

No. 684,123.

Patented Oct. 8, 1901.

G. H. SPAFFORD.
WHEEL.

(Application filed Apr. 27, 1901.)

(No Model.)

2 Sheets—Sheet 1.

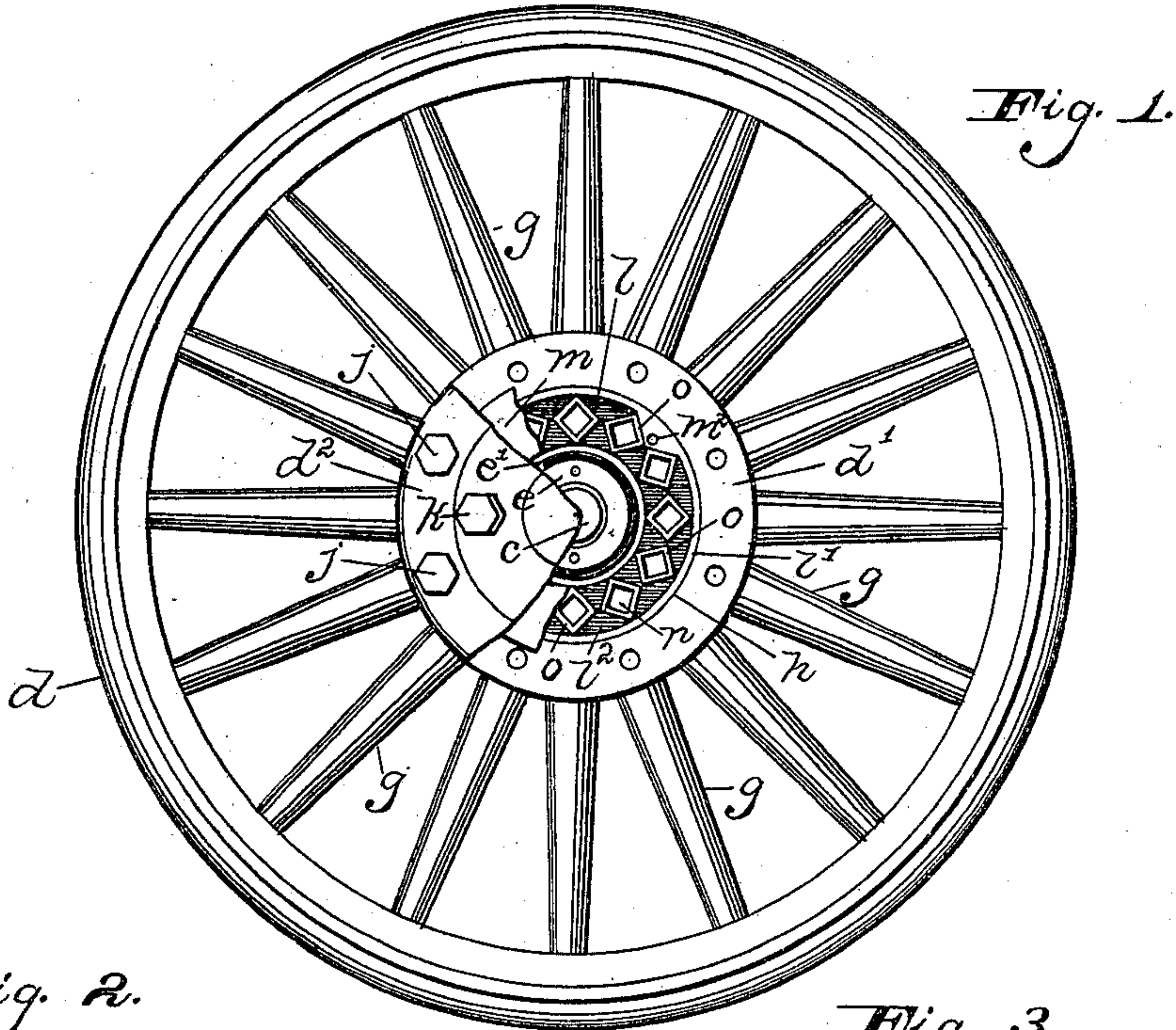


Fig. 2.

