

Dec. 7, 1943.

F. C. SCHUELER

2,336,039

JACKET UNIT FOR SLOTTED PLUGS

Filed April 15, 1940

3 Sheets-Sheet 1

FIG. 1.

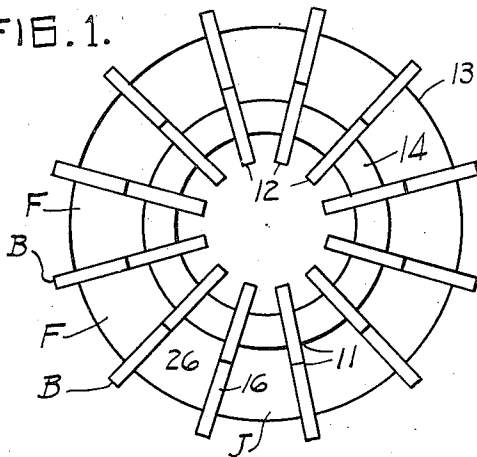


FIG. 2.

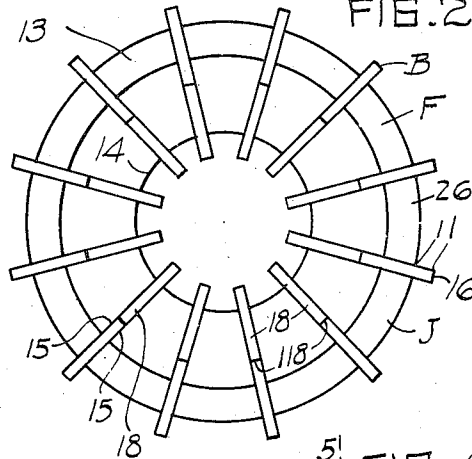


FIG. 3.

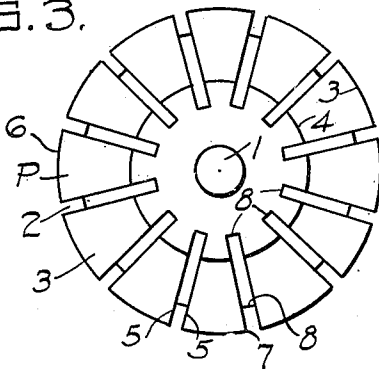


FIG. 4.

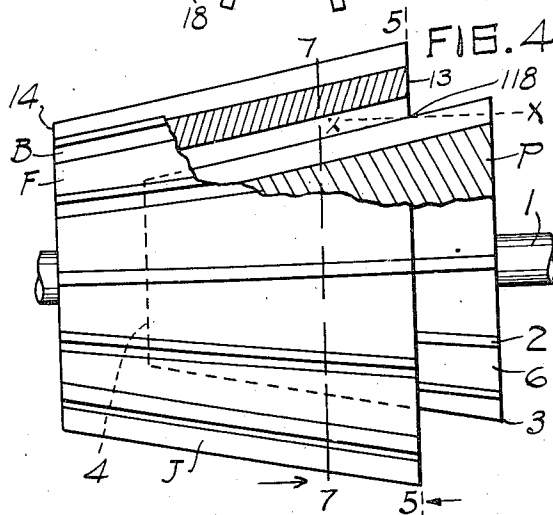


FIG. 5.

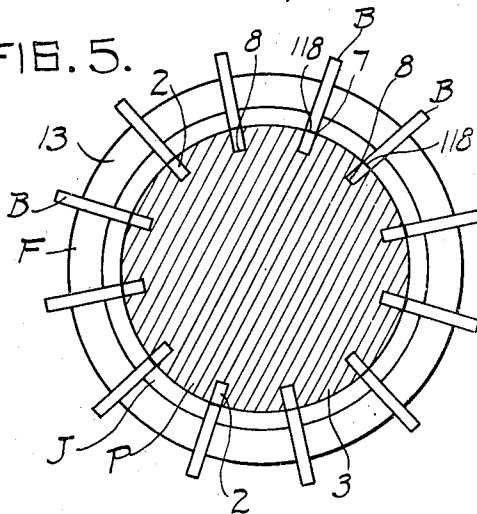
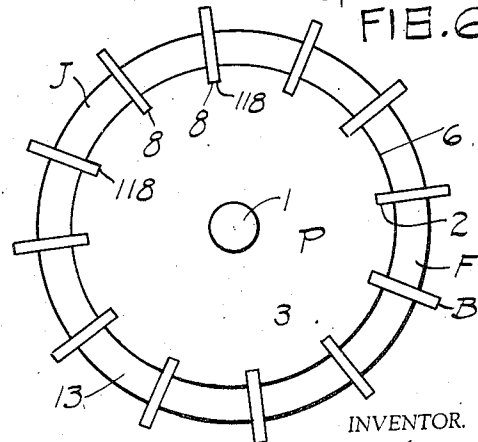


