March 12, 1935. A. LE R. BOLTON 1,994,061

END HELD LINING FOR JORDAN ENGINE SHELLS

Filed May 14, 1927

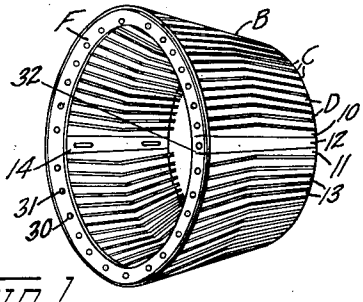


Fig 1

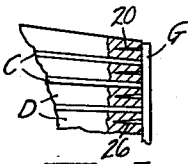


Fig 2

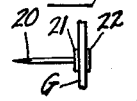


Fig 3

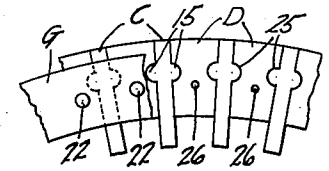


Fig 4

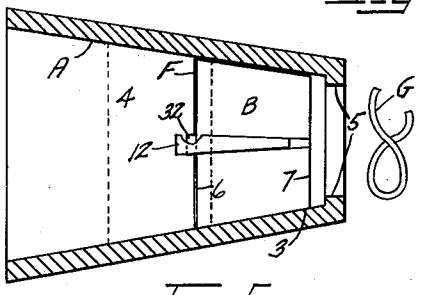


Fig 5

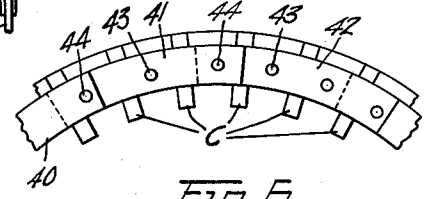


Fig 6

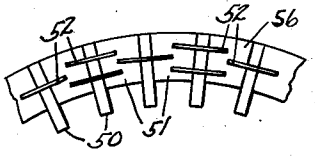


Fig 7



Fig 8

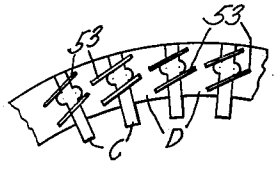


Fig 9

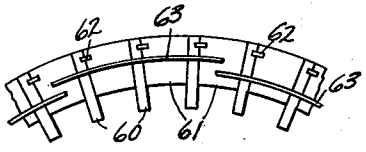


Fig 10

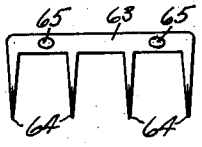


Fig 11

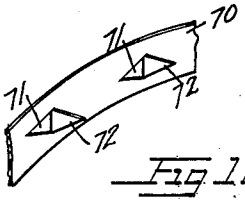


Fig 12

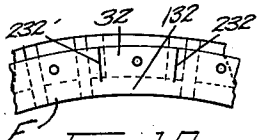


Fig 13

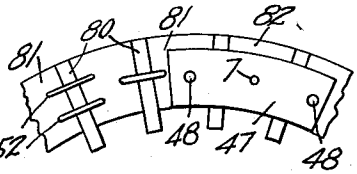


Fig 14

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END HELD LINING FOR JORDAN ENGINE SHELLS

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Application May 14, 1927, Serial No. 191,377

8 Claims. (Cl. 92—27)

This invention relates to paper making machinery having particular reference to the filling of the shells of what are known as Jordan engines. Such shells have a lining which may be all metal but is generally made up of knives and separating members known as woods, both angularly bent and so arranged that the knives project inward beyond the wooden separators.

As these knives and separators wear down, they must from time to time be replaced and this can be done individually by building them up in the paper mill, or preferably they can be assembled at the factory and shipped as a lining.

As wood is generally used for separators, when these assembled linings are kept in storage or in transit any length of time, the wood dries and shrinks, and as the lining must fit very accurately to the shell, it has been found that one or more wedges which are also separators, are very convenient to expand the lining and fit the shell.

A preconstructed lining might collapse unless the knives and separators were strung on wires, held in a jacket and spot welded, or held in a jacket and provided with ribs and grooves like that shown in my application pending herewith, which resulted in patent entitled Self supporting lining for Jordan engine shells, issued September 27, 1927, No. 1,643,368.

If the knives are fastened to the wires or the jacket they cannot be tightened by wedges and as the wires or jacket cannot readily be removed a perfect fit cannot be made.

With my present device as the means to hold the parts together are at the ends and can be removed while in the permanent shell, a perfect fit can be obtained.

