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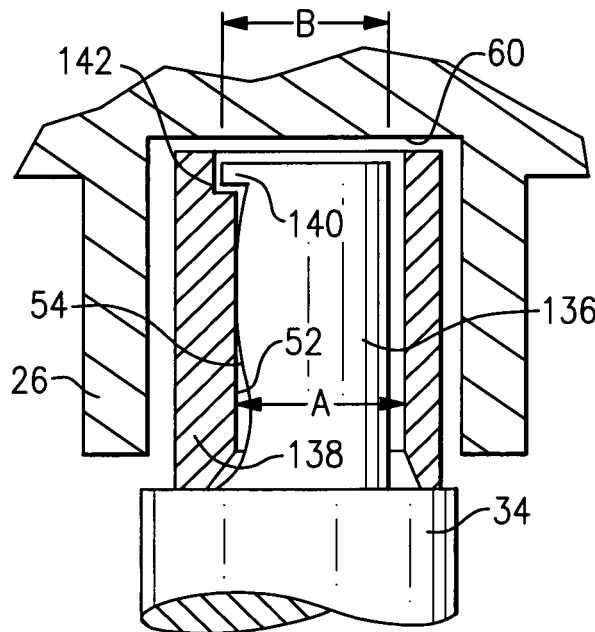
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(54) **Scroll compressor with stop structure to prevent slider block movement**

(57) A scroll compressor has a stop (140) on its eccentric pin (136) to selectively engage a notch (142) in a slider block (138), and prevent the slider block from mov-

ing upwardly and contacting a rear surface (60) of the orbiting scroll (24). The present invention prevents this unwanted contact, and the resultant wear.



**FIG. 2A**

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**Description****BACKGROUND OF THE INVENTION**

[0001] This application relates to a scroll compressor having a slider block which is driven by an eccentric pin from a drive shaft, and wherein there is a stop structure on the eccentric pin to prevent the slider block from moving upwardly beyond the eccentric pin and contacting a rear surface of the orbiting scroll.

[0002] Scroll compressors have become widely utilized in refrigerant compression applications. In a scroll compressor, a first scroll member has a base and a generally spiral wrap extending from its base. The second scroll member has a base and a generally spiral wrap extending from its base. The generally spiral wraps interfit to define compression chambers. One of the two scroll members is caused to orbit relative to the other, and as it orbits the size of the compression chambers decreases and an entrapped fluid is compressed.

[0003] In one type of scroll compressor, the drive mechanism for causing the scroll member to orbit includes a drive shaft driven to rotate, and having an eccentric pin extending upwardly into a slider block. The slider block is received within a rearwardly extending boss in the orbiting scroll. The eccentric pin drives the orbiting scroll through the slider block. One concern with this type of scroll compressor is that the slider block has sometimes migrated upwardly and into contact with a rear face of the base of the orbiting scroll. This has resulted in undesirable wear.

[0004] It has been proposed to modify the slider block in a manner such as to have a bump or other structure on its uppermost surface to minimize the contact surface area with the orbiting scroll base, but still there is wear with the prior art.

**SUMMARY OF THE INVENTION**

[0005] In the disclosed embodiment of this invention, a stop structure is provided on the eccentric pin. This stop structure prevents the slider block from moving upwardly and contacting the orbiting scroll. In one embodiment, this stop structure is a slightly enlarged upper portion of the eccentric pin which fits into a notch in the slider block. While the two may be out of contact in most cases, should the slider block begin to migrate vertically upwardly, it will contact the stop, and the stop will prevent further movement. In one embodiment, the outside dimension of the eccentric pin at the stop is less than an inside dimension of a bore through the entirety of the slider block. This will facilitate assembly of the slider block onto the slider pin.

[0006] These and other features of the present invention can be best understood from the following specification and drawings, the following which is a brief description.

**BRIEF DESCRIPTION OF THE DRAWINGS****[0007]**

Figure 1A shows a prior art scroll compressor.

Figure 1B shows another feature of the prior art scroll compressor.

Figure 1C shows yet another feature of the prior art scroll compressor.

Figure 2A shows the inventive scroll compressor.

Figure 2B shows a top view of one portion of this invention.

**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

[0008] A scroll compressor 20 is illustrated in Figure 1A, and is as known in the art. A non-orbiting scroll 22 has a spiral wrap 23 extending from a base. An orbiting scroll 24 has a spiral wrap 25 extending from its base 27. The orbiting scroll 24 further has a boss 26 extending away from its base 27 in an opposed direction to the wrap 25.

