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Tropper et al.

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(45) **Date of Patent: Dec. 30, 2014**

(54) **SYSTEM AND METHOD FOR ACTIVATING A DEVICE BASED ON A RECORD OF PHYSICAL ACTIVITY**

(75) Inventors: **Seth A. Tropper**, Marlboro, NJ (US); **Amado Batour**, Somerset, NJ (US)

(73) Assignee: **Fitbit, Inc.**, San Francisco, CA (US)

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CPC ***A61B 5/486*** (2013.01); ***A61B 5/1118*** (2013.01); ***A61B 5/1126*** (2013.01); ***A61B 5/14539*** (2013.01); ***A61B 5/681*** (2013.01); ***A61B 5/6828*** (2013.01); ***G06Q 30/02*** (2013.01); ***G06Q 30/0264*** (2013.01); ***G09F 3/005*** (2013.01); ***A61B 5/0004*** (2013.01); ***A61B 5/6831*** (2013.01); ***A61B 5/6896*** (2013.01); ***A61B 5/6897*** (2013.01); ***A61B 5/6898*** (2013.01); ***A61B 5/7264*** (2013.01); ***A61B 5/743*** (2013.01); ***A63B 71/06*** (2013.01); ***A63F 13/06*** (2013.01); ***G06Q 30/0207*** (2013.01); ***G06Q 30/0217*** (2013.01); ***G06F 19/36*** (2013.01); ***G07F 17/3244*** (2013.01); *A61B 2560/0456* (2013.01); *A63B 24/0059* (2013.01); *A61B 2560/0412* (2013.01); *A61B 2562/0219* (2013.01)
USPC **705/14.22**; 463/36; 482/8; 600/300; 705/3; 705/14.12; 705/14.25; 705/14.35

(58) **Field of Classification Search**
None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,717,736 A 9/1955 Schlesinger
2,883,255 A 4/1959 Anderson
(Continued)

FOREIGN PATENT DOCUMENTS

JP 11347021 12/1999
WO WO 2008/038141 4/2008
WO WO 2009/042965 4/2009

OTHER PUBLICATIONS

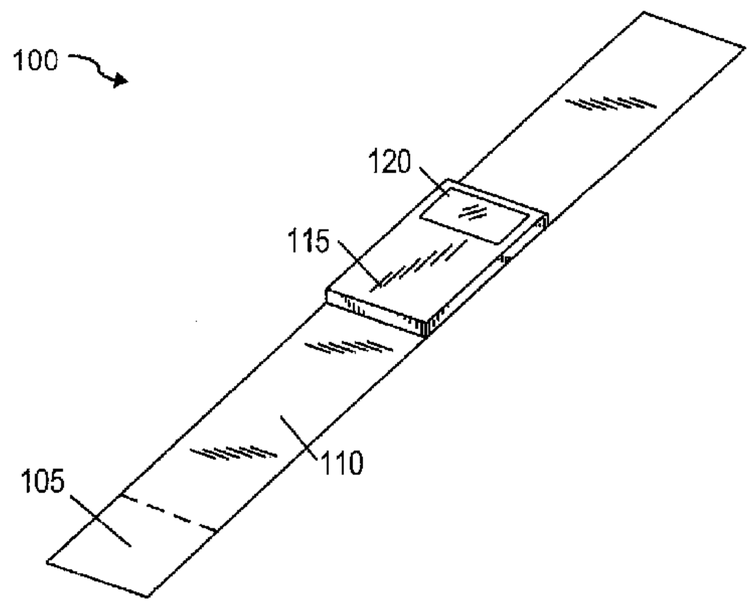
International Search Report issued on Aug. 15, 2008, in related application PCT/IB07/03617.
(Continued)

Primary Examiner — Robert R Niquette
(74) *Attorney, Agent, or Firm* — Martine Penilla Group, LLP

(57) **ABSTRACT**

In a redeemable coupon there is a housing, a motion detector coupled to the housing, wherein the motion detector detects an amount of motion of the coupon, and an indicator coupled to the motion detector, wherein the indicator is activated by the motion detector upon detecting the amount of motion. Additionally, in a method of providing an incentive for a user to exercise, providing the user with a coupon to be coupled to the user, monitoring the motion of the user with a motion sensor included in the coupon, and activating the coupon when the motion sensor has detected a predetermined amount of motion such that the coupon becomes redeemable by the user.

28 Claims, 18 Drawing Sheets



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A63B 71/06	(2006.01)
A63F 13/20	(2014.01)
G06F 19/00	(2011.01)
G07F 17/32	(2006.01)
A63B 24/00	(2006.01)

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,163,856	A	12/1964	Kirby	
3,250,270	A	5/1966	Bloom	
3,918,658	A	11/1975	Beller	
4,192,000	A	3/1980	Lipsey	
4,244,020	A	1/1981	Ratcliff	
2,284,849	A	8/1981	Anderson et al.	
4,281,663	A	8/1981	Pringle	
4,284,849	A	8/1981	Anderson et al.	
4,312,358	A	1/1982	Barney	
4,367,752	A	1/1983	Jimenez et al.	
4,390,922	A	6/1983	Pelliccia	
4,407,295	A	10/1983	Steuer et al.	
4,425,921	A	1/1984	Fujisaki et al.	
4,575,804	A	3/1986	Ratcliff	
4,578,769	A	3/1986	Frederick	
4,617,525	A	10/1986	Lloyd	
4,887,249	A	12/1989	Thinesen	
4,977,509	A	12/1990	Pitchford et al.	
5,058,427	A	10/1991	Brandt	
5,224,059	A	6/1993	Nita et al.	
5,295,085	A	3/1994	Hoffacker	
5,323,650	A	6/1994	Fullen et al.	
5,446,705	A	8/1995	Haas et al.	368/327
5,456,648	A	10/1995	Edinburg et al.	482/4
5,583,776	A	12/1996	Levi et al.	
5,671,162	A	9/1997	Werbin	
5,704,350	A	1/1998	Williams, III	
5,724,265	A	3/1998	Hutchings	
5,890,128	A	3/1999	Diaz et al.	
5,891,042	A	4/1999	Sham et al.	
5,894,454	A	4/1999	Kondo	
5,899,963	A	5/1999	Hutchings	
5,947,868	A	9/1999	Dugan	
5,955,667	A	9/1999	Fyfe	
5,976,083	A	11/1999	Richardson et al.	
6,018,705	A	1/2000	Gaudet et al.	
6,077,193	A	6/2000	Buhler et al.	
6,085,248	A	7/2000	Sambamurthy et al.	
6,129,686	A	10/2000	Friedman	
6,145,389	A	11/2000	Ebeling et al.	
6,183,425	B1	2/2001	Whalen et al.	
6,213,872	B1	4/2001	Harada et al.	463/7
6,241,684	B1	6/2001	Amino et al.	
6,287,262	B1	9/2001	Amano et al.	
6,301,964	B1	10/2001	Fyfe et al.	
6,302,789	B2	10/2001	Harada et al.	463/7
6,305,221	B1	10/2001	Hutchings	
6,309,360	B1	10/2001	Mault	
6,469,639	B2	10/2002	Tanenhaus et al.	
6,478,736	B1	11/2002	Mault	
6,513,381	B2	2/2003	Fyfe et al.	
6,513,532	B2	2/2003	Mault et al.	
6,527,711	B1	3/2003	Stivoric et al.	
6,529,827	B1	3/2003	Beason et al.	
6,561,951	B2	5/2003	Cannon et al.	482/1
6,571,200	B1	5/2003	Mault	
6,585,622	B1 *	7/2003	Shum et al.	482/8
6,607,493	B2	8/2003	Song	
6,620,078	B2	9/2003	Pfeffer	
6,678,629	B2	1/2004	Tsuji	
6,699,188	B2	3/2004	Wessel	
6,761,064	B2	7/2004	Tsuji	
6,790,178	B1	9/2004	Mault et al.	
6,808,473	B2	10/2004	Hisano	
6,811,516	B1 *	11/2004	Dugan	482/8
6,813,582	B2	11/2004	Levi et al.	
6,813,931	B2	11/2004	Yadav et al.	
6,856,938	B2	2/2005	Kurtz	
6,862,575	B1	3/2005	Anttila et al.	705/14.14
7,062,225	B2	6/2006	White	
7,162,368	B2	1/2007	Levi et al.	
7,171,331	B2	1/2007	Vock et al.	
7,200,517	B2	4/2007	Darley et al.	
7,246,033	B1	7/2007	Kudo	
7,261,690	B2	8/2007	Teller et al.	
7,272,982	B2	9/2007	Neuhauser et al.	73/865.9
7,373,820	B1	5/2008	James	
7,443,292	B2	10/2008	Jensen et al.	340/540
7,457,724	B2	11/2008	Vock et al.	
7,467,060	B2	12/2008	Kulach et al.	
7,505,865	B2	3/2009	Ohkubo et al.	
7,559,877	B2	7/2009	Parks et al.	
7,653,508	B1	1/2010	Kahn et al.	
7,690,556	B1	4/2010	Kahn et al.	
7,713,173	B2	5/2010	Shin et al.	
7,762,952	B2	7/2010	Lee et al.	
7,774,156	B2	8/2010	Niva et al.	
7,789,802	B2	9/2010	Lee et al.	
7,881,902	B1	2/2011	Kahn et al.	
7,927,253	B2	4/2011	Vincent et al.	
7,983,876	B2	7/2011	Vock et al.	
8,028,443	B2	10/2011	Case, Jr.	
8,055,469	B2	11/2011	Kulach et al.	
8,099,318	B2	1/2012	Moukas et al.	
8,177,260	B2	5/2012	Tropper et al.	283/67
8,180,591	B2	5/2012	Yuen et al.	
8,180,592	B2	5/2012	Yuen et al.	
8,311,769	B2	11/2012	Yuen et al.	
8,311,770	B2	11/2012	Yuen et al.	
8,386,008	B2	2/2013	Yuen et al.	
8,437,980	B2	5/2013	Yuen et al.	
8,463,576	B2	6/2013	Yuen et al.	
8,463,577	B2	6/2013	Yuen et al.	
8,543,185	B2	9/2013	Yuen et al.	
8,543,351	B2	9/2013	Yuen et al.	
8,548,770	B2	10/2013	Yuen et al.	
8,583,402	B2	11/2013	Yuen et al.	
8,597,093	B2	12/2013	Engelberg et al.	
8,670,953	B2	3/2014	Yuen et al.	
2001/0055242	A1	12/2001	Deshmukh et al.	
2002/0013717	A1	1/2002	Ando et al.	
2002/0077219	A1	6/2002	Cohen et al.	
2002/0082144	A1	6/2002	Pfeffer	
2002/0109600	A1	8/2002	Mault et al.	
2002/0178060	A1 *	11/2002	Sheehan	705/14
2002/0198776	A1	12/2002	Nara et al.	
2003/0018523	A1 *	1/2003	Rappaport et al.	705/14
2003/0050537	A1 *	3/2003	Wessel	600/300
2003/0065561	A1 *	4/2003	Brown et al.	705/14
2003/0131059	A1	7/2003	Brown et al.	
2004/0054497	A1	3/2004	Kurtz	
2004/0061324	A1	4/2004	Howard	
2004/0117963	A1	6/2004	Schneider	
2004/0152957	A1	8/2004	Stivoric et al.	600/300
2005/0037844	A1 *	2/2005	Shum et al.	463/36
2005/0038679	A1	2/2005	Short	
2005/0054938	A1	3/2005	Wehman et al.	
2005/0102172	A1	5/2005	Sirmans, Jr.	
2005/0107723	A1	5/2005	Wehman et al.	
2005/0228244	A1	10/2005	Banet	
2005/0228692	A1	10/2005	Hodgdon	
2005/0234742	A1 *	10/2005	Hodgdon	705/2
2005/0248718	A1	11/2005	Howell et al.	
2005/0272564	A1	12/2005	Pyles et al.	
2006/0020177	A1	1/2006	Seo et al.	
2006/0025282	A1	2/2006	Redmann	
2006/0047208	A1	3/2006	Yoon	
2006/0047447	A1	3/2006	Brady et al.	
2006/0069619	A1 *	3/2006	Walker et al.	705/14
2006/0089542	A1	4/2006	Sands	
2006/0111944	A1 *	5/2006	Sirmans et al.	705/3
2006/0129436	A1	6/2006	Short	

(56) **References Cited**

U.S. PATENT DOCUMENTS

2006/0143645	A1	6/2006	Vock et al.	
2006/0277474	A1	12/2006	Robarts et al.	715/745
2006/0282021	A1	12/2006	DeVaul et al.	
2006/0287883	A1	12/2006	Turgiss et al.	
2007/0050715	A1	3/2007	Behar	
2007/0051369	A1	3/2007	Choi et al.	
2007/0071643	A1	3/2007	Hall et al.	
2007/0123391	A1	5/2007	Shin et al.	
2007/0136093	A1	6/2007	Rankin et al.	
2007/0155277	A1	7/2007	Amitai et al.	
2007/0159926	A1	7/2007	Prstojevich et al.	
2007/0179356	A1*	8/2007	Wessel	600/300
2007/0194066	A1	8/2007	Ishihara et al.	
2007/0197920	A1	8/2007	Adams	
2007/0208544	A1	9/2007	Kulach et al.	
2007/0276271	A1	11/2007	Chan	
2008/0093838	A1	4/2008	Tropper et al.	283/67
2008/0125288	A1	5/2008	Case	
2008/0140163	A1	6/2008	Keacher et al.	
2008/0140338	A1	6/2008	No et al.	
2009/0018797	A1	1/2009	Kasama et al.	
2009/0043531	A1	2/2009	Kahn et al.	
2009/0048044	A1	2/2009	Oleson et al.	
2009/0054737	A1	2/2009	Magar et al.	
2009/0063193	A1	3/2009	Barton et al.	
2009/0171788	A1	7/2009	Tropper et al.	
2009/0271147	A1	10/2009	Sugai	
2010/0205541	A1	8/2010	Rapaport et al.	
2010/0217099	A1	8/2010	LeBoeuf et al.	
2011/0003665	A1	1/2011	Burton et al.	
2011/0009051	A1*	1/2011	Khedouri et al.	455/3.06
2011/0022349	A1	1/2011	Stirling et al.	
2011/0080349	A1	4/2011	Holbein et al.	
2011/0106449	A1	5/2011	Chowdhary et al.	
2011/0131005	A1	6/2011	Ueshima et al.	
2011/0193704	A1	8/2011	Harper et al.	
2011/0224508	A1	9/2011	Moon	
2011/0230729	A1	9/2011	Shirasaki et al.	
2012/0072165	A1	3/2012	Jallon	
2012/0083705	A1	4/2012	Yuen et al.	
2012/0083714	A1	4/2012	Yuen et al.	
2012/0083715	A1	4/2012	Yuen et al.	
2012/0083716	A1	4/2012	Yuen et al.	
2012/0084053	A1	4/2012	Yuen et al.	
2012/0084054	A1	4/2012	Yuen et al.	
2012/0092157	A1	4/2012	Tran	
2012/0183939	A1	7/2012	Aragones et al.	
2012/0226471	A1	9/2012	Yuen et al.	
2012/0226472	A1	9/2012	Yuen et al.	
2012/0227737	A1	9/2012	Mastrototaro et al.	
2012/0265480	A1	10/2012	Oshima	
2012/0330109	A1	12/2012	Tran	
2013/0006718	A1	1/2013	Nielsen et al.	
2013/0072169	A1	3/2013	Ross et al.	
2013/0073254	A1	3/2013	Yuen et al.	
2013/0073255	A1	3/2013	Yuen et al.	
2013/0080113	A1	3/2013	Yuen et al.	
2013/0095459	A1	4/2013	Tran	
2013/0096843	A1	4/2013	Yuen et al.	
2013/0151196	A1	6/2013	Yuen et al.	
2013/0158369	A1	6/2013	Yuen et al.	
2013/0231574	A1	9/2013	Tran	
2013/0261475	A1	10/2013	Mochizuki	
2013/0267249	A1	10/2013	Rosenberg	
2013/0268199	A1	10/2013	Nielsen et al.	
2013/0268236	A1	10/2013	Yuen et al.	
2013/0296666	A1	11/2013	Kumar et al.	
2013/0296673	A1	11/2013	Thaveeprungsriporn et al.	
2013/0310896	A1	11/2013	Mass	
2013/0325396	A1	12/2013	Yuen et al.	
2014/0035761	A1	2/2014	Burton et al.	
2014/0039804	A1	2/2014	Park et al.	
2014/0039840	A1	2/2014	Yuen et al.	
2014/0077673	A1	3/2014	Garg et al.	

OTHER PUBLICATIONS

In U.S. Appl. No. 11/862,059, a non-final Office Action was mailed on Feb. 23, 2011, 28 pages.

In U.S. Appl. No. 11/862,059, a Notice of Allowance was mailed on Jan. 13, 2012, 11 pages.

"Automatic classification of ambulatory movements and evaluation of energy consumptions utilizing accelerometers and barometer", Ohtaki, et al, Microsystem Technologies, vol. 11, No. 8-10, Aug. 2005, pp. 1034-1040.

"Classification of Human Moving Patterns Using Air Pressure and Acceleration", Sagawa, et al, Proceedings of the 24th Annual Conference of the IEEE Industrial Electronics Society, vol. 2, Aug.-Sep. 1998, pp. 1214-1219.

"Non-restricted measurement of walking distance", Sagawa, et al, IEEE Int'l Conf. on Systems, Man, and Cybernetics, vol. 3, Oct. 2000, pp. 1847-1852.

"Activity Classification Using Realistic Data From Wearable Sensors", Parkka, et al, IEEE Transactions on Information Technology in Biomedicine, vol. 10, No. 1, Jan. 2006, pp. 119-128.

"Indoor Navigation with MEMS Sensors", Lammel, et al., Proceedings of the Eurosensors XIII conference, vol. 1, No. 1, Sep. 2009, pp. 532-535.

"Design of a Wireless Assisted Pedestrian Dead Reckoning System—The NavMote Experience", Fang, et al, IEEE Transactions on Instrumentation and Measurement, vol. 54, No. 6, Dec. 2005, pp. 2342-2358.

"On Foot Navigation: When GPS alone is not Enough", Ladetto, et al, Journal of Navigation, vol. 53, No. 2, Sep. 2000, pp. 279-285.

"A Hybrid Discriminative/Generative Approach for Modeling Human Activities", Lester, et al., Proc. of the Int'l Joint Conf. Artificial Intelligence, 2005, pp. 766-772.

"Using MS5534 for altimeters and barometers", Intersema App., Note AN501, Jan. 2006.

"Validated caloric expenditure estimation using a single body-worn sensor", Lester, et al, Proc. of the Int'l Conf. on Ubiquitous Computing, 2009, pp. 225-234.

"Drift-free dynamic height sensor using MEMS IMU aided by MEMS pressure sensor", Tanigawa, et al, Workshop on Positioning, Navigation and Communication, Mar. 2008, pp. 191-196.

"Improvement of Walking Speed Prediction by Accelerometry and Altimetry, Validated by Satellite Positioning", Perrin, et al, Medical & Biological Engineering & Computing, vol. 38, 2000, pp. 164-168.

"An Intelligent Multi-Sensor system for Pedestrian Navigation", Retscher, Journal of Global Positioning Systems, vol. 5, No. 1, 2006, pp. 110-118.

"Evaluation of a New Method of Heading Estimation of Pedestrian Dead Reckoning Using Shoe Mounted Sensors", Stirling et al., Journal of Navigation, vol. 58, 2005, pp. 31-45.

"Direct Measurement of Human Movement by Accelerometry", Godfrey, et al., Medical Engineering & Physics, vol. 30, 2008, pp. 1364-1386.