This invention comprises means to hold the assembled filling together during shipment and until it is almost in position in the permanent shell such means being at the ends, and preferably of such character that the holding means can be removed when the filling is actually in position, or before it is in position.

I intend to cover in this application all types of knives and separators whether ribbed, grooved, of uniform keystone shape, or the usual smooth faced knives and keystone shaped woods associated with any means, whether permanent or detachable, holding them in assembled relation as a truncated conical filling, such means being at the ends.

In the drawing, Fig. 1 is a perspective of one of my assembled linings.

Fig. 2 is a detail in section showing part of the small end.

Fig. 3 is a detail showing my preferred type of holding ring and nail.

Fig. 4 is a fragmentary elevation from the small end, of an assembled filling, part of the ring being broken away and the nails removed.

Fig. 5 is a sectional elevation of the permanent shell with a section of my lining partly in place after the ring at the small end has been removed.

Fig. 6 is a view similar to Fig. 4 showing another alternative construction.

Fig. 7 is a view similar to Figs. 4 and 6 showing another alternative construction.

Fig. 8 is a detail of a staple.

Fig. 9 is a view similar to Fig. 4 of another alternative construction.

Fig. 10 is a view similar to Fig. 4 of another alternative construction.

Fig. 11 is an elevation of one of the holding members shown in Fig. 10.

Fig. 12 is a perspective of a holding ring of still another construction.

Fig. 13 is a detail of the part 32 of a large ring F which can be bent back to allow the large end of a wedge to be pushed back.

Fig. 14 shows a modification.

In the drawing, A represents the permanent shell of a Jordan engine and B represents one assembled lining or filling therefor. There are usually three of such fillings of varying diameter so that the smallest can be positioned in the permanent shell, then the next and then the largest.

The knives C, C, as shown, are of the usual angular construction, that is they are bent across the middle portion in a well known manner.

D, D, represents the members which serve to separate the knives and include the wooden members such as the wedge 12, the especially shaped members 10 and 11, and the members 13, which latter comprises most of the separators. These have an angular bend or are cut angularly to fit between the knives C, C, while the members 10 and 11 are of special shape so that a wedge like 12 can be slipped in between them. Another separator is 14 which usually is made of metal and has recesses through which screws or bolts can pass to hold the assembled filling in the permanent shell.

F represents a sheet metal ring of a size slightly smaller than the large end, and G represents a similar ring slightly smaller than the small end. Through holes 31 in the ring F

at the large end, nails 30 are driven preferably into the end of each wooden separator such as 11, 12 and 13, or every alternate separator, or at such intervals as may be desired.

Opposite the large end of one or more of the wedges such as 12, the metal may be cut away so that as shown in Fig. 5 the part 32 can be bent out allowing the wedge to be partially driven out from the small end so that it projects at the large end.

I prefer to use in connection with the end holding rings, nails such as 20 which have heads 21 and 22 which are respectively on each side of a ring such as G. When these are driven in forming holes 26, and it is desired to remove the ring, all the nails will come off with it, avoiding any danger of leaving any nails in the engine.

I prefer to use knives such as those shown in end view at C in Fig. 4, having on each side a projecting longitudinal rib 15, 15, and to associate with them, wooden separators such as D having corresponding longitudinal grooves 25. When such knives and separators are assembled they hold each other in place and prevent collapsing.

As I assemble my linings in a suitable form, the knives and separators cannot move outward until the form is removed, and before it is removed I attach the rings such as F and G, and these permit the assembled lining to be removed and shipped with no danger either of collapsing or spreading.

When my assembled linings are to be used in a permanent shell such as A shown in Fig. 5, the smallest section is positioned in toward the small end of shell A at which there is usually an inwardly extending annular flange 5, and when far enough in so that it practically touches all the way around, the ring G at the small end is ripped off, twisted and pulled through the small end of the shell A as shown.

The sections such as 32 of the large ring may then be bent out or the whole ring may be removed so that one or more of the fitting wedges 12 can be driven back from the small end thus allowing the whole assembled filling to be pushed in close up against flange 5. Its parts are then evened up and the wedge or wedges 12 driven completely in so as to keep it tightly in place.

As shown in Fig. 6, instead of a single continuous sheet metal ring at each end I can use sections such as 40, 41 and 42 which overlap in such a manner that certain nails such as 44 can be driven through two sections while others such as 43 are driven through one only.

Instead of metal rings I can, as shown in Fig. 7, assemble the knives such as 50 shown in Fig. 7 and separators 51 in suitable form, and then I can drive the long staples 52 in staggered relation so as to pass over the ends of the knives and into adjoining woods as shown.

