No. 692,602. Patented Feb. 4, 1902.

C. H. BICALKY.

WHEEL.

(Application filed Dec. 24, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

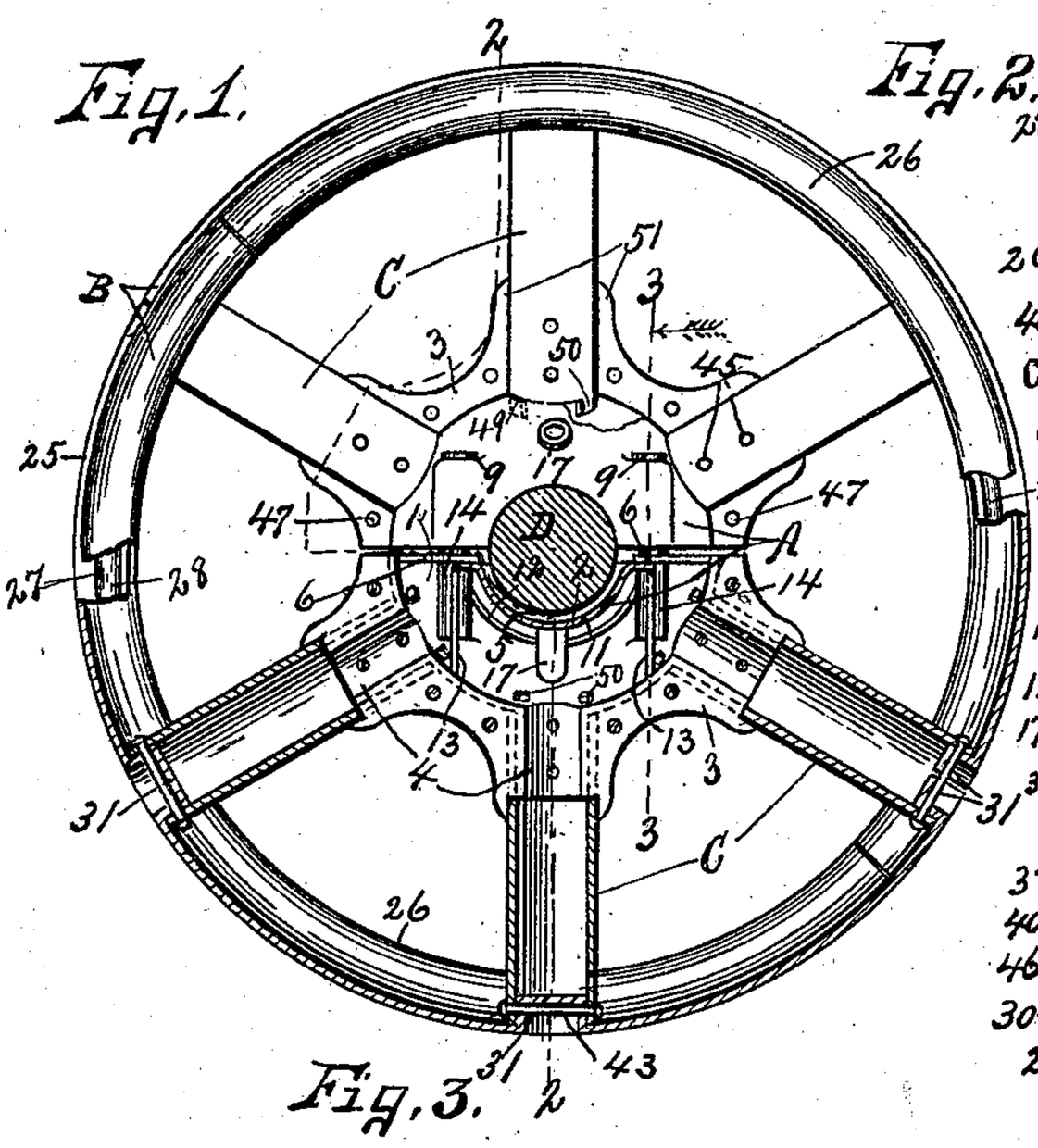


Fig. 2.

