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(12) **United States Design Patent** (10) **Patent No.:** **US D913,351 S**
Ekmekjian et al. (45) **Date of Patent:** **** Mar. 16, 2021**

(54) **MOBILE CARRIER** 3,921,740 A 11/1975 Forster
4,137,984 A * 2/1979 Jennings B62D 1/28
180/168
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4,714,140 A 12/1987 Hatton et al.
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5,127,486 A * 7/1992 Yardley B62D 1/28
180/168
5,343,974 A 9/1994 Rabek
5,558,174 A 9/1996 Avitan et al.
6,328,125 B1 12/2001 Van Den Brink et al.
6,880,654 B2 4/2005 Plishner
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FOREIGN PATENT DOCUMENTS

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WO 0115962 3/2001

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OTHER PUBLICATIONS

Product 6, Photo F1—Iso.
(Continued)

Related U.S. Application Data

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(52) **U.S. Cl.**
USPC **D15/199**; D12/1
(58) **Field of Classification Search**
USPC D15/199; D21/578–583, 621, 622;
D32/21; D12/1; D34/34
CPC B25J 5/007; B60B 19/006; B62D 57/024;
H01F 7/0221; Y10S 901/01
See application file for complete search history.

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(57) **CLAIM**

The ornamental design for a mobile carrier, as shown and described.

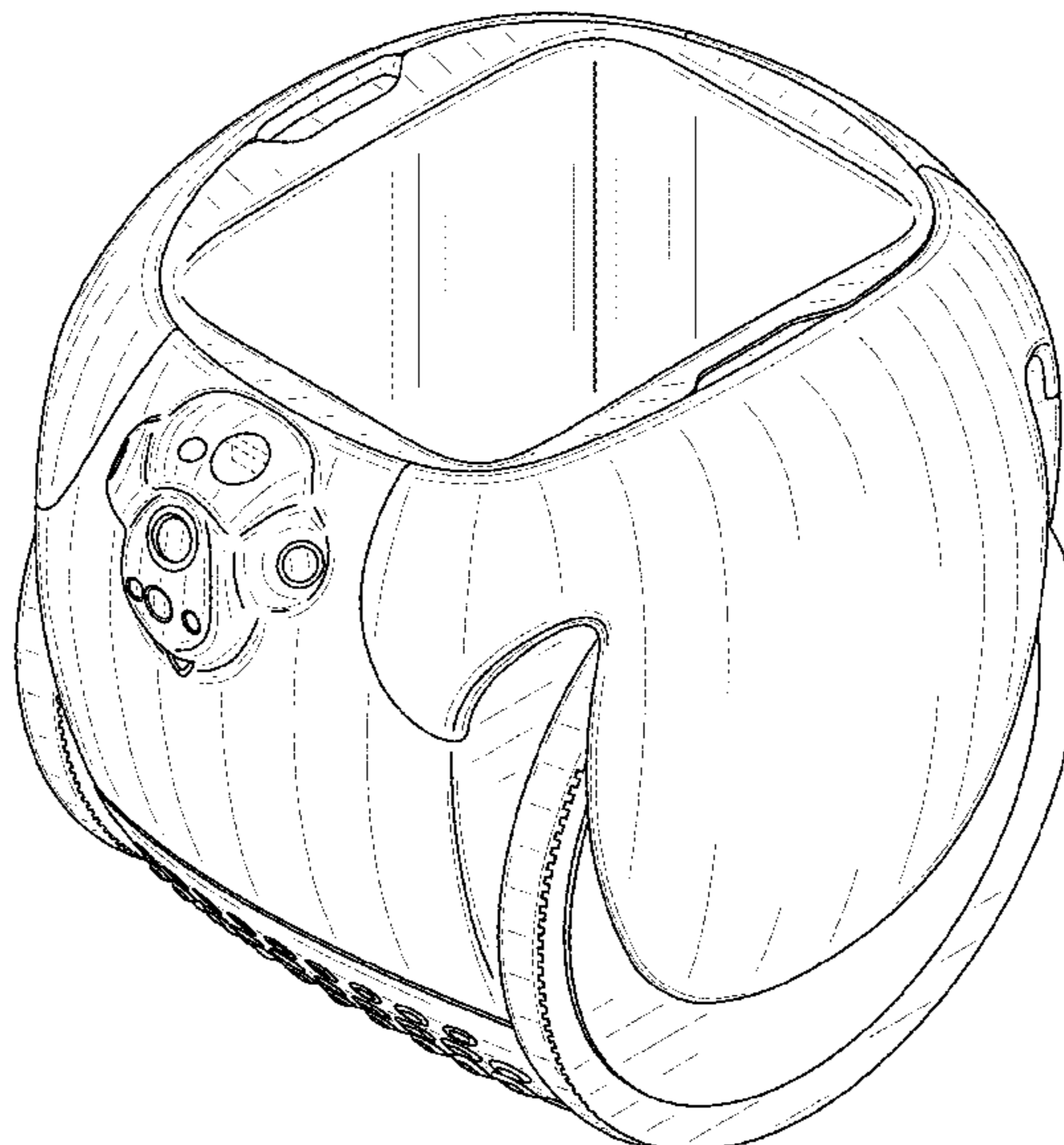
DESCRIPTION

FIG. 1 is an isometric view of a first embodiment of a mobile carrier, in accordance with the present invention; FIG. 2 is a front view of the mobile carrier of FIG. 1; FIG. 3 is a rear view of the mobile carrier of FIG. 1; FIG. 4 is a left side view of the mobile carrier of FIG. 1; FIG. 5 is a right side view of the mobile carrier of FIG. 1; FIG. 6 is a top view of the mobile carrier of FIG. 1; and, FIG. 7 is a bottom view of the mobile carrier of FIG. 1.

