

(No Model.)

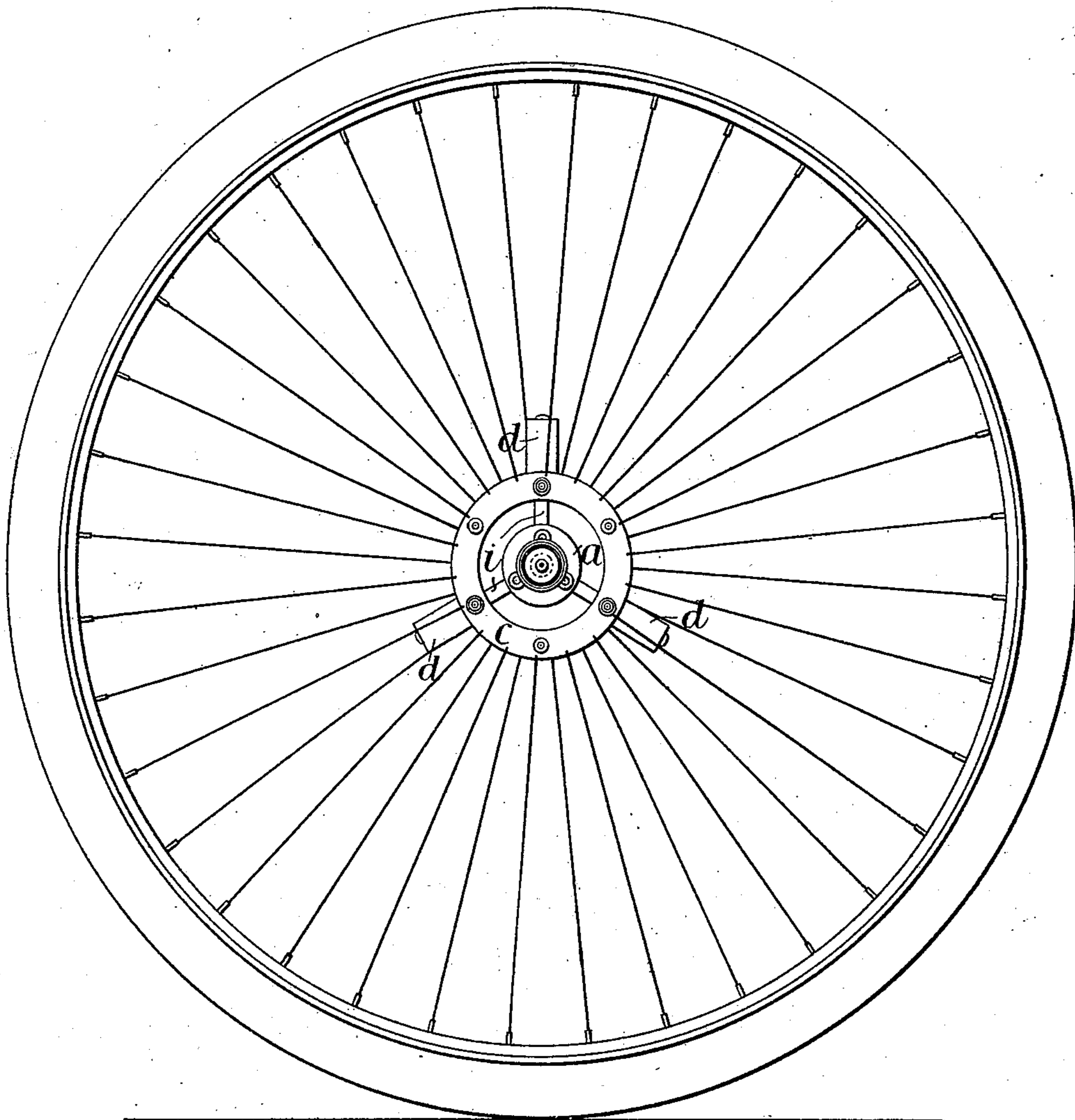
5 Sheets—Sheet 1.

