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Deevers et al.

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(54) **CHAIR**

(71) Applicant: **Steelcase Inc.**, Grand Rapids, MI (US)

(72) Inventors: **Nickolaus William Charles Deevers**,
Holland, MI (US); **Bruce Smith**, Grand
Rapids, MI (US); **Mark Spoelhof**,
Grand Rapids, MI (US); **Kurt R.**
Heidmann, Grand Rapids, MI (US);
Pascal Hien, Radebeul (DE)

(73) Assignee: **Steelcase Inc.**, Grand Rapids, MI (US)

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(52) **U.S. Cl.**

USPC **D6/366**

(58) **Field of Classification Search**

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D6/379, 380, 716, 716.1, 716.2, 716.4

CPC A47C 7/002; A47C 7/004; A47C 7/02;
A47C 7/18; A47C 7/24; A47C 7/282;
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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,678,685 A	5/1954	Volsk
2,726,713 A	12/1955	Turner
3,559,978 A	2/1971	Molt
3,652,809 A	3/1972	Dickopp et al.
3,653,233 A	4/1972	Titone
3,709,559 A	1/1973	Rowland
3,720,568 A	3/1973	Rowland
3,724,402 A	4/1973	Thyberg et al.
3,767,261 A	10/1973	Rowland
3,774,967 A	11/1973	Rowland
3,843,477 A	10/1974	Rowland

3,948,558 A	4/1976	Obermeier et al.
4,502,728 A	3/1985	Sheldon et al.
D279,244 S	6/1985	Bergquist
4,574,100 A	3/1986	Mercer
4,634,178 A	1/1987	Carney
4,668,557 A	5/1987	Lakes

(Continued)

FOREIGN PATENT DOCUMENTS

CN	2256246 Y	6/1997
CN	10149202	10/2007

(Continued)

OTHER PUBLICATIONS

Dolla et al., "Structural and Drug Diffusion Models of Conventional and Auxetic Drug-Eluting Stents" Research Paper dated Aug. 3, 2006, pp. 1-32.

(Continued)

Primary Examiner — Mimosa De

(74) *Attorney, Agent, or Firm* — Brinks, Gilson & Lione, PC

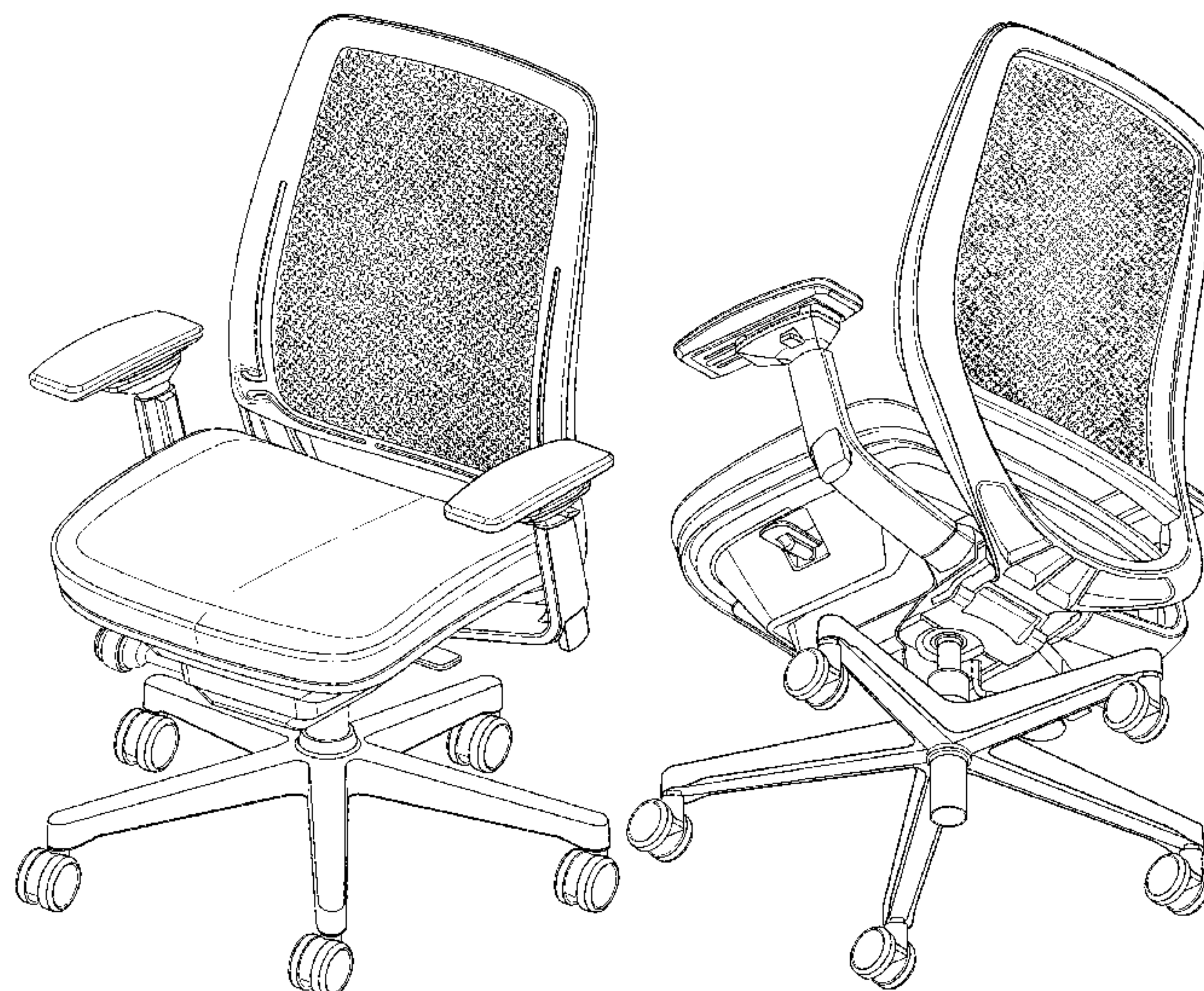
(57) **CLAIM**

We claim the ornamental design for a chair, as shown and described.