FIG. 6.



INVENTOR.

BY

Fred C. Schueler
Charles W. Johnson
ATTORNEY.

Dec. 7, 1943.

F. C. SCHUELER

2,336,039

JACKET UNIT FOR SLOTTED PLUGS

Filed April 15, 1940

3 Sheets-Sheet 2

FIG. 7.

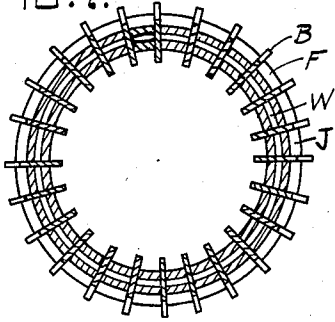


FIG. 8.

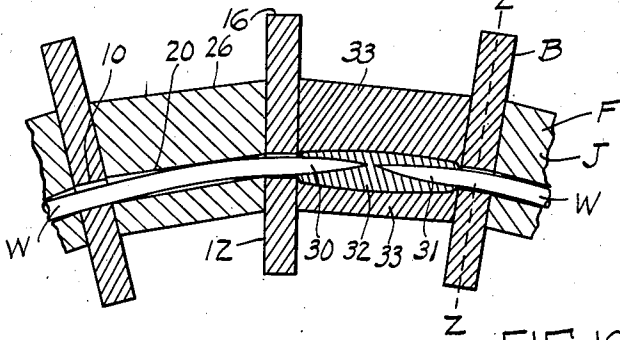


FIG. 9.

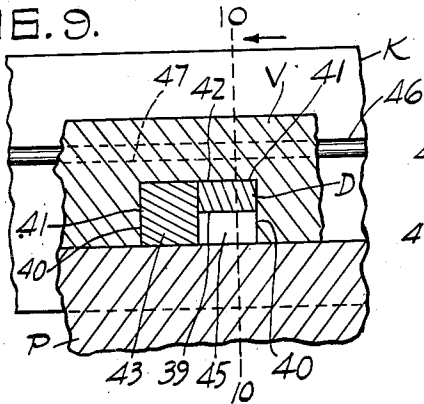


FIG. 10.

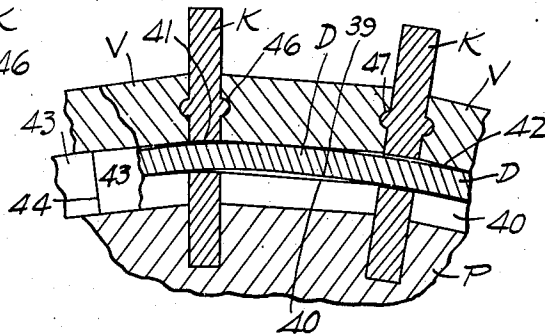
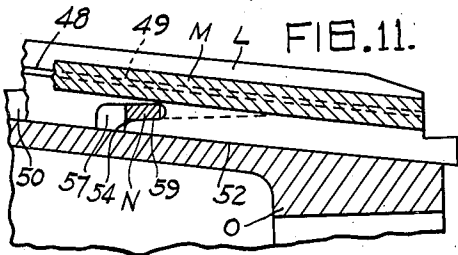


FIG. 12.

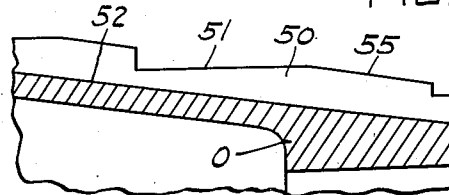


FIG. 13.

