Jan. 27, 1953 L. B. MILLER 2,626,530

RATCHET STRUCTURE FOR RING COMPRESSORS

Filed Dec. 30, 1948

Fig. 1.

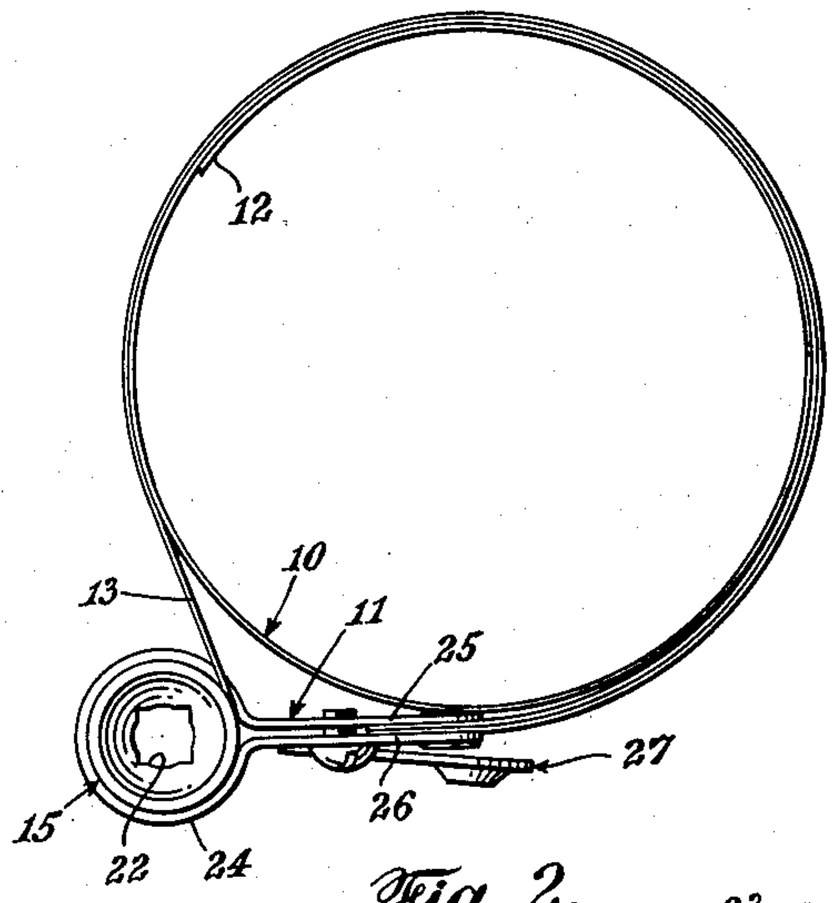


Fig. 7.

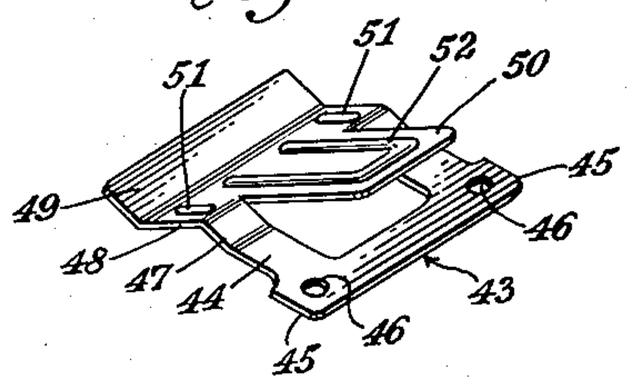


Fig. 4.

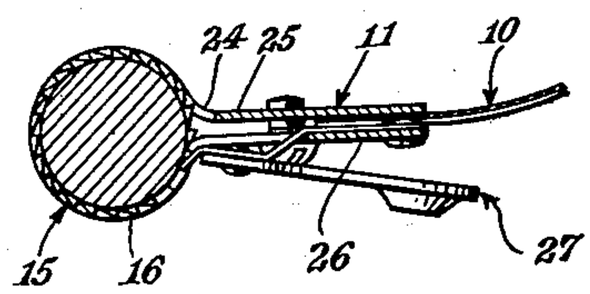


Fig. 2.

