

L. GUTMANN.

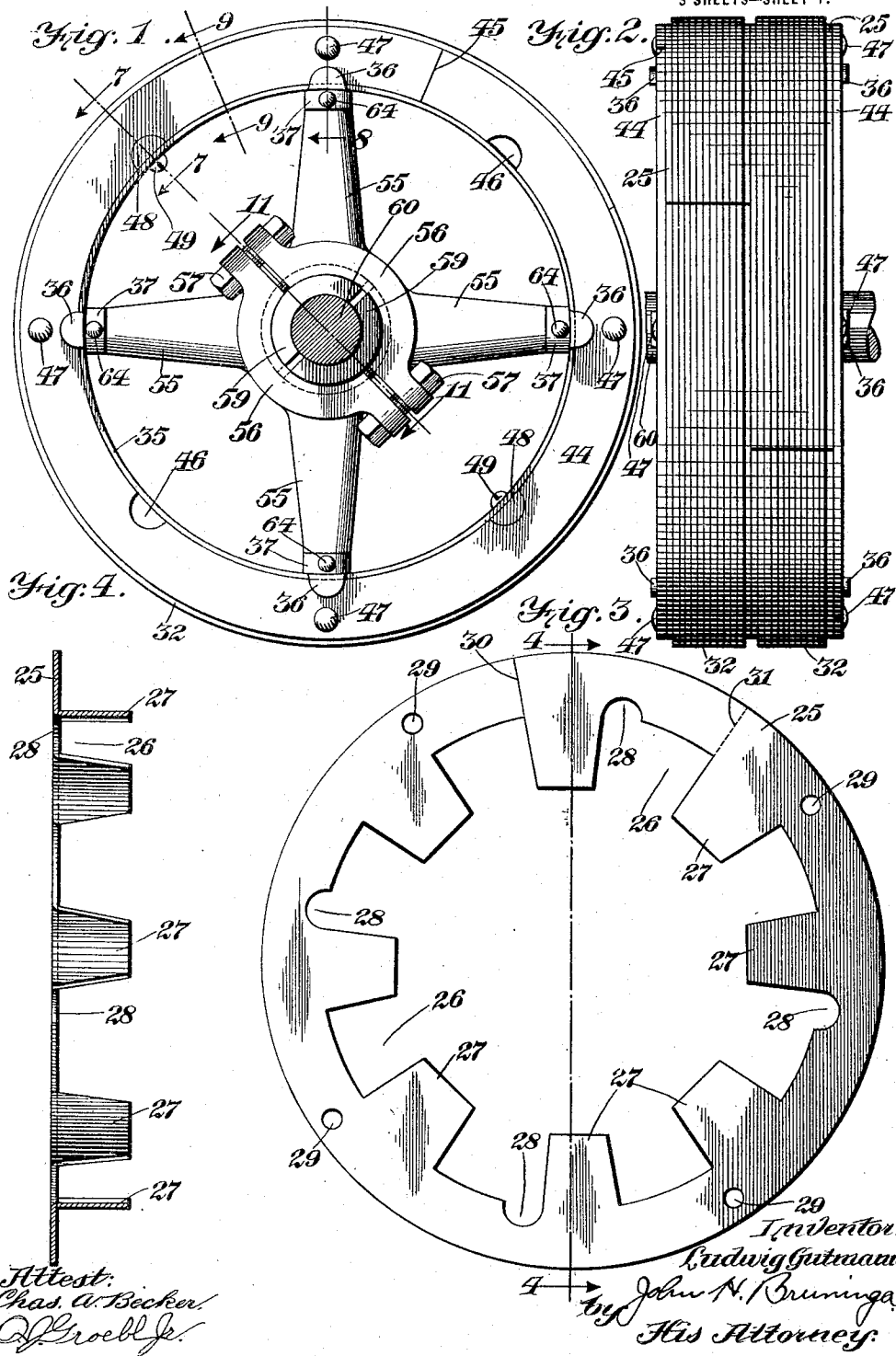
PULLEY.

APPLICATION FILED SEPT. 28, 1912.

Patented Jan. 9, 1917.

3 SHEETS—SHEET 1.

1,211,937.



