road wheels is taken from the gearbox by a propellor shaft to the rear cross-shaft through spiral bevel and differential gear wheels which are similar to those used for the front drive. The rear differential can also be locked by the driver when desired.

THE FUEL SYSTEM .- The fuel system employs a 14-gallon capacity tank mounted transversely on the front body and feeding the carburetter by gravity.

The carburetter is so placed that a free supply of petrol is obtained when climbing gradients of 45°. A petrol strainer is provided at the bottom of the tank just behind the petrol cock. By unscrewing the large hexagon plug the gauze can be readily withdrawn for cleaning which should be done every 500 miles. The petrol cock must be turned off before removing the strainer. This strainer is so placed that it is not necessary to drain



with the two steering racks mounted one on each frame member.

SUSPENSION .- Each frame is carried on two semielliptic springs of ample proportions, these in turn being attached to the dead axles. These springs make for easy riding of the vehicle when crossing bad country and save the transmission from severe shocks. BRAKES.—Both brakes are of the contracting shoe type

and both act indirectly on all four road wheels. They are mounted on the transmission, one behind the gearbox and the other just in front of the rear bevel pinion casing. The front brake is controlled by a hand lever and the rear brake by means of a pedal. **INCH.** — A winch drum, positively driven by spur gears, is mounted on the rear cross shaft casing. The winch is thrown into operation by

de-

.....

means of a sliding dog which is controlled by a lever mounted at the back of the rear frame close to the door.

WHEELS.-Large semi-solid tyres are mounted on heavy gauge wire spoked wheels. The wheels which are 51" in diameter carry steel strakes which are permanently fixed to the rim and can be swung readily into position on the rim face by releasing a spring loaded trigger. The strakes are invaluable when crossing soft ground.

The Reconnaissance Car

HE Reconnaissance Car differs from the Tractor in the following main points. It has a lighter steel frame made from pressings instead of channel section and the winch is omitted. The wheels are shod with $40'' \times 9''$ pneumatic tyres instead of 51'' diameter semi-solids. The top of the body is 4" lower, the track is 5' 11" instead of 4' $10\frac{1}{3}$ " and the

the fuel tank when it is necessary to clean the strainer.

and wheel, the whole being mounted on ball bearings

and totally enclosed. From the steering box a teles-

copic shaft carried on universal joints connects with the

final steering shaft which is mounted on the central

tubular member of the chassis. Finally a helical gear

engages with a large spur gear which in turn engages

STEERING.—A tubular steering shaft operates a worm

wheelbase is 7' 6.8" instead of 7' 11". The speed on top is 35 m.p.h. instead of 15 m.p.h. at 2,400 revolutions per minute.

The prices of both models can be obtained on application to Armstrong Siddeley Motors, Limited, Coventry, England and 10 Old Bond Street, London, W.1.



Hinged strakes for crossing soft group 51" diameter wire wheels running on rollers and fitted with semi-solid Rear chassis rubber tyres

Detatchable hood

Tool ho

Sheet steel body capable of holding a load of one ton or six men

The Armstrong Siddeley Four Wheel Drive Vehicles

An entirely new type of vehicle possessing a remarkable performance over open country, a high degree of manœuvrability and great load carrying capacity, either with or without trailer.

ARMSTRONG SIDDELEY MOTORS LIMITED

COVENTRY ENGLAND Telephone: Coventry 4061 10, OLD BOND STREET, LONDON, W.1 Telephone : Gerrard 9755-6-7-8 Telegrams :





The Armstrong Siddeley Four Wheel Drive Vehicles

WO years ago after extensive experiments the manufacture of this vehicle, which was designed by the Italian engineer, Signor Pavesi, was taken up by Armstrong Siddeley Motors Limited. Since then the original claims made as to its remarkable per-

formance over open country, general manoeuvrability, load carrying capacity, either with or without a trailer, ability to ford rivers, and run on rubber shod wheels on ordinary roads or to use its blades for traversing the worst surfaces have been thoroughly substantiated.



Diagram showing in plan and elevation the articulation of the front and rear chassis M and N of the vehicle. A and B are the front and rear axles. C is the connecting tube between the central parts of axles, P and Q.

GENERAL DETAILS OF THE VEHICLE

Showing the blades on one of the wheels hinged

rubber tyres.

'HE design of the vehicle is unique and must not be considered as a variation or adaptation of an ordinary motor car. Its special features embrace-

- (a) Four large diameter driving wheels. Entire jointed independence of the front part of the vehicle in
- relation to the back. Correction of turn-(c)
- ing. (d) High ground clearance.

