

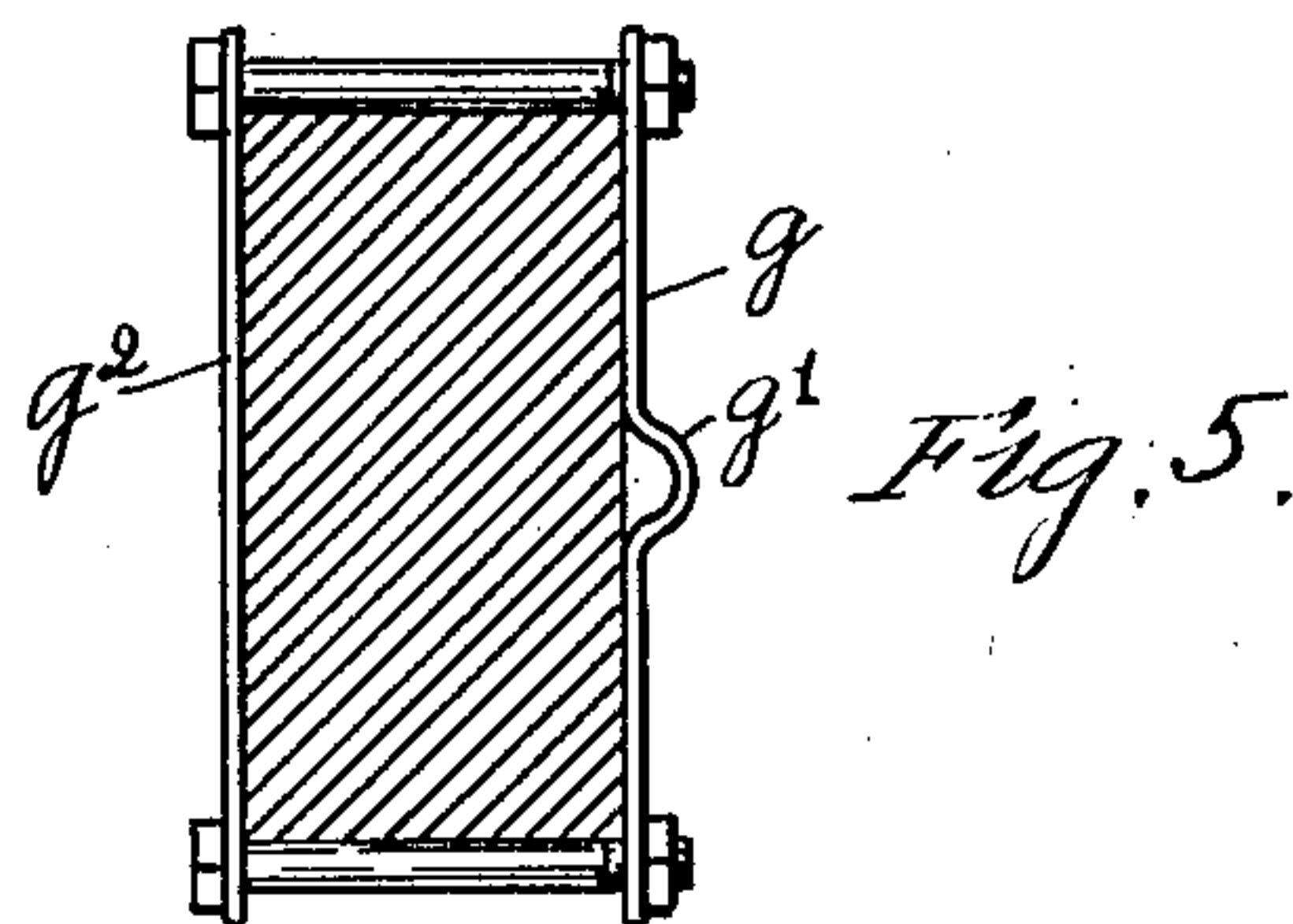
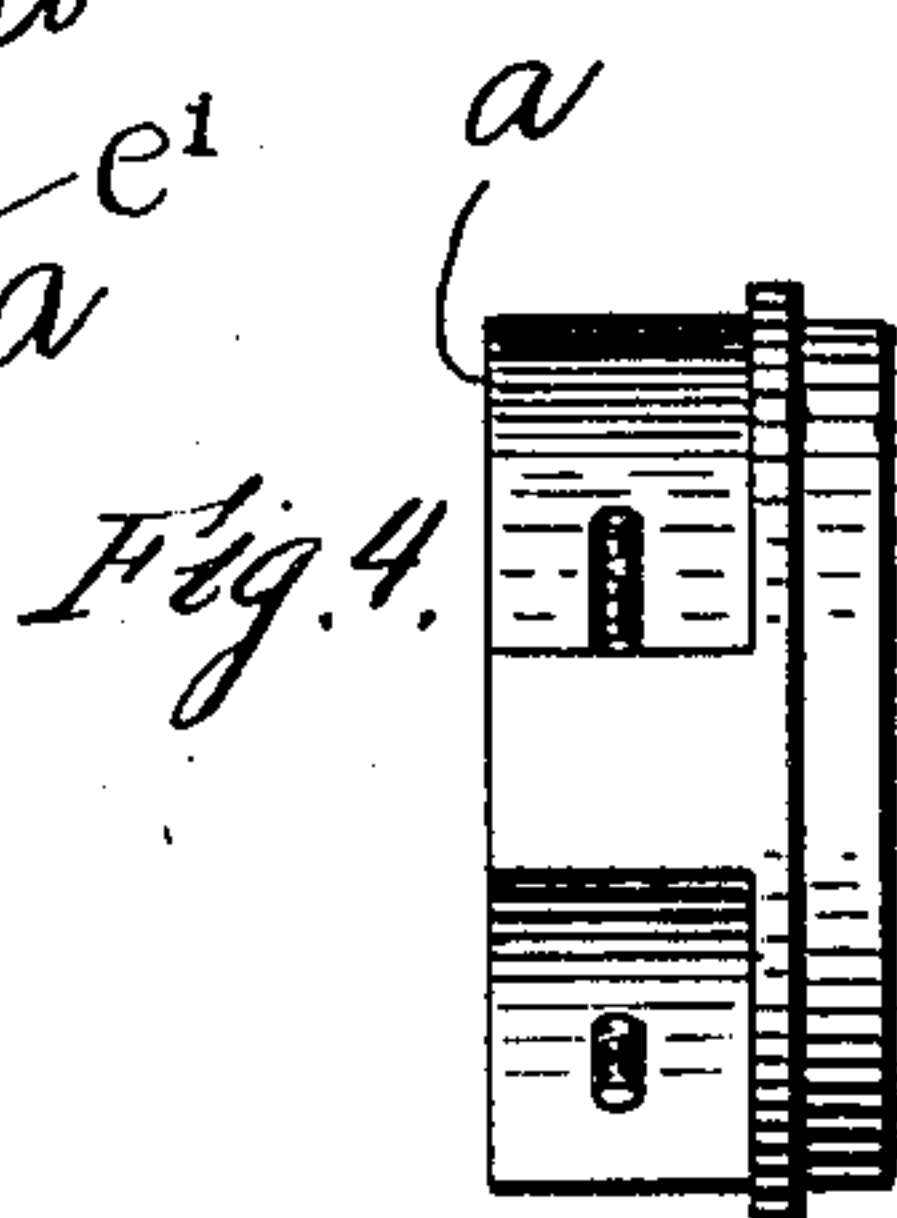