"Foot Mounted Inertia System for Pedestrian Naviation", Godha et al., Measurement Science and Technology, vol. 19, No. 7, May 2008, pp. 1-9.

"Altimeter and Barometer System", Clifford, et al., Freescale Semiconductor Aplication Note AN1979, Rev. 3, Nov. 2006.

"SCP 1000-D01/D11 Pressure Sensor as Barometer and Altimeter", VTI Technologies Application, Jun. 2006, Note 33.

"Suunto LUMI User Guide", Jun. and Sep. 1997.

Deepak et al., Plug-and-Play, Single-Chip Photoplethysmography, 34th Annual International Conference of the IEEE EMBS, San Diego, California USA, Aug. 28-Sep. 1, 2012, 4 pages.

* cited by examiner

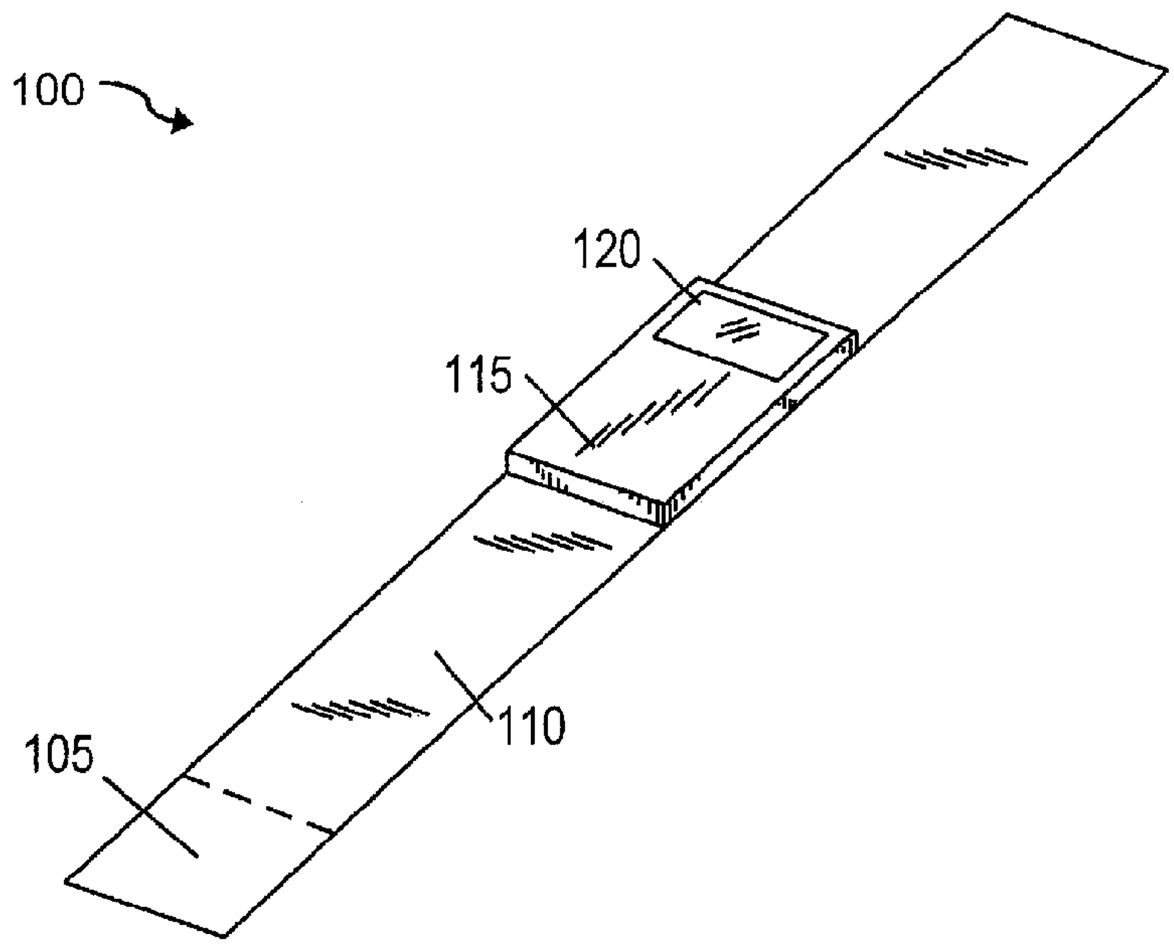


FIG. 1

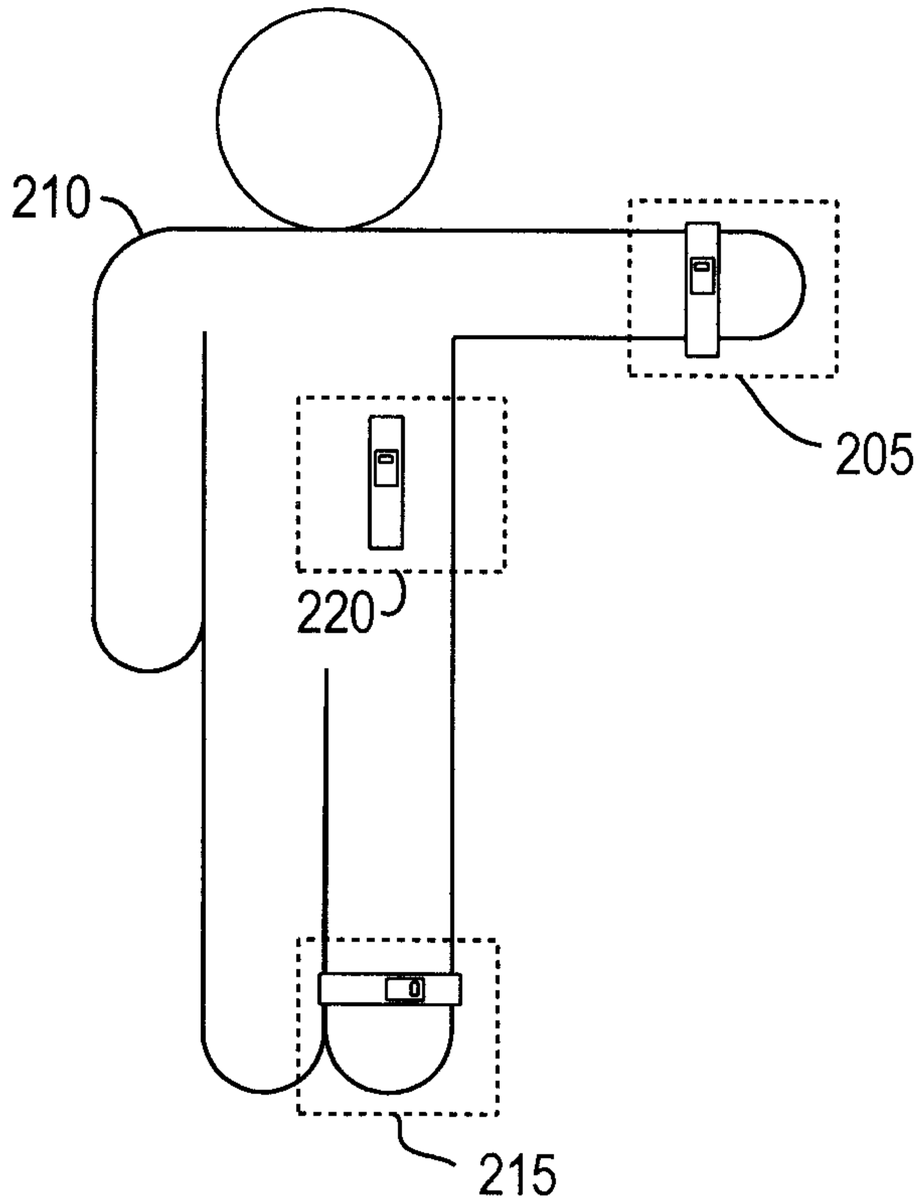


FIG. 2

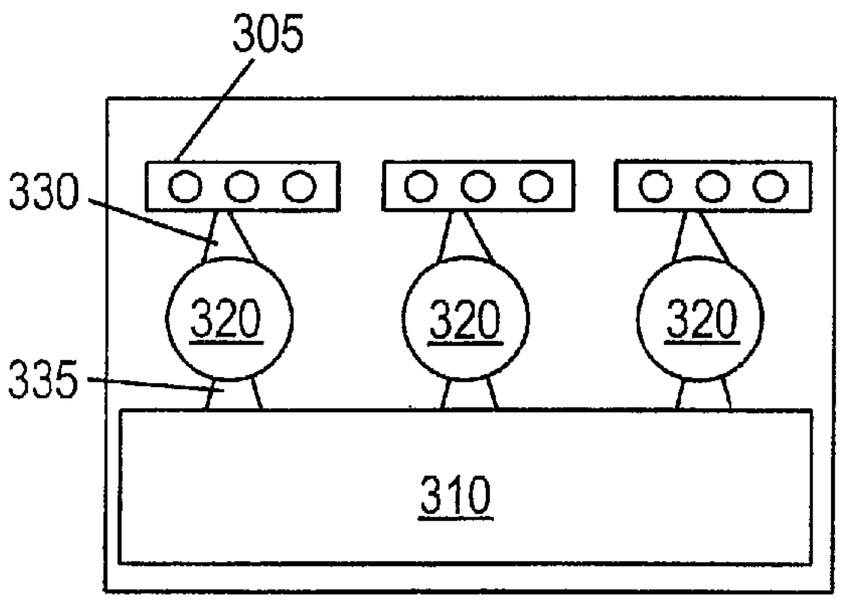


FIG. 3a

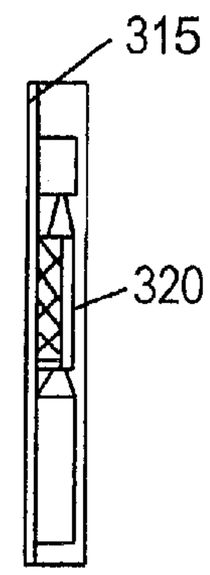


FIG. 3b

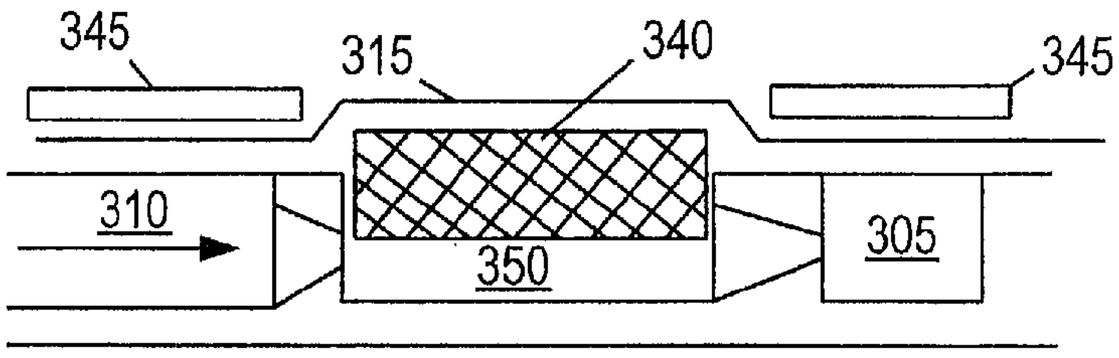


FIG. 3c

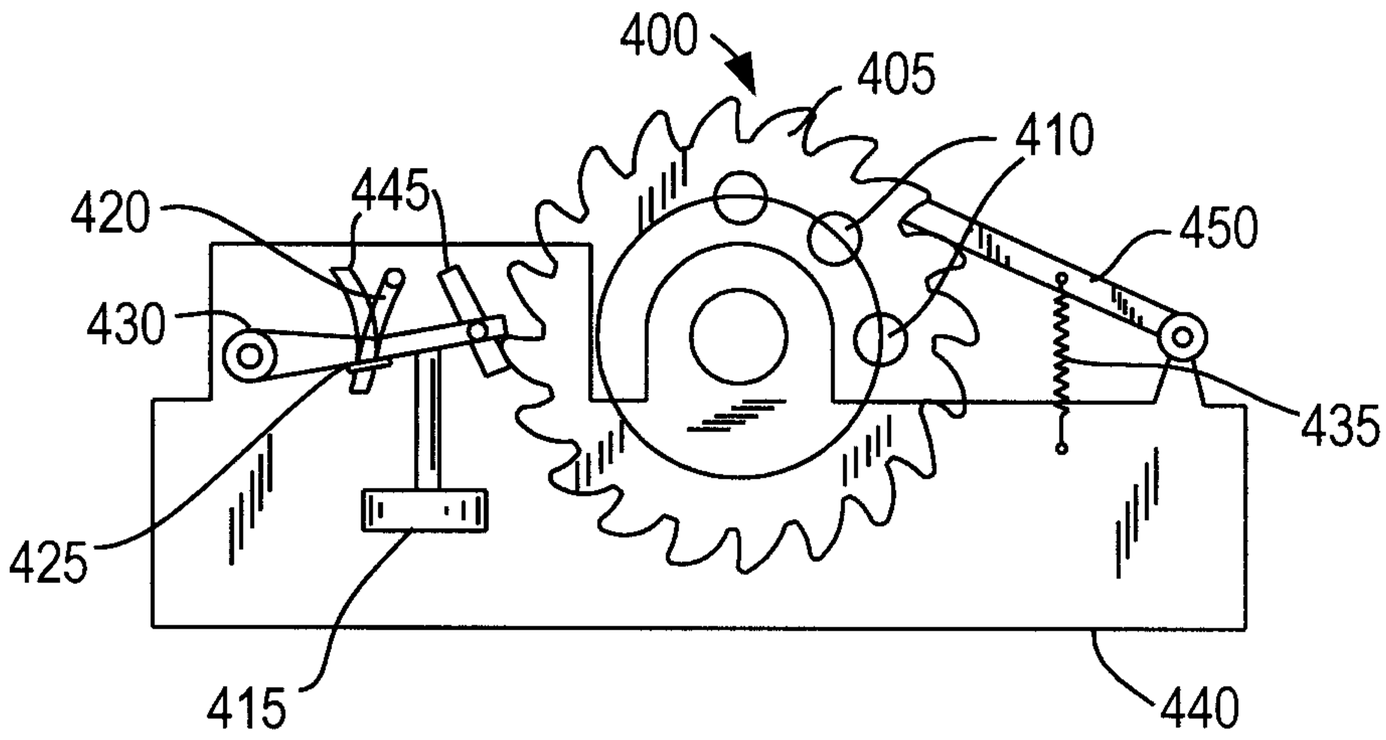

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FIG. 4

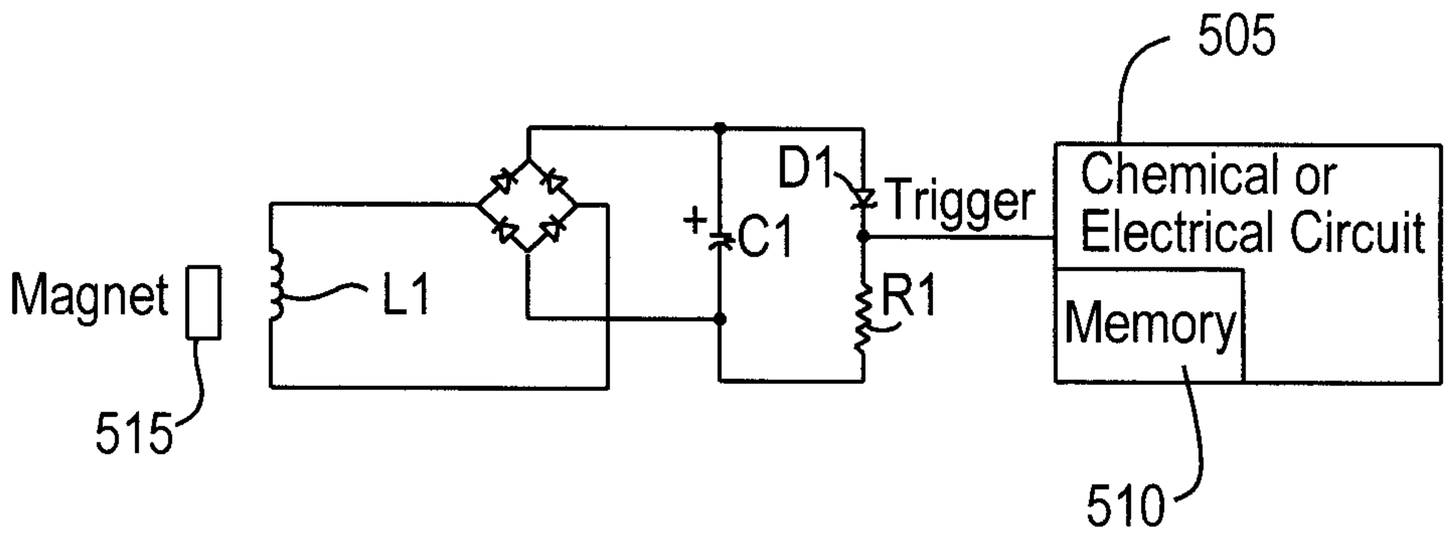

505
D1
Trigger
Chemical or
Electrical Circuit
+
C1
Magnet
L1
R1
Memory
515
510

FIG.5

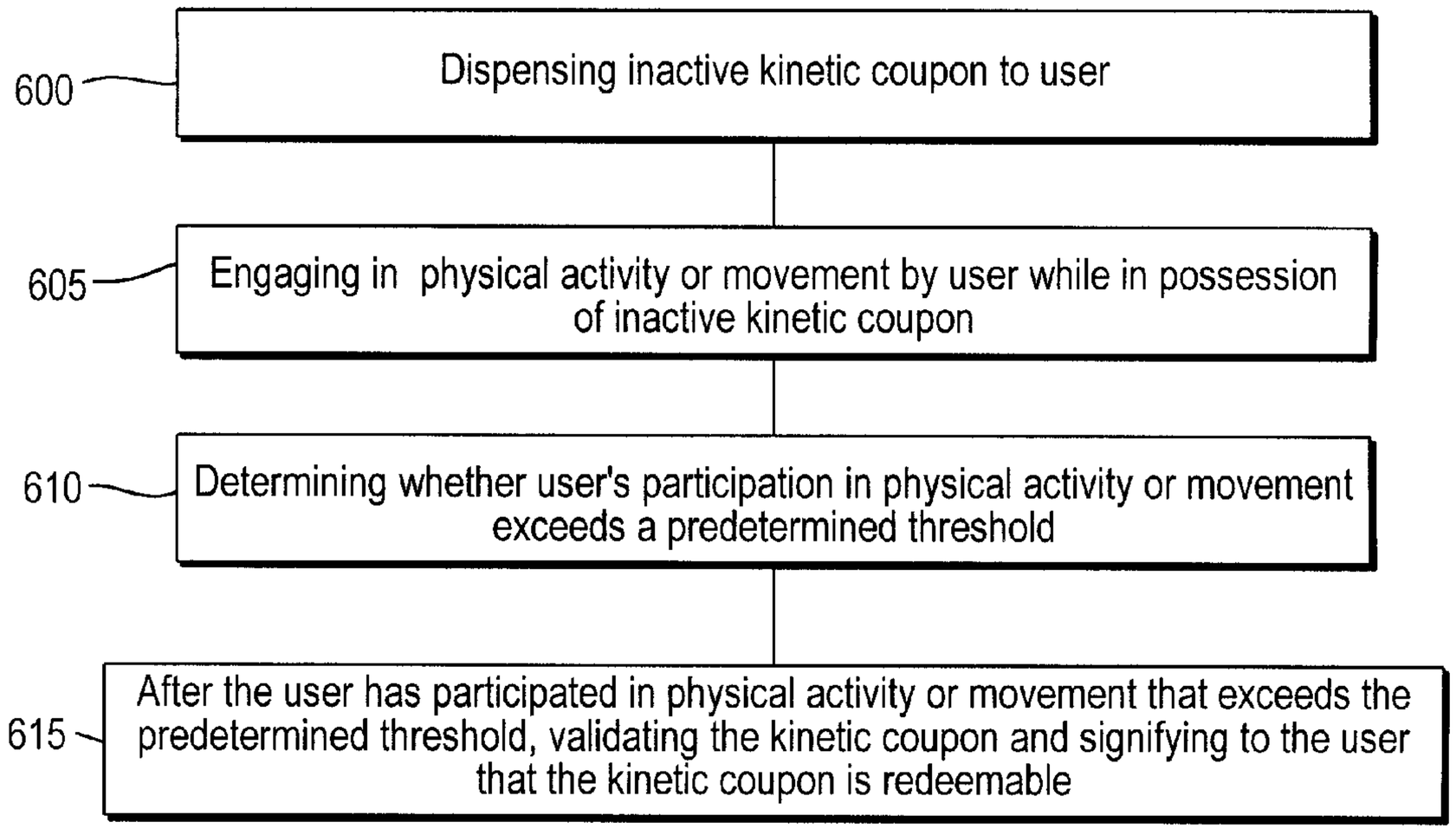

600
Dispensing inactive kinetic coupon to user
605
Engaging in physical activity or movement by user while in possession of inactive kinetic coupon
610
Determining whether user's participation in physical activity or movement exceeds a predetermined threshold
615
After the user has participated in physical activity or movement that exceeds the predetermined threshold, validating the kinetic coupon and signifying to the user that the kinetic coupon is redeemable

