

Description

Hanging scale sensor apparatus and hanging scale comprising same

5 Technical Field

The present invention relates to the field of sensors, and in particular to a hanging scale sensor apparatus and a hanging scale comprising the same.

Background Art

10 In the prior art, hanging scales, also referred to as hanging hook scales, hanging weighing scales, suspension scales, hook scales, etc., are measuring instruments that measures the mass (weight) of an object in a suspended state.

Generally, a hanging scale is mainly comprised of a hanging member, a scale body, a loading apparatus, a housing, a connecting member, etc. The scale body is
15 mainly comprised of a weighing sensor, an electronic circuit, a printer, a mounting frame, etc. A display instrument, an operation panel, etc. are mounted on the housing. The hanging member is connected to the scale body. The loading apparatus is connected to the scale body via the connecting member. The operation panel provided with keys for price, commodity name, etc. are mounted on the housing.
20 During weighing, by selecting different commodity name keys, a weighing result can be displayed on a display screen, and the printer can print commodity names, weight and price, so that the use is very convenient.

However, existing hanging scales have a fixed internal structure that cannot be flexibly adjusted, and the position of the sensor mounted therein is limited. If the
25 sensor is mounted on the outer side of the scale body, an additional external cover is needed to cover the sensor, resulting in a complicated protection structure.

In particular for a super-thin scale body structure, existing hanging scale sensors are not suitable.

In view of this, those skilled in the art have developed a hanging scale sensor
30 apparatus and a hanging scale comprising the same.

Summary of the Invention

The technical problem to be solved by the present invention is to provide a hanging scale sensor apparatus and a hanging scale comprising the same to overcome defects such as the limited mounting position and the complicated protection structure of the hanging scale sensor in the prior art.

The present invention solves the above technical problems through the following technical solution:

a hanging scale sensor apparatus, distinguished by comprising a weighing sensor, an adapter beam, a support base and a scale pan suspension structure, wherein the adapter beam is connected to one end of a bottom face of the weighing sensor, and the support base is connected to the other end of the bottom face of the weighing sensor, such that the adapter beam and the support base are positioned directly below the weighing sensor; and the scale pan suspension structure is connected to the adapter beam for positioning the hanging scale sensor.

According to an embodiment of the present invention, the adapter beam and the support base are connected via a limiting structure.

According to an embodiment of the present invention, an outwardly-extending protrusion is provided at an end portion, close to the support base, of the adapter beam, a groove is provided at an end portion, close to the adapter beam, of the support base, and the protrusion is mounted in the groove;

or a groove is provided at an end portion, close to the support base, of the adapter beam, a protrusion is provided at an end portion, close to the adapter beam, of the support base, and the protrusion is mounted in the groove.

According to an embodiment of the present invention, there are gaps between upper and lower faces of the protrusion and the groove.

According to an embodiment of the present invention, a width of the adapter beam is smaller than or equal to that of the weighing sensor, and a width of the support base is greater than that of the weighing sensor.

The present invention further provides a hanging scale, distinguished by comprising a scale body and the hanging scale sensor apparatus as mentioned above, wherein a mounting groove is provided at a bottom of the scale body, and the scale

pan suspension structure passes through the mounting groove, such that the hanging scale sensor is located in the scale body.

According to an embodiment of the present invention, the support base is fixedly connected to an inner wall face of the scale body.

5 According to an embodiment of the present invention, a plurality of protective limiting members are provided between the adapter beam and the inner wall face of the scale body for supporting and limiting the adapter beam in two directions.

According to an embodiment of the present invention, the protective limiting members are limiting screws, limiting blocks, limiting slots or limiting pins.

10 According to an embodiment of the present invention, the hanging scale sensor meets the following relationship: $L > L1 + h$,

where L represents a thickness of the scale body, $L1$ represents a thickness of the support base, and h represents a wall thickness of the scale body.

The positive improvement effects of the present invention are as follows:

15 the hanging scale sensor apparatus and the hanging scale comprising the same of the present invention may be separately assembled, may be placed inside a scale body according to requirements, and may further adjust the internal space of the scale body. The hanging scale sensor apparatus has an adjustable installation position, can realize two-way limitations and overloading prevention, and occupies
20 a small installation space. The hanging scale sensor apparatus has a small overall size and thus has little influence on the structural layout of the scale body, and is very suitable for the design of a super-thin scale body structure.

