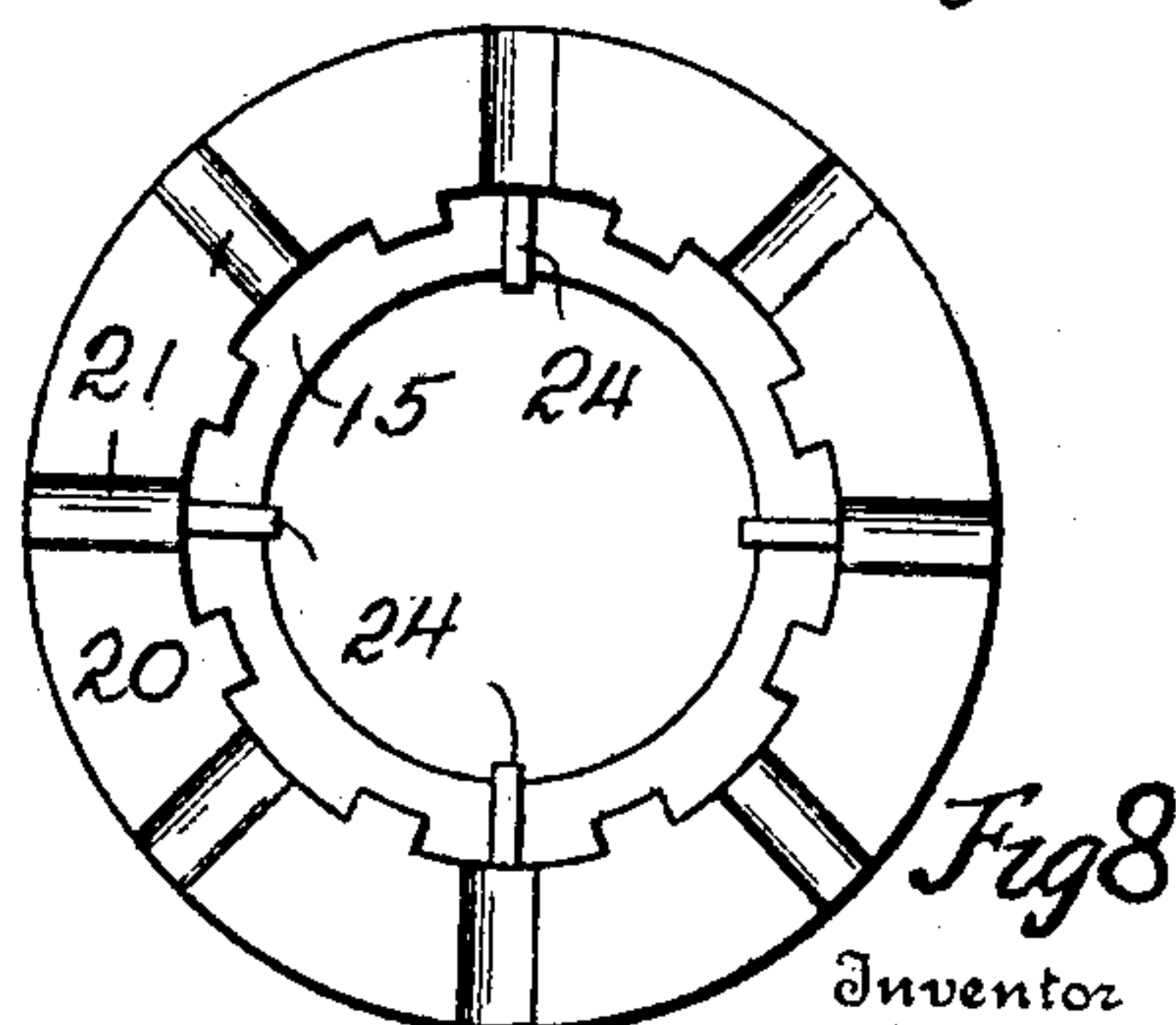
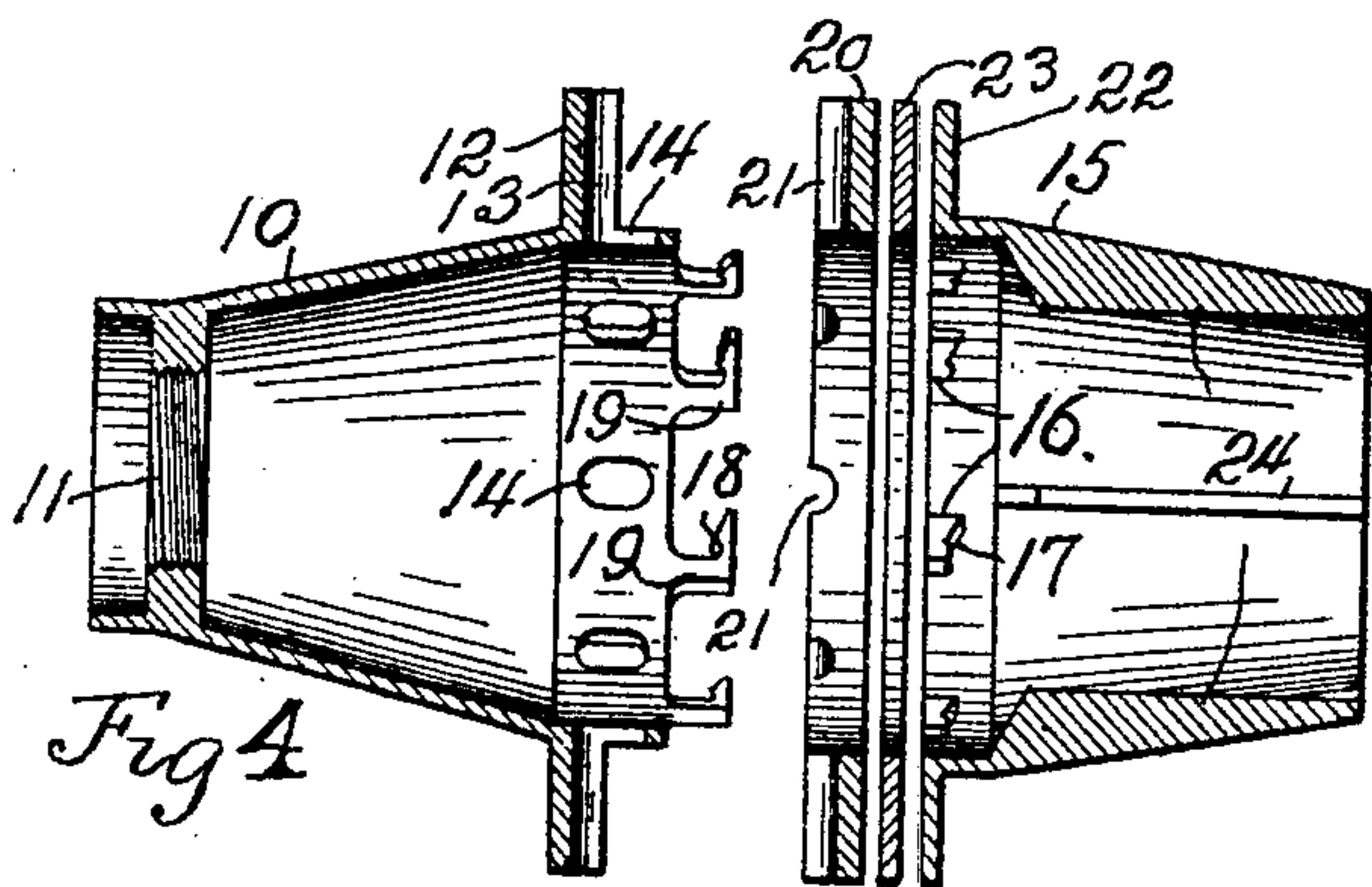
