

## Cycle and Motor Cycle Show

*The 1960 Cycle and Motor Cycle Show at Earls Court celebrates the Golden Jubilee of the promoters, the British Cycle and Motor Cycle Industries Association, Ltd. It was opened last Saturday by the Minister of Transport and continues until tomorrow.*

THE exhibits include few innovations among cycles and motor cycles in the strictest senses of the terms. There was on show, however, a small ground effect machine designated a "Hover Scooter" and built in the United States by Rhoades Incorporated; its relationship to a cycle is that it is steered in the corresponding way by developing bank, although the rider's movement is exactly the opposite, i.e. to tighten a turn he leans out on a cycle and in on a "Hover Scooter." Having no wheels, the cushion-rider has no stability in yaw at other than high speeds, when the tail fins become

drive "LE" one of the first of the modern unit-construction machines built in this country. For an open-frame design, however, the firm once again adopted an unconventional solution and on the "Viceroy" the engine and transmission are separated by a propeller shaft running under the footboard. The advantages of this configuration are a more nearly optimum weight distribution, the ability to get at the engine without removing any cowlings—the sparking plugs are beneath plastic covers just in front of the footboards—and the fact that no cooling fan is needed. The engine itself is

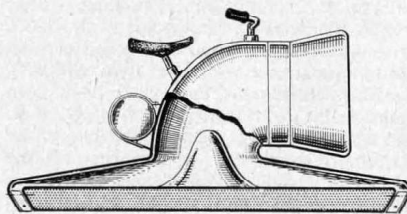


The Rhoades Hover Scooter moving forwards

effective, and so a yaw control is provided. This is achieved by fitting 116 small vanes in the annular jet and connecting the vanes, which are joined by a cable running right round the jet, to a pair of handlebars. Movement of the bars deflects the blades and gives the jet sheet a helical motion; no change in the magnitude of the lift developed can be detected. The machine has a 250 c.c., twin-cylinder, two stroke Yamaha engine driving the forward-facing fan; the weight of the engine is naturally proportionately high in such a small ground effect machine, and so particular attention has been given to the efficiency of the air ducts. Our diagram shows that the internal passages have been shaped to avoid losses due to severe expansions, and in addition a flexible fabric curtain has been fitted which gives some economy in power by reducing the minimum height necessary for moving over an irregular surface. In view of the conspicuous resemblance in principle of this machine to the Cockerell "Hovercraft" in which patent rights are claimed by the National Research Development Corporation, it may be recorded that the principles on which it is based were demonstrated in the United States in 1953 by N.A.C.A. (now N.A.S.A.) and at the U.S. Navy Taylor Basin. The Rhoades vehicle will be marketed in this country by Autohall (Car Hire), Ltd.

A more conventional but yet distinctive scooter making its first public appearance is the Velocette "Viceroy." It may be recalled that Veloce, Ltd., produced with their shaft-

also unconventional; like all the other small Velocette engines, it is a horizontally opposed twin, but, on the presumption that the scooter is accorded less utilisation than a conventional motor-cycle and therefore initial costs compare more heavily with running costs, it is a two-stroke. Clearly, a two-stroke twin of this configuration has the same firing frequency as a single, and the substitution of an unbalanced couple for an



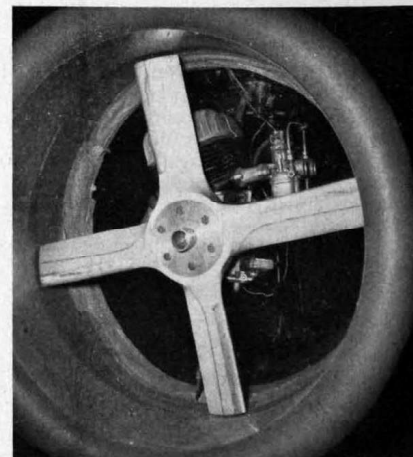
Section through Rhoades ground effect machine

unbalanced force is the only advantage. An apparent disadvantage of such an engine is that unloading of one cylinder by, say, a blocked port will overload the other and possibly pass unobserved. Also, two coils and an enormous silencer are necessary. It has as high a cranking torque as a single and a geared starter is used instead of a dynamotor, but the maker believes that the combined unit, removal of which prevents the engine being run, is too costly in maintenance effort. The starter gear drive is engaged and the

motor energised by a small lever in front of the rider. A more fundamental innovation, at least to this country, is that the engine has an automatic inlet valve.