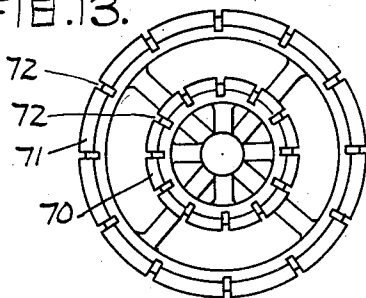
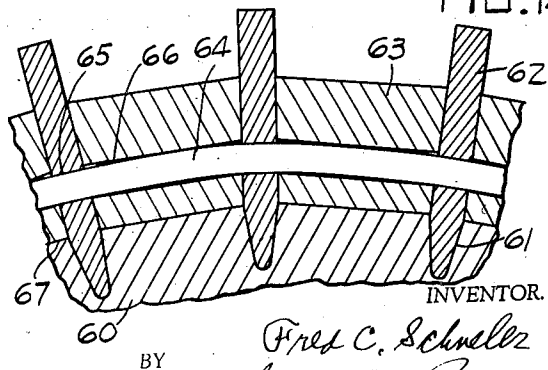


FIG. 14.



INVENTOR.

BY

Fred C. Schueler
Charles W. Pearson
ATTORNEY.

Dec. 7, 1943.

F. C. SCHUELER

2,336,039

JACKET UNIT FOR SLOTTED PLUGS

Filed April 15, 1940

3 Sheets-Sheet 3

FIG. 15.

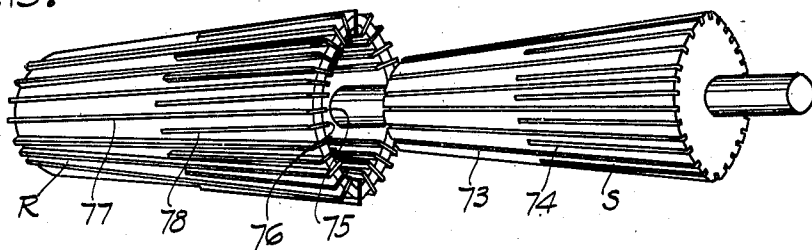


FIG. 16.

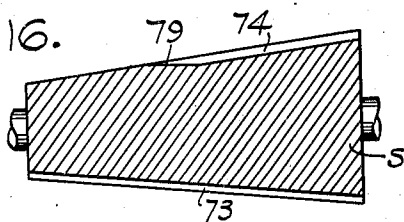
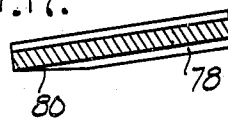


FIG. 17.



INVENTOR.
F. C. Schueler
BY *Arthur W. Pearson*
ATTORNEY.

UNITED STATES PATENT OFFICE

2,336,039

JACKET UNIT FOR SLOTTED PLUGS

Fred C. Schueler, Wausau, Wis., assignor to John W. Bolton & Sons, Inc., Lawrence, Mass., a corporation of Massachusetts.

Application April 15, 1940, Serial No. 329,649

9 Claims. (Cl. 92—27)

This invention relates to unsplit plug jackets for truncated conical Jordan engine plugs. It is distinguished as an article of merchandise from the usual individual parts, such as, bars, separators or fillers, and bands which are extensively, and in fact almost universally, used for lining or covering the outside of Jordan plugs.

The article of this invention is a jacket unit which can be made complete in a machine shop and can be shipped as a unit without distortion or falling apart and which can be slipped on to a Jordan plug which is provided with straight longitudinal slots which converge from the large towards the small end and which are of substantial depth.

Such slots may have straight sides which are in parallel planes, the planes also being parallel with one which extends through the axis or the sides may converge towards the axis of the jacket or plug but in any case the outside or entrance of the slots must be of the same size or larger than the inside.

The feature of this device is the use of a plurality of straight bars between which are fillers or separators; the whole being firmly fastened together in some way, preferably without a split. In every case a part of substantially all the bars or its equivalent projects inward and these parts or projections converge not only from the large towards the small end of the jacket but also converge towards the axis of the cone.

These inside projections and the slots into which they fit are preferably of such depth that when the jacket is slipped on a plug and the inwardly projecting parts of the bars enter and are fully seated in the slots in the plug, the whole jacket and every part of it is locked or held against any possible radial displacement on account of centrifugal force when the plug is revolving.

