. BOUSFIELD, of Westbury, Wiltshire, writes us as follows: "I have tried all sorts and kinds of motor cycles, but never had such good service as from the A.J.S. shown in the accompanying photograph. I have now had three of this make, a 2¾ h.p., a 4 h.p., and 6 h.p.; the last-named I am now running on half petrol and half paraffin. This machine has run 15,000 miles, and I have had very little trouble except for tyres, petrol pipe blocked up, magneto points requiring cleaning, etc., and such can only be regarded as incidents. I remove cylinders for decarbonising and grind valves in every 1,000 miles. This appears to keep the engine in perfect order, and I believe in plenty of oil. Never have too little oil is my principle. My average running is about 250 miles per week—all weathers. The sidecar fitted is my own make out of old tea chests, etc., and is about half the weight of the average body of the same type. I do not carry a passenger—only samples and small packages; in fact, the machine is used for business purposes only."

B24

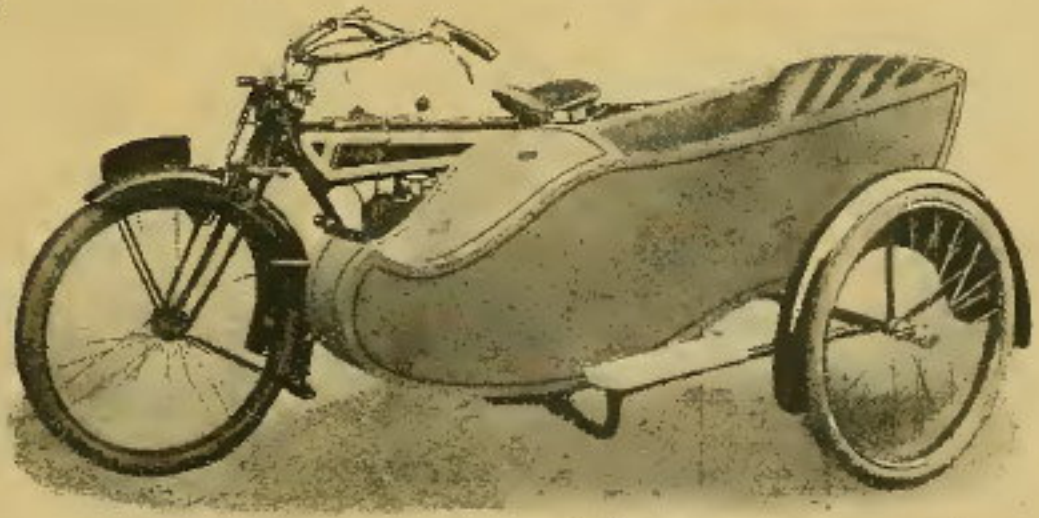
revel in an article in the current issue of *The Light Car*, in which that exponent of the camera and the car, Mr. George D. Abraham, of Keswick, describes and illustrates a day's journey among the lofty moorland heights of that glorious country.

settled until the strength of the gathering is known, but it will probably include a march or ride past along the extreme length of the Blackpool Promenade, with inspection by the County Commandant, or some high authority.



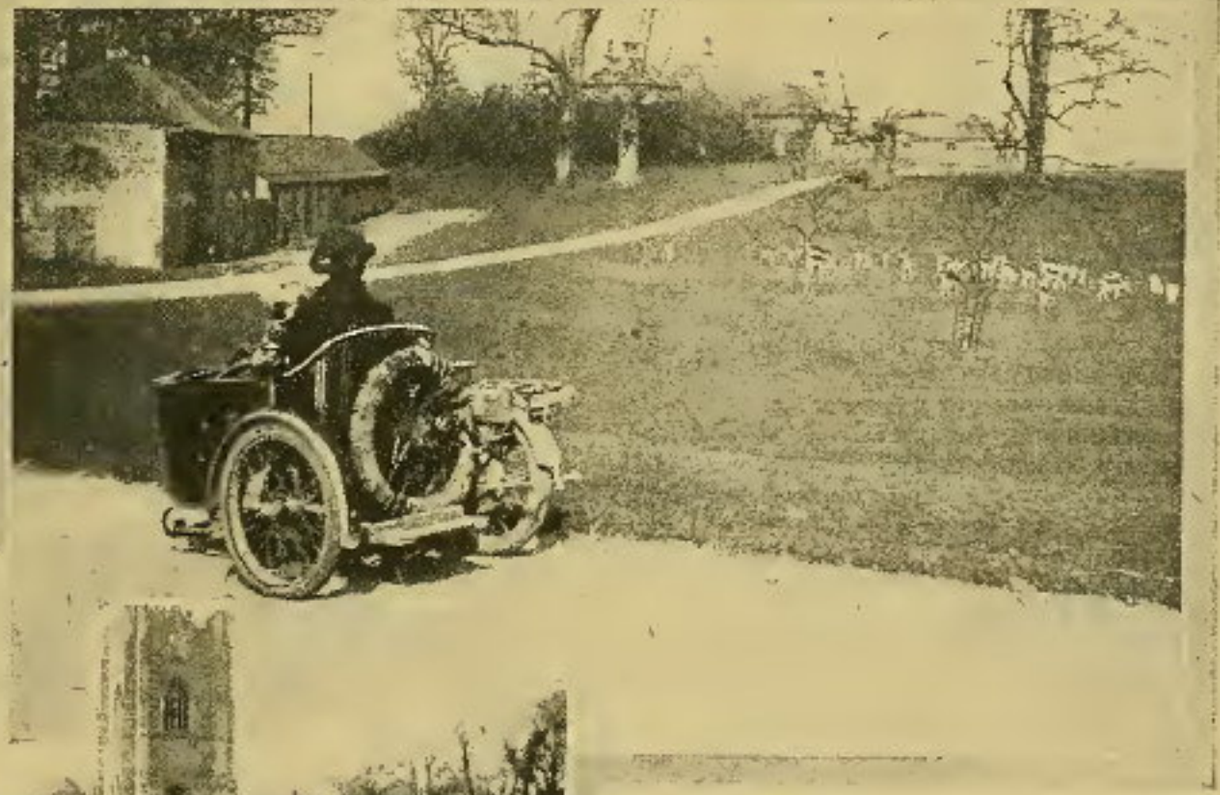
A SPORTING TRIO.

Mrs. Stevens Wood, of Wolverhampton, with Mrs. Stevens in the sidecar and Mrs. Wade on the carrier, covered part of the route taken by the Lancashire Motor Cycle Volunteers (illustrated on pages 424 and 425 last week). They were observed taking the hill between Llangollen and Ruthin, North Wales, in good style, on their 6 h.p. A.J.S.



A 2¾ h.p. A.J.S. outfit, to which is attached a Northern featherweight sidecar.

seats of the Earl of Percy. The church is also worthy of note, one of the monuments inside being erected to Blind Jack of Knaresborough, otherwise John Metcalf, who, although totally blind from the age of six, was noted as a clever road maker. He was responsible for the reconstruction of many of the chief main roads of Yorkshire and Lancashire. Crossing the railway, the road continues past Plompton Park to



In the grounds of Studley Royal. The sidecar in the foreground is a 4 h.p. twin A.J.S.

Fountains Abbey stands in these grounds, and the river Skell flows through them.

After a run of five miles the inland watering place of Harrogate is reached, the road afterwards undulating to Ripley. From Ripley we ran into the park of Studley Royal, and past the historical Fountains Abbey, then on to Ripon. After a brief inspection of the Cathedral we made for York again, *via* Green Hammerton and Marston Moor.

B7

MORE NEW USES FOR THE SIDECAR

A cinema operator busily filming a procession during the recent Baby Week He has converted his A.I.S. sidecar into a temporary grandstand

DARTMOOR AS A TOURING GROUND.

SOME ACCOUNT OF THE ROADS, BEAUTIES, AND ANTIQUITIES OF SOUTH DEVON.

By H. TAPLEY-SOPER.

THE "Forest of Dartmoor," as it is described in ancient documents, generally calls up visions of impossible roads, bogs, fogs, escaping convicts, and, perhaps to the more romantic, "pixies" (the local name for the little fairies who are supposed to dwell in parts of the moor). For the fairies we cannot vouch, fogs seldom occur in the summer months, and bogs need not trouble motorists who are content to stick to the main roads,

The author and his friend, with the A.J.S. combination, on which the tour was accomplished.

DARTMOOR AS A TOURING GROUND

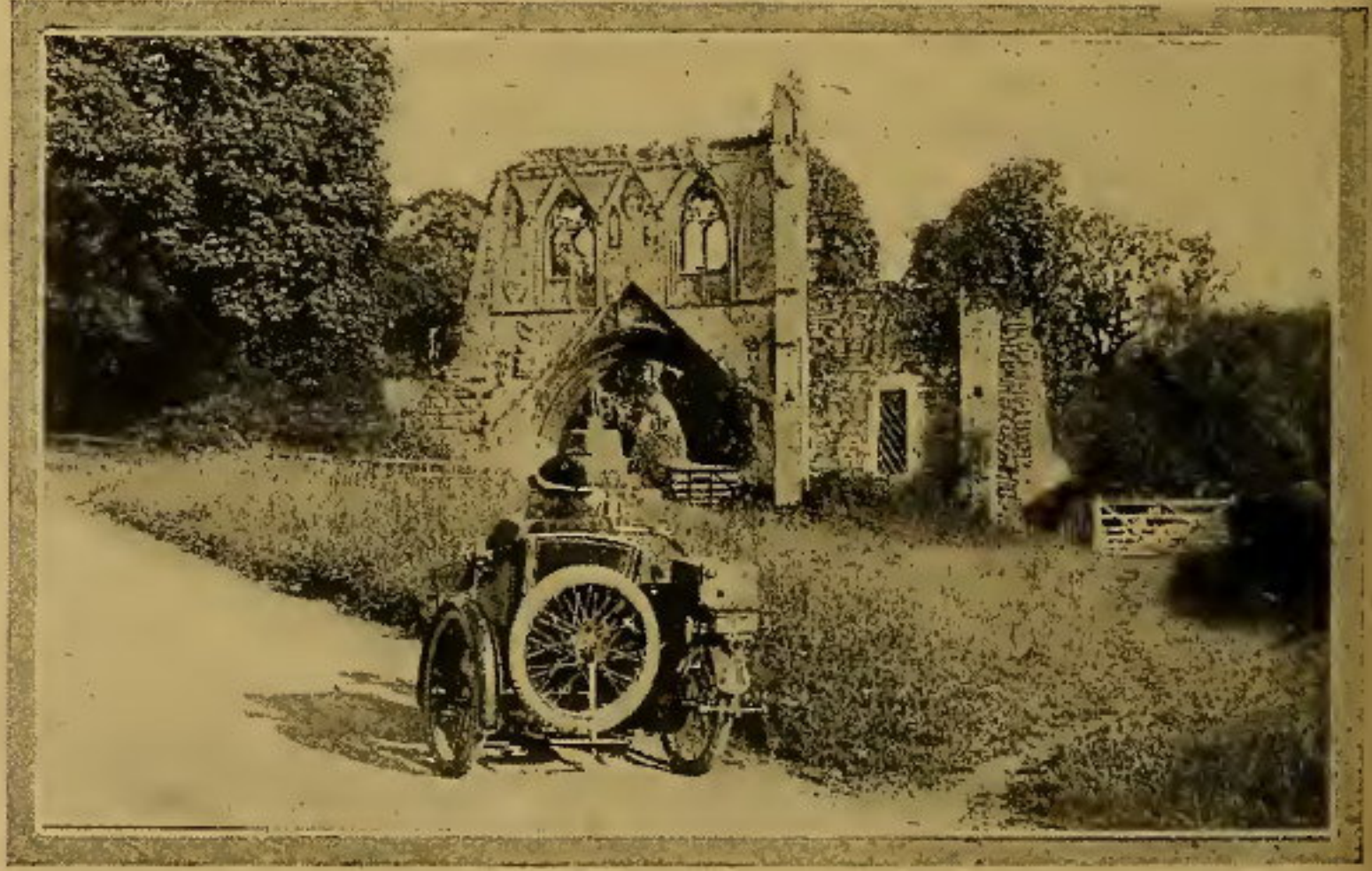
Some Account of the Roads, Beauties, and Antiquities of South Devon.

By H. TAPLEY-SOPER.

(The first instalment appeared on August 16th.)

THE initial twenty miles of our second Dartmoor tour takes us over a course which will be very familiar to riders in the reliability trials of pre-war days. We again quit Exeter *via* Fore Street, but on passing over Exe Bridge turn sharp to the left and soon desert the

Powderham church, surrounded by the exceptionally fine yews, which are worthy of note. In the foreground are three Enfield and two A.J.S. outfits.



ON THE YORK-SCARBOROUGH ROAD. The ruins of the Early English gateway (1121) of Kirkham Priory, thirteen miles from York. Founded by Walter Espec for Augustinian canons in memory of his son. The sidecar is a 1916 4 h p. A.J.S.

May	..	..	..	..	12,270,934
June	..	..	..	..	11,327,434
July	..	..	..	..	12,346,846
August	..	..	..	..	7,853,368

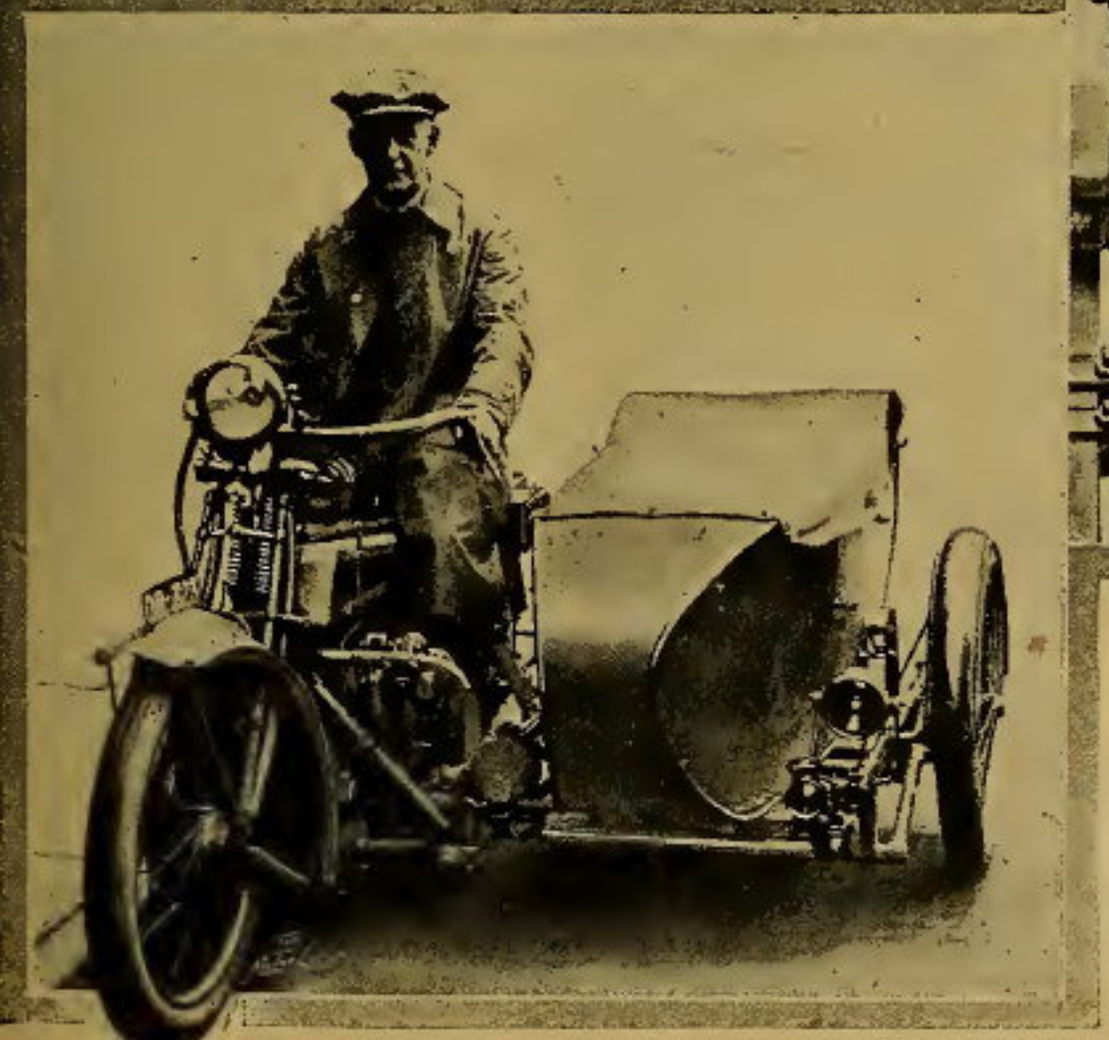
There is food for thought in the troleum import figures (these, of course, cludes petrol, and lamp, lubricating, s, and fuel oils). We received ,915,616 gallons last month, which is 00% increase on the August figures 1915 and 1916.

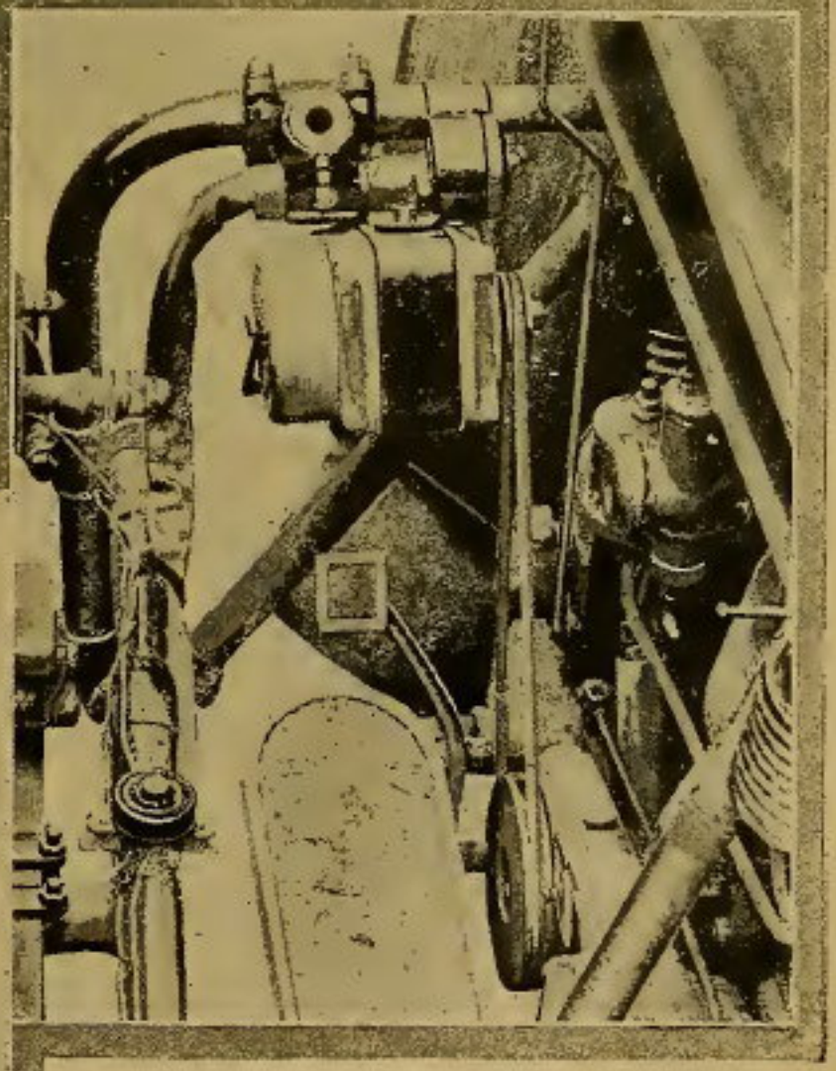
On the other hand, we imported ,919,685 gallons less petrol last month an in August, 1916.

diameter, .40in.

