

**MOTOR'S
FACTORY**

FLAT RATE MANUAL
AND
SHOP MANUAL

1941

HUDSON and TERRAPLANE

YEAR AND MODEL		SERIAL NO.	ENGINE NO.	ENGINE DATA				
				BORE AND STROKE	Piston Displacement, Cubic Inches	Compression Ratio, Std.	Taxable H.P.	BRAKE H.P. @ R.P.M.
HUDSON MODELS								
1935	Six.....GH	53-101 to 53-7724	70000 to 77620	3x5	212.1	6.25	21.60	93 @ 3800
	Special Eight (117" W.B.).....HT	54-101 to 54-7250	55000 to 62150	3x4½	254.5	6.00	28.80	113 @ 3800
	De Luxe Eight (117" W.B.).....HU	55-101 to 55-3197	55000 to 62150	3x4½	254.5	6.00	28.80	113 @ 3800
	Special Eight (124" W.B.).....HTL	57-001 to 57-1066	55000 to 62150	3x4½	254.5	6.00	28.80	113 @ 3800
	De Luxe Eight (124" W.B.).....HUL	58-101 to 58-821	55000 to 62150	3x4½	254.5	6.00	28.80	113 @ 3800
	Custom Eight (124" W.B.).....HHU	56-101 to 56-1560	55000 to 62150	3x4½	254.5	6.00	28.80	113 @ 3800
1936	Six.....63	63-101 to 63-9820	79000 to 88700	3x5	212.1	6.25	21.60	93 @ 3800
	De Luxe Eight (120" W.B.).....64	64-101 to 64-5456	1001 to 6350	3x4½	254.5	6.00	28.80	113 @ 3800
	Custom Eight (120" W.B.).....65	65-101 to 65-2514	1001 to 3400	3x4½	254.5	6.00	28.80	113 @ 3800
	De Luxe Eight (127" W.B.).....66	66-101 to 66-3543	1001 to 4400	3x4½	254.5	6.00	28.80	113 @ 3800
	Custom Eight (127" W.B.).....67	67-101 to 67-5004	1001 to 6000	3x4½	254.5	6.00	28.80	113 @ 3800
1937	Six.....73	73-101 to 73-6913	90000 to 97082	3x5	212.1	6.25	21.60	101 @ 4000
	De Luxe Eight (122" W.B.).....74	74-101 to 74-5728	18000 to 34162	3x4½	254.5	6.25	28.80	122 @ 4200
	Custom Eight (122" W.B.).....75	75-101 to 75-3374	18000 to 34162	3x4½	254.5	6.25	28.80	122 @ 4200
	De Luxe Eight (129" W.B.).....76	76-101 to 76-1197	18000 to 34162	3x4½	254.5	6.25	28.80	122 @ 4200
	Custom Eight (129" W.B.).....77	77-101 to 77-3752	18000 to 34162	3x4½	254.5	6.25	28.80	122 @ 4200
1938	Six (112" W.B.).....89	89-28566 to 89-56040	90101 to 146000	3x4⅝	175.0	6.50	21.60	86 @ 4000
	Six (122" W.B.).....83	83-131 to 83-56040	98000 to 154000	3x5	212.1	6.25	21.60	101 @ 4000
	De Luxe Eight.....84	84-101 to 84-56040	35000 to 91000	3x4½	254.5	6.25	28.80	122 @ 4200
	Custom Eight.....85	85-160 to 85-56040	35000 to 91000	3x4½	254.5	6.25	28.80	122 @ 4200
	Country Club Eight.....87	87-161 to 87-56040	35000 to 91000	3x4½	254.5	6.25	28.80	122 @ 4200
1939	Six (112" W.B.).....90	90-101 to 90-54902	90-101 to 90-54902	3x4⅝	175.0	6.50	21.60	86 @ 4000
	Six (118" W.B.).....92	92-107 to 92-54902	92-107 to 92-54902	3x5	212.1	6.25	21.60	96 @ 3900

HUDSON AND TERRAPLANE

YEAR AND MODEL		SERIAL NO.	ENGINE NO.	ENGINE DATA				
				BORE AND STROKE	Piston Displacement, Cubic Inches	Compression Ratio, Std.	Taxable H.P.	BRAKE H.P. @ R.P.M.
1939	Country Club Six.....93	93-104 to 93-54902	93-104 to 93-54902	3x5	212.1	6.25	21.60	101 @ 4000
	Country Club Eight.....95	95-106 to 95-54902	95-106 to 95-54902	3x4½	254.5	6.25	28.80	122 @ 4200
	Custom Country Club Eight.....97	97-105 to 97-54902	97-105 to 97-54902	3x4½	254.5	6.25	28.80	122 @ 4200
1940	Traveler Six & De Luxe Six40	40-101 and up	40-101 and up	3x4⅞	175.0	7.00	21.60	92 @ 4000
	Super Six.....41	41-101 and up	41-101 and up	3x5	212.0	6.50	21.60	102 @ 4000
	Country Club Six.....43	43-101 and up	43-101 and up	3x5	212.0	6.50	21.60	102 @ 4000
	Eight.....44	44-101 and up	44-101 and up	3x4½	254.5	6.50	28.80	128 @ 4200
	De Luxe Eight.45	45-101 and up	45-101 and up	3x4½	254.5	6.50	28.80	128 @ 4200
	Country Club Eight.....47	47-101 and up	47-101 and up	3x4½	254.5	6.50	28.80	128 @ 4200
1941	Traveler Six & De Luxe Six.....10	10-101	10-101	3x4⅞	175.0	7.25	21.6	92 @ 4000
	Super Six.....11	11-101	11-101	3x5	212.0	6.50	21.6	102 @ 4000
	Commodore Six.....12	12-101	12-101	3x5	212.0	6.50	21.6	102 @ 4000
	Commodore Eight.14	14-101	14-101	3x4½	254.0	6.50	28.8	128 @ 4200
	Commodore De Luxe Eight.....15	15-101	15-101	3x4½	254.0	6.50	28.8	128 @ 4200
	Commodore Custom Eight.....17	17-101	17-101	3x4½	254.0	6.50	28.8	128 @ 4200

TERRAPLANE MODELS

1935	Special Six.....G	51-101 to 51-37772	103000 to 153934	3x5	212.1	6.00	21.60	88 @ 3800
	De Luxe Six.....GU	52-101 to 52-13362	103000 to 153934	3x5	212.1	6.00	21.60	88 @ 3800
1936	De Luxe Six.....61	61-101 to 61-69750	157000 to 243290	3x5	212.1	6.00	21.60	88 @ 3800
	Custom Six.....62	62-101 to 62-17041	157000 to 243290	3x5	212.1	6.00	21.60	88 @ 3800
1937	De Luxe Six.....71	71-101 to 71-70346	250000 to 352074	3x5	212.1	6.25	21.60	96 @ 3900
	Super Six.....72	72-101 to 72-19907	250000 to 352074	3x5	212.1	6.25	21.60	96 @ 3900
1938	De Luxe Six.....81	81-119 to 81-56040	360000 to 415000	3x5	212.1	6.25	21.60	101 @ 4000
	Super Six.....82	82-153 to 82-56040	360000 to 415000	3x5	212.1	6.25	21.60	96 @ 3900

SERIAL NUMBER LOCATION—1935-1936: On front of dash. 1937-1941: On right front pillar post.
ENGINE NUMBER LOCATION—On left side of cylinder block.

HUDSON AND TERRAPLANE

TUNE UP CHART

FIRING ORDER: Six, 1-5-3-6-2-4. Eight, 1-6-2-5-8-3-7-4. POSITIVE battery terminal grounded.

YEAR AND MODEL	SPARK PLUG		BREAKER		Cam Angle, Degrees	SPARK ADVANCE CRANKSHAFT DEGREE @ R.P.M.		Maximum Vacuum Advance, Crankshaft Deg.	Location Timing Marks	Spark Timing, Degrees	TAPPET CLEARANCE	
	Make and Number	Gap, Inch	Gap, Inch	Spring Pres- sure, Ounces		Start	Maxi- mum				For Run- ning, Hot	For Tim- ing, Intake
HUDSON MODELS												
1935, GH	CH-J8	.022	.020	17-20	38	①	②	No	Flywheel	TDC	Int. .006 Ex. .008	.010
All 8's	CH-J8	.022	.017	17-20	27.5	③	④	No	Flywheel	TDC	Int. .006 Ex. .008	.010
1936, 63	⑤	.022	.020	17-20	38	6 @ 800	28 @ 3160	No	Flywheel	TDC	Int. .006 Ex. .008	.010
All 8's	⑤	.022	.017	17-20	27.5	6 @ 800	35 @ 3400	No	Flywheel	TDC	Int. .006 Ex. .008	.010
1937, 73	⑥	.025	.020	17-20	35	6 @ 800	28 @ 3160	No	Flywheel	TDC	Int. .006 Ex. .008	.010
All 8's	⑥	.025	.017	17-20	27.5	6 @ 800	35 @ 3400	No	Flywheel	TDC	Int. .006 Ex. .008	.010
1938, 89	CH-J8A	.032	.020	17-20	35	6 @ 800	28 @ 3160	No	Flywheel	1/4" BTDC	Int. .006 Ex. .008	.010
83	⑦	.032	.020	17-20	35	6 @ 800	28 @ 3160	No	Flywheel	TDC	Int. .006 Ex. .008	.010
All 8's	CH-J8A	.032	.017	17-20	27.5	6 @ 800	35 @ 3400	No	Flywheel	TDC	Int. .006 Ex. .008	.010
1939, 90	CH-J8	.032	.020	17-20	35	6 @ 800	28 @ 3160	No	Flywheel	1/4" BTDC	Int. .006 Ex. .008	.010
92	CH-J8	.032	.020	17-20	35	6 @ 800	28 @ 3160	No	Flywheel	TDC	Int. .006 Ex. .008	.010
93	CH-J8	.032	.020	17-20	35	6 @ 800	28 @ 3160	No	Flywheel	TDC	Int. .006 Ex. .008	.010
95	CH-J8	.032	.017	17-20	27.5	6 @ 800	35 @ 3400	No	Flywheel	TDC	Int. .006 Ex. .008	.010
97	CH-J8	.032	.017	17-20	27.5	6 @ 800	35 @ 3400	No	Flywheel	TDC	Int. .006 Ex. .008	.010
1940, 40, 41, 43	CH-J8	.032	.020	17-20	35	6 @ 800	28 @ 3160	15	Flywheel	TDC	Int. .006 Ex. .008	.010
44	CH-J8	.032	.017	17-20	27.5	6 @ 800	35 @ 3400	No	Flywheel	TDC	Int. .006 Ex. .008	.010
47	CH-J8	.032	.017	17-20	27.5	6 @ 800	35 @ 3400	No	Flywheel	TDC	Int. .006 Ex. .008	.010
1941, 10	CH-J9	.032	.020	17-20	35	6 @ 1400	23.5@3140	15	Flywheel	1/2" BTDC	Int. .006 Ex. .008	.010
11, 12	CH-J9	.032	.020	17-20	35	6 @ 1400	23.5@3140	15	Flywheel	1/2" BTDC	Int. .010 Ex. .012	.012
14, 15, 17	CH-J9	.032	.017	17-20	27.5	6 @ 800	35 @ 3400	No	Flywheel	TDC	Int. .006 Ex. .008	.010

CH—Champion. TDC—Top dead center. BTDC—Before top dead center. ①—For distributor No. IGB-4301A, 4 @ 1650. For distributor No. IGB-4301B, 6 @ 800. ②—For distributor No. IGB-4301A, 30 @ 4000. For distributor No. IGB-4301B, 28 @ 3160. ③—For distributor No. IGP-4001A, 8 @ 1530. For distributor No. IGP-4001B, 6 @ 800. ④—For distributor No. IGP-4001A, 35 @ 4000. For distributor No. IGP-4001B, 35 @ 3400. ⑤—For standard head, Champion J8. For high compression head, Champion J9. ⑥—For standard head, Champion J8. For high compression head, Champion H10. ⑦—For standard head, Champion J8A. For high compression head, Champion H 0.

VALVE MEASUREMENTS AND COMPRESSION PRESSURE

YEAR AND MODEL	STEM CLEARANCE		TAPPET CLEARANCE				SPRING PRESSURE Pounds @ Inches, Length		VALVE SEAT ANGLE, DEGREES	COMPRESSION PRESSURE POUNDS AT R.P.M.
	Intake	Exhaust	Running, Hot		Timing		Valve Closed	Valve Open		
			Intake	Exhaust	Intake	Exhaust				
TERRAPLANE MODELS										
1935, G, GU	.0025	.004	.006	.008	.010	.010	44 @ 2	102 @ 1 21/32	45	80 @ Cr
1936, 61, 62	.0025	.004	.006	.008	.010	.010	44 @ 2	102 @ 1 21/32	45	80 @ Cr
1937, 71, 72	.0025	.004	.006	.008	.010	.010	44 @ 2	102 @ 1 21/32	45	118 @ Cr
1938, 81, 82	.0025	.004	.006	.008	.010	.010	44 @ 2	102 @ 1 21/32	45	120 @ Cr

HUDSON AND TERRAPLANE

VALVE MEASUREMENTS AND COMPRESSION PRESSURE

YEAR AND MODEL	STEM CLEARANCE		TAPPET CLEARANCE				SPRING PRESSURE Pounds @ Inches, Length		VALVE SEAT ANGLE, DE- GREES	COM- PRESSION PRESSURE POUNDS AT R.P.M.
	Intake	Exhaust	Running, Hot		Timing		Valve Closed	Valve Open		
			Intake	Exhaust	Intake	Exhaust				
HUDSON MODELS										
1935, All	.0025	.004	.006	.008	.010	.010	44 @ 2	102 @ 1 ²¹ / ₃₂	45	80 @ Cr
1936, All	.0025	.004	.006	.008	.010	.010	44 @ 2	102 @ 1 ²¹ / ₃₂	45	80 @ Cr
1937, All	.0025	.004	.006	.008	.010	.010	44 @ 2	102 @ 1 ²¹ / ₃₂	45	118 @ Cr
1938, 83, 89	.0025	.004	.006	.008	.010	.010	44 @ 2	102 @ 1 ²¹ / ₃₂	45	120 @ Cr
84, 85, 87	.0025	.004	.006	.008	.010	.010	44 @ 2	102 @ 1 ²¹ / ₃₂	45	118 @ Cr
1939, 90	.0025	.004	.006	.008	.010	.010	40 @ 2	80 @ 1 ²¹ / ₃₂	45	115 @ Cr
92, 93	.0025	.004	.006	.008	.010	.010	40 @ 2	80 @ 1 ²¹ / ₃₂	45	120 @ Cr
95, 97	.0025	.004	.006	.008	.010	.010	40 @ 2	80 @ 1 ²¹ / ₃₂	45	118 @ Cr
1940, All	.0025	.004	.006	.008	.010	.010	40 @ 2	80 @ 1 ²¹ / ₃₂	45	125 @ Cr
1941, 10	.0025	.004	.006	.008	.010	.010	40 @ 2	80 @ 1 ²¹ / ₃₂	45	125 @ Cr
11, 12	.0025	.004	.010	.012	.012	.012	40 @ 2	80 @ 1 ²¹ / ₃₂	45	120 @ Cr
14, 15, 17	.0025	.004	.006	.008	.010	.010	40 @ 2	80 @ 1 ²¹ / ₃₂	45	119 @ Cr

Cr—Cranking speed.

