

March 16, 1926.

A. LE R. BOLTON

1,576,504

BUILT UP JACKET FOR JORDAN ENGINE PLUGS

Filed Feb. 8, 1923

2 Sheets-Sheet 1

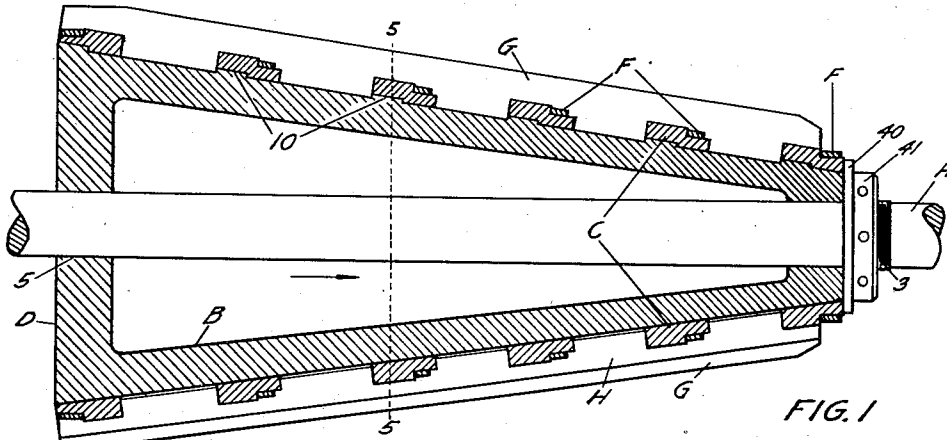


FIG. 1

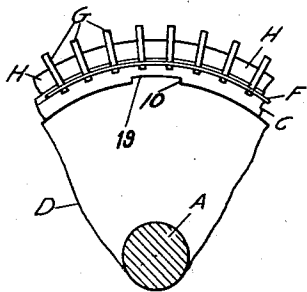


FIG. 2

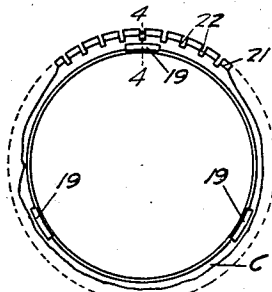


FIG. 3

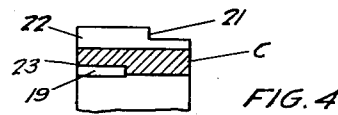


FIG. 4

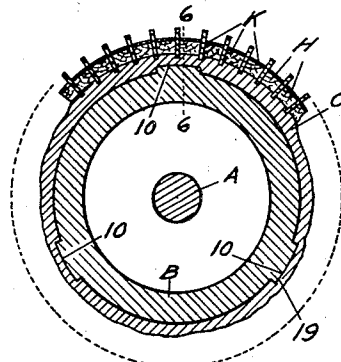


FIG. 5

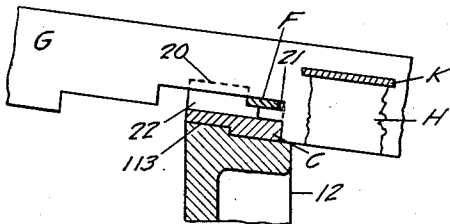


FIG. 6

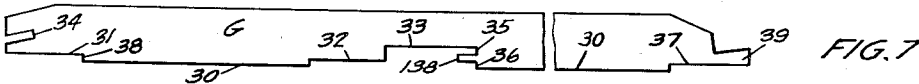


FIG. 7

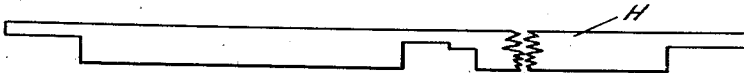


FIG. 8

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BUILT UP JACKET FOR JORDAN ENGINE PLUGS

