No. 742,821. PATENTED NOV. 3, 1903.

E. E. ARNOLD.

METAL CYLINDER.

APPLICATION FILED DEC. 29, 1902.

NO MODEL.

Fig. 1.

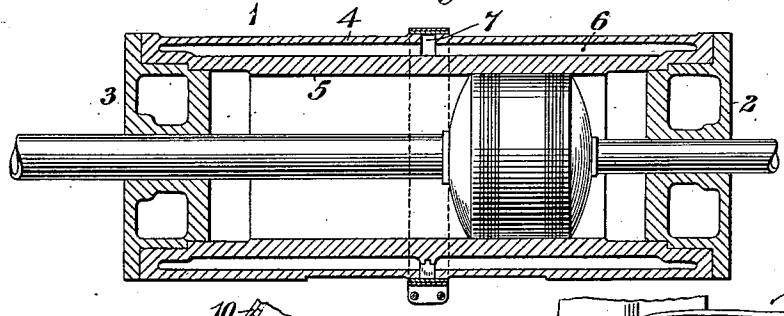


Fig. 2.

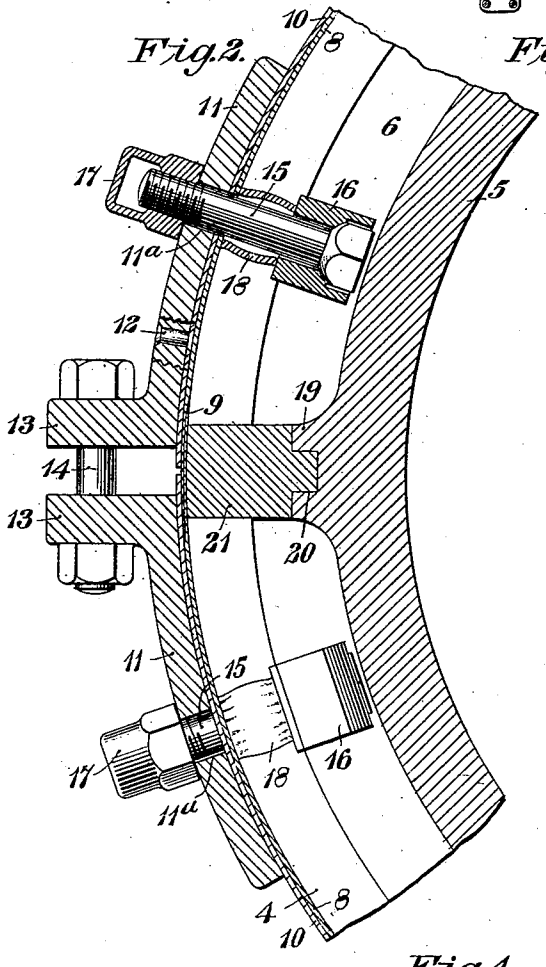


Fig. 3.

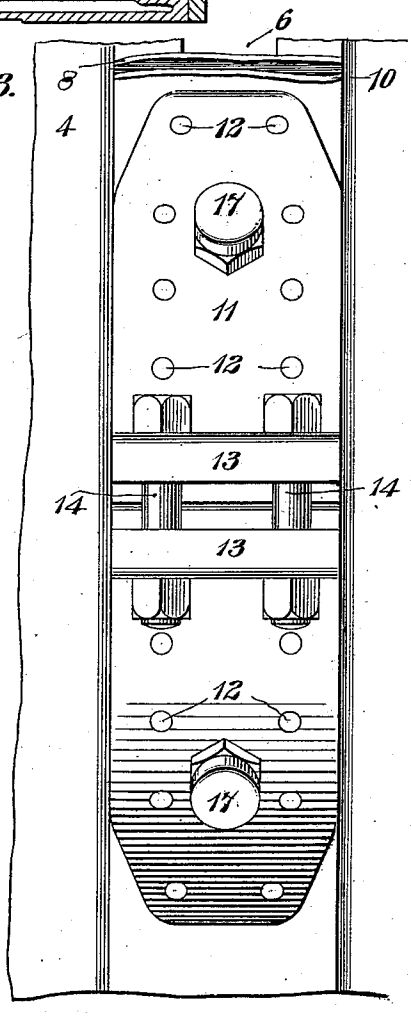
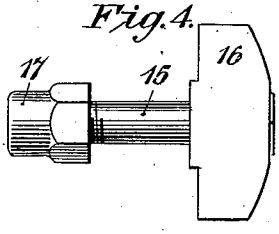


Fig. 4.



