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(54) WALKER APPARATUS WITH WEIGHT SENSOR

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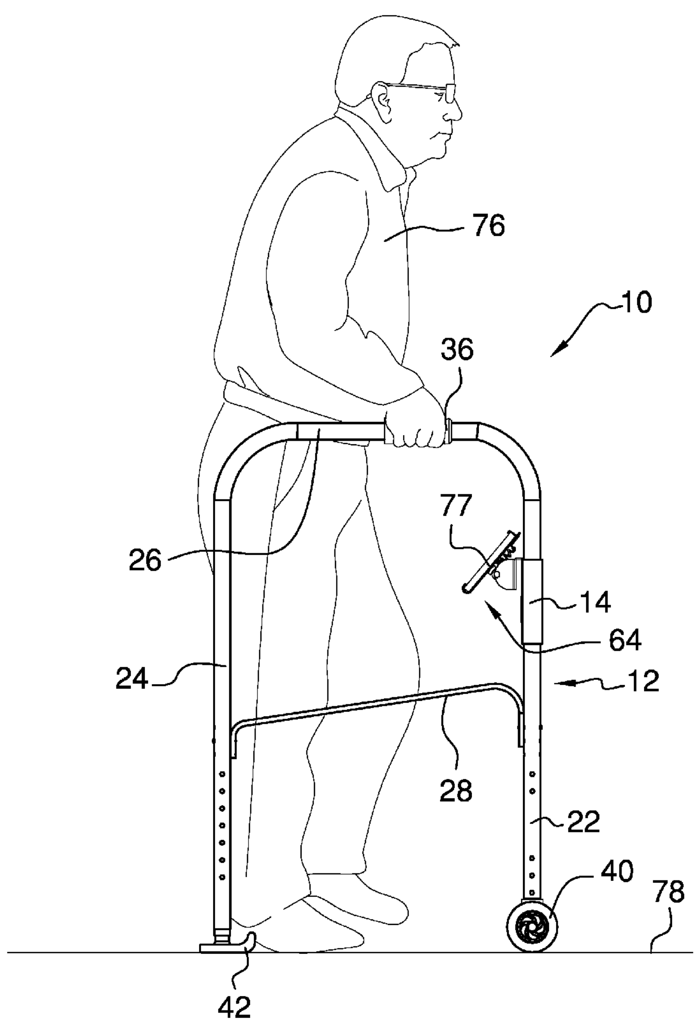
(57) **ABSTRACT**

A walker apparatus for detecting when a user of the walker exerts too much weight downwardly onto the walker includes a support frame, a load sensor, and a feedback assembly. The support frame is grasped by a user to balance the user on a support surface. The load sensor detects a compressive load exerted vertically on the support frame. The feedback assembly generates a feedback signal perceivable by the user to notify the user when too much weight is exerted on the support frame.



