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B. DICK ET AL
ROTARY COMPRESSOR
Filed June 14, 1939

2,251,784

FIG. 1.

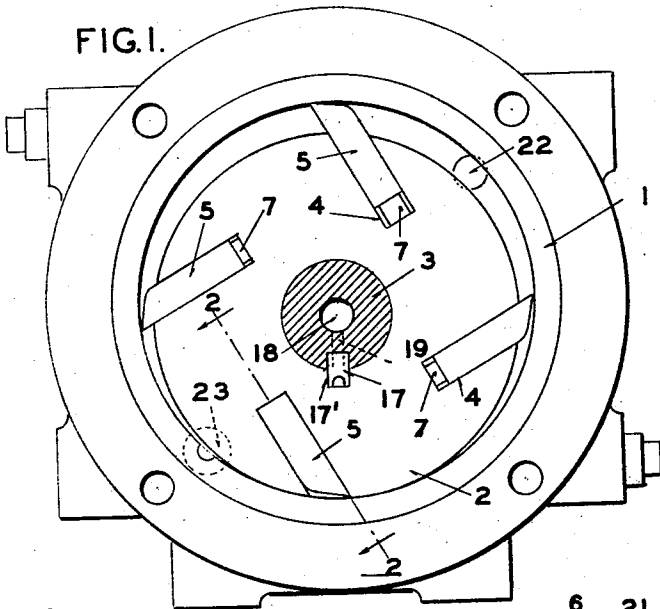


FIG. 3.

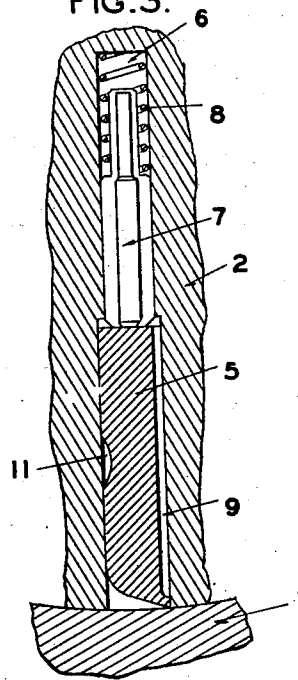


FIG. 2.

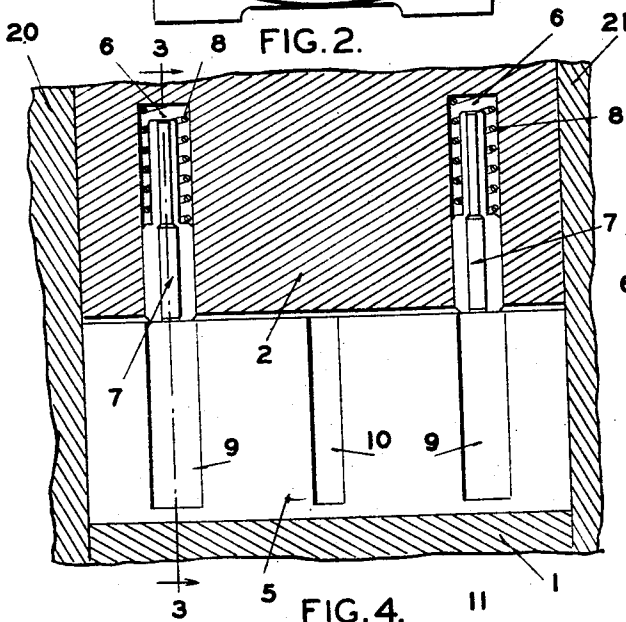


FIG. 5.

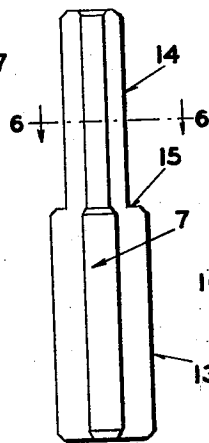


FIG. 6.

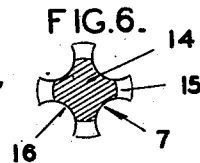
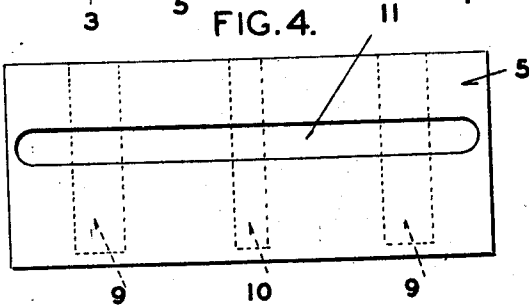


FIG. 4.