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2 Sheets-Sheet 2

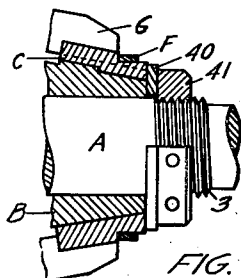


FIG. 9

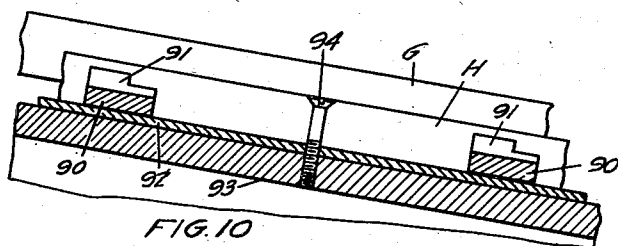


FIG. 10

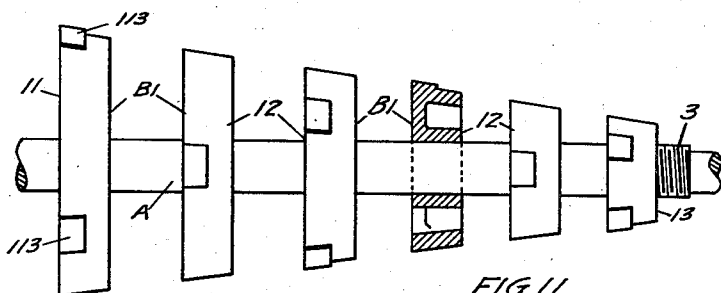


FIG. 11

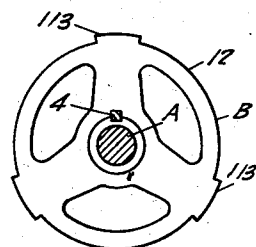


FIG. 12

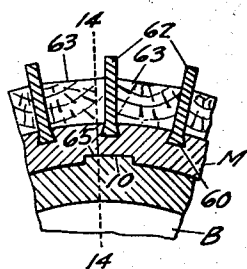


FIG. 13

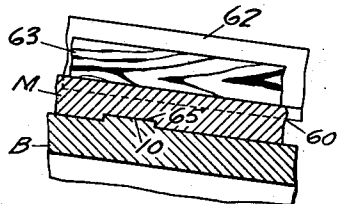


FIG. 14

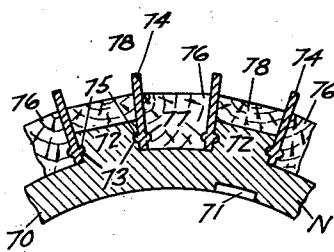


FIG. 15

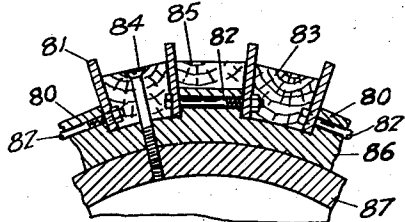


FIG. 16

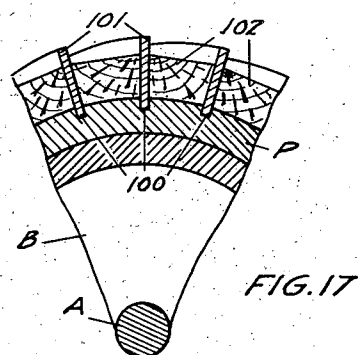


FIG. 17

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UNITED STATES PATENT OFFICE.

ARCHER LE ROY BOLTON, OF NORTH ANDOVER, MASSACHUSETTS.

BUILT-UP JACKET FOR JORDAN-ENGINE PLUGS.

Application filed February 8, 1923. Serial No. 617,811.

To all whom it may concern:

Be it known that I, ARCHER LE ROY BOLTON, a citizen of the United States, residing at North Andover, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Built-Up Jackets for Jordan-Engine Plugs, of which the following is a specification.

This invention relates to that part of a Jordan engine for refining paper stock known as the plug. In such engines, there is an outer shell of truncated conical form with knives which project inwardly, and on a shaft, axially disposed through the shell, is fixed what is known as a plug which carries on its outer truncated conical face what are known as bars which cooperate with the knives in treating the paper stock.

The plug body generally consists of a truncated hollow metal shell, often having longitudinal grooves, fixed between heads attached to the shaft, or of a series of spiders, often having longitudinal grooves which are properly aligned, such spiders being of successively increasing or decreasing diameter as fixed to the shaft.

In the longitudinal grooves, which may be of various cross sectional form, bars are placed and fastened in different ways, and, between these bars, wedge-shaped woods of key-shaped cross section are forced to firmly but resiliently keep the bars in position.

There are other types of plug bodies in which there are no grooves, to which bars and woods are fastened in various ways. Some of these are shown herein.

I am also aware that jackets made entirely of metal with projecting integral rectangular lugs serving the purpose of knives, such jackets being of truncated conical form, have been used in place of the knives and woods.

Wherever knives and woods are used, from time to time they wear or break, and the plug body must be removed from the engine so that the old knives and woods can be removed and new ones put in their places. This can be done either at the paper mill or else the plug part must be sent out to a machine shop, during which time the engine is out of use.

