

"TRADER" SERVICE DATA No. 91

Articles in this series are written by the Technical staff of "The Motor Trader" and checked by the service managers of the vehicle manufacturers. They appear fortnightly. No. 92—CASE TRACTOR, July 3.

Servicing the Hudson

Sixes and Eight, 1939

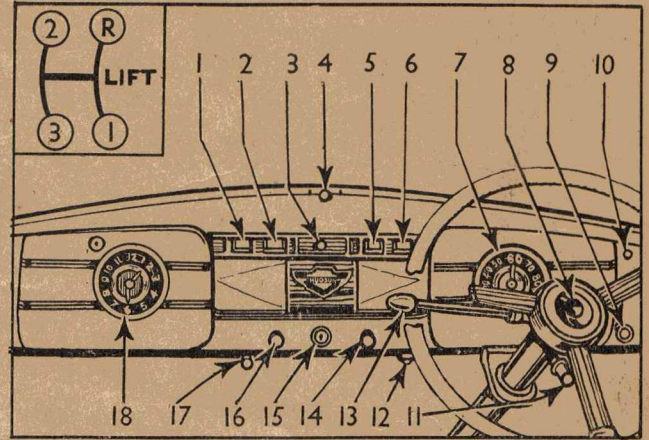
A HIGH degree of standardisation has been achieved in the design of the Hudson range, many components being common to all types.

Briefly the 112, the smallest model, has a 16.9 h.p. engine. Next in size is the Six, with a 21.6 h.p. engine. The Country Club series embraces the long-wheelbase Six and the Eight of the same wheelbase. There is also a long-wheelbase Eight.

Although the Electric Hand gear change was used chiefly on 1938 models, being fitted to only a few 1939 cars, a description of it is included, as its apparent complexity may deter some repairers from attempting to deal with simple faults.

Flat rate schedules for repairs are still being operated by Hudson Motors, and a selection of prices is given here under the appropriate headings. They have, however, owing to wartime conditions, been raised, and 10 per cent. should be added to prices given.

Apart from S.A.E. spanners, special tools are not required. A universal type of hub puller is necessary for axle service.



Instruments and Controls, Hudson Six:

1. Petrol gauge.
2. Oil pressure indicator.
3. Ash tray.
4. Screen wiper control.
5. Dynamo charge indicator.
6. Water temperature gauge.
7. Speedometer.
8. Horn button.
9. Choke.
10. Headlamp beam indicator.
11. Bonnet lock handle.
12. Service light.
13. Gear lever.
14. Light switch.
15. Ignition lock.
16. Starter switch.
17. Scuttle ventilator control.
18. Electric clock.

ENGINE

MOUNTING AND REMOVAL

Three rubber mountings, one each side of front bearer plate, one below front of gear box. Pull bolts up tight against distance pieces and pin.

Engine and gear box come out as unit. Remove bonnet top (undo hinge at front end), bonnet sides, radiator and lid of gear box, disconnect controls, pipes, wires and propeller-shaft front end. Fit slings below front of sump and round gear box. Draw out forwards and upwards.

Remove engine and gear box from frame, refit or fit exchange engine, Six £2 15s.; Eight £3 5s.

Renew rubber mountings: front 8s.; rear £2 10s.

Overhaul engine (including removal, dismantling, refitting all bearings and camshaft, grinding valves, re-assembling and replacing), Six £15 10s.; Eight £17.

CRANKSHAFT

Three main bearings on Sixes, five on Eights. White metal-lined bronze shells located in housings by countersunk screws. Running clearance 0.002in., end float, controlled by centre bearing flanged at both sides, 0.006in.-0.012in. Shims between caps and crankcase for adjustment of running clearance. Scrape to fit if neces-

sary. Bearings can be taken up with engine in place, but to change or inspect top halves engine must be taken out and crankshaft removed.

CRANKSHAFT DATA

	Main Bearings					Crank-pins
	Front	No. 2	Centre	No. 4	Rear	
Length:						
Sixes ...	1 1/8"	—	1 1/2"	—	2 3/8"	1 3/8"
Eight...	1 1/8"	1 1/8"	1 1/2"	1 1/8"	2"	1 3/8"
Diameter:						
Sixes ...	2 1/4"	—	2 3/8"	—	2 1/2"	1 1/8"
Eight...	2 3/2"	2 1/8"	2 1/2"	2 3/8"	2 1/2"	1 1/8"

Flywheel bolted to crankshaft flange. Shrunk on starter ring gear, 134/9 teeth.

Front and rear main bearing caps fit machined openings in crankcase, finishing flush with sump flange. Grooves in case and caps for packing. Front cap has horizontal as well as vertical grooves, and must be removed with puller to shear packing. When replacing use cotton wick driven in with long punch. See that split oil retainer on rear bearing fits tightly.

Torsional vibration damper keyed to front end of crankshaft in front of timing gear with distance piece between which passes through oil seal in timing case. Assembly secured by starter dog nut with male thread screwed into hollow end of shaft.

Damper is in two halves bolted together by setscrews, can be dismantled for replacing rubbers.

Adjust main bearings (sump removed), Six £2 5s.; Eight £2 17s. 6d.

