175. Oil Bypass Valve Components (Engine Assembly 8726920 Only)

Fig. No.	*Ref. letter*	*Point of measurement*	*Sizes and fits of new parts*	*Wear limits*
192	A	Diameter of piston bore in body.	0.500	--
	B	Diameter of valve piston	0.499 to 0.500	--
	B–A	Fit of piston in body	0.000 to 0.001L	--

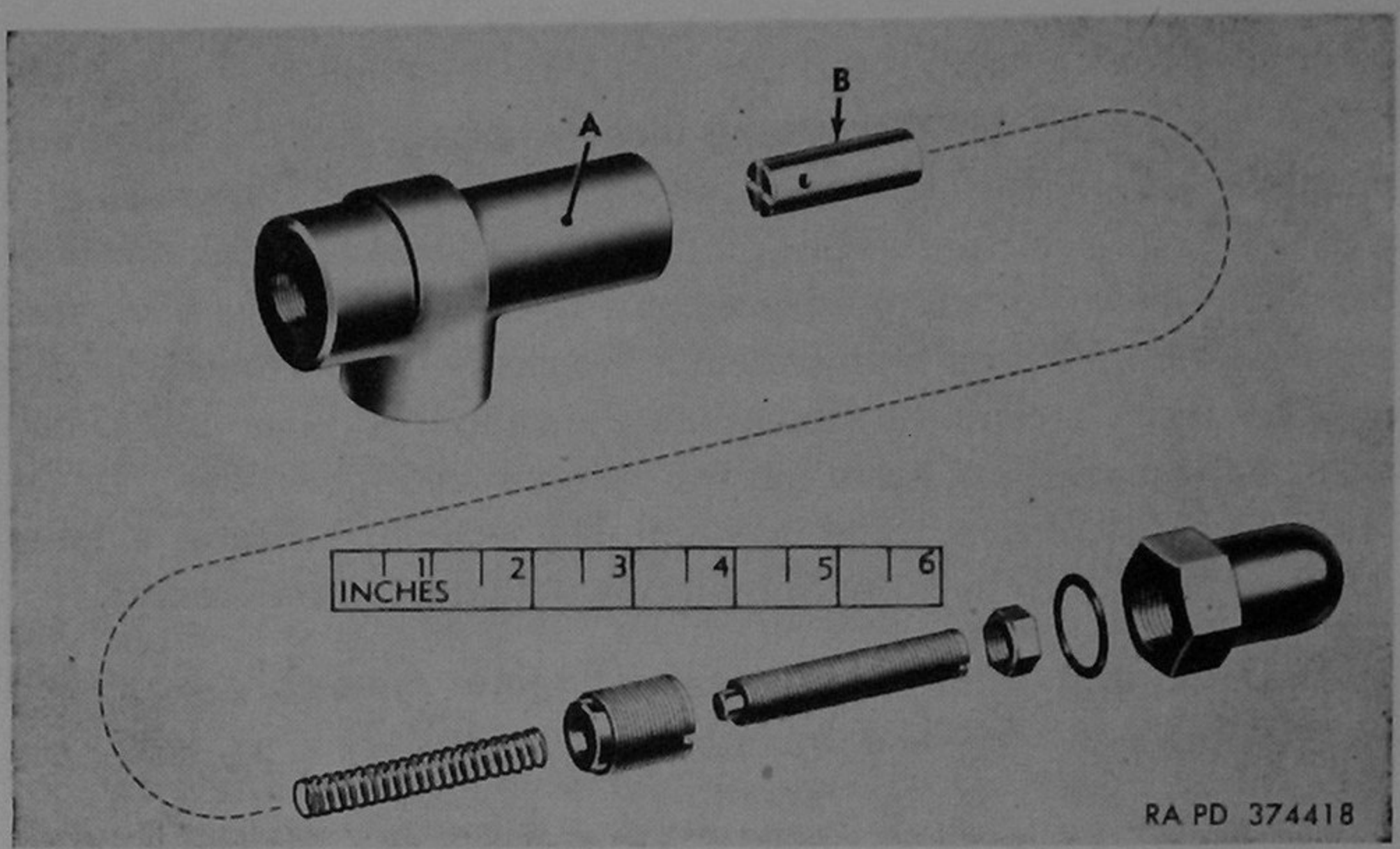

Figure 192. Repair and rebuild standard points of measurement for oil bypass valve (engine assembly—8726920 only).

176. Fan and Pulley

a. Engine Assembly 7411599.

Fig. No.	*Ref. letter*	*Point of measurement*	*Sizes and fits of new parts*	*Wear limits*
		Runout of pulley	0.010	0.020
94		Distance from front face of fan blade to pulley hub.	1.090 to 1.150	--

b. Engine Assembly 8329440.

193	G	Runout of pulley	0.010	0.020

c. Engine Assembly 8726920.

		Runout of pulley	0.010	0.020
94		Distance from rear face of fan blade to pulley hub.	1 to 1⅛	--

177. Water Pump

a. Engine Assemblies 7411599 and 8329440.

Fig. No.	*Ref. letter*	*Point of measurement*	*Sizes and fits of new parts*	*Wear limits*
79		Distance from front face of pulley hub to rear face of body.	6 7/32	--
		(Engine assembly 7411599).		--
		(Engine assy 8329440)	4 15/32	--

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
193	B	Diameter of shaft	0.6262 to 0.6267	--
	A or G	Inside diameter of pulley hub bore.	0.6237 to 0.6247	--
	B–A or G	Fit of shaft in pulley hub	0.0015T to 0.003T	--
	F	Diameter of bearing	1.1806 to 1.1814	--
	E	Inside diameter of body bore.	1.1805 to 1.1815	--
	F–E	Fit of bearing in body	0.0009L to 0.0009T	--
	C	Inside diameter of impeller bore.	0.6242 to 0.6252	--
	C–B	Fit of impeller on shaft	0.001T to 0.0015T	--
		Clearance between impeller and pump body.	0.010 to 0.035	--
		Shaft end play	0.003 to 0.006	0.014
	D	Seal assembly—		
		Minimum load when compressed to 0.486.	8 lb	
		Maximum load when compressed to 0.459.	16 lbs	

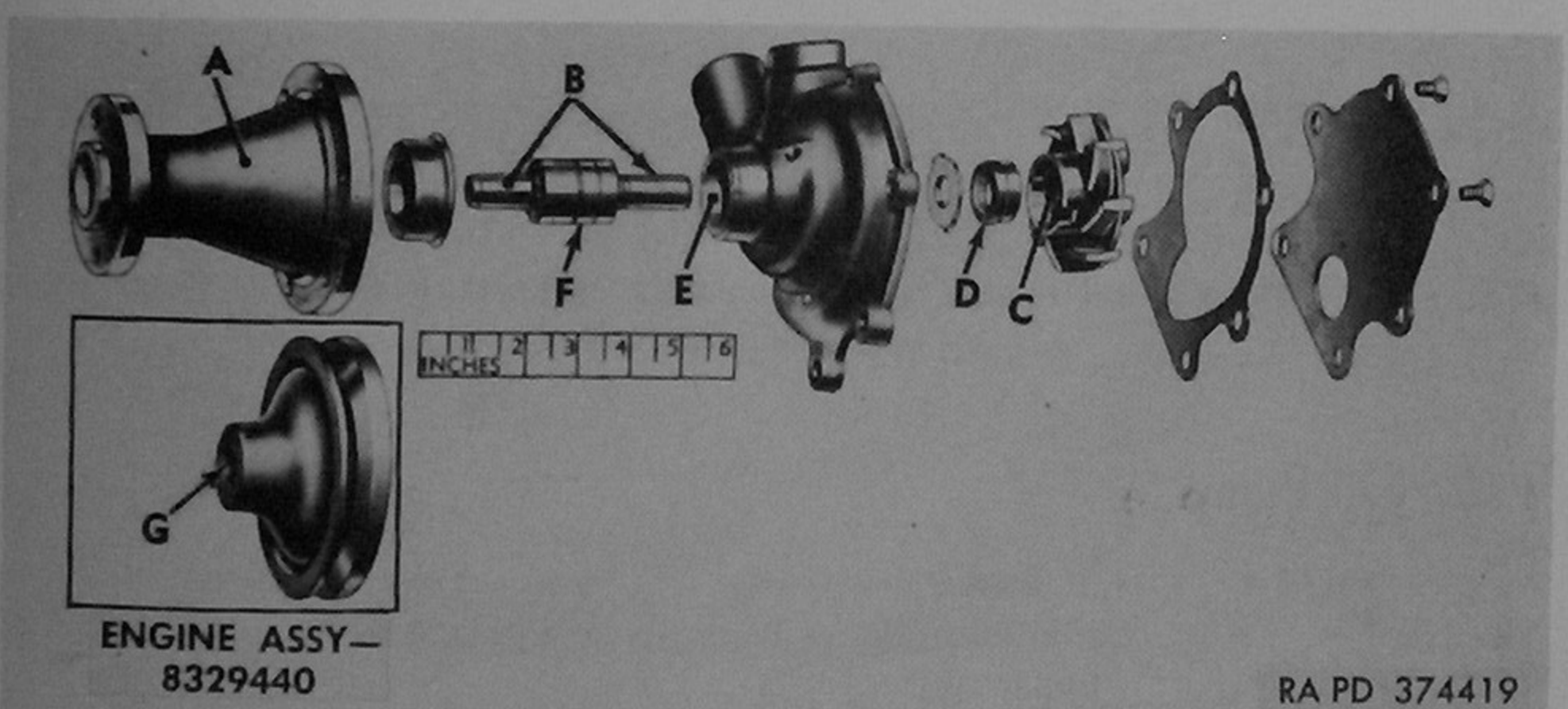

Figure 193. Repair and rebuild standard points of measurement for water pump (engine assemblies 7411599 and 8329440).

b. Engine Assembly 8726920.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
80		Distance from front face of pulley hub to rear face water pump body.	$6\frac{37}{64}$	--
194	B	Diameter of shaft	0.7460 to 0.7465	--
	D	Diameter of shaft	0.6262 to 0.6276	--
	A	Inside diameter of pulley hub bore.	0.7440 to 0.7450	--
	B–A	Fit of shaft in pulley hub	0.0010T to 0.0025T	--
	C	Diameter of bearing	1.4995 to 1.5000	--
	E	Inside diameter of body bore.	1.4984 to 1.4994	--
	C–E	Fit of bearing in body	0.0001T to 0.0016T	--

