Jan. 13, 1942. D. E. JONES 2,270,057

JORDAN SHELL FILLING

Filed May 25, 1939 4 Sheets-Sheet 1

Fig. 1.

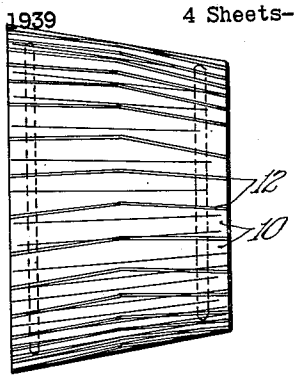


Fig. 2.

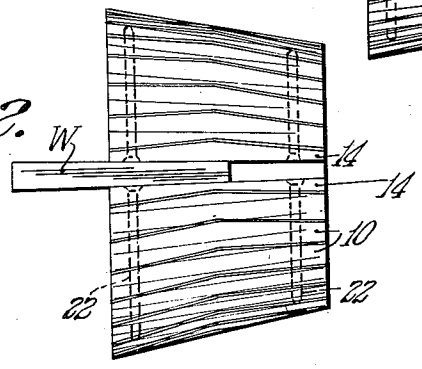


Fig. 3.

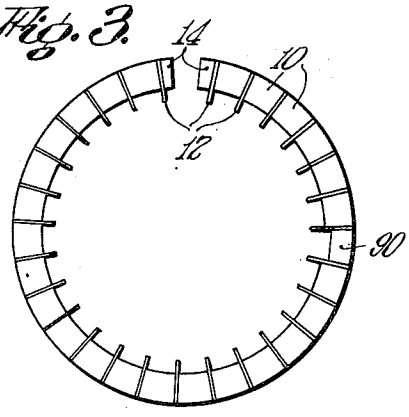


Fig. 4.

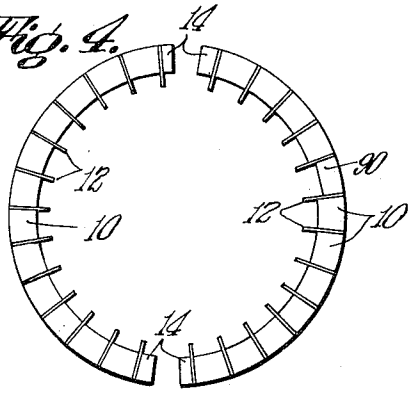


Fig. 5.

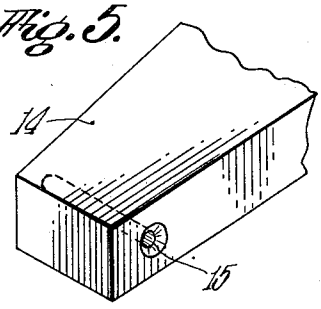


Fig. 6.

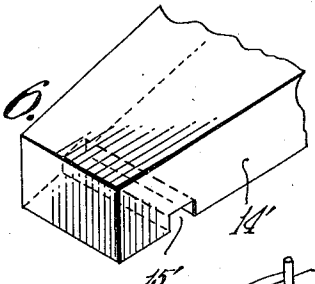
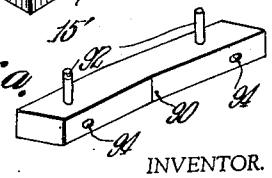


Fig. 6a.



INVENTOR.
Dwight D. Jones.
BY Walter C. Fox.
ATTORNEY.

Jan. 13, 1942. D. E. JONES 2,270,057

JORDAN SHELL FILLING

Filed May 25, 1939 4 Sheets-Sheet 2

Fig. 7.

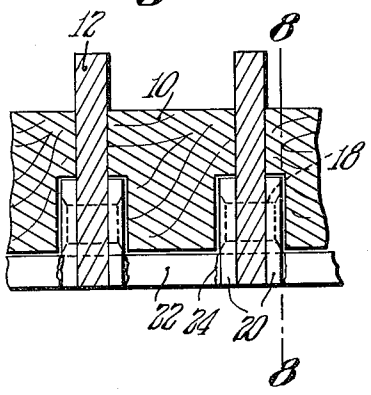


Fig. 8.

