101 **PROCESS**
102 .With condition responsive, program, or timing control
103 .With measuring, testing, indicating, inspecting, or illuminating
104 ..Nondestructive testing
105 ..Using optical viewing means (e.g., microscope)
106 .Using a compliant cushioning medium
107 .Using explosive energy
108 ..Specific rate of explosive burn or approach of preforms
109 ..Critical spacing between preforms
110.1 .Using high frequency vibratory energy (e.g., ultrasonic)
111 ..With treating other than heating
111.5 ..Soldering or liquid phase bonding
112.1 .Using dynamic frictional energy (i.e., friction welding)
113 ..Inertia type
114 ..With treating other than heating
114.5 ..By rotating one work surface relative to another about an axis
115 .Using only pressure (e.g., cold welding)
116 ..With pretreating of work
117 ..Cold rolling
118 .Using bond inhibiting separating material
119 .Repairing, restoring, or renewing product for reuse
120 .Mechanically joining metal/ nonmetal and bonding to the metal
121 .Bonding nonmetals with metallic filler
122.1 .Metal to nonmetal with separate metallic filler
123.1 ..Semiconductor-type nonmetallic material
124.1 ..With treating
124.5 ..Active or reactive filler component
124.6 ..Forming hermetic seal (e.g., welding lid to container)
124.7 ..Forming joint of rotary shaft
125 .With removing or reshaping of filler material or flash after bonding
126 .Encasing a rodlike core within a substantially coextensive tube by complete bonding therebetween
127 ..Thermally induced pressure weld
128 ..With mechanical interlock
129 ..By bending planar part to form tube around rodlike core
130 ...Progressively
131 ..By fitting rodlike core within tube
132 ...Joining through filler
133 ....Preplacing solid tubular filler
134 ....Applying molten filler from top reservoir
135 .With supplementary mechanical joining
136 ..Deforming of work part
137 ...Lock seaming
138 ..Attaching of bridge or tie member
139 ..Using separate fastener
140 ...Threaded fastener
141.1 .With shaping
142 ..Corner mitering
143 ..Of multilayer tube from single web
144 ..And edge joining of one piece blank or strip
145 ...To form helically seamed tube
146 ...Progressively bending and joining
147 ....Forming indefinite length member
148 .....Sheathing, cable or wire
149 ...Uniform thickness thin blank or strip
150 ....Elongated seam
151 .....Butt joining
152 ...Irregular thick blank or strip
153 ..Lap joining of parts of nonplanar surfaces
154 ...For telescoping sleeve
155 ..Subsequent to bonding
156 ...Drawing elongated member through die

157 ...Spreading or expanding work between bond joints (e.g., honeycomb or heat exchanger making, etc.)
158 ...Rolling
159 ...Removing of material
160 ....By cutting
161 .....Producing internal cavity, aperture, or opening
162 .....Abrading
163 ....By melting
164 ..Prior to bonding
165 ...Forming channel, groove, or aperture for reception of filler material
166 ....Elongated seam
167 ....Planar intersecting channel walls
168 ....Annular seam
169 .....Having U-shaped or curved cross section
170 ...By cutting
171 ....Producing opposed complementary matching bonding surface
172 ....Abrading
173.1 ...By deforming
173.2 ....Pressing first work part against second work part
173.3 ....Preforming work faying surface
173.4 ....Tube or frame member
173.5 ....Rod, bar, or wirelike object
173.6 ....Sheet material
173.7 .....Continuously feeding sheet material
174 ...Forming channel, groove, or aperture
265 ..With concurrent bonding
175 .Plural diverse bonding
176 .Combined
177 .Alternative bonding
178 .Plural joints
179.1 ..Of electrical device (e.g., semiconductor)
180.1 ...Simultaneous bonding of multiple joints (e.g., dip soldering of printed circuit boards)
180.21 ....Component terminal to substrate surface (i.e., nonpenetrating terminal)
180.22 .....Lead-less (or "bumped") device
180.5 ...Wire bonding
181 ..Honeycomb structure
182 ..Of mechanical article
183 ...Heat exchanger structure
184 ...Pressure vessels, tanks, and container-type structures
185 ..Noncoextensive lamina to common base in regular pattern
186 ..Preliminary sealing of joints
187 ..Separate successive bonds at different temperatures
188 ..Including nonmetallic base
189 ..Using bridge or spacer
190 ..Of concurrently bonded stacked laminae
191 .With disassembling of bonded joint (e.g., desoldering)
192 .Chain link
193 .Diffusion type
194 ..Using intermediate diffusion facilitating material
195 ..With incipient melting of bonding surface
196 .Autogenous fusion
197 ..With diffusion of atoms or nuclear particles
198 .Chemical reaction produces filler material in situ
199 .With subsequent treating other than heating of bonded parts and/or filler material
200 ..Cooling under particular conditions
201 ..Cleaning
202 ...Chemical
203 .With pretreating other than heating or cooling of work part of filler prior to bonding and any application of filler
204 ..Applying porous or capillary feed material
205 ..Cleaning
206 ...Chemical
207 ....Applying flux
208 ..Applying preliminary bond facilitating metal coating
209 ...Chemical deposition
210 ...Mechanically secured
211 ..Chemical
212 .With clamping or holding
213 ..And unclamping

