Rijksdienst voor Ondernemend Nederland

Co(ro)bots in octrooiland

In te toekomst kijken met octrooipublicaties

3 nov 2015 – Groningen

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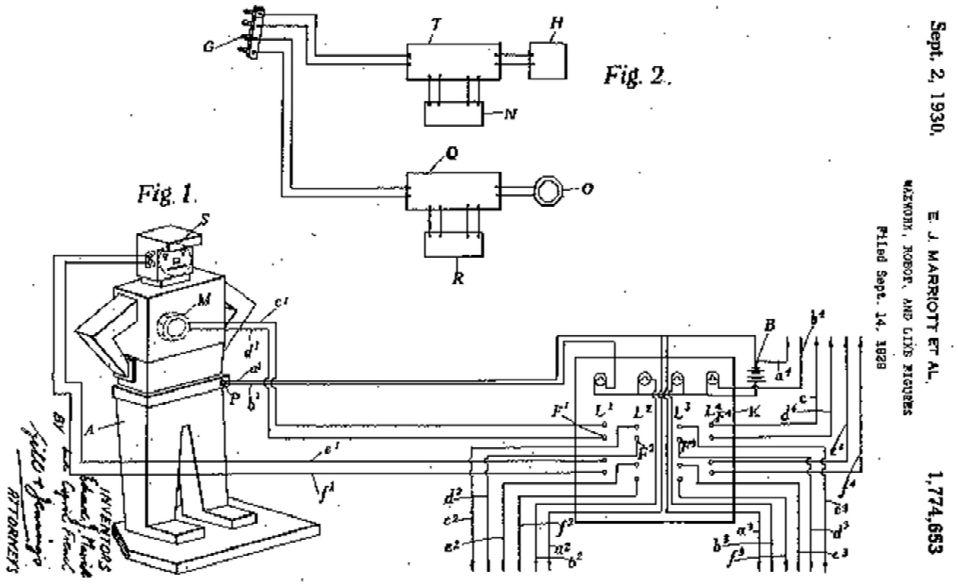
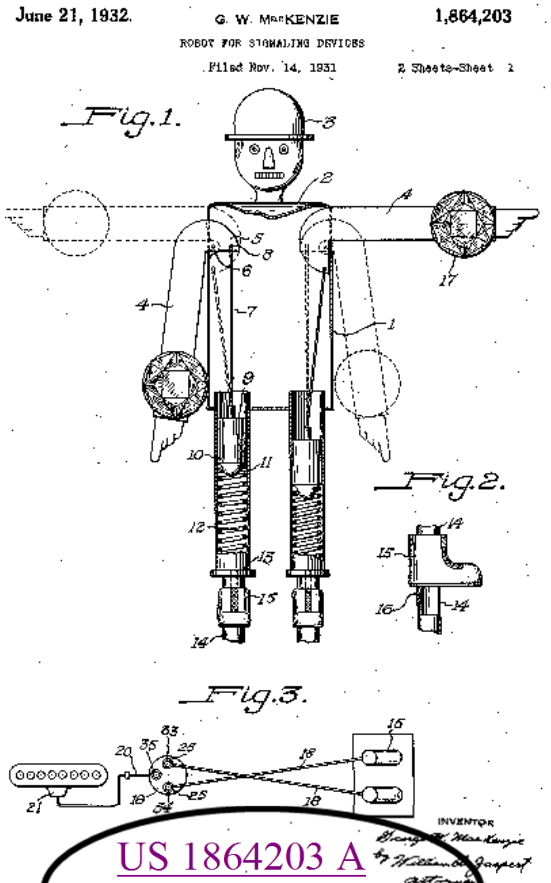
Octrooicentrum Nederland

Glazen bol?

Robots in de praktijk: jaren ’70



US 1774653 A
2 september 1930
JONATHIAN MARRIOTT EDWARD et al.
Waxwork, robot, and like figures.



US 1864203 A
21 juni 1932
MACKENZIE GEORGE W
Robot for signaling devices.

