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(12) **United States Design Patent**
Kawaguchi et al.

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(54) **JOINT DRIVING MEMBER FOR ROBOT**

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(30) **Foreign Application Priority Data**

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(52) **U.S. Cl.**
USPC **D15/199**

(58) **Field of Classification Search**
USPC D15/199; D21/369, 578-583, 621, 622
CPC B25J 9/102; B25J 9/104; B25J 17/0241;
Y10T 74/20317; Y10T 74/20323
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

- 5,002,242 A * 3/1991 Nagai B25J 17/0241
248/49
- 5,099,707 A * 3/1992 Tori B25J 9/02
384/296
- 5,107,716 A * 4/1992 Torii B25J 9/02
384/296
- 5,119,753 A * 6/1992 Milad B23Q 1/5406
114/338

- 5,342,254 A * 8/1994 Sula B25J 9/102
475/223
- 5,593,293 A * 1/1997 Machino B25J 9/0009
414/729
- 5,740,699 A * 4/1998 Ballantyne B25J 17/0266
403/120
- 5,893,296 A * 4/1999 Rosheim G05G 5/03
74/490.03
- 6,151,981 A * 11/2000 Costa B25J 9/023
74/490.03
- 6,220,813 B1 * 4/2001 Launiere B23Q 1/50
198/468.6

(Continued)

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(57) **CLAIM**

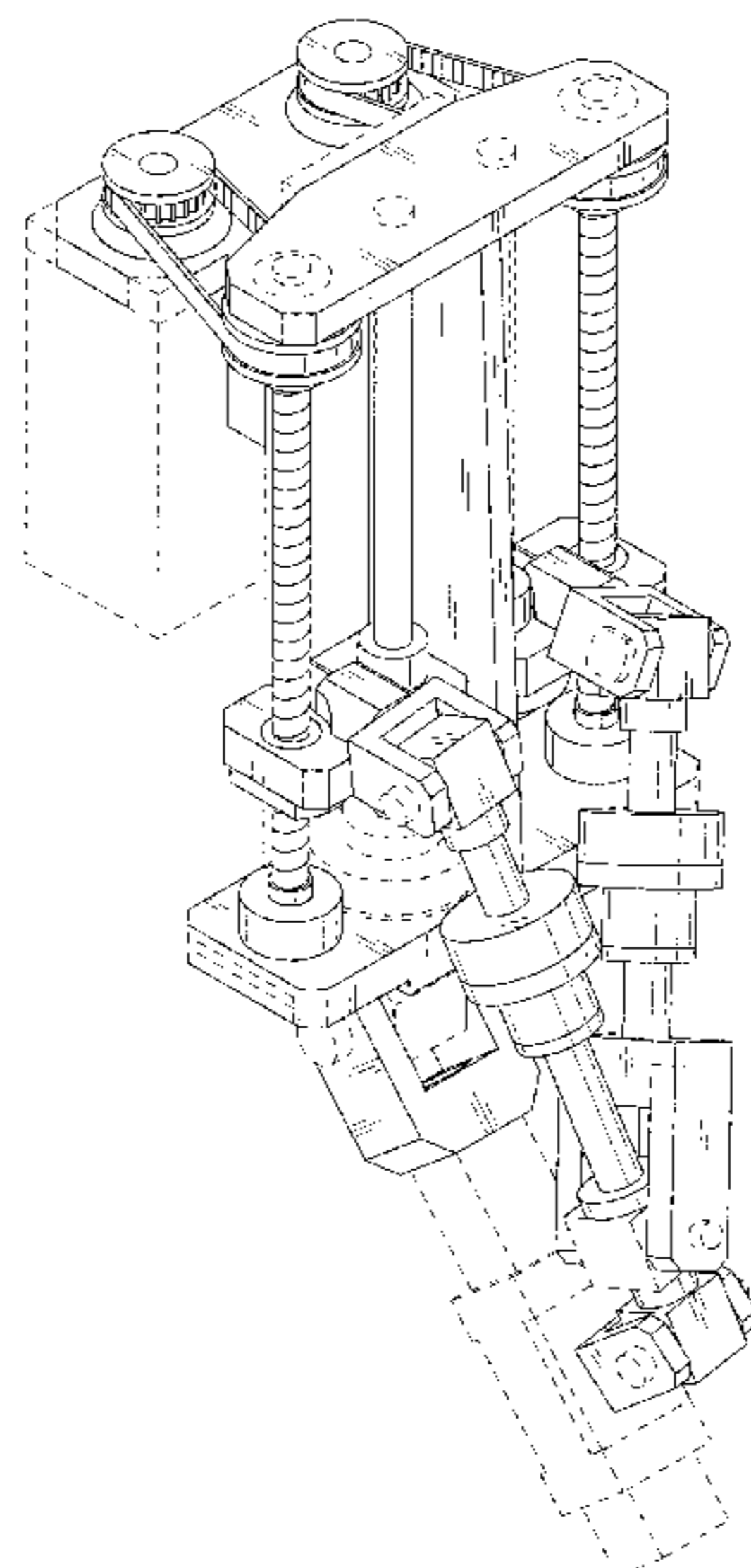
The ornamental design for a joint driving member for robot, as shown and described.

