

No. 691,929.

Patented Jan. 28, 1902.

C. H. BICALKY.  
SHEET METAL PULLEY.

(Application filed Nov. 14, 1900.)

(No Model.)

2 Sheets—Sheet I.

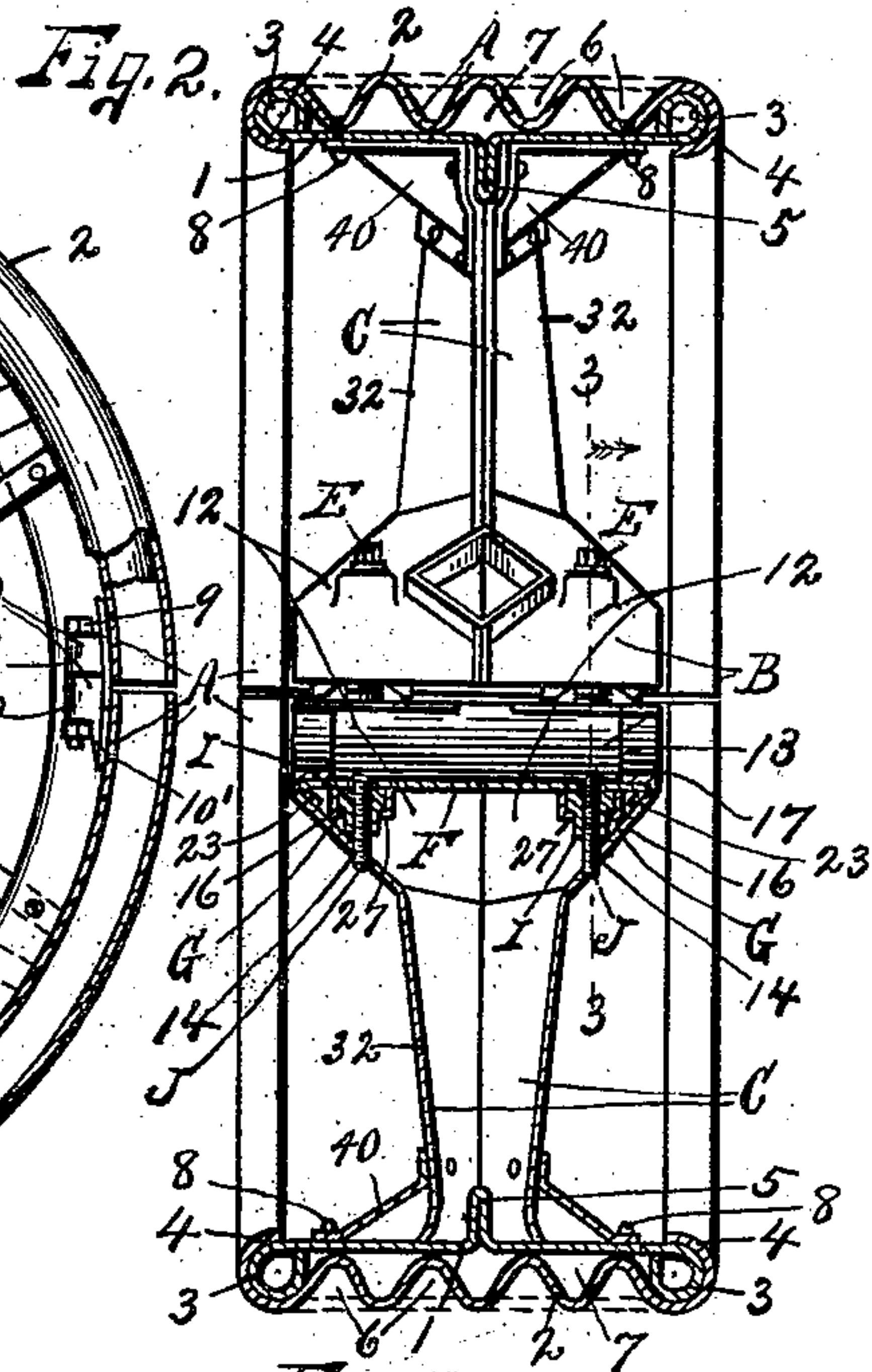
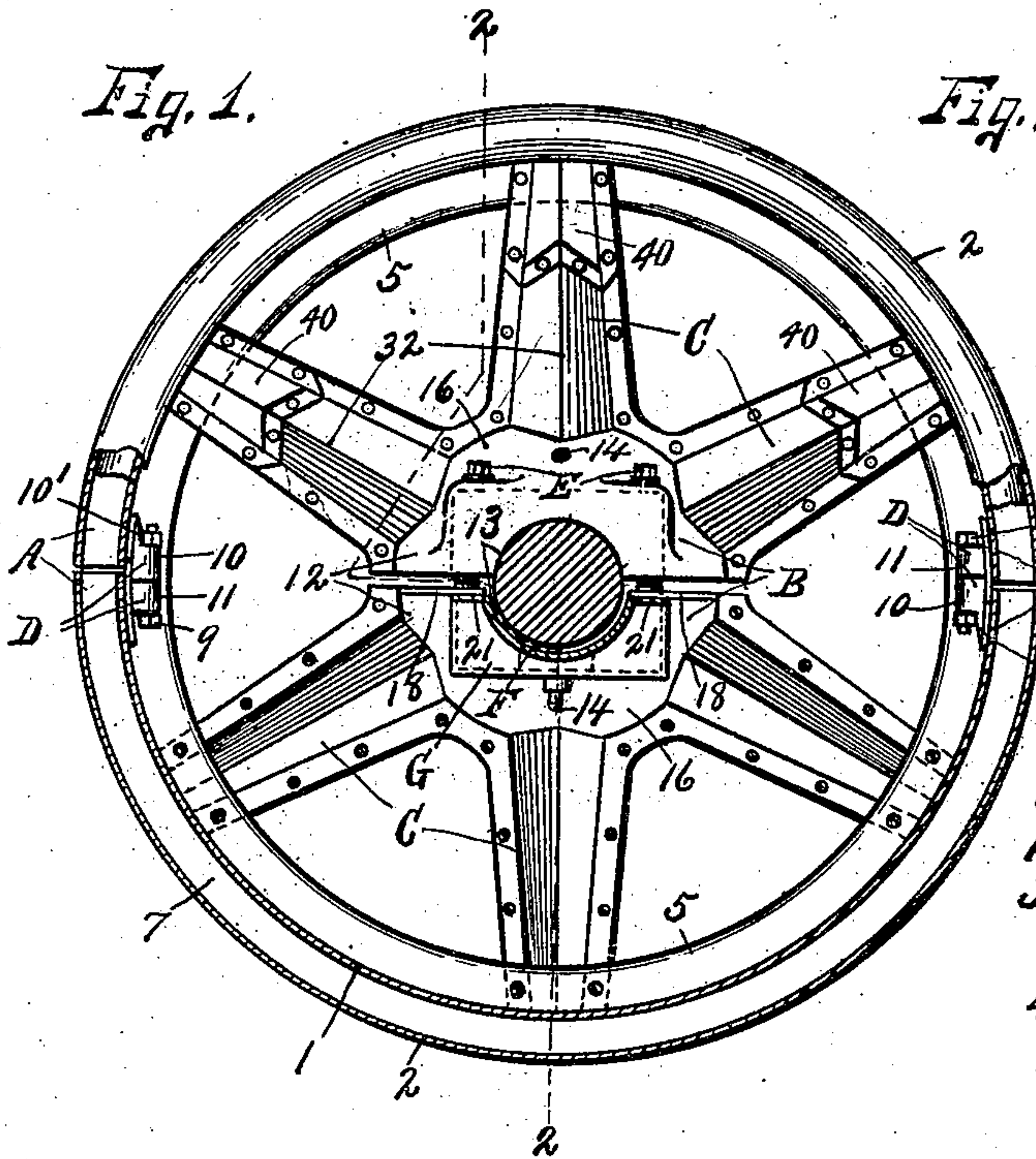