ENGINE CLEARANCES

YEAR AND MODEL	PISTON		RING GAP		Wristpin	ROD BEARINGS		MAIN BEARINGS		
	Top	Bottom	Oil	Comp.	① Clearance	Clearance	Endplay	Thrust on No.	Endplay	Clearance
HUDSON MODELS										
1935, GH	.016	.001-.002	.009-.011	.009-.011	.0003	.001	.006-.010	2	.006-.012	.001
All 8's	.016	.001-.002	.009-.011	.009-.011	.0003	.001	.006-.010	3	.006-.012	.001
1936, 63	.016	.001-.002	.009-.011	.009-.011	.0003	.001	.006-.010	2	.006-.012	.001
64, 65, 66, 67	.016	.001-.002	.009-.011	.009-.011	.0003	.001	.006-.010	3	.006-.012	.001
1937, 73	.016	.001-.002	.009-.011	.009-.011	.0003	.001	.006-.010	2	.006-.012	.001
74, 75, 76, 77	.016	.001-.002	.009-.011	.009-.011	.0003	.001	.006-.010	3	.006-.012	.001
1938, 89, 83	.016	.001-.002	.009-.011	.009-.011	.0003	.001	.006-.010	2	.006-.012	.001
84, 85, 87	.016	.001-.002	.009-.011	.009-.011	.0003	.001	.006-.010	3	.006-.012	.001
1939, 90, 92, 93	.016	.001-.002	.009-.011	.009-.011	.0003	.001	.006-.010	2	.006-.012	.001
95, 97	.016	.001-.002	.009-.011	.009-.011	.0003	.001	.006-.010	3	.006-.012	.001
1940, 40, 41, 43	.016	.001-.002	.009-.011	.009-.011	.0003	.001	.007-.013	2	.006-.012	.001
44, 47	.016	.001-.002	.009-.011	.009-.011	.0003	.001	.007-.013	3	.006-.012	.001
1941, 10	.016	.0005-.001	.009-.011	.009-.011	.0003	.001	.007-.013	2	.006-.012	.001
11, 12	.016	.0005-.001	.009-.011	.009-.011	.0003	.001	.007-.013	2	.006-.012	.001
14, 15, 17	.016	.0005-.001	.009-.011	.009-.011	.0003	.001	.007-.013	3	.006-.012	.001
TERRAPLANE MODELS										
1935, G, GU	.016	.001-.002	.009-.011	.009-.011	.0003	.001	.006-.010	2	.006-.012	.001
1936, 61, 62	.016	.001-.002	.009-.011	.009-.011	.0003	.001	.006-.010	2	.006-.012	.001
1937, 71, 72	.016	.001-.002	.009-.011	.009-.011	.0003	.001	.006-.010	2	.006-.012	.001
1938, 81, 82	.016	.001-.002	.009-.011	.009-.011	.0003	.001	.006-.010	2	.006-.012	.001

①—Fitted at 70° F. Clearance between pin and piston, .0003" fitted with piston heated to 200° F.

MAIN AND ROD BEARING JOURNAL DIMENSIONS

YEAR AND MODEL	DIAMETER AND LENGTH, INCHES							
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	Rod Bearings
TERRAPLANE MODELS								
1935-1938	2 ¹¹ / ₃₂ x1 ⁵ / ₈	2 ³ / ₈ x1 ³ / ₄	2 ¹³ / ₃₂ x2 ³ / ₈	None	None	None	None	1 ¹⁵ / ₁₆ x1 ³ / ₈

HUDSON AND TERRAPLANE

MAIN AND ROD BEARING JOURNAL DIMENSIONS

YEAR AND MODEL	DIAMETER AND LENGTH, INCHES							
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	Rod Bearings
HUDSON MODELS								
1935, GH	2 11/32 x 1 5/8	2 3/8 x 1 3/4	2 13/32 x 2 3/8	None	None	None	None	1 15/16 x 1 3/8
All 8's	2 9/32 x 1 5/8	2 5/16 x 1 3/8	2 11/32 x 1 7/8	2 3/8 x 1 3/8	2 13/32 x 2	None	None	1 15/16 x 1 3/8
1936, 63	2 11/32 x 1 5/8	2 3/8 x 1 3/4	2 13/32 x 2 3/8	None	None	None	None	1 15/16 x 1 3/8
All 8's	2 9/32 x 1 5/8	2 5/16 x 1 3/8	2 11/32 x 1 7/8	2 3/8 x 1 3/8	2 13/32 x 2	None	None	1 15/16 x 1 3/8
1937, 73	2 11/32 x 1 5/8	2 3/8 x 1 3/4	2 13/32 x 2 3/8	None	None	None	None	1 15/16 x 1 3/8
All 8's	2 9/32 x 1 5/8	2 5/16 x 1 3/8	2 11/32 x 1 7/8	2 3/8 x 1 3/8	2 13/32 x 2	None	None	1 15/16 x 1 3/8
1938, 83, 89	2 11/32 x 1 5/8	2 3/8 x 1 3/4	2 13/32 x 2 3/8	None	None	None	None	1 15/16 x 1 3/8
All 8's	2 9/32 x 1 5/8	2 5/16 x 1 3/8	2 11/32 x 1 7/8	2 3/8 x 1 3/8	2 13/32 x 2	None	None	1 15/16 x 1 3/8
1939, All 6's	2 11/32 x 1 5/8	2 3/8 x 1 3/4	2 13/32 x 2 3/8	None	None	None	None	1 15/16 x 1 3/8
All 8's	2 9/32 x 1 5/8	2 5/16 x 1 3/8	2 11/32 x 1 7/8	2 3/8 x 1 3/8	2 13/32 x 2	None	None	1 15/16 x 1 3/8
1940, All 6's	2 11/32 x 1 5/8	2 3/8 x 1 3/4	2 13/32 x 2 3/8	None	None	None	None	1 15/16 x 1 3/8
All 8's	2 9/32 x 1 5/8	2 5/16 x 1 3/8	2 11/32 x 1 7/8	2 3/8 x 1 3/8	2 13/32 x 2	None	None	1 15/16 x 1 3/8
1941, 10	2 11/32 x 1 5/8	2 3/8 x 1 3/4	2 13/32 x 2 3/8	None	None	None	None	1 15/16 x 1 3/8
11, 12	2 11/32 x 1 5/8	2 3/8 x 1 3/4	2 13/32 x 2 3/8	None	None	None	None	1 15/16 x 1 3/8
14, 15, 17	2 9/32 x 1 5/8	2 5/16 x 1 3/8	2 11/32 x 1 7/8	2 3/8 x 1 3/8	2 13/32 x 2	None	None	1 15/16 x 1 3/8

GENERATOR

YEAR AND MODEL	BRUSH SPRING TENSION, OZ.		FIELD AMPERES AT 6 VOLTS	MAXIMUM COLD OUTPUT			MAXIMUM HOT OUTPUT		
	Main	Third		Amperes	Volts	R.P.M.	Amperes	Volts	R.P.M.
HUDSON MODELS									
1935, All	18-22	18-22	3.94-4.36	21-23	8.0		①	①	①
1936, All	18-22	18-22	3.51-3.89	20.5-22.5	8.0		①	①	①
1937, All	53	53	1.9-2.1	24-26	8.0		①	①	①
1938, 89	50-60	50-60	3.8-4.2	19-21	8.0		①	①	①
83, 84, 85, 87	53	53	1.9-2.1	29-32	8.0		①	①	①
1939, 90	50-60	50-60	3.8-4.2	19-21	8.0		①	①	①
92, 93, 95, 97	53	53	1.65-1.82	32-34	8.0		①	①	①
1940, 40	53	53	1.65-1.82	32-34	8.0		①	①	①
41, 43, 44, 47	53	53	1.60-1.78	39-43	8.0		①	①	①
1941, 10	53	53	1.65-1.82	32-34	8.0		①	①	①
11, 12	53	53	1.60-1.78	39-43	8.0		①	①	①
14, 15, 17	53	53	1.60-1.78	39-43	8.0		①	①	①

(1) Cold output readings taken at 70° F. For each 15° change of temperature, add 1 ampere if below 70° and subtract 1 ampere if above 70°.

STARTING MOTOR

YEAR AND MODEL	BRUSH SPRING TENSION OZ.	NO LOAD TEST			LOCK TEST		
		Amperes	Volts	R.P.M.	Amperes	Volts	Torque, Pounds Feet
TERRAPLANE MODELS							
1935-1938	42-53	60	5.5	3700	750	4.0	21.5

HUDSON AND TERRAPLANE

STARTING MOTOR

YEAR AND MODEL	BRUSH SPRING TENSION OZ.	NO LOAD TEST			LOCK TEST		
		Amperes	Volts	R.P.M.	Amperes	Volts	Torque, Pounds Feet
HUDSON MODELS							
1935-1937	42-53	60	5.5	3700	750	4.0	21.5
1938, 89	42-53	67	5.5	4100	750	4.0	17.0
83, 84, 85, 87	42-53	60	5.5	3700	750	4.0	21.5
1939, 90	42-53	67	5.5	4100	750	4.0	17.0
92, 93, 95, 97	42-53	60	5.5	3700	750	4.0	21.5
1940, 40, 41, 43	42-53	50	10.0	6900	520	8.0	14.7
44, 47	42-53	60	5.5	3700	775	4.0	22.5
1941, 10	42-53	70	5.5	4300	560	4.0	11.8
11, 12	42-53	70	5.5	4300	560	4.0	11.8
14, 15, 17	42-53	60	5.5	3700	775	4.0	22.5

CLUTCH AND BRAKE SPECIFICATIONS

YEAR AND MODEL	CLUTCH			BRAKE								
	Facing Material	Facing Dimensions	Free Pedal, Travel, Inches	Lining Material	Lining Dimensions		Shoe Clearance, Inch		Wheel Cyl. Diameter, Inch		Master Cyl. Diam., Ins.	
					Front Shoe	Rear Shoe	Toe	Heel	Front	Rear		
HUDSON MODELS												
1935, GH	Cork		1½	Molded	19 ³ / ₁₆ x 2 ¹ / ₄ x 5 ³ / ₃₂	19 ³ / ₁₆ x 2 ¹ / ₄ x 5 ³ / ₃₂	.010	.010	None	None	None	
HT, HTL, HU, HUL	Cork		1½	Molded	19 ³ / ₁₆ x 2 ¹ / ₄ x 5 ³ / ₃₂	19 ³ / ₁₆ x 2 ¹ / ₄ x 5 ³ / ₃₂	.010	.010	None	None	None	
HHU	Cork		1½	Molded	23 ¹⁵ / ₁₆ x 1 ³ / ₄ x 5 ³ / ₃₂	23 ¹⁵ / ₁₆ x 1 ³ / ₄ x 5 ³ / ₃₂	.010	.010	None	None	None	
1936, 63	Cork		1½	P-Molded S-Woven	22 ¹ / ₈ x 1 ³ / ₄ x 7 ³ / ₃₂	22 ¹ / ₈ x 1 ³ / ₄ x 7 ³ / ₃₂	.010	.010	1	1	1	
64, 65, 66, 67	Cork		1½	P-Molded S-Woven	23 ¹⁵ / ₁₆ x 1 ³ / ₄ x 7 ³ / ₃₂	23 ¹⁵ / ₁₆ x 1 ³ / ₄ x 7 ³ / ₃₂	.010	.010	1	1	1	
1937, 73	Cork		1½	P-Molded S-Woven	22 ¹ / ₈ x 1 ³ / ₄ x 7 ³ / ₃₂	22 ¹ / ₈ x 1 ³ / ₄ x 7 ³ / ₃₂	.010	.010	1	1	1	
74, 75, 76, 77	Cork		1½	P-Molded S-Woven	23 ¹⁵ / ₁₆ x 1 ³ / ₄ x 7 ³ / ₃₂	23 ¹⁵ / ₁₆ x 1 ³ / ₄ x 7 ³ / ₃₂	.010	.010	1	1	1	
1938, 89	Cork		1½	P-Molded S-Woven	19 x 1 ³ / ₄ x 3 ³ / ₁₆	19 x 1 ³ / ₄ x 3 ³ / ₁₆	.010	.010	1	1	1	
83	Cork		1½	P-Molded S-Woven	22 ¹ / ₈ x 1 ³ / ₄ x 3 ³ / ₁₆	22 ¹ / ₈ x 1 ³ / ₄ x 3 ³ / ₁₆	.010	.010	1	1	1	
84, 85, 87	Cork		1½	P-Molded S-Woven	23 ¹⁵ / ₁₆ x 1 ³ / ₄ x 3 ³ / ₁₆	23 ¹⁵ / ₁₆ x 1 ³ / ₄ x 3 ³ / ₁₆	.010	.010	1	1	1	
1939, 90	Cork		1½	P-Molded S-Woven	19 x 1 ³ / ₄ x 7 ³ / ₃₂	19 x 1 ³ / ₄ x 7 ³ / ₃₂	.010	.010	1	1	1	
92, 93	Cork		1½	P-Molded S-Woven	22 ¹ / ₈ x 1 ³ / ₄ x 7 ³ / ₃₂	22 ¹ / ₈ x 1 ³ / ₄ x 7 ³ / ₃₂	.010	.010	1	1	1	
95, 97	Cork		1½	P-Molded S-Woven	23 ¹⁵ / ₁₆ x 1 ³ / ₄ x 7 ³ / ₃₂	23 ¹⁵ / ₁₆ x 1 ³ / ₄ x 7 ³ / ₃₂	.010	.010	1	1	1	
1940, 40	Cork		1½	P-Molded S-Woven	19 x 1 ³ / ₄ x 7 ³ / ₃₂	19 x 1 ³ / ₄ x 7 ³ / ₃₂	.010	.010	1	1	1	
41, 43 44, 47	Cork		1½	P-Molded S-Woven	23 ¹⁵ / ₁₆ x 1 ³ / ₄ x 7 ³ / ₃₂	23 ¹⁵ / ₁₆ x 1 ³ / ₄ x 7 ³ / ₃₂	.010	.010	1	1	1	
1941, 10	Cork		1½	P-Molded S-Woven	19.843x(1)1.75x .1875	19.843x(1)1.75x .1875	.0075	.0075	1	1	1	
11	Cork		1½	P-Molded S-Woven	19.843x(1)1.75x .1875	19.843x(1)1.75x .1875	.0075	.0075	1	1	1	
12	Cork		1½	P-Molded S-Woven	21.593x(1)1.75x .218	21.593x(1)1.75x .218	.0075	.0075	1	1	1	
14, 15, 17	Cork		1½	P-Molded S-Woven	21.593x(1)1.75x .218	21.593x(1)1.75x .218	.0075	.0075	1	1	1	

HUDSON AND TERRAPLANE

CLUTCH AND BRAKE SPECIFICATIONS

YEAR AND MODEL	CLUTCH			BRAKE							
	Facing Material	Facing Dimensions	Free Pedal, Travel, Inches	Lining Material	Lining Dimensions		Shoe Clearance, Inch		Wheel Cyl. Diameter, Inch		Master Cyl. Diam., Ins.
					Front Shoe	Rear Shoe	Toe	Heel	Front	Rear	
TERRAPLANE MODELS											
1935, G, GU	Cork		1½	Molded	19⅜ ^① x 1¾ x ⅝ ^②	19⅜ ^① x 1¾ x ⅝ ^②	.010	.010	None	None	None
1936, 61, 62	Cork		1½	P-Molded S-Woven	22⅞ ^① x 1¾ x ⅞ ^②	22⅞ ^① x 1¾ x ⅞ ^②	.010	.010	1	1	1
1937, 71, 72	Cork		1½	P-Molded S-Woven	22⅞ ^① x 1¾ x ⅞ ^②	22⅞ ^① x 1¾ x ⅞ ^②	.010	.010	1	1	1
1938, 81, 82	Cork		1½	P-Molded S-Woven	22⅞ ^① x 1¾ x ⅝ ^②	22⅞ ^① x 1¾ x ⅝ ^②	.010	.010	1	1	1

①—Dimensions of both linings for each wheel. P—Primary. S—Secondary.

FRONT END MEASUREMENTS

YEAR AND MODEL	CASTER, DEGREES	CAMBER, DEGREES	TOE-IN, INCHES	TOE-OUT ON TURNS, DEGREES	KINGPIN INCLINATION, DEGREES	KINGPIN DIAMETER, INCHES
HUDSON MODELS						
1935, All	4 to 4½	1 to 1½	0 to ⅛	23 ± ½	7	¾
1936, All	3½ to 4½	1 to 1½	0 to ⅛	23 ± ½	7	¾
1937, All	1 to 2	1 to 1½	0 to ⅛	23 ± ½	7	15/16
1938, All	2 to 2½	1 to 1½	0 to ⅛	23½ ± ½	7	15/16
1939, All	1 to 2	1 to 1½	0 to ⅛	24 ± ½	7	15/16
1940, All	0 ± ¼	¼ to ¾	0 to ⅛	24 ± ½	4½	15/16
1941, 10	—¼ to + ¼	¼ to ¾	0—⅛		4½	15/16
11, 12	—¼ to + ¼	¼ to ¾	0—⅛		4½	15/16
14, 15, 17	—¼ to + ¼	¼ to ¾	0—⅛		4½	15/16
TERRAPLANE MODELS						
1935, G, GU	3¼ to 3¾	1 to 1½	0 to ⅛	23 ± ½	7	¾
1936, 61, 62	3½ to 4½	1 to 1½	0 to ⅛	23 ± ½	7	¾
1937, 71, 72	1 to 2	1 to 1½	0 to ⅛	23 ± ½	7	15/16
1938, 81, 82	1 to 2	1 to 1½	0 to ⅛	23½ ± ½	7	15/16

①With outer wheel turned to an angle of 20 degrees, inner wheel should set as specified.

