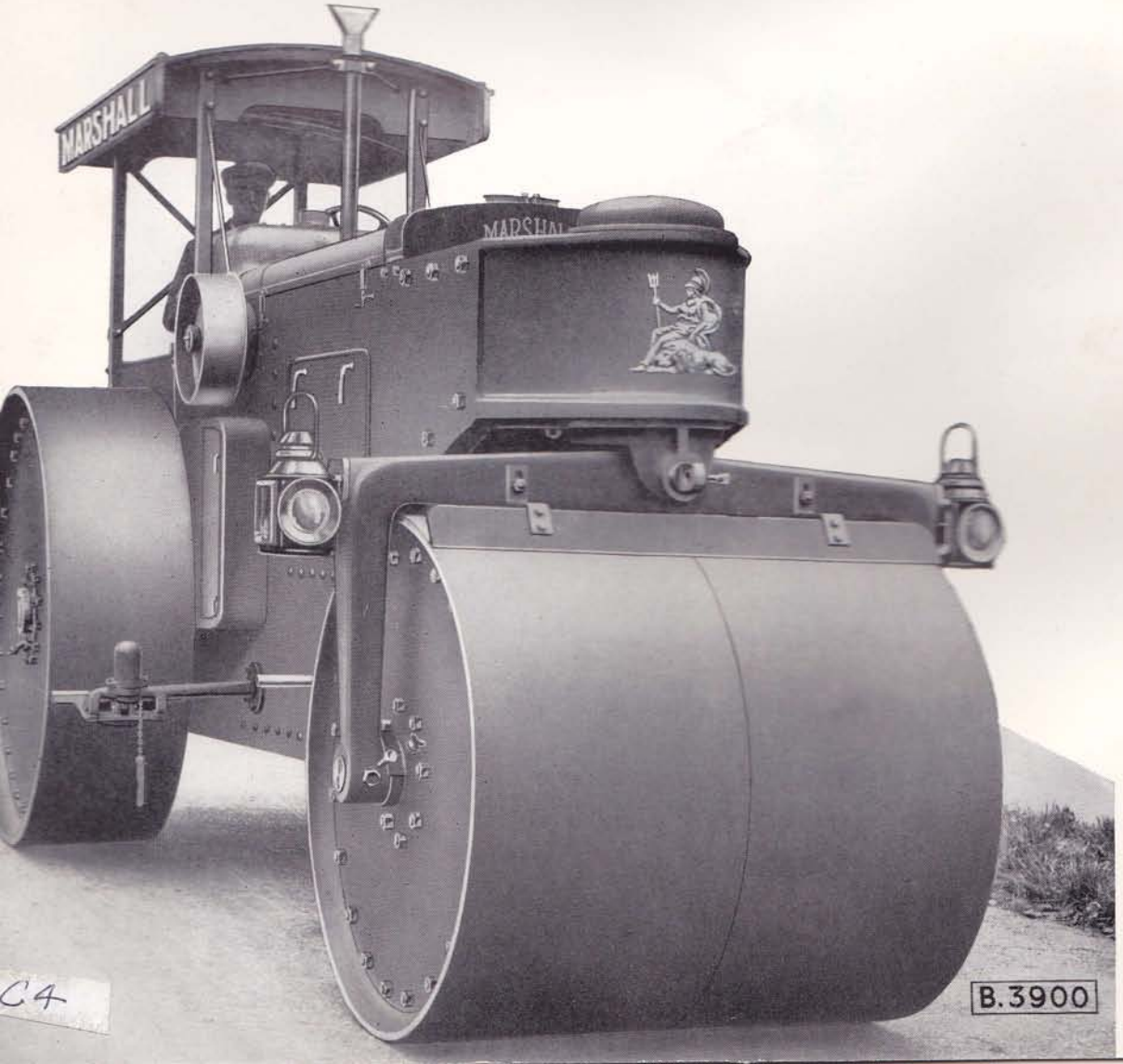
PUBLICATION No. 2390

MARSHALL DIESEL ROLLERS



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PUBLISHED BY

MARSHALL SONS & CO. (SUCCESSORS) LTD.

BRITANNIA IRONWORKS, GAINSBOROUGH

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99, CLIVE STREET, CALCUTTA. MARSHALL'S BUILDINGS, BALLARD ROAD, BOMBAY. 9, SECOND LINE BEACH, MADRAS.

Also at CAWNPORE, KARACHI, LAHORE AND RANGOON.

VIEW OF WORKS.

THE Britannia Ironworks, Gainsborough were established in 1848, and since that time the name "Marshall" has represented all that is best in British Engineering. Because the outstanding characteristic of our productions has always been a successful combination of up-to-date design and superb workmanship, a world-wide reputation has been made, and among other specialities, thousands of Road Rollers have been supplied at home and overseas.

