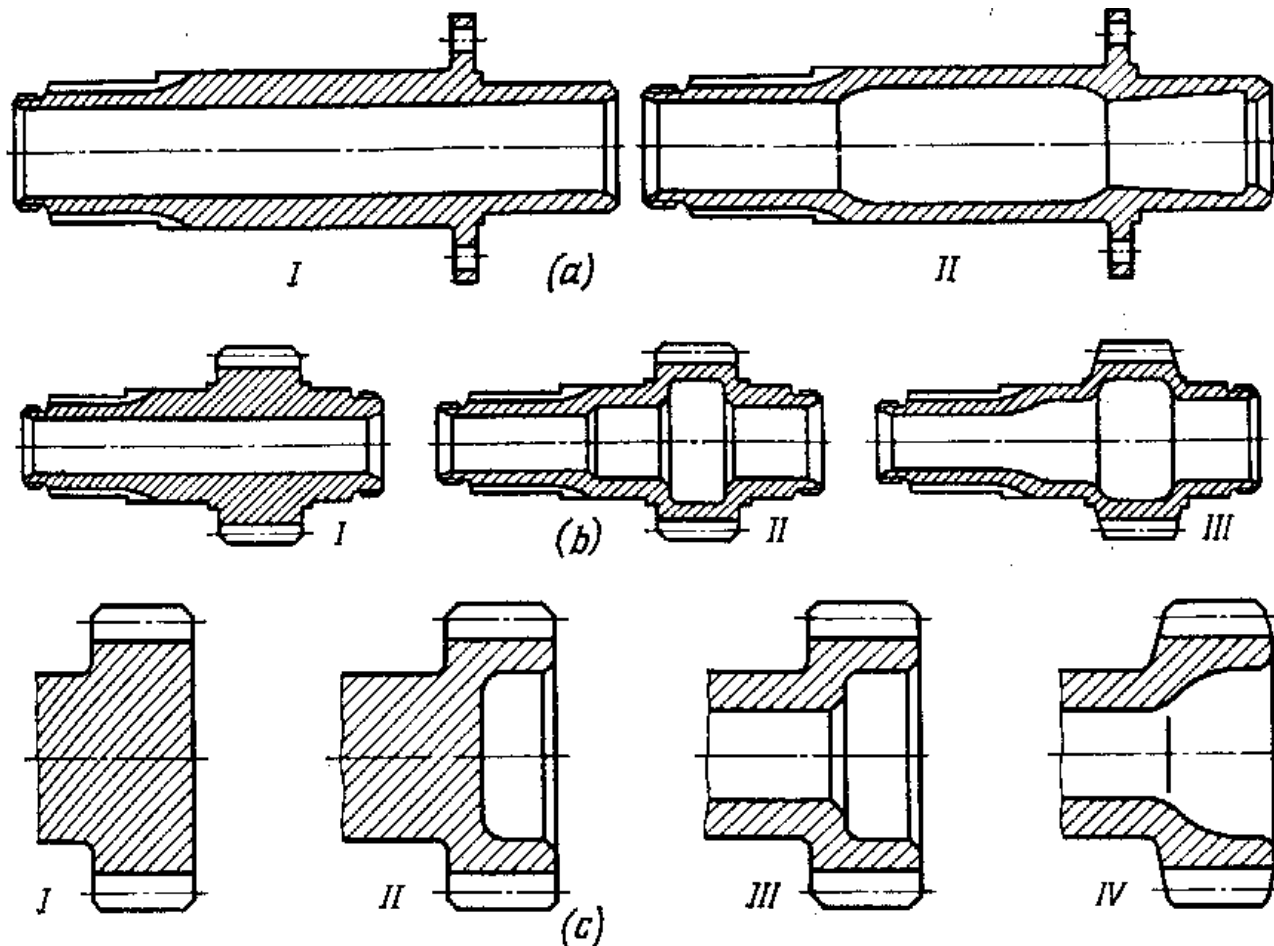


CONSTRUCTION DETAILS Improvement

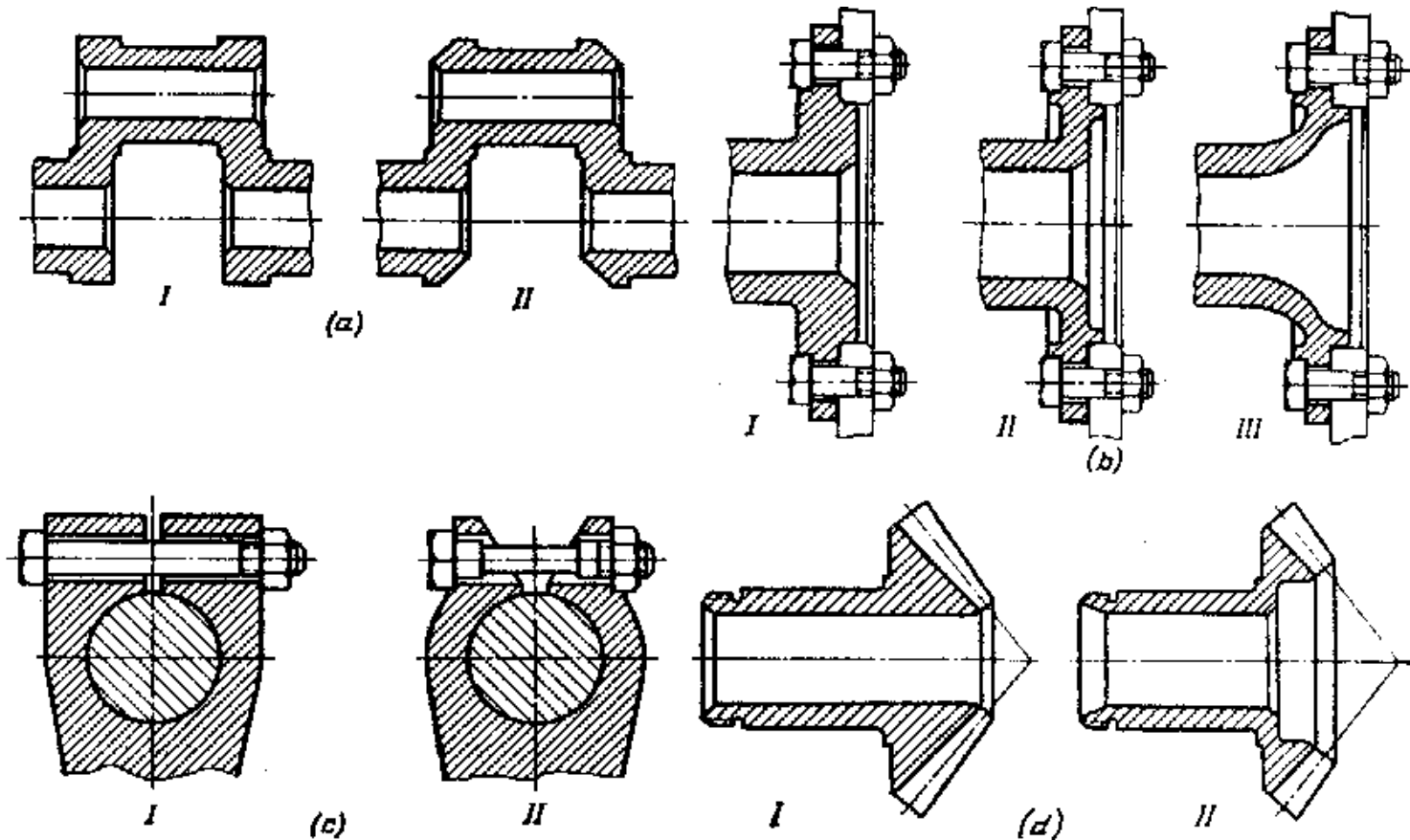
- Lightening of Parts
- Increasing Rigidity
- Decreasing Stress Concentration

