The present invention is directed to providing a backpack, typically a school bag that includes a weighing means integral thereto for the weighing thereof to prevent overburdening the student. The backpack has shoulder straps, a back contacting panel and at least one storage compartment. A handle attached to an upper surface with an electronic strain gauge mechanism coupled to a processor with a digital display such that by suspending the backpack from the handle causes the weight of the backpack to be displayed on the storage display.
FIG 5

- TIMER
- BATTERY
- PROCESSOR
- DRIVER
- STRAIN GAUGE
- DISPLAY
- CLOCK BUTTON
- RESET BUTTON
BACKPACK WITH INTEGRAL WEIGHING MEANS

FIELD OF THE INVENTION

[0001] The present invention is directed to providing a backpack, typically a school bag that includes a weighing means integral thereto for the weighing thereof to prevent overburdening the student.

BACKGROUND

[0002] School children and students carry a miscellany of burdens including textbooks, packed lunches, exercise books, physical education clothing, and personal items, such as toys and games. The maximum safe weight that may be carried is a function of the size of the child and his physical health, and is also affected by the distance the child has to walk to school. As a rule of thumb, it has been stated that children should not carry more than 10% of their body weight.

[0003] It appears that back ache and lumbar problems suffered by adults can, in some cases, be attributed to carrying heavy schoolbags and other loads as a child.

[0004] Weighing a schoolbag by a parent or guardian on a domestic kitchen or bathroom scales is often not practicable. Neither is it practicable for schools to weigh the bags of all students; particularly since the allowable weight that may be carried is student specific, depending on the size and health of the student, as described hereinabove.

[0005] Preferably schoolbags should be worn as back packs, with the weight evenly distributed over both shoulders.

[0006] WO 8404027 to Koivisto describes a bag with an integral weighing device. The bag includes strain gauge transducers that appear to be mounted between the legs and body of the bag to give a reading when the bag is on the ground. Such a setup is not suitable for backpack of the type preferred for schoolchildren.

[0007] United Kingdom Patent Number GB 2402611 to Qurishi describes a suitcase having a means for weighing its contents. It uses tension sensors, but these are coupled to the bottom of the suitcase. Again, such a setup is ideal for suitcases, but is not practicable for schoolbags.

[0008] Chinese patent number CN 1488921 to Liangxian Li et al. titled "suitcase weighing method and self weighing type suitcase thereof" describes a suitcase whose weighing device is activated by the handle and seems to be operated by suspending the case from the handle, with the weight thereof being shown on an indicating plate. The suitcase is described as having a box body, and is not a schoolbag of the backpack variety.

[0009] CN 94202372 titled "School bag with over weigh alarm function" appears to relate to a schoolbag having an alarm if overweight. There is no English language equivalent nor is there an English language abstract. From the title thereof, it would appear that the schoolbag emits some audible alarm if over weight. There is no indication that the bag includes a weighing device that provides weight readings.

[0010] There is also a Chinese utility model number CN 1488921 to Cai Derhing, entitled "Shopping bag with spring balance."

[0011] There is also a registered Chinese design (CN 2728280) titled "School bag having spring balance". We have not been able to access further details. From the title, we believe the weighing means is a mechanical spring balance. It will be appreciated that mechanical spring balances are simple relatively heavy devices that have no memory functions. They are also notorious at trapping or cutting little fingers. They do not have a modern, high tech look as desired by many students, and frequently lack desired precision, accuracy and reliability. Thus they are not really appropriate for schoolbags for the modern student.

SUMMARY OF THE INVENTION

[0013] It is an aim of the invention to provide a schoolbag having a modern high tech integral weighing device and a weighing device for retrofitting to such a schoolbag.

[0014] Accordingly, the present invention is directed to providing a backpack comprising shoulder straps, a back contacting panel and at least a first storage compartment; the backpack being characterized by a handle attached to an upper surface thereof via an electronic strain gauge mechanism coupled to a processor with a digital display, such that when the electronic strain gauge mechanism is activated, suspension of the backpack from the handle causes the weight of the backpack to be displayed on the storage display.

