No. 698,872. Patented Apr. 29, 1902.

H. J. TATE.

GARNET CYLINDER.

(Application filed Jan. 22, 1902.)

(No Model.)

Fig. 1.

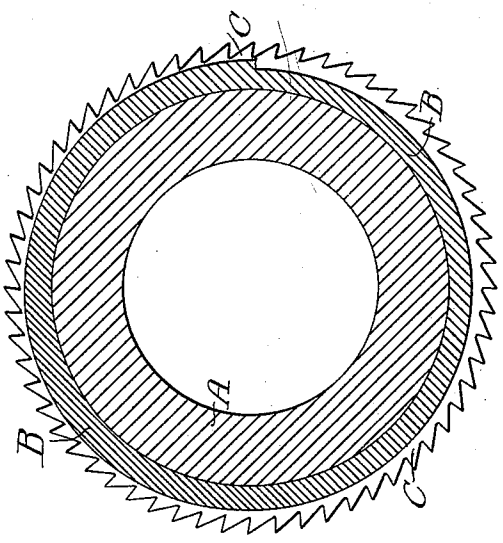


Fig. 3.

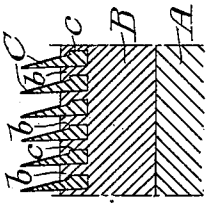
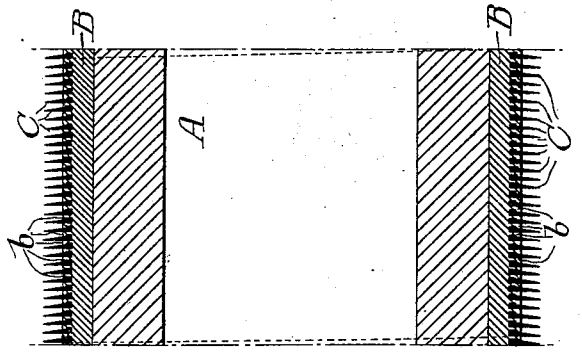


Fig. 2.



Witnesses:-
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Inventor:
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HUGH J. TATE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE PHILADELPHIA TEXTILE MACHINERY COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

GARNET-CYLINDER.

SPECIFICATION forming part of Letters Patent No. 698,872, dated April 29, 1902.

Application filed January 22, 1902. Serial No. 90,856. (No model.)

To all whom it may concern:

Be it known that I, HUGH J. TATE, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Garnet-Cylinders, of which the following is a specification.

My invention relates to certain improvements in toothed cylinders, and more particularly to an improved form of garnet-cylinder, having for its object the provision of a toothed cylinder which may be constructed at a greatly-reduced cost and with the expenditure of less time than has hitherto been required.

A further object of the invention is to provide a finished cylinder which while being structurally of a strength sufficient to safely withstand the strains occurring during its use shall be of a weight much less than that of cylinders as at present constructed and manufactured.

Another object of the invention is to so construct a garnet-cylinder that it may be reclothed at small expense and that without a reduction in the diameter of the body of the cylinder.

These objects I attain as hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a transverse vertical sectional view of a cylinder embodying my invention. Fig. 2 is a longitudinal sectional view of a portion of the cylinder, and Fig. 3 is an enlarged view of a portion of my improved form of cylinder.

Garnet-cylinders as at present constructed almost invariably consist of a heavy hollow cast-iron cylinder provided with heads carrying shafts. During construction after the surface of the cylinder has been turned smooth and true with said shafts a spiral groove of any desired pitch is cut in it. In forming the groove at least three cuts are taken by the tool, this number having been found necessary in order to secure the desired depth without breaking the ridges between adjacent convolutions. A toothed strip is then wound in the groove and properly fastened to the cylinder at its ends, after which a calking-tool, usually in the form of a roller, is passed between successive toothed strips, compressing and spreading out the ridges between the grooves, so that the metal engages and firmly holds the metal strip in position. In performing this calking operation it is necessary to run the calk between the strips the whole length of the cylinder at least six to eight times, in addition to which there must be considerable pressure exerted by said calking-tool in order to properly spread the metal. Said pressure is frequently sufficient to spring the cylinder out of true, and it has then to be trued by means of very tedious peening.