Brief Description of the Drawings

25 The above and other features, properties and advantages of the present invention will become clearer based on the description below in conjunction with the accompanying drawings and embodiments, and the same features are always indicated by the same reference numerals in the figures, in which:

Fig. 1 is a schematic exploded diagram of a hanging scale sensor apparatus and
30 a hanging scale comprising the same of the present invention.

Fig. 2 is a first perspective view of the hanging scale of the present invention.

Fig. 3 is a second perspective view of the hanging scale of the present invention.

Fig. 4 is a first front view of the hanging scale of the present invention.

Fig. 5 is a second front view of the hanging scale of the present invention.

5 Fig. 6 is a sectional view taken along a line A-A in Fig. 4.

[Reference numerals]

Weighing sensor	10
Adapter beam	20
Support base	30
Scale pan suspension structure	40
Protrusion	21
Groove	31
Scale body	50
Mounting groove	51
Protective limiting member	60
Width of the support base	L1
Width of the weighing sensor	L2
Width of the adapter beam	L3
Thickness of the scale body	L
Thickness of the support base	L1
Wall thickness of the scale body	h
Fixing bolt	a

Detailed Description of Embodiments

10 To make the above objects, features and advantages of the present invention more apparent and easier to understand, particular embodiments of the present invention are described in detail below with reference to the accompanying drawings.

Embodiments of the present invention will now be described in detail with reference to the accompanying drawings. Reference will now be made in detail to preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings. The same reference numerals used in all the accompanying drawings denote identical or similar parts wherever possible.

Furthermore, although the terms used in the present invention are selected from well-known common terms, some of the terms mentioned in the description of the present invention may have been selected by the applicant according to his or her determination, and the detailed meaning thereof is described in the relevant section described herein.

Furthermore, the present invention must be understood, not simply by the actual terms used but also by the meanings encompassed by each term.

Fig. 1 is a schematic exploded diagram of a hanging scale sensor apparatus and a hanging scale comprising the same of the present invention. Fig. 2 is a first perspective view of the hanging scale of the present invention. Fig. 3 is a second perspective view of the hanging scale of the present invention. Fig. 4 is a first front view of the hanging scale of the present invention. Fig. 5 is a second front view of the hanging scale of the present invention. Fig. 6 is a sectional view taken along a line A-A in Fig. 4.

As shown in Figs. 1 to 6, the present invention discloses a hanging scale sensor apparatus, which comprises a weighing sensor 10, an adapter beam 20, a support base 30 and a scale pan suspension structure 40, wherein the adapter beam 20 is connected to one end of a bottom face of the weighing sensor 10, the support base 30 is connected to the other end of the bottom face of the weighing sensor 10, such that the adapter beam 20 and the support base 30 are positioned directly below the weighing sensor 10; and the scale pan suspension structure 40 is connected to the adapter beam 20 for positioning the hanging scale sensor.

For example, a fixing bolt a is used to fix the adapter beam 20 and the support base 30 to the weighing sensor 10. Of course, this is just an example, and other fixing member structures may also be used.

Preferably, the adapter beam 20 and the support base 30 are connected via a limiting structure. For example, in this embodiment, an outwardly-extending protrusion 21 is provided at an end portion, close to the support base 30, of the adapter beam 20, a groove 31 is provided at an end portion, close to the adapter beam 20, of the support base 30, and the protrusion 21 is mounted in the groove 31. There are gaps between upper and lower faces of the protrusion 21 and the groove 31 to protect the sensor from being subjected to an upward or downward force during installation and transportation.

Alternatively, the structure can also be changed as follows: a groove is provided at an end portion, close to the support base 30, of the adapter beam 20, a protrusion is provided at an end portion, close to the adapter beam 20, of the support base 30, and the protrusion is mounted in the groove.

In the foregoing structures, a two-way limiting protection is formed between the adapter beam 20 and the support base 30 by means of the protrusion 21 and the groove 31, and upper and lower limiting faces of the groove 31 may respectively protect the weighing sensor 10 from being subjected to an excessive upward pressing force and downward pull force.

According to the installation position, the adapter beam 20 may be adjusted in terms of the length of the beam and the position of a hanging arm, which may be implemented by adjusting the thickness/material, etc. Such a structure may match sensors of different ranges and match the tolerance of the limiting size.

In addition, the size of the support base 30 may be adjusted according to the screw size, the strength, the cost, etc.

Further, a width L3 of the adapter beam 20 is smaller than or equal to a width L2 of the weighing sensor 10, and a width L1 of the support base 30 is greater than the width L2 of the weighing sensor 10.

