May 20, 1958 L. S. SUOZZO 2,835,463

VARIABLE SUPPORT SPRING HANGER

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2 Sheets-Sheet 1

Fig. 2

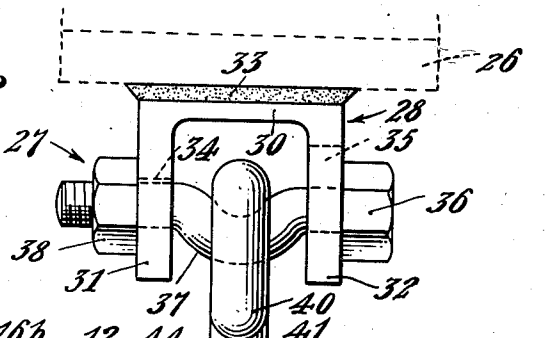
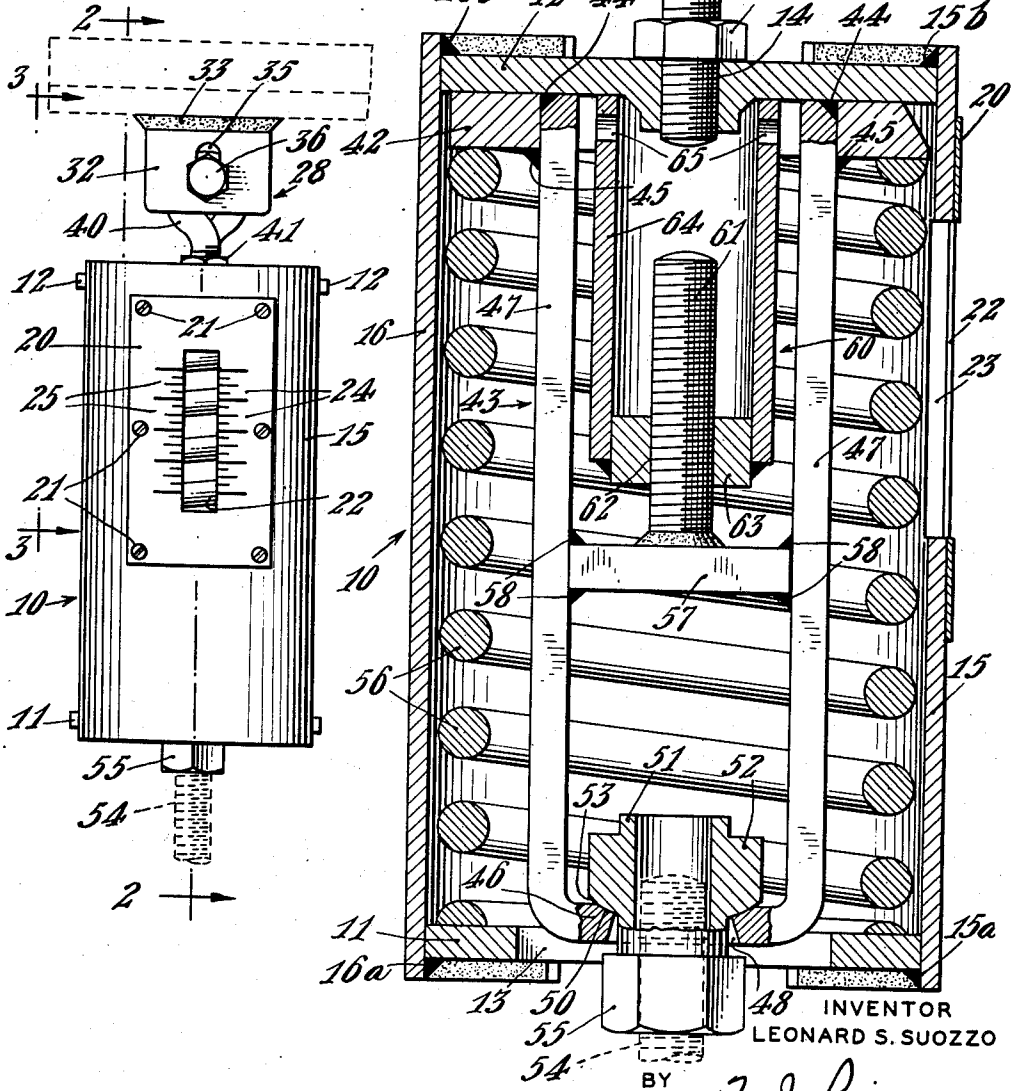