[0015] Optionally the handle comprises a loop having two legs, and the electronic strain gauge mechanism comprises a pair of strain gauges in parallel such that each leg of the handle is attached to a separate strain gauge.

[0016] Typically, the backpack is a schoolbag.

[0017] In preferred embodiments, the backpack further comprises an inflatable base for padding the contents of the bag and for providing stability.

[0018] In preferred embodiments, the backpack further comprises inflatable cells on the back contacting panel.

[0019] In preferred embodiments, the backpack further comprises inflatable cells on the shoulder straps.

[0020] Optionally, the processor is further coupled to a clock circuit such that a clock reading may be displayed on the digital display.

[0021] Preferably the processor is coupled to a user interface including keys that enable the user to program the processor to display information that typically includes information regarding the user of the backpack, selected from the list of name, address, school, class, height, weight, telephone number and email address of the user.

BRIEF DESCRIPTION OF THE FIGURES

[0022] For a better understanding of the invention and to show how it may be carried into effect, reference will now be made, purely by way of example, to the accompanying drawings.

[0023] With specific reference now to the drawings in detail, it is stressed that the particulars shown are by way of example and for purposes of illustrative discussion of the preferred embodiments of the present invention only, and are presented in the cause of providing what is believed to be the most useful and readily understood description of the principles and conceptual aspects of the invention. In this regard, no attempt is made to show structural details of the invention in more detail that is necessary for a fundamental understanding of the invention; the description taken with the drawings making apparent to those skilled in the art how the several forms of the invention may be embodied in practice. In the accompanying drawings:
FIG. 1 is a schematic isometric projection of a schoolbag in accordance with one embodiment of the invention, including a digital weight display;

FIG. 2 is a rear view of the schoolbag shown in FIG. 1 showing air filled shoulder pads and padded back thereof;

FIG. 3 is a section through the padded back shown in FIG. 2;

FIG. 4 is a schematic section through the handle of the schoolbag, showing one arrangement of strain gauges, and

FIG. 5 is a functional block diagram of the electronic circuitry coupling the electronic weight display to the strain gauges.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference now to FIG. 1 and FIG. 2, a backpack 2 is shown from the front and back respectively. The backpack includes a plurality of pockets and compartments. Backpacks of this type are widely used as schoolbags by students and pupils of all ages. By virtue of a pair of shoulder straps 3a, 3b, the weight of the backpack 2 is distributed across both shoulders of the wearer, making the bag easy to carry.

School children and students use such backpacks to carry a miscellany of burdens including textbooks, packed lunches, exercise books, physical education clothing, and personal items, such as toys and games. The maximum safe weight that may be carried is a function of the size of the child and his physical health, and is also affected by the distance the child has to walk to school. As a rule of thumb, it has been stated that children should not carry more than 10% of their body weight.

The backpack 2 includes a digital display unit 6 that includes a display 8 for displaying the weight of the backpack 2 and perhaps further information, such as the time, for example. The digital display unit 6 includes a simple user interface, such as a reset key 10, and, one or two additional keys 12, 14, for example.

When the backpack 2 is suspended from its handle 4, the weight of the backpack 2 and contents thereof, are displayable on the digital display unit 8.

It is a particular feature of the backpack 2 that the base 16 thereof include an inflated cell 18 that is typically inflated with air, but may be inflated with another fluid such as helium gas for example.

The inflated cell 18 in the base 16 serves a variety of purposes, including cushioning of contents of the backpack 2, providing a wide flat base 16 on which the backpack 2 may be conveniently stood, and giving the illusion of lightness to the backpack 2 as a whole. Additionally, with particular reference to FIG. 2, the backpack 2 has shoulder pads 44a, 44b on each shoulder strap 3a, 3b. The shoulder pads 44a, 44b are optionally air filled cells, for minimum weight and maximum conformity to the wearer. Furthermore, the back panel 20 of the backpack 2 preferably includes sealed fluid filled cells 19 for providing low weight padding.