J. BUCHANAN.
SPRING WHEEL.

No. 549,181.

Patented Nov. 5, 1895.

Fig. 1.



Witnesses.

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Fig. 4.

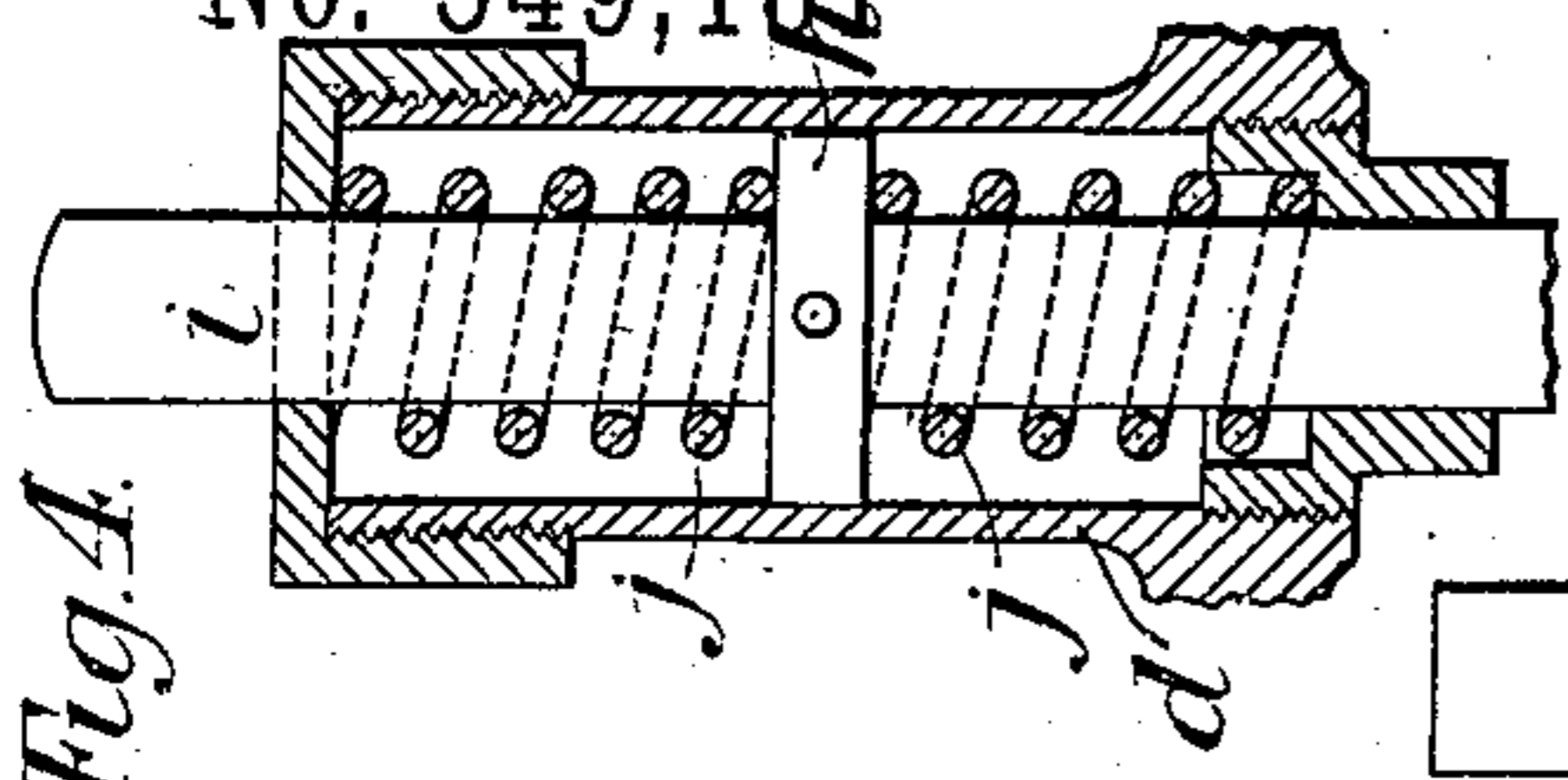


Fig. 3.