Lightening of Parts



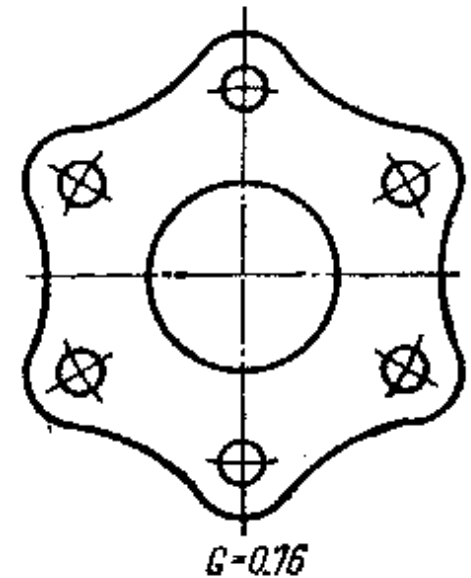
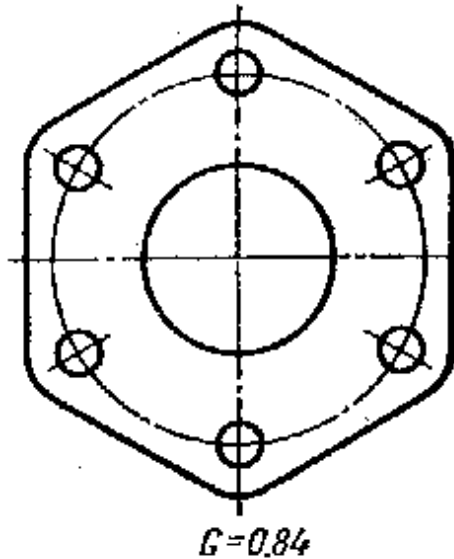
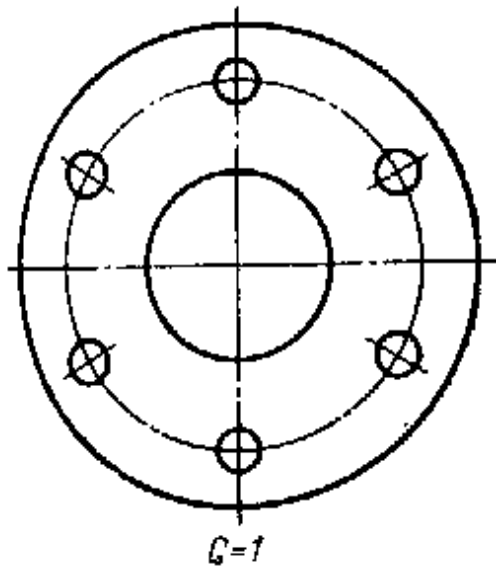
Lightening of Gears and Shafts

