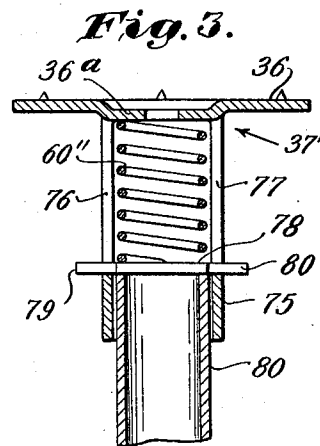
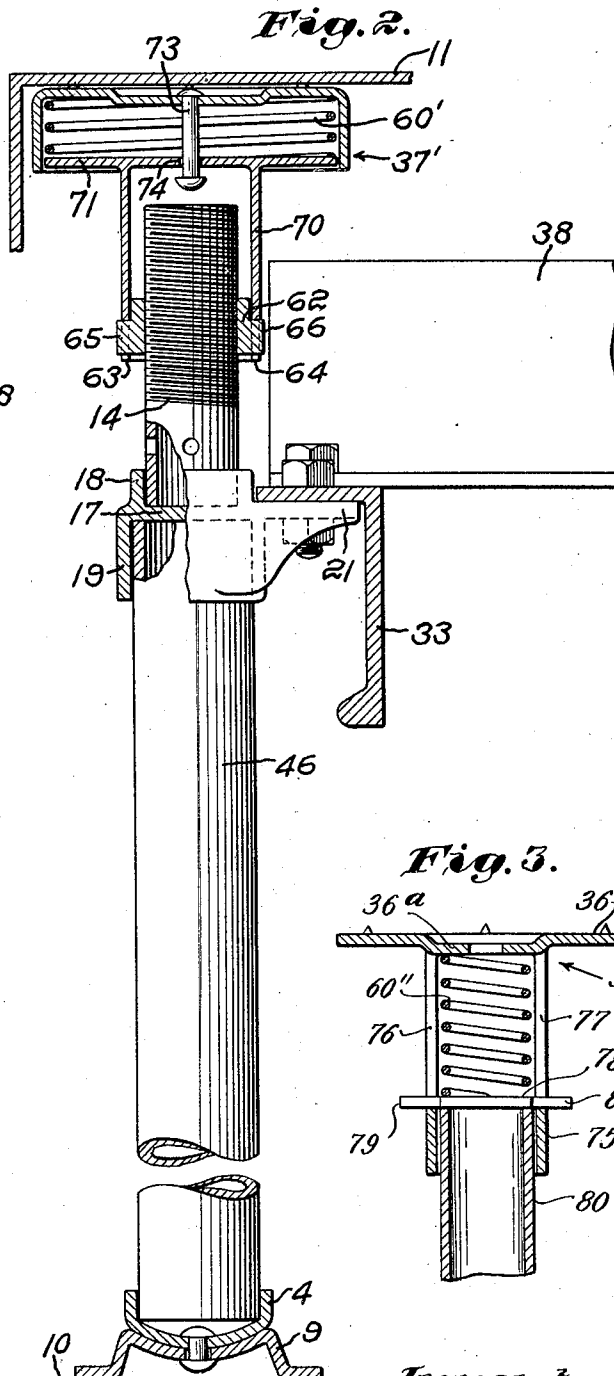
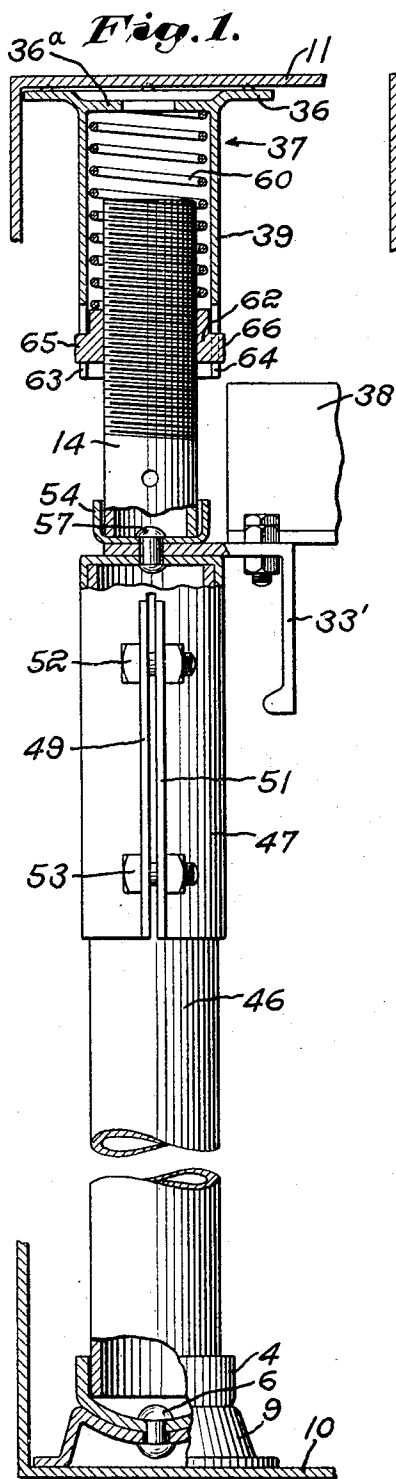