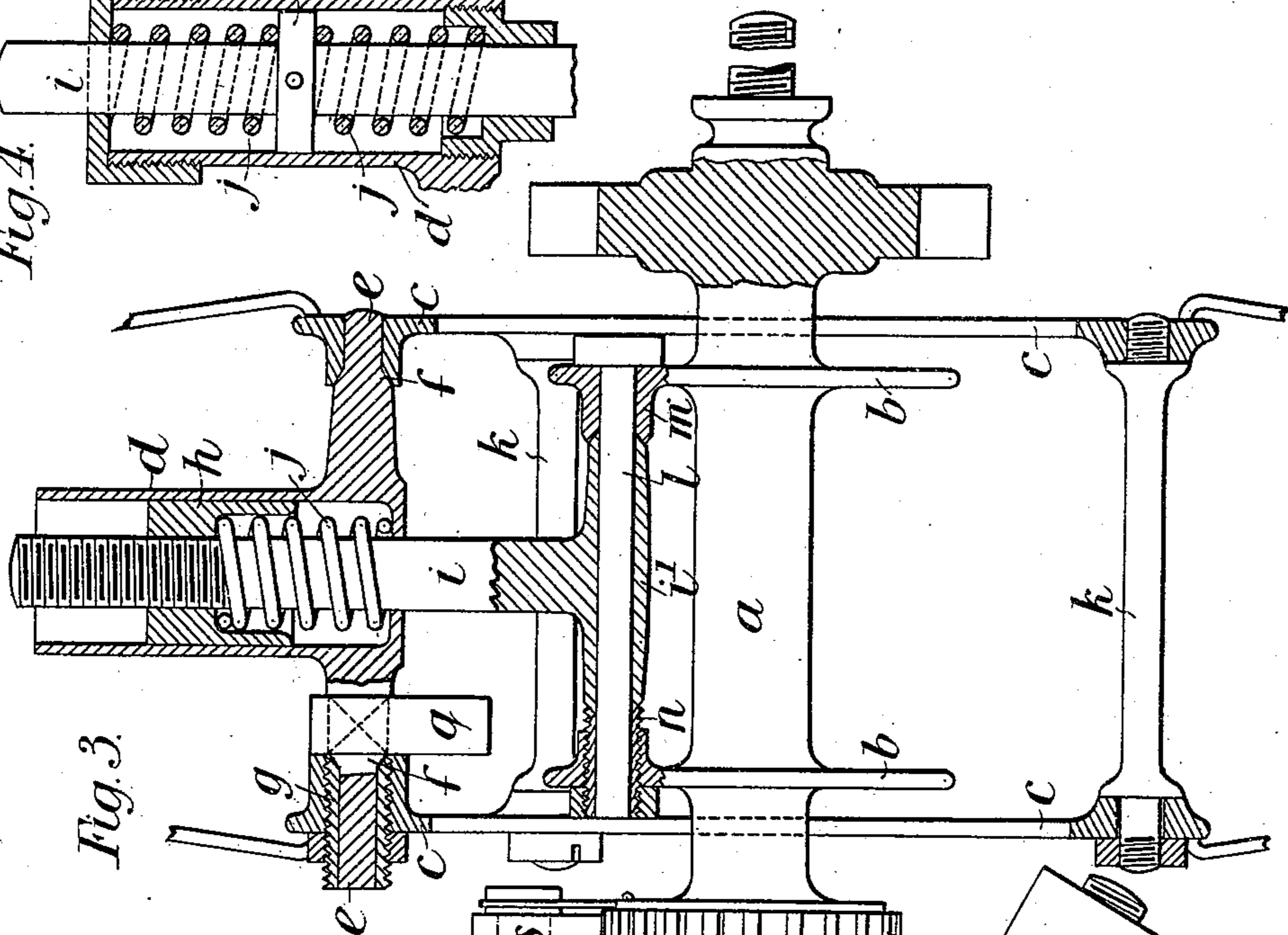