LUBRICATION AND CAPACITY CHART

YEAR AND MODEL	ENGINE			TRANSMISSION			REAR AXLE		FUEL TANK GALS.
	S.A.E. NO.	REFILL, QUARTS	COOLING SYSTEM, QUARTS	S.A.E. NO.	TRANS- MISSION CAPACITY, POUNDS	TRANS. & OVERDRIVE CAPACITY, POUNDS	S.A.E. NO.	CAPACITY, POUNDS	
HUDSON MODELS									
1935, GH	S. 30 W. 20W	5	18	S. 90EP W. 80EP	3	None	S. 110EP W. 90EP	3	15½
All 8's	S. 30 W. 20W	7	23	S. 90EP W. 80EP	3	None	S. 110EP W. 90EP	3	15½
1936, 63	S. 30 W. 20W	5	13	S. 90EP W. 80EP	3	None	S. 110EP W. 90EP	3	16½
64, 65, 66, 67	S. 30 W. 20W	7	20	S. 90EP W. 80EP	3	None	S. 110EP W. 90EP	3	16½
1937, 73	S. 30 W. 20W	5	13	S. 90EP W. 80EP	3	None	S. 160EP W. 90EP	3	16½
74, 75, 76, 77	S. 30 W. 20W	7	20	S. 90EP W. 80EP	3	None	S. 160EP W. 90EP	3	16½
1938, 89	S. 30 W. 20W	5	12½	S. 90EP W. 80EP	3	None	90EP	2¾	12½
83	S. 30 W. 20W	5	12½	S. 90EP W. 80EP	3	None	90EP	2¾	16½
84, 85, 87	S. 30 W. 20W	7	17½	S. 90EP W. 80EP	3	None	90EP	2¾	16½

HUDSON AND TERRAPLANE

LUBRICATION AND CAPACITY CHART

YEAR AND MODEL	ENGINE			TRANSMISSION			REAR AXLE		FUEL TANK, GALS.
	S.A.E. NO.	REFILL, QUARTS	COOLING SYSTEM, QUARTS	S.A.E. NO.	TRANSMISSION CAPACITY, POUNDS	TRANS. & OVERDRIVE CAPACITY, POUNDS	S.A.E. NO.	CAPACITY, POUNDS	
1939, 90	S. 30 W. 20W	4½	12½	S. 90EP W. 80EP	2¼	None	90EP	2¾	12½
92, 93	S. 30 W. 20W	4½	12½	S. 90EP W. 80EP	2¼	None	90EP	2¾	16½
95, 97	S. 30 W. 20W	7	17½	S. 90EP W. 80EP	2¼	None	90EP	2¾	16½
1940, 40	S. 30 W. 20W	4½	13	S. 90EP W. 80EP	2¼	3	90EP	2¾	12½
41, 43	S. 30 W. 20W	4½	13	S. 90EP W. 80EP	2¼	3	90EP	2¾	16½
44, 47	S. 30 W. 20W	7	18	S. 90EP W. 80EP	2¼	3	90EP	2¾	16½
1941, 10, 11, 12	S. 30 W. 20W	4½	13	S. 90EP W. 80EP	2	3¼	90EP	2¾	16½
14, 15, 17	S. 30 W. 20W	7	18	S. 90EP W. 80EP	2	3¼	90EP	2¾	16½

TERRAPLANE MODELS

1935, G	S. 30 W. 20W	5	18	S. 90EP W. 80EP	3	None	S. 110EP W. 90EP	3	11
Gu	S. 30 W. 20W	5	18	S. 90EP W. 80EP	3	None	S. 110EP W. 90EP	3	15½
1936, 61, 62	S. 30 W. 20W	5	13	S. 90EP W. 80EP	3	None	S. 110EP W. 90EP	3	16½
1937, 71, 72	S. 30 W. 20W	5	13	S. 90EP W. 80EP	3	None	S. 160EP W. 90EP	3	16½
1938, 81, 82	S. 30 W. 20W	5	12½	S. 90EP W. 80EP	3	None	90EP	2¾	16½

S—Summer. W—Winter. EP—Extreme pressure.

INDEX

Tune Up Chart	363
Lubrication Chart	367
Capacity Chart	367
Engine	368
Electric System	370
Fuel System	370
Cooling	370
Lubrication	371
Clutch	371
Transmission	374
Overdrive	375
Universals	380
Rear End	380
Brakes	380
Front End	381
Knee Action	381
Shock Absorbers	382
Steering	382

ENGINE

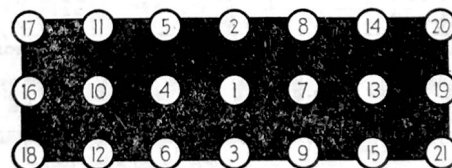
TUNE UP

See pages 4 to 7.

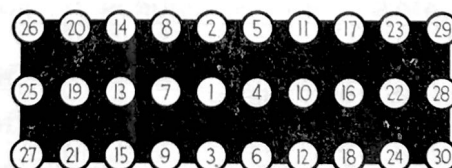
CYLINDER HEAD TIGHTENING 1935-41

Tighten the cylinder head nuts in the order shown, drawing down evenly, and then repeating the operation until all are normally tight. After the engine

has been run sufficiently long to bring all the parts to normal operating temperature, a final tightening should be made.



1935-41 Six Head Tightening Sequence



1935-41 Eight Head Tightening Sequence

When using a tension indicating wrench, the final tightening should be 45 foot pounds for the 6 cylinder cars, and 54 foot pounds for the eights.

VALVE GUIDES, R&R

1935-41: The valve stem guides are driven out from the top. When replacing on the six-cylinder engine, drive the guides in so that the top

of the guide is 1¼" from the top of the block. On the eight-cylinder engine, the distance from the top of the block should be 1½".

Special tools are available to remove and replace the guides and are so designed that when the replacing tool is used, the correct position of the guides is maintained.

TAPPETS, R&R

1935-41. The tappet and guide assemblies can be removed without removing the cylinder head as follows: Remove the tappet chamber cover from the right side of the engine. Remove the valve spring seat retainer spring seats, spring dampener, and spring. Remove the tappet adjusting screw and replace by a short screw with a thin head. Remove the tappet guide clamp screw and clamp. The tappet and guide assembly can then be lifted out.

If the complete set is to be replaced, remove the cylinder head and valves and then remove the tappet assemblies.

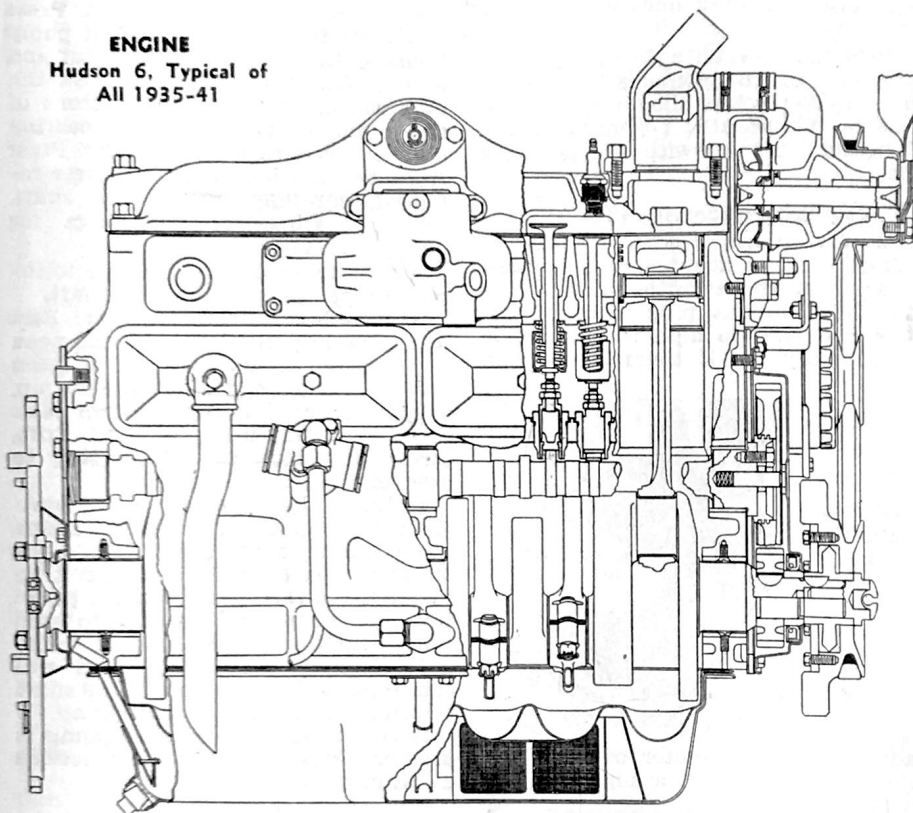
VALVE TIMING, 1935-41

Both the crankshaft and camshaft gears are so designed that they can be installed in only one position. Correct timing is obtained when the punch marks are meshed.

HUDSON AND TERRAPLANE

ENGINE

Hudson 6, Typical of
All 1935-41



PISTONS AND RODS, R&R

1935-41

The pistons and rods are removed from above on the six-cylinder engines, whereas on the eight-cylinder engines, they can be removed from above or below.

On 1938-41 connecting rod bolts, a special "companion" nut is used in place of a cotter pin. Whenever these nuts are removed, they should be replaced with new ones. When installing, tighten the regular nut to desired tension. Install the smooth face of the special nut to the bolt with the fingers until it is a snug fit against the regular nut. Then tighten it $\frac{1}{4}$ to $\frac{1}{2}$ turn more to lock it. This locks the conical-shaped single thread into the root of the bolt thread.

PISTONS, RENEW

1935-41: The code letters stamped on the cylinder block along the lower flange of the valve chamber, designate the original size of each cylinder. The piston size, code letter, and

weight in ounces and quarter ounces stamped on the head of the piston will help in selecting pistons correctly from stock. In addition to the size and weight marks all original piston installations are numbered to indicate the cylinder block number and the number of the cylinder in which the piston is fitted.

Where a single piston is selected it should be of the same weight as the piston removed. Complete sets of new pistons should always carry the same weight stamp on all pistons. Unequal piston weight will cause rough engine operation.

After selecting a piston by the code letters, place it in the cylinder in which it is to be used with a .0015" feeler directly opposite the skirt slot. The position of the feeler is important due to the cam grinding of the skirt. If the piston is the correct size, the feeler can be removed by exerting from 3 to 4 pounds pull.

The Piston & Ring Fitting Table gives cylinder bore sizes from standard to .020" oversize for which pistons

are available. Opposite each cylinder size is given the cylinder code (if any), the code letter of the correct piston size, and the piston ring size.

It will be noted that the same ring size may be designated for more than one piston size. It is advisable to hone the cylinder to the smallest dimension for which a given ring is recommended. This gives a minimum piston ring gap. Always check rings to see that the gap is as specified in the ENGINE CLEARANCES table.

PINS, RENEW

1935-41: Select the pin so that it can be pushed into the piston boss with the heel of the hand when the piston has been heated to 200° Fahrenheit. Heat the piston in boiling water or in an electric furnace. Heating with a blow torch or other concentrated heat or driving the pin in or out of the bosses will distort the piston. After the proper sized pin is selected, replace the connecting rod upper bushing and ream or burnish to .0003" larger than the pin. If this fit is correct the connecting rod will just turn on the pin under its own weight when the rod is held in a horizontal position.

RINGS, RENEW

1935-41: When fitting the pinned type piston ring, the gap between the ends of the ring and the clearance between the pin and the ends of the ring are equally important. The rings are cut and notched to fit the pin so that the clearance at the pin is equal to the gap between the ends of the ring. In other words, if the ring is compressed so that the ends come together there will be no clearance on the pin. If the ends of the ring are filed in fitting the ring it is necessary to file an equal amount in the pin notch to maintain the pin clearance. Filing should, however, not be necessary.

Piston rings of the pinned type are supplied in exact sizes to give a mini-

PISTON AND RING FITTING TABLE

Cylinder		Piston Code	Piston Ring Size
Size	Code		
3.000	A	B	3.000
3.005	B	B	3.000
3.001	C	D	3.000
3.0015	D	D	3.000
3.002	E	F	3.000
3.0025		F	3.000
3.004		J	3.003
3.005		L	3.005
3.010	AO	BO	3.010
3.0105	BO	BO	3.010
3.011	CO	DO	3.010
3.0115	DO	DO	3.010
3.012	EO	FO	3.010
3.0125		FO	3.010
3.015		LO	3.015
3.020		BB	3.020
3.021		DD	3.020
3.022		FF	3.020

HUDSON AND TERRAPLANE

mum gap of .005" when installed in a cylinder of the size for which the ring is designated. When oversize pistons are being fitted, the bores should be brought to a stock ring oversize. For example, a cylinder may clean up at .009" oversize. However, since no ring is available in this size it is advisable to hone the cylinder to .010" oversize rather than file the gap of a set of .010" oversize rings to permit their use in a .009" oversize cylinder. The sizes in which piston rings are available are given in the PISTON AND RING FITTING table. When ordering rings, both the part number and the size desired should be specified.

MAIN BEARING CAPS, R&R

1935-41: Use a puller to remove the front and rear bearing caps as sufficient force must be applied to shear the packing in the horizontal groove. After the cap is removed the packing should be thoroughly cleaned from the grooves in the case and cap. After the bearing caps have been replaced and the stud nuts tightened and keyed, the packing should be replaced. Drive cotton wicking into the front bearing cap horizontal hole first, then drive it into the vertical holes of both the front and rear bearing caps.

After the rear main bearing cap has been installed, the lower half of the oil retainer should be checked to see that it fits tightly against the upper half. A gap between the two halves of the retainer will permit loss of oil. The rear main bearing oil return tube is soldered in the rear of the reservoir and registers with the rear main bearing drain hole. Be sure the gaskets used between the reservoir and dip trough tray, and also between the tray and crankcase, have holes in line with the drain tube. If these holes are not open, oil will be lost out of the rear main bearing oil slinger. A flapper valve is located on the bottom of the oil return tube to prevent oil from being thrown up the tube and out of the rear main bearing. When the reservoir is level, this valve should be slightly open. Check the valve to see that it moves freely against the end of the tube.

ELECTRIC SYSTEM

GENERATOR CONTROLS

See pages 80 to 99.

STARTER CONTROLS

See pages 100 to 110.

HEADLAMP ADJUSTMENTS

See pages 111 to 114.

IGNITION TIMING

1935-40 Sixes (except 90): With No. 1 piston near the end of its compression stroke, the breaker points should open when the DC 1-6 or UDC 1-6 mark on the flywheel lines up with the pointer on the rear engine support.

90: Same as above except the break-

er points should open $\frac{1}{4}$ " before the UDC 1-6 mark lines up with the pointer.

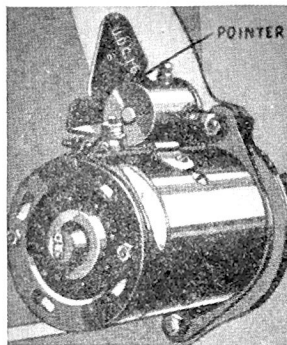
1941 Sixes: Same as 1940 except the breaker points should open $\frac{1}{2}$ " before the UDC 1-6 mark lines up with the pointer.

1935-41 All 8's: With No. 1 piston near the end of the compression stroke, the breaker points should open when the DC 1-8 or UDC 1-8 mark on the flywheel lines up with the peephole pointer.

OCTANE SELECTOR, 1935-41

Adjust octane selector as follows: When running about 8 mph in high gear open the throttle quickly and fully. If a slight ping is heard between 10 and 15 mph the setting is satisfactory but if there is no ping,

TIMING
MARKS
1935-41



advance the distributor one graduation at a time until a slight ping is heard.

HORN BUTTON & WIRE, R&R

1935-36: Unscrew the horn button collar and remove the button and contact spring. Disconnect the horn wire at the lower end of the steering gear and pull out the wire and cup.

1937-39: Disconnect the wire from the lower end of the steering gear. Press down on the horn button and rotate it, which will permit the button and related parts to be removed. Pull the wire out of the steering tube.

1940-41: Remove the screws from the underside of the steering wheel hub and remove the horn button. Disconnect the horn wire at the lower end of the steering gear and withdraw the wire from the steering tube.

FUEL SYSTEM

Carburetors—See pages 8 to 54.

Automatic Chokes—See pages 55 to 63.

Fuel Pumps—Pages 64 to 74.