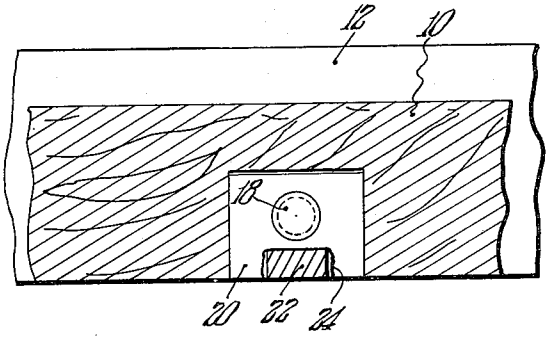


Fig. 9.

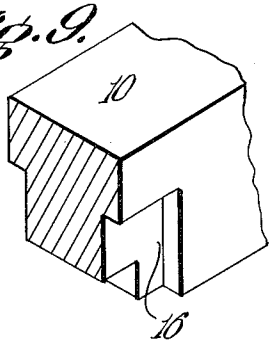


Fig. 10.

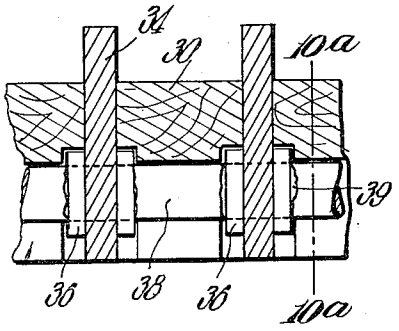
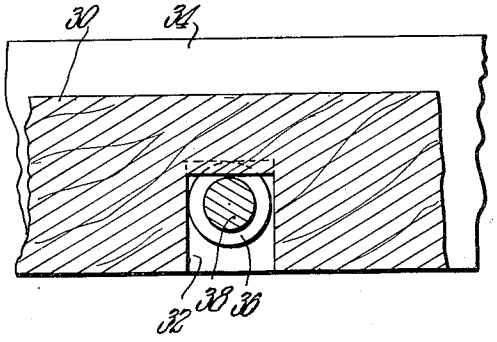


Fig. 10a.



INVENTOR.

BY Dwight D. Jones.
Walter C. Ross.
ATTORNEY.

Jan. 13, 1942. D. E. JONES 2,270,057

JORDAN SHELL FILLING

Filed May 25, 1939 4 Sheets-Sheet 3

Fig. 11.

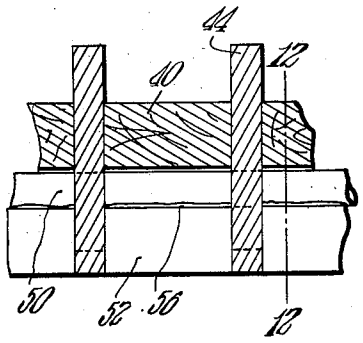


Fig. 12.

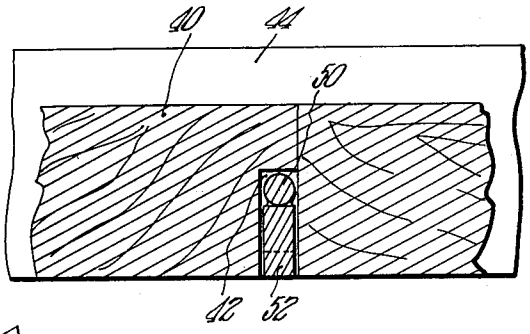
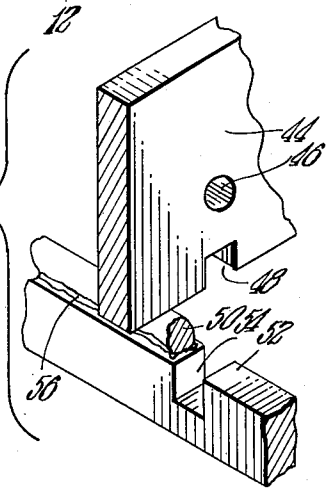


Fig. 13.



