

(No Model.)

2 Sheets—Sheet 1.

W. B. MANN.
ELEVATING CHAIR.

No. 547,221

Patented Oct. 1, 1895.

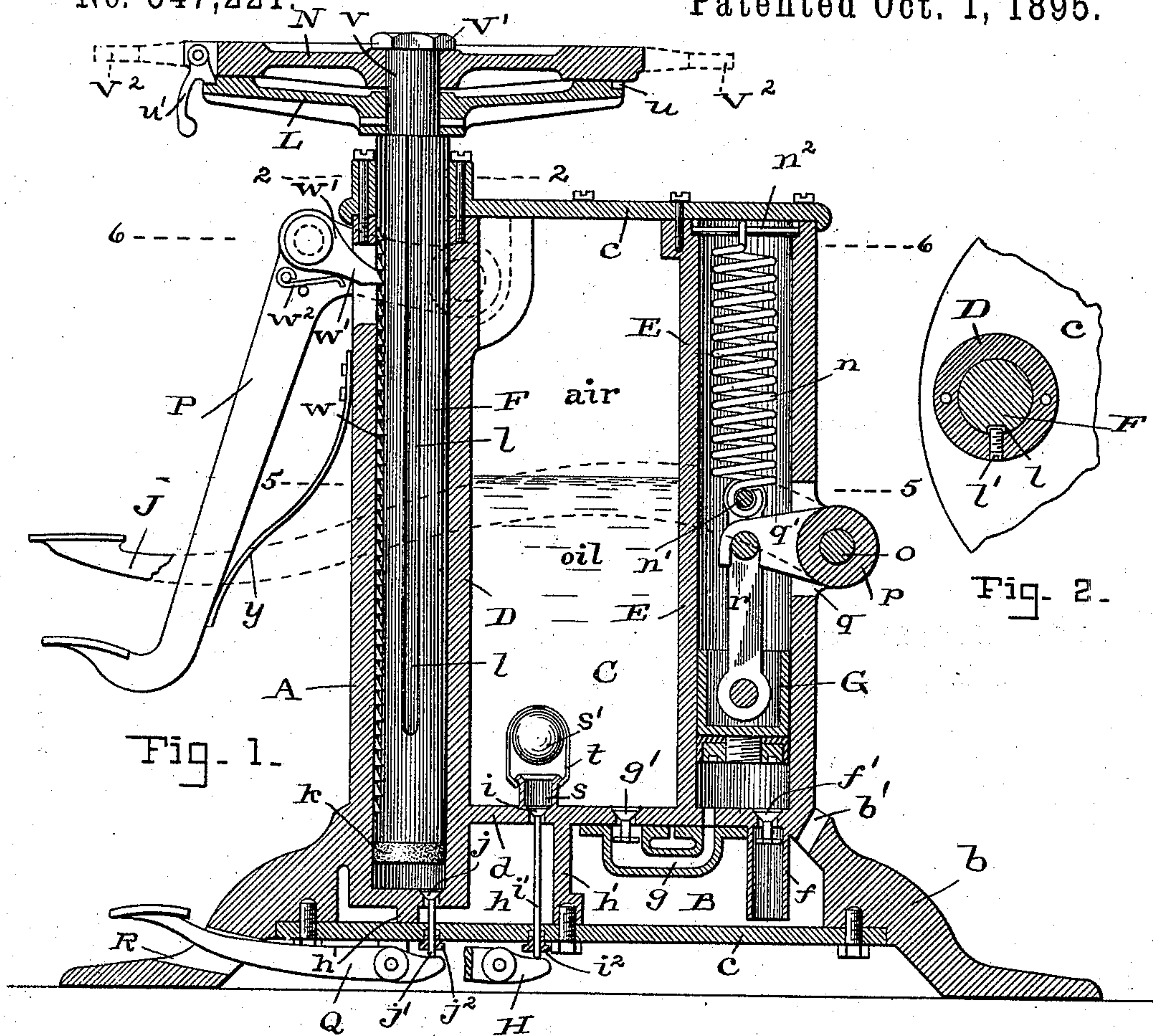


Fig. 1.

Fig. 2.

