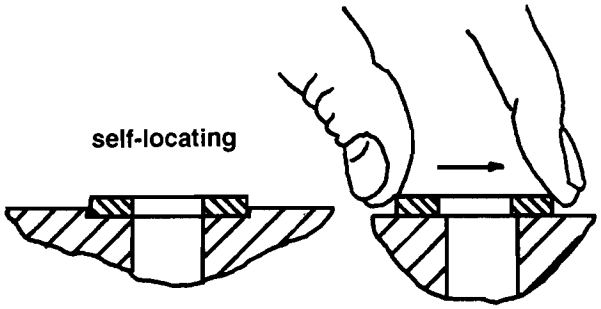


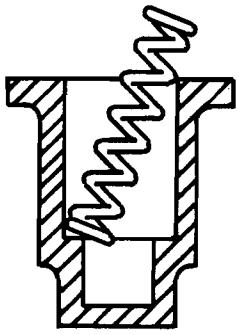


Figure 2.12 Design with Self-Locating Features

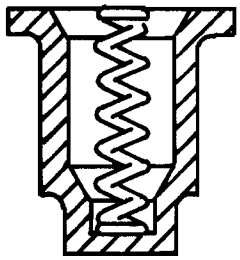
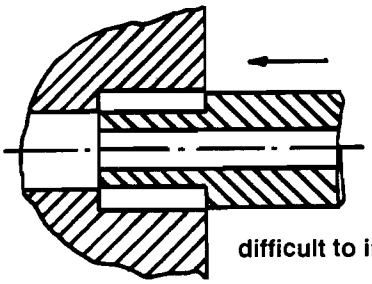


Figure 2.13 Provide Alignment Features



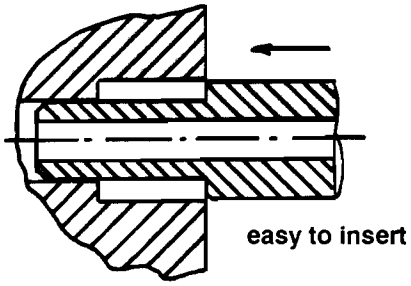


Figure 2.14 Include Chamfers and Avoid Simultaneous Mating Difficulties

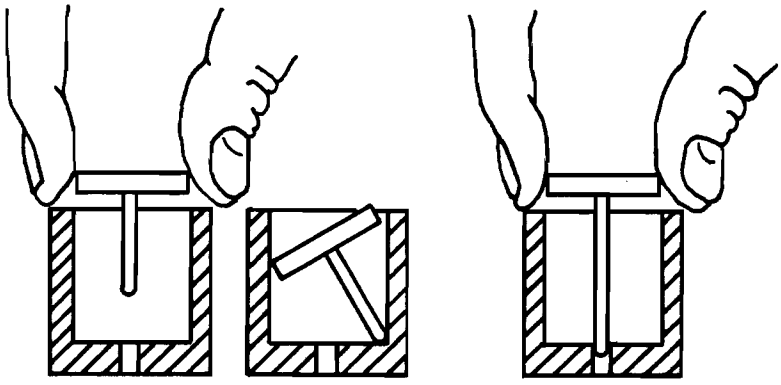


Figure 2.15 Ensure that parts can reach Mating Locations

Figure 2.16 Ensure Adequate Access for Part Insertion

2. Tangling of parts which have combinations of projections and gaps, holes or cut-outs
   —close gaps, enlarge projections etc., to ensure non-tangling; always specify closed end compression coil springs to avoid severe tangling in bulk

3. Use of flexible material
   —preferably design rigid parts, but if flexure is necessary then try to ensure that the parts will retain their shape when handled.

4. Parts which are fragile or sharp
   —avoid sharp edges unless functionally necessary
   —always include safe holding surfaces for sharp or fragile parts

5. Parts which require the use of grasping tools
   —avoid parts such as E-clips which require the assembly worker to pick up a special tool before the part.

Design Parts that Cannot be Installed Incorrectly

Eliminate situations where a part can be installed in orientations which would not permit correct operation of the product.