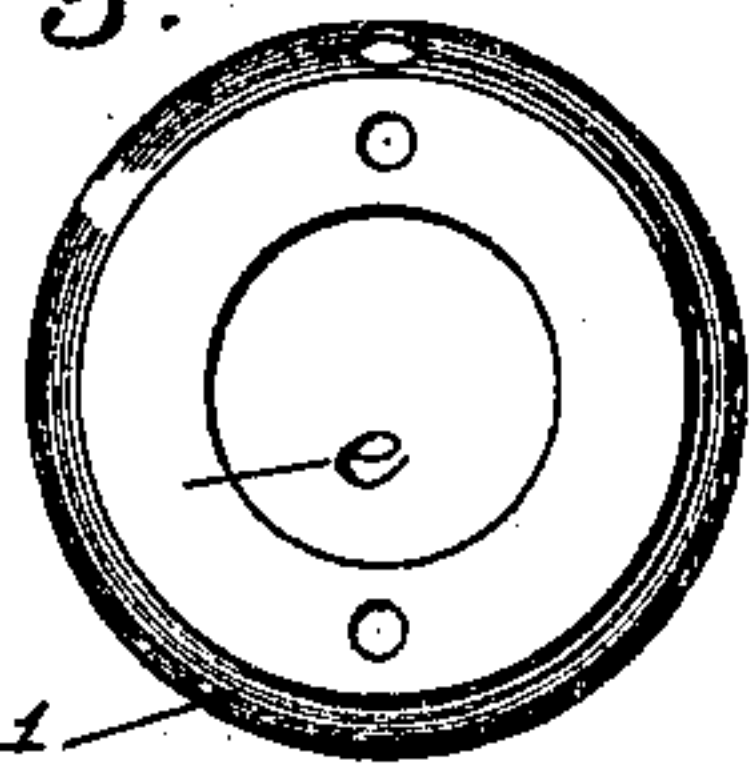
