

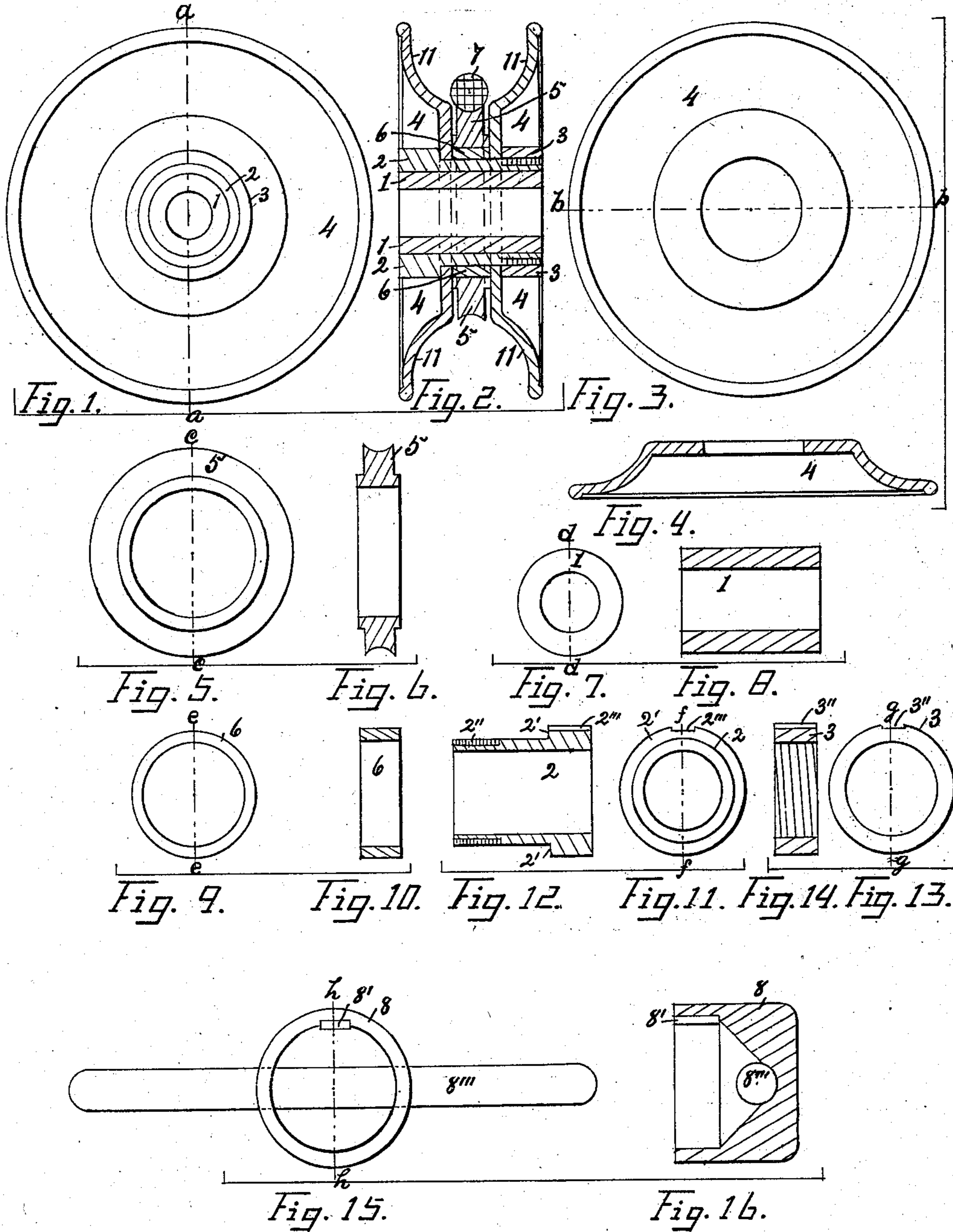
No. 720,454.

PATENTED FEB. 10, 1903.

A. H. MATHESIUS.  
GUIDE WHEEL AND GUIDE.  
APPLICATION FILED MAR. 26, 1900.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses  
Albert C. Tanner.  
George A. Mathesius.

Inventor  
Alexander H. Mathesius.