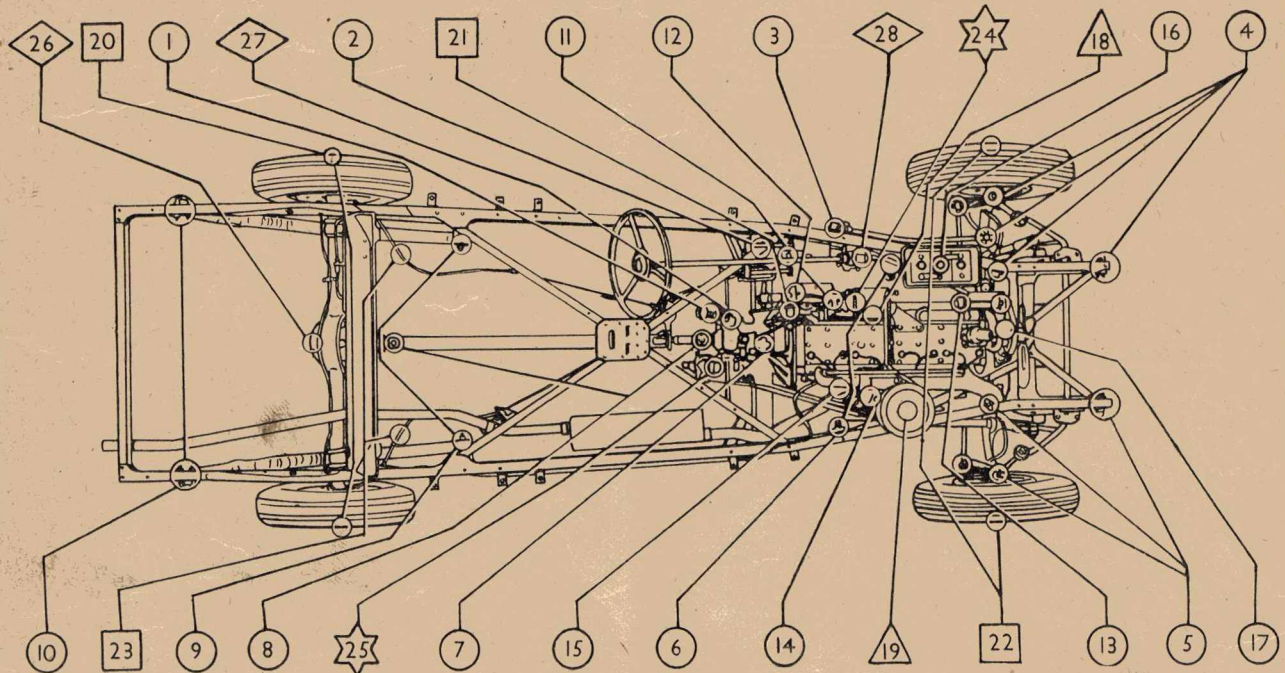
CONNECTING RODS

Big ends direct white-metalled. Running clearance 0.002in., side clear-

ENGINE DATA

	112	Six	Eight
No. of cylinders	6	6	8
Bore & stroke:			
mm.	67.45 x 127	76.2 x 127	76.2 x 114
in.	2 3/4 x 5	3 x 5	3 x 4 1/2
Capacity:			
c.c.	2,723	3,475	4,162
cu. in.	167	212	254
R.A.C. rated h.p.	16.9	21.6	28.8
B.H.P.	76	101	122
at r.p.m.	3,800	4,000	4,200
Compression ratio	6.25		6.25
Firing order	1 5 3 6 2 4		
Valve clearance (hot):			
inlet	.006"		.006"
exhaust	.008"		.008"
Breaker gap	.020"		.017"
Plugs: type	Champion J8, 14 mm.		
gap	.032"		
Capacities:			
sump	10 pts.		14 pts.
water system	2 1/2 gals.		3 1/2 gals.

HUDSON MAINTENANCE DIAGRAM



KEY TO CHASSIS DIAGRAM

EVERY 1,000 MILES (CIRCLE)

1. Governor switch, auto clutch control (underneath)—grease.
2. Brake and clutch pedals—grease. Cross-shaft pivots and rods—engine oil.
3. Drag link—grease.
- 4, 5, 6. King pins, ball joints, spring seats (not on 112), spring shackles—grease.
7. Clutch release bearing—grease.
8. Universal joint splines—grease.
9. Rear spring anchorages—grease.
10. Rear spring shackles—grease.
11. Top up brake master cylinder—use Hudson hydraulic brake fluid.
12. Starter motor bearings—winter engine oil.
13. Dynamo bearings—winter engine oil.
14. Control rod joints—engine oil.
15. Distributor: breaker arm pivot, spindle oiler, top of spindle—engine oil; cam—grease.

16. Battery—top up with distilled water.
17. Water pump shaft—grease.

EVERY 2,000 MILES (TRIANGLE)

18. Engine—drain sump and refill.
19. Air cleaner—wash and re-oil.

EVERY 5,000 MILES (SQUARE)

20. Rear wheel bearings—grease.
21. Clutch—drain and refill with Hudsonite compound.
22. Front wheel bearings—grease.
23. Brake cables and conduits—grease.

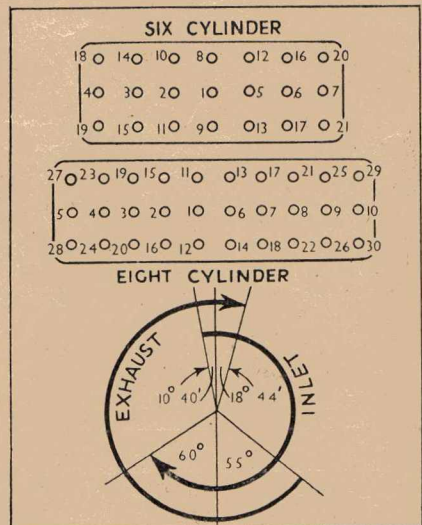
EVERY 10,000 MILES (STAR)

24. Automatic clutch cylinder—remove plug and insert 1oz. shock-absorber fluid.
25. Electric hand—disconnect pipe at front of power cylinder and inject 1oz. shock-absorber fluid.