It was in 1925 that Marshalls executed what is thought to be the World's largest road roller contract, 140 steam rollers being supplied to the Greek Government at a production rate of 10 per week.

To meet the insistent demand for oil driven rollers, the vast experience obtained by us has been utilised in the development of the full range of high-class diesel-engined rollers described in this publication. They are entirely of British material and workmanship, and their combined simplicity, strength, and accessibility, are presented in a clean line design of exceptional attractiveness.

The Engines of this series represent the most modern and economical type of Road Roller obtainable. The marked economy and operating advantages which accrue from the utilisation of heavy oil fuel are fully ensured. Roll diameters, overlap of rolls, low centre of gravity, accurate distribution of weight and perfect balance, together with smooth clutch action and power of quick-reverse without "dwell," are points which have been scientifically studied and correctly materialised in our design.

The rims of the rolls are easily renewable, and the massive construction of the front and hind rolls entirely eliminates loose or broken spokes. If desired the rolls can be supplied suitable to receive water ballast.

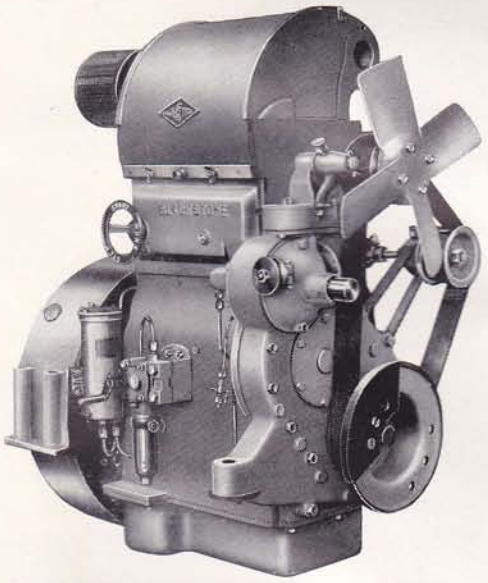
MARSHALL DIESEL ROAD ROLLER

THE POWER UNIT.

BRIEF SPECIFICATION.

Engine.

The power unit is a high-speed Four Cycle Vertical Oil Engine of the Diesel "Solid Injection" Cold-Starting type. No auxiliary starting device is required and one man starts the engine under all conditions. For sizes up to 9 tons, a two cylinder engine is fitted and, in rollers of 10 tons weight and upwards, a three cylinder engine is employed. Power to weight ratio is a notable feature and in all sizes the engine provides ample power, not only on level roads, but for working on



Two-cylinder Diesel Power Unit.

gradients. Compared with the running cost of petrol-power unit, this type yields a fuel cost saving of 75% to 85%. Engine Fuel can be any grade of Gas Oil, Diesel Oil, or Solar Oil, generally conforming to the following specification. Specific gravity not exceeding .90, and viscosity not greater than 50 secs. Redwood at 100°F.

Cooling System.

Cooling is effected by a vertical tubular radiator of ample capacity, assisted by pump and fan.

Governor.

An efficient governor of the enclosed type controls engine speed. The flexibility of engine speed is notable, as the range is from 400 to 1,200 r.p.m., being easily varied by a hand control on the dash. The governor controls the engine at all speeds in this range.

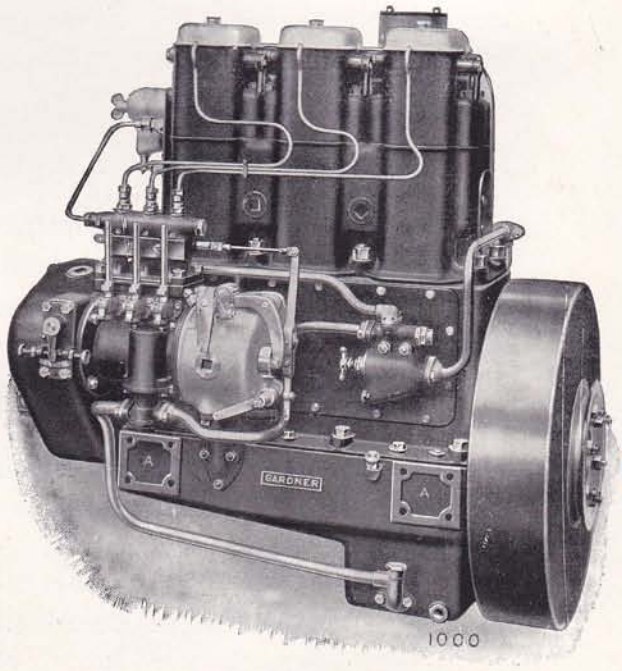
Low Fuel Costs.