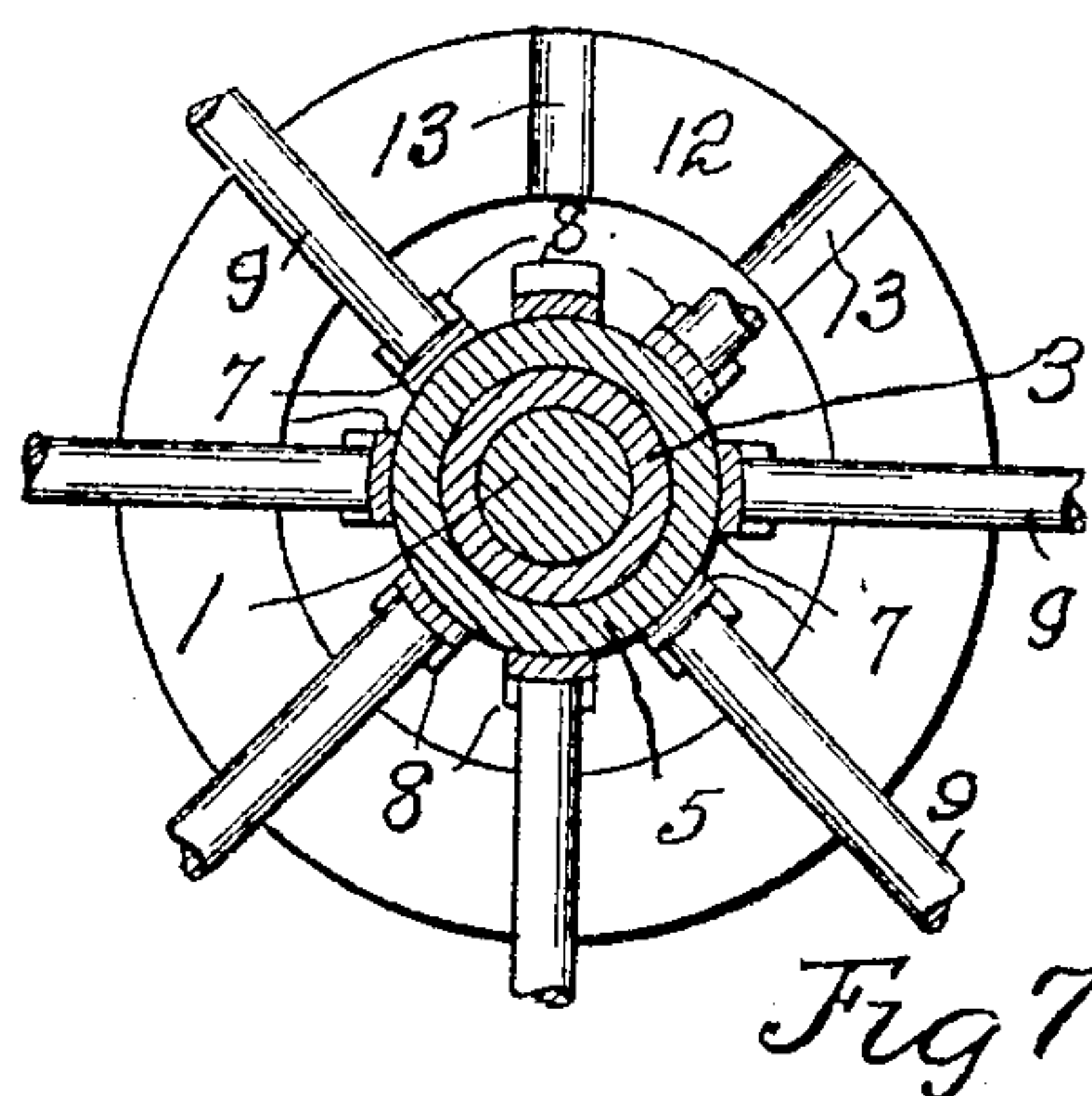
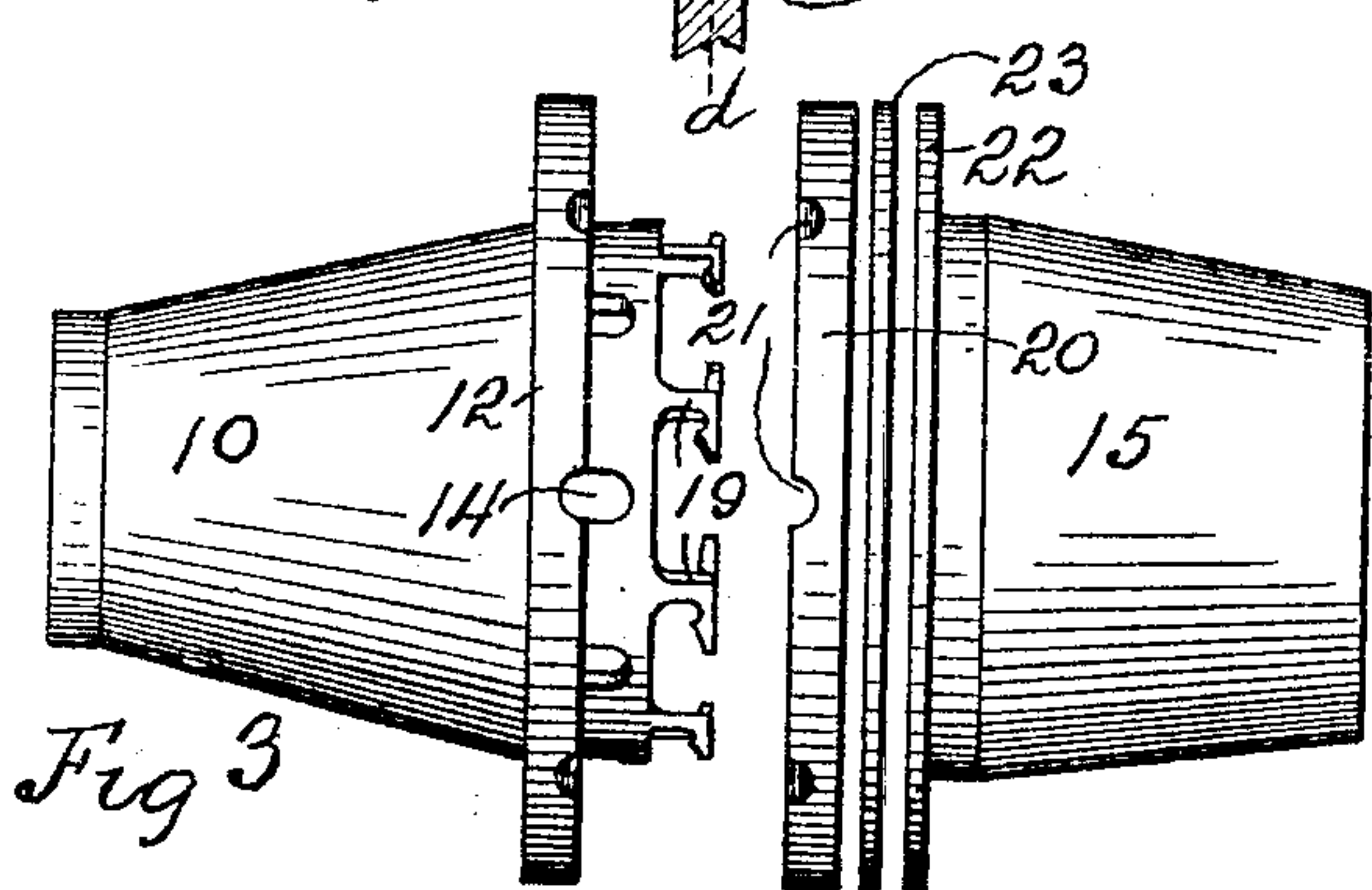