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ROTARY COMPRESSOR

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Application June 14, 1939, Serial No. 279,101

6 Claims. Cl. 230—152)

Our invention relates to rotary compressors and more particularly to improvements in the blades and related structure thereof.

One of the objects of our invention is to provide an improved blade construction for a rotary compressor which will permit efficient operation and lubrication thereof during either constant or variable speed of the rotor.

Another object of our invention is to provide improved means in the form of a pushpin and spring for maintaining the blade of the compressor in constant engagement with the stator wall and for also permitting the blade to reciprocate freely in its slot in the rotor.

Other objects of our invention will become apparent from the following description taken in connection with the accompanying drawing in which Figure 1 is a side view of a rotary compressor in which is embodied our invention, said compressor being shown with an end plate removed; Figure 2 is an enlarged cross-sectional view taken on the line 2—2 of Figure 1, showing the forward face of the blade and the pushpins; Figure 3 is a cross-sectional view taken on the line 3—3 of Figure 2; Figure 4 is a view of the rear surface of the blade; Figure 5 is an enlarged view of the pushpin; and Figure 6 is a cross-sectional view of the pin taken on the line 6—6 of Figure 5.

Referring to the drawing in detail, numeral 1 indicates the stator of the compressor and 2 the rotor which is eccentrically mounted therein and driven by a shaft 3 journaled in the end plates in a well-known manner. The rotor is shown as provided with four blade receiving slots 4 within each of which is mounted our improved blade 5, the rotor also being provided with two bores 6 communicating with the bottom of each slot. Within each bore is our novel pushpin 7 for maintaining the outer edge of each blade biased into engagement with the inner surface of the rotor under the action of a coil spring 8 associated with the pushpin and the bore.

As best shown in Figures 2, 3, and 4, each blade is provided on its forward face with grooves 9 in alignment with the bore 6 when the blade is in the slot. These grooves extend from the bottom edge of the blade to a point closely adjacent the outer edge of the blade which cooperates with the inner surface of the stator. The forward surface of the blade is provided with an additional groove 10 between the grooves 9 and this groove also extends from the bottom edge of the blade to a point closely adjacent the top edge. The rear surface of the blade, as best

shown in Figure 4, is provided with a longitudinally extending groove 11 which extends from a point closely adjacent one end of the blade to a point closely adjacent the other end of the blade. All the grooves in the blade are quite shallow in depth and do not communicate with each other by means of any passages extending through the body of the blade. The outer edge of the blade has a bevel portion 12 in order to reduce the surface which contacts the inner surface of the stator.

The pushpins 7 which are positioned in bores 6 each have a main portion 13 of the same diameter as the diameter of the bore and a reduced portion 14, there being a shoulder 15 formed between the portions. The reduced portion 14 extends into the coil spring 8 and is of substantially the same diameter as the inner diameter of the coil. The spring 8 abuts the shoulder 15 at one end and the bottom of the bore 6 at its other end and the outer diameter of the spring is of substantially the same diameter as the bore. In order to prevent any fluid from being trapped in the bore and thus stopping reciprocal movement of the pin, the pin is provided with a plurality of circumferentially spaced grooves 16 which extend from one end of the pin to the other, the grooves being of greater depth in the main portion 13 due to its larger diameter than in the reduced portion 14 of the pin.

The rotor of the compressor is secured to the drive shaft 3 by means of a key 17 which cooperates with a keyway 17' extending the entire length of the rotor. Lubricant is supplied to the compressor by means of a central passage 18 in the shaft and a cross passage 19 communicating with the keyway whereby fluid is free to flow to both ends of the compressor and then to the moving parts along the end plates 20 and 21 (Figure 2). The inlet 22 of the compressor is carried by the end plate 20 and the outlet 23 of the compressor is carried by the end plate 21, said outlet being shown in dotted lines in Figure 1.