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
	F	Inside diameter of impeller bore.	0.6237 to 0.6247	--
	F–D	Fit of impeller on shaft	0.0015T to 0.0039T	--
		Shaft end play	0.003 to 0.006	0.014

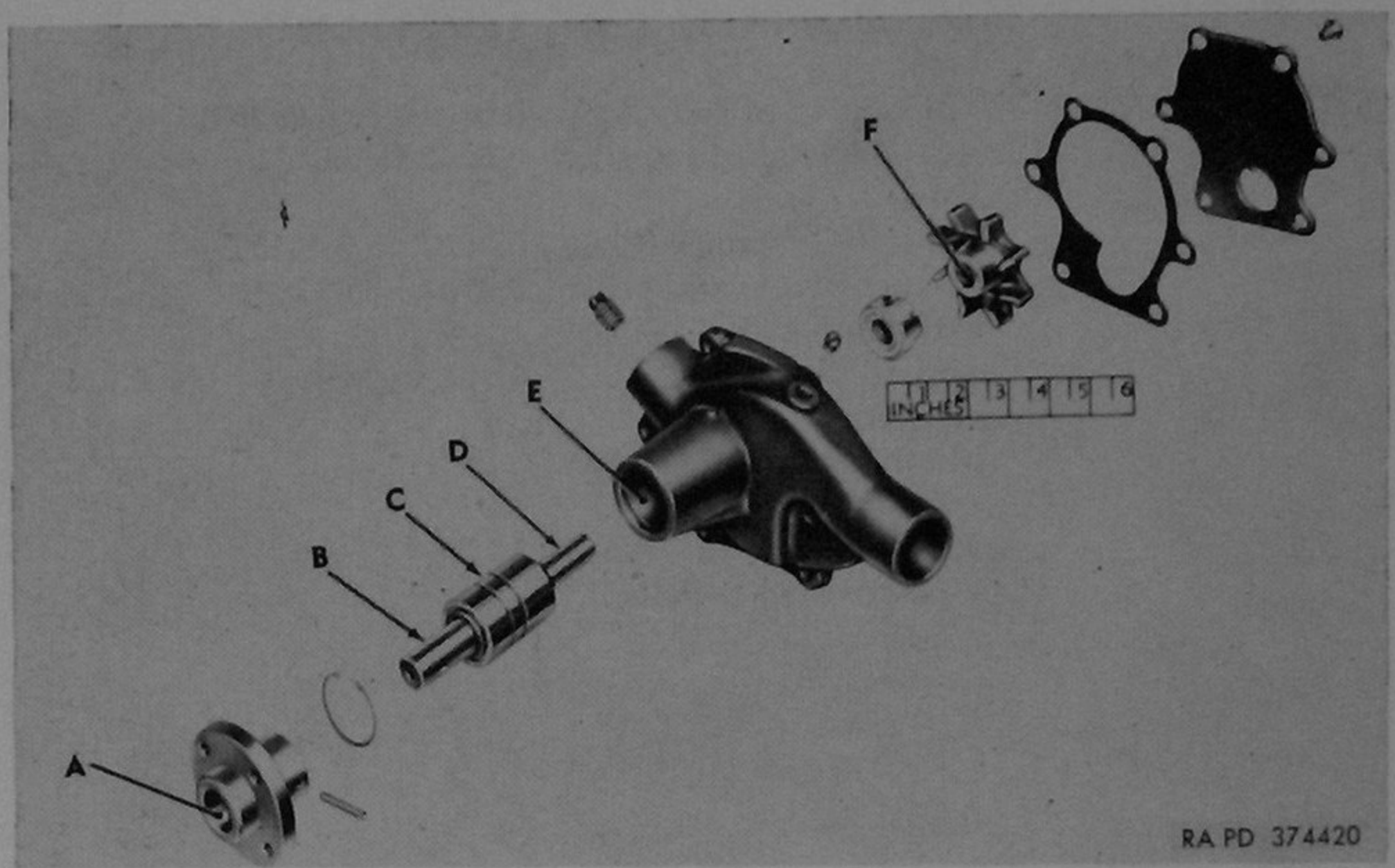

Figure 194. Repair and rebuild standard points of measurement for water pump (engine assembly 8726920).

178. Oil Pump

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
195	H	Inside diameter of body at upper end.	0.496 to 0.4975	--
	K	Diameter of pressure regulator valve bore in body.	0.561 to 0.563	--
	L	Diameter of pressure regulator valve.	0.557 to 0.558	--
	L–K	Fit of valve in body	0.003L to 0.006L	--
	J	Diameter of shaft bore in body.	0.541 to 0.543	--
	N	Diameter of shaft (both ends).	0.540 to 0.5405	0.538
	N–J	Fit of shaft in body	0.0005L to 0.003L	--
	A	Drive gear height	1.247 to 1.2485	--
	Q	Inside diameter of drive gear.	0.5385 to 0.5395	--
	Q–N	Fit of gear on shaft	0.0005T to 0.002T	--
	C	Idler gear height	1.247 to 1.2485	--
	B	Inside diameter of idler gear	0.5415 to 0.5425	--
	E	Diameter of idler gear pin	0.540 to 0.5405	0.538
	B–E	Fit of gear on pin	0.001L to 0.0025L	--
	G	Diameter of idler gear pin bore in body.	0.5385 to 0.5395	--

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
195	E–G	Fit of pin in body	0.0005T to 0.002T	--
	F	Gear to body radial clearance.	0.004 to 0.007	0.008
	P–D	Gear backlash	0.003 to 0.006	0.012
	M	Pressure relief valve spring—Free length.	$2\frac{45}{64}$	--
		Pounds pressure when compressed to $1\frac{11}{16}$.	$13\frac{1}{2}$ to 15	--

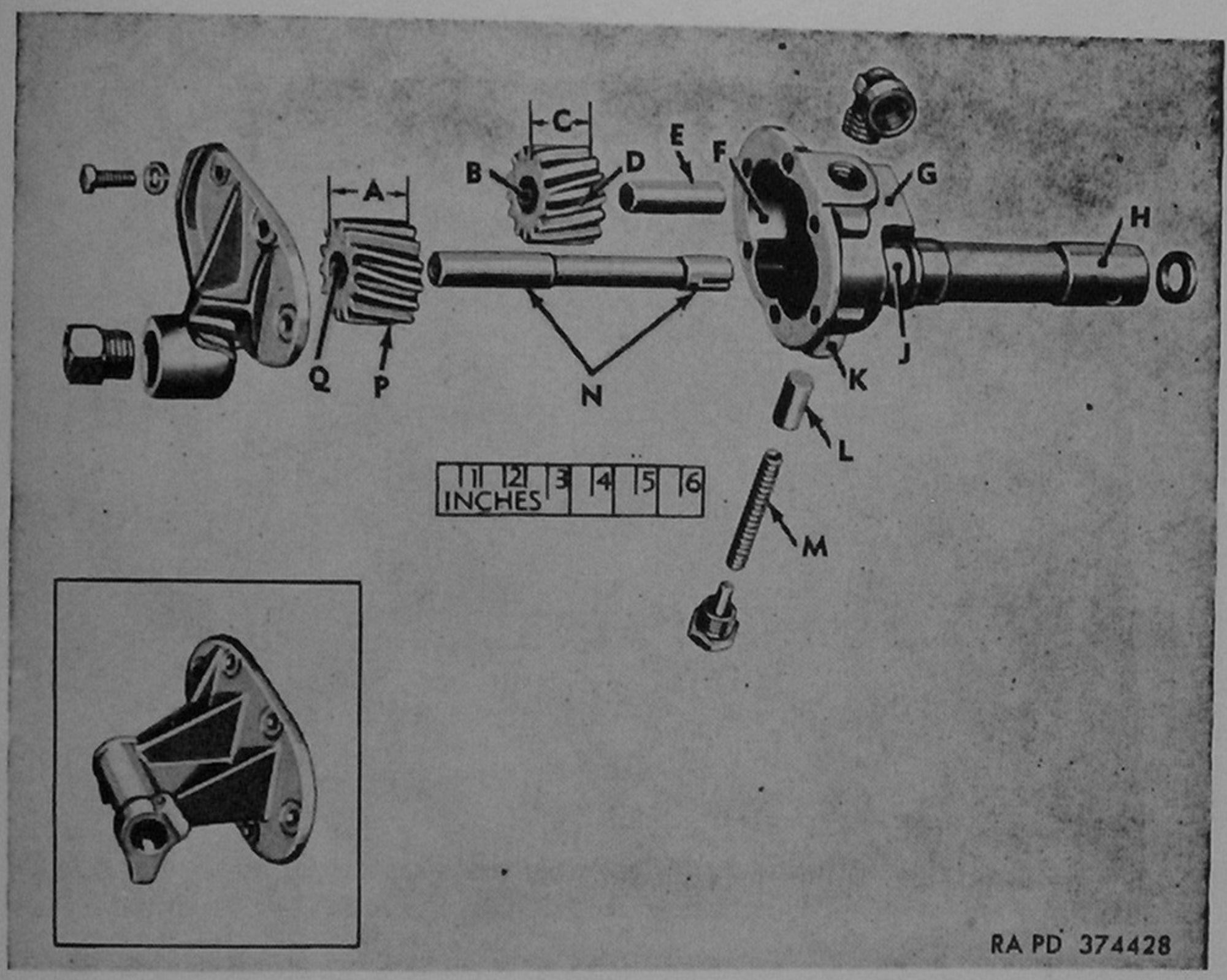

Figure 195. Repair and rebuild standard points of measurement for oil pump.

179. Crankcase Ventilator Valve Spring

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wrar limits
96	C	Free length	$\frac{9}{16}$	--
		Pressure under compressed length of 0.525.	1.0 to 2.0 oz	--

180. Manifolds and Heat Control

a. Manifolds (Engine Assemblies 7411599 and 8329440).

