國立台灣大學技術行銷表

台大案號:06A-100119 (由產學組填寫)

產學合作中心聯絡人：　　電話：　　e-mail：

產品/技術名稱	靜力平衡機械支撐臂
發明人/單位	陳達仁/機械工程研究所
產品/技術說明	一種可活動式機械支撐臂內含彈性元件，其荷重在任意位置皆完全被彈性元件支撐而達到靜平衡狀態。本支撐臂由多個平行四邊形空間連桿組組成，藉由多個模組組合可達成多自由度運動。以應用於具動力源操作器為例，可提升驅動能源效率，且因重力平衡機構與驅動機構係屬不同系統，末端受動器之位移解析度可被提高。本支撐臂可應用於機械手臂、各式支撐架。
應用範圍	本支撐臂可應用於機械手臂、各式支撐架如:監視器支撐、檯燈支撐、手術燈支撐、手術設備支撐、廚具廚櫃支撐、窗戶支撐、機械手臂支撐。
產品/技術優勢	多數之重力平衡支撐臂採用接頭摩擦力、配重方法、彈簧平衡等方式達成。其中，配重方法增加了系統慣性，當系統負載很大時，所需之配重亦需很大，以節能而言並非良好之方式，而接頭摩擦力大多以凸輪或齒輪設計容易造成磨耗，降低機構耐用性，亦不適用於高速運動機構系統，反觀彈簧平衡採用會產生阻抗變形力的彈簧，抗衡地心引力對荷重的吸引，以儲能之方式平衡重力位能變化。在適當安裝條件下，彈簧變形量在伴隨機構運動時，其彈力能完全抵銷機構於各個構型下之重力位能變化。多數之彈簧平衡支撐臂基於結構限制，無法完成空間完整三個旋轉自由度運動。本可活動式機械支撐臂因具結構上之通用性，適用範疇廣。
市場潛力	本重力平衡支撐臂具簡易機械結構是一被動平衡，可應用於具或不具動力源機構與機器中，使用彈簧是一低成本經濟之設計。由於可應用範疇廣，舉煩各式支撐架、機械手臂，因此市場潛力無窮。
產品/技術智財權保護方式	（由技轉組填寫）

Marketing Abstract of NTU's Invention Disclosure

NTU's docket no:_____(由技轉室填寫)

TTO contact：　　Tel：　　e-mail：

Title	Gravity Balancing Arm
Inventor (s)	Dar-Zen Cheng etc.
Brief Description	A gravity balancing arm comprises elastic elements where the gravitational forces of all members are counterbalanced. Said gravity balancing arm is in static equilibrium at any configuration. Said gravity balancing arm is constituted of several modules of spatial parallelogram linkages. Each module can provide an independent degree of freedom to the end of said gravity balancing arm. The applications can benefit from the increase of power efficiency since little actuating force is required to sustain the system payloads. Said gravity balancing arm is suitable for support apparatuses and robotic manipulators.
Fields of Application	There are many applications in which lifts, arms, counterbalances, and force and torque providing mechanisms may be useful. Mechanisms such as these can be used to raise and lower a variety of items including, but not limited to, the examples listed followed; video monitors of all sizes, furniture work surfaces, production assembly tools, work load transfer equipment, robotic control devices, and windows.
Advantages	Most gravity balancing arms are achieved by joint friction method, counter-weight method and spring balancing method, where the counter-weight method induces additional inertia to the applied system, and thus, is considered more inefficient with respect to the saving of energy, the joint friction method facilitates abrasive force of a joint to counterbalance the gravitational forces and it may cause unanticipated failure of the system as the joint friction decays. On the other hands, the spring balancing method uses storage elastic energy against the variation of gravitational potential energy. The proposed gravity balancing arm with spring balancing method is a low-cost and efficient design. However, most gravity balancing arms with spring balancing methods have limited capabilities on the range of motion due the limitation of the mechanical structures. The gravity balancing arm of our inventions has a general mechanical structure and is more compatible to most of the applications.
Market Potential	InteSpring (NL), Ergotron (US), Tiffen (US), Leica Microsystems AG (CH), ABB AB (SE)
IP Right(s)	(由技轉室填寫)