

Dec. 19, 1933.

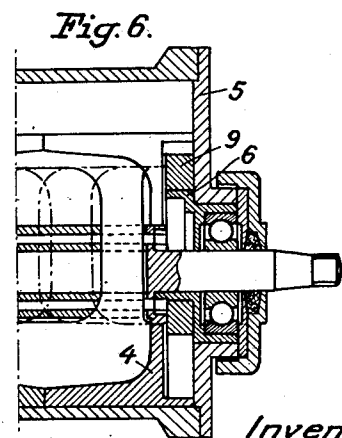
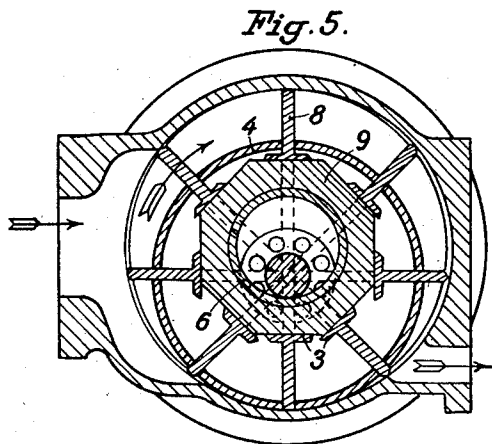
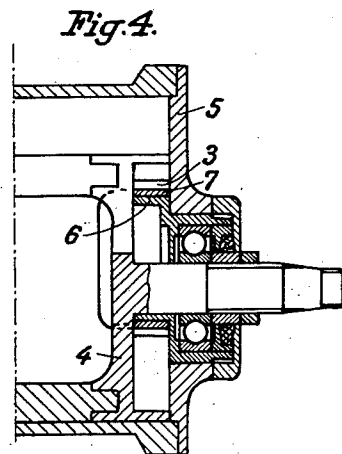
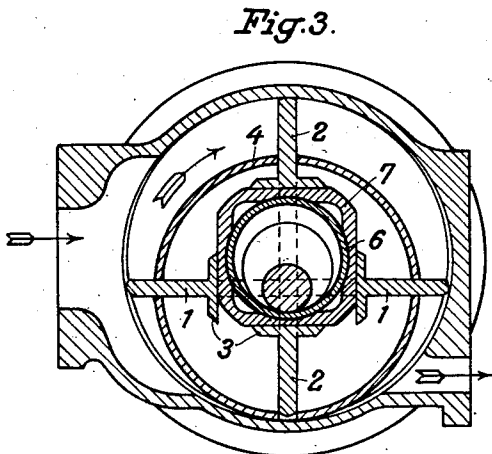
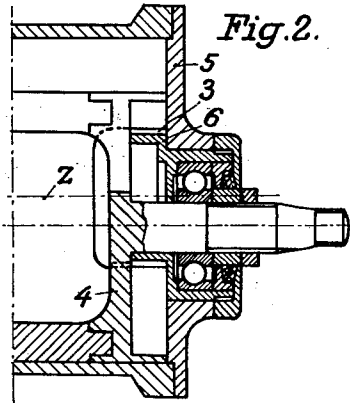
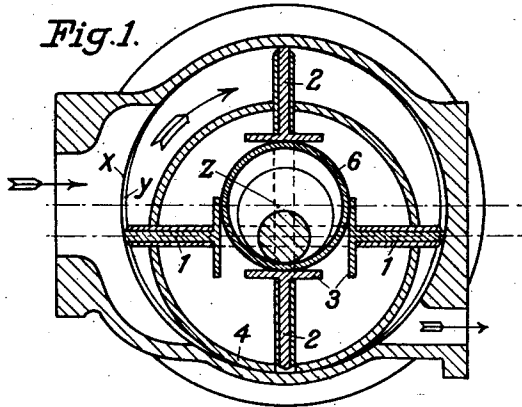
A. ZOLLER