Veel technische details in een octrooi (=patent)

Stand der techniek

Robot in een productieproces

Nadeel van de stand der techniek

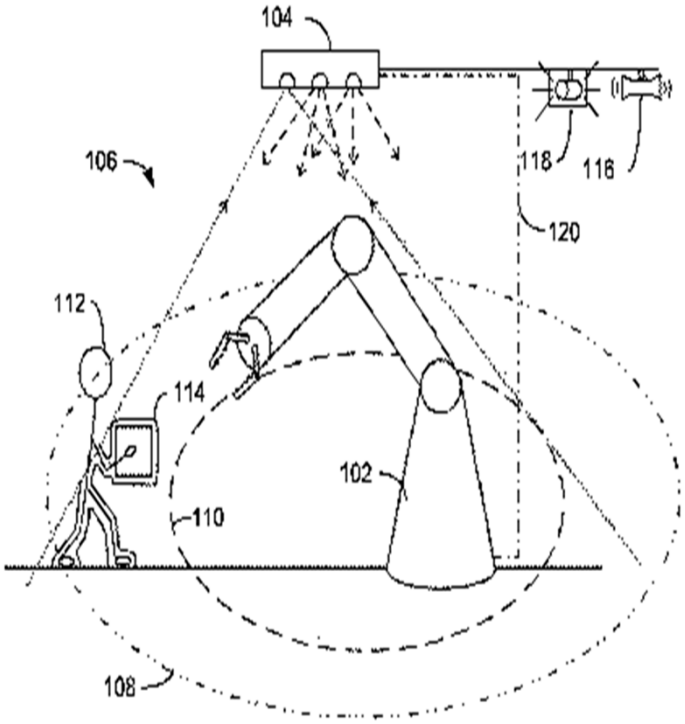
Geen samenwerking robot/mens mogelijk

Op te lossen probleem

Veiligheid bij samenwerking robot/mens

Gedetailleerde beschrijving

Detectie mens door robot met 3D-camera



Oplossing

*Een robot met kenmerk dat hij cameradetectie heeft (= **octrooiclaim**)*

Pak voordeel met kennis uit octrooidatabank!