This locking is because the spaces between the slots diverge outwardly from the axis while the spaces between the bars converge inwardly.

My jacket is an assembled inseparable unit in which, whether the unit is off the plug or on it, the bars and fillers are so fixed together that none of them can move out of position. On account of these facts, my jacket can be slipped or forced onto a slotted plug and will be held at all points evenly and firmly in place without the use of any screws or fastening means to keep it from slipping circumferentially or from

bulging or getting out of shape radially at any point.

If well made, it can be slipped in place and held there by a plate at the small end and can be slipped off in the opposite way but if it is stuck or rusted in place, it can be forced or driven on or off as a unit without being distorted or damaged.

My jacket assembly of bars and fillers can be held together in various ways, some of which will be shown and described so that no bar nor filler can move or be moved out of its place.

The bars usually and preferably project outwardly beyond the outer faces of the fillers and these outer faces are also preferably straight but they may be wavy or may have projections or indentations provided the general direction is straight and conforms to the inside projections.

I am familiar with the patent to Abbe, No. 247,286, of September 20, 1881, who claims a construction where bars and woods are loosely strung on rings, which rings can be varied or adjusted in circumference. I am familiar with the slotted construction of Dillon, No. 621,298, and the ring and band type of Peterson, No. 1,890,622, but neither of these shows an unitary assembly.

The sleeves of Pierce, No. 1,158,277; Bahr, No. 1,166,310; Bolton, No. 1,633,308; De Cew, No. 1,947,900; Bray, No. 2,009,985; and Smith, No. 2,009,976, are all smooth on the inside face and do not fit a slotted plug.

The same is true of the patents to Bolton, No. 1,576,504; Wessel, No. 1,874,676; and Herman, No. 2,027,041 with the additional fact that in these, any bar or separator can be knocked or shaken out of place.

In my construction a single bar or separator cannot be removed alone without braking the assembly.

The Riehm, No. 2,008,228, construction includes, as a fundamental feature, relatively shallow keys, the purpose of which is to prevent the assembly from revolving circumferentially and each of the keys is screwed to the plug.

The jacket of this application is held in substantial uniformity at all points against radial and axial displacement of any of the bars or any of the separators or fillers, while with the Riehm construction, there is a tendency to bulge between and at the keys on account of centrifugal force.

The recent patents to Bridge, No. 2,146,791, and Martindale, No. 2,146,830, are not remova-

ble jackets but separable assemblies of slotted plug, bands, bars and separators.

In the drawings most of the views are shown as of a small plug and jacket with a few bars. Fig. 1 is an elevation from the small end of the jacket. Fig. 2 is an elevation from the large end of the jacket, and Fig. 3 is an elevation from the small end of a plug onto which the jacket is to fit.

Fig. 4 is a side elevation, partly in section, showing a jacket being placed on a plug at the place where the inwardly projecting parts of the jacket bars first start to enter the slots in the plug.

Fig. 5 is an elevation looking from the right on the line 5—5 of Fig. 4.

Fig. 6 is an elevation from the large end of a plug showing the jacket fully in place with the inwardly projecting parts of its bars completely seated in the slots of a plug.

Fig. 7 is a section of the jacket shown in Figs. 1 to 6 on line 7—7 of Fig. 6 with the plug omitted.

Fig. 8 is an enlarged sectional view of that portion of the jacket shown in Fig. 7 where the ends of a holding wire are welded together.

Fig. 9 is a fragmentary sectional view showing a method by which bars and separators can be held together and Fig. 10 is a sectional view as from the right of line 10—10 of Fig. 9.

Fig. 11 is a fragmentary longitudinal sectional view showing another construction in which the bars and separators can be held together so as to fit a plug having annular recesses part of which is shown in section in Fig. 12.

Fig. 13 is an elevation from the small end of a skeleton plug.

Fig. 14 is a view similar to Fig. 8 of another construction in which the bars are of a slightly different shape.

Fig. 15 is an isometric view showing a plug having slots of different lengths and a jacket having bars of different lengths to fit the plug and Figs. 16 and 17 are details showing how the slots or the bars may be modified in a construction such as shown in Fig. 15.