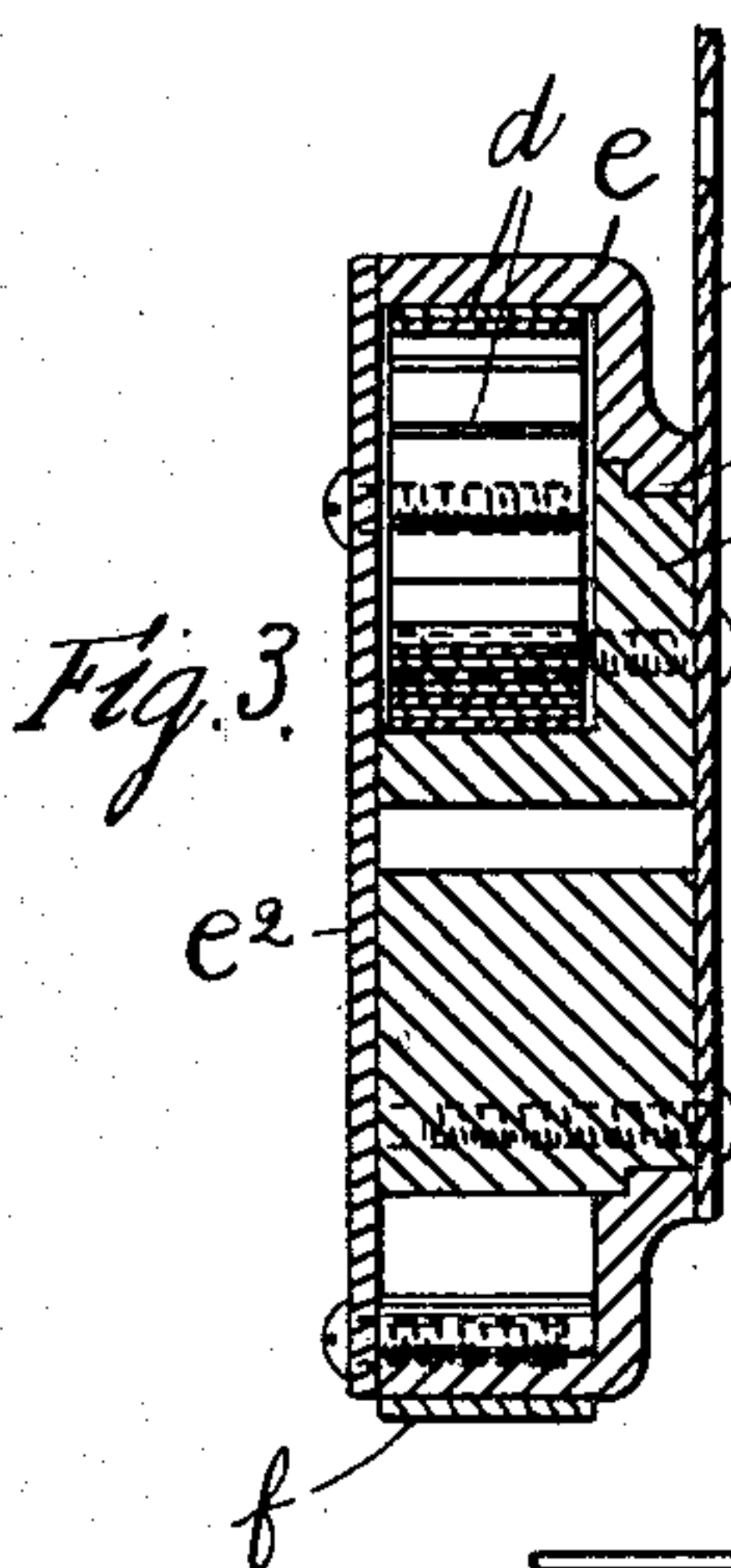
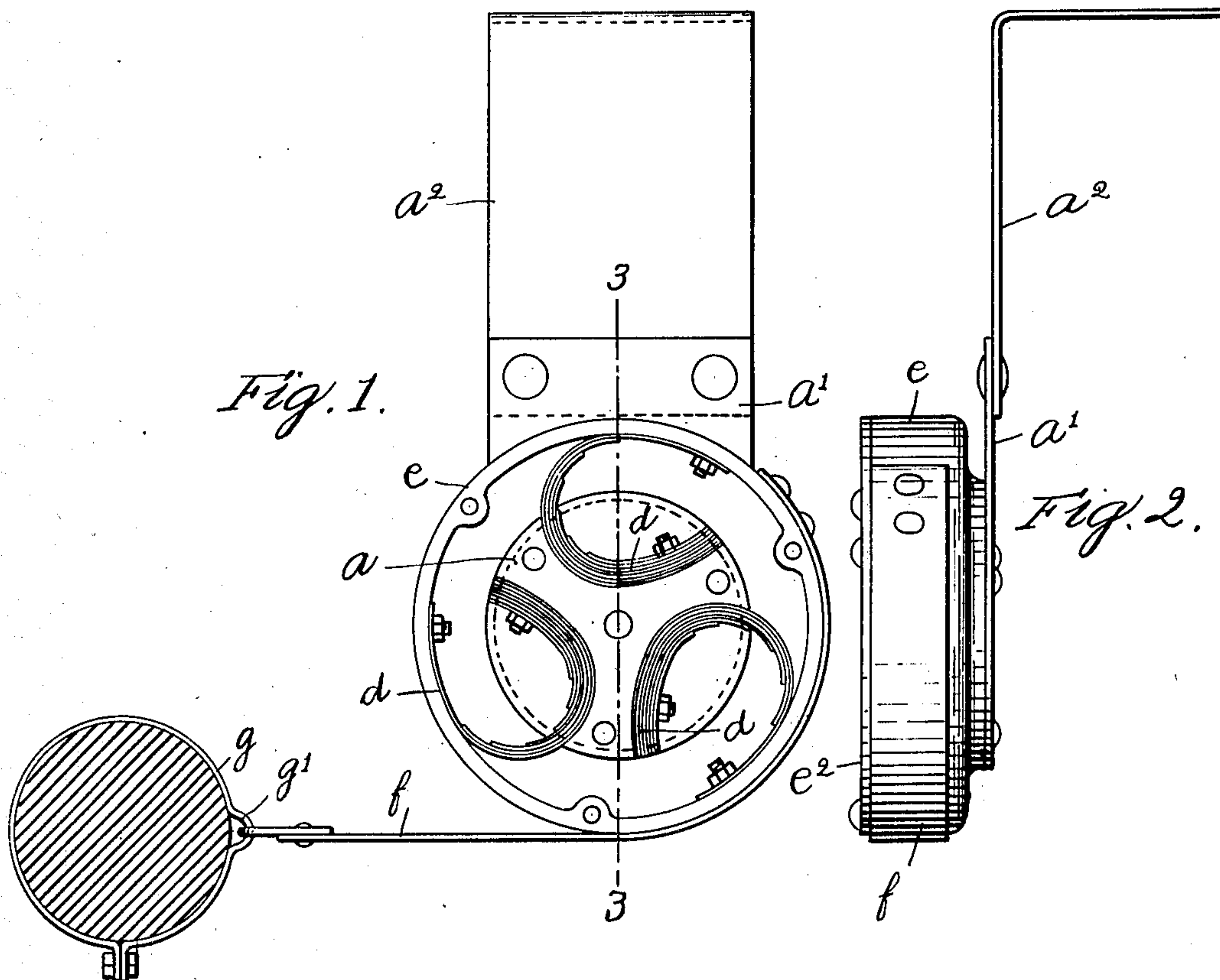
No. 871,631.