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
196	A	Maximum flange warpage	----------	$\frac{1}{32}$
	B	Exhaust manifold studs driven height.	$2\frac{3}{8}$	--
	C	Distance between centerlines of exhaust manifold end holes.	$26\frac{7}{8}$	--

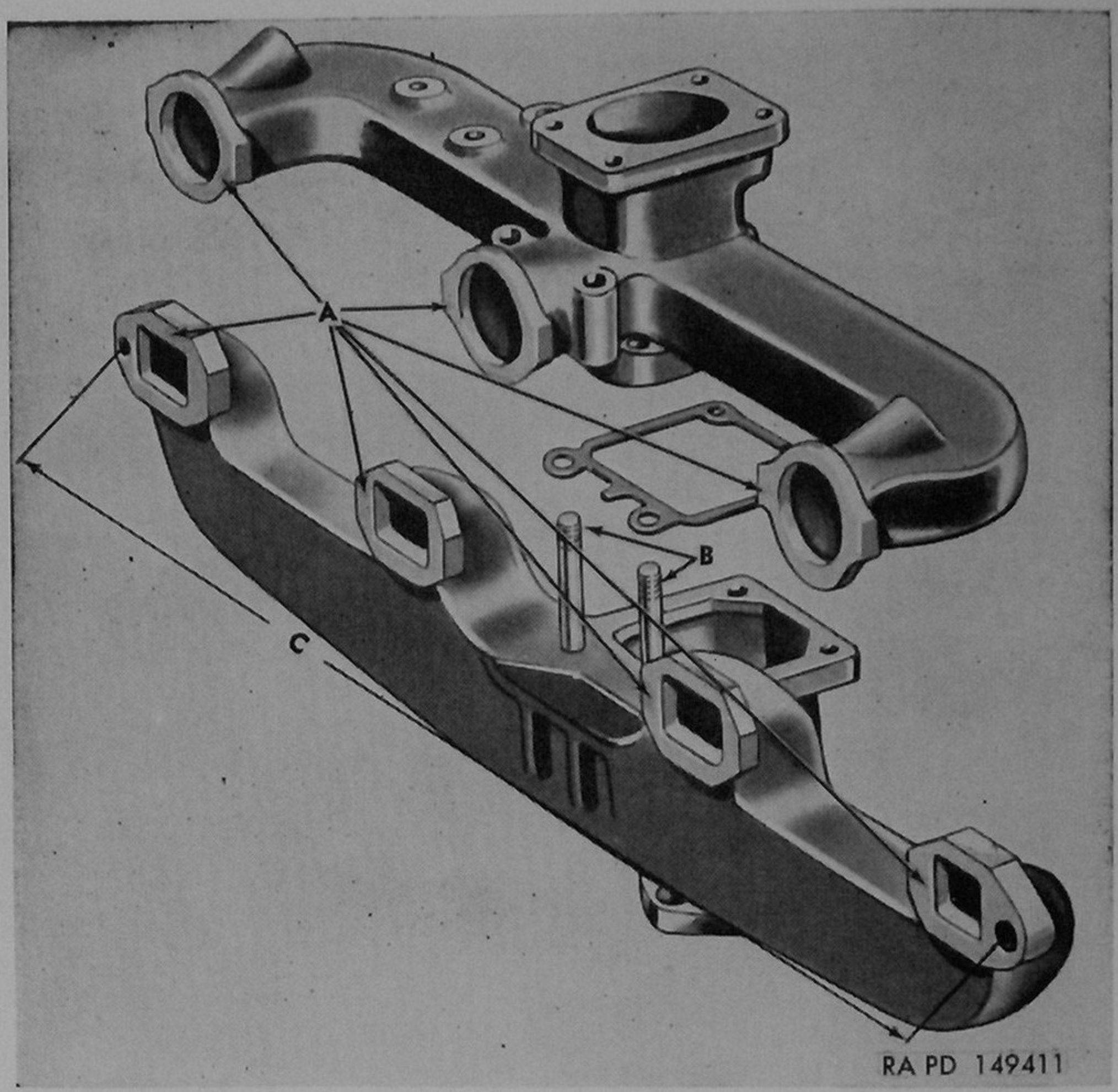

Figure 196. Repair and rebuild standard points of measurement for intake and exhaust manifolds (engine assemblies 7411599 and 8329440).

b. Heat Control (Engine Assemblies 7411599 and 8329440).

Inside diameter of heat control valve shaft bushings.	0.3135 to 0.316	--

c. Manifolds (Engine Assembly 8726920).

Fig. No.	*Ref. letter*	*Point of measurement*	*Sizes and fits of new parts*	*Wear limits*
197	A	Maximum flange warpage	----------	1/32
	B	Driven height of studs in fuel vaporizer.	2.080 to 2.100	--
	C	Distance between centerlines of exhaust manifold end holes.	26 7/8	--
		Driven height of studs in exhaust manifold:		
	D	----------	1 15/16	--
	E	----------	1 7/8	--
	F	----------	1 1/16	--

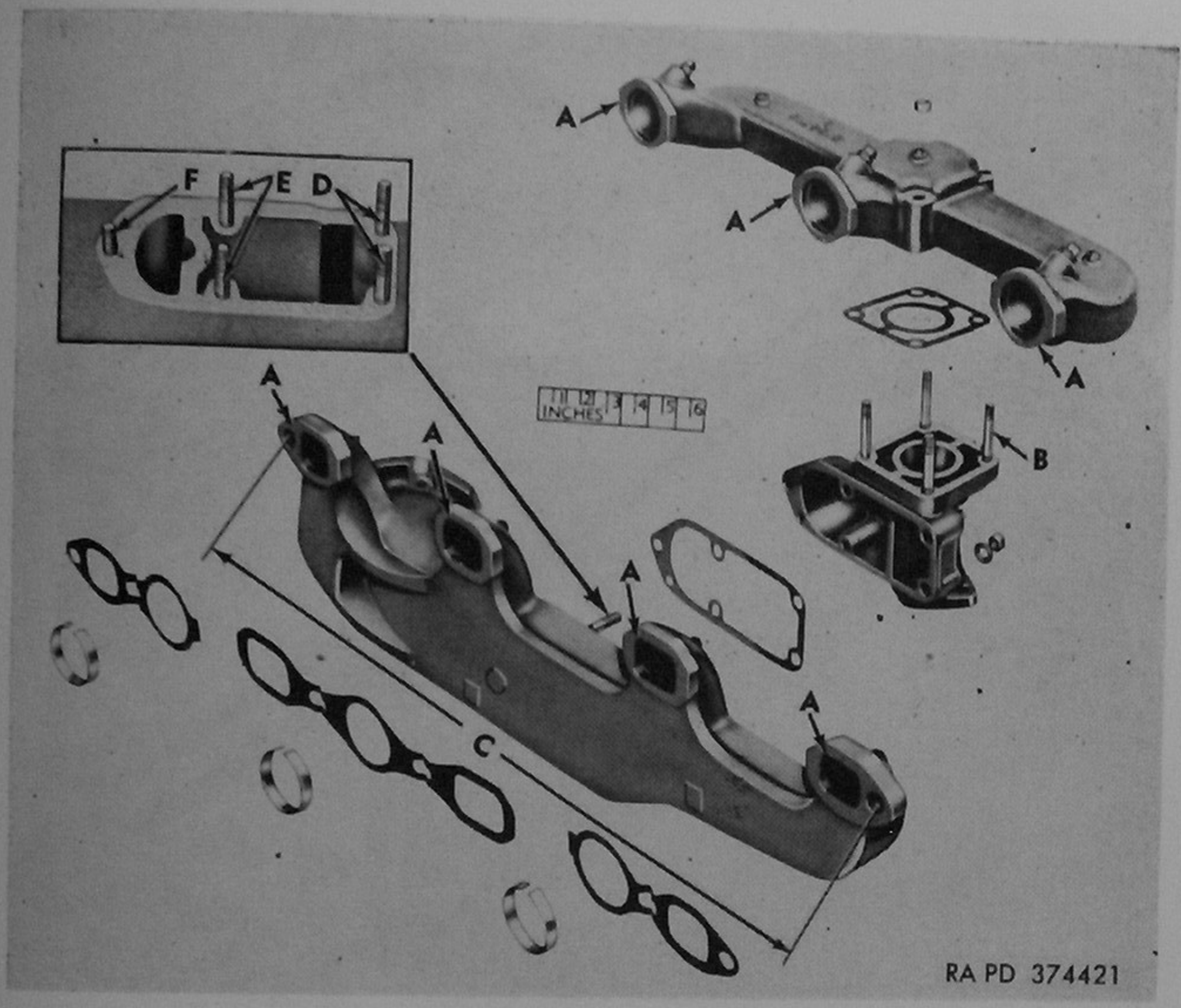

Figure 197. Repair and rebuild standard points of measurement for intake and exhaust manifolds and fuel vaporizer (engine assembly 8726920).

181. Valve Operating Mechanism

a. Valve Lifters.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
203	D	Diameter of lifter bore in cylinder block.	0.9905 to 0.9915	0.9935
		Diameter of lifter	0.989 to 0.990	0.987
	K, fig. 199–D, fig. 203	Fit of lifter in bore	0.0005L to 0.0025L	0.0065L

b. Rocker Arms and Shaft.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
198	A	Diameter of rocker arm shaft.	0.791 to 0.792	0.786
	A	Maximum runout of rocker arm shaft.	----------	0.010
	B	Inside diameter of rocker arm bore.	0.7925 to 0.7935	0.7965
	B–A	Fit of rocker arm on shaft	0.0005L to 0.0025L	0.008
	C	Shaft spring free length	$2\frac{1}{2}$ to $2\frac{5}{8}$	