FIG.6

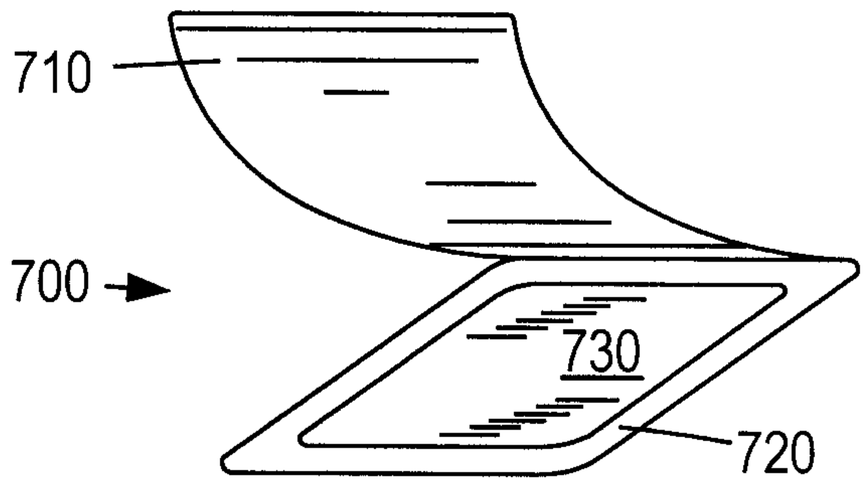


FIG. 7a

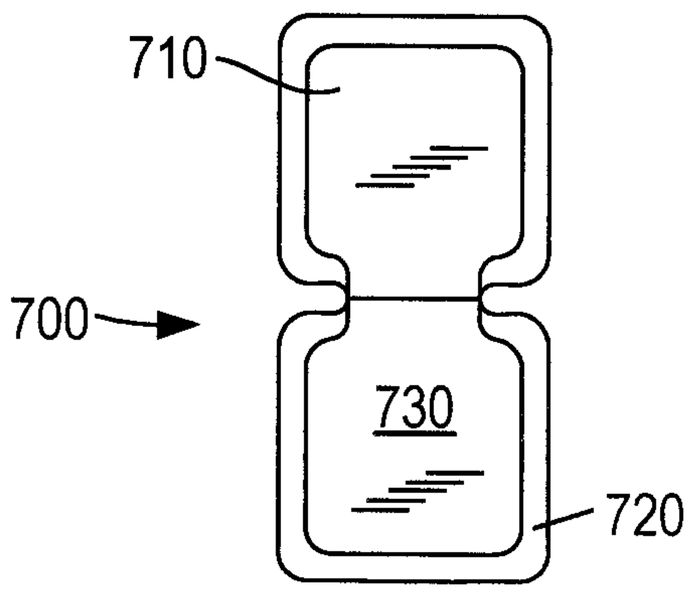


FIG. 7b

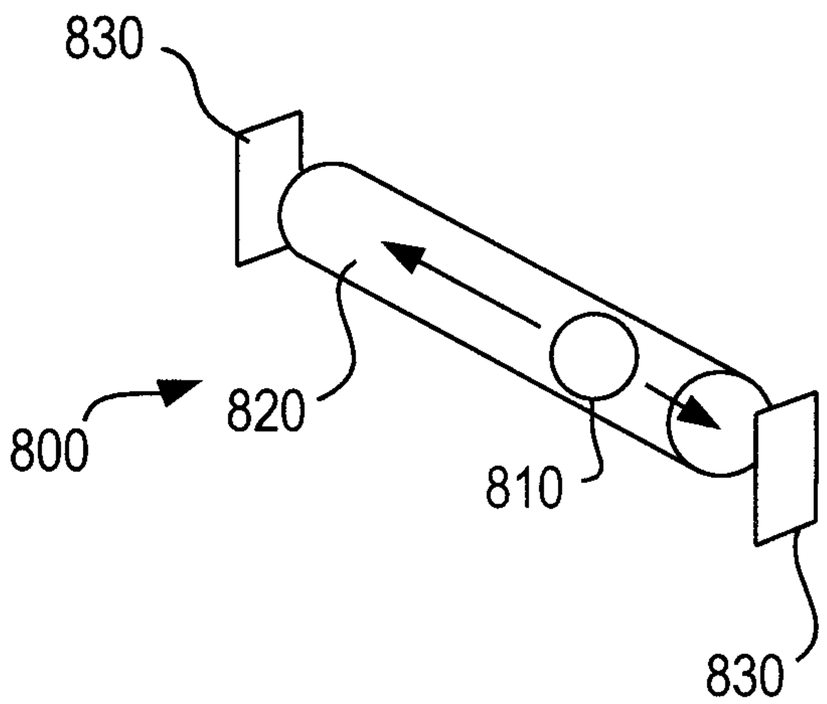


FIG.8a

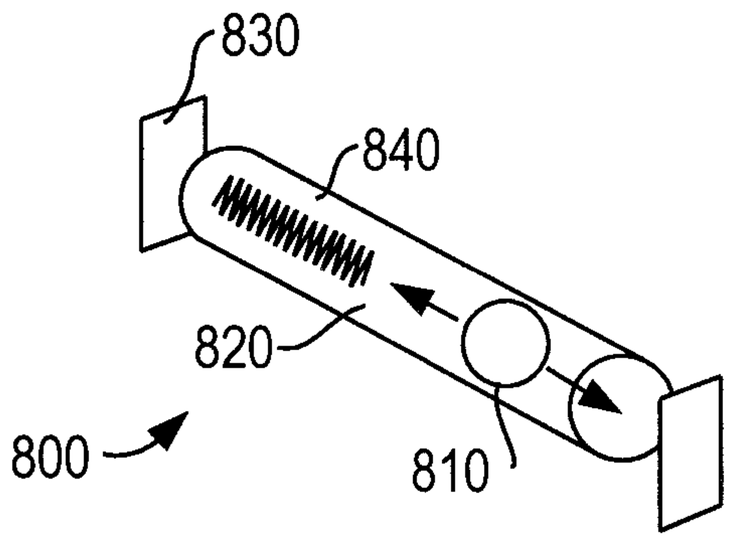


FIG.8b

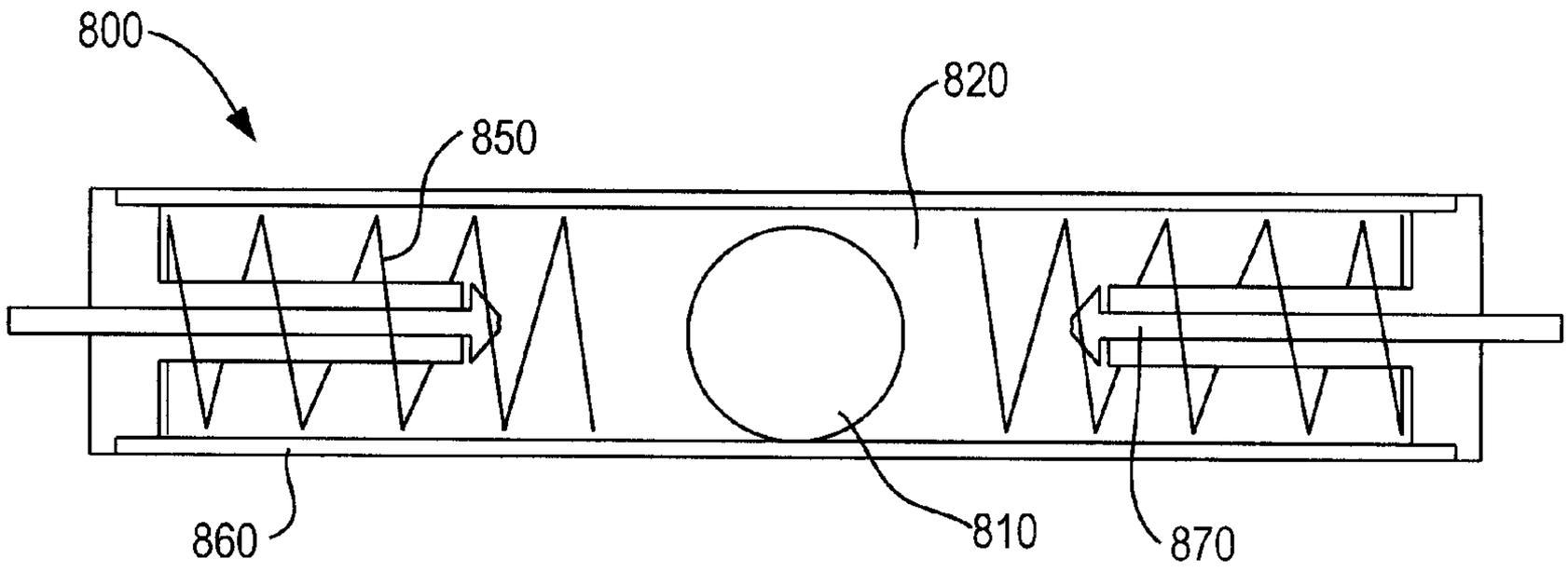


FIG. 8c

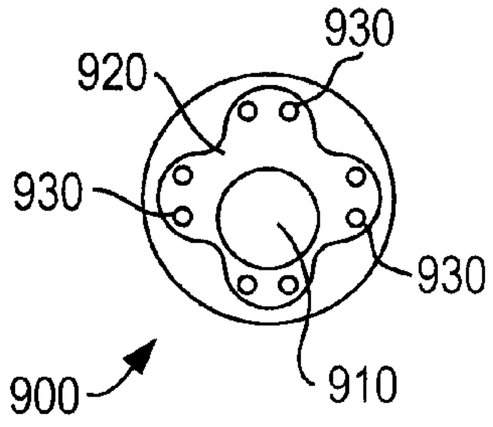


FIG. 9

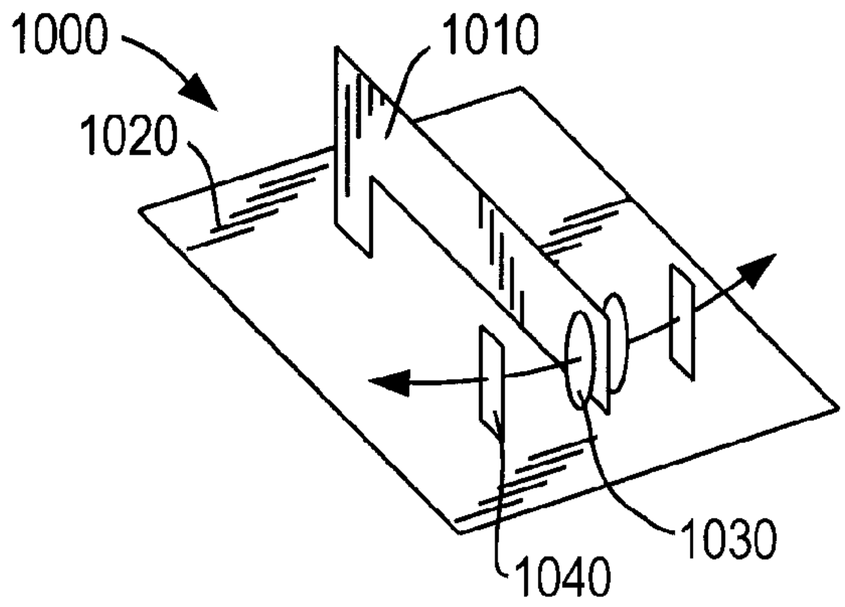

1000
1010
1020
1030
1040

FIG. 10

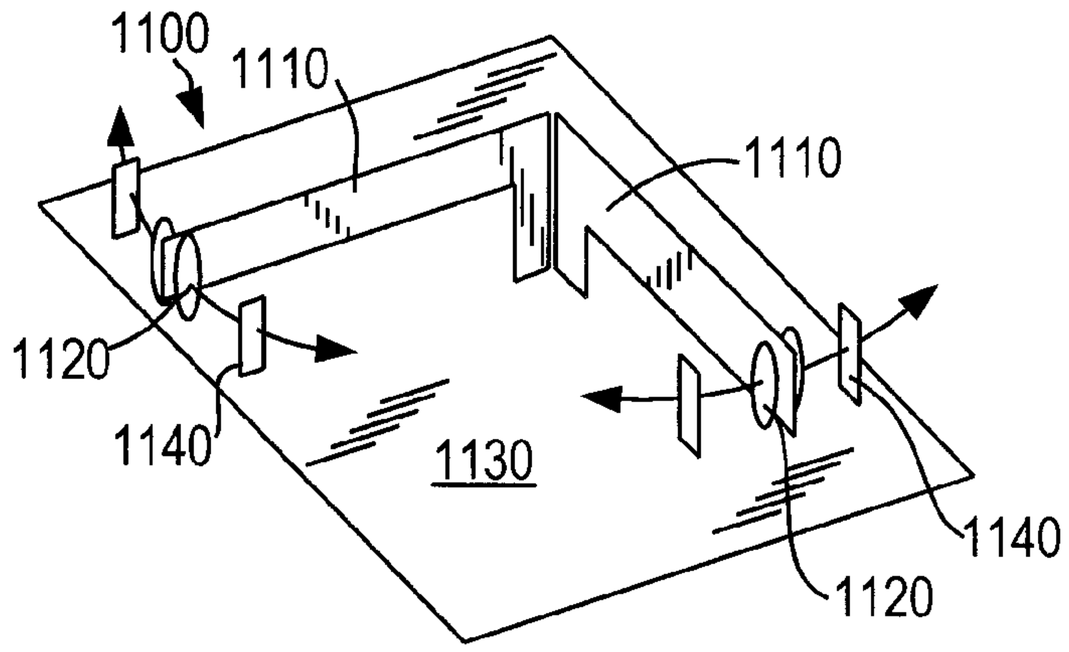

1100
1110
1110
1120
1140
1130
1140
1120

FIG. 11

FIG. 12

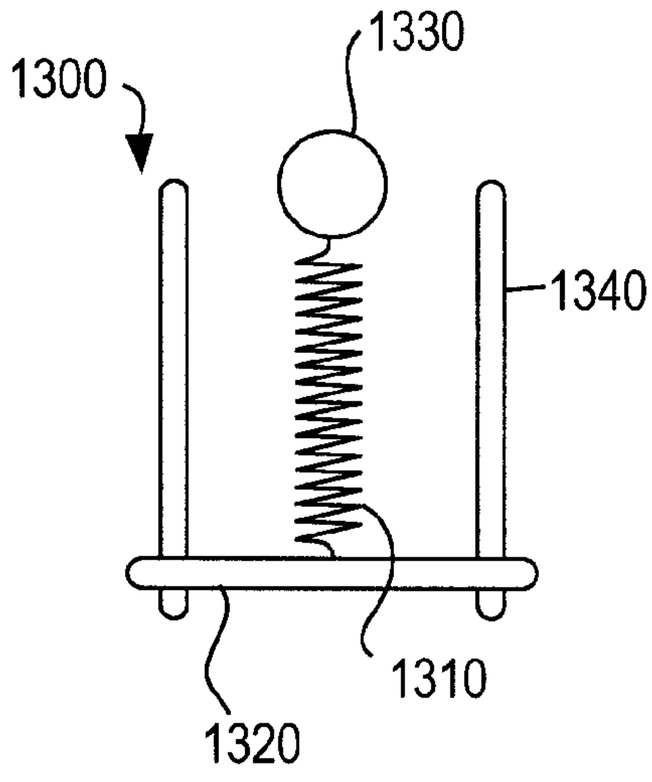


FIG. 13

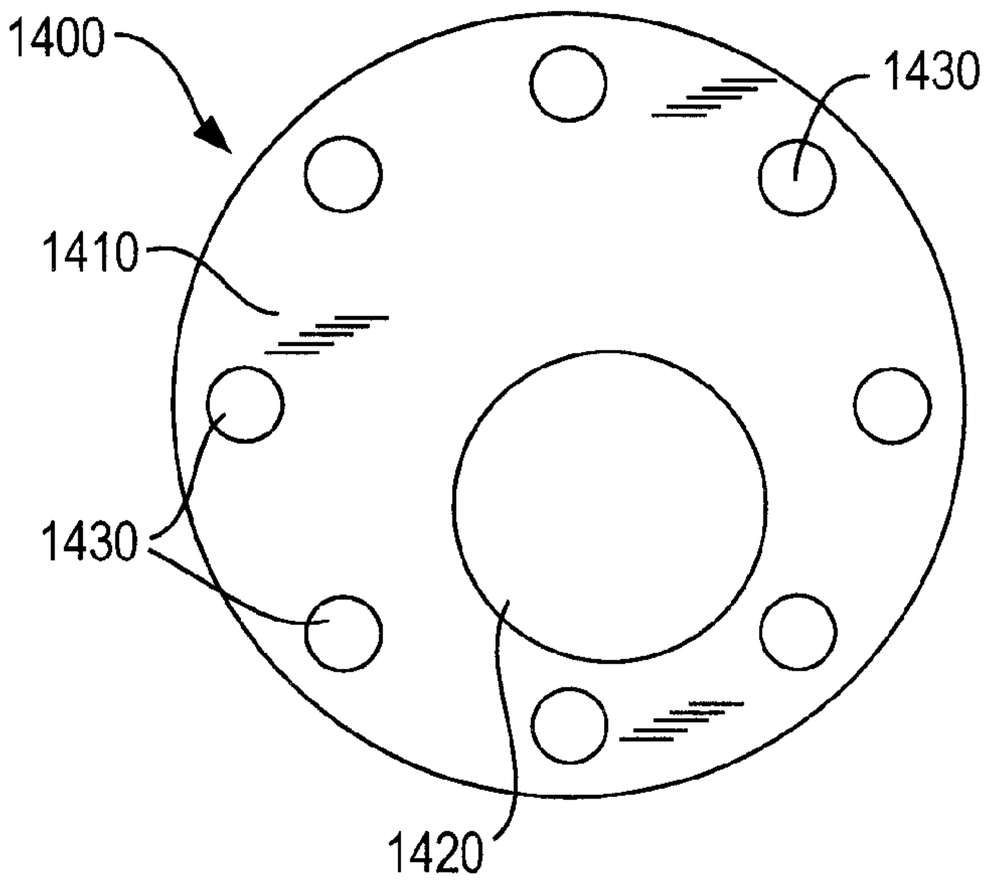


FIG. 14

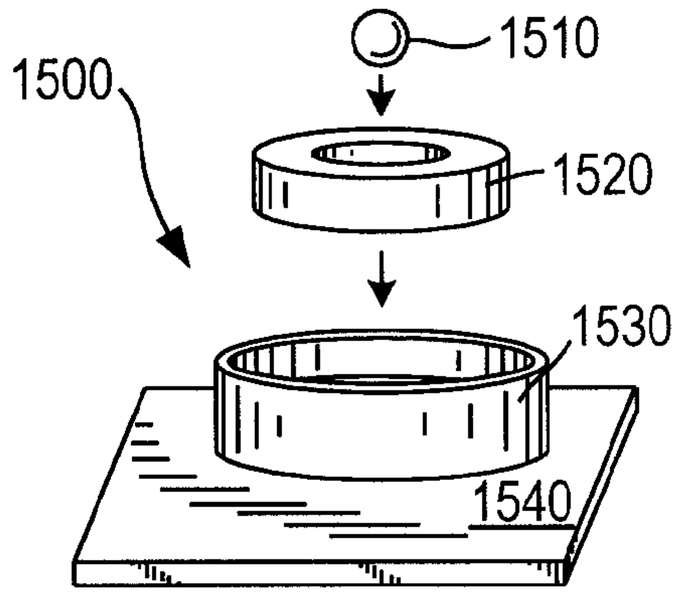


FIG. 15a

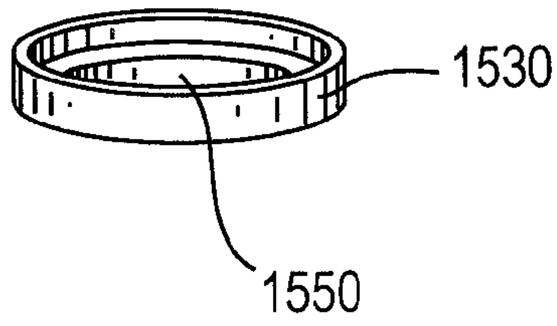


FIG. 15b

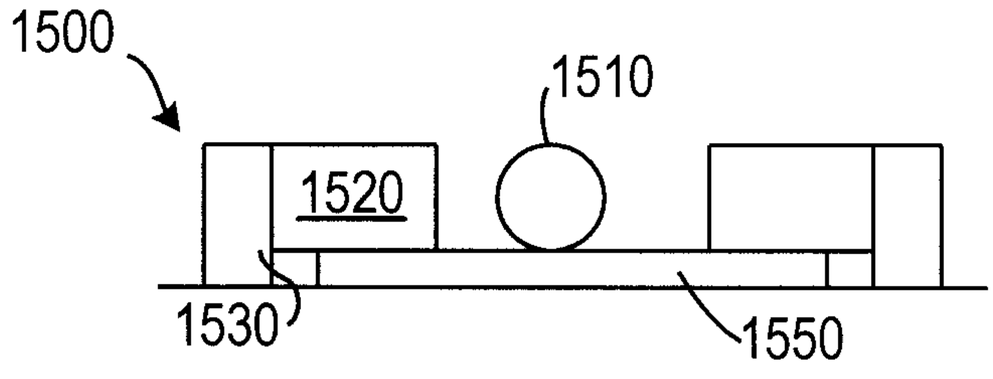


FIG. 15c

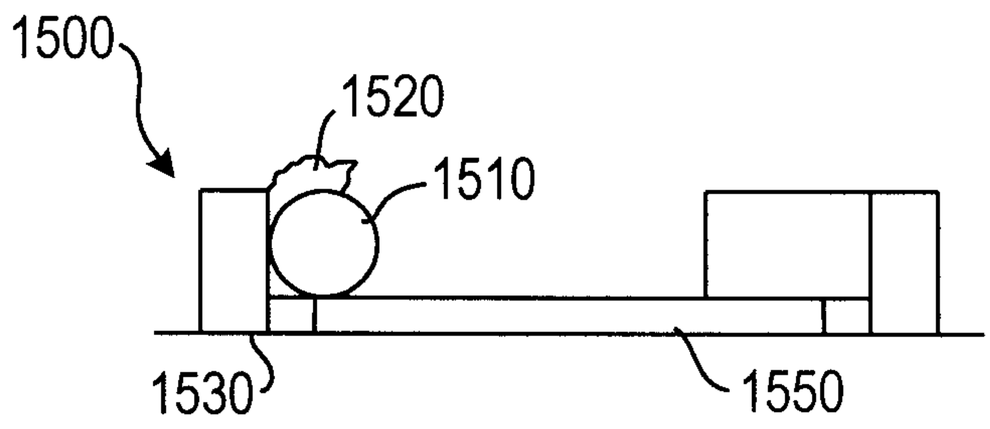