Fig. 4.

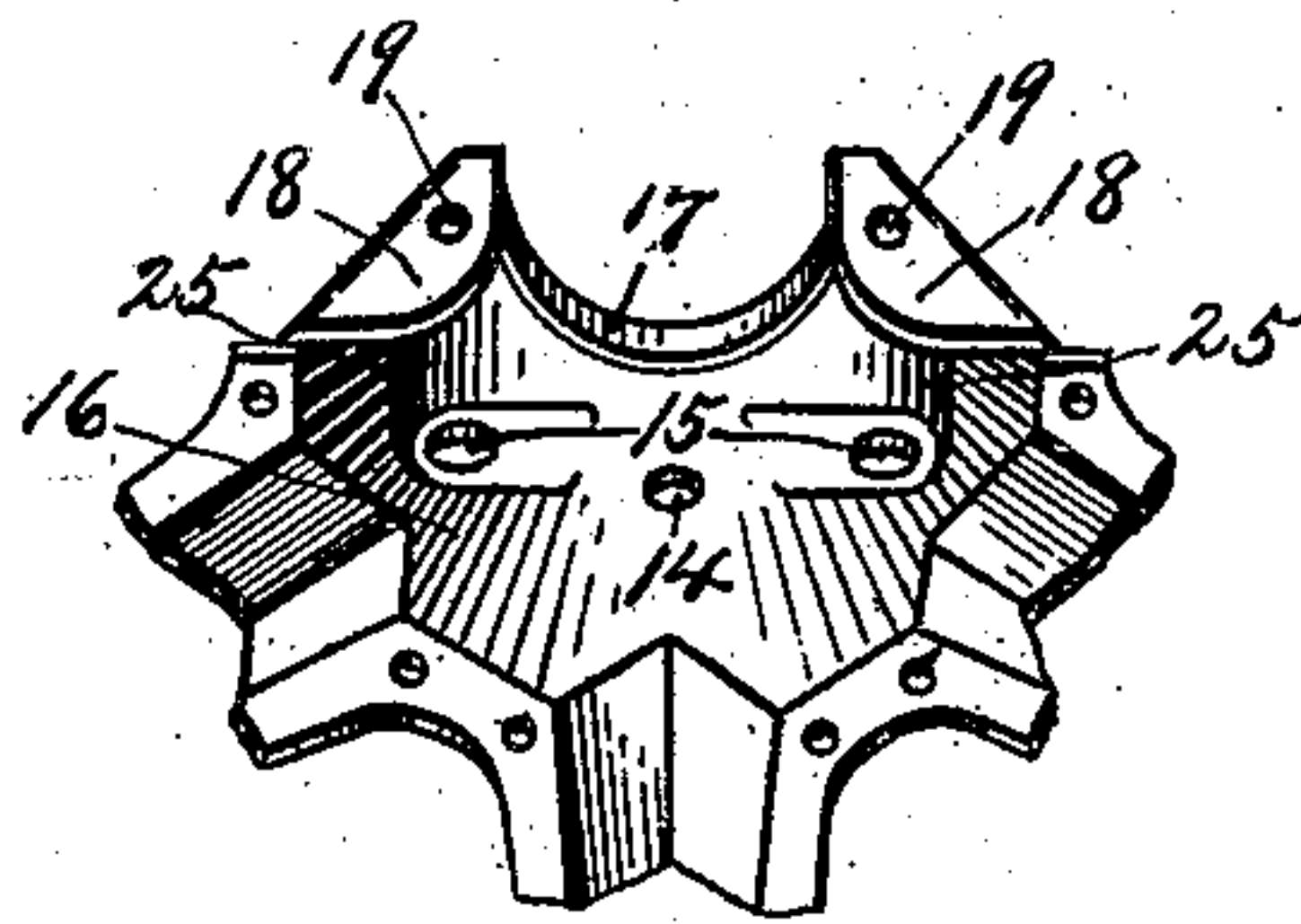


Fig. 5.