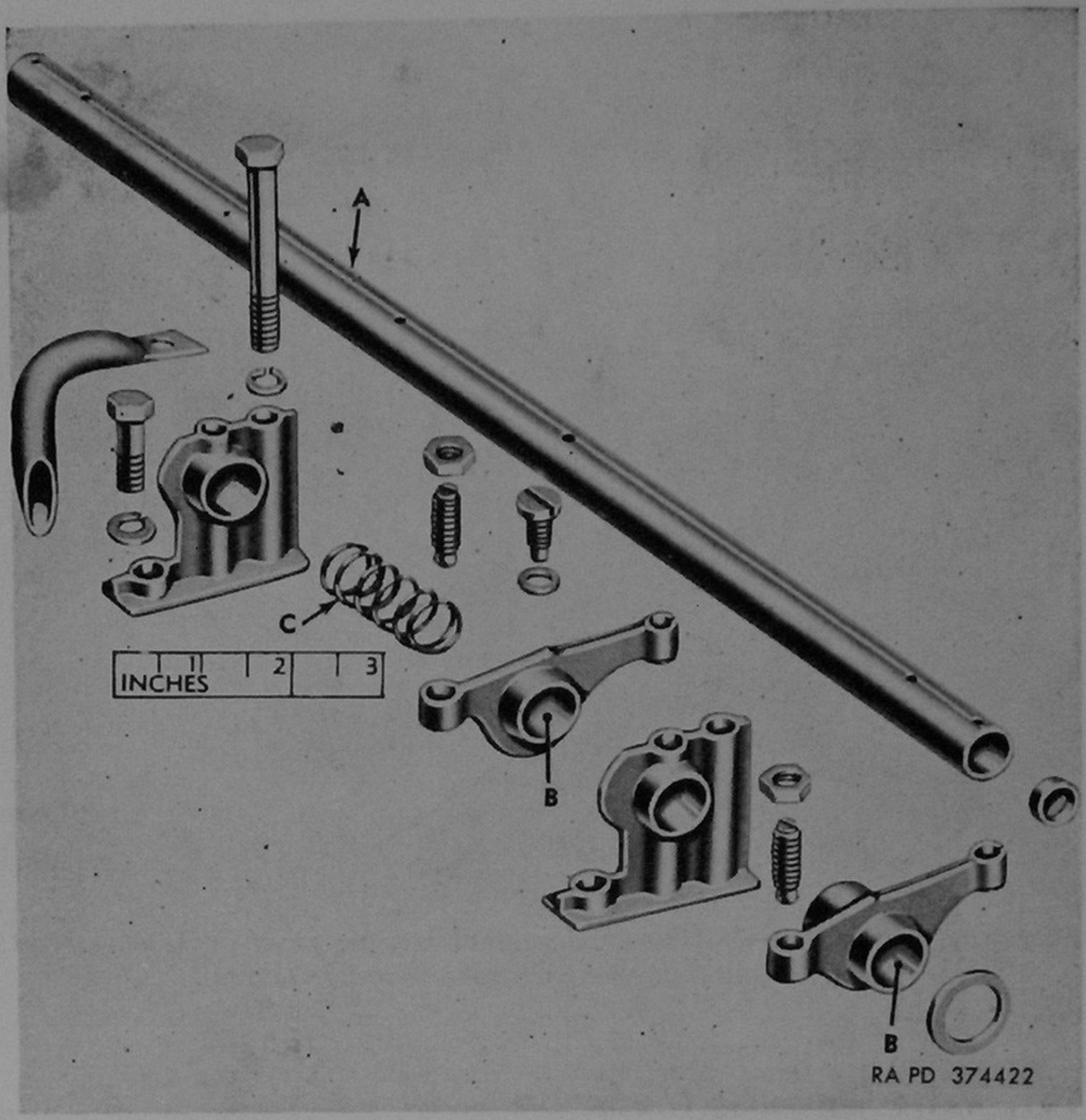

Figure 198. Repair and rebuild standard points of measurement for valve rocker arms and shaft.

182. Cylinder Head and Valves

a. Face of Cylinder Head.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
199	L	Maximum allowable warpage per foot of length.	----------	0.008
		Maximum grind from original surface to correct warpage.	----------	0.020
		Minimum distance from face to top of combustion chamber.	0.795	--
		Permissible amount of channeling before refacing.	----------	0.002

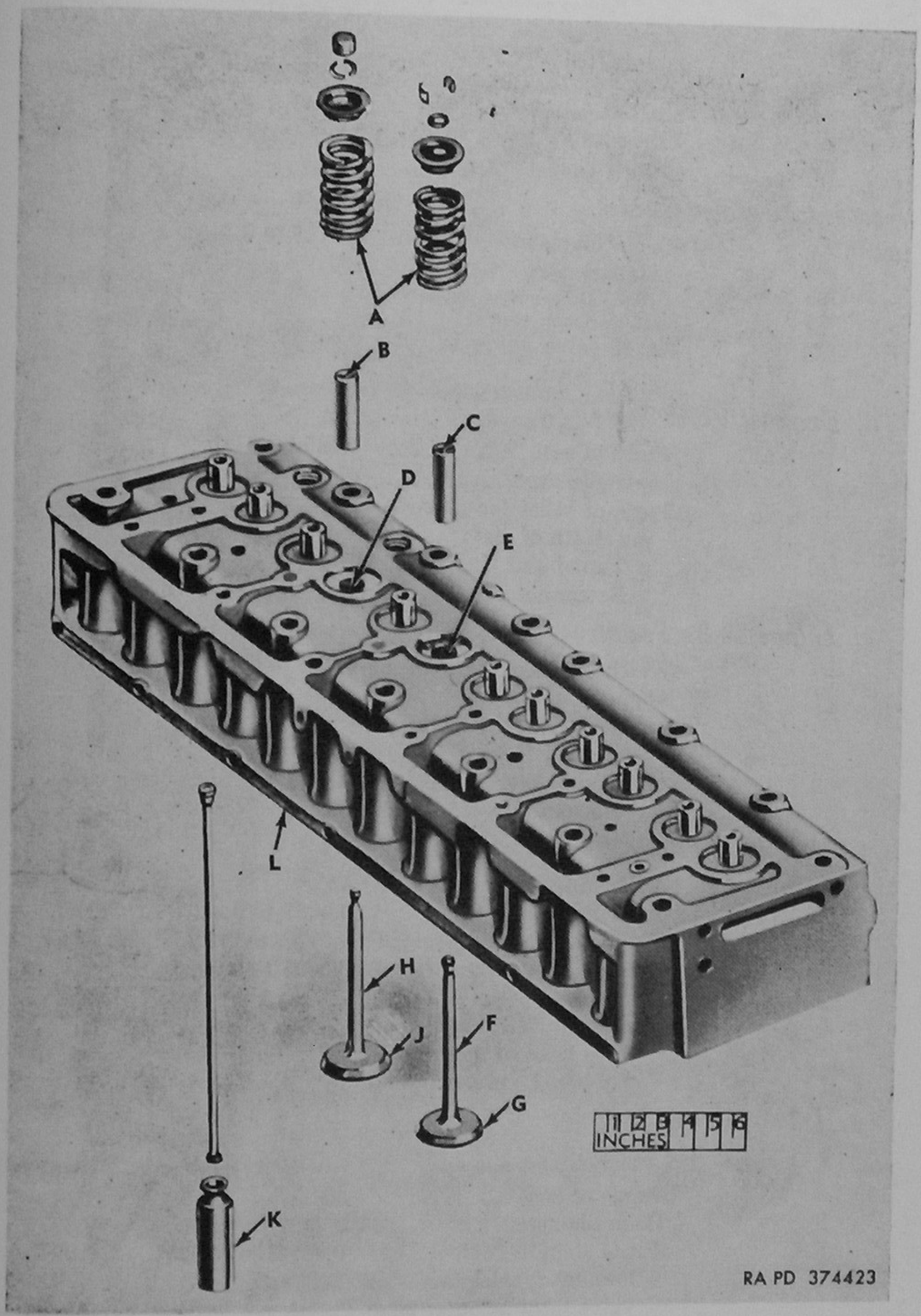

Figure 199. Repair and rebuild standard points of measurement for cylinder head and valves.

b. Exhaust Valve Guides.

Fig. No.	*Ref. letter*	*Point of measurement*	*Sizes and fits of new parts*	*Wear limits*
199	B	Ream diameter (after installation).	0.3427 to 0.3437	0.3477
		Note. On complete engine rebuild, maximum wear.	----------	0.3457
	B–D	Fit of valve guide in cylinder head.	0.0005T to 0.004T	--

c. Intake Valve Guides.

199	C	Ream diameter (after installation).	0.3427 to 0.3437	0.3467
		Note. On complete engine rebuild, maximum wear.	----------	0.3447
	C–E	Fit of valve guide in cylinder head.	0.0005T to 0.004T	--

d. Exhaust Valve Seats.

	Width of seat	0.085 to 0.115	--
	Angle of seat	45°	--
	Angle of relief for narrowing width of seat:		
	Top of seat	10°	--
	Bottom of seat	70°	--

e. Intake Valve Seats.

	Width of seat	0.035 to 0.060	
	Angle of seat	30°	--
	Angle of relief for narrowing width of seat:		
	Top of seat	10°	--
	Bottom of seat	70°	--

f. Exhaust Valves.

199	J	Angle of face	45°	--
	H	Stem diameter	0.3397 to 0.3407	0.3357
	H–B	Fit of stem in guide	0.002L to 0.004L	0.005L
		Rotator cap to stem clearance.	0.0005 to 0.0045	--
	J	Minimum thickness of valve head of outer edge of tapered surface.	----------	1/32

g. Intake Valves.

Fig. No.	*Ref. letter*	*Point of measurement*	*Sizes and fits of new parts*	*Wear limits*
199	G	Angle of face	30°	--
	F	Stem diameter	0.3407 to 0.3412	0.3377
	F–C	Fit of stem in guide	0.0015L to 0.003L	0.007L
	G	Minimum thickness of valve head at outer edge of tapered surface.	----------	1/64

h. Valve Springs.