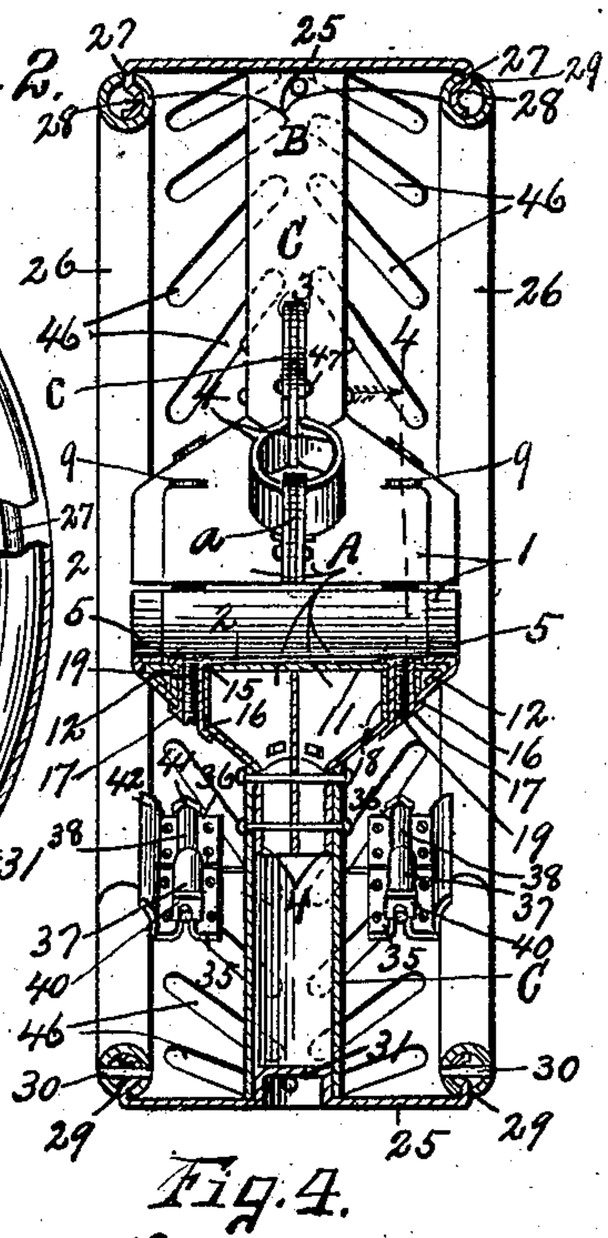


Fig. 3.

Fig. 4.

Fig. 5.

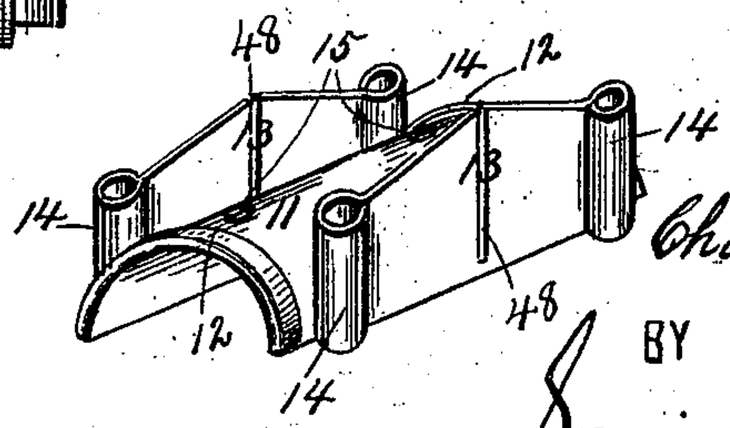


Fig. 7.

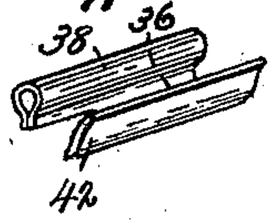
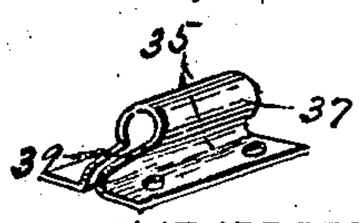


Fig. 6.



WITNESSES.

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No. 692,602. Patented Feb. 4, 1902.

C. H. BICALKY.

WHEEL.

(Application filed Dec. 24, 1900.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 8.