The purpose of a removable jacket is to reduce the time necessary for replacing worn out or broken wearing surfaces.

My invention broadly is a jacket for Jordan

engine plugs which is built up of bars separated by woods, and means by which they are held together in such manner that the whole jacket can be handled as a unit, shipped, and readily be put in place or removed.

More specifically, I claim the particular type of such jacket.

A great advantage is that the jacket can be built up by expert workmen at the shop where the bars and knives are made and then shipped as a complete unit so that it can be quickly put in place at the paper mill by any ordinary mechanic, which is lighter and which has many other advantages over the all metal type, as is well understood by those skilled in the art of making paper.

It can also be built up with bars of hard steel bronze or other metal with more or less elastic woods between instead of being all of cheaper, softer, all metal construction or very expensive hard metal construction.

A new set of knives and woods may be installed in this jacket either at the mill or machine shop, or the series of rings forming the body of the jacket may be returned to the factory in a comparatively small package and the new knives and woods installed in them by skilled workmen. Moreover, if only one ring of the jacket body is worn or damaged, it can be repaired or replaced without affecting the others. The plugs in ordinary use can readily be adapted to receive my built-up jacket.

In the drawings, Figure 1 is a sectional elevation of a Jordan engine shaft carrying a plug body of shell form shaped as a hollow truncated cone, with my preferred form of jacket in place.

Fig. 2 is a view of part of the same jacket shown in Fig. 1 and of the plug body, as viewed from the large end.

Fig. 3 is a view of one of my body rings removed, as from the large end of the plug.

Fig. 4 is an enlarged cross section on line 4—4 of Fig. 3.

Fig. 5 is a cross section on line 5—5 of Fig. 1, with a metal protecting strip added.

Fig. 6 is an enlarged cross section as on the line 6—6 of Fig. 5, but showing a spider or skeleton construction for the plug body.

Fig. 7 is an elevation of my preferred form of bar.

Fig. 8 is an elevation of a wood to be used with said bar.

Fig. 9 is an enlarged sectional elevation showing the way the plug and jacket may be fixed to the drive shaft.

Fig. 10 is a sectional detail of another type of jacket.

Fig. 11 is a side elevation of a skeleton plug body built up of spiders of varying sizes.

Fig. 12 is an end elevation of one of such spiders.

Fig. 13 is a sectional detail showing a continuous jacket body with a different type of bar slots.

Fig. 14 is a section on line 14—14 of Fig. 13.

Fig. 15 is a section similar to Fig. 13 showing another method of fastening bars to a jacket spider.

Fig. 16 is a view similar to Fig. 13 of another method of fastening bars to the jacket, and the jacket to the plug body.

Fig. 17 is a view similar to Fig. 13 of my jacket built up with woods and with bars which are curved, spiral, or set diagonally, as described and claimed in applications pending herewith.

In the drawings, A represents the shaft into which is fastened in any suitable manner as by a drive fit at 5 the plug body B of shell construction and truncated conical form. This is shown as having at its large end a head D cast integral therewith.

On the outside, this plug body is smooth except for a series of lugs 10 which project outwardly therefrom. This plug body may remain on the shaft A when the jacket now to be described is removed or replaced.

My preferred form of jacket comprises a series of metal rings of sizes to correspond with the outer surface of plug body B arranged so that when in position they will conform to the conical surface of the plug body.

Each ring C has one or more recesses 19 into which a lug 10 is adapted to fit.

Each ring C is also cut away to form a shoulder 21, as shown in Fig. 4, and on to this annular shoulder 21 is shrunk a holding ring F.

Each ring C also has a plurality of longitudinal slots 22 each of a size to receive a bar G.

Each bar G is shown as of substantially rectangular form and is shown as cut away at 31, 32, 33 and 37, leaving a part 30 projecting down below the rest to a line corresponding with the outer face of plug B. The part 33 is of a height to reach up over a holding ring F, and the parts are so cut that there will be at the large end a slot 34 which passes under the holding ring F at the large end and other cut-away parts 35 and 36 forming tangs 138 which pass under holding rings F. At the small end is a tang or tail 39 which extends under the holding

ring F at the small end, which may be put in position after the bars and the woods H between them are built up in the machine shop.

This jacket is put together at the machine shop, where it is manufactured, by being placed on a form of a shape corresponding with the plug body B, the rings C being first put in place, all but the small one having the holding rings F shrunk on. After this the bars G and woods H are put in position in the usual manner, and when this is finished the holding ring F at the small end is shrunk in position thereby holding the whole structure together.