Lightening of Parts (Cont.)



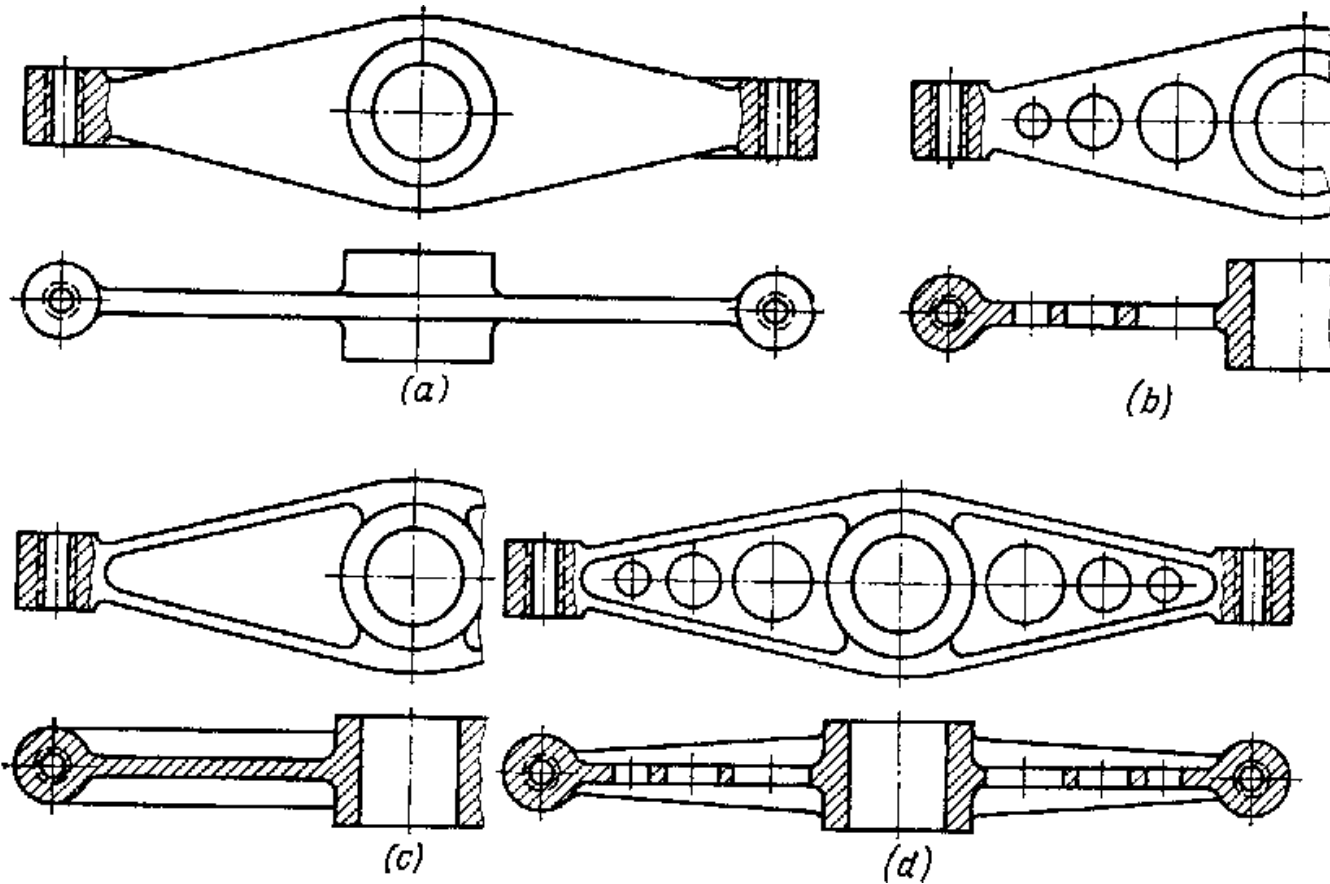
Lightening of Parts and Joints

Lightening of Parts (Cont.)