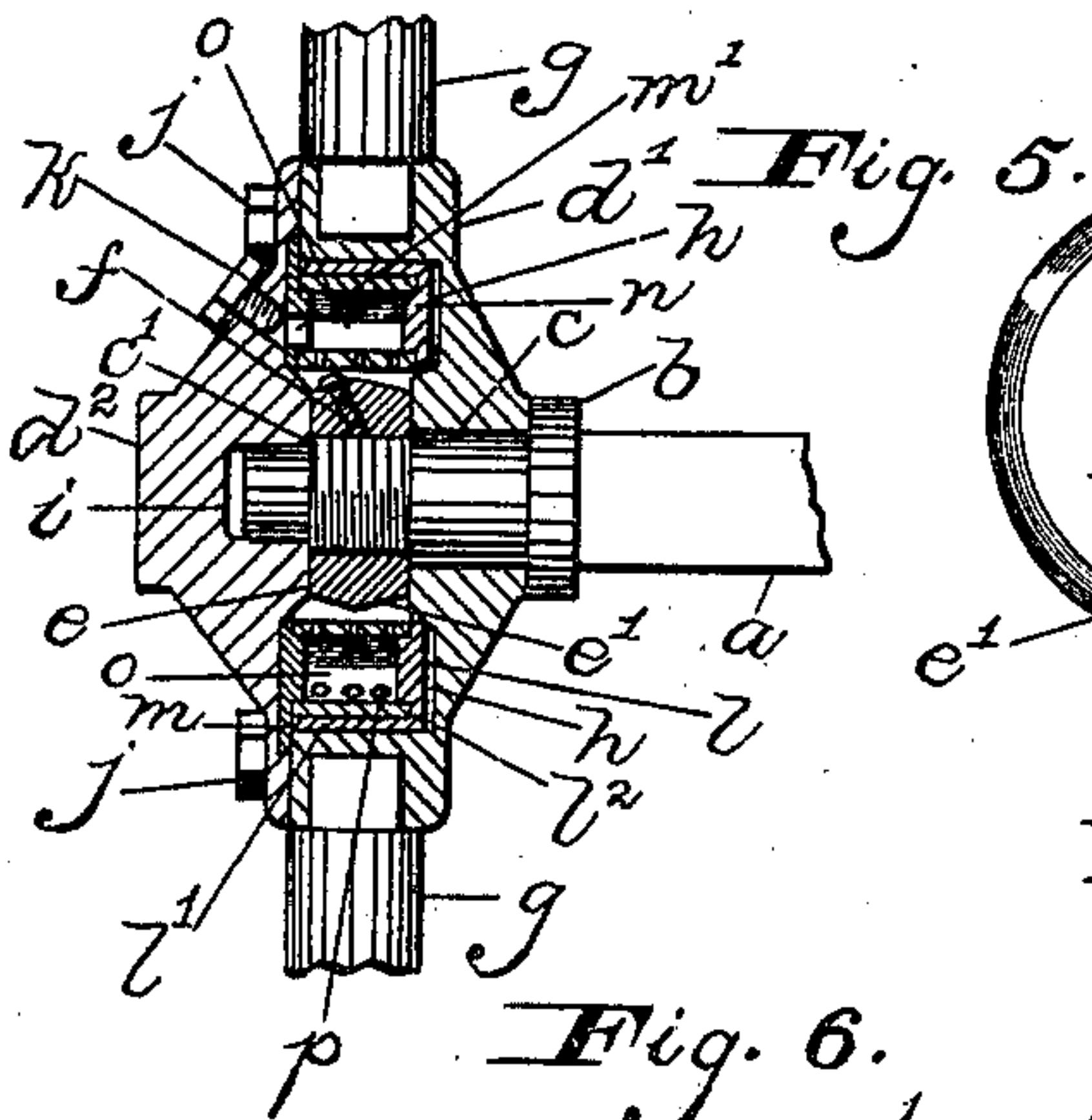


