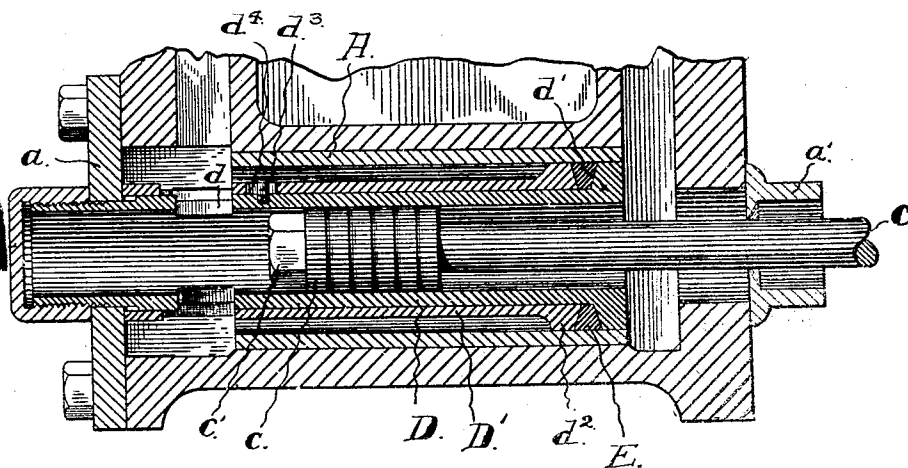


No. 767,527.

PATENTED AUG. 16, 1904.

J. N. PAULSON.
CYLINDER REDUCER.
APPLICATION FILED FEB. 11, 1904.

NO MODEL.



WITNESSES.

Arthur L. Allen
Walter D. Kane

INVENTOR.

John N. Paulson
by Wm F. Booth
his Attorney

UNITED STATES PATENT OFFICE.

JOHN N. PAULSON, OF SEATTLE, WASHINGTON.

CYLINDER-REDUCER.

SPECIFICATION forming part of Letters Patent No. 767,527, dated August 16, 1904.

Application filed February 11, 1904. Serial No. 193,052. (No model.)

To all whom it may concern:

Be it known that I, JOHN N. PAULSON, a citizen of the United States, residing at Seattle, King county, State of Washington, have invented certain new and useful Improvements in Cylinder-Reducers; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to reducers for cylinders, and while it is applicable to any piston-containing cylinder which for any purpose may require to have its capacity reduced it is especially useful in connection with pumps, whether operated by steam, hand, or any other kind of power.

My present invention is another form of that cylinder-reducer forming the subject-matter of a contemporaneous application, Serial No. 193,051, filed February 11, 1904.

The object of my invention is to provide a simple and effective means for readily converting the pump from one for low duty to one for high duty, such conversion being particularly useful in the matter of testing steam-boilers for pressure.

In many situations, especially on shipboard, the pumps in use for feeding the boilers are of such size that they are not available under their driving power, usually a donkey-boiler, for pumping against the high pressure required by the test, and other pumps, frequently hand-pumps, are brought down to the ship and after being connected require a long time to get up the required pressure; but if the pumps already in place could be made to serve the purpose under the limited power of the donkey-boilers much saving in time and labor would result. By my invention such pumps can be used for this purpose by fitting their cylinders with reducers, thereby converting them to high-duty pumps, the donkey-boilers or even hand-power being in their reduced condition ample to pump up to the test-pressure conveniently and quickly.

My invention consists in the novel reducer which I shall now describe by reference to the accompanying drawing, in which the figure is a longitudinal vertical section of a pump-cylinder, showing the application of my reducer.

A is a pump-cylinder. At one end the cylinder has a removable head *a* and at the other a stuffing-box *a'*, through which passes the piston-rod C.

