A SIX-CYLINDER 400-HORSE-POWER RACING GASOLINE POWER BOAT.

BY THE ENGLISH CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

Great interest is being manifested among naval and marine engineers in Great Britain in the gasoline motor racing boat built by the Brooke Motor Company, of Lowestoft. This craft, although primarily designed for racing purposes, is yet of substantial construction, so that it may be possible of utilization in a seaway. The boat, which is propelled by a 400-horse-power engine, is one of the most powerful craft of its type that has yet been constructed.

The boat is just under 40 feet long, with an extreme breadth of 5 feet 6 inches. The draft at the greatest immersed section of the hull is only 12 inches. In view of the enormous power this launch possesses, and with regard to other conditions, great attention has been devoted to the questions of strains due to propulsion, pounding in a seaway, etc., in the design of the hull.

The motor supports are of ample strength and extend the full length of the launch. In conjunction with the American elm keel they form a substantial backbone to the whole fabric, giving great longitudinal strength and affording a solid foundation for the 400-horse-power motor. A bilge stringer of Oregon pine and two side stringers of slightly smaller scantling are fitted at each side, extending and tapering to the end of the boat. A heavy gunwale of American elm completes the longitudinal distribution of the wood construction. The transverse strength is attained by timbers of selected American elm, considerably augmented by grown oak floor frames, all well molded at their throats and all carried hard up to the bilge stringers at each side. Although the strength of the hull as described above is by no means inadequate, yet it has been increased by the addition of steel angle-bars, stringer plates, and tie angles. The fore part of the boat, as well as the rest of the hull, is fitted with steel frames supplemented with beams or cross-tie angle bars. These frames are very necessary at this part of the hull, for racing launches of high speed and light draft are subject to severe panting stresses and thumping under the bows, as their enormous propelling power drives them into head seas, and they may, unless properly stiffened, bulge in the frames and planking at this locality.

While the diagonal lines of the boat are long and narrow, showing just a slight roundness as they extend from bow to stern, the underwater body has been made fairly flat, merging into a nicely rounded bilge, which in its turn is gradually lost as it approaches the transom. She has been given a very fair freeboard combined with a good fore turtle deck, insuring ample protection in any ordinary weather, and for negotiating bad weather, a light portable structure is fitted over the well, with a small aperture aft for the steersman.

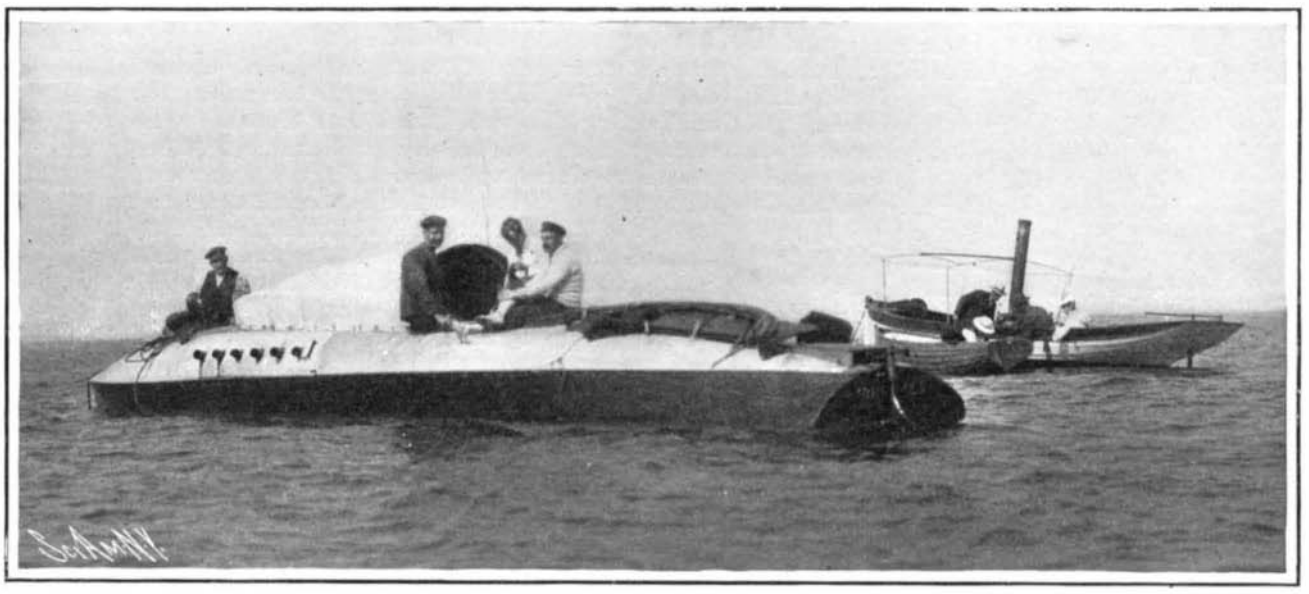
The engine is of the vertical, six-cylinder type, the cylinders cast separately, thereby greatly facilitating their accessibility. The bore is 10 inches, the stroke 8 inches, and at the normal speed of 1,000 revolutions per minute the nominal 400 horse-power is developed.