In the drawings P represents a plug of one well known type carried by a shaft 1 and having in its curved surface 6 the longitudinal slots 2 which converge from the large end 3 towards the small end 4 and have sides 5, 5 which are parallel with each other and with a plane Z, Z, Fig. 6, which passes through the axis. 7 represents the outside opening and 8 represents the inside face or bottom of each slot 2.

J represents the jacket as a whole made up of the bars B and fillers F, held together as shown in Figs. 7 and 8 by wires W which pass through holes 10 in the bars B and 20 in the fillers F. As shown in Figs. 7 and 8, the ends 30 and 31 of each wire W are welded together at 32 while the space between the adjoining bars is filled as with metal 33.

The bars at 11 project beyond the outer faces 26 of the fillers as far as 16 which indicates the outer face of each bar. 12 represents the inwardly projecting part of each bar and the bars as shown, converge from the large end 13 to the small end 14 of the jacket J. The sides on the inside at 15, 15 are parallel and are exactly the same distance apart as the sides 5, 5 of each slot 2 while the inside face 18 of each bar coincides exactly with the outside opening 7 of each slot.

An examination of Figs. 4 and 5 will show that at the transverse plane on which Fig. 5 is drawn, the inside face 18 of each bar will just enter the outside opening 7 of each slot. As the jacket J

is pushed along, the front inside edge 118 of face 18 of each bar B enters a slot and continues to move in a line or plane $x-x$ parallel with the axis until it reaches the bottom of the slot through which it travels. It reaches the bottom 8 of a slot 2 at the large end of the plug as shown in Fig. 6.

During this movement of the jacket J towards the large end of the plug in line or plane $x-x$, as the slots converge radially but diverge axially, this front entering edge 118 of each inner bar face 18 continues to fit each slot as it moves.

Every other transverse part of each bar acts in the same way as its front edge 118 as it moves along parallel lines or planes to one such as $x-x$ in Fig. 4.

As this condition prevails at all points along the inwardly projecting sides of every bar and corresponding parts of every slot the result is that the jacket can be slipped on or slipped off, and when in place on the plug, if the parts are firmly held together the converging spaces between the bars and the diverging spaces between the slots positively lock the whole unit in position at all points.

There are other ways of firmly fastening together the bars and fillers besides the one just described.

In Figs. 9 and 10, the bars are represented by K and the fillers by V and endless bands or hoops are represented by D.

A similar arrangement of recessed bars and fillers has been used in assembling individual bars and fillers on a slotted plug forming part of which are bands or rings which are shrunk in place or otherwise permanently fastened to the plug. However with such an arrangement each bar and filler can be individually removed but they cannot be removed or installed as an assembly nor can they be shipped as a unit. If the bars and fillers could be removed as a unit, they would fall apart.

There is a ring of rectangular recesses 40, 40 in the fillers V, V, and L-shaped recesses 41, 41, in the bars K, K, which leave tongues 45, 45, extending inside each band D to hold a bar in place.

As a convenient method of locking the parts in place, I use a ring 43, split at 44 which I spring into the ring of recesses 40, 41 after all the bars K and fillers V have been assembled on bands D, as shown in Fig. 10. This ring 43 prevents lateral movement while the tongues 45, 45 formed inside the part 42 of recess 41 and band D prevent radial movement of the bars. Ribs 46 on bars K entering grooves 47 in fillers V prevent radial movement of the fillers.

In Fig. 11, I show a jacket made up of fillers M and bars L provided with ribs 48 and grooves 49. Bar L also has an L-shaped recess 57 to receive a band N with an inside face 59 lying in a cylinder corresponding with annular recess 51 in a plug O having slots 50 which extend in to 52.

The spaces between slots 50 indicated by 51 are cut away to form an annular ring which permits bands such as N, the inside faces 59 of which are parallel with the axis, instead of with the surface of the plug, as are faces 39 of bands D, to be slipped in place and welded at 54 to a bar L.

This jacket of Fig. 11 is to fit on a plug O such as shown in Fig. 12 with slots 50 which extend down from curved surface 55 in which are annular recesses formed by cut away parts 51

to accommodate bands N as the jacket is slipped on.

As shown, the inner and outer faces of bands D are in curves concentric with the cone surface while those of bands N lie in cylinders struck on the axis of the cone.