PATENTED NOV. 19, 1907.

D. ROBINSON.
SHOCK ABSORBER FOR VEHICLES.

APPLICATION FILED APR. 15, 1907.

2 SHEETS—SHEET 1.



Witnesses:
H. B. Davis.
Cynthia Doyle.

Fig. 6.

Inventor:
Duncan Robinson
by Hayes & Hariman
Attys

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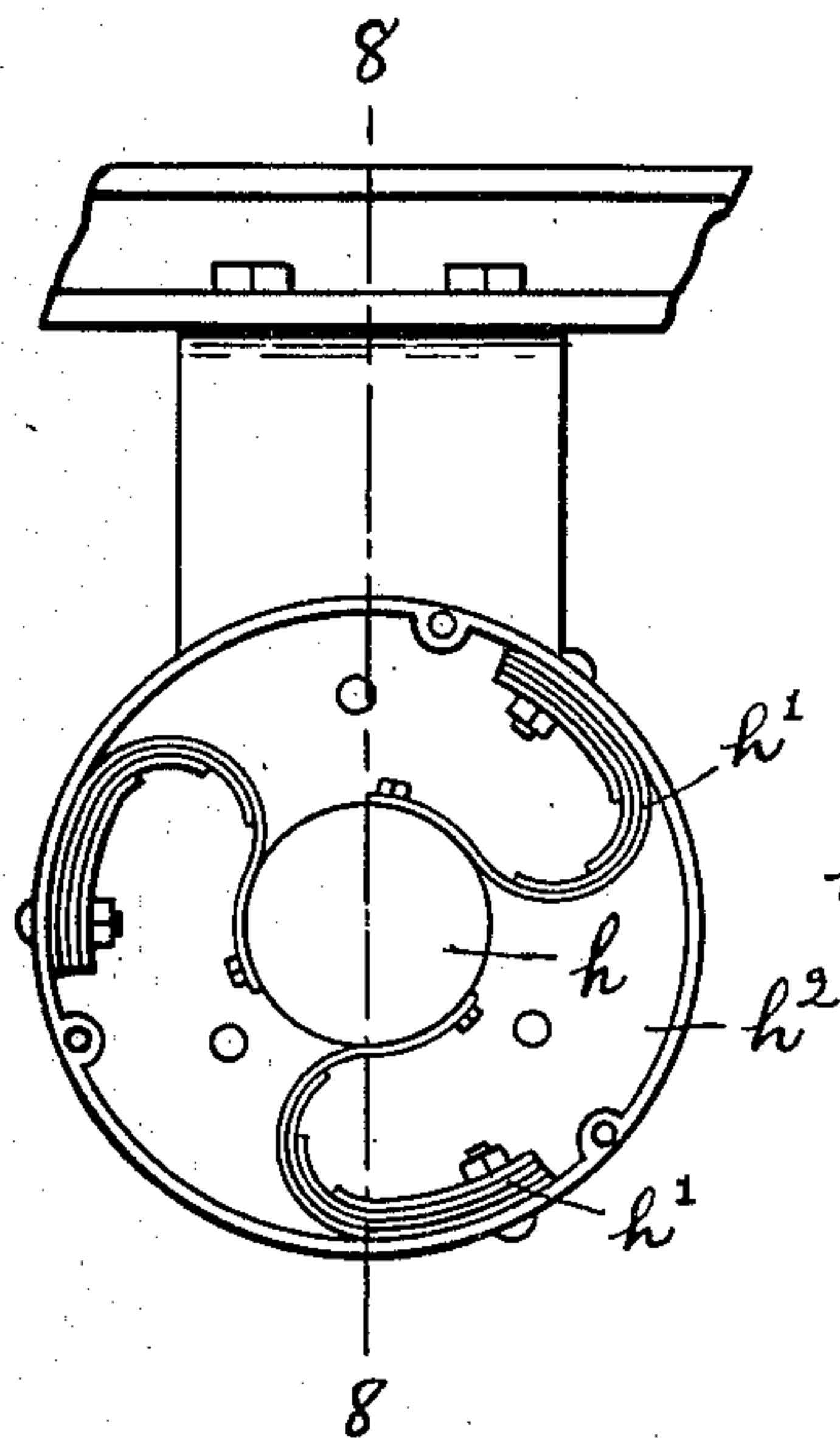