Referring now to FIG. 3, a typical construction for the back panel might be a plurality of cells 19 filled by a low density fluid, such as compressed air, for example. Each cell might comprise an impermeable membrane 24, perhaps fabricated from rubber or a high quality, thick polyethylene material, for example, and coated with a fabric 26 that contacts the body of the wearer, and is thus preferably permeable to be comfortable on the skin.

Inflated cells 18, 19, (44a, 44b) have other advantages than merely padding. For example, a schoolbag including such inflated cells will tend to float if inadvertently dropped into water for example. Indeed, such a bag may serve as an antidrowning device, or an impromptu lifejacket.

Referring now to FIG. 4, a schematic section through the handle 4 and the backpack 2 is shown. The outer upholstery 28 of the schoolbag includes a rigid counter-surface 30 to which a pair of strain gauge 34a, 34b are coupled by some coupling means 32 through which legs 5a, 5b of handle 4 are attached. The strain gauges 34a, 34b are connected to a circuit 36 including a processor 38 that is further coupled to the digital display unit 6 (FIG. 1). It will be appreciated that the specific embodiment shown, is an optional arrangement only. In one alternative embodiment, for example, the handle 4 will be fixed at both sides thereof, to a single strain gauge.

Referring to FIG. 5, a functional block diagram of the typical electronic circuitry 36 coupling the electronic weight display 8 to the strain gauges 34a, 34b is shown. The electronic circuitry includes: (i) a processor 38, to which various components are connected, including (ii) a battery 48, for providing power, that may be a lithium button type battery, such as is widely used in watches and the like, (iii) a driver 46 coupled to the display 8 for driving the display 8, the strain gauge(s) 34a, 34b, the various keys of the user interface, such as reset button 10 and clock buttons 12, 14 and a timer 50.

It will be appreciated that the electronic circuitry may vary somewhat. The different embodiments may have more or less keys in the user interface, and the user interface may be used to input other information, for display on display 8 if processor 38 provides appropriate support. For example, such information could usefully include essential information regarding the user of the backpack 2 such as his name and/or address and identity number, the name (and address) of his school and perhaps class, and/or telephone number and/or email address; such information being useful to identify owner (user) of a misplaced backpack. For calculating allowable loading, it may also be useful to be able to input the user’s height and weight.

Although described hereinabove with reference to a schoolbag, it will be appreciated that the digital strain gauge mechanism fitted to a handle and the padded backs and straps can be applied to other types of backpacks, such as those used for physical endurance training, camping, hiking and the military.

Thus the scope of the present invention is defined by the appended claims and includes both combinations and sub combinations of the various features described hereinabove as well as variations and modifications thereof, which would occur to persons skilled in the art upon reading the foregoing description.

In the claims, the word “comprise”, and variations thereof such as “comprises”, “comprising” and the like indicate that the components listed are included, but not generally to the exclusion of other components.

1. A backpack comprising shoulder straps, a back contacting panel and at least a first storage compartment; the backpack being characterized by a handle attached to an upper surface thereof via an electronic strain gauge mechanism coupled to a processor with a digital display, such that when the electronic strain gauge mechanism is activated, suspension of the backpack from the handle causes the weight of the backpack to be displayed on the storage display.
2. The backpack of claim 1 wherein the handle is a loop having two legs, and the electronic strain gauge mechanism comprises a pair of strain gauges in parallel such that each leg of the handle is attached to a separate strain gauge.

3. The backpack of claim 1, being a schoolbag.

4. The backpack of claim 1 further comprising an inflated base for padding the contents of the bag and for providing stability.

5. The backpack of claim 1, further comprising inflatable cells on the back contacting panel.

6. The backpack of claim 1, further comprising inflatable cells on the shoulder straps.

7. The backpack of claim 1 wherein the processor is further coupled to a clock circuit such that a clock reading may be displayed on the digital display.

8. The backpack of claim 1 wherein the processor is coupled to a user interface including keys that enable the user to program the processor to display information.

9. The backpack of claim 8 wherein the information includes information regarding user of backpack, selected from the list of name, address, school, class, height, weight, telephone number and email address of the user.