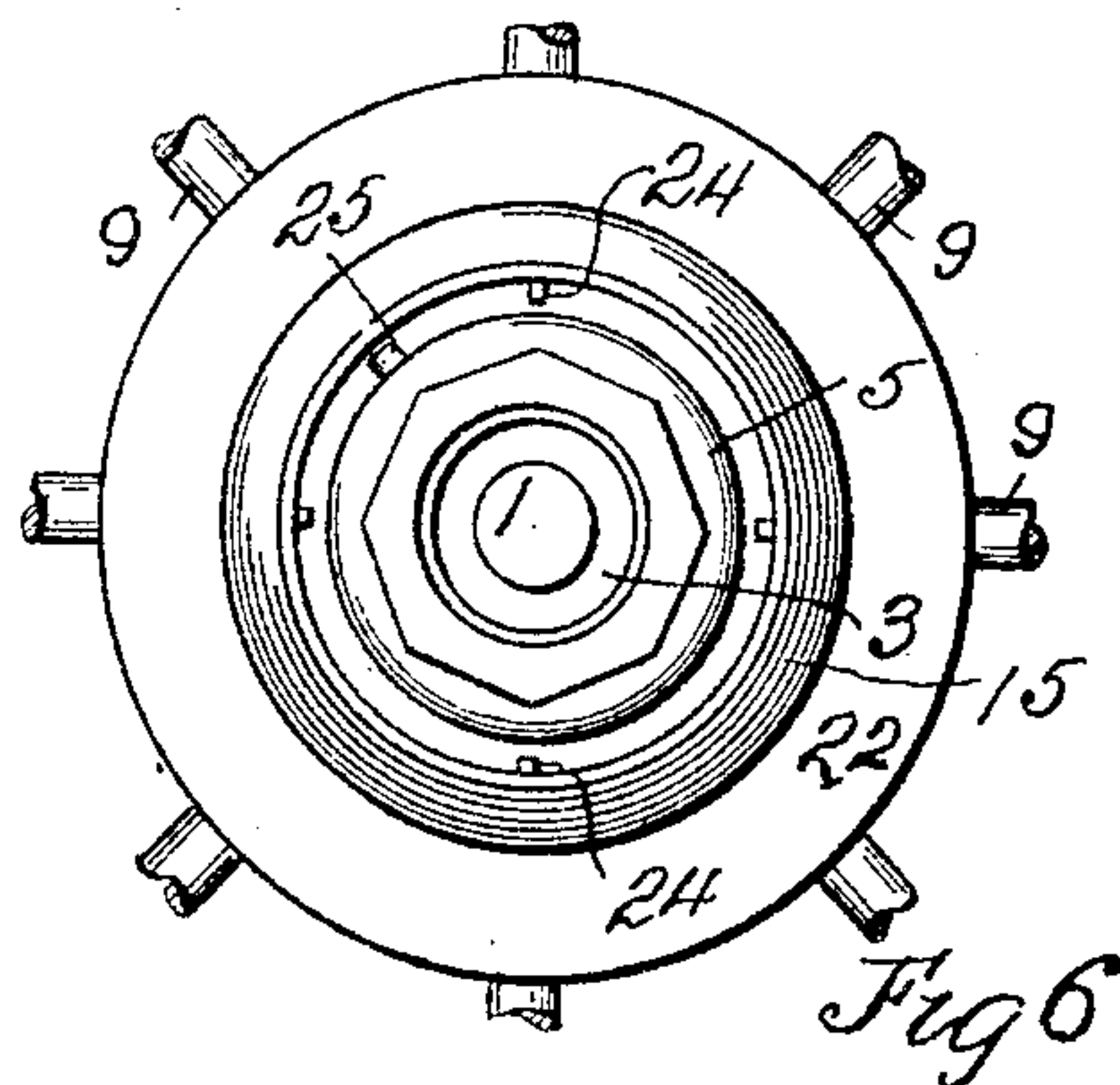
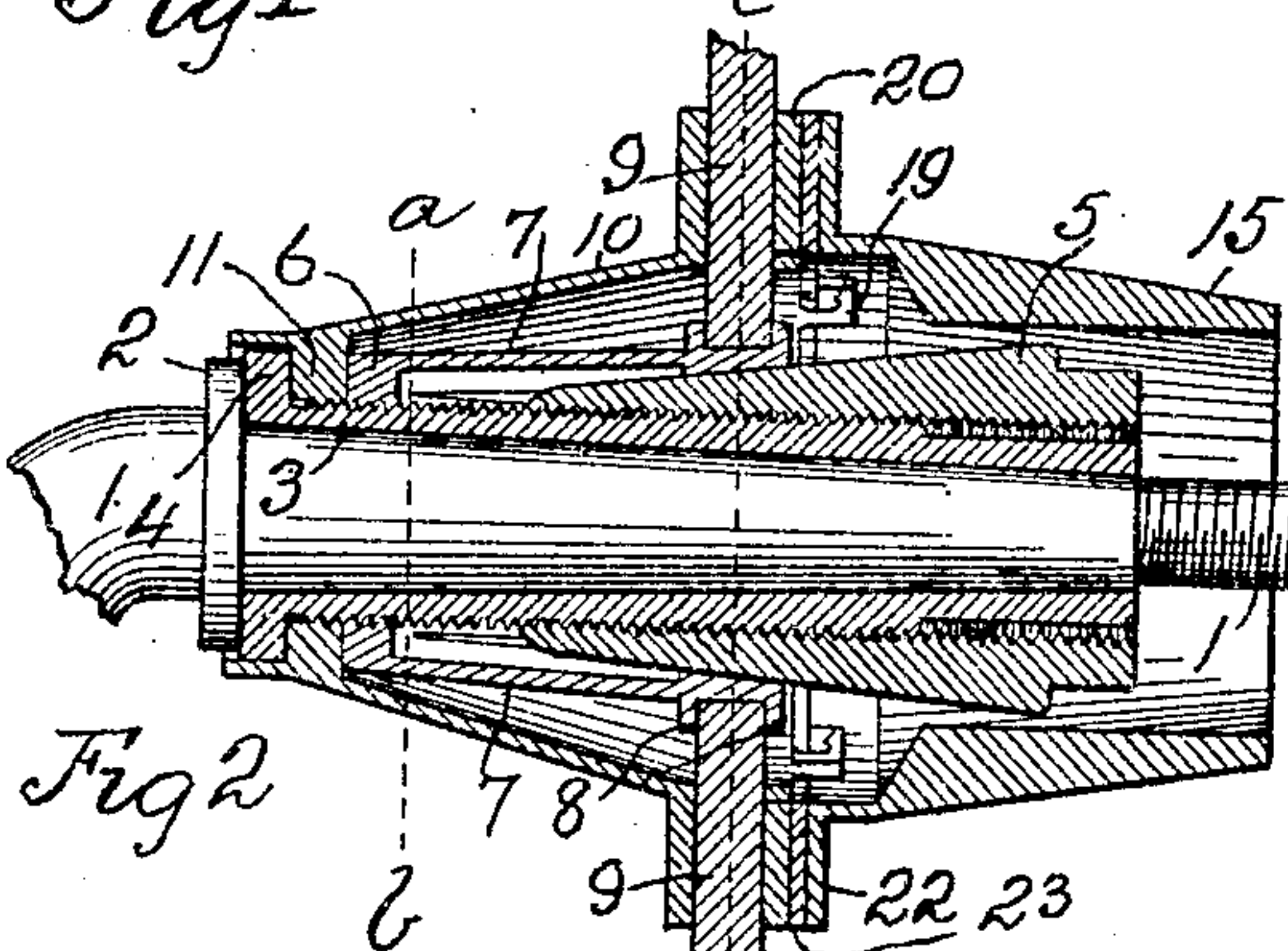