WITNESSES:

C. L. Belcher

Birney Hines

INVENTOR

Edwin E. Arnold

BY

Staley & Starr

ATTORNEY.

No. 742,821. Patented November 3, 1903.

UNITED STATES PATENT OFFICE.

EDWIN E. ARNOLD, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE MACHINE COMPANY, A CORPORATION OF PENNSYLVANIA.

METAL CYLINDER.

SPECIFICATION forming part of Letters Patent No. 742,821, dated November 3, 1903.

Application filed December 29, 1902. Serial No. 137,075. (No model.)

To all whom it may concern:

Be it known that I, EDWIN E. ARNOLD, a citizen of the United States, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Metal Cylinders, of which the following is a specification.

My invention relates to jacketed metal cylinders; and it has for its object to provide cylinders of this type which may be conveniently and safely cast without danger of injury to the casting by reason of unequal expansion and contraction of the metal during the casting operation and which may be free to expand and contract in service without injury, whether cast or otherwise constructed.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section through an engine-cylinder constructed in accordance with my invention. Fig. 2 is a transverse sectional view, on a greatly-enlarged scale, of a portion of the cylinder shown in Fig. 1. Fig. 3 is a front elevation of the parts shown in Fig. 2, and Fig. 4 is a detail view of one of the clamping devices shown in Figs. 2 and 3.

The cylinder 1, with the exception of the heads 2 and 3, may constitute a single casting, having an outer wall 4 and an inner wall 5, between which is a chamber 6 for the reception of such fluid as may be employed for either heating or cooling the cylinder-walls. In order to permit of the production of this cylinder as a single casting and at the same time to avoid injury by reason of unequal expansion and contraction of the metal in casting and during subsequent service, I divide the outer wall 4 circumferentially and cover the space 7 thus formed by the means which will now be described.

The opening 7 is surrounded by a band or gasket 8, of rubber or other suitable yielding material, which is of such length that the meeting ends may overlap, as indicated at 9 in Fig. 2. Surrounding the band 8 is a band 10, formed of steel or other suitable metal. Each of the free ends of the band 10 is provided with a curved metal block 11, which is securely fastened to the end of the band by rivets 12 or other suitable means. The ends of the blocks have angular extensions or lugs 13, which are perforated to receive clamping-bolts 14, these bolts serving, in connection with the blocks, to clamp the band 10 as forcibly as may be desired in order to serve, in conjunction with the band or gasket 8, to effectually prevent the escape of fluid from the chamber 4.

The drawing together of the lugs 13 by means of the bolts 14 tends to raise the outer ends of the blocks 11, and in order to prevent this movement I provide bolts 15, the heads of which rest in sockets in blocks 16, the latter resting against the inner surface of the wall 4. The shanks of the bolts project outward through holes 11^a in the blocks 11 and are provided with suitable cap-nuts 17.

In order to prevent any escape of fluid through the holes 11^a, I provide a flexible tubular gasket 18, which is here indicated as a section of rubber tubing the length of which is slightly greater than the space between the inner face of the block 16 and the inner face of the strap-gasket 8, so that when the nut 17 is turned sufficiently to draw the parts into the close relation desired the tubular gasket 18 will be clamped securely in position, its length being such as to insure a joint between its outer end and the gasket 8 that is impermeable to the fluid in the chamber 6.

In order to form a support beneath the lugs 13 for the ends of the straps 8 and 10, I form a boss 19 on the outer surface of the wall 5 of the cylinder, and in this boss I form a recess 20, in which is seated the reduced end of a post 21. This post may be cast or otherwise formed before being placed in position, or it may be cast in the position which it occupies in the chamber 6.

