Jan. 14, 1936. G. WALTERS 2,028,031

CLUTCH FACING

Filed Oct. 24, 1934

Fig. 2.

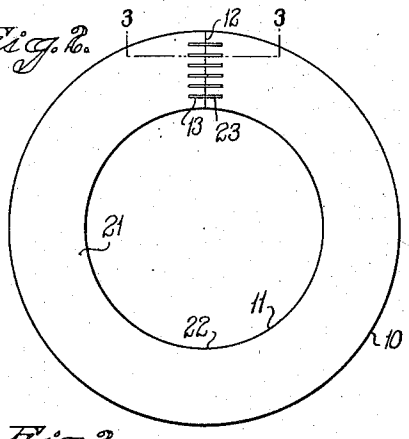



Fig. 1.

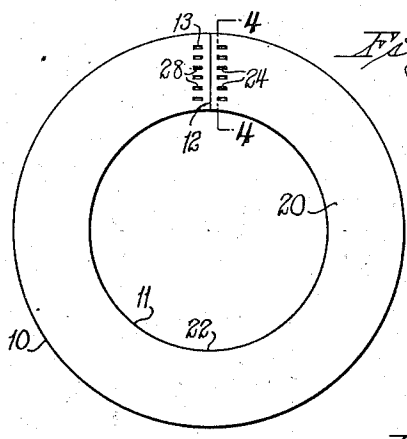



Fig. 3.

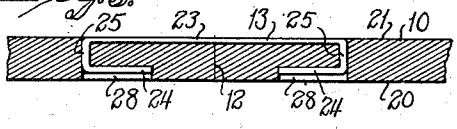



Fig. 6.

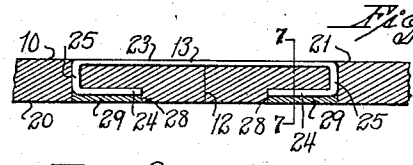



Fig. 5.

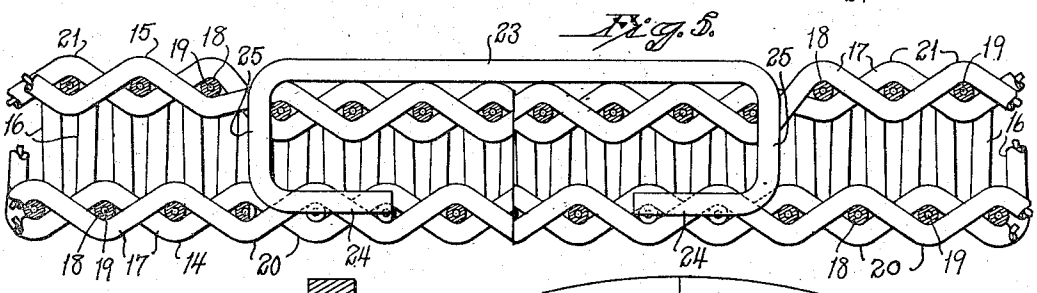



Fig. 4.

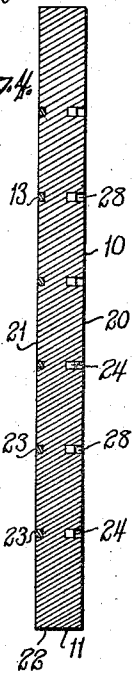



Fig. 10.

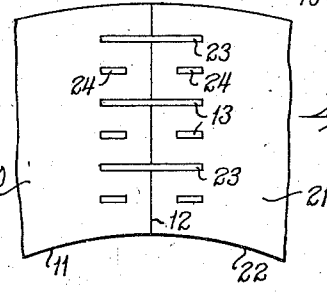



Fig. 7.

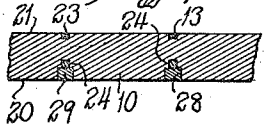



Fig. 8.