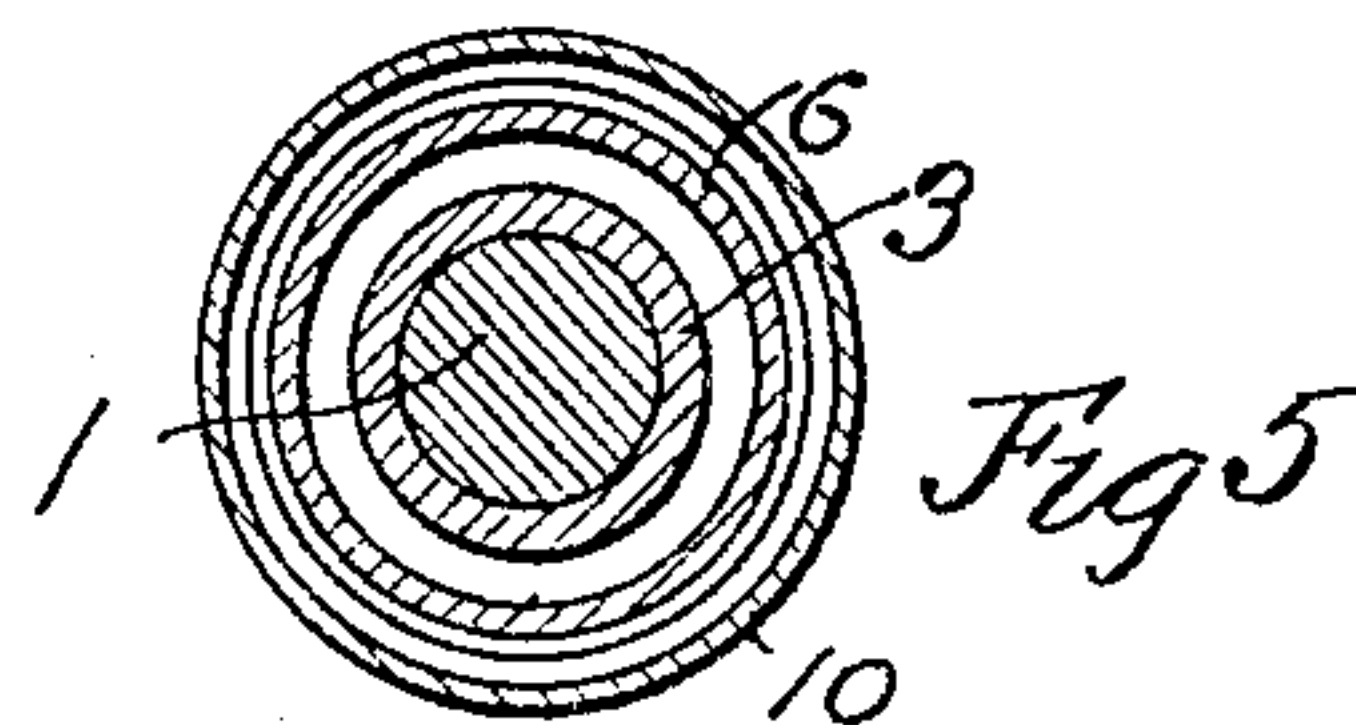
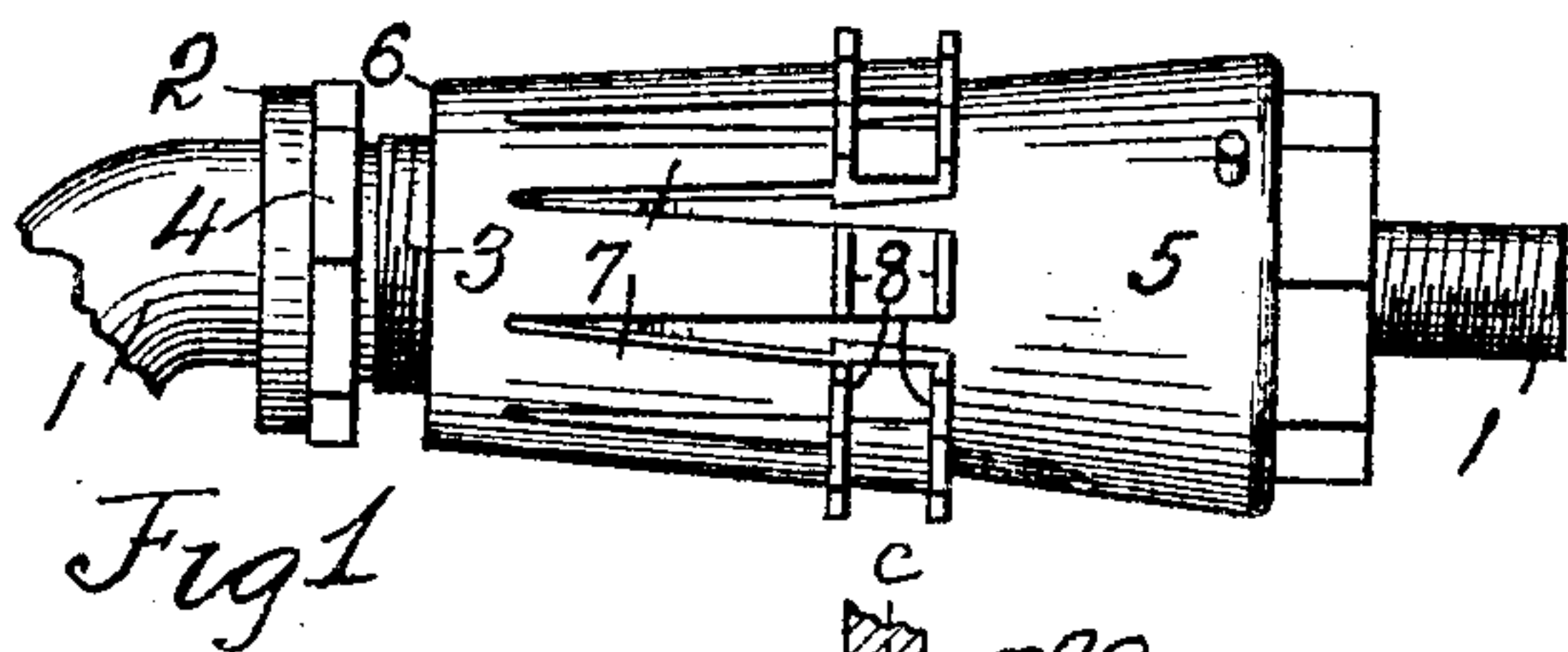