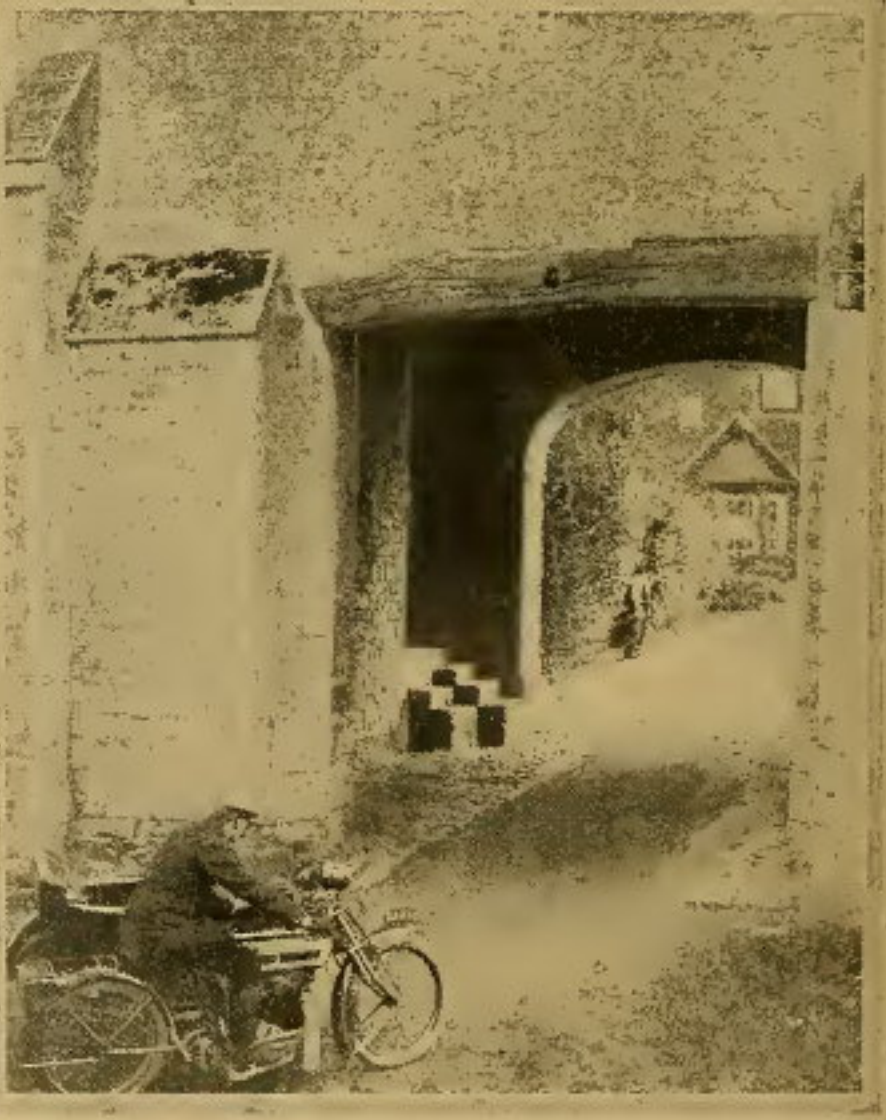
THROTTLE CONTROL. — Handle-bar grip type placed on right side, and operator to open throttle by twisting top of grip towards centre.

CLUTCH PEDAL. — To be placed on the left side and brake pedal on right.



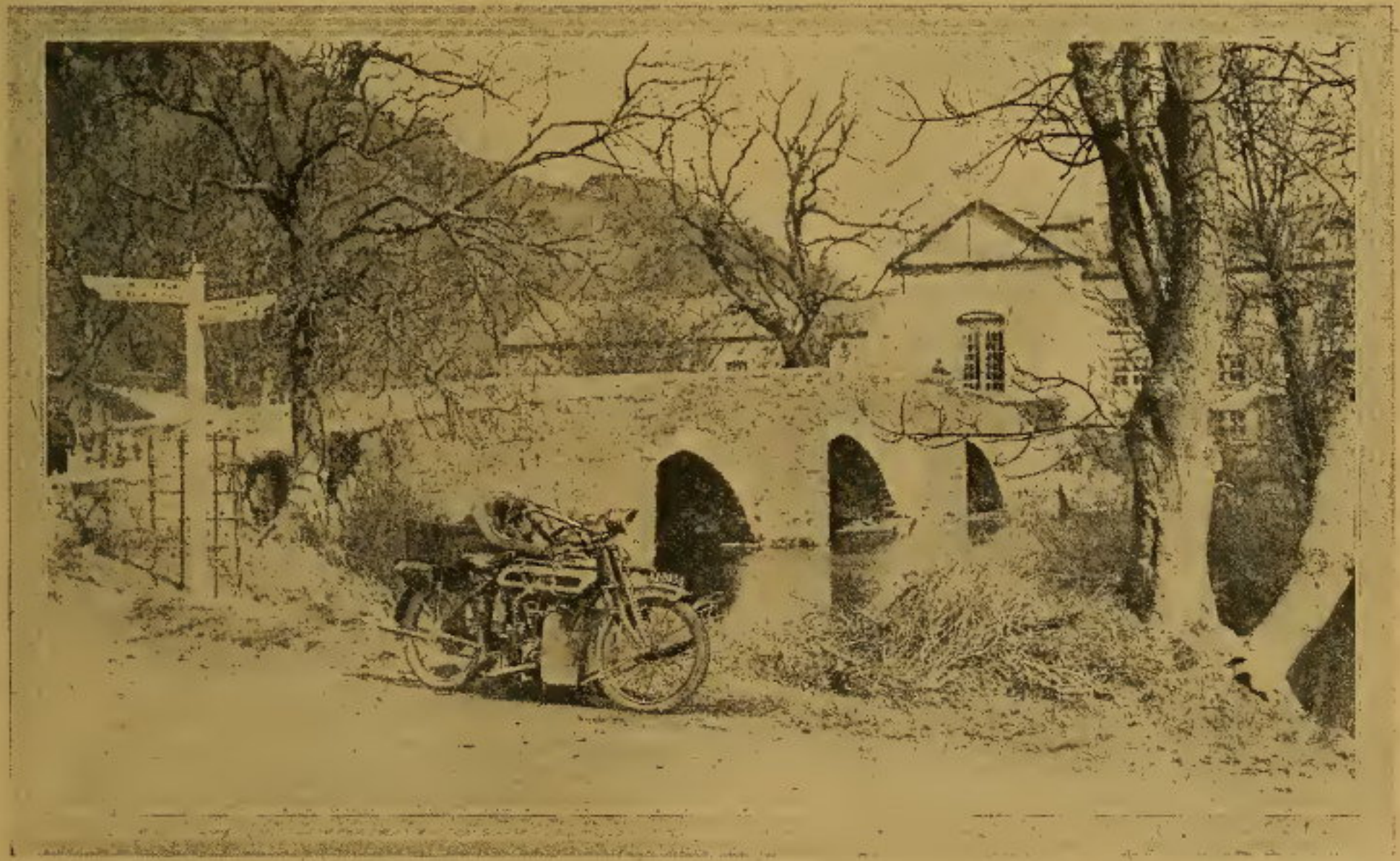


An ingenious way of carrying an electric generator on an A.J.S. outfit has been devised by Mr. Ernest Baydell. It will be seen that he has fixed it to the front sidecar support in such a position that the dynamo pulley lines up with the pulley on the engine shaft. The cables have been enclosed in a cycle tyre tube—quite a good idea. The batteries are carried under the sidecar seat. Note the foot-operated switch for the electric horn.



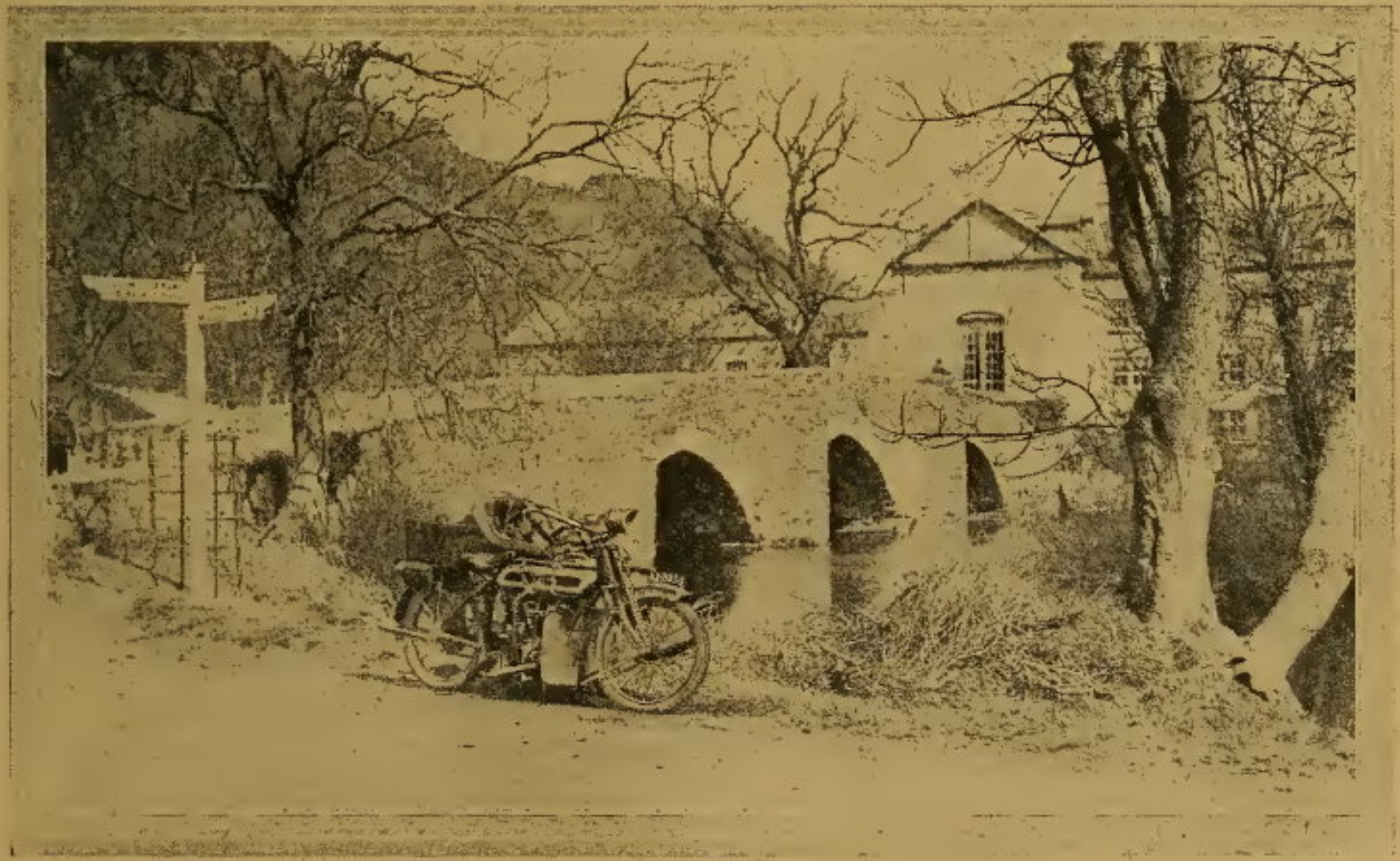
IN BUCKINGHAMSHIRE.

The spirit of solidity and endurance always seems to be exemplified in ancient archways, and these somehow emphasise the ephemeral nature of things of to-day in a most insistent manner. The old mediæval archway through which an A.J.S. is about to pass is the entrance to the old Manor House at Long Crendon, Bucks.



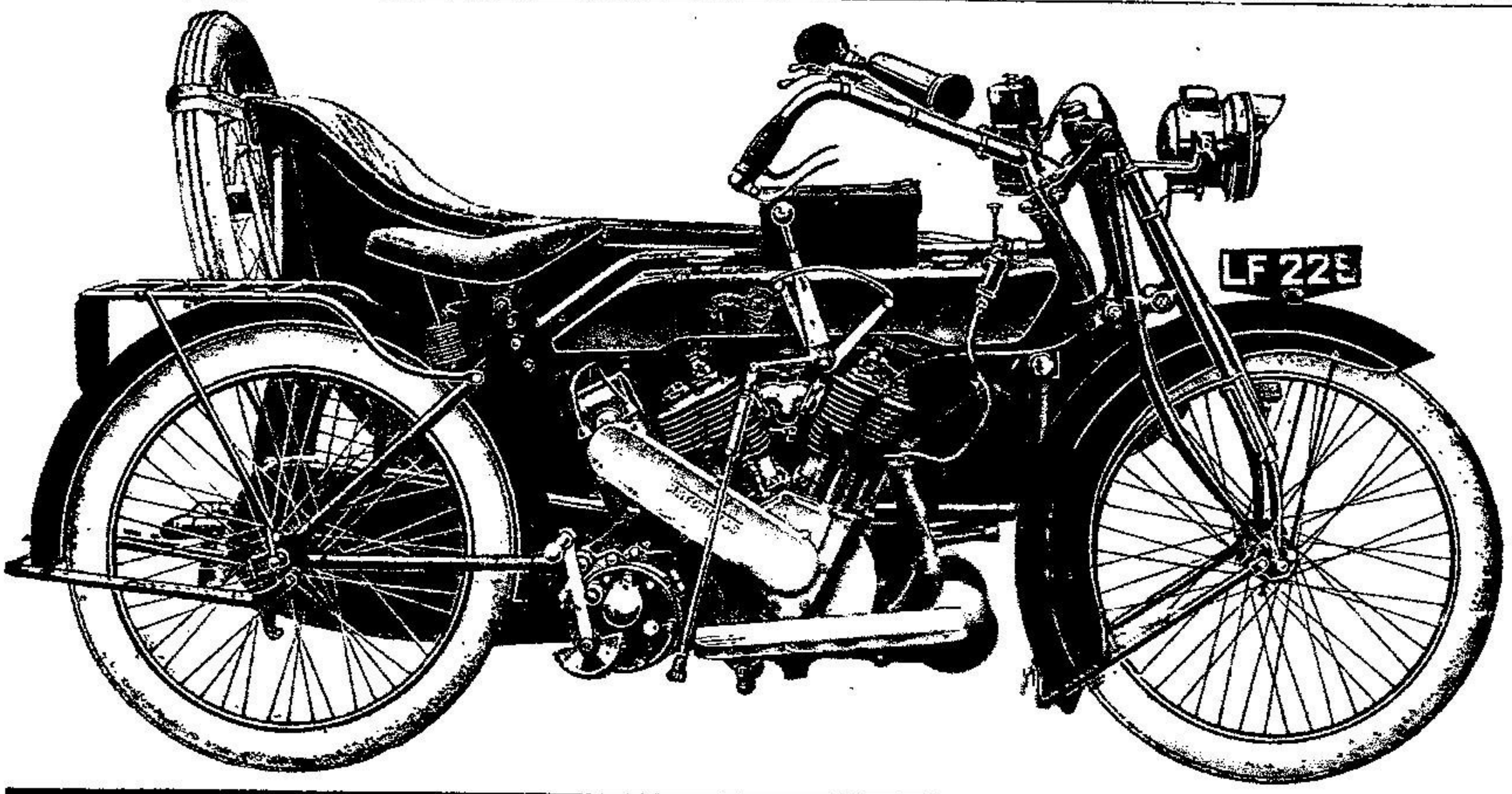
A picturesque scene near the southern entrance to Lake Windermere at Newby Bridge. Hundreds of motor cyclists will recognise the spot, which may recall to many the happy touring days of old. The sidecar is a 5-6 h.p. A.J.S.

B



A picturesque scene near the southern entrance to Lake Windermere at Newby Bridge. Hundreds of motor cyclists will recognise the spot, which may recall to many the happy touring days of old. The sidecar is a 5-6 h.p. A.J.S.

B



THE WAR MODEL

Matchless

THE PERFECT PASSENGER MOTORCYCLE

BRIEF SPECIFICATION.

Special 8 h.p. J.A.P. Engine—Improved Girder Pattern Spring Forks—Countershaft 3-speed Gear—Silent Chain Drive—Patent Quick Detachable Wheels (including Spare Wheel)—3 inch Tyres on all Four Wheels—Extra Long Sidecar Body—Folding Luggage Carrier—5 inch Mudguards.

We are now in a position to supply a number of these famous models. Orders will be executed in strict rotation.

Place your order NOW to ensure PROMPT DELIVERY.

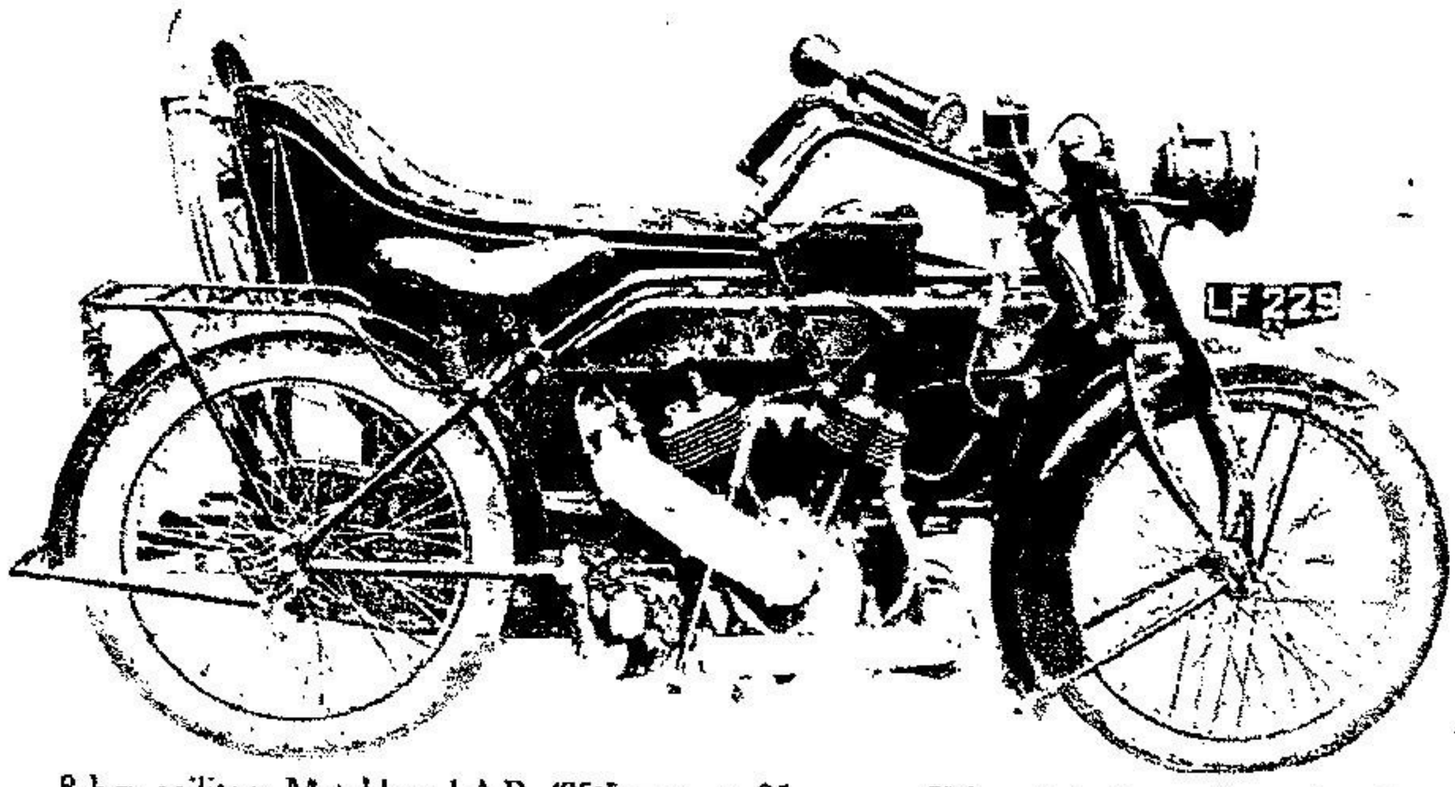
Write for full Particulars to "DEPT. W.M.",
H. COLLIER & SONS, LTD., PLUMSTEAD, S.E.18.