A fuel consumption of .42 lbs. of heavy oil per B.H.P. per hour is the remarkably low figure at which full load can be carried, and at half-load, the figure is only slightly increased.

Great Strength of Framing.

The design of main frame ensures great stability, and preserves a low centre of gravity. The frame is formed of two steel plates braced at the rear end by the built-in water tank for supplying water sprayers. At the front end, the side plates are attached to the steering head casting, and, centrally placed, there is a strong stay plate ; thus a most rigid structure is formed.

The brackets carrying the gearbox and the hind axle are fitted into bored and turned facing plates.



Three-Cylinder Diesel Power Unit.

Gearbox.

All gearing (the final drive excepted) is encased in a dustproof gearbox which forms an oil bath.

Speeds.

Three speeds forward and backward are provided, viz., 1.25, 1.75 and 3.3 miles per hour, for all models except the three smallest, which have two speeds of 1.6 and 3.4 m.p.h. The speeds given are at 1,000 r.p.m. of engine. The maximum speed when travelling in fast gear is 4 m.p.h. at 1200 r.p.m. of engine.

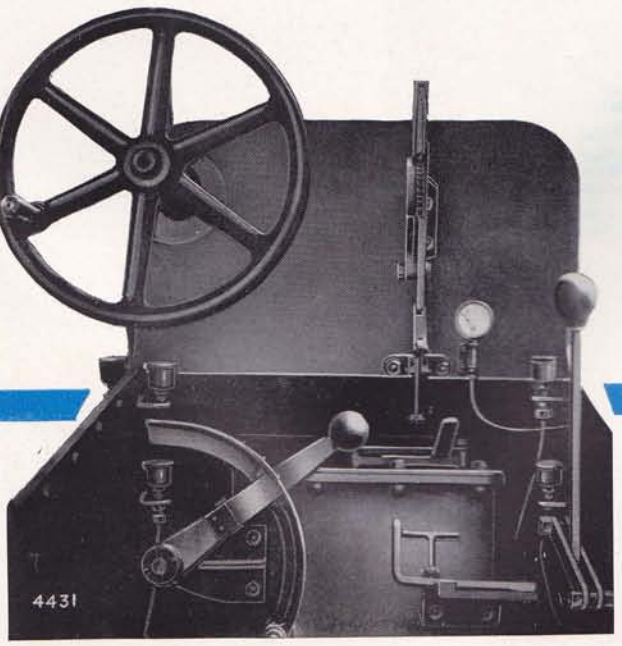
All gears, including the four-pinion differential, have machine cut teeth from steel blanks, with the exception of the final drive gears.

Transmission.

The Inverted Cone Clutches are Ferodo-lined, and transmit power from the first cross shaft in gearbox. The extraordinary ease, absence of shock, and smoothness of action of the quick-reverse are ideal for rolling hot bitumastic carpetings.

Brakes.

A foot operated brake of the internal expanding type, is fitted on one of the intermediate shafts, and a hand-operated Screw Brake is provided, acting directly on the hind rolls.



Steering Gear.

Steering is effected by means of a handwheel mounted on an inclined spindle, and coupled by means of bevel gears to a worm operating a segment directly attached to the steering head. The steering fork is fitted between the jaws of the steering head, pivoting on the forecarriage pin.

Rolls.

The rolls of the 3½, 4 and 5 tons are made of cast iron. In the 6 tons size, the rims are of mild steel with steel side plates, and cast iron bosses, securely bolted together. The rims of the 7 tons size and upwards are of cast iron. The rims of the 6 tons size and upwards are renewable.

Scrapers.

Adjustable scrapers covering the whole width of the front rolls are fitted front and back. Spring-operated Scrapers to front and back of hind rolls.

Fuel Tank.

Of ample capacity for a full week's work.

EXTRA EQUIPMENT.

Belt Pulley.

To drive auxiliary machinery. Designed to transmit the full power of the engine at a belt speed of 2,000 ft. per minute.

Scarifier.

See page 8.

Water Sprayers.

The roller is arranged to carry water for spraying purposes, and water sprayers can be fitted to the front and hind rolls.

Awning.