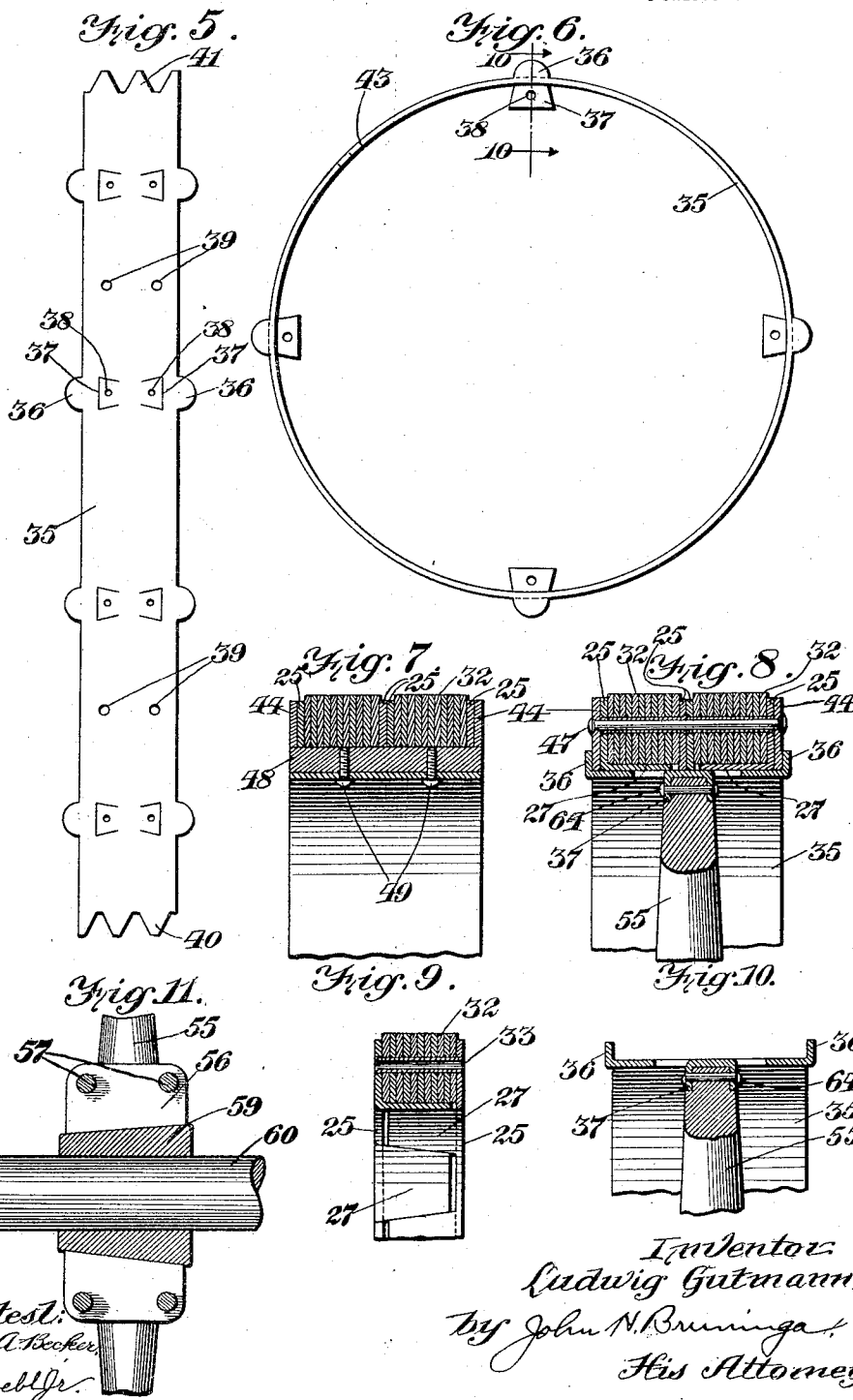
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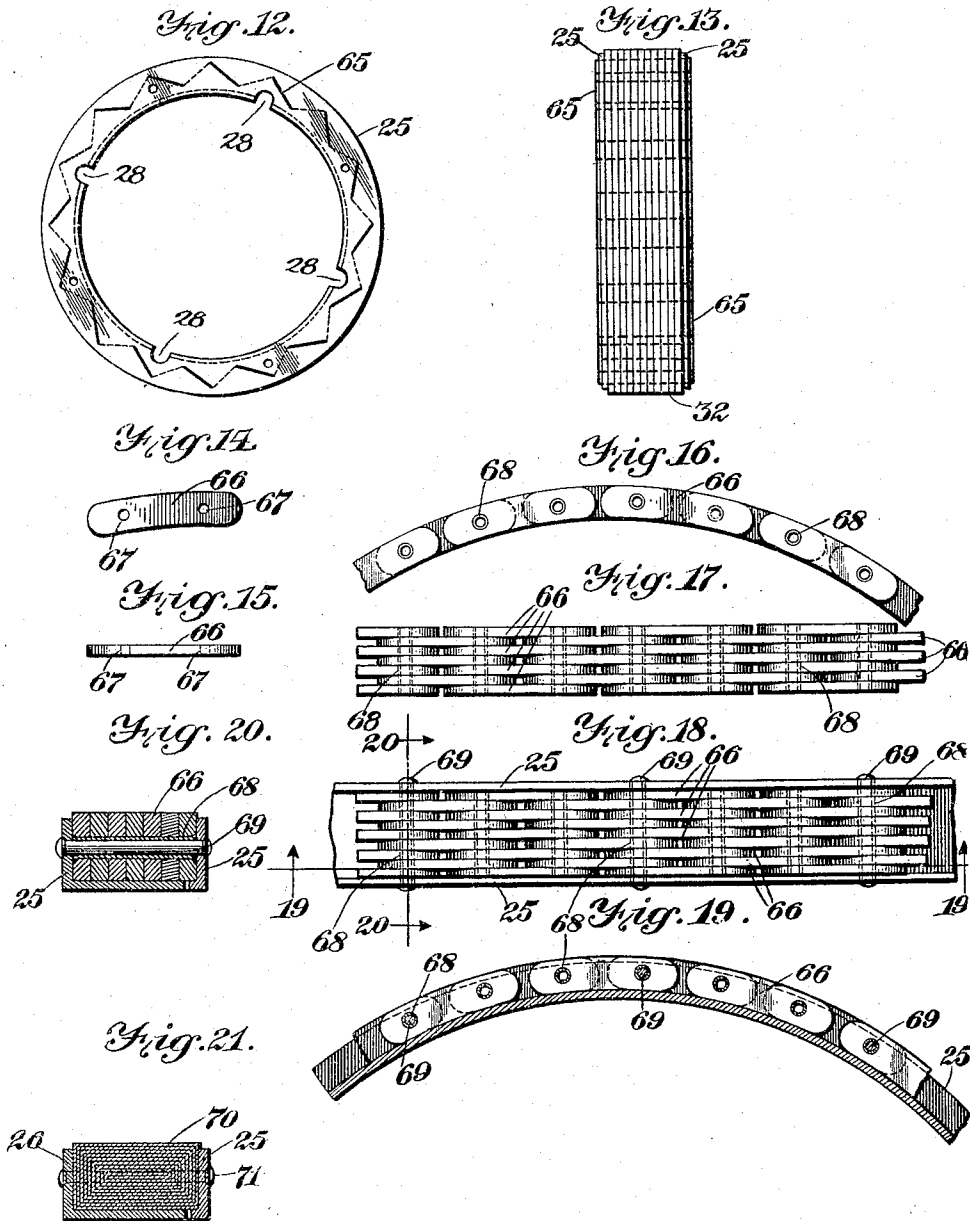
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UNITED STATES PATENT OFFICE.