Fig. 3.

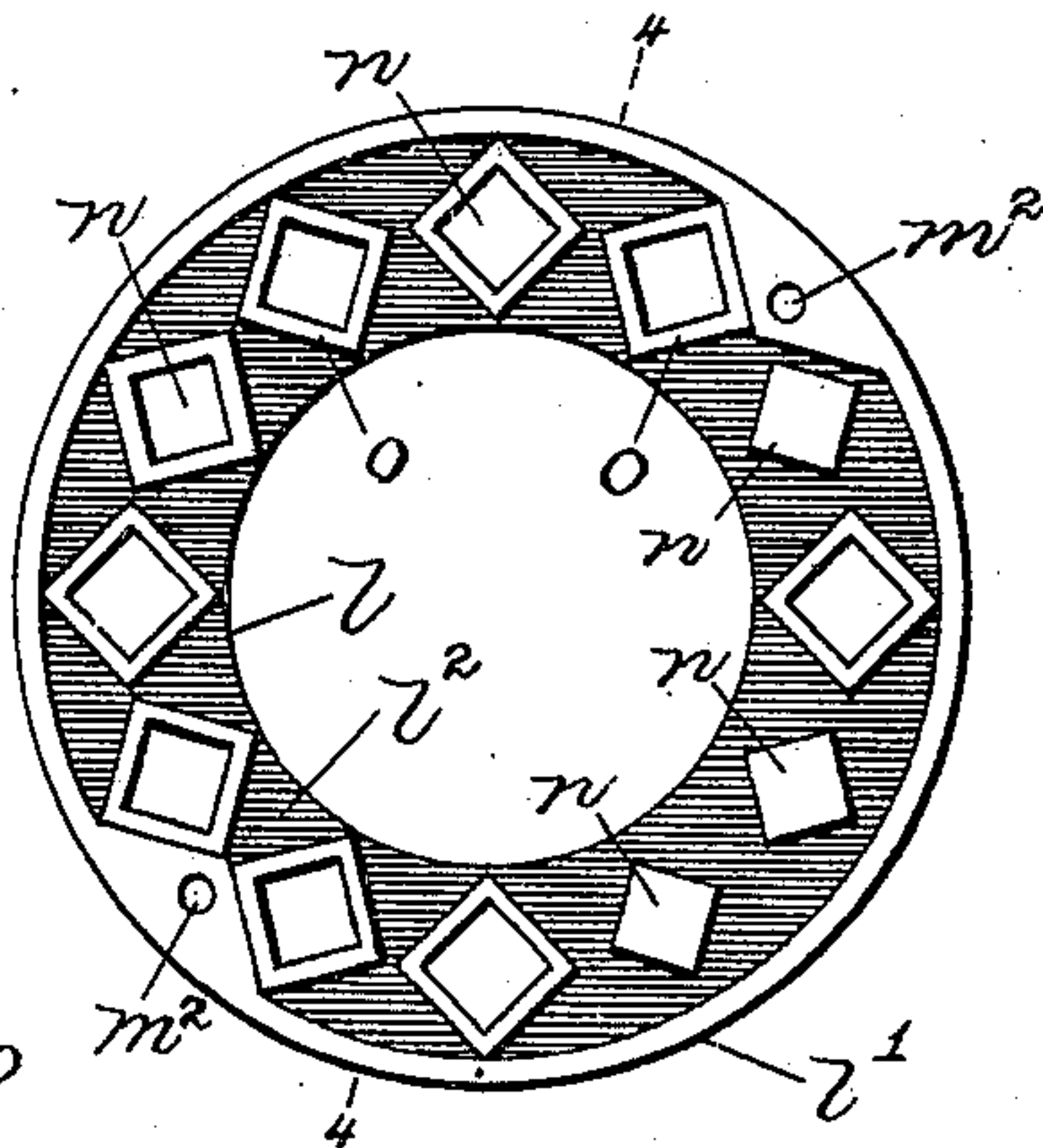