TWICE YEARLY (SPRING AND AUTUMN) (DIAMOND)

26. Rear axle—drain and refill.

27. Gearbox—drain and refill.
28. Steering gear—top up.



RECOMMENDED LUBRICANTS

Engine : Summer	Castrol XL Castrolite	Mobiloil A Mobiloil Arctic	Double Shell Single Shell	Motorine M Motorine E	Essolube 30 Essolube 20	Duckham's NPXX Duckham's NPX
Gear Box, Rear Axle, Steering Gear.	Castrol Hi-Press	Mobiloil EPW	Shell EP Spirax Light	Motorine EP	Essoleum Expee 110	Duckham's XS-Press
Clutch Release, Chassis Nipples, Universal Joint Splines, Water Pump, Springs.	Castrolase Medium	Mobilgrease No. 2	Shell Retinax	Belmoline D*	Esso Grease	Duckham's Laminoid
Wheel Bearings	Castrolase Extra Heavy	Mobilgrease No. 4	Shell Heat-proof Grease	Price's High-Speed Grease	Esso Grease	Duckham's HBB Grease
Distributor Cam	Castrol WP Grease	Mobilgrease No. 2	Shell Retinax	Belmoline B	Esso Grease	Duckham's Laminoid
Brake Cables and Conduits	Castrolase G	Gargoyle Grease Graphited	Shell Retinax	Belmoline B	Esso Grease	Duckham's Laminoid

* Belmoline B for steering drag link and water pump.

"TRADER" SERVICE DATA (Continued)

HUDSON SIXES AND EIGHT

ance 0.006in.-0.010in. No shims are now provided. If worn fit replacement rods.

If bearing runs, carefully clean all traces of white-metal from oil troughs and webs.

Big end caps are now secured with Palnut spring steel locknuts.

Fit rods so that oil scoops on big end caps face to off side.

Small ends bronze bushed. Gudgeon pins should be hand push fit at shop temperature.

PISTONS

Lo-Ex, T slot. Larger Six and Eight have cam-ground skirt. Skirt clearance on smaller Six 0.002in., on cam-ground pistons 0.001in.-0.002in. on thrust side.

Replacement pistons available in oversizes covering worn bores and standard rebores up to 0.020in. Can be ordered by code letter (stamped on head) as follows:—

CYLINDER	PISTON	RING
Oversize	Code	Code
Standard	A	B
0.0005	B	C
0.001	C	D
0.0015	D	E
0.002	E	F
0.0025	—	G
0.003	—	H
0.0035	—	I
0.004	—	J
0.0045	—	K
0.005	—	L
0.010	AO	BO
0.0105	BO	CO
0.011	CO	DO
0.0115	DO	EO
0.012	EO	FO
0.0125	—	GO
0.013	—	HO
0.0135	—	IO
0.014	—	JO
0.0145	—	KO
0.015	—	LO
0.020	—	BB
0.021	—	DD
0.022	—	FF

Standard

0.003

0.003

0.003

0.003

0.005

0.010

0.010

0.010

0.010

0.010

0.010

0.010

0.015

0.020

0.025

0.025

Cylinder bore code is stamped on tappet cover face of cylinder block. Pistons are stamped on head with code letter and weight. For instance 10 3 means 10.3oz. Pistons should all be same weight.

Four rings, all above pin on smaller Six, three above, one below pin on larger Six and Eight. Lower two oil control rings. All rings are pinned to prevent turning. Gap 0.009in.-0.011in., free fit in grooves without play.

Gudgeon pin, located by circlips, should be push fit in piston at boiling temperature.

Big ends will pass through bores on all but smaller Six, on which assembly should be pushed up until gudgeon pin can be driven out, con-rod then being withdrawn from below, and piston through top.

Fit new gudgeon pins and piston

rings (including removing cylinder head), £3 14s.

Fit new gudgeon pin (21.6 h.p.), 16s.; (16.9 h.p.), £2.

Remove, clean and replace cylinder head, Six £1 5s.; Eight £1 10s.

CAMSHAFT

Driven by helical gears, large wheel bakelite. Three bearings on Sixes, five on Eight, white-metal bushes, dowelled from outside by short copper pipes punched in. Running clearance 0.002in. End thrust taken on front face of crankcase and by spring-loaded plunger in end of camshaft pressing against button on timing cover. Timing wheels centre-punch marked for correct mesh. Large wheel bolted to flange on camshaft with three unequally spaced bolts. Heads wired together.

Camshaft can be removed with engine in place if tappets, oil pump, petrol pump and radiator are removed.

Remove and refit camshaft (including adjusting tappets and resetting valve and ignition timing), Six £4 5s.; Eight £4 10s.

Renew all camshaft bearings (complete operation), Six £7; Eight £8 10s.

Remove and refit timing cover, all engines, £1 15s.

VALVES

Side by side. Same size on Sixes but different material, so not interchangeable.

	VALVE DATA		
	Sixes	Eight	
		Both	Inlet
Head diameter ...	1 3/8"	1 1/2"	1 3/8"
Stem diameter ...	3/16"	3/16"	3/16"
Face angle ...	45°	45°	45°
Spring pressure @ 2" ...	40 lbs.	40 lbs.	40 lbs.

Single springs in sheaths.

Valve guides renewable. Press in from above until top is 1 1/8in. below top face of block on Sixes, 1 3/8in. on Eights. Ream out to 0.002in. larger than valve stem when in place.

