C. STEENSTRUP.

METHOD OF MANUFACTURING PACKINGS FOR ROTATING SHAFTS.

APPLICATION FILED SEPT. 20, 1919.

1,357,739.

Patented Nov. 2, 1920.

Fig.1.

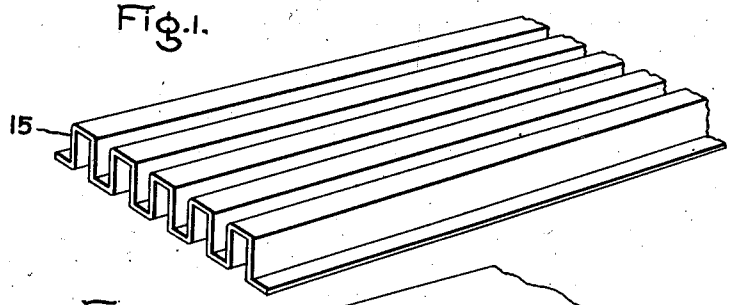


Fig.2.

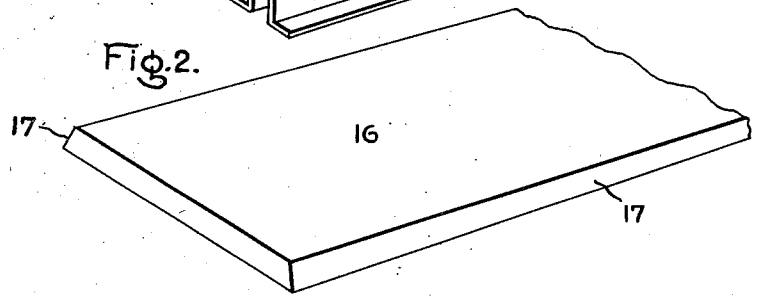


Fig.3.

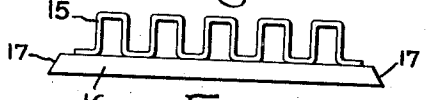


Fig.4.

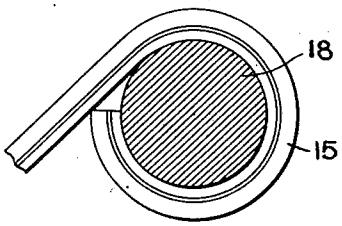


Fig.5.

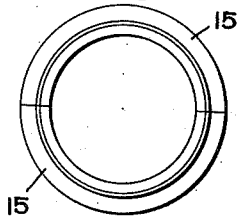


Fig.6.

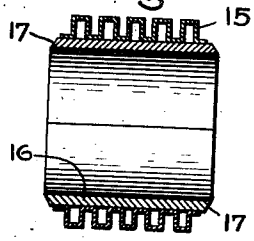


Fig.7.

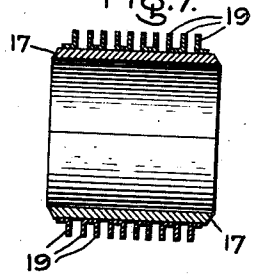


Fig.8.

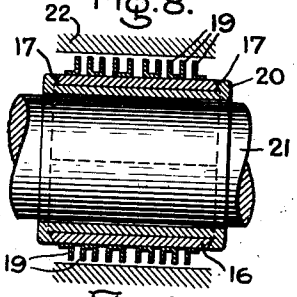
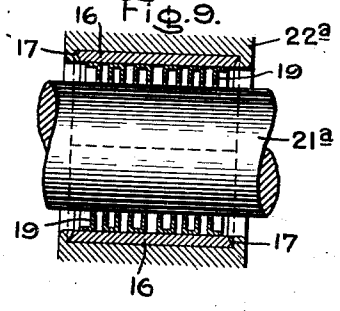


Fig.9.



Inventor:
Christian Steenstrup
by Albert G. Davis
His Attorney.

UNITED STATES PATENT OFFICE.

CHRISTIAN STEENSTRUP, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

METHOD OF MANUFACTURING PACKINGS FOR ROTATING SHAFTS.

1,357,739. Specification of Letters Patent. Patented Nov. 2, 1920.

Application filed September 20, 1919. Serial No. 325,196.

To all whom it may concern:

Be it known that I, CHRISTIAN STEENSTRUP, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Methods of Manufacturing Packings for Rotating Shafts, of which the following is a specification.

The present invention relates to packings, such as are used to prevent leakage between a rotating shaft and an adjacent wall through which the shaft passes and particularly to packings of the type comprising a plurality of thin-edged, annular teeth or projections which are carried by the rotating shaft and pack against the surface of the adjacent wall or which are carried by the wall and pack against the outer surface of the shaft. Packings of this character are well-known and are termed labyrinth or cellular packings.

The object of the present invention is to provide an improved method of manufacturing packings of the type referred to, which is economical to carry out and by means of which a large number of the thin-edged, annular teeth or projections may be provided in a comparatively short space.

A further object of the invention is to provide an improved method in which all the operations are of a simple character and can be carried out by the ordinary workman without the use of special tools, whereby highly skilled labor will not be required.

For a consideration of what I believe to be novel and my invention, attention is directed to the accompanying description and the claims appended thereto.

In the accompanying drawing, Figures 1 to 8 inclusive illustrate successive steps in carrying out the method and Fig. 9 shows a modification.