The compressor is freely lubricated with oil and this oil is in contact with the relatively moving surfaces of the compressor including the stator, the rotor, the blades, and the pushpins. The amount of oil in the compressor is sufficient to fill bores 6 for the pushpin. As the rotor rotates within the stator, the blades will be held outwardly in engagement with the surface of the stator by the action of the pushpins and the coil springs but will be free to reciprocate in their slots. Oil will not be trapped in the bottom of the blade slots, as the grooves 9 and 10 in the

forward face of the blade permit oil to flow in and out of the bottom of the slot. Also, the reciprocable movement of the pins is not retarded or prevented by any oil being trapped between said pins and the bottom of the bores, as grooves 16 of the pin permit the fluid to flow in and out of the bottom of the bores into the bottom of the slots. By having the grooves 16 in each pin extend from one end of the pin to the other, the coil spring will not block the free flow of the oil in and out of the bottom of bore 6. The longitudinal groove 11 in the rear surface of the blade facilitates the lubrication of this surface as the groove acts as a recess to collect oil which is on the rear surface of the blade. It is also to be noted that because of the particular pushpin construction, the reduced portion 14 acts as a guide for the spring and the main portion 13 confines the spring within the bore under all conditions. Thus, if the spring should become broken, there is no danger of any parts coming out of the bore and causing damage to the blades or other parts of the compressor.

Being aware of the possibility of modifications in the particular structure herein described without departing from the fundamental principles of our invention, we do not intend that its scope be limited except as set forth by the appended claims.

Having fully described our invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. In a rotary compressor, a stator having a chamber therein, a rotor eccentrically mounted in the stator chamber and provided with a blade slot and a bore closed at its inner end communicating at its other end with the bottom of the slot, a blade reciprocable in said slot and engaging the stator, said blade being provided with a groove in its forward face communicating with the bore and stator chamber when the blade is in operative position in the slot, a pushpin in the bore separate from the blade and having a portion guided by the bore and a reduced portion in the bottom part of the bore providing a shoulder, said pin being provided with a longitudinal groove extending throughout its length, and a coil spring surrounding the reduced portion and interposed between the shoulder and the bottom of the bore to thereby cause the pin to be forced into abutting engagement with the bottom edge of the blade.

2. In a rotary compressor, a stator having a chamber therein, a rotor eccentrically mounted in the stator chamber and provided with a blade slot and a bore communicating with the bottom of the slot, a blade reciprocable in said slot and engaging the stator, said blade being provided with a groove in its forward face in alignment with the bore and communicating with said stator chamber when the blade is in operative position in the slot, means comprising a pushpin in the bore and a coil spring abutting the bottom of the bore and acting on the pin for biasing the blade into engagement with the stator, and means providing a passage communicating with the bottom of the bore and the groove in the blade for

preventing fluid from being trapped in the bottom of the bore below the pin.

3. In a rotary compressor, a stator having a chamber therein, a rotor eccentrically mounted in the stator chamber and provided with a blade slot and two spaced bores communicating with the bottom of the slot, an imperforate blade reciprocable in said slot and engaging the stator, said blade being provided with two grooves in its forward face in alignment with the bores and communicating with said stator chamber when the blade is in operative position in the slot and with a longitudinal groove in its rear face so spaced from the top edge as to lie in the slot in all operating positions of the blade, pushpins in the bores and each having a reduced inner end portion providing a shoulder, each pin also being provided with a plurality of circumferentially spaced longitudinal grooves extending throughout its length, and a coil spring surrounding the reduced portion and interposed between the shoulder and the bottom of the bore to thereby cause the pin to be forced into abutting engagement with the bottom edge of the blade.

4. A single piece blade for reciprocable mounting in a slot of a compressor rotor and for engagement with the stator, said blade being imperforate and having its forward face provided with a plurality of spaced grooves open throughout their length and each extending from the bottom edge of the blade to a point closely adjacent the top edge which engages the stator of the compressor to thus permit the grooves to be exposed except when the blade is completely in the slot, and said blade also being provided with a second groove in its rear surface extending from a point closely adjacent one side edge to a point closely adjacent the other side edge and said second groove being so spaced from the top edge that it will be positioned in the slot of the rotor in all operating positions of the blade.

5. A pushpin for mounting in a bore of a compressor rotor extending below a blade slot and adapted to cooperate with a coil spring which has one end abutting the bottom of the bore, said pin having a main portion of the same diameter as the bore and an integral extension of reduced diameter for receiving said coil spring and providing a shoulder for the other end of the spring to abut, said pin also being provided with circumferentially spaced grooves in said main portion of the pin.

6. A pushpin for mounting in a bore of a compressor rotor extending below a blade slot and adapted to cooperate with a coil spring which has one end abutting the bottom of the bore, said pin having a main portion of the same diameter as the bore and an integral extension of reduced diameter for receiving said coil spring and providing a shoulder for the other end of the spring to abut, said pin also being provided with a plurality of circumferentially spaced grooves extending the entire length of the pin.

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