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L. I. BECKWITH  
REFRIGERATING APPARATUS

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## UNITED STATES PATENT OFFICE

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## REFRIGERATING APPARATUS

Application filed October 29, 1931. Serial No. 571,733.

This invention pertains to refrigerating apparatus and more particularly to a supporting strut or column adapted to carry cooling coils or other parts of the refrigerating equipment as well as to support the upper wall or ceiling of the refrigerating chamber. The present invention constitutes an improvement upon the supporting means disclosed in my copending application, Serial No. 544,023, filed June 12, 1931.

When metallic struts or columns of the type disclosed in said application are installed in refrigerating compartments, cold storage rooms or the like, the work of installation is usually done under normal room temperature conditions and at the time of installation the columns are adjusted to the proper length so that their upper tooth members bite into the ceiling and the columns are caused to sustain the desired load, but when the compartment is cooled the metal columns contract more rapidly than the nonmetallic walls of the chamber, thus loosening their grip on the ceiling with consequent danger of toppling over unless care is taken to turn the upper section of each column so as to extend it sufficiently to compensate for the contract due to cooling. When after such extension the room is afterward warmed, the extended columns may expand sufficiently to buckle or crack the ceiling or cause other damage, and thus care must be taken to shorten the columns as the room temperature rises. While such adjustment is possible and practical it involves some time and care and is sometimes neglected, with attendant injury such as just suggested, and the present invention is designed to obviate the necessity of manually varying the column length to compensate for temperature changes. To this end I provide a heavy spring or equivalent yielding means capable of transmitting the maximum normal load from the column cap, for example to the upper section of the column, although I contemplate the interposition of the spring at any other appropriate point in the line of compression stress, such spring yielding to abnormal load imposed by rising temperature and expanding as the column shrinks, due to decrease in temperature. In

a preferred embodiment of the invention the length of this spring is such that the spring pressure does not vary substantially in response to the very small changes in length to which it is subjected.

With this arrangement it is possible to install the column in the usual manner, rotating the upper section relatively to the lower section until the retaining teeth on the column cap bite into the ceiling and the column carries the desired load. Thereafter no further attention is necessary since the column automatically maintains its proper length regardless of temperature variations.

In Fig. 1 I have illustrated a preferred embodiment of the invention, the main portion of the column being shown in elevation and the cap in section;

Fig. 2 is a similar view showing a modified construction; and

Fig. 3 is a vertical section of a column cap of a further modified construction.

A single column such as shown in Fig. 1 or in Fig. 2 may serve as one of the corner or intermediate structurally interconnected vertical members of a framework adapted to support refrigerating apparatus.

The column of Fig. 1 is shown as including between its upper and lower parts a horizontal web of an angle bar 33' which may connect the column to the next like column in front or rear thereof. A transversely extending beam 38 may connect this angle bar 31' to a like structural element of the framework; this beam 38 and other like parallel beams supported by the several columns of the framework may serve as the supports for the cooling coils or other refrigerating apparatus. For the purposes of the present invention an explanation of one of the several vertical columns of such a structure will suffice.

Below the horizontal flange of angle bar 33' the column may for example comprise, as shown in Fig. 1, and as described in my application Serial No. 544,023, a closed top sleeve 47 slotted vertically between flanges 49 and 51 which are adapted to be drawn together by bolts 52 and 53. This sleeve 47 embraces a lower upright tube 46, which is

shown as engaging within a cup-shaped member 4 of a two-part base 4, 9. The two parts 4 and 9 of this base, loosely held together by a rivet 6, have relative freedom of motion on a slightly curved meeting surface, such that the lower base member 9 may conform to a floor 10 even though the latter slopes; the column will in general be disposed as nearly vertically as possible.