In making a cylinder according to my improved method of construction a cylinder of any desired material may be employed as a support or body, and upon this is cast a comparatively thin shell of relatively soft metal—as, for instance, lead or some compound thereof. The surface of this shell after being trued with the supporting-shafts attached to the body of the cylinder has a spiral groove of the ordinary form cut in its surface. Owing to the softness of the material, this groove is cut by one operation of the tool, and after the toothed strip has been wound in said groove it is calked in position by but a single application of the calking-tool. For the same reason as above noted this tool is held against the surface of the soft metal with the exertion of but a comparatively slight pressure, not sufficient to run any risk of springing the cylinder from its true cylindrical shape.

In the accompanying drawings, A is the body or core of the cylinder, to which heads with supporting-shafts may be fixed in any desired manner. Upon this body is cast a shell B, of lead or a lead compound. A square thread is cut in this soft metal shell, in which is wound the continuous toothed strip C, after which the calking-tool is run between the successive convolutions of said strip in order to spread the soft metal over the shoulder *c* along the base of the strip.

By the present method of manufacture of garnet-cylinders they are made with a much greater thickness of metal than is actually required structurally, so that if one set of clothing is worn out the cylinder may be

turned down and grooved for the reception of another toothed strip, as it will be understood that owing to the brittleness of cast-iron when a worn-out strip of the toothed metal clothing is pulled out of the spiral groove in the cylinder the ridges *b* between the teeth are almost invariably more or less broken, making it impossible to use the same groove again for another toothed strip. It is therefore necessary in every case to turn off the old grooves and cut another new groove for the reception of new clothing. With my improved construction of cylinder, however, when the clothing is worn out it is only necessary to remove the old strip, after which the new and unworn strip can be inserted in the old groove, since the ductility of the metal has permitted a removal of the said worn-out strip without damage to the ridges between the convolutions. When the new strip is in place, a calking-tool may be run between the convolutions, as at first. Should it be desired to put on clothing the convolutions of which are of a different pitch from that at first used, the metal may be melted off from the surface of the cylinder and a new shell cast on, which can be grooved and set with clothing of any desired pitch, with the expenditure of much less time and labor than would be possible under the methods at present in use. Since the body of the cylinder is not at any time grooved or otherwise operated upon by the successive reclothings, it will be seen that it may be constructed of a thickness only sufficient to fulfil the requirements of strength, the weight of each cylinder from this cause alone being diminished by at least one-third. By the present method of reclothing cylinders their diameter is diminished by at least twice the depth of the grooves each time said cylinder is subjected to the reclothing operation, and it can be easily understood that considerable inconvenience is caused from this constant reduction of diameter in the machines upon which the cylinders are used.

My invention is particularly applicable to the reclothing of old cylinders at present discarded, owing to their becoming too thin for reclothing by the methods now employed. Such cylinders after being provided with a shell of soft metal can be supplied with clothing and used indefinitely, as above set forth.

It will of course be understood that I do not confine myself to the use of any particular substances for the body of the cylinder, as, if desired, this may be wood, papier-mâchè, or any other sufficiently-strong material. The shell may be cast separately, if desired, and the core introduced into the shell and fastened thereto in any suitable manner.

I claim as my invention—

1. As a new article of manufacture, a garnet-cylinder having a cylindrical body, a shell of ductile and relatively soft material cast thereon, said shell having a continuous spiral groove from end to end, and having a continuous toothed strip wound in said groove, the ridges between successive convolutions of said strip being spread and in engagement with said strip, substantially as described.

2. As a new article of manufacture, a garnet-cylinder consisting of a supporting-cylinder, a shell of material having a relatively low fusing-point surrounding the same, a continuous toothed metallic strip wound in a continuous groove in the surface of said shell, the inner edge of said strip being greater in section than the outer edge thereof, the material of said shell being spread so as to overlap the inner portion of said strip thereby retaining it in position, substantially as described.

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

HUGH J. TATE.

Witnesses:
WILLIAM E. BRADLEY,
JOS. H. KLEIN.