Fig. 7.

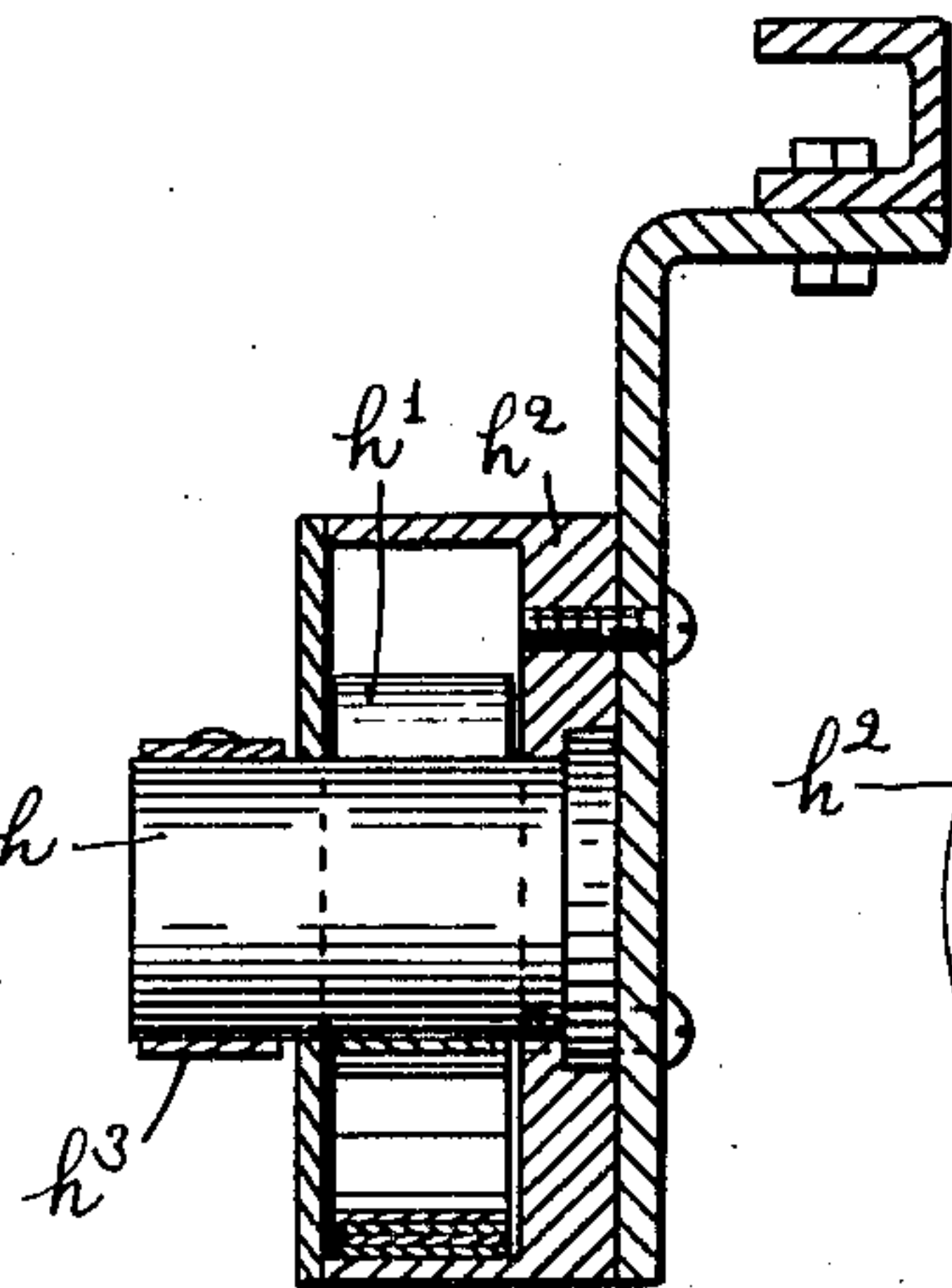


Fig. 8.