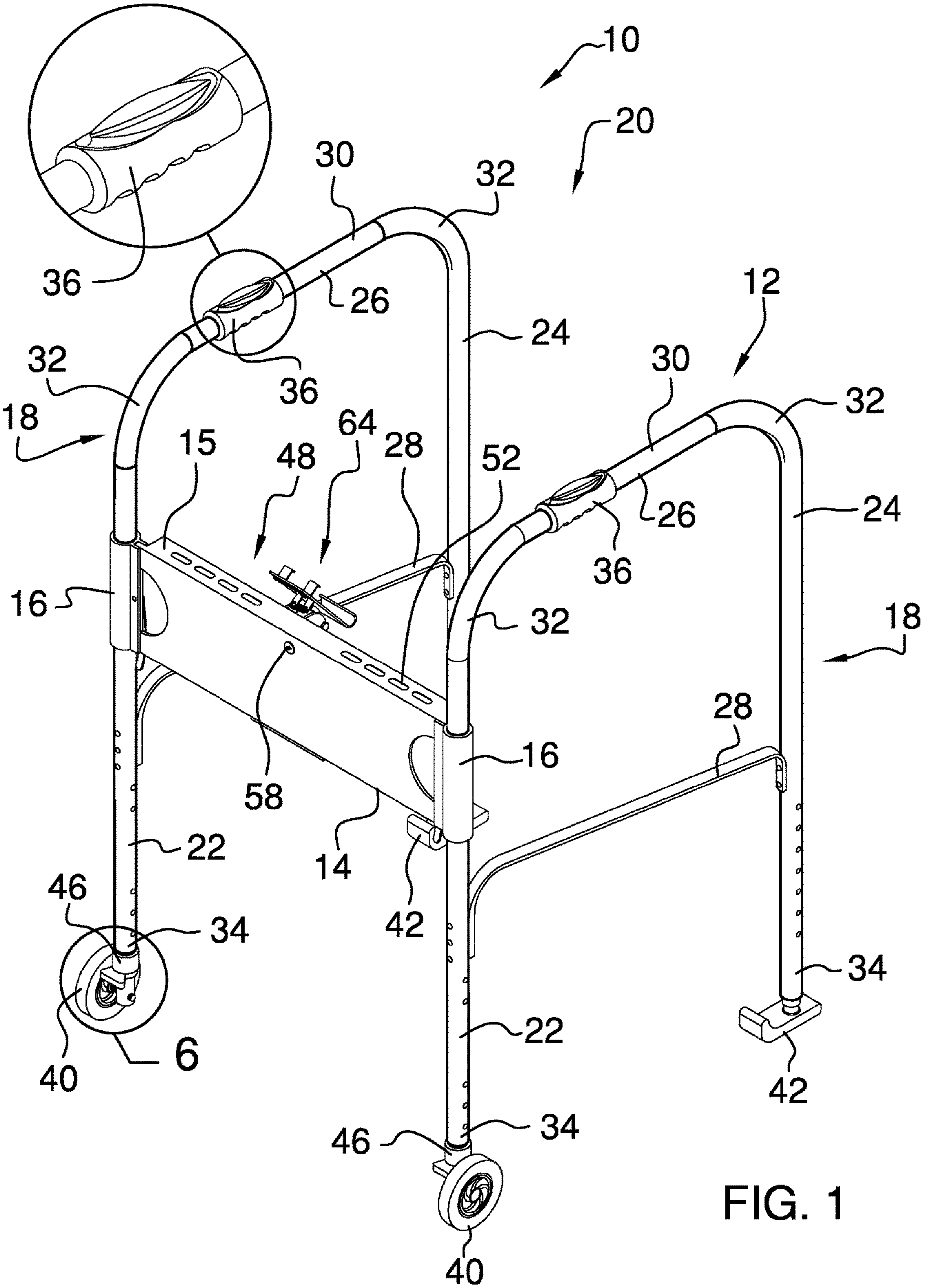


FIG. 1

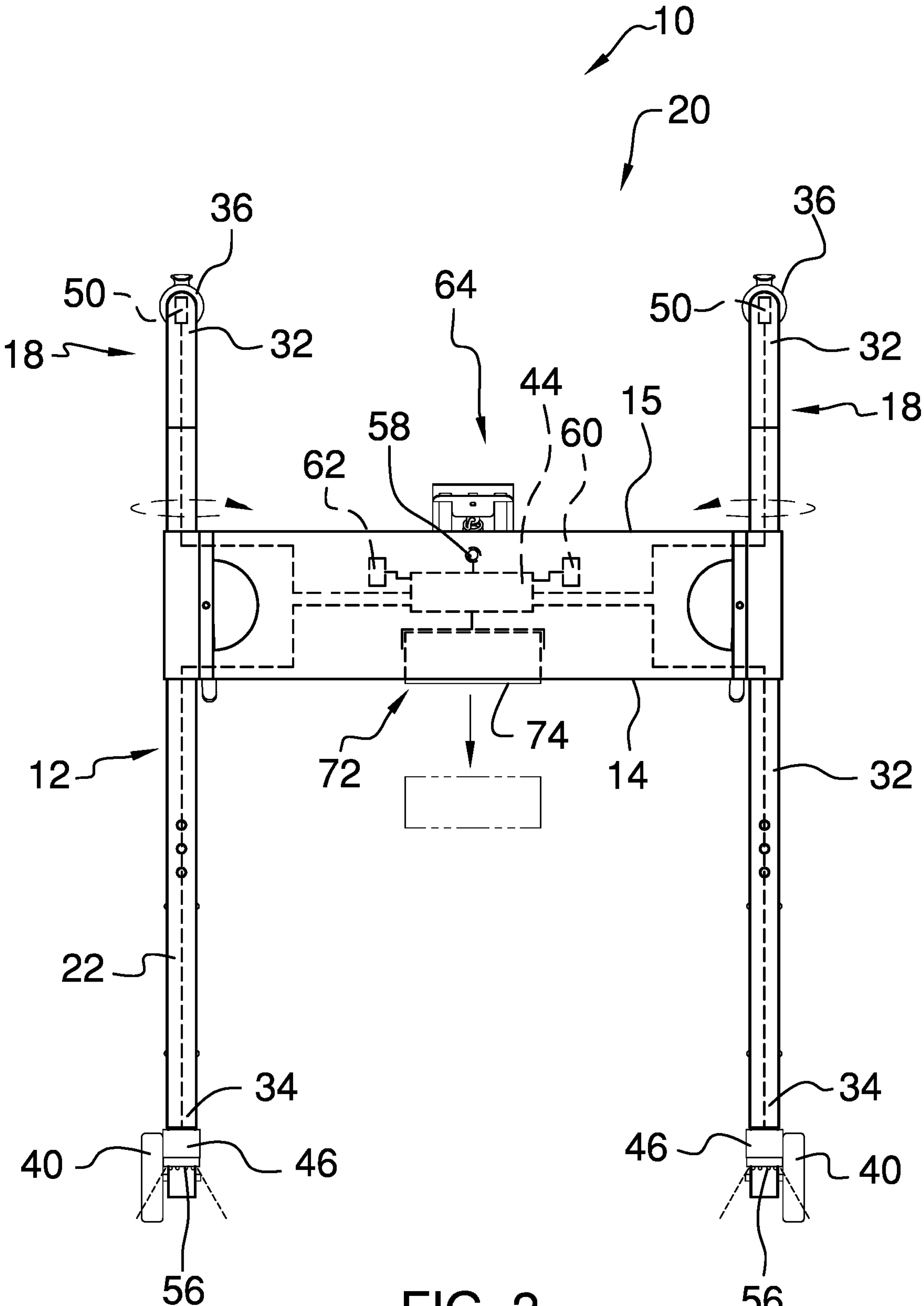

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FIG. 2

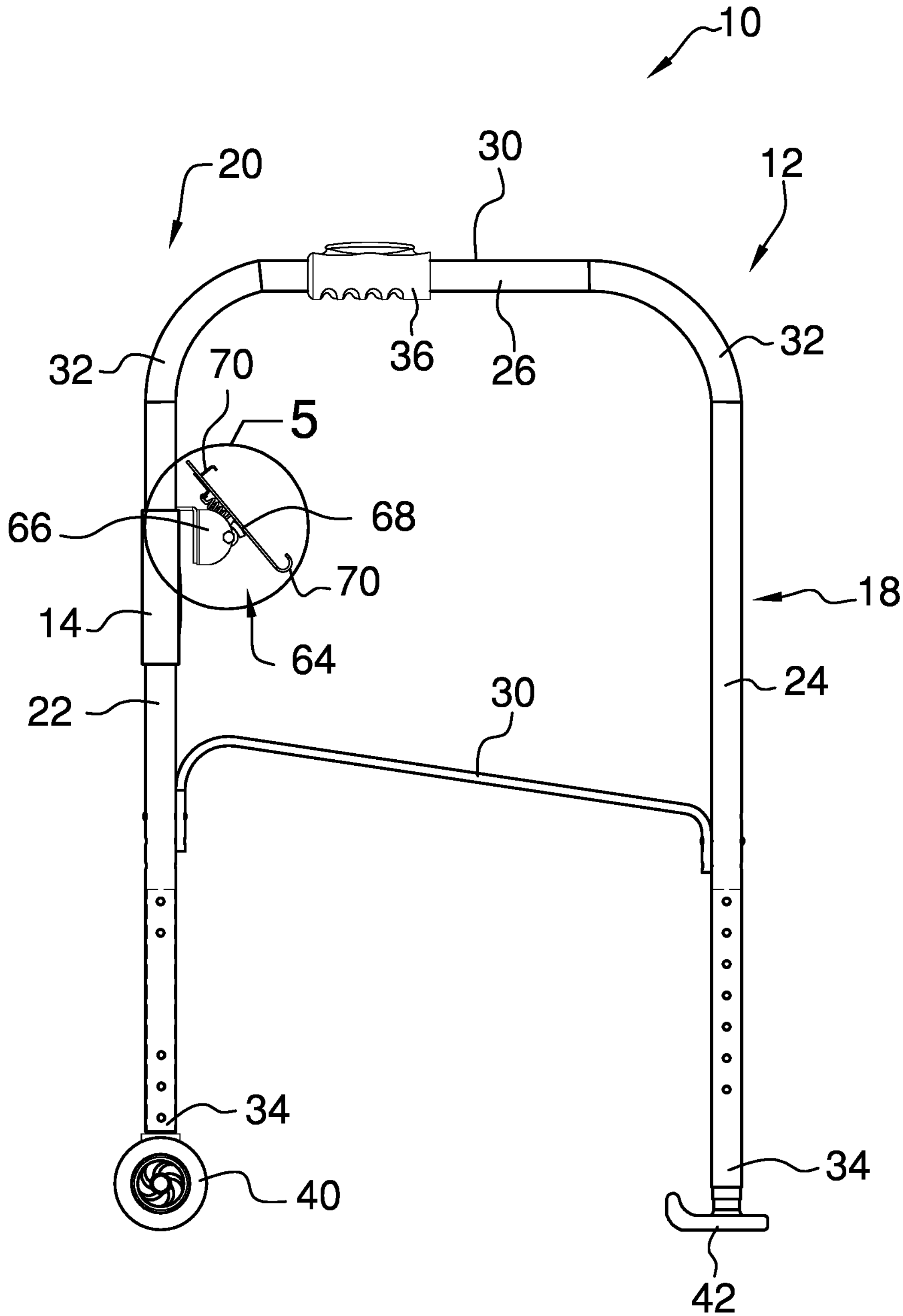


FIG. 3

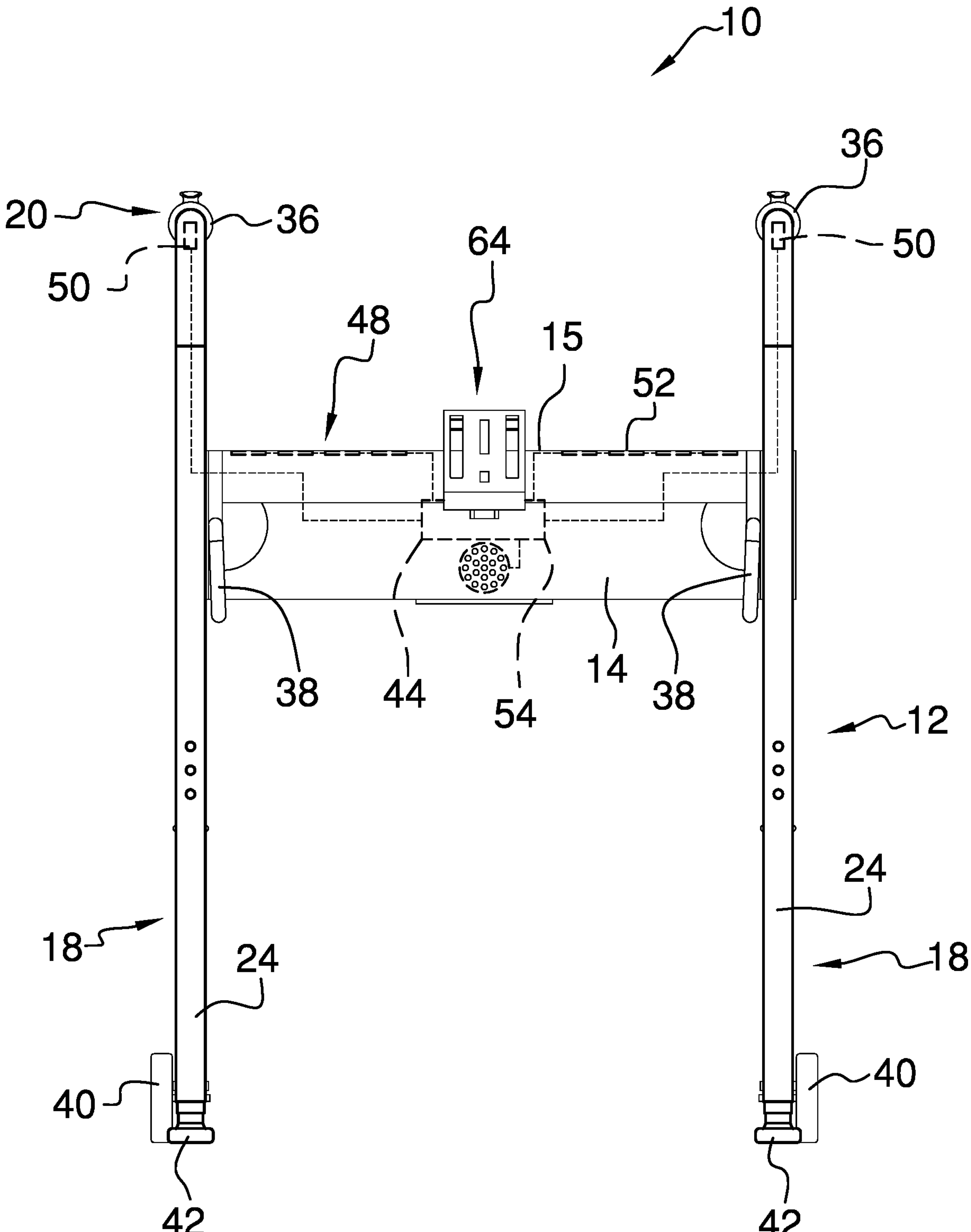


FIG. 4

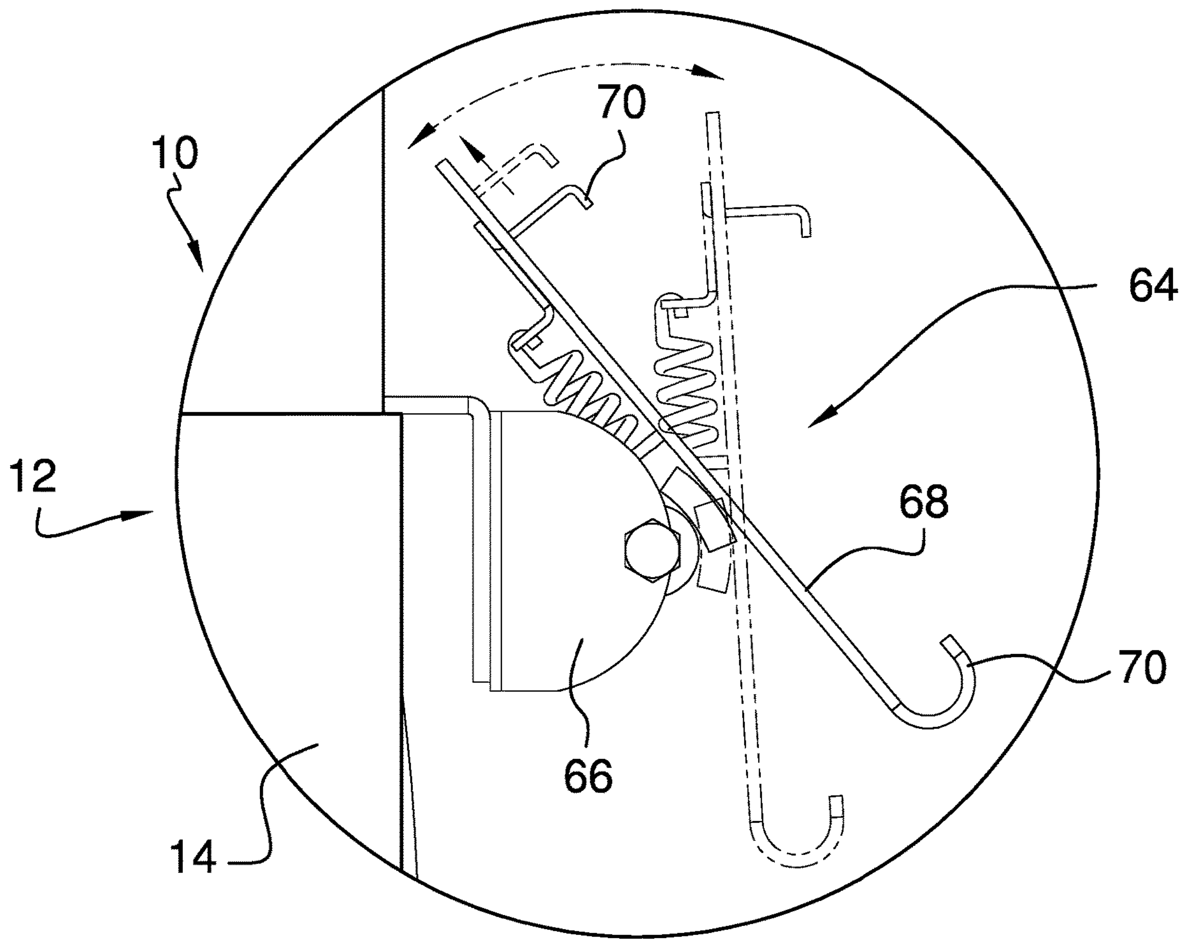


FIG. 5

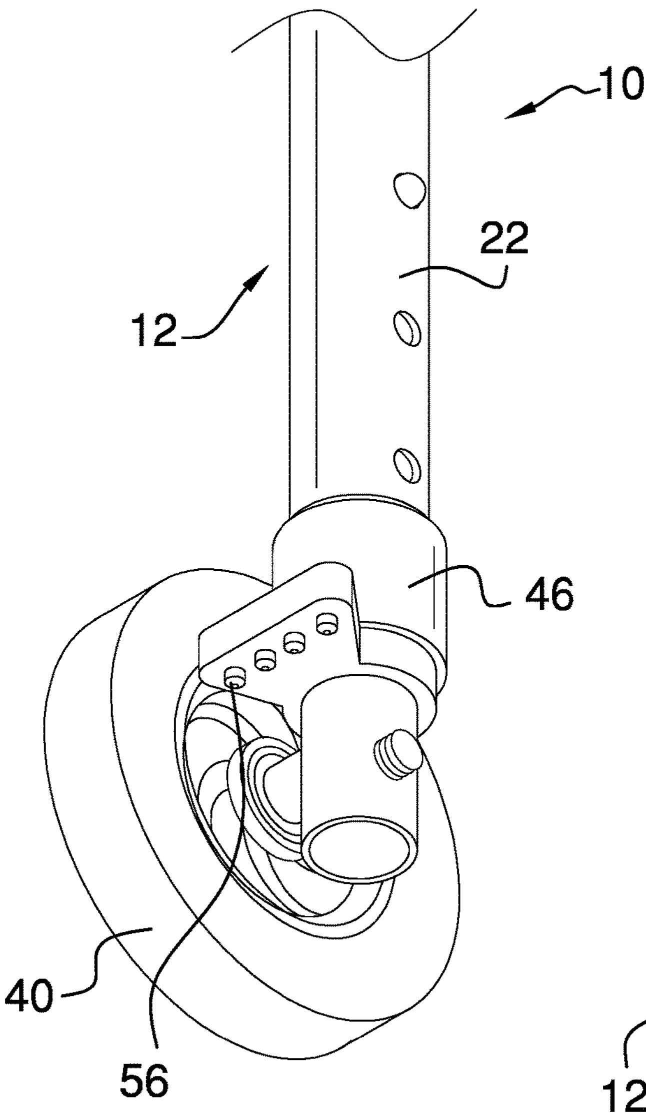


FIG. 6