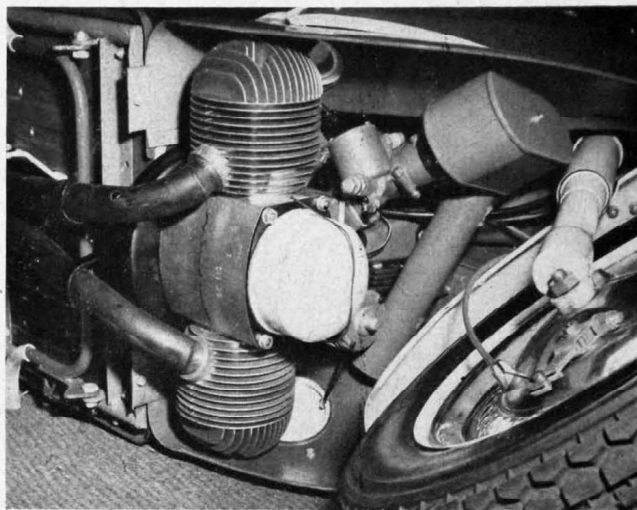
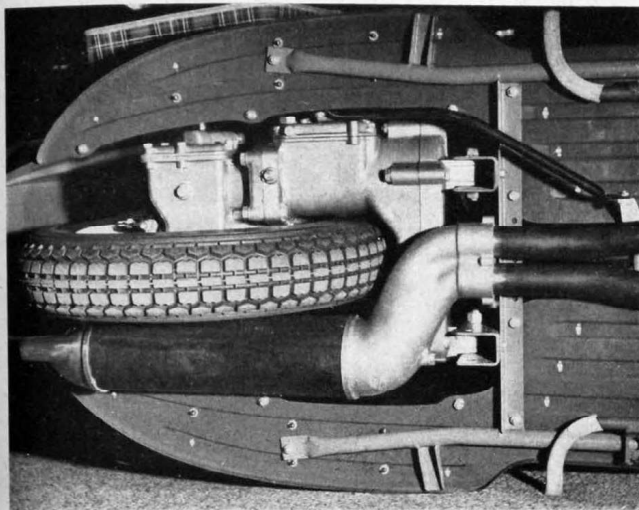
As mentioned, the power is transmitted along the gap in the "frame" by an engine-speed shaft; this is mounted in rubber-bushed universal joints at each end and needs no attention. At the rear end the power enters the swinging arm of the rear suspension; a duplex chain drive carries it to the starboard side. Halfway down the arm is located the four-speed gearbox, operated by a rocking pedal, and the final drive is by spiral bevel gears. It should perhaps be emphasised that while the front suspension is similar to that of the "LE" and "Valiant," the rear suspension is by swinging arm rather than swinging fork in order that a wheel can be removed from under the extensive mudguard. The machine has no lubricating nipples, bearings being either oil impregnated or packed in the factory.

Also of interest among the scooters was that exhibited by the Deutscher Innen- und Aussenhandel Transportmaschinen; the I.W.L. "Berlin" has a footboard formed of a thick and immensely strong-looking aluminium sand-casting. Closer examination of this vehicle discloses that the whole of the cowlings are in thick aluminium sheet, so that they hardly echo when tapped, and that the entire rear body is removable in one piece. The wheels also are light alloy, of riveted construction. The mechanical design is thoroughly unconventional; the swing fork of the rear suspension goes to the bottom ends of long horns carrying the rear hub, and the tops of these links are located by swinging links nearly parallel to the fork. The effect is therefore to generate a parallelogram linkage. Springing is by torsion bars, with a progressive characteristic developed by the rubber cushion prominent in our illustration, and telescopic hydraulic dampers are fitted. This fundamentally attractive solution to the problem of varying chain length with rear suspension travel is, we believe, novel; compared to the discarded Ariel solution of a scissor linkage on a plunger frame, it appears to offer inherently high resistance to displacement of the wheel about the roll axis. The chain itself is, as is the practice in Germany,



The Yamaha twin-cylinder, twin-carburettor two-stroke has the cylinder-head fins in an axial plane

enclosed in rubber tunnels; another typically Continental detail is that the light switch is worked by a key, and both this and the ignition keyholes have covers to exclude water. The detail design of this machine is in many respects worthy of study; for instance,



The "Viceroy" dispenses with a cooling fan by locating the engine at the front; it is a two-stroke with an automatic inlet valve. Between the generator and the air intake duct can be seen the geared starter motor. The clutch, gearbox and final drive are all enclosed in the swinging arm of the rear suspension

the footbrake has a cable of proportions confined to cars in this country. The ends of cables and the sliding sections of the telescopic forks are enclosed in rubber gaiters. All the grease nipples (with which both brake cables and many of the pivots are provided) have the ball valves at the extreme outside of the nipple, so that there is no recess in which dirt or water can remain after the nipple has been wiped clean. Moto Rumi, best known in this country for the "Formichino" twin two-stroke scooters in which all the main components other than the footboards are duralumin die castings, has introduced a scooter of conventional appearance, the "La Strada," in which the engine, of 98 c.c., 125 c.c., or 174 c.c., is an o.h.v. 90 deg. V-twin; this arrangement has been obsolescent for some years in this country, but is presumably the only form of four-stroke that would not compare conspicuously badly with the Rumi engines extant, on which a duodecagonal three-penny piece can be balanced while they are running. The engine is unlike the classical V-twins in having the valves in the transverse plane of the cylinders, so that a single carburettor can be used—the uneven firing order must pose acute problems of

distribution—and in being in unit with the four-speed gearbox. The engine is also mounted in a light motor-cycle, which we illustrate.

Lightweight motor-cycles and sporting machines often do not carry a battery, and

for such applications Joseph Lucas, Ltd., displayed their "energy transfer" ignition system. The ordinary flywheel magneto-generator has no provision for varying the ignition timing and thus compromises the performance of the engine, while the emer-

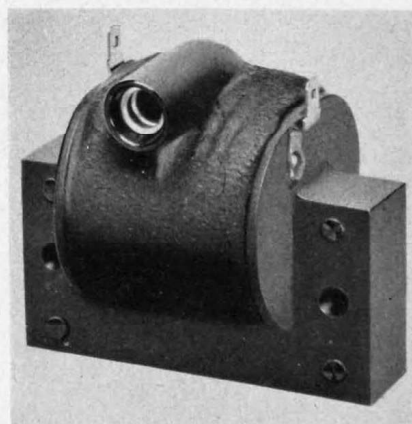


The 90 deg. V-twin engine of the "La Strada" has a single carburettor. In the lightness of the cycle parts the machine is typical of Italian design



The "Berlin" is built extensively of light alloy

gency starting system for machines with alternators is not only critically dependent on the spark being timed at a chosen point in the alternator cycle but also loads heavily the contact-breaker points. The new system has a solid rotor generator in which an adjoining



Ignition coil with closed magnetic circuit for "energy transfer" ignition system