CLAIMS

1. A redrawing tooling assembly for a can bodymaker for redrawing a metal cup, the redrawing tooling assembly comprising:

a center punch tool having a forwardmost annular tip adapted for concentric contact with a base of a metal cup;

a punch sleeve that is concentric with the center punch tool, the punch sleeve has a contact surface that is axially located rearward of the center punch tool forwardmost tip such that the metal cup has a chine wall therebetween during the redrawing process;

a punch ring concentric with the center punch tool, the punch ring is outboard of at least a portion of the center punch tool and inboard of at least a portion of the punch sleeve, the punch ring includes an undercut shoulder on an outboard side, the punch ring has a contact surface that is radially located between the center punch tool forwardmost tip and the punch sleeve contact surface; the punch ring contact surface is adapted to contact the chine wall of the metal cup during the redraw process; and

a compliant support that is configured to axially position the punch ring contact surface to contact the chine wall of the metal cup during the redrawing process to inhibit metal wrinkling, the compliant support is adapted to retract in response to the punch ring engaging doming tooling ~~in~~ of the bodymaker, thereby enabling the punch ring contact surface to retract relative to the center punch tool.

2. The redrawing tooling assembly of claim 1 wherein the punch ring is axially moveable relative to the center punch tool.

3. The redrawing tooling assembly of claim 1 wherein the forwardmost tip of the center punch tool is forward of a forwardmost portion of the punch ring contact surface such that the punch ring engages the metal cup after the center punch tool, and the punch sleeve engages the metal cup after the punch ring.

4. The redrawing tooling assembly of claim 3 wherein the punch ring contact surface is adapted to contact the chine wall at an angled portion of the chine.

5. The redrawing tooling assembly of claim 1 wherein a forwardmost portion of the punch ring contact surface is forward of the forwardmost tip of the center punch tool is such that the punch ring

engages the metal cup before the center punch tool, and the punch sleeve engages the metal cup after the punch ring.

6. The redrawing tooling assembly of claim 1 wherein the compliant support extends circumferentially around a portion of the center punch tool and contacts a base of the punch ring to urge the punch ring forward.

7. The redrawing tooling assembly of claim 4 wherein the punch ring includes (i) an angled contact surface configured to contact the chine wall of a can and (ii) an inboard shoulder that is urged against an undercut shoulder of the punch tool by the compliant support.

8. The redrawing tooling assembly of claim 1 wherein the punch ring undercut shoulder is configured to contact a land surface of the punch sleeve in a fully retracted position of the punch ring.

9. The redrawing tooling assembly of claim 1 wherein the compliant support is retained by a groove in the center punch tool.

10. A method of forming a metal can body comprising the steps of:

(i) redrawing a metal cup including:
contacting a bottom of the cup with a concentric center punch tool; and
contacting a chine wall of the metal cup with a punch ring to inhibit wrinkling of the chine wall, the punch ring having compliant support;

(ii) ironing the sidewall by pushing the center punch tool through ironing rings; and

(iii) forming a dome in the bottom of the cup including contacting the bottom of the cup with doming tooling, the doming tooling compressing the compliant support retracting the punch ring until an outboard undercut surface of the punch ring contacts a land surface of a punch sleeve.

11. The method of forming a metal can body of claim 10 wherein the step of contacting a bottom of the cup with the concentric center punch tool includes reducing the diameter of the metal cup and forming an angled chine wall between the bottom of the metal cup and a sidewall of the metal cup.

12. The method of forming a metal can body of claim 11 wherein the step of contacting the wall of the metal cup with the punch ring includes contacting the angled chine wall of the metal cup with ~~a~~ the punch ring to inhibit wrinkling of the angled chine wall.

13. The method of forming a metal can body of claim 12 or the drawing tooling assembly wherein the redrawing step further includes contacting the angled chine wall with an angled contact surface of the punch ring, the punch ring being concentric with the center punch tool.

14. The method of forming a metal can body of claim 12 wherein the punch ring contacts the metal cup after the center punch tool, and the punch sleeve contacts the metal cup after the punch ring.

15. The method of forming a metal can body of claim 10 wherein the punch ring contacts the metal cup before the center punch tool.

16. The method of forming a metal can body of claim 10 wherein the ironing step further includes contacting the sidewall with the punch sleeve.

17. The method of forming a metal can body of claim 10 or the redrawing tooling assembly of claim 1 wherein the compliant support bears on a portion of the center punch tool.

18. The method of forming a metal can body of claim 10 or the redrawing tooling assembly of claim 1 wherein the compliant support is a spring plate.

19. The method of forming a metal can body of claim 10 or the redrawing tooling assembly of claim 1 wherein the compliant support includes an elastomer.

20. The method of forming a metal can body of claim 10 wherein during the step of forming the dome the doming tooling retracts the punch ring.

21. The method of forming a metal can body of claim 10 wherein the compliant support urges an inboard shoulder of the punch ring into contact with an undercut shoulder of the punch tool until, during the redrawing step (i), the punch ring retracts relative to the punch tool.