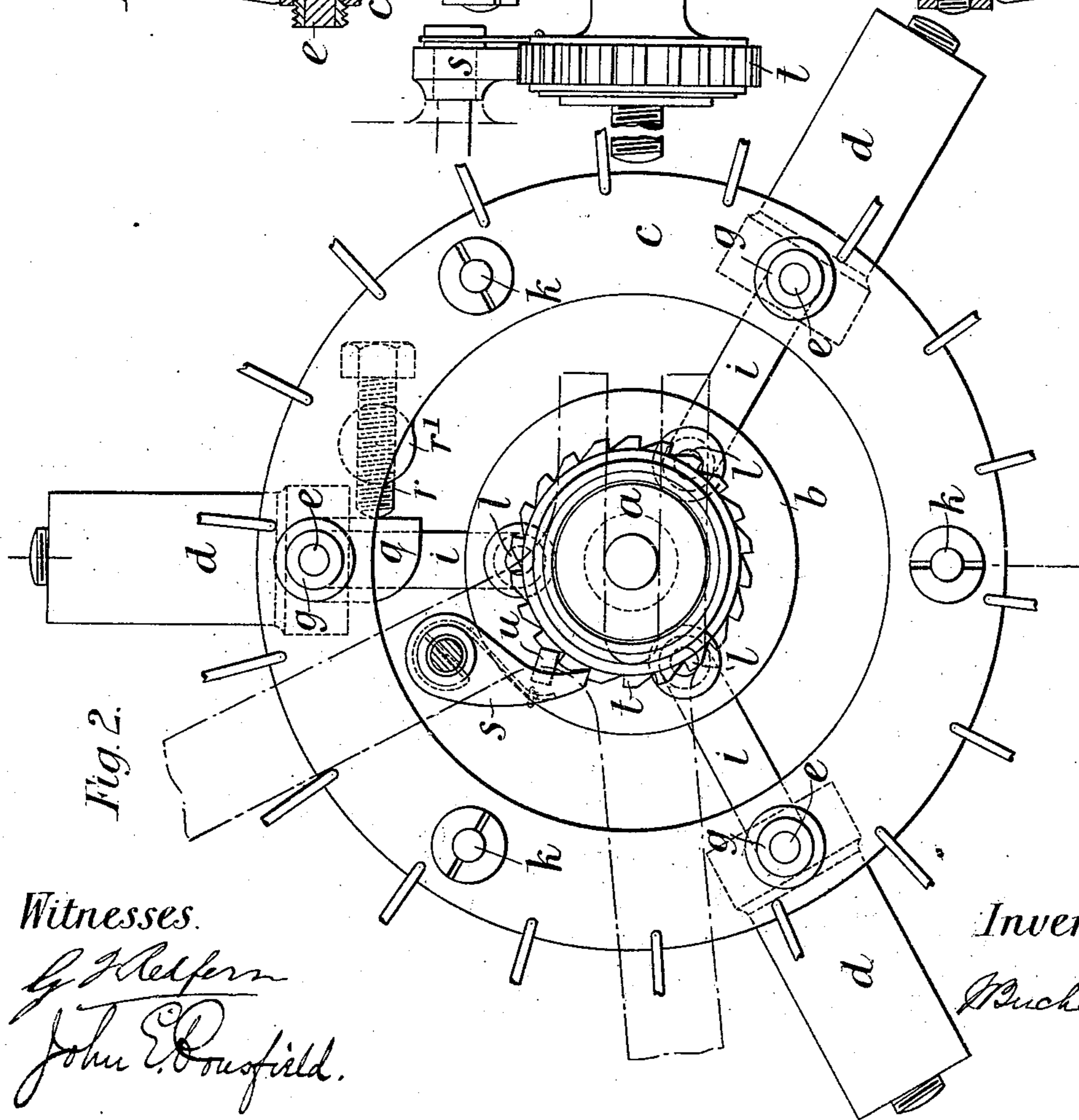