LUDWIG GUTMANN, OF ST. LOUIS, MISSOURI.

PULLEY.

1,211,937.

Specification of Letters Patent.

Patented Jan. 9, 1917.

Application filed September 28, 1912. Serial No. 722,915.

To all whom it may concern:

Be it known that I, LUDWIG GUTMANN, a citizen of the United States, and residing at St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Pulleys, of which the following is a specification.

This invention relates to pulleys and more particularly to pulleys having non-metallic rims or facings.

Pulleys of the above type as now constructed have belt facings of wood, leather, paper or cloth, the facing being directly laid on and secured to the rim. Wood pulleys have a very small coefficient friction and a very small overload capacity so that their comparative cheapness is offset by the wear and tear on the belts, bearings, etc. Paper pulleys show the best results as power transmitters. They are however mechanically weak and are easily damaged when being placed on or removed from the driving shaft. When the driving belt is shifted on or off the pulley the edges of the paper facing are liable to become abraded. The loss due to the accidental abrasion of the paper flanges and other accidental damage is quite heavy and unexpectedly increases the cost of these pulleys when for any reason the pulley or the belt requires removing. Metal pulleys have the necessary strength but lack the desired high coefficient of friction.

The objects of this invention therefore are to construct a pulley which will overcome the defects of the present constructions and which combines the favorable points of the paper pulley with those of the steel pulley and possesses additional points of advantage over both.