(56) **References Cited**
U.S. PATENT DOCUMENTS

1,819,924 A 8/1931 Seppola
2,267,254 A 12/1941 Reilly
3,123,173 A 3/1964 Jacobs
3,776,353 A 12/1973 Roth
3,858,673 A 1/1975 Browning

1 Claim, 4 Drawing Sheets



(56)

References Cited

U.S. PATENT DOCUMENTS

6,974,399 B2 12/2005 Lo
 D517,633 S 3/2006 Chen
 7,124,854 B2 10/2006 Huang
 7,188,694 B1 3/2007 Blair
 D619,929 S 7/2010 Tyler et al.
 7,938,210 B2 5/2011 Kunzler et al.
 7,997,361 B1 8/2011 Bell et al.
 8,002,060 B2 8/2011 Komatsu
 8,096,378 B2 1/2012 Xie
 8,186,467 B2 5/2012 Yoshino et al.
 8,219,308 B2 7/2012 Leeser
 8,490,723 B2 7/2013 Heinzmann et al.
 8,807,254 B2 8/2014 Manus
 8,932,170 B2 1/2015 Ishizuka
 D722,631 S * 2/2015 Stone D15/199
 8,985,264 B2 3/2015 Shirley
 9,364,766 B2 6/2016 Mielniczek
 9,446,510 B2 9/2016 Vu et al.
 D784,852 S 4/2017 Gong et al.
 9,630,447 B2 4/2017 Yoshino et al.
 9,764,592 B1 9/2017 Hays et al.
 9,789,017 B2 10/2017 Hays et al.
 D805,464 S 12/2017 Ma
 D810,799 S * 2/2018 Sokuza D15/199
 D818,397 S * 5/2018 Makela B65G 1/0492
 D821,265 S * 6/2018 Makela D12/86
 D839,331 S * 1/2019 Nilsson D15/199
 10,173,738 B2 1/2019 Schnapp et al.
 D840,277 S 2/2019 Li et al.
 D855,094 S * 7/2019 Li D15/199
 10,399,616 B2 * 9/2019 Ellerman A63H 33/26
 D863,387 S * 10/2019 Wang A63H 33/26
 D865,021 S * 10/2019 Hu A63H 33/26
 D871,477 S * 12/2019 Kolb D15/199
 D879,852 S * 3/2020 Chen D15/199
 D883,354 S * 5/2020 Jafarzadeh D15/199
 D884,043 S * 5/2020 Song D15/199
 2004/0124023 A1 7/2004 Plishner
 2005/0056479 A1 3/2005 Huang
 2005/0176542 A1 8/2005 Lo
 2008/0245593 A1 10/2008 Kim
 2009/0166112 A1 7/2009 Yoshino et al.
 2010/0252338 A1 10/2010 Xie
 2011/0191013 A1 8/2011 Leeser
 2011/0209929 A1 9/2011 Heinzmann et al.
 2011/0303035 A1 12/2011 Niebergall et al.
 2013/0069420 A1 3/2013 Manus
 2014/0011625 A1 1/2014 Thompson
 2014/0116799 A1 5/2014 Pettigrew et al.
 2014/0230602 A1 8/2014 Shirley
 2014/0277841 A1 9/2014 Klicpera et al.
 2015/0093956 A1 4/2015 Mielniczek
 2015/0224640 A1 * 8/2015 Vu B25J 19/023
 700/259
 2016/0068056 A1 3/2016 Burtov et al.
 2016/0303900 A1 10/2016 Yoshino et al.
 2016/0325585 A1 11/2016 Hays et al.
 2018/0043838 A1 * 2/2018 Ellerman A63H 33/26
 2018/0099720 A1 4/2018 Chen
 2018/0099810 A1 * 4/2018 Wu B65G 1/0492
 2018/0105033 A1 4/2018 Schnapp et al.
 2018/0105215 A1 4/2018 Schnapp et al.
 2018/0154971 A1 6/2018 Zuo
 2018/0257512 A1 9/2018 Chen
 2019/0270472 A1 * 9/2019 Akamatsu B62B 5/0093

OTHER PUBLICATIONS

Product 6, Photo F2—Side View.
 Rahman, M.T. Abdul, et al. “Centre of Gravity (C.O.G.)—Based Analysis on the Dynamics of the Extendable Double-Link Two-