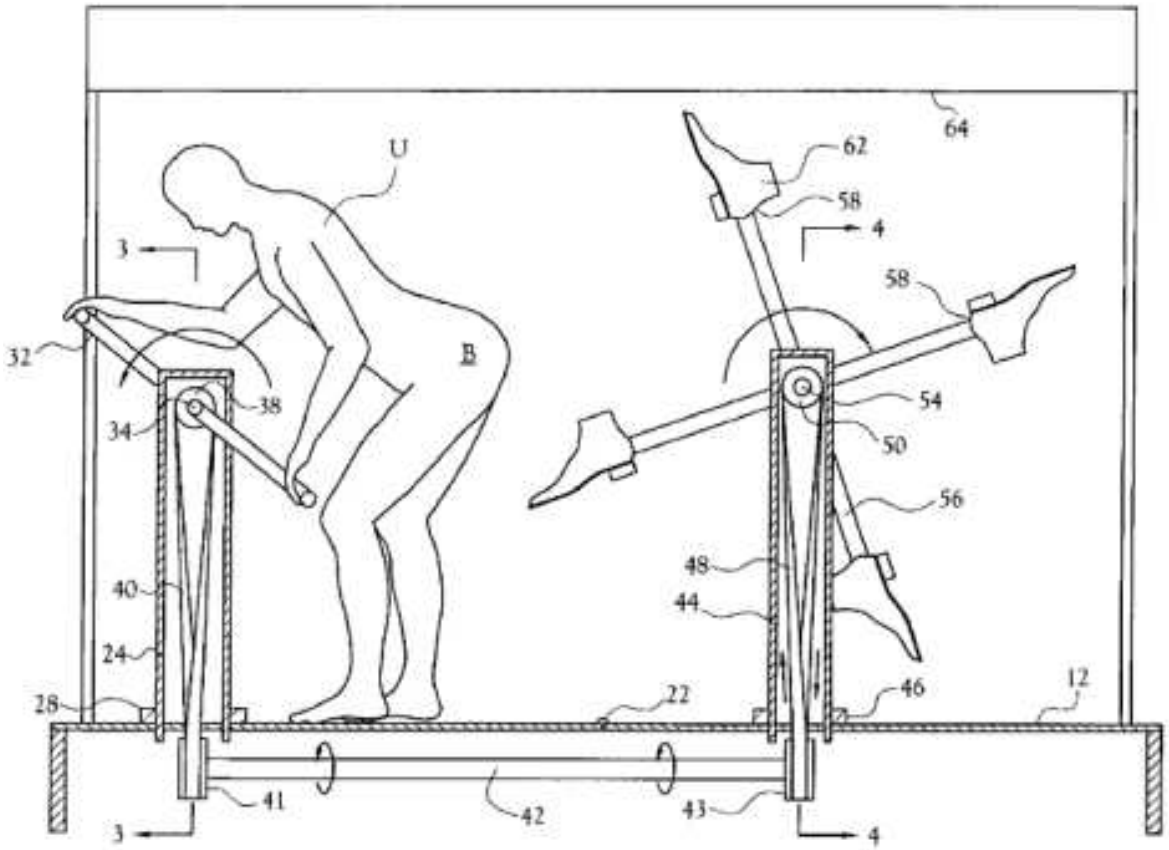
Resultaat octrooisysteem

Openbare databank met > 90 miljoen octrooipublicaties

met onder andere:

- Nieuwe (en oude) techniek<u>en</u>
- Innoverende partijen
- Uitvinders
- Landeninformatie

In de databank de meest vreemde technieken……



maar ook
nuttige technieken
én marktinformatie

Technische én marktinformatie:

Voorbeeld Baxter
(marktintro 2012)

Baxter (http://www.rethinkrobotics.com/)

Rethink Robotics Revolutionizes Manufacturing with Humanoid Robot Company Unveils Robots with Common Sense; First-of-Its-Kind Robot Designed to Make U.S. Manufacturers More Globally Competitive

Boston, MA – September 18, 2012 – Ushering in a new era in robotics, Rethink Robotics today unveiled the world's first humanoid robots capable of applying common sense behavior to manufacturing environments. Affordably priced, versatile and safe enough to work shoulder-to-shoulder with people, Rethink's new line of Baxter robots redefine how small, mid-size and large domestic manufacturers use automation to compete with manufacturers in low-cost regions of the world.

Based on the vision of Rodney Brooks, co-founder of iRobot and former director of the MIT Computer Science and Artificial Intelligence Lab, Baxter breaks down the cost and safety barriers that have limited automation in American manufacturing up until now.

"Roboticists have been successful in designing robots capable of super-human speed and precision. What's proven more difficult is inventing robots that can act as we do – in other words, that are able to inherently understand and adapt to their environments," said Rodney Brooks, founder and CTO of Rethink Robotics. "We believed that if we could cross that chasm with the manufacturing environment specifically in mind, we could offer new hope to the millions of American manufacturers who are looking for innovative ways to compete in our global economy."

Rethink's Baxter robots are groundbreaking in six different ways. No other product on the market can:

US 5650704 A

US005650704A

United States Patent [19]

Pratt et al.

[11] **Patent Number: 5,650,704**

[45] **Date of Patent: Jul. 22, 1997**

[54] **ELASTIC ACTUATOR FOR PRECISE FORCE CONTROL**

[75] Inventors: **Gill A. Pratt**, Lexington; **Matthew M. Williamson**, Boston, both of Mass.

[73] Assignee: **Massachusetts Institute of Technology**, Cambridge, Mass.