Fig. 1



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Fig. 3

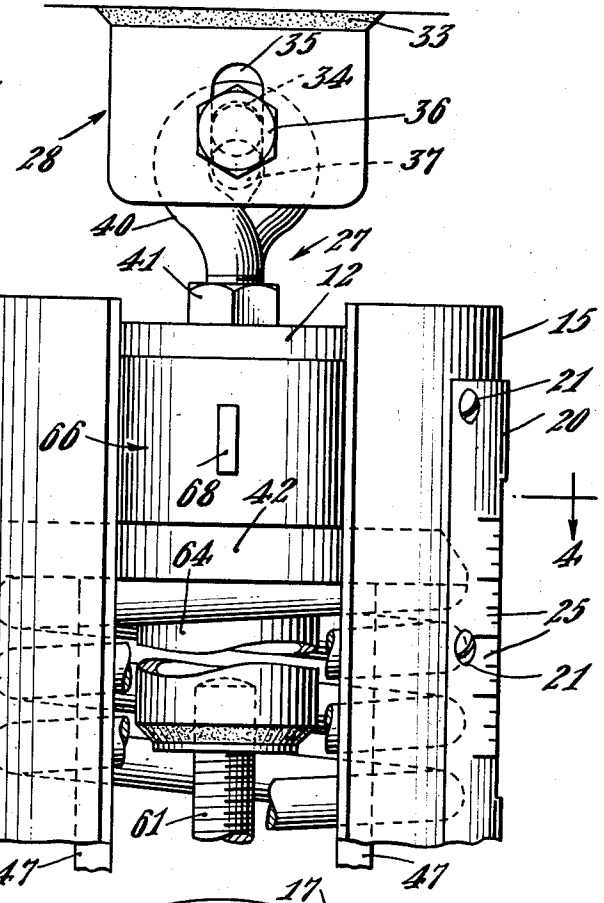
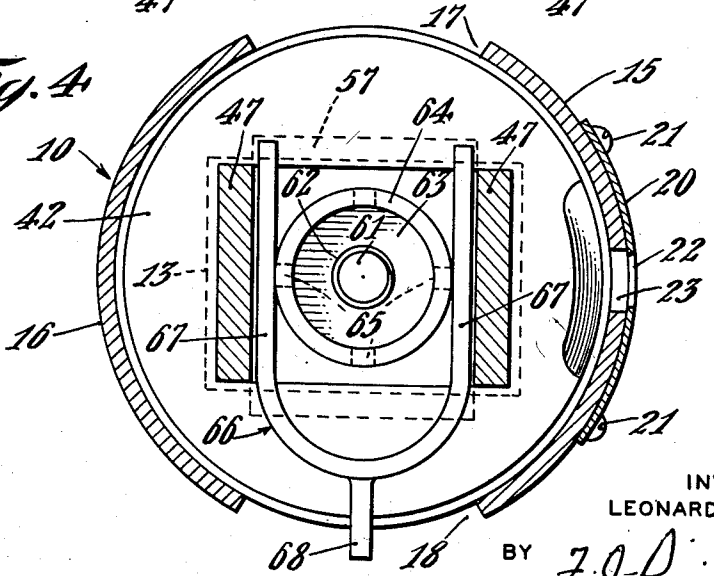


Fig. 4



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VARIABLE SUPPORT SPRING HANGER

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9 Claims. (Cl. 248—54)

This invention relates to the art of spring hangers and, more particularly, to improved spring hangers for supporting pipes or other loads that are subject to vertical displacement.

The need for providing suitable resilient supports for piping systems that carry steam or other fluids at high temperatures and pressures has been recognized for many years. A number of devices have been developed for the purpose of fulfilling this need. Certain of such devices are commercially available today, but, while generally adequate, are not entirely satisfactory due to inherent deficiencies in design, adaptability and/or construction.

The hanger of this invention constitutes a worthwhile advance in the art in that it embodies several important features which contribute materially to its utility. Among such features are:

(*a*) The hanger housing has at least one vertical window that preferably extends from its bottom wall to its top wall. This permits of visual examination of the parts within the housing at the times of manufacture and field installation, and during use. Dust, dirt or other foreign material that may enter the interior of the hanger during use may be readily detected and removed through the window. Also, the window permits convenient access to an adjustable means that is wholly within the housing. Moreover, it allows for ready insertion or withdrawal of a preset spacer for compressing the spring to the proper installed setting.