The present invention also provides a hanging scale, which comprises a scale body 50 and the hanging scale sensor as mentioned above, wherein a mounting groove 51 is provided at a bottom of the scale body 50, and a scale pan suspension structure 40 passes through the mounting groove 51, such that the hanging scale sensor is located in the scale body 50.

Preferably, the support base 30 is fixedly connected to an inner wall face of the scale body 50.

Still further, a plurality of protective limiting members 60 are provided between the adapter beam 20 and the inner wall face of the scale body 50, and there are gaps between the protective limiting members 60 and the adapter beam 20, such that deformation is allowed to occur during weighing for measurement and the adapter beam 20 is supported and limited in two directions (being subjected to a downward or upward force). Here, the protective limiting members 60 are preferably limiting screws.

According to the above structural description, as shown in Fig. 6, the hanging scale sensor meets the following relationship: $L > L1 + h$, where L represents a thickness of the scale body, $L1$ represents a thickness of the support base, and h represents a wall thickness of the scale body.

When the widths of the support base and the adapter beam for sensor installation meet the above characteristics, it is possible to realize the design of a super-thin scale body.

As shown in Figs. 4 and 5, the hanging scale sensor apparatus and the hanging scale comprising the same of the present invention can, with the unchanged design method and the unchanged position of a load-bearing hanging arm, adjust the sizes of the adapter beam and the support base so as to adjust the position of a sensor mounting area according to the layout requirements, and the vacant area may be flexibly allocated to other functional modules.

In conclusion, the hanging scale sensor of the present invention may be separately assembled, may be placed inside a scale body according to requirements, and may further adjust the internal space of the scale body. The hanging scale sensor has an adjustable installation position, can realize two-way limitations and overloading prevention, and occupies a small installation space. The hanging scale sensor has a small overall size and thus has little influence on the structure of the scale body, and is very suitable for the design of a super-thin scale body structure.

Although specific implementations of the present invention have been described above, those skilled in the art should understand that these are merely

examples, and the scope of protection of the present invention is defined by the appended claims. Various alterations or modifications to these implementations can be made by those skilled in the art without departing from the principle and essence of the present invention. However, these alterations and modifications all fall within
5 the scope of protection of the present invention.

Claims

1. A hanging scale sensor apparatus, characterized by comprising a weighing sensor, an adapter beam, a support base and a scale pan suspension structure, wherein the adapter beam is connected to one end of a bottom face of the weighing sensor, and the support base is connected to the other end of the bottom face of the weighing sensor, such that the adapter beam and the support base are positioned directly below the weighing sensor; and the scale pan suspension structure is connected to the adapter beam for positioning the hanging scale sensor.

2. The hanging scale sensor apparatus of claim 1, characterized in that the adapter beam and the support base are connected via a limiting structure.

3. The hanging scale sensor apparatus of claim 2, characterized in that an outwardly-extending protrusion is provided at an end portion, close to the support base, of the adapter beam, a groove is provided at an end portion, close to the adapter beam, of the support base, and the protrusion is mounted in the groove;

or a groove is provided at an end portion, close to the support base, of the adapter beam, a protrusion is provided at an end portion, close to the adapter beam, of the support base, and the protrusion is mounted in the groove.

4. The hanging scale sensor apparatus of claim 3, characterized in that there are gaps between upper and lower faces of the protrusion and the groove.

5. The hanging scale sensor apparatus of claim 1, characterized in that a width of the adapter beam is smaller than or equal to that of the weighing sensor, and a width of the support base is greater than that of the weighing sensor.

6. A hanging scale, characterized by comprising a scale body and a hanging scale sensor apparatus according to any one of claims 1-5, wherein a mounting groove is provided at a bottom of the scale body, and the scale pan suspension

structure passes through the mounting groove, such that the hanging scale sensor is located in the scale body.

7. The hanging scale of claim 6, characterized in that the support base is
5 fixedly connected to an inner wall face of the scale body.

8. The hanging scale of claim 7, characterized in that a plurality of
protective limiting members are provided between the adapter beam and the inner
wall face of the scale body for supporting and limiting the adapter beam in two
10 directions.

9. The hanging scale of claim 8, characterized in that the protective limiting
members are limiting screws, limiting blocks, limiting slots or limiting pins.

10. The hanging scale of claim 6, characterized in that the hanging scale
15 sensor meets the following relationship: $L > L1 + h$,

where L represents a thickness of the scale body, L1 represents a thickness of
the support base, and h represents a wall thickness of the scale body.