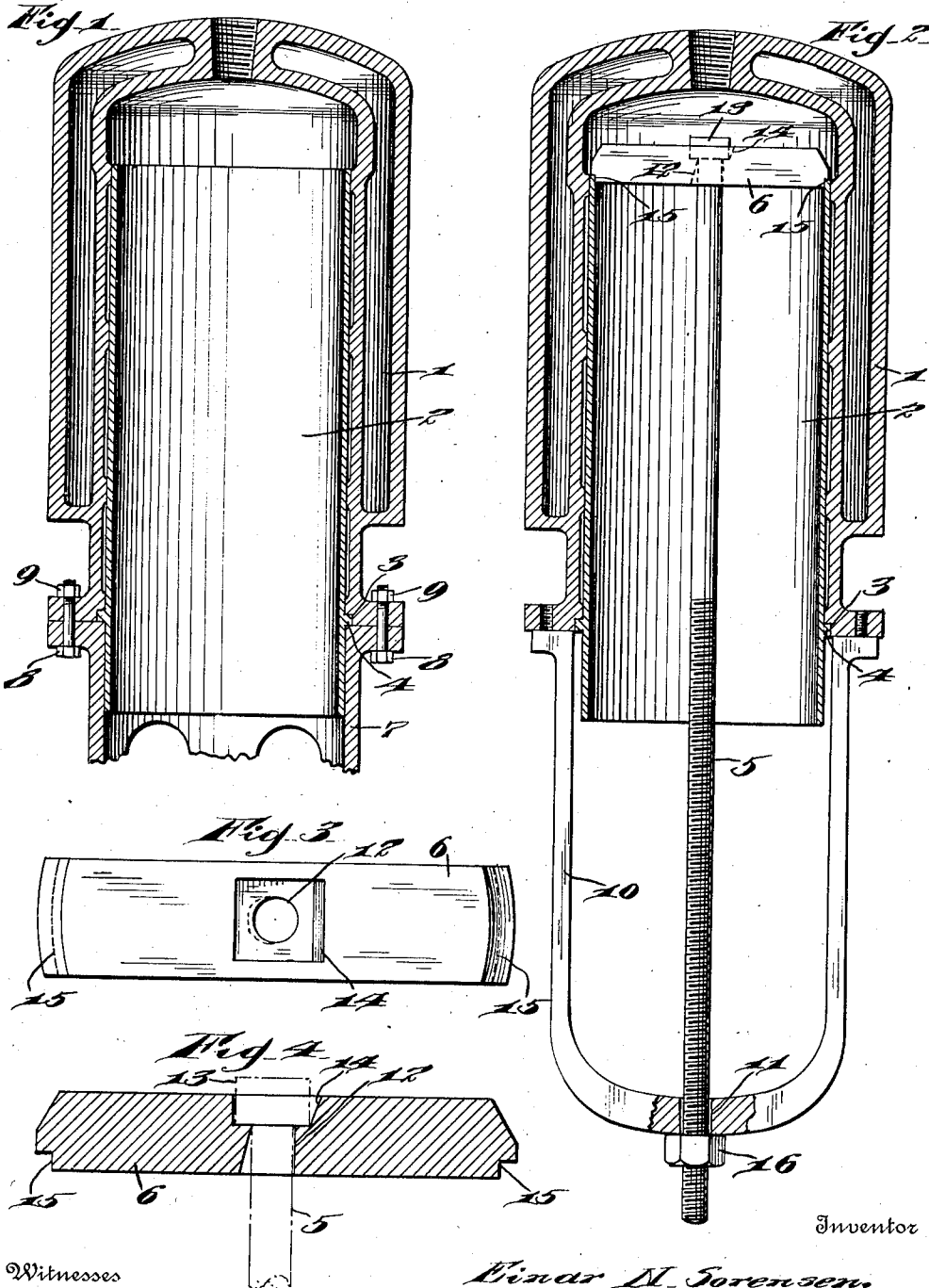


E. N. SORENSSEN.  
LINING FOR ENGINE CYLINDERS.  
APPLICATION FILED JUNE 28, 1910.

983,409.

Patented Feb. 7, 1911.



Witnesses  
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# UNITED STATES PATENT OFFICE.

EINAR N. SORENSSEN, OF ATHENS, PENNSYLVANIA.

LINING FOR ENGINE-CYLINDERS.