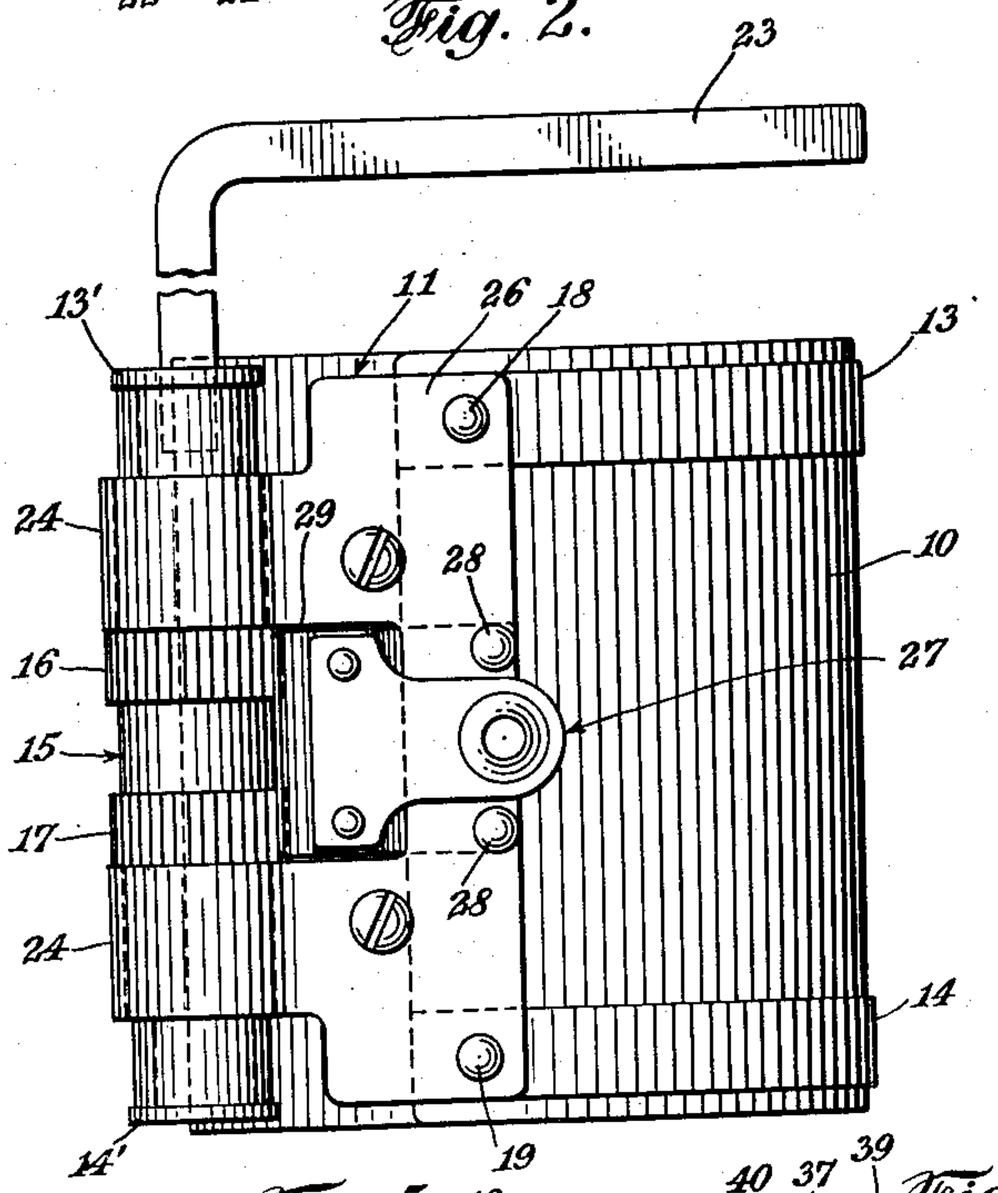


Fig. 3.