Further objects will appear from the detail description taken in connection with the accompanying drawings, in which:

Figure 1 is an end elevation of a pulley embodying this invention, Fig. 2 is a front elevation or face view, Fig. 3 is a view of the blank forming a part of one of the rim elements hereinafter to be described, Fig. 4 is a section on the line 4—4 Fig. 3 and showing the flange forming portions of the blank of Fig. 3 bent up, Fig. 5 is a view of a blank forming the sheet metal rim of the pulley, Fig. 6 is a side elevation of the rim as formed from the blank of Fig. 5, Fig. 7 is a section on the line 7—7 Fig. 1, Fig. 8 is a section on the line 8 Fig. 1, Fig. 9 is a sec-

tion through one of the rim elements taken on the line 9—9 Fig. 1, Fig. 10 is a section on the line 10—10 Fig. 6 and showing one of the spokes in section, Fig. 11 is a section on the line 11—11 Fig. 1, Figs. 12 and 13 are an end and a front elevation respectively of another form of rim element, Figs. 14 and 15 are a side elevation and a plan respectively of one of the units comprising another form of pulley facing, Figs. 16 and 17 are a side elevation and a plan respectively of a pulley facing formed of the units shown in Figs. 14 and 15, Fig. 18 is a plan view of a rim element with the pulley facing of Figs. 16 and 17 in place. Fig. 19 is a section on the line 19—19 Fig. 18, Fig. 20 is a section on the line 20—20 Fig. 18, Fig. 21 is a section through a rim element showing another embodiment of this invention.

The pulley forming the subject-matter of this invention has a rim comprising a plurality of rim elements. Each rim element is a self-contained structure and is so arranged that a pulley of the desired width may be built up by assembling a plurality of these elements. One of these elements will now be described.

Referring to Figs. 3, 4 and 9, 25 designates a sheet metal blank preferably produced by punching to form radially extending recesses 26 and inwardly extending projections or teeth 27. The blank has also formed therein a plurality of recesses 28 extending into the body of the blank from the recesses 26, and a plurality of holes 29. The blank is slit at 30 so as to form a split ring. The projections 27 are bent at right angles to the blank as shown in Fig. 4 so as to form when completed an annular ring having an annular serrated flange consisting of a series of circumferentially spaced projections or teeth. A rim element comprises a pair of rings as shown in Figs. 3 and 4, and these rings are formed identically except that the complementary ring is slit at the point 31 instead of at 30. After a pair of these rings are formed as shown in Fig. 4 they are assembled so that the projections or teeth 27 of one will enter between and telescope with the teeth of the other as shown in Fig. 9, whereby they will form together an annular ring of channel section. The channel section is filled with annular laminations 32 of paper, leather, canvas or the like material. The whole is then com-

pressed and secured by hollow rivets 33 passing through side flanges of the rings 25 and through the laminations 32 as shown in Fig. 9. The structure so formed will comprise a self-contained annular ring having side and annular flanges forming a casing or support of sheet metal and having a non-metallic, fibrous pulley facing. The laminations project a short distance above the side flanges as shown in Fig. 9 so that the pulley face itself will be formed of the fibrous material. In the complete ring the recesses 28 in one ring will be opposite the recesses of the other while the projections 27 are cut away to form clear passages. The laminations are also cut out at these points so that there will be a plurality of semi-circular recesses extending entirely across the inside face of the ring. The slits 30 and 31 will also be opposite each other and the laminations 32 are also slit at this point so that the complete element will form a split annular ring.

Referring now to Figs. 1, 2, 5, 6, 7, 8 and 10, 35 designates a blank of sheet metal which is formed to provide a series of laterally extending projections or lips 36, and is slit to provide a series of pairs of tongues 37 perforated as shown at 38. The blank is further provided with perforations 39, and the ends of the blank are toothed as shown at 40 and 41, the teeth 40 being complementary to the teeth 41 so that they will intermesh. The projections or lips 36 and the tongues are struck up at right angles to the body of the blank, and the blank is then bent in a circle as shown in Fig. 6. This will form a circular rim joined at 43 and having pairs of outwardly extending projections 36 extending upwardly from the edge of the rim, and having pairs of spaced inwardly extending projections 37 positioned on opposite sides of the center line of the rim. This rim forms the support for the rim elements hereinbefore described.