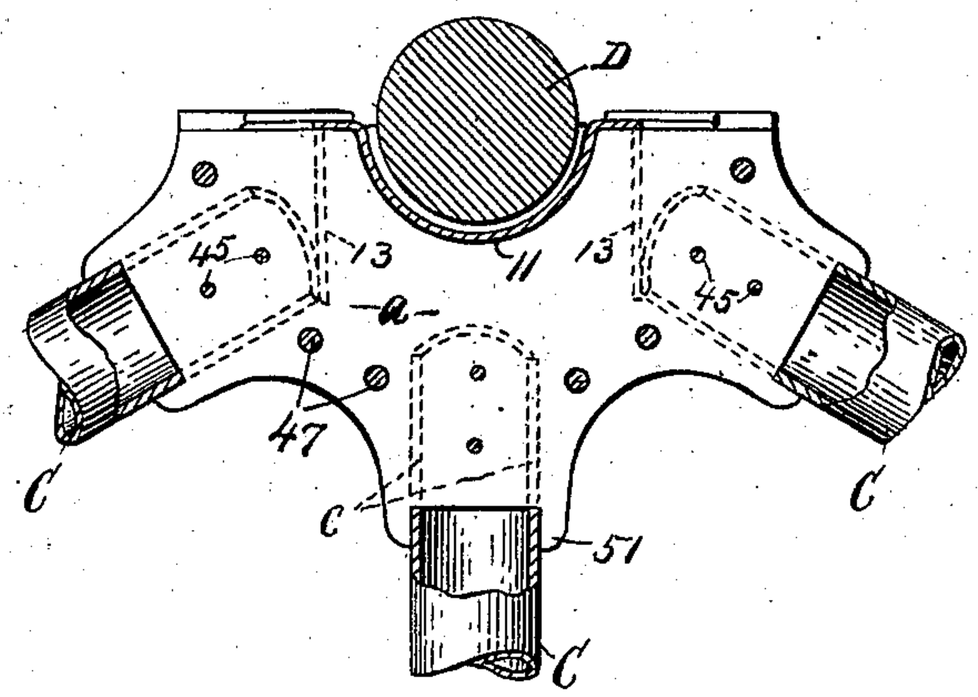


Fig. 9.

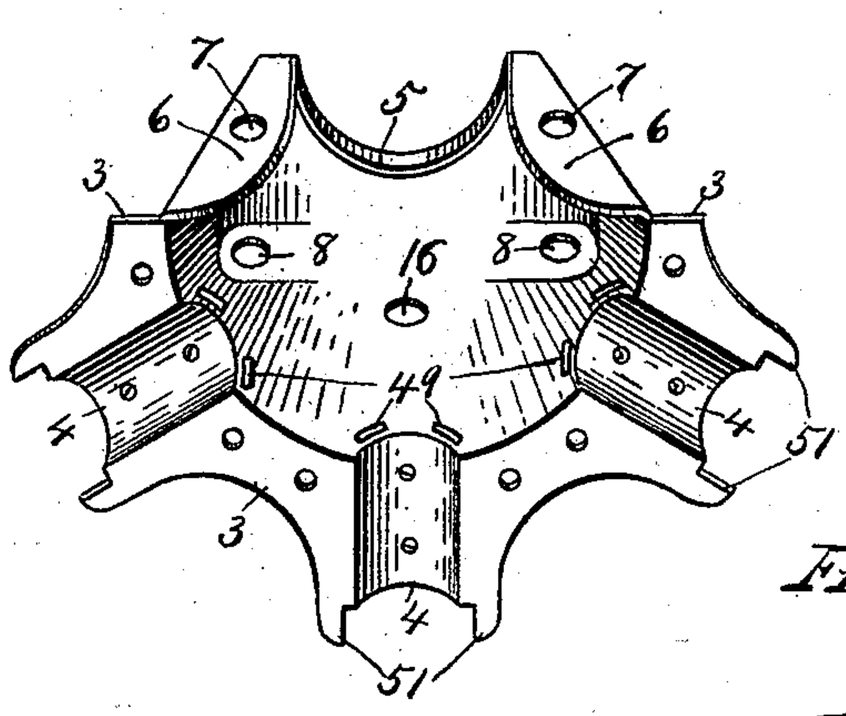


Fig. 10.

