M. H. HANSEN.

WEIGHING SCALE.

APPLICATION FILED FEB. 21, 1914.

1,116,268. Patented Nov. 3, 1914.

Fig. 1

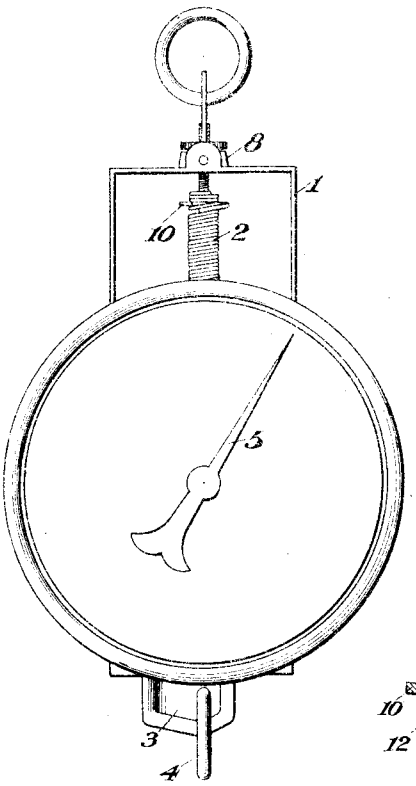


Fig. 2

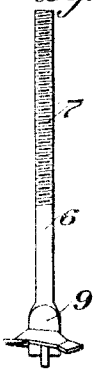


Fig. 3



Fig. 6

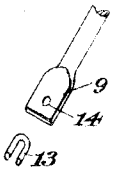


Fig. 4

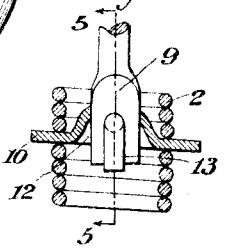
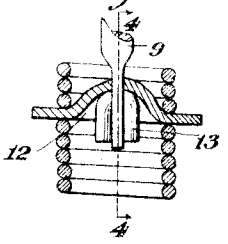


Fig. 5



WITNESSES:

E. M. Goodes

Byron M Burt

INVENTOR

Marinus H Hansen

BY

E. M. Hopkins

ATTORNEY

UNITED STATES PATENT OFFICE.

MARIUS H. HANSEN, OF CHICAGO, ILLINOIS.

WEIGHING-SCALE.

1,116,268. Specification of Letters Patent. Patented Nov. 3, 1914.

Application filed February 21, 1914. Serial No. 820,219.

To all whom it may concern:

Be it known that I, MARIUS H. HANSEN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Weighing Scales, of which the following is a specification.

The present invention relates to that class of spring weighing scales in which there is a helically coiled spring, one end of which is anchored either directly or indirectly to some fixed resistance and the other end of which is connected, either directly or indirectly to a movable part carrying a hook, pan, platform or other device for receiving the article to be weighed, and which anchor connection joins the spring at an intermediate point which may be varied to vary the length of the active portion of the spring; and in which a universal joint is interposed somewhere in the anchor connection between its point of connection with the spring and the point of connection with the fixed resistance, all as shown and described in my prior Patents No. 612,968 dated October 25, 1898 and No. 848,740 dated April 2, 1907.

The invention relates particularly to the construction of the universal joint mentioned.

In the scales shown in the two prior patents aforesaid, the anchor connection has a stem and a cross-head connected by what is the equivalent of a ball and socket, or universal, joint that will permit of the universal movement of one member of the joint relatively to the other and thereby permit of the universal lateral movement of the spring, whereby it is permitted to accommodate itself to the line of strain put upon it by the load, and avoid any lateral strains that would result in error.

In the scales shown in the prior patents aforesaid and also in the scale selected for illustrating an embodiment of the present invention, the universal joint is shown as being or occurring between the stem and cross head of the anchor connection, but so far as the present invention is concerned this particular location of the joint is not essential. On the contrary it may be formed between any two parts intervening between the spring and its ultimate fixed support or resistance. Nor is it essential that the spring occupy a vertical position, as the invention relates solely to the construction of the universal joint.

The object of the invention is to simplify and cheapen the construction of this universal joint and to this end the cross-head, which forms one member of the joint has through it a non-circular opening, preferably of elongated, substantially rectangular, shape the lower end of the stem is of corresponding non-circular shape and passes loosely through the opening of the cross-head, sufficient clearance being left between the cross-head and non-circular portion of the stem, on all sides, to permit of their free relative universal movement laterally with respect to the stem, and the non-circular portion of the stem, below the cross-head, is provided with a perforation in which fits the bent portion of a U-shaped key, the straight parallel portions of which extend downward and fit closely against the sides of the non-circular portion of the stem while the outer surface of its curved portion bears against the under surface of the cross-head.

The invention consists in the features of novelty that are hereinafter described with reference to the accompanying drawing, which is made a part of this specification and in which;

Figure 1 is a front elevation of a suspension-spring weighing scale embodying the invention, a portion of the front of the casing being omitted. Figs. 2 and 3 are a side elevation and an end elevation respectively of the stem and cross-head and the improved universal joint connecting them. Fig. 4 is an axial section on the line 4—4, Fig. 5, showing adjacent portions of the spring and stem and the cross-head connecting them. Fig. 5 is an axial section of the same parts on the line 5—5, Fig. 4. Fig. 6 is a perspective view of the non-circular lower end of the stem and the U-shaped key, separated.