THE MATCHLESS MILITARY MODEL.

Another Machine Strengthened and Adapted to the Requirements of the Russian Army.

FOR some time we have known that Messrs. H. Collier and Sons have been the recipients of an order for several hundred sidecar outfits for the Russian Government, and, hearing last week of their completion, we took an early opportunity of inspecting one of these machines with a view to adding it to the long list of Russian military machines with which we have dealt. During the last two years we have become so well accustomed to describing machines which were not intended for sale to the general public that it is quite refreshing to learn that a certain number of these machines will be available for private distribution.

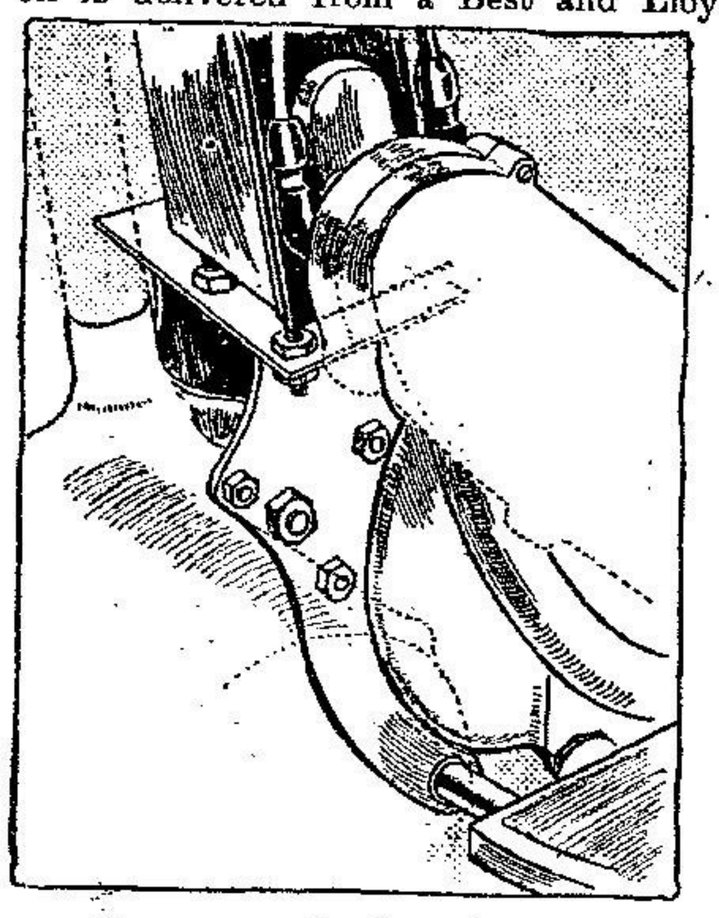
This new and powerful Matchless sidecar will be known as the 8B2/M Russian military model. It is an excellent outfit, which, while presenting no very startling innovations, is a sound and practical job, calculated to give absolute satisfaction under the most trying conditions. It is a curious yet absolutely rational conglomeration of features peculiar to the already-described flat twin and the M.A.G. engine models, and it must be borne in mind that this machine has been built to specifications drawn up by the Russian military motor cycle experts.



8 h.p. military Matchless J.A.P. (85·5 mm. × 85 mm. = 976 c.c.) built to the order of the Russian Government.

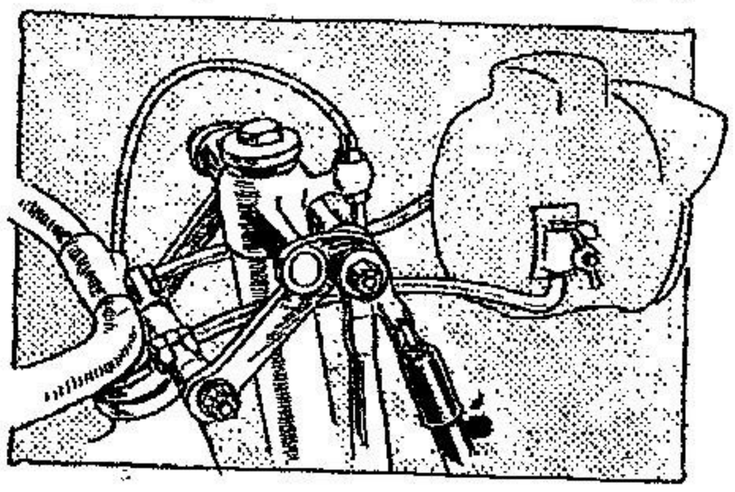
The Power Unit.

The source of power in this military model is derived from a standard 8 h.p. V-twin J.A.P. engine, having a bore and stroke of 85.5 mm. × 85 mm., and following the latest J.A.P. practice throughout. The lubrication is automatic, while extra oil is delivered from a Best and Lloyd combined pump and drip feed, the oil pipe having a branch near the crank case union by which oil can be fed direct to the clutch.



New magneto bracket and platform.

The Dixie magneto is chain-driven, and is carried on a bracket forming part of the steel plates bolted to the frame lugs and serving to hold the engine in position. An extension of the engine plates serves to carry the platform to which the magneto is bolted, and the magneto itself is held by bolts, which enable it to be raised or lowered.



The special lamp bracket. Note the lugs on the horizontal tube of the spring fork.

The carburetter is the standard form of two-lever Amac, fitted with a warm air intake, which has been a feature of Matchless motor cycles for some years.

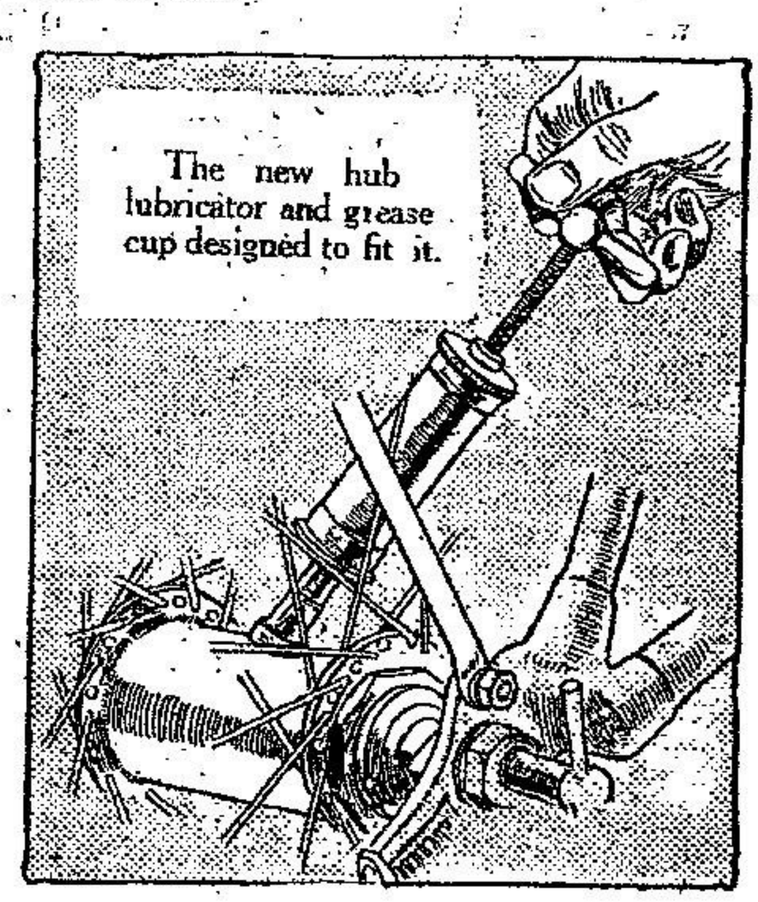
The clutch actuating mechanism, gear box, and totally enclosed chain transmission, including the silent chain drive from engine to gear box (a feature of the M.A.G. and H models), are retained, while the silencer, instead of being of the pattern usually provided with Matchless sidecar combinations fitted with J.A.P. engines, consists of the larger expansion chamber and long extension pipe.

Other features which have been common to the model H are the exceptionally wide and efficient mudguards, the guard to the front wheel having excellent side shields. From the later model H the new type of gear lever quadrant and the improved handle-bars have been adopted. As is the case with the later type of Matchless sidecar combination, all wheels are detachable and interchangeable, but in the new Russian machine there has been fitted a special lubricator designed to allow the spout of a grease gun to fit it exactly, so that an ample quantity of lubricant can be injected under high pressure. It is especially essential that these hubs receive sufficient grease, as not only does the injection force out and exclude grit, but it enables the wheels to be easily and quickly detached, whereas lack of lubrication causes sticking and rust. A comfortable Brooks saddle and footrests assure comfort and good control for the rider, though the handlebars necessitate rather an upright position for rough riding.

The lamp bracket, specially made by Collier and Sons for either Lucas electric or acetylene head lamps, is worth mentioning, as it bolts direct on to lugs forming part of one of the horizontal front fork tubes. The sidecar, which is bigger than standard, is provided with a strong and roomy luggage carrier, and mounts the spare wheel at the rear. The sidecar body is suspended on spiral springs, but the Matchless system of springing the sidecar wheel is not incorporated in this model. The sidecar frame is of great strength, and is suitably trussed to preserve rigidity.

On every machine instructions are printed in Russian on the top of the tank, the latter being of ample dimensions, and is provided with large filler caps, that to the petrol compartment being glass-topped.

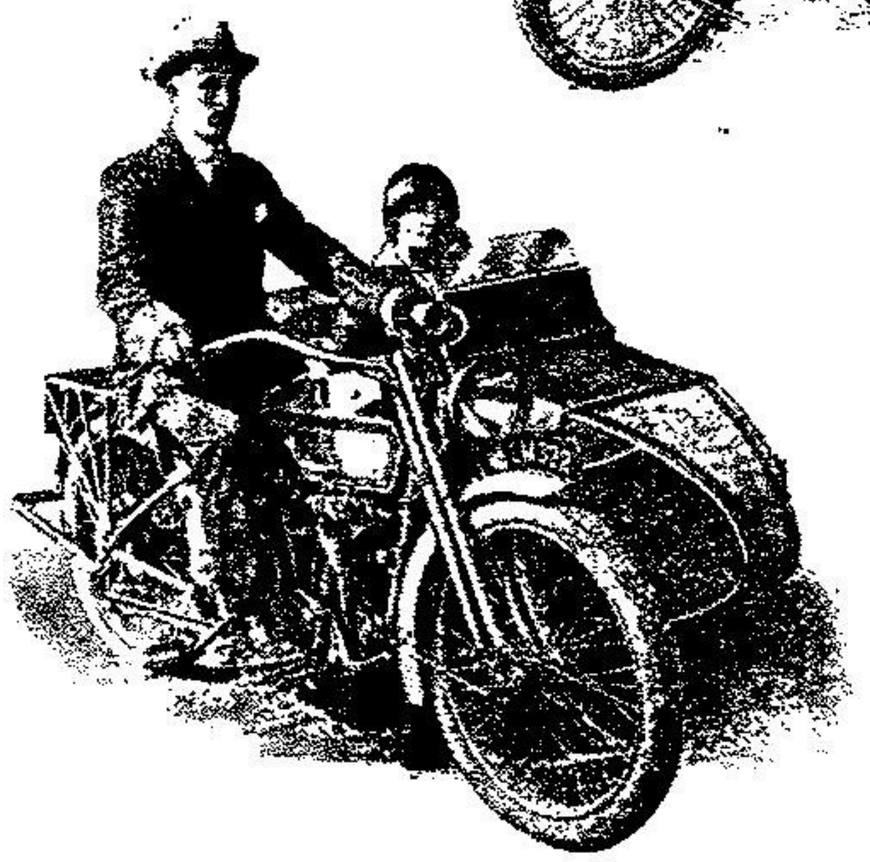
Altogether the machine has been thoroughly well thought out, and though not perhaps quite so comfortable as the pre-war 8B model, it is a really serviceable mount.



The new hub lubricator and grease cup designed to fit it.

PROMISING FUTURE FOR THE MEDIUMWEIGHT OUTFIT.

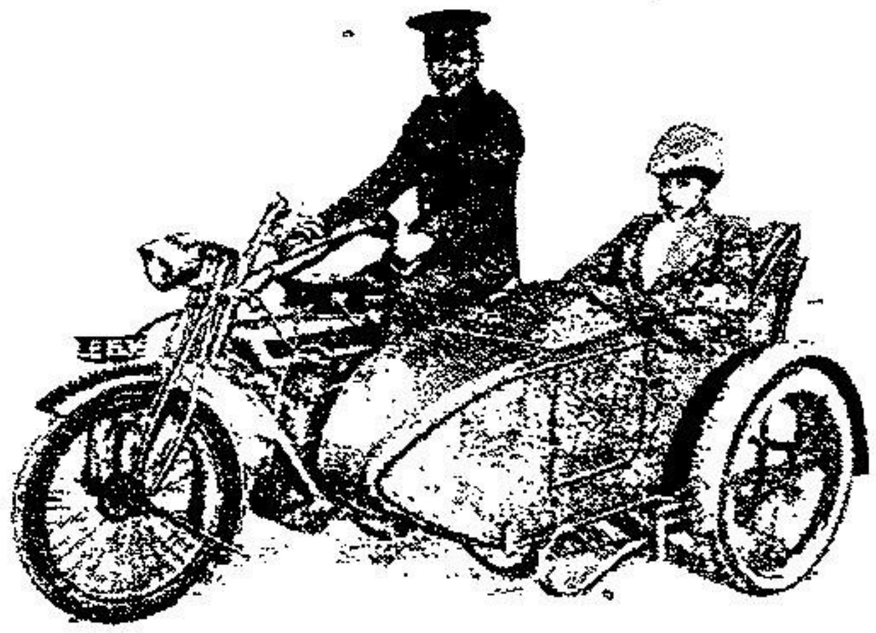
EVERY phase of the sidecar question has been extensively dealt with in this journal. The usefulness of the featherweight attachment for low powered machines, and as a winter stabiliser, has been discussed at length, and the advantages and disadvantages of the luxurious outfit, its proper design, and so on, have long occupied the minds of practical riders and writers. But it is customary to consider the matter from the standpoint that there are only three types of sidecar in the running: (1) the lightweight attachment, which can be attached or taken off in a few minutes; (2) the mediumweight touring sidecar, for attachment to the popular 3½-4 h.p. single; and (3) the heavyweight, for attachment to the 6 or 8 h.p. twin. The latter is considered as a permanent fixture, and, being such, it does not very much matter, from the point of view of most riders, how much weight be piled on in the way of strengthening tubes, etc.



In the following article my object is not to decry the heavyweight sidecar outfit, which has given excellent service, but merely to discuss the growing possibilities of a type which, while offering the same advantages as the heavyweight, is not unnecessarily heavy and cumbersome

I use the word "unnecessarily" with due consideration. It is a proved fact that the greater the weight of the outfit the more massive must be not only the connections between the motor cycle frame and the sidecar frame, but also the frames themselves.

In order to reduce the weight of the sidecar outfit, then, one must begin with the motor cycle. The system of attempting to reduce the weight of an outfit by fitting a featherweight sidecar to a heavy machine of 5 or 7 h.p. is entirely wrong. As stated in a recent leader in this journal, the motor cycle and the sidecar must be properly proportioned as regards weight and strength, which brings us back to the point under discussion—that the whole weight of the outfit is decided by the motor cycle. If the motor cycle is heavy, the couplings and frame members throughout must be strong and massive, since half the strains on the sidecar are the result of the work it does in supporting the motor cycle. Thus, as so many have found to their cost, a featherweight sidecar attached to a heavy machine invariably gives trouble as regards couplings, etc., unless it be of exceptionally



TYPES OF POWERFUL *DE LUXE* SIDECARS.

7 h.p. Matchless and 7 h.p. Harley-Davidson combinations, typical British and American productions.

The Power and Weight of Sidecars.—

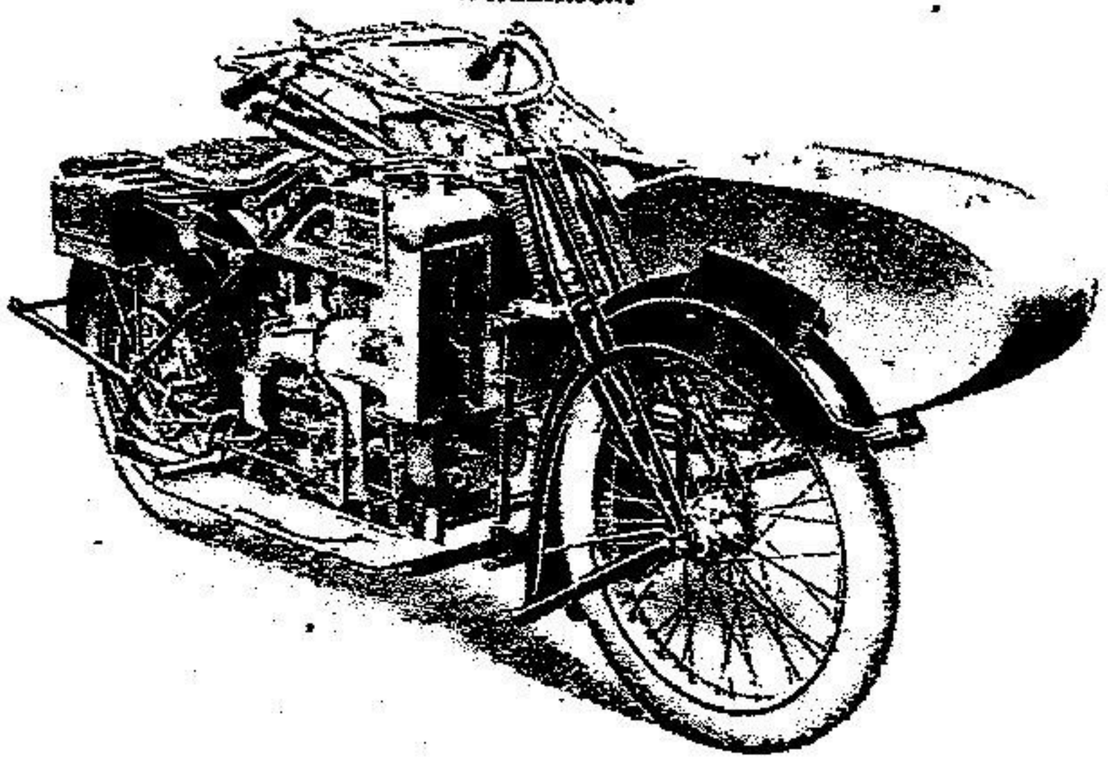
good design and construction. It is invariably difficult to keep in correct alignment, and very often the curved members between the motor cycle and the sidecar frame yield to the strains imposed upon them.