DESCRIPTION

FIG. 1 is a top upper perspective view of a chair; FIG. 2 is a top plan view thereof; FIG. 3 is a bottom plan view thereof; FIG. 4 is a rear elevation view thereof; FIG. 5 is a front elevation view thereof; FIG. 6 is a right side elevation view thereof; FIG. 7 is a left side elevation view thereof; and, FIG. 8 is a rear lower perspective view thereof. The ornamental design which is claimed is shown in solid lines in the drawings.

1 Claim, 8 Drawing Sheets



(56)

References Cited

U.S. PATENT DOCUMENTS

4,680,215 A 7/1987 Mercer
 4,718,724 A 1/1988 Quinton et al.
 5,154,485 A 10/1992 Fleishman
 5,269,631 A 12/1993 Mercer et al.
 5,711,575 A 1/1998 Hand et al.
 5,747,140 A 5/1998 Heerklotz
 5,791,933 A 8/1998 Saka et al.
 5,863,095 A 1/1999 Rivard et al.
 5,871,258 A 2/1999 Battey et al.
 5,934,758 A 8/1999 Ritch et al.
 5,951,109 A 9/1999 Roslund, Jr. et al.
 6,035,901 A 3/2000 Stumpf et al.
 6,062,649 A 5/2000 Nagel et al.
 6,079,785 A 6/2000 Peterson et al.
 D437,501 S 2/2001 Rehmert et al.
 6,189,972 B1 2/2001 Chu et al.
 6,286,900 B1 9/2001 Roark
 6,299,248 B1 10/2001 Gennaro et al.
 D451,293 S 12/2001 Su
 6,354,662 B1 3/2002 Su
 6,412,593 B1 7/2002 Jones
 6,419,318 B1 7/2002 Albright
 6,471,294 B1 10/2002 Dammermann et al.
 D471,042 S 3/2003 Schmitz et al.
 6,550,866 B1 4/2003 Su
 6,568,760 B2 5/2003 Davis et al.
 6,572,190 B2 6/2003 Koepke et al.
 6,575,530 B1 6/2003 Fischer et al.
 6,626,497 B2 9/2003 Nagamitsu et al.
 6,644,752 B2 11/2003 Takata
 6,709,060 B1 3/2004 Su
 6,726,285 B2 4/2004 Caruso et al.
 D489,191 S 5/2004 Ma
 6,729,691 B2 5/2004 Koepke et al.
 6,733,080 B2 5/2004 Stumph et al.
 D494,792 S 8/2004 Schmitz et al.
 6,805,405 B2 10/2004 Koo
 6,874,852 B2 4/2005 Footitt
 6,890,030 B2 5/2005 Wilkerson et al.
 6,957,861 B1 10/2005 Chou et al.
 D513,134 S 12/2005 Asano et al.
 D513,457 S 1/2006 Asano et al.
 6,981,743 B2 1/2006 Edwards et al.
 D521,755 S 5/2006 Kinoshita et al.
 7,059,682 B2 6/2006 Caruso et al.
 7,213,886 B2 5/2007 Schmitz et al.
 7,234,773 B2 6/2007 Raftery et al.
 7,247,265 B2 7/2007 Alderson et al.
 7,249,802 B2 7/2007 Schmitz et al.
 7,252,870 B2 8/2007 Anderson et al.
 7,275,793 B2 10/2007 Fujita et al.
 7,303,232 B1 12/2007 Chen
 D558,995 S 1/2008 Igarashi
 7,344,194 B2 3/2008 Maier et al.
 7,347,495 B2 3/2008 Beyer et al.
 D571,568 S 6/2008 Overthun et al.
 7,406,733 B2 8/2008 Coffield et al.
 7,419,215 B2 9/2008 Wilkerson et al.
 7,441,758 B2 10/2008 Coffield et al.
 7,455,365 B2 11/2008 Caruso et al.
 7,472,962 B2 1/2009 Caruso et al.
 7,484,802 B2 2/2009 Beyer et al.
 D591,969 S 5/2009 Overthun et al.
 7,604,298 B2 10/2009 Peterson et al.
 7,647,714 B2 1/2010 Coffield et al.
 D613,085 S * 4/2010 Fujita D6/366
 D613,086 S * 4/2010 Fujita D6/366
 7,712,834 B2 5/2010 Knoblock et al.
 7,731,295 B2 6/2010 Lin
 7,740,321 B2 6/2010 Brill et al.
 7,794,017 B2 9/2010 Kan et al.
 7,794,022 B2 9/2010 Caruso et al.
 7,841,665 B2 11/2010 Geister et al.
 7,857,388 B2 12/2010 Bedford et al.
 7,887,131 B2 2/2011 Chadwick et al.