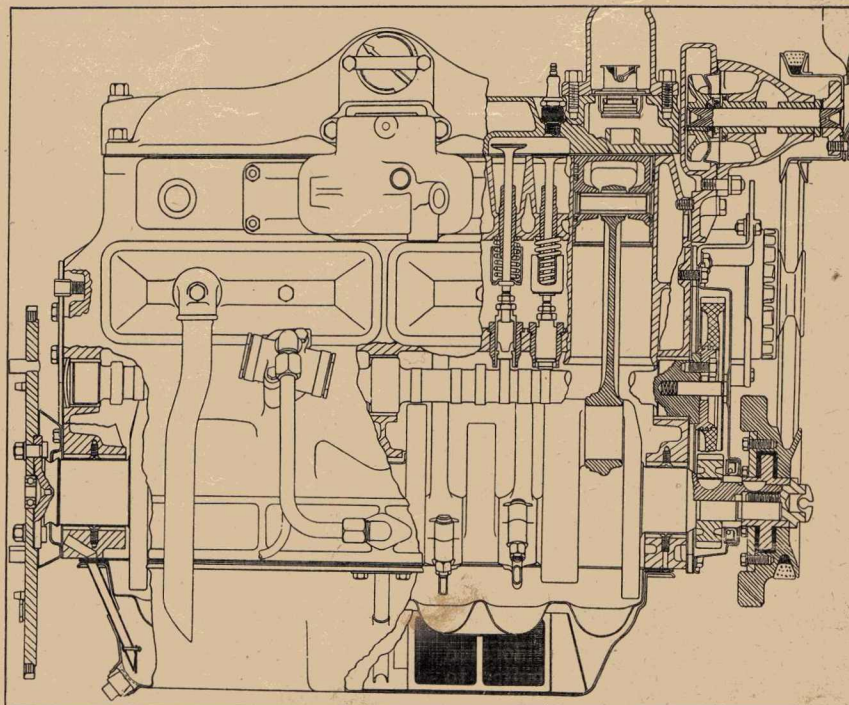
TAPPETS

Shoe type, shoes sliding in slotted guides. Each guide is detachable separately, pairs being clamped in place by flat plate registering with flat on guide flanges.

LUBRICATION

Oscillating double-acting plunger pump bolted to side of crankcase, driven by skew gears from camshaft at 1/12th engine speed. No valves. Oil is fed at low pressure to timing case and check valve at rear of crankcase (connected to electric tell-tale switch) whence it passes to troughs in top of sump. Con-rod dippers feed oil to big ends and splash up to cylinder walls. Splash collected in troughs high up on crankcase walls and led by gravity to main bearings. Overflow returns to bottom of sump via filter screens.

Pressed-steel sump. Bottom section of suction pipe and return pipe from rear bearing oil retainer soldered in,



Longitudinal part section of Hudson Six engine

"TRADER" SERVICE DATA (Continued)

HUDSON SIXES AND EIGHT

standing proud of top flange and registering with holes in case and rear bearing cap. If sump is removed for cleaning, always refill troughs before refitting.

Remove and refit oil pump, 8s.

Overhaul oiling system (including removing sump, cleaning out and replacing suction pipe if necessary), Six 12s.; Eight 15s.

FUEL FEED

AC pump with built-in vacuum booster for suction windscreen wiper on all models except smaller Six. Eccentric-operated from camshaft. Vacuum booster works on same principle as fuel pump, with diaphragm assembly bolted to underside of pump. Leads to intake manifold and wiper.

If engine smokes badly and consumes oil rapidly for no apparent reason, suspect punctured diaphragm of vacuum booster. As one side is open to crankcase and other is subject to depression from inlet manifold, oil will be sucked into cylinders through puncture. Locate fault by disconnecting lead to manifold while engine is running. No oil should be present in pipe.

Remove and replace fuel pump, 8s.
Overhaul fuel pump, 11s.

CARBURETTOR

Carter downdraught. Single with manual choke on smaller Six, dual with automatic choke on larger Six and Eight.

Metering rod is only setting which can normally be altered.

METERING ROD SIZES (part Nos.)

	16.9 Six	21.6 Six and Eight
Standard ...	75-281	75-348
One size weak ...	75-282	75-357
2 sizes weak ...	75-283	75-358

Normal setting of slow-running adjusting screw is $\frac{1}{4}$ - $\frac{3}{4}$ turn open on single and $\frac{1}{4}$ -1 turn on dual carburettor.

Float level should be $\frac{3}{16}$ in. on single and $\frac{1}{8}$ in. on dual carburettor, measured from top of float to bottom face of float chamber lid.

AC oil-wet air cleaner. Clean in petrol and re-oil filter unit every 2,000 miles.

IGNITION

Autolite coil. Distributor located on off side by clamp plate bolted to block. Centrifugal advance.

Set points to break at T.D.C.

COOLING SYSTEM

Pump, fan and non-adjustable thermostat, which is set to start opening at 150 deg.-155 deg. F., and should be fully open at 185 deg. F.

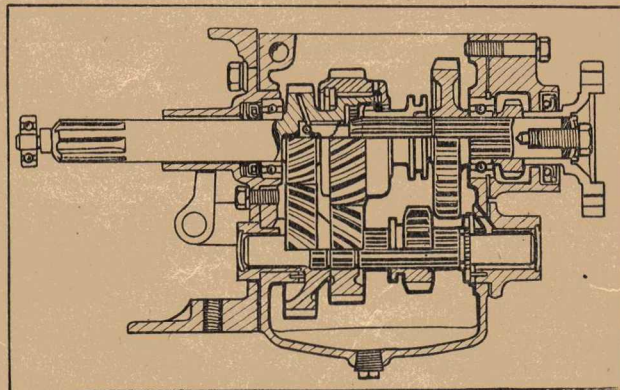
Spring-loaded self-adjusting sealing gland.

To remove pump from engine drain radiator, slacken fan belt and disconnect hoses. Take out two setscrews to cylinder block. Do not split pump in place.

To dismantle remove rear half of housing, cut burr off spindle at impeller end and drive spindle out of impeller. Pulley flange and spindle are supplied as unit and should not be separated. Front and rear bushes are pressed in and flanged at outer ends.

When reassembling seal in impeller place conical spring with large end towards impeller, followed by washer, shaft seal and seal thrust washer which fits in slots, securing assembly with spring ring. Insert pulley flange and spindle into pump body with thrust washer, assemble im-

Gear box in section, showing unusual arrangement



PELLER andpeen over end of spindle, continuing until end play is 0.010 in.-0.014 in.

Lubricate pump only with special aluminium soap grease.

Radiator drain tap on bottom tank. Cylinder block drained by $\frac{1}{8}$ in. gas plug at near side rear of bottom of cylinder jacket.

Adjust fan belt by swinging dynamo until there is 1 in. slack between dynamo and fan pulley.

TRANSMISSION

CLUTCH

Single-plate cork insert, running in oil. Only adjustment to pedal by removing clevis pin in operating linkage and turning yoke to lengthen or shorten. Pedal should have $1\frac{1}{2}$ in. clearance from floorboard, measured from centre of clamp bolt for pedal rod to boards.