In this view, the knives and separators have neither ribs nor grooves.

In Fig. 9 the knives C and separators D are held together by means of staples 53, 53, of which preferably there are two driven diagonally into the separators on each side of each knife so as to straddle the knife.

In Figs. 10 and 11 I show another type of what might be called multiple staples 63, each of which may have more than two prongs 64 which are driven into the separators 61, 61, straddling the knives 60. I show in Fig. 10 splines 62, 62, entering suitable grooves in a knife and adjoining separator, which help to keep the knives from slipping out or in.

I show in this type of staple the holes 65, 65, into which a suitable tool can be passed when it is desired to remove them in the process of fitting the linings to the permanent shells.

Fig. 12 shows another type of ring in which prongs such as 72, 72 are pressed from the metal leaving corresponding holes 71.

While I prefer to use my end holding device merely while the assembled filling is being shipped from the factory to the paper mill and while it is being put in position inside the permanent shell, I may leave them in place, if necessary cutting such rings as F or G to allow any necessary expansion.

In the construction shown in Figs. 7 and 9 the staples such as 52 or 53 can be sunk in suitable recesses so that most of them can be left in place after the lining has been fitted to the permanent shell.

In such case also it is apparent, to permit a wedge separator such as 56 shown in Fig. 7, to be driven back, the three staples 52, 52, 52, which hold it can be pulled out.

It is also obvious that a combination of the various means disclosed can be used if desired as shown in Fig. 14 where I show knives 80, and between them, ordinary separators 81 or wedge shaped separators 82 in some places being held together by staples 52 and in other cases by plates such as 47, through holes 7 in which nails 48 are driven into the separators 81 or 82.

It may be convenient in some cases to use the wedge such as 12 which is in position while the lining is being transported merely as a temporary matter and after the lining section is almost in position to drive this temporary wedge out from the large end and put in place thereof a permanent wedge which may be slightly larger or smaller.

The cuts 232, 232, which make the bendable section 32 should be of such depth and such distance apart that the large end of the wedge can pass through them leaving a connecting portion 132 which holds the assembly together when the wedge is driven wholly or partly out.

This connecting section 132 can be allowed to buckle slightly if it is desirable that the large ring F should contract, but if it becomes necessary to expand the lining beyond the size of the large ring F, that ring must be entirely removed.

I prefer to use a type of knives and separating members having ribs and grooves or other equivalent construction such as shown in Fig. 4 as this keeps them from displacement towards the axis of the shell.

I claim:

1. The combination in a bodily transportable lining for Jordan engine shells of a plurality of knives and members which serve to separate them, each knife and member being of such form that it cannot move inward without moving with it both adjoining members or knives, or the adjoining member or knife; with a flat ring at each end each ring having projecting nails which are driven into the ends of the separating members.

2. The combination in a bodily transportable lining for Jordan engine shells of a plurality of knives and members which serve to separate them, each knife and member being of such form that it cannot move inward without moving

with it both adjoining members or knives, or the adjoining member or knife; with means at their ends to hold the knives and members in assembled relation.

3. The combination in a bodily transportable lining for Jordan engine shells of a plurality of knives; with a plurality of separating members positioned between the knives, one of said separating members being a wedge; and means at their ends to hold them together, such means being so formed as to permit such wedge to be removed from its large end.

4. The combination in a bodily transportable lining for Jordan engine shells of a plurality of knife members and members which serve to separate them; with a flat ring in position at each end of the assembly; and a plurality of members associated with each ring which connects it with the ends of some of the assembled members.

5. The combination in a bodily transportable lining for Jordan engine shells in the form of a hollow truncated cone, of a plurality of knife members and separating members which serve to separate them; with a ring at each end to which ring are attached penetrating members introduced into the ends of enough of the separating members to hold the assembly together.

6. The combination in a bodily transportable lining for Jordan engine shells in the form of a hollow truncated cone, of a plurality of knife members and separating members which serve to separate them; with a sufficient number of penetrating members introduced into the ends of some of said members to hold the assembly together.

7. The combination in a bodily transportable lining for Jordan engine shells in the form of a hollow truncated cone, of a plurality of knife members and separating members which serve to separate the knife members; with a plurality of staples so driven into the ends of some of the separating members as to hold the assembly by locking the members together.

8. The combination in a bodily transportable lining for Jordan engine shells in the form of a hollow truncated cone, of a plurality of knife members and separating members which serve to separate the knife members; with a flat ring at each end, each ring having projecting nails which are driven into the ends of some of the separating members to hold the assembly together.

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