The rim elements and the rim are assembled as follows: A ring 44 slit at 45, and having recesses 46 and holes spaced in the same relation as the recesses 28 and the rivets 33 in the rim elements, is slipped on the rim by first alining the recesses 46 with the lugs 36 so that the ring will pass over the lugs, and then turning the ring through an angle so as to lock it in position. A pair (or the required number) of rim elements are then slipped over the rim in a similar manner, the elements being first positioned with the recesses 28 in alinement with the lugs 36 to pass thereover, and then turned through an angle to lock them in position. A second ring 44 is then slipped over the lugs 36 and turned to lock it in position thereon. It will be understood that the recesses 28 and 46 are slightly larger than the lugs 36. Rivets or bolts 47 are now passed

through holes in the rings 44 and through the hollow rivets 33 in the rim elements so as to securely fasten the parts in position on the rim. The lugs 36 will hold and sustain the rim elements with their supporting rings 44 laterally on the rim, the lugs and recesses forming a bayonet joint. In order to lock these parts in position and against rotation on the rim a series of keys 48 are provided which are inserted in the alined recesses 28 and 46 in the rim elements and the rings 44 respectively, and which are secured to the rim by means of screws 49 passing through the apertures 39 and into the keys. The lugs 36 and the keys 48 will therefore operate to securely hold the rim elements in position on the rim as shown in Figs. 1, 2, 7 and 8.

The pulley body and the means for securing the same to the shaft may be constructed in any suitable manner. The pulley body is preferably split and comprises two halves each consisting of a pair of spokes 55 and a hub section 56 adapted to embrace a shaft and clamped thereon by means of bolts 57. The aperture in the hub is slightly tapering so as to receive a split cone bushing 59 adapted to embrace the driving shaft 60 in the customary way. The spokes are secured to the rim as shown in Figs. 1, 8 and 10 by means of the downwardly turned lips 37. These lips embrace and are turned over the reduced ends of the spokes and are secured thereto by rivets 64 passing through the lips and the spokes.

It will be noted that the rim, the rim elements, the rings 44 and the pulley body and its cone are of split construction. The pulley may therefore be applied to a shaft supported between bearings since each part may be separately slipped over the shaft. The rim elements are sufficiently flexible so as to permit them to be deflected laterally to enable them to be sprung over the shaft. The rim, the rim elements and the rings are so arranged that the split parts will break joints as shown in Figs. 1 and 2 so that when the parts are assembled they will constitute a rigid structure. After the parts are assembled on the shaft and the cone bushing driven into place, the latter will grip both the shaft and the pulley body to secure the pulley in position on the shaft without keys or pins. This will also spread out the arms and the rim so that when the parts are thus assembled they will form together a rigid structure.

In the constructions heretofore described, the rim element has its parts secured together by rivets; it will be understood that this securing means may be varied. Thus in the construction shown in Figs. 12 and 13 the laminations are secured in the metallic support or incasing member and the whole is secured together by means of wire thread

65, or the like passed back and forth through the side flanges and the laminations while the hole is held under pressure.

In the constructions heretofore described the pulley facing is made up of annular rings assembled together on a metallic support or incasing member. This pulley facing may however be of different constructions.

Referring to Figs. 14 to 20 inclusive designates a thin unit which may be cut from waste leather, paper, canvas, rubber or the like and perforated as shown at 67 to form a link. The links are assembled and secured together by means of tubular rivets 68 so as to form a chain as shown in Figs. 16 and 17. This chain is arranged to be placed on a metallic support or ring which may be of substantially the same construction as described heretofore. The chain may be secured in position on the metallic support by rivets or bolts 69 passing at intervals through the hollow rivets 68 as shown in Figs. 18, 19 and 20. The chain formed as shown in Figs. 16 and 17 may be built up to any suitable width or length so as to fit a rim element of any given width or diameter. This form of facing may moreover be applied to a rim of any suitable construction. Since the units or links of this pulley facing may be formed of waste material its cost can of course be kept very low. When in position on the rim it forms a very efficient pulley facing.

Referring to Fig. 21, 70 designates a pulley facing consisting of a roll of cloth, rubber or other material formed to fit a rim element or the rim of a pulley. The material may be treated and compressed so as to form a compact and efficient facing. The facing may be secured in position in any suitable manner as by means of rivets or bolts 71 passing through side flanges of the support and through the facing.