[0009] Refrigerant is compressed in the compression chambers defined between the wraps 23 and 25 and delivered to a discharge port 28. Refrigerant enters the compressor housing through a section port 30.

[0010] The motor 32 drives a shaft 34 to rotate. The shaft 34 includes an eccentric pin 36 which is received within a slider block 38. The slider block sits within the boss 26, and between the boss and the eccentric pin 36. When the shaft 34 is caused to rotate, the eccentric pin moves the slider block, and hence the orbiting scroll 24 to orbit. An anti-rotation coupling 37 ensures that the orbiting scroll will not rotate, but instead orbits.

[0011] One problem with this prior art scroll compressor can be appreciated from Figures 1B and 1C. The slider block 38 typically has an opening for receiving the eccentric pin 36 that is much larger than the pin 36. A flat surface 54 on the eccentric pin 36 engages a flat surface 52 in the bore in the slider block 38. When the motor is driven in a forward direction of rotation, forces within the scroll compressor cause the flat surface 54 to come into contact with the flat surface 52. When these forces are removed, the two can move out of contact with each other.

[0012] Figure 1C is a view generally perpendicular to the Figure 1B view. As shown, the "flat" surface 54 is not truly flat, but actually has a slight barrel shape. With this prior art, there is sometimes a problem in that the slider block 38 has migrated vertically upwardly, and contacted the rear surface 60 of the base 27. This is undesirable.

[0013] The present invention is shown in Figures 2A and 2B. In Figures 2A and 2B, the driveshaft 34 is provided with an eccentric pin 136 that is received within a slider block 138. The slider block 138 is provided with a notch 142 at a vertically uppermost surface. The eccentric pin 36 is provided with a stop 140 at its vertically

uppermost surface. Now, when the slider block 138 begin to migrate upwardly toward the surface 60, the stop 140 will prevent further movement. Notably, the outer dimension of the eccentric pin at the stop 140 is shown at B. This dimension is less than the dimension of the bore within the slider block 138 shown at A. In this manner, the slider block can be simply dropped onto the eccentric pin. However, when the scroll compressor is driven, and the flat surface 54 is forced against the flat surface 52, the stop will move over and be above the notch 142. As can be appreciated from Figure 2B, the notch 142 extends for a greater length than does stop 140. This is to remove any alignment problems as the flat surfaces come into engagement.

**[0014]** In this manner, the present invention provides a simple and effective method of preventing a slider block from contacting the rear of a base of an orbiting scroll. While a preferred embodiment of this invention has been disclosed, a worker of ordinary skill in the art would recognize that certain modifications would come within the scope of this invention. For that reason, the following claims should be studied to determine the true scope and content of this invention.

### Claims

1. A scroll compressor comprising:
  - a first scroll member having a base and a generally spiral wrap extending from said base;
  - a second scroll member having a base and a generally spiral wrap extending from its base, said spiral wraps of said first and second scroll members interfitting to define compression chambers;
  - a driveshaft and a motor for rotating said driveshaft, said driveshaft having an eccentric pin extending from one end of said driveshaft;
  - said second scroll member being caused to orbit by said eccentric pin, and said second scroll member having a boss extending in an opposed direction from said base compared to said spiral wrap, said boss including an opening receiving a slider block and said eccentric pin with said slider block being intermediate said eccentric pin and said boss, and said boss having an upper surface defining a rear surface of said base of said second scroll member; and
  - stop structure on said eccentric pin for selectively contacting a stop surface on said slider block and preventing movement of said slider block toward said rear surface.
2. The scroll compressor set forth in claim 1, wherein said eccentric pin has a drive flat surface which is selectively moved into engagement with a mating flat surface within a bore in said slider block.
3. The scroll compressor as set forth in claim 2, wherein said flat surface on said eccentric pin has a slight barrel shape.
4. The scroll compressor as set forth in claim 1, wherein said stop includes a single stop extending beyond the nominal surface of said eccentric pin, and said stop surface in said slider block includes a notch in an extreme surface of said slider block which selectively contacts said stop.
5. The scroll compressor as set forth in claim 1, wherein an outermost dimension on said eccentric pin including said stop structure is less than an inner dimension of a bore in said slider block, such that said slider block can be moved over said eccentric pin.
6. The scroll compressor as set forth in claim 1, wherein said eccentric pin and said slider block have mating drive surfaces that are brought into contact when said second scroll member is caused to orbit in a forward direction, and a length of said stop structure on said slider block measured along said drive surface is greater than a length of said stop structure on said eccentric pin measured along said drive surface.
7. A scroll compressor comprising:
  - a first scroll member having a base and a generally spiral wrap extending from said base;
  - a second scroll member having a base and a generally spiral wrap extending from its base, said spiral wraps of said first and second scroll members interfitting to define compression chambers;
  - a driveshaft and a motor for rotating said driveshaft, said driveshaft having an eccentric pin extending from one end of said driveshaft;
  - said second scroll member being caused to orbit by said eccentric pin, and said second scroll member having a boss extending in an opposed direction from said base compared to said spiral wrap, said boss including an opening receiving a slider block and said eccentric pin with said slider block being intermediate said eccentric pin and said boss, and said boss having an upper surface defining a rear surface of said base of said second scroll member, said eccentric pin has a drive flat surface which is selectively moved into engagement with a mating flat surface within a bore in said slider block; and
  - a stop on said eccentric pin for selectively contacting a notch on said slider block and preventing movement of said slider block toward said rear surface, said stop includes a single stop extending beyond a nominal surface of said eccentric pin.

