

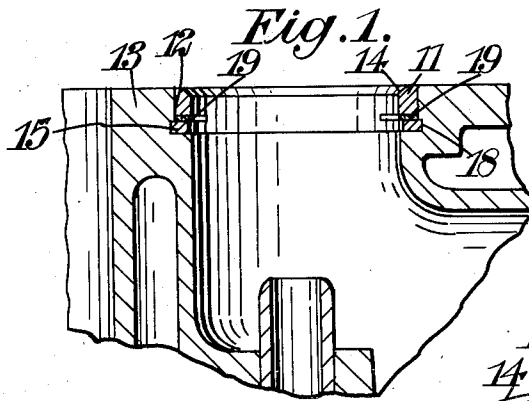
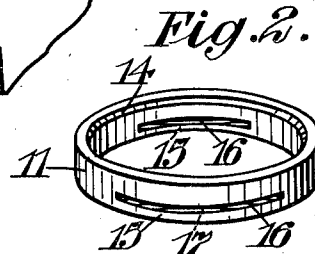
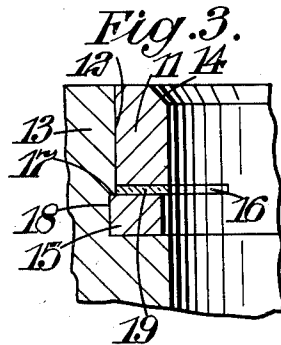
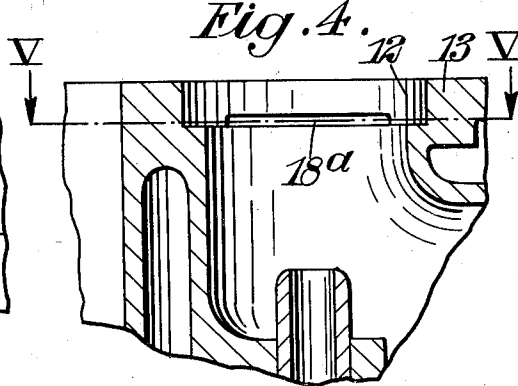
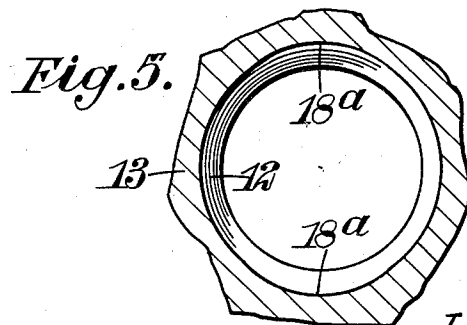
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LOCKING METAL INSERTS INTO CAVITIES

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LOCKING METAL INSERTS INTO CAVITIES

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10 Claims. (Cl. 123—188)

This invention relates to the locking in position of a metal insert in a cavity of a structure—and particularly to the locking of seating rings (for valves) in cavities formed in the cylinder blocks or cylinder heads of internal-combustion engines—by arranging for the insert to be a force fit in the cavity so that an integral radially-flexible portion of its periphery will spring radially into a recess in the cavity when the insert is forced axially into the cavity. The main object is to provide an improved insert of this kind which will be inexpensive to manufacture and which can be very securely locked in position.

According to the main feature of the invention, the radially-flexible portion of the insert is separated from the main portion thereof except at its ends.

In a preferred arrangement the insert, which is initially unstepped externally, is provided with a deep or through slit or slits transverse to the main axis of the insert and extending only partly round the periphery of the insert to leave a sharp-edged, relatively-flexible strip part which can expand radially into the recess in the cavity when the insert is forced axially therein. Preferably at least two such strip parts are used, these being symmetrically arranged and co-planar, whilst the corresponding recess formed in the cavity may be a single continuous one or constituted by several recesses. Furthermore, with a view to preventing the strip part from becoming deformed beyond its elastic limit whilst the insert is being forced into position, use may be made of a brass or other packing arranged adjacent to it, the packing preferably extending radially outwardly not quite as far as the periphery of the strip part.

In the accompanying drawing:—

Figure 1 is a sectional elevation of a part of a cylinder block of an internal-combustion engine with a valve-seating ring adapted according to the invention, the parts being much exaggerated for the sake of clearness;

Figure 2 is a perspective view of the valve-seating ring apart from the cavity in the cylinder block;

Figure 3 is an enlarged fragmentary view corresponding to that of Figure 1;

Figure 4 is a part-sectional elevation showing the manner in which the cavity in the cylinder block may alternatively be adapted, the valve-seating ring being omitted in this figure; and

Figure 5 is a cross-section taken on the line V—V of Figure 4.

Like numerals indicate like parts throughout the drawing.

In the arrangement illustrated, for locking an insert in the form of a valve-seating ring 11 to a cylindrical cavity 12 formed in a cylinder block 13, the ring 11, which is of circular periphery, the external surface of its walls being truly cylindrical and not tapered, is a force fit in the cavity 12, having an overall diameter of between about 0.18 millimetres and 0.25 millimetres (dependent upon the size of the ring 11) greater than the bore of the cavity 12. The ring 11 is provided near its inner end, away from its machined seating face 14, with a pair of oppositely-arranged strip parts 15, 15 which in this case are formed by the provision of the saw-cut or like slits 16, 16 extending right through the seating ring and at right-angles to its axis. These slits 16 are sufficiently near the bottom of the ring for the strip parts 15 to be slightly flexible compared with the rest of the ring, and in manufacture care should preferably be taken that the upper edges 17 of the strip parts 15 are sharp.