Gasoline Gauges—Pages 75 to 79.

COOLING

WATER PUMP, R&R, 1935-41

Remove the fan belt by loosening the generator bracket pivot bolt. Remove the water pump mounting bolts and loosen the pump hose connections, after which, the pump may be removed.

WATER PUMP, OVERHAUL

1935

Special tools are available for doing this job. After removing the water pump from the car, cut the burr from the impeller end of the shaft. Press shaft out through front end of pump housing. Remove the packing nut and gland. With a suitable tool, press the rear bearing out toward the front of the pump housing. Pry front bearing oil seal out with a screw driver. Press front bearing out. With all parts removed, carefully inspect the shaft, needle bearings and bushings for damage or wear.

A new impeller must be used to insure proper press fit on the shaft.

Reassemble in reverse order. Rest water pump pulley on anvil andpeen impeller end of shaft with a ball peen hammer. If all end play is taken up, support pump housing between jaws of a vise and, using a blunt drift, strike the shaft to obtain .005" to .009" end play.

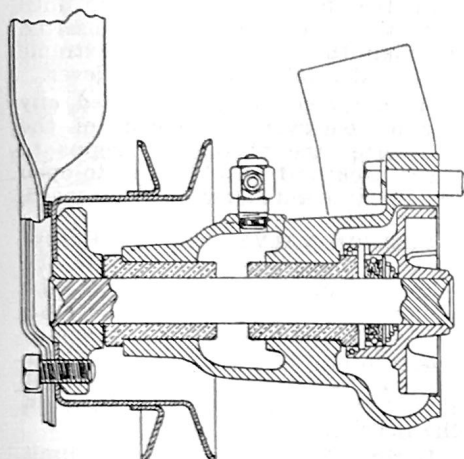
Tighten the packing nut down against the packing firmly, to shape the packing to the shaft, then back off on the packing nut and turn it up finger tight. Do not tighten the packing nut more than enough to stop water leaking by the shaft. If tightened forcibly the packing nut will cause the packing to bind on the shaft resulting in damage to the pump.

If the packingless type of pump is used on these cars, follow instructions as given for 1936-41 cars.

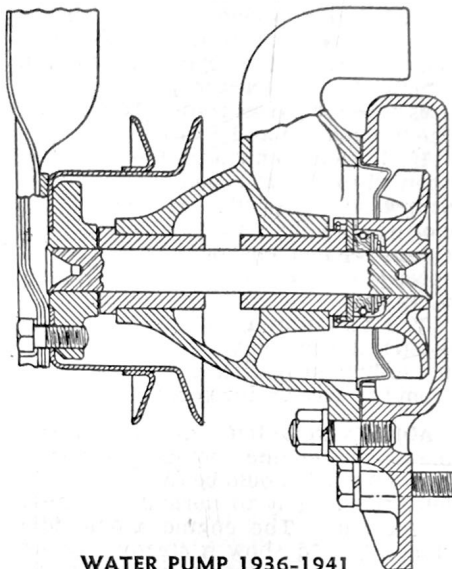
1936-41

After the unit has been removed, remove the fan blades, pulley and impeller housing. Cut the burr from the impeller end of the shaft and press the shaft out of the housing. It is essential to service the bushings in this type pump with special equipment as the material of which they are made does not allow for reaming or cutting. A special set of tools is available (J-788) for this work. With the puller and driver, remove the front bushing through the front and the rear bushing through the rear of the housing. Remove the oil seal retaining ring and disassemble the oil seal. Examine the oil seal and thrust washer and assemble in the following order: Tension spring, oil seal, thrust washer and retaining ring. Install the front and rear bushings. With a burnishing tool, polish the bushings until the surface is free from burrs, dents or scratches. Install the shaft assembly and a new impeller. Place the pulley flange on a solid surface and peen the end of the shaft until a clearance of from .005" to .010" is obtained between the pulley flange and the front bushing. Assemble the housing to the body and install the fan blades and pulley. Fill the unit with water pump grease and install on engine.

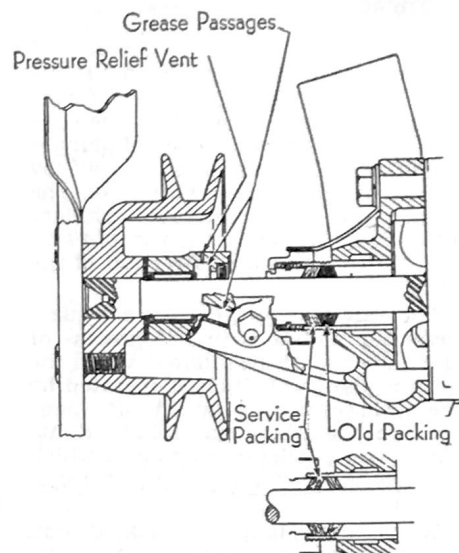
HUDSON AND TERRAPLANE



REPLACEMENT WATER PUMP 1935



WATER PUMP 1936-1941



WATER PUMP 1935

WATER THERMOSTAT, TEST

1935-41

Place the thermostat in a pail of water with a thermometer. Heat the water until the thermostat valve begins to open, at which time, the thermometer should read from 150° to 155° F. Continue heating the water until the valve is wide open, when the thermometer should read 185° F. The distance between the closed position of the valve and the wide open position should be $\frac{3}{8}$ ".

When thermostats of higher opening temperatures are used, it is essential that only permanent type anti-freeze be used.

RADIATOR GRILLE, REMOVE

1937. Hudson & Terraplane. Remove the hood assembly and disconnect the radiator brace rods from the shell. Disconnect headlight wiring from junction blocks at each side of the shell. Remove the bolts from bottom and center of grille and the two bolts to the rear of each headlamp. Remove the radiator shell and grille as an assembly.

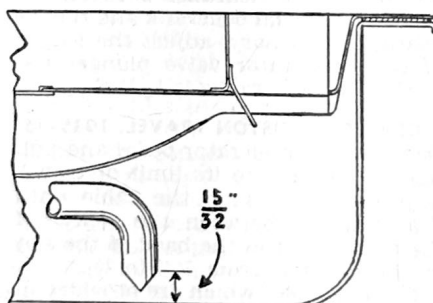
LUBRICATION

OIL PUMP, OVERHAUL

1935-41: The pump can be removed by disconnecting the inlet and outlet lines and removing the two mounting cap screws. To disassemble the pump: Remove hex caps and gaskets at ends. Remove dowel screw from pump mounting sleeve, and withdraw shaft and plunger. Before reassembling, wash all parts thoroughly, blow dry and dip the shaft and plunger in engine oil.

The inlet to the pump consists of

two $\frac{5}{8}$ " tubes. The first leads from the reservoir to the crankcase side wall and the second from the crankcase side wall to the pump. It is important in checking the system to see that the lower suction line extends to within $\frac{15}{32}$ " of the bottom of the reservoir as illustrated.



OIL RESERVOIR Hudson 1935-41

CLUTCH

See pages 115 to 127.

CLUTCH PEDAL, ADJUST

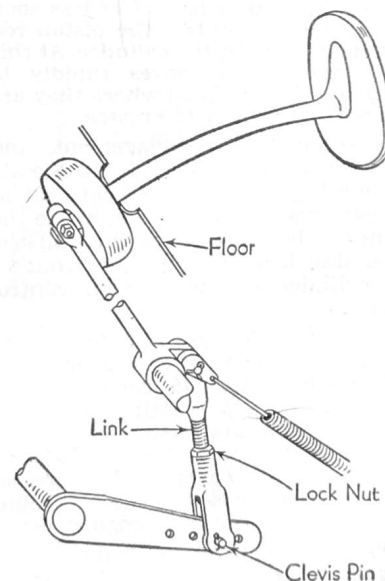
1935-41: The length of the rod which connects the clutch pedal to the cross shaft lever should be adjusted so that the center of the clutch pedal clamp bolt is $1\frac{1}{2}$ " from the toe board.

CLUTCH, LUBRICATE

1935-41: Hudsonite clutch lubricant should be drained and replaced every 5,000 to 15,000 miles. To drain, turn the engine until one of the plugs in the front of the flywheel is in the timing inspection opening at the left side of the engine support plate, and remove the plug with a special

wrench. Turn the engine slowly, approximately $\frac{1}{4}$ -revolution, until the star on the flywheel is in line with the pointer on the timing inspection hole. This brings the drain hole to the bottom. Turn the engine until the drain hole is in the timing opening and insert $\frac{1}{2}$ pint of Hudsonite.

Then, if clutch engagement is not smooth or disengagement is not complete, it is probable that some substitute fluid has been used and that the corks have become glazed and the pores closed. If this condition is encountered the clutch should be flushed with kerosene and relubricated with Hudsonite, which will, after a few hundred miles of driving, clean the corks and give normal clutch action.



CLUTCH PEDAL ADJUSTMENT, 1937

HUDSON AND TERRAPLANE

VACUUM CLUTCH CONTROL

1935-37: The vacuum clutch control is actuated by the vacuum in the intake manifold through a tubing connection to the control valve. The control valve contains the control plunger which cuts the system in or out by means of the control button on the dash, and the accelerator plunger which is connected to the throttle system, and controls the movement of the clutch.

The operation of the vacuum control when the clutch is in the process of disengagement is as follows: When the control plunger (which is operated by the dash control) is pulled out, vacuum from the intake manifold is admitted to the accelerator plunger, which controls the vacuum to the power cylinder.

When the plunger is pulled out, vacuum enters the front of the power cylinder so that the piston is moved forward. At the same time, air enters the rear of the power cylinder through the atmospheric check valve and the air by-pass. This forward movement of the piston disengages the clutch.

When the clutch is in the process of engagement, the operation of the control is as follows: When the accelerator pedal is depressed, the accelerator plunger moves inward, moving the radial slot away from the vacuum port, cutting off the vacuum to the power cylinder, and the longitudinal slot in the accelerator plunger is brought into line with the vacuum port, so that air can enter the front of the power cylinder.

The air in the front of the cylinder permits the clutch springs to pull the piston backward, forcing air out of the rear of the cylinder through the air by-pass in the piston rod. This air by-pass extends to within about $1\frac{1}{2}$ " of the piston so that it is closed as soon as its inner end enters the piston rod seal at the head of the cylinder. At this point, the piston moves rapidly to bring the clutch plates where they are just ready to begin to engage.

To complete the engagement, and since the by-pass is closed and the atmospheric check valve is held against its seat by air pressure from inside the cylinder, the air escapes through the bleed line leading from the front of the cylinder to the cushion control valve.

As the accelerator is depressed to speed up the engine, the tapered slot in the accelerator plunger passes the bleed line port, permitting additional air escape and final cushioned engagement of the clutch. The farther the accelerator is depressed, the greater the slot area exposed to the bleed line, and the faster the final engagement.

The pendulum hangs straight down when the car is at rest or when accelerating normally, and when in this

position, the radial slot in the cushion control valve is held in line with the ports so that air can pass through to a port through the cylinder through which the accelerator plunger operates. The air passes from this port into the tapered slot and escapes.

If the engagement is too rapid on open throttle, the pendulum swings backward, partially or completely closing the air bleed, which arrests clutch engagement, permitting the car speed to attain engine speed gradually.

The 1937 unit is equipped with an electrical control to eliminate coasting in high gear when the foot is taken from the accelerator pedal.

ADJUSTMENTS: Before making adjustments, the engine should be properly tuned up and should be run sufficiently long to bring it to normal operating temperature. The engine should idle smoothly and show a steady reading on a vacuum gauge of from 18 to 21 inches of mercury. The clutch pedal free travel should be according to specifications, and the clutch action should be checked manually to see that it operates smoothly. If the clutch action is harsh, drain the clutch housing and re-fill with Hudsonite oil.

ACCELERATOR VALVE PLUNGER, 1935-37: Disconnect the throttle pull rod and check the clearance between the accelerator pedal bellcrank and the toe board. If necessary, adjust the length of the accelerator valve plunger rod so that this clearance is $\frac{1}{2}$ inch.

CENTERING PISTON TRAVEL, 1935-36: Depress the accelerator pedal and pull the piston back to its limit of travel. Adjust the clevis on the cable until the clearance between the center of the clevis pin and the back of the slot in the clevis is from $\frac{7}{8}$ " to $1\frac{1}{16}$ ".

The four holes which are provided in the lever are for the purpose of varying the clutch pressure plate movement. The hole marked "1" gives the least movement of the plate while the other holes, in the order numbered, give increased pressure plate movement.

The hole marked "2" is correct for most purposes. However, if the clutch fails to disengage completely or tends to lag, the rod should be moved to hole "3" or "4". This change is usually required only after considerable wear of the clutch facing.

CENTERING PISTON TRAVEL, 1937: With the engine shut off, push the accelerator control valve plunger forward, and pull the piston rod all the way back. The clearance between the front end of the slot in the clevis on the rod and the clevis pin should be $\frac{1}{8}$ ".

THROTTLE ROD, 1935-37: With the engine warm and running smoothly at idle, and clutch disengaged by the au-

tomatic control, pull back on the throttle rod just until the piston rod begins to move backward. While holding the throttle rod in this position, turn the clevis on its front end until the clevis pin can just be inserted through the clevis and the extreme rear of the slot in the throttle lever.

After the clevis pin is inserted, any further backward movement of the rod, after the piston rod begins to move backward, should begin to open the throttle and increase engine speed.

CUSHION VALVE, 1935-37: Before making the adjustment, remove the fitting from the right side of the plunger housing and check the position of the plunger. When the pendulum is in its extreme forward position, the cutaway section of the plunger should line up exactly with the port in the housing.

During 1937, a stop was used to limit the travel of the pendulum, and if equipped with this arrangement, the position of the plunger can be changed by springing the pendulum arm slightly.

If the unit is not equipped with this stop, a stop screw was used. To adjust the plunger position, loosen the lock nut and turn the stop screw in the direction desired to bring the plunger slot in the line with the port.

To complete the adjustment, remove the plunger spring and stretch it to a free length of $1\frac{5}{8}$ ". After replacing the spring, turn the screw in flush with the locking nut and re-check the plunger position.

PISTON ROD, 1937: Adjust the piston rod clevis so that the center of the clevis is exactly $1\frac{1}{8}$ " from the rear end of the piston rod. This measurement should include the length of the lock nut.

LUBRICATION, 1935-37: Remove the piston rod rubber boot and with an oil can containing the recommended shock absorber fluid, inject the oil in the slot in the piston rod. With the engine running and the accelerator depressed so as to engage the clutch, release the accelerator pedal and squirt the oil into the slot as the clutch is disengaging. The forward motion of the piston will draw the oil into the cylinder.

After the oil has been injected, remove the clevis pin and work the piston back and forth while rotating it, in order to distribute the oil. Before connecting the clevis, locate the piston one-half turn from its original position so that the portion of the packing which has been resting on the bottom will now be at the top, and will tend to distribute the wear of the packing evenly.

1938-40

This unit is of the internal valve

HUDSON AND TERRAPLANE

design. The power cylinder connects to the clutch operating lever by means of a bellcrank and operating rod. It also connects to the accelerator pedal through a threaded sleeve rod, valve lever, and a valve lever cam arrangement.

The operation of this unit is actuated by intake manifold vacuum and is controlled by a knob located on the dash panel. When the knob is pulled out, the clutch is operated manually. By pushing the button in, automatic operation is provided.

To cause the engagement of the clutch, initial movement of the accelerator pedal is transmitted directly to the valve lever cam at the lower end of the valve lever. As the valve lever cam moves forward, the upper end of the valve lever and the valve rod moves rearward, uncovering the piston rod ports, and vacuum within the forward end of the cylinder begins to withdraw the air from the rearward side of the piston. This action has the tendency to equalize the pressure on both sides of the piston.

With a reduction of pressure on the rearward side of the piston, the piston starts to move rearward on its engaging stroke, and the piston rod ports tend to overtake the valve plunger and seal off the vacuum ports. The piston rod movement stops as soon as the valve closes the ports so that the air is trapped on the rearward side of the piston.

As this initial engagement, or cushion point, is reached, the throttle rod takes up its lost motion clearance, and the throttle begins to open. After the initial clutch engagement has been made, the valve lever cam angle changes rapidly, allowing the clutch to complete its engagement.

PISTON ROD GUARD, R&R, 1938-40

To replace the piston rod guard, disconnect the valve lever at the eccentric pivot and at the valve rod trunnion. Disconnect the piston rod from the bell crank. Remove the piston rod guard from the groove in the piston rod end and remove the piston rod end.