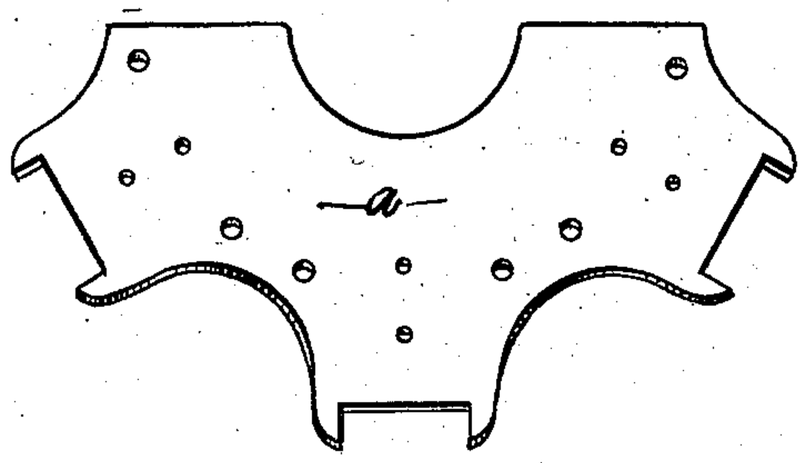
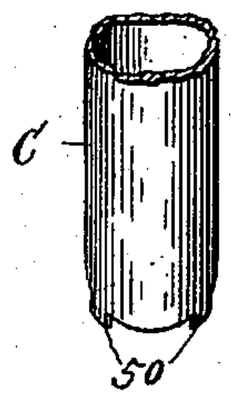


Fig. 11.



WITNESSES.
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UNITED STATES PATENT OFFICE.

CHARLES H. BICALKY, OF ONEIDA, NEW YORK.

WHEEL.

SPECIFICATION forming part of Letters Patent No. 692,602, dated February 4, 1902.

Application filed December 24, 1900. Serial No. 40,861. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. BICALKY, of Oneida, in the county of Madison, in the State of New York, have invented new and useful Improvements in Wheels, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to improvements in wheels, and particularly to sheet-metal split pulleys, the object being to produce a pulley entirely from sheet metal in which the several parts are stamped, rolled, or pressed to the desired form and then secured together in the simplest possible manner upon a suitable shaft.

The further object of this invention is to provide means for reinforcing the hub of the pulley and for permitting the opposite sections of the pulley to be simultaneously forced toward and away from each other, and also to provide means whereby the pulley may be secured to or loosely mounted upon the shaft.

A still further object of my invention is to provide means whereby one or more of the spokes serve as a locking member for the meeting edges of the axially-split rim and the circumferentially-split hub.

Referring to the drawings, Figure 1 is a side elevation, partly in section, of my improved pulley. Figs. 2, 3, and 4 are sectional views taken, respectively, on lines 2 2 and 3 3, Fig. 1, and 4 4, Fig. 2. Fig. 5 is an isometric view of one of the detached reinforcing-sections of the inner shell. Figs. 6 and 7 are isometric views, respectively, of the oppositely-arranged clamping-plates for the split rim. Fig. 8 is an inner face view of one of the detached conical hub-sections, showing the inner shell in section and the circumferential reinforcing-plates in operative position. Figs. 9, 10, and 11 are isometric views, respectively, of one of the detached semiconical hub-sections, one of the reinforcing-plates *a*, and the inner end of one of the spokes.

Similar reference characters indicate corresponding parts in all the views.

This invention consists, essentially, of a hub A, a rim B, and spokes C, all of which parts are formed of sheet metal and united to each other in a manner hereinafter described.

The hub A may be of any desired form or size, and preferably consists of an outer lenticular shell 1 and an inner substantially cylindrical shell 2, the outer shell 1 being divided circumferentially, the meeting edges being formed with outwardly-turned flanges 3, portions of said flanges being pressed in the form of bosses or nipples 4 for receiving the inner ends of the tubular spokes C, hereinafter described. This circumferential division separates the hub into opposite conical sections having truncated outer ends, which are usually bent or turned inwardly for forming annular flanges 5, adapted to engage a shaft D, Figs. 1 and 4. The hub 1 is also divided axially for forming said hub into oppositely-arranged semiconical sections, each of which is provided at its axial meeting edge with inturned flanges 6, having apertures 7 alined with similar apertures 8, formed in the peripheral wall of said semiconical hub-section. I preferably provide each of these semiconical sections with two sets of these apertures 7 and 8, arranged on opposite sides of the shaft-opening for receiving suitable sleeves 9, which are expanded at their inner and outer ends against the outer faces of the flanges 6 and the peripheral wall of said semiconical section. These sleeves 9 serve to stiffen the hub and are usually threaded internally for receiving suitable clamping members 10, presently described.