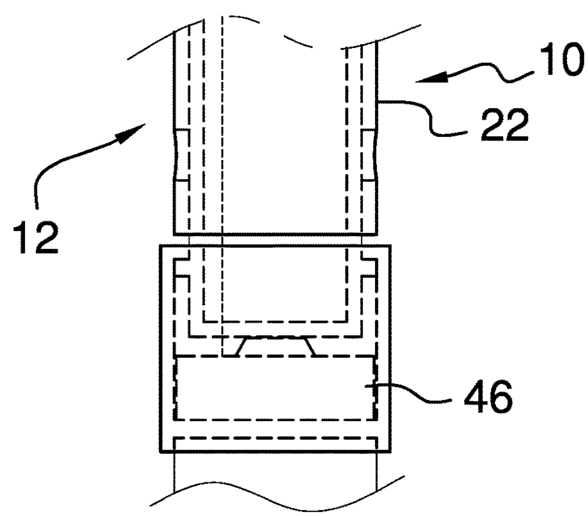


FIG. 7

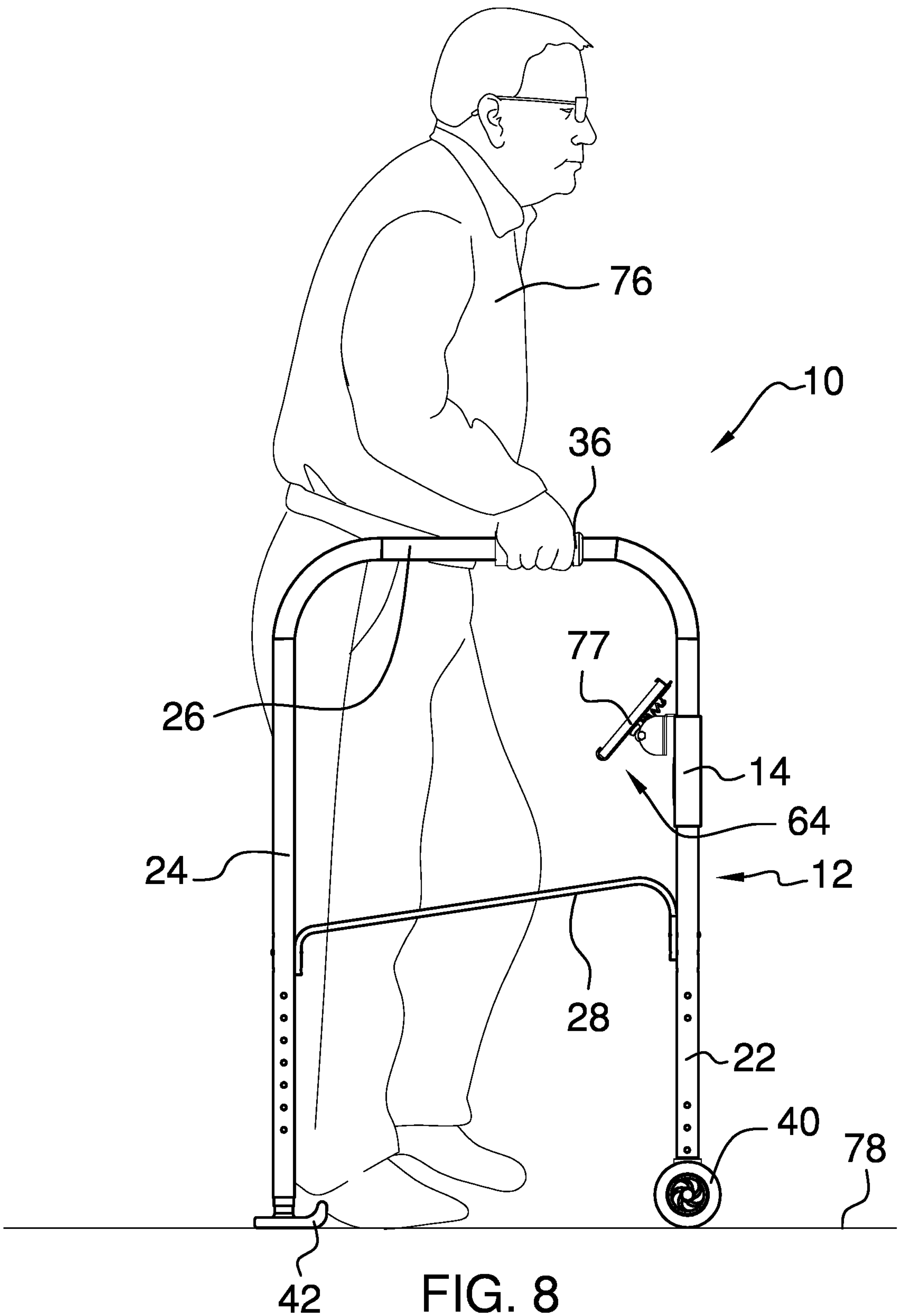
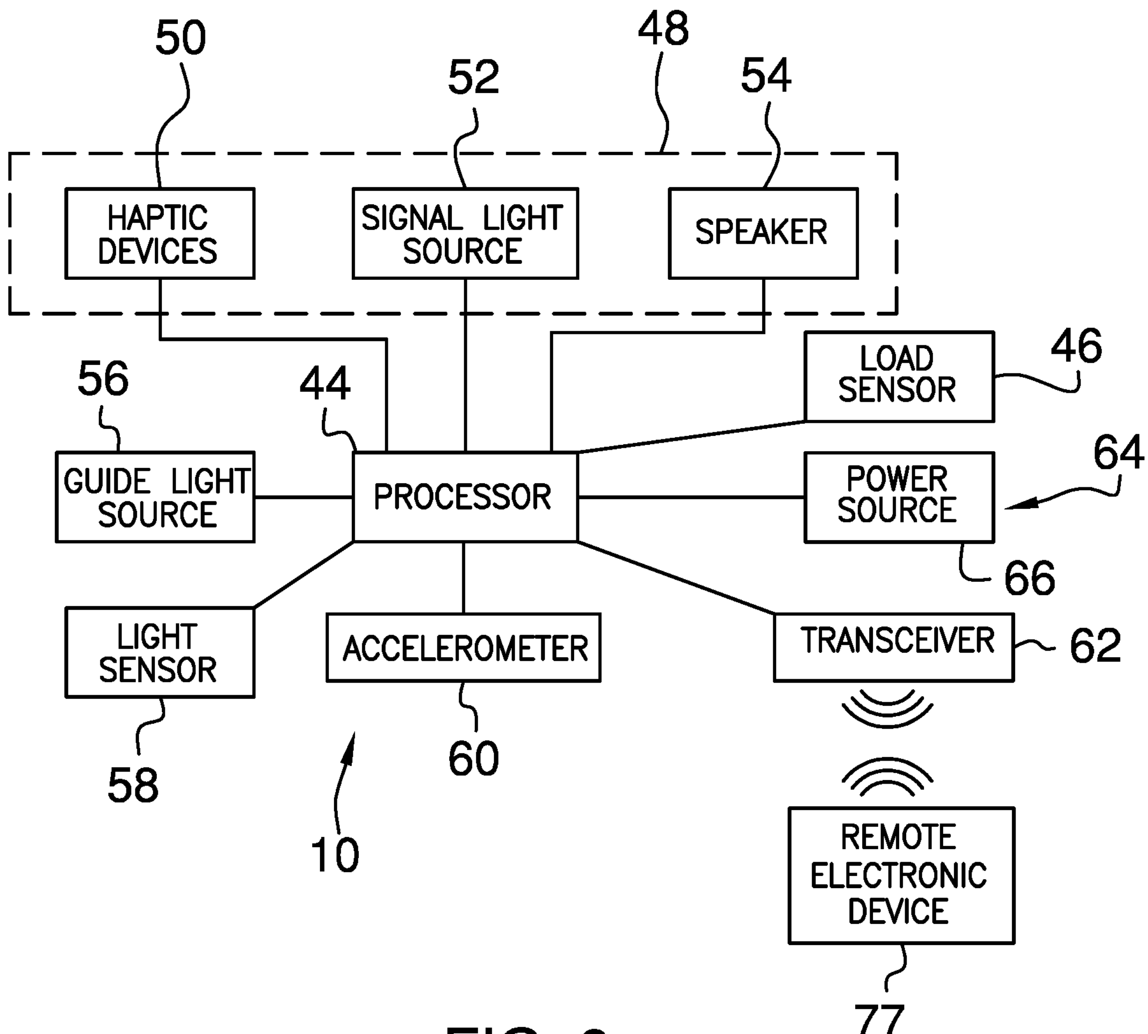


FIG. 8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HAPTIC DEVICES
SIGNAL LIGHT SOURCE
SPEAKER
46
LOAD SENSOR
56
44
GUIDE LIGHT SOURCE
PROCESSOR
POWER SOURCE
64
66
LIGHT SENSOR
ACCELEROMETER
TRANSCEIVER
62
58
60
10
REMOTE ELECTRONIC DEVICE
77

FIG. 9

WALKER APPARATUS WITH WEIGHT SENSOR

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] Not Applicable

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not Applicable

THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT

[0003] Not Applicable

INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC OR AS A TEXT FILE VIA THE OFFICE ELECTRONIC FILING SYSTEM

[0004] Not Applicable

STATEMENT REGARDING PRIOR DISCLOSURES BY THE INVENTOR OR JOINT INVENTOR

[0005] Not Applicable

BACKGROUND OF THE INVENTION

(1) Field of the Invention

[0006] The disclosure relates to walkers and more particularly pertains to a new walker for detecting when a user of the walker exerts too much weight downwardly onto the walker.