7,931,257 B2 4/2011 VanDeRiet et al.
 D648,554 S 11/2011 Smith
 D655,522 S 3/2012 Czumaj-Bront et al.
 8,157,329 B2 4/2012 Masoud et al.
 D660,612 S 5/2012 Smith
 8,172,332 B2 5/2012 Masunaga et al.
 8,186,761 B2 5/2012 Brill et al.
 8,191,970 B2 6/2012 Igarashi et al.
 D665,589 S * 8/2012 Wagner D6/366
 D666,841 S 9/2012 Czumaj-Bront et al.
 8,297,708 B2 10/2012 Mizobata et al.
 D671,330 S 11/2012 Izawa
 D671,332 S * 11/2012 Izawa D6/366
 D673,394 S 1/2013 Hurford
 8,436,508 B2 5/2013 Kornbluh et al.
 8,449,037 B2 5/2013 Behar et al.
 D686,833 S 7/2013 Chan
 D687,641 S * 8/2013 Barrell D6/366
 8,534,648 B2 9/2013 Coffield et al.
 D695,537 S 12/2013 Geelen
 8,652,602 B1 2/2014 Dolla
 D701,068 S 3/2014 Usumoto et al.
 D710,640 S 8/2014 Usumoto et al.
 8,926,016 B2 1/2015 Behar et al.
 D726,431 S 4/2015 Ye
 D733,446 S * 7/2015 Izawa D6/366
 D741,099 S 10/2015 Igarashi et al.
 9,155,393 B2 10/2015 Hurford et al.
 9,192,237 B2 11/2015 Bachar
 9,211,014 B2 12/2015 Schmitz et al.
 9,301,615 B2 4/2016 Behar et al.
 9,332,851 B2 5/2016 Machael et al.
 9,486,079 B2 11/2016 Romero
 D773,199 S * 12/2016 Neil D6/366
 D782,240 S 3/2017 Wada
 9,603,451 B2 3/2017 Masunaga et al.
 D793,141 S * 8/2017 Igarashi D6/716.4
 D834,844 S * 12/2018 Chan D6/366
 2002/0021040 A1 2/2002 Caruso et al.
 2004/0140701 A1 7/2004 Schmitz et al.
 2005/0025948 A1 2/2005 Johnson et al.
 2005/0146193 A1 7/2005 Shieh
 2006/0022506 A1 2/2006 Chan
 2006/0267258 A1 11/2006 Coffield et al.
 2006/0286359 A1 12/2006 Coffield et al.
 2007/0031667 A1 2/2007 Hook et al.
 2008/0011021 A1 1/2008 Starbuck et al.
 2008/0248710 A1 10/2008 Wittner
 2009/0020931 A1 1/2009 Coffield et al.
 2009/0239049 A1 9/2009 Hook et al.
 2011/0046715 A1 2/2011 Ugbolue et al.
 2011/0282452 A1 11/2011 Koerner et al.
 2012/0007400 A1 1/2012 Behar et al.
 2012/0129416 A1 5/2012 Anand et al.
 2015/0190269 A1 7/2015 Lenoble et al.
 2015/0296989 A1 10/2015 Machael et al.
 2015/0320220 A1 11/2015 Eberlein et al.
 2016/0135603 A1 5/2016 Chan et al.

FOREIGN PATENT DOCUMENTS

CN 202932442 U 5/2013
 CN 203524214 U 4/2014
 DE 102016010929 4/2017
 GB 1224810 3/1971
 JP 3974636 6/2007
 JP 2008/000364 1/2008
 JP 2008/237332 10/2008
 JP 4462227 2/2010
 JP 2014/054578 3/2014
 KR 10-1575774 12/2015
 KR 10-1679795 11/2016
 WO WO 1988/00523 1/1988
 WO WO 1991/01210 2/1991
 WO WO 2000/53830 9/2000
 WO WO 2004/032686 4/2004
 WO WO 2004/088015 10/2004
 WO WO 2004/104315 12/2004
 WO WO 2007/133458 11/2007

(56)

References Cited

FOREIGN PATENT DOCUMENTS

WO	WO 2009/002479	12/2008
WO	WO 2010/049511	5/2010
WO	WO 2012/171911	12/2012
WO	WO 2015/108143	7/2015

OTHER PUBLICATIONS

Dolla et al., Structural and Drug Diffusion Models of Conventional and Auxetic Drug-Eluting Stents, *Journal of Medical Devices*, vol. 1, Mar. 2007, downloaded from the Internet on Jan. 8, 2018, pp. 47-55.

Proceedings of NanoBio 2006, *Frontiers in Biomedical Devices Conference*, NanoBios2006-18035, Jun. 8-9, 2006, Irvine, California, U.S.A., pp. 1-2.

Alderson, *A Triumph of Lateral Thought*, Chemistry & Industry, dated May 17, 1999, pp. 384-391.

Roguin et al., BeStent—The Serpentine Balloon Expandable Stent: Review of Mechanical Properties and Clinical Experience, *Artif Organs*, vol. 22 (3), 1998, presented in part on Jun. 29-Jul. 1, 1997, in Providence, Rhode Island, U.S.A., pp. 243-249.

Dolla, Drug Diffusion and Structural Design Criteria for Conventional and Auxetic Drug-Eluting Stents, *Dissertation in Engineering and Chemistry*, 2006, pp. 1-149.

Hwang, et al. 2003, downloaded from the Internet on Oct. 26, 2014, "Impact of Transport and Drug Properties on the Local Pharmacology of Drug-Eluting Stents," *International Journal of Cardiovascular Interventions*, 5, pp. 7-12.

Walline, K.S., 2004, "Drug Delivery Coatings for Cardiovascular Stents: Silicone Elastomer and Thrombin Responsive Hydrogel Coatings," M.S. Thesis, University of Washington.

Windecker et al., 2003, "Sirolimus Eluting Stent: A New Era in Interventional Cardiology," *Current Pharmaceutical Design*, 9, pp. 1077-1094.

Lu et al., 2004, "Biaxial Incremental Homeostatic Elastic Moduli of Coronary Artery: Two-Layer Model," *American Journal of Physiology—Heart*, vol. 287, pp. H1663-H1669.

Boulanger et al., 1998, "Poisson's ratio of Orthorhombic Materials," *Journal of Elasticity*, vol. 50, pp. 87-89.

Clark et al., 1994, "Negative Poisson's Ratios in Angle-Ply Laminates: Theory and Experiment," *Composites*, vol. 25, No. 9, pp. 863-868.

Evans et al., 2004, "The Design, Matching and Manufacture of Auxetic Carbon Fiber Laminates," *Journal of Composite Materials*, vol. 38, No. 2, pp. 95-106.

