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PACKING

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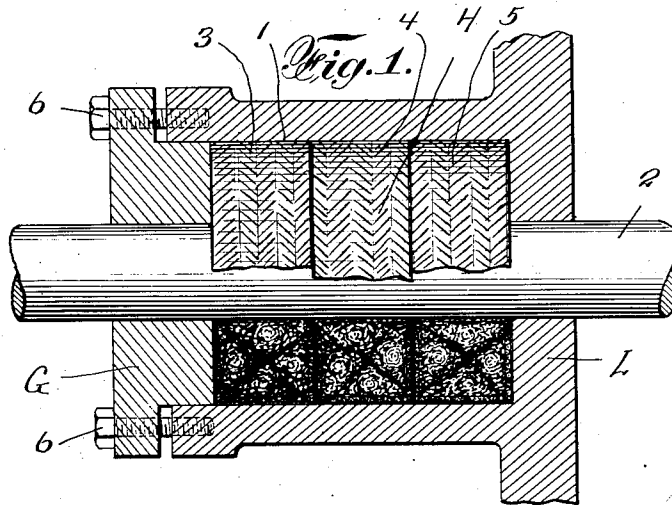
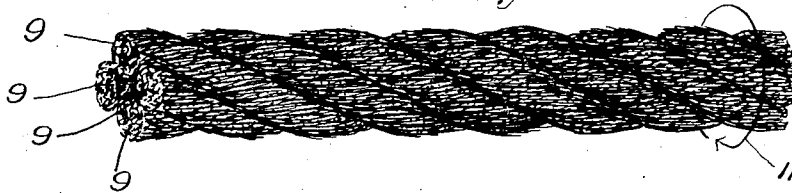
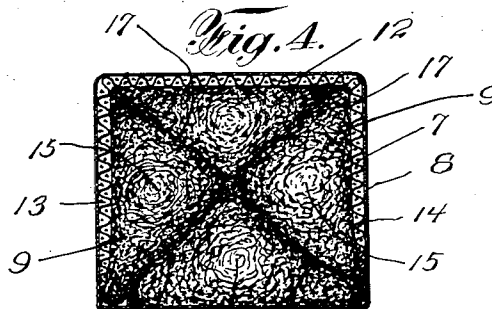


Fig. 2.



Fig. 3.



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PACKING.

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This invention relates to an improvement in packings. While the packing may be used to advantage in various relations it is particularly adapted for use upon piston rods, plungers, pistons, etc.

An object of the invention is to provide a packing which may be easily and cheaply manufactured, which will be durable, and which will be more uniformly efficient than packings heretofore in use.

A further object is to provide a packing so constructed that when in use certain component parts thereof will be free to be moved relative to other component parts to the end that a tight engagement with the shaft or piston may be effected.

A further object is to so construct the packing that it will contain a lubricant always present between moving parts of the packing at once increasing the density of the packing and facilitating movement of the component parts.

A further object is to provide a packing made up principally of metal and having the above recited characteristics.

A further and more detailed object is to provide a packing made up principally of metallic strands arranged to hold a lubricant between them to facilitate relative movement of the strands.

A further detailed object is to provide a packing made up principally of metallic strands arranged in groups, and to provide means whereby the groups are adapted for unitary movement with respect to each other.

A further detailed object is to so construct the groups of metallic strands that in the completed packing they will present spaced regions having relatively little lubricant therein and other regions intermediate said mentioned regions having relatively greater lubricant therein whereby to permit easy movement of the first regions with respect to each other.

A further object is to provide a metallic strand packing which is capable of appreciable elongation under gland pressure.

A further detailed object is to provide a packing made of metallic strands extending in a spiral direction longitudinally of the packing so that pressure laterally against the packing in use will result in a direct end thrust of said strands.

A further object is to provide an improved

method by which to produce the packing above referred to.

Other objects and aims of the invention, more or less specific than those referred to above, will be in part obvious and in part pointed out in the course of the following description of the elements, combinations, arrangements of parts and applications of principles constituting the invention; and the scope of protection contemplated will be indicated in the appended claim.

In the accompanying drawings which are to be taken as a part of this specification, and in which I have shown merely a preferred form of embodiment of the invention:—

Fig. 1 is a transverse sectional view through a stuffing box showing the same to be packed with a packing constructed in accordance with this invention.

Fig. 2 is a fragmentary perspective view of one of the groups of metallic strands employed in the packing.

Fig. 3 is a similar perspective view showing several groups of said metallic strands twisted together, and

Fig. 4 is an enlarged transverse sectional view through the completed packing.

Referring to the drawings for describing in detail the structure therein illustrated, the reference character L indicates an ordinary stuffing box having a seat or recess therein closed by the usual gland G, said seat or recess serving to accommodate the packing which is indicated generally by the reference character H.

The shaft or piston rod 2 passes through this stuffing box, and the packing H fits closely thereto.