The cavity 12 in the cylinder block is provided with an undercut recess 18, which is assumed in Figure 1 to be continuous, and the upper edge of this recess is preferably also sharply defined.

In use the ring 11 is forced axially into the cavity 12 until the strip parts 15 spring radially into the recess 18, whereupon the ring 11 becomes securely locked in position by the engagement of the sharp edges 17 against the sharp-edged wall of the recess 18. The dimensions of the recess 18 in a direction parallel to the axis of the seating ring should preferably be slightly greater than the corresponding dimension of the strip parts 15.

To obviate the tendency for the strip parts 15 to become permanently deformed while the ring 11 is being inserted into the cavity 12, use may be made of brass or other packings 19, 19, as shown, the outer edges of the packings preferably not extending radially quite to the outer edges of the slits 16. The packings 19 may be a relatively loose fit in the slits 16.

In the modification illustrated by Figures 4 and 5, use is made of two oppositely-disposed undercut recesses 18a, 18a in the cavity 12 of the cylinder block of a size to receive the strip parts 15, instead of a continuous recess such as 18 being used.

By means of the invention, the secure locking of an insert, such as a valve-seating ring, can be effected in a very simple and inexpensive manner.

Although reference has been made above particularly to the locking of a valve-seating ring, it

should be understood that the invention can be applied to the locking of cylinder liners, bushes, core-plugs, or other circular or other elements to internal-combustion engines or other structures.

What I claim as my invention and desire to secure by Letters Patent of the United States is:—

1. A metal insert, which is a force fit in a cavity of a structure in which the insert is to be secured, the structure having a recess communicating with said cavity, the insert having an integral radially-flexible peripheral portion which can spring radially into said recess when the insert is forced axially into said cavity, and said peripheral portion being separated from the main portion of the insert except at its ends.

2. A metal insert, which is a force fit in a cavity of a structure in which the insert is to be secured, the structure having a recess communicating with said cavity, the insert having an integral radially-flexible peripheral portion which can spring radially into said recess when the insert is forced axially into said cavity, and the insert also having a deep slit in it along one edge of said peripheral portion.

3. A metal annular insert, which is a force fit in a cavity of a structure in which the insert is to be secured, the structure having a recess communicating with said cavity, the insert having an integral radially-flexible peripheral portion which can spring radially into said recess when the insert is forced axially into said cavity, and the insert also having a through slit in it along one edge of said peripheral portion.

4. A metal insert, which is a force fit in a cavity of a structure in which the insert is to be secured, the structure having a recess communicating with said cavity, the insert having at one end an integral radially-flexible peripheral portion which can spring radially into said recess when the insert is forced axially into said cavity, and said peripheral portion being separated from the main portion of the insert, except at its ends, by a slit substantially parallel to the said one end of the insert.

5. A metal annular insert, which is a force fit in a cavity of a structure in which the insert is to be secured, the structure having a recess communicating with said cavity, the insert having an integral radially-flexible peripheral portion which can spring radially into said recess when the insert is forced axially into said cavity, and

the insert also having a through slit along one edge of said peripheral portion and in a plane at right-angles to the axis of the insert.

6. A metal insert, which is a force fit in a cavity of a structure in which the insert is to be secured, the structure having a recess communicating with said cavity, the insert having an integral radially-flexible peripheral portion which can spring radially into said recess when the insert is forced axially into said cavity, and the insert having a deep slit in it along one edge of said peripheral portion leaving said peripheral portion sharp-edged adjacent said slit.

7. A metal insert, which is a force fit in a cavity of a structure in which the insert is to be secured, the structure having a recess communicating with said cavity, the insert having an integral radially-flexible peripheral portion which can spring radially into said recess when the insert is forced axially into said cavity, the insert having a slit in it along one edge of said peripheral portion and said slit having in it a packing adapted to prevent axial deformation of said peripheral portion during the forcing of the insert into said cavity.

8. A metal annular insert, which is a force fit in a cavity of a structure in which the insert is to be secured, the structure having a recess communicating with said cavity, the insert having an integral radially-flexible peripheral portion which can spring radially into said recess when the insert is forced axially into said cavity, the insert having a through slit in it along one edge of said peripheral portion and said slit having in it a packing of arcuate shape.

9. A metal annular insert, which is a force fit in a cavity of a structure in which the insert is to be secured, the structure having a recess communicating with said cavity, the insert having an integral radially-flexible peripheral portion which can spring radially into said recess when the insert is forced axially into said cavity, the insert having a through slit in it along one edge of said peripheral portion, and said slit having in it a brass packing which does not extend radially outwardly as far as the periphery of the insert.

10. A metal annular insert, as claimed in claim 3, having a pair of similar, oppositely-arranged, co-planar peripheral portions.

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