FIG. 15d

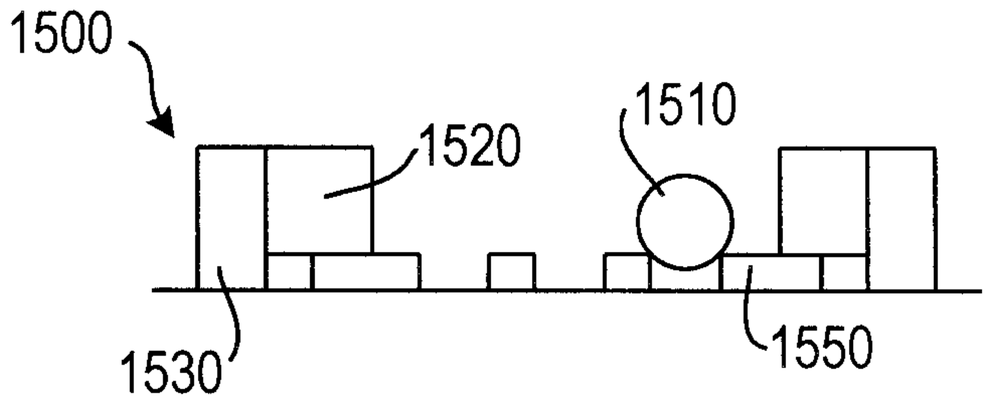


FIG. 15e

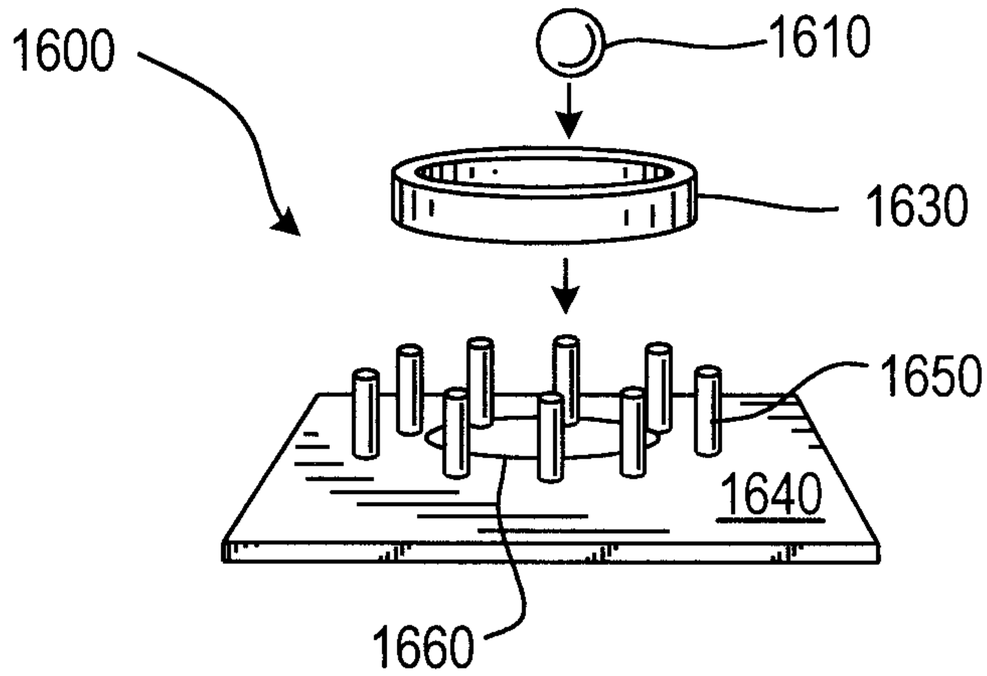

1600
1610
1630
1650
1640
1660

FIG. 16

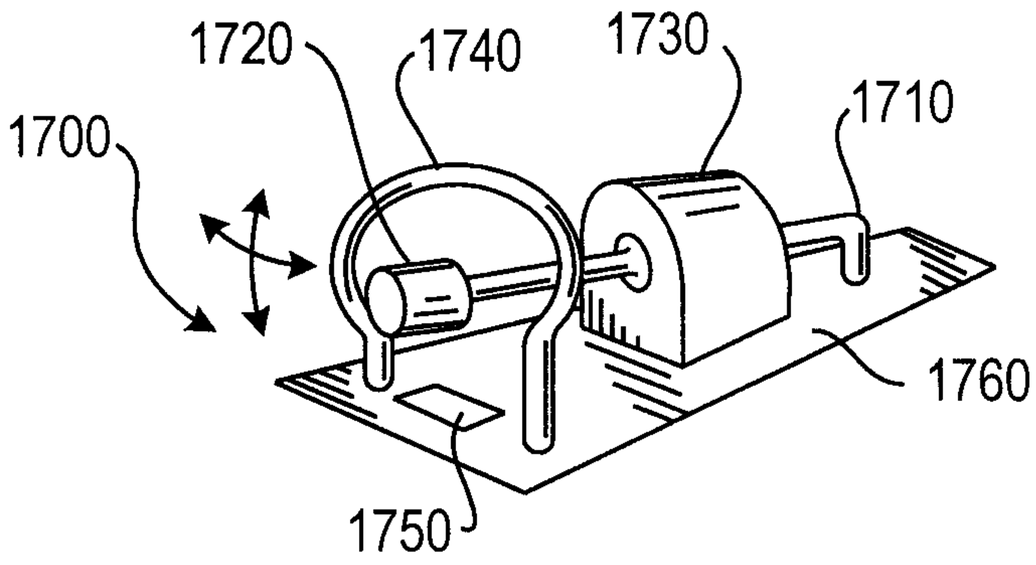

1720
1740
1730
1710
1700
1760
1750

FIG. 17

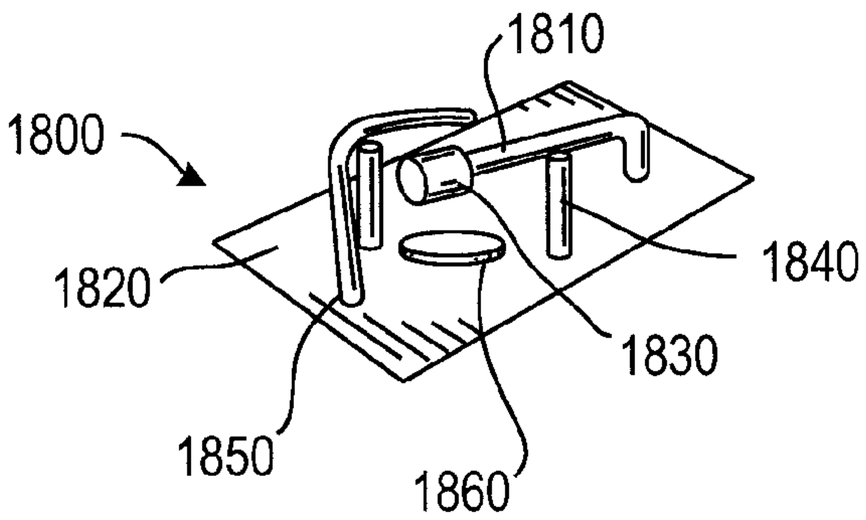


FIG. 18a

FIG. 18b

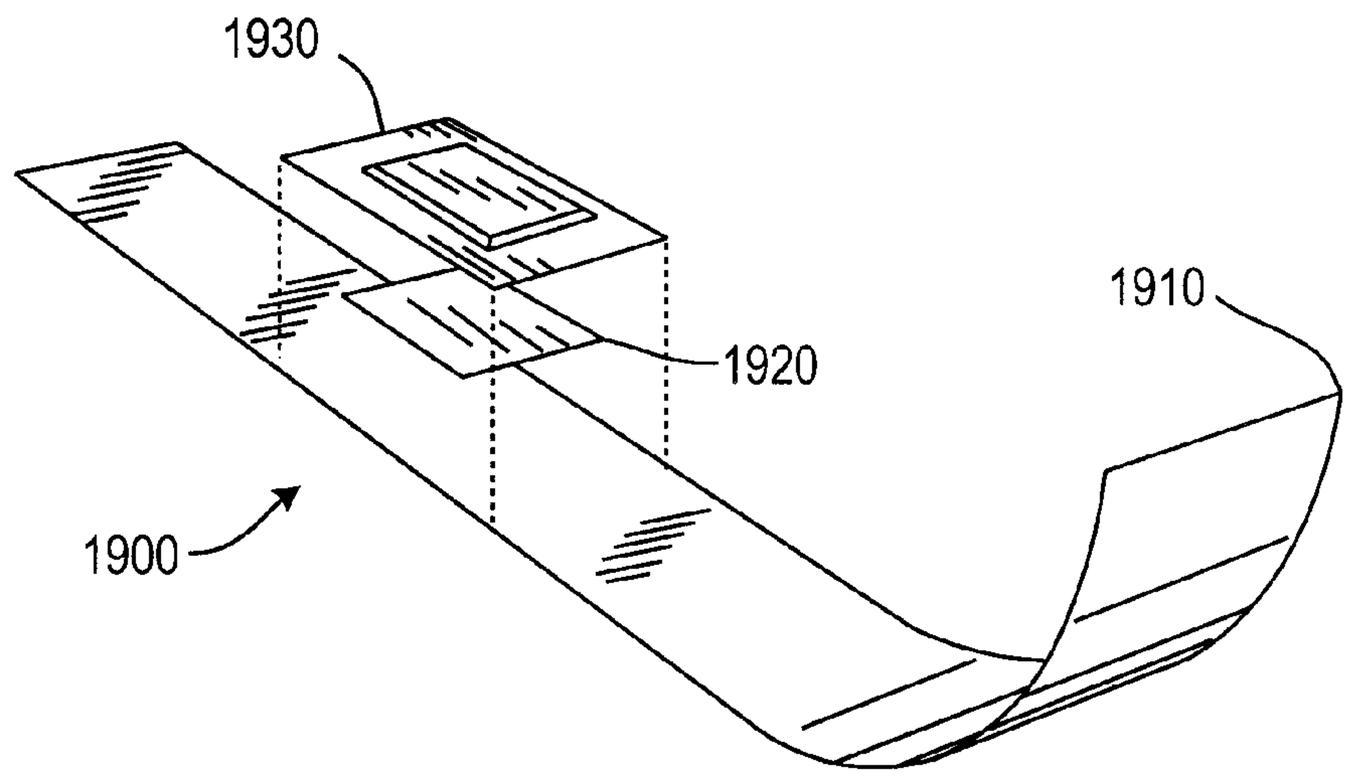


FIG. 19

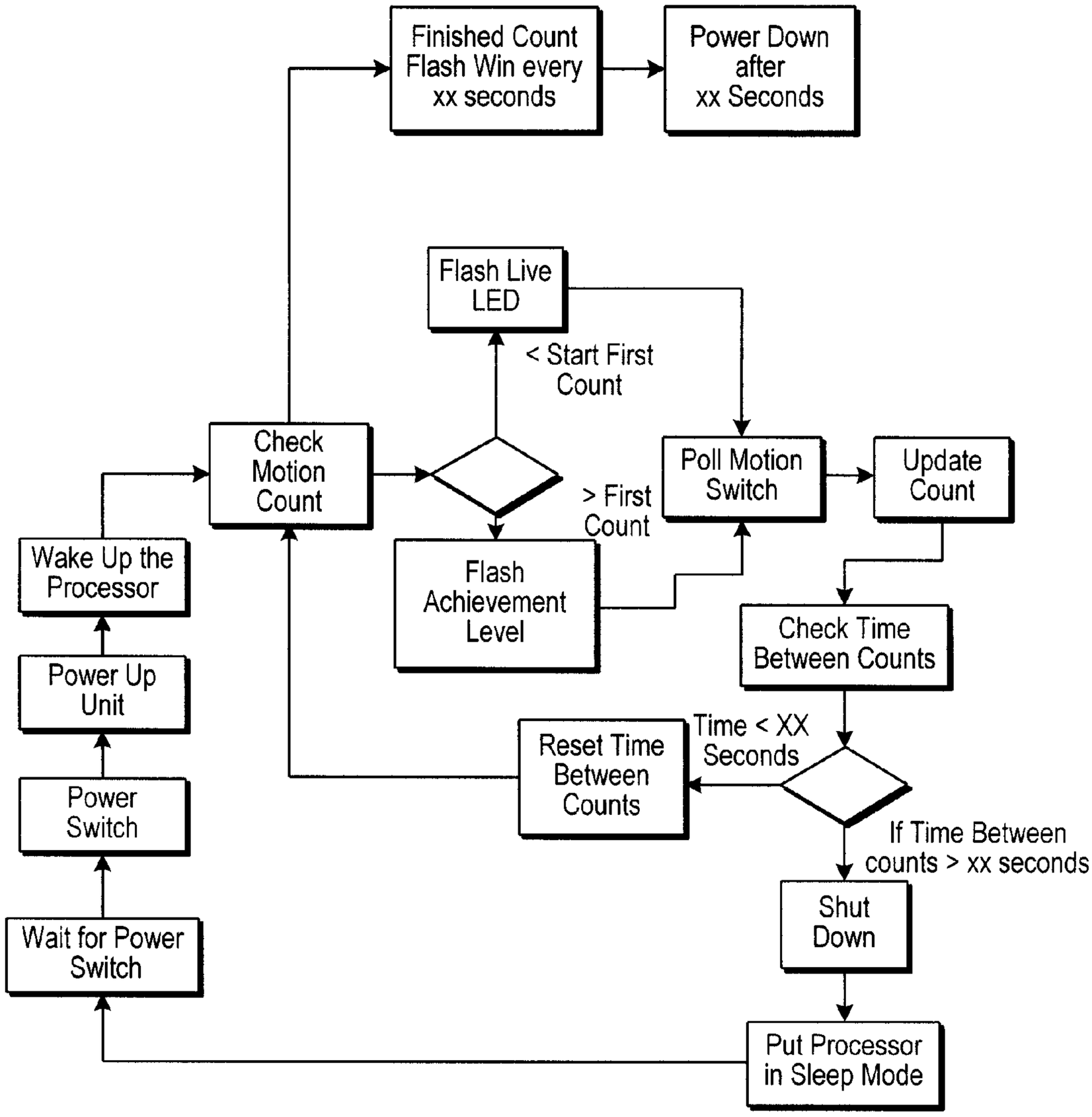

Finished Count Flash Win every xx seconds
Power Down after xx Seconds
Flash Live LED
< Start First Count
Check Motion Count
> First Count
Poll Motion Switch
Update Count
Wake Up the Processor
Flash Achievement Level
Check Time Between Counts
Power Up Unit
Reset Time Between Counts
Time < XX Seconds
Power Switch
If Time Between counts > xx seconds
Shut Down
Wait for Power Switch
Put Processor in Sleep Mode