The inner shell 2 is arranged within the outer shell 1 and preferably consists of oppositely-arranged semicylindrical sections 11, having their opposite ends encircling the flanges 5 and provided with outturned flanges 12, bearing against the inner face of the outer shell for the purpose of reinforcing both inner and outer shells and preventing contact of the raw edges of the metal with each other. Each of the sections 11 of the inner shell is provided with oppositely-arranged wings 13, springing from the opposite longitudinal meeting edges thereof and adapted to engage the inner face of the outer shell 1. The opposite ends of each of these wings are usually bent or lapped upon themselves for forming suitable sleeves 14, which are alined with the apertures 7 and 8 and preferably encircle the sleeves 9, previously mentioned. The end faces of these sleeves are adapted to engage the inner faces of the flanges 6 and periph-

eral walls of the outer shell and serve to materially stiffen the adjacent portions of the hub, it being understood that the outer longitudinal edges of the wings 13 also engage the inner faces of said outer shell. It is thus evident that the reinforcing pieces or sections 12 serve not only to stiffen the walls of the outer shell, but also serve to tie the sections of the outer shell on opposite sides of their circumferential meeting edges together. The sleeves 9 at opposite sides of the axial division of the hub are preferably threaded in opposite directions, the clamping-screws 10 being also provided with right and left threads for simultaneously engaging said sleeves 9 and forcing the hub-sections toward and away from each other as the screws 10 are rotated.

The threaded portion at one end of each of the screws 10 is usually of less length than the threaded portion of the opposite end for permitting the screw to be detached from one of the sleeves at one side of the axial division before said screws are disengaged from the threads of the opposite sleeve, thereby retaining the screw in position and at the same time permitting the hub-sections to be readily detached from each other and separated any desired distance for removing the same from the shaft. These clamping-screws are usually provided at their opposite ends with suitable slots adapted to receive a screw-driver or similar instrument whereby the clamping-screws may be rotated in either direction for the purpose above mentioned.

It is evident from the foregoing description that the clamping-screws 10 may be employed to force the opposite hub-sections firmly into positive engagement with the shaft D for clamping the pulley to said shaft, and thereby producing a tight pulley; but this means being somewhat insecure I usually provide the inner and outer shells with apertures 15 and 16, alined with each other, in which is arranged a hollow stay-bolt 17, threaded internally and having its outer and inner ends expanded respectively upon the outer and inner faces of the shells 1 and 2. In order that this stay-bolt may be firmly clamped upon the outer and inner shells 1 and 2 without depressing or otherwise injuriously affecting said shells, I preferably interpose between said shells a suitable sleeve 18, having its opposite ends engaged, respectively, with the adjacent faces of the outer and inner shells.

Arranged within the internally-threaded stay-bolt 17 is a suitable set-screw 19, adapted to engage the shaft D for additionally holding said pulley from independent revoluble movement upon the shaft. Although I have described but one of these stay-bolts and the set-screw movable therein, I have shown each of the semiconical hub-sections as provided with a similar clamping device, whereby the hub is more firmly clamped upon the shaft.

The rim B preferably consists of a sheet-metal band 25 and oppositely-arranged annular rings or beads 26, detachably interlocked with the marginal edges of the band 25. These marginal edges are usually bent inwardly for forming annular ribs 27, having lateral offsets 28, and the annular rings or beads 26 are usually provided with circumferential slots 29, adapted to receive the ribs 27, the shoulders 28 being adapted to interlock with the inner faces of said beads or rings for preventing undue displacement of said rings.

The band 25 and annular beads 26 are usually split axially, the beads 26 being movable circumferentially upon the ribs 27 and having the meeting edges of its sections adapted to break joints with the meeting edges of the sections of the band 25. Any desired means may be employed, as rivets 30, for securing these beads 26 to the ribs 27. When desired to remove the pulley from the shaft, these rivets may be readily withdrawn and the meeting edges of the bead-sections moved into alinement with the meeting edges of the band-sections, whereupon the pulley-sections may be readily removed from the shaft. The band 25 is also provided with depressions 31, formed at intervals throughout the periphery of the band for forming bosses or internal projections which are engaged by the outer ends of the tubular spokes C. The axial division of the band 25 extends through two of these depressions, and the adjacent ends of the spokes C encircle said projections and serve to hold the meeting edges of the band-sections in close relation to each other. In order that the meeting edges of the band-sections may be more firmly clamped in position, I provide clamping-plates 35 and 36, which are formed of sheet metal, having their intermediate portions provided with loops 37 and 38, the loop 38 being formed of less width than the loop 37 and extends beyond its base, said loop 38 being adapted to telescope with the loop 37 for preventing lateral movement of the meeting edges of the band-sections. The end of one of the loops, as 37, is cut away for forming a suitable bearing-face 39, which is adapted to receive one of the shoulders, as 40, of a suitable clamping-bolt 41.