Every 5,000 miles clutch should be drained and refilled with Hudsonite clutch compound. Turn engine until

TRANSMISSION DATA

	112	Six and Eight
Final drive ratios: 1st ...	11.02	9.9
2nd ...	7.33	6.6
Top ...	4.55	4.11
Rev. ...	13.50	12.28
Crown wheel/bevel teeth...	41/9	37/9
Capacities: clutch ...	$\frac{1}{4}$ pint	$\frac{1}{4}$ pint
gear box ...	3 "	3 "
rear axle ...	2 $\frac{1}{2}$ "	2 $\frac{1}{2}$ "

drain plug in front face of flywheel is visible through hole above starter motor. Remove plug and turn engine until star stamped on flywheel is visible, allow to drain, then turn again until filler hole is accessible. Fill with $\frac{1}{4}$ pint of Hudsonite and replace plug.

Overhaul clutch (including dismantling, renewing pressure plate and springs, reassembling and refitting), £2 10s.

AUTOMATIC CLUTCH

Some cars are fitted with automatically operated clutch. Pedal is connected to a vacuum cylinder which is caused to operate by solenoid valve

on vacuum line. Solenoid circuit is fed from ignition switch and controlled, apart from on-off switch on dash, by three factors, namely accelerator switch, top gear selector rod switch and governor switch attached to speedometer drive. If automatic clutch is used with electric hand there are additional switches worked by clutch pedal and gear selector switch.

Normally when accelerator is released circuit is closed, so that solenoid valve is open and when engine is running clutch will be held out by vacuum. As accelerator is depressed it opens first connection to governor, then connection to top gear selector switch. These two switches complete circuit to earth. Top gear selector switch is open when top gear is engaged, and governor switch is open above 15-25 m.p.h. Thus clutch cannot operate in top gear when accelerator is released except below cutting out speed of governor. Object is to provide full engine braking effect on top gear.

"TRADER" SERVICE DATA (Continued)

HUDSON SIXES AND EIGHT

GEAR BOX

Of unusual design but quite straightforward. Three-speed, helical constant mesh and second gears. Reverse pinion slides out of engagement when forward gears are used. Second gear driven pinion turns on extension of primary shaft gear, each having internal teeth. Splined sleeve, with teeth formed on front end, slides on mainshaft, moved by selector fork, picking up on top or second gear internal teeth.

Box can be removed from car with engine in place if rear of engine is jacked up. Disconnect gear change operating levers and cables. Remove box complete with bell-housing.

To dismantle box remove cover and lever, take off clutch interlocking rods from each side of box by undoing nuts at bottom and sliding downwards (one or both of these rods are sometimes omitted). Remove bell-housing, pull off universal joint flange and speedometer drive housing and gear. Remove selector locking plungers from each side of box and take out selector rods and forks. Remove front main bearing cover. Drive back bottom gear mainshaft pinion far enough to uncover split locking ring, take off ring and pull out mainshaft with bearing backwards, lifting out top- and second-gear sleeve and bottom gear pinion from inside. Primary shaft can now be lifted out through top of box, with top and second constant mesh pinions.

Mainshaft spigot bearing has 26 needle rollers and seven thrust balls. Do not lose these when dismantling.

Next remove reverse shaft cover, which comes away with stationary shaft. Fixed gear and splined sleeve with sliding gear can now be lifted out.

To remove layshaft, take off rear plain bearing housing, with thrust-washer and spacer. Prise top and second layshaft gears apart with blunt tool until top gear pinion is off splines, turn shaft slightly so that splines do not register, and drive second gear pinion forward. Then place selector in neutral and, holding three gears together, pull out shaft backwards. Bottom and reverse selector mechanism can then be reached.

Assembly is a reversal of these operations.

To remove second gear from primary shaft, knock out expanding spring ring in back of second gear pinion with punch through holes in side of gear. Split white-metal faced thrust-washer can then be "juggled" out and gear will slide off, with opposite thrust washer at inside end.

"Handy-shift" remote control on steering column is direct mechanical control, selector rods being moved by rod and levers. Cross-change is effected by cable operated by up-and-down movement of gear lever shaft.

Overhaul gear box, £3 10s.

Remove and refit gear box, £2 4s.

ELECTRIC HAND

This operates on principles comparatively simple in practice, although layout appears complicated at first sight.

Standard gear box is used, with provision for manual control. Fore-and-aft movement of each selector rod is effected by a large vacuum cylinder, closed at each end, and a double-acting piston with coupling rod connected to lever and transverse control shaft.

Cross-change movement from one rod to other is effected by a single-acting vacuum unit with rubber diaphragm and spring return, its action sliding control shaft across by means of a bell crank. Admission of vacuum to cylinder and diaphragm unit is via pipes connected to a valve chest containing three double-action valves operated by celluloid plungers.

Steering-column gear selector operates in "H" slot and controls valve solenoids through sliding and semi-rotary switch movement. A sliding contact assembly on gear box,

actuated by selector control, and an interlocking switch linked to cross-change unit, complete circuits.

Operation is as follows: Current supply to whole unit is controlled via ignition switch, master switch incorporated in column control, and clutch pedal-operated circuit-breaker. Selection of gear, or change, is made with clutch engaged, action being suspended until pedal is fully depressed, closing circuit-breaker.

With hand lever in first gear position and breaker closed, current flows via master switch to upper right brush 5 (see diagram), across sleeve 6 to lower brush 18 and wiring to solenoid terminal 11. Solenoid is energised, plunger drawn down against spring, when valve 13 opens upper port and closes lower port. Vacuum is applied to cross-change unit, diaphragm of which is drawn in against spring.

Movement is followed by coupling link, bell crank shifting control shaft so that dog engages first and reverse selector rod. Simultaneously, delay-action coupling to interlocking switch causes it to operate when cross-change traverse is completed, when sector 9 moves to bridge contacts 8 and 10, while sector 16 moves to bridge 17 and 15.