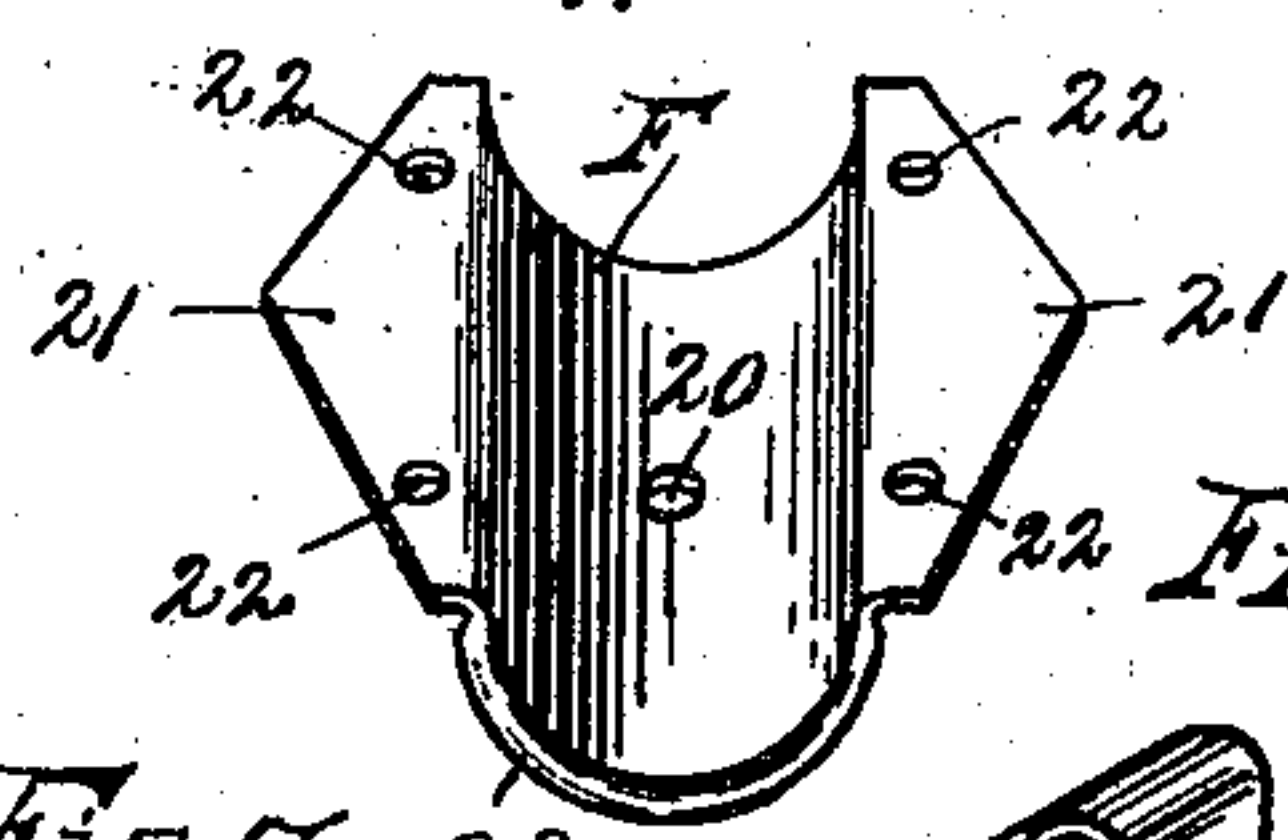


Fig. 9.

Fig. 7.