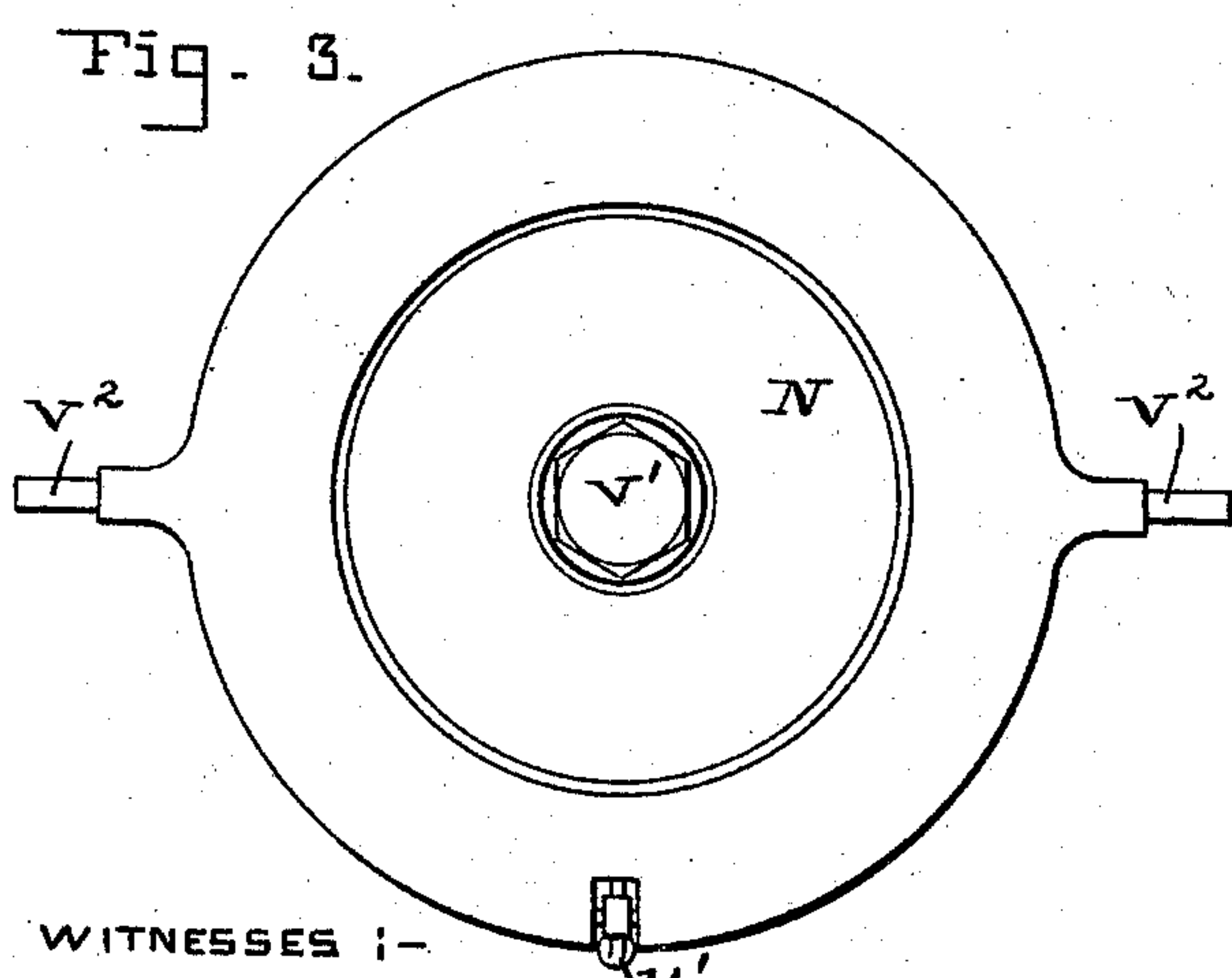


Fig. 3.