(*b*) The referred-to adjustable means limits upward movement of certain parts within the housing and permits varying the loading on the spring within the capacity of the hanger, as desired.

(*c*) The preset spacer permits preloading the hanger prior to installation and may be easily removed through the window after installation has been completed. This saves time and labor in the field, insures proper installation and minimizes the possibility of error at the time of installation.

(*d*) The hanger is provided with an improved coupling means for effecting connection with the load that is supported by the hanger. Certain parts of the coupling means are so configured as to obtain a swivel connection thereby improving the flexibility of the structure both at the time of installation and during use.

(*e*) The hanger also has an improved top coupling means which is adapted to connect the housing in suspended relation to a beam or other structural support. This coupling means has certain parts so configured and arranged as to permit rocking or swaying movement of the housing relative to the beam. Moreover, this coupling means is compact and requires less head-room than corresponding structures now in use.

(*f*) The hanger includes a vertically disposed U-shaped member that registers with an aperture in the bottom wall of the housing. This member is connected to a spring plate and supports the adjustable means. The member and the parts of the bottom wall which define the aperture are so configured and arranged as to permit vertical

movement of the member through the aperture but prevent rotational movement of the member relative to the housing. Thus, the member and the spring plate are properly guided and the possibility of undue friction due to rubbing of parts within the housing is reduced to a minimum.

(*g*) A plate element is positioned between and secured to the arms of the U-shaped member. This element serves the dual functions of: first, limiting downward movement of the member relative to the housing; and, second, directly supporting the earlier referred-to adjustable means.

The invention has for its primary object the provision of a spring hanger for pipes or the like having improved features of design and construction.

Another object of the invention is to provide a spring hanger that may be readily adjusted and that may be preloaded to the required installed setting at the time of manufacture or at any other time prior to installation.

Another object of the invention is to provide a spring hanger including a housing having at least one window which permits of inspection of parts within the housing, removal of dust or other foreign particles that may become deposited in the housing, access to adjustable means within the housing for the purpose of actuating the same, and insertion or withdrawal of a preset spacer of the character referred to above.

Another object of the invention is to provide a spring hanger having its parts compactly arranged whereby it may be installed and used in locations where vertical space is restricted.

A further object of the invention is to provide a hanger of the character indicated that is simple, lightweight and sturdy in construction, that is reasonable in manufacturing and maintenance costs and that is adapted to be readily assembled, adjusted and serviced, as required.

The invention has for a still further object the provision of a spring hanger for pipes that is capable of performing its intended functions in a satisfactory and trouble-free manner.

The foregoing objects, as well as other objects of the invention, will be understood by persons skilled in the art upon reference to the following detailed description, taken in conjunction with the annexed drawings, which respectively describe and illustrate a preferred arrangement of devices embodying the invention.

In the drawings:

Fig. 1 is a view in elevation of a spring hanger constructed in accordance with the invention;

Fig. 2 is a view in enlargement taken along line 2—2 of Fig. 1;

Fig. 3 is an enlarged view taken along line 3—3 of Fig. 1 and showing certain of the parts in another relative position, and

Fig. 4 is a view taken along line 4—4 of Fig. 3.

Referring to the drawings wherein like reference numerals denote corresponding parts throughout the several views, a housing, generally indicated by numeral **10**, includes circular and parallel bottom and top walls **11** and **12**, respectively. The bottom wall has an oblong central opening **13** while the top wall has a tapped opening **14**. The housing also includes a pair of spaced-apart vertical side walls **15** and **16**. Side wall **15** is welded to the bottom and top walls, as indicated at **15***a* and **15***b*, respectively, while side wall **16** is similarly welded to the top and bottom walls as indicated at **16***a* and **16***b*. As is best shown in Fig. 4, the side walls are arcuate in transverse cross section. The top, bottom and side walls are so formed and arranged as to define a pair of windows **17** and **18** that extend the full effective height of the housing. These windows are of substantial width thereby permitting of ready access to the interior of the housing.

An indicator plate 20 is mounted on the outer face of side wall 15 by screws 21 and has a vertical slot 22 which is aligned with a like slot 23 in the side wall. The plate is provided with a first scale having graduations 24 for indicating the weight of the load carried by the hanger and a second scale having graduations 25 for indicating load travel distance.