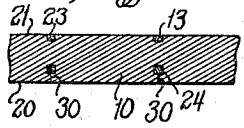
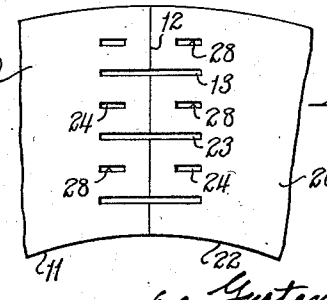



Fig. 9.




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# UNITED STATES PATENT OFFICE

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## CLUTCH-FACING

Gustav Walters, Middletown, Conn.

Application October 24, 1934, Serial No. 749,730

6 Claims. (Cl. 192—107)

This invention relates to improvements in clutch-facings and more particularly to clutch-facings formed of impregnated multi-ply woven fabric.

One object of this invention is to provide an improved impregnated multi-ply woven-fabric clutch-facing which will minimize or eliminate the tendency to produce grooves in the face of the metal clutch-member which cooperates with the friction-face of the clutch-facing.

With the above and other objects in view, this invention includes all improvements over the prior art which are disclosed in this application.

In the accompanying drawing, in which certain ways of carrying out the invention are shown for illustrative purposes:

Fig. 1 is a front elevation illustrating a clutch-facing made in accordance with this invention;

Fig. 2 is a rear elevation of the clutch-facing shown in Fig. 1;

Fig. 3 is a sectional view on line 3—3 of Fig. 2;

Fig. 4 is a sectional view on the line 4—4 of Fig. 1;

Fig. 5 is a greatly-enlarged sectional view similar to Fig. 3, but prior to the final finish grinding of the opposite faces and with the two plies of fabric separated a considerable distance apart for clearness;

Fig. 6 is a sectional view similar to Fig. 3, but with filler-pads in the depressions formed by the inset portions of the splicing-members;

Fig. 7 is a sectional view on line 7—7 of Fig. 6;

Fig. 8 is a sectional view similar to Fig. 7, of a modified construction;

Fig. 9 is an enlarged fragmental view similar to Fig. 1, but with alternate splicing-members inserted from opposite sides of the clutch-facing; and

Fig. 10 is a rear view of Fig. 7.

In the description and claims, the various parts are identified by specific names for convenience, but they are intended to be as generic in their application as the prior art will permit.

Referring to Figs. 1 to 5 of the drawing, 10 is a clutch-facing of disk form, with an inner opening 11 and having ends adjacent and abutting along the line 12, the adjacent ends of the facing being connected or joined together by the splicing-members 13.

In the manufacture of clutch-facings of the form shown in the drawing, a multi-ply fabric of the approximate width of the annular disk shown in Fig. 1, is, according to one mode of manufacture, first woven as a straight length of material. This strip of material is woven with two plies of fabric 14 and 15, connected together by binders 16 (Fig. 5). In actual practice, the two plies of fabric 14 and 15 would be in close contact with one another, but have been shown in Fig. 5 as separated widely apart in order to more clearly illustrate the invention. Each ply of fabric consists of the warp strands 17 and the weft strands or picks 18, which may consist of one or more strand lengths. Each strand has a wire core 19, preferably of brass or zinc and preferably of a diameter ranging between .008″ and .010″, which is provided with a covering formed of a suitable mixture of asbestos and cotton. The outside diameter of the finished strand preferably is approximately $\frac{3}{32}$″.

After the strip of multi-ply fabric is completed, it is wet and wound spirally edgewise about a mandrel of the size of the opening 11 and pressed to shape on the mandrel. After it dries, a longitudinal slit is cut throughout the length of one side of the spirally-wound fabric, which results in producing a plurality of disk-like members similar to disk 10, shown in Fig. 1.

The fabric disks are preferably impregnated with a suitable mixture of asphaltum and China-wood oil, or with barytes and China-wood oil, after which the disks are baked. The splicing-members 13 may then be applied to connect the adjacent ends of the clutch-facing together, after which one or more subsequent impregnations and bakings are given to the clutch-facings. Then, both faces 20 and 21 and the inner edge 22 are ground true to the desired dimensions, the finished thickness of the disk ordinarily being from .130″ to .136″.