[21] Appl. No.: **496,419**

[22] Filed: **Jun. 29, 1995**

[51] **Int. Cl.**[6] **B25J 17/00**; H02K 7/10

[52] **U.S. Cl.** **318/623**; 318/630; 318/632; 318/560

[58] **Field of Search** ..... 318/560–696; 901/20–47; 395/95; 294/106–111; 74/501 M; 73/862.48

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,442,390	4/1984	Davis	318/663
4,463,291	7/1984	Usry	318/254
4,518,307	5/1985	Bloch	414/729
4,532,462	7/1985	Washbourn et al.	318/372
4,546,295	10/1985	Wickham et al.	318/372
4,546,296	10/1985	Washbourn et al.	318/372
4,546,297	10/1985	Washbourn et al.	318/372
4,546,298	10/1985	Wickham et al.	318/372
4,600,357	7/1986	Coules	414/730
4,657,470	4/1987	Clarke et al.	414/627
4,843,921	7/1989	Kremer	64/89.2
4,865,376	9/1989	Leaver et al.	294/111
4,872,803	10/1989	Asakawa	414/730
4,921,293	5/1990	Ruoff et al.	294/111
		en et al.	414/729
			364/513
		awa	33/382
		ps	318/568.16
		ıra	294/111
		i et al.	74/89.21
			318/568.1
		et al.	73/862.325
		aki	318/568.22
		ost et al.	188/378
		et al.	318/568.11

OTHER PUBLICATIONS

Hanafusa et al., "A Robot Hand with Elastic Fingers and Its Application to Assembly Process," pp. 337–359, *Robot Motion*, Brady et al., MIT Press, Cambridge, MA, 1982.

Howard, "Joint and Actuator Design for Enhanced Stability in Robotic Force Control," Ph.D. thesis, Massachusetts Inst. of Technology, Dept. of Aeronautics and Astronautics, 1990.

Hashimoto et al., "An instrumented compliant wrist using a parallel mechanism," *Japan/USA Symposim on Flexible Automation*, vol. 1, pp. 741–744, ASME, 1992.

Sugano et al., "Force Control of the Robot Finger Joint equipped with Mechanical Compliance Adjuster," *Proc. 1992 IEEE/RSJ Int. Conf. on Intell. Robots & Sys.*, pp. 2005–2013, Jul. 1992.

Pfeffer et al., "Experiments with a Dual–Armed, Cooperative, Flexible–Drivetrain Robot System," *Proc. 1993 IEEE Int. Conf. on Robotics & Automation*, vol. 3, pp. 601–608, May 5, 1993.

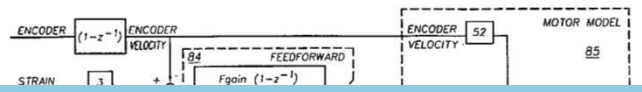
Primary Examiner—Paul Ip

Attorney, Agent, or Firm—Theresa A. Lober

[57] **ABSTRACT**

The invention provides an elastic actuator consisting of a motor and a motor drive transmission connected at an output of the motor. An elastic element is connected in series with the motor drive transmission, and this elastic element is positioned to alone support the full weight of any load connected at an output of the actuator. A single force transducer is positioned at a point between a mount for the motor and an output of the actuator. This force transducer generates a force signal, based on deflection of the elastic element, that indicates force applied by the elastic element to an output of the actuator. An active feedback force control loop is connected between the force transducer and the motor for controlling the motor. This motor control is based on the force signal to deflect the elastic element an amount that produces a desired actuator output force. The produced output force is substantially independent of load motion. The invention also provides a torsional spring consisting of a flexible structure having at least three flat sections each connected integrally with and extending radially from a central section. Each flat section extends axially along the central section from a distal end of the central section to a proximal end of the central section.

9 Claims, 12 Drawing Sheets



US 5650704 A
22 juli 1997
MASSACHUSETTS INST TECHNOLOGY
Elastic actuator for precise force control.

Conclusie:

Met de octrooidatabank weet je heel veel eerder:

- wat een partij ontwikkelt, inclusief technische detailkennis
- evt. waar een product(idee) te koop is

(en als je zelf ontwikkelt) - waarmee oppassen i.v.m. inbreuk

Enkele voorbeelden van recent gepubliceerde octrooien over co(ro)bots

Octrooidatabank (www.espacenet.nl) schat aan info!

(Veilig) samenwerken door visuele middelen ingebed in robots.