I prefer also to use a protecting metal strip K positioned on top of the woods in a manner similar to what is shown in my application for patent pending herewith, covering for plug of Jordan engine, Serial No. 609,409, Dec. 28, 1922, and my patent No. 1,507,305 of Sept. 2, 1924. This not only protects the woods from the liquid in the machine but adds great strength and stiffness to the whole jacket.

The jacket is fastened in position by means of the lugs 10 and the corresponding recesses 19 which prevent any turning with reference to the plug body, and by a plate washer 40 slipped over the shaft A up against the small end of the plug and jacket and held in place by means of a lock nut 41 which screws on to threads 3 on shaft A.

If the plug body, instead of being a continuous shell as shown at B, is of skeleton construction as shown at B¹, Fig. 11, built up of a series of spiders extending from the large end 11 and the middle spiders 12 to the small end spider 13, some or all the six spiders are provided with outwardly extending lugs 113 corresponding with lugs 10.

It is obvious that my jacket can be slipped in place over such a skeleton plug body as indicated in Fig. 6 just as readily as over the type of plug body shown at B.

One of these spiders 12 is shown in Fig. 12 as being keyed to shaft A by means of a key 4, but they may be attached in any well known manner.

If it is desirable, as shown in Fig. 10, instead of the body rings C with no connections except the bars G and the woods H, rings may be used, such as 90, with suitable slots 91 fastened by brazing, riveting or otherwise, to a thin shell-like body 92 of a form to fit the plug body, and this may be fastened to the plug body 93 by means of screw 94.

In Fig. 13, I show a shell-like plug body B with lugs 10 and a jacket M in which are dovetailed grooves 60 in which fit similarly shaped edges of the bar 62. This dovetailing holds the bars in position while the woods 63 keep them apart.

In Fig. 15, I show a jacket body N made up of rings 70 each of which has a recess 71 on the inside, and on the outside lugs 72 which are recessed at 73 to fit ribs 75 on one side of bar 74, while corresponding ribs 75 on the other side fit suitable grooves 77 in the woods 76. 78 represent thinner woods which fit over the outside of lugs 72.

In Fig. 16, I show another construction in which 87 represents the plug body of either form and 86 represents the jacket body of either form, with outwardly projecting lugs 80 to which the bars 81 are fastened by means of bolts 82 and separated by woods 83 and 85 of suitable shape, the jacket 86 being fastened to the plug 85 by screws 84.

It is to be clearly understood that my jacket may be of skeleton ring form or may have a continuous metallic inner surface, and that the plug body may be of skeleton form or have a continuous metal outer surface.

I claim to be the first to devise a readily removable and detachable jacket built up of bars and woods, with suitable connecting means whereby it forms a unitary construction.

In the claims, "means to fasten" includes lugs 10 and 113, recesses 19, washer 40, nut 41, screws 84, 94, or any other similar devices.

I may use woods and bars the faces of which are relatively straight and the sides of which lie each in a flat plane or, as shown in Fig. 17, I may use a set of bars 101 which are curved spirally or otherwise or are set diagonally to the axis of the plug. The grooves 100 and corresponding woods 102 are shaped to correspond with the bars.

I claim:

1. In a Jordan engine, the combination of

a drive shaft, and a conical plug body carried thereby having projecting lugs; with a jacket removable from the plug body built up of a body consisting of rings of different sizes arranged to form a skeleton cone each having a recess engaging one of said lugs, an annular recess and a plurality of axial slots, a holding ring fixed in said annular recess, a plurality of bars fitted in said slots and under each holding ring, and woods between said bars.

2. In a Jordan engine, the combination of a drive shaft, and a conical plug body carried thereby; with a jacket removable from the plug body built up of a conical body member having annular recesses and a plurality of axial slots, a holding ring fixed in each annular recess, a plurality of bars fitted in said slots and under each holding ring, and woods between said bars, together with means to fasten said jacket to the plug body.

3. In a Jordan engine, the combination of a conical plug body with a unitary transportable jacket built up of a body, a plurality of bars fastened thereto, woods between said bars, and means to fasten said jacket to the plug body.

4. A unitary transportable jacket for Jordan engine plugs built up of a body, a plurality of bars fastened thereto, and woods between said bars.

5. In a Jordan engine, a unitary transportable jacket built up of a body consisting of holding rings of different sizes arranged to form a skeleton cone, in combination with a plurality of bars and woods positioned between said bars, said rings, bars and woods being so arranged as to hold each other together.

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