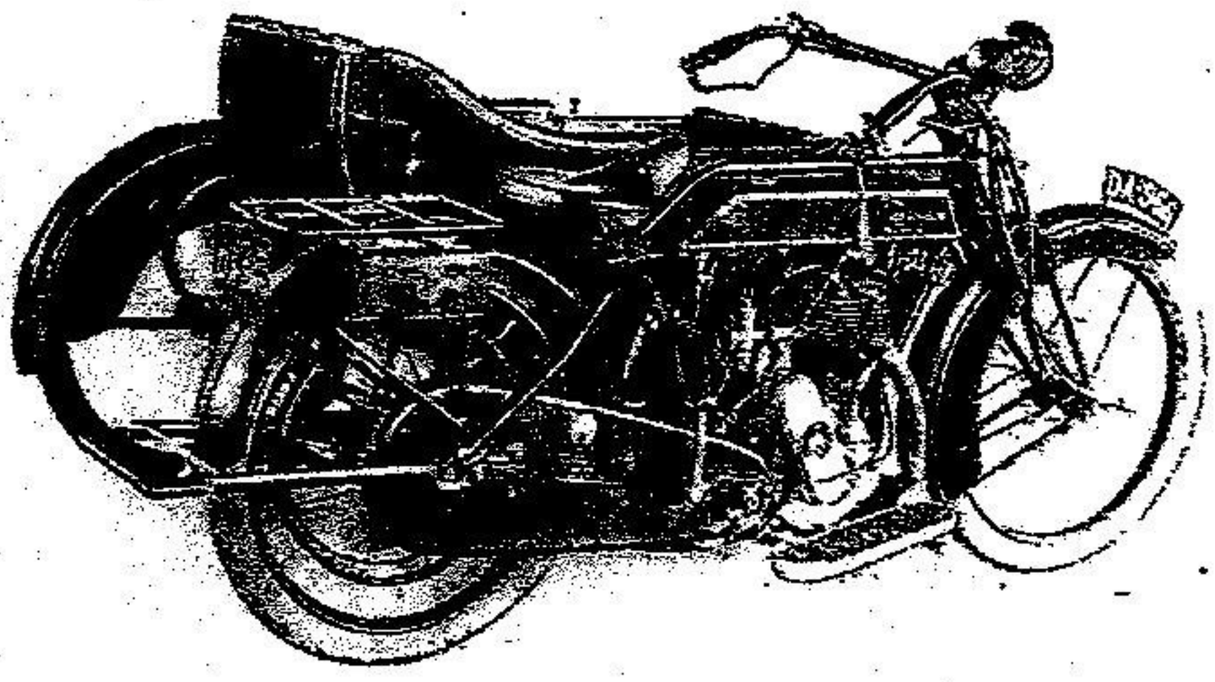
Use a featherweight body by all means, but the sidecar chassis must be proportionate to the motor cycle, the weight of the body and the passenger it carries being one of the least important factors.

While on this point, I have often wondered why many manufacturers, particularly of lightweight sidecars (which call for highly efficient design), employ curved tubes when a straight tube design is equally adaptable. Take, for instance, the front tube connection, which is often arranged as shown in the sketch overleaf with its weak bend, when a straight triangular steel rod connection on the lines also shown would eliminate this weakness.

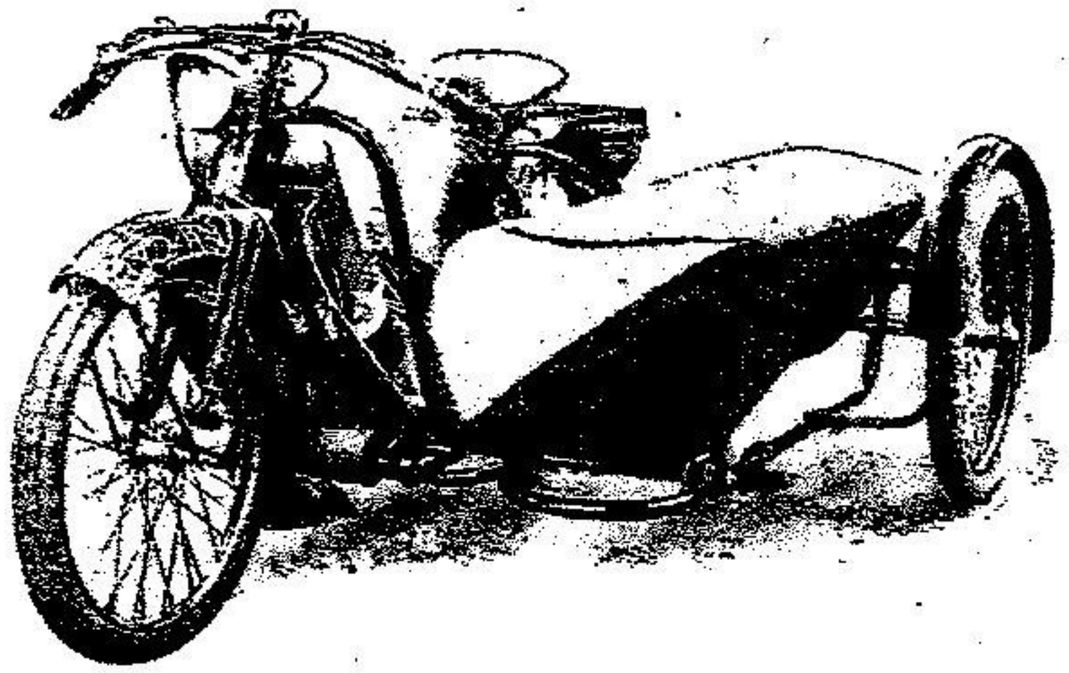
TYPES OF SIDECAR OUTFITS.

A heavy and powerful combination, the 8 h.p. water-cooled Williamson.

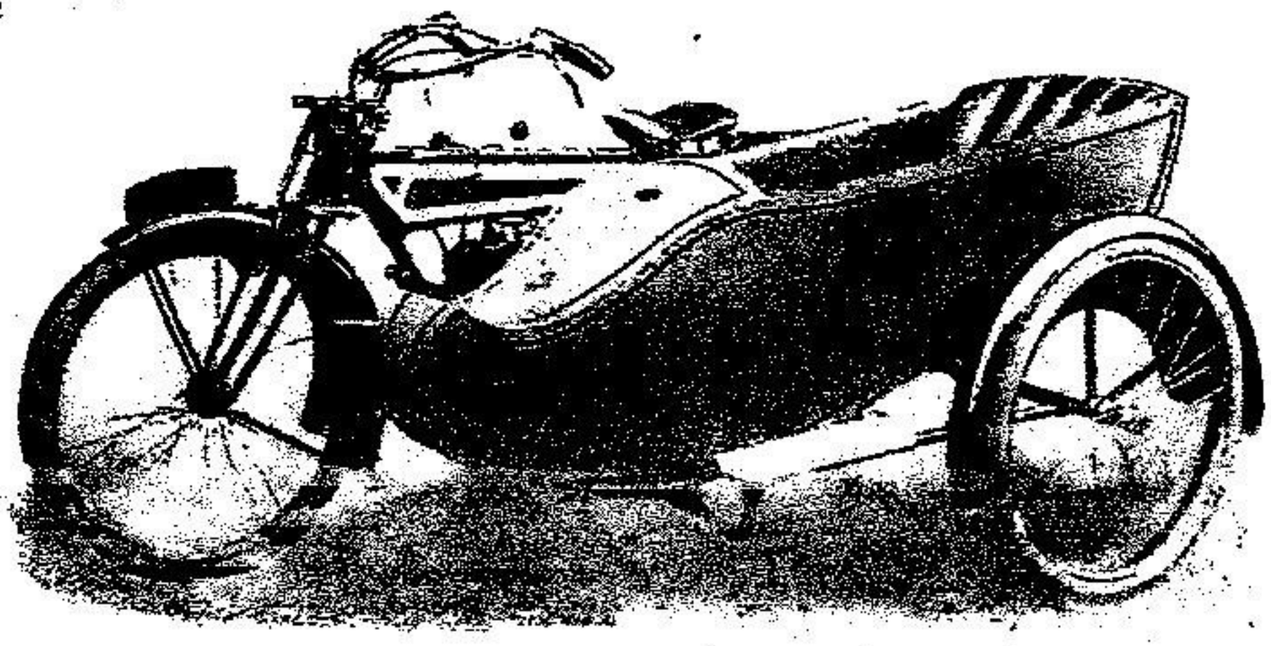




The mediumweight, the type favoured by the writer.



A T.T. Scott equipped with a sporting sidecar body, the chassis representing a reasonable compromise in strength and lightness.



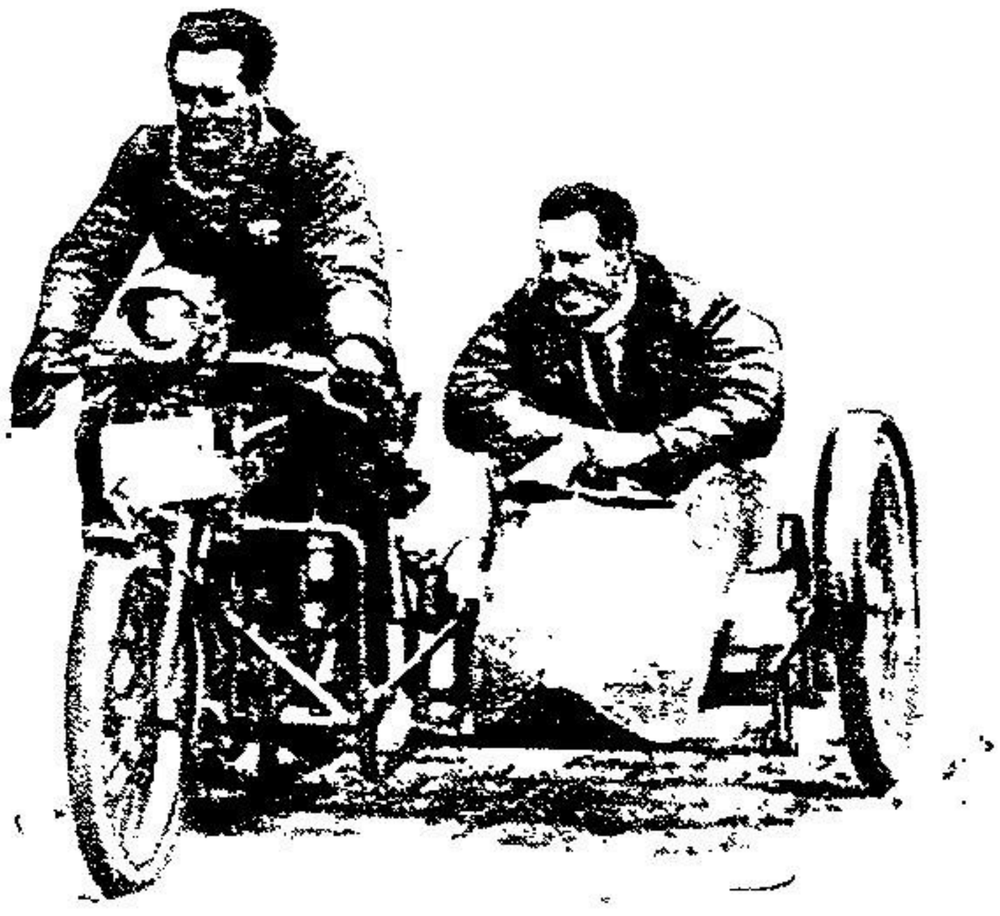
A 7½ h.p. A.J.S. outfit, to which is attached a Newham featherweight sidecar.

Quite apart from the question of weight there are, however, two other points which enter into the decision. The first of these is power. Nothing tests the strength of sidecar couplings so much as rapid acceleration, chiefly because the couplings are so often designed without any thought for this important factor. But acceleration can be met by straight tube design; in other words, 90% of the load that imposed could, theoretically, be taken by a fine steel wire, placed in the proper position, and in as direct a line as possible between the front portion of the motor cycle and the hub of the sidecar wheel. If indeed it were possible to run a steel wire direct from the front bracket of the motor cycle to the hub of the sidecar the question of pull need not enter into discussion at all. The second deciding factor, the sweetness of the transmission system, applies chiefly in the case of a single-cylinder machine. A little jerking at low speeds imposes strains upon the sidecar couplings (which, of course, means the sidecar chassis and also the motor cycle frame throughout) equal to "half a mile" of rapid but smooth motion on a machine of double the power. Thus the pull of a 3½ h.p. single with harsh drive would probably impose greater wear and tear on its sidecar and frame than an 8 h.p. twin of the same weight but transmitting a smooth torque.

Rigidity.

Let us take it, however, that in the modern machine all transmission shocks are damped out. We come now to the very loosely used term "rigidity." We do not want rigidity in a sidecar outfit. The more rigid it becomes, the greater the need for strength, which is inseparable from weight—inseparable because we are dealing with an unmechanical machine, which cannot be adapted to straight tube, triangular design (unless we depart entirely from the principles under discussion). Therefore, in entering into the question of present-day machines, I bear towards Dr. Lewis' idea expressed in *The Motor Cycle* of supple sidecar frames, built on aeroplane lines, having enough give in their members to relieve the whole structure of those terrific breaking strains and jolts which occur on encountering, for instance, a string of pot holes when taking a right-hand corner [illegible] the strain falls

The Power and Weight of Sidecars.—



A 5 h.p. Ariel outfit possessing a strong sidecar chassis but fairly light cane body.

on the sidecar couplings and chassis. But if we have spring frame motor cycles and spring sidecar wheels the complete chassis can be made absolutely rigid—the more rigid the better, for it will then be relieved of the breaking strains imposed by bad surfaces, which are a very considerable factor.

Some Interesting Comparisons.

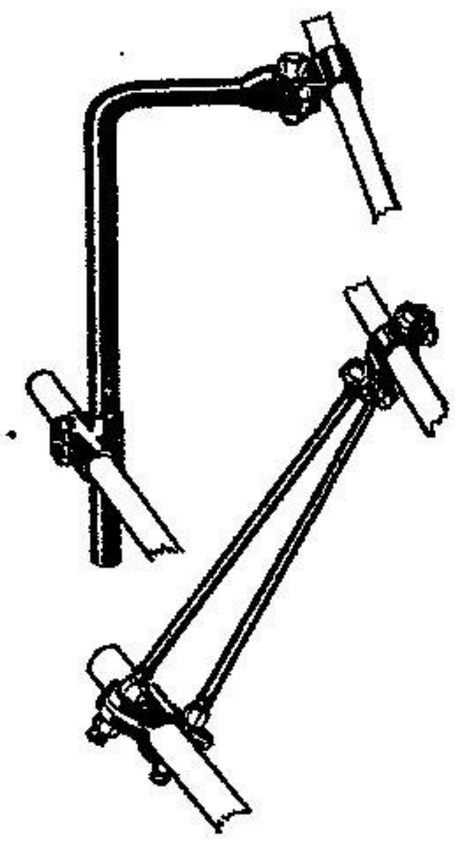
It is time to get away from the notion that a comfortable body necessitates an excessively heavy motor cycle. This principle is all right so far as it goes, but it is the wrong basis on which to work, for weight necessitates still greater weight. That is, the heavy cycle requires heavy couplings and a heavy sidecar frame to support it, which, in turn, means that the motor cycle frame must be stiffened up and strengthened, and a big powerful engine used to propel the ultimate outfit. It was on these lines that some of the heavy outfits of pre-war days came into being.

The table given below gives interesting running comparisons as regards weight-h.p. ratios. The two high-powered machines are equipped with all spares and accessories, it being taken that one reason why a rider chooses a machine of this type is that it enables him to carry such refinements.

WEIGHT (FULLY EQUIPPED) PER CUBIC CAPACITY.

Machine.	Weight of Machine.	Weight of Sidecar.	Total Weight with Passengers.	Weight, lb. per cub. cm.
	lb.	lb.	lb.	
7 h.p. electric (1,000 c.c.)	380	300	960	.96
6 h.p. (770 c.c.)	365	275	920	1.19
4 h.p. modern flat twin (620 c.c.)	260	160	700	1.13
4 h.p. T.T. single (550 c.c.)	240	100 (featherweight)	620	1.12
3½ h.p. touring single (490 c.c.) ..	260	130	655	1.31
2¾ h.p. T.T. single (349 c.c.)	190	95 (featherweight)	565	1.61

The 7 h.p. outfit of course tips the beam, and is the best powered of the bunch; against it the popular 6 h.p., similarly equipped except for electric lighting set, shows up rather badly. It will be observed that the 4 h.p. T.T. single with featherweight sidecar, and also the 4 h.p. modern flat twin with mediumweight touring sidecar, are both better powered than the popular 6 h.p. heavyweight outfit, while the 3½ h.p. touring single and the 2¾ h.p. lightweight are both obviously overloaded. The figures illustrate the fact that there is very little to be gained in paying for oil, petrol, and tyres for an outfit weighing 640 lb., when one weighing 420 lb. is as well powered.



(Top) A common design of sidecar front connection, the weakness of the bent tube being obvious. (Bottom) This weakness could be eliminated by the use of a triangulated steel rod connection.

It may be clear by now that I am advocating sidecar outfits on the lines of the 3½ h.p. Brough or 4 h.p. Douglas, weighing about 230-260 lb., and allowing 100-140 lb. for the sidecar, in preference to the huge 6, 7, and 9 h.p. outfits, the sidecars alone of which may weigh close upon 300 lb. Personally, I would put the minimum h.p. at 4, but we can expect higher efficiency after the war. What is even more to the point than anything else is the fact that, while one type of machine is ideal for solo use, the other is quite hopeless except with its massive sidecar attached.

Some may contend that the modern highly efficient engine does not lend itself well to sidecar work because it will not "slog," but with present-day gear boxes slogging is a thing to be avoided rather than looked for.

An outfit on the lines suggested would probably prove considerably faster on a long journey than a more heavily engined outfit, both carrying weight in proportion with their power, and I firmly believe that the post-war sidecar outfit de luxe will be of the highly efficient mediumweight order—not flimsily light, nor yet unnecessarily heavy. CHINOOK.

A 6 h.p. Enfield sidecar on the road.

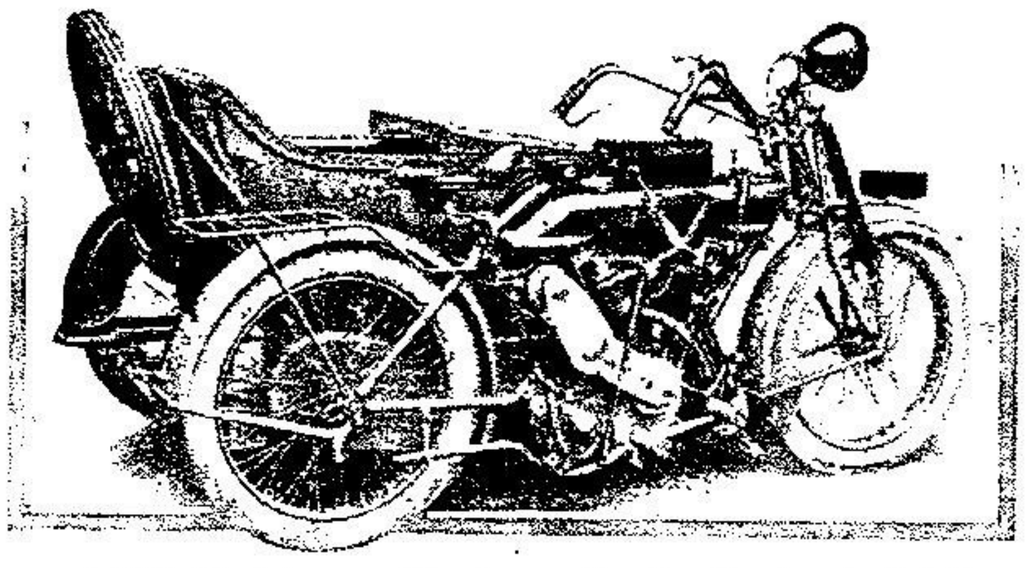
A RUN ON A 1916 7-9 h.p. MATCHLESS.