FIG. 20

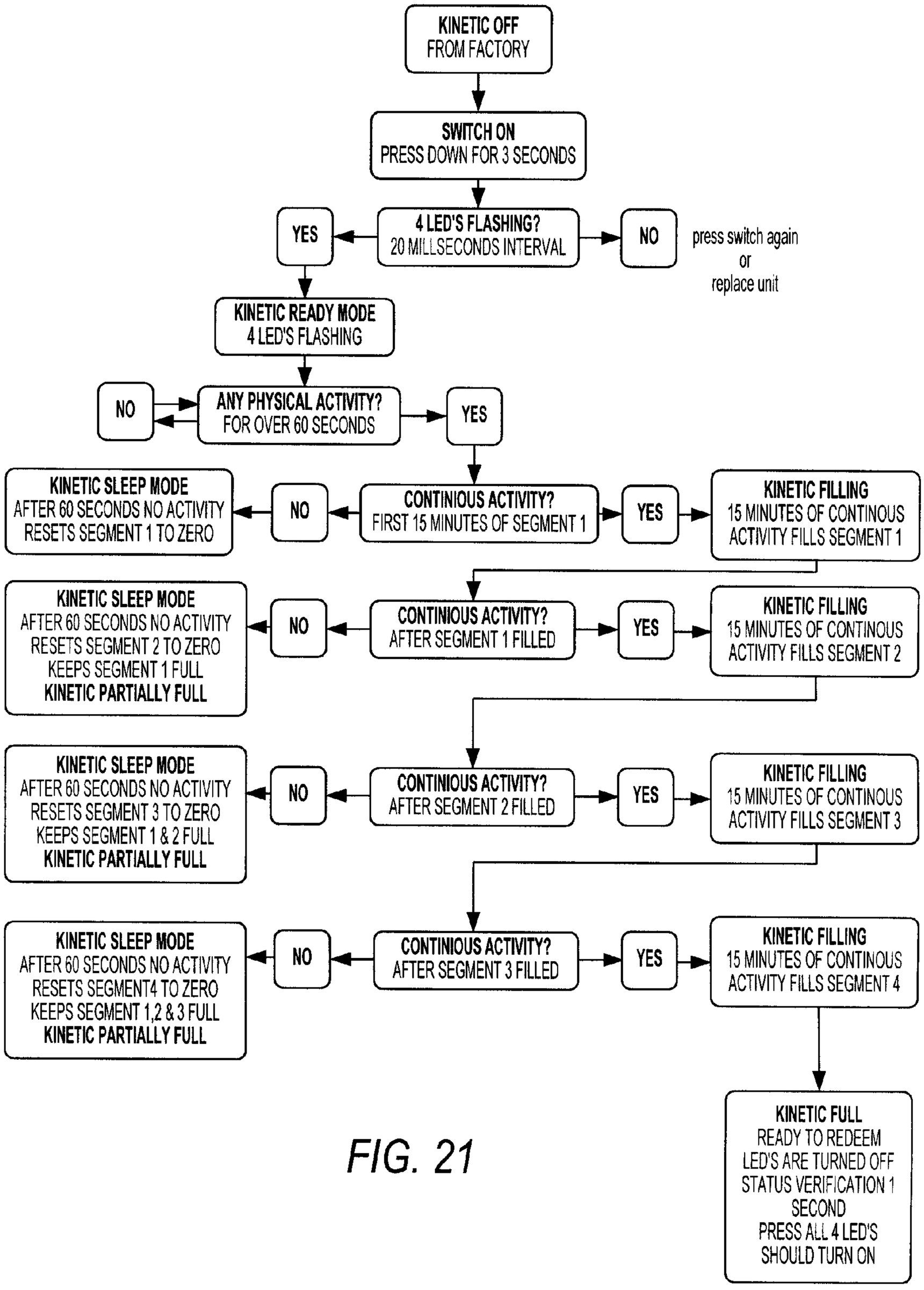

KINETIC OFF
FROM FACTORY
SWITCH ON
PRESS DOWN FOR 3 SECONDS
4 LED'S FLASHING?
20 MILLSECONDS INTERVAL
YES
NO
press switch again
or
replace unit
KINETIC READY MODE
4 LED'S FLASHING
ANY PHYSICAL ACTIVITY?
FOR OVER 60 SECONDS
NO
YES
CONTINIOUS ACTIVITY?
FIRST 15 MINUTES OF SEGMENT 1
NO
YES
KINETIC SLEEP MODE
AFTER 60 SECONDS NO ACTIVITY
RESETS SEGMENT 1 TO ZERO
KINETIC FILLING
15 MINUTES OF CONTINOUS
ACTIVITY FILLS SEGMENT 1
CONTINIOUS ACTIVITY?
AFTER SEGMENT 1 FILLED
NO
YES
KINETIC SLEEP MODE
AFTER 60 SECONDS NO ACTIVITY
RESETS SEGMENT 2 TO ZERO
KEEPS SEGMENT 1 FULL
KINETIC PARTIALLY FULL
KINETIC FILLING
15 MINUTES OF CONTINOUS
ACTIVITY FILLS SEGMENT 2
CONTINIOUS ACTIVITY?
AFTER SEGMENT 2 FILLED
NO
YES
KINETIC SLEEP MODE
AFTER 60 SECONDS NO ACTIVITY
RESETS SEGMENT 3 TO ZERO
KEEPS SEGMENT 1 & 2 FULL
KINETIC PARTIALLY FULL
KINETIC FILLING
15 MINUTES OF CONTINOUS
ACTIVITY FILLS SEGMENT 3
CONTINIOUS ACTIVITY?
AFTER SEGMENT 3 FILLED
NO
YES
KINETIC SLEEP MODE
AFTER 60 SECONDS NO ACTIVITY
RESETS SEGMENT4 TO ZERO
KEEPS SEGMENT 1,2 & 3 FULL
KINETIC PARTIALLY FULL
KINETIC FILLING
15 MINUTES OF CONTINOUS
ACTIVITY FILLS SEGMENT 4
KINETIC FULL
READY TO REDEEM
LED'S ARE TURNED OFF
STATUS VERIFICATION 1
SECOND
PRESS ALL 4 LED'S
SHOULD TURN ON

FIG. 21

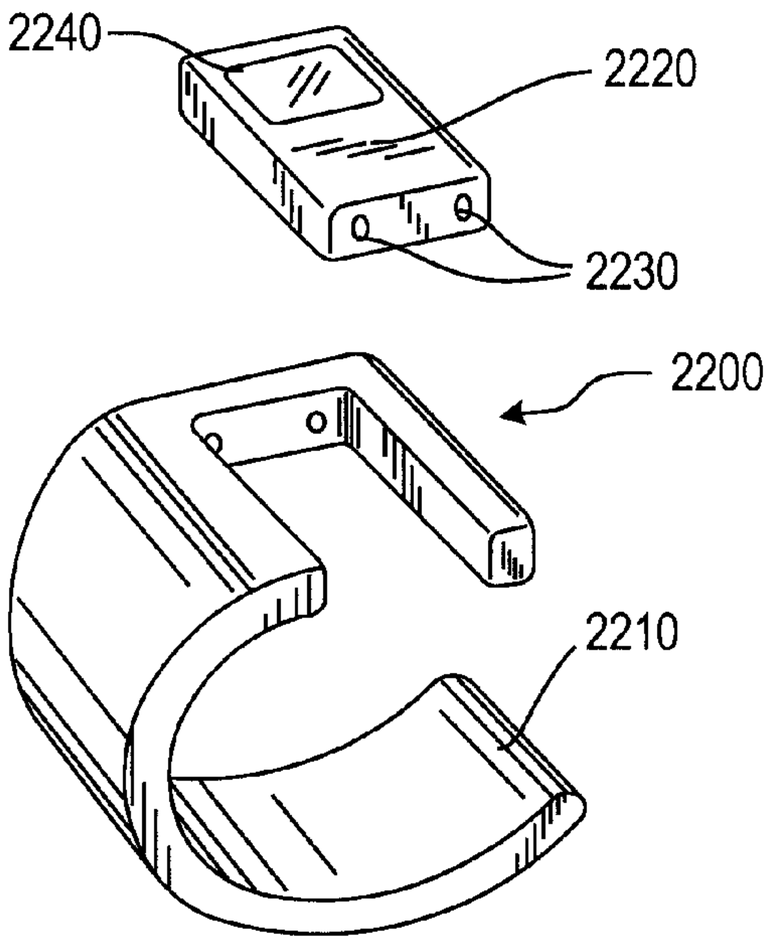


FIG. 22

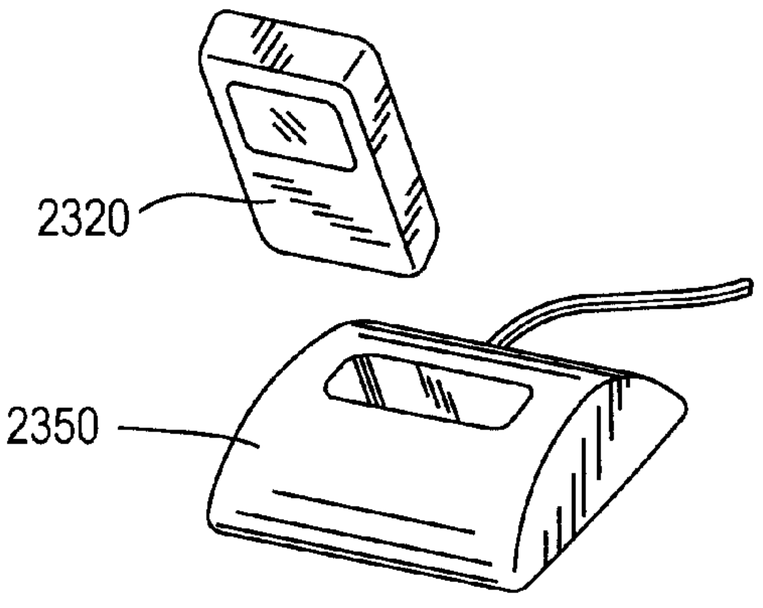


FIG. 23

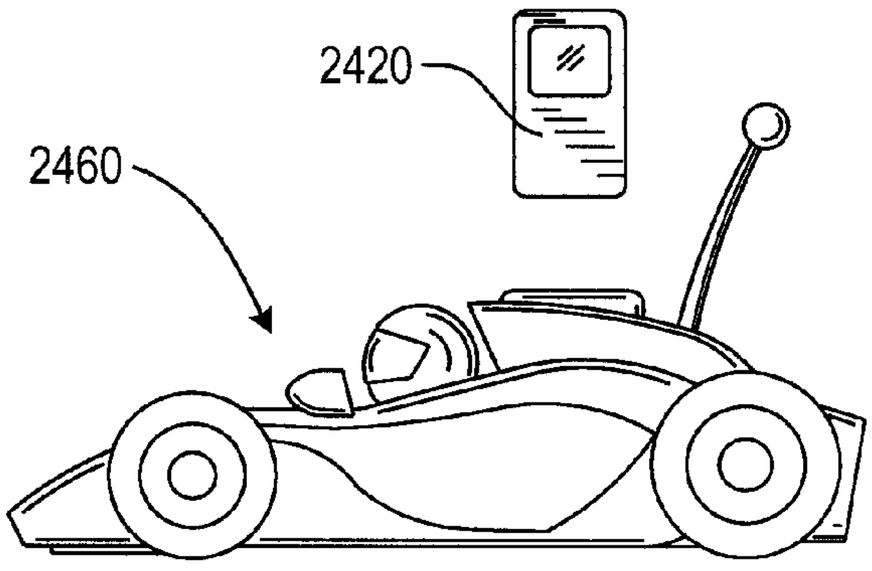


FIG. 24

SYSTEM AND METHOD FOR ACTIVATING A DEVICE BASED ON A RECORD OF PHYSICAL ACTIVITY

CROSS REFERENCE TO RELATED APPLICATIONS

The present application is a continuation-in-part claiming the benefit of and priority to U.S. patent application Ser. No. 11/862,059, filed Sep. 26, 2007 now U.S. Pat. No. 8,177,260 and International Patent Application Serial No. PCT/IB07/03617, both entitled "Coupon Redeemable Upon Completion of a Predetermined Threshold of Physical Activity," filed Sep. 26, 2007, each of which claim the benefit of U.S. Provisional Patent Application Ser. No. 60/847,538, entitled "Kinetic Coupon Redeemable Upon Completion of a Predetermined Threshold of Physical Activity," filed Sep. 26, 2006. In addition, the present application claims the benefit of U.S. Provisional Patent Application Ser. No. 61/023,119, entitled "System and Method for Activating a Device Based on a Record of Physical Activity," filed Jan. 24, 2008 and U.S. Provisional Patent Application Ser. No. 60/975,411, entitled "Coupon Redeemable Upon Completion of a Predetermined Threshold of Physical Activity," filed Sep. 26, 2007. The contents of the U.S. Patent Application, International Patent Application, and U.S. Provisional Patent Applications referenced above are hereby incorporated by reference in their entirety.

BACKGROUND OF THE INVENTION

The present application is directed to a system and method for encouraging physical activity and in particular a system and method for utilizing a coupon to indicate the achievement or completion of physical activity for a predetermined amount and/or predetermined period of time.

Obesity has taken a front seat in public discussions and media coverage. As a nation, we have been getting steadily heavier. The number of adults who are obese has increased dramatically. An estimated 300,000 deaths each year in the United States are attributed to obesity. The economic cost of obesity in the United States was approximately $117 billion in year 2000. Obesity has reached epidemic proportions in the United States, as well as worldwide. According to national data analyzed in 2002, it is estimated that 65% of Americans are now overweight or obese, and more than 61 million adults are obese.

Adults are not the only ones who have been getting heavier. The percentage of overweight children in the United States is growing at an alarming rate, specifically, it has more than doubled since the 1970s. Children are spending less time exercising and more time in front of the television, computer, or video-game consoles. According to the Center for Disease Control, 16% (or ~9 million) of American children are substantially overweight and the number is expected to grow by 20% over the next 5 years. Some states have childhood obesity rates as high as 25%. Children who lack exercise and proper nutrients in their diet are subject to an increased risk of potential serious health related problems including stunted growth, cognitive impairment, heart disease, diabetes and a range of other illnesses.

The United States Department of Health and Human Services recommends that children and teens be physically active for at least 60 minutes on most, if not all, days. It is recommended that adults engage in at least 30 minutes of moderate-intensity physical activity, above usual activity, on most days of the week. More than 60% of adults do not achieve the recommended amount of regular physical activity. In fact, 25% of the adults in the United States do not participate in any leisure time physical activity. Physical activity declines dramatically with age during adolescence. As such, nearly 50% of young people aged 12-21 are not active on a regular basis. Physical activity is important in preventing and treating obesity and is extremely helpful in maintaining weight loss, especially when combined with a healthy diet.

Exercise is one component of the equation to solve the problem of obesity. The real challenge is motivating individuals to participate in an exercise regimen or physical activity. People's behavior must change and they must lead a lifestyle of physical activity. Corporations have become sensitive to the perception that they are socially responsible. As such, corporations strategically advertise and promote their contributions towards a healthy community and encourage physical activity. Numerous fast food restaurants have dramatically altered their menus to incorporate healthy foods thereby promoting the importance of healthy lifestyles and physical fitness.

Exercise, while rewarding in numerous ways, offers little incentive or motivation for individuals to continue to exercise and stay physically fit. Most corporations today rely on monetary coupons or rebates to encourage the purchase of a particular product or service. In the year 2000 over 330 billion coupons were distributed with approximately 4.5 redeemed for a total consumer savings of $3.6 billion. Overall, 77.3% of people use coupons.

Issuance of rewards or incentives to encourage, motivate, or promote additional physical activity or exercise is nothing new. For instance, U.S. Pat. No. 6,585,622 as well as U.S. Published Application Nos. 2005/0102172; 2003/0065561; 2002/0077219 all disclose systems in which rewards are earned based on user participation in physical activity or exercise. Rewards or points are accumulated and may be redeemed at a later point in time. Such systems require the establishment of an infrastructure so that the physical activity of the user may be monitored and the rewards of incentive points issued. In part due to the expense associated with employing such an infrastructure, these systems and methods are best suited for monitoring participation in physical activity or exercise over an extended period of time. Irrespective of the accumulation and tabulation of intangible rewards or points as they are earned over a period of time, such a protracted process is better suited for adults rather than children or teenagers who have a shorter attention span which requires more immediate gratification in today's fast paced society.

It is therefore desirable to develop a new interactive physical coupon, whereby after engaging in physical activity for a predetermined amount and/or predetermined period of time the coupon is activated and immediately redeemable providing the user with immediate satisfaction.

SUMMARY OF THE INVENTION

The present application is directed to an interactive coupon redeemable by the holder after having participated in physical activity for a predetermined period of time.

The application relates to a kinetic coupon for encouraging participation in physical activity. Initially, the kinetic coupon may be inactive when dispensed to the user. While in possession of the kinetic coupon the user participates in physical activity that is monitored by circuitry in the coupon. The circuitry determines when the user's participation in physical activity exceeds a predetermined threshold, e.g., a predetermined amount and/or predetermined period of time. After participating, in physical activity that exceeds the predeter-

mined threshold, the kinetic coupon is validated and signified to the user that it is now redeemable.

The application comprises a coupon that detects physical activity of a user using a motion detector. The motion detector may use any one of a variety of technologies such as chemical motion detectors, mechanical motion detectors, or electrical motion detectors.

A chemical motion detector according to the present application may comprise one or more chemicals which, when mixed, indicate to a user that the threshold of activity has been reached. The chemicals may be included in various reservoirs or indicator wells, which mix upon physical activity and movement of the motion detector. The chemicals may also be mixed using micro-pumps, which are powered by movement of the motion detector and dispense the chemicals from one or more reservoirs. In a further embodiment, a piezoelectric device powered by physical activity may be used to power the micro-pumps. The micro-pumps may be configured to function only upon a certain level of physical activity such that minor movements of the motion detector do not drive the micro-pumps.

In another embodiment, a chemical motion detector according to the present application may comprise one or more chemical solutions that react to the sweat, pH level of, biological cues, or chemicals released by or through a user's skin during and after physical activity.

In another embodiment, a chemical motion detector according to the present application may comprise one or more chemicals that are microencapsulated in small spheres that burst upon physical activity. An abrasive agent may be provided adjacent to the spheres to assist in the rupture of the spheres.

A mechanical motion detector according to the present application may comprise a number of different configurations. In one embodiment, the motion detector comprises a pendulum which moves upon physical activity of the user and causes the rotation of a ratchet gear. Once the ratchet gear has been moved a sufficient number of times, the user is presented with the indicator. Another embodiment of a mechanical motion detector to be used with the present application is a magnetic switch in which a metal ball is held in place using magnetic attraction. Physical activity of the user will force the metal ball to move and short against a contact, which is detected and used to determine when the threshold of physical activity has been reached.

Another embodiment of a mechanical motion detector comprises a conductive tube in which a conductive object such as a metal ball is disposed. A spring inside the conductive tube maintains the ball apart from a contact at the end of the tube. Motion such as physical activity of the user causes the ball to compress the spring and short against the contact at the end of the tube, which is registered by a circuit which determines when the predetermined threshold of activity has been reached.

In a further embodiment of a mechanical motion detector which may be used with the present application, a conductive element such as a ball is disposed in a bounded area on a conductive plate and surrounded by a conductive wall or conductive posts. The wall or posts are separated from the conductive plate such that the ball will close a circuit between the wall or posts and the plate when the ball touches the wall or posts. Upon physical activity of the user, the ball moves inside the bounded area and closes a circuit between the wall or posts and the plate whenever it touches them both. The bounded area may be flat and elongated in a certain direction to detect only one range of motion. The bounded area may also be a sphere in order to detect motion in every direction. The different posts may register different signals with the circuitry so that the present application may detect a predetermined threshold of various different types of physical activities which cause different motions of the motion detector. In some embodiments, a dampening device surrounds the ball in order to eliminate the detection of minor movements that do not constitute physical activity which the present application seeks to detect.