199	A	Pounds pressure at compressed length of 1.505.	124 to 140	--
		Pounds pressure at compressed length of 1.821.	53 to 63	--

183. Connecting Rod and Bearings

Fig. No.	*Ref. letter*	*Point of measurement*	*Sizes and fits of new parts*	*Wear limits*
200	P	Inside diameter of large end (grind).	2.4563 to 2.4568	--
	K	Inside diameter of small end (diamond bore).	1.0455 to 1.0465	--
	P–K	Axis of piston pin and bearing holes must be parallel in all planes within.	----------	0.002
	R	Inside diameter of bearing inserts when installed (vertical dia).	2.3124 to 2.3135	2.3155
R, fig. 200–K, fig. 201		Clearance between bearing and crankshaft (vertical).	0.0004 to 0.0025	0.0045
		Horizontal clearance greater than vertical (maximum).	0.001	--
		End clearance between connecting rod and crankshaft.	0.007 to 0.012	0.018
	Q	Thickness of connecting rod bearing at crown:		
		Standard----------	0.07165 to 0.07195	
		0.010 undersize-------	0.07665 to 0.07695	
		0.020 undersize-------	0.08165 to 0.08195	
		0.030 undersize-------	0.08665 to 0.08695	
		0.040 undersize-------	0.09165 to 0.09195	
	M	Finished diameter of piston pin bushing.	0.9901 to 0.9905	0.9915
	L–K	Fit of bushing in rod------	0.003T to 0.006T	--
	N–M	Fit of piston pin in bushing	0.0001L to 0.0007L	0.0017L

184. Pistons, Pins, and Rings

Fig. No.	*Ref. letter*	*Point of measurement*	*Sizes and fits of new parts*	*Wear limits*
200	J	Diameter of piston at bottom of skirt:		
		Standard----------	3.9955 to 3.9975	3.9925
		0.020 oversize-------	4.0163 to 4.0167	4.0133
		0.040 oversize-------	4.0363 to 4.0367	4.0333
		0.060 oversize-------	4.0563 to 4.0567	4.0533
		0.075 oversize (semi-finished).	4.075 to 4.100	--
		Width of ring grooves:		
	E	Groove No. 1 (top)---	0.096 to 0.097	0.101
	F	Grooves No. 2 and 3--	0.095 to 0.096	0.100
	G	Groove No. 4-------	0.1880 to 0.1895	0.1935
		Piston selective fit in bore (new piston) with ½-in. feeler 0.004 in. thick to run entire length of cylinder.	4 to 8 lb	--

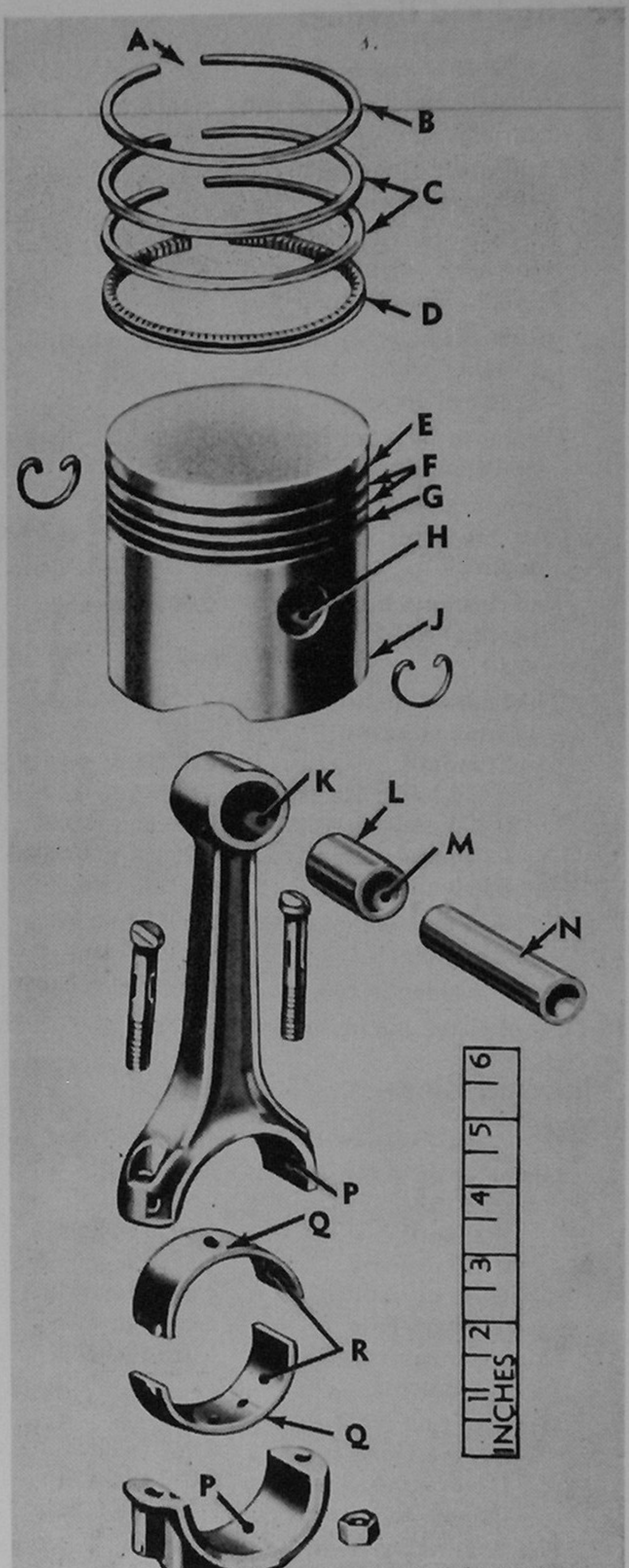

Figure 200. Repair and rebuild standard points of measurement for piston and connecting rod.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
200		Piston to bore clearance:		
		Top of skirt	0.005	--
		Bottom of skirt	0.0035	--
		Piston selective fit in bore (used piston) with ½-in. feeler 0.006 in. thick to run entire length of cylinder.	4 to 8 lb	--
	N	Piston pin diameter:		
		Standard	0.9898 to 0.9900	0.9888
		0.005 oversize	0.9948 to 0.9950	0.9938
	H	Diameter of piston pin bore in piston.	0.9896 to 0.9898	0.9908
	N–H	Fit of piston pin in piston	Thumb push fit with piston preheated to 170° F.	
		Piston pin round and straight within.	0.0001	
	A	Piston ring gap (in cylinder):		
		Groove No. 1	0.014 to 0.022	--
		Grooves No. 2 and 3	0.010 to 0.018	--
		Groove No. 4 (early models).	0.010 to 0.018	--
		Groove No. 4 (late models).	No gap	--
		Clearance between ring and groove:		
	B–E	Groove No. 1	0.0025 to 0.0045	0.0085
	C–F	Grooves No. 2 and 3	0.0015 to 0.0035	0.0075
	D–G	Groove No. 4 (early models).	0.0015 to 0.0025	0.0065
	D–G	Groove No. 4 (late models).	0.0015 to 0.0035	0.0075

185. Camshaft and Bearings

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
201		Diameter of bearing journals:		
	A	No. 1	2.0287 to 2.0297	2.0267
	B	No. 2	1.9662 to 1.9672	1.9642
	C	No. 3	1.9037 to 1.9047	1.9017
	D	No. 4	1.8412 to 1.8422	1.8392
	B or C	Allowable runout of center journals when end journals are supported.	0.0015	0.003
		Inside diameter of camshaft bearings:		
202	M	No. 1	2.0307 to 2.0317	2.0337
	N	No. 2	1.9682 to 1.9692	1.9712
	P	No. 3	1.9057 to 1.9067	1.9087
	Q	No. 4	1.8432 to 1.8442	1.8462

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
202		Fit of bearing journals in bearings.	0.001L to 0.003L	0.005L
		Fit of camshaft bearings in crankcase.	0.002T to 0.003T	--
		End play of camshaft (installed).	0.003 to 0.006	--
	S	Thrust plate thickness (early models).	0.184 to 0.189	--
	T	Thrust plate thickness (late models).	0.187 to 0.189	--
	U	Spacing ring thickness (late models).	0.1919 to 0.1935	--

186. Crankshaft and Bearings

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
		Main bearing journal diameter:		
201	J	No. 1	2.6835 to 2.6845	2.6815
	H	No. 2	2.7145 to 2.7155	2.7125
	G	No. 3	2.7455 to 2.7465	2.7435
	F	No. 4	2.7765 to 2.7775	2.7745
		Allowable out-of-round	0.00025	0.002
	H or G	Allowable runout at center bearing journals when supported at each end.	0.0015	0.003
	L	Main bearing journal fillet radius.	7/64 to 1/8	--
	K	Connecting rod journals:		
		Nominal diameter	2.311 to 2.312	2.309
		Allowable out-of-round	0.00025	0.002
	M	Connecting rod journal fillet radius.	5/32 to 3/16	--
	E	Runout of flywheel mounting face.	0.001	0.002
202	A	Runout of flywheel face when mounted on crankshaft.	0.005	--
		Balance crankshaft to	1/2 in.-oz	--
		Diameter of main bearing bores, less inserts, at proper torque tightness:		
	H	No. 1	2.8728 to 2.8738	
	J	No. 2	2.9038 to 2.9048	
	K	No. 3	2.9348 to 2.9358	
	L	No. 4	2.9658 to 2.9668	
		Inside diameter of main bearing inserts when installed at proper torque tightness (vertical):		
	F	No. 1	2.6852 to 2.6872	2.6892
	E	No. 2	2.7162 to 2.7182	2.7202
	D	No. 3	2.7472 to 2.7492	2.7512
	B	No. 4	2.7782 to 2.7802	2.7822