1. Provide obstructions that will not permit incorrect assembly.

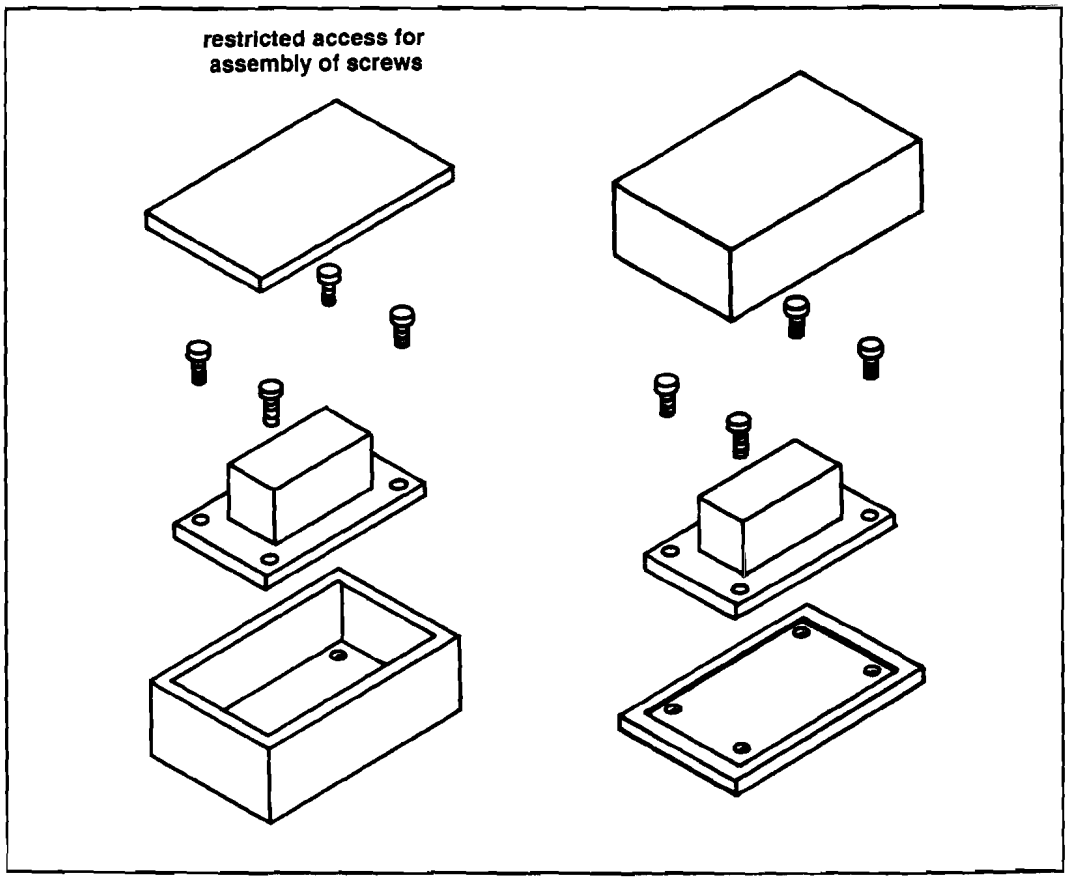


Figure 2.20 Ensure Open Access for Assembly Processes

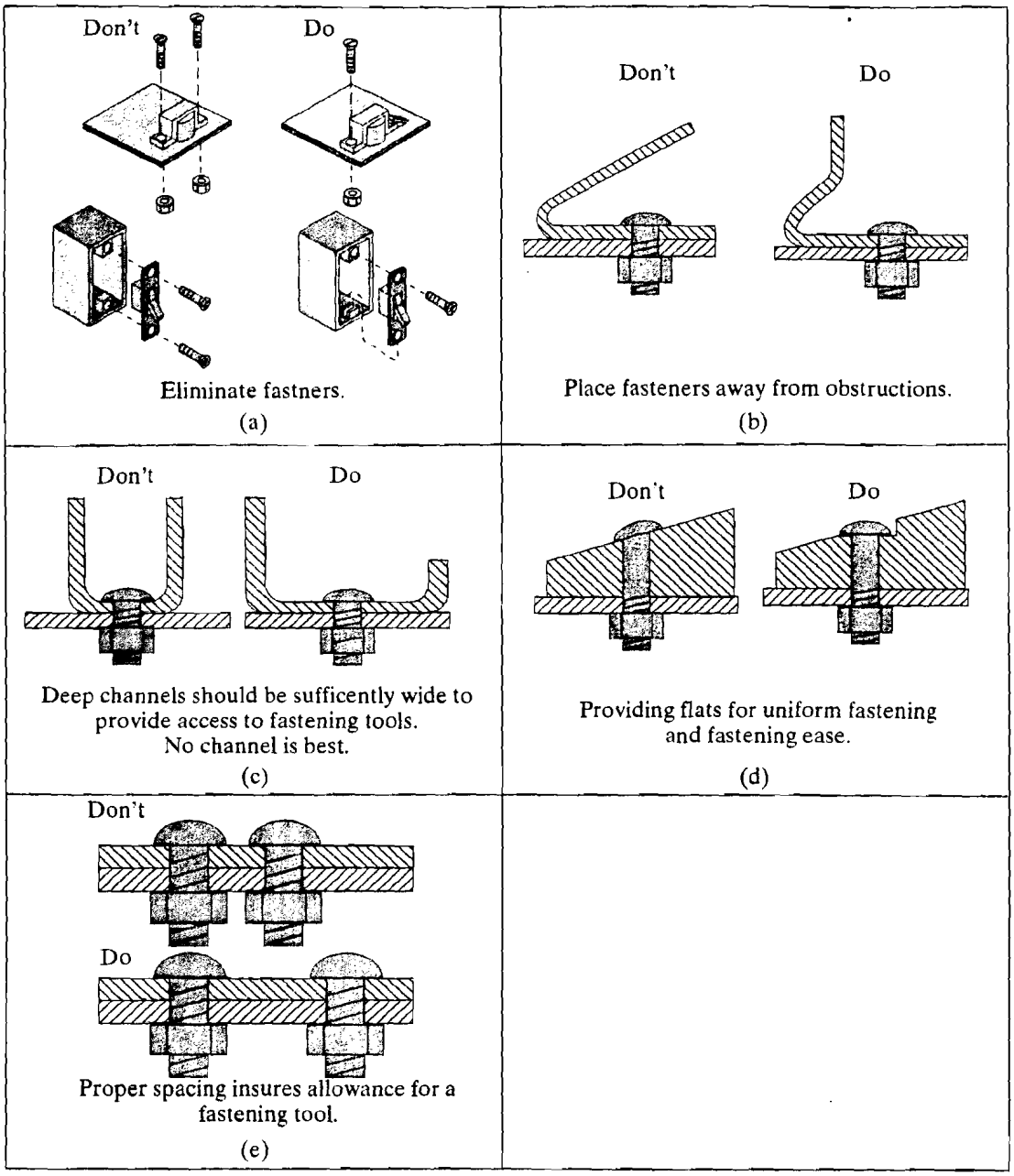


FIGURE 7.7d

Design for assembly examples continued. (*Product Design: Techniques in Reverse Engineering and New Product Development*, by Otto/Wood, © 2001, Prentice-Hall. Reprinted by permission of Pearson Education, Inc., Upper Saddle River, NJ.)

