S. S. OSBORN.

TUBE MILL LINING.

APPLICATION FILED APR. 7, 1909.

965,730. Patented July 26, 1910.

Fig I

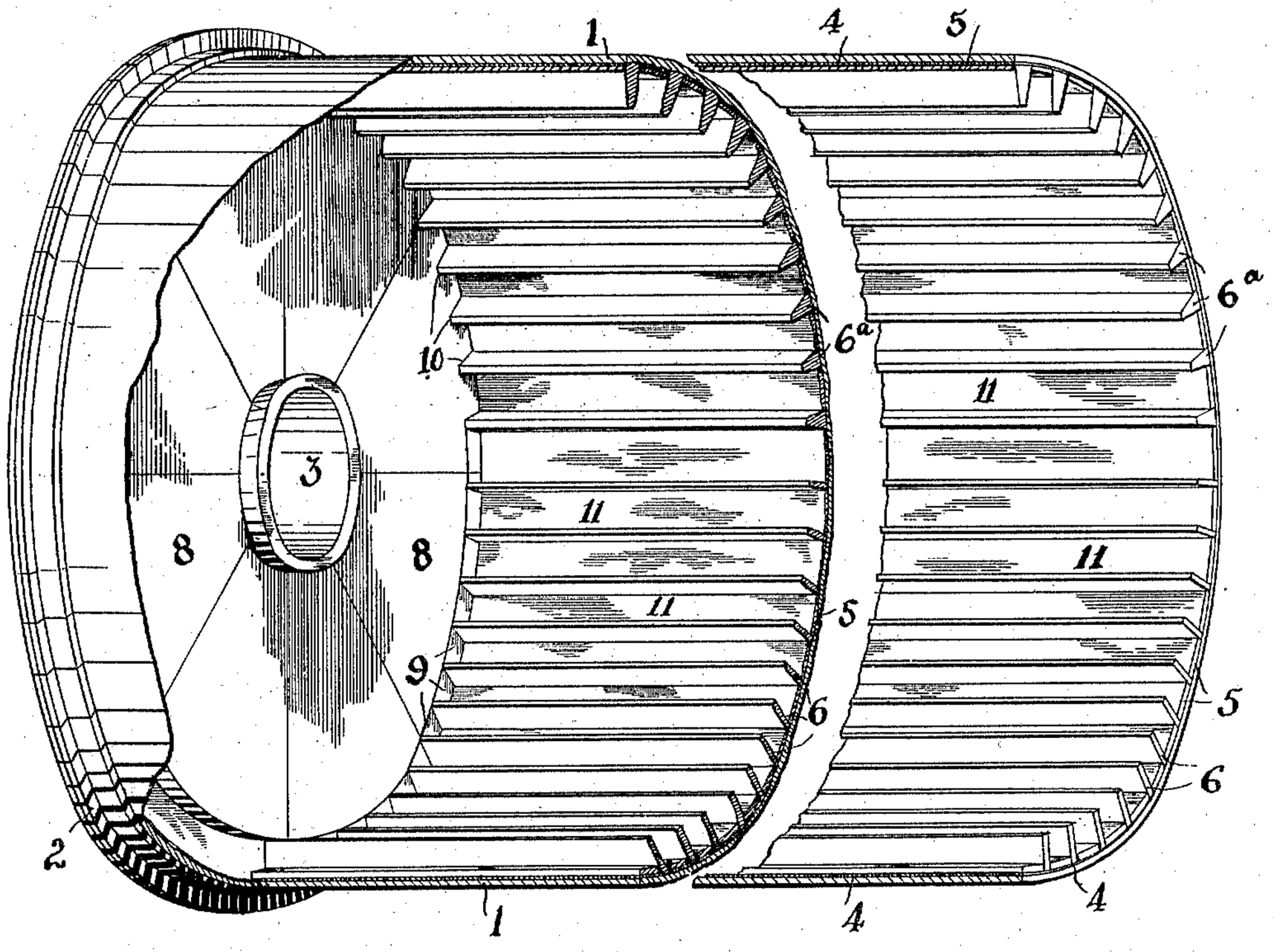
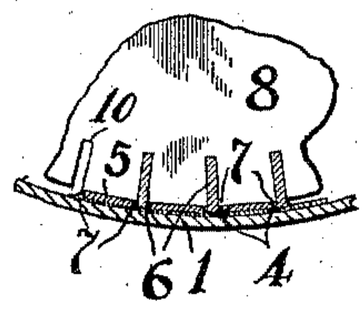


Fig II



Witnesses.
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UNITED STATES PATENT OFFICE.