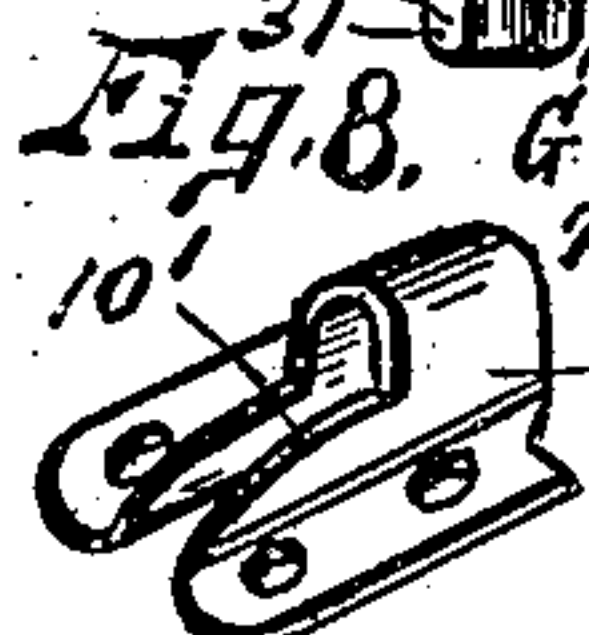
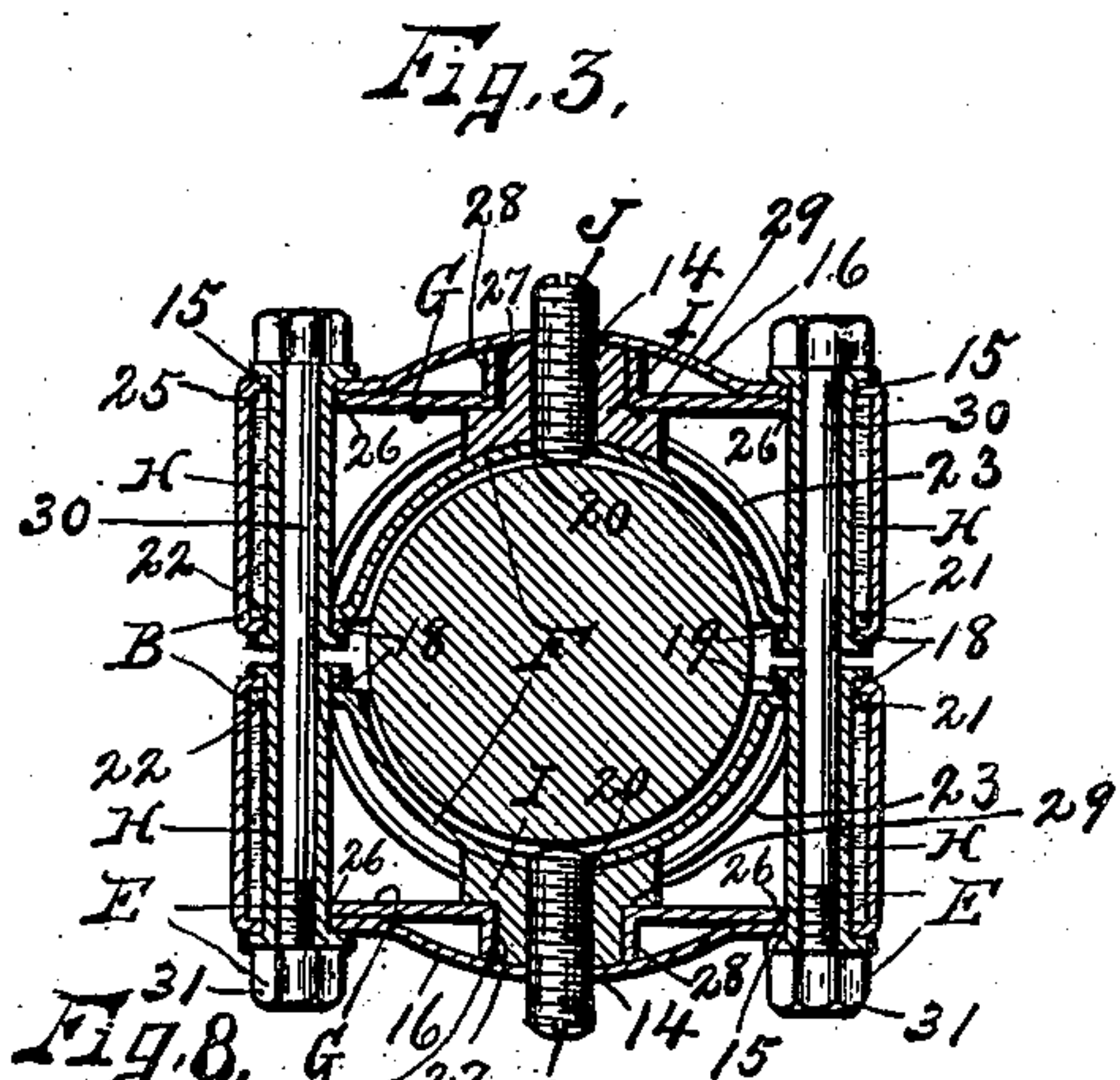
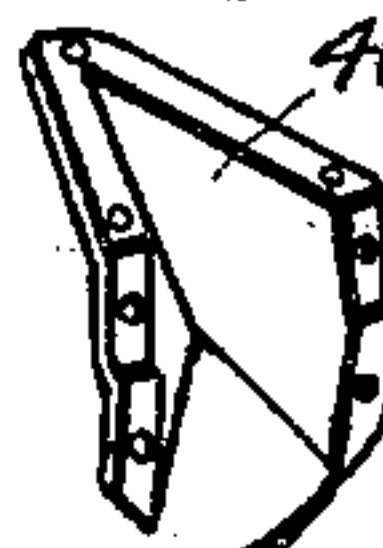
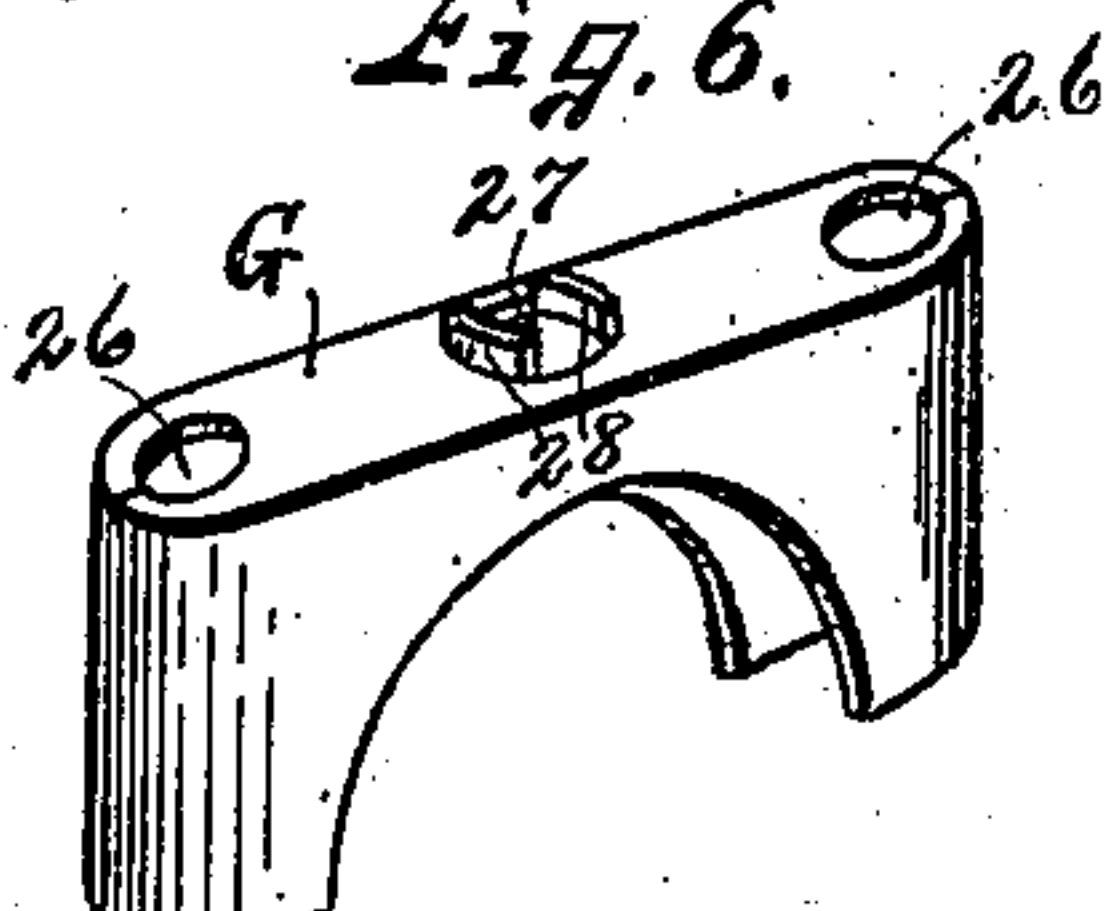


Fig. 6.



