

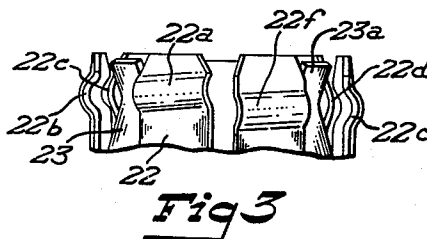
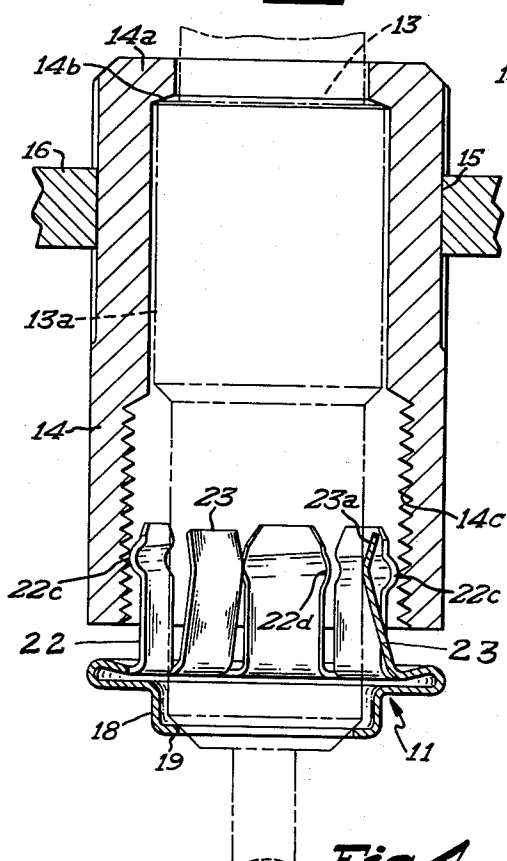
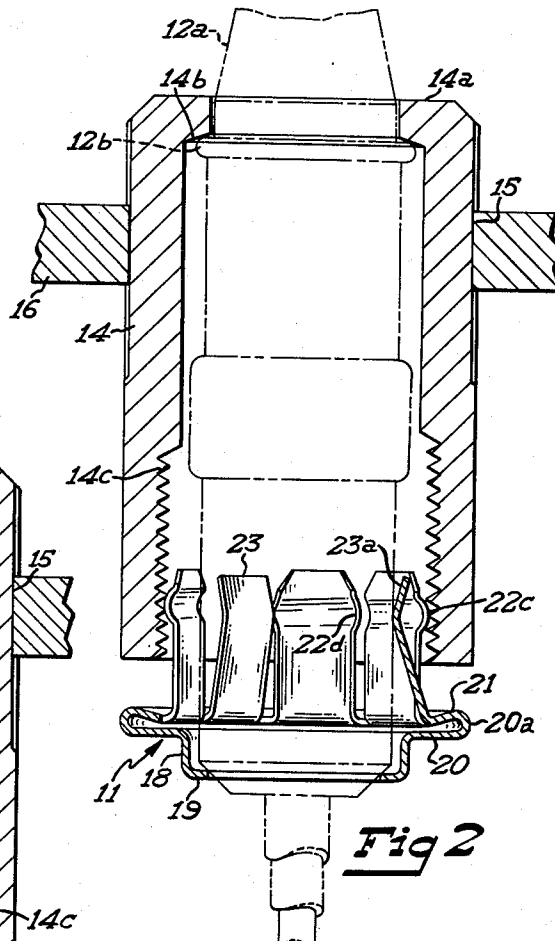
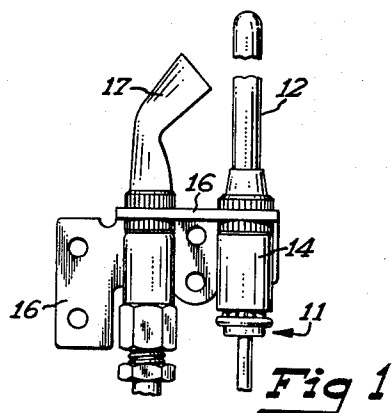
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3,173,473

THERMOCOUPLE CLIP

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3,173,473

THERMOCOUPLE CLIP

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This invention relates to spring clips and, more particularly, to a thermocouple clip for retaining a thermocouple in a pilot burner bracket in lieu of a conventional screw threaded ring nut.