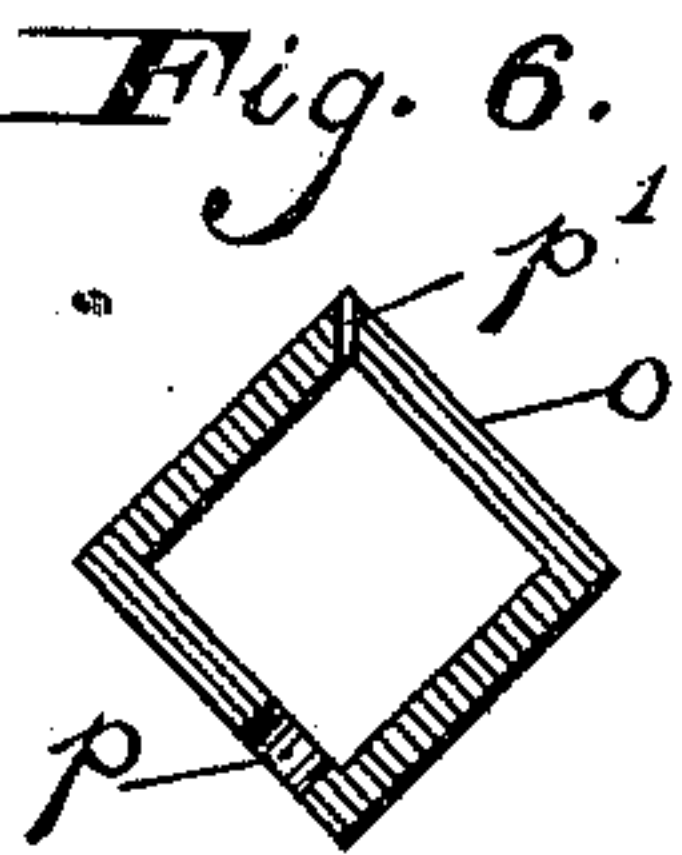
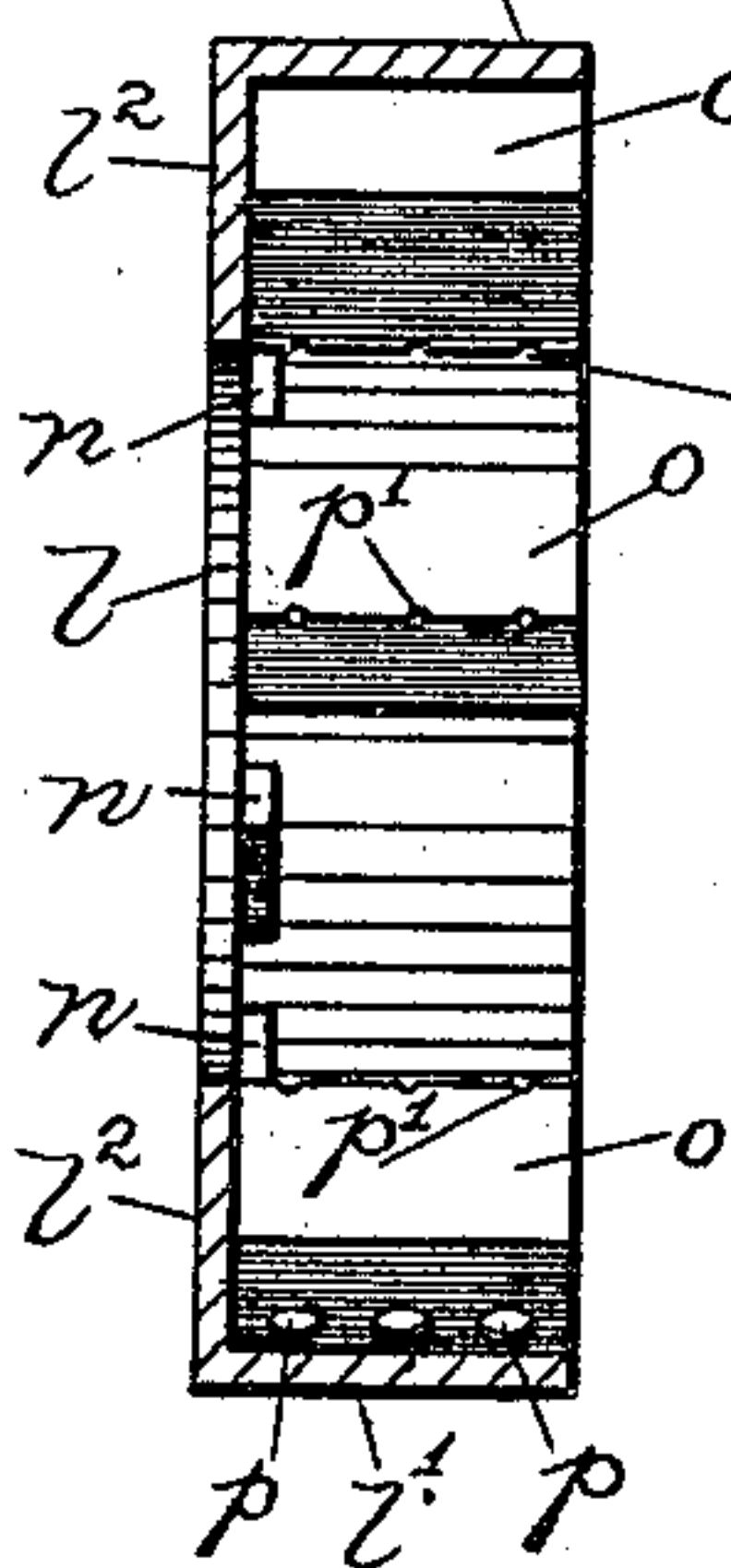