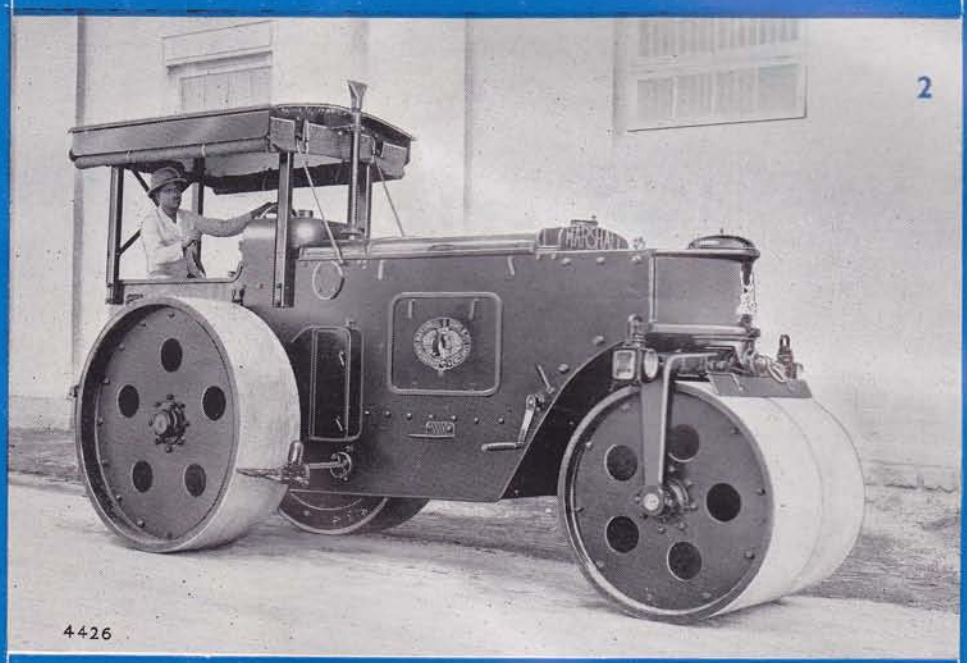
Affording complete protection for driver.

Curtains.

Waterproof side and end curtains, to attach to awning.

Hand Pump & Hose.

A semi-rotary hand pump fitted with 26 ft. of suction can be supplied for filling the water tank.



Notable C

Multi-cylinder Power Unit g
flexibility, and ease of sta

All-gear drive in totally enc
drive to hind rollers.

Differential enclosed in dustp

Gearbox with differential lock
seat.

Quick reverse through doul

Cold-starting engine mounte

Machine-cut gears.

One-piece steel frame of gr

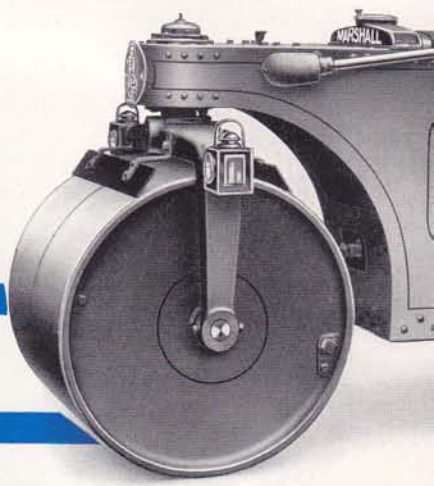
Finger-light steering with no "

Unrestricted vision for driver

Correct power in proportio

Effective grouping of all c

Scarifier capable of operating



1. 8 ton roller supplied to the Ma
with steel side plates and cast ir

2. 10 ton roller supplied to the Ex
Karachi, India.

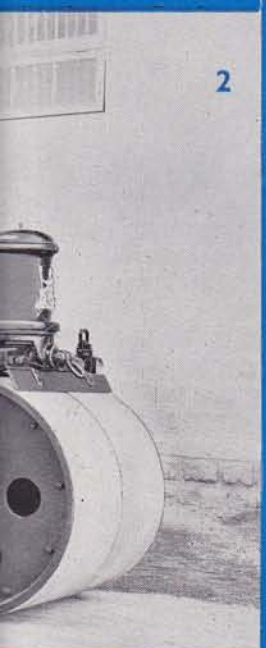
3. 6 ton roller supplied to the Roya
rolls.

4. Illustration of Diesel Rollers as

5. 6 ton roller supplied to the Bex
water ballast rolls.

6. 9 ton Roller supplied to the Boro
attachment.

7. The 9 ton Diesel Roller supplie



Notable Characteristics.

Multi-cylinder Power Unit giving perfect balance, even torque, flexibility, and ease of starting.

All-gear drive in totally enclosed oil bath gear box, with double drive to hind rollers.

Differential enclosed in dustproof oil bath.

Gearbox with differential locking device operated from the driver's seat.

Quick reverse through double clutches without gear change.

Cold-starting engine mounted in centre of roller chassis.

Machine-cut gears.

One-piece steel frame of great strength.

