No. 860,720.

PATENTED JULY 23, 1907.

L. E. ADAMS.

MANUFACTURE OF PACKING.

APPLICATION FILED JAN. 4, 1907.

FIG. 1

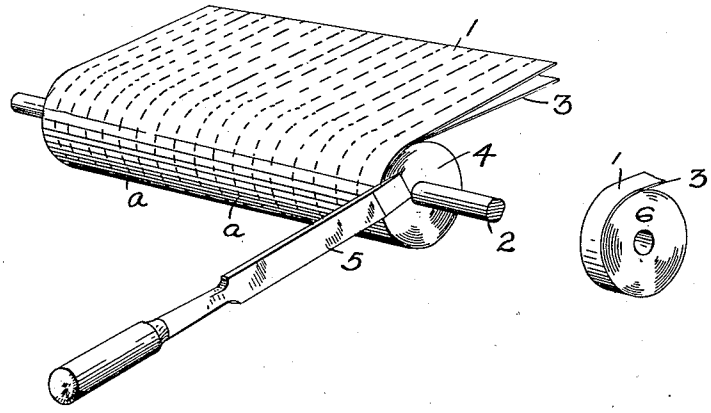


FIG. 2

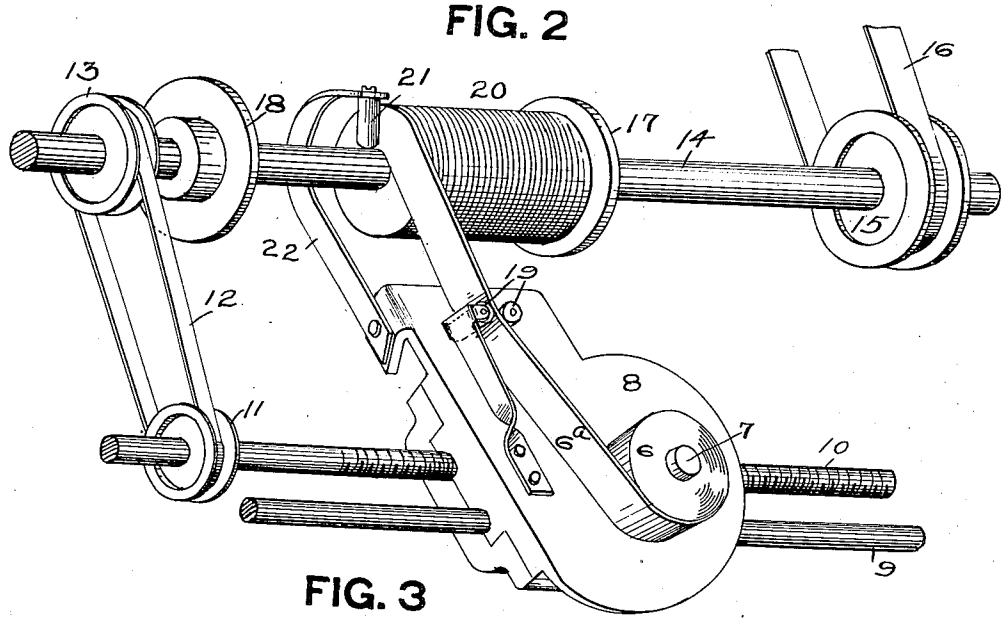
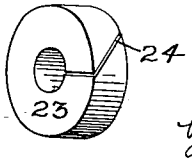


FIG. 3



WITNESSES.

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UNITED STATES PATENT OFFICE.

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MANUFACTURE OF PACKING.

No. 860,720. Specification of Letters Patent. Patented July 23, 1907.

Application filed January 4, 1907. Serial No. 350,757.

To all whom it may concern:

Be it known that I, LYNDON E. ADAMS, a citizen of the United States, and residing in the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented or discovered new and useful Improvements in the Manufacture of Packing, of which the following is a specification.