Fig. 4.



Witnesses.
H. J. Meyer, Jr.
F. S. Stitt.

Inventor,
George H. Spafford
By Char. B. Mann
Attorney.

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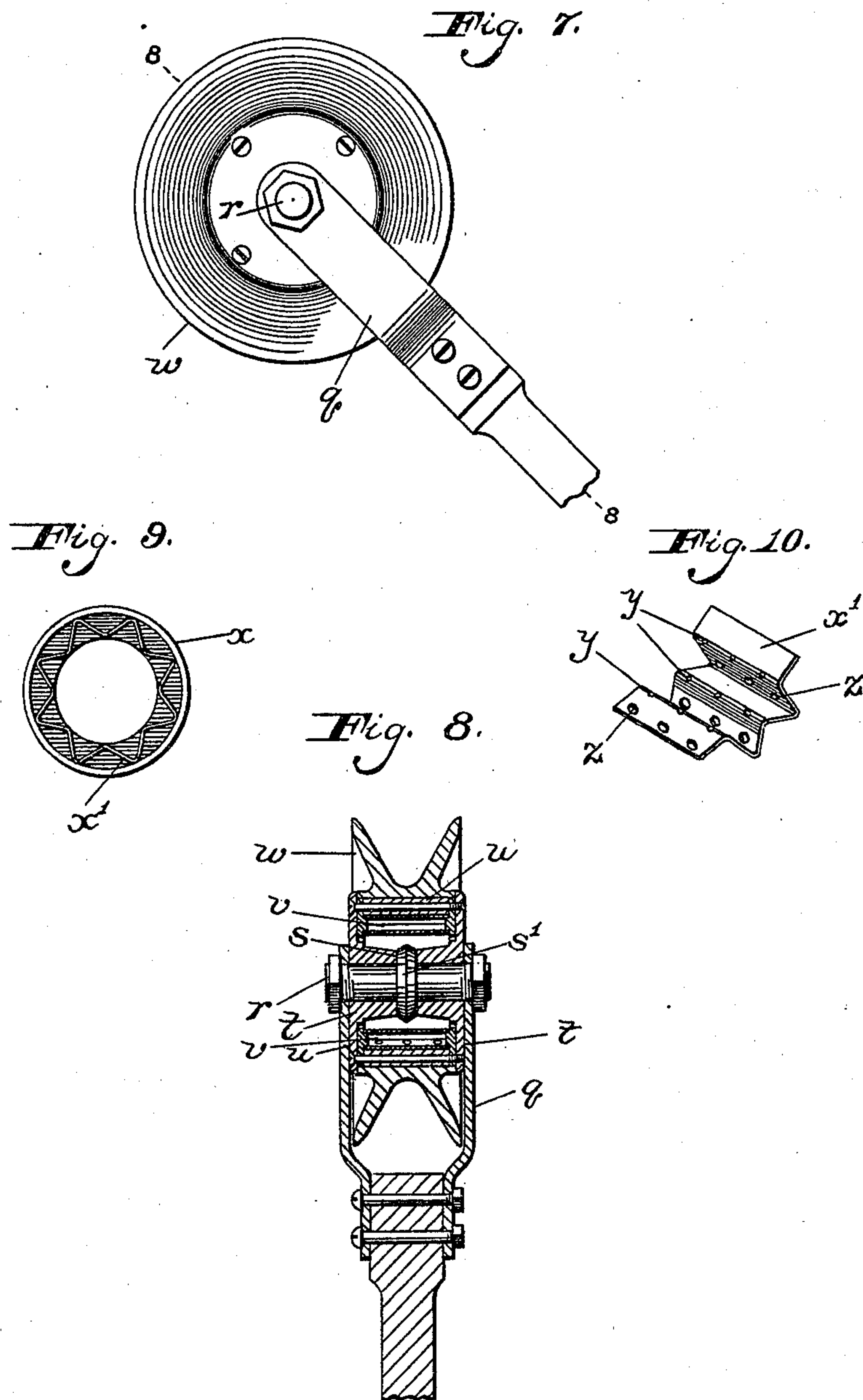
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(Application filed Apr. 27, 1901.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses:
H. F. Meyer, Jr.
F. S. Stitt.

Inventor:
George H. Spafford
By Chas B. Mann
Attorney.

UNITED STATES PATENT OFFICE.

GEORGE H. SPAFFORD, OF BALTIMORE, MARYLAND.

WHEEL.

SPECIFICATION forming part of Letters Patent No. 684,123, dated October 8, 1901.

Application filed April 27, 1901. Serial No. 57,701. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. SPAFFORD, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Wheels, of which the following is a specification.

This invention relates to means for lubricating the bearings of revoluble parts, such as vehicle-wheels, trolley-wheels, pulleys, and the like; and its object is to provide a wheel having improved lubricating devices which will hold a comparatively large amount of oil and will keep the bearing well lubricated at all times, which will be practically dirt and dust proof, and by which access may be had to the bearing without entirely removing the revoluble part.

