the highway in the district. The object of the Board of Trade in formulating their new rule is to prevent these compulsory powers being conferred upon irresponsible persons.

THE MOTOR CAR INDUSTRY.

The growing invasion of this country by motor vehicles of foreign origin is illustrated by a reference to the Board of Trade returns for the first ten months of the current year. In round figures the imports of motor cars and parts thereof amounted to £2,887,000 in that period, as compared with £2,176,000 in the corresponding ten months of 1904, being an increase of no less than £711,000 for the year; while the value of motor cycles and parts has advanced from £42,000 in the first ten months of 1904 to £67,000 in the equivalent term of this year. If the import trade has assumed such large dimensions, it is, on the other hand, somewhat satisfactory to be able to say that we have an export trade which, although comparatively small, is at all events manifesting an upward movement. Thus, the value of the exports of motor cars and cycles and parts totalled £387,000 in the first ten months, as contrasted with £271,000 in the same period of last year, being an increase of £116,000 for the present year. The improvement in the value of the vehicles sent out of the country is encouraging; but it is specially in regard to the home market that makers should devote particular attention before launching forth on a large scale in the export markets. Certainly some of the large concerns, judging from the reports presented during the past few weeks, are beginning to find the motor vehicle industry of a profitable character. No less than 20 per cent. was paid by one firm, whilst others have distributed dividends at the rate of 10 and 7½ per cent., so that it would seem that the motor car industry, as represented by these recent instances of distribution of profits, is in a tolerably satisfactory condition financially. Not only so, but the companies report the possession of extensive orders, whilst other companies engaged in the trade also intimate briskness of business and bright prospects for the future.

It is scarcely necessary to say that with a demand in the home market exceeding the supply, and with an outlet to the Colonies and elsewhere that is waiting to be cultivated, no pessimistic ideas prevail as to the future of the home industry of motor car engineering. Even the inquiry with closed doors of the Royal Commission on Motor Car Traffic will not place a damper upon the development of the industry, for, apart from the question as to whether —as in the case of Royal Commissions on certain other subjects—any effect will be given to the recommendations which the Commission may deem it necessary to make, very few persons believe that the present speed limit will be reduced by the Government which may be in power on the conclusion of the investigation. On the contrary, it seems possible that, while penalties for convictions for driving to the danger of the public may be suggested to be rendered more severe in the case of light motor cars, the speed limit may be increased or entirely abolished. This is, of course, merely a conjecture of the legislation which is promised for next year; but however the position may turn out to be, it is highly probable that the ultimate situation will be, generally speaking, more favourable for the development of the home industry.

LONDON TRAFFIC.

In answer to a letter recently addressed to him by Sir Henry Oakley, as Chairman of the Central London Railway, Sir Francis Hopwood has replied on behalf of the Board of Trade that he is authorised to state that the Government have sanctioned the preparation of a Bill relating to London traffic and involving the establishment of a Traffic Board. It will be remembered that among the recommendations of the Traffic Commission, the report of which was discussed in our columns some little while ago, was the appointment of a Traffic Board for the control and co-ordination of means of locomotion in the metropolis. The practically unanimous view of all witnesses before the Commission had been that such a body was a necessity, and that much of the complexity and difficulty which had arisen in the past had been because no such authority existed. The Commission appeared thoroughly to appreciate the want, and went so far as to define the number of members of which it considered the Board should consist, and the powers which it should possess. Among other things it was suggested that it should make a preliminary examination of all private Bills dealing with locomotion in Greater London; should bring about the improvement of the main roads leading out of London, and should consider the revision and amendment of the laws regulating the breaking up of streets. The central idea was that the Board was to seek to make all the various factors work smoothly together, and generally to devise and superintend improvements. Evidently the Government have considered the recommendations—or some of them—good, or they would not have acted upon them. It would appear, too, that action is to be taken in the near future, since, in his reply to Sir Henry Oakley, Sir Francis Hopwood remarked that although it was impossible to say what effect, it any, the introduction of the Bill would have upon the decisions of Parliamentary Committees appointed to deal with railway and other private Bills touching the traffic interests of London, yet the Government thought it only fair that notice should be given of the proposed Bill, so that promoters of other Bills might determine what course to adopt during the coming session. This would certainly seem to indicate that the Bill will be brought forward at an early period of the coming session. If this be the case the Government are to be congratulated in having so promptly dealt with a matter which is of pressing importance.

THE LIMITATIONS OF THE TELEPHONE.