THIS machine was no manufacturer's specially tuned demonstration model, but a hard-worked hack belonging to a friend, which had had a season's wear. It was a fine autumn day, and as our course lay in the teeth of a south-westerly gale the engine was hard put to it for forty miles, but behaved splendidly. It would have done better had not the clutch been over-lubricated: this was caused by the relief pipe from the crank case throwing too much oil on to the chains and clutch—a fault which could have been easily remedied by closing the pipe a little. Despite this slight inconvenience the machine travelled extremely well and good time was made.

The Matchless halts beside an old windmill. These picturesque landmarks are rapidly falling into disuse, and the little country miller may in a few years cease to be.

Some Facts about the Engine.

The M.A.G. engine with which this outfit is equipped deserves the highest praise. It was not extraordinarily fast, but was a good puller, capable of a high average speed without making the slightest fuss, and totally devoid of all clatter and valve noises which are far too prevalent in many motor cycle engines. At 20 m.p.h. it was inaudible, and at higher speeds practically so, while the exhaust was quiet, though in no way throttled unduly. In short, the machine was one which a considerate driver would rejoice to use. Few people know how to remove the inlet valves of an M.A.G. engine. After the inlet dome has been removed the valve, if the motor has been run a long time since last taken down, will be found so firmly fixed as to be apparently immovable. If an attempt be made to lever the valve complete out of its seating the cage will probably be irremediably damaged. The process of removal is simplicity itself when once the procedure has been explained. Having taken away the exhaust spring the stem of the exhaust valve should be lifted until the head is found to be touching the inlet; next a nut or anything which will form a suitable distance-piece should be inserted between the bottom of the exhaust valve stem and the tappet, and the engine should be rotated, when the exhaust valve will push the inlet out.



A 1916 Matchless combination equipped with electric lighting set and interchangeable spare wheel. The engine is a 7 h.p. M.A.G

A SHORT TRIP ON A POWERFUL AND COMFORTABLE MACHINE.

The particular engine referred to is fed with gas by an ordinary two-lever Amac carburetter, which is absolutely and entirely automatic. The air lever is permanently closed and is only moved to stop the engine. Occasionally, on very warm days, the engine can be persuaded to take a little air when travelling fast, but this is a very rare occurrence. This setting of the carburetter has been brought about by two factors—the fitting of the smallest jet the engine would take, and the extraordinary accuracy of the workmanship of the engine generally, which renders all joints perfectly gas and airtight. Of course, nowadays many two-lever carburetters are, to all intents and purposes, automatic in action, but the air lever is kept open instead of closed as in the instance mentioned above.

Mechanical Details.

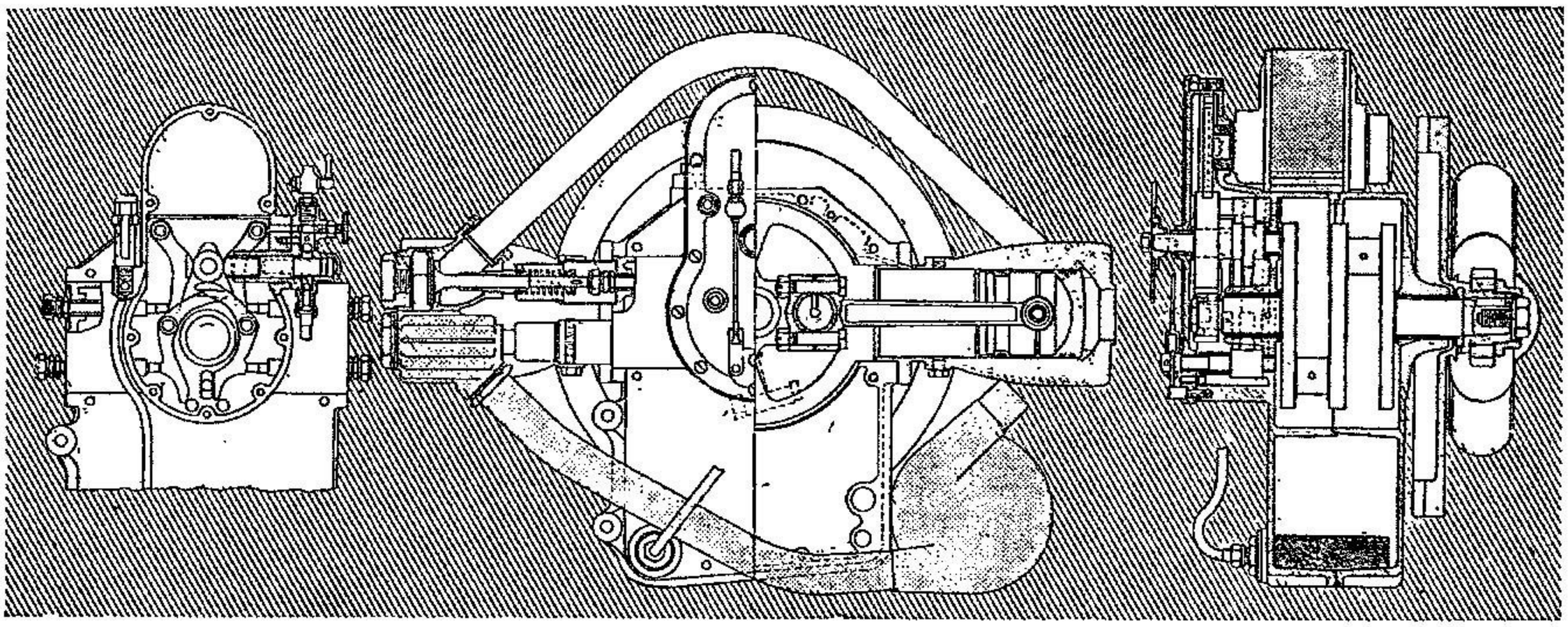
To return to the machine in general; the change-speed was excellent and the clutch sweet in action, but the method of the control of the latter would have been better appreciated had the actuation been by a simple pedal similar to that working the brake and placed on the opposite footrest to that on which the brake control is situated. The other criticism is touching the handle-bars, which in the writer's opinion might be a trifle wider. Notwithstanding this fact the combination steered remarkably well, and even in unaccustomed hands proved a real pleasure to drive in traffic on account of the controllability of the engine and the excellence of the brakes.

The sidecar, the wheel of which is sprung, was luxuriously comfortable, and altogether the machine is one calculated to satisfy the most critical expert. Our return journey was made with the gale in our favour. Despite the fact that good time was made on the open stretches of road the throttle was only opened on hills. In the meantime, however, the new Matchless flat twin claims first attention, and when the factory of Messrs. Collier and Sons at Plumstead, resumes its normal state the Matchless sidecar promises to become increasingly popular.

ATO

THE MATCHLESS FLAT TWIN ENGINE.

Some Observations on the Mechanical Details. Aluminium Alloy Pistons Successlully Used.



MECHANICAL DETAILS OF THE MATCHLESS 5-6 h.p. FLAT TWIN ENGINE, 70 mm. × 95 mm. = 732 c.c.

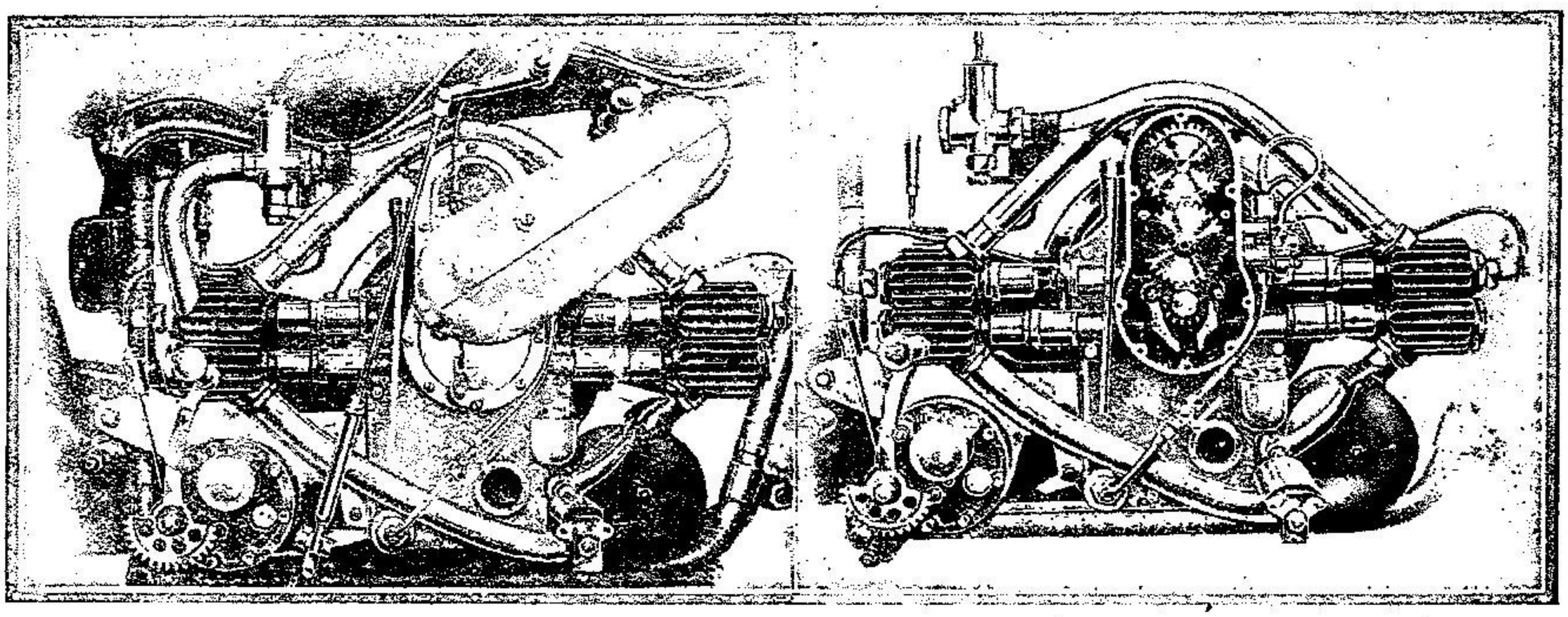
(1) Arrangement of valve gear, and cam operation of lubricating pump.

(2) Part section and side elevation of the engine.

(3) Vertical section on centre line, showing magneto drive and oil sump.

IN the issue of *The Motor Cycle* for November 16th, 1915, we published a full description of the new Matchless sidecar combination, and as the power unit is a distinct departure for this firm a few observations on the mechanical details and minor points of design will undoubtedly be of interest to our readers. The bore and stroke of this new engine are 70 × 95 mm. = 732 c.c., and the makers' rating 5-6 h.p.

One of the latest innovations is the adoption of aluminium alloy pistons, which, so far, Messrs. Collier and Sons, Ltd., have found to be most successful. These pistons are provided with two rings, and in the skirt a scraper ring is fitted, which allows increased oil pressure to be used without the accompanying disadvantage of oiled plugs. Each piston weighs only 18½ oz., including the rings, and is longer than the pistons usually employed in motor cycle practice, being 3⅜in. in length with a bore of 2¾in. This unusual length of piston is found necessary when aluminium alloy is used. There are six ribs underneath the head and an annular rib joining the two bosses taking the gudgeon pin, the object being to strengthen the piston, to radiate the heat from the piston head, and to preserve its truth by preventing distortion.



Timing gear side of the new 5-6 h.p. flat twin Matchless. Observe carburetter hot air collector, and position of dynamo and its enclosed drive.

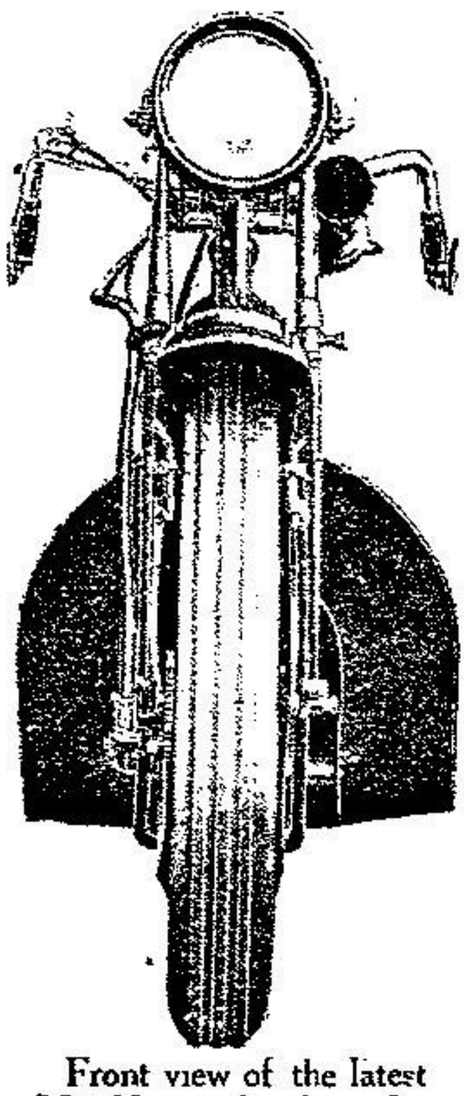
The engine with magneto drive and timing gear cover removed. The oil inspection window and also the feed pipe from the sump are discernible.

The Matchless Flat Twin Engine.

The connecting rods are somewhat short, being 7in. in length, this having been found necessary to keep the horizontal twin engine within reasonable dimensions.

The compression, though not abnormally low, is somewhat less in the case of this engine than in average touring types. All bearings are plain, as it has been found that with the forced system of lubrication ball bearings, which are usually adopted in flat twins to overcome the difficulty of lubricating, are not necessary.

The idea of fitting overhead valves was given up, as it was found that this would have involved an engine of too great a length, and the present system is more convenient. As regards the valve gear, experiments are being made with fibre timing wheels, a special kind of fibre, which is claimed to withstand both heat and oil, being employed. The valve guides of case-hardened steel are forced into the cylinders, and have the advantage of possessing excellent wearing qualities.



Front view of the latest Matchless, showing the sensible leg shields, which are extended under the engine and gear box, as shown in the lower illustration.

The Lubrication System.

To revert to the lubrication system, it was found desirable to fit a large sized pump, the surplus being returned by a by-pass, as a smaller pump, though large enough to carry out its duties effectively when the engine was warm, would not act efficiently when the oil was thick and cold. The present plunger feeds the lubricant well at all speeds. The main bush is provided with an annular groove and a passage leading direct into the flywheel boss, so that any excess of oil is carried *via* this passage to the chain case. There is a plug on the cylinder head, the same size as the valve caps, through which the engine may be decarbonised. This appears to be an excellent feature.

Provision for Cooling.

A large space is left between the cylinder and valve ports, while the longitudinal fins are excellently finished, and are a fine example of founders' work.

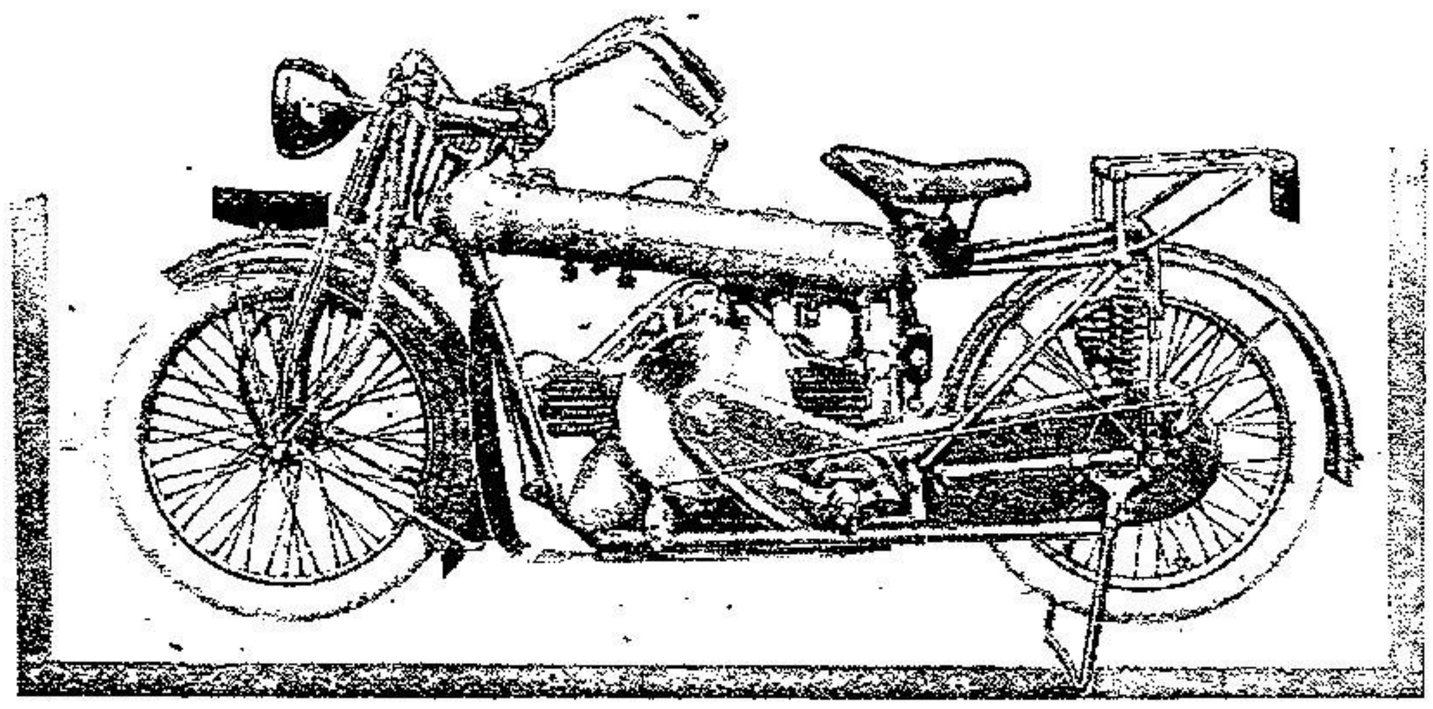
In the latter design the bosses for the compression taps have been discarded, as it has been found that the engine never gums up, and an injection of petrol is quite unnecessary. Owing to the excellently balanced flywheel and engine throughout, no transmission shock absorber is considered necessary. Messrs. Collier and Sons have found that in practice the side-by-side valve engine is smoother running than an engine fitted with overhead valves.

Valve Covers.