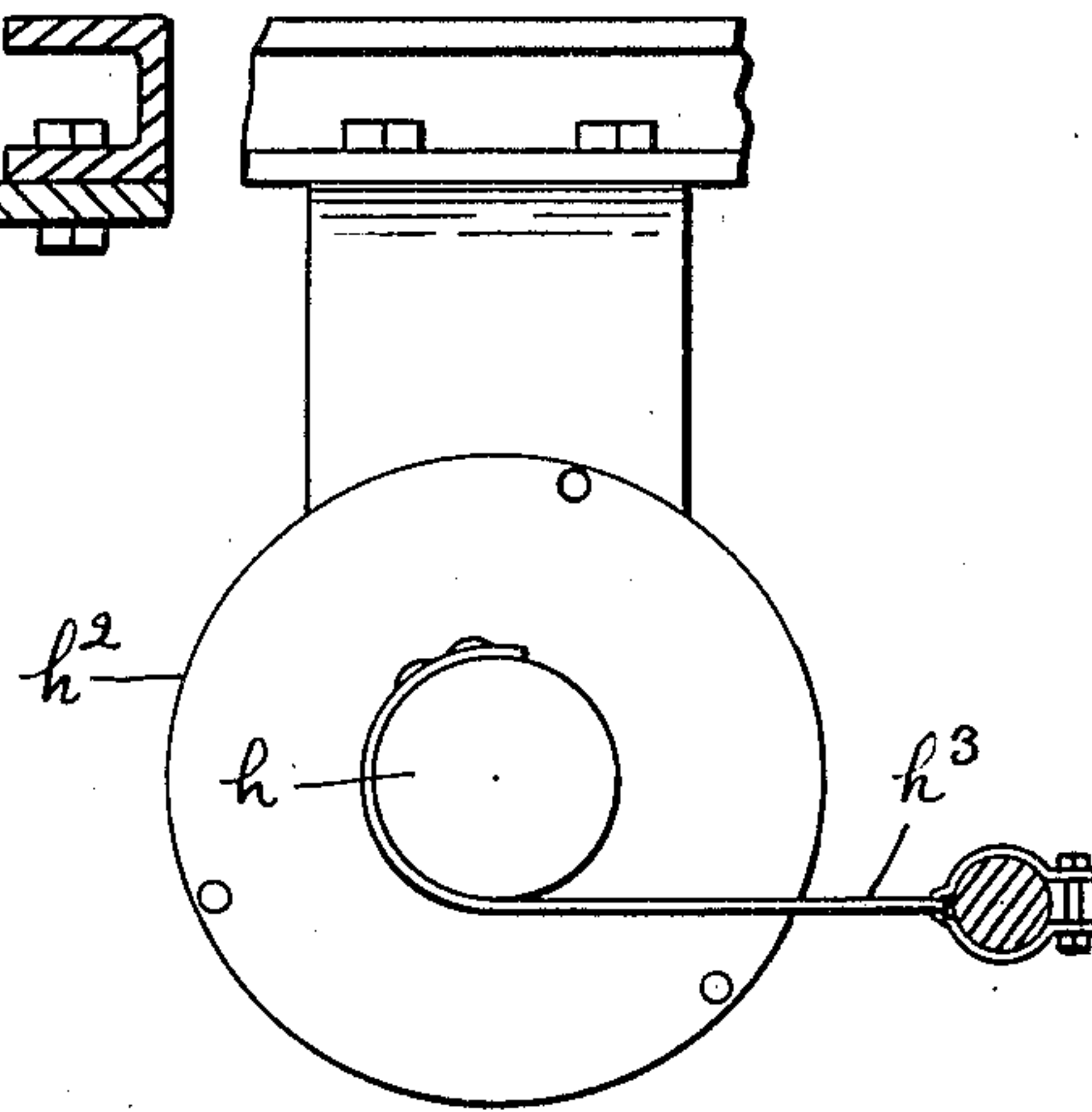


Fig. 9.