DESCRIPTION

FIG. 1 is a first perspective view of the front, left, and top sides of a joint driving member for robot showing our new design;
 FIG. 2 is a second perspective view of the rear, right, and bottom sides thereof;
 FIG. 3 is a third perspective view of the front, left, and bottom sides thereof;
 FIG. 4 is a front view thereof;
 FIG. 5 is a rear view thereof;
 FIG. 6 is a left side view thereof;
 FIG. 7 is a right side view thereof;
 FIG. 8 is a top plan view thereof; and,
 FIG. 9 is a bottom plan view thereof.

The broken lines in the drawings represent portions of the joint driving member for robot and form no part of the claimed design. The dash-dot lines represent the boundary between the claimed design and unclaimed design and form no part of the claimed design.

1 Claim, 9 Drawing Sheets



(56)

References Cited

U.S. PATENT DOCUMENTS

6,240,799 B1 * 6/2001 Yau B23Q 1/5462
74/479.01

7,013,750 B1 * 3/2006 Kazami B25J 9/08
74/490.03

9,512,912 B1 * 12/2016 Edsinger F16H 48/12

9,568,074 B2 * 2/2017 Gosselin B25J 9/102

9,849,925 B2 * 12/2017 Outa B62D 53/02

10,040,206 B2 * 1/2018 Jeong et al.

D810,801 S * 2/2018 Hsu et al.

10,144,464 B1 * 12/2018 Buerger et al.

D847,238 S * 4/2019 Kawaguchi D15/199

D847,239 S * 4/2019 Kawaguchi D15/199

D847,240 S * 4/2019 Kawaguchi D15/199

D847,241 S * 4/2019 Kawaguchi D15/199

D847,242 S * 4/2019 Kawaguchi D15/199

2002/0078778 A1 * 6/2002 Grover B25J 9/042
74/490.03

2005/0275367 A1 * 12/2005 Buehler B25J 9/102
318/568.12

2007/0062321 A1 * 3/2007 Chablat B23Q 1/5462
74/479.01

2009/0308188 A1 * 12/2009 Yang B25J 9/104
74/89.27

2010/0122602 A1 * 5/2010 Marcroft B25J 17/0216
74/490.03

2010/0162846 A1 * 7/2010 Lee B25J 9/1045
74/490.04

2010/0170357 A1 * 7/2010 Kim B25J 9/102
74/89.32

2011/0048158 A1 * 3/2011 Maisonnier B25J 17/0275
74/490.03

2011/0056321 A1 * 3/2011 Sim B25J 9/1025
74/490.04

2011/0067518 A1 * 3/2011 Park B25J 9/102
74/490.04

2011/0113914 A1 * 5/2011 Zhang B25J 9/107
74/490.01

2011/0126651 A1 * 6/2011 Pan B25J 9/102
74/89.2

2011/0137423 A1 * 6/2011 Ouyang B25J 9/102
623/18.11

2011/0214524 A1 * 9/2011 Jacobsen A61F 2/68
74/490.04

2011/0314949 A1 * 12/2011 Long B25J 19/0029
74/490.04

2012/0011956 A1 * 1/2012 Lundberg B25J 9/04
74/490.03

2012/0048047 A1 * 3/2012 Zhang B25J 9/046
74/425

2012/0067150 A1 * 3/2012 Zhang B25J 9/102
74/423

2012/0204670 A1 * 8/2012 Ryland B08B 9/045
74/490.03

2012/0271207 A1 * 10/2012 Schoen A61F 5/0102
601/34

2012/0291582 A1 * 11/2012 Kang B25J 19/0016
74/490.03

2013/0104676 A1 * 5/2013 Yang B25J 9/06
73/865.8

2013/0282174 A1 * 10/2013 Xi B25J 9/1682
700/248

2013/0296746 A1 * 11/2013 Herr A61H 3/00
601/34

2014/0007730 A1 * 1/2014 DeLouis B25J 15/0009
74/490.03

2014/0123800 A1 * 5/2014 Choi F16H 48/10
74/490.03

2014/0213409 A1 * 7/2014 Yoon F16H 1/203
475/343

2015/0114163 A1 * 4/2015 Rosheim B25J 9/0045
74/490.03

2015/0122071 A1 * 5/2015 Lee B25J 9/06
74/490.04

2015/0190246 A1 * 7/2015 Ryu G06F 3/011
74/89.22

2015/0272811 A1 * 10/2015 Choi B25J 17/00
623/27

2016/0038313 A1 * 2/2016 Kim B25J 9/102
623/24

2016/0114479 A1 * 4/2016 Rosheim B25J 9/0075
74/490.03

2016/0288319 A1 * 10/2016 Kfoury B25J 9/104

2017/0120453 A1 * 5/2017 Roy B25J 5/04

2017/0297197 A1 * 10/2017 King B25J 9/126

2017/0319421 A1 * 11/2017 Julin A61H 3/00

2017/0348852 A1 * 12/2017 Sarh B25J 9/106

2018/0009116 A1 * 1/2018 Jeong et al.