WITNESSES.  
J. E. Arthur,  
E. W. Benson.

INVENTOR.  
Charles H. Bicalky

BY  
Smith & Brinson  
ATTORNEYS.

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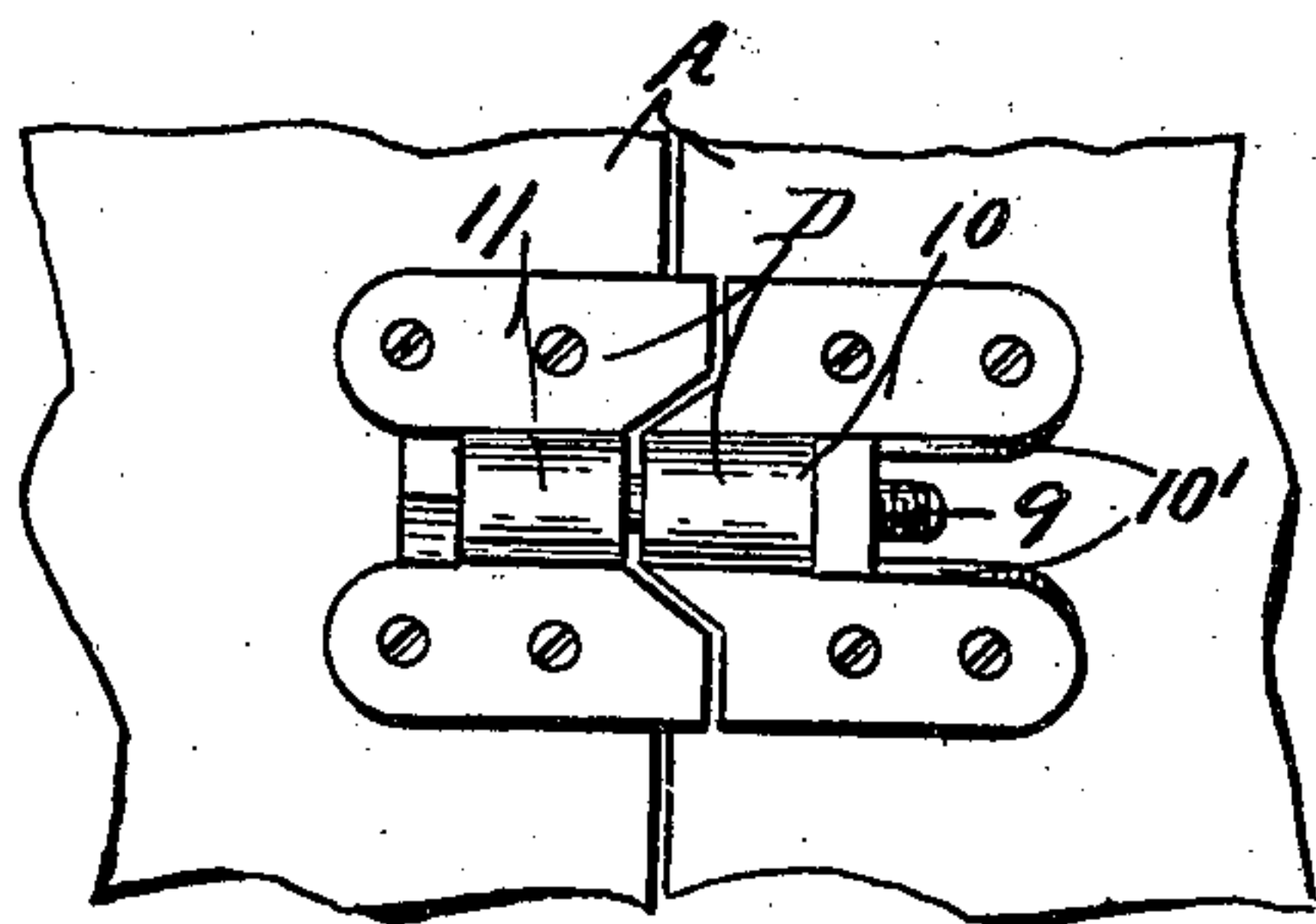
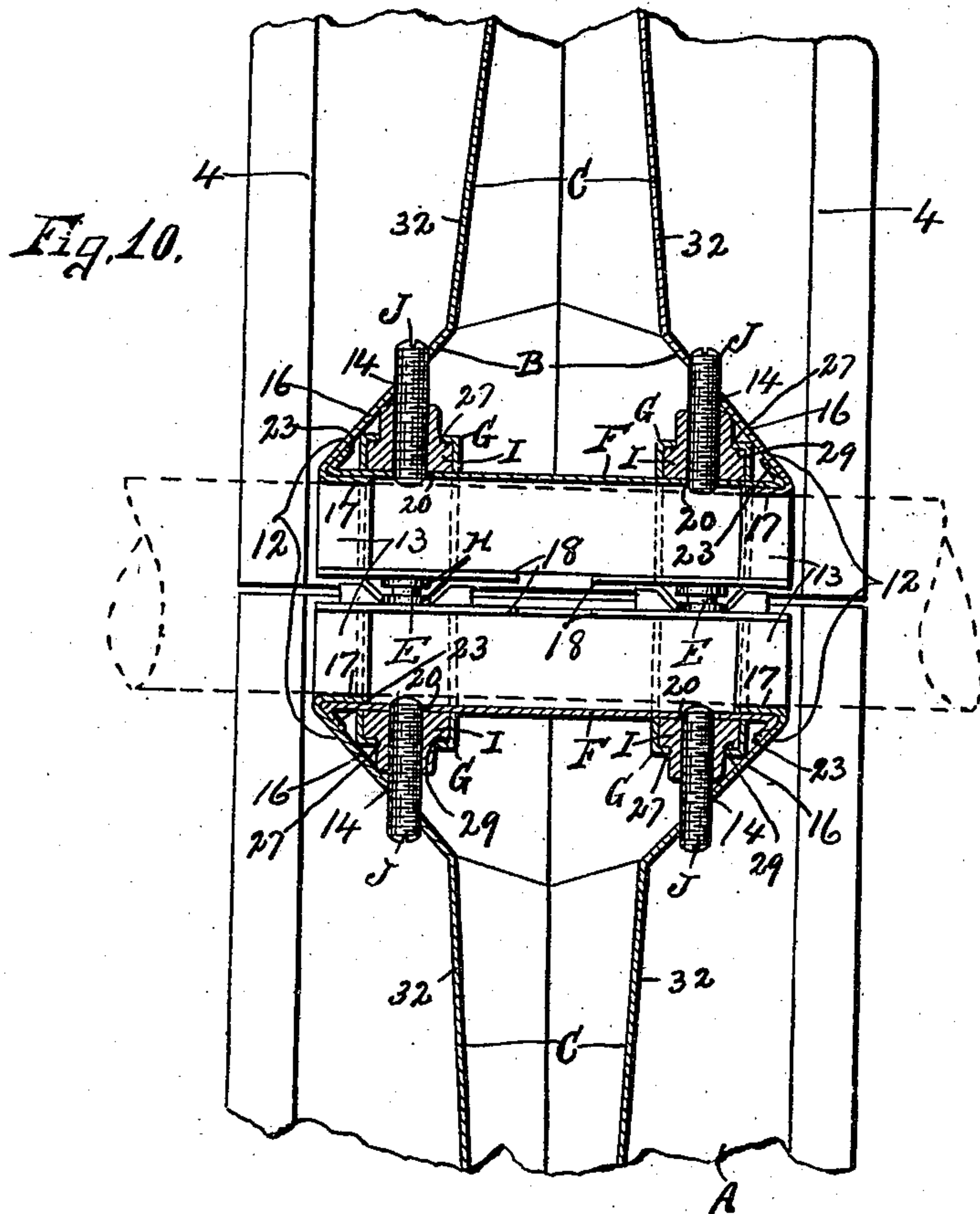
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**2. Sheets—Sheet 2.**