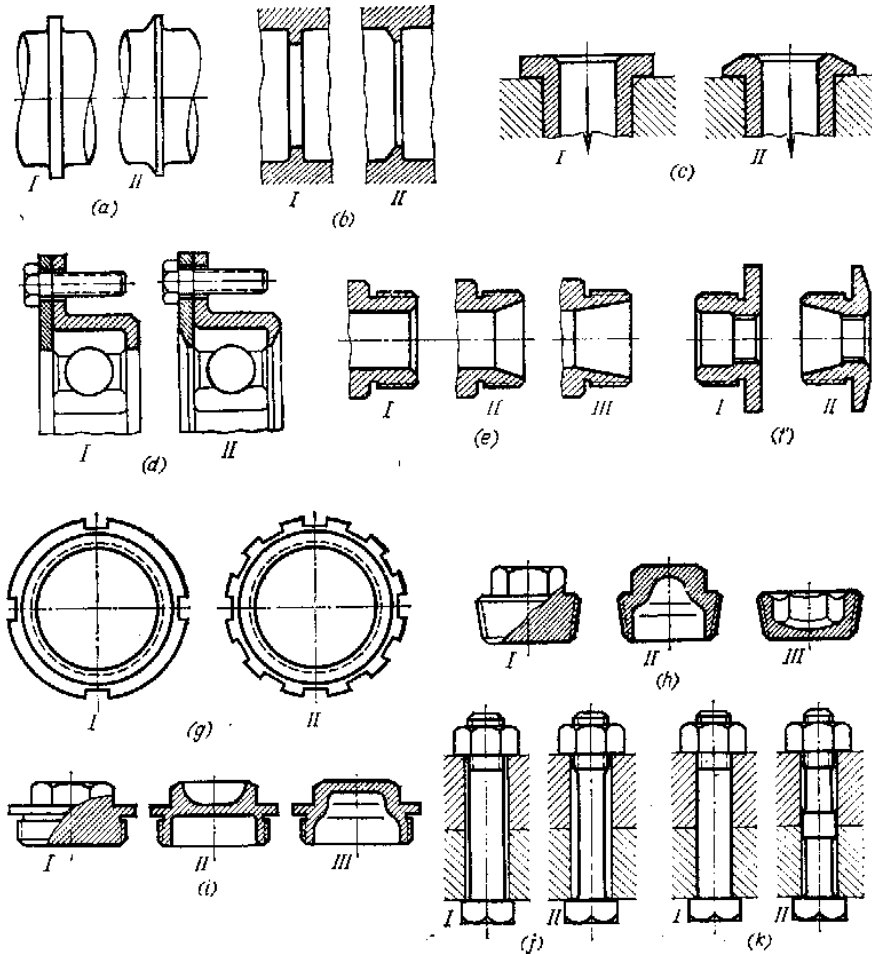
Effect of Shape on Flange Weight

Lightening of Parts (Cont.)