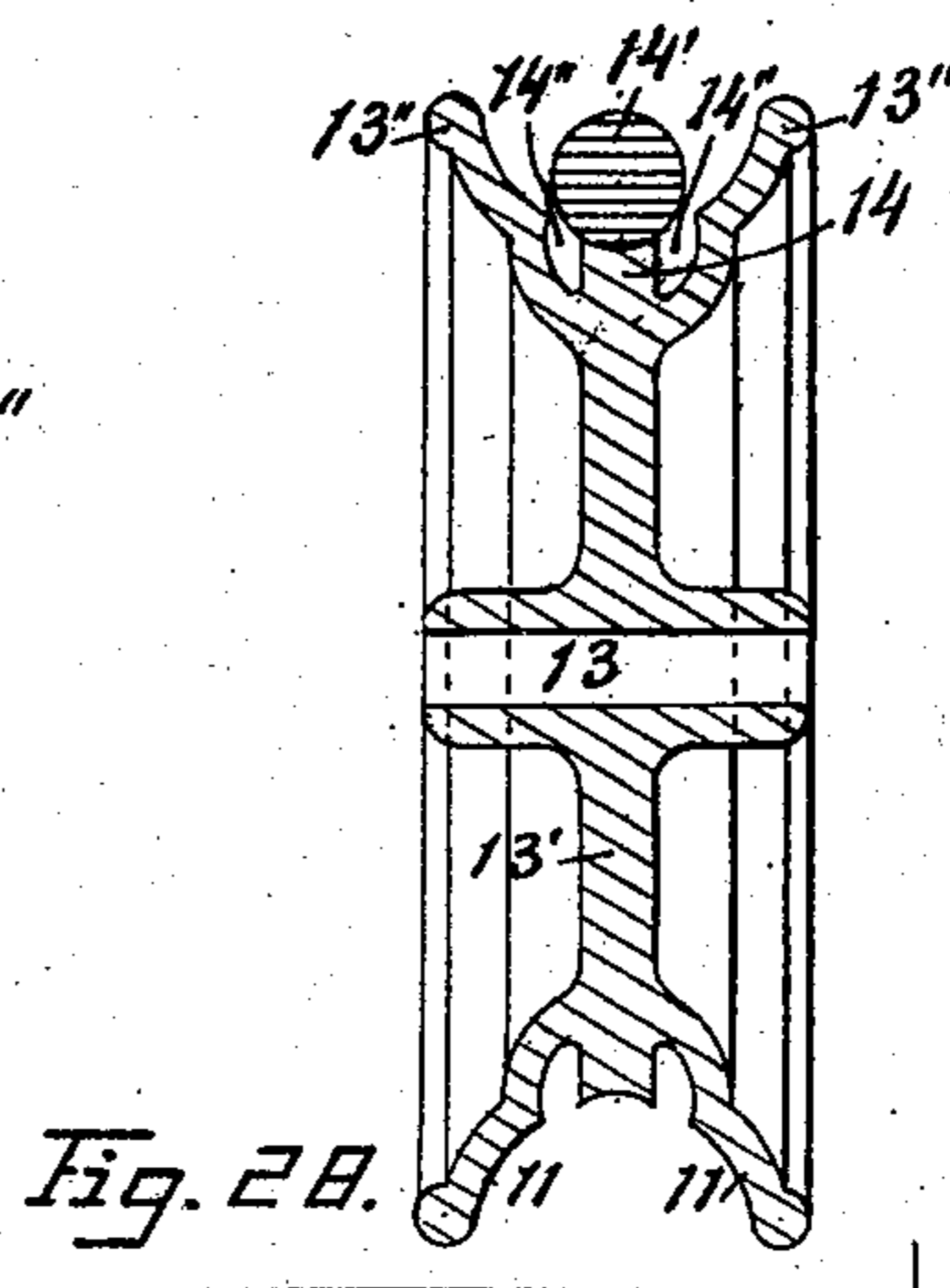
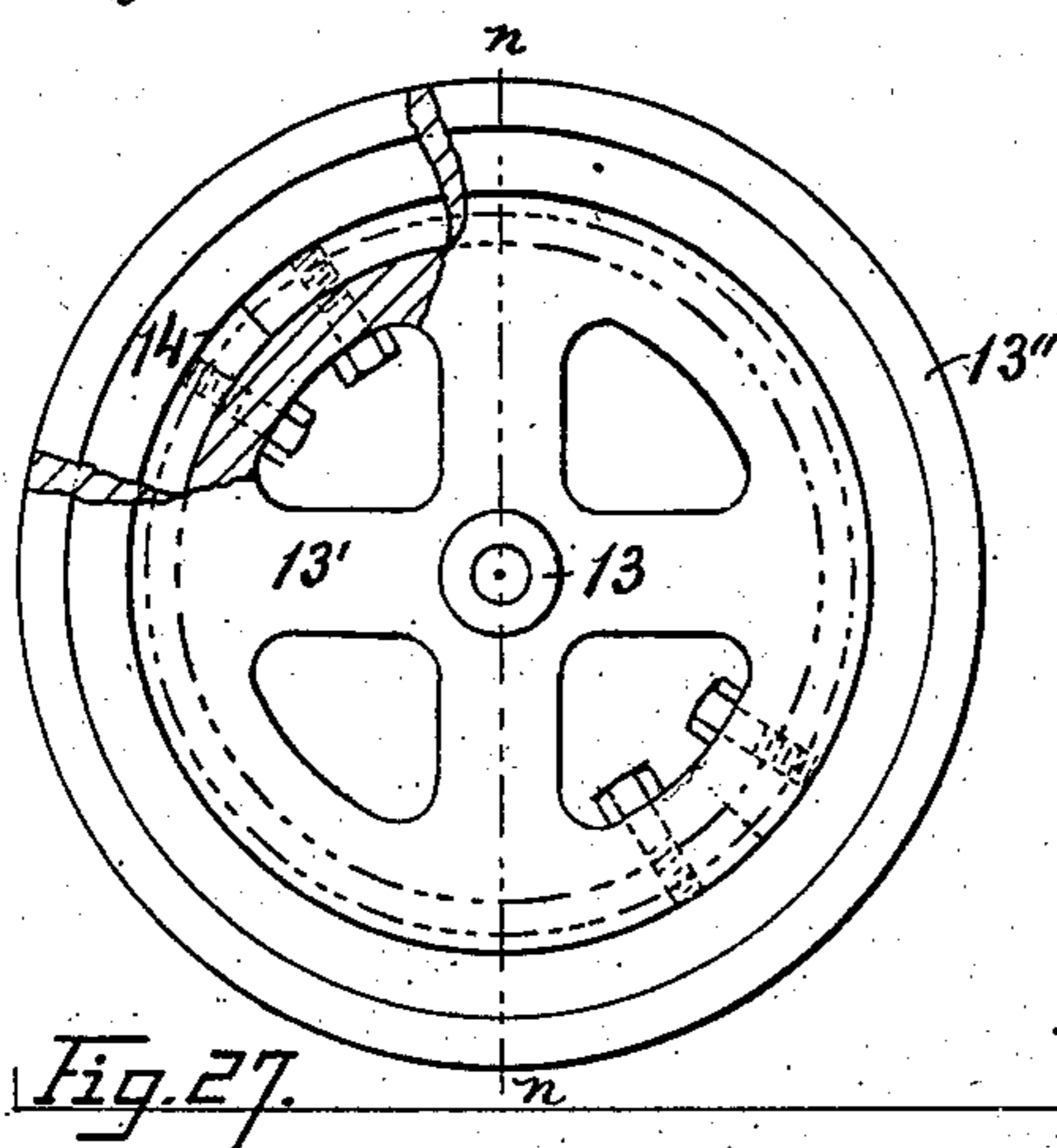