WITNESSES.

H. Arthur.  
H. C. Chase.

INVENTOR.

INVENTOR.  
Charles H. Bicalky

BY

BY  
Smith & Brinson  
ATTORNEYS



# UNITED STATES PATENT OFFICE.

CHARLES H. BICALKY, OF ONEIDA, NEW YORK.

## SHEET-METAL PULLEY.

SPECIFICATION forming part of Letters Patent No. 691,929, dated January 28, 1902.

Application filed November 14, 1900. Serial No. 36,434. (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  
5 useful Improvements in Sheet-Metal Pulleys, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to improvements in  
10 pulleys, and particularly to sectional sheet-metal pulleys, the object being to produce a light, strong, and durable pulley which is free from dangerous external projections and which may be economically manufactured by  
15 stamping, pressing, or otherwise forming the sections and then securing the parts together in the most secure and expeditious manner.

The further objects of my invention are to provide means whereby the pulley may be rigidly secured to or loosely mounted on a shaft  
20 and used for either a tight or loose pulley, to provide suitable clamps for uniting the meeting edges of a split rim and preventing lateral or circumferential displacement of said meeting edges, and to otherwise reinforce the various parts of the pulley without materially adding to its weight.

To this end the invention consists in the combination, construction, and arrangement  
30 of the parts of a pulley, as hereinafter fully described, and pointed out in the claims.

Referring to the drawings, Figure 1 is a face view, partly in section, of a pulley embodying my invention, the lower half of one side  
35 of the hub and spokes being removed. Figs. 2 and 3 are sectional views taken on lines 2 2, Fig. 1, and 3 3, Fig. 2. Figs. 4 and 5 are isometric views, respectively, of one of the hub-sections and the ends of contiguous spokes  
40 and one of the sections of the inner shell or thimble. Figs. 6 and 7 are isometric views, respectively, of one of the detached yokes or reinforcing-pieces and one of the detached rim-braces. Figs. 8 and 9 are also isometric  
45 views of the opposite clips for securing the rim-sections together. Fig. 10 is an enlarged sectional view of the hub through its axis, showing the inner shell or sleeve, yokes, and set-screws; and Fig. 11 is an inner face view  
50 of one of the rim-clamps.

As seen in the drawings, my improved pul-

ley consists, essentially, of a rim A, a hub B, and spokes C.

The rim A preferably consists of inner and outer sheet-metal bands 1 and 2, having their  
55 marginal edges formed with interlocking shoulders 3 and 4, the intermediate portion of the inner band being depressed inwardly for forming an annular rib 5 and the outer band being corrugated transversely for forming one  
60 or more annular peripheral grooves 6 and inner chambers 7 between the bands. These bands 1 and 2 are split axially for a purpose well known, and the meeting edges of their sections are securely locked together by suitable  
65 clamping means D, presently described.

The interlocking shoulders 3 and 4 usually consist of annular beads, the beads of the outer band lapping upon the outer and inner  
70 faces of the beads of the inner band and serving to stiffen the rim and to prevent displacement of the outer band. The rib 5 also serves to stiffen the rim and provides a convenient and effective means for uniting the rim to the  
75 spokes. The corrugations in the outer band 2 serve to additionally strengthen the rim, and the grooves 6 are adapted to receive suitable cables or rope power-transmitting belts, or by simply removing the outer band the inner  
80 band may be used as a flanged pulley for flat belts without further change in the pulley. The outer band 2 is held from circumferential movement upon the inner rim by any  
85 desired means, as one or more screws or rivets 8, and when desired to remove the outer band it is only necessary to remove the rivets or  
90 screws 8, detach the meeting edges of the rim, and to move one band upon the other circumferentially until they are separated and then to reclamp the meeting edges of the inner  
95 band together. It is also evident that, if desired, the corrugated band 2 may be substituted by a plain or flat surface band.