SIDNEY SHERRARD OSBORN, OF GERMISTON, TRANSVAAL.

TUBE-MILL LINING.

965,730. Specification of Letters Patent. **Patented July 26, 1910.**

Application filed April 7, 1909. Serial No. 488,518.

To all whom it may concern:

Be it known that I, SIDNEY SHERRARD OSBORN, cyanid manager, a subject of the King of Great Britain, residing at the Glen Deep Limited, Germiston, Transvaal, have invented new and useful Improvements in Tube-Mill Linings, of which the following is a specification.

The present invention relates to linings for reduction mills of the type commonly known as tube mills.

The purpose of the present invention is to provide an improved, simple and inexpensive construction of the known type of liner which is characterized by the provision of inward projections which serve to retain the lower layer or layers of the charge substantially motionless with respect to the mill, thereby forming a temporary lining which is automatically renewed as it becomes worn away and which protect the lining proper from excessive wear.

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

Figure I shows a projected view of a mill with one end and the front part of the shell broken away, and Fig. II an end sectional elevation of part of the lining with end plate in position.

Numeral 1 indicates the permanent shell of the mill, 2 one end plate thereof, and 3 one of the usual trunnion orifices.

In fitting up the improved liner there is preferably first laid on the interior of the shell a thin layer 4 of cement onto which the other parts of the lining are positioned. Metallic bars of a somewhat flat section are then laid in, alternately flat-wise as indicated by 5, and on edge as shown by numeral 6. Between the bars is placed a preferably thin course 7 of cement; and as each bar is laid it is bedded well into the cement layer 4 and the preceding cement course.

The lining may be additionally secured in place by securing the usual end plate liners 8 over the extremities of the bars 6, and cementing or otherwise fixing blocks 9 of stone, metal or other material, between the peripheries of said end liners and the bars 5.

In some cases the end plate liners may be slotted peripherally as shown at 10, so as to take the bars 6 and at the same time make contact with the bars 5.

The presence of the cement layer 4 and courses 7 is desirable in that it constitutes a solid bed for the metallic bars in spite of inequalities in the shell and assists to hold them in place; but it may in some cases be dispensed with, the bars being then retained in position by the end liners 8 or similar holding means.

In the operation of the mill the lowermost layer of the charge passes into the spaces 11 between the bars 6 and is thus carried round with the mill either completely or at least until it passes from under the mass of the charge, accordingly as it becomes jammed more or less completely in place. Said lowermost layer thus forms a temporary lining upon which the mass of the charge slides or rolls and which protects the bars 5 and the lower parts of bars 6. When the latter are so worn down as no longer to retain the charge, the old lining is taken out and a fresh one built up; it being remarked that the flat-laid plates 5 will as a rule outwear several sets of the edge-wise plates 6.

The width of the spaces 11 is determined by the average size of the grinding charge constituents, the object being so to proportion them that they will always be tightly packed with pieces of the grinding charge. By the term "grinding" charge is meant either added pebbles or like hard substances, or the larger pieces of the matter under treatment which are sometimes used in place of the pebbles.

The bars which are placed on their edges may if desired be of tapering section inwardly as indicated at 6^a so as to make the space between them of tapering form into which the charge tends to wedge.

It will be understood from the foregoing that the improved liner is inexpensive as regards material and may be fitted up or taken out rapidly and without skilled labor.

What I claim, and desire to secure by Letters Patent is:—

1. A tube mill lining composed of more or less flat sectioned metallic bars laid longitudinally of the mill alternately flat-wise and on edge and bedded upon a common surface, said bars forming respectively the bases and walls of channel recesses adapted for the mill charge to pack into.

2. A tube mill lining composed of more or less flat sectioned metallic bars laid longitudinally of the mill alternately flat-wise and on edge and a layer of cement between said bars and the shell of the mill, onto which the bars are bedded while it is plastic,

said bars forming respectively the bases and walls of channel recesses adapted for the mill charge to pack into.

3. In combination, a tube mill, a lining therein composed of metallic bars laid longitudinally of the mill alternately flat-wise and on edge, said bars forming respectively the bases and walls of channel recesses adapted for the mill charge to pack into, and liners for the end plates of the mill, said liners serving to lock said bars in place.

4. A tube mill lining composed of more or less flat sectioned metallic bars laid longitudinally alternately flat-wise and on edge within the shell of the mill and cemented in place, said bars forming respectively the bases and walls of channel recesses adapted for the mill charge to pack into.

In testimony whereof I affix my signature in presence of two witnesses.

SIDNEY SHERRARD OSBORN.

Witnesses:

J. WARREN VENNING,

WESLEY E. JOHN.