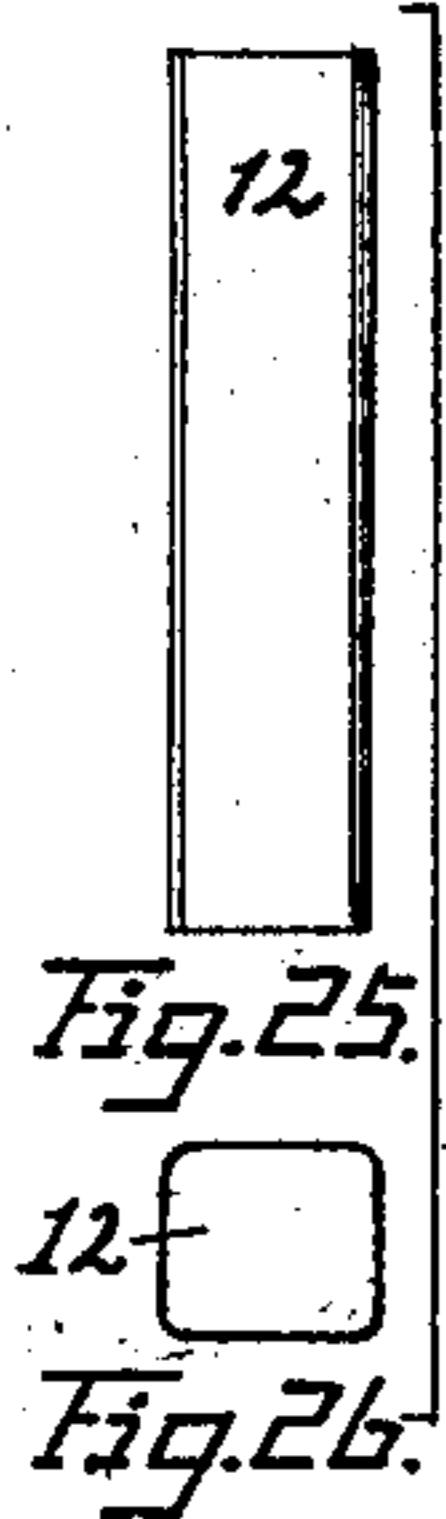
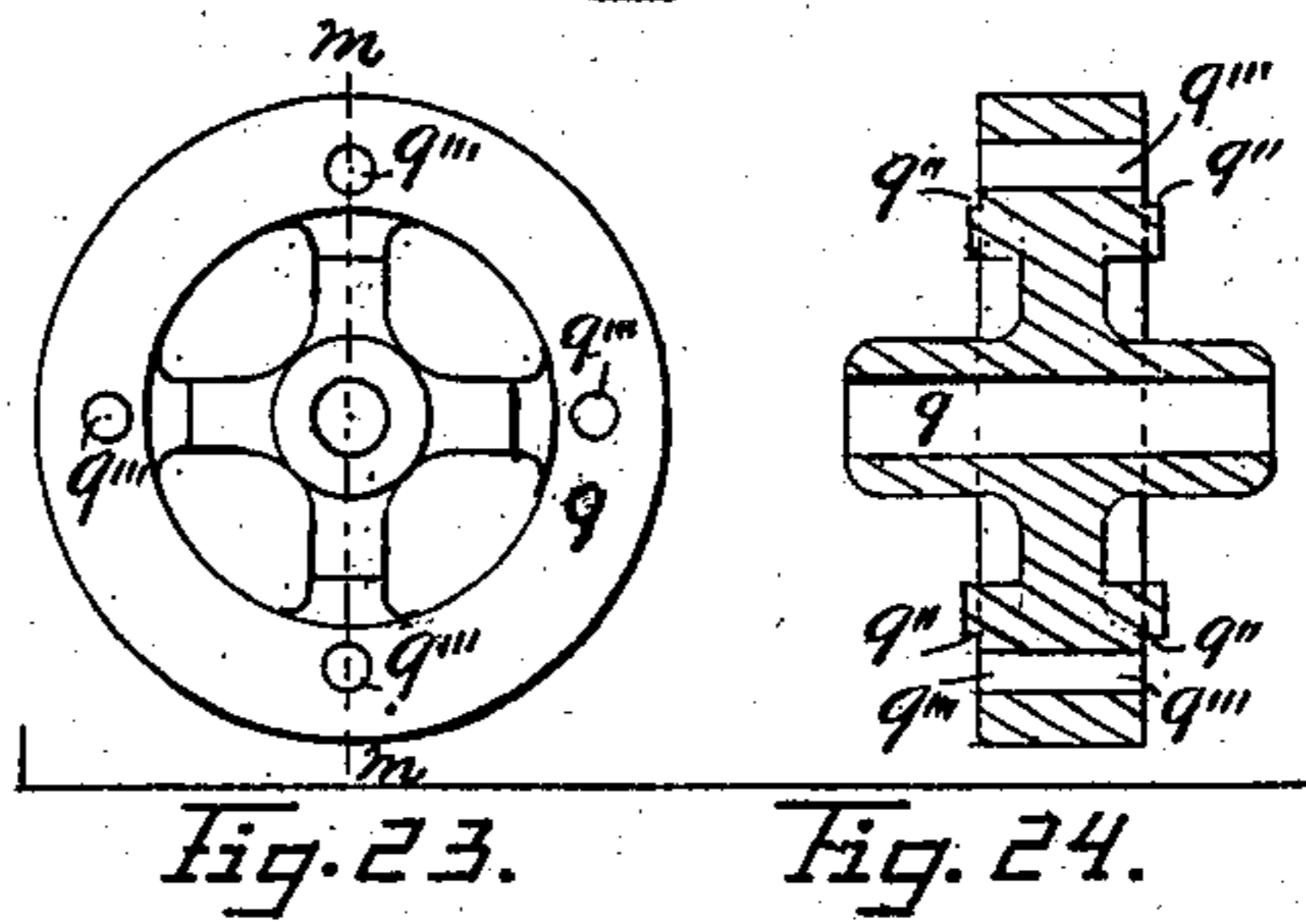