2018/0079084 A1 * 3/2018 Woo et al.

2018/0133894 A1 * 5/2018 Choi et al.

2018/0140441 A1 * 5/2018 Poirters

2018/0193172 A1 * 7/2018 Smith et al.

2018/0236655 A1 * 8/2018 Nakanishi

* cited by examiner

FIG. 1

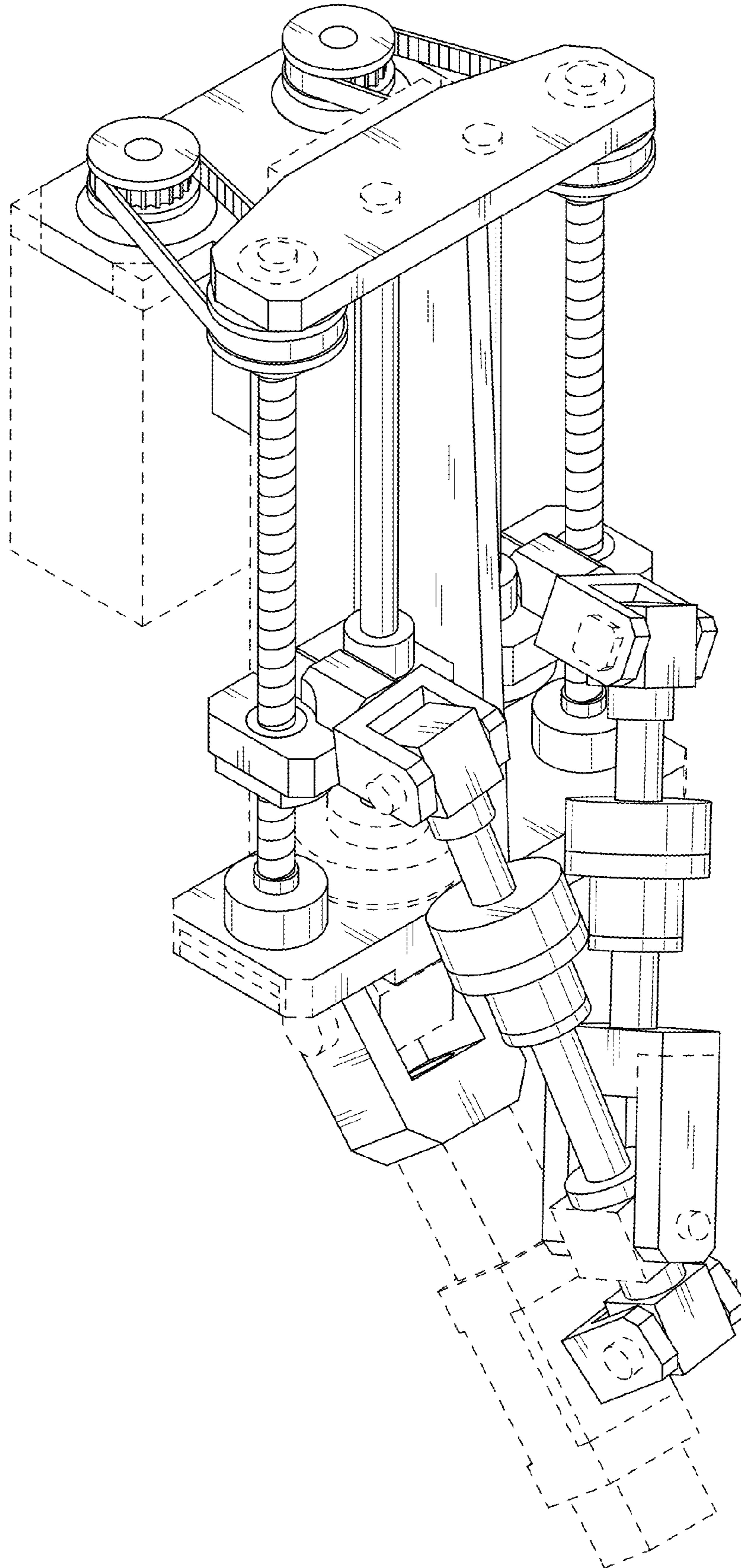


FIG. 2

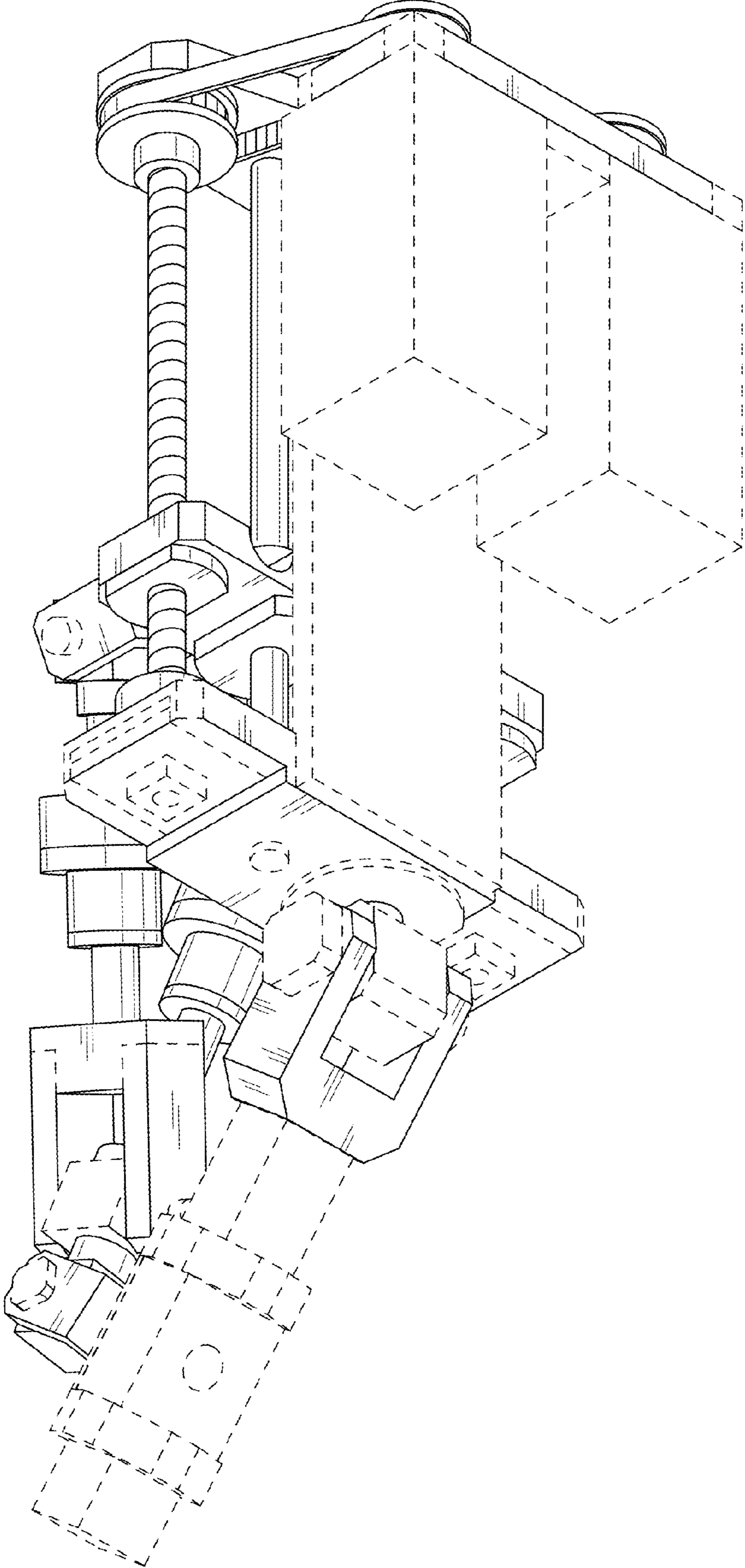