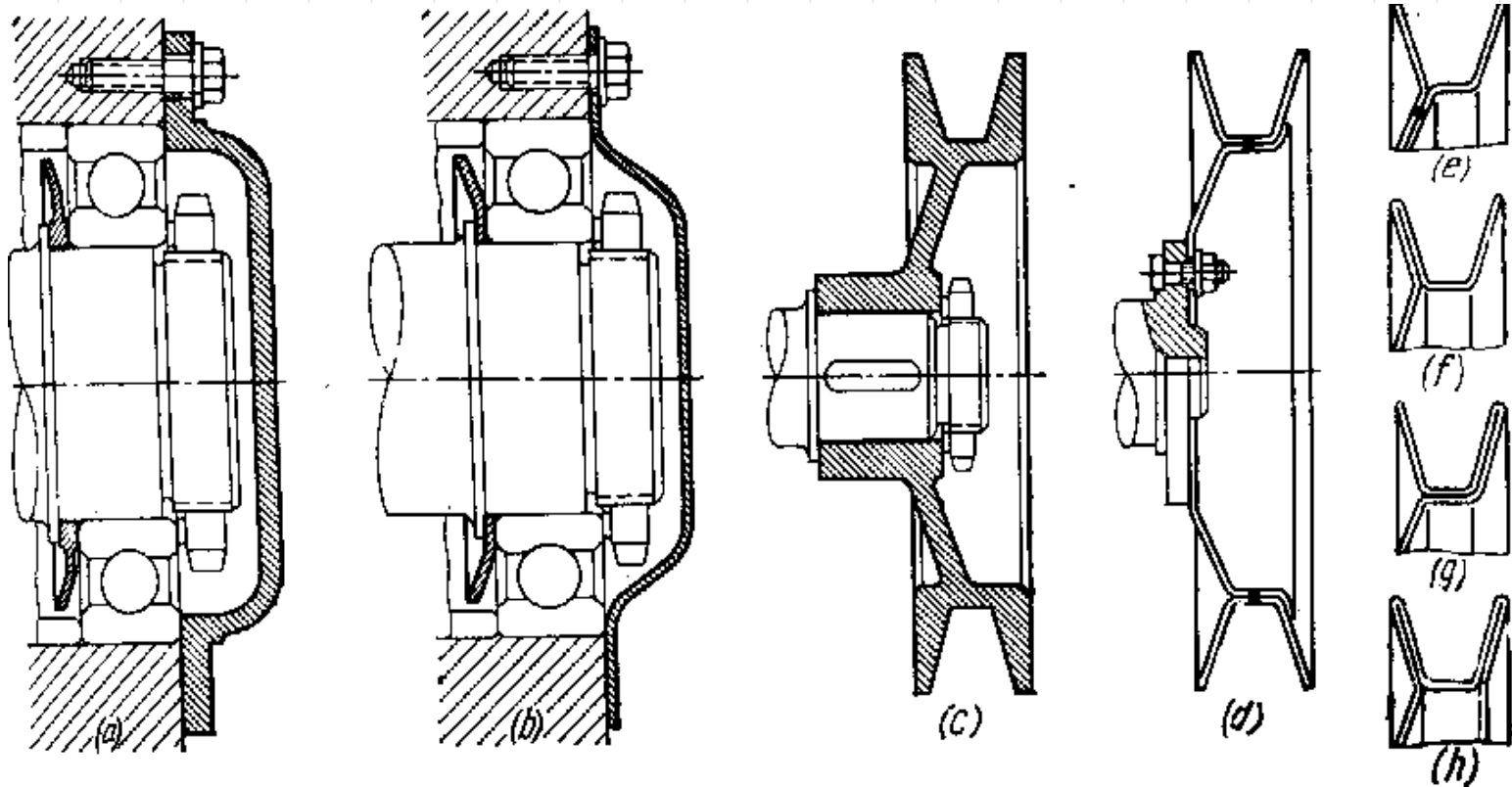
Lightening of Levers

Lightening of Parts (Cont.)



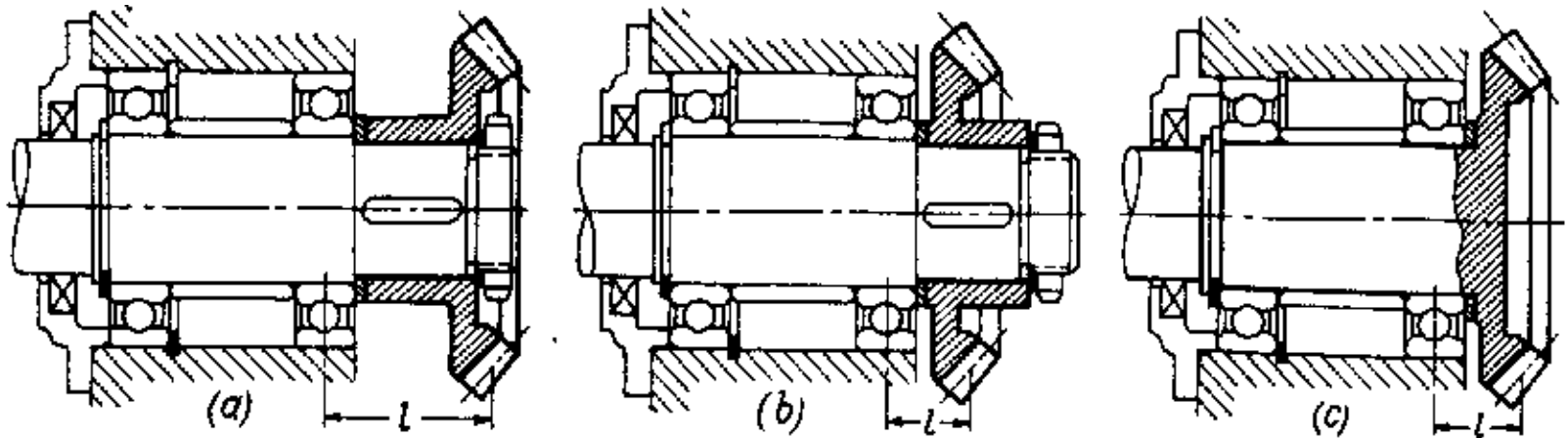
Lightening of Elements

Lightening of Parts (Cont.)