My invention consists in a new and useful process for the manufacture of packing for steam pistons and all other purposes. The material used is canvas, asbestos or other material, either impregnated or coated with rubber or similar material or placed face to face with sheet rubber or similar material. I wind a sheet of such rubbered canvas, or other material, or sheets of rubber and canvas face to face, about a mandrel until a cylinder of the material of the diameter to produce ribbons of the required length is obtained. I then cut the resultant cylinder at right angles to its axis into disks, thus forming rolls of ribbon of a width equal to that of the disks. I next unroll said ribbon and wind the same on edge about a second mandrel of the proper size to produce packing rings of the required central bore thus forming a cylinder having a thickness of wall equal to the width of the ribbon used in its formation. After the cylinder is of the desired length, additional ribbons being fed on as needed, the cylinder is compressed longitudinally and then vulcanized thus uniting the coils of ribbon firmly together into an integral whole. The resultant blank may now be cut into sections to form the sizes of packing rings required and the wall of said rings cut obliquely to enable the ring to be sprung into place around a piston or other member. If desired, I may omit the preliminary winding of the sheet or sheets of material and simply use strips of the proper material of the desired width for the second step, to wit, winding the same on edge on a mandrel. However, I find that by resorting to the preliminary winding and cutting steps I effect a great saving of time and material and obtain a better quality of ribbon. If desired, the sheet or sheets used for the preliminary winding may be of the width of the ribbon required to form the cylinder for vulcanization so that no severing the same into disks is resorted to but the roll is unwound and the sheet wound on edge on the mandrel.

In the accompanying perspective views, Figure 1 shows the sheets being wound onto a mandrel, the small view showing a severed roll of ribbon, Fig. 2 shows the ribbon roll being unwound and the ribbon wound on edge on the second mandrel and Fig. 3 shows a completed packing ring.

In the accompanying drawings 1 is a sheet of canvas or other material which is rolled snugly on a mandrel 2. I may use canvas or other suitable material, either impregnated with a solution of rubber or other similar material or coated with some such material, or I may, as shown in Fig. 1, wind face to face with the sheet 1, a sheet of rubber or similar material, 3, forming on said mandrel 2, a cylinder 4. When said cylinder 4 is of a diameter sufficient to produce the desired length of ribbon, I next sever the cylinder at right angles to its axis as shown by dotted lines *a*—*a* into ribbon rolls 6 of the desired width. In case a relatively wide ribbon is desired, I may use a sheet 1, or sheets 1 and 3, of the width of the required ribbon and roll the same up into a cylinder 4 thus forming a single ribbon roll 6 without the cutting operation. The ribbon roll 6 is now placed on a spool 7 rotatably mounted on table 8. Said table is slidably mounted on guide rod 9, while 10 is a worm shaft, parallel with shaft 9 and in threaded engagement with said table 8. Adjacent to one end thereof said shaft 10 is provided with a band pulley 11, which is operatively connected by means of belt 12 with a second pulley 13. 14 is a mandrel, removably mounted in housings, not shown, parallel with shaft 10, on which mandrel said pulley 13 is removably mounted. At the other end said mandrel is provided with a third pulley, 15, removably mounted thereon, which is engaged by power belt 16. It is evident that by means of said power belt 16 the mandrel 14 and shaft 10 may be rotated simultaneously.

17 is a disk rigidly mounted on mandrel 14 and 18 is a similar disk slidably mounted on said mandrel and securable in any desired position by convenient means, not shown. The loose end of the ribbon, 6^a, composing roll 6 on spool 7, is led between spring tension rolls 19—19 on table 8 and attached on edge to mandrel 14 close against the face of disk 17. The mandrel and shaft 10 are now started to revolve in the proper direction to wind ribbon 6^a on mandrel 14 and advance table 8 toward the left in Fig. 3. The thread on the worm shaft 10 is of the proper pitch to advance said table 8 along said shaft at a sufficient rate to accommodate the feed of ribbon 6^a onto the increasing cylinder 20 of wound ribbon on mandrel 14. A roller 21 carried by spring arm 22 pivotally attached to table 8 presses against the ribbon as it is wound on the mandrel 14 and presses it snugly into place. The arm 22 is pivotally attached to table 8 so that it and its roller 21 may be swung out of the way when not in use. When the ribbon of roll 6 first placed on spool 7 is exhausted, another ribbon roll 6 may be substituted and its ribbon 6^a feed onto the cylinder 20. The cylinder 20 is thus made to any length desired, governed by the number of packing rings to be cut off the same when finished and convenience in handling. When the desired length of cylinder is obtained, the unwound ribbon is cut away and the roller 21 and arm 22 pushed aside. The slidable disk 18 is then slid up against the end of cylinder 20 and pressure applied thereto, by any convenient

means, not shown, to compress the cylinder to the desired density. The mandrel 14 is then removed from pulleys 13 and 15 and, with the cylinder 20 mounted thereon, placed in a proper apparatus, not shown, for vulcanization of the cylinder. After the vulcanization of the cylinder, the ribbon spirals are found to be united into an integral mass forming a cylindrical blank from which packing rings 23 of the desired thickness may be sheared at right angles to the axis of the cylinder. These rings 23 are then preferably cut through obliquely as at 24 to permit their being sprung conveniently into place about a piston or other member.