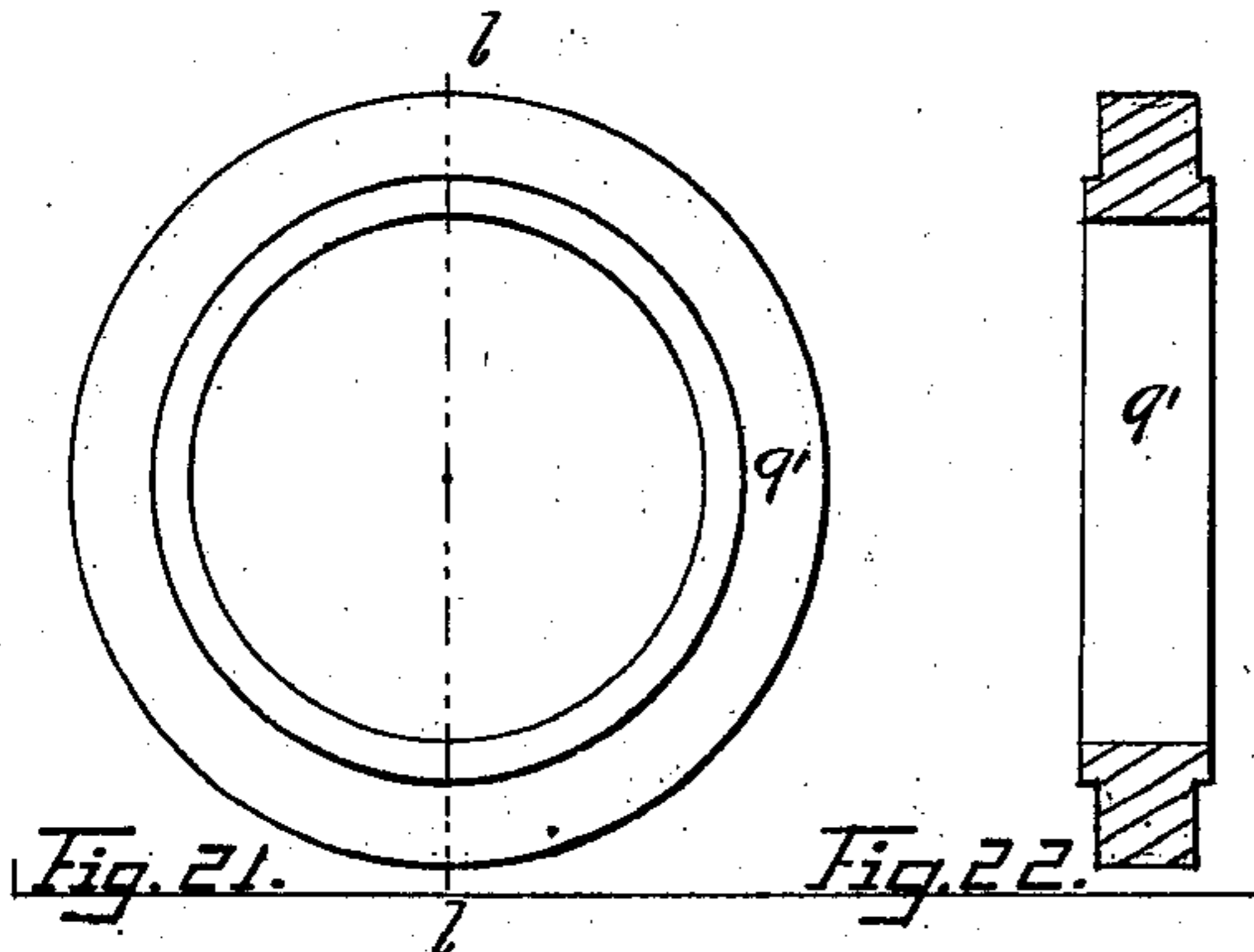
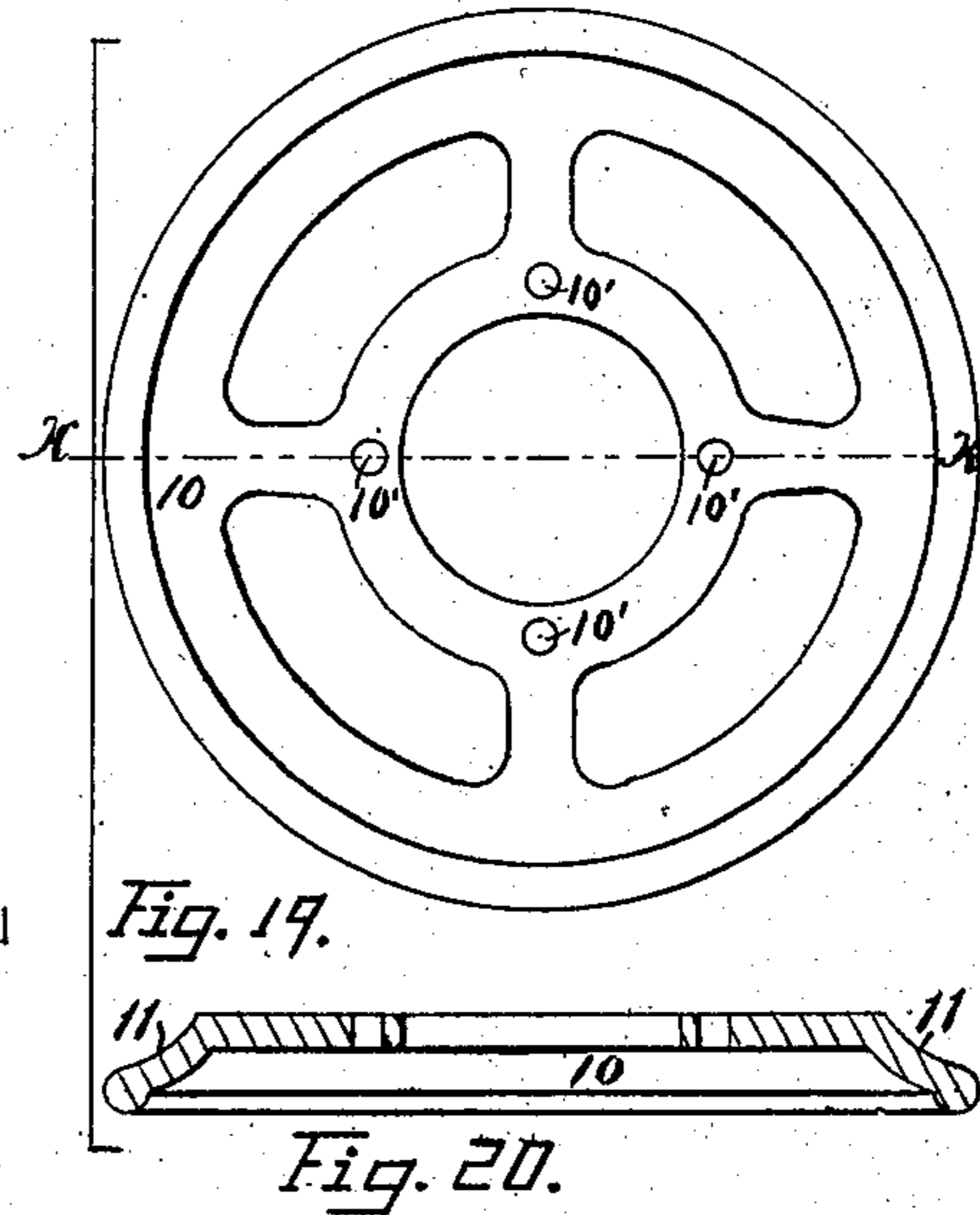