G05B2219/00	(20)	Program-control systems
G05B2219/30	(13)	· Nc systems
G05B2219/40	(0)	· · Robotics, robotics mapping to robotics vision
G05B2219/40202	(173)	· · · Human robot coexistence

= juiste classificatiecode om mee te zoeken

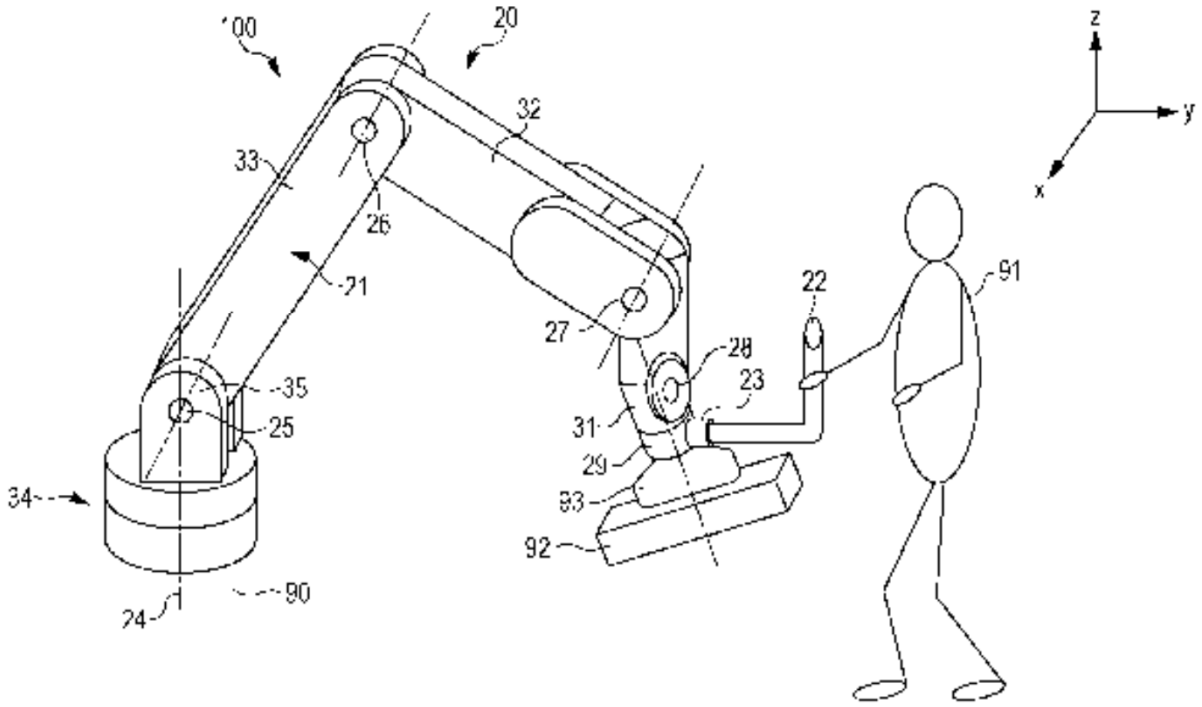
US 2015/0209961 A

30 juli 2015

PANASONIC INTELLECTURAL PROPERTY MAN CO LTD

Robot, device and method for controlling robot, and computer-readable non-transitory recording medium.