When two sheets, 1 and 3, of canvas and rubber, respectively, are used, as shown in Fig. 1, it is evident that the ribbon 6^a is duplex but the adhesion of the rubber to the canvas prevents any inconvenience in handling.

It is evident that the bore or central aperture of the packing ring is determined by the diameter of the mandrel 14 used, while the external diameter of the packing ring is determined by the width of the ribbon 6^a used. The length of the cylinder 20 is determined by convenience in handling and the number of packing rings to be cut therefrom.

While my rings are made from the spiral windings of a ribbon, the ribbon is relatively so very thin that the pitch of the spiral is not noticeable and therefore the cylinder is practically made up of layers in a plane at right angles with the axis of the cylinder. Therefore the vulcanized blank does not present its grain on a bias or angle as is the case where a built up strip of material is bent into a spiral and vulcanized. Such a packing, when cut into rings, does not maintain a flat position but tends to reassume its spiral contour while my ring remains perfectly flat and retains its true annular form.

The method most largely used at present in the manufacture of packing is to cut, by stamping, the rings from a sheet of built up packing material. This entails a percentage of scrap which amounts to about a third of the material used. This great waste greatly increases the cost of manufacture.

In the use of my improved process there is practically no loss as the entire ribbon rolls are used in winding the cylinder to be vulcanized, and the entire area of the raw sheeting is wound up into cylinders and cut into disks. It is thus evident that I effect not only a great saving in time and cost of manufacture but also a great economy in materials. I also produce a greatly improved article of manufacture.

To more clearly illustrate my process, I have described the same in connection with crude means for working the same, but I do not limit myself to any particular mechanism or agencies for that purpose, but claim broadly:—

1. The process of manufacturing packing consisting in winding on edge a ribbon of canvas and rubber, or other materials, on a mandrel and compressing and vulcanizing the resultant blank.

2. The process of manufacturing packing consisting in winding on edge a ribbon of canvas and rubber, or other material, on a mandrel, vulcanizing the resultant blank and cutting the same into packing rings of the desired size.

3. The process of manufacturing packing consisting in winding on edge a ribbon of canvas and rubber, or other materials, on a mandrel, compressing and vulcanizing the resultant blank and cutting the same into packing rings of the desired size.

4. The process of manufacturing packing consisting in winding canvas and rubber, or other materials, into cylindrical form, winding on edge the resultant ribbon on a mandrel and vulcanizing the resultant blank.

5. The process of manufacturing packing consisting in winding canvas and rubber, or other materials, into cylindrical form, winding on edge the resultant ribbon on a mandrel and compressing and vulcanizing the resultant blank.

6. The process of manufacturing packing consisting in winding canvas and rubber, or other materials, in cylindrical form, winding on edge the resultant ribbon on a mandrel, vulcanizing the resultant blank and cutting the same into packing rings of the desired size.

7. The process of manufacturing packing consisting in winding canvas and rubber, or other materials, into cylindrical form, winding on edge the resultant ribbon on a mandrel, compressing and vulcanizing the resultant blank and cutting the same into packing rings of the desired size.

8. The process of manufacturing packing consisting in winding canvas and rubber, or other materials, into cylindrical form, cutting said cylinder into ribbon rolls, winding on edge the resultant ribbon on a mandrel and vulcanizing said resultant blank.

9. The process of manufacturing packing consisting in winding canvas and rubber, or other materials, into cylindrical form, cutting said cylinder into ribbon rolls, winding on edge the resultant ribbon on a mandrel and compressing and vulcanizing said resultant blank.

10. The process of manufacturing packing consisting in winding canvas and rubber, or other materials, into cylindrical form, cutting said cylinder into ribbon rolls, winding on edge the resultant ribbon on a mandrel, vulcanizing said resultant blank and cutting the same into packing rings of the desired size.

11. The process of manufacturing packing consisting in winding canvas and rubber, or other materials, into cylindrical form, cutting said cylinder into ribbon rolls, winding on edge the resultant ribbon on a mandrel, compressing and vulcanizing the resultant blank and cutting the same into packing rings of the desired size.

Signed at Philadelphia, Pa. this 31st day of December 1906.

LYNDON E. ADAMS.

Witnesses:
GEO. A. WILLMANNS,
S. G. MCKEEVER.