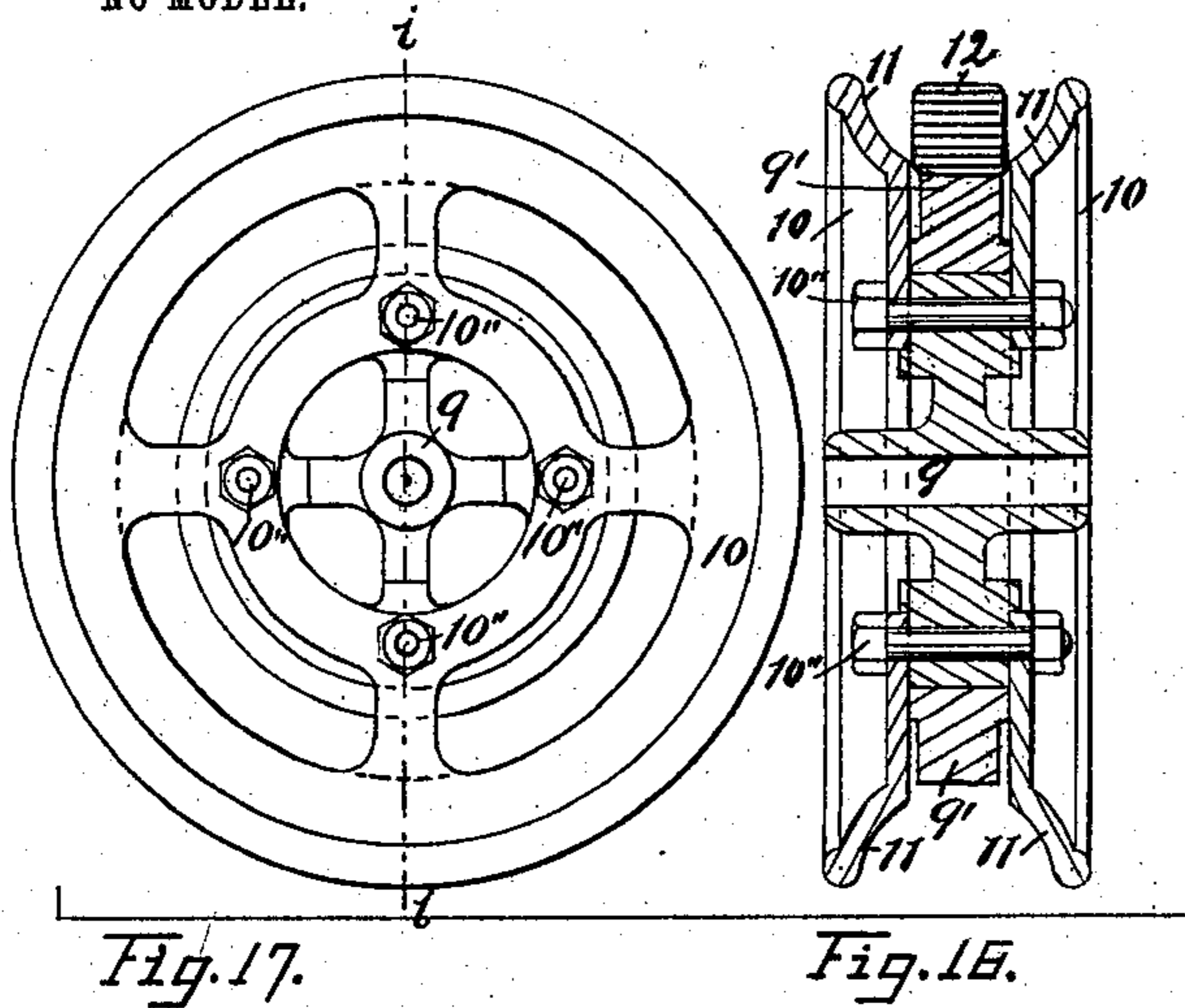
No. 720,454.