Fig. 2.



Witnesses.

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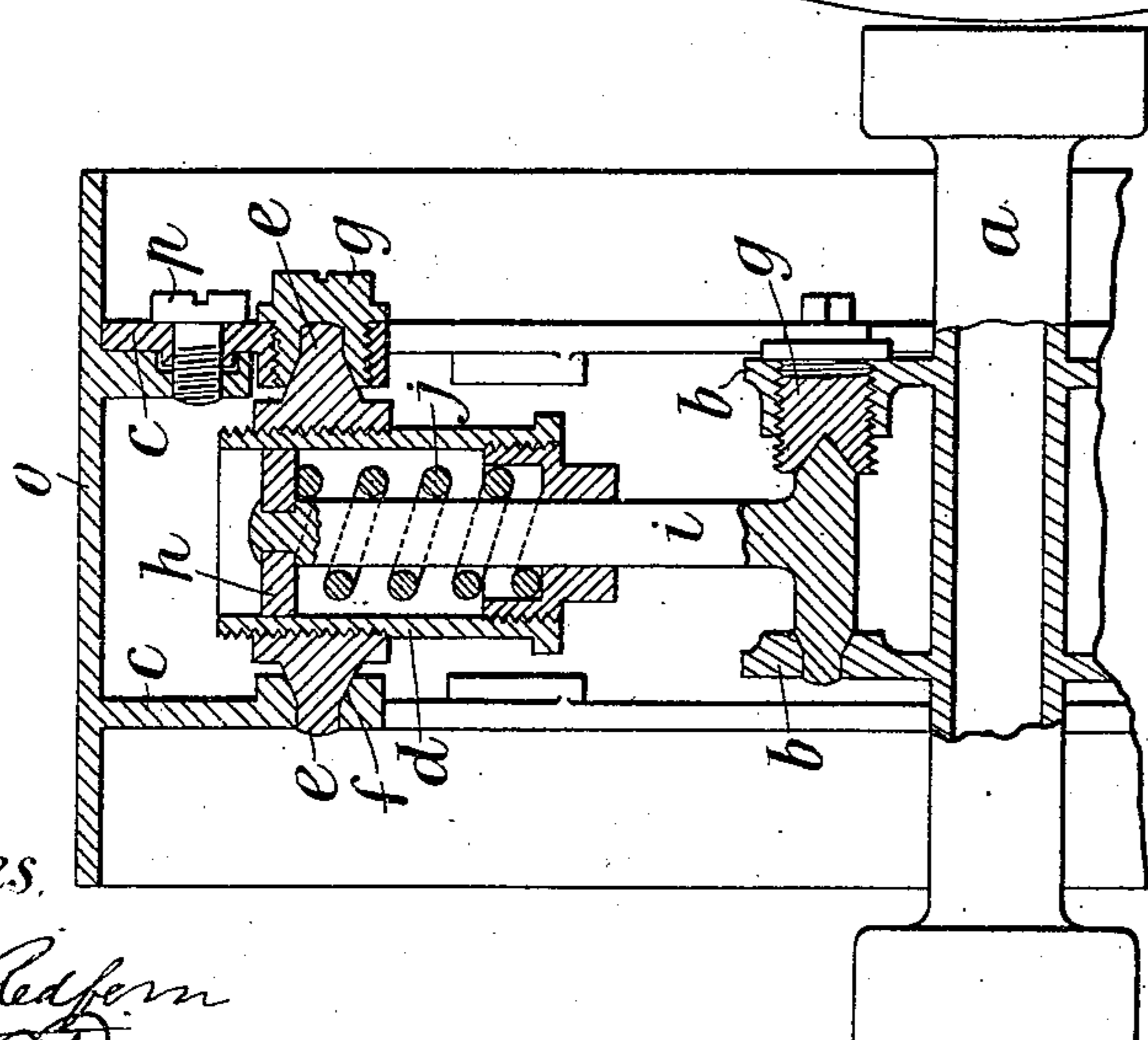
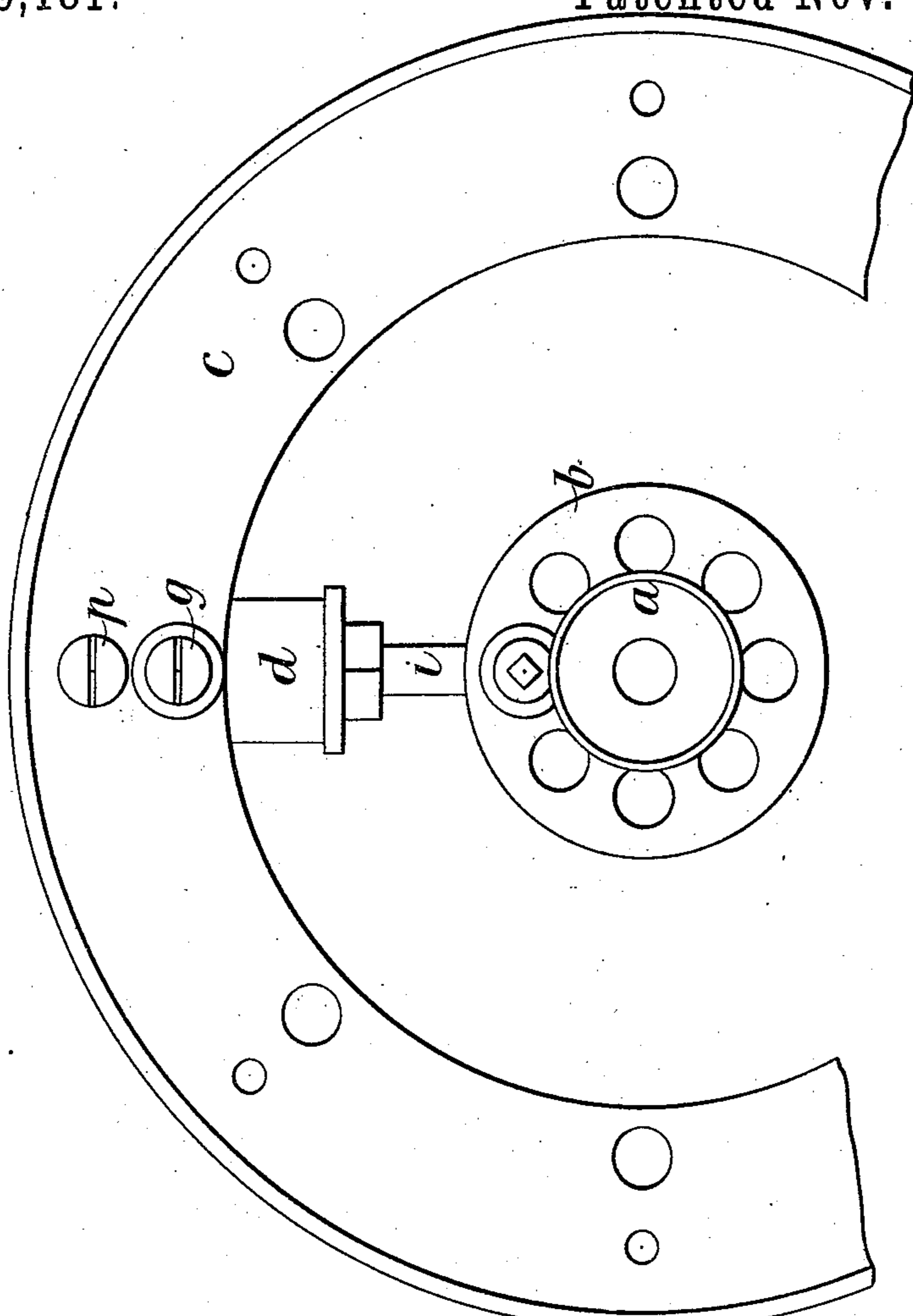
(No Model.)