In carrying out my improved method I take a strip of corrugated metal 15 as shown in Fig. 1 and fasten it to a flat sheet of metal of suitable length, width and thickness as shown at 16 in Fig. 2. The corrugated strip 15 may be made in any suitable manner from thin material and the corrugations will have a depth depending on the radial depth which it is desired the teeth shall have in the finished packing. Likewise the corrugations will be of such width as to give the desired spacing of the teeth. Such corrugated strips can be very readily made as is well-understood. The corrugated strip 15 is preferably fastened to the metal sheet 16 by brazing or welding and after being fastened into place the sheet 16 with the corrugated strip 15 fastened thereon will have the appearance in end elevation as shown in Fig. 3. The side edges of sheet 16 are beveled as indicated at 17 so that such sheet may be attached to a holder by a dovetail connection as will be referred to hereinafter. After the corrugated strip 15 has been fastened to sheet 16 a section of it is then wound about a former 18 of suitable diameter and cut off so as to form a tube of the same diameter as the former. (See Fig. 4). The tube will thus comprise a backing piece which is formed from sheet 16 with the corrugated strip 15 fastened on its outer surface. Beveled edges 17 will be located at the two ends of the tube. The tube thus formed is removed from former 18 and split at a point diametrically opposite the meeting point of the two edges of the section so as to form the tube into two halves as indicated in Fig. 5 and as shown in section in Fig. 6. The outer surface of the corrugations is then ground off leaving projecting rings or teeth as shown at 19 in Fig. 7, such rings or teeth being formed from the radially extending parts of the corrugated strip. The respective halves of the tube are then mounted in a suitable holder 20 as shown in Fig. 8 which holder in turn is mounted on the shaft 21 which is to carry the packing rings. The holder 20 may be made in two halves and is provided with a circumferential slot of the width of the tube and having undercut edges to receive the beveled end 17 of the tube. This forms a very firm mounting for the tube and packing teeth 19. In Fig. 8, 22 indicates the adjacent stationary wall between which and the shaft the packing is arranged.

In Fig. 9 I have shown a modified form of the invention in which the packing rings or teeth 19 are arranged on the inside of the tube and the tube is carried by the stationary wall 22^a instead of by the shaft 21^a. In other words the arrangement of Fig. 9 is the reverse of that of Fig. 8. The method of forming the tube as shown in Fig. 9 is exactly the same as that already described except that strip 16 when placed around the former 18 as shown in Fig. 4, will be bent

with the corrugated strip 15 on the inside instead of on the outside.

By the foregoing method a packing can be made having the teeth or annular projections as close together as is found desirable; also very thin material may be readily used in making the corrugated strip and it can be easily handled while being fastened to the backing sheet since the corrugations stiffen the strip and prevent bending of the corrugations crosswise of the strip. As is well recognized, it is desirable that the packing teeth or projections be made from as thin material as possible.

The method also results in a packing in which the packing teeth are firmly anchored or fixed to the part carrying them, and in a packing which can be easily replaced or repaired in case it is damaged. Furthermore, the same strip material, that is, the sheet 16 with a corrugated strip 15 fastened thereto as shown in Fig. 3 can be made into packings of any desired diameter and for being carried by the shaft as shown in Fig. 8 or by the surrounding wall as shown in Fig. 9; or if desired by both the shaft and the surrounding wall with the packing teeth interleaving as is well understood.

In accordance with the provisions of the patent statutes, I have described my improved method in connection with the steps that I now prefer for carrying it out, but it will be understood that the specific steps described are only illustrative and that the method may be carried out by such steps as come within the terms of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. The method of manufacturing a packing element comprising a plurality of annular, radially extending teeth which comprises fastening a strip of corrugated metal to a holder and then removing the outer portion of the corrugation to leave outwardly projecting teeth.

2. The method of manufacturing a packing element comprising a plurality of annular, radially extending teeth which comprises fastening a strip of corrugated metal to a holder and removing those portions of the corrugations which are parallel to the holder and spaced therefrom.

3. The method of manufacturing a packing element which comprises fastening a strip of corrugated material on a flat backing sheet, bending the backing sheet to form a tube with the corrugations on one side thereof, and removing from the free side of the corrugated material that portion of it which extends parallel to the backing sheet.

4. The method of manufacturing a packing element which comprises fastening a strip of corrugated material on a flat backing sheet, bending the backing sheet to form a tube with the corrugations on one side thereof, removing from the free side of the corrugated material that portion of it which extends parallel to the backing sheet and fastening the backing sheet to a supporting holder.

5. The method of manufacturing a packing element which comprises fastening a strip of corrugated material on a flat backing sheet, bending the backing sheet to form a tube with the corrugations on one side thereof, removing from the free side of the corrugated material that portion of it which extends parallel to the backing sheet, fastening the backing sheet to a supporting holder, and mounting the supporting holder on the part which is to carry the packing.

6. The method of manufacturing a packing element which comprises providing a tube having a strip of corrugated material fastened on one surface thereof and grinding off the corrugations until only the radial portions remain.

7. The method of manufacturing a packing element which comprises providing a tube having a strip of corrugated material fastened on one surface thereof, grinding off the corrugations until only the radial portions remain and mounting the tube on a part which is to carry it.

8. The method of manufacturing a packing element which comprises fastening a strip of corrugated material on a flat backing sheet having beveled edges, bending the backing sheet to form a tube, grinding off the corrugations until only the radial portions of them remain, and mounting said tube on a holder with the beveled ends engaging undercut grooves in said holder.

In witness whereof, I have hereunto set my hand this 19th day of September, 1919.

CHRISTIAN STEENSTRUP.