(No Model.) 2 Sheets—Sheet 1.

T. B. CARDON & G. LUNDBERG.

CYLINDER.

No. 377,234. Patented Jan. 31, 1888.

Fig. 1.

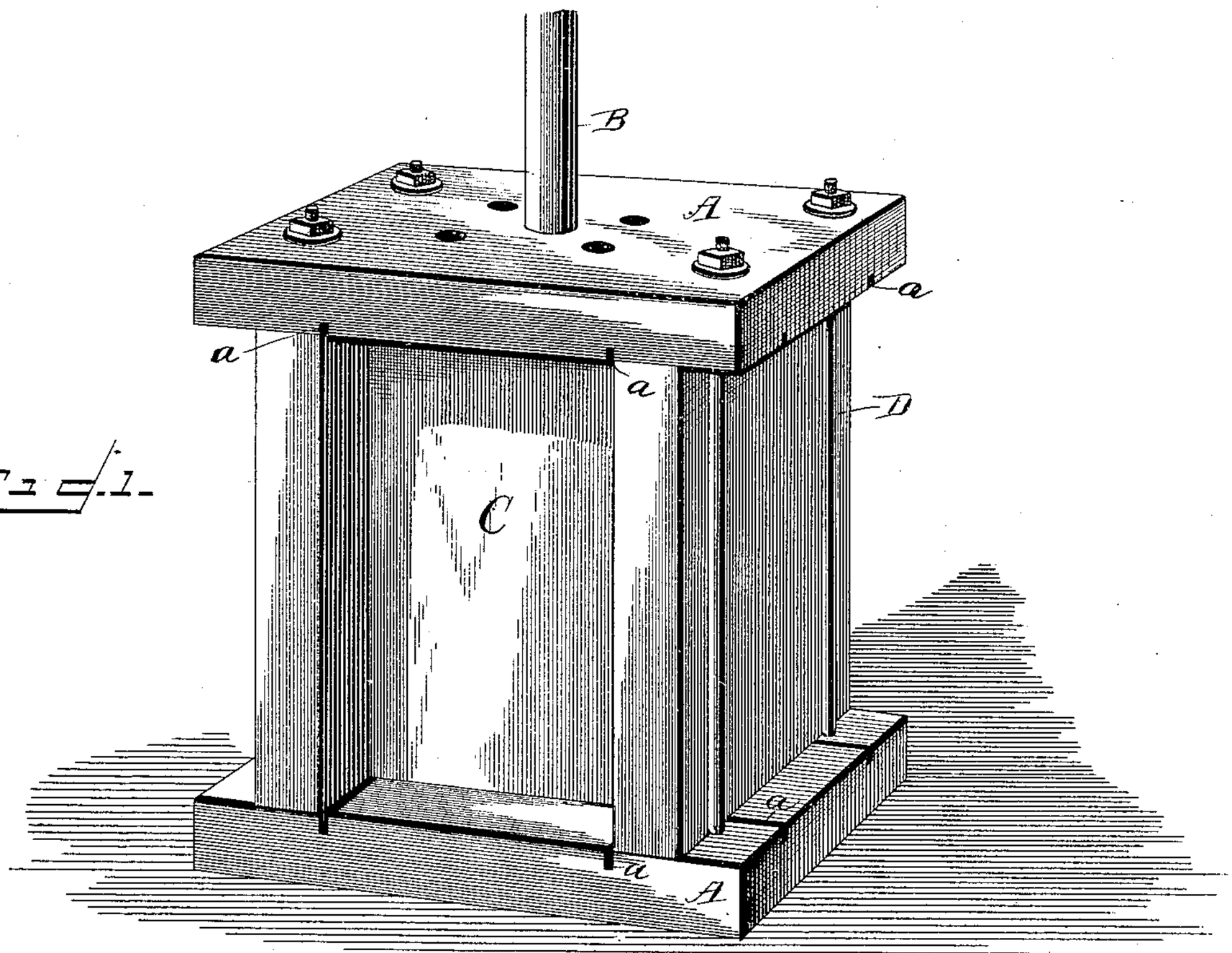
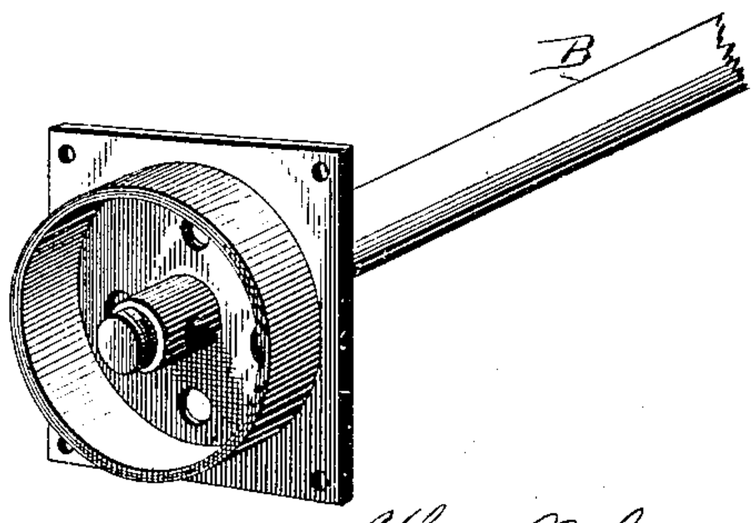


