

Oct. 21, 1930.

G. B. DUSINBERRE

1,779,034

PISTON RING EXPANDER

Filed Jan. 12, 1929

Fig. 1.

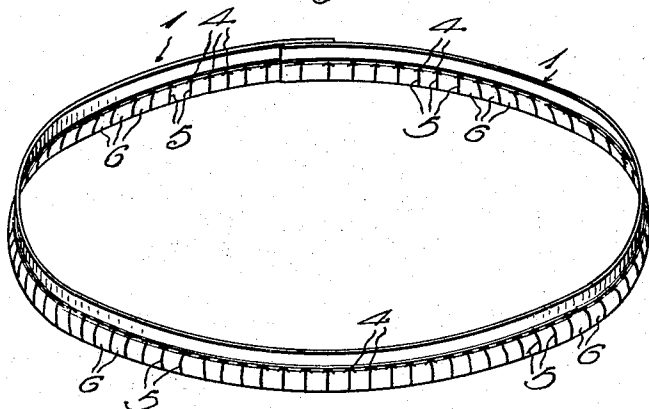


Fig. 2.

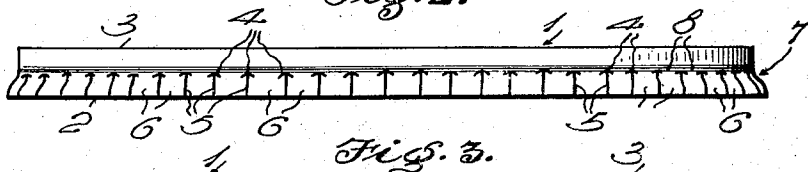


Fig. 3.

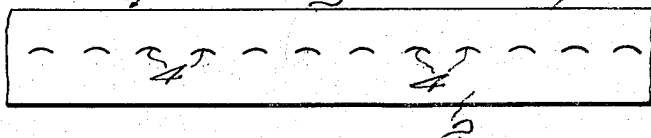


Fig. 4.

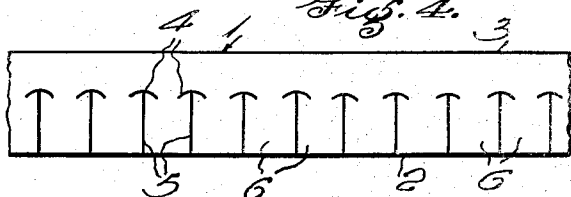


Fig. 5.

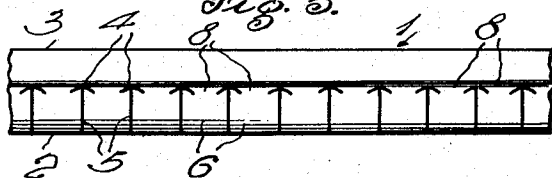


Fig. 6.

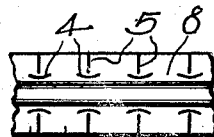
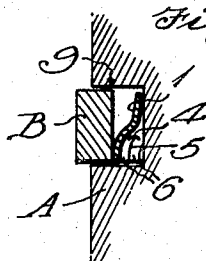


Fig. 9.

Fig. 7.

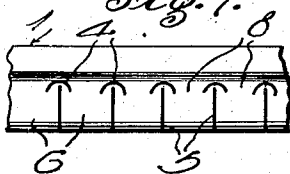
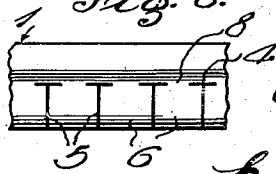


Fig. 8.



G. B. Dusinberre
Inventor

By *Chas. Stewart*
Attorney

UNITED STATES PATENT OFFICE

GEORGE B. DUSINBERRE, OF WELLSBORO, PENNSYLVANIA

PISTON-RING EXPANDER

Application filed January 12, 1929. Serial No. 332,069.

My invention relates broadly to means for expanding piston rings against the walls of the cylinders in which they operate, and the object of my invention is to provide an improved form of such expanding means.

More specifically, the object of my invention is to provide a piston ring expander which will be particularly free from the tendency to break when in use.

Another object of my invention is to provide a piston ring expander which will fit snugly around the base of the ring-groove in the piston.

A further object of my invention is to provide an expander which will exert a uniform outward pressure throughout the length of the piston ring.

It is a further object of my invention to produce an expander of this type by a novel method of manipulating the material.

I attain these objects by providing a device of the type which is disclosed by way of example in the following specification and illustrated in the accompanying drawings in which

Fig. 1 is a perspective view of the preferred form of my expander;

Fig. 2 is a front elevation of the same;

Fig. 3 is a fragmentary front elevation of the strip from which the expander is formed and as it appears upon completion of the first operation;

Fig. 4 is a similar view of the strip upon completion of the second operation;

Fig. 5 is a like view of the strip in its final form;

Fig. 6 is a fragmentary vertical cross-section of a piston and ring showing the expander in position behind the ring;

Fig. 7 is a fragmentary front elevation of my expander of slightly modified form;

Fig. 8 is a similar view of a further modified form of my invention; and

Fig. 9 is a fragmentary front elevation of a still different embodiment of my invention.