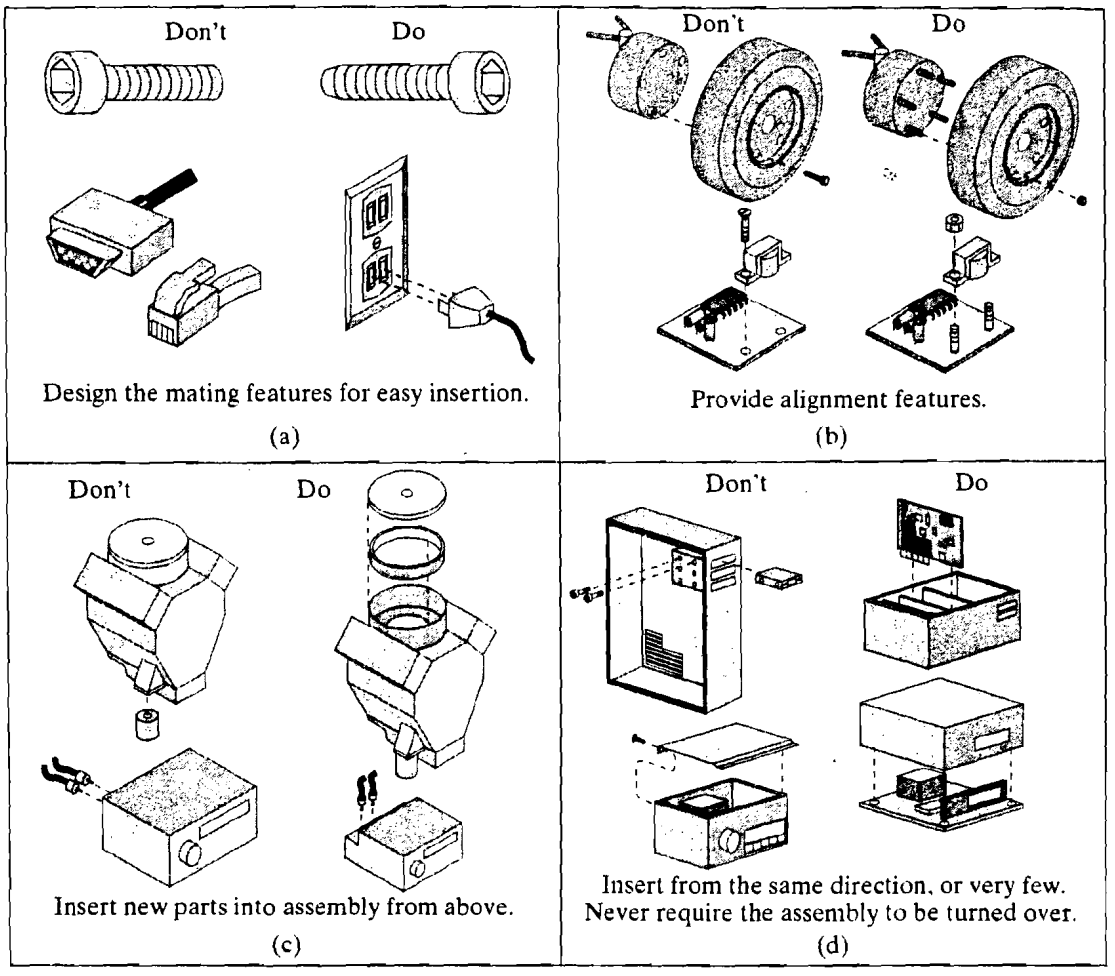


FIGURE 7.7c

Design for assembly examples continued. (*Product Design: Techniques in Reverse Engineering and New Product Development*, by Otto/Wood, © 2001, Prentice-Hall. Reprinted by permission of Pearson Education, Inc., Upper Saddle River, NJ.)

processes produce the configured part features? Further, will the processes be economical with respect to materials, processing, and tooling costs?

To screen alternative-part configurations for their manufacturability, we can develop a set of design for manufacture guidelines or checklist. Table 7.3 is a checklist for parts made by molding/casting, sheet metalworking, and machining. It was prepared by reviewing the capabilities of the manufacturing processes presented earlier in the text.

Examples of design for manufacture guidelines are shown for injection molding, sheet metal working, casting, and machining as shown in Figures 7.8– 7.13.