Fig. 4.



WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

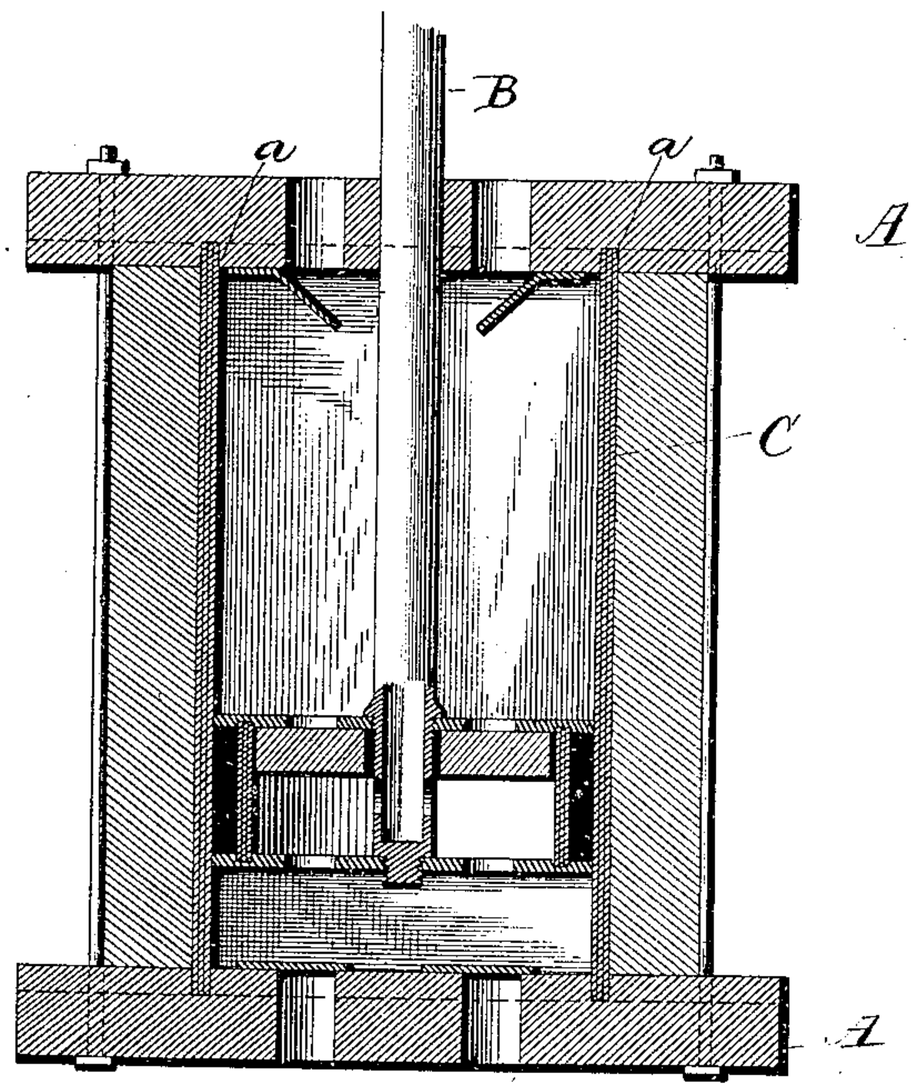


Fig. 3.