PATENTED FEB. 10, 1903.

A. H. MATHESIUS.  
GUIDE WHEEL AND GUIDE.  
APPLICATION FILED MAR. 28, 1900.

NO MODEL.

2 SHEETS—SHEET 2.



Witnesses  
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# UNITED STATES PATENT OFFICE.

ALEXANDER H. MATHESIUS, OF BROOKLYN, NEW YORK.

## GUIDE-WHEEL AND GUIDE.

SPECIFICATION forming part of Letters Patent No. 720,454, dated February 10, 1903.

Application filed March 26, 1900. Serial No. 10,287. (No model.)

*To all whom it may concern:*

Be it known that I, ALEXANDER H. MATHE-  
SIUS, a citizen of the United States, residing in  
the city of Brooklyn, county of Kings, and  
5 State of New York, have invented certain new  
and useful Improvements in Guide-Wheels  
and Details Connected Therewith, of which  
the following is a specification.

My invention has relation to means for con-  
veying power from an electrical conductor,  
moving rope, or the like and also relates to  
certain details and apparatus to be used in  
connection therewith.

This application relates in part to improve-  
ments in guide-wheels, and comprehends cer-  
tain modifications of improvements upon the  
general construction set out in Letters Pat-  
ent No. 432,757, granted to me on July 22,  
1890.

In my Letters Patent above referred to I  
have disclosed an original type of guide-wheel  
having for its special novelty the divided cen-  
ter-bearing, which is made of a number of  
separate circular sections in a manner that  
each section is free to revolve with a velocity  
in correspondence to the length of its radius,  
thereby reducing the slipping and abrasion  
of the guide, rope, or the like and the center-  
bearing of the guide-wheel.

My present invention has for its object a  
further development of the same general fea-  
tures—namely, reducing the slipping and ab-  
rasion of the contact-lines of the wire, rope,  
or the like and of the guide-wheel.

In carrying out my invention I make the  
center-bearing of the guide-wheel in one sec-  
tion, but narrower than the diameter of the  
rope, wire, or the like with which it is mov-  
ing in contact for the purpose of reducing  
the difference of the different diameters of  
which the curved circumference of the cen-  
ter-bearing is composed, thereby simplifying  
the construction of the guide-wheel and mak-  
ing it more practical for general use.

In one form of my invention of the guide-  
wheel I employ an independently-revolving  
center-bearing, which has for its object to  
prevent the slipping and abrasion of the met-  
als of the contact-lines, the flanges, and the  
sides of the rope, wire, or the like. The in-  
dependently-revolving center-bearing of the  
guide-wheel has also for its object to reduce

the inertia, which prevents revolving the  
solid guide-wheel for some time, when it is  
started rapidly from a state of rest, there-  
by abrading part of the circumference into  
a flat angular face. On account of the re-  
duced inertia the independently-revolving  
center-bearing will start to revolve first  
around the hub or separating-ring upon  
which it is journaled, and then gradually  
the rest of the guide-wheel will commence to  
revolve. Therefore a guide-wheel fitted with  
an independently-revolving center-bearing  
will revolve with less contact pressure and  
will cause less wear of the contact-lines than  
a guide-wheel with a fixed center-bearing.  
When guide-wheels are fitted with independ-  
ently-revolving center-bearings and are ap-  
plied to different classes of work and differ-  
ent sizes of rope, different designs are re-  
quired for their details. I have shown two  
illustrations of these different designs in the  
drawings—one design for a small guide-wheel  
in contact with a round wire and one design  
for a larger guide-wheel in contact with an  
angular wire. In both of these guide-wheels  
the principle which governs the design of the  
center-bearing is practically the same; but  
the designs of the details of the rest of the  
guide-wheel are governed by different prin-  
ciples, which will be explained farther on.

In another form of the invention of the  
guide-wheel I make the center-bearing move  
as an integral part of the rest of the wheel.  
It may be made of one piece, as the ordinary  
guide-wheel, except the center-bearing being  
made narrower than the diameter of the rope,  
wire, or the like, or it may be made with a  
detachable center-bearing, which may be fas-  
tened to the wheel in any suitable manner.

My invention embraces all center-bearings  
which are made narrower than the round  
rope, wire, or the like with which they are  
brought in contact.

In the smaller forms of my invention of the  
sectional guide-wheel the flanges are shown  
in the drawings to be restrained on the bush-  
ing by screw-nuts, which are tightened or  
loosened by suitable wrenches, which are also  
shown in the drawings.

My improvements will be better understood  
by reference to the accompanying drawings,  
in which—

Figure 1 is a side view of a guide-wheel fitted with an independently-revolving center-bearing designed for a small round rope, wire, or the like. Fig. 2 is a vertical section on the line *a a* of Fig. 1. Fig. 3 is a detail side view of one of the flanges made use of in this design. Fig. 4 is a horizontal section on line *b b* of Fig. 3. Fig. 5 is a side view in detail of the center-bearing shown in general views of Figs. 1 and 2. Fig. 6 is a vertical section on the line *c c* of Fig. 5. Fig. 7 is a detail side view of a bushing which I use with this wheel. Fig. 8 is a vertical section on the line *d d* of Fig. 7. Fig. 9 is a detail side view of the separating-ring against which the flanges of the wheel are pressed. Fig. 10 is a vertical section on the line *e e* of Fig. 9. Fig. 11 is a detail side view of the hub of the guide-wheel. Fig. 12 is a vertical section on the line *f f* of Fig. 11. Fig. 13 is a detail side view of the round screw-nut which I use to retain the flanges on the hub. Fig. 14 is a vertical section on line *g g* of Fig. 13. Fig. 15 is a side view of a socket-wrench employed for tightening or loosening the round screw-nut above referred to. Fig. 16 a vertical section on the line *h h* of Fig. 15. Fig. 17 is a side view of a modified design for a guide-wheel also fitted with an independently-revolving center-bearing. Its details are designed for use in connection with large rope, wire, or the like. It is shown in contact with an angular wire; but wires, ropes, or the like of other cross-sections than angular may be used. Fig. 18 is a vertical section on the line *i i* of Fig. 17 and an end view of an angular wire in contact with the center-bearing. Fig. 19 a detail side view of the flanges of the guide-wheel shown in Figs. 17 and 18. Fig. 20 is a horizontal section on the line *k k* of Fig. 19. Fig. 21 is a side view of the center-bearing for this guide-wheel. Fig. 22 is a vertical section on the line *l l* of Fig. 21. Fig. 23 is a side view of a combined hub and spider for this modified guide-wheel. Fig. 24 is a vertical section on the line *m m* of Fig. 23. Fig. 25 is a side view of the angular wire in contact with the guide-wheel shown in Fig. 18. Fig. 26 is an end view of the wire shown in Fig. 25. Fig. 27 is a side view of a modified guide-wheel fitted with a fixed center-bearing. Fig. 28 is a vertical section on the line *n n* of Fig. 27.