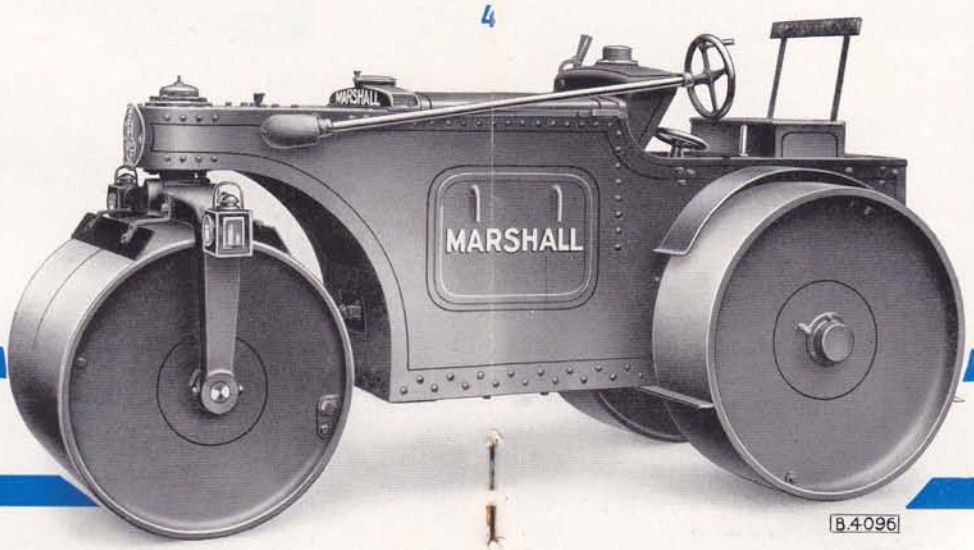
Finger-light steering with no "back-lash" (chains are not employed).

Unrestricted vision for driver and powerful independent brakes.

Correct power in proportion to the weight.

Effective grouping of all controls.

Scarifier capable of operating in four positions at back of roller.



1. 8 ton roller supplied to the Manchester Corporation, showing cast iron rolls with steel side plates and cast iron hubs.

2. 10 ton roller supplied to the Executive Engineer, Karachi Buildings Division, Karachi, India.

3. 6 ton roller supplied to the Royal Borough of Kensington, showing steel plate rolls.

4. Illustration of Diesel Rollers as made in sizes from 3 to 5 tons.

5. 6 ton roller supplied to the Bexhill Corporation, showing the application of water ballast rolls.

6. 9 ton Roller supplied to the Borough of East Retford, showing two line scarifier attachment.

7. The 9 ton Diesel Roller supplied to the Borough of New Windsor.

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of Kensington, showing steel plate

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Retford, showing two tine scarifier

rough of New Windsor.

GEAR BOX

The Acme of Mechanical Perfection

The drive from the engine flywheel is transmitted by a fabric flexible coupling to the flanged coupling A. It then passes through shaft and bevel pinion to the pair of bevel wheels BB which rotate in opposite directions. The bevels are connected to the outer member of the cone clutches CC which transmit the drive in the desired direction to centre spur pinion D when either of the inner clutch cones E are engaged. The drive then passes from the spur pinion D to the wheel F on the counter-shaft, which carries the change speed pinions F, G and H. To travel in slow gear the pinion H is engaged with the spur wheel J. The drive then passes through the spur pinion K to wheel L on the differential casing, and then through the differential gearing to the main driving pinions N.

Slow Gear Drive is through B, D, F, H J, K, L, M, N.

Second Gear Drive is through B, D, F, G, P, K, L, M, N.

Fast Gear Drive is through B, D, F, R, K, L, M, N.