983,409.

Specification of Letters Patent.

Patented Feb. 7, 1911.

Application filed June 28, 1910. Serial No. 569,284.

*To all whom it may concern:*

Be it known that I, EINAR N. SORENSSEN, a citizen of the United States, residing at Athens, in the county of Bradford and State of Pennsylvania, have invented certain new and useful Improvements in Linings for Engine-Cylinders, of which the following is a specification.

My invention relates to improvements in linings for engine cylinders, the object of the invention being to provide a lining for engine cylinders, particularly adapted for the cylinders of internal combustion engines, to take the wear of the piston and which may be removed and replaced when worn.

A further object is to provide an improved lining which may be used in worn cylinders after boring the latter, hence enabling discarded cylinders to be utilized.

A further object is to provide an improved lining so as to be able to use aluminum in the casting of cylinders.

With these and other objects in view, the invention consists in certain novel features of construction, and combinations and arrangements of parts, as will be more fully hereinafter described and pointed out in the claims.

In the accompanying drawings: Figure 1, is a view in longitudinal section illustrating my improved lining in a cylinder for engines of the internal combustion type. Fig. 2, is a similar view illustrating my improved mechanism for removing the lining. Fig. 3, is an enlarged view in end elevation of the bar 6, and Fig. 4, is a view in section thereof illustrating the position of the operating rod 5.

1, represents a cylinder for internal combustion engines, and 2 is my improved lining snugly fitting the cylinder but preferably terminating short of the inner closed end of the cylinder, leaving a space devoted to the exploding of the gases, as no lining is needed at this point. The lining 2 projects outward beyond the open end of cylinder 1, and the latter at its open end is provided with a circular groove 3 to receive an annular flange 4 around the outside of lining 2, so that when the crank casing 7 is secured against the end of cylinder 1, by means of the bolts 8 and screws 9, the flange 3 will be confined and the lining 2 held against any possibility of longitudinal movement.

To remove the lining, I employ a mechanism such as illustrated in Fig. 2, which comprises a U-shaped fork or yoke 10 to straddle the projecting end of the lining 2, when the crank casing 7 is removed, and bear against the flanged open end of the cylinder outside of the wall of groove 3. The intermediate portion of the fork 10 is made with an opening 11 to receive a rod 5, which latter projects through an opening 12 in a cross bar 6, and is provided at its inner end with a head 13 located in a recess 14 in the bar 6. The ends of the bar are rounded to conform to the curvature of the cylinder, and recesses 15 are provided in the ends of bar 6 to receive the end of lining 2, and bear against the end of the lining to draw the same out of the cylinder as will be hereinafter explained.

Rod 5 is screw-threaded throughout a portion of its length and a nut 16 is located on the threaded portion of this rod and bears against fork 10, so that when the nut is turned, it will compel the rod to move longitudinally.

To enable bar 6 to be inserted through the lining, one wall of opening 12 and one wall of recess 14 are inclined, so that the bar 6 may be positioned at an angle to rod 5 while being moved through the lining, and when the bar reaches the inner end of cylinder 1, it is turned at a right angle to rod 5 and when the latter is drawn outward, the recessed ends 15 of bar 6 will engage the inner end of the lining. When in this position, the turning of nut 16 will cause rod 5 and bar 6 to move outwardly and draw the lining 2 out of the cylinder.

Various slight changes might be made in the general form and arrangement of parts described without departing from my invention, and hence I do not limit myself to the precise details set forth, but consider myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The combination with an engine cylinder having a closed end, and a circular groove in its open end, of a lining fitting the cylinder and terminating short of the closed end, an annular flange around the outside of the lining located in the groove in

the open end of the cylinder, and means confining the flange in the groove, substantially as described.

2. The combination with a cylinder of an  
5 internal combustion engine having a closed  
end and an open end, and an annular internal  
groove in the open end, of a lining  
fitting the cylinder and terminating short  
of the closed end and projecting beyond the  
10 open end of the cylinder, an annular flange  
around the lining positioned in the groove,  
and a crank casing secured to the open end

of the cylinder around the projecting end  
of the lining, and confining the flange of  
the lining in the groove, substantially as de- 15  
scribed.

In testimony whereof I have signed my  
name to this specification in the presence  
of two subscribing witnesses.

EINAR N. SORENSEN.

Witnesses:

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