Wheeled Mobile Robot” In IOP Conference Series: Materials Science and Engineering, vol. 53, No. 1, paper 012079, 2013.
 Ruan, X., et al. “Research on stable control for two-wheeled self-balancing robot in complex environment”, Beijing Gongye Daxue Xuebao (Journal of Beijing University of Technology), vol. 37, No. 9, pp. 1310-1316, Sep. 2011. (Translation of Abstract Only).
 Sales, Jorge, et al. “CompaRob: The Shopping Cart Assistant Robot”, International Journal of Distributed Sensor Networks, vol. 2016, Article ID 4781280, 15 pages, 2016.
 Sony Rolly, Product 3, Photo C1: Colors.
 Sony Rolly, Product 3, Photo C10: Iso Top View 3.
 Sony Rolly, Product 3, Photo C2: Front View 1.
 Sony Rally, Product 3, Photo C3: Front View 2.
 Sony Rolly, Product 3, Photo C4: Iso Back View.
 Sony Rally, Product 3, Photo C5: Iso Front View.
 Sony Rally, Product 3, Photo C6: Iso Right View.
 Sony Rolly, Product 3, Photo C7: Iso Side View.
 Sony Rally, Product 3, Photo C8: Iso Top View 1.
 Sony Rolly, Product 3, Photo C9: Iso Top View 2.
 Tumbleweed, Product 6, Photo F3.
 Tumbleweed, Product 6, Photo F4: Side View.
 Twinswheel, Product 2, Photo B1: Back View.
 Twinswheel, Product 2, Photo B2: Front View.
 Twinswheel, Product 2, Photo B3: Iso Left View.
 Twinswheel, Product 2, Photo B4: Iso Right View.
 Twinswheel, Product 2, Photo B5: Side View 1.
 Twinswheel, Product 2, Photo B6: Side View 2.
 Van Der Wijk, Volkert, et al. “Force Balancing of Variable Payload by Active Force-Balanced Reconfiguration of the Mechanism” In ASME/IFToMM International Conference on Reconfigurable Mechanisms and Robots, pp. 323-330, IEEE, Jun. 2009.
 Wang, Kun, et al. “Enhanced active dynamic balancing of the planar robots using a three-rotating-bar balancer” Advances in Mechanical Engineering, vol. 8, No. 4, 1687814016643885, Apr. 2016.
 Wu, K., et al. “Dynamic control of two-wheeled mobile robot”, Journal of Astronautics, vol. 2, p. 024, 2006. (Translation of Abstract Only).
 YouTube video uploaded on Feb. 26, 2015, titled “Still Human 2015 Presentation du Cyborg Vegetal” downloaded from: <https://www.youtube.com/watch?v=Ev02Ym2ZVRE> on Feb. 7, 2017.
 YouTube video uploaded on Nov. 21, 2016, titled “TwinswHeel M6 1945 2016 11 18” downloaded from: <https://www.youtube.com/watch?v=e3laoGU56nY&feature=youtu.be> on Jan. 19, 2017.
 YouTube video uploaded on Sep. 15, 2016, titled “TwinswHeel Lyon 2016 09 13 EN” downloaded from: <https://www.youtube.com/watch?v=ysYtN3Wm5Dw&feature=youtu.be> on Jan. 19, 2017.
 Zhao, Yudong et al. “Balancing control of Mobile Manipulator with Sliding Mode Controller” 15th International conference on Control, Automation and Systems (ICCAS), pp. 802-805, IEEE, Oct. 2015.
 Beroud, Annick. “L’intralogistique au service de la performance” a la matinale de l’Aslog (with English machine translation) L’antenne, Sep. 27, 2016. Retrieved from URL: http://www.lantenne.com/L-intralogistique-au-XService-de-la-performance-a-la-matinale-de-l-Aslog_a33383.html.
 Cyborg Vegetal, Product 1, Photo A1: Front View.
 Cyborg Vegetal, Product 1, Photo A10: Side View 5.
 Cyborg Vegetal, Product 1, Photo A11: Top View.
 Cyborg Vegetal, Product 1, Photo A2: Iso Left View.
 Cyborg Vegetal, Product 1, Photo A3: Iso Right View 1.
 Cyborg Vegetal, Product 1, Photo A4: Iso Right View 2.
 Cyborg Vegetal, Product 1, Photo A5: Iso Right View 3.
 Cyborg Vegetal, Product 1, Photo A6: Side View 1.
 Cyborg Vegetal, Product 1, Photo A7: Side View 2.
 Cyborg Vegetal, Product 1, Photo A8: Side View 3.
 Cyborg Vegetal, Product 1, Photo A9: Side View 4.
 Goher, K.M., et al. “Dynamic modeling and control of a two wheeled robotic vehicle with a virtual payload.” ARPN Journal of Engineering and Applied Sciences, vol. 6, No. 3, pp. 7-41, Mar. 2011.
 Hay, Benjamin. “TwinswHeel, le livreur de colis de demain?” (with English machine translation) Tumblr French IoT, Oct. 6, 2016. Retrieved from URL: <http://french-iot.tumblr.com/post/151417346436/lwinswheel-le-livreur-de-colis-de-demain-la>.

(56)

References Cited

OTHER PUBLICATIONS

Hu, Jian et al. "Analysis of two-wheeled self-balancing mobile robots based on ADRC." *Journal of Mechanical & Electrical Engineering*, vol. 31, No. 2, pp. 159-164, 2014. (Translation of Abstract Only).

Ji, Pengfei, et al. "Design of Self-balancing Two-wheeled Vehicle Control System Based on STM32", *Electronic Science and Technology*, vol. 11, p. 29, 2014. (Translation of Abstract Only).

Kugelpanzer, Product 4, Photo D1: Back View.

Kugelpanzer, Product 4, Photo D2: Front View.

Kugelpanzer, Product 4, Photo D3: Iso Left View.

Kugelpanzer, Product 4, Photo D4: Iso Right View 1.

Kugelpanzer, Product 4, Photo D5: Iso Right View 2.

Kugelpanzer, Product 4, Photo D6: Side View 1.

Kugelpanzer, Product 4, Photo D7: Side View 2.

Kugelpanzer, Product 4, Photo D8: Side View 3.

Larimi, S. Reza, et al. "A New Stabilization Algorithm for a Two-Wheeled Mobile Robot Aided by Reaction Wheel", *Journal of Dynamic Systems, Measurement, and Control*, vol. 137, No. 1, paper 011009, Jan. 2015.

Libeskind, Jerome. Blog Jerome Libeskind, "A quoi ressemblera le dernier kilometre dans 10 ans?" ("What will the last mile look like in 10 years?") *TwinswHeel*, Sep. 26, 2016. Retrieved from URL: <http://www.logicites.fr/2016/09/26/a-quoi-ressemblera-dernier-kilometre-10-ans/> (with English machine translation).

Product 1, Photo A1: Back View.

Product 1, Photo A2: Front View.