Hine et al., 1997, Negative Poisson's Ratios in Angle-Ply Laminates, *Journal of Materials Science Letters*, vol. 16, No. 7, pp. 541-544.

Lakes, R.S., 1987(a), Foam Structures with a Negative Poisson's Ratio, *Science*, vol. 235, pp. 1038-1040, dated Feb. 27, 1987.

Lakes, R.S. et al., 1993, Indentability of Conventional and Negative Poisson's Ratio Foams, *Journal of Composite Materials*, vol. 27, pp. 1193-1202.

Warren, T.L., 1990, "Negative Poisson's Ratio in a Transversely Isotropic Foam Structure," *Journal of Applied Physics*, vol. 67, No. 12, pp. 7591-7594, dated Jun. 15, 1990.

Baughman et al., "Negative Poisson's Ratios as a Common Feature of Cubic Metals," *Letters to Nature*, vol. 392, MacMillan Publishers Ltd., 1998; dated Mar. 26, 1998, pp. 362-365.

Choi et al., "Fracture Toughness of Renetrant Foam Materials with a Negative Poisson's Ratio: Experiment and Analysis," *Int. J. Fracture*, vol. 80, 1996, pp. 73-83.

Amir Yeganeh-Haeri et al., "Elasticity of #-Christobalite: A Silicon Dioxide with a Negative Poisson's Ratio," *Science*, vol. 257, No. 5070, pp. 650-652, dated Jul. 31, 1992.

Smardzewski et al., "Auxetic Spring Elements for Elastically Supporting a Sitting or Lying," Article, *WULS-SGGW, Forest and Wood Technology* 73, 2011, 9 pages.

Smardzewski, "Auxetic Springs for Seating," *Journal*, May 6, 2013, 8 pages, Poznan, Poland.

Smardzewski et al., "Design of Small Auxetic Springs for Furniture," 2 pgs.