FIG. 3

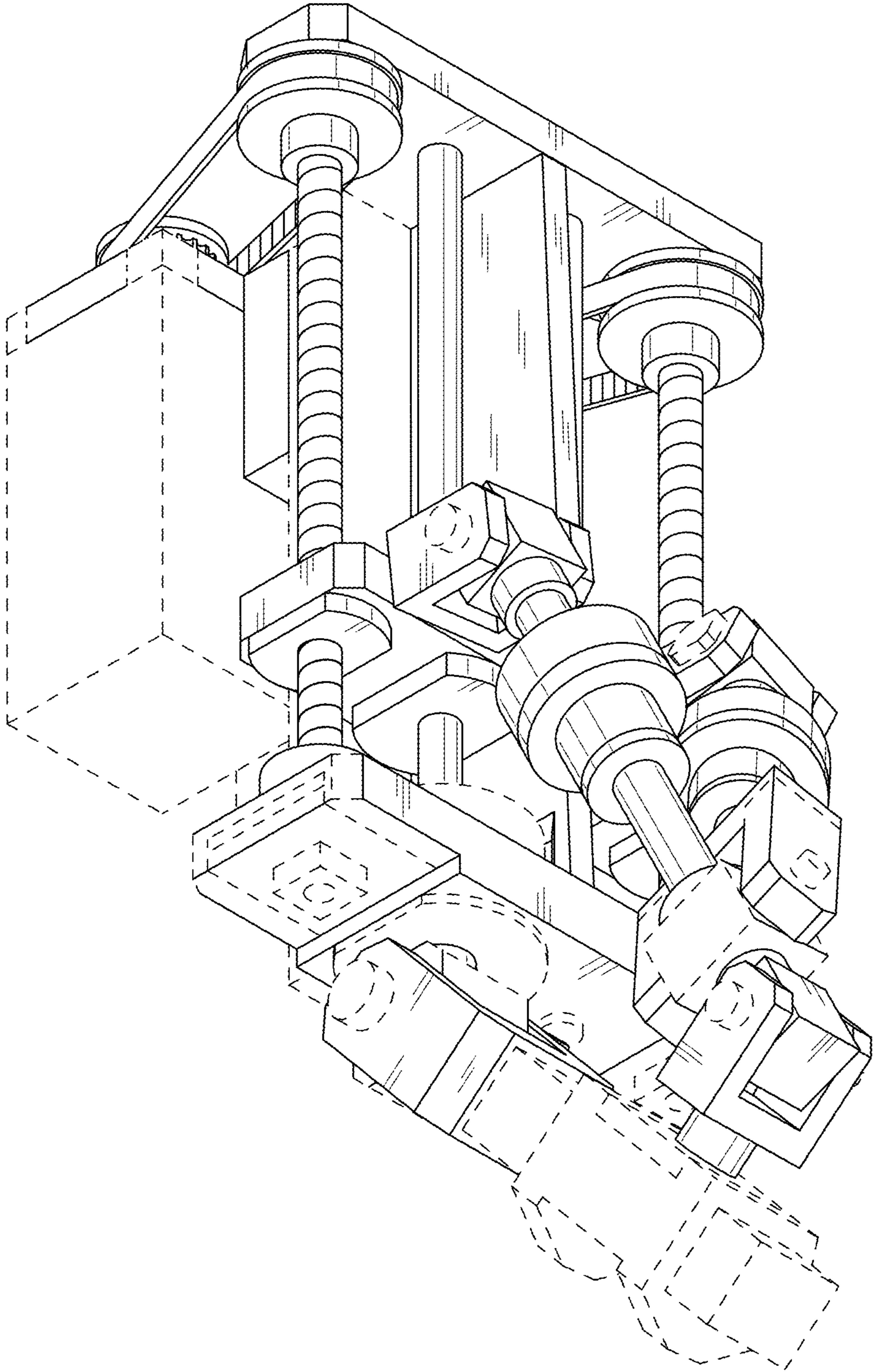


FIG. 4

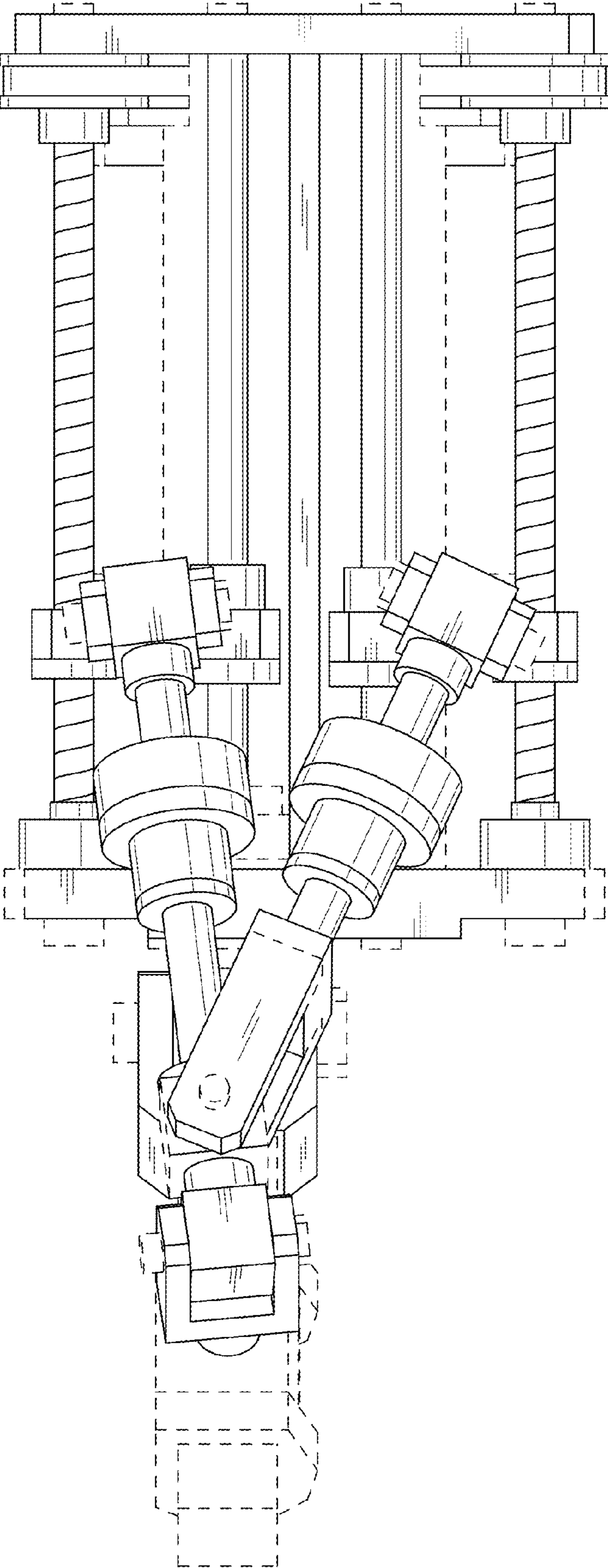


FIG. 5