After replacing the piston rod guard, adjust the piston rod end to give a length of $13\frac{1}{16}$ " from the center of the tripod mounting hole to the center of the bell crank bolt hole in the piston rod end. Replace the valve lever and adjust the cushion point stop screw as described in the FINAL ADJUSTMENT paragraph.

LINKAGE ADJUSTMENT, 1938-40

All clutch control and throttle linkage should work freely and without binding. Set the accelerator bell crank arm to stop within $\frac{1}{4}$ " of the toe board by adjusting the throttle rod clevis.

The bell crank operating rod must be in the third hole from the end in the lower arm of the accelerator bell crank. The threaded sleeve should be

adjusted at the clevis to obtain $\frac{3}{8}$ " clearance between the bell crank and the dash with the engine idling and vacuum clutch control on.

BELL CRANK YOKE, ADJUST, 1938-40

Remove all play between the piston rod and the clutch operating lever. With the engine shut off and the piston rod in its extreme rear position, remove the valve lever assembly. The bell crank operating rod yoke should be adjusted so that there is a clearance of $\frac{1}{8}$ " between the front edge of the clevis pin and the front end of the slot in the yoke.

PISTON TRAVEL, ADJUST, 1938-40

With the guide block in the rear hole in the cam lever, adjust the valve lever cam threaded sleeve to obtain maximum disengagement travel to the piston. With the engine running and the clutch disengaged, and the compensator pin in its extreme rear position, screw the threaded sleeve toward the dash until the piston rod reaches its extreme forward position. Then screw the threaded sleeve away from the dash until the piston rod moves rearward $\frac{1}{4}$ ".

VACUUM CLUTCH CUSHION POINT 1938-40

To make this adjustment, block the wheels securely and start the engine, leaving the brakes unset. Accelerate the engine several times while manually engaging and disengaging the clutch in order to wipe off the clutch disc.

Swing the compensator to the rear and turn the cushion point stop screw in until it meets the cam. Shift the transmission gears into low and hold the cam against the stop screw, and at the same time, turn the stop screw out slowly until the car shows a tendency to move forward. At this point, the clutch disc begins to drag against the

flywheel, and is the correct cushion point.

THROTTLE ROD CLEVIS, ADJUST, 1938-40

Lost motion in the throttle system should be adjusted so that the piston moves to its cushion point just as the engine begins to accelerate. Hold the accelerator down until the cam just touches the stop screw. This can be done by wedging the accelerator bell crank away from the toe board with a screw driver or other suitable tool behind the upper arm of the bell crank. Adjust the clevis until all lost motion is taken up. The adjustment should be at a point where any additional pedal travel will increase engine speed. Remove the wedge.

The throttle rod should be in the center hole of the pull lever on the 8-cylinder cars, and in the top hole on the sixes (except Traveler, 1940). For the Traveler 1940, the rod should be in the bottom hole.

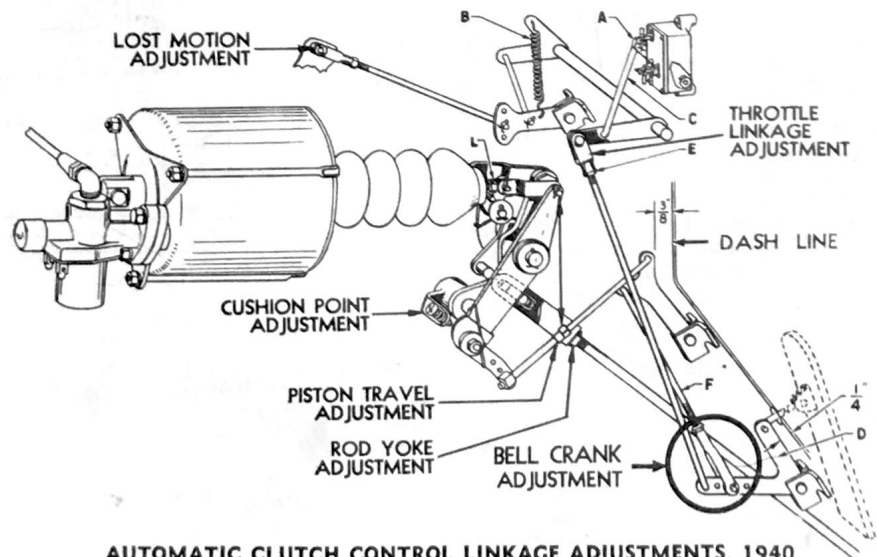
FINAL ADJUSTMENT, 1938-40

With the engine running, shift into second gear and depress the accelerator pedal gradually. As soon as the throttle starts to open, the clutch should engage. The cushion point stop screw and the throttle should be so adjusted that the car begins to move slightly when the engine speed first increases.

If the clutch engagement is slow while the engine is slightly racing, turn the stop screw outward. If the clutch engagement is too fast, causing the engine to stall, turn the stop screw inward. Do not turn the stop screw more than $\frac{1}{2}$ turn at a time.

LUBRICATION, 1938-40

Every 10,000 miles, one ounce of the recommended shock absorber fluid should be poured into the cylinder in order to keep the piston seal soft and pliable so that it effectively seals



AUTOMATIC CLUTCH CONTROL LINKAGE ADJUSTMENTS, 1940

HUDSON AND TERRAPLANE

against the cylinder wall.

Remove the pipe plug and inject the fluid. Disconnect the piston rod end from the bell crank and rotate the piston rod with an in and out motion so as to distribute the fluid properly over the entire piston and oil wick.

After assembling the piston rod end, re-check the adjustment as described in the FINAL ADJUSTMENT paragraph.

VACUUM CLUTCH CONTROL, 1941

The operation of the vacuum clutch has been greatly improved through the use of new throttle linkage. Due to the dash mounting used formerly, lost motion provisions were incorporated. On the 1941 models, the accelerator switch is attached to the left side of the engine instead of on the dash. The new locations for the throttle linkage and the switch provide more direct operation of the clutch control rods, thereby greatly minimizing the need for linkage adjustments.

The only throttle adjustment required is now made by the screw at the left end of the accelerator cross shaft. The cushion point adjustment used on 1940 models is retained. This arrangement makes for simplification of adjustments due to their both being located on the left side of the car. The power unit is the same as 1940 and its service is identical.

TRANSMISSION

ELECTRIC HAND, INSPECT

1935-39. A preliminary service check should be made before attempting to make any repairs. Be sure that the cutout switch on the selector switch is on. Be sure that the transmission is free and can be moved into all its positions manually with the clutch pedal depressed fully. Inspect the vacuum line and fittings for leaks. Check the wire connections on the interlock switch. Make certain that all clevis pins and cotter pins are in place. Inspect the junction block on the solenoid unit to see that all six wires are in place. Make certain that all soldered connections are intact in both portions of the steering column wire harness. Check all wires for breaks or damaged insulation. To make a quick test for a short circuit, shift into all positions with the Electric Hand, while the instrument board lamp is lighted. Any appreciable dimming of the lamp indicates a short circuit in that position.

Test the circuit breaker which is operated by the clutch pedal. It should close the circuit and cause the gears to shift just as the clutch is disengaged. In other words the gears should not shift at any time unless the clutch is fully disengaged. However, if too much downward pedal movement is required to close the Electric Hand circuit, the shift will not be completed because an end-to-

end condition of the gears is encountered. This happens only when the car is standing still and is usually noticed only in attempting to shift into low or reverse. If the gears are shifted with the clutch engaged it is probably due to a short circuit in the circuit breaker or the improper position of the circuit breaker arm. The circuit should close at the circuit breaker when the clutch pedal is approximately 2" from the floor board.

If all connections and wires appear to be in good order and the transmission cannot be shifted into any speed, or any one speed, remove the power unit assembly at the side of the transmission. With two leads from a battery, ground one and with the other touch one of the three solenoid terminals. A slight clicking sound should be heard when the wire is touched at each terminal which indicates the action of the electro magnet. If any do not operate remove and check the rubber plunger valve and the electro magnet. It is advisable to install new rubber plungers whenever removed. Clean chamber to remove any dust or oil that may have collected. It is imperative that this chamber be cleaned of any foreign substance as it will affect the action of the valves.

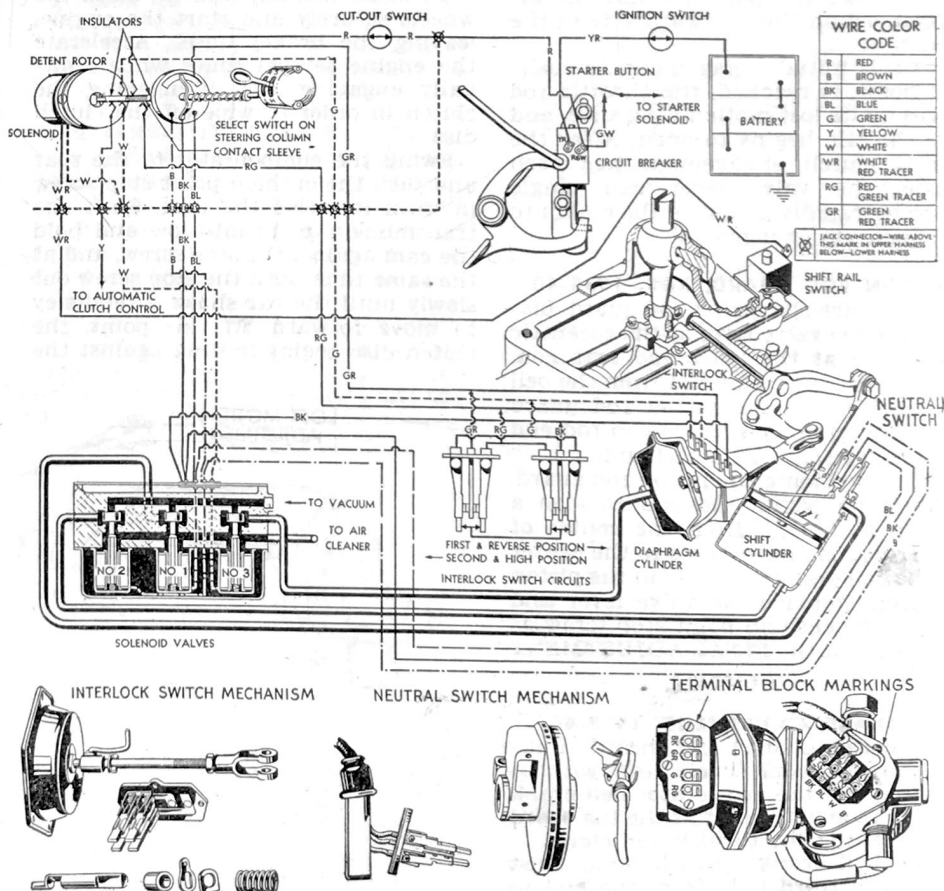
Remove the two vacuum hose con-

nections from the vacuum cylinder and test the plunger for any leakage by holding the thumb over the lower vacuum hose connection and pressing the plunger downward. Test the upper plunger by pulling the plunger outward with the thumb over the outlet. Any loss of pressure will denote a leak and the leather plunger will have to be removed and checked. Failure in this unit will affect the sliding shift of the gears but not the cross shift.

Remove the cap screws on the vacuum diaphragm and remove its cover. Check the rubber diaphragm for any breaks. Failure in this unit will prevent cross shift.

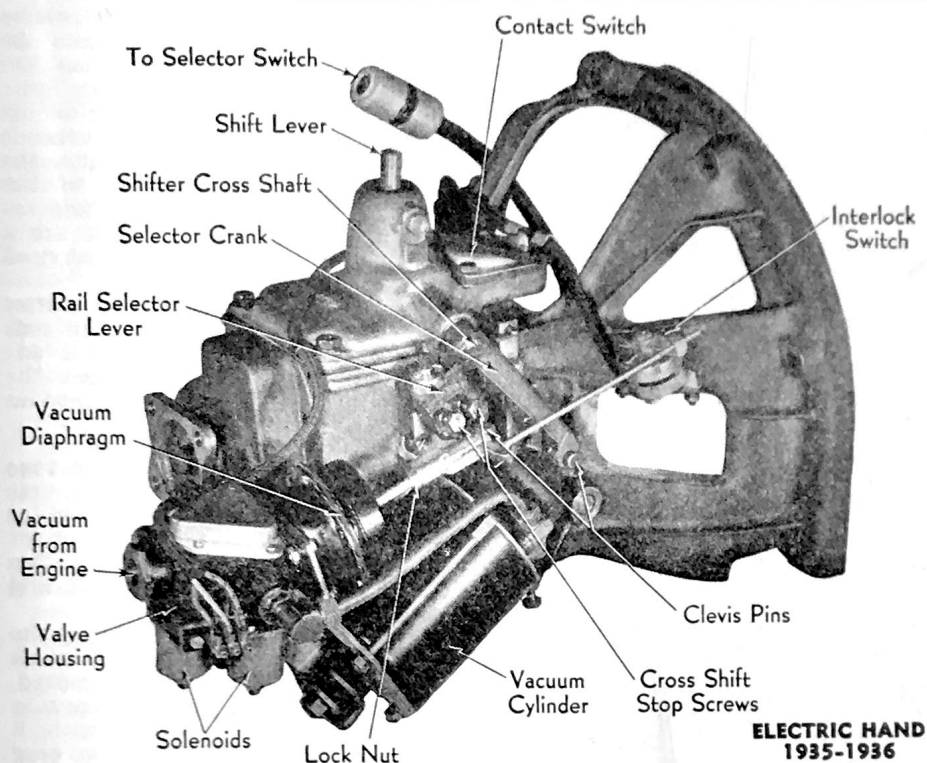
If an adjustment is necessary, remove the clevis pin from the diaphragm rod. With the transmission in neutral, adjust the clevis so that $\frac{1}{8}$ " compression on the diaphragm return spring will just permit insertion of the clevis pin. That is when $\frac{1}{8}$ " of light can be seen through the clevis pin hole when the clevis is placed over the bell crank. Note: Avoid turning the cylinder in its mounting, or damaging the rubber diaphragm.

When replacing the power unit, care should be taken not to change the adjustments of the unit arms. The power unit is mounted on rubber grommets and is a floating unit. Do



ELECTRIC HAND WIRING DIAGRAM, 1938-39

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not tighten so that all play is removed.

If an adjustment to the power piston is necessary, hold the clutch pedal down with the engine running. Remove the clevis pin at end of rod. With both selector on steering column and transmission in the neutral position, adjust the power cylinder piston rod until it aligns with the shifting arm hole and the clevis pin can be easily reinserted.

If these tests do not locate the trouble special test equipment supplied by the Hudson company is required.

TRANSMISSION, R&R 1935-39 Conventional Shift

Remove floor mat and floor boards. Remove the transmission cover. Disconnect the universal joint at the transmission companion flange. On cars equipped with the electric hand, remove the interlock and circuit breaker switch control arms and the power unit assembly. Disconnect the clutch and brake linkage. Detach the speedometer cable. Disconnect the rear engine support and jack up the rear of the engine. Remove the flywheel housing connecting bolts and remove the transmission and flywheel housing back and out through the front compartment.

1939 With Steering Column Shift

Remove front seat cushion, accelerator pedal and front floor mat. Remove the transmission opening hole cover and disconnect the control tube, which is attached to the transmission cover rod, by removing the clevis pin. Remove the selector plate push rod

dust shield, located at the side of the transmission, by bending back the ears under the casing bracket, and remove the attaching bolt and bracket. Remove the control wire anchor clip and bend over clip which holds the casing to the frame at the brake pipe frame tee.

The balance of the removal procedure is the same as described for the conventional shift transmission.

1940 Without Overdrive

Remove the accelerator pedal and the floor mat. Remove the bolts from the transmission floor cover. Disconnect the accelerator pedal link bell crank from the accelerator cross shaft rod and remove the floor cover. Disconnect the front universal joint, and the clutch linkage. Loosen the inside nuts on the transmission side bumper and remove the rubber bumpers, then, push the bumper rod out of the way. Disconnect the shift control tube from the transmission cover rod and remove the transmission cover.

Raise the car on jacks. From below, remove two screws connecting the clutch housing to the flywheel guard and two engine rear mounting bolts. Do not remove the bolt connecting the rear mounting to the clutch housing. Jack up the rear end of the engine until it is $\frac{1}{2}$ " off the frame, and then, disconnect the transmission from the clutch housing. Disconnect the speedometer cable at the transmission. Pull the transmission back and lift it out.