The invention consists in certain constructions, arrangements, and combinations of the parts hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of the improved lubricating devices in combination with the axle and wheel of a vehicle, parts being broken away to show the interior of the wheel-hub. Fig. 2 is a transverse section of the same. Fig. 3 is an enlarged detail elevation of the hub oil-box and series of compartments or oil-receptacles carried thereby, several of the latter being removed to illustrate the short studs on which said compartments are rigidly held. Fig. 4 is a diametrical section of said oil-base with its compartments. Fig. 5 is a detail side view of the spindle-bearing collar, whose sides form bearings for the wheel-hub. Fig. 6 is an enlarged detail sectional view of one of the oil compartments or receptacles, illustrating the relative areas of the inlet and outlet openings for the oil. Fig. 7 is a side view of a trolley harp and wheel provided with the improved lubricating devices. Fig. 8 is a transverse section thereof on the line 8 8 of Fig. 7. Fig. 9 is a detail elevation of a slightly-modified form of oil-box. Fig. 10 is a detail perspective view of a portion of the fluted circular band that forms the oil-compartments in said modified form of oil-box.

Referring to the drawings, (Sheet 1,) the letter *a* designates a vehicle-axletree pro-

vided at each end with a rigid butting ring *b* and a rigid spindle *c*, screw-threaded, as at *c'*. The hub of the vehicle-wheel *d* is made in two side sections—an inner section *d'* and an outer section *d''*—rigidly but detachably connected together by screws *j* and mounted to rotate on the axle-spindle *c*, and a bearing-collar *e* is screwed on the threaded portion *c'* of said spindle and is interposed between the said two sections of the hub, whereby to form a side bearing for the latter. The periphery of the said bearing-collar is beveled from the center toward each side, as shown at *e'*, Fig. 2, and a set-screw *f* works in the collar and bears against the axle-spindle, whereby to prevent the collar from turning and jamming.

The inner section *d'* of the wheel-hub has the spokes *g* attached thereto and is provided on its interior with a circular chamber *h*, surrounding said bearing-collar *e*, and the outer hub-section *d''* is provided on its inner side with a socket *i*, which fits over and incloses the end of the axle-spindle *c*, whereby to exclude dirt and dust from the latter. The outer hub-section is detachably secured to the inner hub-section by means of the screws *j*, and the outer section is further provided with an oil-feed port, normally kept closed by a plug *k*, as shown in Figs. 1 and 2.

Within the chamber *h* of the wheel-hub is located an annular oil-box *l* (shown in detail in Fig. 3) and which is provided with a cylindrical rim *l'*, fitting snugly in the chamber, and also provided with an inwardly-extending inner side or flange *l''*, and said box is further provided with a removable cover *m*, (shown in Figs. 1 and 2,) which cover is held tightly on the box-rim *l'* by means of screws intended to screw into openings *m''* on the rim. The said cover *m* is provided with an oil-feed port *m'* in registry with the oil-feed port of the outer hub-section *d''*.

Both the inner side *l''* and the cover *m* of the oil-box are provided on their opposing sides with corresponding series of short studs *n*, and between each stud of one series and the corresponding stud of the opposite series is rigidly held an oil compartment or receptacle *o*. The studs extend a short distance into the ends of the oil-compartments to hold the latter. These oil-compartments are in

this instance rectangular in shape and are held spaced a short distance from each other and each with one corner or angle abutting against the inner side of the rim l' or circumference of the box and with the opposite corner or angle extending toward the center of the box and of course also toward the bearing-collar e . Each oil-compartment is provided with a set of oil-inlet apertures p in proximity to the box-rim l' and a set of oil-outlet apertures p' , which latter are formed in that corner or angle of each compartment nearest the center of the box, and the areas of the oil-inlets p are relatively larger than the areas of the oil-outlets p' , so that the oil will flow into the compartments faster than it will flow out.