It will be understood that the details of construction as regards form and dimensions of parts may be varied from what is shown without departing from the spirit and scope of my invention and that the invention is adapted and intended for use wherever it is desired to provide a metal cylinder with double walls for the reception of a body of temperature-regulating fluid, irrespective of the

type of machines or apparatus to which such cylinders may be applied or the specific uses to which they may be put.

I claim as my invention—

1. A metal cylinder having double walls the outer one of which is circumferentially slotted and provided with a metal band and a gasket of yielding material between the metal band and said outer wall.

2. In a metal cylinder having double walls the outer one of which is divided circumferentially to form a slot, a band of yielding material covering said slot, a metal band superimposed upon said band of yielding material and means for drawing and clamping the ends of said metal band together.

3. A metal cylinder having double walls the outer one of which is circumferentially slotted, a band of yielding material covering said slot, a metal band superimposed upon said band of yielding material and having blocks fastened to its ends, and means for drawing the ends of said blocks toward each other to clamp the bands securely in position.

4. A metal cylinder having double walls the outer one of which is circumferentially slotted, a band of yielding material covering said slot, a metal band superimposed upon said band of yielding material and having blocks fastened to its ends, means for drawing said blocks toward each other to clamp the bands in position and means for clamping said blocks to the cylinder.

5. A metal cylinder having double walls the outer one of which is circumferentially slotted, a metal band provided with clamping-blocks at its ends, a packing-band or gasket between the metal band and the cylinder-slot, means for drawing the ends of the clamping-blocks toward each other and means for clamping the blocks to the cylinder-wall.

6. A metal cylinder having double walls, the outer one of which is circumferentially slotted, and a metal band surrounding and closing the slot.

7. A metal cylinder having double walls, the outer one of which is circumferentially slotted, a band of yielding material covering the said slot, a metal band superimposed upon said band of yielding material and having blocks fastened to its ends, means for drawing the ends of said blocks toward each other and clamping the band securely in position, bolts for clamping said blocks to the cylinder, and elastic gaskets which press the band of yielding material against the metal band around the holes made for the clamping-bolts.

8. A metal cylinder having double walls, the outer one of which is circumferentially slotted, a metal band provided with clamping-blocks at its ends, a packing-band or gasket between the metal band and the cylinder-slot, means for drawing the ends of the clamping-blocks toward each other, bolts for clamping the blocks to the cylinder-wall and elastic tubes or gaskets to prevent leakage through the holes thus formed in the packing-band for said clamping-bolts.

9. A metal cylinder having double walls, the outer one of which is divided circumferentially, a band of yielding material surrounding said cylinder and bridging the division in its outer wall and a metal band superimposed upon the band of yielding material.

10. A metal cylinder having double walls, the outer one of which is divided circumferentially, a band of yielding material surrounding said cylinder, means for supporting said band at its point of junction, and a metal band superimposed upon the band of yielding material.

11. A metal cylinder having double walls, the outer one of which is slotted circumferentially, a band of yielding material covering the circumferential slot, a metal band superimposed upon said band of yielding material and provided with clamping means and a post located beneath said clamping means.

12. A metal cylinder having double walls, the outer one of which is circumferentially slotted, a band of yielding material covering the slot and having overlapping ends, a metal band surrounding said yielding band and provided with clamping means and a supporting-post located beneath the overlapping ends of the yielding band.

13. A metal cylinder having double walls, the outer one of which is circumferentially slotted, a yielding band covering said slot, a metal clamping-band superimposed upon said yielding band and provided with end blocks and means for drawing said blocks toward each other, bolts for clamping said blocks to the outer cylinder-wall and tubular gaskets surrounding said bolts and clamped thereby against the yielding band.

In testimony whereof I have hereunto subscribed my name this 10th day of December, 1902.

EDWIN E. ARNOLD.

Witnesses:
FRED J. HALE,
JAMES B. YOUNG.