In Fig. 13, is shown an elevation, as from the small end of a well known type of what might be called a skeleton plug built up of spiders or rings such as 70 and 71 through both of which extend the longitudinal slots such as 72.

As shown in Fig. 14, I may use slots 61 in a plug 60 whose sides converge inward and bars 62 the inner portions of which also converge to fit slots 61. As shown, fillers 63 rest on the curved surface 67 of plug 60 and are pierced with holes 66 which register with holes 65 in bars 62, through both of which passes an endless ring, wire or band 64.

In Fig. 15, is shown a plug S with long slots 73 and short slots 74 into which fit the inward extensions 75 and 76 of long bars 77 and short bars 78 of a jacket R. With long and short bars, each short slot 74 must have a part 79 parallel with the axis as shown in Fig. 16 or each short bar must be cut away as at 80 as shown in Fig. 17 or the short bars must go into long slots, because the movement of the front, inside entering edge 118 and of all parts of every bar is parallel with the axis.

I claim:

1. For use with a truncated conical Jordan plug having in its curved surface a plurality of straight slots which converge towards each other from the large towards the small end, each slot having sides which are parallel with and at substantially equal distances from a plane which passes through the axis of the plug; an unsplit plug jacket which is transportable as a unitary structure and is made up of a plurality of straight bars, part of each bar projecting inwardly so as to fit into a slot in such a plug, together with fillers between the bars which will extend from substantially the surface of the plug between the outwardly projecting part of the bars, and means to hold the bars and fillers rigidly together.

2. For use with a truncated conical Jordan plug having in its curved surface a plurality of straight slots which converge towards each other from the large towards the small end, each slot having sides which are at substantially equal distances from a plane which passes through the axis of the plug; an unsplit plug jacket which is transportable as a unitary structure and is made up of a plurality of straight bars, part of each bar projecting inwardly so as to fit into a slot in such a plug, together with fillers between the bars which will extend from substantially the surface of the plug between the outwardly projecting part of the bars, and means to hold the bars and fillers together.

3. A bodily transportable truncated conical unitary unsplit plug jacket made up of straight

bars with fillers between them, the bars and fillers being firmly fastened together in such a manner that the bars project outwardly and also inwardly from the fillers and converge from the large towards the small end.

4. A bodily transportable truncated conical unitary plug jacket made up of straight bars with fillers between them, the bars and fillers being firmly fastened together in such a manner that the bars project outwardly and also inwardly from the fillers and converge from the large towards the small end.

5. A bodily transportable truncated conical unitary plug jacket made up of straight bars with fillers between them, the bars and fillers being firmly fastened together in such a manner that the bars project inwardly from the fillers and converge from the large towards the small end.

6. A bodily transportable truncated conical unitary plug jacket made up of bars with fillers between them, the bars and fillers being firmly fastened together, a part of each bar being straight and projecting inwardly from the fillers, the straight parts of the bars converging from the large towards the small end.

7. A bodily transportable truncated conical unitary unsplit plug jacket made up of straight bars with fillers between them, the bars and fillers being rigidly fastened together in such a manner that the bars project outwardly and also inwardly from the fillers and converge from the large towards the small end.

8. For use with a truncated conical Jordan plug having in its curved surface a plurality of straight slots which converge towards each other from the large towards the small end, each slot having sides which are at substantially equal distance from a plane which passes through the axis of the plug; an unsplit rigid plug jacket which is transportable as a unitary structure and is made up of a plurality of straight bars, part of each bar projecting inwardly so as to fit into a slot in such a plug, together with fillers between the bars which will extend from substantially the surface of the plug between the outwardly projecting part of the bars, and means to hold the bars and fillers rigidly together.

9. For use with a truncated conical Jordan plug having in its curved surface a plurality of slots which converge towards each other from the large towards the small end, each slot being as wide at its outside opening as it is at its inside face; a rigid unsplit plug jacket which is transportable as a unitary structure and is made up of a plurality of bars, part of each bar projecting inwardly so as to fit into a slot in such a plug; together with fillers between the bars which will extend from substantially the surface of the plug between the outwardly projecting part of the bars and means to rigidly hold the bars and fillers together.

FRED C. SCHUELER.