In the form of the invention illustrated in Figs. 1 to 5, the splicing-members 13, which are initially of U-shaped form, are forced through adjoining ends of the clutch-facing to bring the body-portion 23 against one face and the clamping-fingers 24 against the opposing face of the clutch-facing, with the leg-portions 25 extending through adjacent end-portions thereof. The end-fingers 24 are forced down rather deeply below the friction-face 20, formed by the ply 14, while the body-portion 23 is preferably left substantially flush with the rear face 21 formed by the ply 15. The ends of each pair of clamping-fingers 24 are preferably well spaced apart from one another so as not to approach too closely to the line of juncture 12 of the adjacent portions of the clutch-facing, in order to minimize the tendency of pieces of the clutch-facing becoming broken, loose and disengaged from the clutch-


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facing, due to the disruption of the edge along the line of juncture 12.

The depressions 28 overlying the inset portions of the splicing-members at the friction-face tend to collect metal particles from the flywheel or pressure-plate (not shown) which frictionally engages the friction-face of the clutch-facing, with the result that some of these metal particles ultimately may become embedded in the splicing-members, which latter ordinarily are of brass, with a resultant tendency to cause the metal particles to score or groove the flywheel or pressure-plate. To prevent this, the depressions 28 may be filled with suitable filler-pads 29 (Figs. 6 and 7). One way of doing this is by filling the depressions with a putty or cement formed of asbestos and China-wood oil.

In the modified construction shown in Fig. 8, the clutch-facing 10 has portions of the splicing-members 13 forced down deeply below the friction-face 20 while the clutch-facing is in a flowable or semi-plastic condition, after which, the clutch-facing is subjected to a pressing operation which causes the material of the clutch-facing to flow or spread over the depressed portions 23, or 24 of the splicing-members 13 so as to meet along the line 30, to thus form filler-pads and thereby eliminate the depressions formed by the operation of insetting the portions of the splicing-members below the friction-face of the clutch-facing. Then the clutch-facing disks are preferably impregnated with a suitable material such, for example, as a mixture of asphaltum and China-wood oil, or barytes and China-wood oil, after which the disks are baked. The clutch-facing may then be ground to accurate size similar to the manner previously described.

It will be observed that although the clamping-fingers 24 cut pretty well through the ply of fabric 14 at the friction-face, the body-portion 23 does not substantially cut the fabric ply 15 at the rear-face, but while distorting and compressing it, leaves it without serious impairment of the continuity and strength of its strands, thus providing ample mechanical strength to the spliced adjacent ends of the clutch-facing, notwithstanding that the end-fingers 24 may have partially cut through the fabric ply 14 of the friction-face.

In the form of the invention illustrated in Figs. 9 and 10, instead of inserting the splicing-members 13 all from one side of the clutch-facing, alternate splicing-members are inserted through the clutch-facing from opposite directions, as shown. This mode of construction provides greater mechanical strength against lateral bending of the clutch-facing joint when the clutch-facing is used on a wrinkled type of clutch-member, and also from handling prior to its insertion in the clutch. The friction-face 20 of the clutch-facing shown in Figs. 9 and 10 has the body-portions 23 and clamping-fingers 24 inset well below the friction-face 20 in a similar manner to the showing of the clamping-fingers 24 of Figs. 5 and 6, and the inset-portions 23 and 24 may be covered as illustrated in Figs. 6 and 7, or Fig. 8.

Thus, it will be observed from Fig. 9 that where the body-portions 23 of the splicing-members 13 occur at the friction-face, they are inset below the friction-face, as is also true of the clamping-fingers 24 at the friction-face. At the rear-face 21, shown in Fig. 8, the body-portions 23 and clamping-fingers 24 are preferably merely made flush with the rear-face in a manner similar to the showing in Figs 5 and 6.