The clamping means D preferably consist of a bolt 9 and clamping plates or clips 10 and  
100 11, riveted or otherwise secured to the meeting ends of the opposite rim-sections and provided with lengthwise apertures for receiving the bolt 9. The base of one of the clips, as 10, is generally extended beyond one end of its aperture for forming a bearing-face 10', which is adapted to engage either the head or nut



of the bolt for preventing its rotation as the rim-sections are being drawn together. The meeting edges of the clip-plates 10 and 11 are generally arranged in staggered relation to the meeting edges of the rim-sections, portions of the clip of one section being arranged to lap upon the adjacent end of the other section and both clips being formed with interlocking shoulders at their meeting edges, Fig. 11, for stiffening the meeting edges of the rim and preventing their lateral or circumferential displacement.

The hub B preferably consists of a hollow lenticular shell composed of opposite concavo-convex or truncated conical sections 12 12, arranged base to base and each provided with a shaft-opening 13, intermediate set-screw openings 14, arranged at an angle with the shaft-opening, and additional openings 15 15, extending through the walls of the hub-sections on opposite sides of the shaft-opening for receiving suitable clamping means E, presently described. These sections 12 12 are usually divided axially in a plane substantially coincident with the meeting edges of the rim A, thereby forming opposite semi-conical segments 16 16, each of which is formed with an inturned semi-annular flange 17 at its apex and with opposite inturned axial flanges 18 18, the flanges 18 being provided with apertures 19, alined with the openings 15.

Arranged within the hub B is an inner shell or thimble F, consisting of a substantially cylindrical sheet-metal shell split axially, each thimble-section being provided with set-screw openings 20 20 and having its meeting edges formed with outturned flanges 21 21, lapping upon the inner faces of the flanges 18 of the hub B and provided with apertures 22 22, alined with the openings 15 for receiving the clamping means E, previously mentioned. The opposite ends of each of the thimble-sections encircle the corresponding semi-annular flanges 17 of the hub B and are usually provided with outturned ribs 23, adapted to engage the inner adjacent faces of the sections 12 for reinforcing the shaft-engaging ends of the hub and preventing contact of the raw or sharp edges of the metal. It is thus apparent that the thimble-sections just described extend on opposite sides of the circumferential meeting edges of the hub-sections 12 and serve to brace and stiffen the portions of the hub adjacent to the shaft.

The hub-shells B are preferably reinforced by suitable bridge-sections or yokes G G, interposed between the shell F and the opposite halves of the sections 12, and each consists of a single piece of sheet metal bent upon itself and having its intermediate inner portion cut away for receiving the shaft and adapted to engage the adjacent outer face of the shell F and its opposite meeting ends extended beyond the shaft-opening and adapted to rest upon or engage the flanges 21. The outer face of each of the yokes G is substantially straight, is arranged to engage the in-

ner face of the outer shell B, and preferably extends into suitable recesses 25, formed in the outer shell by stamping or pressing a portion of the sheet metal outwardly. The opposite ends of the outer wall of the yoke are cut away between the ends of the side walls, and the ends of said side walls are then bent inwardly toward each other for forming an opening 26, alined with the openings 15 and 19. These openings 15, 19, 22, and 26 at each side of the shaft-opening and at opposite sides of the circumferential and axial meeting edges of the hub-sections are arranged to receive suitable sleeves H, having their opposite ends flanged upon the outer face of the hub-shell and inner face of the meeting flanges 18. The intermediate portion of the outer wall of each of the yokes F is provided with an opening 27, alined with set-screw openings, previously mentioned, for receiving a threaded sleeve or nut I, said outer wall being formed with flanges 28 at opposite sides of the opening 27 for holding the nut I from turning. The nut I may be of any desired construction and is interposed between the outer and inner shells B and F, the inner end being concave for engaging the curved surface of the inner shell F and the outer end being reduced in size for forming a shoulder 29 and extended through the opening 27. The shoulder 29 of the nut I engages the inner face of the shell F, and the outer end face of said nut is arranged to engage the inner face of the outer shell B. It is thus evident that the curved engaging faces of the inner shell F and nut prevent the turning of said nut when the set-screw is adjusted therein and that the end faces of the nut and the shoulder 29 serve to stiffen the intermediate portions of the outer and inner shells and also the yoke G by distributing the strain upon the outer shell. A suitable set-screw J is passed through the openings 14 and 20 therefor and engaged with the nut I for firmly securing the pulley to a shaft or for permitting the same to be used as a loose pulley, if desired.

The means E for clamping the axially-split hub-sections together generally consists of bolts 30 and nuts 31, the bolts 30 being passed through the sleeves H and having their heads engaged with one end of the sleeves of one half of the hub and the nuts 31 being engaged with the opposite ends of the bolts and the adjacent outer ends of the sleeves of the other half of the hub.

The spokes C may be of any desired cross-sectional form and preferably consist of sheet-metal arms formed integral with the opposite hub-sections and provided with lengthwise depressions merging with the interior chamber of the hub-sections for forming suitable ribs 32, which serve to stiffen the spokes and are additionally stiffened by braces 40. The opposite halves of the hub-sections 12 and the adjacent arms of the spokes are stamped or pressed from a single piece of sheet metal, thereby forming the spokes with circumfer-



ential divisions which are disposed in substantially the same plane as the similar division of the hub-sections, and the meeting edges of said hub-sections and arms are provided with suitable flanges for permitting the same to be riveted or otherwise secured to each other. The outer ends of the spoke-arms are lapped upon the opposite faces of the annular rib of the rim and are secured thereto by suitable rivets or bolts, which may also serve to secure braces 40 to said rib, said braces being concavo-convex in cross-section and are secured base to base to the side faces of the spokes, with their outer ends abutting against the inner face of the rim and secured thereto.

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 considerable change may be made in the detail construction and arrangement of the parts of my invention without departing from the spirit thereof. Therefore I do not herein limit myself to the precise construction and arrangement shown and described.

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

1. In a pulley, a hub comprising outer and inner shells formed of sheet metal and each provided with shaft and set-screw openings, a nut interposed between the shells and having its threaded aperture alined with the latter openings, and a set-screw movable in said latter openings and engaged with the nut.