Electrical inter-communication by telephone has become such an important factor in every-day life that it is not a matter for surprise that Mr. John Gavey, in his presidential address to the Institution of Electrical Engineers, delivered on Thursday, 9th inst., should have dealt largely with this subject. It would appear from Mr. Gavey's remarks that for short distance messages the telephone was seriously threatening the telegraph; but, as he pointed out, the questions of cost and physical limitations of the former at present prescribed the radius of its efficient employment. The distance that speech could be transmitted through cables was limited. One of the problems for the coming electrician to solve was the increase of this distance. The reason for the restriction was to be found in the attenuation and distortion of the electrical waves or impulses in cables, which results in telephone authorities usually considering 42 to 46 miles of English standard lead-covered paper insulated cable as the limit of effective commercial speech. Not the least interesting part of Mr. Gavey's address was his presentation of some oscillograph records showing the attenuation which takes place through one mile and through 20 miles of the standard cable. A number of letters were rapidly spoken into the transmitter, and the respective transmitted and received curves recorded in the usual photographic manner. In the one mile length the curves at opposite ends were almost counterparts of one another, the differences of amplitude were inappreciable, and all the irregularities of each transmitted curve were faithfully reproduced at the distant end. When experiments were made with the longer length of cable the difference of amplitude was strongly marked, and it became difficult to compare the shapes of the two curves, although these still bore a substantial resemblance one to the other. This line of investigation was to be carried a good deal further, and Mr. Gavey would appear to be by no means hopeless regarding the future, for he concluded his address with these words:—"I have little doubt that the progress of electrical means of inter-communication will in the future go on unchecked, and that those associated with and responsible for such progress will, in the course of the next few years, bring about such developments that they be in a position to compare in no unfavourable manner the advance of these particular branches of our work with that which we can foresee in all other branches."

OBITUARY.

ROBERT WHITEHEAD.

A man who did much to revolutionise modern naval warfare has passed away in the person of Mr. Robert Whitehead, who died on Tuesday last at Beckett Park, near Shrivenham. Perhaps because his life's work had been carried out in Austria, Mr. Whitehead had received from his native country no recognition of his services. Paradoxical as it may appear, when talking of such a devastating appliance as a torpedo, Mr. Whitehead is reported to have considered it as a means for ensuring peace rather than a bringer about of war. His idea, no doubt, was that the fearful effects of the torpedo, when once realised, would be a sufficient deterrent to peoples or nations contemplating war. Apparently he has been too ill during the last year to be informed of the fearsome work wrought by the torpedo in the Russo-Japanese war. The fact that both nations were armed with the same weapon did not prevent the breaking out of war, but, on the contrary, called forth deeds of heroism on both sides. When it comes to be considered, it will be seen that the self-propelling torpedo has entailed very great changes in naval construction. Without it we should not have the numerous torpedo boats and torpedo boat destroyers which form such a feature in the navies of the world. Without it the submarine would have no *raison d'être*, and net equipment would be unnecessary. In the light of present-day arrangements, it is, perhaps, difficult to say exactly what would have taken place had not the Whitehead torpedo been invented. It is, at all events, safe to state that it has probably had more influence than any one other thing on modern naval tactics.

Whitehead was not the inventor of the torpedo as such. Spar torpedoes had been used long before his time, but it may be claimed for him that he produced the first dependable self-propelling and steering torpedo. As long ago as 1866 a Captain Luppis, of the Austrian navy, submitted to Mr. Whitehead a model of a torpedo—if such it might be called. It was a small boat propelled by clockwork, and capable of making some six to seven knots on the surface of the water, on which alone it could travel. Its range of action was to be some 600 to 700 yards. It was supposed to be steered by lines from the shore. In the bows of the boat was carried the explosive, which was to be detonated by a percussion arrangement when the boat came against any obstacle. This was the starting point. The Austrian's boat appears to have been quite unworkable, but it set Mr. Whitehead's mind to work. It is characteristic of the energy of the man that before the end of the same year in which Captain Luppis had come to him, the first Whitehead torpedo had been designed and made. It was a very different instrument to that which is carried at the present time by all the navies of the world. Unfortunately, during experiments with it, it was lost. However, sufficient experience had been gained to indicate in what manner it might be improved, and two years later, in 1868, a second torpedo capable of being launched and of making its way unaided towards the object of attack had been constructed. The same year it was adopted by the Austrian Government, but it was not till 1871 that Great Britain, after a number of trials which were carried out at Sheerness, decided to purchase the right to employ it. Curiously enough, at this time the capabilities of the apparatus were closely akin, as regards speed and radius of action, to the boat of Captain Luppis. It could travel at the rate of eight knots for a distance of about 600 yards.