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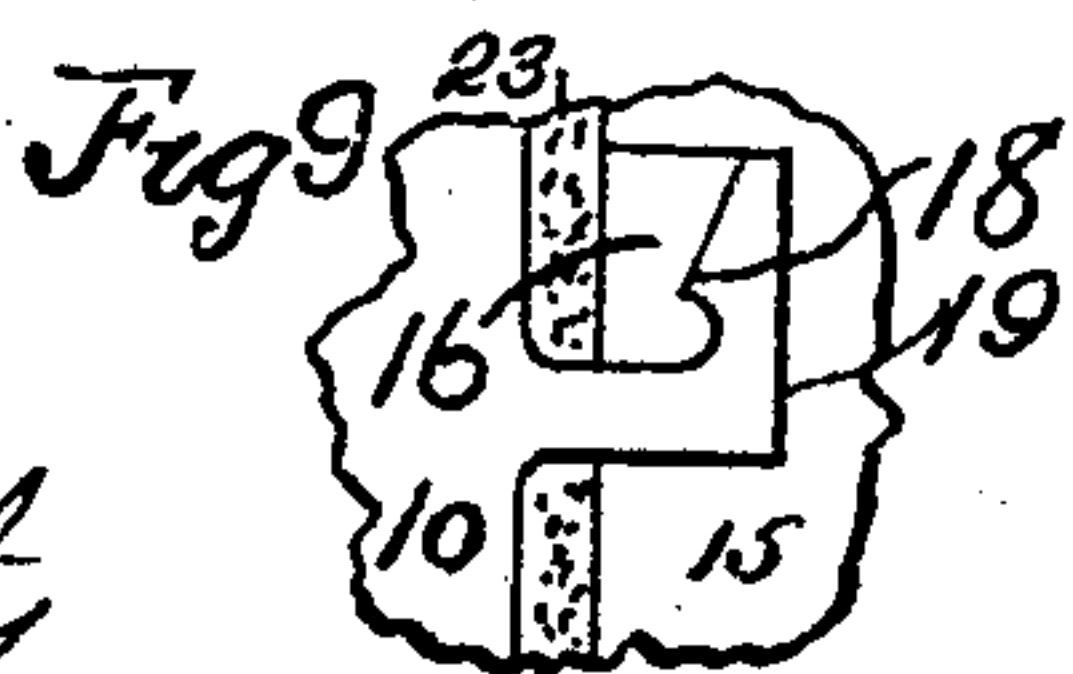
PATENTED NOV. 28, 1905.