Current now flows from top-left brush 7 of column control, through wiring to terminal 10 of interlock switch via 9 to 8, wiring to centre plate 19 of column control change switch, rotor to 20, wiring to plate 21 of gear box contact assembly, across three-brush sliding contactor 22 to plate 23 and wiring to terminal 24 of

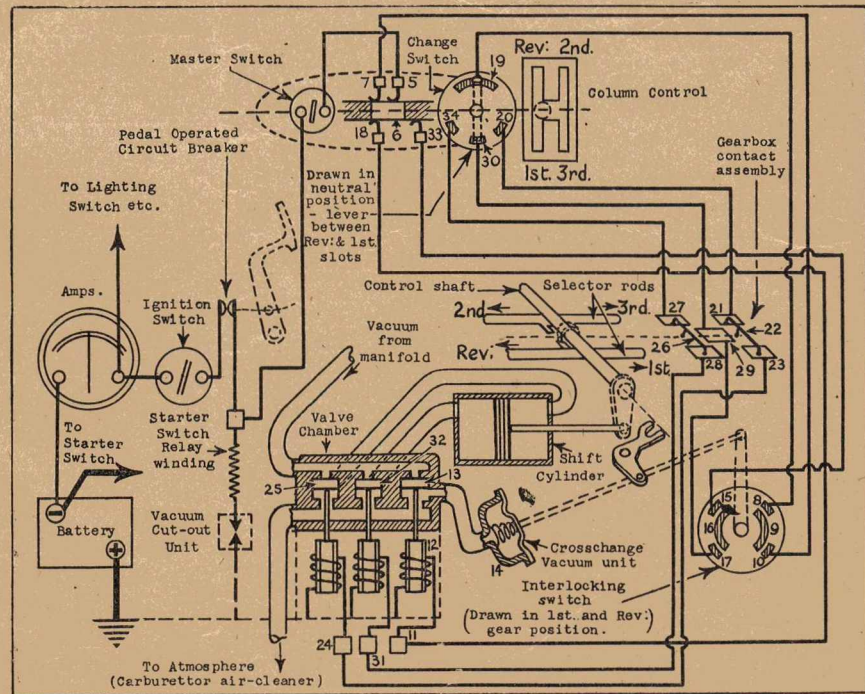


Diagram of Electric Hand layout and circuit. See text for numbers

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HUDSON SIXES AND EIGHT

solenoid group. Solenoid operates, valve 25 opens upper port and closes lower, admitting vacuum to front of shift cylinder when piston is drawn forward and connecting linkage moves control shaft and selector rod to engage first gear.

Two three-brush contactors, 22 and 26 are insulated and mounted on a sliding member controlled by either selector rod movement, so completion of movement into first gear causes contactor 22 to move off plates 21 and 23, while contactor 26 moves in to connect plates 27 and 28 with neutralising centre plate 29, which serves an important purpose. Thus, contactor 22 opens solenoid circuit by sliding off plates 21 and 23, usual spring lock retaining gear in mesh. When changing to second gear first act is movement of hand lever to neutral, when current from 19 of change switch flows to stud 30, wiring to centre plate 29 and through contactor 26 to plate 28 and wiring to terminal 31 of centre solenoid, which operates valve 32 and admits vacuum to back of cylinder, moving selector rod back to neutral position.

and wire to sol. terminal 31, which operates valve 32 and shift cylinder engages second gear.

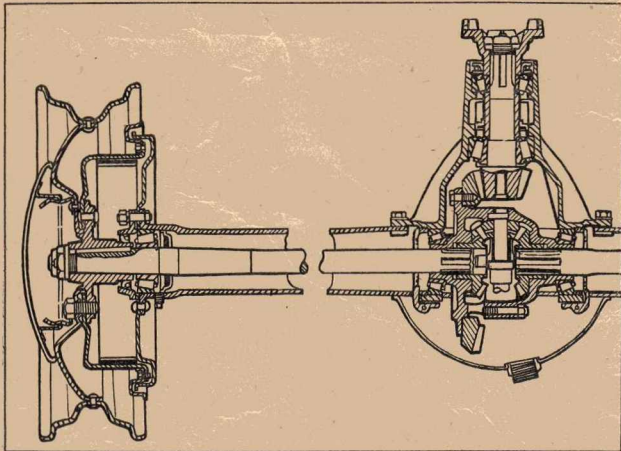
On full stroke, contactor 26 leaves 27 and 28, while contactor 22 bridges 21 and 23 to neutral centre plate 29, thus preselecting circuit to "opposite" solenoid for movement to neutral when lever is returned to gate.

Moving hand lever to third slot causes change switch to contact 19 and stud 20, circuit then being 5-6-33, wire to 15-16-8, wire to 19-20, wire to 21-22-23, wire to 24. Operation of valve 25 causes cylinder action to engage top gear.

When engaging reverse gear circuit is as that for second, except that cross-change vacuum unit remains in action, interlock combination and sliding sleeve assembly in column control being in positions as drawn.

In all cases of trouble it is best to check through with diagram for wrong connections which may originate during dismantling of gear box or controls. Principal adjustment is circuit-breaker delay, which should allow full clutch disengagement before acting.

Circuit-breaker should close with clutch pedal about $\frac{1}{2}$ in. from toe-board. Interlocking switch also has delay action coupling which is set to operate at extreme ends of traverse movement.



Rear axle in section

Contactors resume positions as drawn, opening circuit to solenoid on completion of change. When hand lever is moved across gate, sleeve 6 leaves brushes 7 and 18 insulated and bridges 5 and 33. Brush 18, being dead, interrupts current to solenoid 12 and spring in cross-change unit 14 moves control shaft to engage dogs of second-third selector rod. Interlocking switch, following cross-change movements, now assumes a position where contacts 15-16-8 and 10-9-17 are grouped respectively.