The Whitehead torpedo has been very greatly improved since that date. Now-a-days the radius of action is up to 4000 yards or over, and the maximum speed has been increased to 36 knots. The weight of explosive carried in the 1868 torpedo was perhaps 30 lb. Now-a-days it is about 200 lb. Mr. Whitehead and his firm are largely responsible for all the improvements which have been introduced, but one of the most important of these is due to Mr. L. Obry, of Trieste. Indeed, it may be said that without it the present-day torpedo would have been impossible. We refer to the gyroscopic steering apparatus. This was based upon the principle that a body revolving on a free axis tends to preserve its plane of rotation. A gyroscope with a plane of rotation parallel to the vertical axis of the torpedo will have an angular motion if the torpedo is diverted from its original course. This angular motion is employed to actuate the steering mechanism by operating an air motor connected with the rudders, and keeping the torpedo in the line of discharge. The apparatus consists of a fly-wheel caused to rotate by a spring, the barrel on which the latter is wound having a segmental wheel which gears into a toothed pinion spindle of the fly-wheel. Owing to the diameter of the segment being much greater than the pinion, a rapid rotary motion is imparted.

The spring is wound up by a key from outside the torpedo, and kept in tension until the projectile is discharged, when the spring is released by the air lever being thrown back, which admits air to the engine; the gyroscope is then freed and set in motion with its plane in the plane of the vertical axis of the torpedo, as it was in the launching tube.

The earlier forms of torpedo had been subject to the defect that they might or might not keep on their proper course. Up to, say, 600 yards they might be relied upon to be fairly accurate. Even as late as 1898 the range of comparatively certain steerage was not above 800 yards. The fastest speed was 29 knots. With the advent of the gyroscopic steering apparatus the radius was immediately raised, and it is now some five times what it was but seven years ago. It has likewise been safe to increase the speed.

It may, perhaps, be of interest if we give particulars of some of the Whitehead torpedoes actually employed by the Japanese in the late war. The Japanese have from their earliest determination to be possessed of a navy been great believers in the efficacy of torpedo craft. Our readers will be well aware how many of these have come from English builders. The dimensions of some of the torpedoes they carried will come somewhat in the nature of a revelation to the uninitiated. They were 21ft. 4in. long, and 17·7in. in diameter. They weighed no less than 1968 lb., and carried a charge of 198 lb. of gun-cotton. Their propelling machinery was worked by air under a pressure of 2250 lb. on the square inch. They could travel for 2187 yards at an average speed of 28 knots, and for 1094 yards at an average speed of 31 knots. It can be well understood what fearful possibilities attach to such an engine of war—and a very large part of the credit for its invention was due to the late Mr. Whitehead.

Robert Whitehead was born on January 3rd, 1823, at Mount Pleasant, Bolton-le-Moors, Lancashire. He was therefore in his eighty-third year at the time of his death. What little schooling he had was obtained locally, and at the age of fourteen he was apprenticed to his mother's brother, Mr. William Swift, who was manager of the engineering works of Messrs. Richard Ormerod, of Manchester. Here he went through the works and drawing-office, and, at the same time, attended classes on engineering subjects at the Mechanics' Institute. He was an able draughtsman, and retained his skill with mechanical instruments practically up to the time of his

death. He was employed with this firm for nine years, and at some time during this period an event occurred which had a potent bearing on his future career. This was simply that his uncle, Mr. Swift, went abroad as manager to Messrs. Philip Turner and Sons, who had a business at Marseilles. Young Whitehead joined his uncle, and entered into the service of the same firm. Being, however, apparently of an independent disposition, he did not occupy this position long, for three years later he moved to Milan, and set up in business on his own account. The particular line he took was very different from that with which he afterwards became associated, for it had to do with machinery for silk weaving, into which he introduced a number of improvements. He also designed and carried out some drainage works in the Lombardy plains.

In 1848 he left Milan and went to Trieste, entering the service of the Australian Lloyd Company, and later on was for two years in the engineering works now called Stabilimento Tecnico Triestino, but then belonging to Messrs. Strudthoff. In 1856 he went from Trieste to Fiume, and was persuaded by some friends, who provided the necessary funds, to open the Stabilimento Tecnico Fiumano. His versatility in matters engineering is well shown by the fact that in these works he designed and constructed the engines for some of the Austrian warships. For this he was decorated by the Emperor.