8. The scroll compressor as set forth in claim 7, wherein said flat on said eccentric pin has a slight barrel shape.

9. The scroll compressor as set forth in claim 7, wherein an outermost dimension on said eccentric pin including said stop structure is less than an inner dimension of a bore in said slider block, such that said slider block can be moved over said eccentric pin.

10. The scroll compressor as set forth in claim 7, wherein said eccentric pin and said slider block have mating drive surfaces that are brought into contact when said second scroll member is caused to orbit in a forward direction, and a length of said stop structure on said slider block measured along said drive surface is greater than a length of said stop structure on said eccentric pin measured along said drive surface.

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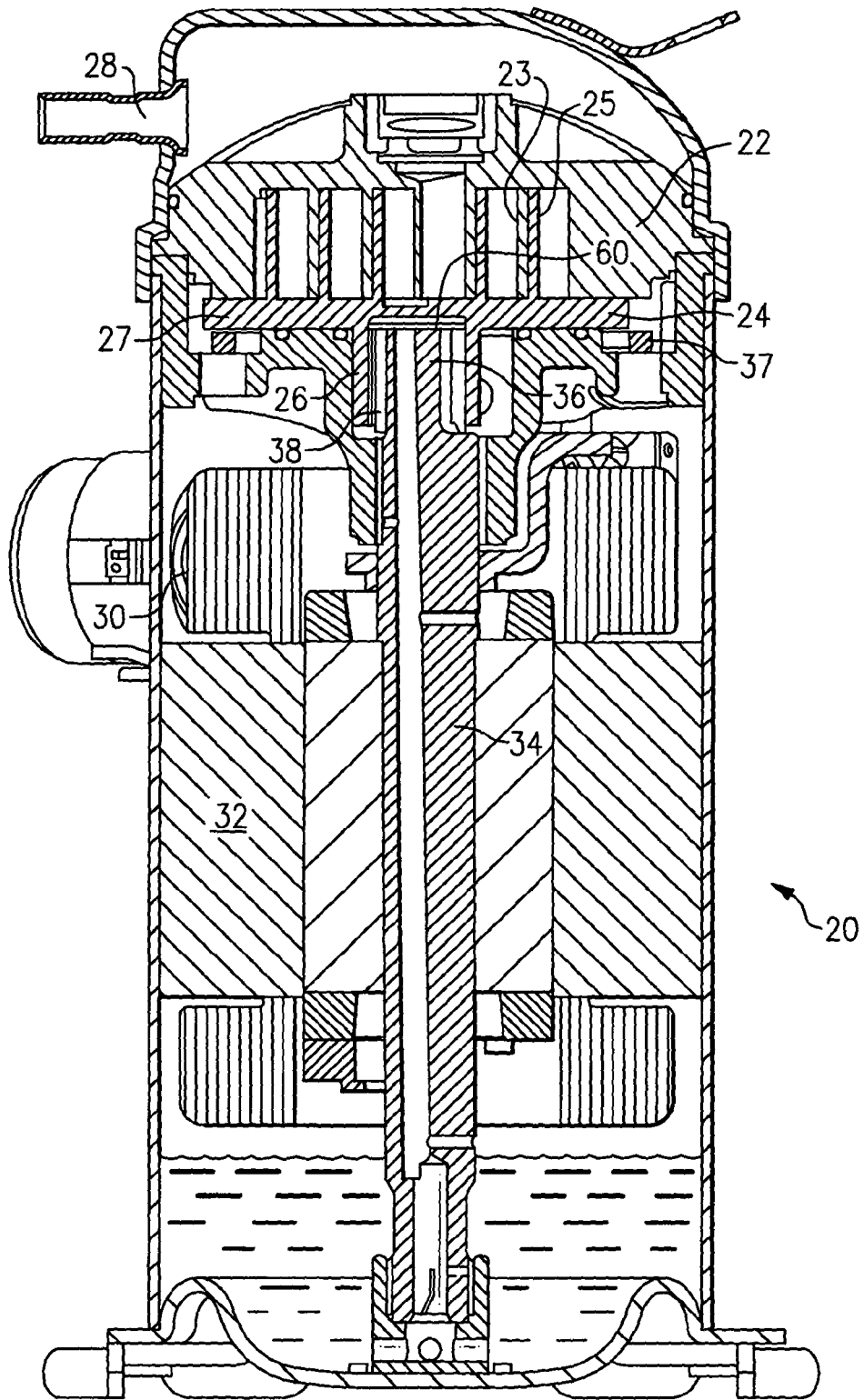