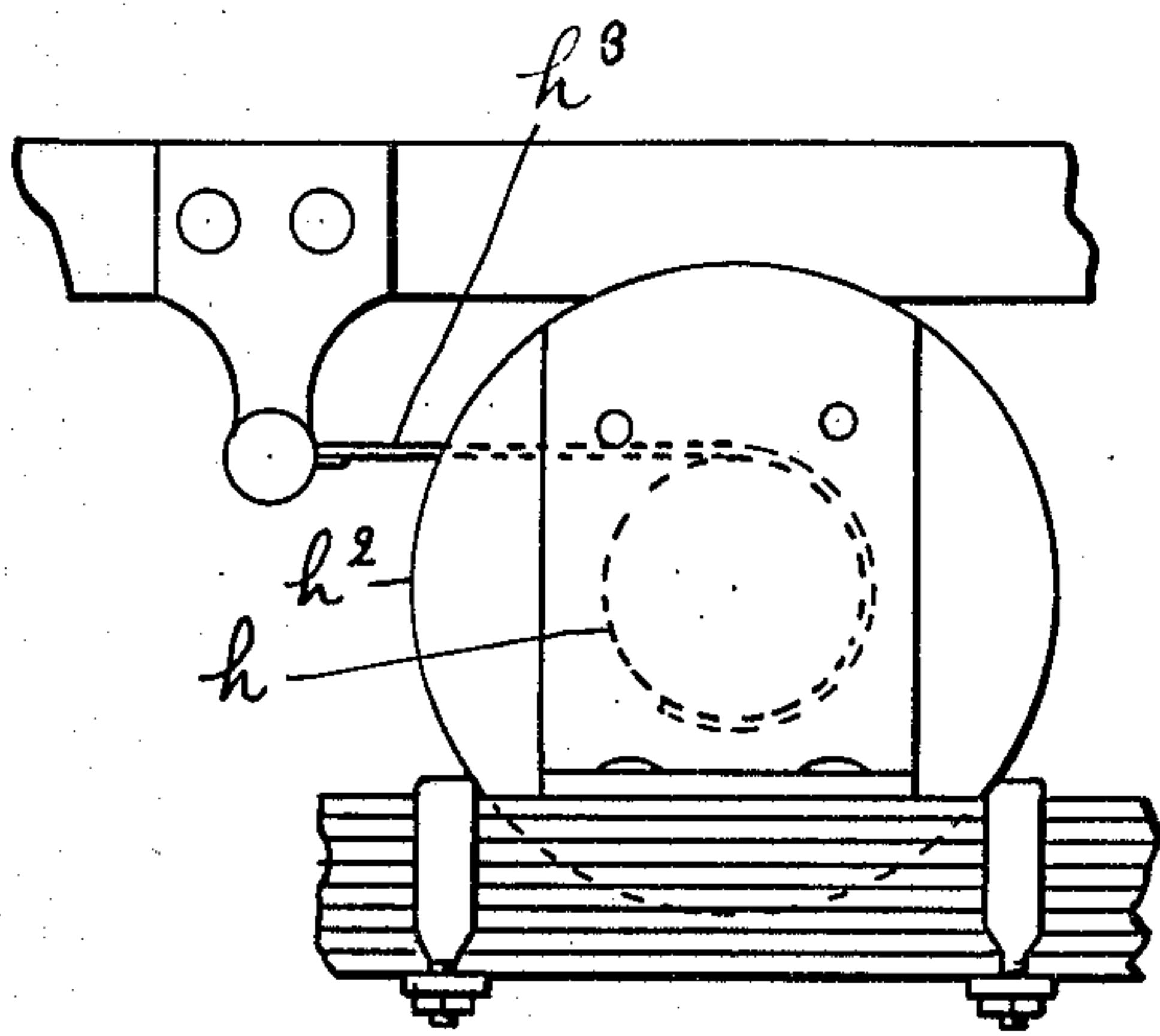


Fig. 10.

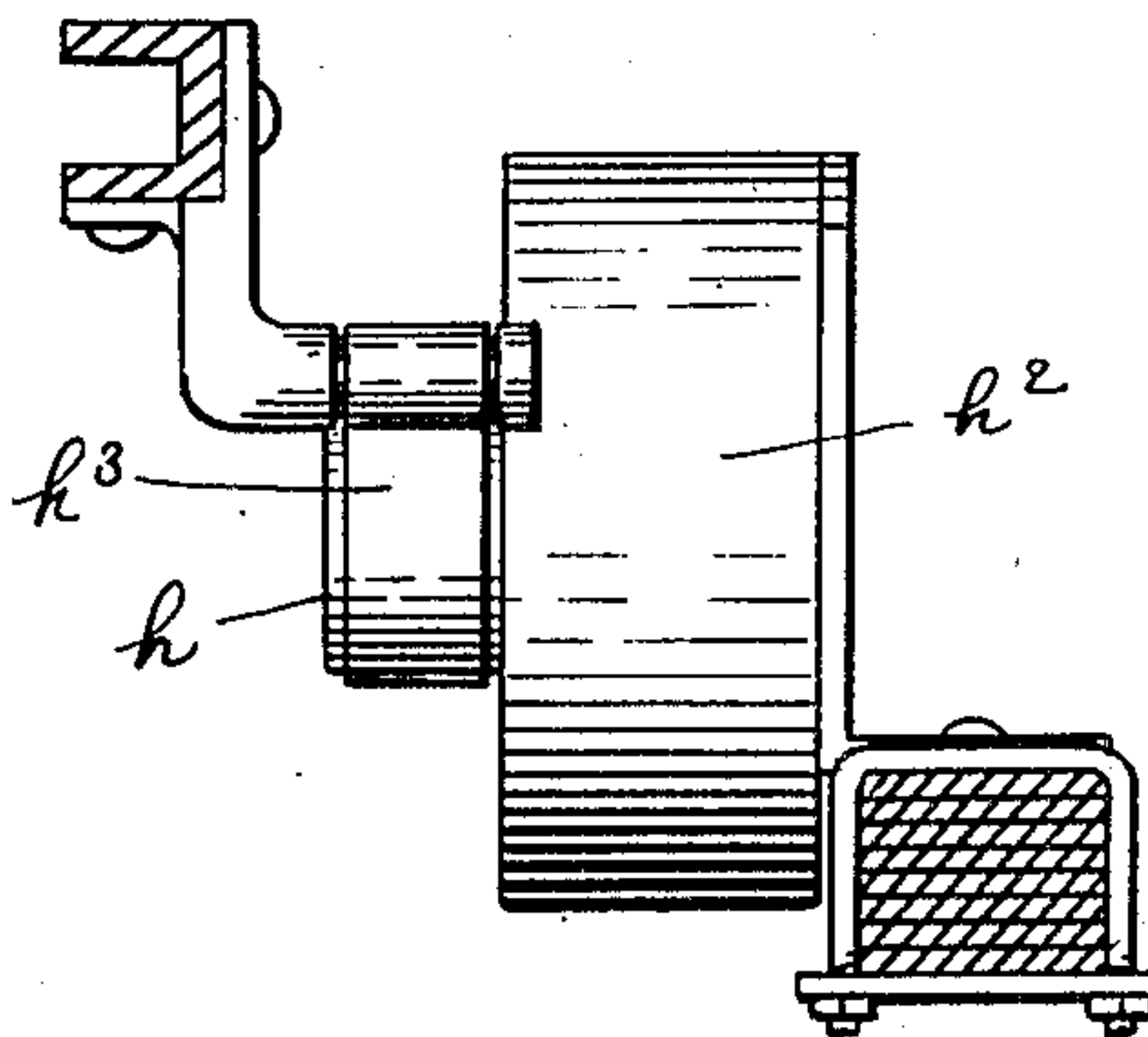


Fig. 11.

Witnesses:

H. B. Davis.
Cynthia Doyle.

Inventor:

Duncan Robinson
by Hayes & Harmon
Attys

UNITED STATES PATENT OFFICE.

DUNCAN ROBINSON, OF BROOKLINE, MASSACHUSETTS.

SHOCK-ABSORBER FOR VEHICLES.

No. 871,631.

Specification of Letters Patent.