FIG. 1

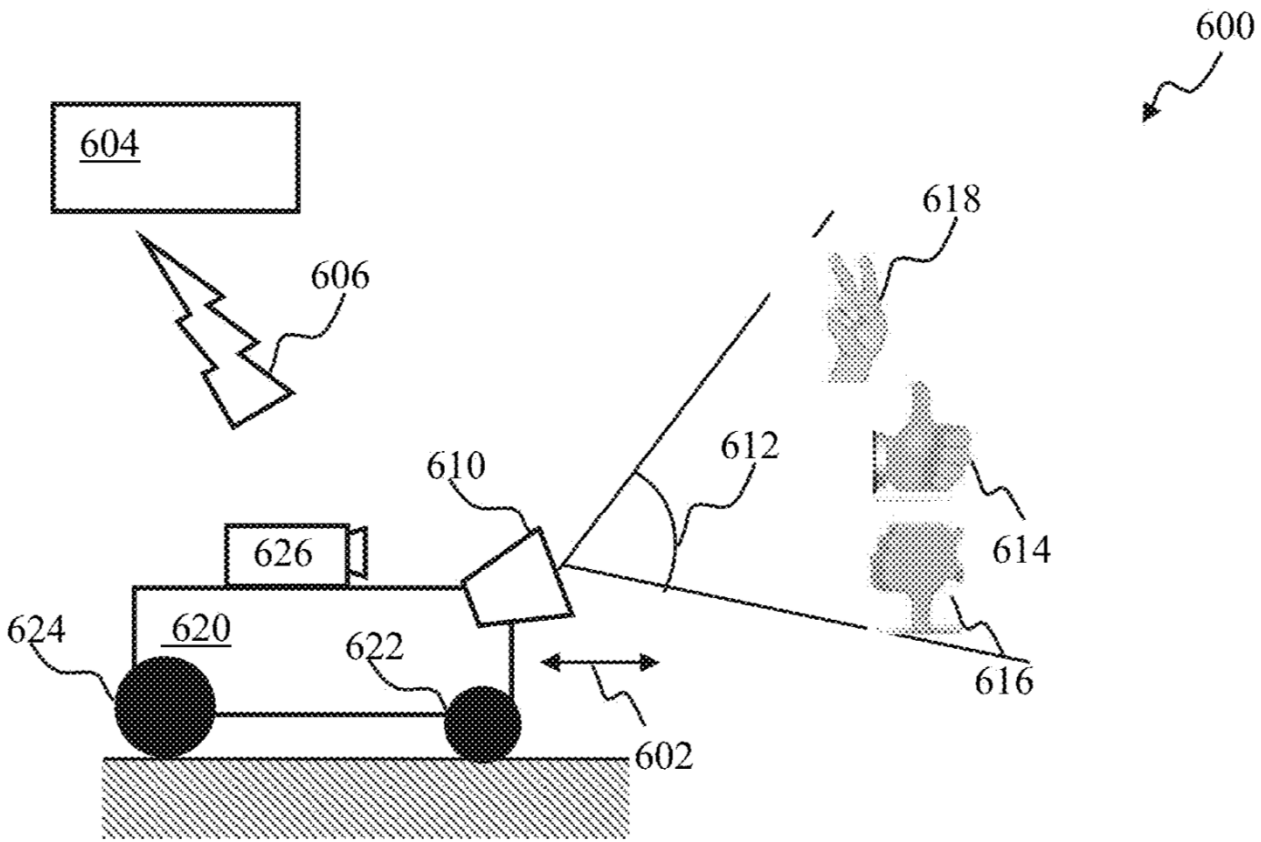


Octrooidatabank (www.espacenet.nl) schat aan info!

Aansturen/aanleren van robots door observatie

G05B2219/00	(20)	Program-control systems
G05B2219/30	(13)	· Nc systems
G05B2219/40	(0)	· · Robotics, robotics mapping to robotics vision
G05B2219/40116	**(60)**	**· · · Learn by operator observation, symbiosis, show, watch**