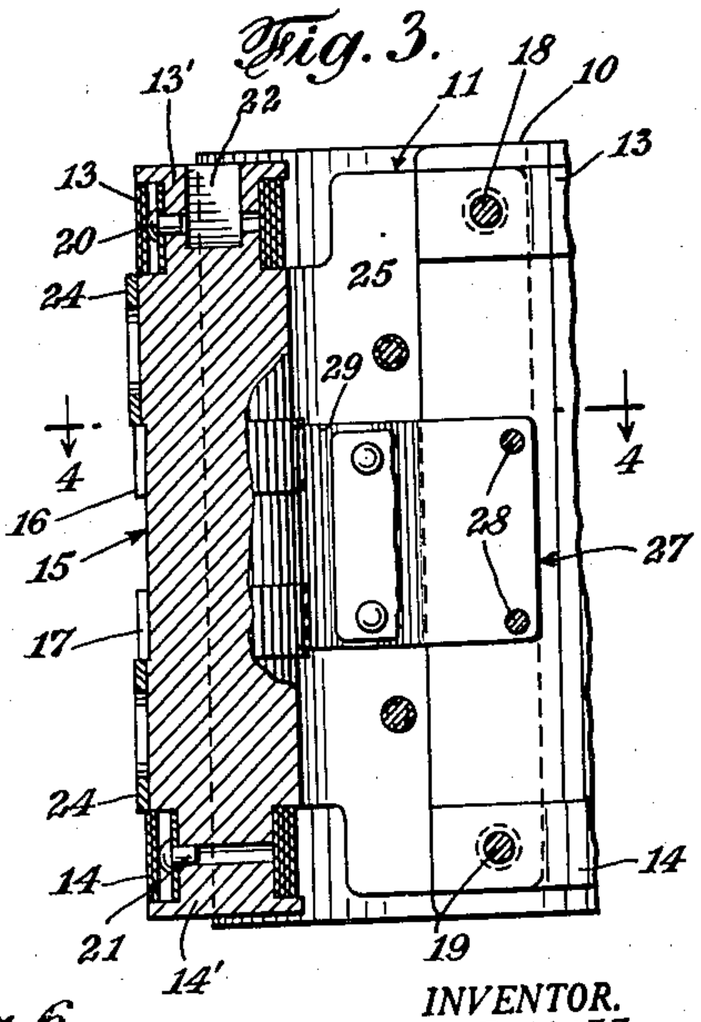


Fig. 5.

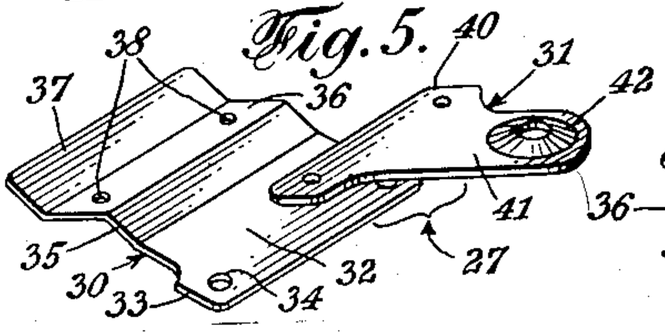
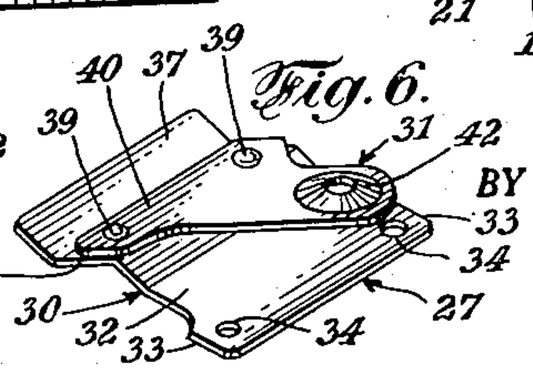


Fig. 6.



INVENTOR.
Leon B. Miller.

BY

ATTORNEY.

Patented Jan. 27, 1953 2,626,530

UNITED STATES PATENT OFFICE

2,626,530

RATCHET STRUCTURE FOR RING COMPRESSORS

Leon B. Miller, Stamford, Conn.

Application December 30, 1948, Serial No. 68,211

11 Claims. (Cl. 74—575)

1

This invention relates generally to piston ring compressors, such as disclosed in my Patents No. 2,208,136, issued July 16, 1940, and No. 2,305,486, issued December 15, 1942, and especially concerns a detent structure in a ratchet arrangement for operating the piston ring compressor.

Piston ring compressors of the type disclosed in the above-mentioned patents are founded on the principle of coiling up a relatively wide, resilient strip of metal for urging rings of a piston into the grooves. The coiling up of such strip is effected by means of a pair of spaced compression bands, preferably engaging the edge portions of the strip. When these bands are spirally wound they coil up the strip. When they are released, they permit the strip to expand. The winding up and the release of the bands is controlled by a spindle operatively supporting the compression bands, and which spindle is equipped with teethed ratchet wheels engaged by suitable detent means or ratchets, the latter being so constructed as to facilitate their manual operation to a position at which they disengage the ratchet wheels when so desired.

In the prior art it has been found that the construction of the detents engaging the ratchet wheels have lacked in simplicity of operation and positiveness and security in respect to their cooperation with the ratchet wheels, and the present invention therefore contemplates an improved detent structure which is not only simple in design, but also positive and simple in its operation, especially when it is desired to momentarily disengage the detent from the ratchet wheels for releasing the piston ring compressor.