The cylinders are water-cooled, the jackets being cast with the cylinders. Two entrances are provided in each jacket for the circulation of the cooling water, above the combustion chamber and the exhaust valve. The induction valves are arranged on the starboard side of the engine and are of large diameter with angular seats, and are set down below the main level of the water. The exhaust valves are placed on the opposite side of the engine, and are interchangeable with the inlet valves. By slightly sliding the camshaft operating the exhaust valves, the latter are caused to lift on the compression stroke to facilitate starting. The inlet and exhaust crankshafts are driven by large outside two-to-one gear wheels, and to insure perfect alignment are run in seven bearings each.

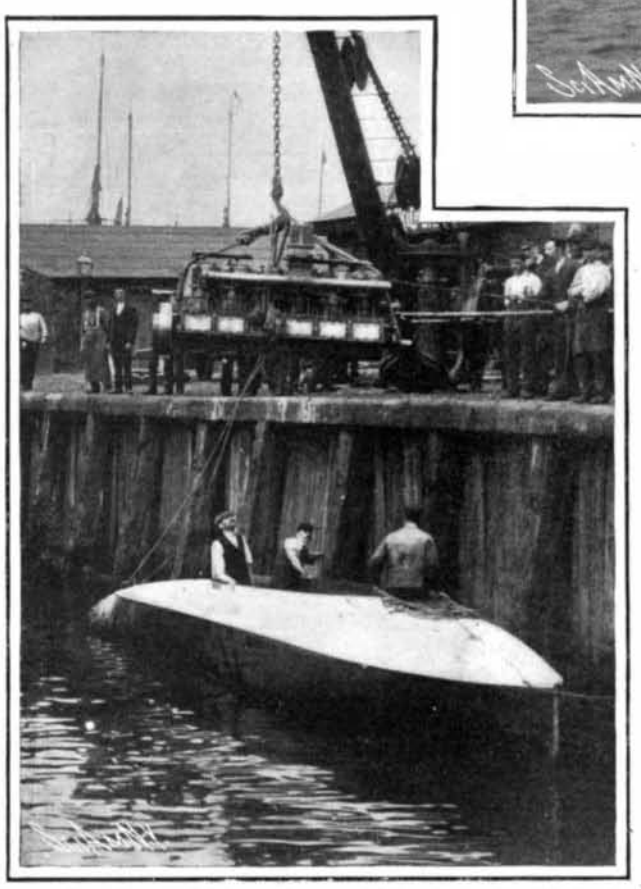
The crank chamber, which is made of cast steel, is formed of two sections, and is provided with six large inspection doors on each side. The crankshaft runs in five intermediate bearings on bored surfaces, and the bolts securing them to the bottom of the crank case extend up through the top of the same, in order to act as the holding-down bolts of the cylinder heads. Two types of ignition are available—low-tension magneto and the high-tension system with accumulators and coil.

Splash lubrication is adopted for the lower ends of the connecting rods and intermediate bearings. The gudgeon pins and pistons are provided with forced lubrication. The motor is fitted with a light flywheel carrying an expanding internal metal-to-metal clutch, which transmits the engine power through universal joints, reverse gear, and thrust block to the propeller.