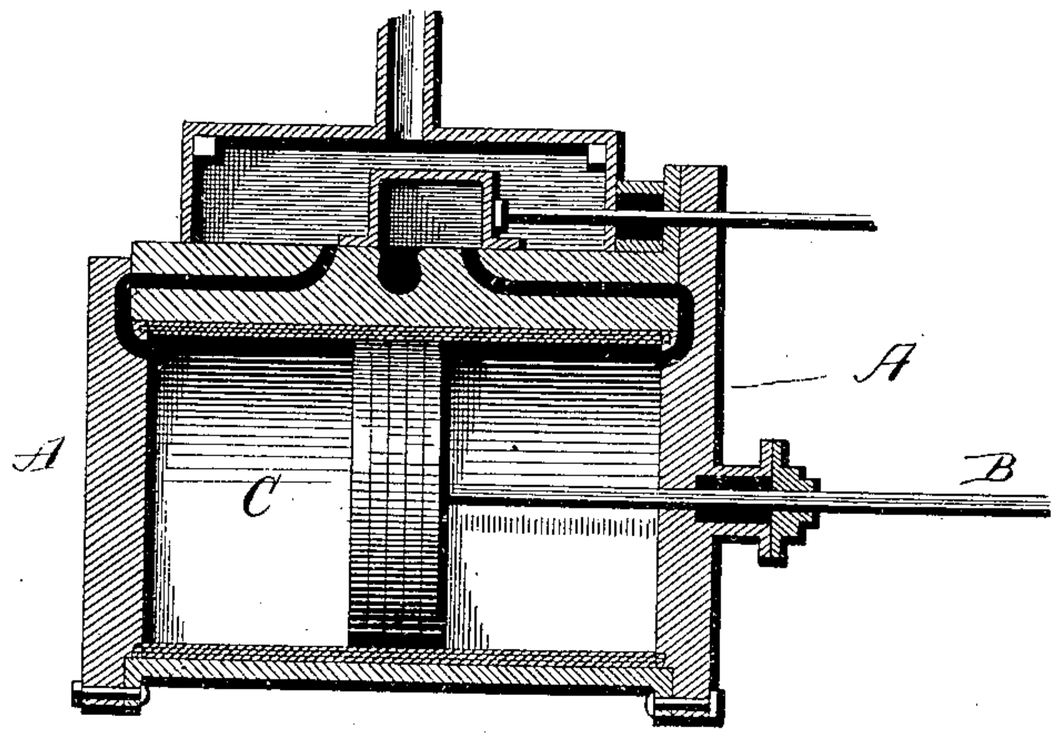
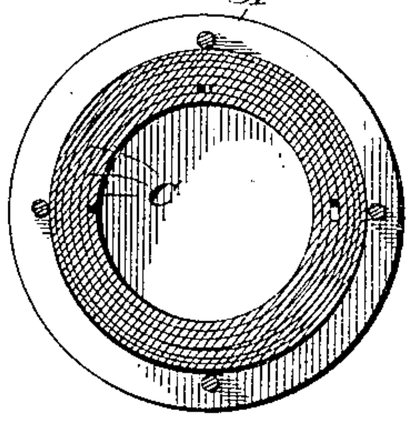


Fig. 5.



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UNITED STATES PATENT OFFICE.

THOMAS B. CARDON AND GUSTAVE LUNDBERG, OF LOGAN, UTAH TERRITORY.

CYLINDER.

SPECIFICATION forming part of Letters Patent No. 377,234, dated January 31, 1888.

Application filed July 14, 1887. Serial No. 244,323. (No model.)