Above the horizontal flange of angle bar 33', the column of Fig. 1 preferably employs a cup-shaped member 54, fastened in place by a rivet 57, to receive the lower end of an upper rotatable part 14 of the column, as described in my application Serial No. 544,023.

To contact with the ceiling 11 of the room or chamber, a cap 37 is provided at the top of the column, this cap preferably having a horizontal flange 36 at its top adapted to be engaged with the ceiling without necessitating alteration of the ceiling. Arranged to react on the cap and on the lower part of the column respectively, is a coil spring 60, shown in Fig. 1 as engaging the lower side of a depressed inner annular portion 36<sup>a</sup> of the cap. For supporting the spring and connecting it to the member 14 of the column there is a collar 62 threaded on the screw threads of member 14 and bearing against the lowest convolution of the spring 60. The cap 37 is preferably provided with a depending tubular sleeve 39 which laterally encloses the coil spring 60 and extends down to the member 62. To secure the cap 37 and member 62 against rotation relative to each other, the lower part of extension 39 is preferably provided with slots 63 and 64, into which project lateral extensions or ears 65 and 66 respectively, integral with member 62.

It will now readily appear that the spring 60 is capable of compensating for the expansion and contraction of the column as a whole caused by changes in the temperature of the room or chamber. The compression of spring 60 may be adjusted by rotation of the screw-threaded member 14 while the cap is held in place, thus effecting lengthwise displacement of the spring with relation to the remainder of the column. When the compression of spring 60 is properly adjusted, the column cap 36 will be capable of maintaining effective contact with the ceiling even during periods of extensive contraction of the column.

In the modified construction illustrated in Fig. 2, the previously described cup 54, rivet 57 and sleeve 47 are replaced by an integral bracket having an upper annular wall 18 adapted to fit the lower end of upper tubular section 14, and a lower annular wall 19 adapted to fit the upper end of lower section 46 with a horizontal web 17 between these two portions of the column. This horizontal web 17 is continued as an exterior arm 21 to which

may be secured an angle bar 33, which supports the cross beam 38 in the same manner as the previously described bar 33' of Fig. 1.

The column cap 37' in the column of Fig. 2 is of inverted cup shape, adapted to receive therein and laterally enclose a coil spring 60' of somewhat larger diameter than the spring of Fig. 1. A threaded collar 62 is engaged by the threads on the upper rotatable portion 14 of the column, as in the form of Fig. 1, and serves to bear the weight and pressure of the cap and spring. Between this member 62 and the spring there is provided a sleeve 70, slotted in the same manner as sleeve 39 of the device of Fig. 1, to engage ears 65 and 66 on the threaded member 62. This sleeve 70 has integral with its top a horizontal web 71 adapted to bear against the lower convolution of the spring 60', and closing the bottom of the space occupied by the spring. Preferably the cap 37' is connected to this plate 71 by a rivet 73 extending loosely through a hole 74 in the plate 71 and of a length sufficient to permit such separation of these parts as may occur in use. The rivet 73 acts to limit the extent of separation of the cap and sleeve 70, and thus prevent their accidental disassembly. The central upper surface of the cap 37' is slightly depressed to receive the head of this rivet. Such a connection between the parts which embrace the spring permits the spring to be kept confined during the erection of the column, whereupon a few turns of the rotatable member 14 will suffice to place the spring under the proper compression to compensate for contraction of the column.

The modified form of cap 37'' illustrated in Fig. 3 is provided with the horizontal flange 36 and the depressed inner annular portion 36<sup>a</sup> of the cap shown in Fig. 1, and includes also a downwardly extending sleeve 75 of approximately the shape of the sleeve 39 of the cap of Fig. 1. This sleeve 75 is provided with opposite vertical slots 76 and 77 extending part way down from the top of the cap. A plate 78, of circular shape and fitting loosely in the sleeve, is provided with laterally extending ears 78 and 80 which extend through, and slide in, the two slots 76 and 77. Any suitable spring, such as indicated at 60'' is confined within the sleeve 75, bearing at its upper end against the depressed central portion 36<sup>a</sup> of the cap, and at its lower end against the plate 78.