1,940,384

ROTARY COMPRESSOR

Original Filed April 18, 1928

4 Sheets-Sheet 1



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*Arnold Zollner*

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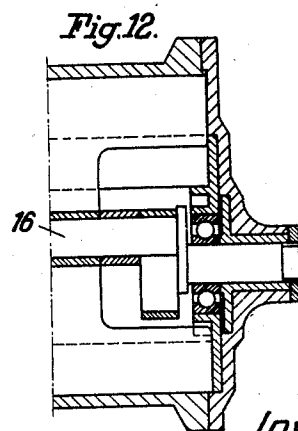
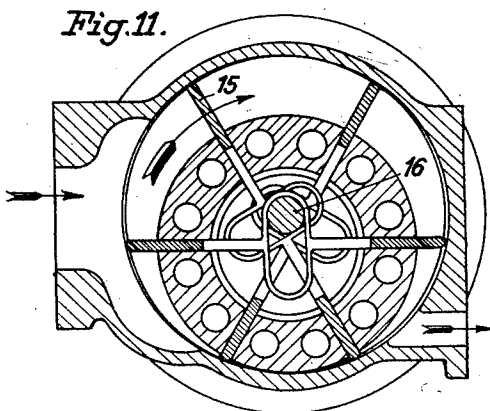
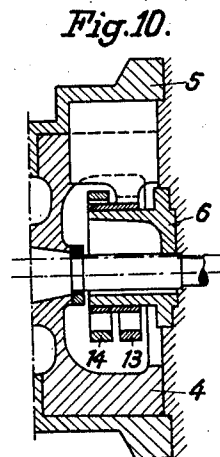
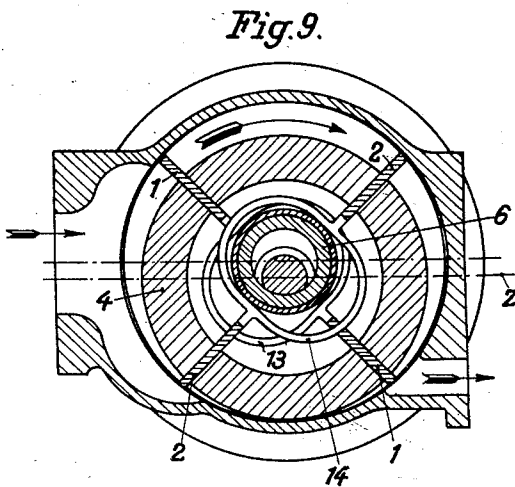
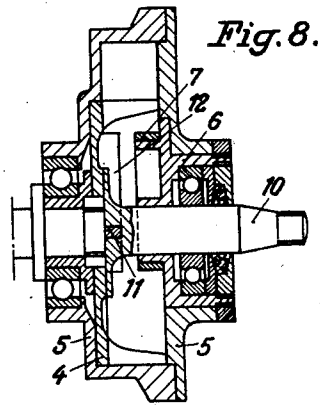
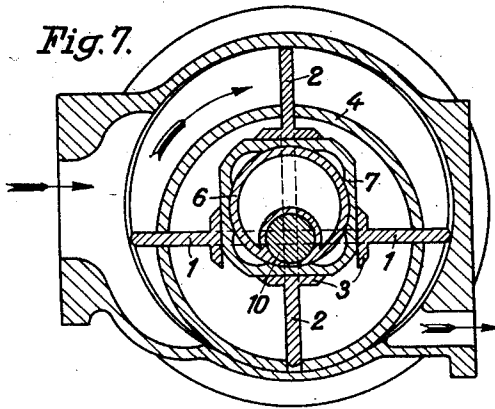
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Fig. 13.

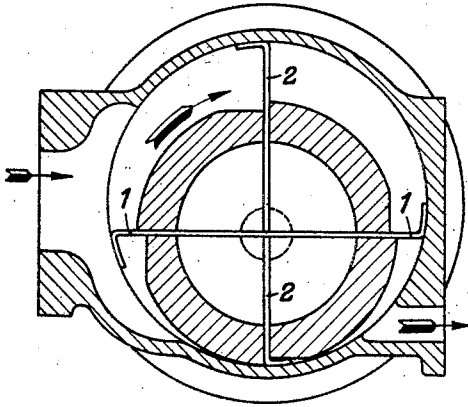


Fig. 14.

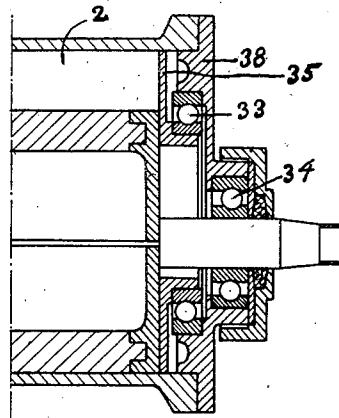


Fig. 15.

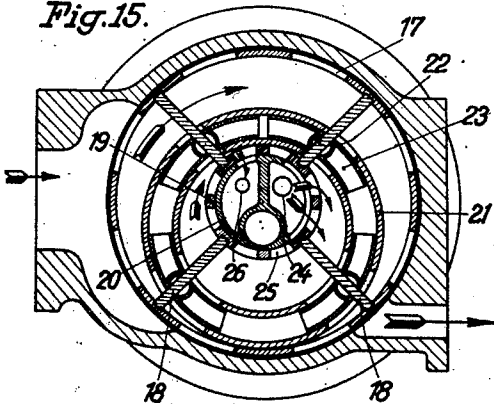


Fig. 16.