In view of the fact that there is a constant trend for gas furnaces to provide smaller and smaller spaces for the main burner as well as the pilot burner for the main burner and controls for controlling the gas flow to these burners, control manufacturers are constantly striving to make controls more compact and make them more readily installed in the furnaces and to provide for easier and better servicing of the components of the fuel feeding system.

One of the objects of this invention is to provide a spring clip that will take the place of the conventional ring nut generally used for holding the thermocouple in a pilot burner bracket.

Another object of the invention is to provide a thermocouple retaining member which is quickly and easily insertable and removable into the pilot burner bracket for retaining a thermocouple therein.

Another object of the invention is to provide a spring clip for thermocouple mounting wherein the spring clip has means for holding it on the thermocouple, to facilitate the mounting of the thermocouple in a supporting bracket.

A still further object of the invention is to provide a thermocouple mounting clip which may be manipulated by the installer's fingers to position a thermocouple in a pilot burner bracket.

Still other objects of the invention will become apparent upon reading the following detailed description of the invention in conjunction with the accompany drawing wherein:

FIGURE 1 is an elevational view of a pilot burner and thermocouple assembly illustrating the invention substantially at normal size;

FIGURE 2 is an enlarged vertical sectional view through the thermocouple supporting portion of the assembly of FIGURE 1.

FIGURE 3 is a fragmentary view of the upper end of the spring clip in side elevation; and,

FIGURE 4 is a view similar to FIGURE 2 showing a thermopile mounted in the supporting bracket rather than the thermocouple of FIGURES 1 and 2.

The clip of this invention is generally designated by the reference numeral 11 and is used to support either a thermocouple 12 or a thermopile 13 in a sleeve-like supporting member 14, which, in turn, is suitably mounted in a bore 15 through a mounting bracket 16. The mounting bracket 16 has holes therein which permit mounting bolts (not shown) to pass therethrough and be secured to a main burner of the furnace, which also are not shown. A mounting bracket 16 also supports a pilot burner 17 in spaced relationship to the thermocouple so that the flame from the pilot burner 17 can play on the upper end of the thermocouple unit.

The thermocouple supporting sleeve 14 has an inwardly extending annular flange 14a that is beveled at its lower end at 14b to provide an abutment shoulder for the enlarged diameter portion or annular rib 12b of the thermocouple or 13a of the thermopile. The lower end of the sleeve portion 14 is interiorially threaded at 14c.

It is in this type of a thermocouple supporting member

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that the thermocouple clip of this invention is adapted to be used to quickly insert the thermocouple unit and firmly hold it in place with respect to the associated pilot burner. The clip has a body portion 18 that terminates at its lower end in an inwardly extending annular flange 19 adapted to bear against the lower end of an enlarged diameter portion of a thermocouple unit. Extending transversely outwardly from the upper end of the body portion 18 is an annular flange 20 which is bent backwardly upon itself at 21 to form a loop 20a between the flange portions 20 and 21. The inner end of the flange 21 terminates in a plurality of thread engaging fingers 22 and a plurality of thermocouple engaging fingers 23. The thread engaging fingers are peripherally arranged in groups of two spaced annularly around the inner edge of the flange 21 while the thermocouple engaging fingers 23 are positioned annularly around the flange 21 between each pair of thread engaging fingers. The thread engaging fingers normally extend substantially parallel to the axis of the spring clip while the thermocouple engaging fingers extend generally in the same direction as the thread engaging fingers but are inclined inwardly towards the axis of the clip so as to frictionally engage a thermocouple unit when such a unit is inserted through the clip. These thermocouple engaging fingers have outwardly bent end portions 23a to prevent the digging in of the ends into the surface of the thermocouple units. The main function of these fingers is to hold the clip around the thermocouple unit to aid in the assembly of the thermocouple into the supporting bracket.