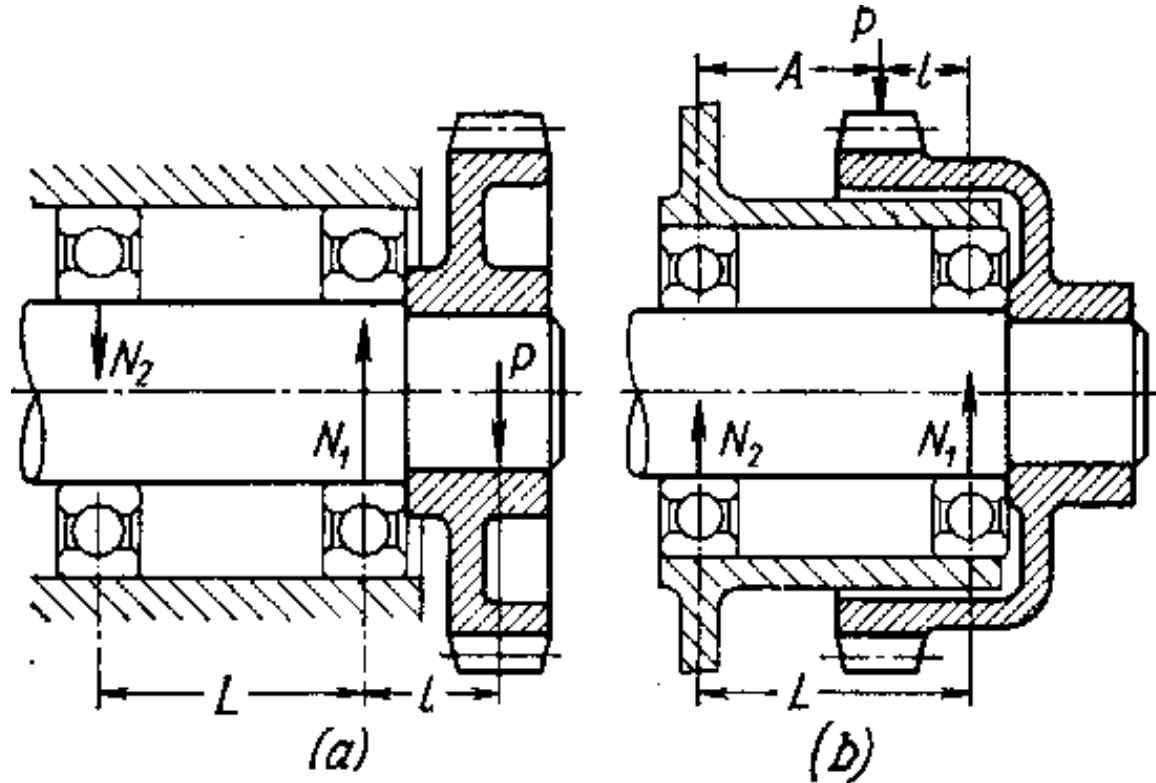
Substitution of Stampings for Cast Parts

Increasing Rigidity



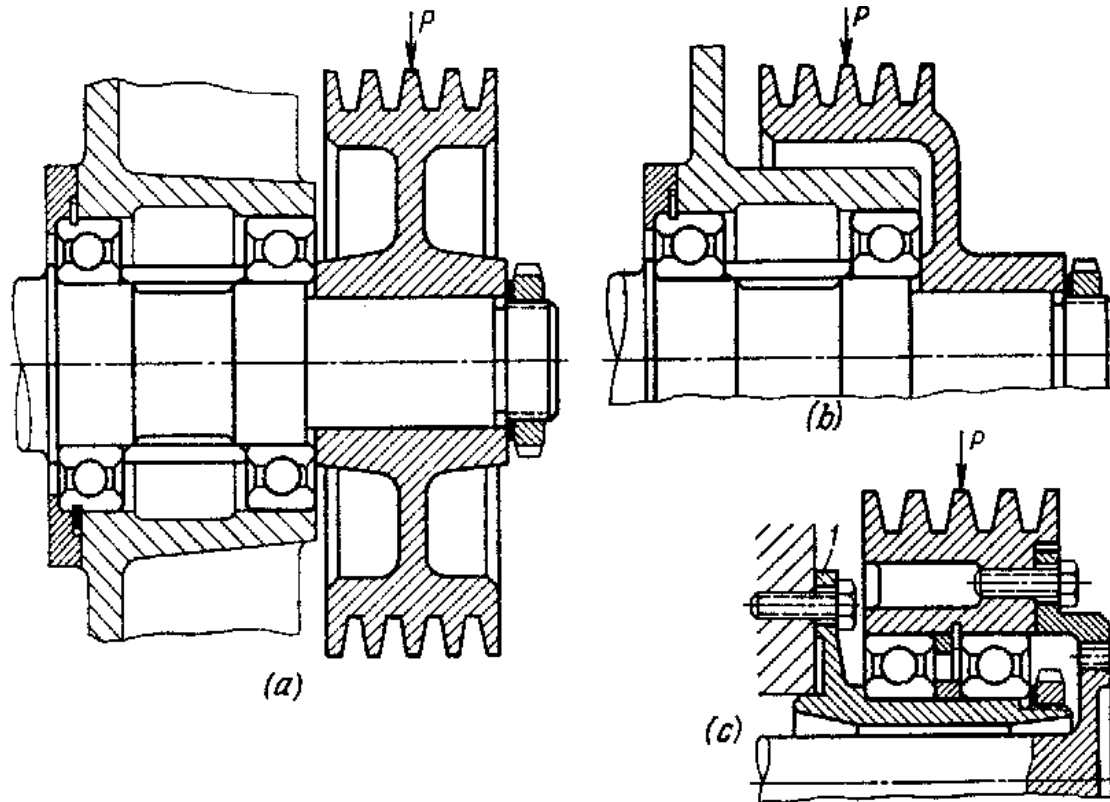
Reducing Overhang in Cantilevered
Bevel Gear Assemblies