(2) Description of Related Art Including Information Disclosed Under 37 CFR 1.97 and 1.98

[0007] A common problem users of walkers encounter during use of a walker is relying too much on the walker to support the weight of the user. Walkers are primarily intended to help users balance rather than supporting their weight. Furthermore, heavy reliance on a walker to support the weight of a user can lead to postural conditions which are deleterious to the health of the user. The prior art describes walkers which aid users in developing proper gaits when using the walkers, but the prior art fails in disclosing such an apparatus which notifies the user that too much weight is being exerted onto the walker. A new apparatus which provides this information to the user would be advantageous in training the user to properly use the walker such that postural issues are avoided.

BRIEF SUMMARY OF THE INVENTION

[0008] An embodiment of the disclosure meets the needs presented above by generally comprising a support frame with a front panel, a pair of lateral supports, and a pair of grips. Each lateral support is coupled to the front panel and is positioned on an associated end of a pair of ends of the front panel. Each grip is coupled to a top side of an associated lateral support of the pair of lateral supports. A processor is mounted to the support frame, and a pair of load sensors is operatively coupled to the processor. Each load sensor of the pair of load sensors is mounted to an associated lateral support of the pair of lateral supports. The pair of load sensors is configured to detect a compressive load exerted vertically on the support frame, and the processor is programmed to determine when the compressive load is greater than a threshold load. The threshold load is selected to have a magnitude is less than a weight of a user and is considered to be too high a proportion of the weight of the user to be placing on the support frame. A feedback assembly is operatively coupled to the processor and is programmed to generate a feedback signal indicative of the compressive load is greater than the threshold load via the feedback assembly.

[0009] There has thus been outlined, rather broadly, the more important features of the disclosure in order that the detailed description thereof that follows may be better understood, and in order that the present contribution to the art may be better appreciated. There are additional features of the disclosure that will be described hereinafter and which will form the subject matter of the claims appended hereto.

[0010] The objects of the disclosure, along with the various features of novelty which characterize the disclosure, are pointed out with particularity in the claims annexed to and forming a part of this disclosure.

BRIEF DESCRIPTION OF SEVERAL VIEWS OF THE DRAWING(S)

[0011] The disclosure will be better understood and objects other than those set forth above will become apparent when consideration is given to the following detailed description thereof. Such description makes reference to the annexed drawings wherein:

[0012] FIG. **1** is a perspective view of a walker apparatus according to an embodiment of the disclosure.

[0013] FIG. **2** is a front view of an embodiment of the disclosure.

[0014] FIG. **3** is a side view of an embodiment of the disclosure.

[0015] FIG. **4** is a back view of an embodiment of the disclosure.

[0016] FIG. **5** is a detail view of an embodiment of the disclosure taken from Circle **5** in FIG. **3**.

[0017] FIG. **6** is a detail perspective view of an embodiment of the disclosure taken from Circle **6** in FIG. **1**.

[0018] FIG. **7** is a detail side view of a force sensor of an embodiment of the disclosure.

[0019] FIG. **8** is an in-use view of an embodiment of the disclosure.

[0020] FIG. **9** is a block diagram of an embodiment of the disclosure.

DETAILED DESCRIPTION OF THE INVENTION

[0021] With reference now to the drawings, and in particular to FIGS. **1** through **8** thereof, a new walker embodying the principles and concepts of an embodiment of the disclosure and generally designated by the reference numeral **10** will be described.

[0022] As best illustrated in FIGS. **1** through **8**, the walker apparatus **10** generally comprises a support frame **12** which has a front panel **14** and a pair of lateral supports **18**. Each lateral support **18** of the pair of lateral supports **18** is coupled to the front panel **14** and is positioned on an associated end **16** of a pair of ends **16** of the front panel **14**. The lateral supports **18** are pivotable between a deployed configuration **20** wherein each lateral support **18** extends rearwardly from the front panel **14** and a folded configuration (not shown) wherein the lateral supports **18** extend toward each other. Each lateral support **18** of the pair of lateral supports **18** comprises a front leg **22**, a rear leg **24**, an upper crossbar **26**, and a lower crossbar **28**. The upper crossbar **26** is coupled to and extends between upper ends **32** of the front leg **22** and the rear leg **24**. The lower crossbar **28** is coupled to and extends between the front leg **22** and the rear leg **24** below the upper crossbar **26**. Each of the front leg **22** and the rear leg **24** is telescopically adjustable. Spring buttons, locking pins, or the like may be provided for securing the front leg **22** and the rear leg **24** in selected lengths.

[0023] The support frame **12** further includes a pair of grips **36** and a pair of support securement members **38**. Each grip **36** is coupled to a top side **30** of an associated lateral support **18** of the pair of lateral supports **18**. Each support securement member **38** of the pair of support securement members **38** is mounted to the front panel **14** and is engageable with an associated lateral support **18** of the pair of lateral supports **18** to secure the associated lateral support **18** with respect to the front panel **14**. Each support securement member **38** of the pair of support securement members **38** is rotatable with respect to the front panel **14** to engage the associated lateral support **18** in a clamping action. The support securement members **38** also may comprise spring buttons, locking pins, latches, or the like.

[0024] The support frame **12** also has a pair of wheels **40** and a pair of skids **42** to facilitate moving the support frame **12** across a support surface **78**. Each wheel **40** of the pair of wheels **40** is rotatably coupled to a lower end **34** of the front leg **22** of an associated lateral support **18** of the pair of lateral supports **18**. Each wheel **40** of the pair of wheels **40** comprises a resiliently compressible material such that the wheel **40** is configured to conform to a shape of an obstruction. The resiliently compressible material may comprise rubber, for example, or silicone, a polymer foam, or the like. The wheels **40** may also have a size which facilitates moving the wheels **40** over the obstruction when the wheels **40** approach the obstruction in a direction parallel to the support surface **78**. Each wheel **40** of the pair of wheels **40** defines a tread to frictionally enhance the wheel **40**. Each skid **42** of the pair of skids **42** is mounted to a lower end **34** of the rear leg **24** of an associated lateral support **18** of the pair of lateral supports **18**. In some embodiments, only a plurality of wheels **40** or only a plurality of skids **42** may be provided.