In 1872 he bought up the works, which had apparently failed owing to want of work, and engaged with his son-in-law and eldest son in the manufacture chiefly of torpedoes and the necessary adjuncts. These have always remained the headquarters of the firm, though a branch works, which has mainly been concerned in the manufacture of torpedoes for the British Navy, was started in 1890 near Weymouth.

A portion of each year Mr. Whitehead spent in England principally on his estate of Paddockhurst, at Worth, in Sussex. Here he was much loved for his courtesy and benevolence. Though there is reason to believe that he felt acutely that, though honoured by other countries, the country of his birth did not recognise him in the same manner, he was, as a fact, the most modest and retiring of men, nor one who sought public fame for himself. In business he was regarded as being scrupulously honest and straightforward.

In 1845 he married Miss Frances Maria Johnson, of Old Byland, North Yorkshire, and he had seven children, two of whom died when quite young. His wife predeceased him in 1884.

WILLIAM PARROTT.

We regret to have to announce the death of Mr. William Parrott, the general secretary of the Yorkshire Miners' Association, which occurred at his house in Huddersfield-road, Barnsley, on the 9th inst.

Mr. Parrott was one of the well-known quartette—Messrs. E. Coney, B. Pickard, W. Parrott, and J. Frith—who for nearly a quarter of a century laid and ruled the destinies of the strong Yorkshire Miners' Association. Mr. Parrott was born in December, 1843, at Roe Green, Wellington, Somerset, but the family shortly after his birth removed to Methley, near Leeds. Whilst still a boy—aged nine or ten years—young Parrott was at work in the pit, and passed through the usual processes to that of coal getting. The instinct for learning and self-improvement quickly became manifest, though Mr. Parrott was almost thirty years old before his fellow-miners established him checkweighman at the Good Hope pit, Normanton Common, under the then new legislation. In 1876, he became assistant secretary to his late colleague, Mr. Pickard, of the West Yorkshire Miners' Association; and again, in 1881, when the South and West Yorkshire organisations were merged into the present Yorkshire body, Mr. Parrott was placed in the position of agent. From that time he took part in all the notable movements, being chosen by his Association, along with his fellow-officials at both national and international assemblies of miners, and in each case became one of the executives. In 1902, when Mr. Pickard died, Mr. Parrott attained a long-cherished ambition of entering Parliament for Normanton, and became also secretary of the Yorkshire Association.

It is most fitting to speak of Mr. Parrott as a conciliator. In times of trouble and dispute between owners and workmen at collieries, his presence was ever welcomed, and he won for himself marked esteem and implicit confidence.

DOCKYARD NOTES.

The armoured cruiser Black Prince, built at the Thames Ironworks, has arrived at Spithead, and coaled in Portsmouth Harbour on Wednesday preparatory to steam trials. She promises to be the first completed of the class, and her sister the Duke of Edinburgh, after some trouble on her steam trials, is now laid up for her propeller to be altered and her boilers seen to. These failures are probably nothing but the troubles usually incidental to any new class of ship; but some considerable reticence is being observed officially about her. So far as we can ascertain, however, the stories about her breakdowns are very exaggerated—that is to say, there is no reason to suppose that she will not presently reach her designed speed.