* cited by examiner

Fig. 1

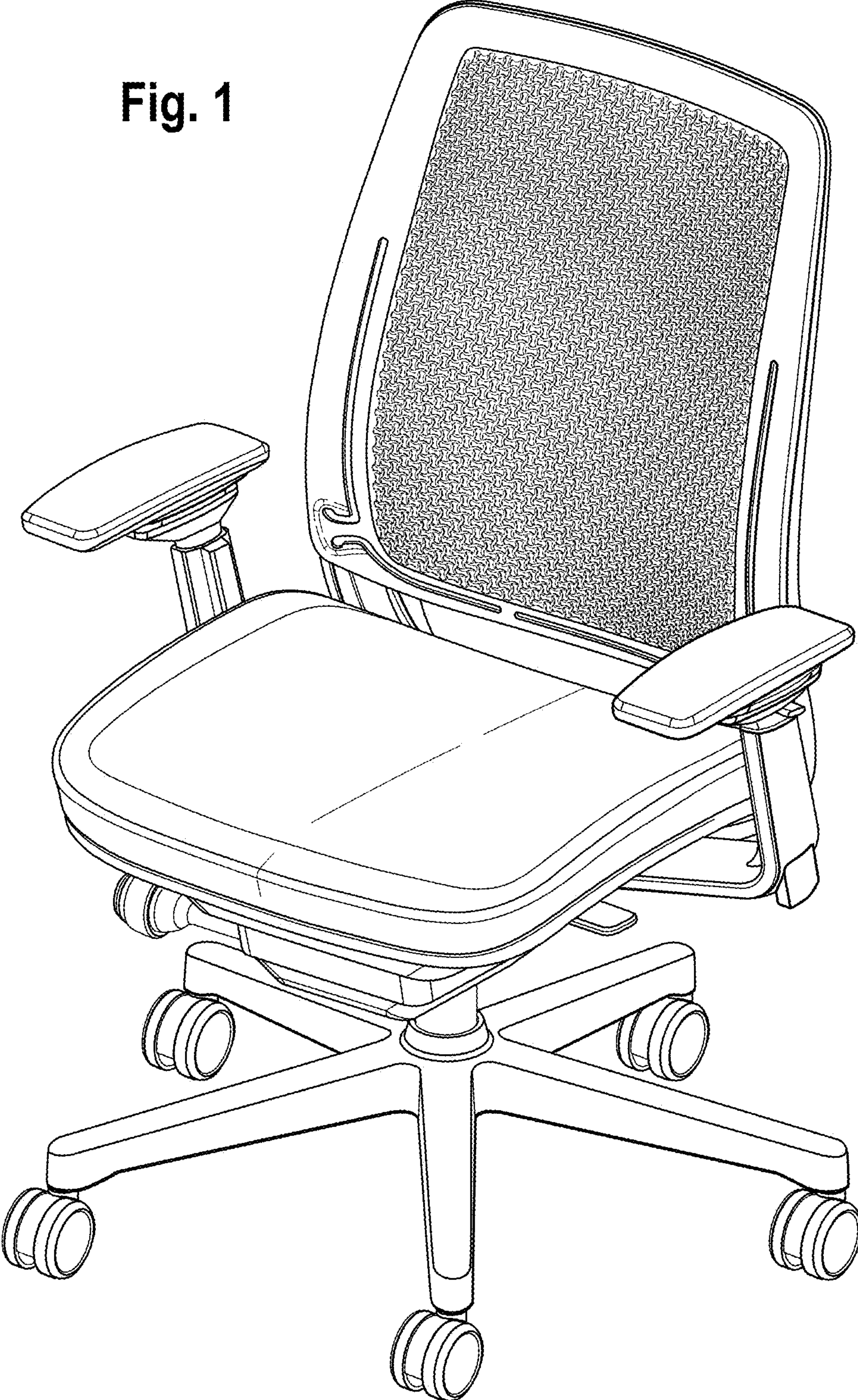


Fig. 2