The cap 37'' just described can be substituted for the illustrated caps in devices such as shown in Figs. 1 and 2, the sleeves 62 of these devices then being dispensed with, and the plate 78 resting directly on the upper end of member 14 of those devices. Obviously also, the cap 37'' of Fig. 3 can receive the upper end of any suitable supporting column member which need not be threaded, indicated at 80 in Fig. 3, which bears against the lower

surface of plate 78. When the supporting column is positioned in place with the cap 37'' in contact with the ceiling of the room or chamber, the spring 60'' is placed under compression. The spring 60'' then functions in the manner of the springs of the other forms of the invention, to maintain contact of the cap and ceiling during periods of decreased temperature and to compensate for changes in length of the column. The cap 37'' can move up and down as required, by virtue of the slots 76 and 77 which permit movement of the sleeve 75 with respect to the plate 78 and the supporting column.

The ears 78 and 80, adapted to abut against the lower ends of the slots 76 and 77, act to prevent accidental disassembly of the ceiling engaging part and the column engaging plate 78, as well as to prevent escape of the interposed spring 60''.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the appended claims.

I claim:

1. A column adapted for use in supporting refrigerating apparatus, the column including upper and lower sections having freedom for relative rotation, the upper section being screw-threaded, spring-supporting means threaded thereon for longitudinal adjustment with relation to the column, a cap adapted to contact with the ceiling of a room, and a spring positioned to react on said cap and on said spring-supporting means, thereby to compensate for expansion and contraction of the column under changes in temperature.

2. A device of the class described having therein, a column cap of inverted cup shape, a coil spring disposed therein, a downwardly extending sleeve adapted to receive the upper end of a column, said sleeve including a horizontal web disposed to bear against the lower end of the said coil spring, and means associated with the cap for limiting the extent of separation of the sleeve and the cap.

3. A column for use in supporting refrigerating apparatus comprising upper and lower relatively rotatable parts, a cap associated with the upper part for engagement with the ceiling of a refrigerating compartment, a spring acting between said upper part and the cap for holding the latter in firm engagement with the ceiling during longitudinal expansion and contraction of the column due to temperature change, a member having threaded engagement with said upper part and receiving the reaction of said spring, said cap having a substantially longitudinal groove, and a projection on said member disposed within said groove, whereby the force of said spring may be varied by rotating said

upper part while said cap remains substantially stationary.

4. A column for use in refrigerating apparatus comprising a lower load-supporting portion and an upper portion connected to said load-supporting portion for rotative movement relative thereto, a cap associated with the upper portion for engagement with the ceiling of a refrigerating compartment and a spring acting between the upper portion and the cap for holding the latter in firm engagement with the ceiling during longitudinal expansion and contraction of the column due to temperature change, a member having threaded engagement with said upper portion for receiving the reaction of said spring, and means providing for relative longitudinal movement of this member and the cap and for holding these parts from relative rotary movement, whereby the force of said spring may be varied by rotating said upper part.

5. A column for use in supporting refrigerating apparatus, said column comprising upper and lower relatively rotatable sections, bracket means interposed between said sections for supporting a load, the upper section of the column including a cap vertically movable relative thereto and arranged to bear against the ceiling of a room, a spring interposed between said cap and said upper section of said column, and means between said cap and said upper section of said column and carried by the latter for compressing the spring acting on said cap.

6. A column for use in supporting refrigerating apparatus, said column comprising upper and lower relatively rotatable sections, means for maintaining said sections in substantially the same relative positions vertically of each other during relative rotary movement of these sections so that a load supported by one of these sections may remain substantially at the same elevation during such relative rotary movement, a cap associated with the upper of said sections and arranged to engage the ceiling of a room, a spring interposed between said cap and the upper of said sections, and means effective on rotary movement of said upper section for effecting longitudinal adjustment of said spring.

7. A column for use in supporting refrigerating apparatus, said column comprising upper and lower relatively rotatable sections, means interposed between said sections for supporting a load, the upper section of the column including a cap vertically movable relative thereto and arranged to bear against the ceiling of a room, a spring interposed between said cap and the upper of said relatively rotatable sections, and means for longitudinally displacing said spring with relation to said column, said means including a

member screw-threaded to the upper of said relatively rotatable sections and connecting the spring thereto.

8. A column for use in supporting refrigerating apparatus, said column comprising upper and lower relatively rotatable sections, means for supporting a load substantially entirely from the lower of said relatively rotatable sections, the upper of said relatively rotatable sections having its upper end portion screw-threaded, a collar threaded on this upper end portion, a cap element adapted to contact with the ceiling of a room, and a spring interposed between said cap element and said collar to compensate for changes in temperature.

Signed by me at Everett, Mass., this 27th day of October, 1931.

LOUIS I. BECKWITH.