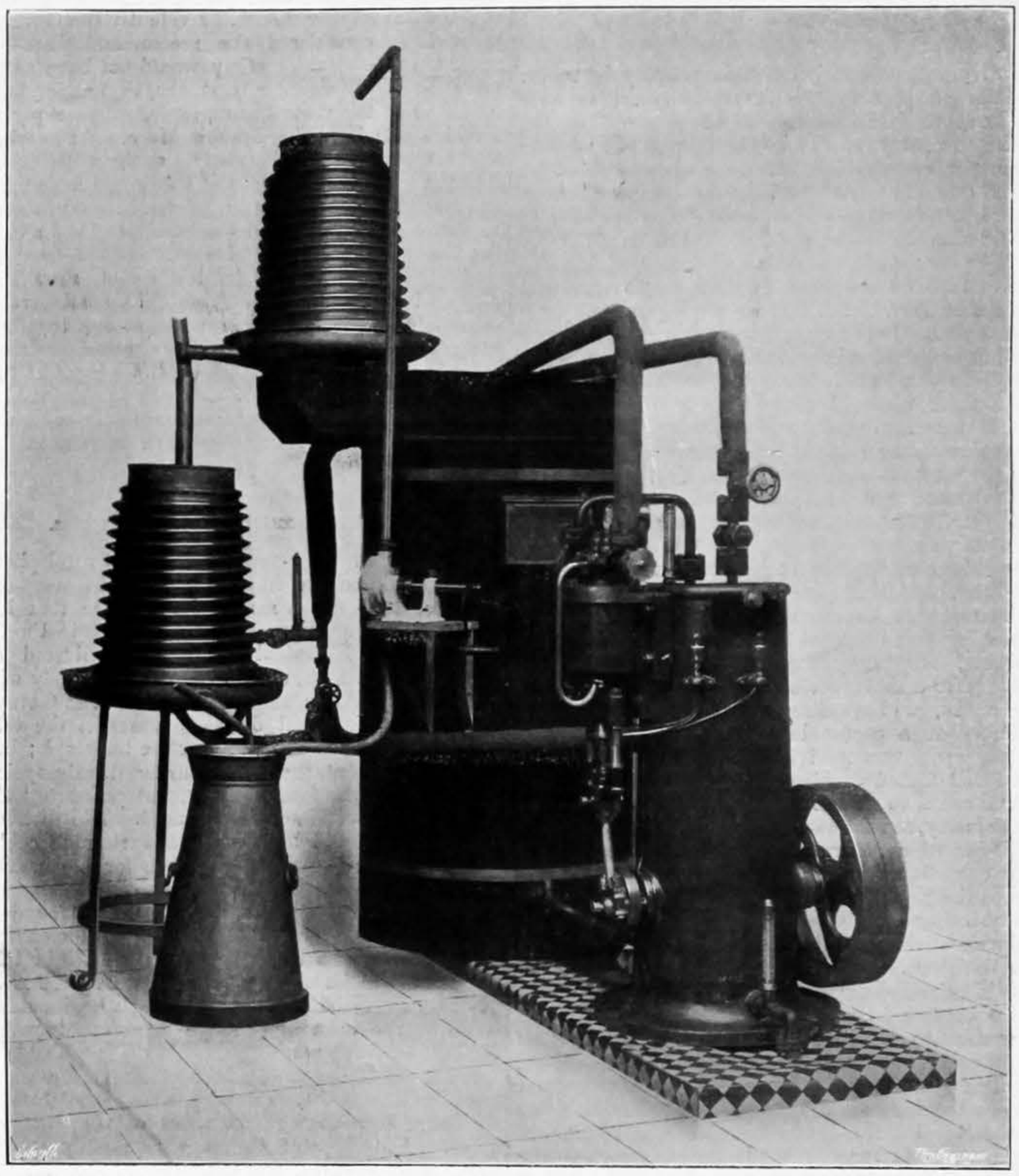
The latest story of the new German battleships is that they will carry 12in. guns instead of 11in.

Latest reports from Japan do not suggest that the navy of our allies will be very materially strengthened by some of the salved Port Arthur fleet, and that the enterprise expended in raising Admiral Wiren's fleet was directed rather with a view to trophy hunting than naval expansion. The cost of repairing some of the vessels will be nearly as much as building new ships would amount to.

The Askold has been released at Shanghai, and is reported to have sailed for Vladivostok, or what may be left of that place.