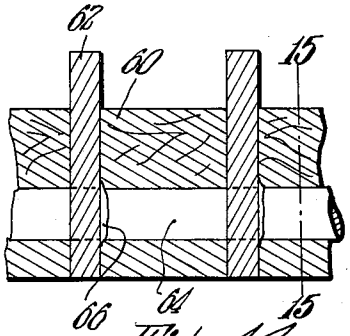


Fig. 14.

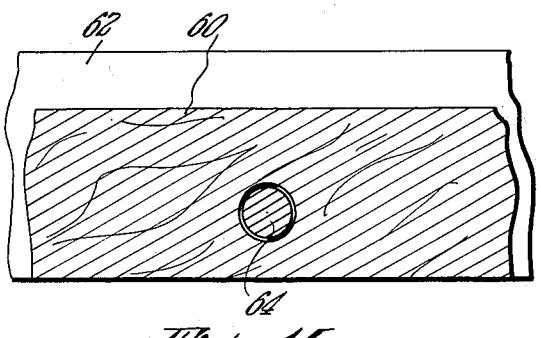


Fig. 15.

INVENTOR.
Dwight E. Jones.
BY Walter C. Rose
ATTORNEY.

Jan. 13, 1942. D. E. JONES 2,270,057

JORDAN SHELL FILLING

Filed May 25, 1939 4 Sheets-Sheet 4

Fig. 16.

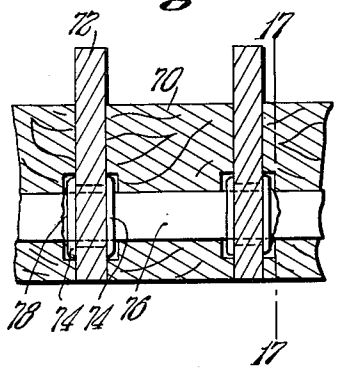


Fig. 17.

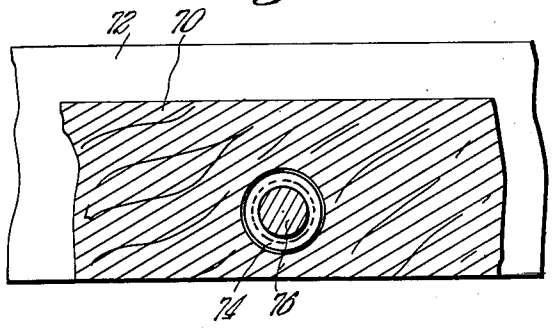


Fig. 18.

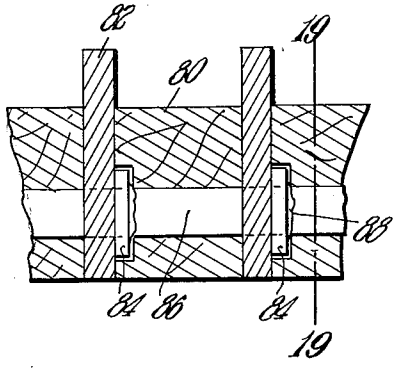
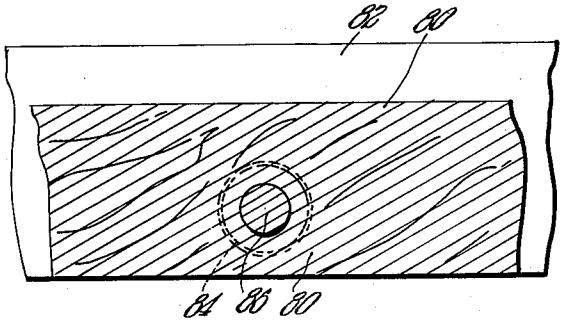


Fig. 19.



INVENTOR.
Dwight E. Jones.
BY Walter C. Ross.
ATTORNEY.

Patented Jan. 13, 1942 2,270,057

UNITED STATES PATENT OFFICE

2,270,057

JORDAN SHELL FILLING

Dwight E. Jones, Pittsfield, Mass., assignor to E. D. Jones & Sons Company, Pittsfield, Mass., a corporation of Massachusetts

Application May 25, 1939, Serial No. 275,769

3 Claims. (Cl. 92—27)

This invention relates to improvements in linings or fillings for the stationary element or shell of a Jordan engine.