To all whom it may concern:

Be it known that we, THOMAS B. CARDON and GUSTAVE LUNDBERG, citizens of the United States of America, residing at Logan, in the county of Cache and Territory of Utah, have invented certain new and useful Improvements in Cylinders; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Our invention relates to certain new and useful improvements in cylinders, the object of our invention being to provide a cheap, simple, and effective means whereby a cylinder can be readily lined and the interior lining removed when worn, our invention being adapted to be applied to pumps, steam-engines, or other uses, whether the cylinder is round, square, or of other shape.

In the accompanying drawings, which illustrate our invention, Figure 1 is a perspective view of a pump-cylinder which is rectangular in cross-section, the same being constructed in accordance with our invention. Fig. 2 is a vertical longitudinal section of such a rectangular pump-cylinder, showing the piston applied thereto. Fig. 3 is a longitudinal section showing our improvement applied to a steam-cylinder which is circular in cross-section, and Fig. 4 is a detail perspective view of a piston for a pump, showing our improvements applied thereto. Fig. 5 is a transverse section of a cylinder.

The main or leading object of our invention is to provide an interior packing for cylinders of all description which can be readily removed, so as to expose a new and unworn surface, said cylinder which is worn from use being adapted to be inserted behind the newly-exposed cylinder, so that the diameter of the cylinder will not be diminished.

A in the accompanying drawings refers to the heads of a cylinder, which may be provided with valves, as shown in Figs. 1 and 2, or with ports, as shown in Fig. 3, and through one of these heads the piston-rod B passes.

When our invention is applied to pump-cylinders or other analogous devices which may be rectangular in cross-section, the piston-heads A are provided with grooves or recesses *a*, which preferably extend across the inner faces of said piston-heads, and within these grooves or recesses *a* the ends of a series of plates, C, lie. When side pieces are used, as shown in Figs. 1 and 2 of the drawings, these side pieces, D, are provided with vertical recesses, within which the plates C, which extend from one of the side pieces to the other, will lie. The plates C, which form opposite sides of the cylinder, are of the same size, two of the sides being of a greater width than the other two sides when the rectangular cylinder is employed. The plates C are made of any suitable metallic material, and we prefer to use in practice three or more in number, said plates being securely held in position by the cylinder-heads and the rods or bolts which connect the heads to each other.

When after use the interior plates of the cylinder are worn, by removing one of the cylinder-heads the inner plates can be withdrawn, so as to expose the plate next adjacent thereto, and by placing the plate which has been removed behind the newly-exposed plate the diameter of the cylinder will not be diminished, and the cylinder can be relined and re-backed by using the interior plate which has been removed without extra cost.

If desirable, the plates, after becoming worn on one side in the rectangular cylinder, may be reversed, so as to present a new wearing-surface.

As the wear of pumps or other cylinders is usually irregular or in spots, the size of the cylinder will not be affected when said plates are used as backing-plates.

When the cylinder is circular in cross-section, the plates C are made of a single piece, which is bent in cylindrical shape, so that the edges of the inner plate will meet, and several plates, preferably three, are used within an ordinary cylinder, each of these plates being the same size, and when these cylinders are placed in position within the cylinder they are placed so as to break joints.

If desirable, the exterior portion of the cyl-

inder may be made up of a single plate of metal which is bent or coiled spirally upon itself, as shown in Fig. 5.

If desired, the heads of the circular cylinders may be provided with recesses within which the plate C will lie. The same style and form of packing may be used for the pistons behind the ordinary packing, as shown in Fig. 2.

By the means hereinbefore described we are enabled to provide pump cylinders, cylinders of steam-engines, and cylinders used for whatever purpose it may be necessary with an interior lining which can be readily and cheaply removed and a new lining presented to the cylinder, thereby avoiding the necessity of having the cylinders rebored when worn.

We claim—

1. A cylinder for the purpose set forth provided on its interior with a series of plates, each of which is adapted to be removed and replaced behind any one of said series, for the purpose set forth.

2. A cylinder having its interior walls made up of a series of removable plates of substantially the same size, whereby the interior plate or plates can be removed and reinserted behind one of the series, said plates being held in position by the cylinder-heads, which are provided with recesses for the reception of the ends of said plates, substantially as shown, and for the purpose set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

THOMAS B. CARDON.
GUSTAVE LUNDBERG.

Witnesses:
JNO. A. MCALISTER,
W. W. MAUGHAN.