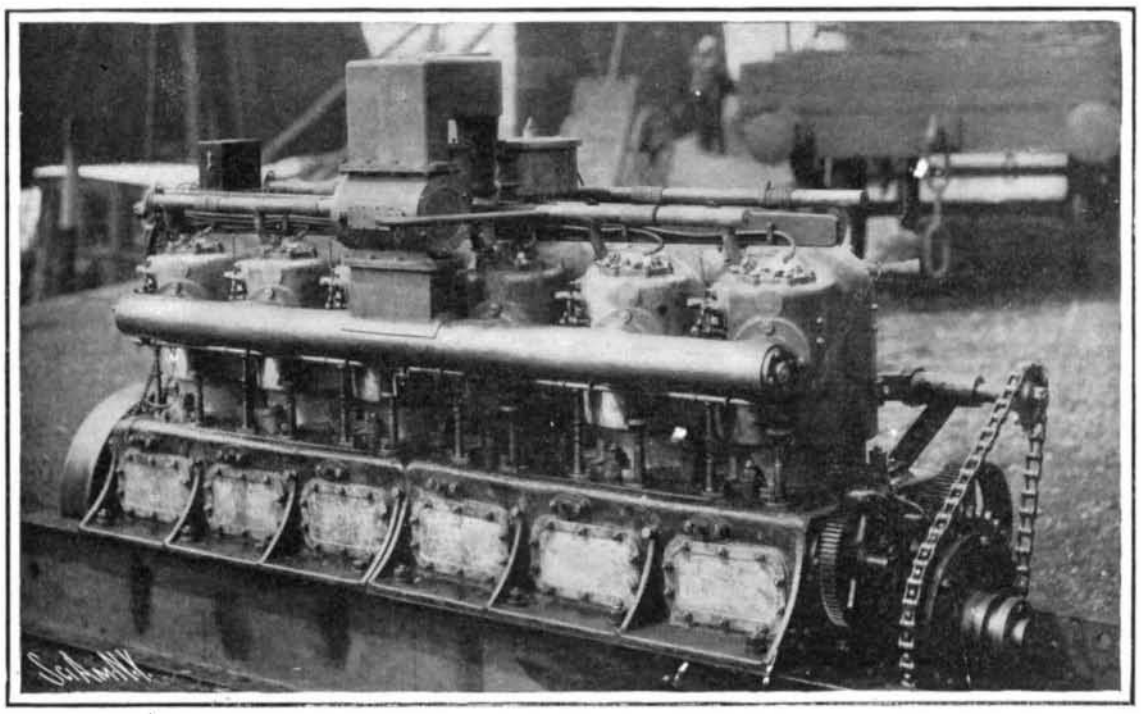
The design of this boat, in which the aim has been to secure the maximum of strength consistent with the minimum of weight, and the high power of the motor, have provoked much discussion in marine engineering circles, and the behavior of the craft in varying weather conditions is being awaited with profound anticipation. It is conceded that this launch provides an interesting development of the application of gasoline engines of great horse-power to small light hulls, and the results of its trials will exercise a far-reaching effect upon the design of this class of craft for various purposes where large horse-power, speed, and light hulls are required.



The "Brooke I."—A 400-Horse-Power Motor Boat.



Lowering the 400-Horse-Power Motor Into the Hull of the "Brooke I."



The 400-Horse-Power Gasoline Motor of the "Brooke I."

MICROPHOTOGRAPHY.

INTERESTING MICROPHOTOGRAPHS OBTAINED WITHOUT COSTLY APPARATUS.

BY D. R. WINSLOW.

Microphotography is a field into which apparently few amateurs care to venture, and yet, in this branch of photography, there will be found more to interest and instruct than in the prevailing habit of promiscuously "snapping" friends, acquaintances, and familiar scenes. The supposed expense of the thing is the foremost reason given by the amateur for letting this interesting branch of photography severely alone. The secondary reason is lack of confidence in his ability to make satisfactory pictures. All that he knows about the subject is the little he remembers having read in articles entirely too technical for his understanding. From these he has absorbed the erroneous idea that the work requires costly apparatus and at least a year of training. The outfit ordinarily considered absolutely indispensable for this branch would cost not less than $300, and to operate such an outfit would require many months of training.

The microphotographs used to illustrate this article were made by an amateur, and the only piece of apparatus used, in addition to his camera, was a small microscope which cost one dollar. With the cheaper microscopes, the kind usually sold for twenty-five cents, pictures equally satisfactory, if not as highly magnified, can be made. No experience is required to make these pictures, and the only preliminary preparation necessary can be made with a sharp knife and a small saw. Any camera may be used, provided it has a ground glass for focusing. It should, however, be furnished with some sort of shutter, as the removal and replacement of a lens cap is impossible.

The microscope need not cost over twenty-five cents. It is the kind that has long been considered a mere toy and often sold as such; a short brass barrel fitted at one end with a magnifying glass mounted on a small stand which slides into the brass barrel, and at the other end with a rather powerful objective, an apparently cubical piece of glass polished on two opposite