The accompanying drawings give a clear idea of the general construction of the unit, showing one of the valves in section, and over the other the valve spring protector, which is of telescopic pattern. A good idea of the long piston can also be obtained, as well as the shape of the radiating fins. The vertical section of the engine shows some interesting features of the lubrication system; for example, the size of the oil sump, the gauze at the base thereof through which the oil is drawn, the oilways cut in the main bearings, and the space referred to showing how the excess of oil from the right-hand bush is led into the recess on the flywheel boss, allowing the oil to leak into the chain case.

Interesting Cam Design.

The drawing of the timing gear is also interesting, showing the single cam actuating one exhaust and two inlet valves, and the cam-actuated plunger pump, together with the by-pass. Between the two exhaust levers is a separate cam, which is employed for lifting the exhaust valves. The Matchless flat twin is certainly an engine possessing novelty and originality, and we hope, and expect, to hear a great deal more to its credit in the near future.

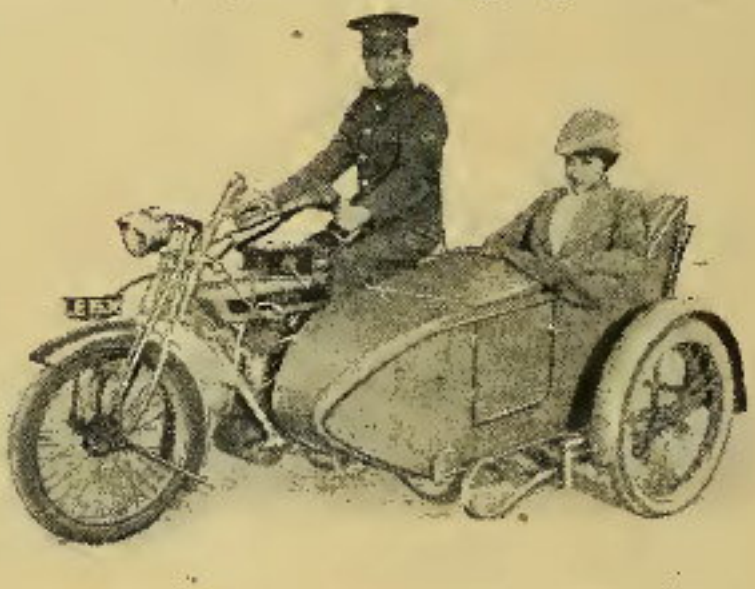


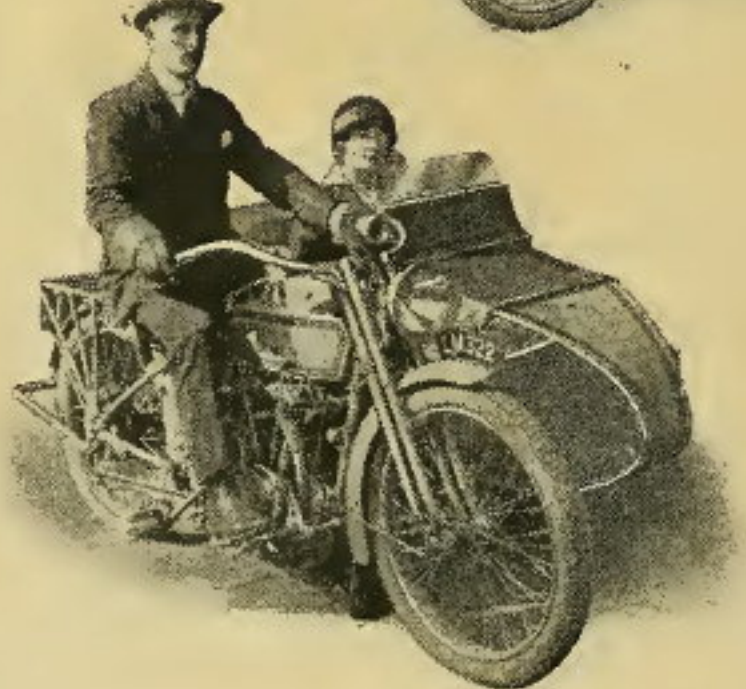
The newly-designed 5-6 h.p. Matchless, which has a three-speed countershaft gear box and transmission by totally enclosed chains.

Piston Ring Pressure.

A WRITER recently stated in *The Automobile Engineer* that he had investigated with a 3½ h.p. engine the pressures exerted on the cylinder walls by the piston rings. The original rings of the engine used exerted a pressure in the test of normally 11 lb. per square inch. For experiment he substituted a weaker set giving a pressure of 8 lb. per square inch, with the result that an increase of five miles an hour road speed was obtained. Tests of this sort, though exceedingly interesting, need to be of a very exhaustive nature if useful information is to be obtained from them, and the question of piston ring pressures is undoubtedly one of sufficient importance to warrant full investigation.

tandpoint that there are
f sidecar in the running:
attachment, which can be
off in a few minutes; (2)
t touring sidecar, for
popular 3½-4 h.p. single;
veight, for attachment to
. The latter is considered
ture, and, being such, it
matter, from the point of
how much weight be piled





TYPES OF POWERFUL *DE LUXE* SIDECARS.

7 h.p. Matchless and 7 h.p. Harley-Davidson combinations, typical British and American productions.

lings and frame member
be strong and massive, si
on the sidecar are the re
does in supporting the m
as so many have found
featherweight sidecar att
machine invariably gives
couplings, etc., unless it

INDEX.

C.

D.

E.

F.

G.

H.

I.

S.

T.

Iliffe & Sons Ltd., London and Coventry.

THE OVERSEAS MOTOR CYCLE.

THE MOTOR CYCLE

1D

Rec'd JAN 1917 P.L.

Largest Net Sale. *Founded 1903.*

COVERS EVERY PHASE OF THE MOVEMENT AND CIRCULATES THROUGHOUT THE WORLD

No. 719. Vol. 18. Thursday, January 4th. 1917. Price 1d.

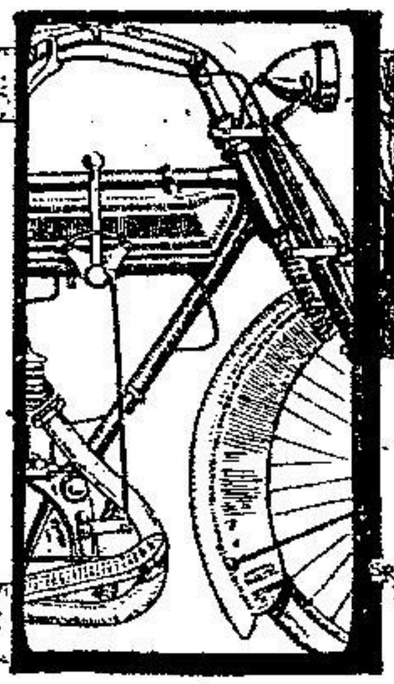
COPYRIGHT—REGISTERED AS A NEWSPAPER FOR TRANSMISSION IN THE U.K. Published Weekly.

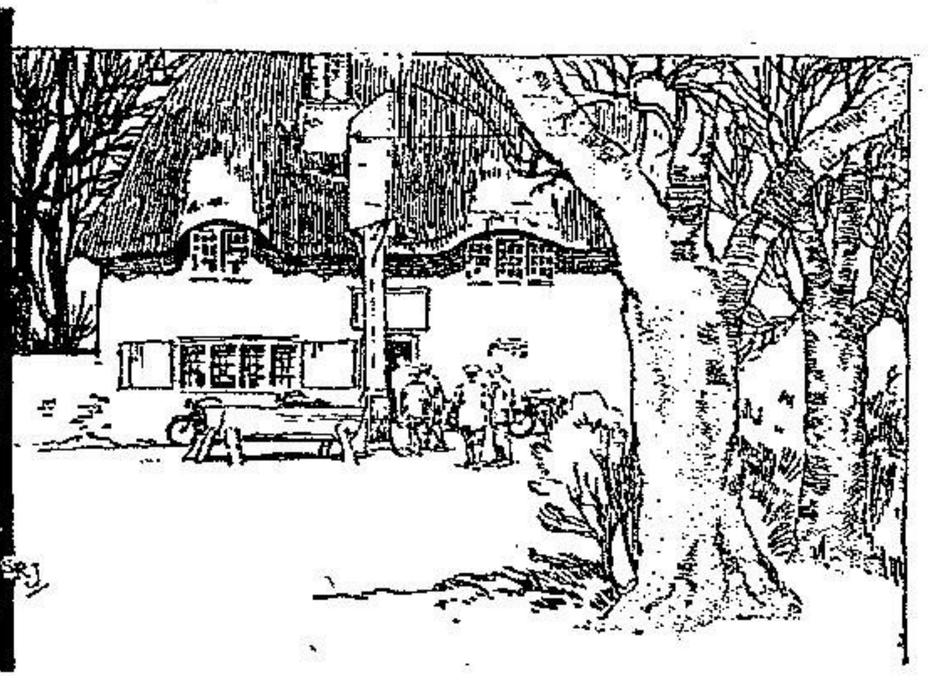
SPECIAL NOTICE.

The Ministry of Munitions has given us permit to supply any motors, erected or assembled up to the 15th February, 1917. If Agents, therefore, are desirous of securing motors which we have coming through the works they could be delivered before that date; after that date we expect no more motors can be supplied for the English market
THE WOLVERHAMPTON ENGINEERING CO., LTD., WOLVERHAMPTON.

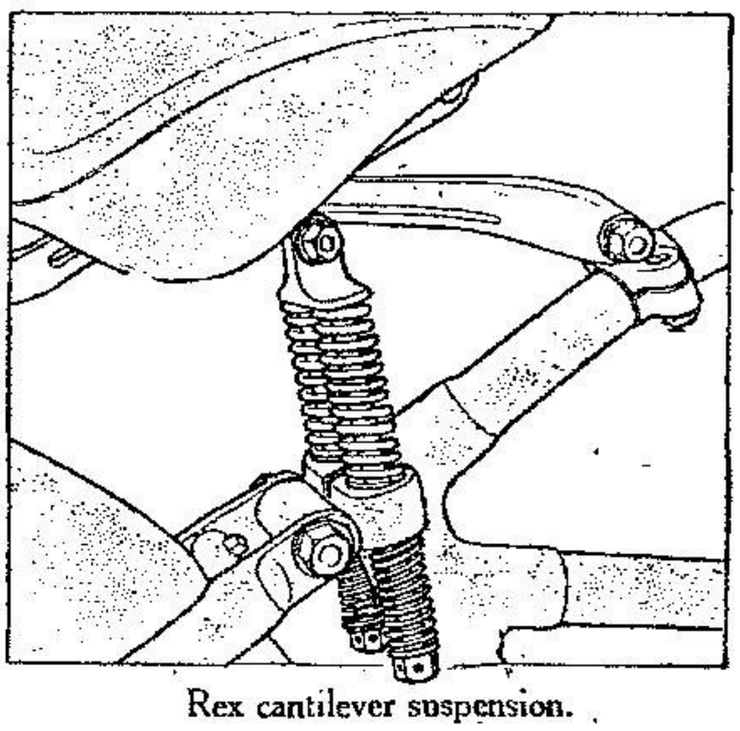
SPRING SEAT-PILLARS.

The Desirability of Comfort. A Good Substitute for an Entirely Sprung Frame.





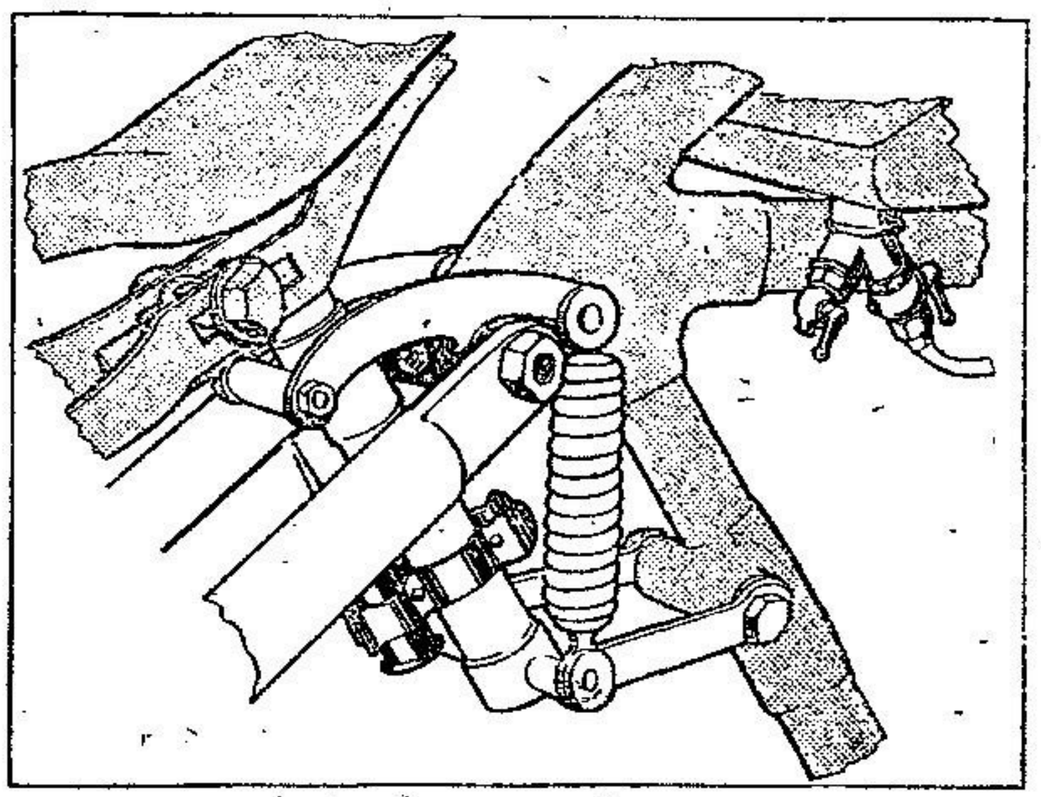
THE ideal spring frame is slow in materialising, but in its absence it is encouraging to note that many makers are endeavouring to render their machines more comfortable by the introduction of spring saddle pillars. Several



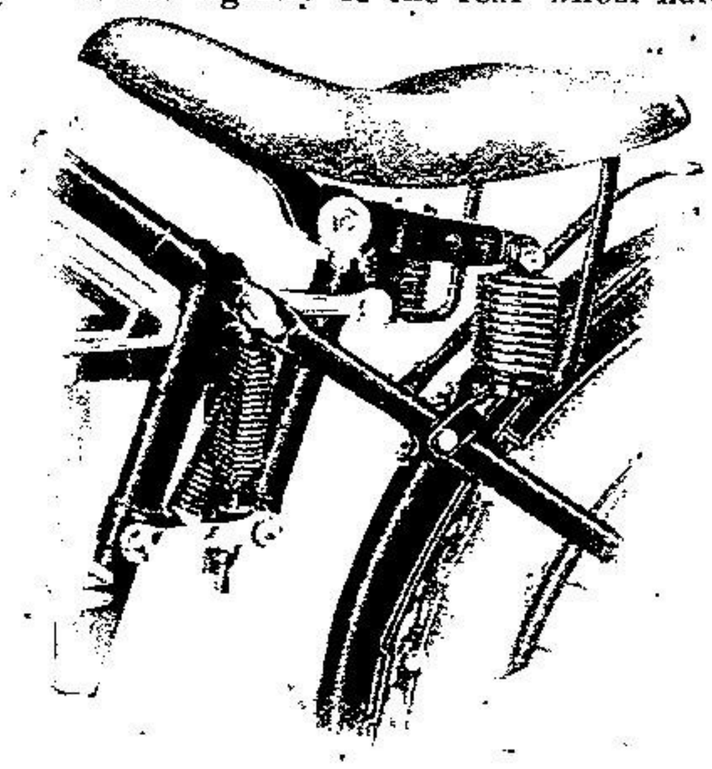
Rex cantilever suspension.

firms have already adopted them as standard, though others still regard them as an "extra." Although this type of springing is not so good as the ideal spring frame would be if it could be evolved, it is certainly a simple way of adding to the comfort of the rider.

In nearly all designs of the fully sprung frame that have so far been manufactured very many difficulties arise. Among other points, the rigidity of the rear wheel has had to suffer, if not at first, as soon as slight wear takes place. Rigidity of the rear wheel is an important point to be considered. Lack of it causes most unpleasant sensations when taking sharp turns at speed or when negotiating difficult stretches of rutty or greasy road. This disadvantage may easily counteract the advantage of increased comfort gained by the springing. The insulation given by the spring seat-pillar, although insulating only the rider from road shocks, at any rate permits the rigidity of the rear wheel to be maintained, and also allows for a simple construction of the frame, which is, of course, an important point if the price of the complete machine is to be kept down. The spring seat-pillar was perhaps one of the earliest attempts to reduce road shocks, and it will be remembered that a most excellent example was on the market incorporated as a standard fitment on the Rex models as early as 1907. Probably the chief disadvantage with the spring pillar is that the riding position is necessarily somewhat higher than it would be with the ordinary saddle attachment, but with the low built frames of to-day this can really be overlooked. Among the many machines now fitted as standard with these extra springing devices—or on which a device can be included if specified—may be mentioned the following leading makes: Clyno, Ariel, A.J.S., Rex, and Leader.



On the latest Clyno a spring saddle-pillar is used, also based on the front fork principle.

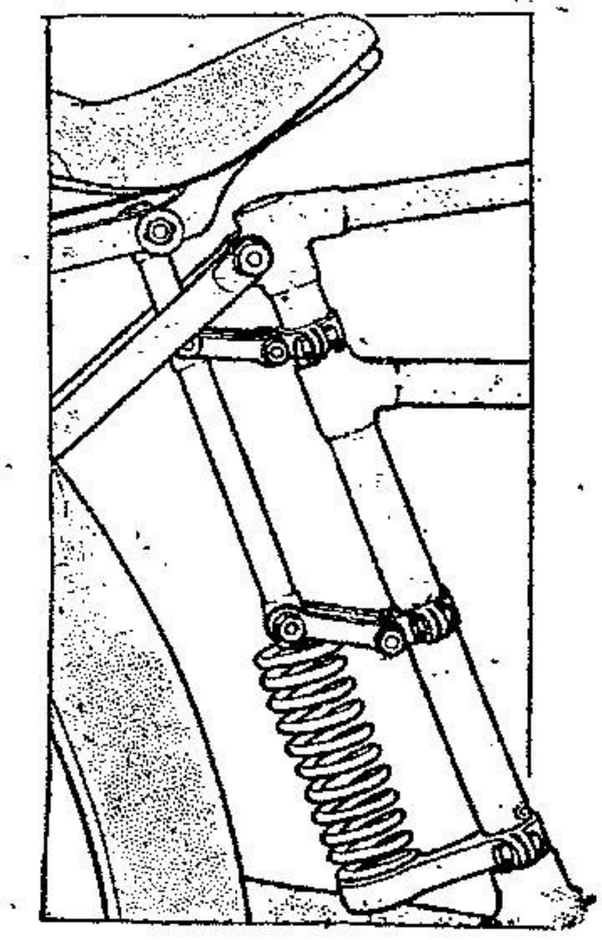


The Ariel saddle suspension is based on front fork principles, the auxiliary seat-pillar being adjustable to various weights.

An Early Model.

The spring seat-pillar fitted to the Rex de Luxe since 1907 is quite a simple affair, and is on the cantilever principle. The tube on which the saddle is carried is hinged at the foremost end, where it is attached to the cycle frame by means of a clip. Amidships are two guide rods, which pass through two guide lugs cast on the saddle lug of the machine. Above the guides are the two main springs, while below are situated two springs to take the rebound.