Patented Nov. 19, 1907.

Application filed April 15, 1907. Serial No. 368,233.

To all whom it may concern:

Be it known that I, DUNCAN ROBINSON, of Brookline, county of Norfolk, State of Massachusetts, have invented an Improvement in Shock-Absorbers for Vehicles, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

10 This invention relates to shock absorbers for vehicles and is intended as an improvement upon the shock absorber shown in my application for Letters Patent #347,458, filed December 12, 1906. In my said application the shock absorber, broadly speaking, comprises a circularly movable spring controlled ring or member, and means, operated by both the up and down movements of the vehicle body, relative to its running gear, for turning said ring or member in the same direction, from its normal position, against the action of its controlling-springs, to thereby resist both the up and down movements of said body.

25 In accordance with my present invention a circularly movable spring controlled member or ring is likewise employed, which is turned in the same direction from its normal position against the action of its controlling springs upon both the up and down movements of the vehicle body relative to the running gear, but the construction of the shock absorber is simplified, and the parts thereof re-arranged, whereby all the results accomplished by my previous device and more are obtained.

My present invention consists essentially in a re-arrangement of the parts whereby a single strap may be connected with the circularly movable member, for turning it against the action of its controlling-springs, upon both the up and down movements of the vehicle body relative to the running gear, also in simplifying the construction of the device.

45 In the preferred form of my present invention the circularly movable spring controlled member is supported upon or by the vehicle body and is, therefore, moved bodily by it up and down, relative to the running gear, and a strap is attached to said member, which is connected with the axle or other part of the running gear, which operates to turn said member in the same direction from its movable position, against the action of its con-

trolling-springs, when pulled upon by the member moving either up or down. The circularly movable spring controlled member is located at one side of, as for instance, in front of or in rear of the axle or other part of the running gear and on a level therewith or thereabouts, so that on a downward movement of the body the movable member is bodily moved downward with respect to the axle and is turned against the action of its controlling-springs by the strap which is connected with the axle, and on an upward movement of the body said movable member is bodily moved upward with respect to the axle and is turned against the action of its controlling-springs, in the same direction, from its normal position, by the strap which is connected with the axle.

By the construction and arrangement of my present device forward and backward movements of the vehicle body, relative to the running gear, are also provided against.

Figure 1 shows a front elevation of the shock absorber embodying this invention, the front plate being removed from the ring to expose the springs, and the axle being shown in section. Fig. 2 is a side view of the parts shown in Fig. 1 the axle being omitted. Fig. 3 is a vertical section of the shock absorber shown in Fig. 1, taken on the dotted line 3—3. Fig. 4 is a detail of the hub to which the springs are connected. Fig. 5 is a detail showing a different form of axle and means for connecting the strap thereto. Fig. 6 is an edge view of the band which passes around the axle and serves to connect the strap thereto. Figs. 7, 8 and 9 show a modified form of shock absorber embodying my invention. Figs. 10 and 11 show another modified form of shock absorber embodying my invention.

Referring to Figs. 1 to 4, *a* represents a non-rotating hub, which, as herein shown, see particularly Fig. 4, is recessed to receive a plurality of controlling-springs. This hub comprises a circular base and a recessed spring-receiving portion. This hub is bolted or otherwise secured to an arm *a'*, which is adapted to be bolted or otherwise secured to a bracket *a''*, which is adapted to be attached to the body of the vehicle. The bracket *a''*, as well as the supporting arm *a'*, may be of any suitable construction so far as my invention is concerned, yet, as herein shown, is made of strap-iron or equivalent material,

in order that it may be adapted to be attached to different vehicle bodies without material alteration, as for instance, it may be cut off or it may be drilled at different points to provide for lengthening and shortening it. The hub serves as and constitutes the non-rotating or stationary member of the shock absorber to which the controlling-springs are attached. So far as my present invention is concerned said hub or equivalent non-rotating member may be connected with the vehicle body by any suitable means in lieu of the bracket and supporting arm herein shown.

The controlling-springs d are made as C-springs, preferably composed each of a plurality of leaves, and said springs are constructed to fit the recesses or seats which are provided for them in the hub, and they are bolted or otherwise secured to said hub. In practice I find springs of this form are particularly well suited for the purposes of my invention, as they can be made very strong and durable and also very elastic, having a wide range of movement, which increases progressively with the distance moved, yet I do not desire to limit my invention to the employment of controlling springs of this form.

e represents a circularly movable ring, which is placed upon or incloses the hub a , and to the inner side of said ring the outer ends of the controlling-springs d are bolted or otherwise secured. The ring is made much larger in diameter than the hub to provide for the springs, which are of quite large dimensions.

A flange e' is formed on or provided at one side of the ring, which loosely fits the circular base of the hub.

A circular plate e^2 is secured to the opposite side of the ring, to inclose the parts within the ring and thereby protect them from injury. The ring e serves as and constitutes the circularly movable member of the shock absorber to which the controlling-springs are attached.

The ring or other movable member has attached to it a strap f , which partially surrounds it, and which extends from it to the axle or to some other part of the running gear or equivalent point of attachment. For the purpose of attaching the strap to the axle a band g , see Figs. 1 and 6, is provided, which is adapted to surround the axle and its ends to be connected together, as shown in Fig. 1, and said band has a loop or eye g' , at any desirable point, to which the strap f is connected; or said band may overlie the axle as shown in Fig. 5, and its ends connected with a plate g^2 . This strap, however, may be connected with the axle or other part of the running gear in any other manner, and furthermore any other means may be employed for connecting the circularly

movable member with the axle or other part of the running gear without departing from the spirit and scope of my invention, when adapted to operate said circularly movable member in the manner herein described.