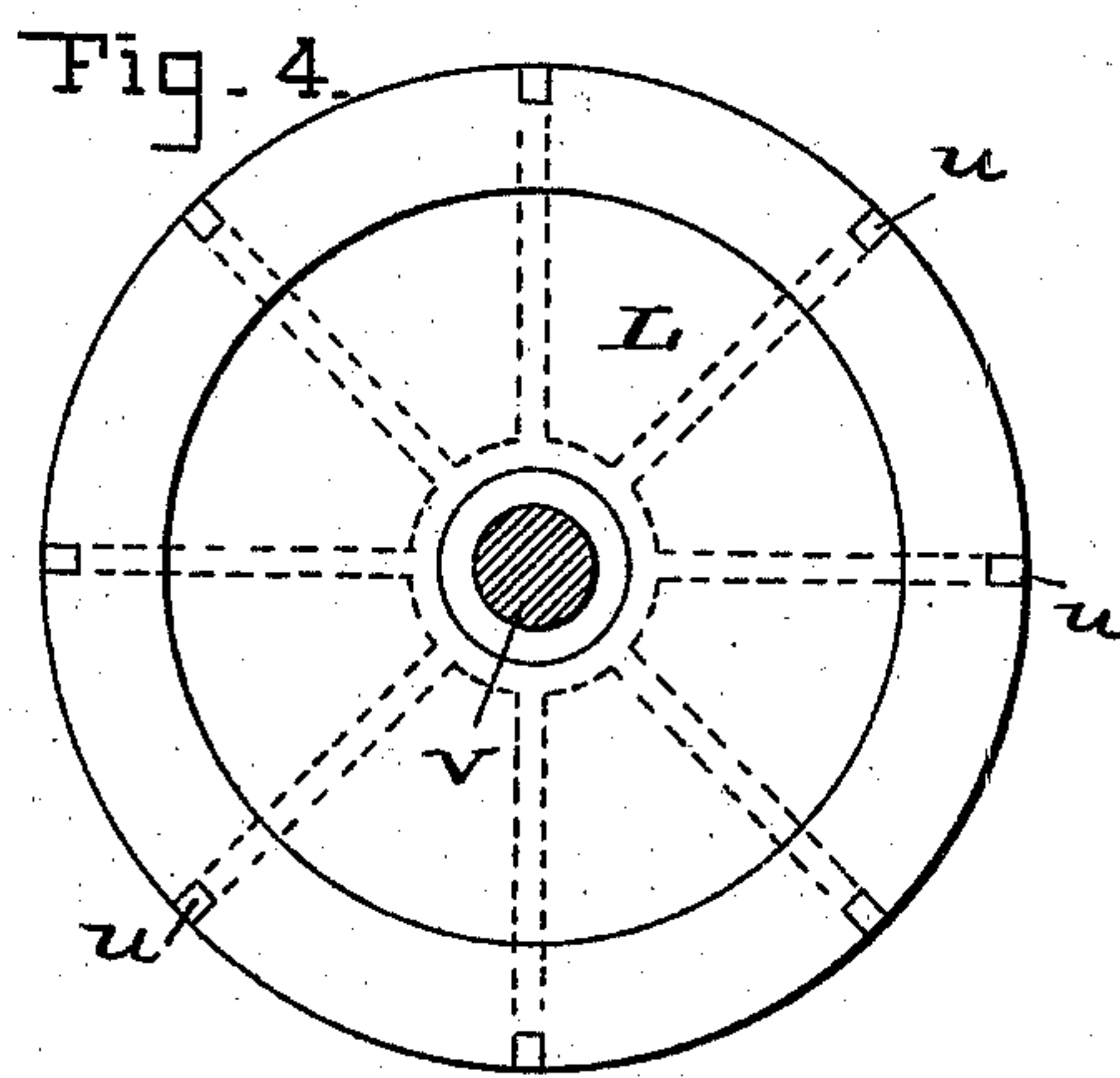


Fig. 4.