Expanders of this general type made from a strip of spring metal with short transverse slits producing tongues which may be bent out of the plane of the metal strip are well known. They are designed to be placed in

the ring groove under the piston ring, with the strip resting against the bottom of the groove and the tongues pressing outwardly against the rear of the piston ring. It has been found, however, that such devices as ordinarily manufactured are open to serious objection on account of an inherent tendency to fracture transversely where the slits occur.

In the expanders as formed in the past, the slits were simply cut partway across the strips and the tongues bent outwardly into position. When these expanders had been in use for a time cracks developed, starting at the termini of the slits, and finally continuing across the body of the strip until it was completely severed, and the expander rendered inoperative.

In my improved expander I avoid this tendency for the slits to initiate fractures, by positively preventing the prolongation of the slits by fracture.

By way of example I have shown my invention in its preferred and complete form in Figs. 1 and 2.

In producing the preferred embodiment of this expander I take a strip 1, (Fig. 3) of suitable spring material having edges 2—3, and, by punching or otherwise, form crescent shaped cuts 4—4, in spaced relation to each other, the ends of said slits all pointing toward the edge 2 of the strip. These cuts are preferably located with their ends in a line parallel to the edges of the strip and approximately midway therebetween.

I next form slits 5—5, starting from the edge 2 of the strip, extending transversely thereof and terminating in the crescent shaped cuts 4—4 midway between the ends thereof.

It is clear that the presence of the cuts 4—4 will arrest any tendency for the slits 5—5 to extend in the form of cracks, into and across the body of the strip, a tendency which has been marked in expanders made according to prior methods.

The completion of the slits 5—5 divides the lower half of the strip into tongues 6—6. The strip is then bent by rolling or otherwise to the form shown in Figs. 5 and 6, so that

the above mentioned tongues project slightly from the plane of the strip as shown at 7, Fig. 2.

The strip may then be cut into lengths and formed into rings, or it may be sold in a single length, and readily cut and formed into rings by hand at the time of installation.

Due to the cuts 4—4, the tongues have relatively narrow necks 8—8. These necks provide extended areas permitting the regular and uniform bending of the body of the ring around the piston, and avoiding the tendency which would otherwise exist, to localize the bending at the points of narrowest width opposite the transverse slits and leave straight the portions of the strip opposite the tongues.

In the present device the cuts 4—4 sever the portion first bent from that which it is desired to curve around the piston with the exception of the narrow necks 8—8. The tendency of the finished strip to bend into a series of short straight sections, instead of into a smooth curve is therefore avoided.

The manner in which the expander operates to extend the piston ring is shown in Fig. 6 in which A is a part of a piston shown in section and having a ring groove 9, and B is a piston ring fitted in said groove.

My expander is shown in section in the space behind the piston ring, the upper edge 3 pressing inwardly against the bottom of the ring groove, and the tongues 6 pressing outwardly against the ring as shown.

In Fig. 7 I have shown a slightly modified form of my invention in which the cuts 4—4 are made to cover a much greater arc than in the form first described.

In Fig. 8 I have shown a further modified form of my invention in which the cuts 4—4 take the form of short straight lines parallel to the edges of the strip.

In Fig. 9 I have shown a modification in which the strip is provided with tongues on both edges instead of on one edge only.

It is not necessary, and in some cases it may not be desirable for the slits 5—5 to extend into intersecting relation with the cuts 4—4, but it may be of advantage to terminate said slits slightly short of said cuts as shown in Figs. 7 and 9. The function of the cuts 4—4 would not be disturbed in this event, since any fracture initiating at the end of one of the slits 5 would soon encounter and be stopped by one of the cuts 4. At the same time leaving the metal uncut at this point makes for markedly increased strength and resilience.

It will be understood that the advantages peculiar to my invention apply to these latter forms in the same way that they do to the preferred form, and indeed that my invention might be applied to many different forms of expanders with advantageous results.

I accordingly do not wish to be limited in the practice of my invention to the forms

herein disclosed, or in fact to any specific embodiment, except as defined by the following claims.

What I claim is:

1. A piston ring expander comprising a strip of resilient material having transverse slits forming tongues in the material and other curved slits extending longitudinally of the strip and intersecting with the transverse slits.

2. A piston ring expander comprising a strip of resilient material having slits extending inwardly from one edge thereof to form tongues in the material and other slits intersecting the first named slits and curved toward the said edge of the strip.

3. A piston ring expander comprising a strip of resilient material having a series of longitudinally extending arcuate slits and transverse slits from one edge of the strip intersecting the said arcuate slits.

4. A piston ring expander comprising a strip of resilient material having a series of longitudinally extending slits, transverse slits from one edge of the strip intersecting the longitudinal slits, the tongues constituted by the material between adjacent transverse slits being bent out of the plane of the strip.

5. A piston ring expander comprising a strip of resilient material having a series of contiguous tongues along one side of said strip, said tongues being formed by slits in the material longitudinally at spaced points, and intersecting slits in the material from one side of the strip.

6. A piston ring expander comprising a strip of resilient material having a series of tongues along one side of said strip, each tongue having a narrowed connection with the body of said strip and being bent outwardly from the latter.

7. A packing or seal for use between a piston and a piston ring consisting of a strip of resilient material having transverse slits extending part way through the strip to form tongues, each of said slits terminating in a curve convex to the body of the strip, and said tongues being bent to form one contact while the body of the strip forms another contact between the piston and the ring.

In testimony whereof I affix my signature.
GEORGE B. DUSINBERRE.