The plate 36 is preferably provided with an extension 42, lapping upon the annular bead 26 and extending beyond the meeting edges of said bead for further stiffening the rim of the pulley. The spokes C are usually tubular in form, their inner ends being slotted longitudinally for receiving the flanges 3 and are adapted to closely fit upon the outer surface of the nipples 4, the outer ends of said spokes being arranged to closely fit upon the outer surface of the rim projections or bosses 31 and are secured thereto by suitable means, as rivets 43. The inner ends of the spokes are also secured to the nipples 4 by suitable fastening means, as rivets 45.

It is sometimes desirable to provide means for relieving the air-pressure beneath the belt when in contact with the pulley during its rotation. I have therefore provided the

band 25 with transverse openings 46, extending diagonally across and through the rim, the adjacent ends of said openings being extended circumferentially beyond each other for the purpose of forming a continuous vent for the air between the belt and face of the pulley.

I preferably provide the hub A with additional oppositely-arranged reinforcing-plates *a a*, which are usually interposed between the circumferential meeting faces of the opposite conical sections of the hub, are secured in position by suitable rivets 47, which serve also to secure said conical sections to each other, and their inner edges are arranged to engage the peripheries of the sections 11 of the inner shell 2, it being understood that the wings 13 of the sections 11 are slotted at 48 for receiving these plates *a a*, the meeting edges of the plates *a a* being substantially coincident with the axial meeting edges of the sections 11 and the periphery of each plate being of substantially the same contour as and coincident with the periphery of the corresponding conical sections of the hub A.

In order to additionally stiffen the ends of the spokes C adjacent to the hub A, I usually provide the hub with apertures 49 for receiving suitable tangs 50, projecting from the inner ends of the spokes, which tangs may, if desired, be clenched upon the inner face of the hub. The circumferential meeting flanges of the hub-sections are generally formed with tangs 51, which extend beyond the nipples 4 and the adjacent lengthwise slit *c* in the spokes C and engage the opposite faces of said spokes. These tangs 50 and 51 and apertures 49 permit the hub and spokes to be readily assembled and add materially to the strength and efficiency of the pulley.

The operation of my invention will now be readily understood upon reference to the foregoing description and the accompanying drawings, and it will be noted that some change may be made in the detail construction and arrangement of the various parts of my invention without departing from the spirit thereof. Therefore I do not limit myself to the precise construction and arrangement shown and described.

It will be further noted that the invention is not restricted to pulleys, since it is evident that the various elements shown, described, and claimed may be adapted to various uses in which a rotary wheel or hub is involved.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination with the hub and spokes of a pulley, of a sheet-metal rim having its opposite edges bent inwardly for forming annular ribs, and tubular sections having circumferential slots receiving the ribs.

2. The combination with the hub and spokes of a pulley, of a sheet-metal rim having its opposite edges bent inwardly for forming annular ribs, said ribs being formed with lateral annular shoulders, and sheet-metal annular tubes slotted circumferentially for receiving the ribs and interlocked with the shoulders for the purpose described.

3. The combination with the hub and spokes of a pulley, of a sheet-metal rim split axially, each section having its circumferential edges bent inwardly and formed with semi-annular laterally-projecting shoulders, and semicircular tubes slotted circumferentially for receiving the inturned edges and interlocked with said shoulders.

4. The combination with the hub and spokes of a pulley, of a sheet-metal rim split axially, each section having its circumferential edges bent inwardly and formed with semi-annular laterally-projecting shoulders, and semicircular tubes slotted circumferentially for receiving the inturned edges and interlocked with said shoulders, said tubes being movable circumferentially on the rim for breaking joints at the meeting edges of the rim-sections and tubes.

5. The combination with the hub and spokes of a pulley, of a sheet-metal rim having its peripheral walls formed with transverse openings arranged one in advance of the other and extending diagonally across and through the rim, the end of each opening being extended circumferentially beyond the adjacent end of the next opening.