[0025] A processor **44** is mounted to the support frame **12** and is positioned in the front panel **14**. A pair of load sensors **46** is operatively coupled to the processor **44**. Each load sensor **46** is mounted to the lower end **34** of the front leg **22** of an associated lateral support **18** of the pair of lateral supports **18**. The load sensors **46** are configured to detect a compressive load exerted vertically on the support frame **12**, and the processor **44** is programmed to determine when the compressive load is greater than a threshold load. The load sensors **46** may comprise metal foil strain gauges or other force transducers. The threshold load is selected to have a magnitude is less than a weight of a user **76** and is considered to be too high a proportion of the weight of the user **76** to be placing on the support frame **12**. The threshold load may be a constant value, such as 10.0 pounds for example. The threshold load also may be selected by a manufacturer or the user **76**.

[0026] A feedback assembly **48** is operatively coupled to the processor **44** and is programmed to generate a feedback signal indicative of the compressive load being greater than the threshold load via the feedback assembly **48**. The feedback assembly **48** comprises a pair of haptic devices **50**, a signal light source **52**, and a speaker **54**. Each haptic device **50** is mounted in an associated grip **36** of the pair of grips **36** and is configured to generate a tactile signal to be sensed by a hand of the user **76**. The haptic devices **50** may comprise eccentric rotating mass actuators, piezoelectric actuators, or other actuator to produce a vibration, a nudge, or another action which is detectable by the user **76** via touch. The signal light source **52** is mounted to an upper edge **15** of the front panel **14** and is configured to emit a visible signal. The speaker **54** is mounted to the front panel **14** and is configured to emit an audible signal. The feedback signal may use one or more of the pair of haptic devices **50**, the signal light source **52**, and the speaker **54**, and the processor **44** may be programmed to receive selections from the user **76** as to which of the pair of haptic devices **50**, the signal light source **52**, and the speaker **54** is used to generate the feedback signal.

[0027] A pair of guide light sources **56** is operatively coupled to the processor **44**. Each guide light source **56** is coupled to the lower end **34** of the front leg **22** of an associated lateral support **18** of the pair of lateral supports **18**. The pair of guide light sources **56** is configured to emit light forwardly of the pair of wheels **40**. A light sensor **58** is operatively coupled to the processor **44** and is mounted to the front panel **14**. The processor **44** is programmed to activate the pair of guide light sources **56** when the light sensor **58** detects a low brightness level. The low brightness level is selected to have a brightness at which the user **76** has difficulty visually observing the environment around the user **76**. In some embodiments, the guide light sources **56** also may be manually operable by the user **76**.

[0028] An accelerometer **60** is operatively coupled to the processor **44** and is mounted to the support frame **12**. The processor **44** is programmed to cause the feedback assembly **48** to generate an alert signal when the accelerometer **60** detects a tipping motion of the support frame **12**. The alert signal may be identical to the feedback signal or may be distinct. The processor **44** may be programmed to receive selections from the user **76** as to which of the pair of haptic devices **50**, the signal light source **52**, and the speaker **54** is used to generate the alert signal.

[0029] A transceiver of **62** is operatively coupled to the processor **44** wherein the processor **44** is configured to wirelessly communicate with a remote electronic device **77**, which may be a smartphone, a tablet, a computer, or the like. The remote electronic device **77** may have instructions for receiving instructions from the user **76** to send to the processor **44** in order to control the processor **44**. The transceiver of **62** may communicate with the remote electronic device **77** via any suitable wireless network including, for example, a personal area network following a Bluetooth® communications protocol.

[0030] A device mount **64** is coupled to a rear side of the front panel **14** and comprises a base **66** and a clamp **68**. The base **66** is coupled to the front panel **14**, and the clamp **68** is pivotally coupled to the base **66**. The clamp **68** comprises a pair of hooks **70** which are biased to move toward each other to clamp and hold the remote electronic device **77**. The clamp **68** may be secured in a selected position via friction with the base **66** or securement means such as a latch, a locking pin, or the like. The device mount **64** may also secure the remote electronic device **77** via a snap fit, a cradle, or the like.

[0031] In some embodiments, a separate display screen may be mounted to the support frame **12** and be operatively coupled to the processor **44**. An input, which may be incorporated into the separate display screen, may also be mounted to the support frame **12** and operatively coupled to the processor **44**. The input may comprise a touchscreen, a keypad, or the like. A power source **72** is electrically couplable to the processor **44** and is removably mountable to the front panel **14** to electrically couple to the processor **44**. The power source **72** comprises a battery **74**.

[0032] In use, the support frame **12** is used by the user **76** to facilitate balancing the user **76** above the support surface **78** while the user **76** walks across or stands upon the support surface **78**. When the force sensors detect that the compressive load is greater than the threshold load, the feedback signal is generated via the feedback assembly **48**, notifying the user **76** to decrease the amount of weight the user **76** is placing on the support surface **78**. When the light sensor **58** detects the low brightness level, the processor **44** activates the guide light sources **56**. When the accelerometer **60** detects the tipping motion, the processor **44** activates the feedback assembly **48** to generate the alert signal.

[0033] With respect to the above description then, it is to be realized that the optimum dimensional relationships for the parts of an embodiment enabled by the disclosure, to include variations in size, materials, shape, form, function and manner of operation, assembly and use, are deemed readily apparent and obvious to one skilled in the art, and all equivalent relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by an embodiment of the disclosure.

[0034] Therefore, the foregoing is considered as illustrative only of the principles of the disclosure. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the disclosure to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the disclosure. In this patent document, the word "comprising" is used in its non-limiting sense to mean that items following the word are included, but items not specifically mentioned are not excluded. A reference to an element by the indefinite article "a" does not exclude the possibility that more than one of the element is present, unless the context clearly requires that there be only one of the elements.

I claim:

1. A walker apparatus comprising:

a support frame comprising:

a front panel;

a pair of lateral supports being coupled to the front panel, each lateral support of the pair of lateral supports being positioned on an associated end of a pair of ends of the front panel; and

a pair of grips, each grip being coupled to a top side of an associated lateral support of the pair of lateral supports;

a processor being mounted to the support frame;

a pair of load sensors being operatively coupled to the processor, each load sensor of the pair of load sensors being mounted to an associated lateral support of the pair of lateral supports, the pair of load sensors being configured to detect a compressive load exerted vertically on the support frame, the processor being programmed to determine when the compressive load is greater than a threshold load; and

a feedback assembly being operatively coupled to the processor, the processor being programmed to generate a feedback signal indicative of the compressive load being greater than the threshold load via the feedback assembly.

2. The apparatus of claim **1**, wherein the lateral supports of the pair of lateral supports are pivotable between a deployed configuration wherein each lateral support extends rearwardly from the front panel and a folded configuration wherein the lateral supports extend toward each other.

3. The apparatus of claim **2**, wherein the support frame further comprises a pair of support securement members, each support securement member of the pair of support securement members being mounted to the front panel and being engageable with an associated lateral support of the pair of lateral supports to secure the associated lateral support with respect to the front panel.

