

March 18, 1941.

J. B. GIERN ET AL
CYLINDER CONSTRUCTION

2,235,070

Filed Feb. 9, 1938

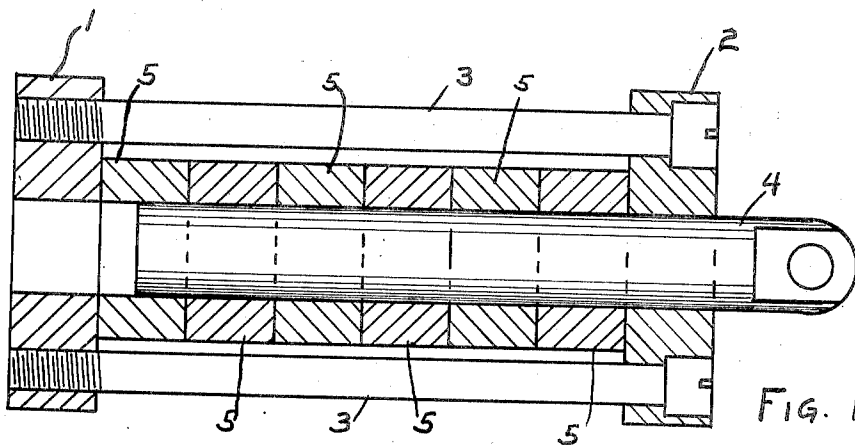


FIG. 1

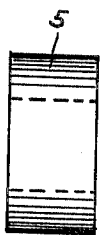


FIG. 4

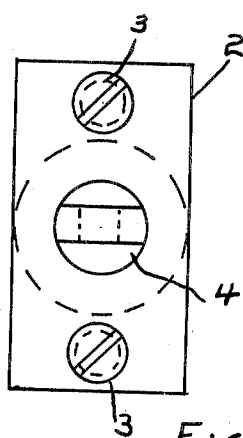


FIG. 2

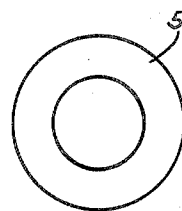


FIG. 3

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2,235,070

CYLINDER CONSTRUCTION

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Application February 9, 1938, Serial No. 189,595

1 Claim. (Cl. 309—2)

The invention relates to a more perfect pressure cylinder or chamber than hitherto obtainable. The chamber or cylinder referred to is especially one in which the depth or axis is of a greater measure than its rightangular measure or diameter.

The invention herein set forth particularly refers to its construction and manufacture.

Heretofore it was a difficult task to bore and finely finish the wall of a cylinder with any degree of certainty as to its circularity and also maintaining the same diameter at every point; this difficulty mounting with the hardness of the cylinder wall and also with the length of the bore in proportion to the diameter.

It is in order to avoid the necessity of machining or tooling a cylinder at a greater depth than controllable with ordinary tools, and at a reasonable cost that this construction is made.

It has already been set forth that the longer or deeper the bore or axis is in proportion to the diametrical measure, the greater the resulting error generally termed "bell mouthness" and "out of round" condition becomes.

It is generally considered that the above mentioned conditions set in when the axial measure exceeds the diametrical one with one and one-half in the smaller diameters and with two in the larger.

In order to create favorable conditions for the building of such cylinders or pressure chambers the invention here referred to is a multiplicity of cylinder sections piled onto one another, none of these sections having any greater length than practical in generating same.

The cylinder sections referred to above will all have finely finished edges in order to obviate any possible leakage when assembled edge to edge on a common mandrel or piston, which is the purpose in this construction.

The column or pile of cylinder sections are finally clamped, with pressure exerted at either or both ends.

The aforementioned bell mouthness, which is caused by the tool's entering or leaving the bore while in the process of manufacture, will of course also be present in this our construction, but a final machine or lapping process on ends or edges of the cylinder sections diminish this condition to a minimum.

The remaining trace of bell mouth left from the last named end tooling will form minute circular recesses in the column assembly; this, rather than being detrimental to the construction is of distinct advantage since the mentioned recesses act as oil reservoirs, and thus lubricates the piston or mandrel intended to enter the bore.

The invention relates to cylinders in which the diameter is smaller than the length of the cylinder, and especially to cylinders used for high compression duty when it is desirable to harden and grind the inside wall of the cylinder; and the object of the improvement is to provide a method of manufacturing a cylinder of small diameter any desired length having a true straight diameter through its length.

One form of the invention is illustrated in the accompanying drawing, in which Figure 1 is a cross section of a cylinder and plunger; Figure 2 is an end view; Figure 3 is an end view of one of the laminations used in assembling the cylinder; Figure 4 is a plan view of lamination shown in Figure 3.

The end plates 1 and 2 have holes ground and lapped to the same size as laminations 5; thus the end plates form sections of the cylinder wall and the built up cylinder is clamped and held in position by screws 3. In assembling a cylinder of this type the end plates and laminations are placed over the plunger 4 and are then clamped, and held together by the screws 3.

We claim:

In a reciprocating piston machine, a cylinder composed of a plurality of cylinder bodies with coaxial bores of equal diameter arranged end-to-end with their internal bores in accurate alignment to form an elongated cylinder bore, each cylinder body having a maximum axial length greater than the radius and less than substantially twice the diameter thereof, a piston reciprocably engaging said elongated cylinder bore, and means for holding said cylinder bodies in end-to-end alignment, the outer longitudinal portions of said cylinder bodies being spaced apart from and out of engagement with said holding means, whereby minor errors in the external surfaces of said cylinder bodies do not affect the internal alignment of said bores.

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