214 .With protecting of work or filler or applying flux
215 ..By confining filler
216 ...Using backup means
217 ..Using getter
218 ..Using gas, vapor, vacuum, or reactive flame
219 ...Gas or vapor
220 ....Reducing gas
221 ...Vacuum
222 ..Using cooling means (e.g., heat sink or barrier)
223 ..Applying flux
224 ...Flux affixed to or incorporated with filler
225 .Plural filler applying
226 ..Diverse fillers
227 .Plural heat applying
228 ..And applying pressure
229 ..Separate and distinct heating of work and filler
230 ..Diverse heating
231 ..Including post-heating
232 ..Including preheating
233.1 .Specific rate of varying pressure or schedule of distinct pressures
233.2 .Specific rate of varying temperature or schedule of distinct temperatures
234.1 .Specific mode of heating or applying pressure
234.2 ..Vapor phase heating
234.3 ..Exothermic reaction heating
235.1 ..Mode of applying pressure
235.2 ...Roll bonding
235.3 ....At specific temperature level
244 .Feeding unfused filler into fusing contact with work part
245 .Preplacing solid filler
246 ..Particular size or shape
247 ...Indefinite length
248.1 ..Applied in powdered or particulate form
248.5 ...Nonhomogeneous metal filler particles
249 ..Joint interposed
250 ...Butt
251 ...Lap
252 ...Coextensive sheet
253 ...Attaching filler to work part
254 ....Adherent solid layer or coating (e.g., pretinned)
255 ....Mechanically secured
256 .Applying or distributing fused filler
257 ..By gravity
258 ..By capillary action
259 ..By immersing in stagnant pool
260 ..Using pumped stream or jet
261 ..Using spray
262 ..With agitating or vibrating (e.g., using ultrasonic energy)
262.1 .Critical work component, temperature, or pressure
262.2 ..Nonmetal work component without metallic filler
262.21 ...Solid state bonding
262.3 ..Nickel or cobalt member
262.31 ...Brazing or soldering
262.4 ..Ferrous metal member
262.41 ...Steel member
262.42 ....Brazing or soldering
262.43 .....And nonferrous metal member
262.44 ....And nonferrous metal member
262.45 ...Brazing or soldering
262.5 ..Aluminum or magnesium member
262.51 ...Brazing or soldering
262.6 ..Copper or noble metal member
262.61 ...Brazing or soldering
262.7 ..Refractory metal member
262.71 ...Titanium or zirconium member
262.72 ....Brazing or soldering
262.8 ...Brazing or soldering
262.9 ..Brazing or soldering
264 **PROCESS OF DISASSEMBLING BONDED SURFACES, PER SE (E.G., DESOLDERING)**
1.1 **MEANS TO APPLY VIBRATORY SOLID-STATE BONDING ENERGY (E.G., ULTRASONIC, ETC.) TO WORK**
2.1 **INCLUDING MEANS TO PROVIDE HEAT BY FRICTION BETWEEN RELATIVELY MOVING SURFACES (I.E., FRICTION WELDER)**
2.3 .Means to rotate one surface relative to the other about a fixed axis
2.5 **EXPLOSIVE WELDING MEANS**
3.1 **MEANS TO BOND BY APPLYING ONLY PRESSURE (E.G., FOR COLD WELDING, ETC.)**
4.1 **WITH MEANS TO JUXTAPOSE AND BOND PLURAL WORKPIECES**
4.5 .Wire lead bonder
5.1 .With means to treat workpieces (e.g., cutting, deforming, etc.)