Another embodiment of a mechanical motion detector comprises a conductive pin, wire, or ribbon which may have a conductive weight on the free end. Spaced from the weight in various different directions are contact points which close a circuit upon contact with the weight. While the motion detector is not moving, the weight is not contacting any other surface, but physical activity will cause the weight to move and contact one or more contact points disposed a predetermined distance from the weight.

The coupon according to the present application has an indicator which indicates to the user when a certain threshold of physical activity has been reached. The indicator may be a change in color of the coupon, the appearance of an image or message on the coupon, a visual indicator such as a light emitting diode, or a sonic indicator.

Once the predetermined threshold of physical activity has been detected by the coupon, the coupon may be redeemed. In one embodiment, the coupon may be redeemed by bringing the coupon to a location such as a retail store or restaurant which accepts the coupon in exchange for free or discounted goods and/or services. In another embodiment, the coupon may be redeemed on an interactive web site by, for example, entering a unique code from the coupon into the web site. The unique code may be electronically revealed on a display such as, for example, a liquid crystal display or a series of light emitting diodes. The unique code may also be permanently printed on the coupon or printed on the coupon in a way that reveals all or a portion of the unique code once the predetermined threshold of physical activity has been reached. The coupon may be redeemed for users to earn free or discounted goods and/or services. In a further embodiment, the coupon may be redeemed for points or virtual currency which may be used for online goods, services, or games.

In one embodiment, the coupon is a single-use product that may be discarded upon redemption. In another embodiment, once the coupon has reached the predetermined threshold of physical activity and redeemed, it may be reset so that it may be used again. In this embodiment, the vendor who issued and collected the coupon may reset the coupon for repeated distribution. In one embodiment, the vendor may be a computer system that automatically resets the coupon without any user interaction. In another embodiment, a single user may retain the coupon and redeem the coupon for rewards each time the predetermined threshold of physical activity has been reached.

An embodiment covers a redeemable coupon comprising a housing, a motion detector coupled to the housing, wherein the motion detector detects an amount of motion of the coupon, and an indicator coupled to the motion detector, wherein the indicator is activated by the motion detector upon detecting the amount of motion.

In an embodiment the coupon may be redeemed, for example, via an electronic network. The electronic network may be, for example, the Internet or a wireless communication network. The coupon may be redeemable for items, such as, for example, money, points, prizes or an item relating to an electronic game, such as, for example, at least one of an avatar, life, strength, a weapon, a potion, money, health,

ammunition, special power, food, an accessory, a pet, an article of clothing, a clue, and a key.

In an embodiment, the motion may be monitored, for example, during a predetermined time interval, or from a first predetermined point in time until a second predetermined point in time. Additionally, the at least one of the first predetermined point in time and the second predetermined point in time may be a preset date. Alternatively, at least one of the first predetermined point in time may be an activation of the motion detector and/or the second predetermined point in time may be determined from the first predetermined point in time and a predetermined time interval.

In an embodiment the redeemable coupon may further comprise computer programmable code including instructions that implement an electronic game.

In an embodiment the information indicated by the indicator may correspond to at least one of a point and a reward based on a level of motion detected by the motion detector.

In an embodiment a user may interact with an online game using the redeemable coupon. In another embodiment the indicator may present a code. In yet another embodiment the redeemable coupon may be used to interact with an online game by entering the code from the indicator. In one or more of the prior embodiments, the user may be rewarded upon detection of a predetermined level of motion by the motion detector. The reward may be at least one of money, a prize, an game item and points. The game item may be at least one of an avatar, life, strength, a weapon, a potion, money, health, ammunition, special power, food, an accessory, a pet, an article of clothing, a clue, and a key.

In an embodiment a user may be rewarded based on a level of motion detected by the motion detector. In another embodiment the user may be rewarded based on an amount of motion detected by the motion sensor.

In an embodiment the redeemable coupon may be provided together with a product offered to consumers. The redeemable coupon may comprises a packaging for the product or a label for the product.

In an embodiment the motion detector may be decoupled from the housing. In one or more of the prior embodiments the housing may be a wearable object. The wearable object may be selected from the group including a bracelet, anklet, necklace, headband, hat, scarf, glove, clothing, footwear, pin, clip, eyewear, belt and neckwear.

In an embodiment a memory may be coupled to the motion detector, wherein the memory stores information from the motion detector. The information may include the amount of motion detected.

One or more of the previous embodiments may further comprise an electronic device, wherein at least one of the motion detector is decoupled from the housing and coupled to the electronic device. The motion detector may activate at least one feature of the electronic device based on the amount of motion detected prior to decoupling. The electronic device may be at least one of a game, toy, game controller, computer interface device, cell phone, mobile data communication device, microprocessor or computer. The motion detector may be coupled to an electronic game controller. In an embodiment the coupon may further comprise an electronic device, wherein the memory is decoupled from the motion detector and coupled to the electronic device. The electronic device may be at least one of a game, toy, game controller, computer interface device, cell phone, mobile data communication device, microprocessor or computer. In one or more of the prior embodiments the electronic device may be usable for a period of time corresponding to the amount of motion detected. In one embodiment the coupon may further comprise a base station, wherein at least one of the motion detector and the memory is coupled to the base station. The base station may be in communication with a processing arrangement. The processing arrangement may control an interactive game.

In one embodiment at least one of the motion detector and the memory may enable a feature of the electronic device.

In an embodiment the coupon may further comprise a transmitter, wherein the transmitter may be used to communicate with a wireless network. In an embodiment the coupon may further comprise an electronic device, wherein the memory communicates with the electronic device using the transmitter.

In one or more of the embodiments the motion detector may distinguish between levels of physical activity. Alternatively or additionally, the motion detector may distinguish between types of physical activity. The indicator may comprise a plurality of indicators. Each of the plurality of indicators may correspond to a type of physical activity.

In an embodiment the indicator may be a code which may be used for redeeming the coupon from a remote location. The coupon may be redeemed via a web site. The coupon may be redeemed via a portable electronic device.

In an embodiment the motion detector may activate a plurality of indicators upon the attainment of a plurality of predetermined limits. The motion detector may be adapted to deactivate the indicator when a predetermined threshold of inactivity is reached.

In one or more of the above embodiments the coupon may be coupled to a bracelet. The coupon may be formed of flexible material. In one or more of the above embodiments at least one of the motion detector and indicator may be reset or resettable.

An embodiment covers a method of providing an incentive for a user to exercise comprising providing the user with a coupon to be coupled to the user, monitoring the motion of the user with a motion sensor included in the coupon, and activating the coupon when the motion sensor has detected a predetermined amount of motion such that the coupon becomes redeemable by the user. The method may further comprise indicating to the user when the motion sensor has detected a predetermined amount of motion. The method may also comprise redeeming the coupon. The coupon may be redeemed, for example, via an electronic network. The electronic network may be, for example, the Internet or a wireless communication network. In an embodiment the coupon may be redeemable for money, points, prizes or an item relating to an electronic game. In an embodiment the item may be at least one of an avatar, life, strength, a weapon, a potion, money, health, ammunition, special power, food, an accessory, a pet, an article of clothing, a clue, and a key.

In an embodiment the motion may be monitored, for example, during a predetermined time interval or from a first predetermined point in time until a second predetermined point in time. In an embodiment at least one of the first predetermined point in time and the second predetermined point in time may be a preset date. In an embodiment at least one of the first predetermined point in time may be an activation of the motion sensor. In an embodiment the second predetermined point in time may be determined from the first predetermined point in time and a predetermined time interval.

In an embodiment the coupon may comprise a game. An embodiment may further comprise issuing at least one of a point and a reward to the user based on a level of motion monitored by the motion sensor. An embodiment may further comprise the user interacting with an online game using the

coupon. Another embodiment may further comprise the coupon presenting a code. An embodiment may further comprise interacting with an online game by entering the code provided by the coupon. An embodiment may further comprise rewarding the user upon detection of a predetermined level of motion by the motion sensor. The reward may be at least one of money, a prize, a game item and points. The game item may be at least one of an avatar, life, strength, a weapon, a potion, money, health, ammunition, special power, food, an accessory, a pet, an article of clothing, a clue, and a key. An embodiment may further comprise rewarding the user based on a level of motion detected by the motion sensor. An embodiment may further comprise rewarding the user based on an amount of motion detected by the motion sensor.

In an embodiment the coupon may be provided with a product offered to consumers. The coupon may comprise a packaging for the product. The coupon may comprise a label for the product.

An embodiment further comprises decoupling the motion sensor from the coupon. In an embodiment the coupon may be a wearable object. The wearable object may be selected from the group including a bracelet, anklet, necklace, headband, hat, scarf, glove, clothing, footwear, pin, clip, eyewear, belt and neckwear.

In an embodiment the motion sensor may include a memory that stores information from the motion detector. The information may include the amount of motion detected. An embodiment may further comprise coupling the motion sensor to an electronic device. An embodiment may further comprise activating at least one feature of the electronic device based on the amount of motion detected prior to decoupling. The electronic device may be at least one of a game, toy, game controller, computer interface device, cell phone, mobile data communication device, microprocessor or computer. An embodiment may further comprise coupling the motion sensor to an electronic game controller. An embodiment may further comprise coupling the memory to the electronic device. The electronic device may be at least one of a game, toy, game controller, computer interface device, cell phone, mobile data communication device, microprocessor or computer. The electronic device may be usable for a period of time corresponding to the amount of motion detected.

An embodiment may further comprise coupling at least one of the motion sensor and the memory to a base station. An embodiment may further comprise communicating between the base station and a processing arrangement. Another embodiment may further comprise controlling an interactive game from the processing arrangement. An embodiment may further comprise enabling a feature of the electronic device by at least one of the motion sensor and the memory. Another embodiment may further comprise enabling a feature of the electronic device by at least one of the motion sensor and the memory. An additional embodiment may further comprise communicating with a wireless device using a transmitter. Another embodiment may further comprise communicating between the memory and an electronic device using the transmitter.

In an embodiment the predetermined amount of motion may be based on a level of physical activity. In an embodiment the motion sensor may distinguish between types of physical activity. The predetermined amount of motion may comprise a plurality of predetermined amounts of motion. Each of the plurality of predetermined amounts of motion may correspond to a type of physical activity.

In an embodiment the coupon may be activated by providing a code which may be used for redeeming the coupon from a remote location. In an embodiment the coupon may be redeemed via a web site. In another embodiment the coupon may be redeemed via a portable electronic device.

Another embodiment further comprises activating the coupon upon the attainment of a plurality of predetermined limits. An embodiment further comprises deactivate the coupon when a predetermined threshold of inactivity is reached.

In an embodiment the coupon may be coupled to a bracelet. In an embodiment the coupon may be formed of flexible material. In an embodiment at least one of the motion detector and indicator may be reset or resettable. Another embodiment may further comprise decoupling the motion sensor from the coupon.

BRIEF DESCRIPTION OF THE FIGURES

The foregoing and other features of the present application of the present application will be more readily apparent from the following detailed description and drawings of illustrative embodiments of the application wherein like reference numbers refer to similar elements throughout the several views in which:

FIG. **1** is a enlarged perspective view of the exemplary kinetic coupon in accordance with the present application;

FIG. **2** is an exemplary kinetic coupon in accordance with the present application shown being worn on different parts of the body;

FIGS. **3***a* and **3***b* are front and side views, respectively, of an exemplary device employing chemical technology for monitoring the extent of participation in physical activity or movement by the user;

FIG. **3***c* is a front view of the device in FIGS. **3***a* and **3***b* with the membrane deformed;

FIG. **4** is a schematic diagram of an exemplary device employing mechanical technology for monitoring the extent of participation in physical activity or movement by the user;

FIG. **5** is a schematic diagram of an exemplary device employing electrical technology for monitoring the extent of participation in physical activity or movement by the user; and

FIG. **6** is an exemplary flow chart of the use of the kinetic coupon in accordance with the present application.

FIGS. **7***a* and **7***b* depict one embodiment of a motion-activated coupon according to the present application.

FIGS. **8-18***b* depict embodiments of motion sensors to be included with coupons according to the present application.

FIG. **19** depicts one embodiment of a coupon according to the present application coupled to a wearable device.

FIG. **20** depicts a flow diagram of one embodiment of a method of conserving power according to the present application.

FIG. **21** depicts a flow diagram of a method according to the present application.

FIG. **22** depicts an embodiment of a device according to the present invention with a removable component that records physical activity detected by the device.

FIG. **23** depicts the removable component shown in FIG. **22** as inserted into a base with a communication cable.

FIG. **24** depicts the removable component showing in FIG. **22** being inserted into a toy.

DETAILED DESCRIPTION

The present application is directed to an interactive or "kinetic" coupon that is a physical device which is redeemable, activated or validated only after the user has participated in movement or physical activity of a predetermined amount

and/or for a predetermined period of time. Referring to FIG. **1**, the kinetic coupon **100** has a housing **115** in which is enclosed components for monitoring the extent of physical activity or movement by the user and activating an indicator to signify to the user when the kinetic coupon is redeemable, activated or validated. A display **120** such as, for example, a light emitting diode (LED), liquid crystal display (LCD) or other display device is provided for display of some type of indicia indicating when the physical activity exceeds a predetermined threshold, i.e., a predetermined amount and/or predetermined period of time. The indicator may simply be a color indicator (e.g., change from colorless to a color, change of color or change from opaque to transparent to reveal some indicia otherwise not previously visible). For instance, after participating in physical activity for a predetermined period of time, a green color may be indicated on the display **120**. Alternatively, written indicia may be observed in the display **120**. Any desired alphanumeric word or message may be displayed. In one embodiment, the written indicia may display some sort of encouragement such as "Keep Going", "Don't Stop" before the predetermined time period has expired in which the user has participated in physical activity or movement. Once the wearer has participated in physical activity for the predetermined threshold the indicia is activated to reflect the redeemable value of the coupon and/or perhaps the location at which the coupon is to be redeemed. By way of example, upon engaging in physical activity or movement for the predetermined period of time, the display **120** may read "Free Frisbee" and the name of the participating vendor from whom the toy may be redeemed. The kinetic coupon may alternatively, or in addition to a visual indicator, include an audible alarm and associated circuitry for producing an audible alarm. Upon the engagement of physical activity that exceeds the predetermined threshold, the kinetic coupon will produce or generate an audible sound to inform the wearer that the coupon may now be redeemed. Such audible alarm may be a beep, melody, word, phrase or instructions as to how to go about redeeming the value of the coupon.

The coupon may be redeemable on an interactive web site for free or discounted goods and/or services. The coupon may, for example, display a code when the predetermined threshold has been reached. The coupon may also display a code which will only be accepted by a vendor once the coupon has issued an indicator that the threshold level of physical activity has been reached. The user may then enter the code into the web site to be redeemed. The coupon may also be redeemed for points or virtual currency in an online game or in an online gaming environment. The points or virtual currency may be used to purchase additional games. In some games, the coupon may be redeemed for rewards specific to that game such as, for example, special playable characters, special playable levels, costumes for a character, character energy or health, or playable items that that may be branded with the logo of the entity that issued the bracelet. For example, in a car racing game, the user may be able to redeem the coupon for a playable car that is branded with a vendor's logo.

In one embodiment, the coupon may communicate with a computer system which includes a computer game. The user may participate in the game by achieving a predetermined level of physical activity for an extended period of time. In one embodiment, the game comprises a virtual character such as a virtual pet whose health and progress through a game is determined by the physical activity of the user as measured by the coupon.

Kinetic coupon **100** may be secured about a part of the body, for example, by a band or strap **110**. FIG. **2** shows several exemplary positions of the kinetic coupon **100** worn on the body of a wearer **210**, e.g., about the wrist **205** or ankle **215**. Other parts of the body may be chosen such as, but not limited to, the head, earlobe, neck, arm, finger, leg, toe, or waist of the wearer **210**. As shown in FIG. **1**, the strap **110** may also include a securing device **105**. The securing device **105** may be, but need not necessarily be, releasable such as hook-n-eye, VELCRO™, a buckle, a snap or a clasp. In the case that the securing device **105** is not releasable, then the strap may be broken or torn after use and discarded either alone or with the housing **115** and components disposed therein. Yet another variation of the present application would eliminate the securing device **105** altogether whereby the strap would be made of a material such as a thin metal or plastic band that in a relaxed state is wound into a coil, but upon the application of a force may be stretched out substantially straight. After being positioned about a portion of the body, the force exerted on the band is removed allowing it to return to its relaxed state and substantially conform about a part of the body of the wearer **210**. The strap may be custom designed and printed, as desired, for instance, to identify a corporate name and/or promotional item or an advertiser.

Alternatively, the strap **110** itself may also be eliminated and the kinetic coupon **100** releasable secured directly to the body or clothing of the wearer **210** via an adhesive strip, pin or other device. This alternative embodiment is particularly well suited for placement of the kinetic coupon on the wearer **210** rather than about a part of the body of the wearer **210**, such as depicted in FIG. **2** by coupon **220** worn on the chest of the wearer **210**. Instead of being worn on or about the body or clothing of the wearer **210**, the wearer **210** may simply hold the kinetic coupon in their hand.

As previously mentioned the coupon **100** includes components for indicating when the user's participation in physical activity or movement exceeds a predetermined threshold, e.g., a predetermined amount and/or predetermined period of time, required to activate or validate the coupon. The kinetic coupon may be designed to require either continuous or non-continuous physical activity or movement. Functionality for monitoring the extent of the user's participation in physical activity or movement may be achieved using chemical, mechanical and electrical technology either exclusively or in combination thereof. It is advantageous to minimize the cost of manufacture and overall size when designing the components for monitoring the extent of participation in physical activity or movement by the user. An illustrative example of a system for monitoring the extent of user's participation in physical activity or movement utilizing each of the three different technologies will be described, however, alternative devices such as piezoelectric devices or pedometers are contemplated and within the intended scope of the present application.

The first method to be addressed employs chemical technology whereby one or more chemicals when mixed together activate an indicator that signifies to the user participation in movement for at least a predetermined threshold, e.g., predetermined amount and/or predetermined time period. Referring to FIGS. **3***a* and **3***b*, indicator wells **305** are filled with a chemical indicator that is activated when mixed with fluid from a reservoir **310**. In the illustrative example shown, the coupon includes three indicator wells **305**, each having three indicator apertures illustrated therein via the circular elements within the indicator wells **305**, wherein each indicator aperture represents a different indicator (e.g., different color or indicia such as a letter or number). An impervious membrane **315** covers the surface of the device and is sealed around a pump **320** to form a vacuum. The pump **320** such a

micro-pump is used to dispense fluid from reservoir **310**. A fluid is selected based on such factors as its potential corrosive effects and viscosity to pass through the pump. In the exemplary embodiment three pumps **320** are shown, one associated with each well indicator **305**. The application may be modified, as desired, to vary the number of indicator wells, indicator apertures and/or pumps.

An external force such as a motor or piezoelectric device may be used to drive the micro-pump. However, the use of a motor or piezoelectric device disadvantageously requires a power source that contributes to both the overall cost of manufacture and footprint of the integrated circuit. In a preferred embodiment, the use of a power source is eliminated altogether and instead the micro-pumps are driven by an oscillating membrane that acts as a piston. The user's motion thereby supplies the necessary force to drive the micro-pump. Accordingly, a predetermined minimum threshold level of physical activity or movement may be required to drive the micro-pump. Some physical activity or movement may be so inconsequential as to be insufficient to drive the micro-pump. Some physical or movement may be so inconsequential as to be insufficient to drive the micro-pump. As the user moves, the mass of the fluid in pumping well **350** causes the membrane **315** to vibrate or oscillate and deform, as shown in FIG. **3***c*. The pumping action of mass or magnet **340** may be enhanced by utilizing a changing magnetic field or a fluctuating mass. Specifically, as shown in FIG. **3***c* a magnetic field is created by the displacement of a magnet **340** with respect to an attracting material **345** such as steel or other magnetic material disposed proximate the pump **320**. The attracting material **345** shown in FIG. **3***c* is configured in the shape of a metal ring, in operation, the user's motion causes the membrane **315** to vibrate or oscillate by the mass of the fluid flowing into the pumping well **350** from reservoir **310** resulting in an initial displacement of magnet **340**. As the magnet **340** approaches the metal ring **345** the attraction of magnetic forces assist the suction of fluid from the reservoir **310** into the pump well **350**. Gravity and motion forces the fluid into the indicator wells **305**.