It is a principal object of the invention to provide a unitary filling or lining of tapered construction adapted to be readily inserted in the tapering shell member of a Jordan engine. As a special feature of this invention the filling may have one or more longitudinal splits into which a wedge or wedges may be driven so as to expand, wedge or anchor the filling in place in the shell. The filling of the invention may be in one or more parts and when it is split into two or more parts the same may be conveniently stored and shipped and readily inserted in place in the shell and suitable wedges inserted between the adjacent longitudinal marginal edges of adjacent members to expand the filling more or less within the shell.

It is another object of the invention to provide a split filling having end spacers, that is the spacers at adjacent marginal end or edge portions of the split or splits, which may be of metal, to which a tie member or members are fixedly secured. The result is a rigid and solid unitary construction as will later appear.

It is still another object of the invention to provide a Jordan shell filling having alternate grinding bars or knives and spacers with means permanently connecting the spaced knives and holding them against the intermediate spacers in such a way as to provide a unitary, rigid, solid structure. That is to say, the filling is such that it may be preconstructed in the shop, packed, shipped and delivered to the user as a unit or units, and then readily fitted into the shell.

Various other novel features and advantages of the invention will be hereinafter more fully referred to in connection with the accompanying description of the preferred form of the invention, reference being had to the drawings, wherein:

Fig. 1 is a side elevational view of a shell filling embodying the novel features of the invention;

Fig. 2 is a side elevational view showing a filling similar to that of Fig. 1 having a wedge for expanding the same;

Fig. 3 is an end view of the filling of Fig. 3;

Fig. 4 is a similar view of a unit having two longitudinal splits;

Fig. 5 is a perspective view of a portion of one form of an end spacer member;

Fig. 6 is a perspective view of a portion of another form of end spacer member;

Fig. 6*a* is a perspective view of an anchor rail member;

Fig. 7 is a partial sectional view through one form of a filling showing adjacent knives and spacers with tie means;

Fig. 8 is a sectional view on the line 8—8 of Fig. 7;

Fig. 9 is a partial perspective view showing a part of one of the spacers shown in Figures 7 and 8;

Fig. 10 is a view similar to Fig. 7 showing another form of the invention;

Fig. 10*a* is a sectional view on the line 10*a* of Fig. 10;

Fig. 11 is a view also similar to Fig. 8 showing still another form of the invention;

Fig. 12 is a sectional view on the line 12—12 of Fig. 11;

Fig. 13 is a partial perspective view showing the parts of Figures 11 and 12 in disassembled relation;

Fig. 14 is another view similar to Fig. 8 showing still another modification of the invention;

Fig. 15 is a sectional view on the line 15—15 of Fig. 14;

Fig. 16 is a view similar to Fig. 8 showing another modification;

Fig. 17 is a sectional view on the line 17—17 of Fig. 16;

Fig. 18 is a view similar to Fig. 8 showing a further modification; and

Fig. 19 is a sectional view on the line 19—19 of Fig. 18.

Referring now to the drawings more in detail, the invention will be fully described.

The filling of the invention consists generally of one or more conical sections for inserting in the shell of a Jordan engine. When more than one section is employed the sections are arranged to be inserted in end to end relation in the shell, and for shipping and storage purposes, the sections may be inserted or nested one within the other. In Fig. 1 there is one of such sections illustrated.

The section shown in Fig. 1 and constituting the filling of the invention is conical in shape as shown. As stated, there are at least two or more such units end to end, with the smaller end of the forward unit being approximately the diameter of the larger end of the next unit and so on.

For purposes of description, we have shown but one unit and said unit consists of alternate bars and spacers assembled in various ways which will eventually be described. Each unit preferably

has at least one longitudinal slit such as the form shown in Fig. 3 but there may be no splits, as shown in Fig. 1 or two splits dividing the sectional unit into two parts, as shown in Fig. 4. It will be appreciated that when the filling section is in two or more parts, the latter may be readily stacked so as to take up little space which facilitates storing and shipping of the same.