3 Sheets—Sheet 3.

J. BUCHANAN.
SPRING WHEEL.

No. 549,181.

Patented Nov. 5, 1895.



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UNITED STATES PATENT OFFICE.

JOSEPH BUCHANAN, OF LONDON, ENGLAND.

SPRING-WHEEL.

SPECIFICATION forming part of Letters Patent No. 549,181, dated November 5, 1895.

Application filed February 18, 1895. Serial No. 538,740. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH BUCHANAN, a subject of the Queen of Great Britain, residing at London, England, have invented new and useful Improvements in Spring Wheels or Pulleys, of which the following is a specification.

This invention relates to an improved wheel for cycles and other vehicles; and it consists in the novel arrangement of springs between the wheel-rim and the hub, as hereinafter described.

According to my invention I make use of a series of boxes or drums, which are swiveled or pivoted between rings or flanges on the outer part of the wheel. In these boxes or drums are arranged spring-pistons, the rods of which are pivoted between flanges on the hub in such a manner that the said springs will allow of the hub moving relatively with the other parts of the wheel.

To enable my invention to be fully understood, I will describe the same by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of a wheel constructed according to my invention. Fig. 2 is a similar view of the central part of the wheel, drawn to a larger scale; and Fig. 3 is a central vertical section of the same. Fig. 4 is a sectional view illustrating a modified arrangement of springs. Figs. 5 and 6 are respectively a sectional side elevation and a vertical section illustrating a modification of the invention.

Similar letters of reference indicate corresponding parts in the several figures.

a is the wheel-hub, which is formed with two flanges *b b*, and *c c* are the rings upon the outer part of the wheel.

d d are my drums or boxes, which drums or boxes are provided with trunnions *e e*. In practice I prefer to make the journals of the trunnions with conical shoulders *f*, fitting into corresponding bearings, and in order to permit of taking up the wear I make the bearing of one trunnion in a bush or socket *g*, which is screwed into one of the rings, so as to be adjustable therein, as shown in Fig. 3.

h is the piston with which each of the boxes or drums is provided, and *i* is the rod connected thereto.

j is the spring surrounding the rod and arranged between the piston and the end of the drum, the said rod being pivoted between the flanges *b b* of the hub.

In the arrangement of my invention shown in Figs. 2 and 3 the rings *c c*, carrying the pivoted boxes or drums *d*, are held in their proper relative positions by means of distance tie-rods *k k*, and the said boxes or drums are provided with solid inner ends. To permit of introducing the springs into the said boxes, the pistons are adapted to be screwed onto the rods *i* through the open ends of the boxes or drums, this arrangement of the pistons also permitting of adjusting the pressure of the springs within the boxes *d d*. The rods *i i* are connected to the hub *a* by means of pins *l l*, passed through the flanges of the hub and through the bearing part or cross-head *i'* of the rod *i*, which part is elongated, and in order to compensate for wear each end of the part *i'* is coned, and one works against a boss *m* on one flange and the other end against a screw-bush *n*, inserted through a boss on the other flange, as shown in Fig. 3.

Instead of using a single spring in each box, as hereinbefore described, I may employ two springs, as shown in Fig. 4. With this modification the cylinder is provided with movable ends, the springs being arranged one on each side of the piston *h*.

In the modification of my invention shown in Figs. 5 and 6 the rings *c c*, instead of being connected by rods *k k*, are arranged as follows—that is to say, one of them is cast in one piece with a drum *o*, to which the spokes are connected, and the other is made detachable and secured to lugs upon the inner side of the drum by means of screws *p*. The pistons *h h* are also fixed to the rods *i i*, and the springs *j j* are adjusted in the boxes or drums *d d* by making one end of the boxes adjustable. Furthermore, the said pistons, instead of being connected to the flanges of the hub *a* by means of pins, are provided with trunnions carried in the said flanges in the same manner as the trunnions of the boxes or drums.