It will be understood that the stuffing box L here shown is intended merely as an illustration of one way of utilizing the present packing, and that said box is not a part of the present invention.

The packing H is made up of a strip of material having the cross-sectional appearance substantially as in Fig. 4, and there may be as many sections, or convolutions, as 3, 4 and 5 of this strip within the box as may be required to fill the length of the box, the rings or convolutions 3, 4 and 5 being arranged side by side along the length of the shaft, and the gland G having suitable means, as for instance the screws 6—6 by which to move it against the packing for thereby closely

confining said packing, all in the usual manner.

The method of constructing the strip of packing seen in Fig. 4 consists in:

- 5 First, twisting together a number of strands of suitable metal or the like, such as lead or some composition thereof, the individual strands being of any appropriate size but approximately the size of what is com-
10 monly known as tinsel or heavy thread. The individual strands may be of any length and when twisted together they form what may be here conveniently referred to as a group of strands having generally the appearance
15 as presented in the illustration Fig. 2. The strands are not very tightly twisted, the twisting movement being stopped while the group is yet soft and its surface quite irregular and lined with deep interstices,
20 Second, applying to the surface of the twisted group a coating of a suitable lubricant, such as flake graphite, powdered soap stone or other appropriate material,
25 Third, laying together side by side parallel with each other a plurality of these twisted and lubricated groups of strands, four such groups being usually sufficient, they being laid in compact formation, that is to say that
30 where four groups are concerned two will be laid side by side and the second two will be laid above them also side by side, and then twisting together the several groups so that collectively they present an appearance approximately as illustrated in Fig. 3. It is
35 here noted that the lubricant which has been applied over the entire circumferential surface of the individual groups now not only covers the entire outer surface of the four groups collectively but also occurs in double
40 layer in between the assembled groups, a particularly heavy supply of lubricant being present at the centre of the assembled groups. In twisting together these groups care is
45 taken that the twisting movement is in a direction opposite to the twisting movement which was applied to the original strands, that is that whereas the direction of twist of the strands as seen in Fig. 2 is counter-
50 clockwise, the direction of twist of the groups as seen in Fig. 3 is clockwise. This reversal of twisting movement is of material importance in that co-incident with the twisting to-
55 gether of the groups there will occur also a certain amount of untwisting of the strands in the individual groups. The strands which occur at the outer surface of the groups collectively will of course be most strongly affected in this regard since their movement
60 will not be opposed by abutting portions of adjacent groups. The strands occurring at or near the surfaces of the respective groups where said surfaces abut adjacent groups will be affected to some extent however in degree according to their tightness of contact with
65 adjacent groups, and this untwisting and con-

sequent loosening of the strands of the respective groups, throughout the circumference of the respective groups but particularly in the portions of the respective groups abutting adjacent groups will cause a corresponding
70 loosening, and consequent migration of the lubricant into the newly formed and enlarged interstices of the respective groups so that, whereas the lubricant which was originally
75 applied to the surface of the individual groups will now find its way relatively deeper toward the centres of the individual groups and thus more effectually and completely lubricate the component strands of the respec-
80 tive groups so that said strands will be better able to slide and rub against each other when the packing is in use.

The lubricant originally applied to the outer surface of those portions of the groups which face outwardly in the assembled struc-
85 ture will also to a greater or less extent find its way toward the centres of the respective groups but since there are no opposing surfaces of adjacent groups to hold the lubricant against falling off or to crowd the lubricant
90 toward the centres of the respective groups the relatively exposed surfaces of the assembled groups may not be as heavily lubricated in the finished product as are the sur-
95 faces which engage surfaces of adjacent groups, but there will nevertheless be ample lubricant retained and caused to migrate inwardly in any event, it being here noted that the relatively exposed surfaces of the assem-
100 bled groups in the completed packing have less need for lubricant than the relatively inner surfaces which engage adjacent groups.

Owing to the fact that the relatively central strands of the respective groups have relatively slight twisting or un-twisting
105 movement at any time these relatively central strands will not materially loosen with respect to each other, and hence little or none of the lubricant will find its way to the immediate centres of the respective groups. The
110 metallic strands comprising these centres will in this way be maintained relatively free of lubricant and hence be relatively stiff longitudinally, the degree of stiffness diminishing outwardly away from said centres as
115 the supply of lubricant increases,

Fourth, applying pressure externally against the assembled groups so as to form
120 said assembled groups into rectangular cross section, and

Fifth, either before or after pressing the assembled groups into rectangular cross section, applying a cover of cushion material,
125 as 7, about at least three sides of said assembled groups, and a jacket, as 8, preferably of woven fabric, entirely about said assembled groups and said cushion material, to complete the structure as illustrated in cross section, Fig. 4.