H. W. WURTH.
EXPANSIBLE HUB FOR SPOKED WHEELS.

APPLICATION FILED OCT. 18, 1904.



Witnesses
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UNITED STATES PATENT OFFICE.

HENRY W. WURTH, OF LEEDS, MISSOURI.

EXPANSIBLE HUB FOR SPOKED WHEELS.

No. 805,614.

Specification of Letters Patent.

Patented Nov. 28, 1905.

Application filed October 18, 1904. Serial No. 228,978.

To all whom it may concern:

Be it known that I, HENRY W. WURTH, a citizen of the United States, residing in Leeds, in the county of Jackson and State of Missouri, have invented a new and useful Improvement in Expansible Hubs for Spoked Wheels, of which the following is a specification, reference being had therein to the accompanying drawings, forming a part thereof.

My invention relates to improvements in expansible hubs for spoked wheels.

The object of my invention is to provide an expansible hub for forcing outwardly the spokes, so as to tighten and hold them rigidly.

My invention provides a novel adjustable expansible supporting means for the inner end of the spokes.

My invention provides, further, a novel means for preserving intact such adjustment, and it provides, further, a novel hub-casing for protecting the working parts and securely bracing the wheel.

The peculiarities and novel construction of my invention are hereinafter fully described and claimed.

In the accompanying drawings, illustrative of my invention, Figure 1 is a side elevation view of the expansible hub shown mounted on an axle, a portion of which is shown, the casing being omitted. Fig. 2 is a vertical central longitudinal sectional view of my invention. Fig. 3 is a side elevation view of the casing, the parts composing which being detached from each other. Fig. 4 is a longitudinal vertical sectional view of what is shown in Fig. 3. Fig. 5 is a cross-section taken on the dotted line *a b* of Fig. 2. Fig. 6 is an outer end elevation view. Fig. 7 is a cross-section taken on the dotted line *c d* of Fig. 2. Fig. 8 is an inside elevation view of one of the spacing means and the outer tubular member of the casing. Fig. 9 is a detail view of a portion of each of the tubular members of the casing, showing one of the locking devices for holding said members together.

Similar characters of reference denote similar parts.

1 denotes the axle, provided with a flange 2. On the axle is mounted a rotatable sleeve 3, externally screw-threaded and provided, preferably at its inner end, with a flange 4 of polygonal form, so as to be gripped with a wrench. A conical member 5 is provided with a longitudinal screw-threaded hole fitted to the screw-threaded portion of the sleeve 3. The outer end of the cone 5 may also be

polygonal in form for being embraced by a wrench. Encircling the sleeve 3 is an annular member 6, preferably internally screw-threaded to fit the threaded portion of the sleeve 3. Said member 6 is provided with a series of arms 7, having more or less flexibility, preferably, and radially adjustable toward and from the conical member 5, upon the tapering periphery of which rest the inner sides of the free outer ends of the arms 7. Each arm 7 on its outer side and at its outer end is provided with two transverse flanges 8, which form a recess adapted to receive and support the inner end of the adjacent spoke of the wheel, the spokes being denoted by 9. The recesses provided in the arms 7 by means of the flanges 8 prevent lateral movement of the spokes at their inner ends in the direction parallel with the said arms. By rotating the conical member 5 on the sleeve 3 the arms 7 may be radially moved, so as to force the spokes 9 outwardly against the rim of the wheel. (Not shown.) The ordinary axle-nut (not shown) when mounted on the outer screw-threaded portion of the axle 1 retains the sleeve 3 in position on the axle.

To protect the inner parts of the device and to support and rigidly hold the spokes 9 against lateral movement and also to lock the conical member 5 on the sleeve, I provide a casing comprising the following parts: The inner conical tubular member 10 of the casing is provided on its inner periphery near its inner end with an internally-screw-threaded flange 11, fitted to the screw-threaded portion of the sleeve 3 and disposed between the member 6 and the flange 4. The member 10 is provided with an outer peripheral flange 12, provided on its outer side with a series of radial recesses 13, which recesses are in line, respectively, with a series of holes 14, adapted to receive the spokes 9. The outer end of the member 10 is insertible in the inner end of the outer member 15, also tubular in form and preferably converging toward its outer end. The member 15 is provided on its inner periphery with a series of inwardly-extending projections 16, having each on its outer side a recess 17, adapted to receive and hold an inwardly-extending projection 18, provided on the inner side of a hook 19, provided on the outer end of the tubular member 10. The said tubular member 10 is provided with a number of hooks 19, corresponding to the number of projections 16 on the member 15. Encircling the member 10 outside the

flange 12 is a ring 20, provided with a series of radial recesses 21, adapted to receive and be disposed on the sides of the spokes 9 opposite the sides engaged by the recesses 13.

5 On the inner end of the member 15 is provided a peripheral flange 22, adapted to bear against a resilient ring 23, which lies against the outside of the ring 20. The function of the ring 23 is to force the member 15 out-
10 wardly, so that the projections 18 on the hook 19 will be tightly drawn into the recesses 17 of the projections 16. On the inner periphery of the member 15 are provided one or more longitudinal radial flanges 24. On the periphery of the cone 5 is provided a projection
15 25, which is insertible through the member 15, but extends outwardly a sufficient distance to engage the flanges 24, which thereby limit rotation of the member 5 on the sleeve 3.

20 In assembling the parts the member 10 is first screwed on the sleeve 3, after which the ring 6 is screwed onto the sleeve, followed by the conical member 5. The spokes are then inserted through the holes 14, so as to rest
25 upon the arm 7 between the flanges 8, respectively. The conical member 5 is then rotated until the arms 7 have been swung to the proper position for the adjustment of the spokes 9. The ring 20 is then slipped over
30 the member 10 and against the spokes, being positioned so that the spokes lie in the recesses 21. The ring 23 is then placed against the ring 20, after which the tubular member 15 is slipped over the hooks 19, said hooks
35 passing between the projections 16 of the member 15. By then forcing the member 15 inwardly the ring 23 is compressed against the ring 20, after which the member 15 is rotated in the proper direction for causing the
40 laterally-projecting portions of said hooks to engage the outer sides of the projections 16. The member 15 is then released and caused to slightly spring outwardly, thus causing the projections 18 on the hook 19 to enter the re-
45 cesses 17 of the projections 16, thus securely locking the two members 10 and 15 together. The flanges 24, disposed at each side of the projection 25, limit the rotative movement, if any should occur, of the member 5 on the
50 sleeve 3. The ordinary axle-nut may then be mounted in the ordinary manner upon the outer end of the axle 1, thus retaining the wheel in position on the axle and closing the outer end of the member 15.