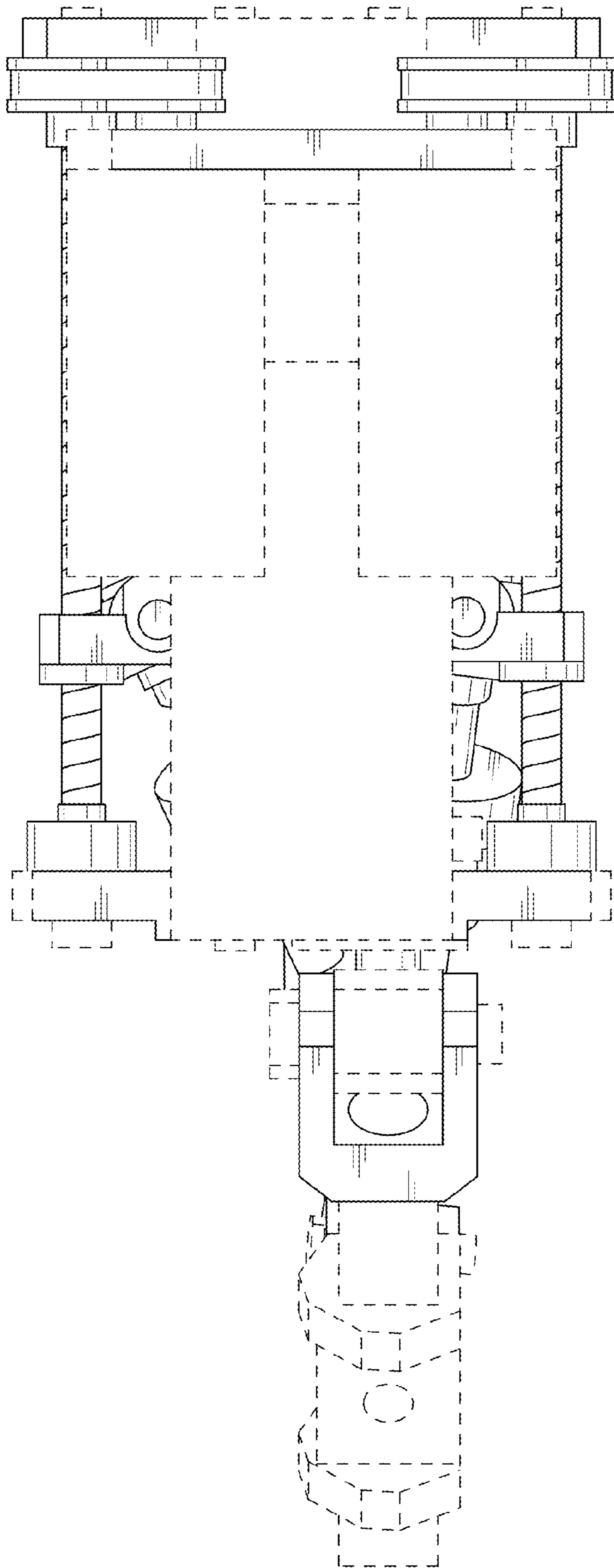


FIG. 6

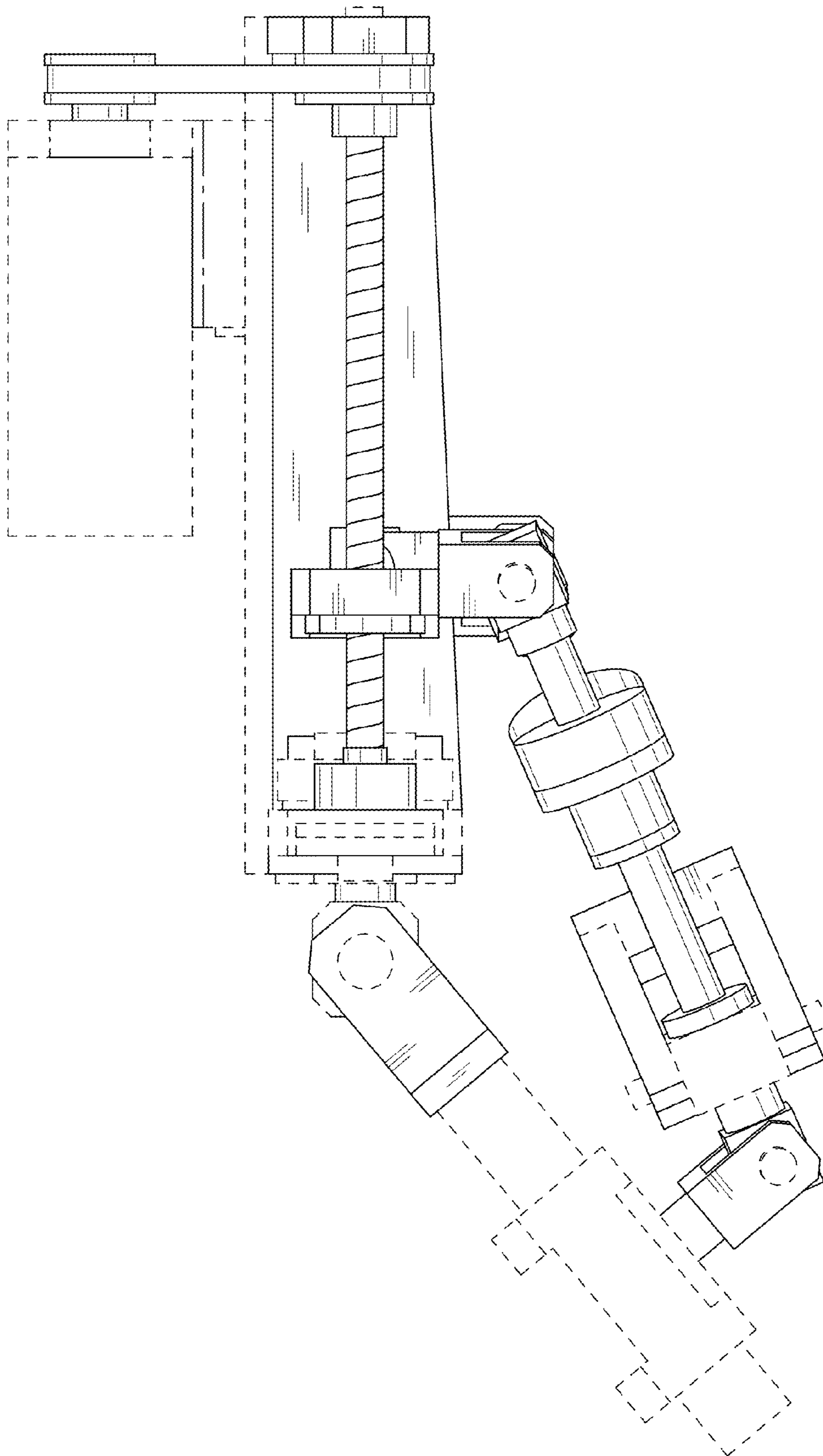


FIG. 7