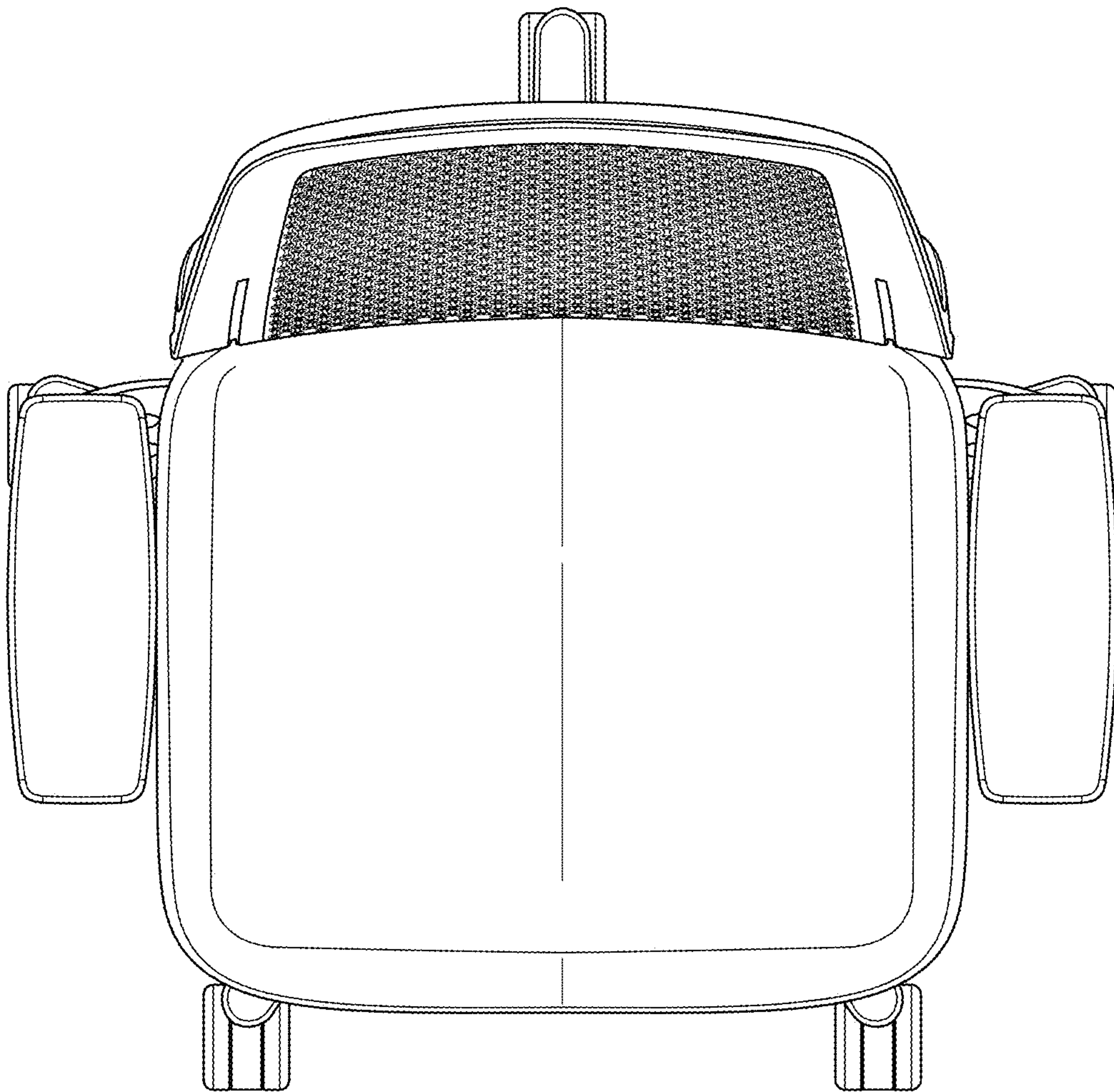


Fig. 3

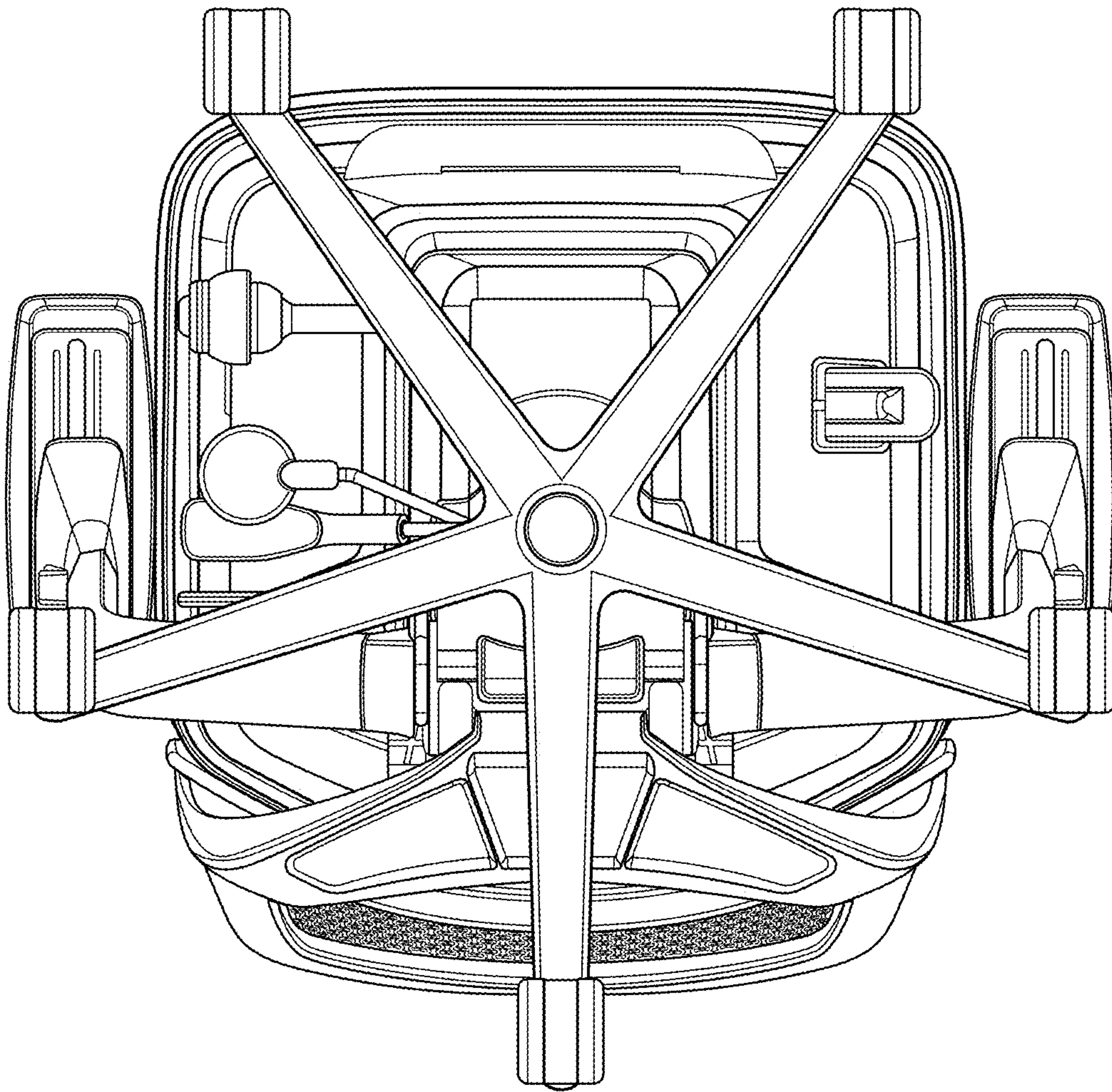


Fig. 4