The housing is adapted to be suspended from a structural beam 26, or other form of support, by a connector or coupling means 27 that will now be described. This coupling means comprises an inverted U-shaped bracket 28 which consists of a web 30 and a pair of spaced parallel arms 31 and 32. Bracket 28 is preferably secured to the under surface of beam 26 by welding, as indicated at 33. Leg 31 of the bracket has an opening 34 while leg 32 has a slot 35. A bolt 36 extends through opening 34 and slot 35 and is supported by the bracket as shown. The shank of the bolt is bent intermediate its ends to form a saddle 37. The bolt is retained on the bracket by a nut 38. An eye bolt 40 engages tapped opening 14 in the housing top wall and carries a locking nut 41. The eye bolt is connected to bolt 36 and rides in saddle 37 thereby permitting of rocking movement of the housing relative to bracket 28 and beam 26.

Positioned within the housing, intermediate its top and bottom walls, is a spring plate 42 which is in the form of a ring. Also positioned within the housing is a U-shaped member 43 that registers with aperture 13 in the housing bottom wall and that is secured to the ring by welds 44 and 45. This U-shaped member consists of a web 46 and a pair of elongated parallel arms 47. Web 46 has a central through opening 48. The upper opening-defining surface of web 46 is dished to form a concave seat 50.

The hanger is equipped with a second connector or coupling means for effecting connection with pipes to be supported by the hanger. This coupling means includes a tubular rod 51 having a circular flange or head 52 which has a convex lower surface 53. Surface 53 mates with seat 50 of U-shaped member 43 thus obtaining a swivel connection between member 43 and rod 51. At least the lower portion of rod 51 is internally threaded to receive the upper portion of a threaded rod 54 that is adapted to be connected at its other end to the piping or other load (not shown) which is to be supported by the hanger. Rod 54 is provided with a locking nut 55.

A helical compression spring 56 is positioned in the housing and bears at its opposite ends against the housing bottom wall 11 and plate 42. This spring normally and yieldingly urges plate 42, U-shaped member 43 and the parts carried by the member in an upward direction relative to the housing.

A stop element 57, that is preferably in the nature of a plate, extends across the interior of U-shaped member 43 and is welded to arms 47 as indicated at 58. The stop element projects beyond the side edges of arms 47 and is wider than aperture 13. Element 57 is adapted to bear against the housing bottom wall and serve as a positive stop whereby to limit downward movement of member 43 and the parts connected thereto.

The hanger includes an adjustable means 60 for varying the loading on the spring. This means comprises an upstanding threaded post 61 mounted on stop element 57 and positioned equidistant from arms 47. Post 61 extends through a tapped central opening 62 in a plate 63 which constitutes the bottom wall of a tubular member 64. A plurality of circumferentially spaced openings 65 in member 64 is adapted to receive a suitable tool (not shown) for turning the member relative to post 61 and thus effect vertical adjustment thereof.

Figs. 3 and 4 illustrate the relative position of the parts when the hanger is equipped with a preset spacer 66 which is preferably U-shaped and which includes a pair of legs 67 and a handle 68 for facilitating insertion or removal of the spacer in or from the hanger. As shown, the spacer is adapted to be inserted in the housing and bear against spring plate 42 and housing top wall 12. When the spacer is used, its height determines the extent of preloading of the spring. As was explained earlier, the size of the spacer may be such as to compress the spring to its proper installed setting. The spacer may be placed in the hanger at the time of assembly or at any other time prior to installation. After the hanger is properly installed, the load carried thereby is such as to permit ready withdrawal of the spacer through window 18.

From the foregoing, it is thought that the construction, operation, and advantages of the herein described invention will be apparent to those skilled in the art, without further description; and, it will be understood that various changes in the size, shape, proportion and minor details of construction may be resorted to without departing from the spirit, or sacrificing any of the advantages of the invention.

I claim:

1. In a spring hanger for supporting pipes and the like, a housing including a top wall, a bottom wall and at least one substantially vertical side wall, said bottom wall having a central through aperture, a transverse plate movable within the housing, a U-shaped member registering with the aperture in the bottom wall and including a pair of substantially parallel upwardly projecting arms that are secured to the plate, said member and the parts of the bottom wall defining the aperture being so configured and arranged as to permit vertical movement of the member through the aperture and prevent rotation of the member relative to the housing, a compression spring within the housing and bearing against the plate, said spring normally and yieldingly urging the plate and member upwardly relative to the housing, an element disposed between and secured to the arms, said element cooperating with the bottom wall for limiting downward movement of the member relative to the housing, and vertically adjustable means within the housing secured to the member for limiting upward movement of the member relative to the housing and varying the loading on the spring.