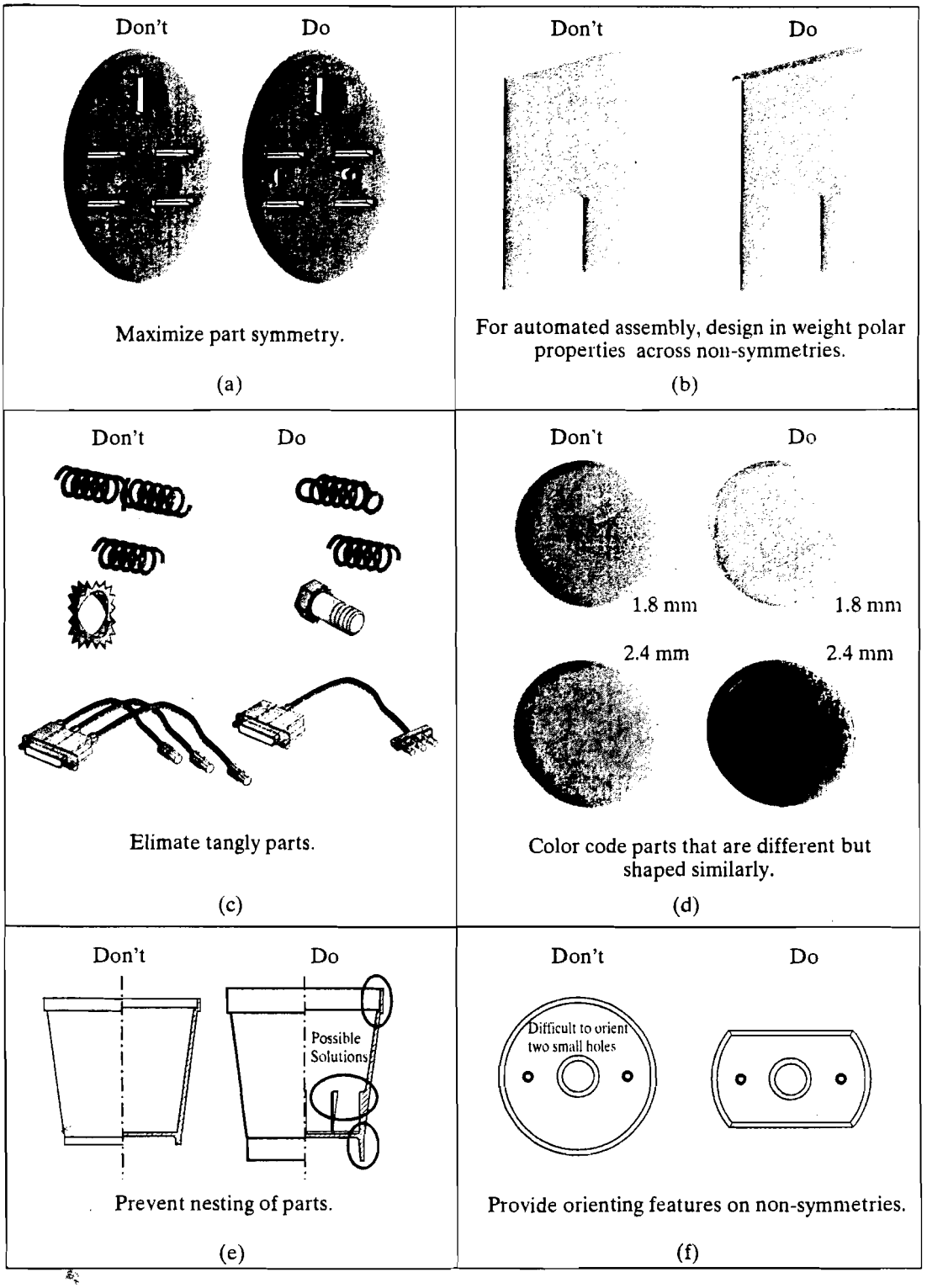


FIGURE 7.7b

Design for assembly examples continued. (*Product Design: Techniques in Reverse Engineering and New Product Development*, by Otto/Wood, © 2001, Prentice-Hall. Reprinted by permission of Pearson Education, Inc., Upper Saddle River, NJ.)