The completed packing constructed in ac-
130

cordance with this method thus consists of a number of groups of strands, each group, as 9, Fig. 2, comprising a multitude of strands of suitable metal or the like twisted in one direction, and the assembled groups consisting of any desired number of the groups twisted together in a reverse direction, the direction of twist of the individual groups being indicated by arrow 10 in Fig. 2, and the direction of twist of the assembled groups being indicated by arrow 11 in Fig. 3, the whole being partly covered by the cushion material 7 which overlies the top or outer surface as at 12 and extends downwardly about opposite side surfaces of the packing as at 13 and 14, and the binder covering or jacket as 8 being applied entirely about the packing and its cushioning material.

That side of the packing which is covered only by the jacket 8, that is the under or inner side as 16, is intended to lie in rubbing contact with the shaft 2 and the material of the jacket is preferably such that the portion thereof which engages the shaft will rapidly wear off and enable the metallic strands comprising the inner body of the packing to come into direct contact with the shaft.

It will be apparent that in applying pressure to alter the cross sectional contour of the packing, from the generally round or circular form initially present at the time the groups are twisted together to the rectangular form of the completed packing, the individual groups will naturally assume a substantially triangular shape approximately as illustrated, the triangles operating as wedges attempting constantly to squeeze into each other. When pressure is applied against two opposite sides the wedges at right angular relation to the line of pressure will tend to be moved outwardly. The lubricant which is present between the several strands, and hence now between the wedges, as indicated at 17—17 in Fig. 4, will facilitate this movement, and the wedges may therefore move with considerable freedom one against the other.

During any such movement the strands of the respective groups will be capable of moving one against the other also, due to the presence of the lubricant between said strands as hereinabove set forth, and this will further facilitate the easy movement of the wedges with respect to each other.

It is important to note also that the fact that the groups extend longitudinally in helically curved directions further facilitates movement of the wedges with respect to each other, this due to the fact that any movement of a wedge in a direction toward or away from the centre of the packing produces a corresponding longitudinal movement of parts of the wedge owing to the tendency to straighten out the longitudinal axial line of the wedge.

The substantially unlubricated metallic strands centrally of each group constitute relatively stiff cores, as 15, longitudinally of the respective groups and thus give body and strength to the whole mass and greatly facilitate the elongation of the mass under gland pressure.

This inherent virtue of the present packing to become lengthened under lateral pressure is valuable in that it enables the packing to be cut square off in suitable lengths to surround a shaft which is being packed, the abutting ends of the piece always maintaining tight contact with each other and thus at all times maintaining a tight seal upon the shaft.

It should be mentioned that owing to the fact that the groups of strands comprising the main body of this packing are twisted longitudinally so that viewed exteriorly they present the general appearance of an ordinary piece of twisted rope, see Fig. 3, the cross sectional appearance of the completed piece or strip of packing will vary at different points longitudinally of said strip. The illustration Fig. 4 is correct for a selected point in the length of the strip but of course at a different point spaced from the selected point the wedge formations will appear in a more or less rotated position according to the precise point at which the cross section is taken, as will be readily understood. The wedge formations will nevertheless always be present and will always be movable relative to and against each other for correctly performing the functions as and in the manner as above fully set forth.

It is desired further to point out that in some instances the packing may be considered complete and ready for use after the several groups of strands have been twisted together, either with or without the lubricant above described, and without being pressed into rectangular form or provided with covering material of any kind. The spongy texture given to the mass of metal strands by the peculiar grouping and the contrary twisting thereof renders it well adapted for use as a strip packing in many cases.

By adding the lubricant as above referred to the quality of the packing is altered in that owing to the more easy movement of its component strands against each other it is to that extent more easily flexed and condensed in use.

The actual formation of the strip into rectangular cross section permits its more ready insertion into position filling a stuffing box or the like and gives a more definite wedge shaped contour to the strand groups and thereby increases the ease of movement of said groups as such with respect to each other.

The packing may be obviously used if desired without the cushion material 7, or without the cover 8, these last being applied sim-

ply to further improve the quality and functional operation of the packing and hold its component parts against possible dis-assembly during handling.

5 As many changes could be made in this construction without departing from the scope of the invention as defined in the following claim, it is intended that all matter contained in the above description or shown in
10 the accompanying drawings, shall be interpreted as illustrative only and not in a limiting sense.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

15 A strip packing comprising a plurality of separate groups of strands extending longitudinally of the strip, each group having a quantity of lubricant applied to its outer

surface and being twisted in one direction, 20 the groups collectively being twisted together in a relatively opposite direction so that the strands of the respective groups are partially untwisted and the outer strands of said
25 respective groups loosely engaging each other and thereby enable penetration of the lubricant toward the centres of the respective groups there being a longitudinal central core-like portion thus formed in each group
30 free of said lubricant but surrounded with lubricated strands, said surrounding lubricated strands of the respective groups being
35 in contact those of one group with those of adjacent groups and providing ease of frictional movement of the groups against and with respect to each other.

In testimony whereof I affix my signature.
NORMAN B. MILLER.