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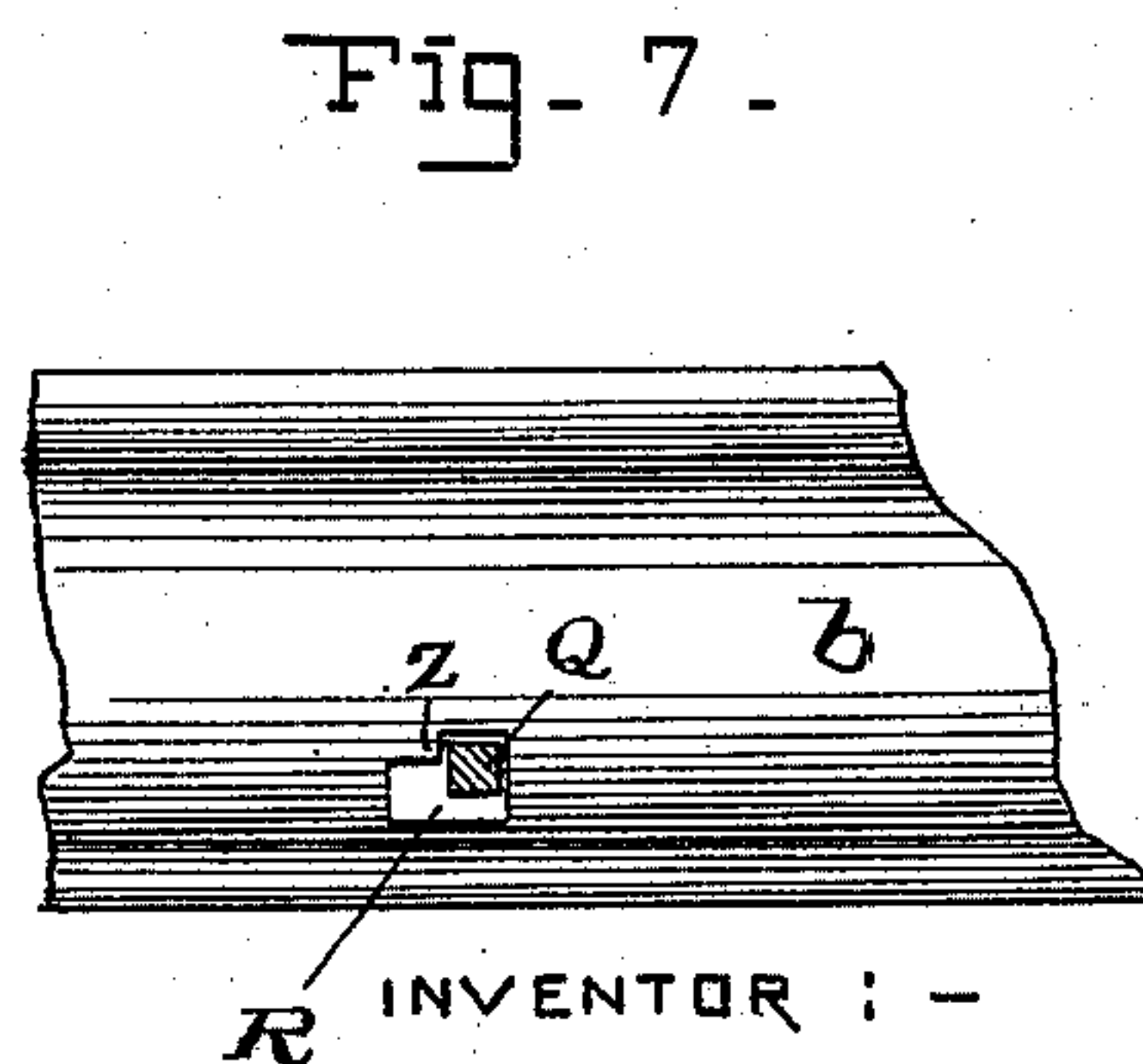