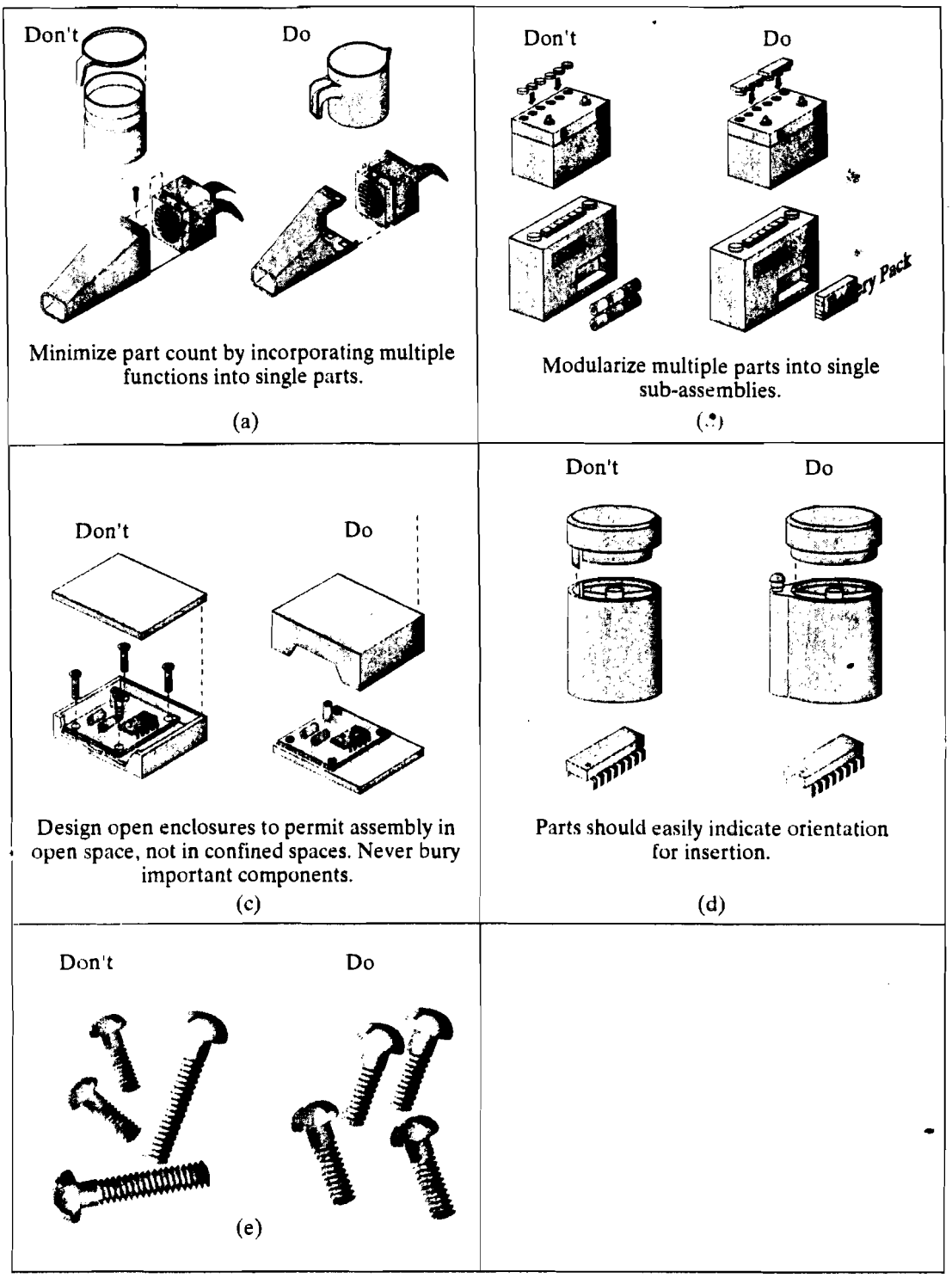


FIGURE 7.7a

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