Each part, according to this invention, whether it have one or more splits or none at all is of itself a fixed unit. That is, its alternate bars and spacers have means permanently holding them in fixed relation so as to form a solid and rigid construction.

Before describing this means, which, as will presently appear, may take various forms, the method of assembling a split filling in a shell will be described. Where there is a single longitudinal split as shown in Fig. 3, the unit is inserted into the shell and a wedge member such as W is inserted between the coinciding marginal edges of the split and driven in to the desired distance so as to expand the same and cause it to be rigidly held in place within the shell. Of course, where the filling consists of two pieces as shown in Fig. 4, a wedge is inserted into each of the splits.

According to all of the preferred forms of the invention, the spacers **10** are formed of wood and the knives **12** of metal, although it will be appreciated that some other relatively rigid material could be adapted to space the knives apart. Preferably too, when a split unit is employed, the end spacers indicated by **14** are formed of metal for a purpose which will appear later.

As above mentioned, I provide permanent holding means for these knives or bars and spacers which serve to provide a solid assembled relation. In the assembling of the various forms of units, I apply pressure to each bar as it is installed to assure its being firmly up against the wood, and, as will appear, when the assembly is completed, the bar cannot move in either direction because it is held fast by individual welds.

According to the modification shown in Figs. 7, 8 and 9, the woods **10** have slots such as **16** cut in their sides intermediate their ends. One knife **12** is disposed adjacent each side of the spacer and the slots thus provide recesses therebetween.

Prior to assembly I secure to opposite sides of each knife, as by a headed-over rivet **18**, what I call clips **20**. These are of metal, and therefore may be welded to the knives instead of riveted, if desired.

The clips **20** and bars **12** are slotted at their lower sides to receive a continuous tie member **22** which extends circumferentially of the unit as indicated in Fig. 2 and passes through the lower part of the slots **16** in the spacers. The tie member **22** is then welded, as indicated by **24**, to the clips whereby the tie member is held against any movement relative to the knives and, of course, the spacers are rigidly locked between the knives.

It will be noted that in the detail drawings, the knives are shown as being in parallelism and the spacers as being of equal width throughout their height.

The showing is thus for purposes of convenience and clarity but it will be appreciated that in the actual assembled construction, the spacers are wedge-shaped, that is narrower at their upper or inner sides than at their outer, and the knives are radially disposed. This will be apparent from Figs. 3 and 4.

In the preferred form of the invention, each unit has a pair of tie members, one adjacent each end thereof, as indicated in Figs. 1 and 2. That is to say, preferably the knives and spacers are similarly slotted or recessed as described adjacent its opposite ends.

However, only one or more than two tie members could be employed.

According to the preferred form of the invention, what I call an anchor rail member **90** is provided to secure the filling to the shell and prevent its rotating. This may be inserted in place of one of the woods and have bolts **92** associated therewith for attachment to the shell. When the circular tie members are employed, suitable openings **94** through the rail are provided to receive them.

In Figs. 10 and 10*a* I have shown another form of the invention with separators **30** slotted at **32** in their lower sides as shown. Knives **34** are disposed between the woods **30** and there are what I call washers **36** adjacent opposite sides of the knives.

These members **36** may be either round or square or any shape desired and extending through them as well as through the knives **34** and through the slots **32** is a continuous rod or band **38** which is welded to the washers after assembly as indicated at **39**. In this form it will be seen that the band **38** being rigidly fixed to washers which are forced up against the knives holds the knives and spacers against any relative movement whatever so as to render the whole assembly in rigid construction. Preferably the band **38** is substantially flush against the upper sides of slots **32**.

In Figs. 11 and 12 another modification of the invention is shown as including woods **40** notched as at **42** and knives **44** apertured at **46** and notched at **48**. Extending through the apertures **46** and the upper parts of notches **42** are tie members **50** while continuous rings or bands **52** having spaced notches **54** are disposed below the members **50**, passing through the lower parts of slots or notches **42**.

The notches **54** are arranged to receive the portions of the cutting bars which lie between the latters' openings **46** and notches **48** as indicated in Fig 13. Then the bands **52** and **50** are welded together as at **56** whereby the apertured knives and notched spacer bars are firmly held in place.