6. The combination with the hub and tubular spokes of a pulley, of a sheet-metal rim having depressed portions for forming bosses adapted to enter the tubular outer ends of the spokes.

7. The combination with the hub and spokes of a pulley, of a sheet-metal rim split axially and having portions of the meeting edges of its sections depressed for forming inwardly-projecting split bosses, opposite spokes having their outer ends arranged to inclose corresponding split bosses for the purpose described.

8. The combination with the hub and spokes of a pulley, of a sheet-metal rim having depressed portions for forming bosses, said rim being split axially through one of the bosses, the split boss being inclosed by the adjacent end of one of the spokes for the purpose described.

9. In a pulley, the combination of a sheet-metal band having portions thereof depressed at intervals for forming inwardly-projecting diametrically opposite bosses, said band being split transversely through two of the opposite bosses, semi-annular sheet-metal sections interlocking with the marginal edges of the band and having their meeting edges adapted to break joints with the meeting edges of the band, a hub, and tubular spokes having their inner ends engaged with the hub and their outer ends surrounding their respective bosses.

10. In a pulley an axially-split rim formed of sheet metal, each section being provided with an inner lengthwise flange, a clamping-

plate secured to each of the sections, a portion of one of the plates of one section being extended beyond the meeting edges of the sections and lapped upon the flanges of both of said sections, and means for drawing said plates together.

11. The herein-described clamp for securing the meeting edges of split pulleys together, said clamp comprising two sheet-metal plates having base-flanges and intermediate loops, the loop of one plate being extended beyond its base and adapted to telescope with the other loop, and means for forcing the plates lengthwise of each other.

12. The herein-described clamp for securing the meeting edges of split pulleys together, said clamp comprising two sheet-metal plates having base-flanges and intermediate loops adapted to telescope with each other, one end of one of the loops being cut away above the base for the purpose described.

13. In a pulley, a sheet-metal rim divided axially and having portions of the meeting ends of its sections depressed for forming inwardly-projecting bosses, a sheet-metal hub divided circumferentially and having portions of its meeting faces pressed outwardly for forming nipples, and tubular spokes having their opposite ends inclosing the bosses and nipples respectively for the purpose described.

14. In a pulley, a sheet-metal rim divided axially and having portions of the meeting ends of its sections depressed for forming inwardly-projecting bosses, a sheet-metal hub divided circumferentially and having portions of its meeting faces pressed outwardly for forming nipples, and tubular spokes having their opposite ends inclosing the bosses and nipples respectively for the purpose described, and semi-annular rim-sections interlocking with the marginal edges of the drum and having their meeting edges adapted to break joints with the meeting edges of the drum-sections.

15. In a pulley, the combination with a rim and spokes of a sheet-metal hub comprising outer and inner shells having shaft-openings, the outer shell being divided circumferentially and the sections secured at their meeting edges, and hollow stay-bolts passed through apertures in the adjacent walls of the shells and secured thereto.

16. In a pulley, a sheet-metal hub comprising outer and inner shells divided axially and provided with shaft-openings, the shell-sections of the hub being provided with transverse apertures, opposite sleeves passed through the apertures and having their inner and outer ends expanded for locking the half-shell sections together, and clamping means inserted into the sleeves for the purpose described.

17. In a pulley, a sheet-metal rim comprising outer and inner shells divided axially and provided with shaft-openings, the shell-sections of each half of the hub being provided with transverse apertures, opposite internally-threaded sleeves passed through the apertures and having their inner and outer ends expanded for locking the half-shell sections together, and a clamping-screw having right and left threads engaged respectively with said sleeves for the purpose described.

18. A sheet-metal hub for pulleys comprising outer and inner shells, having shaft-openings, the outer shell being divided circumferentially, hollow internally-threaded stay-bolts secured to the outer and inner shells, and set-screws engaged with the threads of the stay-bolts and adapted to lock the hub to the shaft.

19. A sheet-metal hub for pulleys comprising an outer shell divided circumferentially and provided with a shaft-opening, an inner sheet-metal shell composed of opposite semi-cylindrical sections each having its longitudinal edges bent outwardly at an angle to the meeting plane of the inner-shell sections and engaged with the inner face of the outer shell and means for securing the outer and inner shells together.