Current now follows path: 5-6-33, wire to 15-16-8, wire to 19 and stud 34 of change switch when hand lever is placed in second gear position. From this point path is: Wire to 27-26-28

Whole unit is mounted on a rubber bush fitted to a bracket secured by two studs to gear box rear base, being connected by clevis pins to control shaft lever and cross-change bell crank. Three wires to solenoid terminals should be marked for correct assembly.

PROPELLER-SHAFT

Spicer needle roller. Two bearing assemblies at each end secured to flanges by U bolts. Undoing U bolts releases bearing assemblies and shaft. Other bearings retained by split rings. If dismantled, use new seals on re-assembly.

Remove and refit propeller-shaft, 8s.

REAR AXLE

Semi-floating, spiral bevel drive. Halfshafts splined in differential, tapered and keyed to hubs. All bearings are taper roller. Wheel bearings adjustable with shims. Remove hub (do not use knock-out type of puller, as axle shafts have thrust buttons on inner ends and damage to differential might result), remove bearing cap, with oil seal inside, and add or subtract shims. Another oil seal is located in axle casing behind bearings. End play on shafts 0.004in.-0.010in.

Drive pinion carried in taper rollers. Adjusting shims for mesh between pinion and bearing, for bearing adjustment behind distance piece between bearing inner races. Correct bearing adjustment is when pinion shaft can just be turned with one hand. Oil seal at outer end of pinion shaft housing.

Crown wheel adjustable sideways by ring nuts in carrier. Correct mesh leaves 0.0005in.-0.003in. backlash measured on edge of crown wheel.

Adjust rear wheel bearings, 8s.

CHASSIS

BRAKES

Bendix hydraulic, 10in. drums. Pull-up type hand-brake works rear shoes by cable, interconnected with foot-brake for emergency use.

Shoe adjustment is obtained by moving eccentric adjustment behind secondary shoe (rear side of back plate) until 0.010in. feeler inserted in hole in drum is snug fit at either end of secondary shoe. Uncover hole at bottom of back plate and turn notched adjusting screw with screwdriver to spread shoes, until drum can just be turned by hand, then release until drum is just free.

Pedal must have $\frac{1}{2}$ in. clearance to floorboard to ensure full return of master cylinder piston. Adjust connecting link.

To adjust pedal push-rod turn adjusting nut until rear face is $1\frac{1}{8}$ in. from front end of push-rod with equaliser bar against stop, and lock with lock-nut.

Reline and adjust brakes (including linings, rivets and labour). Six £4 9s. 3d.; Eight £5 11s. 3d.

Extra if brakes are bled, 5s.

Remove and replace brake shoe assemblies and adjust, £1 15s.

Adjust brakes (minor adjustment), 8s.

SPRINGS

Semi-elliptic. U-type shackles with screwed bushes at both ends on

"TRADER" SERVICE DATA (Continued)

HUDSON SIXES AND EIGHT

CHASSIS DATA					
	112	Six	Country Club Six and Eight	Eight l.w.b.	
Wheelbase	9' 4"	9' 10"	10' 2"	10' 9"	
Track: front	4' 8"	4' 8"	4' 8"	4' 8"	
rear	4' 11½"	4' 11½"	4' 11½"	4' 11½"	
Turning circle	40' 0"	42' 6"	49' 0"	45' 0"	
Tyres... ..	6.00-16	6.00-16	6.25-16	6.50-16	
Tyre pressures: front	24 lbs.	24 lbs.	24 lbs.	24 lbs.	
rear	32 lbs.	32 lbs.	32 lbs.	32 lbs.	
Petrol tank capacity	9½ gals.	13½ gals.	13½ gals.	13½ gals.	

front axle. Front springs have divided second leaf, outer ends wrapped round eye of main leaf. Inner ends guided by plate assembled between second and third leaves. Spring centre bolts are not central, long side of spring being to rear on front springs and to front on rear spring.

Stabiliser bar fitted to front axle. *Remove and replace springs, front* £1; rear, Six £1 4s.; Eight £1 8s. *Remove and refit stabiliser, £1.*

SPRING DATA						
	112" w.b.		118" w.b.		122" & 129" w.b.	
	Front	Rear	Front	Rear	Front	Rear
Length ...	32½"	48"	33"	52½"	37½"	52½"
Width ...	1½"	1½"	1½"	1½"	1½"	1½"
No. of leaves	9	8	8	9	9	9

FRONT AXLE

Located by radius arms bolted to axle beam (except on 112 model which has normal axle with flat spring pads). Spring pads clamped on round sections of beam so that axle can turn on springs. Radius arms pivoted at rear ends in rubber bushes on chassis brackets. Elliot type steering.

King pins located in stub axles by keys which also hold steering arms. To remove king pin, remove steering arm and greaser from top bush. Drive pin downwards with drift through grease hole, forcing out Welch plug at bottom. Remove pin carefully, catching five thrust-balls (located under cap of top bush). Drive out upper bush downwards and lower bush upwards.

STEERING DATA			
Castor ...	1°-2°	King pin inclination	7°
Camber ...	1°-1½°	Toe-in	0-½"

To adjust castor on radius arm models, slacken upper bolt on axle end of radius arm each side and remove lower bolt. To increase castor add shims at lower bolt (0.020in.

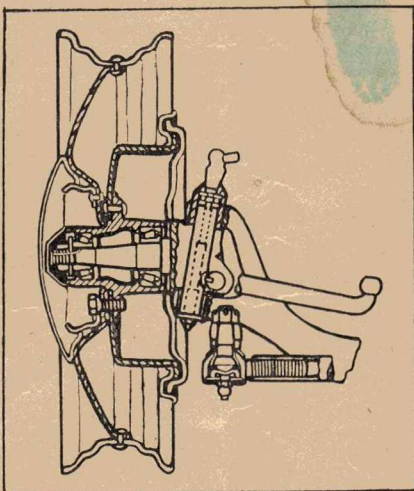
shim equals ½°). To decrease, remove shims.