These features provide :

- 1. A maximum towing power for a given weight.
- 2. A constant adherence to the ground and the ability to traverse the roughest country without fear of injuring the mechanism.
- back to permit the vehicle to run direct on its 3. The ability to turn in the most restricted circle possible, even in muddy or sandy soil, and the certainty of steering even at high speed in crowded streets.

4. The maximum mechanical efficiency over any kind of ground, due to the fact that the parts in contact with the ground are not in contact with each other as is the case with caterpillar wheels or wheels fitted with discs.

> The Armstrong Siddeley four-wheel drive vehicle reduced to its simplest form (see sketch) is composed of two axles A and B with corresponding wheels and a connecting tube between the points P and Q of the axles. The axles A and B turn at the same time and at the same angle. The axle B can also turn round the point Q and can in addition oscillate in the vertical plane around the tube C, thus ensuring independence of the chassis and the ability to run over the roughest ground.

The four wheels are all driving wheels, the front axle carrying a chassis M, which is in one with it, and the back axle supporting a chassis N.

These two chassis follow every movement of the two axles when turning as well as when oscillating. The four wheels may thus be of large diameter without touching the parts of the chassis over them.

The power unit consists of a four cylinder aircooled engine which drives through a gearbox providing four speeds and an emergency low gear to all four road wheels thus enabling the whole of the weight of the machine to be used for tractive purposes.

The chassis is built in two halves, which are joined together by a central tubular member. At each end of this central member is a vertical

THE ENGINE.—The engine is an air-cooled four cylinder, 4" bore by $4\frac{3}{4}$ " stroke, developing 45 h.p. at the normal speed of 1,600 r.p.m. Ignition is by standard type magneto. The engine is cooled by a Keith Blackman fan which is positively driven from the front of the unit and draws air through the oil cooler at the front of the

machine. The air then passes over the cylinder heads and around the cylinder barrels and is finally discharged from the fan through a duct between the frame and final drive gear casing.

The dry sump principle of lubrication is used, gear type oil pumps being fitted to the bottom of the oil case. A dural scavenge pump draws oil from each end of the oil base and thus scavenges efficiently at any angle of the machine, the oil being cooled by the cooling radiator at the front of the machine.

The carburettor which is a standard Solex Type M.V.46 is fitted to the offside of the engine.

The crankshaft is machined all over and runs in five white metal lined steel housings.

Overhead valves are operated by rockers running on ball bearings, the whole being totally enclosed and means being provided for rendering valve adjustment easily accessible.

The "Y" alloy pistons are provided with two gas rings and an oil scraper ring.



pivot around which each frame can turn both in a horizontal and vertical direction.

Attached to each frame are the dead axles, the ends of which carry the driving wheels. These dead axles move with their respective frames and thus enable road wheels of large diameter to be used, while eliminating the necessity for cutting away the frame to clear the road wheels, as would be necessary in the case of a vehicle with a rigid frame.

To each frame is also attached a cross-shaft casing through which the carden shafts transmit the drive to the final drive gears. These gears are enclosed in sheet steel casings which protect them from dirt and enable them to be efficiently lubricated.

The Principal Units

The tubular section connecting rods are machined all over while the large diameter gudgeon pins are of the fully floating type.

Starting is by electric motor fitted with a Bendix drive which operates the enclosed flywheel. The dynamo is gear driven from the front end of the engine.



gear wheel. C, fio it chassis. D, rear chassis. E, tubular propeller shaft and F, chassis control member.

The particulars of the engine timing are given on a plate fixed to the top of the fan casing.

GEAR BOX .- The gearbox is an Armstrong Siddeley selfchanging epicyclic type giving four speeds forward and reverse and an emergency low gear and direct drive when on top.

Gear	Ratio	s.	Engine to Road wheel.	M.P.H. at 1600 r.p.m.
4th		1	24.61	9.86
3rd		1.48	36.4	6.67
2nd		2.45	60.3	4.02
lst		4.3	105.8	2.29
Em:	Low	10.5	258.	.95
Reve	erse	7.7	190.	1.28

The gearbox forms a unit with the engine and front cross drive. At the rear end of the gearbox a train of gears leads to the jack shaft which is mounted on ball bearings and provided with adequate means for taking the end thrust.

The cross-shaft drives by helical bevel gears to ensure quietness and smoothness of operation.

The drive to the front wheels is taken through a differential gear which can be thrown out of operation by means of a sliding dog operated from the driver's seat.

THE TRANSMISSION.-The transmission to the rear