2. A spring hanger in accordance with claim 1 wherein the vertically adjustable means is connected to the element and is positioned between the arms of the U-shaped member.

3. In a spring hanger for supporting pipes and the like, a housing including a top wall, a bottom wall and at least one substantially vertical side wall, said bottom wall having a through aperture, said housing having a window defined at least in part by the side wall and the top wall, a transverse plate movable within the housing, a member secured to the plate and registering with the aperture in the bottom wall, said member and the parts of the bottom wall defining the aperture being so configured and arranged as to permit vertical movement of the member through the aperture and prevent rotation of the member relative to the housing, a compression spring within the housing and bearing against the plate, said spring normally and yieldingly urging the plate and member upwardly relative to the housing, an element carried by the member and cooperating with the bottom wall for limiting downward movement of the member relative to the housing, vertically adjustable means secured to the member for limiting upward movement of the member relative to the housing and varying the loading on the spring, said means being wholly within the housing and accessible through the window.

4. A spring hanger in accordance with claim 3 including a removable presetting device interposed between the movable plate and the top wall and maintained in such position by force stored in the spring, said device being accessible for removal through the window.

5. In a spring hanger for supporting pipes and the like, a housing including a top wall, a bottom wall and at

least one substantially vertical side wall, said bottom wall having a central through aperture, said housing having a window formed at least in part by the top wall and the side wall, a U-shaped member registering with the aperture and including a web and a pair of substantially parallel upwardly projecting arms, said web having a through opening, a transverse plate movable within the housing and secured to the ends of the arm remote from the web, a compression spring within the housing and bearing against the plate, said spring normally and yieldingly urging the plate and member upwardly relative to the housing, an element positioned between and secured to the arms intermediate the ends thereof, said element cooperating with the bottom wall for limiting downward movement of the member relative to the housing, vertically adjustable means positioned between the arms and secured to the element for limiting upward movement of the member relative to the housing, said adjustable means being accessible through the window, and means connected to the member and adapted to be connected to pipes that are to be supported by the hanger, said last-mentioned means comprising a rod including a part bearing against the upper surface of the web and a part extending through the opening in the web.

6. In a spring hanger for supporting pipes and the like, a housing including a top wall, a bottom wall and at least one substantially vertical side wall, said bottom wall having a through aperture, said housing having a window formed at least in part by the top wall and the side wall, a U-shaped member registering with the aperture and including a web and a pair of substantially parallel upwardly projecting arms, said web having a through opening, said member and the parts of the bottom wall defining the aperture being so configured and arranged as to permit vertical movement of the member through the aperture and prevent rotation of the member relative to the housing, a transverse plate movable within the housing and secured to the ends of the arms remote from the web, a compression spring within the housing and bearing against the plate, said spring normally and yieldingly urging the plate and member upwardly relative to

the housing, an element positioned between and secured to the arms intermediate the ends thereof, said element limiting downward movement of the member relative to the housing, vertically adjustable means positioned between the arms and secured to the element for limiting upward movement of the member relative to the housing, said adjustable means being accessible through the window, and means connected to the member and adapted to be connected to pipes that are to be supported by the hanger, said last-mentioned means comprising a rod including a part bearing against the upper surface of the web and a part extending through the opening in the web.

7. A spring hanger in accordance with claim 6 including means for presetting the loading on the spring and comprising a removable device positioned between and bearing against the movable plate and the top wall of the housing, said device being accessible through the window.

8. A spring hanger in accordance with claim 6 including connector means for suspending the housing from a support, said connector means comprising a bracket including a pair of spaced dependent legs, each leg having an opening, a rod comprising axially aligned portions that register with corresponding openings in the legs and an intermediate arcuate portion that constitutes a saddle, and a member engaging the saddle and connected to the top wall of the housing.

9. A spring hanger in accordance with claim 7 including means for presetting the loading on the spring and comprising a removable device interposed between and bearing against the movable plate and the top wall of the housing, said device being accessible through the window.

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