

Nov. 24, 1936.

J. M. TAYLOR

2,061,815

NONMETALLIC GEAR, PULLEY AND THE LIKE

Filed Dec. 1, 1933

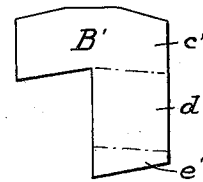
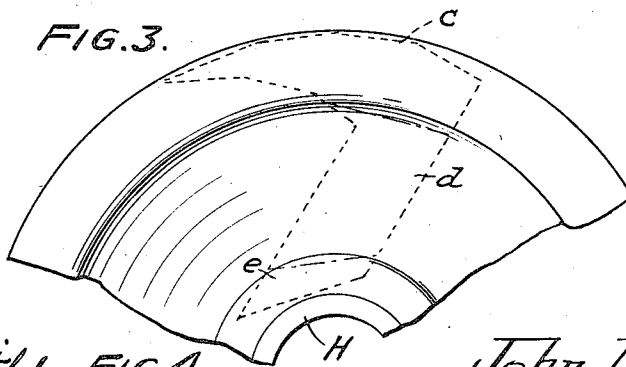
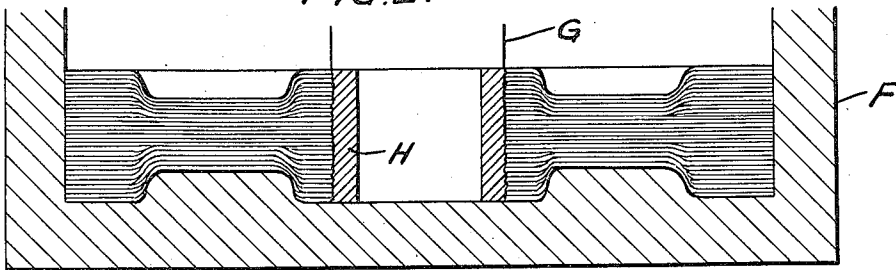
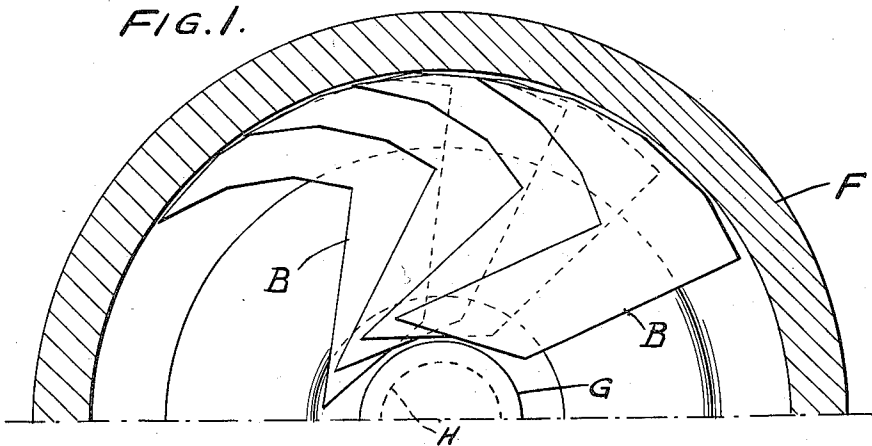
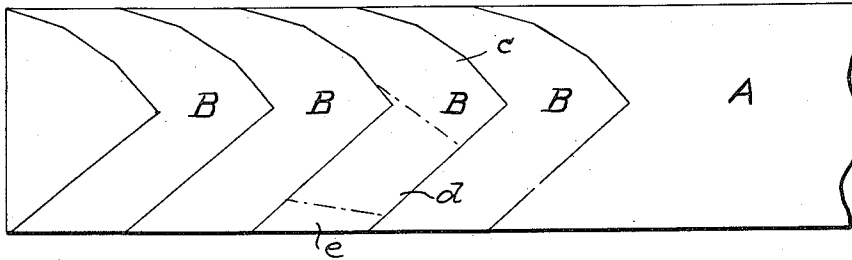


FIG. 5.