Increasing Rigidity (Cont.)



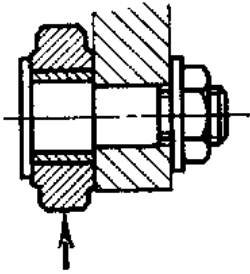
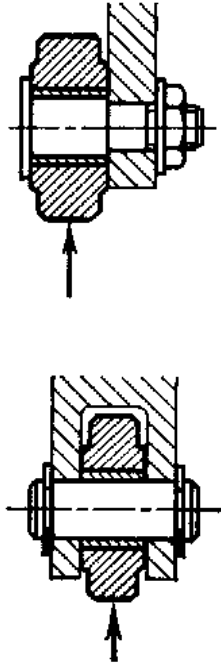
Changing the place of Force Application

Increasing Rigidity (Cont.)



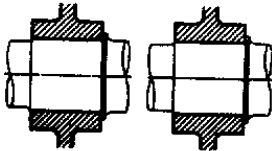
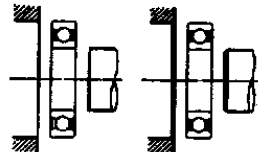
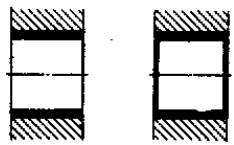
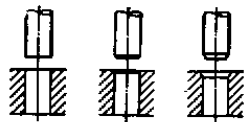
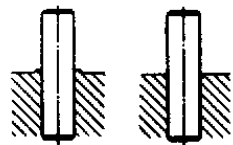
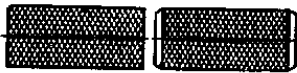
Decreasing Loads on Cantilever Supports

Increasing Rigidity (Cont.)

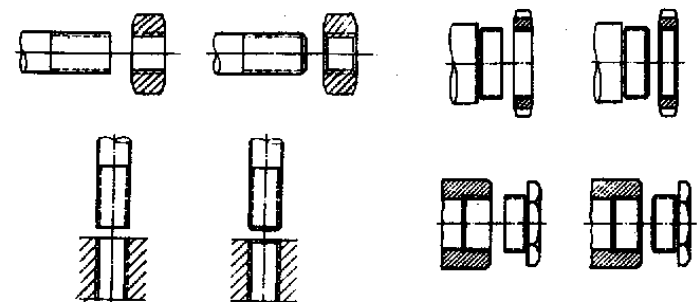
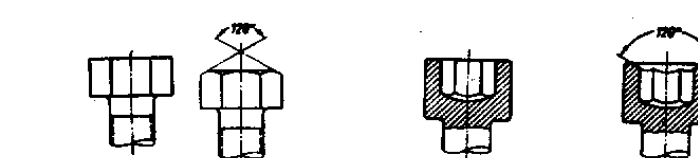
Original design	Improvement	Essence of improvement
Cantilever fastening of a roller lever  Lever weak, roller shaft fastening non-rigid		Cantilever span is reduced. Lever, shaft and assembly strengthened Cantilever eliminated; roller shaft mounted in two supports in lever fork

Decreasing Stress Concentration (Chamfers)