The reducer comprises two bushings or barrels, an inner one D and an outer one D', the two telescoping freely, being united and guided by the pins *d*³ in the one playing in slots *d'* in the other. Openings *d* in the bushings near one end establish free communication with the cylinder spaces and ports. The inner end of the inner bushing D projects beyond the inner end of the outer bushing and is provided with a flange *d'*, and the inner end of the outer bushing has a flange *d*². Between the two flanges on the projecting end of the inner bushing is an expansion-ring E, which may consist of metal—as, for example, a split ring—or it may be made of elastic material, such as rubber, said ring in any case, whether of metal or rubber, being of a nature to expand its exterior diameter under side compression between the two flanges *d'* and *d*². The outer end of the outer bushing D' terminates against the inner surface of the cylinder-head *a*; but the inner bushing projects through said head and is threaded to receive a screw-cap F.

The end of the piston-rod C, which originally had screwed upon it the larger piston for the cylinder A, has now screwed upon it the substitute piston *c*, secured by a nut *c'*, and of a diameter to fit the inner reducer-bushing, as shown.

To make the change from the larger to the smaller cylinder, the operation is as follows: The ordinary head of the pump-cylinder is first removed, and the large piston, with its rod, is passed out through the open end of the cylinder. The reducer D D' is now inserted in the cylinder through its open end, the entrance being readily effected by reason of the expansion-ring E being normal—that is, under no side pressure. The larger or original piston having been removed from the rod C and the smaller piston *c* substituted, said rod is passed in through the inner bushing and through the stuffing-box until the smaller piston *c* is seated in the inner bushing. Then the apertured head *a* is fitted over

the projecting end of the inner bushing and is bolted to the cylinder A. Finally the cap F is screwed on the outer end of the inner bushing up to the head *a*. By tightening this cap against the head the inner bushing is drawn outwardly, which has the double effect through the inner end flange *d'* of said bushing of tightening the outer end of the outer bushing against the inner surface of the head *a* and of compressing laterally between the two flanges *d'* and *d''* the expansion-ring E, causing said ring to grip the walls of the cylinder A. Thus the reducer is firmly held in place, and the pump may be operated for high-pressure duty.

The reducer may when the occasion for its use is past be readily removed and the pump thus restored to its original condition.

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

1. A reducer for pump and other piston cylinders, comprising telescopic bushings fitted within the cylinder, means for relatively moving said bushings with respect to each other, and a means operated by said movement to secure the bushings in the cylinder.

2. A reducer for pump and other piston cylinders, comprising telescopic bushings fitted within the cylinder, means for relatively moving said bushings with respect to each other, and means carried by the reducer and operated by said movement, for gripping the cylinder-wall.

3. A reducer for pump and other piston cylinders, comprising telescopic bushings fitted within the cylinder, means for relatively moving said bushings with respect to each other, an expansion-ring carried by the reducer, and flanges on the bushings on each side of said ring adapted by their movement

to press upon and effect the expansion of the ring to grip the cylinder-wall.

4. A reducer for pump and other piston cylinders, comprising telescopic bushings fitted within the cylinder, and relatively movable with respect to each other, means for clamping said bushings to the cylinder-head, and means on said bushings dependent on the operation of the clamping means for gripping the cylinder-wall.

5. A reducer for pump and other piston cylinders, comprising telescopic bushings fitted within the cylinder, the inner bushing projecting through the cylinder-head, and the outer bushing having its end bearing against the inner surface of said head, a cap threaded upon the projecting end of the inner bushing and adapted to be set up against the outer surface of said head, and means on the inner end of the reducer operated by the relative movement of the two bushings effected by setting up the cap, to grip the cylinder-wall.

6. A reducer for pump and other piston cylinders, comprising telescopic bushings fitted within the cylinder, the inner bushing projecting through the cylinder-head, and the outer bushing having its end bearing against the inner surface of said head, a cap threaded upon the projecting end of the inner bushing and adapted to be set up against the outer surface of said head, a flange on the inner end of the inner bushing, a flange on the inner end of the outer bushing and an expansion-ring between the two flanges adapted by compression to grip the cylinder-wall.

In witness whereof I have hereunto set my hand.

JOHN N. PAULSON.

Witnesses:

WALTER F. VANE,
D. B. RICHARDS.