2. In a pulley, a hub comprising outer and inner shells formed of sheet metal and each provided with shaft and set-screw openings, a nut engaging the adjacent faces of the shells, and a set-screw movable in the latter openings and engaged with said nut.

3. In a pulley, a sheet-metal hub comprising oppositely-arranged concavo-convex sections split axially and provided with a shaft-opening, each section having a set-screw opening, a hollow shell surrounding the shaft-opening and provided with a set-screw opening, nuts between the hub and shell, and set-screws movable in the openings therefor and engaged with the nuts.

4. A pulley comprising a sheet-metal hub terminating at its opposite ends in inturned flanges, an inner shell having its opposite ends encircling the flanges, said hub and shell being formed with apertures, a nut between the hub and shell, and a set-screw engaging the nut.

5. In a pulley, the combination of a hub divided perpendicular to its axis and a yoke within the hub for reinforcing said hub.

6. In a pulley, the combination of a hub formed of sections arranged end to end and having alined shaft-openings and yokes within the sections at opposite sides of the shaft for reinforcing the hub.

7. In a pulley, the combination of an axi-

ally-split hub and oppositely-arranged yokes within the hub-section for the purpose of reinforcing said section.

8. In a pulley, the combination of a hub split substantially perpendicular to its axis and formed of sheet metal and having a shaft-opening, a yoke within each section and extended on opposite sides of the axis of the hub.

9. In a pulley, the combination of opposite truncated conical hub-sections arranged base to base and formed of sheet metal and oppositely-arranged yokes within each section for the purpose described.

10. In a pulley, the combination of a lenticular sheet-metal hub split axially and substantially perpendicular to its axis for forming semiconical sections, and a yoke within each section for the purpose described.

11. A pulley comprising a sheet-metal hub split axially and having a shaft-opening, each section being provided with apertures at opposite sides of the shaft-opening, and a yoke within each section and provided with apertures alined with the former apertures, and clamping-bolts passed through said apertures for the purpose described.

12. The combination with the rim and spokes of a pulley of a sheet-metal hub having shaft and set-screw openings, a yoke within the hub and provided with an opening alined with the set-screw opening, a nut arranged within the yoke-opening, and a set-screw engaged with the nut.

13. In a pulley, a hub comprising outer and inner shells formed of sheet metal and each provided with shaft and set-screw openings, a yoke between said shells, a nut engaged with the yoke and a set-screw engaged with the nut.

14. The combination with the hub and spokes of a pulley, of a sheet-metal rim consisting of inner and outer sections having their marginal edges interlocked with each other, the outer sections being corrugated transversely for the purpose described.

15. The combination with the hub and spokes of a pulley, of an axially-split rim and clamping means consisting of clips in the form of loops secured to the rim-sections at opposite sides of the meeting edges, portions of one of the clips of one section being lapped upon the end of the adjacent section for the purpose described, and bolts passed through the loops of the clips for detachably clamping the sections together.

16. The herein-described clamp for split pulleys comprising a bolt and nut, oppositely-arranged clips having adjacent interlocking shoulders and lengthwise apertures for the bolt, one of these clips having an engaged face extending beyond one end of its aperture for engaging the bolt-head or nut and preventing its rotation.

17. The combination with sections of a split pulley, of an apertured lug secured to one section, and a second lug secured to the other section and consisting of a sheet-metal



plate bent in the form of a loop and having a portion thereof cut away for forming a bearing-face for engaging the bolt-head or nut and preventing its rotation and a bolt for drawing the lugs together.

18. The herein-described clamp for uniting the meeting edges of split-rim pulleys, said clamp consisting of a clamping-bolt and oppositely-arranged sheet-metal plates, each bent in the form of a loop and having their bases adapted to be secured to the rim-sections, one of said plates having one end of its intermediate portion cut away for forming a bearing-face engaging the bolt-head or nut and preventing its rotation.

19. In a pulley, a hub formed of sheet-metal sections each section having a concavo-convex central portion and radiating arms formed concavo-convex in cross-section, said arms being integral with the central portion, the concaved faces of the arms being aligned with each other and merging with the concavities of said central portion of the hub.

20. A pulley comprising a sheet-metal hub split axially and having a shaft-opening, each section having inturned flanges at their meeting edges and formed with apertures in their peripheral walls and said flanges, a yoke within each section, and clamping-bolts passed through the yoke and apertures of the hub for the purpose described.

21. The combination with the hub and spokes of a pulley, of a sheet-metal rim consisting of inner and outer sections, each being split axially, one rim-section being movable one upon the other for breaking joints with each other and means for securing the rim-sections together.

22. The combination with the hub and spokes of a pulley, of an axially-split rim formed of sheet metal, and semi-annular sections inclosing the circumferential marginal edges of the rim, and movable circumferentially thereon.

23. The combination with the hub and spokes of a pulley, of an axially-split rim formed of sheet metal, and semi-annular tubes having circumferential slots receiving the circumferential marginal edges of the rim, said tubes being movable circumferentially on said edges.

24. The combination with the hub and spokes of a pulley, of an axially-split rim formed of sheet metal, and semi-annular sections inclosing the circumferential marginal edges of the rim, the meeting edges of the sections being arranged to break joints with the meeting edges of the rim-sections.

25. The combination with the hub and spokes of a pulley, of an axially-split sheet-metal rim, each section being provided with circumferential marginal shoulders, and semi-annular tubes slotted circumferentially and interlocking with the shoulders.

26. In a pulley, an axially-split rim formed of sheet metal, a clamping-plate secured to each of the sections in proximity to their meeting edges, one of the plates of one of the sections being extended beyond the meeting edges and lapped upon the other section for the purpose described and means for drawing said plates together.

27. 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 of the plates being of less length than its base for forming a lengthwise bearing-face for the purpose described, and means adapted to be passed through the loops for forcing the plates lengthwise of each other.

In witness whereof I have hereunto set my hand this 10th day of November, 1900.

CHARLES H. BICALKY.

Witnesses:

C. W. KNIGHT,  
JOSEPH BEAL.