Product 1, Photo A3: Front View 2.

Product 1, Photo A4: Side View.

Product 2, Photo B1 Front View.

Product 2, Photo B2: Iso.

Product 2, Photo B3: Iso 2.

Product 2, Photo B4—Side View.

Product 3, Photo C1—Back View.

Product 3, Photo C2—Front View.

Product 3, Photo C3—Side View.

Product 3, Photo C4—Top View.

Product 4, Photo D1—Back View.

Product 4, Photo D2—Detail view.

Product 4, Photo D3—Front View.

Product 4, Photo D4—Side View.

Product 5, Photo E1—Back View.

Product 5, Photo E2—Bottom view.

Product 5, Photo E3—Front View.

Product 5, Photo E4—Iso Left.

Product 5, Photo E6—Left.

Product 5, Photo E7—Right.

Product 5, Photo E8—Top.

Product 5, Photo ES—Iso Right.

* cited by examiner

FIG. 1

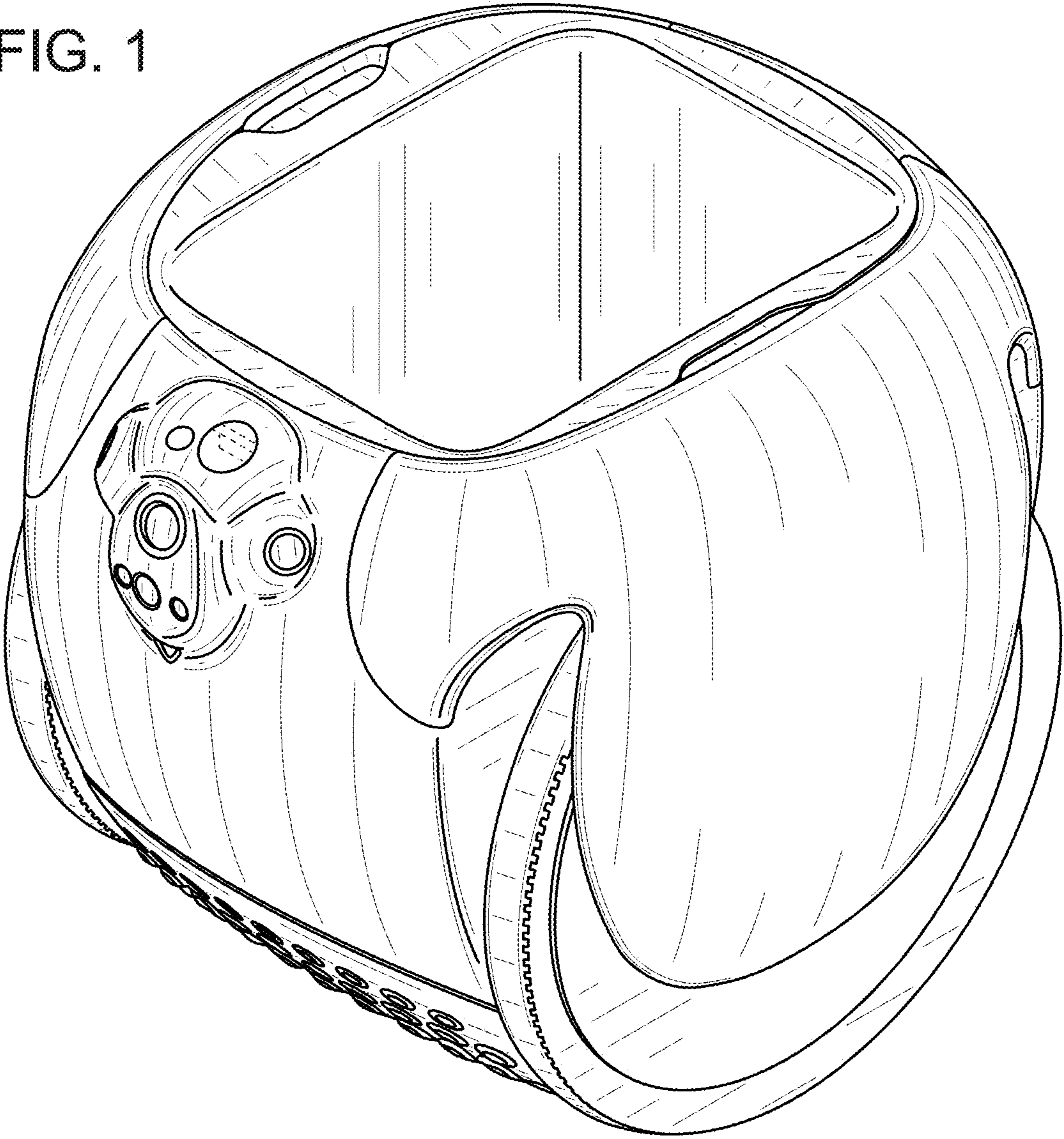


FIG. 2

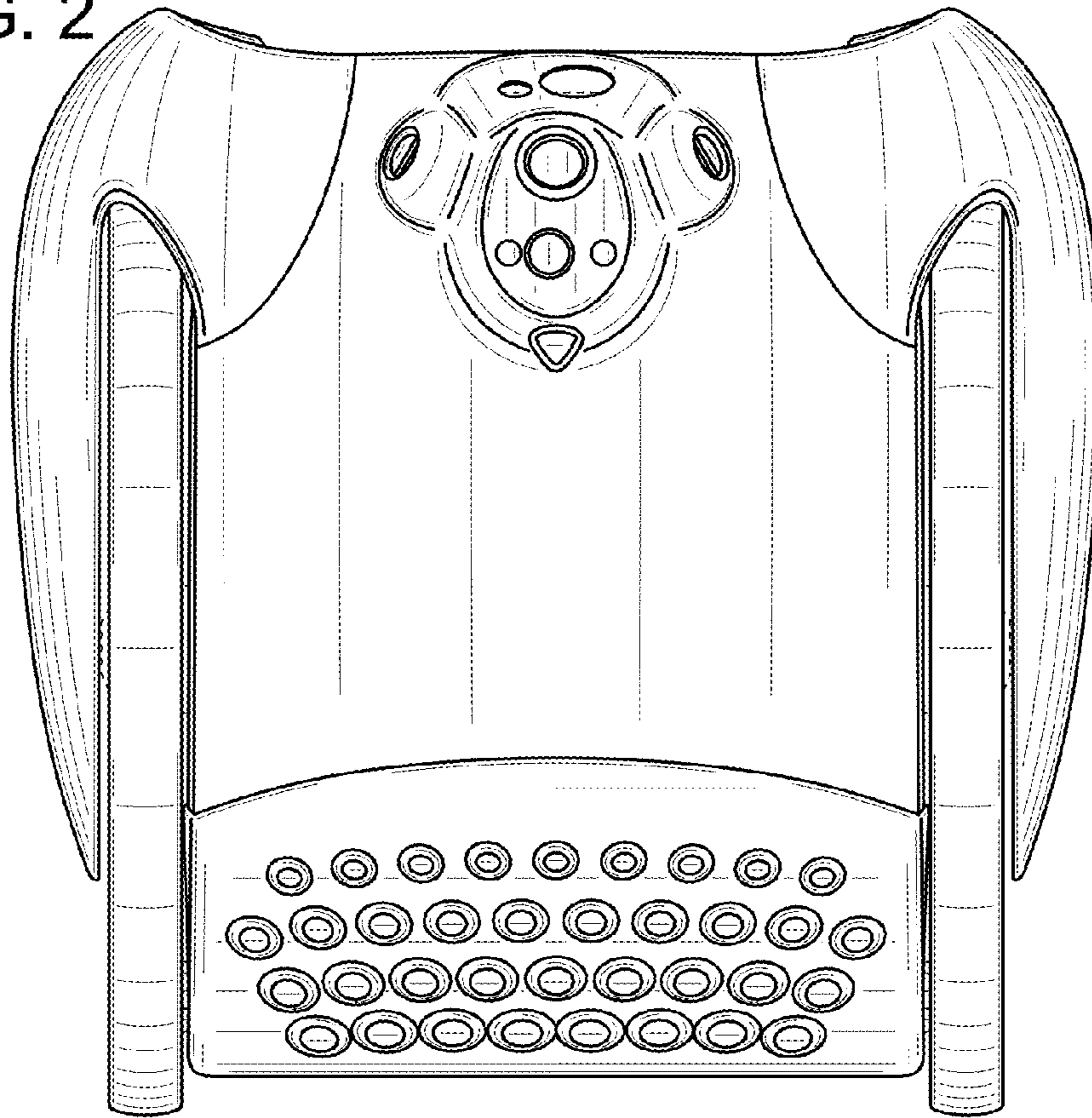


FIG. 3

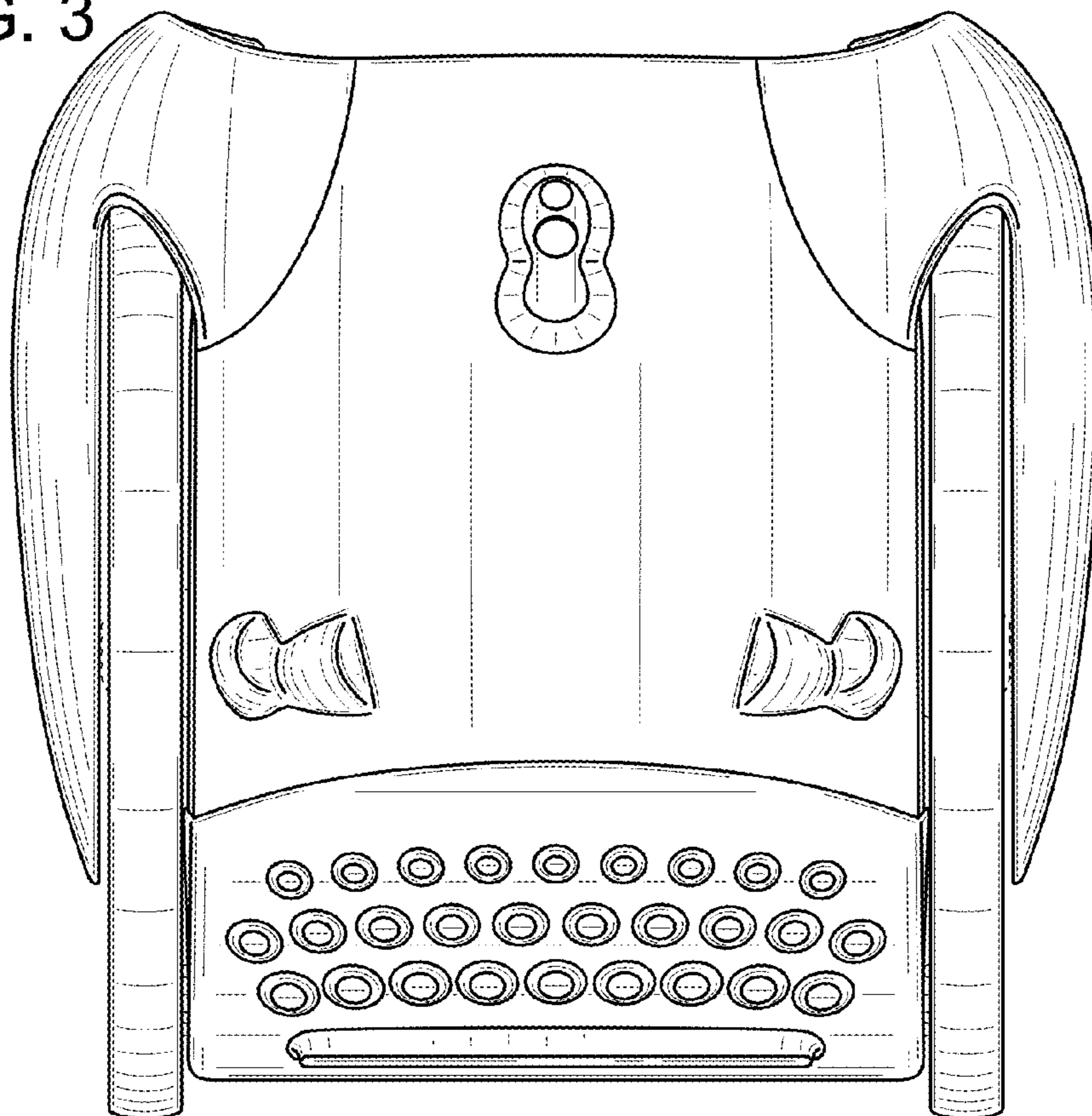


FIG. 4

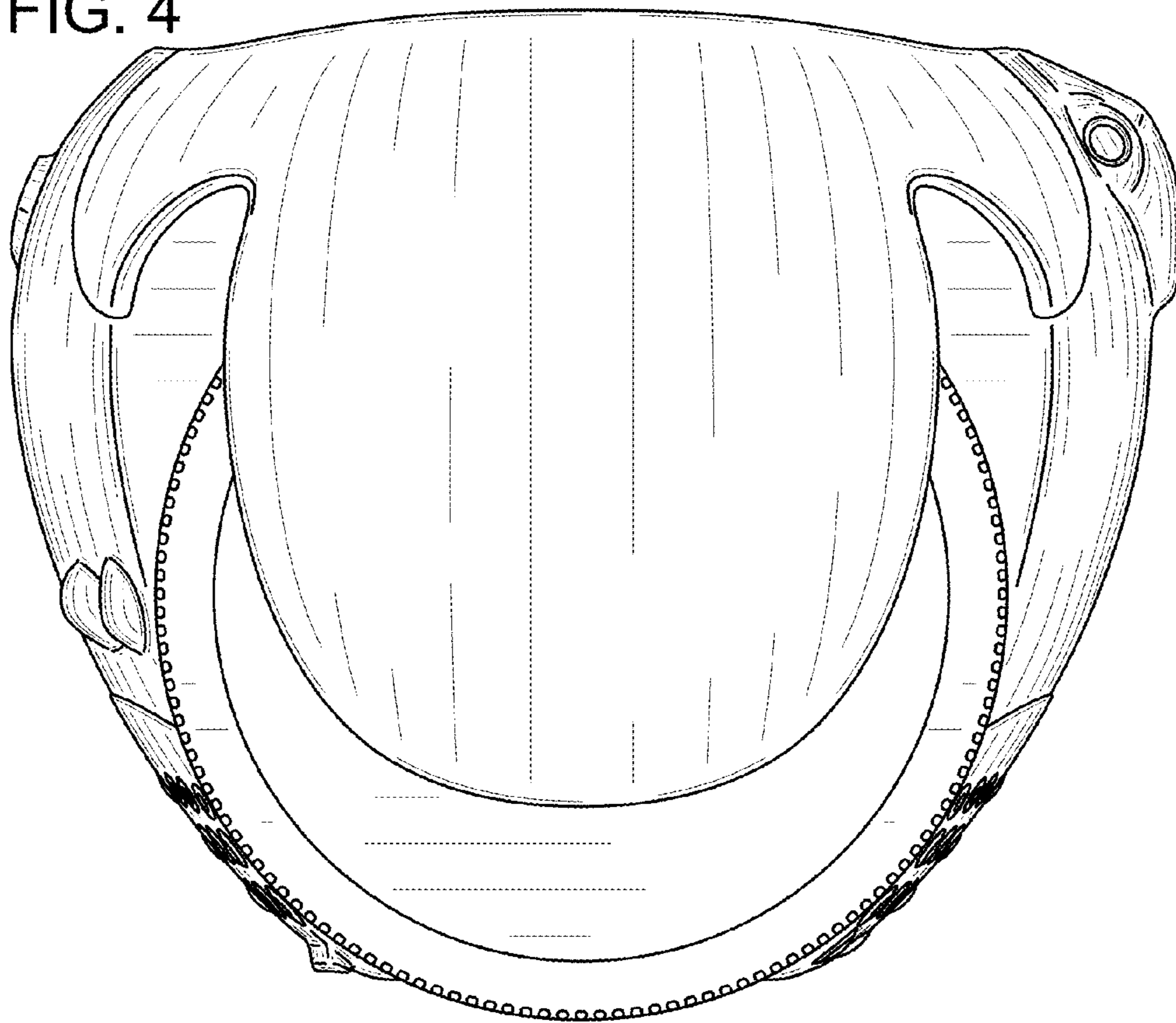
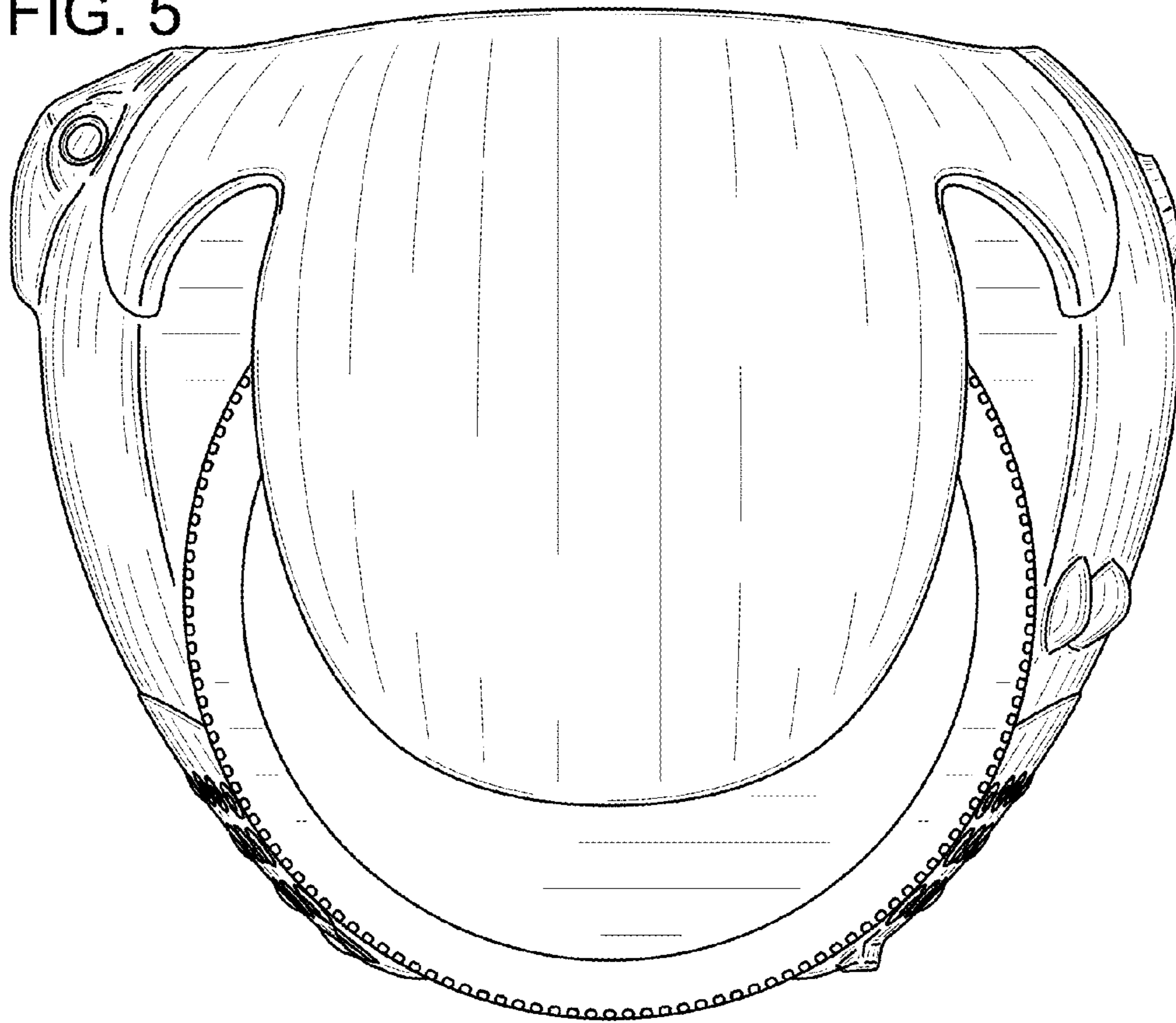