55 Various modifications of my invention may be resorted to without departing from its spirit.

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

1. In a spoke-expander, the combination with a member adapted to be mounted upon the axle, of an annular member carried there-
65 by and provided with a plurality of swinging arms provided respectively with means for

supporting and holding against lateral move- ment the inner ends of the spokes, and means for adjusting said arms toward and from the axle.

2. In a spoke-expander, the combination 70 with a sleeve adapted to be mounted upon the axle, of an annular member carried thereby and provided with a plurality of swinging arms provided with means respectively for supporting and holding against lateral move- 75 ment the inner ends of the spokes, and a conical member longitudinally adjustable upon the sleeve and having its periphery bearing against the inner sides of said arms.

3. In a spoke-expander, the combination 80 with a sleeve adapted to be mounted upon and rotatable around the axle, of an annular member encircling said sleeve and provided with a plurality of swinging arms provided with means respectively for supporting and hold- 85 ing against lateral movement the inner ends of the spokes, and means for adjusting said arms radially.

4. In a spoke-expander, the combination 90 with a sleeve adapted to be mounted upon and rotatable around the axle, of an annular member encircling said sleeve and provided with a plurality of swinging arms provided with means respectively for supporting and hold- 95 ing against lateral movement the inner ends of the spokes, and a conical member longitudinally movable upon the sleeve and having its periphery bearing upon the said arms.

5. In a spoke-expander, the combination 100 with a sleeve having a screw-threaded periphery and adapted to be mounted on the axle, of a conical member provided with a hole fitted to said screw-threaded portion of the sleeve, and an annular member encircling and carried by said sleeve and provided with a 105 plurality of swinging spoke-engaging arms arranged around and bearing upon the conical member, said arms having means for holding the spokes against lateral movement.

6. In a spoke-expander, the combination 110 with a sleeve adapted to be rotatively mounted upon the axle and having a screw-threaded periphery, of a conical member having an axial screw-threaded hole fitted to said screw-threaded portion of said sleeve, and an annu- 115 lar member encircling and rotatable with the sleeve and provided with a plurality of swinging spoke-engaging arms arranged around and having a bearing upon the tapering portion of said conical member and having each a re- 120 cess to receive the inner end of a spoke.

7. In a spoke-expander, the combination with a sleeve adapted to be mounted on the axle, of a conical member provided with an axial hole fitted to said sleeve and the said 125 member being longitudinally movable on the sleeve, and a plurality of swinging spoke-engaging arms provided with means for being supported by the sleeve and arranged around and bearing upon the tapering portion of said 130

conical member and having each a recess to receive the inner end of a spoke.

8. In a spoke-expander, the combination with a sleeve adapted to be mounted on the axle, of a conical member longitudinally adjustable upon the sleeve, and a plurality of swinging arms provided each with a recess adapted to receive the inner end of a spoke, arranged around and bearing upon said conical member and provided with means for being supported by the sleeve.

9. In a spoke-expander, the combination with a sleeve having a cylindrical screw-threaded periphery, of a conical member provided with an axial screw-threaded hole fitted to the screw-threaded periphery of the sleeve, and a ring internally screw-threaded and mounted upon the screw-threaded portion of the sleeve and provided with a plurality of arms arranged around and bearing upon the tapering periphery of the conical member and provided each with a recess for receiving the inner end of a spoke.

10. In a spoke-expander, the combination with a member adapted to be mounted upon the axle, of a flexible device carried by said member and provided with means for supporting and holding against lateral movement the inner ends of the spokes, means for expanding said flexible device for forcing the spokes outwardly, and a spacing device for engaging and holding in position the inner ends of the spokes.

11. In a spoke-expander, the combination with a member adapted to be mounted upon the axle, of a device carried by the said member and provided with flexible arms having recesses for receiving respectively the inner ends of the spokes, means for expanding said flexible arms for forcing outwardly the spokes, and a ring encircling said device and provided with a series of radial holes fitted to and adapted to receive respectively the inner ends of the spokes.

12. In a spoke-expander, the combination with a sleeve adapted to be mounted upon the axle, of a conical member longitudinally movable upon said sleeve, a series of swinging arms supported at their inner ends by the sleeve and provided at their other ends with recesses for receiving respectively the inner ends of the spokes, the said arms bearing upon the tapering periphery of said conical member, and spacing means for retaining the inner ends of the spokes in position.

13. In a spoke-expander, the combination with a sleeve adapted to be mounted upon the axle, of a conical member longitudinally adjustable upon the sleeve, an annular member provided with a plurality of swinging arms resting upon the tapering periphery of the conical member and having recesses for receiving respectively the inner ends of the spokes, the said annular member being mounted upon

the sleeve, and a spacing device encircling said arms and engaging the spokes.

14. In a spoke-expander, the combination with a sleeve adapted to be mounted upon the axle, of a conical member longitudinally movable upon the sleeve, an annular member mounted upon the sleeve and provided with a plurality of swinging arms arranged around and bearing upon said conical member and having recesses for receiving respectively the inner ends of the spokes, and a ring encircling said arms and provided with means for engaging and holding the spokes in position.

15. In a spoke-expander, the combination with the sleeve adapted to be mounted upon the axle and provided with a cylindrical screw-threaded periphery, of a conical member provided with an axial screw-threaded hole fitted to the screw-threaded portion of the sleeve, an annular member encircling and supported by the sleeve and provided with a plurality of swinging arms having recesses for receiving respectively the inner ends of the spokes and resting upon the tapering portion of the conical member, and a ring encircling said arms and provided with a plurality of radial holes adapted to fit and hold the inner ends of the spokes.

16. In a spoke-expander, the combination with a sleeve adapted to be mounted upon the axle and provided with a screw-threaded periphery, of a conical member having an axial screw-threaded hole fitted to said screw-threaded portion of the sleeve, an internally-screw-threaded ring fitted to said sleeve and provided with a plurality of arms arranged around and resting upon the tapering portion of the conical member and provided each with a recess for receiving the inner end of a spoke, and a ring encircling said arms and provided with a plurality of radial holes adapted to receive and hold the inner ends of the spokes.

17. In a hub, the combination with an inner and an outer member provided with means for being secured together, one of said members being provided with radial recesses adapted to receive the spokes, of a sleeve adapted to be rotatably mounted upon the axle, a member mounted on said sleeve and provided with a series of swinging arms having means for supporting and holding against lateral movement the inner ends of the spokes, and means for adjusting said arms radially.