Reducing channels or reserve flow restrictors **330**, **335** are preferable used to create a unidirectional flow of fluid from the reservoir **310** to each of the indicator wells **305**. As the mass or magnet **340** is displaced in a positive y-direction a vacuum forces liquid to flow from the reservoir **310** into the pumping well. Micro-pump **320** provides metered output based on the type of movement or physical activity. The mass of magnet **340** is selected based on different activity levels. The orifice of the flow restrictors may be adjusted to accommodate a wide variety of flow rates and fluids. Fluids stored in reservoir **310** may be neutral, acidic or alkaline. The indicator in wells **305** may be a solid, fluid, gas or some combination thereof which when it mixes with the fluid from reservoir **310** is activated. In one embodiment the indicator wells activate the indicator immediately upon contact with fluid dispersed from the reservoir, irrespective of the amount of fluid. However, an alternative embodiment provides for activation of the indicator by a predetermined amount of fluid from the reservoir passing into the indicator well. This latter embodiment may be employed to signify that a period of time for participation by the user in physical activity or movement has expired. Exemplary indicators such as fluids, gels or paper that may be used include halochromic chemical compound that produce changes in compounds such as Thymol blue, Methyl red and Indigo carmine. Another class of fluid is Amylose in starch which can be used to produce a blue color in the presence of iodine. The iodine molecule slips inside of the amylose coil. Iodine is not very soluble in water, therefore the iodine reagent is made by dissolving iodine in water in the presence of potassium iodide to produce a soluble linear triiodide ion complex. The triiodide ion slips into the coil of the starch creating a blue-black color.

In one embodiment, the coupon comprises one or more chemical solutions that react to motion, sweat, and/or pH level of the user's skin during and after a physical activity. The chemical solutions may cause a portion of the coupon to change from one color to another. The chemical solutions may also transform an opaque overlay to a transparent overlay to reveal a layer of printed information below the layer. One example of this embodiment is the coupon **700** depicted in FIGS. **7***a* and **7***b*. Coupon **700** has a first layer **710** which may contain a message or image and a second layer **720** with an overlay **730** that will transform from opaque to transparent upon the physical activity that activates the chemical solutions. The transparent window will then allow the user to view the message on the first layer **710**.

In one embodiment, the coupon comprises two or more chemicals that react to movement of the coupon. One or more of the chemicals may be microencapsulated in small spheres and react to the second part of the solution that has an abrasive. The abrasive, with time and physical agitation, will break the encapsulated spheres and mix the two chemicals. One or more of the solutions will then change from one color to another or from an opaque overlay to a transparent overlay to reveal a layer of printed information below the overlay.

In one embodiment, the coupon comprises two gels which begin mixing when a seal separating them is broken. The physical agitation from the user will mix the two gels over a predetermined amount of time. Once the two gels have sufficiently mixed, they will then change from one color to another or from an opaque overlay to a transparent overlay to reveal a layer of printed information below the overlay.

The next methodology to be discussed is use of the mechanical technology whereby mechanical components are displaced by forces generated by or derived from the user's motion to indicate when the user has engaged in physical activity or movement for a predetermined threshold, e.g., a predetermined amount and/or predetermined period of time. A pendulum is employed that swings when the user moves. Guides **445** serve as an escapement mechanism to restrict movement to a single direction. FIG. **4** is an exemplary assembly **400** that includes a ratchet gear **405** rotatably mounted on a base **440**. A weight **415** freely supported by a level or arm **430** serves as a pendulum. The user's motion is imparted to weight **415** which, in turn, displaces the lever or arm **430** engaging a tooth of the ratchet gear **405** causing it to rotate. A rubber band **420** produces a balancing or restoring force. Hinge **425** allows the lever or arm **430** to pivot between a downward stroke position in which it engages a tooth of the ratchet gear **405** and another position a predetermined distance clear of the gear when the restoring force generated by the rubber band **420** pulls the arm back to its original position. Indicator apertures **410** may be provided to enable a mark to be visually observed by the user to signify when the user has engaged in a predetermined amount of physical activity or movement.

In the case of the present inventive kinetic coupon being utilized as an incentive for children to engage in physical activity to promote a healthier lifestyle, it is often desirable to ignore or disregard physical activity or movement by the user that is inconsequential or insignificant so as not to contribute towards the issuance or earning or rewards or points. Therefore the present application may be designed so that the motion exerted by the user is not recorded until it exceeds a predetermined threshold level. There are numerous methods

in which said functionality may be accomplished an example of which will be described in further detail.

Referring once again to the mechanical assembly shown in FIG. **4**, motion exerted by the user is not recorded until it overcomes or exceeds a counterbalancing static force exerted on the ratchet gear **405**. This counterbalancing static force may be produced by a tension spring **435**, a magnet or other device. Rotation of the ratchet gear **405** is restricted by a restricting arm **450** which is pivotally mounted to base **440**. The tension spring **435** is connected between the base and restricting arm **450**. When the user's motion overcomes or exceeds the counterbalancing static force produced by the tension spring physical activity or movement is recorded.

In one embodiment, the coupon comprises a kinetic device as a sensor which comprises a magnetic switch. The magnetic switch may include a conductive object such as, for example, a metal ball which is held in place in an area by magnetic attraction. If the force is strong enough the object will overcome the magnetic force of the object, which will move to either end of the area and short against two contacts at the boundaries of the area. The shorted contacts may be periodically sampled to assess physical activity. FIG. **8***a* depicts one example of this a motion sensor **800** according to this embodiment in which the magnetic ball **810** is held by magnetic attraction between the contacts **830** in the tube **820**.

In one embodiment, a coupon comprises a microprocessor which periodically samples the contacts in a motion detector to determine when contact has been made. The sample rate may be adjusted by adjusting the internal timer. The microprocessor may also be set to turn on when there is a transition on the contacts and turn off when no motion is detected to conserve power. The battery may be shipped in the unit. A power switch will trigger the unit on. The power can be automatically turned off by the processor or can be enabled for a preset duration. A capacitor is used to keep the power switch on. Over time the voltage on the capacitor is bled off with a high value resistor. If the processor wishes to stay alive the processor can recharge the voltage on the capacitor.

In one embodiment as depicted in FIG. **20**, the software on the microprocessor has two main loops that run. The first loop is the power loop. In this loop the unit is powered up from the power switch. The unit then processes the second loop, which tracks movement. When movement is not detected the unit within a predetermined number of seconds of use it will go back to sleep. The unit will wake up if motion is detected on the motion detect switch or the power switch is depressed.

In one embodiment, the coupon includes a motion sensor composed of a conductive tube inside of which resides a conductive object such as a ball and a coil. FIG. **8***b* depicts a motion sensor **800** according to one example of this embodiment. One end of the tube **820** contains an electrical contact **830** insulated from the tube. A coil **840**, compression spring, or other compressible, non conductive material rests on the insulted portion of the electrical contact **830** located in the end of the insulted tube **820** and holds the conductive ball **810** from the end of the conductive tube **820**. Upon sensing motion, the ball **810** deflects inside tube **820** in the general direction of the motion. This compresses the spring **840** and, if the motion is of sufficient magnitude, causes the ball **810** to come in contact with the contact **830** at the end of the conductive tube **820**. Coming in contact with the electrical contact **830** in the end of the tube **820** causes an electrical circuit to be made. This circuit signal is interpreted by control electronics indicating that motion has occurred. The circuit signal may include a electronic circuit that incorporates algorithms capable of detecting individual deflections and interprets the inputs to correspond to the use, orientation and numeric quantity of deflections detected. The electronics interpret the information and send the results to a storage or enunciation device which may include a display such as, for example, liquid crystal display, light emitting diode display or other means to store or communicate the resulting information to a user.

In one embodiment, the coupon comprises a spring-loaded ball and multiple contact tube motion detector. The motion sensor may be composed of a conductive tube inside of which resides a conductive ball. Each end of the tube contains an electrical contact insulated from the tube. Two coil compression springs or other compressible material rest on the insulated portion of the electrical contact located in the end of the insulated tube and hold the conductive ball equidistant from the ends of the conductive tube. Upon sensing motion, the ball deflects inside tube in the general direction of the motion. This compresses the spring and, if the motion is of sufficient magnitude, causes the ball to come in contact with the contact at the end of the conductive tube. Coming in contact with the electrical contact in the end of the tube causes an electrical circuit to be made. This circuit signal is interpreted by control electronics indicating that motion has occurred. One example of this embodiment is depicted in FIG. **8***c*. The conductive ball **810** is housed in the conductive tube **860** between two springs **850**. The springs surround two conductive posts **870** and hold the conductive ball **810** away from the two conductive posts **870** while the motion detector **800** is standing still. Motion of the motion detector **800** will force the conductive ball **810** against one of the springs **850** which will compress and allow the conductive ball to touch one of the conductive posts **870** which completes a circuit with the conductive tube **860**. Each time a circuit is completed, the circuitry of the coupon implements a counter until the predetermined threshold is reached.

In one embodiment, the coupon comprises a dual-axis motion sensor with a ball in a cross-shaped channel. One example of this embodiment is depicted in FIG. **9**. In this embodiment, the motion sensor **900** comprises a conductive sphere **910** and rests inside a cross-shaped channel **920**. The shape of the channel fixes the potential movement of the ball **910** to two axes. At the end of each of the four channels there is an electronic contact **930** that closes a circuit whenever the ball **910** makes contact. The cross-shaped channel form and orientation to the device is defined by the orientation and the allowed movement.

In another embodiment, the coupon comprises a single-axis motion sensor. One example of this embodiment is depicted in FIG. **10**. The motion sensor **1000** is comprised of a single conductive flat spring **1010** in which one end is affixed to a circuit board **1020** or other conductive member and the other end contains a weight **1030** to amplify detected motion. Conductive stops **1040** are affixed to the circuit board **1020** and are equally spaced on either side of the flat spring **1010** and weights **1030**. Upon deflection, the conductive flat spring **1010** contacts conductive stops **1040**. When contact with the conductive stops **1040** occurs, a signal flows through the circuit board **1020** or other conductive member to the sensor then to the conductive stops and back through the circuit board. This signal is interpreted by control electronics indicating that motion has occurred. The conductive stops may be electrically joined or remain separate wherein the control electronics may interpret the signal received from the motion detector together or individually.

In one embodiment, the coupon comprises a dual-axis motion sensor comprised of a single conductive flat spring bent to form an angle of between 1 and 90 degrees. One example of this embodiment is depicted in FIG. **11**. Each end

of the flat spring **1110** incorporates a weight **1120** to amplify detected motion. The bent end of the sensor **1110** is affixed to a circuit board **1130** or other conductive member. Conductive stops **1140** are affixed to the circuit board and are equally spaced on either side of the flat springs **1110** and weights **1120**. When contact with the conductive stops **1140** occurs, a signal flows through the circuit board **1130** or other conductive member to the sensor then to the conductive stops **1140** and back through the circuit board **1130**. This signal is interpreted by control electronics indicating that motion has occurred. Each of the four conductive stops **1140** may be electrically joined or remain separate. Therefore, the control electronics may interpret the signal received from the motion detector **1100** together or individually. In this embodiment, the motion detector may include an electronic circuit that incorporates algorithms capable of detecting and interpreting individual or joined signals from the motion sensor. The electronics can define orientation, number of deflections from each conductive stop and interpret the results. The resulting information is maintained in electrical storage or displayed on an enunciation device which may include a Liquid crystal display, Light emitting diode display or other means to store or communicate the resulting information to a user.

In one embodiment as depicted in FIG. **12**, the coupon comprises a motion sensor having a dual-axis or balanced pendulum motion detector **1200** composed of a pendulum **1210** which pivots at one end and contains a weight **1220** at the other, and which incorporates two balanced hair pin springs **1230** symmetrically located around the long axis of the pendulum **1210**. The hair pin springs **1230** balance the pendulum **1210** in a central location and allow deflection in two directions. Two contacts **1240** are located at either side of the pendulum weight **1220**. Deflection of the pendulum **1210** to either contact **1240** causes an electrical circuit to be completed between the pivot end of the pendulum **1210** through the weight **1220** to either contact **1240**. The contacts **1240** may be joined or separated. The pendulum **1210** may include electronic logic. This embodiment may further comprise an electronic circuit that incorporates algorithms capable of detecting individual or joined deflections and interpreting the inputs to correspond to the use, orientation and numeric quantity of deflections detected. The electronics interpret the information and send the results to a storage or enunciation device which may include a Liquid crystal display, Light emitting diode display or other means to store or communicate the resulting information to a user.

In one embodiment as depicted in FIG. **13**, the coupon comprises a motion detector **1300** comprising a spring wire **1310** with a dampening device motion detector. This embodiment includes a three-axis motion sensor **1300** in which a conductive spring **1310** wire is affixed to a selectively conductive mounting plate **1320** (such as a printed circuit board) and the other end incorporates a fixed weight **1330**. A predetermined length of the spring wire **1310** protrudes through a compressible material (such as open cell foam). The fixed weight end **1330** protrudes through a conductive hoop **1340**. The hoop **1340** is connected to the mounting plate **1320**. Upon deflection, the conductive spring wire **1310** deflects and contacts the conductive hoop **1340**. When contact with the conductive hoop **1340** occurs, a signal flows through the printed circuit **1320**. This signal is interpreted by control electronics indicating that motion has occurred. The conductive hoop may be electrically joined or remain separate wherein the control electronics may interpret the signal received from the motion detector. This embodiment may include electronic logic such as, for example, an electronic circuit that incorporates algorithms capable of detecting individual deflections and interpreting the inputs to correspond to the numeric quantity of deflections detected. The electronics send the resulting information to a storage or display device such as, for example, a liquid crystal display, light-emitting diode display or other means to store or communicate the resulting information to a user.

In one embodiment, the coupon comprises a spring wire with dampening device motion detector and three-axis interpretation. This embodiment includes a three-axis motion sensor in which a conductive spring wire is affixed to a selectively conductive mounting plate (such as a printed circuit board) and the other end incorporates a fixed weight. A predetermined length of the spring wire protrudes through a compressible material (such as open cell foam). The fixed weight end is located between two individual contacts. A third contact is located on the selectively conductive mounting plate under the weight. Upon sensing motion, the spring wire is deflected and contacts one or more of the conductive contacts. An electrical signal flows through the selectively conductive mounting plate. This signal is interpreted by control electronics indicating that motion has occurred. The conductive stops may be electrically joined or remain separate wherein the control electronics may interpret the signal received from three contacts and the motion detector. The compressible material dampens oscillations from the spring wire. This motion detector may include an electronic circuit that incorporates algorithms capable of detecting individual deflections and interpreting the inputs which correspond to the use, orientation and numeric quantity of deflections detected. The electronics interpret the information and send the results to a storage or enunciation device which may include a Liquid crystal display, Light emitting diode display or other means to store or communicate the resulting information to a user.

In one embodiment, the coupon includes a motion detector that can detect 360 degrees of longitudinal motion and which is comprised of a platform with a single outer raised conductive ring, an inner conductive surface placed inside, but not contacting the raised conductive ring, a movable ball or "puck" is located inside the raised conductive ring, and a compressible porous member such as open cell foam, which fits around the movable ball or "puck" and which is compressed by the ball or "puck" as it is deflected by motion. The ball or "puck" is held in a central location by the compressible porous member. Upon sensing motion, the ball or "puck" is deflected and causes the porous member to compress in the direction the motion is detected and proportion to the energy contained in the motion. If the energy is sufficient, the porous member if fully compressed and the ball or puck makes contact through the porous member to the raised conductive ring. Making contact with the raised conductive ring caused an electrical circuit to be completed. This embodiment may include an electronic circuit that incorporates the algorithms capable of detecting deflections and interpreting the inputs to correspond to the use, orientation and numeric quantity of deflections detected. The electronics can define orientation, number of deflections from each conductive stop and interpret the results. The resulting information is maintained in electrical storage or displayed on a display device such as, for example a liquid crystal display, light-emitting diode display or other means to store or communicate the resulting information to a user.

In one embodiment as depicted in FIG. **14**, the coupon includes a motion sensor **1400** comprising separate or individual raised conductive ring members **1430** arranged equidistant from a center point and mounted on a platform **1410**, an inner conductive surface is located on the platform but not

touching the raised conductive ring members **1430**, a movable ball **1420** or "puck" is located inside the individual raised conductive ring members **1430**, and a compressible porous member which fits around the movable ball **1430** or "puck" and which is compressed by the ball **1430** or "puck" as it is deflected by motion. The ball **1430** or "puck" is held in a central location by the compressible porous member. Upon sensing motion, the ball **1430** or "puck" is deflected and causes the porous member to compress in the direction the motion is detected and proportion to the energy contained in the motion. If the energy is sufficient, the porous member if fully compressed and the ball **1430** or puck makes contact through the porous member to one or more of the individual raised conductive ring members **1430**. Making contact with one or more individual raised conductive ring members **1430** caused an electrical circuit to be completed. This motion sensor **1400** may include a electronic circuit that incorporates algorithms capable of detecting individual or joined deflections and interpreting the inputs to correspond to the use, orientation and numeric quantity of deflections detected. The electronics send the resulting information to a storage or enunciation device which may include a Liquid crystal display, Light emitting diode display or other means to store or communicate the resulting information to a user.

As depicted in FIGS. **15***a*-**15***e*, one embodiment of the present application comprises a coupon including a motion detector **1500** comprising a conductive element such as a ball **1510**, a dampening element such as a foam ring **1520**, and a conductive ring **1530** disposed on a substrate **1540**. The conductive ring **1530** surrounds an inner conductor **1550**. A cross-section of this motion detector **1500** is depicted in FIG. **15***c* which shows the ball **1510** resting on the inner conductor **1550** and held apart from the conductive ring **1530** by the foam ring **1520**. As depicted in FIG. **15***d*, motion of the motion detector will force the ball **1510** against the foam ring **1520**, deforming the foam ring **1520** and forming a circuit between the inner conductor **1550** and the conductive ring **1530**. In a further embodiment depicted in FIG. **15***e*, the inner conductor **1550** may have channels, holes, or protuberances which inhibit the free movement of the ball **1510** and thus require additional motion to form a circuit.

A similar embodiment of a motion detector **1600** is depicted in FIG. **16** in which a conductive element such as a ball **1610** is disposed in a dampening element such as a foam ring **1630** which is placed inside a number of conductive posts **1650** on a substrate **1640**. An inner conductor **1660** is disposed in the middle of the motion detector **1600**. In this embodiment, the ball **1610** forms a circuit between the conductive posts **1650** and the inner conductor **1660** when the ball **1610** is subject to sufficient motion to deform the foam ring **1630** and allow the ball **1610** to contact the conductive posts **1650** while resting on the inner conductor **1660**.

FIG. **17** depicts another embodiment of a motion detector **1700** to be included with a coupon according to the present application. The motion detector **1700** comprises a conductive pin **1710** that may have a weight **1720** coupled to the end. The conductive pin **1710** may be surrounded by a dampening element such as a piece of foam **1730** which may be coupled to the substrate **1760** from which the conductive pin **1710** extends. The weight **1720** is surrounded by a conductive member **1740** and/or a conductive plate **1750**. The movement of the motion detector **1700** will cause the weight **1720** to contact either the conductive member **1740** or the conductive plate **1750**, closing a circuit with the conductive pin **1710**.