The circularly movable member or ring is located in front of or in rear of the axle, and for the best results is so located with respect thereto that the lower edge of the ring is on a level with the middle of the axle. When so located that portion of the strap between the ring and axle occupies a horizontal plane, yet the ring may be disposed a little above or a little below such level. When the ring is located with respect to the axle, as shown in Fig. 1, the distance between the tangent point of the ring and strap and the axle is the shortest, and any movement of the ring, from such point, except in a direction toward the axle will act to pull on the strap and turn the ring, or in other words any bodily movement of the ring relative to the point of attachment of the strap, except in a direction toward said point of attachment will act to pull the strap and turn the ring.

In operation, on a downward movement of the body the ring is moved bodily downward and pulling upon the strap is caused to turn in a direction against the action of its controlling-springs d , so that said springs resist the downward movement of the vehicle body, with a gradually increasing force. On an upward movement of the body the ring is moved bodily upward and pulling upon the strap is likewise caused to turn in a direction against the action of its controlling-springs d , being in the same direction as previously turned, so that said springs likewise act to resist the upward movement of the vehicle body, with a gradually increasing force. If the ring is located a little above the point shown in Fig. 1, it will be turned in the same manner as before described, but will act sooner on the upward movement of the body than on the downward movement thereof; and if located below the point shown in Fig. 1, the reverse will be true.

When placing the devices on a vehicle, four will be employed, and they will all be located either outside of the axles or inside of the axles, and, in such case, two of them will act to resist forward movement of the vehicle body and the other two will act to resist backward movement of the vehicle body, both of which results are desirable to obtain.

Referring to Figs. 7, 8 and 9, the hub h , controlling-springs h' and ring h^2 , are all constructed substantially the same as in Figs. 1 to 4, but the ring is stationarily supported, being connected with the vehicle body, and the hub is rotatable or circularly movable. The ring, therefore, serves as and constitutes the non-rotatable or stationary member and the hub serves as and constitutes the circu-

larly movable member. The strap h^3 is attached to the hub and to the axle or to some other part of the running gear. The operation of this modified form of my invention is substantially the same as previously described, but in practice it is not as efficient owing to the limited distance moved by the hub, which is connected with the inner ends of the controlling-springs.

Referring to Figs. 10 and 11, the hub h , controlling-springs and ring h^2 , substantially as shown in Figs. 7, 8 and 9, are shown, the ring serving as and constituting the stationary member, and the hub the circularly movable member, but instead of attaching them to the vehicle body and connecting the strap with the axle, they are attached to the running gear and the strap is connected with the vehicle body. The operation of this modified form of my invention is substantially the same as previously described, but in practice, like the modified form shown in Figs. 7, 8 and 9 it is not as efficient as the form shown in Figs. 1 to 4.

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

1. In a shock absorber for vehicles, a circularly movable spring-controlled member, a strap attached thereto, means for connecting one of said parts with the vehicle body, and means for connecting the other part with the running gear, said member being so disposed with respect to the point of attachment of the strap, that upon both up and down movements of the body the strap is pulled to turn said spring-controlled member in the same direction from its normal position against the action of its controlling-springs, substantially as described.

2. In a shock absorber for vehicles, a circularly movable spring-controlled member supported upon the vehicle body, a strap attached thereto which is connected with the running gear, said member being so disposed with respect to the point of attachment of the strap, that upon both up and down movements of the body the strap is pulled to turn the member in the same direction from its normal position against the action of its controlling-springs, substantially as described.

3. In a shock absorber for vehicles, a circularly movable spring-controlled ring, a strap attached thereto which is connected with the running gear, and means connecting said ring with the body, and so disposing it with respect to the point of attachment of the strap, that upon both, up and down movements of the body the strap is pulled to turn the ring in the same direction from its normal position against the action of its controlling-springs, substantially as described.

4. In a shock absorber for vehicles, a circularly movable spring controlled ring sup-

ported upon the vehicle body, a strap connecting said ring with the running gear at a point whereby both up and down movements of the ring operate to pull the strap and turn the ring in the same direction from its normal position against the action of its controlling-springs, substantially as described.

5. In a shock absorber for vehicles, a circularly movable spring-controlled member supported upon the vehicle body, means connecting it with the running gear at a point whereby both up and down movements of said body and also a horizontal movement of said body relative to the running gear operate to turn said member in the same direction from its normal position against the action of its controlling-springs, substantially as described.

6. In a shock absorber for vehicles, a circularly movable spring-controlled member, a strap attached thereto, means for connecting one of said parts with the vehicle body, and means for connecting the other part with the running gear, said member being so disposed with respect to the point of attachment of the strap, that upon both up and down movements of the body and also a horizontal movement of said body, relative to the running gear, the strap is pulled to turn said spring-controlled member in the same direction from its normal position against the action of its controlling-springs, substantially as described.

7. In a shock absorber for vehicles, a circularly movable spring-controlled member, a support therefor, a strap attached at one end to said member, a support to which the other end of said strap is attached, one of said supports being borne by the vehicle body and the other by the running gear and being so disposed with respect to each other that the strap is pulled upon both up and down movements of the body, to turn said member in the same direction from its normal position against the action of its controlling-springs, substantially as described.

8. In a shock absorber for vehicles, a circularly movable spring controlled ring supported upon the vehicle body and located at one side of the axle, and a strap attached to said ring which is connected with the axle and arranged to turn said ring in the same direction from its normal position against the action of its controlling springs as said ring is moved both up and down bodily with respect to the axle, substantially as described.

9. In a shock absorber for vehicles, a non-rotating hub, means for connecting it with the vehicle body, a ring inclosing said hub, a plurality of springs interposed between said ring and hub which are attached at their opposite ends respectively to said ring and hub, and a strap, partially surrounding said ring, which is connected with the running gear, said ring being so disposed with respect to

the point of attachment of the strap that the
ring is turned against the action of its con-
trolling-springs by said strap, as the vehicle
body is moved both up and down from its
5 normal position with respect to the running
gear, substantially as described.

In testimony whereof, I have signed my

name to this specification, in the presence of
two subscribing witnesses.

DUNCAN ROBINSON.

Witnesses:

B. J. NOYES,

H. B. DAVIS.