By thus having the portions of the splicing-members which are located at the friction-face of the clutch-facing, inset well below the friction-face, all risk of scoring of the metal of the clutch-member, which is to operate in conjunction with the friction-face of the clutch-facing, is avoided, without, however, unduly weakening the material from which the clutch-facing is made.

The invention may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention, and the present embodiments are therefore to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

I claim:

1. A clutch-facing comprising: a disk formed of impregnated multi-ply woven fabric having two ends adjacent one another and with one play forming a friction-face ply and another ply forming a rear-face ply; and a plurality of splicing-members joining said adjacent ends; each splicing-member including a body-portion engaging one of said face plies, a pair of leg-portions extending through said adjacent ends, and a pair of clamping-fingers engaging the other of said face plies; the portions of said splicing-members engaging said friction-face ply being inset substantially below the surface of said friction-face.

2. A clutch-facing comprising: a disk formed of impregnated multi-ply woven fabric having two ends adjacent one another and with one ply forming a friction-face ply and another ply forming a rear-face ply; and a plurality of splicing-members joining said adjacent ends; each splicing-member including a body-portion engaging one of said face plies, a pair of leg-portions extending through said adjacent ends, and a pair of clamping-fingers engaging the other of said face plies; the portions of said splicing-members engaging said friction-face ply being inset substantially below the surface of said friction-face ply, and the face-engaging portions of said splicing-members at said rear-face being substantially flush with the surface of said rear-face.

3. A clutch-facing comprising: a disk formed of impregnated multi-ply woven fabric having two ends adjacent one another and with one ply forming a friction-face ply and another ply forming a rear-face ply; and a plurality of splicing-members joining said adjacent ends; each splicing-member including a body-portion engaging one of said face plies, a pair of leg-portions extending through said adjacent ends, and a pair of clamping-fingers engaging the other of said face plies; the portions of said splicing-members engaging said friction-face ply being inset substantially below the surface of said friction-face, the face-ply engaging portions at each said face including some body-portions and some clamping-fingers of splicing-members.

4. A clutch-facing comprising: a disk formed of impregnated multi-ply woven fabric having two ends adjacent one another and with one ply forming a friction-face ply and another ply forming a rear-face ply; and a plurality of splicing-members joining said adjacent ends; each splicing-member including a body-portion engaging one of said face plies, a pair of leg-portions ex-

tending through said adjacent ends, and a pair of clamping-fingers engaging the other of said face plies; the portions of said splicing-members engaging said friction-face ply being inset substantially below the surface of said friction-face, and the face-engaging portions of said splicing-members at said rear-face being substantially flush with the surface of said rear-face, the face-ply engaging portions at each said face including some body-portions and some clamping-fingers of splicing-members.

5. A clutch-facing comprising: a disk formed of impregnated multi-ply woven fabric having two ends adjacent one another and with one ply forming a friction-face ply and another ply forming a rear-face ply; and a plurality of splicing-members joining said adjacent ends; each splicing-member including a body-portion engaging one of said face plies, a pair of leg-portions extending through said adjacent ends, and a pair of clamping-fingers engaging the other of said face plies; the portions of said splicing-members engaging said friction-face ply being inset substantially below the surface of said friction-face, and at least some of each pair of clamping-fingers extending toward each other with their ends spaced apart and away from the line of juncture of said adjacent ends.

6. A clutch-facing comprising: a disk formed of impregnated multi-ply woven fabric having two ends adjacent one another and with one ply forming a friction-face ply and another ply forming a rear-face ply; a plurality of splicing-members joining said adjacent ends; each splicing-member including a body-portion engaging one of said face plies, a pair of leg-portions extending through said adjacent ends, and a pair of clamping-fingers engaging the other of said face plies; the portions of said splicing-members engaging said friction-face ply being inset substantially below the surface of said friction-face; and filler-pads interposed between said inset-portions of said splicing-members and the plane of said friction-face.

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