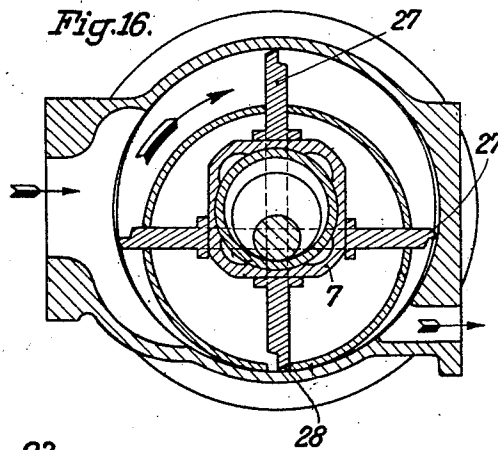
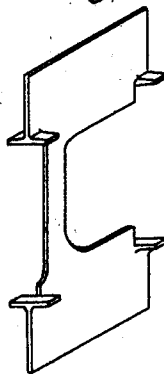


Fig. 23.



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*Fig.17.*

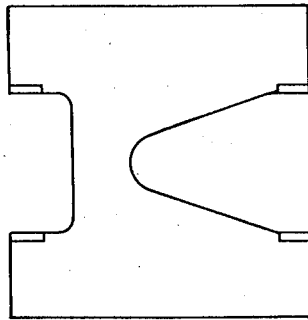


*Fig.18.*

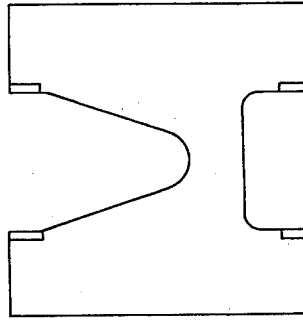


*Fig.19.*

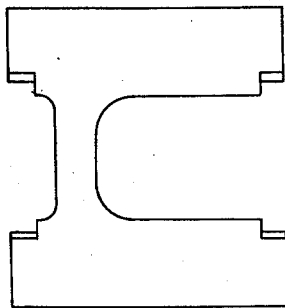


*Fig.20.*

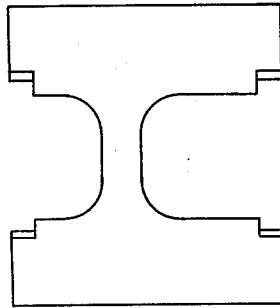


*Fig.21.*

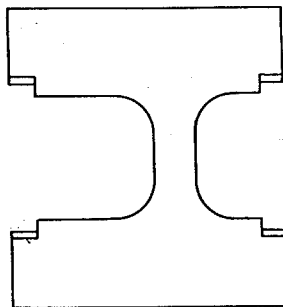
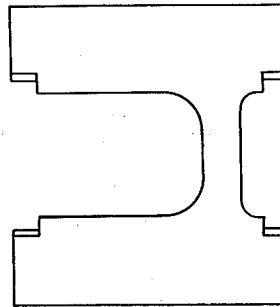


*Fig.22.*



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## UNITED STATES PATENT OFFICE

1,940,384

## ROTARY COMPRESSOR

Arnold Zoller, Berlin, Germany

Application April 18, 1928, Serial No. 271,035,  
and in Germany May 7, 1927. Renewed April  
5, 1932

3 Claims. (Cl. 230—153)

This invention relates to a rotary compressor for use with internal-combustion engines and the like and of the kind wherein vanes which extend diametrically through a rotary drum are radially displaceable in the latter, the vanes being controlled by eccentrically arranged guide elements and adapted to abut with their outer ends against the inner periphery of a casing within which the drum rotates, the casing being concentric with the guide elements.

Owing to the eccentric arrangement of the guide elements relative to the drum, the ends of the vanes do not follow a truly cylindrical path, and it has therefore been proposed to give the casing a slightly oval form. The path of the vanes, however, is not oval but conchoidal, and the oval shape of the casing does not therefore ensure a continuous uniform contact of the vanes with the periphery of the casing.

According to the present invention the casing is bored strictly in accordance with the path of the ends of the vanes, the latter being, moreover, unlike known arrangements, controlled by one or two round or angular guide elements which are common to all the vanes.

Several forms of construction of the compressor are illustrated in the accompanying drawings,

Figs. 1 and 2 representing a cross-section and an axial section respectively of one form,

Figs. 3 and 4, similar views of a second form, Figs. 5 and 6, corresponding views of a third form,

Figs. 7 and 8, views of a fourth form,

Figs. 9 and 10, views of a fifth form,

Figs. 11 and 12, views of a sixth form,

Figs. 13 and 14, views of a seventh form,

Fig. 15 is a cross-section of an eighth form,

Fig. 16, a view illustrating a method of boring out the compressor casing,

Figs. 17 to 22 are plan views of different forms of vanes, and

Fig. 23, a perspective view of one of the vanes.