INVENTOR

WITNESS:

Robt. Blitchel

FIG. 4.

John M. Taylor

BY
Bussert Harding
ATTORNEYS

UNITED STATES PATENT OFFICE

2,061,815

NONMETALLIC GEAR, PULLEY,
AND THE LIKE

John M. Taylor, Villanova, Pa., assignor to
Taylor & Company, Inc., Norristown, Pa., a
corporation of Delaware

Application December 1, 1933, Serial No. 700,542

5 Claims. (Cl. 74-445)

This invention relates to an improvement in non-metallic gear, pulley and the like and more particularly relates to such formed by compression of fabric, felt, paper, or the like and a binder.

Heretofore gears, pulleys and the like and blanks therefor have been produced by the compression in a mold of elements impregnated with a binder, separate elements being provided for forming the rim and web portions respectively of the gear or pulley and separate elements or a filling being provided for forming the hub portion, in order that the several portions of the gear or pulley would have the proper relative thickness.

In such constructions the rim and web elements have variously composed fabric, paper, felt and the like, impregnated or associated with a binder, such as a thermoplastic composition, or a thermosetting composition, as a phenol-formaldehyde condensation product which becomes insoluble and infusible under the influence of heat and pressure. Thus, heretofore, for example, the rim elements have been of ring or washer shape, or segments thereof, while the web elements have been of disk shape or the web has been formed from the scrap, and a filling has been provided for formation of the hub.

The prior constructions referred to have been found variously disadvantageous, more particularly in that differently formed elements to form the rim and web must be cut out from a sheet or strip and separately laid up in a mold; in that the elements cannot be interlocked with maximum efficiency except through the binder at the juncture of the rim and web and in that for the formation of the hub portion the use of a filling is usually necessary.

Now in accordance with this invention there is provided a gear, pulley, or the like, comprising a plurality of elements, each, as an integral whole, comprising a rim, web and hub forming section.

The elements comprising the gear or pulley may be of any suitable material, as fabric, felt, paper, or the like, and will be impregnated or associated with a binder of any suitable type well known to the art, though a thermosetting binder or a phenol-formaldehyde condensation product will be preferred; and the hub, web and rim forming sections of the elements will be so related and so shaped that on compression of a plurality of the elements arranged or laid up in overlapping relation in a mold, a gear or pulley having the rim, web and hub portions integral and of conventional or desired relative thickness will be formed.

Having now indicated in a general way the nature and purpose of this invention, I will proceed to a detailed description of a preferred embodiment thereof with reference to the accompanying drawing, in which:

Figure 1 is a plan view of a strip of fabric impregnated with a binder and having a plurality of structural elements for the formation of a gear, pulley, or the like in accordance with this invention laid out thereon.

Figure 2 is a plan view of one-half of a mold with a plurality of structural elements for the formation of a gear, pulley, or the like, laid up thereon.

Figure 3 is a view, partly in section and partly diagrammatic, showing structural elements arranged in a mold, as shown in Figure 2, after compression.

Figure 4 is a fragmentary plan view of a pulley, gear blank or the like, with a structural element indicated thereon.

Figure 5 is a plan view of a structural element of modified form.

Referring to the several figures, A indicates a strip of material, as, for example, fabric, paper felt or the like, or which may be a composite strip as, for example, of fabric and paper, formed by parallel strips of fabric and paper secured together and forming the rim and web portions respectively, impregnated with a binder, which may be any suitable binder, as for example, a thermoplastic or a thermosetting composition, as a phenol-formaldehyde condensation product.

B, B indicate structural elements for the formation of a gear, pulley, or the like, cut, in any suitable manner or by any suitable mechanism, from the strip A. Each of the elements B, B comprises a rim forming section c, a web forming section d and a hub forming section e.

F indicates the outer wall of a mold, having a center pin or wall G, within which the structural elements B, B are laid up in overlapping relation in layers, desirably with the outer edges of their rim forming portions conforming substantially to the outer wall of the mold and giving maximum overlap to the hub-forming portions, all as shown in Figure 2. The elements in adjacent layers are laid in break joint relationship, as indicated in Figure 2. H indicates a bushing or sleeve serving as a reinforcement for the hub.