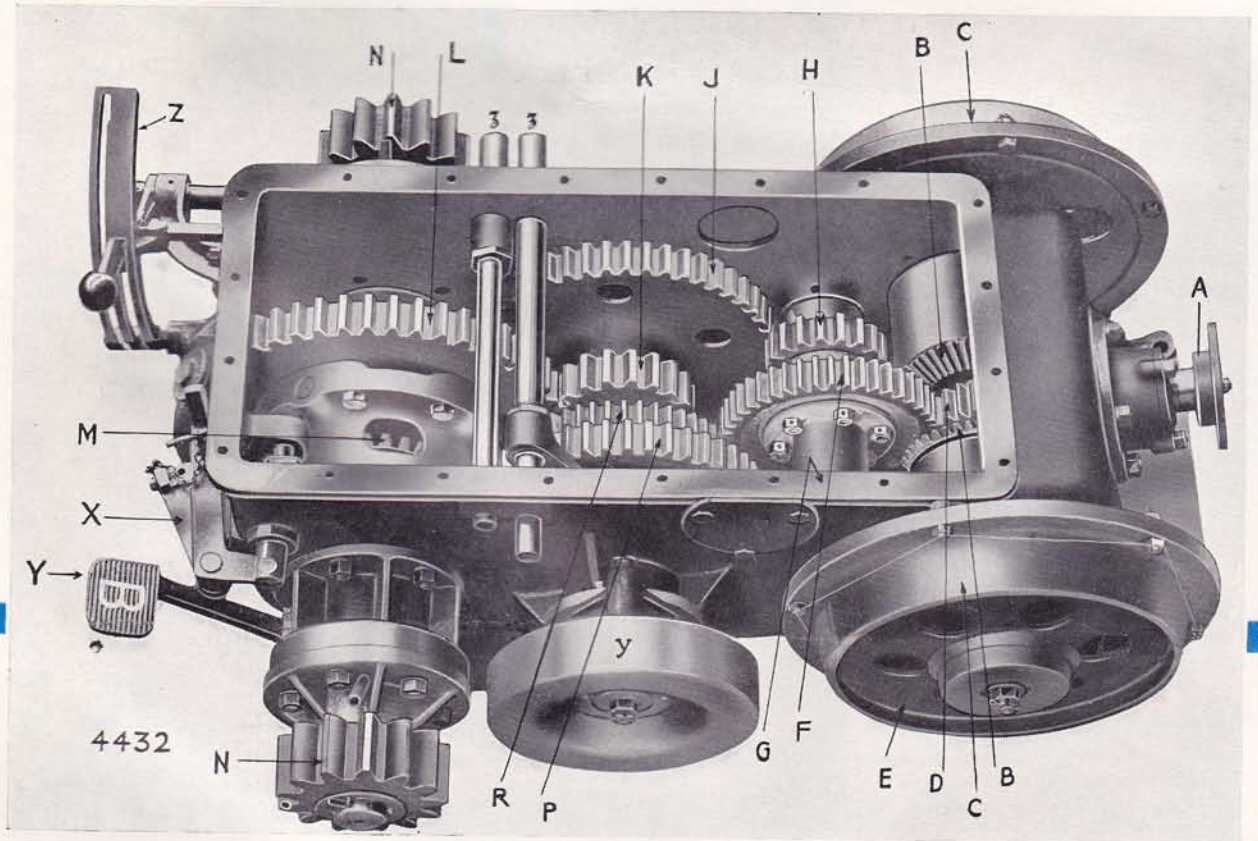
Ball and Roller Bearings on fast speed gear, and gunmetal bearings on slow speed, differential and all gears except final drive N work in oil bath with steel sheet cover.

G is not shown as it is hidden by flange of gear box. It is on the same shaft as F and H and engages with P for second gear.

Zzz—Gear Change Control and selector rods.

Yy—Foot Brake and foot brake drum.

X—Differential Locking Control.



The Marshall Cambering Axle

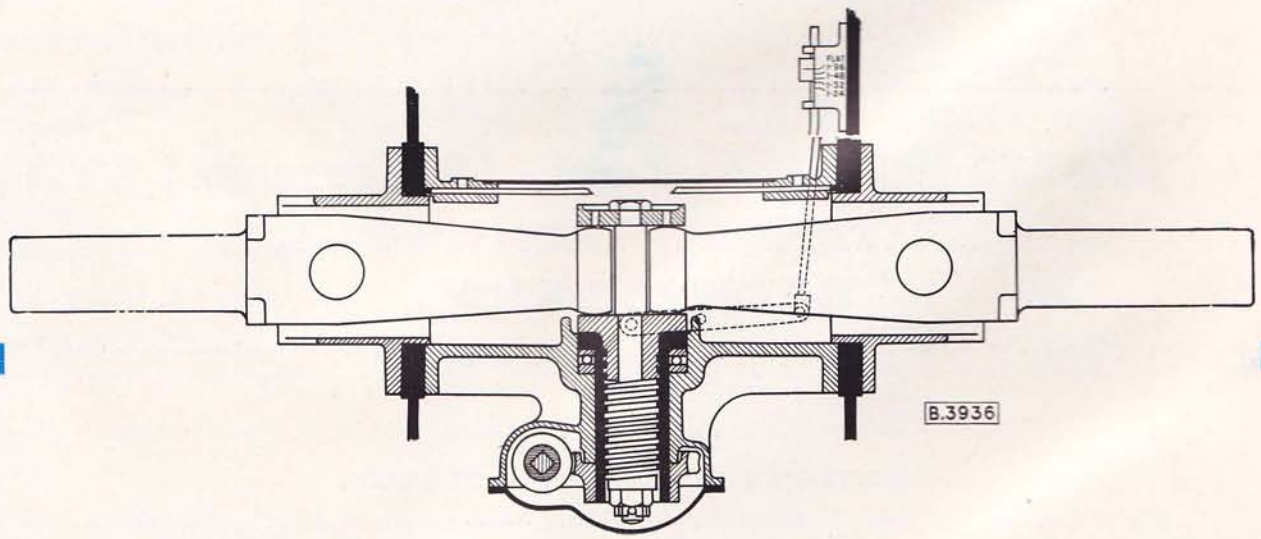
The standard equipment of all our diesel rollers includes a rigid axle, but all models from and including the six ton size can be fitted with our highly successful articulated main axle at moderate extra cost.