It will be readily understood that a wheel constructed as hereinbefore described will possess considerable lateral rigidity by reason

of the distance apart of the bearings of the pivoted boxes or drums and of the connections between the pistons and the hub.

In order to provide for more or less altering the compression of all the springs simultaneously, I advantageously fix to the trunnion of one of the boxes or drums *d d* an arm *q*, against which a set-screw *r*, working in a stud or boss *r'*, fixed to one of the rings *c c*, acts in such a manner that by screwing up the said screw the rod *i i* in the box or drum to which the arm is connected, and consequently the other arms *i i*, connected with the rings *c c*, will be moved to a position more or less tangential to the axis of the hub.

In a spring-wheel of the kind described it will be obvious that the power being transmitted through the hub to the outer part of the wheel will, when the machine is being driven, cause the hub to be somewhat in advance of the outer portion of the wheel. In order that when the driving-cranks are in the most ineffective position for driving—that is to say, when they are practically on their dead-centers—the reaction of the springs in the boxes or drums *d d* shall not tend to move the said hub in a rearward direction, I provide on some part of the framing of the machine a spring-pawl *s*, and on the hub of the driving-wheel I place a ratchet-wheel *t*, with which the said pawl is designed to engage in such a manner that while allowing of the rotation of the hub to drive the machine forward it will prevent any backward movement of the said hub, so that any reaction of the springs which may take place when the cranks are on their dead-centers will serve to propel the outer part of the wheel forward instead of giving a backward movement to the hub.

To prevent any noise which might be caused during the running of the machine, owing to the movement of the ratchet-wheel with the pawl *i*, I provide on the under side of the latter a buffer *u*, of india-rubber or other suitable material, bearing upon the ratchet-wheel and of such dimensions that the free end of the pawl is just out of contact with the said wheel.

Although I have shown my invention as applied to a wheel for velocipedes and other vehicles, it is to be understood that it may also be used as a pulley for receiving or transmitting power, the form shown in Figs. 5 and 6 being especially adapted for this purpose. It is also to be understood that although in the foregoing specification I have described

the boxes or drums *d d*, containing the springs *j j*, as being pivoted to the outer part of the wheel and the rods *i i* connected to the hub *a* this arrangement may be reversed—that is to say, the boxes or drums may be carried between flanges on the hub and the rods *i i* connected to the outer portion of the wheel.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. The combination with the hub, of a spring wheel of yielding devices interposed between the hub and the main body of the wheel, a ratchet wheel connected to said hub and a pawl connected with a stationary part and engaging said ratchet, whereby the yielding of the wheel with respect to the hub produces the rotation of the hub, substantially as described.

2. The combination with the hub of a spring wheel, of a series of spring cushioning devices interposed between the hub and the main body of the wheel, and means for simultaneously adjusting the tension of all of said cushioning devices, substantially as described.

3. The combination with the hub of a spring wheel, of a series of spring cushioning devices interposed between the hub and the main body of the wheel, independent adjusting devices for each cushioning device, and means for adjusting the tension of all of said cushioning devices, simultaneously, substantially as described.

4. The combination with the hub of a spring wheel, of spring pistons pivotally connected thereto and engaging cylinders pivotally connected with the main body of the wheel, a lug secured to one of said cylinders and an adjusting screw engaging said lug for adjusting the tension of all of the spring pistons simultaneously, substantially as described.

5. The combination with the hub of a spring wheel, provided with a ratchet wheel, of a series of spring pistons pivotally secured to said hub, and a series of cylinders pivotally secured to the main body of the wheel and engaging said pistons, and a pawl secured to a stationary part and engaging said ratchet, substantially as described.

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Witnesses:

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