The thread engaging fingers have outwardly struck arcuate ribs 22a through 22f thereon, one on each finger, in the modification shown in the drawing, there being six of such fingers. These ribs are spaced inwardly from the upper end of each of the fingers with the first of the ribs 22a being closer to the upper end than the rib 22f on the last of the fingers extending around the clip from the first finger. The distance between the centers of these ribs is equal to the width of, or space between, the threads 14c in the holder 14. It is to be noted that these ribs are also inclined at the same pitch as the threads.

Operation

It is deemed to be readily understood that to mount either a thermocouple 12 or a thermopile 13 in a thermocouple bracket having a sleeve-shaped thermocouple support therein, all that is necessary in using the invention, is to insert the thermocouple unit into and through the sleeve-shaped support and to shove the clip member, which is frictionally held on the lower end of the thermocouple in guiding relationship therewith, into the threaded lower end of the support and give a slight clockwise rotation to the clip to properly align the ribs 22a-22f between the threads which will cause the thermocouple to be snugly held in this sleeve-shaped member with the abutment shoulder at the upper end of the thermocouple firmly pressing against the under surface of the inwardly extending flange at the upper end of the sleeve-shaped support. In this inserting operation, the rounded surface of the ribs 22a-22f will cause the thread engaging fingers to be deflected toward the thermocouple so that the outermost portions of the ribs will ride over the threads and come to rest on the side walls of the grooves to provide a good anchoring means for the thermocouple in the supporting bracket. Obviously the material of the clip is so selected that it will provide the necessary holding strength to prevent accidental disengagement of the thermocouple unit from the bracket, yet provide enough resilience so that the thermocouple may be readily withdrawn from the supporting bracket by merely pulling downwardly on the thermocouple or on the clip without having to rotate the clip to cause

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this disengagement. It is also to be noted that the friction fingers 23 not only keep the clip on the thermocouple, but also help to serve the function of properly aligning the thread engaging fingers so that as the thermocouple and the clip is inserted into the support, thread engaging fingers are properly centered with respect to the threaded opening.

As it is deemed apparent that modifications may be made in the clip without departing from the spirit of the invention, the scope of the invention should be determined from the appended claims.

I claim:

1. The combination comprising a bracket, a threaded bore in said bracket, a pilot burner on said bracket, a flame sensing member positioned in said bore for heating by said burner, and a spring clip for retaining said flame sensing member in said threaded bore bracket, said spring clip including a generally annular-shaped body portion having a reduced diameter opening in the bottom thereof provided by portions thereof extending downwardly and inwardly from points around said body portion for engaging a portion of said flame sensing member, the upper edge of the body portion having a plurality of annularly spaced fingers extending above said body portion and generally parallel to the axis of the body portion, and outwardly extending arcuate ribs on said fingers shaped to engage the threads in said bore to retain said flame sensing member in said bore.

2. The combination defined in claim 1 wherein said ribs are at an inclination and positioned to provide substantially uniform contact between adjacent pairs of threads in said threaded bore.

3. The combination of claim 2 wherein said flame sensing member has an external annular shoulder thereon intermediate its ends and said bore has an internal annular

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shoulder against which said external shoulder rests when the combination is assembled.

4. A quick-connect clip for retaining a flame sensing unit in a threaded bore of a pilot burner supporting bracket comprising a generally annularly-shaped body portion having a reduced diameter opening in the bottom thereof providing an inwardly extending flange for engaging the lower end of the flame sensing unit, the upper edge of the body portion having an outwardly extending annular flange that is looped back over itself and terminates in a plurality of alternately spaced thread-engagable fingers and flame sensing unit engageable fingers extending above and around the flange and generally parallel to the axis of the body portion, said flame sensing unit engageable fingers having bearing surfaces terminating radially inwardly from the thread-engagable fingers for engaging the side walls of the flame sensing unit.

5. A quick-connect clip as defined in claim 4 wherein said thread-engagable fingers have inclined ribs thereon so shaped that they provide substantially uniform contact with the surfaces of adjoining pairs of threads when inserted in a threaded bore of a pilot burner bracket.

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