

Nov. 2, 1926.

H. FROOD ET AL

1,604,985

MANUFACTURE OF FRICTION DISKS FOR USE IN CLUTCHES AND THE LIKE

Filed Oct. 16, 1924

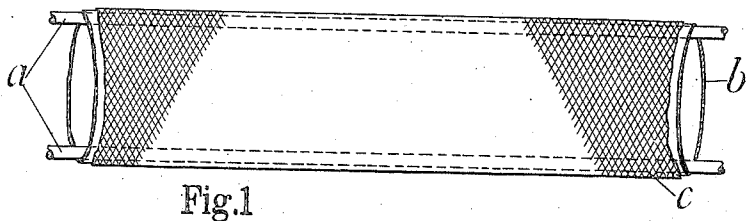


Fig. 1

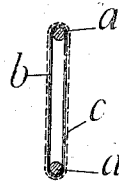


Fig. 2

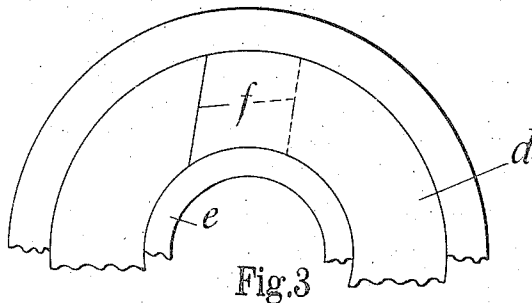


Fig. 3

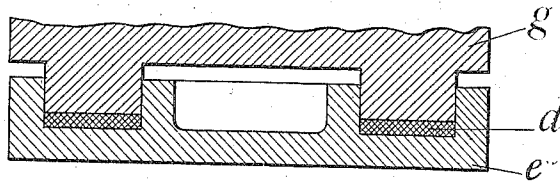


Fig. 4

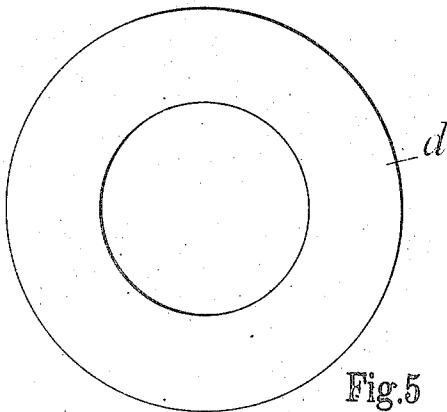


Fig. 5

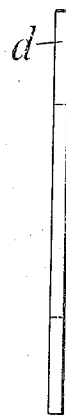


Fig. 6

Inventors
H. Frood
H. H. Sydee
By Mark & Co. Attys.

UNITED STATES PATENT OFFICE.

HERBERT FROOD AND WALTER RICHARD SYDEE, OF CHAPEL-EN-LE FRITH, ENGLAND.

MANUFACTURE OF FRICTION DISKS FOR USE IN CLUTCHES AND THE LIKE.

Application filed October 16, 1924, Serial No. 744,061, and in Great Britain November 21, 1923.

This invention relates to the manufacture of friction disks for use in clutches and the like, and has for its object to provide improved means of producing such disks which will yield a strong, durable and efficient product.

The invention comprises the winding of yarn, cord or the like (hereinafter termed yarn) upon a collapsible or removable mandrel to produce a tubular body of any desired length, the mandrel being then withdrawn, and the tubular body flattened and laid in ring form, in a die wherein it is compressed and consolidated by heat, pressure and a resinous condensation substance, thus producing an annular friction disk.

In one convenient application of the invention, an asbestos or other inorganic yarn, is wound with a quick traverse motion upon a collapsible or removable mandrel which may consist of tightly stranded wires or be otherwise formed so as to produce a flat tubular body. The yarn is impregnated or coated before winding by passing it through a bath containing a solution of the phenol formaldehyde condensation product known as synthetic resin or bakelite. After winding is completed (the number of layers in the wind is determined by the thickness of the disk to be produced) the mass is dried whilst in position upon the mandrel. The latter is now withdrawn, when the tubular body flattens and resembles a tape or strip. It is then laid or wound into the recess in an annular die, the ends of the tape overlapping. Such ends may be cut at an angle or tapered off. The male portion of the die is placed in position and the material subjected to heat and pressure whereby it is compressed and consolidated into a ring of the desired thickness and the resinous material converted into an infusible insoluble binder.

If desired, the mandrel may be covered with a sleeve of fabric or textile material before winding thereon commences and the said sleeve may be allowed to remain in the wound mass to add strength thereto.

The ring or annular disk from the dies is then trued up in any suitable machine for that purpose.

The accompanying sheet of explanatory drawings illustrates the application of our invention.

Figure 1 is an elevation and Figure 2 a sectional end view showing the manner of

winding the yarn in the collapsible mandrel. In clearness of illustration the yarn is represented by a dotted line in Figure 2.

Figure 3 is a plan and Figure 4 a sectional elevation showing the dies for the formation of the annular disks from such wound yarn.

Figure 5 is an elevation and Figure 6 an end view of a completed disk.

The mandrel is made up of tin metal wires as *a* and in the example illustrated there is passed over the mandrel a fabric sleeve *b*. The yarn *c*, impregnated with the synthetic resin, is wound around and along such sleeve and at the conclusion of the winding the tubular body formed by the yarn with the sleeve *b* constituting a lining therefor is withdrawn from the mandrel, and when flattened, after such withdrawal, it resembles a tape or strip. After cutting its ends diagonally or tapering, such strip *d* is placed in ring form in a heated die as *e* which has an annular recess to receive it; the diagonal ends *f* of the strip overlap as shown at Figure 3. Whilst in the die *e* the strip *d* is subjected to pressure applied by the die *g* and under such pressure is consolidated to the complete ring in annular disk form which is represented by the finished article at Figures 5 and 6.

We claim:—

1. A process of manufacturing friction disks, comprising the impregnation of yarn with a synthetic resin, coiling said impregnated yarn upon a collapsible mandrel, drying the yarn and subsequently withdrawing the mandrel from the yarn, flattening the coil, inserting said flattened coil in an annular die to form a ring with over-lapping ends and subjecting said ring in said die to heat and pressure for the formation of the required annular disk.

2. A process of manufacturing friction disks, comprising winding yarn on a collapsible core to form a tubular body, withdrawing said mandrel from said body and flattening and placing the said body in ring form in a die, wherein it is compressed and consolidated by heat and pressure to form an annular disk, said yarn being impregnated with a synthetic resin before the application of heat and pressure.

In testimony whereof we have signed our names to this specification.

HERBERT FROOD.

WALTER RICHARD SYDEE.