The Ariel device is on front fork principles, and consists of an auxiliary seat-pillar carried at the rear of the frame saddle tube, to which it is connected by four rocking links. The springing is obtained by two suspension springs, while a third spring is provided to absorb the recoil shocks. The auxiliary seat-pillar is adjustable to a



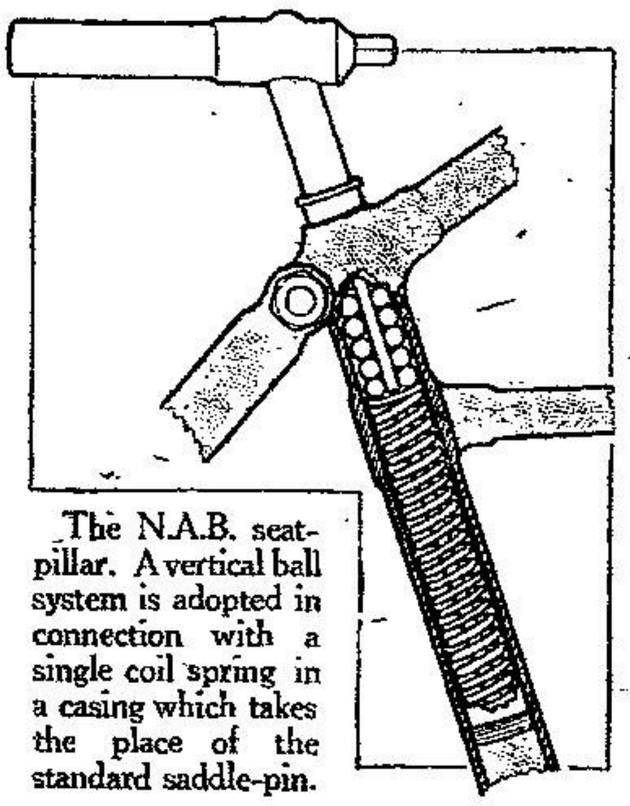
The A.J.S. device consists of an auxiliary saddle tube, beneath which is one large compression spring.

Spring Seat-pillars.—

certain extent to suit the weight of rider, while if so desired it can be entirely removed, and an ordinary seat-pillar fitted in the usual way.

On the latest War Office model Clynos the spring saddle-pillar is also on the spring front fork principle. The saddle pin proper telescopes into a tube which is connected to the cycle frame by means of four links. The attachment to the frame is by bolts passing through specially designed lugs brazed to the frame; two tension springs sustain the load.

The A.J.S. device, though not a standard fitment, can be had as an extra on any model. It consists of an auxiliary saddle tube situated behind the usual saddle tube of the frame. The auxiliary tube is attached to the frame by means of two pairs of links, the clips that secure the device to the frame being detachable. The springing is obtained by means of one large compression spring situated beneath the auxiliary saddle support to which one end of the spring is secured, the other end being supported on and attached to a stout bracket which is clipped to the down tube.



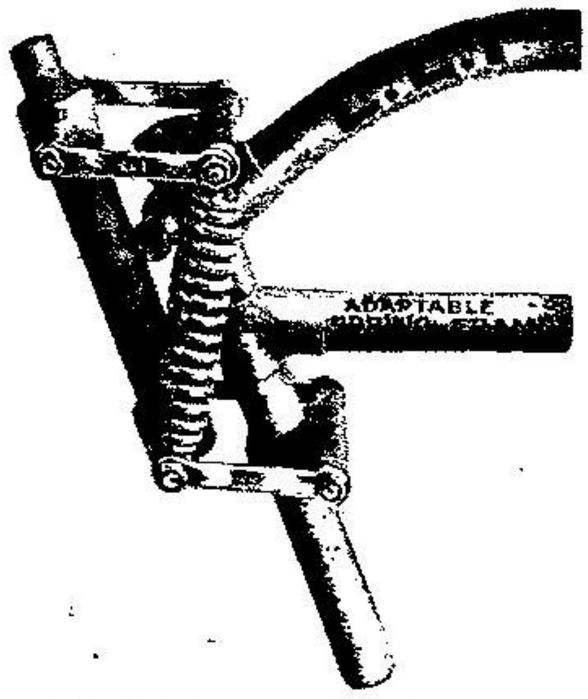
The N.A.B. seat-pillar. A vertical ball system is adopted in connection with a single coil spring in a casing which takes the place of the standard saddle-pin.

Auxiliary Attachments.

Apart from the machines fitted with standard spring seat-pillars, there are now attachments available for fitting to existing motor cycles. Among these, probably the best known is the N.A.B., which has been on the market for many years. The pillar fits in place of the usual standard saddle pin, and consists of a solid pin telescoping in a casing, which fits in the usual saddle-pillar tube. The pin is supported on a strong coiled spring, and rows of ball bearings are inserted in grooves between it and the outside casing, these being to prevent the movable pillar from jamming, and to give a free and easy movement. The saddle is mounted on the top of this movable pin, and an adjustable top is provided for the purpose. The N.A.B. can also be obtained in a form which clamps to the down tube of the bicycle frame, and so gives a very low riding position. It will suit machines not fitted with the usual hollow saddle tube.

The E.L.I. adaptable spring frame manufactured by Eli Clarke, the well-known Douglas rider of Bristol, is another serviceable spring saddle attachment which will fit practically any machine.

It is really an adaptation of Druid fork design to the saddle-pillar. The saddle-pillar proper is attached to the down tube by means of links, as in the spring fork, these being secured to the tube by means of substantial clips. Two strong coil tension springs extend from the frame pivot of the upper links to the floating pillar pivot of the lower links, the weight of the rider being, therefore, supported by these springs. The motion given to the saddle would be exactly the same as that of the front spring forks.



The E.L.I. is another adaptation of front fork springing, and is easily attached to any machine.

RACING IN CHILE.

Success of British Machines in Santiago Speed Trials.

THE most important motor cycling event of the year held at Santiago de Chile took place recently over an oval course measuring nearly 1,700 metres (just over one mile). The course has a fair surface, but, as it has no banking, excessive pace is impossible, but speeds of 56, 59, and 62 m.p.h. over the lap were attained.

Junior Race.

The competitors were divided into the following classes: Class I. for machines under 350 c.c.; Class II. machines under 450 c.c.; Class III. under 500 c.c.; and Class IV. unlimited. Class I. contained the following entries: three Junior Triumphs, one Wanderer, one Alcyon, one F.N., and one Brown, while Class II. contained four N.S.U.'s, three Peugeots, and one Humber.

Classes I. and II. were run over the course concurrently, one of the Triumphs, ridden by H. Wilson, failing to get away; but later this rider put up some extraordinarily fast laps, and worked himself into the fourth position. In the sixteenth lap Corson (Peugeot) retired with engine troubles, and on the twenty-seventh lap Wilson ran into first place. Subsequently, however, his tyre burst, and though he tried to finish, the tyre came off the rim, throwing the rider at the very last turn. Results:

FIFTY KILOMETRES.

CLASS I.

1. A. Checa (Alcyon, 271 c.c.)
2. A. Friedemann (Wanderer, 251 c.c.)

Speed 37¼ m.p.h.

CLASS II.

1. L. Poggi (Humber, 350 c.c.)
2. J. Birrer (N.S.U., 396 c.c.)

The Senior Race.

The Senior race was very keenly contested between the Triumph, Harley-Davidson, and Indian machines. The Triumph riders put up some marvellous riding, attaining speeds of 58 and 59 m.p.h., the American machines proving heavy to handle for the constant cornering at speed. Maillard, the crack rider of the Valparaiso Moto Club, experienced trouble with the belt of his Trinmph twisting, and after putting up a splendid race was forced to retire. F. Bolt, an Indian rider, retired on the nineteenth lap, and on the twenty-fifth lap one of the H.D. riders came to grief, luckily sustaining no serious injuries. Results:

HUNDRED KILOMETRES.

CLASS III.

1. F. Moreno (T.T. Triumph, 498 c.c.), time 1h. 24m.
2. F. Larios (Kynoch-Jap, 499 c.c.)
3. E. Betteley (Motosacoche, 495 c.c.)

Won by three laps. Speed 44.4 m.p.h.

CLASS IV.

1. A. Macchiavello (Triumph, 550 c.c.), time 1h. 19m. 16⅕s.
2. C. Grunnert (Harley-Davidson, 998 c.c.)
3. R. Maira (Indian, 998 c.c.)

Speed 47 m.p.h.

THE ANNUAL GENERAL MEETING OF THE MOTOR CYCLING CLUB.

THE annual general meeting of the M.C.C. was held at the Café Monico, Piccadilly Circus, London, W., on Wednesday, January 31st. Mr. E. M. P. Boileau was invited to take the chair.

The only business of the meeting was to receive the annual report and statement of accounts.

During the meeting it was announced that Mr. Arthur Millbourn is acting as hon. sec. *pro tem.*, and Mr. W. H. Wells is doing the work of treasurer.

It was proposed by the Chairman and seconded by Mr. H. Taylor that the officers of the club and committee should be re-elected for the present year. The auditor, Mr. W. Richards, was also re-elected.

Mr. Wells proposed and Mr. Armstrong seconded the proposal that no applications for subscriptions should be made to members during the war. The proposal was carried *nem. con.*

Mr. R. H. Head, chairman of the club, mentioned that the hon. sec. of the club, Mr. Southcomb May, M.M.G.S., had been wounded in East Africa, and was in hospital at Cape Town. Another member of the committee, Mr. E. B. Dickson, had also been wounded.

SPRING WHEELS.

Spring Wheels are now Widely Used by the Army, and Great Strides have recently been made in this Line of Invention.

FROM the earliest periods of history but little alteration has been made in the principles of wheel construction and design. The solid wooden wheel with steel tyre was, for many ages, adequate for every type of vehicle.

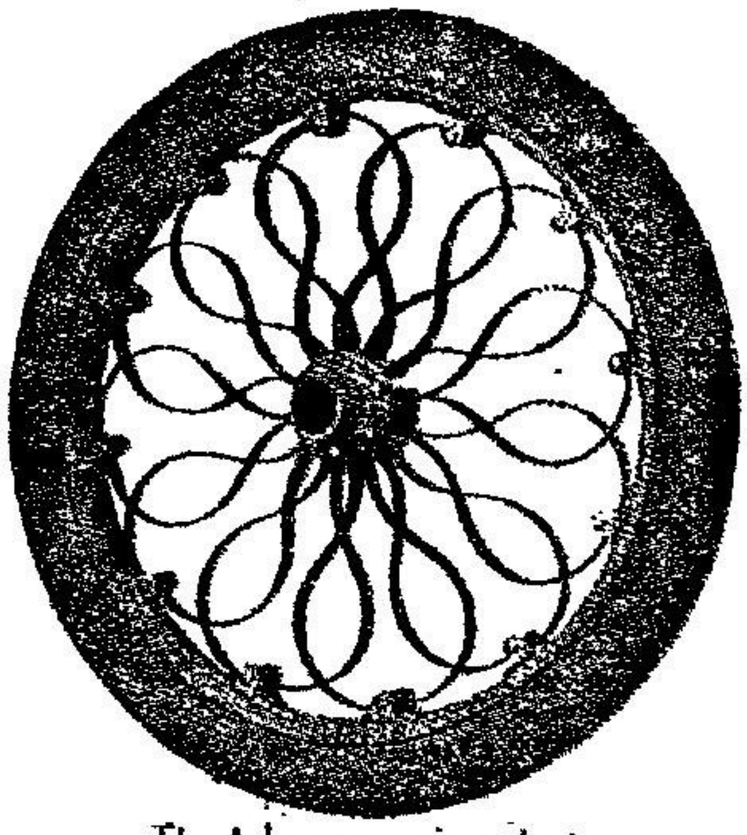
Good roads brought about the rubber tyre. After the introduction of light and faster vehicles the pneumatic tyre was evolved, but now that we have vehicles weighing anything up to 2 tons, and capable of speeds up to 60 m.p.h., it is not unreasonable to suppose that something better than the solid wheel may be introduced to meet the changed conditions.

The Possibilities of Shock-absorbing Wheels.

At any rate we cannot fairly close our eyes to the efforts of invention trending in this desirable direction. True, spring wheels of the past may have possessed conspicuous weaknesses, may, indeed, have been in the main "abominable contraptions," but, for that matter, the pneumatic-tyred wheel is not perfection. Its shock-absorbing properties are dependent on the narrow margin of tyre resiliency; the tyre is apt to puncture and strand one away from home, it is costly, and has a limited life.

So far as motor cycles are concerned, it is not to be anticipated that the spring wheel will ever eliminate the use of pneumatic tyres, but it would, in a perfected state, come as a valuable adjunct to the pneumatic tyre. Some ambitious inventors may even see in the spring wheel the secret of the rear springing problem, but, on the face of things, the spring wheel presents the same difficulties as those which stand in the way of the spring frame—namely, the wheel must be rigid in every direction (except radially) to resist lateral strains; it must be silent in action, and capable of withstanding long usage without rattling to pieces, and must be capable of withstanding the driving strains without wasting power.

Since the advent of motor vehicles the spring wheel has offered an unlimited field for inventive genius, but up to now with no permanent results. Recently, however, developments have been made,



The Ackerman spring wheel.

and it is encouraging to note that in Europe to-day there are many heavy military transport vehicles equipped with spring wheels in place of pneumatic tyres. Does this mark the period of a new development in wheel design?

Under Practical Test.

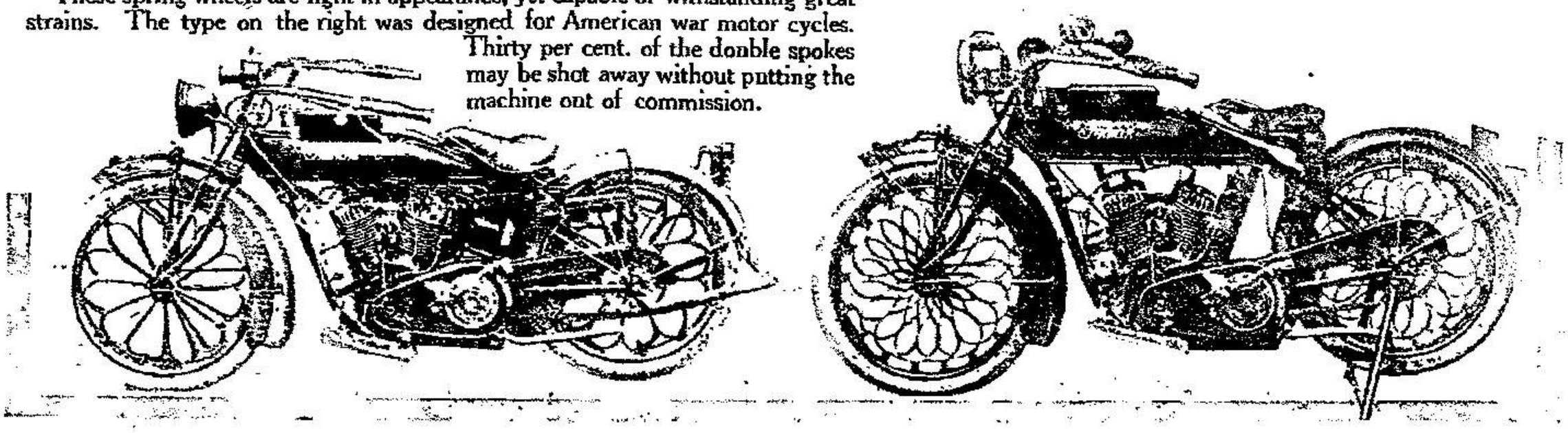
Except as concerns the question of weight, there is no apparent reason why a spring steel wheel, having no wearing parts; and giving a certain amount of radial elasticity, should not be applicable to motor cycles, and such an innovation is the Ackerman wheel, a product of the United States, which possesses resilient steel spokes, instead of the usual variety. According to the *Motor Mechanic*, an Ohio periodical, this wheel has undergone four years of practical test, and very extravagant claims are made for it. It is stated that this wheel, even when fitted with a solid tyre, imposes less jolting strain on the axle than a solid wheel having a pneumatic tyre, and that, when used in conjunction with the latter, the life of the tyre is decided by its internal durability rather than its outer wearing qualities. As regards the strength of the wheel, the provision for overload is such that a wheel in which 30% of the spokes are broken is safe to run, and it may be added that broken spokes can be replaced without removing the wheel or ever jacking it up.

Great Strength Claimed.

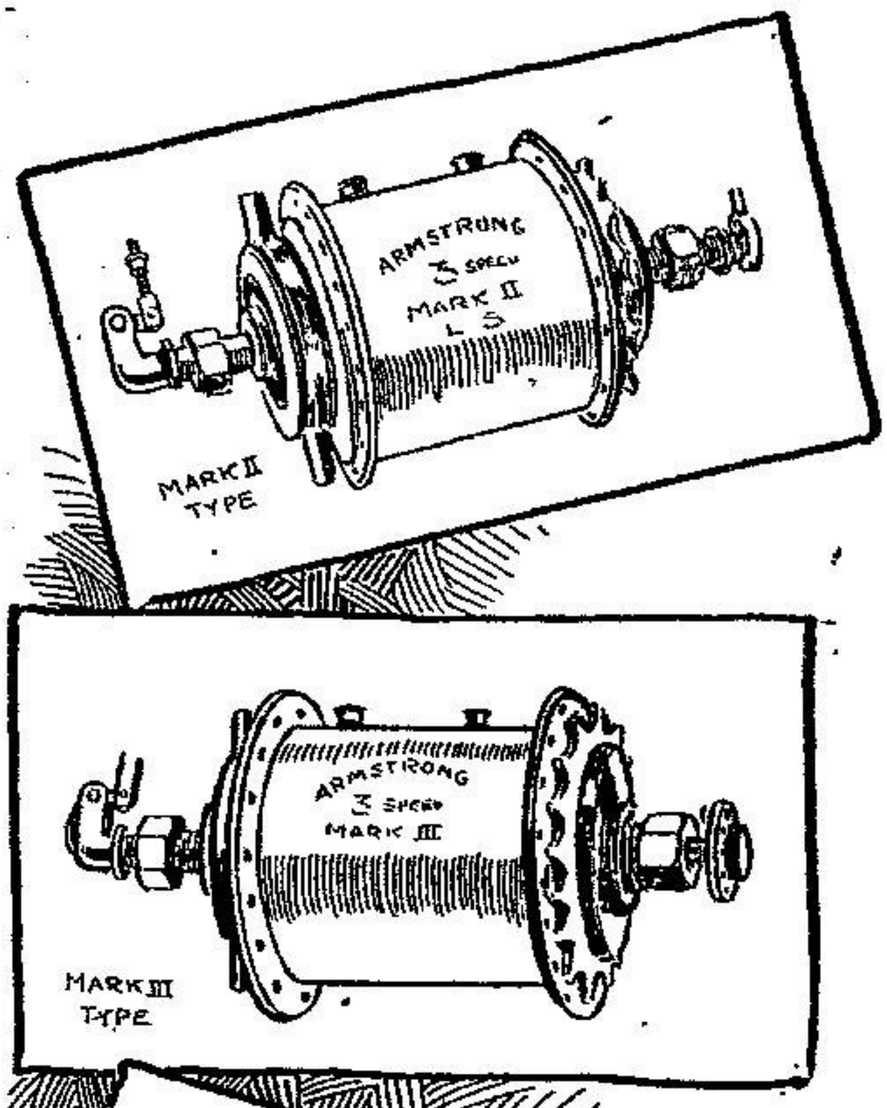
Apparently very extensive tests have been made, and on one test, under side thrust, a wooden wheel gave way beyond repair under a load of 5,530 lb. lateral thrust, whereas with the steel wheel the first signs of rupture appeared at 18,500 lb., and even then the damage was immediately repairable. On another test two wheels were tested simultaneously under a combined load of 13,000 lb. —nine times the load for which they were designed. The load was left for two hours, after which the wheels were removed and no sign of set or deflection was perceptible.