20. In a pulley, the combination with the rim and spokes, of a sheet-metal hub comprising outer and inner shells having shaft-openings, the outer shell being divided circumferentially, hollow internally-threaded stay-bolts secured to the outer and inner shells, sleeves encircling the stay-bolts and having their opposite ends engaged with the adjacent faces of the outer and inner shells, and set-screws engaged with the threaded stay-bolts for locking the hub to the shaft.

21. In a pulley, a sheet-metal hub comprising an outer shell divided axially and provided with a shaft-opening, each half-section being formed with inturned meeting flanges and apertures extending through their peripheral walls and meeting flanges, an inner shell composed of opposite sheet-metal semi-cylindrical sections each having lengthwise wings, the opposite ends of the wings being bent in the form of sleeves alined with their respective apertures in the outer shell, and clamps passed through the apertures and sleeves for drawing the hub-sections together.

22. In a wheel, a sheet-metal hub split circumferentially and provided with a shaft-opening, and a reinforcing-plate impinged between the circumferential meeting edges of the hub-sections and extended inwardly beyond said meeting edges toward the shaft-opening for the purpose described.

23. In a wheel, a rim, a sheet-metal hub having a lengthwise shaft-opening and peripheral spoke-nipples, said hub being split circumferentially through the nipples and spokes having their inner ends formed hollow and arranged to inclose the opposite sections of their respective nipples for the purpose set forth.

24. A wheel comprising a rim, a hollow sheet-metal hub split circumferentially, the hub-sections having their circumferential

meeting edges provided with lateral projections alined with each other for forming nipples, and spokes having tubular inner ends inclosing their respective nipples.

25. A wheel comprising a rim, a hollow sheet-metal hub having apertures through its outer wall, and spokes having their inner end faces engaged with the periphery of the hub and provided with tangs projecting into said apertures.

26. A wheel comprising a circumferentially-split hub formed of sheet metal and provided with apertures at opposite sides of the meeting faces of the hub-sections, and spokes having their inner end faces abutting against the periphery of the hub and provided with tangs extending into the apertures for the purpose described.

27. A wheel comprising a hollow sheet-metal hub having a peripheral flange provided with separate tangs, and spokes having their inner ends inserted between the tangs and their end faces engaged with the periphery of the hub.

28. A wheel comprising a hollow sheet-metal hub split circumferentially, the hub-sections having circumferential meeting edges provided with peripheral flanges and with lateral depressions alined with each other and forming nipples, the opposite hub-sections being formed with apertures at opposite sides of the meeting flanges, there being tangs projecting from the flanges on opposite sides of the nipple, and spokes having their inner ends inserted between said tangs and surrounding the nipples and provided with lengthwise slots receiving the flanges of the hub, the inner end faces of the spokes being engaged with the periphery of the hub and formed with tangs projecting into said apertures.

29. The herein-described reinforcing-yoke in combination with an axially-split sheet-metal hub and a rim and spokes, said yoke comprising semicylindrical sections formed of sheet metal, each yoke-section having opposite lengthwise wings disposed at an angle with the meeting faces of the hub-section and engaged with the inner faces of said hub-sections.

30. The herein-described reinforcing-yoke in combination with an axially-split sheet-metal pulley hub and a rim and spokes, said yoke comprising semicylindrical sections formed of sheet metal, each yoke-section having opposite lengthwise wings bent back from the meeting faces of the hub-section, the free end of each wing being bent in the form of a sleeve and means to pass through the sleeves and engage with the hub-sections for locking the hub and yoke sections together.

31. The herein-described hub for wheels consisting of opposite concavo-convex sheet-metal sections secured base to base and provided with concavo-convex substantially radial arms at their bases for forming hollow nipples.

32. A wheel-hub comprising concavo-convex sheet-metal sections arranged base to base and having their outer ends open and provided with inturned annular flanges, said sections being each formed with semi-annular arms or flanges adapted to form hollow peripheral nipples.

33. A wheel-hub comprising an outer shell composed of sections arranged end to end and having their outer ends provided with inturned annular flanges, a second shell within the former shell and encircling said flanges, said inner shell having its opposite ends formed with outturned flanges engaging the peripheral walls of the former shell.

In witness whereof I have hereunto set my hand this 15th day of December, 1900.

CHARLES H. BICALKY.

Witnesses:
J. W. WARNER,
EDWARD R. MCDOUGALL.