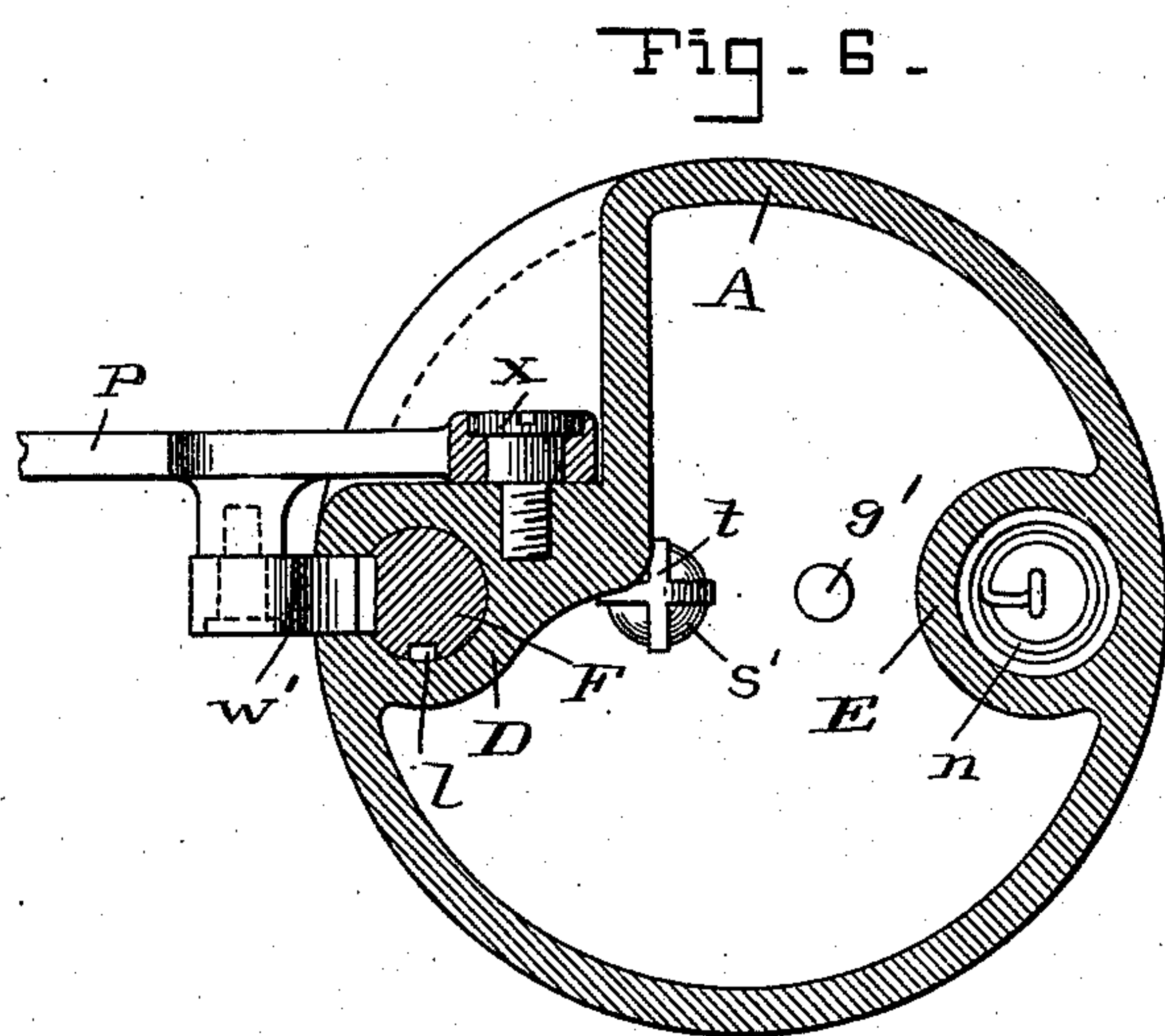
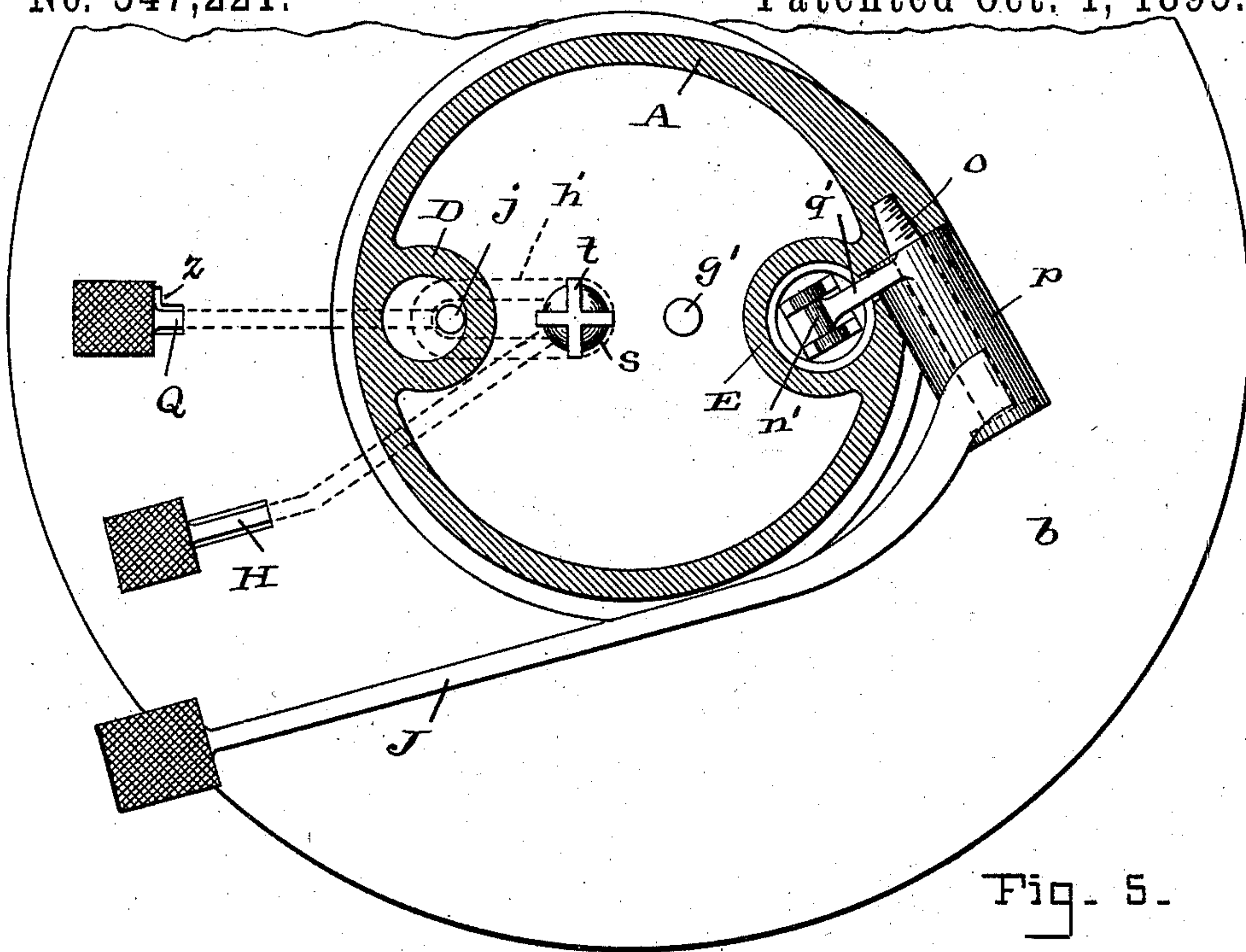
(No Model.)