The detent, in accordance with the present invention, preferably consists of either a one-piece or a two-piece bodily deformable, resilient ratchet pawl structure, adapted to normally engage the ratchet wheels of the piston ring compressor under tension, and which structure is equipped with a simple, depressible lever, which, when operated, will so deform the pawl body that the latter will disengage the teeth of the ratchet wheels and remain in that disengaging position until pressure against the lever ceases.

In developing the present ratchet pawl, three important features dominated its construction. First, the utter simplicity in its manufacture, second, the ease and inexpensiveness of associating it with the mounting parts of the piston ring compressor, and, third, the readiness and practicability in its operation.

The prime object of the present invention therefore is the provision in a ratchet structure

2

of a simple, effective and inexpensive ratchet pawl adapted to normally engage the teeth of a ratchet element under tension, and wherein the body of the pawl preferably constitutes a one-piece resilient stamping which is bodily deformable and wherein a part of that body forms lever-like operating means for deforming the pawl body so that its disengagement from the teeth of such ratchet elements is effected.

Another object of the present invention is to provide in combination with a toothed ratchet element, a deformable ratchet pawl which normally engages the teeth of a ratchet element under tension and which element is provided with operating means for deforming its body to move the ratchet pawl from its ratchet element-engaging position, and wherein said operating means constitute a depressible lever structure secured to the body of the pawl.

The foregoing and still further objects and important advantages of the present invention will become more fully apparent from the ensuing description, in conjunction with the accompanying drawings, wherein:

Fig. 1 is a top view of a piston ring compressor equipped with the ratchet structure in accordance with the present invention;

Fig. 2 is an elevation of the piston ring compressor shown in Fig. 1;

Fig. 3 is a vertical detail view of a portion of the ratchet arrangement, partly in section;

Fig. 4 is a cross section taken on line 4—4 of Fig. 3;

Fig. 5 illustrates an exploded perspective view of a two-piece ratchet pawl;

Fig. 6 is a perspective view of a finished two-piece ratchet pawl; and

Fig. 7 is a perspective view of a one-piece ratchet pawl.

In the drawings numeral 10 denotes a relatively broad, resilient strip for engaging piston rings of a piston. The strip is held at one of its ends in a mounting 11, while its other end 12 is free, as clearly seen in Fig. 1. Strip 10 may be rolled up by means of compression bands 13 and 14, which are adapted to be spirally wound about ends 13′ and 14′ of a spindle 15, the latter having a pair of toothed ratchet wheels 16 and 17. It will be observed from Figs. 2 and 3, that one end of compression bands 13 and 14 is fixedly secured in mounting 11, as indicated at 18 and 19, while their windable ends are attached to ends 13′ and 14′ of spindle 15 at 20 and 21. In end 13′ of the spindle there is provided a socket 22 for the reception of a wrench 23, shown in Fig. 2, by means

of which the bands are wound about the spindle ends, whereby strip 10 is contracted.

Mounting 11 is so constructed as to form two loops 24, forming journals for spindle 15, and from which loop structures extend inner and outer attaching flanges 25 and 26, respectively, which are in adjacency with one another and between which are fixedly secured ring-compressing strip 10 and compression bands 13 and 14.

Also held between these flanges is a deformable, resilient ratchet pawl structure 27, secured at one end by rivets 28, and extending with its body portion from between the flanges into a cut-out or recess 29, provided in these flanges, so that its free end normally engages under tension the teeth of ratchet wheels 16 and 17.

Ratchet pawl 27, as shown in Figs. 5 and 6, is composed of a deformable body 30 and a depressible lever element 31. Body 30 is pre-shaped and comprises a broad, flat attaching area 32, the end of which extends sidewise as at 33 and in which extensions are provided apertures 34 for the reception of rivets 28.

Continuing at an angle from flat portion 32 is a connecting area 35, which joins portion 32 with another area 36. From the latter area extends again at angular relation to area 36 the free or teeth-engaging area 37, which is adapted to tensionally cooperate with the teeth of the ratchet wheels. As will be observed from Fig. 4, the free end area 37 is disposed at a tangent in respect to ratchet wheels 16 and 17. In area 36 are provided two apertures 38 for the reception of rivets 39 by means of which lever element 31 is attached to body 30 of the ratchet pawl. Lever element 31 has a broad, attaching end 40 and a reduced extension 41, the latter terminating in a rounded button formation 42 by means of which lever 31 may be depressed. By the depression of lever element 31 body 30 of the pawl is deformed so that its teeth-engaging portion 37 disengages the teeth of ratchet wheels 16 and 17. Such disengagement of the teeth is necessitated when it is desired to release the tension of compression bands 13 and 14 upon ring compressing strip 10.