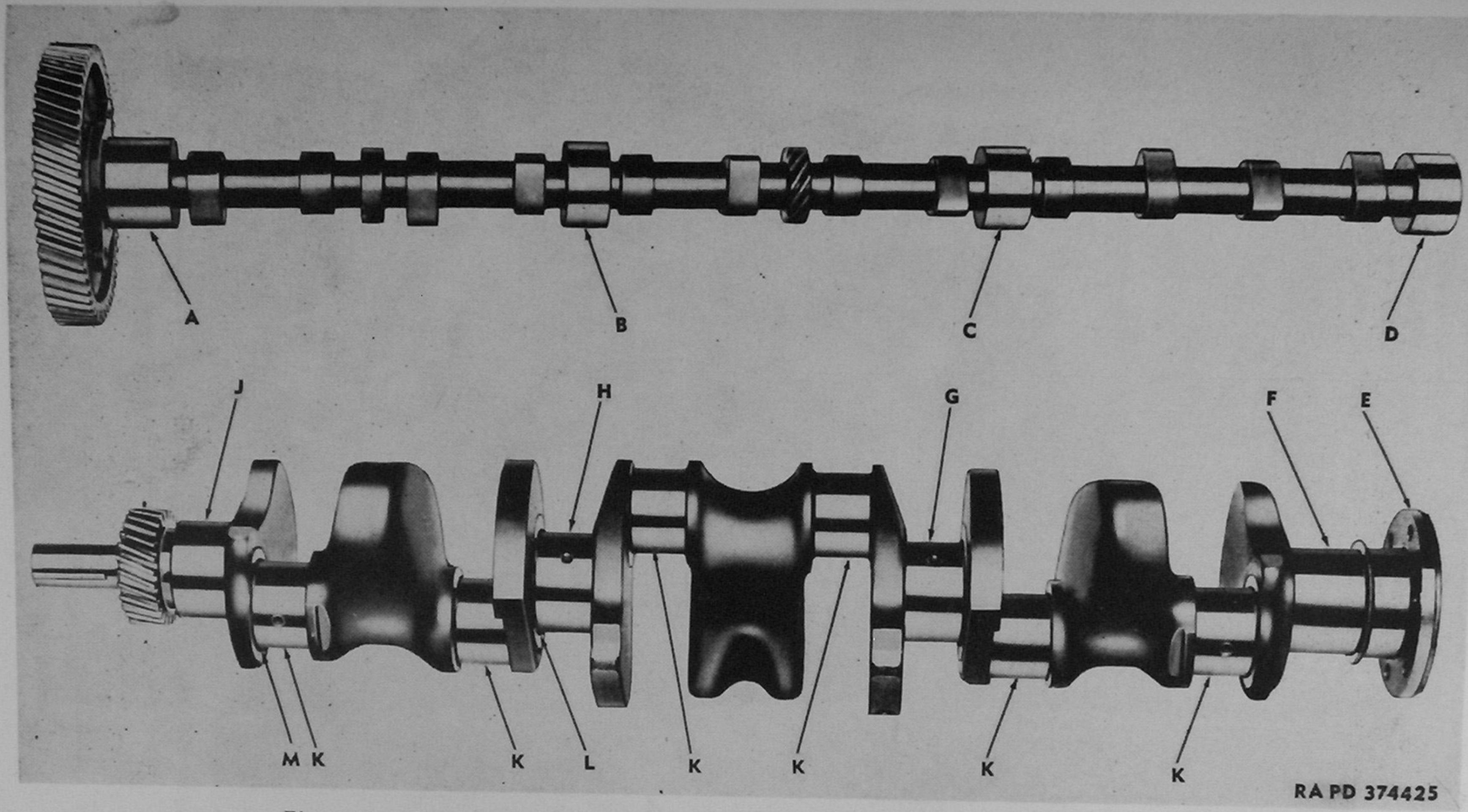

Figure 201. Repair and rebuild standard points of measurement for camshaft and crankshaft.

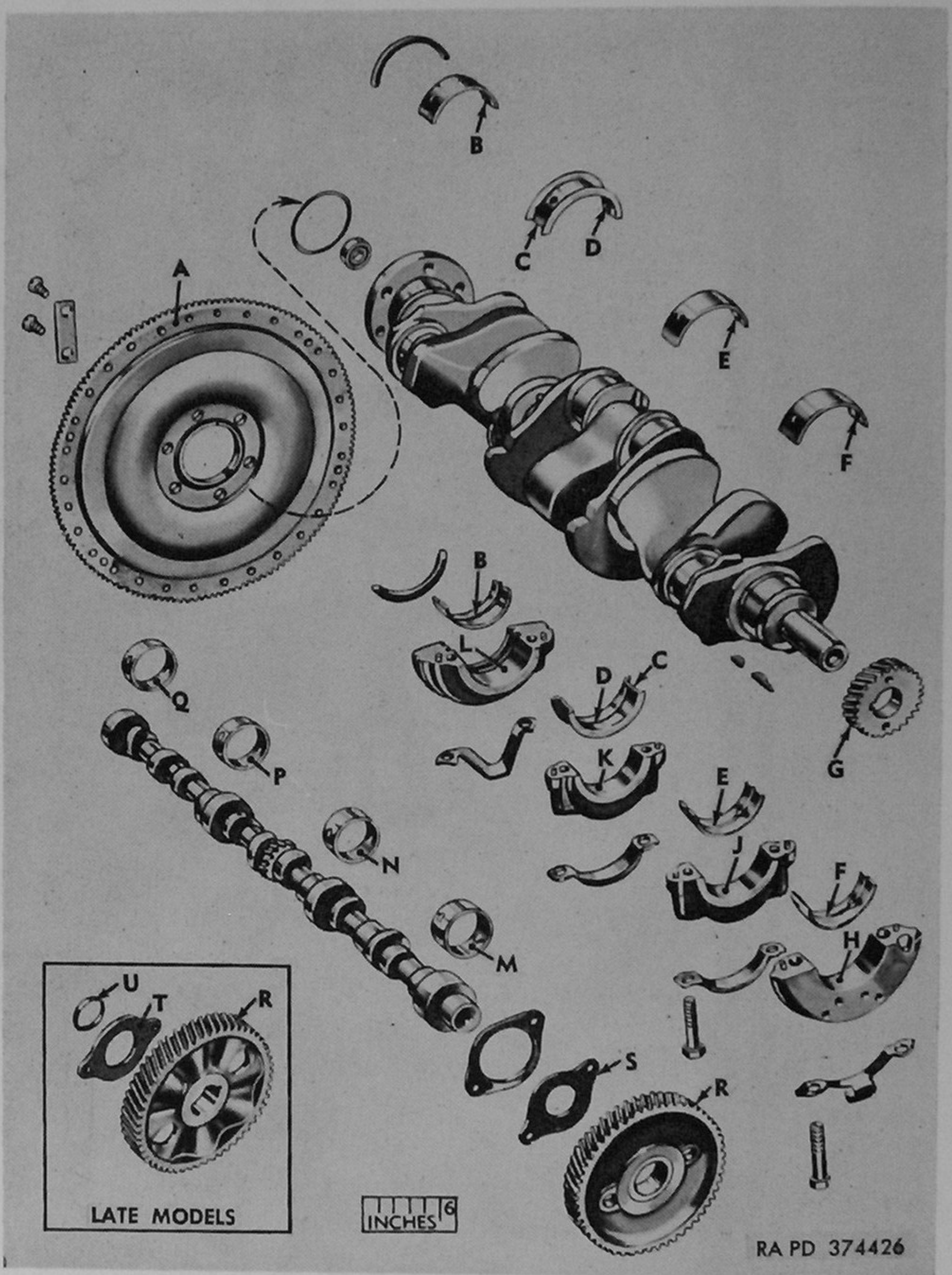

Figure 202. Repair and rebuild standard points of measurement for camshaft and crankshaft bearings.

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
202		Thickness of overlay (co-plated) on main bearing inserts.	0.0003 to 0.0008	--
		Amount of bearing crush	0.0013 to 0.0023	--
		Clearance between crankshaft and bearings.	0.0007 to 0.0038	--
		End play of crankshaft when installed.	0.003 to 0.008	0.012
	C	Width of rear center bearing inserts.	1.4305 to 1.4325	1.4275

187. Timing Gears (Camshaft and Crankshaft Gears)

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
202	G–R	Total backlash	0.003 to 0.004	0.010

188. Flywheel

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
202	A	Runout at outer bolt circle	0.005	--

189. Flywheel Housing Rear Half (Engine Assemblies 7411599 and 8329440)

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
		Rear face square with axis of crankshaft at 5-inch radius within (matched housings).	0.0025	--
		Pilot hole concentric with main bearing bores within (matched housings).	0.002	--

190. Cylinder Block

Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Wear limits
203	B	Bore diameter *Note.* On complete engine rebuild.	3.999 to 4.001 4.005	4.011
	B	Out-of-round	0.0005	0.001
	B	Taper of bore *Note.* On complete engine rebuild.	0.0005 0.004	0.010
	A	Face of block:		
		Maximum allowable warpage.	0.010	--
		Maximum grind from original surface to correct warpage.	0.020	--
	C	Minimum distance from top face of block to parting line of main bearing bore.	11.355	--
	D	Valve lifter bore diameter	0.9905 to 0.9915	--

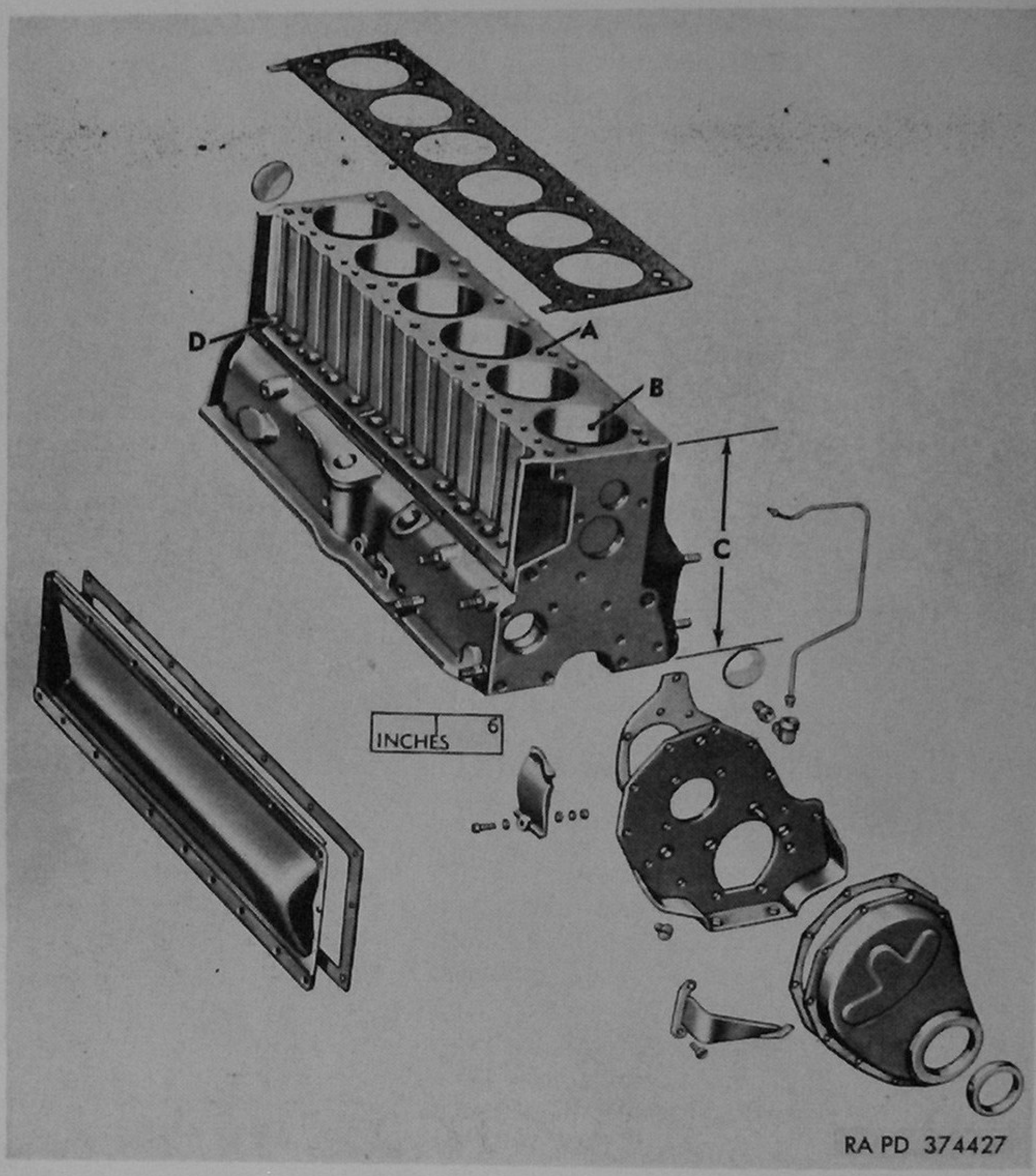

Figure 203. Repair and rebuild standard points of measurement for cylinder block.

