June 9, 1925. 1,540,983

A. M. FENTON ET AL.

PRODUCTION OF FRICTION DISKS, WASHERS, BRAKE LININGS, AND THE LIKE

Filed Dec. 9, 1921

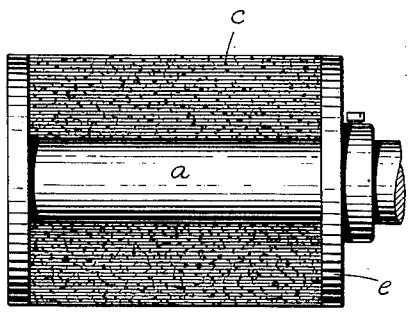


FIG. 1.

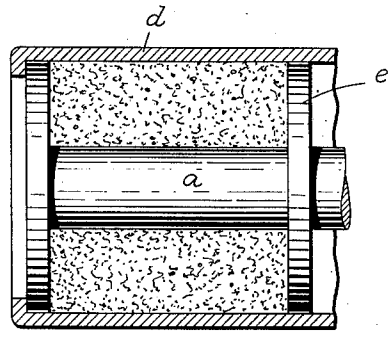


FIG. 2.

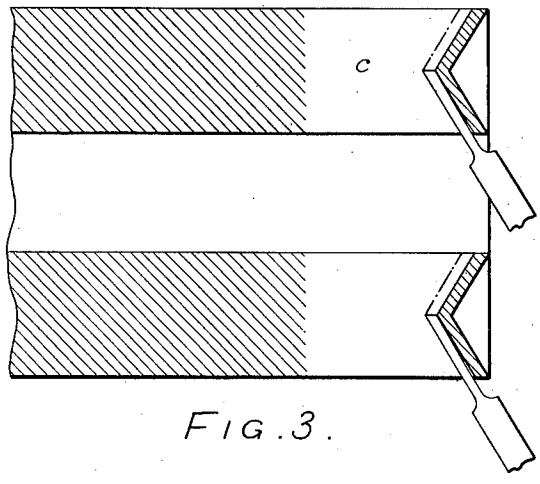


FIG. 3.

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UNITED STATES PATENT OFFICE.

ALEXANDER MILLER FENTON AND THOMAS HENRY CROWTHER, OF CLECKHEATON, ENGLAND, ASSIGNORS TO "SCANDINAVIA" BELTING, LIMITED, OF THE COUNTY OF LONDON, ENGLAND.

PRODUCTION OF FRICTION DISKS, WASHERS, BRAKE LININGS, AND THE LIKE.

Application filed December 9, 1921. Serial No. 521,243.

To all whom it may concern:

Be it known that we, ALEXANDER MILLER FENTON, a subject of the King of Great Britain and Ireland, residing at Northcliffe, Cleckheaton, in the county of York, England, and THOMAS HENRY CROWTHER, a subject of the King of Great Britain and Ireland, residing at Prospect Villas, Cleckheaton, aforesaid, have invented new and useful Improvements in the Production of Friction Disks, Washers, Brake Linings, and the like, of which the following is a specification.

This invention relates to improvements in, and in the production of, friction disks, washers, clutch-coverings and the like, and in particular to the types of such elements as are used in automobile vehicles; our objects being to enhance the efficiency thereof, to simplify their manufacture, to economize material and to facilitate their impregnation with a binding and hardening agent.

According to our improved method of manufacture, the mass whence the disks or the like are produced is built up by forming upon a bobbin, a winding of yarn, tape or canvas composed of cotton, ramie, flax, silk, wool, asbestos or other suitable fibrous material, or any combination of such materials, impregnated with a suitable binding agent and, after drying and heating the mass for the purpose of hardening it, cutting it into rings of the required thickness or shape according to the purpose to which the article is to be applied.

Appliances adapted for use in carrying our invention into effect are illustrated in the accompanying drawings, whereof Fig. 1 is a longitudinal section, showing a bobbin furnished with retaining plates between which a winding of tape or canvas is formed. Fig. 2 shows a similar wound mass composed of yarn and enclosed within a cylinder provided with means for compressing the said mass. Fig. 3 shows a similar mass or spool of wound yarn, tape or canvas, from which clutch-linings or coverings of V-section can be cut as hereinafter explained.

Referring to Fig. 1, the winding *c* may be applied in the form of tape or woven material, such as asbestos canvas, laid up about the bobbin *a*. This bobbin is preferably of a diameter corresponding with that of the inner diameter desired for the washer, and the winding is continued until its outer diameter corresponds with that of the outer diameter intended for the washer. According to Fig. 2 the winding *c* is applied to the bobbin *a* in the form of yarn and whilst still on its bobbin, the spool so formed is passed into the cylinder *d* and subjected to compression by the axial movement of the plate *e*. To facilitate the introduction of the spool, the cylinder *d* may be divided longitudinally and the two halves bolted together. In either case, the resultant spool *c* having been dried, and heated with a view to hardening its binding agent, is of a compact and hard nature, and may be sawn or otherwise cut transversely to form disks or obliquely to form cones suitable for employment as washers or liners in friction-clutches or for sundry other uses.

In the production of rings of V-section for use in covering or lining clutch-members we cut the spool *c* obliquely from its exterior and its interior as illustrated in Fig. 3; the cuts being oppositely inclined and intersecting within the walls of the mass.

As a binding agent, we employ a viscous product obtained by boiling phenol and formaldehyde in the presence of a catalytic agent and we apply same to the yarn, tape or woven fabric, by passing same through a bath of the said product prior to the winding operation.

When disks, washers and the like, are cut from sheets composed of layers of woven fabric, laid up on the multiply system, the face of the fabric is presented as the wearing surface. A large percentage of such sheets are moreover wasted when disks are cut therefrom. It will however be observed that, according to the method of manufacture described, there is comparatively little waste of material, the edges of the cut windings become the wearing surfaces, the threads of yarn or the warp threads are disposed circumferentially, instead of crosswise, and are unsevered.

It will be understood that, although the disks and washers and the like, produced

according to the methods hereinbefore described, are primarily intended for use in clutches and friction-brakes, they may be applied to other purposes, as for example, in packing steam and other joints.

We claim:—

1. The process of making friction disks, washers, clutch-coverings and the like, by forming upon a bobbin furnished with co-axial retaining plates, a winding of fibrous material, impregnated with a suitable binding agent, drying and hardening the wound mass and diagonally cutting the same into sections whereby to expose the ends of the fibres.

2. The process of making disks, washers, clutch-coverings and the like, by forming, upon a bobbin furnished with co-axial retaining plates, a wound spool composed of fibrous material, impregnated with a suitable binding agent, enclosing the mass in a cylinder and subjecting it to axial compression, drying and hardening the spool and then cutting it into sections.

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