The form shown in Figs. 14 and 15 includes alternate woods **60** and knives **62** which are apertured to receive a continuous rod, band or ring **64**. The latter is preferably rigidly fixed to the knives by welding indicated at **66**.

According to the forms shown in Figs. 16 and 17 spacers **70** are apertured and notched to provide recesses in their sides. Knives **72** have what I call bushings **74** which receive a continuous rod or band **76** and which bushings are welded to the rods, preferably only at one side as at **78** which makes it impossible for the bars to move sideways.

In this form the bushings **74** are preferably of some soft steel which readily lends itself to welding and which, prior to the welding, is pushed into the bars **72**. This is desirable because often the knives are formed of material which will not properly weld and the bushings of this invention are easily pressed into the bar.

A rod or band **86** extends through the aper-

tures, and washers and through the knives and welding indicated at 88 secures the washers to the rod. The assembly is thus held rigid, the tie member 86 being immovable through the alternately-arranged bars and spacers.

It will be appreciated that the fillings of this invention will retain their size and shape under most conditions, as contrasted with prior art construction which have the objection that when the woods dry out as from over-heating and shrink away from the knives, the knives are allowed to move and thereby alter the size and shape of the preassembled truncated section.

That is to say, my knives are firmly held in a definite spaced relation so that the shape and size of the filling are not affected by any shrinkage of the woods. I desire to point out, too, that if the woods of my fillings do shrink during storage, when they come into contact with moisture in the refining machine they will swell back to their original condition flush against the knives which, of course, have not moved from their original relationship because of the construction described.

Also by reason of the permanent tieing of the knives in place, any individual bar is prevented from being pulled out from between the plug and shell and thereby damaging the remainder of the filling. Thus I provide a safer and stronger construction.

While I have described the invention in great detail and with respect to the present preferred form thereof, it is not desired to be limited thereto since changes and modifications may be made therein without departing from the spirit and scope of the invention. The invention may be embodied in other specific forms without departing from the essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What it is desired to claim and secure by Letters Patent of the United States is:

1. A preconstructed lining section for a Jordan engine shell comprising in combination, a plurality of alternately-arranged and adjacently-disposed spacer members and metallic knives, said knives projecting inwardly beyond the inner marginal edges of said spacer members and the latter being provided with transversely extending cut-out portions therein intermediate the opposite ends thereof, separate preformed metallic clip members disposed in said cut-out portions and closely adjacent longitudinal faces of said knives, the latter and said preformed clip members being provided with notches which extend transversely therethrough in substantial coincidence with said cut-out portions of the spacer members, and a tie rod extending through said cut-out portions and notches and permanently secured to said preformed clip members.

2. A preconstructed lining section for a Jordan engine shell comprising in combination, a plurality of alternately-arranged and adjacently-disposed spacer members and metallic knives, said knives projecting inwardly beyond the inner marginal edges of said spacer members and each of the latter being provided intermediate its opposite ends with cut-out portions which extend inwardly towards one another transversely of the opposite longitudinal faces thereof, separate preformed metallic clip members disposed in said cut-out portions and closely adjacent the opposite longitudinal faces of each of said knives, the latter and said preformed clip members being provided with notches which extend transversely therethrough in substantial coincidence with said cut-out portions of the spacer members, and a tie rod extending through both said cut-out portions and notches and permanently secured to said preformed clip members.

3. A preconstructed lining section for a Jordan engine shell comprising in combination, a plurality of alternately-arranged and adjacently-disposed spacer members and metallic knives, said knives projecting inwardly beyond the inner marginal edges of said spacer members and each of the latter being provided intermediate its opposite ends with cut-out portions which extend inwardly towards one another transversely of the opposite longitudinal faces thereof, separate preformed metallic clip members disposed in said cut-out portions and closely adjacent the opposite longitudinal faces of each of said knives, the latter and said preformed clip members being provided with notches which extend transversely therethrough in substantial coincidence with said cut-out portions of the spacer members, a tie rod extending through both said cut-out portions and notches and permanently secured to said preformed clip members, and separate means securing together the clip members adjacent opposite faces of a knive.

DWIGHT E. JONES.