Similar reference-numbers denote like parts throughout the various views of the drawings. The bushing 1 (shown in Figs. 1, 2 and 7, 8) is made of suitable material and of a shape and size to be forced into the hub 2, which holds it in place by friction. The bushing is also provided with a central longitudinal hole for receiving a pin or axis around which the bushing, and with it the guide-wheel, may revolve.

The hub 2 (shown in Figs. 1, 2 and 11, 12) is made of suitable material and is provided with a central longitudinal hole to receive the bushing 1. The hub 2 is also provided near one end with a shoulder 2' and at the

other end with screw-threads 2'', adapted to receive the screw-nut 3, between which shoulder and screw-nut the separating-ring 6 and flanges 4 are located. The shoulder of the hub is provided with a key-seat 2''', which serves to prevent the hub from turning when the socket-wrench 6, fitted with a key 8' to enter the seat 2''', is placed in position for service upon the hub. The screw-nut is also provided with a key-seat 3'', (shown in Figs. 13, 14,) and when another socket-wrench 8 is placed in position for service upon the screw-nut 3 the latter may be turned sufficiently to fasten firmly the flanges 4 and the separating-ring 6 upon the hub 2.

The screw-nut 3 (shown in Figs. 1, 2 and 13, 14) is made of suitable material and key-seated at its circumference to receive a suitable socket-wrench, as 8, fitted with a key, as 8', for tightening or loosening the several details of the guide-wheel as a whole.

The flanges 4 (shown in Figs. 1, 2 and 3, 4) are made of suitable material. They are each provided with a central hole, to the end that they may be duly mounted on the hub 2. They are also each provided near its circumference with straight lines, which join the curved lines 11 11 of the cavity. These straight lines of the cavity of the flanges are vertical or approximately vertical to the axis around which the guide-wheel revolves and serve to prevent the guide-wheel from leaving or jumping the electrical conductor or other guide when the guide-wheel is forced sidewise by jolting or otherwise. The curved lines 11 11 serve to guide the rope, wire, or the like to the center-bearing 5.

The center-bearing 5 (shown in Figs. 2 and 5, 6) is made of suitable material and provided with a central hole suitable of being mounted loosely upon the separating-ring 6 between the flanges 4, where it is capable of revolving independently of said flanges. The circumference of the center-bearing 5 is fitted with an endless groove, as indicated in Figs. 2 and 5, and the same serves as a bearing for the rope or round wire or the like, with which it may be brought in contact. At or near the circumference said center-bearing is made narrower than the diameter of such rope, wire, or the like for the purpose of reducing the difference of the different radii of which the transverse face of the center-bearing is composed, and thereby also reducing the slipping and consequent abrasion of its circumference and of the rope, wire, or the like.

The separating-ring 6 (shown in Figs. 2 and 9, 10) is made of suitable material. It is provided with a central longitudinal hole to admit of its being mounted upon the hub 2 between the flanges 4. It is made sufficiently wider than the width of the journal of the center-bearing 5 for the purpose that the latter may be able to revolve independently between the flanges, and its circumference is finished suitably to serve as a journal for said center-bearing. When the separating-ring 6

is placed upon the hub 2 between the flanges 4 and the screw-nut 3 is tightened, it and the flanges are held firmly to the hub without interfering with the independent revolution of the center-bearing.

The guide-wheel, as shown in Figs. 1 and 2, is suitable for guiding a round rope or to be guided by a round wire at its circumference. It may be used for rope transmission—such as cable-roads, &c—or for conveying an electric current from or to an electrical conductor circular in cross-section, such as conveying current from a trolley-wire to a motor-car.

The socket-wrench (shown in Figs. 15 and 16) is provided with a central hole, into which the hub-shoulder 2' or the screw-nut 3 is able to enter. Within the central hole of the wrench is fitted a key 8' to enter a corresponding key-seat 2'', located at the circumference of the shoulder 2', and key-seat 3'', which is located at the circumference of the screw-nut 3. It is also provided with a handle 8'', which may be grasped and used as a lever when using the wrench.

The guide-wheel shown in Figs. 17, 18 and 23, 24 is designed to revolve in contact with larger rope, wire, or the like than the guide-wheel shown in Figs. 1 and 2. It is designed with a combined hub and spider 9. The hub is provided with a central hole to receive a shaft, around which it may revolve. It is also provided with bolt-holes 9'' for bolting the flanges 10 and spider together. Shoulders 9'' are provided at the side of the spider for guiding the flanges 10 accurately to place. The circumference of the spider is fitted as a journal, around which the center-bearing 9' may revolve independently of the flanges 10. This guide-wheel is shown as fitted with a cylindrical center-bearing in contact with an angular wire; but the contact-face of the center-bearing may be made to fit any other form of cross-section of a wire, rope, or the like with which it is to revolve.

The flanges 10 (shown in Figs. 17, 18 and 19, 20) are each provided with a central hole, to the end that they may be fitted on the shoulder 9'' of the spider. They are also provided with bolt-holes 10', which register with the bolt-holes 9'' of the spider, bolts 10'' being employed for fastening the flanges in place. The circumference of the flanges are provided with proper curves and straight lines 11 11 for guiding the rope, wire, or the like to the center-bearing 9'.

The center-bearing 9' (shown in Figs. 17, 18 and 21, 22) is provided with a central hole for mounting it loosely upon the circumference of the spider 9 to enable it to revolve independently of the rest of the wheel. Its circumference is shown to be fitted with a plain cylindrical surface as a bearing for a wire, as 12, angular in cross-section; but it may be made to fit any other form of cross-section of a wire, rope, or the like.