How far these claims may impress our readers is a matter of speculation, but it must be borne in mind that, if the spring wheel became a practical proposition, it would effect an enormous improvement in motor cycle design. The shock-absorbing properties of the wheel need not be great in order to assist very materially in the direction of comfort and reduced wear.

These spring wheels are light in appearance, yet capable of withstanding great strains. The type on the right was designed for American war motor cycles. Thirty per cent. of the double spokes may be shot away without putting the machine out of commission.



GEAR REPAIRS.



Whatever your gear is WE can repair it promptly.

Is it STURMEY-ARCHER or ARMSTRONG?

We have specialised in repairing these for the past three years, and have EVERY PART for EVERY TYPE *actually in stock*. Where desired, parts can be supplied by return post. GEARS REPAIRED IN SIX HOURS with tested parts, exactly as supplied by us to the British and Allied Governments

READ WHAT CUSTOMERS SAY:

Victory Cycles and Motor Cycles,
Witham, Hull, 12th April, 1917.

Dear Sirs,—I thank you for the prompt despatch of wheel, and also for the parts returned. Our customer is highly satisfied, and the gear is now as good as when new.

Yours truly, A. E. BROWN

Lydd, Kent, 17/7/17.

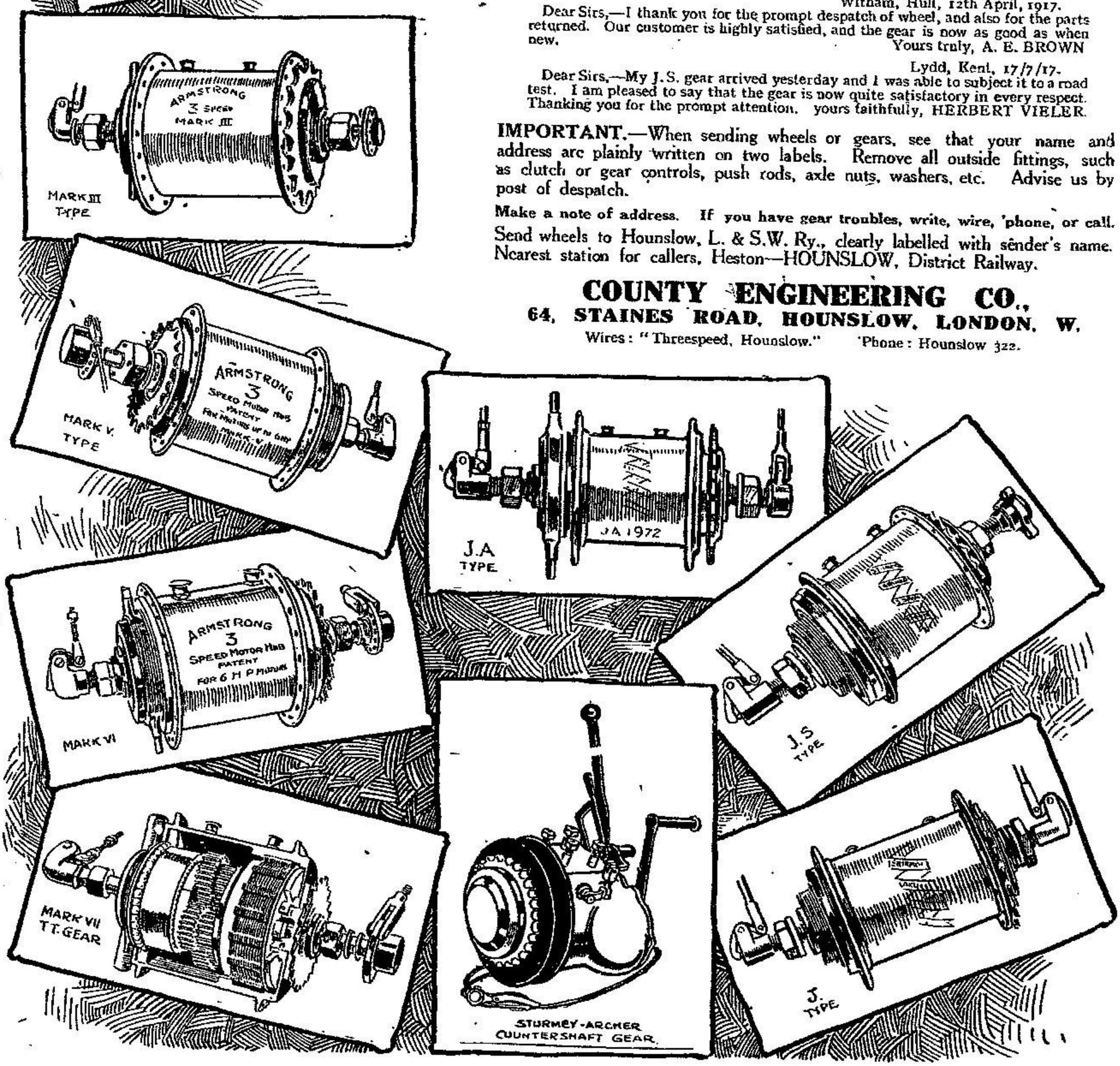
Dear Sirs,—My J.S. gear arrived yesterday and I was able to subject it to a road test. I am pleased to say that the gear is now quite satisfactory in every respect. Thanking you for the prompt attention. yours faithfully, HERBERT VIELER.

IMPORTANT.—When sending wheels or gears, see that your name and address are plainly written on two labels. Remove all outside fittings, such as clutch or gear controls, push rods, axle nuts, washers, etc. Advise us by post of despatch.

Make a note of address. If you have gear troubles, write, wire, 'phone, or call.

Send wheels to Hounslow, L. & S.W. Ry., clearly labelled with sender's name. Nearest station for callers, Heston—HOUNSLOW, District Railway.

COUNTY ENGINEERING CO.,
64, STAINES ROAD, HOUNSLOW, LONDON, W.
Wires: "Threespeed, Hounslow." 'Phone: Hounslow 322.

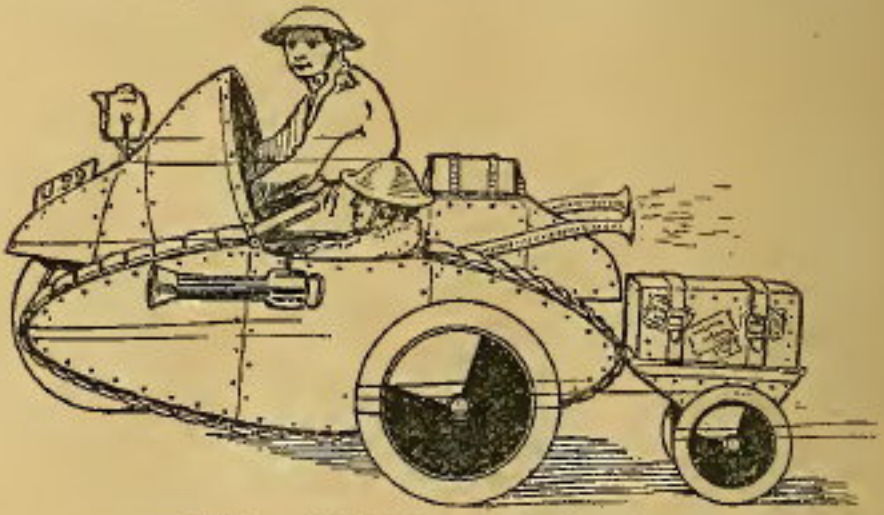


THE AUTO-PED IN ENGLAND.

The Auto-ped has arrived, and its user was soon in trouble—not of the mechanical variety! Miss Shirley Kellogg, the revue actress, took her motor scooter for a spin and was hauled up for "causing an obstruction," so the daily papers say. Most likely, however, the absence of registration letters was the real offence, as the scooter is a motor cycle within the meaning of the Act.

A POST-WAR MODEL SIDECAR.

Sir,—No doubt the war will have a great effect on motor cycle design, and I am wondering whether sidecar combina-

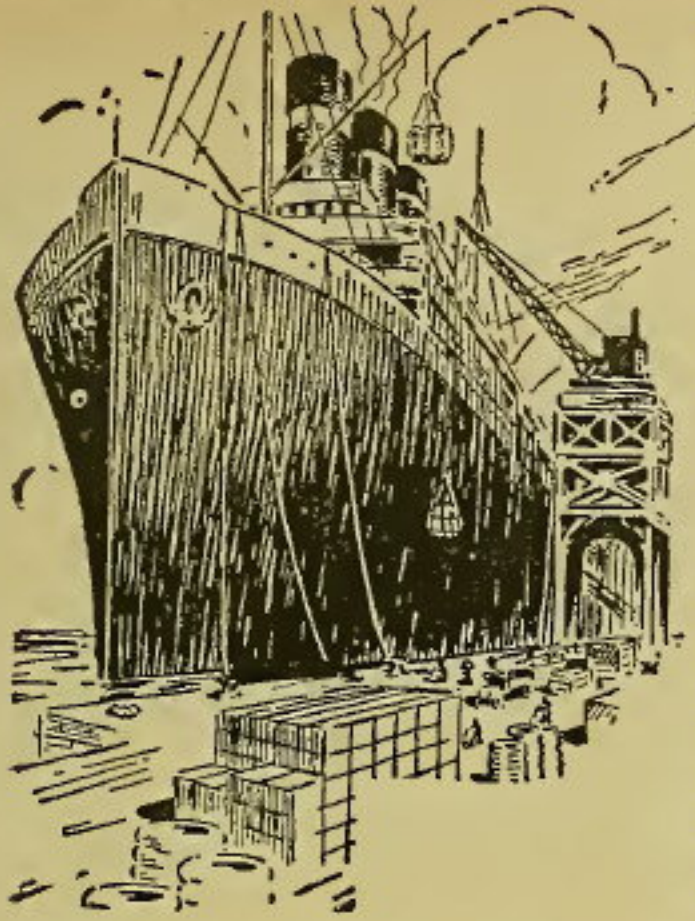


Will battlefield fashions develop thus?

tion makers will supply a model to suit our "Tank" officers and men after the war. Possibly the design I enclose will appeal to them.

ROYAL SUSSEX.

Eastbourne.



FOOD or TYRES?

SOMEWHERE, lying alongside a quay in a seaport of a country taking no active part in this war, is a transport actually accepting as a preferential cargo tyres instead of food for this country. We DON'T need tyres, but we DO need food, and in view of the recent import restrictions rendered necessary to maintain Britain's food supply

SHOULD THIS CONTINUE?

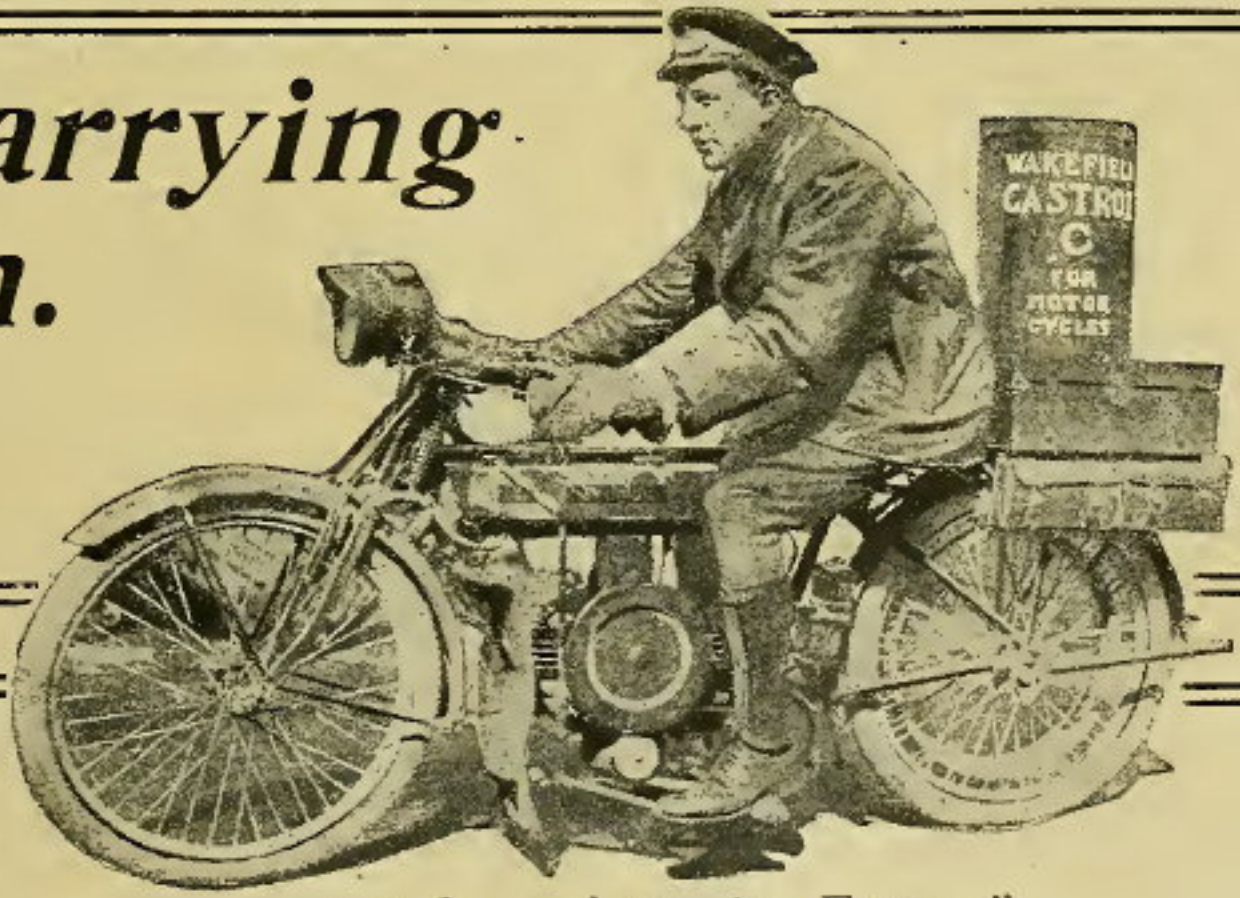
To substantiate the above statement, the Board of Trade returns for 1916 show that £2,423,865 went out of this country (think of this fact alone!) in the purchase of these imported tyres, the conveyance of which meant a loss of nearly two million cubic feet of shipping space for the transport of food and munitions.

ALMAGAM
AVON
BATES
BELDAM
NORTH BRITISH CLINCHER
DUNLOP
HENLEY
KEMPSHALL
LEYLAND
MACINTOSH
MIDLAND
MOSELEY
PALMER
SPENCER-MOULTON
WOOD-MILNE

This must be stopped; it can be stopped, if every British user will purchase only British tyres. British tyre manufacturers have ample facilities to supply every home need.

Remember, not all tyres with British-sounding names are British, but the adjoining list, although not complete, affords you a choice of fifteen all-British products.

Carrying on.



"Somewhere in France"

WAKEFIELD **'CASTROL'** "C"

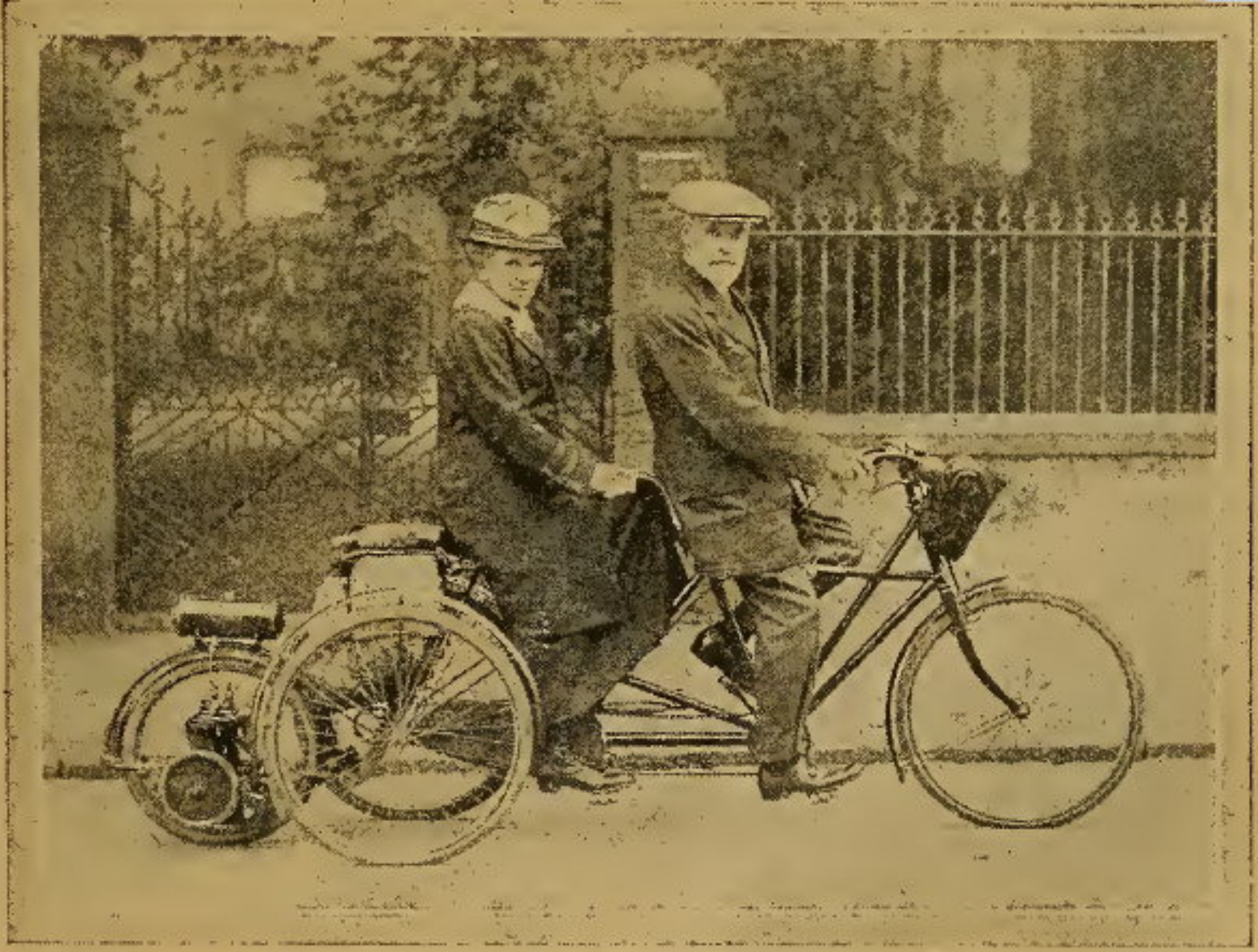
is still doing its bit.

C C WAKEFIELD & CO., WAKEFIELD HOUSE, CHEAPSIDE, LONDON, E.C.2
(Proprietor: Sir Charles Wakefield, Bart.)

C.D.C.

POLICEWOMEN WHO MOTOR CYCLE

By ONE OF THEM



A ONE-HORSE POWER PUSH.

The Auto-wheel is an adaptable little unit, and though, of course, much under-powered to propel a tandem tricycle, the owners find it a great help on their journeys. By its aid they can average twelve miles an hour with comparatively little exertion.