This special axle is a two-piece mechanism, centrally divided, and adjustable for different road curvatures. It solves the problem of providing super-elevation, in addition to the type of camber commonly used. The danger of damaging the surface by cutting with the outer edges of the rolls (due to the usual camber provided on ordinary roller rims) is entirely eliminated. Rolls can be adjusted for either a perfectly flat super-elevation, or it is capable of adjustment to roll a slightly concave super-elevation. The axle can also be adjusted to roll any normal camber desired, barrel or sloped.

The adjustment is positive and self-locking when the two axle arms are set to any pre-determined degree of camber, thus tending to maintain the desired camber throughout the length of the road being constructed.

We have adopted the positive adjustment and self-locking method because of its superiority over any spring or other type of flexible mounting of the inside ends of the two axle parts. This latter method, whilst giving an automatic action, must obviously cause variations to the road camber. Every time any initial irregularity occurs, due to imperfect spreading of material, or faults in foundation courses, a flexible mounting has a tendency to produce waves or corrugations, thus defeating the main object of making the finished surface smooth for traffic.

Our method of rigidly locking the two axle parts has proved highly satisfactory. Each half axle is supported on horizontal trunnions. Both half axles are positively adjustable for inclination, and to any degree of camber. The camber can be varied at will from level to 1 in 24, and graduated indicator shows :—level, and cambers of 1 in 96, 1 in 48, 1 in 32, and 1 in 24. Any degree of camber is obtained by a few turns of the handle. The camber gear is automatically locked when the operating handle is removed.

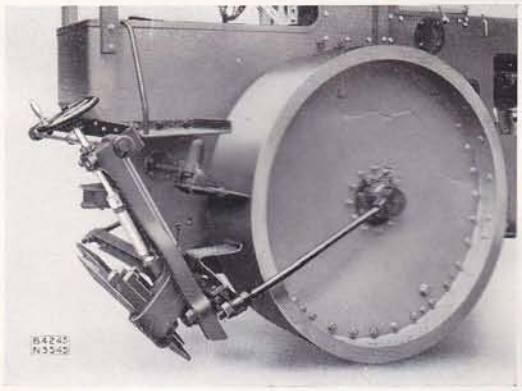


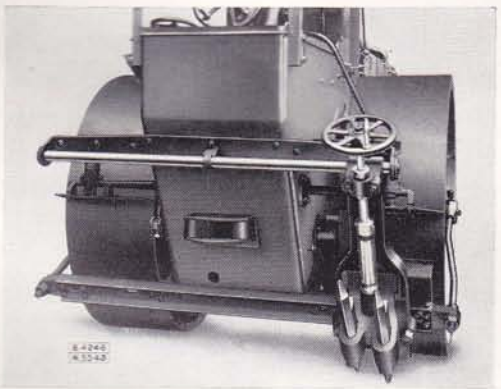
Scarifier

The Scarifier we recommend for the "MARSHALL" Diesel Road Roller is a thoroughly modern "Allen" type which slides on a frame directly attached to the rear of the roller, as shown in the illustrations. The frame is rigidly stayed to the main axle.

After removing two bolts, the scarifier can be slid across the end of the roller, and can be fixed in any one of the four positions provided. The two outside positions enable the scarifier tines to work close up to a road curb on either side, and with the two intermediate positions available, it is possible to scarify easily the full width of a road without changing over the direction of the roller. This is a great advantage when working on narrow roads, and will be readily appreciated by road roller users.

Scarifiers are not recommended for attachment to rollers under six tons weight. A single tine scarifier is available for six ton rollers and above that size a two tine implement can be applied.





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MARSHALL DIESEL ROLLERS

General Dimensions, Weights, Code Words, Etc.