191. Torque Wrench Specifications

Fig. No.	*Ref. letter*	*Location*	*Size*	*Torque (pound-feet)*
78	A	Engine oil cooler elbow attaching bolt.	5/16 x 2 3/4	9 1/2 to 13
78	E	Engine oil cooler elbow and housing plate attaching nut.	5/16–24	9 1/2 to 13
		CHAPTER 5—Section VI		
81	K	Water pump plate attaching screw.	5/16 x 5/8	10 to 15
84	L	Water pump plate attaching screw.	5/16 x 5/8	10 to 15
		CHAPTER 5—Section VII		
89	L	Oil pump body cover attaching bolt.	1/4 x 3/4	6 to 8

Fig. No.	Ref. letter	Location	Size	Torque (pound-feet)
		CHAPTER 7—Section I		
117	S	Baffle to cylinder block attaching screw nut.	No. 10–24	20 to 25 (pound–inches)
118	X			
117	--	Inner front support mounting brackets attaching stud nut (engine assemblies 7411599 and 8329-440 only).	7/16–20	40 to 50
23	--	Generator mounting bracket attaching stud nut (engine assembly 8726-920 only).	7/16–20	40 to 50
109	Y	Crankshaft center bearing cap bolt.	9/16 x 2 15/16	100 to 110
	W	Crankshaft front and rear bearing cap bolt.	9/16 x 2 5/16	100 to 110
129	--	Timing gear plate to cylinder block attaching screw.	5/16 x 5/8	15 to 20
	--	Timing gear plate to cylinder block attaching bolt.	5/16 x 3/4	12 to 18
136	--	Timing gear cover attaching screw.	1/4 x 1/2	3 to 4
	--	Timing gear cover attaching screw.	1/4 x 5/16	3 to 4
	--	Timing gear cover attaching screw.	1/4 x 5/8	3 to 4
	--	Front bearing cap to timing gear cover plate bolt.	5/16 x 1 1/8	15 to 20
139	--	Flywheel housing front half to cylinder block bolt.	7/16 x 1 3/8	30 to 40
	--	Flywheel housing front half to cylinder block bolt.	7/16 x 1 1/4	30 to 40
141	B	Flywheel housing rear half to front half bolt (engine assemblies 7411599 and 8329440).	3/8 x 1 5/8	20 to 30
	C	Flywheel housing rear half to front half bolt (engine assemblies 7411599 and 8329440).	3/8 x 1 1/8	20 to 30
	D	Flywheel housing rear half to front half bolt (engine assemblies 7411599 and 8329440).	3/8 x 1	20 to 30
146	--	Flywheel to crankshaft bolt	1/2 x 29/32	102 to 107
115	--	Transmission converter drive flange screws (engine assembly 8726920 only).	5/16 x 9/16	25

Fig. No.	Ref. letter	Location	Size	Torque (pound-feet)
63	A	Plate and balancer weight to hub nut (engine assemblies 7411599 and 8329440).	5/16–24	8 to 10
64	A	Plate and balancer weight to pulley nut (engine assembly 8726920).	5/16–24	8 to 10
63	J	Balancer hub to crankshaft bolt (engine assemblies—7411599 and 8329440).	5/8 x 2 3/4	140 to 150
64	H	Balancer weight and pulley to crankshaft bolt (engine assembly 8726920).	5/8 x 1 3/4	140 to 150
61	K	Connecting rod bolt nut---	3/8–24	40 to 45
155 156	C E	Oil pan to cylinder block bolt.	5/16 x 7/8	15 to 20
155 156	E G	Oil pan to cylinder block screw.	1/4 x 5/8	4 to 6
156	H	Oil pan to cylinder block screw (engine assembly 7411599).	1/4 x 3/4	4 to 6
56 57	K H	Oil pump strainer support bracket to oil pan bolt (engine assemblies 7411-599 and 8329440).	1/4 x 1/2	6 to 8
56 57	F D	Oil strainer support to bracket bolt nut (engine assemblies 7411599 and 8329440).	3/8–24	20 to 30
155 156	J B	Oil pan cover to pan bolt (engine assemblies 7411-599 and 8329440).	1/4 x 11/16	3 to 4
155 156	G K	Flywheel housing seal to housing bolt (engine assemblies 7411599 and 8329440).	5/16 x 3/4	5 to 10
158	F	Flywheel housing seal to housing bolt (engine assembly 8726920 only).	5/16 x 3/4	12 to 15
	B	Flywheel housing seal to housing bolt (engine assembly 8726920 only).	3/8 x 3/4	See par. 136*c*(3)
50	C	Cylinder head to cylinder block bolt.	1/2 x 5 29/32	See par. 138
	A	Cylinder head to cylinder block bolt (having three radial line marking).	1/2 x 4 17/32	70 to 80
	A	Cylinder head to cylinder block bolt (having six radial line marking).	1/2 x 4 17/32	90 to 100
165	K	Rocker arm shaft bracket to cylinder head bolt.	3/8 x 1 1/8	20 to 30
	F	Rocker arm shaft bracket to cylinder head bolt.	3/8 x 3 1/4	20 to 30

Fig. No.	Ref. letter	Location	Size	Torque (pound-feet)
159	C	Rocker arm shaft bracket stud nut.	3/8–24	20 to 30
97	A	Intake to exhaust manifold stud nut (engine assemblies 7411599 and 8329-440).	3/8–16	20 to 25
	E	Exhaust to intake manifold bolt (engine assemblies 7411599 and 8329440).	3/8 x 1	20 to 25
99	D	Vaporizer to exhaust manifold stud nut (engine assembly 8726920).	3/8–16	20 to 25
	A	Intake manifold to vaporizer stud nut (engine assembly 8726920).	3/8–24	6 to 11
169	--	Manifold to cylinder head stud nut (end).	3/8–16	25 to 30
167	--	Manifold to cylinder head stud nut at clamps.	3/8–16	15 to 20
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47 or 48		Starting motor to flywheel housing stud nut.	1/2–20	90 to 100
45	J or M	Water pump to cylinder block bolt (engine assemblies 7411599 and 8329-440).	3/8 x 1 7/8	18 to 24
	H	Water pump to cylinder block bolt (engine assemblies 7411599 and 8329-440).	3/8 x 1 3/8	18 to 24
	L	Water pump to cylinder block bolt (engine assemblies 7411599 and 8329-440).	3/8 x 1 1/4	18 to 24
46	D	Water pump to cylinder block bolt (engine assembly 8726920).	3/8 x 1 3/4	18 to 24
	E	Water pump to cylinder block bolt (engine assembly 8726920).	3/8 x 1 1/4	18 to 24
45	F	Thermostat housing to cylinder head bolt.	3/8 x 1 7/8	18 to 24
46	B			
45	B	Thermostat upper housing to lower housing bolt (engine assemblies 7411-599 and 8329440).	3/8 x 1	18 to 24
44	V	Oil cooler housing to thermostat housing bolt (engine assembly 8726920).	3/8 x 1	18 to 24
	R	Oil cooler housing bracket to cylinder head stud nut (engine assembly 8726-920).	7/16–20	33 to 43

Fig. No.	*Ref. letter*	*Location*	*Size*	*Torque (pound-feet)*
40	Q	Carburetor to manifold stud nut (engine assemblies 7411599 and 8329440).	5/16–24	15 to 20
41	P			
40	H	Throttle control bracket to manifold stud nut (engine assemblies 7411599 and 8329440).	5/16–24	15 to 20
41	G			
42	B	Carburetor to vaporizer stud nut (engine assembly 8726920).	7/16–20	33 to 43
33	V	Oil filter bracket to cylinder block screw.	1/4 x 5/8	4 to 6
34	Q			
33	J	Oil filter bracket to cylinder block bolt.	3/8 x 3/4	20 to 30
34	G			
33	L	Oil filter bracket to cylinder block bolt.	3/8 x 1	20 to 30
34	J			
33	G	Crankcase filler tube bracket to cylinder block screw (engine assemblies 7411-599 and 8329440).	1/4 x 5/8	3 to 4
34	R	Crankcase filler tube bracket stud nut (engine assembly 8726920).	5/16–24	9 1/2 to 13
32	--	Spark plug		23 to 27
173	H	Distributor mounting clamp bolt.	3/8 x 1	20 to 30
174	G			
29	C	Oil filter to bracket bolt	3/8 x 7/8	20 to 30
30	D	Oil filter to bracket bolt	3/8 x 7/8	20 to 30
26	N	Generator bracket to support bracket bolt (engine assembly 7411599).	3/8 x 1 1/8	25 to 35
	K	Generator to bracket bolt (engine assembly 7411-599).	7/16 x 1 5/16	50 to 60
27	L	Generator bracket to cylinder block stud nut (engine assembly 8726920).	7/16–20	40 to 50
	H	Generator to bracket bolt (engine assembly 8726-920).	7/16 x 1 1/4	50 to 60
26	D	Generator to belt tension adjusting arm bolt (engine assembly 7411599).	3/8 x 1	20 to 30
27	C	Generator to belt tension adjusting arm bolt (engine assembly 8726920).	3/8 x 7/8	20 to 30
26	F	Generator belt tension arm to thermostat housing bolt (engine assemblies 7411599 and 8726920).	3/8 x 1	20 to 30
27	E			
17	D	Air compressor to mounting base bolt (engine assembly 7411599).	7/16 x 1 1/4	30 to 40

Fig. No.	Ref. letter	Location	Size	Torque (pound-feet)
	Q	Air compressor belt tension arm to thermostat housing bolt (engine assembly 7411599).	3/8 x 1	20 to 30
	S	Air compressor belt tension arm to arm bracket bolt nut (engine assembly 7411599).	3/8 x 7/8	20 to 30
18	K	Water pump drive belt idler bracket to engine bracket bolt (engine assembly 8329440).	3/8 x 1	18 to 24
17	M	Fan-blade to pulley hub bolt (engine assembly 7411599).	5/16 x 1	8½ to 11
22	D	Fan blade to pulley hub bolt (engine assembly 8726920).	5/16 x 1¼	8½ to 11

APPENDIX
REFERENCES

1. Publication Indexes

The following indexes should be consulted frequently for latest changes or revisions of references given in this appendix and for new publications relating to materiel covered in this technical manual.