1940 With Overdrive

Drain the lubricant from both the transmission and overdrive cases. Dis-

connect the front seat assembly and push it back. Remove the accelerator pedal, the floor mat, and the transmission floor cover plate. Disconnect the propeller shaft at the front universal joint. Disconnect the clutch linkage. Release transmission side bumper and bumper rod assemblies. Remove the shift control connections at the transmission. Remove the speedometer cable at the overdrive case and the wires from the solenoid. Disconnect the overdrive control cable from the control lever at the overdrive case.

Raise the car on jacks and remove the lower flywheel guard. Raise the rear of the engine from the frame and disconnect the clutch housing from the engine. Pull the transmission and overdrive assembly back and out of the car.

TRANSMISSION (Without Overdrive) OVERHAUL, 1935-40

See TRANSMISSION, R&R and proceed as follows: Remove transmission cover. Disconnect the link which is attached to the shift rail locking device, and remove the link and rail lock rods. Remove the clutch housing. Using a suitable puller, remove the universal companion flange. Remove speedometer housing and drive gear.

Disassemble the shifter mechanism, being careful not to lose the interlock balls and springs. Remove the main drive gear bearing retainer.

To remove the mainshaft, drive the low and reverse sliding gear back sufficiently to remove the snap ring. With a suitable puller, remove the mainshaft and rear bearing through the rear. Remove the low and reverse sliding gear and the second and high shift sleeve from the case. The clutch shaft assembly can now be removed from the top of the case.

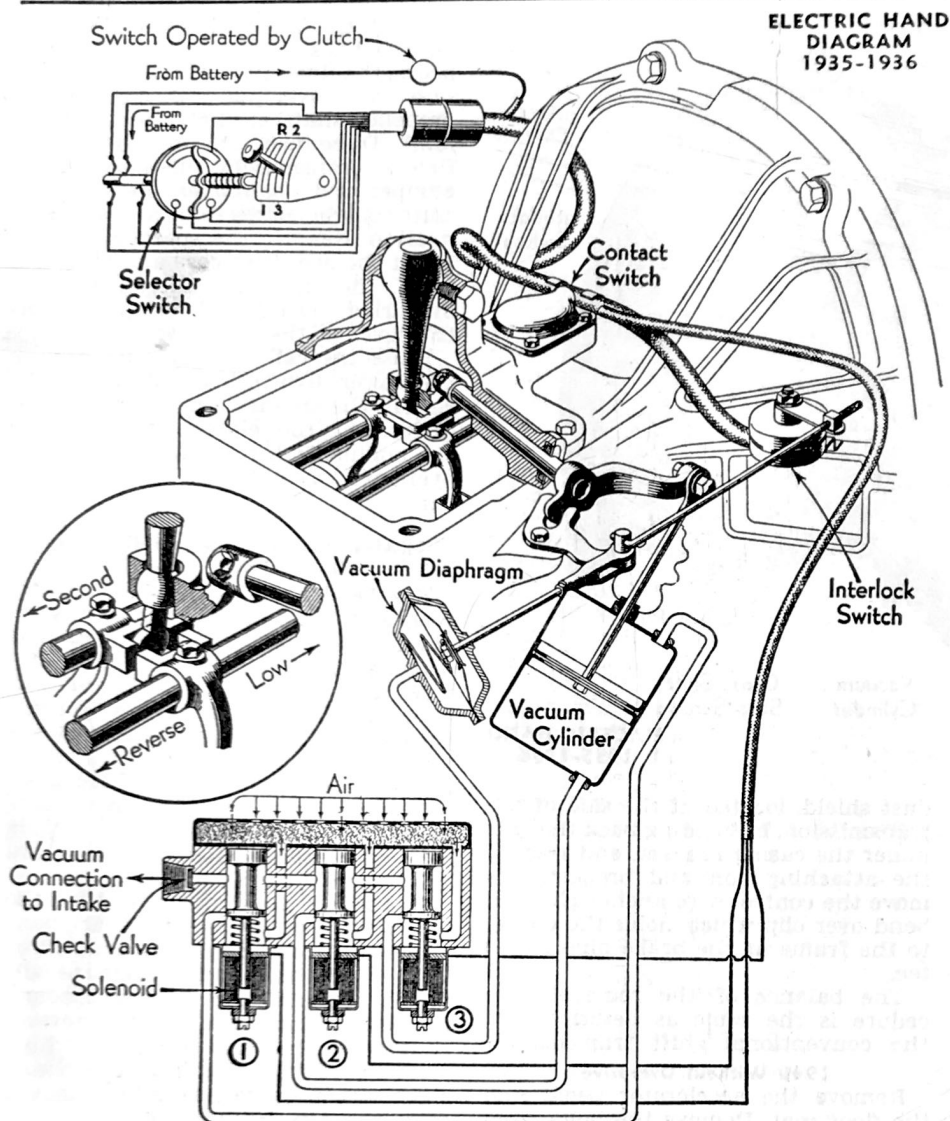
To disassemble the main drive gear assembly, remove the thrust balls and needle bearings. Remove the snap ring from the front of the second speed gear. Remove the main drive gear bearing with a puller.

To remove the reverse gear on the 1935 models, remove the reverse gear shaft cap, shift rail lock strap pivot and drive the shaft out from the inside of the case. Remove the rotating shaft and gear assembly.

On 1936-40 models, remove the reverse gear shaft screws and withdraw the cap and shaft. Remove the stationary gear and shaft assembly.

To remove the countershaft assembly, remove the rear bearing cap, thrust washer and spacer. Separate the drive gear and intermediate gear by inserting the beveled edge of a gear drift between the gears. After the countershaft has been forced back out of the splines of the drive gear, turn the shaft so that the splines of the shaft butt against the splines of the drive gear. Insert the gear drift through the rear of the case and drive

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**ELECTRIC HAND
DIAGRAM
1935-1936**

If necessary to replace the reverse idler gear bushing, it should be reamed to obtain .003" clearance. On 1935 units, the reverse sliding gear on the rotating shaft should be installed so the shifting fork collar is to the rear. For 1936-40 units, the collar should be installed to the front. The reverse stationary and rotating shaft on 1936-40 units are a pressed fit together and is serviced only as an assembly.

The clearance between the shifter lock rod plungers and the lock rods should be .005". To obtain this adjustment, place shims between the lock rod guides and the transmission case.

TRANSMISSION WITH OVERDRIVE, 1940

The overhaul procedure for this unit is similar to that which is described for the unit without overdrive except for the removal of the mainshaft. See OVERDRIVE, R&R & OVERHAUL and proceed as follows:

To remove the mainshaft, after the shift rails, shift forks, the interlock and related parts have been removed, remove the mainshaft and reverse gear retainer lock by prying it with a pointed tool, after which, the two gear retainers may be lifted out.

Remove the two cap screws which connect the adapter plate to the transmission case and pull off the adapter, together with the mainshaft, rear bearing and oil baffle. The mainshaft low and reverse gear and the shifter sleeve will fall into the case and the drive gear thrust balls and the needle rollers will drop out of place in the gear.

Press the mainshaft and the mainshaft rear bearing out of the adapter, and then, press the bearing from the mainshaft.

TRANSMISSION, OVERHAUL, 1941

Without Overdrive

After removing the transmission, disconnect the clutch housing from the transmission case. Remove the transmission cover, being careful not to allow the shift rail lock ball spring from jumping out of place.

Tip the case on its side and, using a magnet, remove the low and reverse shift rail lock ball. Flush out and clean the case and gears thoroughly. Remove the companion flange with a puller if necessary. Remove the speedometer gear housing, the oil seal and speedometer gear.

Remove the screws which retain the low and reverse gear shift fork and shifter. Slide the low and reverse shifter rail out of the front of the case, and remove the shifter and fork.

Tilt the case on its side and, using a magnet, remove the shift rail interlock. Remove the second and high shift fork set screw and slide the shift rail out through the front, and remove the shift fork.

the intermediate gear forward, but not entirely off the shaft. With the low and reverse shifter in reverse position, move the countershaft to one side far enough to move the shifter in the neutral position. Hold the three gears together and remove the countershaft through the rear.

Remove the low and reverse intermediate lever stud and lever. Remove the set screw from the right side of the case and drive the low and reverse shifter fork shaft out of the case. Remove the nut from the bottom of the case, which will permit the reversing mechanism to be removed, being careful to observe the position of the various parts.

Assembly can be made in the reverse order.

ASSEMBLY DETAILS: Check all the parts for wear and replace where necessary. Make sure that the bearings are free from dirt or chips and that they are free from roughness or looseness. Make sure the gears and shafts are free from nicks on the

teeth and splines, to prevent noisy operation and hard shifting.

The second speed gear bushing should have a clearance not exceeding .0005". If more than this amount, the second speed gear and bushing should be replaced as an assembly, because the bushing is machined to great accuracy at the factory to insure quiet operation. The end play should be .009".

The mainshaft end play is adjusted by shims at the front bearing cap and should be from .006" to .009". When installing the thrust balls and bearing rollers, use cup grease to hold them in position.

The countershaft end play is controlled by shims at the rear bearing cap and should be from .005" to .008". If necessary to replace the countershaft bushings, they should be line reamed to obtain .0005" clearance. When installing the countershaft intermediate gear, the front end of the gear should be flush with the edge of the countershaft splines.

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Tilt the case on its side and remove the second and high shift rail lock ball, using a magnet.

Pull the mainshaft back far enough to disengage it from the main drive gear, and tilt its front end up slightly so as to remove the lock ring, using a suitable pair of spreader pliers. Remove the synchronizer unit, together with the two bronze synchronizer rings from the mainshaft. Remove the second speed gear and the low and reverse gear from the mainshaft, after which, the mainshaft may be withdrawn from the case.

Remove the screw which retains the countershaft and idler shaft lock plate and drive the plate out of the slots of the shafts. Drive the countershaft out through the rear of the case, and before removing the countergear, remove the main drive gear.

Drive out the reverse idler shaft through the main drive gear hole in the case, and remove the idler gear.

Remove the set screw which fastens the shift selector shaft bushing. Remove the shift selector lever and shaft assembly from inside of the case and lift the bushing out from the top.

Before removing the shift selector lever and shaft, and the shift shaft inner lever—which are splined—they must be marked to insure their being replaced in the same relative position. This is necessary to insure full travel of the low and reverse shifter and the second and high shift fork.

Remove the shift shaft outer lever. Turn the case upside down and drive out the pin which passes through a

groove in the shift shaft, after which the shift shaft and oil seal may be removed.

To disassemble the main drive gear, remove the needle roller retainer in the pocket of the gear and remove the rollers. With suitable spreader pliers, remove the lock ring. With a suitable puller, remove the bearing from the gear.

ASSEMBLY DETAILS: The main drive gear bearing retainer is a tight fit in the clutch housing and in addition, a locating pin is assembled in the retainer to hold it securely in position. If it is necessary to replace the main drive gear bearing retainer oil seal, the use of special tools is recommended to make the installation, as damage to the case may result.

If necessary to replace the counter-gear bushings, make sure that the annular oil groove in each bushing is placed toward the front for the front bushing and toward the rear for the rear bushing. The annular groove in the reverse idler gear bushing, if it is to be replaced, should be toward the front end in the gear. These bushings should be reamed to .865" to .866". When installing the countergear, be sure to place the steel thrust washer at the rear end of the cluster.

When installing the low and reverse gear on the mainshaft, be sure to position the gear so that the four oil holes in the gear line up with the deep grooves in the mainshaft.

The synchronizer shift sleeve hub and synchronizer rings are supplied with two different tooth designs. Parts

designated as Design A have a 90 degree tooth chamfer, while parts designated as Design B have a 110 degree tooth chamfer. The parts with the 110 degree tooth chamfer are marked with a number 110, while the parts with the 90 degree tooth chamfer are not marked. Parts of different tooth design should never be installed together.

TRANSMISSION, OVERHAUL, 1941 With Overdrive

After removing the assembly from the chassis, remove the clutch housing from the transmission case. Drain the lubricant from both the overdrive and transmission cases. Disconnect the overdrive housing from the transmission and separate the housing from the overdrive adapter. Remove the housing together with the overdrive mainshaft, free wheeling cam, clutch hub shift sleeve, and the shifter rail fork guide pin. Some of the free wheeling rollers may drop into the housing. Be sure to account for 12 rollers.

Remove the free wheeling cam retaining bolt from the end of the transmission mainshaft, and slide the free wheeling cam assembly and the clutch hub rear thrust washer off the shaft.

Remove the clutch hub, ring gear and pinion cage assembly as a unit to avoid the necessity of re-winding the split pinions if the pinion cage assembly is not to be serviced.

Remove the pinion cage retaining snap ring, and using a screw driver, pry out the pinion cage oil collector ring cover snap ring, and slide off the collector ring. The stationary gear assembly can now be removed from the mainshaft.

This completes the removal of the overdrive from the transmission. The procedure for servicing the transmission is the same as already described for the unit without overdrive except that the transmission mainshaft is removed with the adapter plate after the adapter plate has been disconnected from the transmission case.

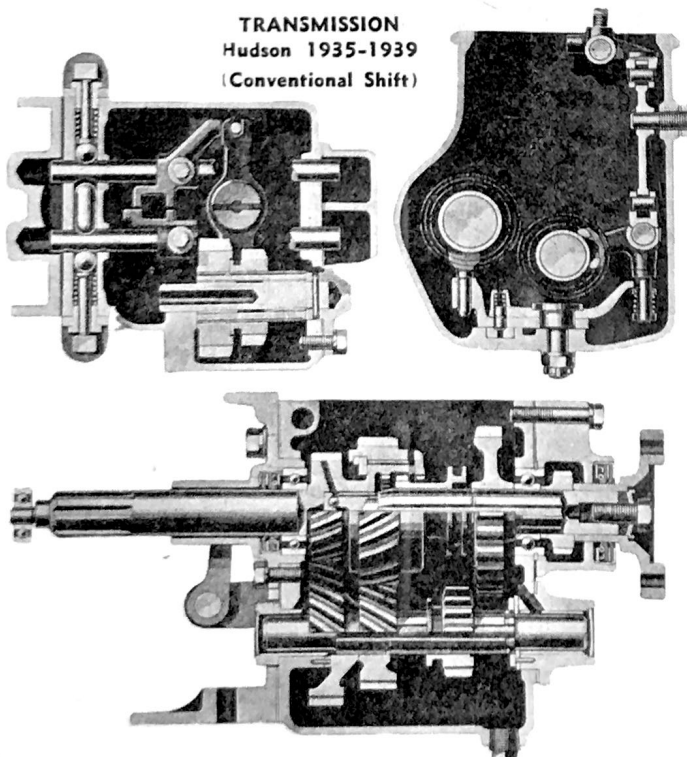
OVERDRIVE, R&R & OVERHAUL, 1940

Disconnect the overdrive case from the adapter plate and pull off the overdrive case together with the overdrive mainshaft, clutch sleeve and shifter rail reverse lock-up plunger.

Unbolt the free wheeling cam from the end of the transmission mainshaft and slide the assembly off the shaft. The overdrive clutch pawl and core assembly, together with the pinion cage assembly should be removed as a unit to eliminate the necessity of re-winding the split pinions, since these parts cannot be obtained separately. Care should be exercised however, not to damage the oil thrower on the front face of the pinion cage.

Remove the pinion cage snap ring and take out the pinion cage oil collector ring cover. Remove the solenoid and the plunger pawl by pulling it to

TRANSMISSION
Hudson 1935-1939
(Conventional Shift)



HUDSON AND TERRAPLANE

the rear and sliding it off the ball.

If necessary to remove the transmission mainshaft at this point, follow the procedure as already described under **TRANSMISSION WITH OVERDRIVE, OVERHAUL**.

To disassemble the overdrive case, remove the lock-up plunger from the front of the case. Remove the speedometer drive pinion and sleeve. Pull off the universal joint flange with a suitable puller, and remove the overdrive mainshaft through the front. Lift out the clutch sleeve. Remove the overdrive mainshaft bearing inner snap ring and tap the bearing out through the front, and then, tap the oil seal out towards the rear.

If necessary to remove the overdrive control shaft, pay particular attention to the way the related parts are removed to insure proper assembly. When installing the poppet ball, spring and spring seat, do not adjust the seat too tightly to prevent the free movement of the control shaft lever.

ASSEMBLY DETAILS: If a new oil seal is required for the overdrive mainshaft, soak it in light engine oil and roll it with a steel roller so that it becomes soft and pliable. When installed, it should protrude 9/32" from the outer edge of the case.