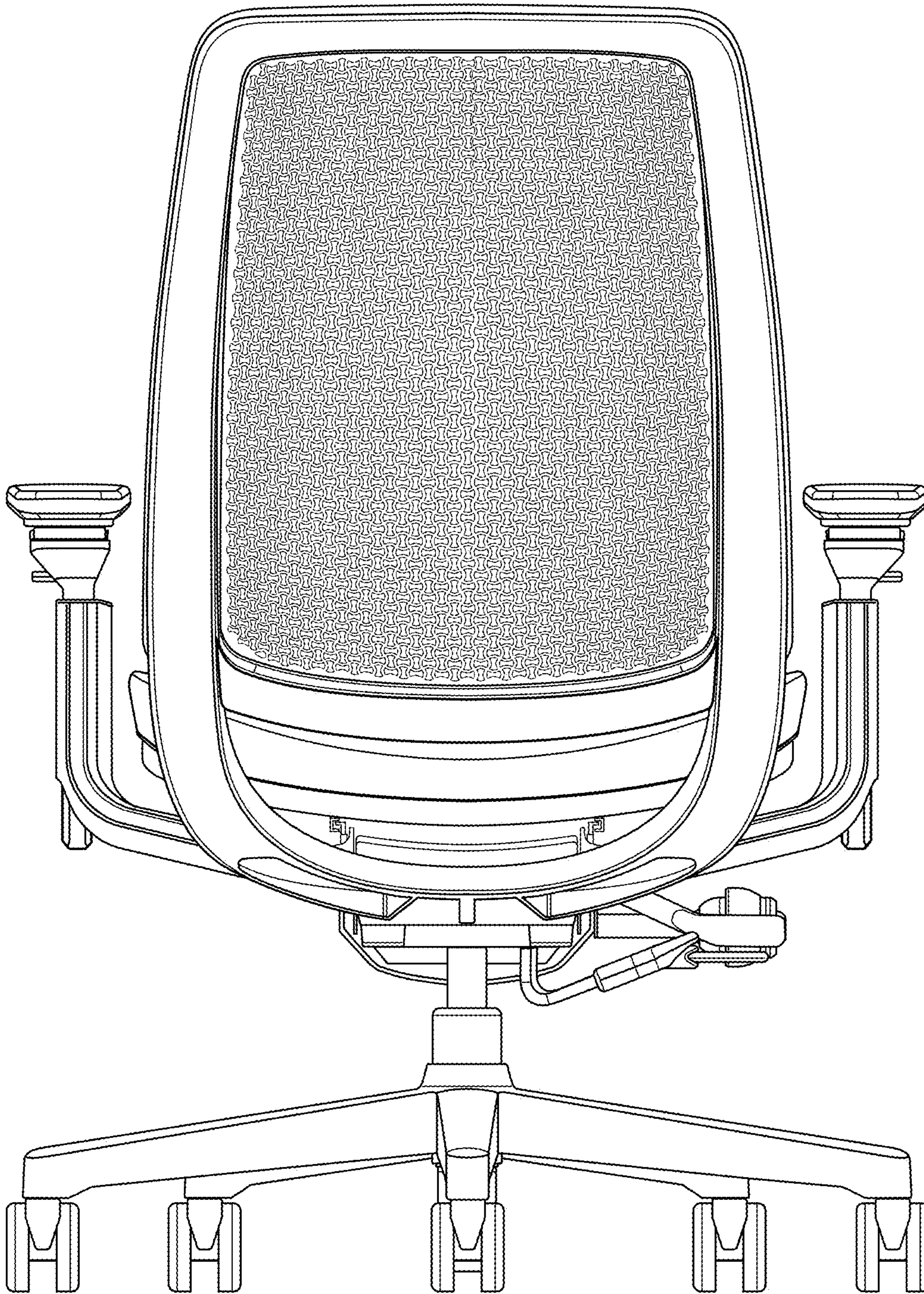


Fig. 5

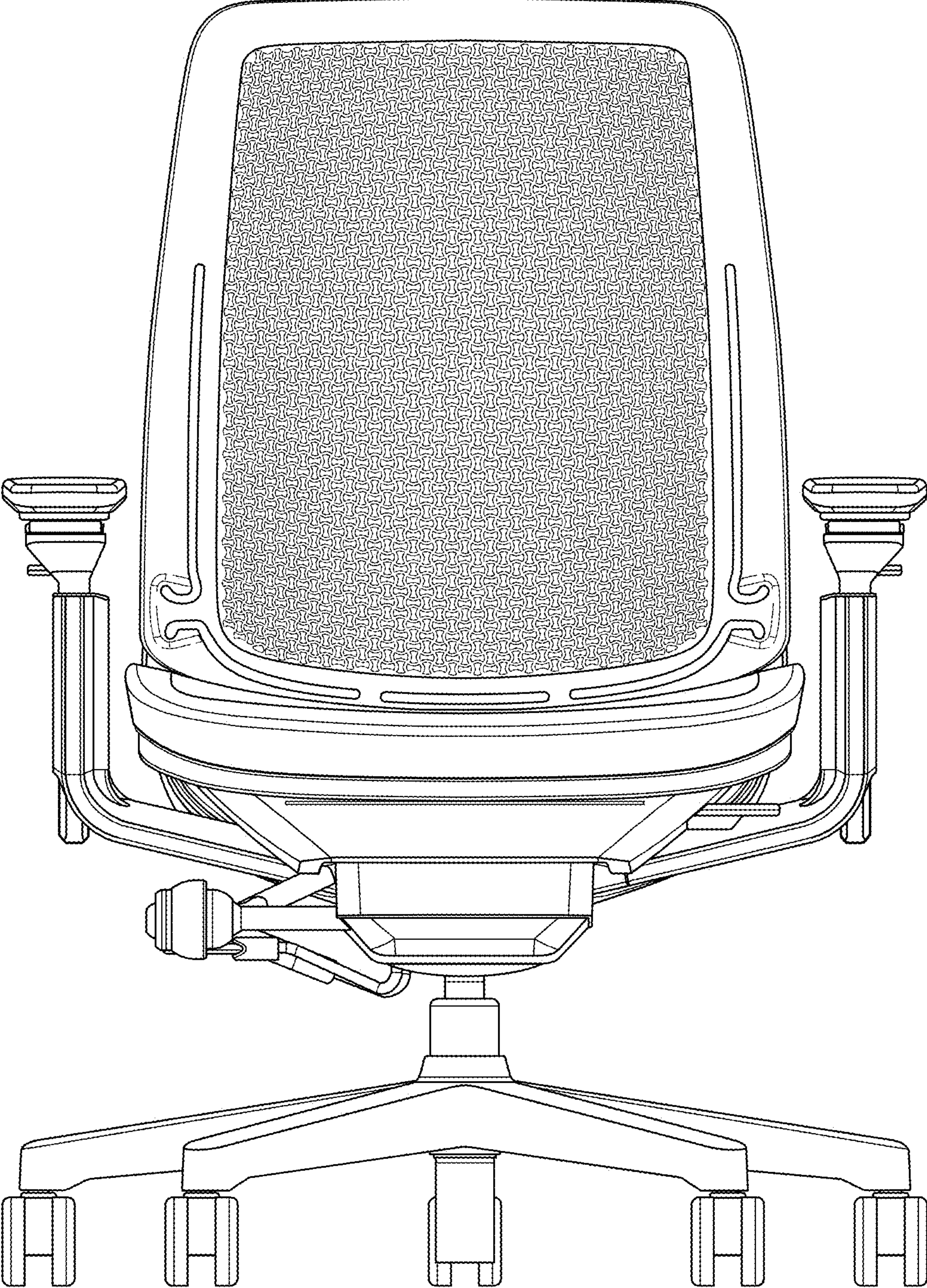


Fig. 6