At 1 is shown the case of a suspension-spring weighing scale having a helically coiled pendant spring, 2, with one end of which is connected a movable part,—in this instance a vertical draw bar, 3,—carrying a hook, 4, a pan or other device for holding the articles to be weighed. The pointer, 5, derives its movement from this movable part—draw-bar—through the medium of

suitable mechanism, such for example as that shown in my aforesaid former patents, or any other mechanism.

The stem, shown at 6, is made of a slender rod or a piece of stout wire of round cross section, the upper portion of which is screw threaded as shown at 7, and engages a nut, 8, which rests upon the top of the casing, 1, which forms a fixed "resistance" so that by turning the nut in one direction or the other the stem is bodily moved upward or downward and the spring 2 put under more or less initial tension as will appear hereinafter. The lower portion of the stem is subjected to the action of a press by which it is flattened to produce a non-circular portion, 9, of generally rectangular shape in cross section. This non-circular portion passes loosely through an opening of corresponding shape formed through a cross-head, 10, which preferably is shaped and arranged as shown and described in my former patents aforesaid. That is to say, enough clearance is left between the non-circular portion of the stem and the cross-head to permit of their universal relative movement laterally with respect to the stem and the outer portion of the cross-head is helically pitched at the same angle as the coils of the spring, between adjacent convolutions of which said helical portion fits, the cross-head being of greater diameter than the spring so that its periphery may be grasped between the thumb and finger for turning it relatively to the spring, whereby it is advanced along the spring, screw fashion. To permit of this arrangement of the spring and cross-head, the latter is provided with a radial notch, 11, of sufficient circumferential length to span the wire of one convolution of the spring where it crosses the plane of said helical portion.

The cross-head preferably, though not necessarily, has in its under side a curved concavity or socket, 12, which may be formed by dies and this socket is occupied by the bent upper end of a U-shaped part, 13, herein called a "key," preferably made of a piece of wire of round cross sectional shape, bent to form. The bent or curved portion of this so-called "key" passes through a perforation, 14, formed through the non-circular portion, 9, of the stem and this key performs not only the function of a key connecting the stem and cross-head, but also the function of one member of the universal joint, the other member of which consists of the cross-head, which, as before stated, preferably has the curved socket, 12.

The bend of the key provides a curved surface lying in one plane, for contact with the cross head and the round cross sectional shape of wire of which the key is made provides a curved surface lying in another plane, perpendicular to the first, for contact with the cross head, thus providing a universally rocking bearing similar to that of a ball and socket joint, although with less frictional contact surface between the cross head and stem. This permits of an absolutely free lateral bodily movement of the spring, allowing it to accommodate itself to the line of strain produced by the load and relieving it of any lateral strain that would produce error.

The parallel portions of the U-shaped key lie flat against the sides of the portion, 9, and preferably extend beyond its lower end, and are of equal length, although these details are not essential and the perspective of Fig. 6 makes the one last named appear not to be so.

What I claim as new is:

1. In a device of the class described, the combination of a fixed resistance, a spring and means connecting the spring with the fixed resistance, said connecting means having a stem and a universal joint, said universal joint having a part forming one member of the joint, and having an opening through which said stem passes freely, clearance being left between them to permit of their universal relative movement laterally with relation to the stem, and a U-shaped part carried by the stem and forming the second member of the joint, the outer curved surface of the U-shaped part contacting with the first named member of the joint and providing a rocking bearing.

2. In a device of the class described, the combination of a helically coiled spring, a stem and a universal joint between them, said joint having a cross-head, engaging the spring, constituting one member of the joint and having an opening through which the stem passes, and a U-shaped part carried by the stem and constituting the second member of the joint, the curved outer surface of the bent portion of said U-shaped part having contact with the cross head, forming a rocking bearing.

3. In a device of the class described, the combination of a helically coiled spring, a stem, and a universal joint connecting them, said joint having a cross-head, engaging the spring, forming one member of the joint and having an opening through which the stem passes freely, clearance being left between the cross-head and stem, a U-shaped part carried by the stem and constituting the second member of the joint, the stem having a perforation through which the bent portion of said U-shaped part passes and the curved outer surface of said bent portion having contact with the cross-head, forming a rocking bearing.

4. In a device of the class described, the combination of a helically coiled spring, a stem, and a universal joint connecting them, said joint having a cross-head, form-

ing one member of the joint, having a helical portion fitting between the convolutions of the spring and having an opening through it through which the stem passes freely, clearance being left between the cross-head and stem, and a U-shaped part, made of wire of round cross sectional shape, carried by the stem and constituting the second member of the joint, the stem having a perforation through which the bent portion of the U-shaped part passes, and the curved outer surface of said bent portion having contact with the cross-head, forming a rocking bearing.

5. In a device of the class described, the combination of a helically coiled spring, a stem having at one end a portion of oblong, substantially rectangular, shape in cross-section, and a universal joint connecting them said joint having a cross-head having a helical portion fitting between the convolutions of the spring and having an oblong opening through which the oblong portion of the stem passes freely, clearance being left between the cross-head and stem, and a U-shaped part made of wire of round cross sectional shape, carried by the stem, the stem having through its oblong portion a perforation through which the bent portion of the U-shaped part passes, and the cross-head being provided with a curved socket with which the curved outer surface of said bent portion contacts, forming a rocking bearing.

MARIUS H. HANSEN.

Witnesses:
HARRY W. MONS,
L. W. HOPKINS.