The guide-wheel shown in Figs. 27, 28 is an-

other modification of the guide-wheel shown in Figs. 1, 2. It is made like an ordinary solid guide-wheel, with hub 13, spider 13', flanges 13'', a fixed center-bearing 14, in contact with wire 14'. The center-bearing may be secured to the rim in any approved manner, as by screws, (indicated in Fig. 27, where a portion of one of the flanges is broken away to show the center-bearing fastened in position for service, as by means of bolts,) or the center-bearing may be formed integral with the guide-wheel. The center-bearing shown in Fig. 28 is also made narrower at its circumference than the diameter of the rope, wire, or the like with which it is brought in contact at its circumference. The inside curves of the flanges are also shaped in such manner that they will guide the rope, wire, or the like to the center-bearing. Adjoining the center-bearing are recesses 14'', which permit the round rope or round wire to abrade the center-bearing some distance below its original diameter without interfering with the adjacent shoulders of the flanges. The abrasion of the circumference of the center-bearing of this guide-wheel should be limited to the extent of the rope or wire coming in contact with the shoulders of the wheel-flanges. Within this limit this guide-wheel will effect a considerable saving in the expenses incident to the renewals of the rope or wire and the guide-wheel as compared with the ordinary solid guide-wheel; but it will not be as economical as the guide-wheel fitted with the independently-revolving center-bearing.

It will be observed that my improved guide-wheel is particularly well adapted for the purpose for which it is designed and also that the same may be modified somewhat as to the details of the construction without departing from the spirit and principle of my invention.

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

1. A guide-wheel for use with an electrical conductor, rope or the like, having a central bearing which is narrower at its circumference, than the largest transverse dimension of the electrical conductor, rope or the like with which it may revolve in contact, for the purpose specified.

2. A guide-wheel for use with an electrical conductor, rope or the like, having a central bearing which is narrower at its circumference, than the largest transverse dimension of the electrical conductor, rope or the like with which it may revolve in contact, and fitted to revolve independently of the flanges, for the purpose specified.

3. A guide-wheel for use with an electrical conductor, rope or the like, having a central bearing which is narrower at its circumference, than the largest transverse dimension of the electrical conductor, rope or the like with which it may revolve in contact; and a separating-ring, for the purpose specified.

4. A guide-wheel for use with an electrical

conductor, rope or the like, having a central bearing which is narrower at its circumference, than the largest transverse dimension of the electrical conductor, rope or the like with which it may revolve in contact; and a hub, for the purpose specified.

5. A guide-wheel for use with an electrical conductor, rope or the like, having a central bearing which is narrower at its circumference, than the largest transverse dimension of the electrical conductor, rope or the like with which it may revolve in contact; and a bushing, for the purpose specified.

6. A guide-wheel for use with an electrical conductor, rope or the like, having a central bearing which is narrower at its circumference, than the largest transverse dimension of the electrical conductor, rope or the like with which it may revolve in contact; and flanges which are located on each side of the central bearing, for the purpose specified.

7. A guide-wheel for use with an electrical conductor, rope or the like, having a central bearing which is narrower at its circumference, than the largest transverse dimension of the electrical conductor, rope or the like with which it may revolve in contact; and flanges which project beyond the circumference of the central bearing and which are fitted with rounded edges next to the central bearing, for the purpose specified.

8. A guide-wheel for use with an electrical conductor, rope or the like, having a central bearing which is narrower at its circumference, than the largest transverse dimension of the electrical conductor, rope or the like with which it may revolve in contact; and flanges which are fitted with rounded edges near the center-bearing and straight lines near their largest diameters, for the purpose specified.

9. A guide-wheel for use with an electrical conductor, rope or the like, having a central bearing which is narrower at its circumference, than the largest transverse dimension of the electrical conductor, rope or the like with which it may revolve in contact; and flanges which are fitted with rounded edges near the central bearing, with straight lines near their largest diameter and with intermediate curved lines, for the purpose specified.

10. A guide-wheel for use with an electrical conductor, rope or the like, having a central bearing which is narrower at its circumference, than the largest transverse dimension of the electrical conductor, rope or the like with which it may revolve in contact; and a

hub which is fitted with a screw-nut, for the purpose specified.

11. A guide-wheel for use with an electrical conductor, rope or the like, having a central bearing which is narrower at its circumference, than the largest transverse dimension of the electrical conductor, rope or the like with which it may revolve in contact; and a hub which is fitted with a shoulder at one end and a screw-nut at the other end, for the purpose specified.

12. A guide-wheel for use with an electrical conductor, rope or the like, having a central bearing which is narrower at its circumference, than the largest transverse dimension of the electrical conductor, rope or the like with which it may revolve in contact; and bolts by which the flanges are held together, for the purpose specified.

13. A guide-wheel composed of a central bearing which is narrower at its circumference, than the largest transverse dimension of the electrical conductor, rope or the like with which it may revolve in contact; flanges; a hub, means for connecting the details together and means for guiding them from a common axis, for the purpose specified.

14. A guide-wheel composed of a central bearing which is narrower at its circumference, than the largest transverse dimension of the electrical conductor, rope or the like with which it may revolve in contact; flanges; a hub; and a separating-ring; means for connecting the details together and means for guiding them from a common axis, for the purpose specified.

15. A guide-wheel composed of a central bearing which is narrower at its circumference, than the largest transverse dimension of the electrical conductor, rope or the like with which it may revolve in contact; flanges; a bushing, and a hub; means for connecting the details together and means for guiding them from a common axis, for the purpose specified.

16. A guide-wheel composed of a central bearing which is narrower at its circumference, than the largest transverse dimension of the electrical conductor, rope or the like with which it may revolve in contact, flanges, a bushing, a hub, a separating-ring, means for connecting the details together and means for guiding them from a common axis, for the purpose specified.

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Witnesses:

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