5.5 .Including compliant cushioning medium
5.7 .Strip leading end to trailing end bonder
6.1 .Plural discrete workpieces
6.2 ..With electrical connection made at joint
7 **WITH MACHINE PART RESPONSIVE TO TEMPLATE OR PATTERN OR TO INDICIA CARRIED BY AUXILIARY RECORD (E.G., TAPE, CARD, ETC.)**
8 **WITH CONTROL MEANS RESPONSIVE TO SENSED CONDITION**
9 .Work-responsive (e.g., temperature, orientation of work, etc.)
10 ..Presence of work
11 ...To control feed of filler
12 .Responsive to position of work carrier
13 **WITH MEANS TO CUT OR SEPARATE WORK, FILLER, FLUX, OR PRODUCT**
14 .Plus means to apply cut filler or cut flux to work
15.1 **WITH MEANS TO DEFORM WORK, FILLER, OR FLUX PORTION BEFORE FUSION**
16 .By a funnel-shaped conduit (e.g., welding bell, etc.)
17 .By roller means
17.5 .Comprising means forming one-piece blank into a tubular shape
17.7 ..Helical tubular shape
18 **COMBINED**
19 **WITH MEANS TO REMOVE, COMPACT, OR SHAPE APPLIED FLUX OR FILLER**
20.1 .By fluid blast or suction
20.5 ..Hand tool
21 .With shield or guide for removed material
22 .Including wiper
23 ..Comprising endless wiper
24 **INCLUDING REPETITIVE IMPACT FUSION-BONDING MEANS**
25 **INCLUDING APPLICATOR MOVABLE DURING FUSION**
26 .Including "flying" applicator engaging moving work
27 .With lateral oscillation along path of seam
28 .Reciprocatory or oscillatory motion
29 .Orbital or plane curvilinear motion
30 ..Of roller applicator
31 ...With associated bath of liquid flux or filler
32 .Means to move applicator
33 **INCLUDING MEANS TO APPLY FLUX OR FILLER TO WORK OR APPLICATOR**
34 .With means to skim dross
35 .By brush, wick, or pad
36 .By partial or total immersion of work or applicator into liquid
37 ..Flowing flux or filler (e.g., wave former, etc.)
38 ..With means to roll or orbit work portion
39 ..With means to mask or stop work
40 ..Comprising work immersion
41 .Solid flux or solid filler
42 .Gaseous flux
43 .Moving work
44.3 **INCLUDING MEANS TO FORCE OR CLAMP WORK PORTIONS TOGETHER DURING BONDING**
44.5 .Comprising tube aligning means
44.7 .Work portion comprises electrical component
45 **INCLUDING MEANS TO MOVE OR GUIDE APPLICATOR**
46 **WITH MEANS TO COOL WORK OR PRODUCT**
47.1 **WITH MEANS TO HANDLE WORK OR PRODUCT**
48 .Including means to rotate cylindrical work
49.1 .Including means to orient work or position work portion relative to another work portion
49.2 ..Means to rotate work and to position work about a different axis
49.3 ..Pipe joint aligner
49.4 ..Sheet aligner
49.5 .Work portion comprises electrical component
49.6 .Work portion comprises can body
50 **SEAM BACKUP MEANS**
51 **METALLIC HEAT APPLICATOR (E.G., SOLDERING IRON, ETC.)**
52 .With means to handle flux or filler
53 ..With means to heat applicator
54 .Tip or head alloy or polymetallic structure

55 .Adjustable or detachable head or tip
56.1 **SPECIALIZED POT**
56.2 .Having means to treat flux or filler
56.3 **SOLDER FORM**
56.5 **WITH SIGNAL, INDICATOR, GAUGE, OR STOP**
58 **APPARATUS FOR BONDING BATTERIES (I.E., PLURAL CELLS)**
59 **HEAT SHIELD**
60 **TUBE END CLOSING**
57 **MISCELLANEOUS**

CROSS-REFERENCE ART COLLECTIONS

901 **PROCESS OF BONDING BATTERIES**
902 **USING FLAME**
903 **METAL TO NONMETAL**
904 **WIRE BONDING**

FOREIGN ART COLLECTIONS

FOR 000 **CLASS-RELATED FOREIGN DOCUMENTS**