18. In a hub, the combination with an inner and an outer member provided with means for being secured together, one of said members having a series of radial recesses adapted to receive the spokes, of a sleeve adapted to be rotatively mounted on the axle and supporting one of said members, a member mounted on said sleeve provided with a plurality of swinging arms having means for supporting and holding against lateral movement the inner ends of the spokes, and a conical member

longitudinally movable on the sleeve and having its periphery supporting the free ends of said arms.

19. In a hub, the combination with an inner and an outer member provided with means for being locked together, one of said members having a series of radial recesses adapted to receive the spokes, of a sleeve adapted to be rotatively mounted on the axle and supporting one of said members, said sleeve having a screw-threaded exterior, a member mounted on said sleeve and provided with a plurality of swinging arms having means for supporting and holding against lateral movement the inner ends of the spokes, and a conical member the periphery of which supports the inner sides of said arms, said conical member being provided with a longitudinal screw-threaded hole fitted to the screw-threaded portion of said sleeve.

20. In a hub, the combination with an inner and an outer member provided with means for being secured together, one of said members being provided with a plurality of radial recesses adapted to receive the spokes, of a sleeve adapted to be rotatively mounted on the axle and supporting one of said members, an annular ring mounted on said sleeve and provided with a plurality of swinging arms having means for supporting and holding against lateral movement the inner ends of the spokes, and a conical member movable lengthwise on the sleeve and supporting on its periphery the free ends of said swinging arms.

21. In a hub, the combination with an inner and an outer tubular member provided with means for being secured together, one of said members having a series of radial recesses adapted to receive the spokes, of a sleeve adapted to be rotatively mounted on the axle and encircled by and supporting one of said members, an annular member mounted on said sleeve and provided with a plurality of swinging arms having means for supporting and holding against lateral movement the inner ends of the spokes, a conical member adjustable lengthwise on said sleeve and supporting on its periphery said arms, and means by which one of said tubular members limits the movement of said conical member on said sleeve.

22. In a hub, the combination with two tubular members provided with means for being secured together, one of said members having a series of recesses adapted to receive the spokes, of a sleeve adapted to be rotatively mounted on the axle and encircled by and supporting one of said tubular members, and provided with a screw-threaded exterior, a member mounted on said sleeve provided with a plurality of arms radially movable and adapted to support the inner ends of the spokes, a conical member having a screw-threaded longitudinal hole fitted to the screw-threaded portion of the sleeve and adapted to support on its periphery said arms, and means by which

rotation of said conical member on said sleeve may be limited by one of said tubular members.

23. The combination with two tubular members provided with means for being secured together, one of said members having a series of radial recesses adapted to receive the spokes, an annular member disposed between said tubular members and provided with a series of radial recesses adapted to receive the spokes, and a resilient ring disposed and adapted to be clamped between said annular member and one of said tubular members.

24. In a hub, the combination with two tubular members provided with means for being secured together, one of said members having a series of radial recesses adapted to receive the spokes, of a sleeve adapted to be rotatively mounted on the axle and encircled by and supporting one of said tubular members, of an annular member provided with a plurality of radially-adjustable devices adapted to support the inner ends of the spokes, a conical member adjustable lengthwise on the sleeve and supporting said radially-adjustable devices, a ring encircling said conical member and provided with a series of recesses adapted to receive the spokes, said ring being located between said tubular members and adapted to be held thereby against the spokes, and a resilient ring disposed and adapted to be pressed between one of said tubular members and the other ring.

25. In a hub, the combination with two tubular members provided with means for being locked together, one of said members being provided with a series of radial recesses adapted to receive the spokes, and one of said members being provided on its inner periphery with a longitudinal flange, of a sleeve adapted to be rotatively mounted on the axle and encircled by and supporting one of said tubular members, said sleeve being externally screw-threaded, of a conical member provided with a longitudinal screw-threaded hole fitted to the threaded portion of said sleeve, said conical member being provided with a peripheral projection adapted to engage said flange on one of the tubular members for preventing rotation of the conical member, and an annular member mounted on the sleeve and provided with a series of radially-adjustable devices adapted to support the inner ends of the spokes, and supported upon the periphery of the conical member.

26. In a hub, the combination with an exteriorly-screw-threaded sleeve adapted to be rotatively mounted on the axle, of a conical member having a longitudinal screw-threaded hole fitted to the threaded portion of the sleeve, a series of spoke-engaging devices supported by said conical member and radially adjustable when said conical member is rotated, and a casing encircling and supported by said sleeve, provided with a series of radial openings adapted to receive the spokes and provided

with means for limiting the rotation of said conical member.

27. In a hub, the combination with an exteriorly-threaded sleeve adapted to be rotatively mounted on the axle, of a conical member provided with a longitudinal threaded hole fitted to the threaded portion of said sleeve, an annular member mounted on said sleeve and provided with a plurality of radially-adjustable arms adapted to support the inner ends of the spokes and supported upon the periphery of said conical member, and a casing encircling and supported by said sleeve, provided with a series of radial holes adapted to receive the spokes and provided with means for limiting the rotation of the conical member on the sleeve.

28. A hub-casing comprising two tubular members provided with means for being releasably locked together, each of said members being provided with a peripheral flange and one of said members having a series of radial holes adapted to receive the spokes, a ring encircling one of said members, disposed opposite the flange thereon and provided with a series of radial recesses adapted to receive the spokes, and a resilient ring disposed between the flange on the other member and between said other ring.

29. In a hub, the combination with two tubular members, one insertible within the other, the inner member having a series of hooks and

the other member provided with a corresponding series of peripheral projections adapted to be engaged by said projections when the opposite member is rotated to the proper position in the outer member, of resilient means for normally forcing the members apart.

30. In a hub, the combination with two tubular members insertible one in the other, the inner member being provided with one or more hooks and the outer member having a corresponding number of inwardly-extending projections adapted to engage said hooks when one of the members is rotated on the other in the proper direction, each of said members being provided with an outer peripheral flange, and one of the members having a series of radial holes adapted to receive the spokes, of a ring encircling one of said members, disposed between said two flanges and provided with a plurality of radial recesses adapted to receive the spokes, and a resilient ring bearing against the other ring upon the side opposite the recesses therein and against the flange of the adjacent tubular member.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY W. WURTH.

Witnesses:

WARREN D. HOUSE,
HENRY F. ROSE.