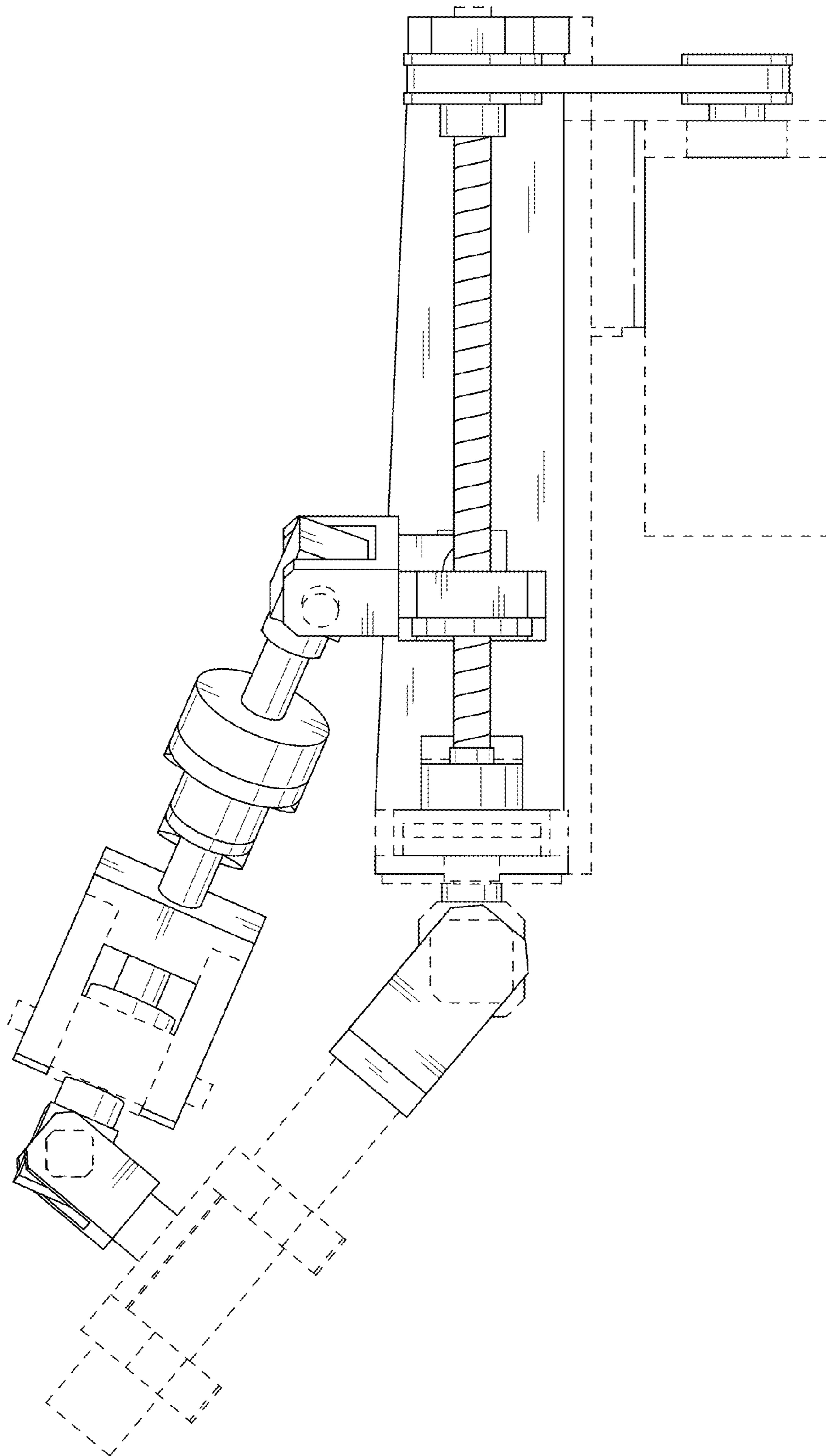


FIG. 8

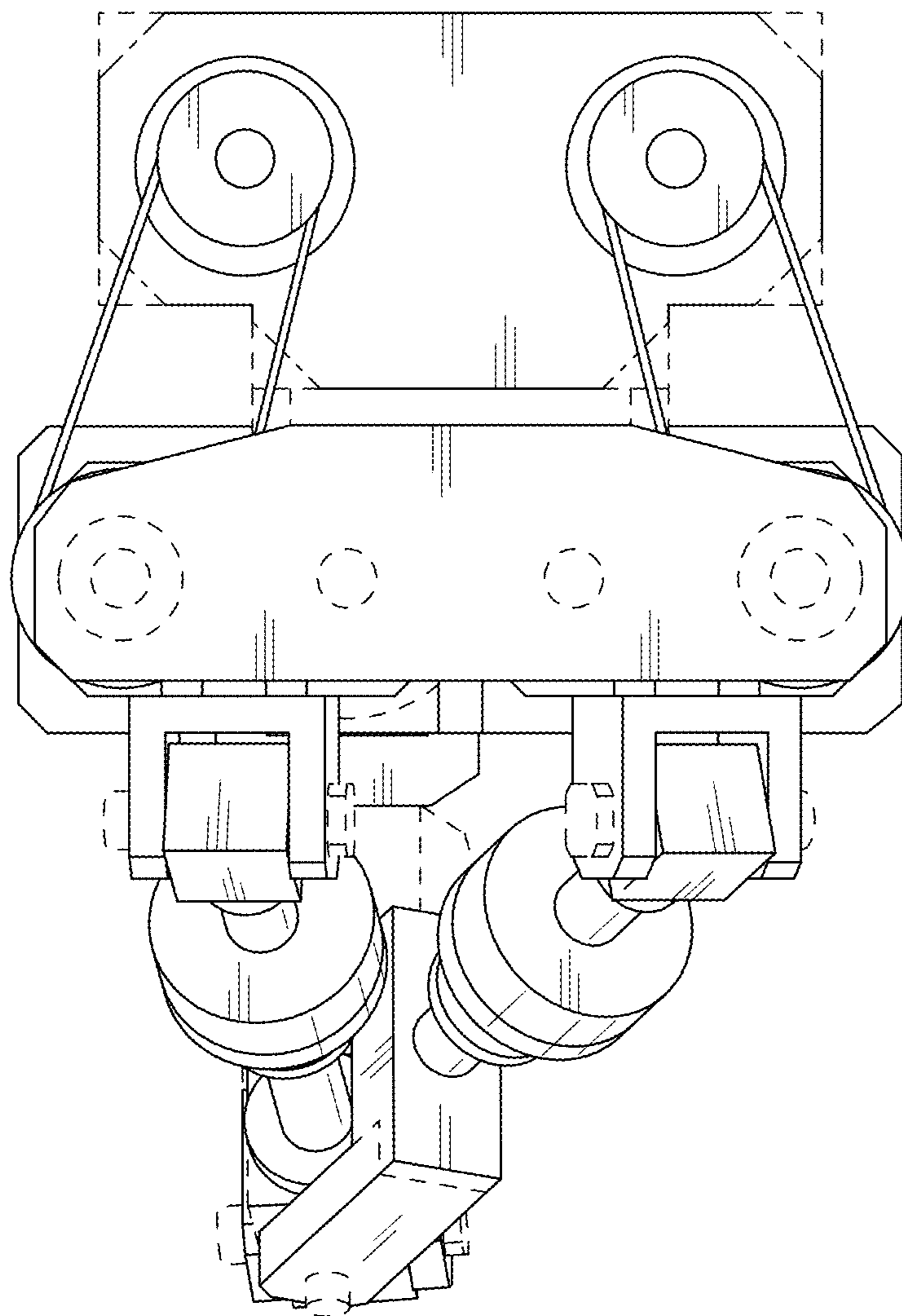


FIG. 9