Each of the elements B, B as shown is of angular form, and more particularly the rim forming section, which is composed of a series of angular shapes arranged end to end, tapers to a point at its free end while its inner edge forms an

acute angle with the inner edge of the web forming section; the web forming section is of quadrilateral form and the hub forming section is substantially triangular.

- 5 The several sections *c*, *d*, and *e* are so related and proportioned that when they are laid up in the mold in overlapping relation the rim forming sections *c* will provide a greater thickness of material for the formation of the rim of, for example, a gear blank or pulley, than will the web forming sections *d*, while the hub forming sections when laid up in the mold will provide a greater thickness of material, than that provided by the web forming sections, for the formation of the hub.

10 The gear, pulley, or the like is, as will now be obvious, finally formed by compression of the elements *B*, *B* in a mold under suitable temperature and pressure to cause the binder to flow and bind the elements *B*, *B* together into a homogeneous whole, in which the hub, rim and web portions will be integral not only with respect to the binder, but with respect to the fabric, felt, paper, or the like, or composite material, of which, in addition to the binder, they are composed.

20 It will, of course, be understood that the shape of the rim, web and hub sections of the elements *B*, *B* severally and collectively, and of the elements as a whole, may be widely varied from the shapes illustrated and described herein for illustrative purposes. Thus, the edges of the elements *B*, *B* in whole or in part may be curved rather than straight, it being only necessary in accordance with this invention that the several sections of the elements be so shaped and related that the elements may be laid up to provide on compression a gear, pulley, or the like having desired or conventional differential or relative thickness of the rim, web and hub portions. And it will be understood that within the scope of this invention the hub forming portions *e* of the elements *B* may be omitted where the formation of a hub is not required, as in cases where the hub is formed solely by a metallic element secured to the web.

45 Obviously, as will be understood the elements *B*, *B* may be formed from any suitable material and any suitable binder known to the art to which this invention relates, or which is suitable for the purpose intended, may be used.

50 It will now be understood that this invention from the broad standpoint contemplates a gear, pulley, or the like, essentially composed of struc-

tural elements formed from paper, felt, fabric, or the like, and comprising as an integral whole, rim, web and hub forming sections; and that from the more specific standpoint the invention contemplates variously the details herein described.

What I claim and desire to protect by Letters Patent is:

1. A non-metallic gear, pulley, or the like, comprising a plurality of L-shaped, non-metallic structural elements and a binder consolidated under pressure, said elements respectively being arranged in overlapping relation.

2. A non-metallic gear, pulley, or the like, comprising a plurality of non-metallic structural elements and a binder consolidated under pressure, said elements respectively being arranged in overlapping relation, said elements respectively comprising integral rim, web and hub forming sections and characterized by the fact that the inner edge of the rim forming section joins an edge of the web forming section at an acute angle.

3. A non-metallic gear, pulley, or the like, comprising a plurality of non-metallic structural elements and a binder consolidated under pressure, said elements respectively being arranged in overlapping relation, said elements respectively comprising integral rim, web and hub forming sections and characterized by the fact that the outer edge of the rim forming section includes a salient angle.

4. A non-metallic gear, pulley, or the like, comprising a plurality of non-metallic structural elements and a binder consolidated under pressure, said elements respectively being arranged in overlapping relation, said elements respectively comprising integral rim, web and hub forming sections and characterized by the fact that the outer edge of the rim forming section includes a salient angle and by the fact that the inner edge of the rim forming section includes a re-entrant angle.

5. A non-metallic gear, pulley, or the like, comprising a plurality of non-metallic structural elements and a binder consolidated under pressure, said elements respectively being arranged in overlapping relation, said elements respectively comprising integral rim, web and hub forming sections and characterized by the fact that the web forming section is substantially uniform in width and that the free end of the hub forming section is on a bias line with respect to its edges.

JOHN M. TAYLOR.