= juiste classificatiecode om mee te zoeken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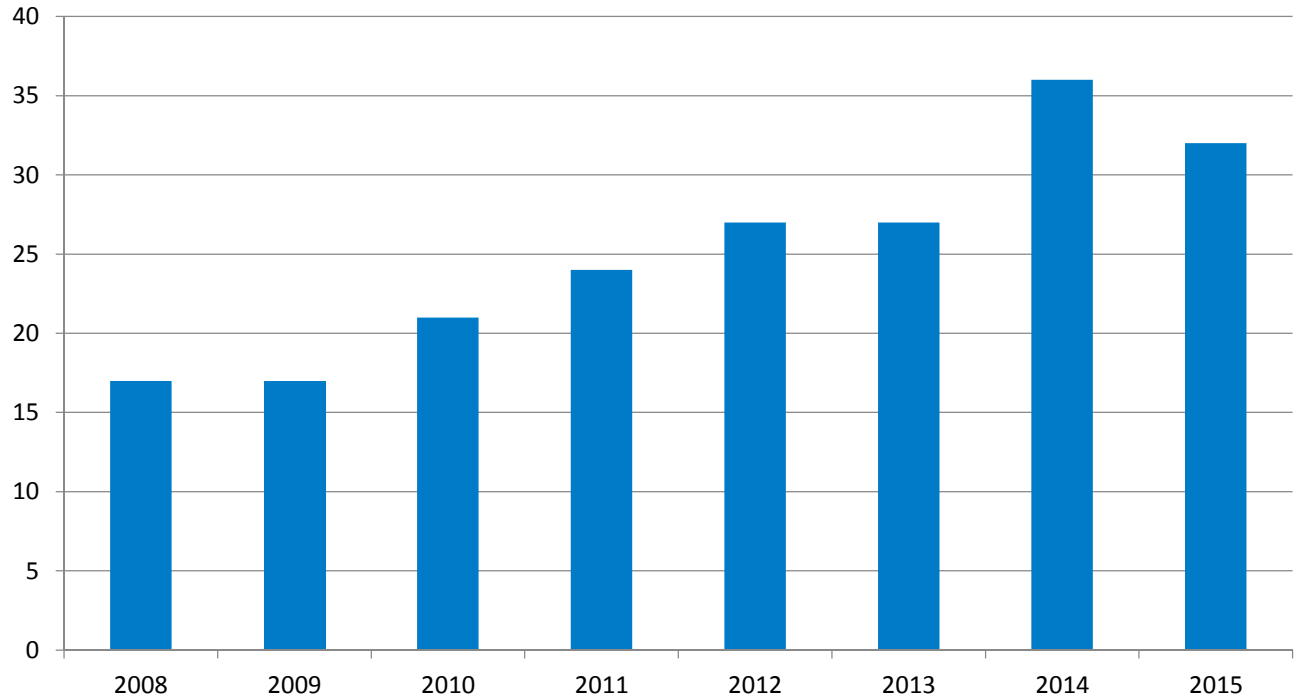
Top 5 landen met octrooien voor robotica:
US
JP
DE
CN
GB

Relatieve aantallen gepubliceerde octrooiaanvragen op het gebied van robotica



Robotarmen (classificatiecode B25J18)

Periode	Type robotarm	Classificatie-code	Opmerking
2015	Flexibel	B25J18/06	Snelste stijger: Chirurgische robots
2010-2015	Flexibel	B25J18/06	
2005-2010	Draaibaar	B25J18/04	
2000-2005	Draaibaar	B25J18/05	
1995-2000	Uitrekbaar	B25J18/02/low	
1990-1995	Uitrekbaar	B25J18/02/low	

Specifieke technische oplossingen nodig? (i.v.m. aankoop of innovatietraject)

Raadpleeg de octrooidatabank, hierdoor weet u eerder:

- Wie een bepaalde techniek ontwikkelt;

- Waar een bepaalde (product)idee te koop is.

Octrooicentrum Nederland kan u hiermee (gratis) helpen

Octrooicentrum Nederland (Rijksoverheid) geeft octrooivoorlichting aan technisch MKB:

Onafhankelijk, kosteloos, regionaal en onder geheimhoudingsplicht

Wat doen wij dan?

- **1:1 gesprek over technische innovaties**
  Bescherming zinvol ? IE strategie, gebruik octrooi-informatie, samenwerking en IE.
- **Presentaties/Workshops**
  O.a. Slim gebruik maken van octrooien, Zelf zoeken in octrooien, Samenwerken & IE en IE strategie
- **Octrooi Signalering Service**
  Actuele info over nieuwste octrooien op een specifiek vakgebied
- **Oriënterend octrooionderzoek op maat voor MKB**

Vragen?
Bedankt voor uw aandacht!

Octrooicentrum Nederland

www.rvo.nl/octrooien

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LinkedIn-profiel