FIG. 5



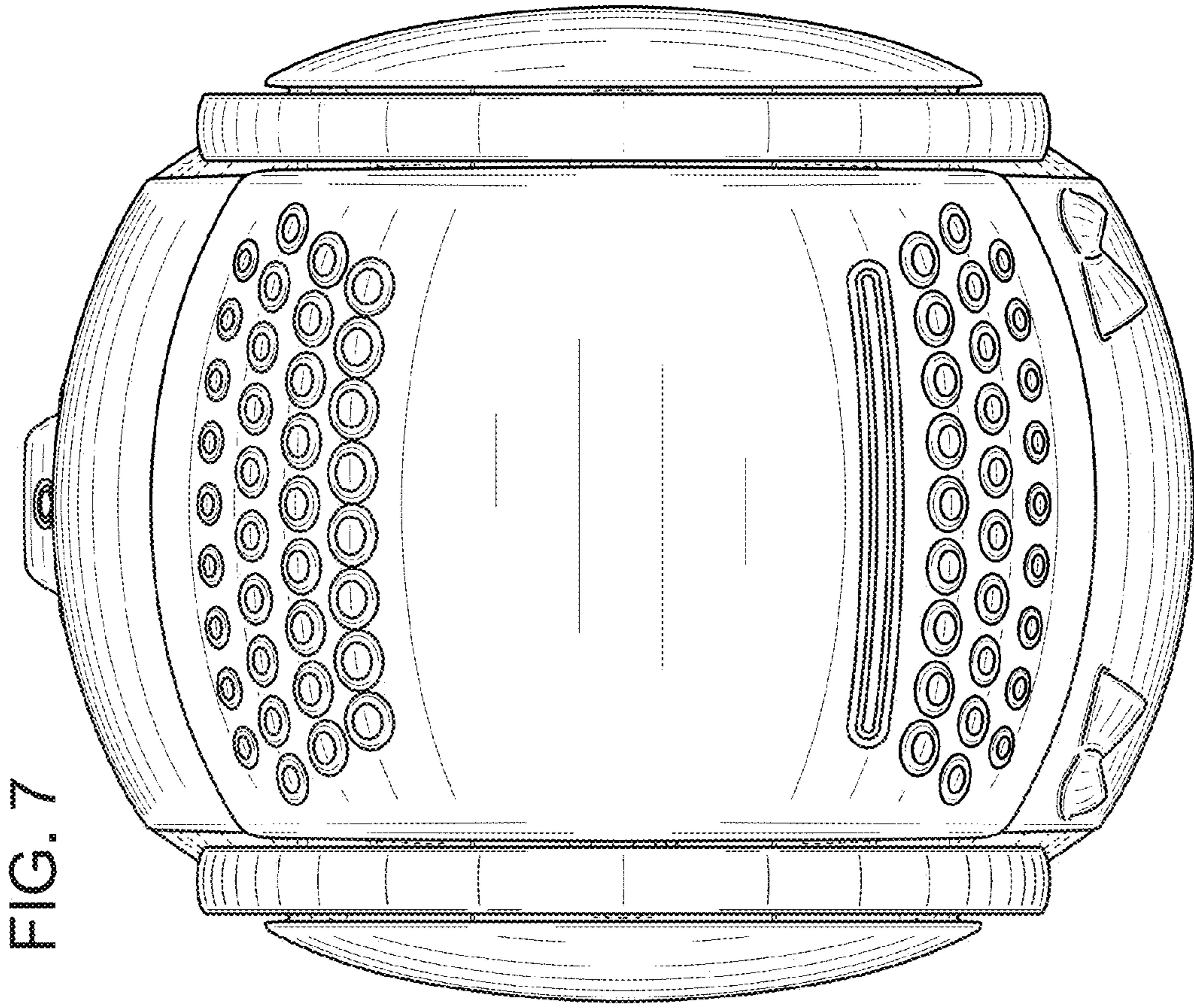


FIG. 7

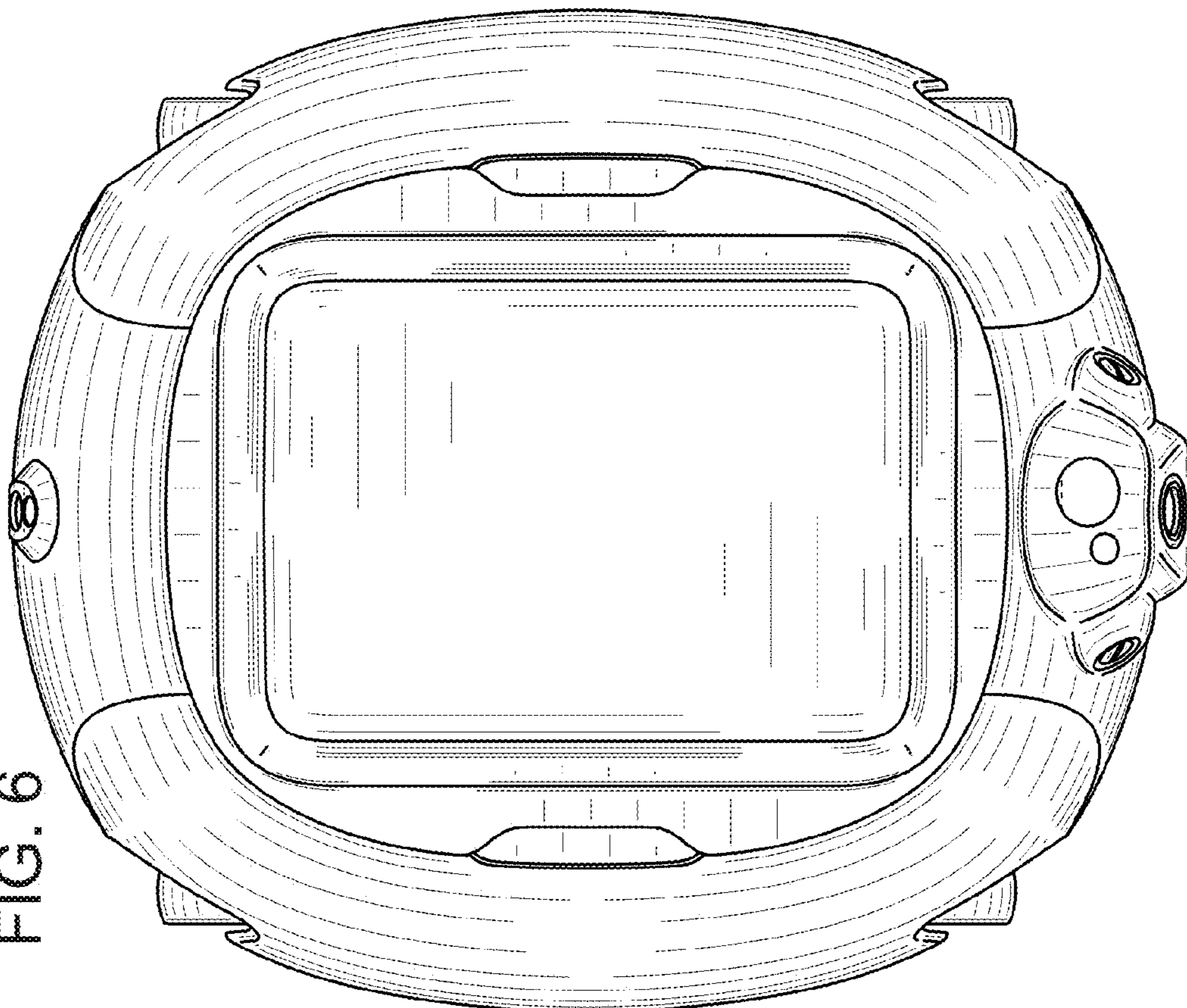


FIG. 6