Index of Army Motion Pictures, Film Strips, Slides, and Phono-Recordings.	DA Pam 108–1
Military Publications:	
Index of Administrative Publications	DA Pam 310–1
Index of Blank Forms	DA Pam 310–2
Index of Graphic Training Aids and Devices.	DA Pam 310–5
Index of Supply Manuals—Ordnance Corps.	DA Pam 310–29
Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.	DA Pam 310–4
Index of Training Publications	DA Pam 310–3

2. Supply Manuals

a. Destruction To Prevent Enemy Use.	
Ammunition Explosives, Bulk Propellants, and Explosive Devices.	SM 9–5–1375
Ammunition and Explosives; Land Mines	SM 9–5–1345
Pyrotechnics, Military and All Types	SM 9–5–1370
b. General.	
Introduction	ORD 1
c. Repair and Rebuild.	
Abrasives, Adhesives, Cleaners, Preservatives, Recoil Fluids, Special Oils, and Related Items.	ORD 3 SNL K–1
Antifriction Bearings and Related Items	ORD 5 SNL H–12
Engine Accessories: Engine Air and Oil Filters, Strainers, and Cleaners, Nonaircraft.	SM 9–1–2940
Engine Cooling System Components, Nonaircraft.	SM 9–1–2930
Engine Fuel System Components, Nonaircraft.	SM 9–1–2910

Lubricating Fittings, Oil Filters, and Oil Filter Elements.	ORD 5 SNL H–16
Oil Seals	ORD 5 SNL H–13
Shop Set: Auto Fuel and Electrical System Field Maintenance.	ORD 6 SNL J–8, Sec. 12
Shop Set, Contact and Emergency Repair, Field Maintenance.	ORD 6 SNL J–8, Sec. 18
Shop Sets, Engine and Power Train Rebuild Company (Armament) Depot Maintenance.	ORD 6 SNL J–9, Sec. 8
Shop Sets, Engine Rebuild Company (Automotive) Depot Maintenance.	ORD 6 SNL J–9, Sec. 3
Shop Sets, Headquarters and Service Company, Depot Maintenance, Automotive or Armament.	ORD 6 SNL J–9, Sec. 2
Shop Sets, Field Maintenance, Automotive, Basic Set.	SM 9–4–4910–J8–13
Shop Sets, Power Train Rebuild Company (Automotive), Depot Maintenance.	ORD 6 SNL J–9, Sec. 1
Soldering, Metallizing, Brazing, and Welding Materials; Gases and Related Items.	ORD 3 SNL K–2
Standard Electrical Components	ORD 5 SNL H–4
Standard Hardware	ORD 5 SNL H–1
Tool Set, Auto Fuel and Electrical System Repairman (MOS 3912).	ORD 6 SNL J–10, Sec. 8
Tool Set, General Mechanic's (41–T–3534–30).	ORD 6 SNL J–10, Sec. 4
General Motors Corporation Model 302	ORD 6 SNL J–16, Sec. 61
Used in carrier, personnel, full-tracked, Armored M59.	
d. Vehicle.	
Group G, List of all Service Parts of Infantry Vehicle Armored Tracked M59.	ORD 9 SNL G–280
Rifle, Self-Propelled, Full-Tracked: Multiple 106-mm, M50.	ORD 9 SNL G–288
Truck, Cargo; 2½-Ton, 6 x 6, M135; M211; Truck Dump: 2½-Ton, 6 x 6, M215; Truck, Gasoline, Tank: 2½-Ton, 6 x 6, M217; Truck, Water, Tank: 2½-Ton, 6 x 6, M222; Truck Tractor: 2½-Ton, 6 x 6, M221; Truck, Shop, Van: 2½-Ton, 6 x 6, M220.	ORD 9 SNL G–749

3. Forms

The following forms pertain to this materiel:

DA Form 9–1, Materiel Inspection Tag.
DA Form 9–3, Processing Record for Shipment and Storage of Vehicles and Boxed Engines.
DA Form 9–68, Spot Check Inspection for Wheeled and Half-Track Vehicles.
DA Form 9–71, Locator and Inventory Control Card.
DA Form 9–77, Job Order Register.
DA Form 9–78, Job Order.
DA Form 9–79, Parts Requisition.
DA Form 9–80, Job Order File.
DA Form 9–81, Exchange Part or Unit Identification Tag.
DA Form 446, Issue Slip.
DA Form 447, Turn-In Slip.
DA Form 460, Preventive Maintenance Roster.
DA Form 461, Preventive Maintenance Service and Inspection for Wheeled and Half-Track Vehicles.
DA Form 461–5, Limited Technical Inspection.
DA Form 468, Unsatisfactory Equipment Report.
DA Form 478, Organizational Equipment File.
DA Form 865, Work Order.
DA Form 866, Consolidation of Parts.
DA Form 867, Status of Modification Work Order.
DD Form 6, Report of Damaged or Improper Shipment.
DD Form 317, Preventive Maintenance Service (Sticker—due date next service).

4. Other Publications

a. Destruction To Prevent Enemy Use.

Explosives and Demolitions	FM 5–25
Ordnance Service in the Field	FM 9–5

b. General.

Authorized Abbreviations	AR 320–50
Basic Arctic Manual	FM 31–70
Cooling Systems: Vehicle and Powered Ground Equipment.	TM 9–2858
Dictionary of United States Army Terms	SR 320–5–1
Inspection of Ordnance Materiel in Hands of Troops.	TM 9–1100
Instruction Guide: Operation and Maintenance of Ordnance Materiel in Extreme Cold (0° to −65° F).	TM 9–2855
Logistics (General): Unsatisfactory Equipment Report.	AR 700–38

Lubrication Order: Carrier, Personnel, Full-Tracked: Armored, M59.	LO 9–7002
Lubrication Order: Rifle, Self-Propelled, Full-Tracked, Multiple, 106-mm, M56.	LO 9–7222
Lubrication Order: Truck, 2½-Ton, 6 x 6, M135, M211, M215, M217, M220, M221, M222.	LO 9–8024
Military Symbols	FM 21–30
Military Training	FM 21–5
Military Vehicles (Ordnance Corps Responsibility).	TM 9–2800–1
Ordnance Maintenance and General Supply in the Field.	FM 9–10
Packaging and Packing for Shipment and Storage of Spare Parts for Military Vehicles.	MIL–P–11443
Preservation, Method of	MIL–P–116C
Principles of Automotive Vehicles	TM 9–8000
Safety: Accident Reporting	SR 385–10–40
Techniques of Military Instruction	FM 21–6
c. Repair and Rebuild.	
Uneconomically Repairable Ordnance Vehicle	AR 755–2300–2
Electrical Equipment (Delco-Remy)	TM 9–8627
Emergency Repair of Cracks in Cylinder Heads, Cylinder Blocks, Radiators, Fuel Tanks, and Liquid Containers.	TB ORD 607
Fuel pumps	TM 9–1828A
Full Armored Infantry Vehicle T59	TM 9–7002
Instruction Guide: Care and Maintenance of Ball and Roller Bearings.	TM 37–265
Instruction Guide: Welding Theory and Application.	TM 9–2852
Lubrication	TM 9–2835
Maintenance Responsibilities and Shop Operations.	AR 750–5
Expenditure Limits for Repair of Tactical Type Transport Vehicles.	AR 750–2300–7
Multiple 106-mm Full-Tracked, Self-Propelled Rifle M50.	TM 9–7222
Operation and Organizational Maintenance: 2½-Ton, 6 x 6, Cargo Trucks M135 and M211; Dump Truck M215; Gasoline Tank Truck M217; Shop Van Truck M220; Truck Tractor M221; and Water Tank Truck M222.	TM 9–8024
Ordnance Maintenance: Carburetors and Governors (Holley).	TM 9–1826D

Ordnance Maintenance: Carburetors and Governors (Zenith).	TM 9–1826C
Ordnance Maintenance: Materials used for Cleaning, Preserving, Abrading, and Cementing Ordnance Materiel and Related Materials Including Chemicals, Lubricants, Indicators, and Hydraulic Fluids.	TM 9–1007
Ordnance Maintenance: Power Brake Equipment (Midland Steel Products).	TM 9–8601
Ordnance Maintenance: Vehicular Maintenance Equipment; Grinding, Boring, Valve Reseating Machines, and Lathes.	TM 9–1834A
Preparation of Ordnance Materiel for Deep-Water Fording.	TM 9–2853
d. Shipment and Limited Storage.	
Instruction Guide: Ordnance Preservation, Packaging, Packing, Storage, and Shipping.	TM 9–1005
Marking and Packing of Supplies and Equipment: Marking of Oversea Supply.	SR 746–30–5
Major Items and Major Combinations of Group G.	TB 9–OSSC–G
Army Shipping Document	TM 38–705
Preservation, Packaging, and Packing of Military Supplies and Equipment.	TM 38–230
Protection of Ordnance General Supplies in Open Storage.	TB ORD 379
Standards for Oversea Shipment and Domestic Issue of Ordnance Materiel Other than Ammunition and Army Aircraft.	TB ORD 385

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CNGB	Gen Depot
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USCONARC	Port of Emb (OS)
US ARADCOM	Army Terminal
OS Maj Comd	Trans Terminal Comd
Log Comd	OS Sup Agcy
MDW	Ord PG
Armies	Ord Arsenal
Corps	Ord Ammo Comd
Div	Ord Proc Dist
Ord Gp	Fld Comd, AFSWP
Ord Bn	Mil Dist
Ord Co	MAAG
Ft & Camp	Mil Mis
Svc College	JUSMAG (Greece)
Br Svc Sch	JBUSMC

NG: State AG; units—same as Active Army.
USAR: None.
For explanation of abbreviations used, see AR 320–50.

☆ U. S. Government Printing Office: 1958—458347