A similar embodiment is depicted in FIG. **18***a*. In this embodiment of a motion detector **1800**, a conductive pin **1810** with a weight **1830** extends from a substrate **1820**. The weight **1830** is surrounded by a plurality of conductive posts, **1840**, **1850** and positioned above a conductive plate **1860**. Motion cause the conductive pin **1810** to contact either the posts **1840**, **1850** or the conductive plate **1860** which completes a circuit. A side view of this embodiment is depicted in FIG. **18***b*.

One embodiment of a coupon is depicted in FIG. **19**. The coupon **1900** comprises a flexible band **1910**, a circuit **1920** which includes a motion detector, and a housing **1930** which holds the circuit **1920** to the flexible band **1910**. The flexible band **1910** may further comprise an adhesive strip on one or both ends in order to affix the coupon **1900** to a user. In some embodiments, the housing **1930** may be a pocket in the band **1910** and not a separate component. In another embodiment, the housing **1930** may also be coupled to the sensor and then affixed to the band **1910**.

In one embodiment, the coupon comprises a motion detector comprised of individual contacts arranged on a sliding surface and which are spaced equidistant from a center point and which alternate in conductivity. A ball or puck is contained inside the contacts and which upon being tilted, slides against the contacts and creates a circuit. The sensor can detect tilts at 45 degree quadrants.

In one embodiment, a coupon comprises a series of light emitting diodes which provide signals to a user. One embodiment of a method of measuring physical activity and conserving battery power of a coupon is depicted in FIG. **21**.

Intelligence may be built into a coupon such that the coupon does not begin to measure physical activity until a predetermined time has passed. Thus, the coupon is not activated until a predetermined time. This may be advantageous when a number of coupons are presented to a user, such as in a physical therapy application where the user is given a number of coupons that must be activated at different times. The activation of certain coupons at different times will prevent the user from wearing all of the coupons at the same time.

In one embodiment, the coupon may also serve as a gift card. The gift card would be purchased for a fixed dollar amount. Typical of traditional gift cards, the gift card may be redeemed for the purchased value or if the consumer chooses to engage in physical activity for a predetermined level or amount of time, the gift card may increase in value. Suppose one purchases a gift card from a book store for $20 and gifts the card to someone. This individual may choose to use the gift card to purchase merchandise for the value of $20 or may choose to engage in physical activity to increase the value of the gift card (perhaps the gift card will increase in value from $20 to $25).

In one embodiment, the coupon comprises a ring motion detector with equidistant non-alternating contacts. The motion detector is comprised of individual contacts arranged on a sliding surface and which are spaced equidistant from a center point and which do not alternate in conductivity (i.e. ++, −−). A ball or puck is contained inside the contacts and which upon being tilted, slides against the contacts and creates a circuit. The sensor can detect tilts at 90 degree quadrants.

In one embodiment, the coupon comprises a ring motion detector with equidistant pairs of alternating contacts. The motion detector is comprised of pairs of contacts arranged on a sliding surface and which are spaced equidistant from a center point and the contact of which alternate in conductivity. A ball or puck is contained inside the contacts and which upon being tilted, slides against the contacts and creates a circuit. The sensor can detect tilts at 45 degree quadrants. Space between alternating contacts changes speed and transition of the ball or puck from one set of contacts to the other.

In one embodiment, the coupon comprises a motion detector comprised of pairs of contacts arranged on a sliding surface and which are spaced equidistant from a center point and the contact of which do not alternate in conductivity. A ball or puck is contained inside the contacts and which upon being tilted, slides against the contacts and creates a circuit. The sensor can detect tilts at 90 degree quadrants.

In either of the ring designs described above, a hole may exist in the center of the ring surface (i.e. printed circuit board). This will allow the ball or puck to remain idle or in a stationary position during a time when the motion detector should not be registering hits (i.e. during transportation).

In another embodiment, the motion detector is comprised of pairs of electrical contacts arranged around the circumference of a sliding surface. A plurality of holes or protuberances are incorporated into the sliding surface. A conductive object such as, for example, a sliding puck or rolling ball, touches the electrical contacts upon tilting of the motion detector and creates electrical contact between the contacts. The holes or protuberances in the sliding surface alter the friction between the conductive object and the surface thereby adjusting the reaction of the conductive ball or puck to tilting. When the conductive object contacts one or more of the electrical contacts, a circuit is formed between the contacts and the contact is recorded by a device.

A final and third methodology for monitoring the user's motion is achieved using electrical technology, as shown in FIG. **5**. In accordance with this third method electrical energy is captured by moving a magnet **515** around or through a coiled wire. A change in the magnetic field includes an electromotive force or voltage in inductor L**1**. Four diodes denoted as D**1** represent a bridge rectifier to convert the AC voltage generated in inductor L**1** to DC voltage for storage by a capacitor C**1**. Similar to that described above with respect to the other methodologies, the electrical methodology also disregards physical activity or movement by the user which is inconsequential or insignificant (falls below a predetermined threshold level). To achieve this result, a triggering signal is transmitted to power ON a chemical or electrical circuit **505** only when the stored voltage in capacitor C**1** exceeds a predetermined threshold voltage level of physical activity or movement. In the ON state, the voltage is used to power the circuit **505** to electronically record the level of physical activity in a memory **510** and change the pH of a compound of a chemical indicator thereby producing a color to signify to the user that the kinetic coupon has been validated or activated and is now redeemable.

It is to be noted that each of the methodologies described above may be used independently or in any combination thereof.

Many additional features may be added to the inventive kinetic coupon. A timing clock may be employed to ensure that the kinetic coupon is validated and/or redeemed after being validated prior to expiration of a predetermined redemption period of time. Upon the expiration of the predetermined redemption period of time, the kinetic coupon if not yet validated will no longer be activatable and, if already validated, will become inactive or perhaps indicate on the display that it is no longer redeemable.

The kinetic coupon may be reusable whereby after validation and redemption the components may be reset and used again. Otherwise, it is also contemplated and within the intended scope of the application for all or some portion of the kinetic coupon to be disposable. One factor in this determination is the overall cost associated with the components of the kinetic coupon itself.

As previously noted, the kinetic coupon may be designed or customized, as desired, to promote the specific corporation or sponsor. For example, the name, trademark, logo, or other indicia of the corporation or sponsor may be displayed on the strap or other portion of the coupon including in the display itself. In this regard, the kinetic coupon may be used as yet another advertising tool for promotion of a corporate or sponsor's name, brand, and/or product/service. Additional companies or advertisers may be added to the kinetic coupon.

FIG. **6** is an exemplary flow chart of the user of the kinetic coupon in accordance with the present application. In step **600** in inactive coupon is dispensed to the user. Initially, the kinetic coupon is not activated and this not redeemable for any type of reward or incentive. However, the indicia may display instructions that invite the user to participate in physical activity or movement while in possession of the inactive kinetic coupon in step **605**. A determination is made in step **610** whether the user's participation in physical activity exceeds a stored predetermined threshold, e.g., a predetermined amount of physical activity and/or a predetermined period of time. After the user has participated in physical activity for at least the predetermined threshold then in step **615** the kinetic coupon is validated and signifies to the user that it is now able to be redeemed.

In one embodiment, the coupon comprises a system for encouraging physical activity in children. In this embodiment, a child is issued a coupon from a source which may be the child's parents, the child's school, or an entity such as a restaurant or other vendor. The parent or guardian of the child may set up an account such as, for example, a bank account or a points account for the child on a web site. When the child engages in physical activity that exceed the predetermined threshold set by the coupon, the coupon will success to the child with an indicator such as a code. The code may then be entered into the web site by the parent or guardian or by the child to redeem the coupon for a predetermined amount of points or currency. In the embodiment where an online bank account is set up for the child, the coupon may be redeemed for currency which is deposited into the child's account.

In one embodiment, a coupon according to the present application comprises a self-contained game that monitors the physical activity of a user and provides feedback to the user based on the level of physical activity of the user. The game will react to the physical activity of the user and issue points or rewards to the user based on the level of physical activity recorded by the coupon.

One example of this embodiment is a virtual pet that is displayed on a display such as a liquid crystal display on the coupon. The virtual pet will appear as healthy when the coupon has detected a predetermined amount of physical activity from the user and the virtual pet may appear ill if the coupon detects an amount of physical activity below a threshold level. The pet may also grow and become stronger upon detection of a number of different thresholds of physical activity. In a further embodiment, the coupon monitors only recent physical activity from a predetermined time in the past until the present. This ensure that the user regularly engages in physical activity to maintain the health of the virtual pet.

In one embodiment, the coupon interacts with an online game which responds to the amount of physical activity detected by the coupon. Such a game may reward the user upon the detection of certain threshold levels of physical activities from the coupon.

In one embodiment, a coupon according to the present invention may be issued as a label on food or beverage products, a peel-off addition to packaging of goods, or a promo-

tional label that may be sold in office supply stores and printed with a company's promotional logo.

In one embodiment a device including a coupon has a removable component that alerts the user when a predetermined level of physical activity has been reached. The removable component has a display or other visual indication as described herein to inform the user how much physical activity has been achieved while wearing the device and/or whether the predetermined level of physical activity has been reached. The removable component may fit into a device such as a wearable bracelet, anklet, or other device as described herein. The removable component records the amount of physical activity detected by a motion sensor in the removable component.

The removable component may be added to a second device such as, for example, a toy that is able to detect the amount of physical activity recorded by the removable component or some other signal from the removable component corresponding to the amount and/or level of physical activity recorded. The second device reacts to the amount and/or level of physical activity recorded by the removable component in one or more ways such as, for example, activating the features of the second device for a predetermined period of time or unlocking special features upon detection of a certain amount and/or level of physical activity recorded by the removable component.

One example of a device with a removable component that may be used with a second device is a bracelet with a removable component configured to record an amount of physical activity undertaken by the user while wearing the bracelet that is detected by the bracelet. The user may remove the removable component from the bracelet and insert the removable component into a video game console, which will allow the user to play video games only if a predetermined amount and/or level of physical activity has been recorded by the removable component. The video game console may provide bonuses to a user such as, for example, additional playing time or additional available games, if a certain amount and/or level of physical activity has been recorded. In one embodiment, the video game console will allow playing time commensurate with the time of physical activity recorded by the removable component.

One example of a removable component is depicted in FIGS. **22-24**. A first device **2200** includes a wrist strap **2210** to be worn by a user. The first device **2200** further includes a motion sensor and a removable component **2220** for recording the physical activity of a user wearing the first device **2200** as detected by the motion sensor. The removable component further includes a display **2240** to alert the user when a predetermined amount and/or level of physical activity has been recorded. The removable component may include electrical contacts **2230** to communicate with the wrist strap **2210**.

The removable component **2320** is depicted in FIG. **23** as being inserted into a base station **2350**. The base station **2350** may serve to retrieve information from the removable component and transmit the information to a second device, such as the video game console as described above. The base station **2350** may also include a Universal Serial Bus adapter or other connector or coupling device so that the removable component may be coupled to a computer such as, for example, a personal computer. Information from the removable component may be transmitted to the personal computer if a user wishes to examine the precise levels of physical activity recorded by the removable component or if a user wishes to record all physical activity over time that has been recorded by the removable component. The removable component may also be used to enable certain applications on the personal computer such as, for example, computer games. The removable component may also enable particular features of a application such as, for example, points in a particular game, different levels in a game, special skills in a game, or online currency redeemable for goods or services.

FIG. **24** depicts the removable component being inserted into a toy car **2460**. In this embodiment, the toy car functions based on the amount and/or level of physical activity recorded by the removable component. The car may, for example, only function for a specific time based on the amount and/or level of physical activity recorded by the removable component. The car may also make special features available to a user based on the amount and/or level of physical activity recorded by the removable component such as super speed or stunt driving.

In one embodiment, the removable component includes a transmitter such as a RFID transmitter that communicates with devices such as, for example, toys or computer games. The transmitter will send a signal to such devices when a predetermined level of physical activity has been recorded by the removable component and the devices may activate or function in specific ways based on the signals. This obviates the need to insert the removable component into a second device for the second device to function in a specific way based on the amount and/or level of physical activity detected or recorded by the removable component. The transmitter may send signals to a second devices for a predetermined time based on the amount and/or level of physical activity recorded by the removable component or may send signals only while the removable component is presently detecting physical activity. When equipped with a transmitter, the removable component needs not be removable but instead may communicate with the second devices via radio frequency, infrared, or some other communications method or protocol.

The removable component may also accumulate points for the amount of physical activity recorded and these points may be uploaded to a web site through a computer. The web site may provide a variety of bonuses based on the amount of points accumulated by a user.

In one embodiment, a coupon may include intelligent logic that detects not only physical activity, but also levels of physical activity and types of physical activity. The coupon will discern between activities such as running, walking, and jumping jacks and record the level of a user's participation in each such activity. The coupon may require a user to participate in a predetermined level of a plurality of activities before the coupon is redeemable. The coupon may also include a plurality of indicators or displays each corresponding to one of a plurality of physical activities to alert the user when a predetermined threshold has been reached for each of the plurality of physical activities.

In an embodiment wherein a coupon detects a plurality of types of physical activity, the coupon may include a removable component which records the different types and levels of physical activity detected by the coupon. The removable component may then interact with a device such as, for example, a toy which will react to the amount and the types of physical activity recorded in the removable component by providing bonuses or special features based on the level and the type of physical activity the user has achieved. For example, the device may be a toy robot which includes a space for insertion of the removable component. If the removable component has recorded a predetermined threshold of jumping jacks, the toy robot may talk. If the removable component has recorded a predetermined threshold of running, the toy robot may walk. In this way, a device such as a toy will

respond to the various physical activities achieved by a user. As described above, the removable coupon need not be removable.

Thus, while there have been shown, described, and pointed out fundamental novel features of the application as applied to a preferred embodiment thereof, it will be understood that various omissions, substitutions, and changes in the form and details of the devices illustrated, and in their operation, may be made by those skilled in the art without departing from the spirit and scope of the application. For example, it is expressly intended that all combinations of those elements and/or steps that perform substantially the same function, in substantially the same way, to achieve substantially the same results be within the score of the application. Substitutions of elements from one described embodiment to another are also fully intended and contemplated. It is also to be understood that the drawings are not necessarily drawn to scale, but that they are merely conceptual in nature. It is the intention, therefore, to be limited only as indicated by the scope of the claims appended hereto.

Every issued patent, pending patent application, publication, journal article, book, or any other reference cited herein is each incorporated by reference in their entirety.

What is claimed is:

1. A system, comprising:

a device having one or more motion sensors configured to monitor physical activity based on a motion of the device, the device including circuitry configured to process signals generated by the one or more motion sensors to differentiate between at least two different types of monitored physical activity, the device including a memory for storing respective amounts of the at least two different types of monitored physical activity, the device including a display having at least five light emitting diodes arranged in a substantially straight line, the device including circuitry connected to control illumination of the at least five light emitting diodes in a sequential manner based on an amount of at least one of the at least two different types of monitored physical activity,

wherein the device is configured to:

determine when an amount of at least one of the at least two different types of monitored physical activity meets or exceeds a predetermined threshold, and

control illumination of the at least five light emitting diodes in a sequential manner to indicate that the amount of at least one of the at least two different types of monitored physical activity meets or exceeds the predetermined threshold; and

a band formed to secure to a wrist of a person and hold the device.

2. The system recited in claim **1**, wherein the device includes a transmitter configured to transmit a wireless signal conveying information about the monitored physical activity for processing by an interactive web site.

3. The system recited in claim **1**, wherein the one or more motion sensors are configured to monitor the physical activity from a first predetermined point in time until a second predetermined point in time.

4. The system recited in claim **1**, wherein the predetermined threshold includes a predetermined amount or a predetermined time period.

5. The system recited in claim **1**, wherein the device further includes one or more removable components adapted to connect with one or more other devices configured to react to the physical activity monitored by the one or more motion sensors.

6. The system recited in claim **1**, wherein the physical activity monitored with the one or more motion sensors include walking, running, and jumping.

7. The system recited in claim **1**, wherein the device is configured to control illumination of the at least five light emitting diodes to display a unique code.

8. The system recited in claim **1**, wherein the display having the at least five light emitting diodes arranged in the substantially straight line is a first display, the device further including a second display configured to display an alphanumeric message.

9. The system recited in claim **8**, wherein the second display is configured to display an appearance of a health of a virtual live entity based on a level of the monitored physical activity.

10. The system recited in claim **1**, wherein the device is configured to be reset so as to clear the memory.

11. The system recited in claim **1**, wherein the device is associated with an account of a user.

12. The system recited in claim **1**, wherein the device further includes a microprocessor configured to power the kinetic device on or off based on the physical activity monitored with the one or more motion sensors.

13. The system recited in claim **1**, wherein the device includes an alarm to audibly signify that the physical activity monitored with the one or more motion sensors meets or exceeds the predetermined threshold.

14. The system recited in claim **1**, wherein the at least five light emitting diodes are configured to emit light of a single color.

15. The system recited in claim **1**, wherein the at least five light emitting diodes are configured to emit light of multiple colors.

16. A method, comprising:

monitoring, by one or more motion sensors of a device, physical activity based on a motion of the device, the one or more motion sensors generating signals indicative of the monitored physical activity;

processing signals generated by the one or more motion sensors to differentiate between at least two different types of monitored physical activity;

storing respective amounts of the at least two different types of monitored physical activity in a memory of the device;

determining when an amount of at least one of the at least two different types of monitored physical activity meets or exceeds a predetermined threshold;

controlling illumination of the at least five light emitting diodes in a sequential manner to indicate that the amount of at least one of the at least two different types of monitored physical activity meets or exceeds the predetermined threshold.

17. The method recited in claim **16**, further comprising:

enabling resetting of the device upon determining that the amount of at least one of the at least two different types of monitored physical activity meets or exceeds the predetermined threshold, wherein resetting the device includes clearing the memory.

18. The method recited in claim **16**, wherein the physical activity monitored with the one or more motion sensors include walking, running, and jumping.

19. The method recited in claim **16**, further comprising:

controlling illumination of the at least five light emitting diodes to display a unique code.

20. The method recited in claim **16**, further comprising:

displaying an alphanumeric message on a second display of the device in response to the amount of at least one of

the at least two different types of monitored physical activity meeting or exceeding the predetermined threshold.

21. The method recited in claim **20**, further comprising:

displaying an image or written indicia on the second display to visually signify that the physical activity monitored with the one or more motion sensors meets or exceeds the predetermined threshold.

22. The method recited in claim **20**, further comprising:

displaying one or more encouragement words or messages on the second display while the monitored physical activity remains less than the predetermined threshold.

23. The method recited in claim **16**, further comprising:

transmitting a wireless signal from the device, the wireless signal conveying information about the monitored physical activity for processing by an interactive web site.

24. The method recited in claim **16**, further comprising:

operating a microprocessor on the device to power the device on or off based on the physical activity monitored with the one or more motion sensors.

25. The method recited in claim **16**, further comprising:

sounding an alai in to audibly signify that the physical activity monitored with the one or more motion sensors meets or exceeds the predetermined threshold.

26. The method recited in claim **16**, wherein the one or more motion sensors monitor the physical activity associated with a user wearing or holding the device from a first predetermined point in time until a second predetermined point in time.

27. The method recited in claim **16**, wherein the predetermined threshold includes a predetermined amount or a predetermined time period.

28. The method recited in claim **16**, wherein the device includes one or more removable components adapted to connect with one or more other devices configured to react to the physical activity monitored with the one or more motion sensors.

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