It will thus be seen that the invention accomplishes its objects. A pulley of any desired width may be built up of the rim elements and these rim elements when in assembled position will form together a compact rigid pulley rim. In view of the fact that the pulley facing of each element is supported laterally close to its working surface by the metallic flanges of its support or casing, abrasion and tearing of the edges is prevented. Each rim element is a self-contained structure; damage is therefore minimized and may mean merely the replacement of another element. A pulley of any suitable width may be built up by the addition of any suitable number of elements. Since these elements are made comparatively narrow it is possible to form them better than if the facing were wide. A pulley of this construction will moreover possess greater strength than one having

a single unitary pulley face. The provision of the split elements permits ready removal and replacement from a supported shaft, while the overlapping and breaking of joints will result in a rigid structure having great strength. The pulley is so constructed that it may be applied to a shaft supported in bearings and when in position the parts will be arranged so as to form a unitary and rigid construction. This pulley therefore combines the advantages of the paper pulley with its high coefficient of friction, with the advantages of the metal pulley with its strength and durability. The rim and the elements are stamped from sheet metal and since the parts of the rim elements are duplicated to a large extent the cost will be comparatively low.

While in the specific embodiment shown the pulley is of the split type arranged to be placed on shafting already in position, it may be noted that in those cases where a split pulley is not required, as where the pulley is placed on the end of a shaft, neither the punchings 25 nor the rim element itself need be split. In pulleys having a narrow face, only one rim element may be used which may be secured in position on the rim in the manner described. The pulley face may be treated with rubber, balata, or any other suitable material. It is further obvious that various changes may be made in details of construction within the scope of the claims without departing from this invention, and it is therefore to be understood that this invention is not to be limited to the specific construction shown and described.

Having thus described the invention what is claimed is:

1. A pulley having a rim, a plurality of rim elements removably mounted on and arranged axially of said rim, each rim element comprising a pair of side members and a pulley facing between said side members, said side members and pulley facing being united to form a self-contained annular structure, and means for securing said rim elements in assembled relation on the rim.
2. A pulley having a rim, a plurality of split rim elements removably mounted on and arranged axially of said rim, each rim element comprising a pair of side members and a pulley facing between said side members, said side members and pulley facing being united to form a self-contained split annular structure, and means for securing said rim elements in assembled relation on the rim.
3. A pulley having a rim, and a self-contained rim element comprising a pair of annular metallic side members, and a laminated non-metallic pulley facing between said side members, said parts being secured together to form a self-contained annular

structure, the rim element so formed being adapted to be removably mounted on the pulley to form the driving rim thereof.

4. A pulley having a rim element comprising a pair of annular sheet metal side members having laterally extending serrated flanges struck up from the body thereof, the teeth on one flange fitting between the teeth of the other, and said flanges being positioned to form a rim of channel section, and a pulley facing between said side members, said parts being secured together to form a self-contained annular structure, the rim element so formed being adapted to be removably mounted on the pulley to form the driving rim thereof.

5. A pulley having a rim, and a self-contained rim element comprising a pair of annular metallic side members, and a laminated non-metallic pulley facing between said side members, said parts being secured together to form a self-contained annular structure, the rim element so formed being adapted to be removably mounted on the pulley to form the driving rim thereof, said element having recesses, and said rim having cooperating lugs to form a lock joint between said element and said rim.

6. A pulley having a sheet metal rim, said rim having pairs of lugs struck and bent radially inwardly from the body thereof to form pairs of spoke engaging members, each pair adapted to embrace a spoke therebetween, and said rim having lugs bent radially outwardly from the edges thereof to form means for securing a pulley facing on the rim.

7. A power transmitter comprising a hub adapted to be mounted on a shaft, a rim mounted on said hub, a self-contained rim

element comprising side members and a laminated facing between said side members, said rim element parts being secured together to form a self-contained structure, the rim element so formed being adapted to be removably mounted on the pulley to form the driving rim thereof.

8. A power transmitter comprising a hub adapted to be mounted on a shaft, a rim mounted on said hub, a self-contained rim element comprising side members and a laminated facing between said side members, the laminations extending at right angles to the shaft and each lamination comprising a plurality of parts, said rim element parts being secured together to form a self-contained structure, the rim element so formed being adapted to be removably mounted on the pulley to form the driving rim thereof.

9. A power transmitter comprising a hub adapted to be mounted on a shaft, a rim mounted on said hub, a self-contained rim element comprising side members and a laminated facing between said side members, the laminations extending at right angles to the shaft and each lamination comprising a plurality of parts and divided circumferentially into a plurality of pivotally connected links, said rim element parts being secured together to form a self-contained structure, the rim element so formed being adapted to be removably mounted on the pulley to form the driving rim thereof.

In testimony whereof I affix my signature in the presence of two witnesses.

LUDWIG GUTMANN.

Witnesses:

CHARLES LUECKE,
WM. J. FINNEGAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."