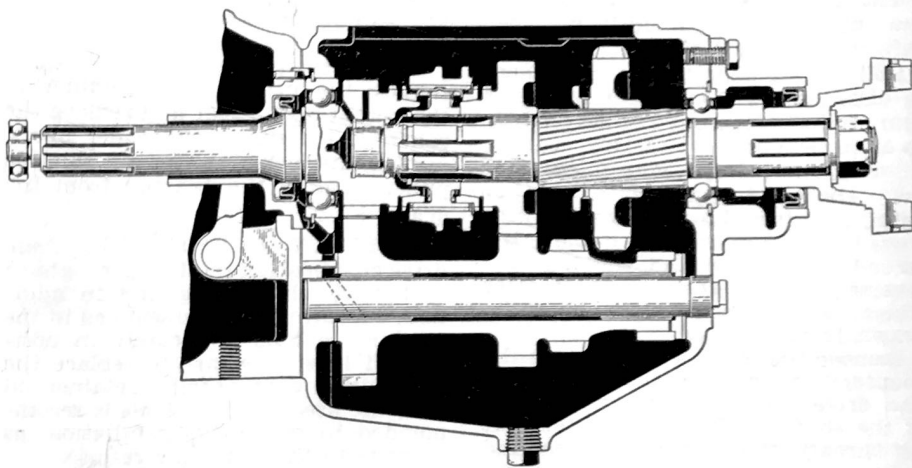
CLUTCH CORE & CORE ASS'Y: When replacing the clutch pawl adjusting screws, install them so that each screw receives the same number of turns to provide equal tension on the springs. As these springs control the cut-in speed of the overdrive, both pawls of the clutch should engage at the same time. Therefore, the screws should be turned in until the top of the screw heads are exactly 1/16" below the top edge of the counterbore. The tighter the screws are turned, the higher the cut-in speed.

CLUTCH SLEEVE: Wear on the pawl raceway or windows of the shifter clutch sleeve produces a rasping noise above 30 MPH, which vanishes when the overdrive is engaged. A worn sleeve should be replaced and when this is done, the centrifugal clutch unit should be replaced.

PLANETARY PINIONS: These pinions are the spring-loaded split type which are designed to prevent gear backlash noise. When installing, be sure to wind up the free portion of each pinion until the tooth marks align, before meshing pinions into the ring gear. The amount of windup is about 1½ teeth.

STATIONARY GEAR PAWL: The clearance between the solenoid pawl and the balk ring should be .015" with the solenoid in place and energized. Adjust the clearance by adding gaskets under the solenoid unit.

FREE-WHEEL CAM: Install the free-wheel cam and rollers by holding the rollers in place with cup grease and a tight fitting rubber band. Turn the low point of the cam to the top.

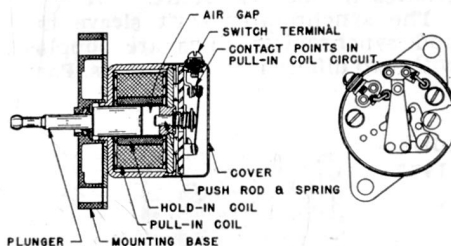


TRANSMISSION, 1941

Insert the clutch sleeve in the case with the windows to the front and finger engaged in slot. Be sure to install the reverse lock-out rod.

SOLENOID SERVICE, 1940

The main purpose of the solenoid is to withdraw the stationary gear pawl from the stationary gear plate which releases the gear and disconnects the overdrive. During this operation, the ignition is momentarily interrupted while assisting in the withdrawal of the pawl.



OVERDRIVE SOLENOID, 1940

Should the pawl fail to disengage for any reason, the ignition would continue to be shorted and consequently the engine would stall. To prevent this, a fuse is inserted into the solenoid relay battery feed circuit. If the duration of the flow of current through the solenoid exceeds a few seconds, the fuse will blow, and when this occurs, the ignition will resume its normal function but the step-down will be inoperative until a new fuse is installed.

SOLENOID TEST: Ordinarily, the solenoid will not require any service other than keeping the terminals tight. However, should it become necessary to test the solenoid, proceed as follows:

With the unit at room temperature, move the pawl operating rod out of the solenoid to obtain an air gap of 3/8". Connect the solenoid to a fully-charged six-volt battery. The maximum load against which the rod will draw into the solenoid should be 16

pounds. Connect an ammeter into the winding circuit to measure the solenoid current draw, which should be from 28 to 34 amperes at 6 volts.

After the operating rod pulls in, the contact points of the pull-in winding circuit are opened, and only the hold-in winding retains the operating rod in the solenoid. The current draw of the hold-in winding should be from .9 to 1.1 amperes at 6 volts, and a 16-pound pull should be required to hold the plunger in the solenoid.

OVERDRIVE THROTTLE SWITCH, ADJUST, 1940

This switch should operate only when the accelerator is depressed beyond the wide-open throttle position. When the accelerator is in this position, the contact washer should just be making contact with the switch plunger.

To adjust the washer, remove the carburetor air cleaner and make sure that the choke valve is fully open. Then, turn the adjusting nuts above and below the contact washer to bring the contact washer to the desired position.

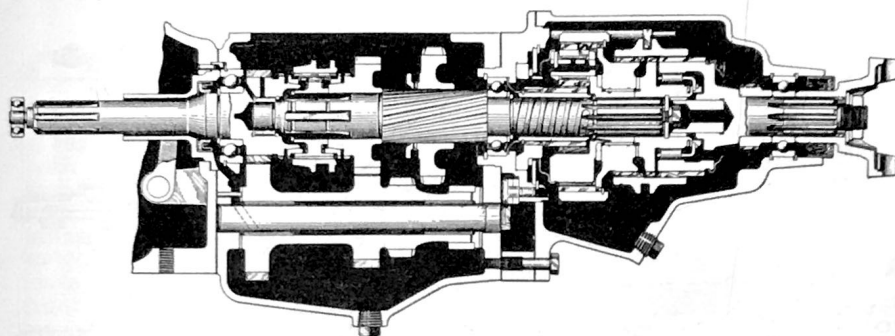
OVERDRIVE CONTROL CABLE, ADJUST, 1940

Release the cable at the binding screw at the overdrive control lever. Push the control button on the dash in all the way, and then, pull it out about 1/8". Before tightening the binding screw, make sure that the control lever is back as far as possible, which is the engaged position of the overdrive unit.

OVERDRIVE, OVERHAUL, 1941

After removing the overdrive from the transmission case, remove the governor switch from the overdrive housing. Remove the companion flange, using a puller if necessary. Pull the overdrive mainshaft out of the front of the housing. Lift out the clutch hub sleeve and the speedometer gear.

HUDSON AND TERRAPLANE



TRANSMISSION WITH OVERDRIVE, 1941

Remove the overdrive mainshaft bearing inner snap ring and tap the bearing out toward the front of the housing. Remove the overdrive control lever and the control shaft set screw, after which, the control shaft may be removed from inside the case, and then the oil seal.

Remove the shifter head screw headless plug, and insert a socket wrench through the plug hole to remove the shifter head screw. Remove the shifter rail stop screw, and withdraw the shifter rail, rail retractor spring and the shifter rail fork.

ASSEMBLY DETAILS: When installing the shifter rail, be sure the wide groove in the rail is in line with the shifter rail stop screw in the housing. Install a new control shaft oil seal.

The overdrive mainshaft bearing snap rings are available in several thicknesses and care must be used to select one that fits snugly in the groove. The mainshaft oil seal assembly should protrude 9/32" from the outer edge of the housing.

The interlock plunger is available in five lengths. The longest plunger has no identification grooves, while the shorter ones have one to four grooves for identification. Select a long plunger to maintain from .008" to .021" clearance between the lower end of the short plunger and the tip of the interlock, with the long plunger in the shifter rail groove, and the top of the short plunger against the side of the pawl.

To lock out the overdrive properly when the overdrive control button is pulled out, or when the car is operated in reverse gear, it is important that the interlock plungers operate freely.

With the stationary gear pawl out to the maximum travel of the solenoid, a clearance of .015" must be maintained between the end of the pawl and the baulk ring. Not more than a total of two solenoid gaskets should be used to maintain this clearance.

When assembling the rollers to the cam assembly, apply a liberal amount of cup grease to the rollers and hold them in place with a rubber band.

STEERING GEARSHIFT

STEERING SHIFT SERVICE, 1939-40

To remove and install any part of the shift control, with the exception of the lower control rod and cable, it is necessary to remove the horn button and steering wheel. See **STEERING WHEEL, R&R**.

SHIFT LEVER, R&R, 1939-40

Remove steering wheel as described under **STEERING WHEEL, R&R**. Remove the upper bracket clamp bolt to remove the bracket and ring. Remove the control lever fulcrum and withdraw the lever and the anti-rattle washer. Remove the control wire anchor clip at the bottom of the steering column, and push the end of the push rod upward to expose the upper end of the control lever push rod.

Reverse the procedure to assemble and apply a small amount of chassis grease in the bracket before installation.

SHIFT LEVER FULCRUM BRACKET, R&R 1939-40

Remove front seat cushion, accelerator pedal and floor mat. Remove transmission opening hole cover. Remove the steering wheel as described under **STEERING WHEEL, R&R** and disconnect the control rod at the steering gear end. Remove the control wire casing anchor bracket bolt and the wire anchor clip. Remove the jacket tube bracket cap. Pull the jacket tube and the control tube from the steering column tube. Remove the control tube upper bracket clamp bolt, and remove the bracket and ring. Remove the control lever fulcrum, control lever and the anti-rattle washer. Remove the fulcrum bracket set screw.

Mark the control tube and the fulcrum bracket to insure the proper installation of the bracket, and press the tube out of the bracket.

To assemble, reverse the removal procedure, but, before the final tightening of the control wire casing anchor bracket bolt, adjust the casing anchor bracket to provide proper clearance at the top and bottom for the cable anchor clip.

CONTROL TUBE LOWER BRACKET, R&R 1939-40

Remove the jacket tube and control tube as described under **SHIFT LEVER FULCRUM BRACKET, R&R** and remove the lower control bracket clamp bolt, and slide off the bracket.

Reverse the procedure to assemble being sure that the control tube compression spring seat is placed in position below the spring. Adjust the wire casing anchor bracket to provide proper clearance at the top and bottom for the wire anchor clip.

CONTROL WIRE CASING & BRACKET, R&R 1939-40

See **TRANSMISSION, R&R** and then, remove the lower wire casing anchor bracket bolt at the steering gear. Remove the control wire anchor clip and withdraw the casing and wire assembly.

Reverse the removal procedure to assemble being sure to adjust the casing bracket to provide clearance at the top and bottom for the anchor clip.

SHIFT CONTROL TUBE TO TRANSMISSION, R&R, 1939-40

Raise the hood and remove the ball joint nuts, washers and grommets at the steering gear. Raise the front end of the car. Remove the clevis pin at the rear end (connecting to the shift lever at transmission) and remove the rod.

Reverse the operations to install. Check the operation of the rod, and if necessary to make an adjustment, remove the clevis pin and turn the clevis until the pin will pass through the clevis and the shift lever with the transmission in neutral.

SHIFT CONTROL PUSH ROD, R&R 1939-40

Remove the steering wheel as described under **STEERING WHEEL, R&R**. Remove the upper bracket clamp bolt and remove the bracket and ring. Remove control lever fulcrum, control lever and anti-rattle washer. Remove the wire anchor clip at the lower end of the steering column and disconnect the wire. Loosen the wire casing anchor bracket bolt, and detach the anchor bracket from the lower bracket.

Pull the lower end of the push rod down far enough to remove the key. Remove the push rod from the control tube by pushing upward from the lower end. Remove the push rod upper end by taking out the key. Remove the upper compression spring and seat with a wire hook.

Assemble in the reverse order, but, when installing the push rod ends, assemble the keys toward the front of the car.

Hold the control lever in its extreme up position and adjust the control wire casing anchor bracket, and tighten the bolt securely.

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OPERATING ROD, ADJUST 1939-40

With the transmission cover lever and shift lever in neutral position, loosen the yoke lock nut and turn the yoke until the clevis pin will drop into the lever without moving either lever. This operation can be performed from below.

CROSS SHIFT, ADJUST 1939-40

Loosen the cap screw at the lower end of the steering column and pull the casing bracket up until all slack is removed from the casing and the shift shaft in the transmission is fully over to the low and reverse side. Tighten the bracket clamp screw. The anchor clip in the control wire should have clearance at the top and bottom of travel.

This adjustment should be made with the shift lever in the extreme up position.

UNIVERSALS

See pages 142 to 145.

REAR END

See pages 146 to 151.

AXLE SHAFT, R&R

1935-41: Jack up the rear of the car and remove the wheel. Remove the axle shaft nut and washer. With the use of a suitable puller, remove the hub and drum assembly. To avoid damage to the differential, a knock-out type puller is not recommended.

Remove the bearing adjusting cap and shims and pull out the axle shaft and bearings.

Reverse the procedure to install. The end play of the axle shaft should be maintained at from .004" to .010" for 1935 to 1938 cars, and from .002" to .004" for 1939-41 cars. By adding or removing shims between the axle housing and the bearing adjusting cap, the recommended clearance can be obtained.

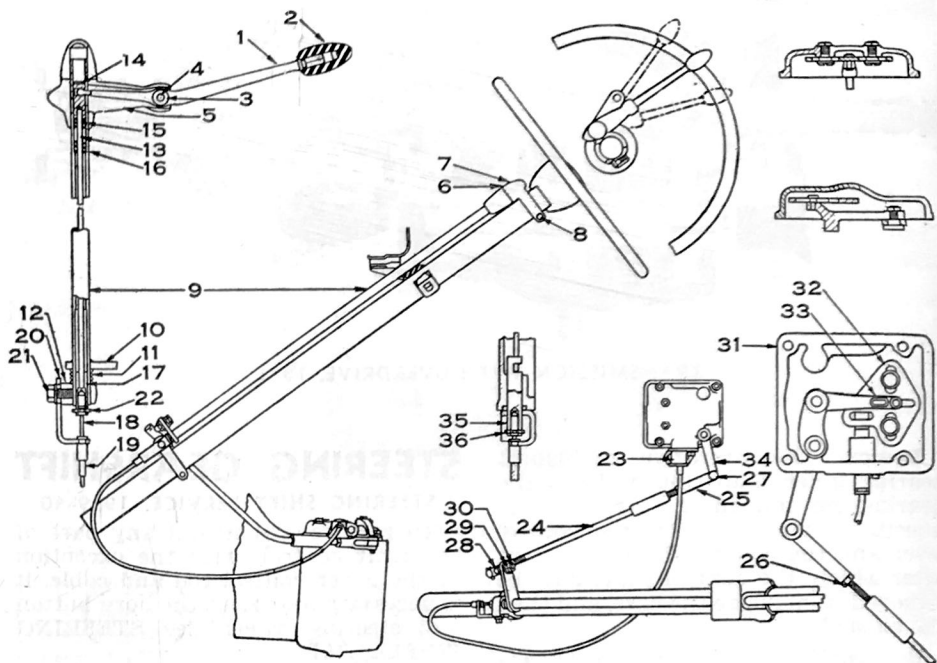
AXLE SHAFT THRUST BUTTON, R&R

1935-41: Remove the axle shaft as described under AXLE SHAFT, R&R. Grind off the button until it is flush with the end of the axle shaft. Drill an 11/32" hole through the center of the button and tap a 3/8" thread in the hole. Screw a long 3/8" cap screw into the tapped hole. With the head of the cap screw locked in a vise, tap the end of the axle shaft with a soft hammer until the button is removed.

To install a new button, clean out the hole thoroughly, and drive in the button until it is firmly seated in the end of the shaft.

REAR AXLE, ADJUST, 1935-41

The pinion is held in place by shoulders on the pinion shaft housing



STEERING COLUMN SHIFT, 1939-1940

1—Control level. 2—Control lever knob. 3—Control lever anti-rattle washer. 4—Control lever fulcrum. 5—Control lever fulcrum bracket. 6—Control lever fulcrum bracket ring. 7—Control tube upper bracket. 8—Control tube upper bracket clamp bolt. 9—Control tube. 10—Control tube lever. 11—Control tube compression spring. 12—Control tube lower bracket. 13—Control lever push rod. 14—Control lever push rod end—upper. 15—Control lever push rod upper compression spring. 16—Control lever push rod upper compression spring seat. 17—Control lever push rod end—lower. 18—Control wire. 19—Control wire casing. 20—Control wire casing anchor bracket. 21—Control wire casing anchor bracket bolt. 22—

Control wire anchor clip. 23—Control wire and selector plate push rod dust shield. 24—Control tube to transmission cover rod assembly. 25—Control tube to transmission cover rod clevis. 26—Control tube to transmission cover rod clevis lock nut. 27—Control tube to transmission cover rod clevis pin. 28—Control tube to transmission cover rod ball joint. 29—Control tube to transmission cover rod ball joint nut. 30—Control tube to transmission cover rod ball joint nut companion nut. 31—Transmission cover. 32—Transmission cover shift selector plate. 33—Transmission shift finger. 34—Transmission shift lever—outer. 35—Transmission cover shift selector push rod. 36—Control wire anchor clip.

and is adjusted by shims between the pinion and the cone of the rear bearing. Adding shims moves the pinion toward the rear. Shims between the spacer and the front bearing adjusts bearings. Removing shims lessens the play. The ring gear and differential bearings are adjusted by a nut at each bearing.