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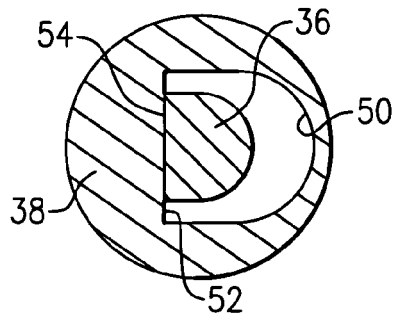
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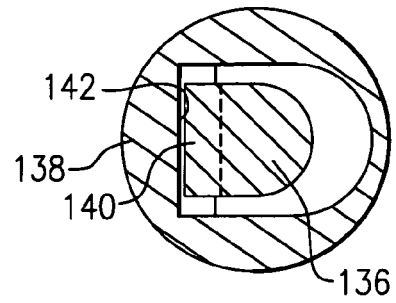
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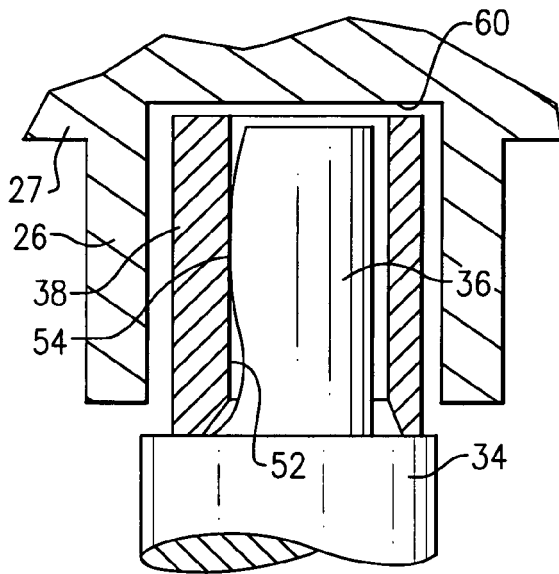
**FIG. 1A**  
Prior Art



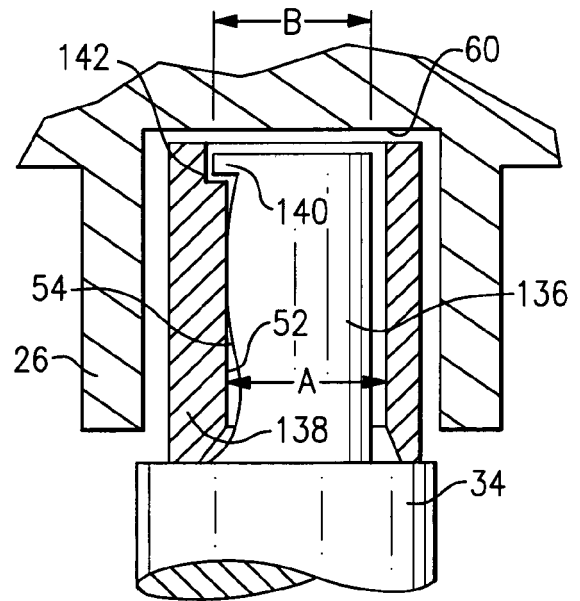
**FIG. 1B**  
Prior Art



**FIG. 2B**



**FIG. 1C**  
Prior Art



**FIG. 2A**



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
			F04C F01C
The present search report has been drawn up for all claims			
Place of search <b>Munich</b>		Date of completion of the search <b>26 September 2007</b>	Examiner <b>Descoubes, Pierre</b>
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 07 25 1632

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

26-09-2007

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