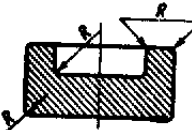
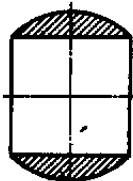
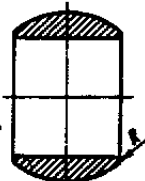
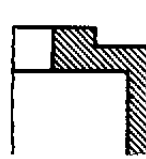
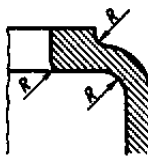
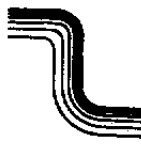
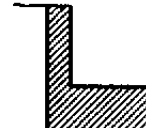
Chamfers

Design		Application	Purpose	Design		Application	Purpose
wrong	correct			wrong	correct		
		All machined parts	To protect hands from injury. To protect precision surfaces from chance damage			Fixed joints	To reduce edge pressures
			To facilitate assembly			Slide bearings and other movable connections	
		Press-fitted connections	To facilitate press-fitting			Gear teeth. Parts working under contact loads	To eliminate load concentration at edges
		Press-fitting into soft-metal parts	To prevent metal from rising around hole edges			Knurled parts	To improve appearance

Decreasing Stress Concentration (Chamfers)

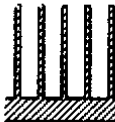
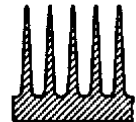
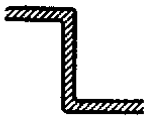
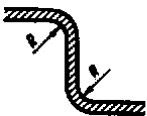
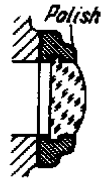
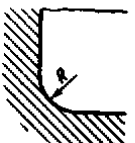
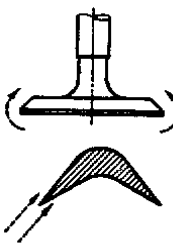
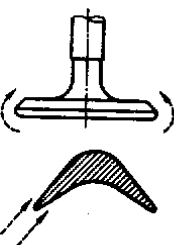
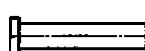
Design		Design		Application	Purpose
wrong	correct	wrong	correct		
				Threaded connections	To facilitate screwing of nuts and threaded rods
					To facilitate use of spanners
					To form an annular bearing surface (with diameter D). To prevent point contact on bearing surface

Decreasing Stress Concentration (Filletlets)

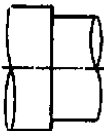
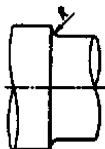
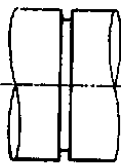
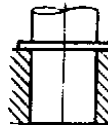
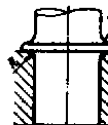
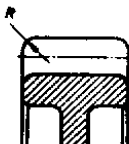
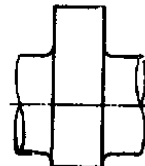
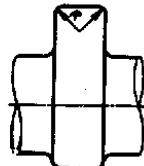
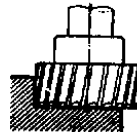
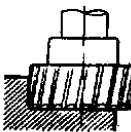
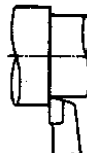
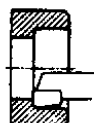
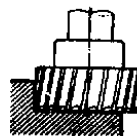
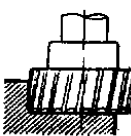
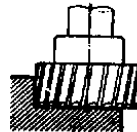
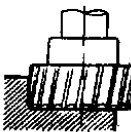
Design		Application	Purpose	Design		Application	Purpose
wrong	correct			wrong	correct		
		Heat-treated parts	To prevent edges from overheating and decarbonization. To reduce quenching stresses at transitions			Electro-plated parts	To prevent local variations in current density. To ensure uniform deposition of metal
							
							
		Parts subjected to chemical and thermal treatments and thermal diffusion saturation	To ensure uniform saturation of surface layer with introduced elements			Cast parts	To ensure uniform solidification of metal in cooling. To reduce shrinkage stresses

Decreasing Stress Concentration (Fillet)

Table 9 (continued)

Design		Application	Purpose	Design		Application	Purpose
wrong	correct			wrong	correct		
		Stamped parts	To improve metal flow and fill die reentry angles			Heat-dissipating fins	To improve heat transfer from part body to fins
		Parts stamped from sheets	To improve metal flow. To prevent disruptions at transition areas			Decorative parts	To improve outer appearance. To facilitate polishing
		Reservoirs	To eliminate corrosion at corners. To facilitate flushing			Hand controls	To protect hands from injury and facilitate manipulation. To facilitate polishing
		Parts subject to heat erosion	To prevent edges from overheating and burning				

(Fillet)

Design		Design		Design		Application	Purpose
wrong	correct	wrong	correct	wrong	correct		
 	 	 	 	Any loaded part	To increase static and cyclic strength at transitions		
 	 	 	 	Parts subject to contact loads	To reduce edge pressures		
 	 	 	 	Machined parts	To enhance durability of cutting edges		