This invention is the first time two sleeves have been used to improve the manufacturability of the collapsible sections of this apparatus; this greatly improves the accuracy during manufacture and reliability during use.
COLLAPSIBLE CORE USING TWO SLEEVES AND IS SPRING LOADED

[0001] This invention relates in general as part of an injection mold which produces parts requiring details such as internal threads, undercuts, protrusions, or cut-outs.

[0002] This invention releases the internal (FIG. 4 thru FIG. 6) detail by removing the central pin and collapsing inwardly first the inner sleeve and then the outer sleeve allowing the core sleeves to clear the protruding material (the safety bushing will force this collapse), and the part would then be ejected by other means not associated with this apparatus.

[0003] This invention does not require any rotational motion.

[0004] The collapsible core is manufactured using two sleeves (FIG. 7 thru FIG. 14), one fit inside the other (FIG. 1 thru FIG. 3), which allows advanced manufacturing techniques resulting in improved quality and reliability.

[0005] (1) FIG. 1 is a top view of the assembly in molding position.

[0006] (2) FIG. 2 is a detail view “C” taken from FIG. 1 showing the inside and outside sleeves.

[0007] (3) FIG. 3 is a section view “A-A” taken from FIG. 1 showing the assembly in molding position cut through both the inside and outside sleeves.

[0008] (4) FIG. 4 is a top view of the assembly in collapsed position.

[0009] (5) FIG. 5 is a detail view “D” taken from FIG. 4 showing the inside and outside sleeves.

[0010] (6) FIG. 6 is a section view “B-B” taken from FIG. 4 showing the assembly in collapsed position cut through both the inside and outside sleeves with the pin removed.

[0011] (7) FIG. 7 shows the top view of the inner sleeve in molding position.

[0012] (8) FIG. 8 shows the right side view of the inner sleeve in molding position.

[0013] (9) FIG. 9 shows the front view of the inner sleeve in molding position.

[0014] (10) FIG. 10 shows the isometric view of the outer sleeve in molding position.

[0015] (11) FIG. 11 shows the top view of the outer sleeve in molding position.

[0016] (12) FIG. 12 shows the right side view of the outer sleeve in molding position.

[0017] (13) FIG. 13 shows the front view of the outer sleeve in molding position.

[0018] (14) FIG. 14 shows the isometric view of the outer sleeve in molding position.

[0019] (15) FIG. 15 shows an isometric image of the assembly in molding position.

[0020] (16) FIG. 16 shows an isometric image of the assembly in collapsed position.

1. (canceled)
2. (canceled)
3. A collapsible core device for molding articles around said core device in a mold cavity, comprising:
   a. outer sleeve member having a plurality of outside wedge sections extending from a first base in an axial direction, said plurality of outside wedge sections defining a discontinuous first perimeter surrounding a channel;
   b. a inner sleeve member having a plurality of inside wedge sections extending from a second base in an axial direction, said plurality of inside wedge sections defining a discontinuous second perimeter surrounding said central channel;
   c. each of said inside wedge sections arranged between adjacent ones of said outside wedge sections; and
   d. a center pin, slidably axially within said central channel to forcibly displace said first and inside wedge sections outwardly to form a substantially continuous perimeter defined by said first and inside wedge sections.
4. The core device according to claim 3, wherein said outside wedge sections are tapered in a radially inward direction and said inside wedge sections are tapered in a radially outward direction.
5. The core device according to claim 3, wherein said overall perimeter comprises a cylindrical surface with projecting threads.
6. The core device according to claim 5, wherein at least said inside wedge sections comprise outside protuberances arranged around said second discontinuous perimeter, and further comprising a bushing surrounding said second discontinuous perimeter and including a surface for sliding over said protuberances to drive said inside wedge sections inwardly.
7. The core device according to claim 3, wherein at least said inside wedge sections comprise outside protuberances arranged around said second discontinuous perimeter, and further comprising a bushing surrounding said second discontinuous perimeter and including a surface for sliding over said protuberances to drive said inside wedge sections inwardly.
8. The core device according to claim 3, wherein said outside wedge sections are tapered in a radially inward direction and said inside wedge sections are tapered in a radially outward direction, wherein at least said inside wedge sections comprise outside protuberances arranged around said second discontinuous perimeter, and further comprising a bushing surrounding said second discontinuous perimeter and including a surface for sliding over said protuberances to drive said inside wedge sections inwardly.
9. The core device according to claim 3, wherein said first base comprises a cap portion and said second base comprises a ring portion that is fitted into said cap portion.
10. The core device according to claim 9, wherein said outside wedge sections are tapered in a radially inward direction and said inside wedge sections are tapered in a radially outward direction and said overall perimeter is a substantially continuous surface.

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