MILK REFRIGERATING PLANT

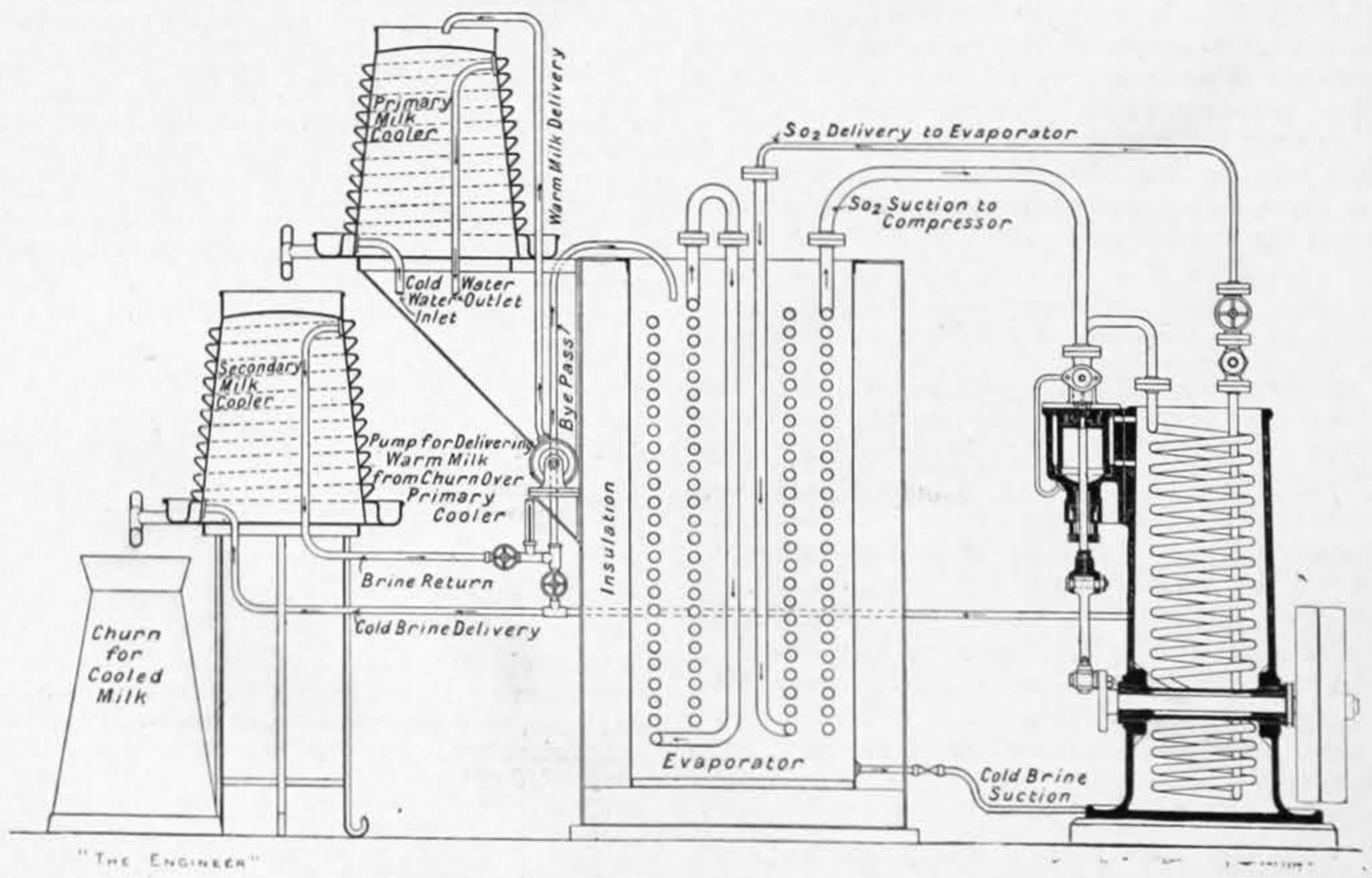
WILLIAM DOUGLAS AND SONS, LIMITED, PUTNEY, ENGINEERS



MILK REFRIGERATING MACHINE.

A milk refrigerating plant, made by Messrs. William Douglas and Sons, Limited, of Putney, is shown in the accompanying engravings. This plant, we may mention, competed at the recent Dairy Show, where it was awarded the gold medal. The general arrangement will be well understood from the diagrammatic drawing below. On the right is the refrigerating machine, which is the Douglas-Conroy patent, the refrigerating agent being sulphurous anhydride—SO_2. The compressing cylinder is, as will be seen, jacketed. This is for the circulation of water, and the inlet and outlet ports for the water are connected direct to the general water supply to the condenser. The jacketing is required in order to liquefy a small amount of the SO_2 in the cylinder where it supplies all the lubrication necessary. The compressor is mounted on the side of the condenser tank, which is of cast iron, and the driving shaft runs through the body of the condenser, a gap being made in the condenser coils to permit of this arrangement; the shaft, of course, runs in a sleeve. Above the suction and compression valves on the top of the cylinder are two stop valves by which the whole system can be shut off from the compressor with no further loss of refrigerating gas than the small amount which may be in the top of the cylinder. The regulating valve is shown to the right on the top of the condenser with a stop valve underneath. The working pressure of the compressor is from 35 lb. to 50 lb., and ordinary cast iron packing rings are, so we are informed, sufficient for the piston head. The gland is packed with soft cotton soaked in oil and also with one or two turns of Garlock packing, finishing with a rubber ring.

The evaporator, which in milk-cooling plant is made relatively large, so that it may hold a good stock of brine, consists of a wrought iron cistern insulated with cowhair out-



MILK REFRIGERATING PLANT