Backlash between ring and pinion should be from .002" to .005" for 1935-39 cars, and from .0005" to .0035" on 1940-41 cars.

BRAKES

See pages 128 to 136.

BRAKE CONTROL, ADJUST

1935. Disconnect all four wheel brake cables from rotary equalizer. Place the rotary equalizer against the frame bracket stop and the hand lever in the full "off" position. Adjust the lock nuts on the lower end of the pedal push rod so that they are against the pedal push tube when the pedal shank is against the rubber

bumper on the underside of the toe board. Adjust the sleeve on the end of the hand brake cable so that it is just against the rear face of the rotary equalizer. Be sure that the rotary equalizer is still against the frame bracket stop. Lubricate all pivots and clevises and see that the rotary equalizer returns sharply to the stop when the brake pedal is released.

1936-41: Check to see that the pedal return spring holds the master cylinder operating lever against the stop. An adjustment is necessary if the pedal shank touches the toe board in the fully released position or has more than 3/8" clearance. Adjust cylinder operating link until clevis pin just enters rod with clevis 1/4" from toe board and cylinder bell crank lever against stop.

Adjust mechanical follow-up with equalizer bar against stop. Rear adjusting nut should be 1 3/8" from end of pedal push rod on 1936-37; 1 7/16" on 1938-39, and 1 1/4" on 1940-41 models.

FRONT END

WHEEL ALIGNMENT

See pages 165 to 168.

FRONT AXLE, R&R

1936-39. Jack up the front axle with a roller jack and place two stand jacks under the frame side rail just back of the torque arm frame brackets. Lower roller jack until car weight is held on stand jacks but leave roller jack in place to support front axle. Remove front wheels. Remove brake backing plates and hang on fender supports with hooks made from heavy wire. Remove cotter keys from inner ends of bolts which attach torque arms to frame brackets, remove nuts and press out. Due to the rubber grommets clinging to the bolt a constant pressure is required to remove the bolt. Remove nuts, grommet seats, and grommets from bottom shock absorber mounting studs. Disconnect the front stabilizer links. Remove drag link from steering arm and remove axle.

KNEE ACTION

STEERING KNUCKLE SUPPORT,

R&R, 1940-41

Raise the car clear of the floor and place another jack under the frame side rail. The jack, which was used to raise the car, should be left in position so as to relieve the knuckle support from all weight.

Remove the wheel and hub and drum assembly. Remove the nuts holding the brake backing plate and the stabilizer bar bracket to the steering knuckle. Remove the backing

plate and hang it on the fender support with wire so as to prevent damage to the hydraulic brake hose.

Remove the kingpin and its bearings. Remove the threaded bushing and bolt connecting the lower control arm to the knuckle support. Loosen the knuckle support clamp bolt, and, before removing the upper support pin and bushings, note carefully the position of the eccentric bushing, as this controls the caster and camber. After removing these parts, the knuckle support may be removed.

Assembly may be made in the reverse order, but when assembling the knuckle support to the upper control arm, screw the pin into the support until the pin section with the largest diameter is centralized in the support. Tighten the support clamp bolt. Start the front bushing on the pin and screw it in until the dimension be-

tween the knuckle support boss and the shoulder of the upper control arm is $\frac{3}{32}$ ". When this dimension has been obtained, screw the rear bushing into the arm, and then into the support until the distance between the upper control arm and the knuckle support boss is $\frac{7}{8}$ ". Check and adjust the caster and camber as described under CASTER & CAMBER, ADJUST.

CAMBER & CASTER, ADJUST, 1940-41

When checking caster and camber, the car should be rocked vigorously from side to side a few times and allowed to come to the normal at-rest position before attempting any measurements.

Caster, Adjust. The caster readings should be taken with the weight of the car on the wheels and a level place on the floor selected. Check the caster with a reputable gauge to obtain the readings specified in the FRONT END MEASUREMENTS table. To make the adjustment, turn the eccentric bushing into the support to decrease caster and out of the support to increase it. One complete turn changes the caster $\frac{1}{2}$ degree.

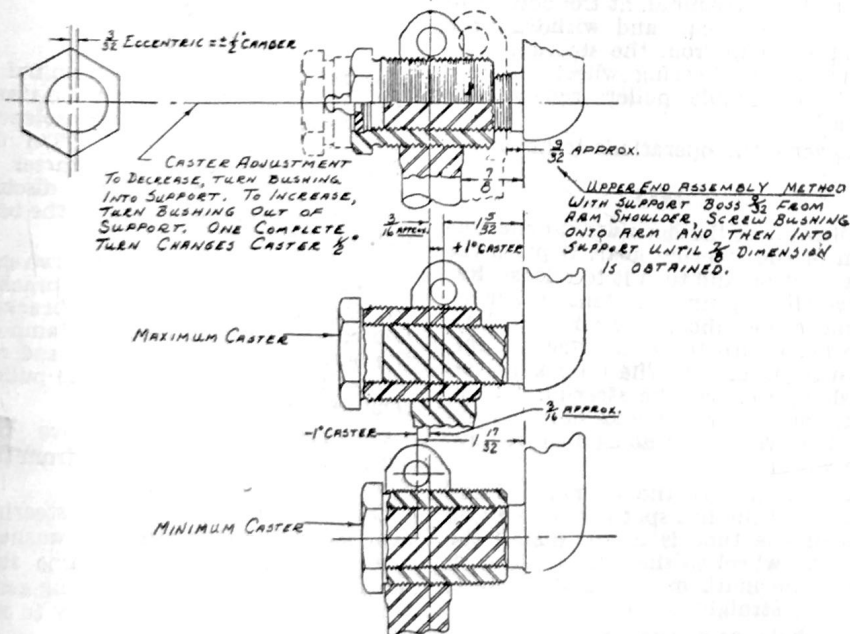
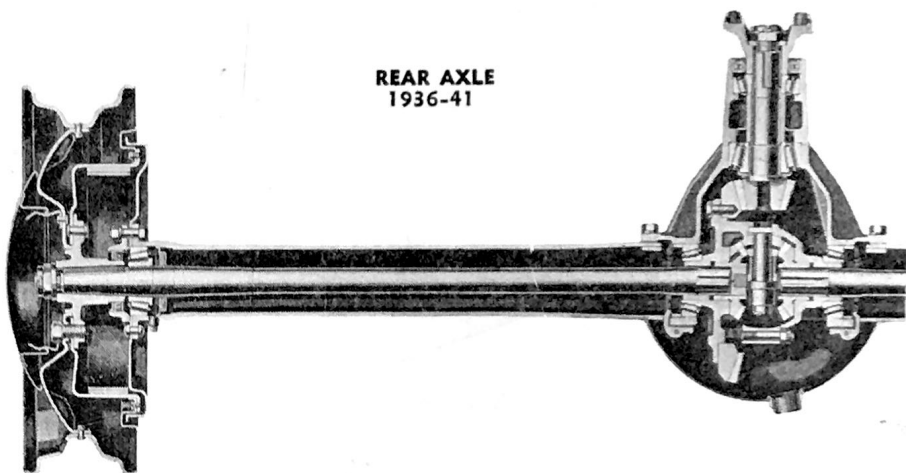
Camber, Adjust. Before making the camber adjustment, the caster should be correct. The camber adjustment is governed by the eccentric action of the threaded pin and a half turn gives the maximum adjustment. Changing the camber will change the caster angle slightly, but will still be within the specified limits.

TOE-IN, ADJUST, 1940-41

With the steering gear in the straight-ahead position, the adjustment is made by lengthening or shortening the tie rods. Adjust the tie rods individually to obtain the correct toe-in as specified in the FRONT END MEASUREMENTS table. Be sure to tighten the clamp bolts when the desired result is obtained.

FRONT SPRING, R&R, 1940-41

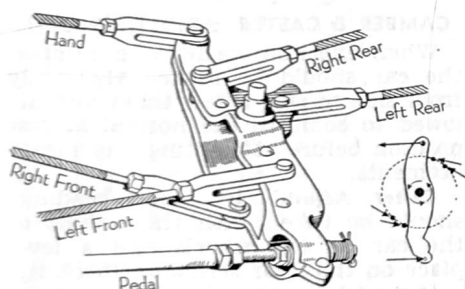
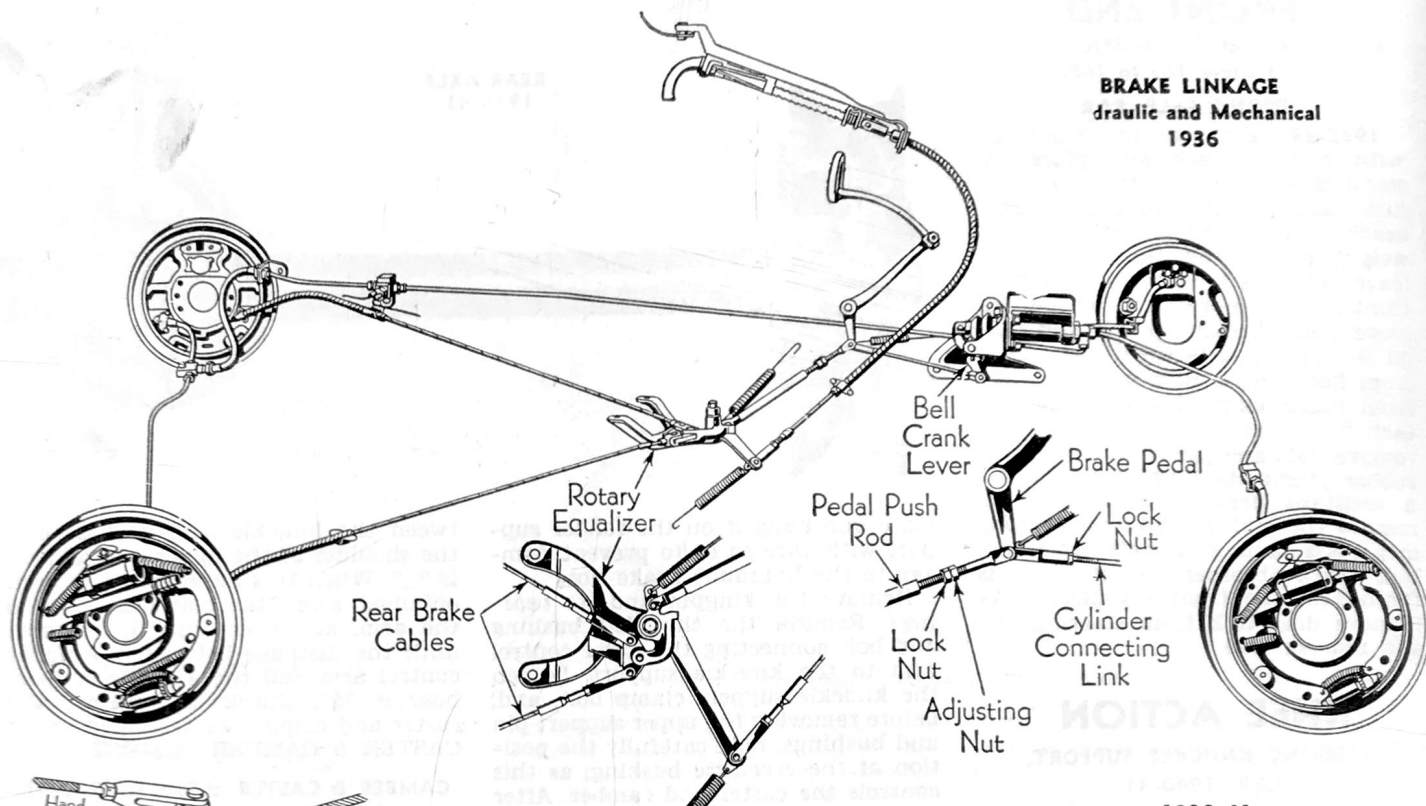
Raise the car about 10 inches from the floor and place another jack



1940-41 Caster Adjustment

HUDSON AND TERRAPLANE

BRAKE LINKAGE Hydraulic and Mechanical 1936



BRAKE ROTARY EQUALIZER 1935

under the frame side member. The jack, which was used to raise the car, should be left in position. Remove the wheel and hub and drum assembly. Remove the shock absorber as described under **SHOCK ABSORBER, R&R**. Disconnect the knuckle support from the lower control arm. Lower the jack which was used to raise the car until the spring can be removed.

Assembly can be made in the reverse order.

SHOCK ABSORBERS

See pages 169 to 178.

SHOCK ABSORBER, R&R, 1940-41

Remove the nut from the shock absorber upper stud and the two bolts holding the mounting plate to the lower control arm. Rotate the mounting plate until it is free to pass through the correspondingly-shaped opening in the lower control arm spring seat. The shock absorber may now be removed from this opening.

STEERING

See pages 152 to 164.

STEERING WHEEL, R&R

1935-36

Unscrew the horn button collar and remove it with the horn button and contact spring. Disconnect the horn wire at the terminal, at the bottom of the steering gear, and withdraw the wire and cup from the steering gear. Remove the steering wheel nut and with a suitable puller, remove the wheel.

Reverse the operations to install.

1937

Disconnect the horn wire at the bottom of the steering gear. Depress the horn button and turn it to release. Remove the cup and the tension spring. Remove the rubber silencer. Withdraw the horn wire from the steering column together with the fibre and steel washers. Remove the steering column nut, contact spring and horn button retainer. With a suitable puller, remove the wheel.

To install, turn the steering column tube until the flat spot in the serrated end of the tube is down. Install the steering wheel so that the spoke with the trade mark on the under side is pointing straight down.

The balance of the procedure is the reverse of the removal operations.

Disconnect the horn wire at the bottom of the steering gear. Depress the horn button and turn it to release. Remove contact spring. Pull out horn wire and remove insulating washer, contact cup and steering wheel nut. Remove the horn button lock wire and retainer. Remove the steering wheel with a suitable puller.

Assemble in the reverse order.

STEERING GEAR, R&R

1935-37

Disconnect the negative terminal at the battery and the wires at the starting motor terminal and the solenoid switch. (Not necessary on 1937.) On 1935-36 models, remove the starter. If equipped with electric hand, disconnect the electric hand jack at the bottom of the jacket tube.

On all models, remove the two cap screws holding the jacket tube bracket to the instrument panel bracket. Loosen the steering column clamp at the bottom of the jacket tube and remove the tube. Using a suitable puller, remove the pitman arm.

On 1935-36 models, remove the spring, seal retainer and seal from the steering gear cross shaft.

On all models, remove the steering gear mounting stud nuts and washers from the outside of the frame side member, and remove the steering gear. On 1937 models, it is necessary to remove the engine side pan.

Assemble in the reverse order.

HUDSON AND TERRAPLANE

1938-41

Disconnect the battery cable at the negative terminal and remove the cable clip bolt and nut at the battery tray. On the 89 and 90 models, remove the bolts attaching the starter motor switch to the lower end of the steering gear.

On all models, disconnect the horn wire at the lower end. Remove the jacket tube clamp bolt and nut. Disconnect the column shift control wire (if so equipped) by removing the anchor clip and wire casing anchor bracket bolt. Disconnect the column shift control tube rod at the tube

lever. Remove the control tube lower bracket clamp bolt. Disconnect the drag link at the pitman arm. Using a suitable puller, remove the pitman arm. Remove the horn button and wire, steering wheel nut and steering wheel as already described. Remove the jacket tube bracket cap and bolts. Remove the shift control tube-upper bracket and ring.

Slide the jacket tube from the main tube, and out of the jacket tube clamp and the control tube lower bracket. Remove the shift control tube by working the lower lever up through the hole in the toe board, leaving the rub-

ber hole cover on the control tube. Remove the steering gear mounting nuts and washers.

On 1940-41 cars, disconnect the radiator stay rods at the dash and move them out of the way. On 1940 models, disconnect the hood hinge at the right hand side of the hood.

Remove the steering gear by raising the lower end up over the engine, and out over the right hood side panel, by turning the lower end for clearance, as required.

Installation may be made in the reverse order.