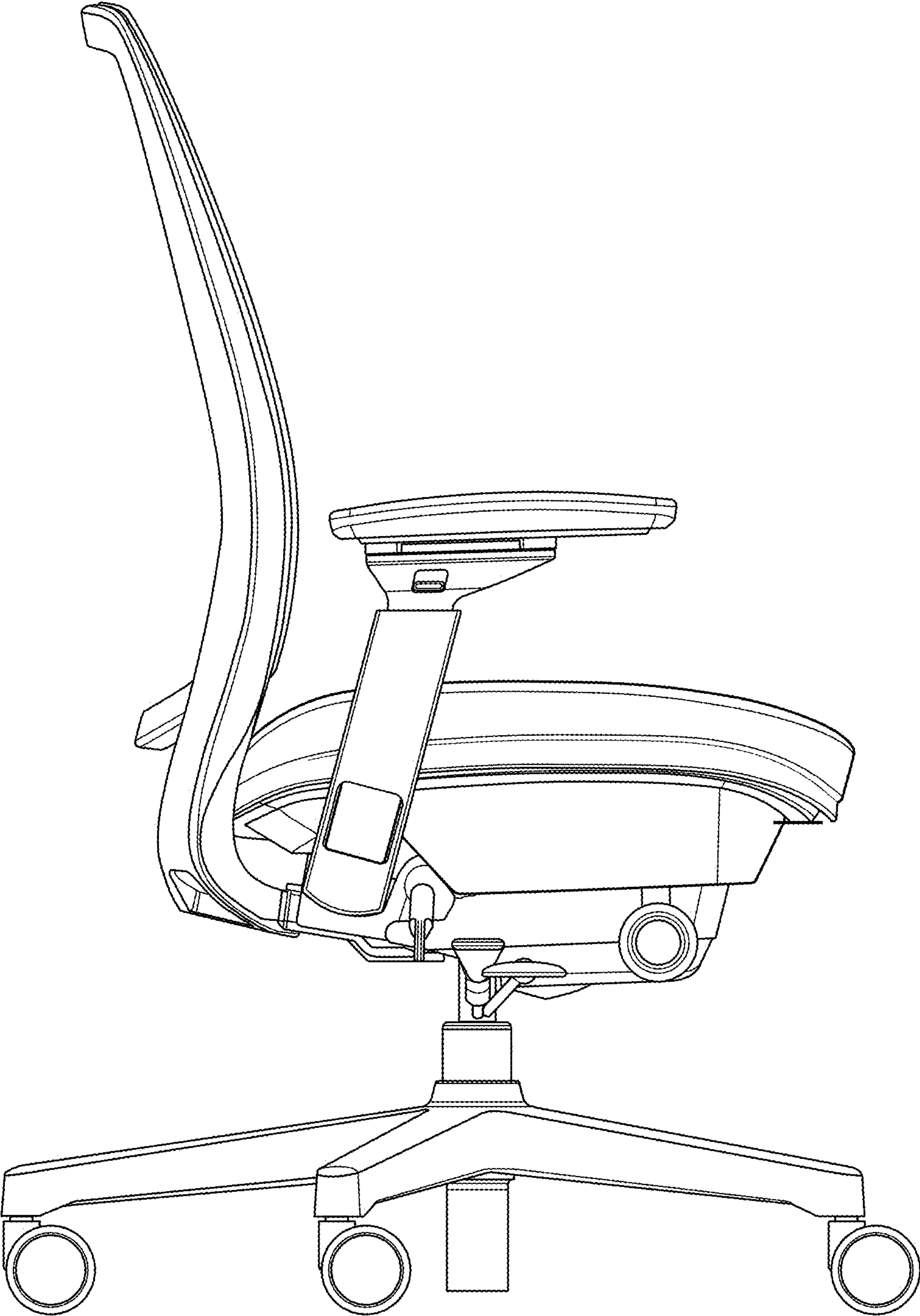


Fig. 7

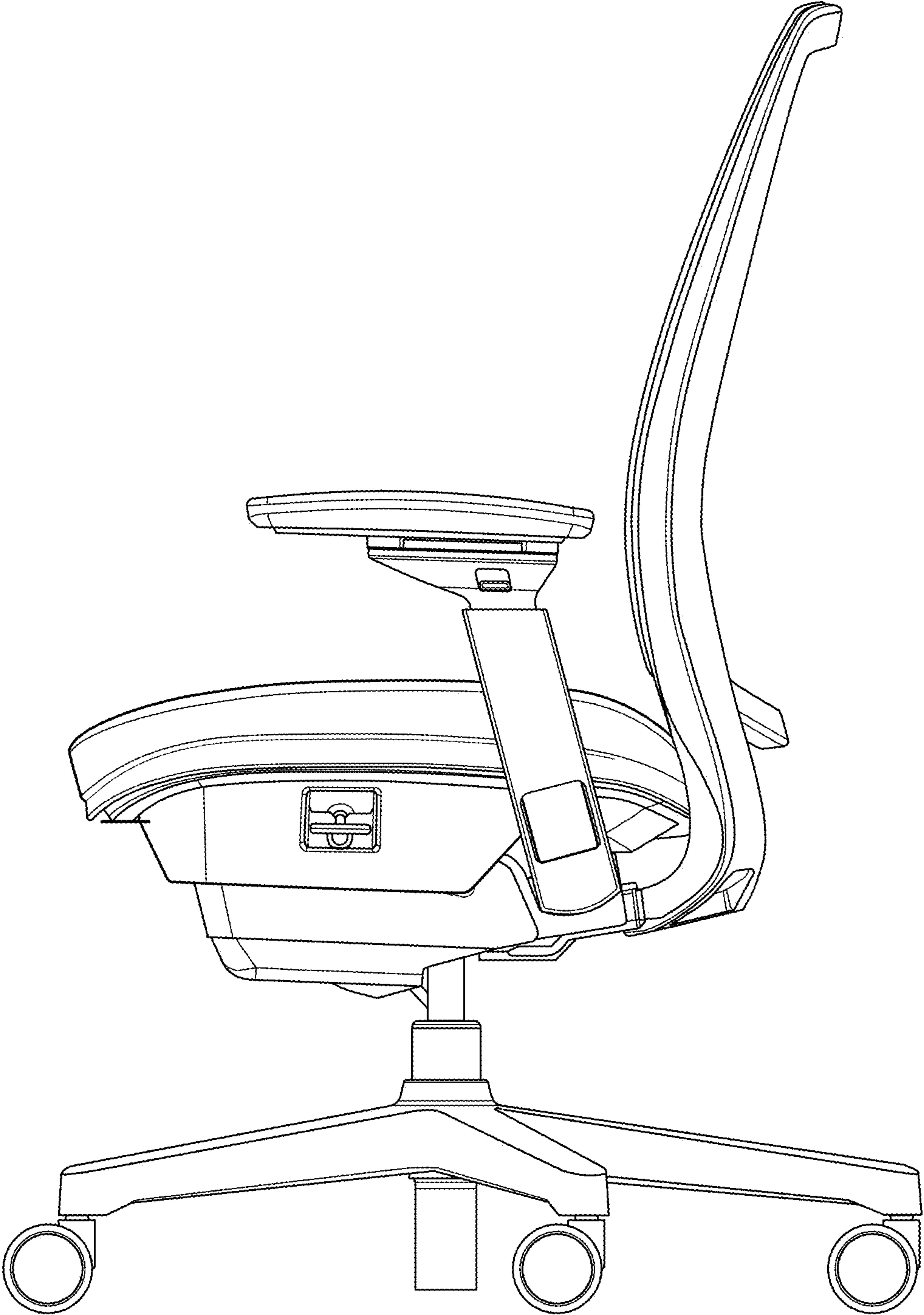


Fig. 8