Modification

While in Figs. 1 to 6 a two-piece pawl construction is indicated, Fig. 7 discloses a one-piece pawl construction 43 which is also pre-formed and comprises an attaching area 44 with broadened ends 45 provided with attaching perforations 46, an intermediate portion 47, inclined in respect to attaching portion 44, a continuing portion 48, inclined in respect to portion 47, and a teeth engaging portion 49. From portions 44 and 47 is stamped out a lever element 50 which extends from and forms a continuation of portion 48. The latter, as well as lever element 50, is provided with reinforcements indicated, respectively, at 51 and 52, the latter reinforcement being designed to so stiffen the lever element that it is rendered substantially non-resilient.

While only two modified forms of the ratchet pawl structure are shown and described, it is obvious that changes and improvements may be made therein within the scope of the present invention defining a deformable ratchet pawl structure, as covered by the annexed claims.

I claim:

1. In a ratchet structure for ring compressors including a rotatable member having ratchet teeth, a one-piece, deformable stamping constituting a resilient detent having fixed and movable ends and being adapted to normally engage said

teeth with its movable end and having a depressible lever element superimposed over a portion and forming an integral part of the detent and being adapted for moving the teeth-engaging part of the detent to a teeth-disengaging position when depressed toward said fixed end of the detent.

2. In a ratchet structure as per claim 1, said detent comprising a pre-shaped member, one end of which having means for facilitating its attachment in a fixed position so that its other, free end is rendered movable by said superimposed lever element.

3. In a ratchet structure for a rotary, toothed element, a detent adapted to cooperate with the teeth of said element and comprising a resilient, pre-shaped body, one end of which being movable and normally engaging the teeth of the element and being disengageable from the latter when desired, the other end of the detent having means for fixedly holding it in respect to said element, and an operating lever for the movable end of the detent extending from that end toward and being located substantially above the fixed end of the detent and being adapted, when depressed, to disengage the movable end of the detent from the teeth of the element.

4. In a ratchet structure for a rotary, toothed element, a detent in cooperation with the teeth of the element, said detent comprising an elongated, pre-shaped, resilient member, one end of which being movable relative to the teeth of the element, its other end being fixed, depressible operating means for the movable end and extending from the latter toward the fixed end of the detent, the fixed detent end being disposed in one plane, the movable end having three areas, the first disposed in a plane substantially tangential to the toothed portion of the element, the second, next adjacent area being disposed angularly to both the first area and to said fixed end, and the third area connecting the fixed end with the second area and being inclined to both, said operating means extending from and being disposed in the plane of said second area.

5. In ratchet structure for a rotary, toothed element, a detent cooperating with the teeth of the element and comprising an elongated, resilient member shaped to form end areas and a plurality of intermediate areas disposed at divergent angles, one end area constituting the fixed part of the detent, the other end area forming the teeth-engaging part thereof, and operating means for said other end area extending from one of the intermediate areas toward the fixed end area.

6. In a ratchet structure as per claim 5, the said fixed end area being wider than the teeth-engaging area and having apertures to facilitate the attachment of the detent.

7. In a ratchet structure as per claim 5, said operating means forming a lever fixedly associated with and extending in substantially the plane of one of said intermediate areas.

8. In a ratchet structure as per claim 5, said operating means constituting an integral part of said resilient member struck from the material thereof and forming an extension of one of the intermediate areas.

9. In a ratchet structure as per claim 5, said operating means constituting an integral part of said resilient member struck from the material thereof and forming an extension of one of the intermediate areas and reinforcement provided

for said operating means and for the area from which it extends.

10. In a ratchet structure, a ratchet pawl having fixed and operative ends for engaging with its operative end a toothed ratchet element and having a deformable body adapted to normally assume an operative, element-engaging position, and means associated with the pawl and located intermediate between its ends and extending substantially above its fixed end and being depressible for deforming its body, thereby causing the pawl to assume an inoperative, element-disengaging position.

11. In a ratchet structure, the combination with a toothed ratchet element, of a one-piece, resilient stamping constituting a deformable pawl normally in tensional engagement with said element, said pawl having depressible lever-forming

portion extending from the body of the stamping between its ends for deforming the latter to an element-disengaging position, said pawl-deforming portion constituting an integral, relatively non-resilient part of said pawl.

LEON B. MILLER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
156,115	Anderson	Oct. 20, 1874
225,382	Hoyt	Mar. 9, 1880
2,067,992	Thomas	Jan. 19, 1937
2,499,958	Knowlton	Mar. 7, 1950