The apparatus comprises a cylindrical casing 5 within which a rotary drum 4 is arranged in an eccentric position. The drum is fitted with loosely guided vanes which, according to the invention, extend diametrically through the drum for co-operation with the casing 5. In the construction according to Figs. 1 and 2 there are two vanes 1 and 2 arranged at right angles to each other and fitted with shoes 3 whereby they are guided on rings 6 secured to the end walls of the casing 5 in a central position. The guides maintain the vanes parallel to the axis  $z$  of the

casing. The outer ends of the vanes follow the path  $x$  which in two positions slightly deviates from the circle  $y$ . The vanes are provided with incisions, as shown by way of example in Figs. 17 to 23, so as to enable them to clear one another.

Figs. 3 and 4 show the two vanes formed integrally with the shoes 3, and the shoes are guided on the flat faces of collars 7 which are loosely mounted on the guide rings 6.

A similar arrangement is shown in Figs. 5 and 6 wherein four vanes are employed which are guided on octagonal collars 9 rotatably mounted on the guide rings 6. The vanes may have the forms shown in Figs. 19 to 22.

The arrangement of Figs. 7 and 8 is similar to that of Figs. 3 and 4, but the construction is shortened and only one set of guide elements 6 and 7 is employed. The vanes 1 and 2 are inserted into the drum 4 from one side, whereupon the driving shaft 10, which is flanged and provided with two grooves 11 which intersect each other at right angles, is secured to the drum by means of keys 12.

In the construction according to Figs. 9 and 10 the vanes are formed with elongated loops 14 whereby they are guided on the rings 6, the shoes being omitted.

Figs. 11 and 12 show a similar arrangement with three vanes 15 the loops of which embrace and are guided on a shaft 16 which is concentric with the casing 5.

In the construction according to Figs. 13 and 14 the vanes 1 and 2 are slidable in rotor 28 and the edges thereof are bent over to form lips which are adapted to bear resiliently against the casing 5. It is evident that the resiliency of the lips will remain constant irrespective of the speed of the rotor. The rotor is rotatably mounted in the compressor end-plate 38 by a bearing 34 and is provided with a sealing member 35, having a sliding contact with the rotor and rotatably mounted in the end-plate by bearing 33.

Fig. 15 is a cross-section of a two-stage compressor with a single rotor, an inner compression space being provided in addition to the usual outer one. The two stages work in parallel. By this arrangement the efficiency of the compressor will be increased by about 70%, the outer dimensions remaining the same. An outermost rotary drum 17 is rigidly connected by means of the vanes 18 with the innermost drum 19. Both drums rotate about guide rings 20 which are concentric with the compressor casing. The intermediate drum 21 is mounted on the end walls of

the casing in an eccentric position and provided with pins 22 which are rotatably mounted in the drum in segments 23.

The rotor may be driven either through the medium of the intermediate drum 21 or through the medium of one of the drums 17 and 19. The outermost drum 17 may be omitted. The inner compressor receives the air from lateral apertures 24 and slits 25 and discharges the air through lateral apertures 26.

Fig. 16 illustrates the method of boring out the casing. The vanes are replaced by boring cutters 27 which have the same form as the vanes and are provided with cutting edges where they contact with the walls 28 of the compressor casing. While the rotor is in motion, the cutters are compelled to move in the same manner as the vanes, and the casing will thus be bored out in exact agreement with the path pursued by the vanes.

I claim:

1. A rotary compressor of the character described comprising a casing having a conchoidal bore, a rotary drum arranged eccentrically within said casing, four equally spaced vanes guided in and carried diametrically through said drum for co-operation with the casing, centrally disposed, circular guides on the casing, octagonal rollers rotatably mounted on the guides, and shoes on the vanes slidably supporting the latter on said collars, said vanes having webs passing through the center of said drum, said webs provided with mating cut-out portions centrally located therein,

for permitting relative movement of said vanes.

2. A rotary compressor comprising a casing having a conchoidal bore, a rotary drum arranged eccentrically with respect to the casing, four equally spaced vanes slidably radially in said drum having intersecting webs passing through the axis of said drum, said vanes having centrally located cut-out portions, a stationary guide member arranged eccentric to the drum in a manner to force the vanes to follow the conchoidal contour of the casing, and an octagonal collar rotatably mounted on the guide and having its faces in sliding contact with the lateral ends of the vanes.

3. A rotary compressor comprising a casing having a conchoidal bore, a rotary drum eccentrically mounted in the casing, said drum having radial intersecting slots therethrough, four equally spaced slidably vanes in the slots cooperating therewith for radially guiding the vanes in the drum, a circular guide concentrically mounted on the end wall of the casing, an octagonal collar rotatable on the guide cooperating with the vanes to cause their extremities to travel in a conchoidal path, said collar having each pair of its opposite sides parallel and at right angles to one of said vanes and said collar being arranged to slidably contact the lateral ends of said vanes for supporting the same.

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