TYPE	3½ R.D.	4 R.D.	5 R.D.	6 R.D.	7 R.D.	8 R.D.	9 R.D.	9½ R.D.	10 R.D.	11 R.D.	12 R.D.
CODE WORD	IKABO	IKECA	IKECY	IKIDE	IKOEL	IKURI	IKYMU	ILACY	ILEER	ILITA	ILOME
Approx. Weight in Working Order of Roller without Extras	3½ tons	4 tons	5 tons	6 tons	7 tons	8 tons	9 tons	9½ tons	10 tons	11 tons	12 tons
*Max. Weight in Working Order with water ballast and Extras	4	4½	5	7½	8½	9½	9¾	10¾	12	13	14
Diameter of Hind Rolls	3′ 6″	3′ 6″	3′ 6″	4′ 6″	4′ 9″	4′ 9″	4′ 9″	5′ 0″	5′ 0″	5′ 0″	5′ 0″
Width of Hind Rolls	14″	14″	14″	15″	16″	18″	18″	18″	20″	20″	20″
Diameter of Front Rolls	3′ 0″	3′ 0″	3′ 0″	3′ 3″	3′ 6″	3′ 6″	3′ 6″	3′ 9″	3′ 9″	3′ 9″	3′ 9″
Width of Front Rolls	2′ 10″	2′ 10″	2′ 10″	3′ 9″	4′ 0″	4′ 0″	4′ 0″	4′ 0″	4′ 0″	4′ 2″	4′ 2″
Total Width of Road Rolled	4′ 6″	4′ 6″	4′ 6″	5′ 6″	5′ 11″	6′ 3″	6′ 3″	6′ 3″	6′ 7″	6′ 7″	6′ 7″
Overlap of Rolls	4″	4″	4″	4½″	4½″	4½″	4½″	4½″	4½″	5½″	5½″
Wheelbase	7′ 0″	7′ 0″	7′ 0″	9′ 7″	9′ 7″	9′ 7″	9′ 7″	10′ 0″	10′ 9″	10′ 9″	10′ 9″
Overall Length	10′ 8″	10′ 8″	10′ 8″	15′ 6½″	15′ 8″	15′ 8″	15′ 8″	16′ 4″	17′ 3″	17′ 3″	17′ 3″
Capacity of Fuel Tank (Galls.)	5	5	5	15	15	15	15	25	25	25	25
Capacity of Water Tank (Galls.)	25	25	25	85	85	85	85	100	100	100	100
Engine B.H.P. at 1200 R.P.M.	15	15	15	24	24	24	24	24	36	36	36
Number of Cylinders	2	2	2	2	2	2	2	2	3	3	3

* The Maximum weights given would be inclusive of all extras supplied, and water ballast in front and hind rolls.

Models available to Customers requirements from 12 tons to 20 tons weight.

Telegrams : " ENGINE RAND, LONDON."
Telephone : TEMPLE BAR 5792 & 5793.

MARSHALL, SONS AND COMPANY (Successors) LTD.

ENGINEERS.

N.B.—ALL DATES FOR DELIVERY ARE GIVEN SUBJECT TO A REASONABLE EXTENSION OF TIME TO BE ALLOWED IN CASES OF STRIKES, LOCK-OUTS OR OTHER CIRCUMSTANCES BEYOND OUR CONTROL.

All communications to be addressed to the Company and not to individuals.

Britannia Iron Works,
GAINSBOROUGH,
ENGLAND.

Dear Sirs,

In directing your attention to the machinery we man facture for Municipal and Road Contractors' service, we trust the enclosed publication dealing with the latest range of Marshall Diesel Rollers may prove of interest.

We are also sending you brochure illustrating and describing the small Motor Rollers for footpath and light road work, and would point out that while reference in this publication is only made to petrol power unit, we can fit a 2 or 4 stroke Diesel Engine. It will therefore be understood that we offer a complete range of Rollers from 2 to 20 tons suitable for every conceivable purpose, and powered to suit individual requirements.

Fully appreciating the fact that many Officials and Contractors still have a preference for Steam Rollers, we are maintaining in production our range of Class "S" Steam Rollers (See Catalogue 2380), and these are available in sizes from 6 to 20 tons.

The New Marshall 12/20 All-British Diesel Tractor has a wide application for municipal service, and is being successfully employed for hauling gang rollers, gang mowers, tar spraying plant, chip boxes and other appliances. Its sturdy construction, simplicity in operation and remarkably low running costs make a strong appeal, and further details are contained in the folder herewith.

With the modern equipment now available, providing easy starting, simple handling and low running costs and maintenance charges, many Councils are buying their own Rollers in preference to hire, and there is no doubt that considerable economy can be effected in this way, apart from the convenience of always having your own machinery exactly where you want to use it.

We cordially invite your enquiries for any machinery as outlined herein, and assuring you of our close attention to your requirements.

Yours faithfully,

MARSHALL, SONS AND COMPANY (SUCCESSORS) LTD,

C C Hudson

SALES MANAGER.