In practical operation a quantity of oil is fed through the feed-ports of the outer hub-section and box-cover m into the oil-box l until the latter is comparatively well filled, and said ports are then closed by the plug k . The oil will of course fill the oil-compartments o of said box, and whenever the wheel comes to a standstill it is obvious that the oil in those compartments that at that time happen to be above the bearing-collar e will drip out of the oil-outlets p' down upon the said bearing-collar and will be directed by the oppositely-beveled periphery of the latter toward the two sides of the collar and will thence work onto the spindle c , and the said oil will also, seeking its level, flow down the inner side of the box-rim l' and drop between the compartments o and will thence flow through the inlets p into those oil-compartments that at that time happen to be below the bearing-collar, so that such compartments will be kept full of oil. It should be noted that the oil-compartments will fill much faster than they will empty, because the areas of the oil-inlets p are relatively greater than the oil-outlets p' , and it should also be noted that the only point at which the oil can leak or escape from the wheel-hub is at the butting ring b , so that the supply of oil will last a considerable time.

To gain access to the lubricating devices on the interior of the hub, it is not necessary to "jack" the wheel up and remove it from the axle; but it is only necessary to remove the outer hub-section d^2 and the box-cover m , which will expose the interior of the oil-box, as indicated by the broken-away parts in Fig. 1.

This invention is not limited to a vehicle-wheel. For instance, Figs. 7 and 8 illustrate the lubricating devices embodied in a trolley-wheel, to whose harp q is secured a rigid spindle r , provided with a preferably integral bearing-collar s , whose periphery is oppositely beveled, as shown at s' , Fig. 8. Two hub-sections t are mounted to rotate on said spindle, one on each side of said bearing-collar. An oil-box u is rigidly held between said hub-sections and is provided with an annular series of oil-compartments v , similar

in construction and arrangement to the oil-compartments o , heretofore described in connection with the vehicle-wheel d , and a grooved rim w to receive the trolley-wire is also rigidly held between said hub-sections.

Figs. 9 and 10 illustrate a slightly-modified form of oil-box x , in which the oil-compartments are formed by a band x' of metal bent or otherwise formed into fluted shape, with inwardly-extending angles and outwardly-extending angles, and also provided with two sets of apertures y z , as shown in Fig. 10, for the ingress and egress of the oil, one set of apertures, y , being located at the inwardly-extending angles of the band and being relatively small and the other set, z , being located near the outer angles of the band and being relatively large, whereby the oil in the box x may flow through said latter apertures into the various compartments faster than it will flow out of the same through the small apertures y .

It is evident that various changes may be made in the details of construction and arrangement of the parts hereinbefore described without departing from the scope of the invention as defined in the appended claims.

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

1. The combination with an axle or shaft provided with a bearing-collar, of a wheel mounted thereon and provided in its hub with a chamber surrounding said bearing-collar; and an oil-box secured within said hub and provided at its circumference with a series of oil-compartments surrounding said bearing-collar and each compartment having a single or continuous oil-chamber extending from one side of the bearing-collar to the other side and provided with an oil-inlet near the circumference of the oil-box, and an oil-outlet at its inner portion of relatively less area than the said oil-inlet.

2. The combination with an axle or shaft, and a wheel mounted thereon, of a fluted annular band, x' , secured within the hub of said wheel, and forming between every two of its outwardly-extending or circumferential angles an oil-compartment, each oil-compartment being provided with oil-inlets, z , and oil-outlets, y , as set forth.

3. The combination with an axle or shaft and a wheel mounted thereon, of an annular oil-box, x , secured within the hub of said wheel and having a fluted band, x' , with outwardly-extending angles in contact with the circumferential wall of the said box and also inwardly-extending angles, whereby to form an oil-compartment between every two outwardly-extending angles, and said band also provided with an oil-inlet aperture opening into each compartment near the said circumferential wall and provided at each of its inwardly-extending angles with an oil-outlet aperture relatively smaller than the said oil-inlet aperture, as set forth.

4. The combination with an axle or shaft,
of a wheel mounted thereon; and an oil-box
secured within the hub of said wheel and pro-
vided with an annular series of oil-compart-
5 ments each of which has a single chamber ex-
tending from the wall at one side of the hub
to the wall at the other side and is provided
with an oil-inlet near the circumference of
the oil-box and an oil-outlet at its inner por-

tion of relatively less area than the said oil-
inlet.

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

GEORGE H. SPAFFORD.

Witnesses:

F. S. STITT,
CHARLES L. VIETSCH.