4. The apparatus of claim **3**, wherein each support securement member of the pair of support securement members is rotatable with respect to the front panel to engage the associated lateral support in a clamping action.

5. The apparatus of claim **1**, wherein each lateral support of the pair of lateral supports comprises a front leg, a rear leg, an upper crossbar, and a lower crossbar, the upper crossbar being coupled to and extending between upper ends of the front leg and the rear leg, the lower crossbar being coupled to and extending between the front leg and the rear leg below the upper crossbar.

6. The apparatus of claim **5**, wherein each of the front leg and the rear leg is telescopically adjustable.

5. The apparatus of claim **1**, wherein the support frame further comprises a pair of wheels, each wheel of the pair of wheels being rotatably coupled to an associated lateral support of the pair of lateral supports, each wheel of the pair of wheels comprising a resiliently compressible material such that the wheel is configured to conform to a shape of an obstruction.

6. The apparatus of claim **5**, wherein each wheel of the pair of wheels defines a tread to frictionally enhance the wheel.

7. The apparatus of claim **1**, wherein the support frame further comprises a pair of skids, each skid of the pair of skids being mounted to an associated lateral support of the pair of lateral supports.

8. The apparatus of claim **1**, wherein the feedback assembly comprises a pair of haptic devices, each haptic device being mounted in an associated grip of the pair of grips, the pair of haptic devices being configured to generate a tactile signal.

9. The apparatus of claim **1**, wherein the feedback assembly comprises a signal light source being mounted to an upper edge of the front panel, the signal light source being configured to emit a visible signal.

10. The apparatus of claim **1**, wherein the feedback assembly comprises a speaker being mounted to the front panel, the speaker being configured to emit an audible signal.

11. The apparatus of claim **1**, further comprising a guide light source being operatively coupled to the processor, the guide light source being oriented such that the guide light source is oriented such that the guide light is configured to emit light forwardly of the support frame.

12. The apparatus of claim **11**, further comprising a light sensor being operatively coupled to the processor, the light sensor being mounted to the front panel, the processor being programmed to activate the guide light source when the light sensor detects a low brightness level.

13. The apparatus of claim **1**, further comprising an accelerometer being operatively coupled to the processor, the accelerometer being mounted to the support frame, the processor being programmed to cause the feedback assembly to generate an alert signal when the accelerometer detects a tipping motion of the support frame.

14. The apparatus of claim **1**, further comprising a transceiver being operatively coupled to the processor wherein the processor is configured to wirelessly communicate with a remote electronic device.

15. The apparatus of claim **14**, further comprising a device mount being coupled to a rear side of the front panel, the device mount being configured to hold the remote electronic device.

16. The apparatus of claim **15**, wherein the device mount comprises a base and a clamp, the base being coupled to the front panel, the clamp being pivotally coupled to the base, the clamp comprising a pair of hooks, the pair of hooks being biased to move toward each other wherein the pair of hooks is configured to clamp the remote electronic device.

17. The apparatus of claim **1**, further comprising a power source being electrically couplable to the processor, the power source being removably mountable to the front panel to electrically couple to the processor, the power source comprising a battery.

18. A walker apparatus comprising:

a support frame comprising:

a front panel;

a pair of lateral supports being coupled to the front panel, each lateral support of the pair of lateral supports being positioned on an associated end of a pair of ends of the front panel, the pair of lateral supports being pivotable between a deployed configuration wherein each lateral support extends rearwardly from the front panel and a folded configuration wherein the lateral supports extend toward each other, each lateral support of the pair of lateral supports comprising a front leg, a rear leg, an upper crossbar, and a lower crossbar, the upper crossbar being coupled to and extending between upper ends of the front leg and the rear leg, the lower crossbar being coupled to and extending between the front leg and the rear leg below the upper crossbar, each of the front leg and the rear leg being telescopically adjustable;

a pair of grips, each grip being coupled to a top side of an associated lateral support of the pair of lateral supports;

a pair of support securement members, each support securement member of the pair of support securement members being mounted to the front panel and being engageable with an associated lateral support of the pair of lateral supports to secure the associated lateral support with respect to the front panel, each support securement member of the pair of support securement members being rotatable with respect to the front panel to engage the associated lateral support in a clamping action;

a pair of wheels, each wheel of the pair of wheels being rotatably coupled to a lower end of the front leg of an associated lateral support of the pair of lateral supports, each wheel of the pair of wheels comprising a resiliently compressible material such that the wheel is configured to conform to a shape of an obstruction, each wheel of the pair of wheels defining a tread to frictionally enhance the wheel; and

a pair of skids, each skid of the pair of skids being mounted to a lower end of the rear leg of an associated lateral support of the pair of lateral supports;

a processor being mounted to the support frame, the processor being positioned in the front panel;

a pair of load sensors being operatively coupled to the processor, each load sensor of the pair of load sensors being mounted to the lower end of the front leg of an associated lateral support of the pair of lateral supports, the pair of load sensors being configured to detect a compressive load exerted vertically on the support frame, the processor being programmed to determine when the compressive load is greater than a threshold load;

a feedback assembly being operatively coupled to the processor, the processor being programmed to generate a feedback signal indicative of the compressive load being greater than the threshold load via the feedback assembly, the feedback assembly comprising:

a pair of haptic devices, each haptic device being mounted in an associated grip of the pair of grips, the pair of haptic devices being configured to generate a tactile signal;

a signal light source being mounted to an upper edge of the front panel, the signal light source being configured to emit a visible signal; and

a speaker being mounted to the front panel, the speaker being configured to emit an audible signal;

a pair of guide light sources being operatively coupled to the processor, each guide light source of the pair of guide light sources being coupled to the lower end of the front leg of an associated lateral support of the pair of lateral supports, the pair of guide light sources being configured to emit light forwardly of the pair of wheels;

a light sensor being operatively coupled to the processor, the light sensor being mounted to the front panel, the processor being programmed to activate the pair of guide light sources when the light sensor detects a low brightness level;

an accelerometer being operatively coupled to the processor, the accelerometer being mounted to the support frame, the processor being programmed to cause the feedback assembly to generate an alert signal when the accelerometer detects a tipping motion of the support frame;

a transceiver being operatively coupled to the processor wherein the processor is configured to wirelessly communicate with a remote electronic device;

a device mount being coupled to a rear side of the front panel, the device mount comprising a base and a clamp, the base being coupled to the front panel, the clamp being pivotally coupled to the base, the clamp comprising a pair of hooks, the pair of hooks being biased to move toward each other wherein the pair of hooks is configured to clamp the remote electronic device; and

a power source being electrically couplable to the processor, the power source being removably mountable to the front panel to electrically couple to the processor, the power source comprising a battery.

* * * * *