Fit new king pins and bushes and align wheels, £3 12s.

Adjust front wheel bearings, clean and repack with grease, 5s.

STEERING GEAR

Gemmer hourglass worm and roller tooth. To remove gear from car dis-



Section of front axle and hub, showing Elliot type forked axle beam

connect horn wire, remove toe-board, slacken clamp of upper gear lever support and push bearing up to clear shaft. Gear change assembly can then be left in place on dash bracket, column being released and gear drawn up into body. Alternative is to remove wheel and draw gear out through front. To remove wheel disconnect horn wire and press horn button, turning ¼ turn to left. Horn switch can then be withdrawn, exposing wheel nut.

Worm carried in back-to-back taper roller bearings. Adjust by removing shims behind end cover, first disconnecting drag link from drop arm. No stiffness should be present. To adjust mesh of roller tooth in worm, turn steering wheel to straight-ahead position, tighten adjusting screw and back off enough to prevent binding, after-

wards tightening lock nut. Number of turns from lock to lock, 3½.

Remove and refit steering gear, Six £1 2s.; *Eight* £1 8s.

Overhaul steering gear assembly, Six £1 16s.; *Eight* £2.

SHOCK ABSORBERS

Delco telescopic hydraulic. Eye at top and stud at bottom mounted in rubber to give necessary movement. Cannot be topped up or adjusted. To refill completely remove from car and use special filling cup and measure.

Remove and refit shock absorbers, 2s. 6d. each, 8s. per set.

Remove and replace body, £4 10s.
Remove chassis frame (including dismantling, installing new frame complete and reassembling, removing and refitting body), £11 10s.

ELECTRICAL

GENERAL

With one or two detail exceptions, electrical layout closely follows earlier practice with Autolite equipment. Twelve-volt, positive earthed battery connected direct to solenoid starter switch, dynamo with adjustable field brush in all models. Control unit with voltage and current regulators in all except some 16.9 h.p. cars, fitted with cut-out only, are main points.

CHARGING CIRCUITS

Dynamo should not be run on open circuit. Voltmeter connected with negative lead to terminal A and positive lead to chassis will indicate generated potential. Check for belt slip, and verify that cables are correctly placed. If output is erratic or consistently low in voltage-controlled models, connect jump lead to terminal F and chassis, when output should increase in proportion to speed. Avoid exceeding 16-20 amps. charging rate for test purposes.

Control box seal should not be disturbed if replacement box can be fitted. In case of urgency when seal is broken, regulator contacts may be cleaned with superfine sandpaper and adjustment reset by increasing spring tension to increase output. Lower spring anchorage is bent down towards base to increase tension. Adjustment is very critical, and must be carefully executed. Current regulator setting seldom needs resetting.

In all cases battery condition, dynamo brushes and commutator, belt and wiring should be checked before disturbing regulator. Normal output on all models is 12.5 amps. with dynamo hot. Check with test ammeter in series with connections to terminal B of regulator box.

"TRADER" SERVICE DATA (Continued)

HUDSON SIXES AND EIGHT

LIGHTING

Main lighting fuse, together with auxiliary fuse, situated on common base. Cables with rubber-covered connectors lead to junction blocks adjacent to each head lamp and to rear lamp assembly. Dimming switch controls driving and dipped beam filaments, former being indicated by warning lamp in parallel. Rear lamp dual-filament bulbs serve rear and stop-lamp functions.

Panel lamps, fitted in speedometer and clock, are fed in parallel with rear lamp. Locate shorts with test fuse by separating lines at switch or connectors. Signal bulbs indicate oil pressure and ignition circuits.

GAUGES

Fuel gauge and water-temperature gauge are each connected through fixed resistors to drop voltage to required value. Panel gauges and tank unit, together with radiator heat element, must be adequately earthed. Connect voltmeter in series when checking, and avoid applying battery voltage direct to units. Test line wiring separately for breaks and earths, and verify all connections by diagram.

HORNS

Twin units operated by relay. Disconnect opposite horn when effecting adjustment. Relay winding energised by current flowing via column wire and button to earth. Check for voltage at terminal B and earth. If relay clicks only, check for voltage at terminal H and examine wiring to horns. Complete failure of relay may be due to open relay winding, column line, or break in B wire.

IGNITION-CONTROLLED CIRCUITS

Separate cable from starter and regulator terminal B leads to ignition switch; circuits fed via switch, including ignition and oil-warning lamps and fuel and water-temperature gauges. Main feed cable to starter solenoid panel push and to electric hand circuits also connected via ignition switch. No fuse in circuit.

AUXILIARIES

Auxiliary fuse protects all circuits connected to terminal plate x (see diagram), which is independent of ignition. Included are cigar-lighter, traffic signals, service lamp, roof lamp

and stop-lamp switch. Electric clock movement wired from this fuse also. Traffic signals are controlled by spring-loaded time switch. Signals are earthed direct to body frame. In eight-cylinder models, where a door-controlled switch operates roof lamp, feed to this is taken from rear lamp terminal of lighting switch. Door control is inoperative when lights are not in use.

A.R.P.

When disconnecting one head lamp it is better to detach cables at junction, leaving bulb in position. Shaped mask required, with parking lamp window. Remove bulb from number-plate lamp and fit reducing disc in rear lamp. Dimming switch can be utilised for control of fog lamp by connecting wire to terminal normally feeding dipped-beam filament.

ELECTRICAL DATA	
Battery: type	Exide 6CK-11
capacity	12 v. 75 a.h.
Dynamo charge rate	12.5 amps.
Fuses: lighting circuit	20 "
accessory circuit	20 "
Lamp bulbs:	
head	36-36 watts
side	3 "
instrument	3 "
tell-tale	2 "
roof	9 "
number plate	4 "
stop-tail	18-3 "
indicators	3 "
beam indicator	2 "
radio	3 "

HUDSON WIRING DIAGRAM—COUNTRY CLUB SERIES