2 Sheets—Sheet 2.

W. B. MANN.
ELEVATING CHAIR.

No. 547,221.

Patented Oct. 1, 1895.



WITNESSES :-

L. J. Van Alton.
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UNITED STATES PATENT OFFICE.

WILLIAM B. MANN, OF BALTIMORE, MARYLAND.

ELEVATING-CHAIR.

SPECIFICATION forming part of Letters Patent No. 547,221, dated October 1, 1895.

Application filed May 19, 1894. Serial No. 511,761. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. MANN, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Elevating-Chairs, of which the following is a specification.

This invention relates to improvements in chairs, such as are used by dentists. In chairs where fluid pressure is employed to elevate the chair-body the latter has been lowered by allowing the fluid pressure to exhaust.

My present invention has for its object to provide means whereby the chair-body may be lowered against the lifting force of said fluid-pressure.

In order to make the improvements more clearly understood I have shown in the accompanying drawings certain means for carrying the same into practical effect without, however, intending to limit my invention to the particular construction which for the sake of illustration I have set forth.

In the accompanying drawings, illustrating the invention, Figure 1 is a vertical section of the base or pedestal of a chair embodying my invention. Fig. 2 is a cross-section of the plunger which slides in the cylinder. Fig. 3 is a plan view of the frame which carries the chair-seat and rotates on the head. Fig. 4 is a top view of the head which is mounted on the plunger. Fig. 5 is a horizontal section on the line 5 5 of Fig. 1. Fig. 6 is a horizontal section on line 6 6 with annular rim removed. Fig. 7 is a detail view of a portion of the annular rim of the base, showing the lever-locking notch therein.

In the accompanying drawings, A designates the base, which exteriorly is cylindric and is supported on feet or on an annular rim *b*. It has a bottom plate *c*, which serves as the bottom of an oil-reservoir B, and a horizontal plate *d* above said bottom which serves as the bottom of a pressure-chamber C. A top plate *c* serves as a cover and makes the pressure-chamber air-tight. Two small cylinders D E are in the present instance in the base A. These may be formed or constructed in any desired manner. In the present instance they are formed with and as part of the casting of the base A. The cylinder D is for the plunger F, which supports the chair-seat, and the other cylinder E is for the pump-piston

G. The pressure-chamber C in the present instance is designed to hold both air and oil under pressure. It is obvious, however, that instead of one chamber to contain both oil and air two separate chambers may be used, (one for the oil and the other for the air,) and a suitable communication between them, so that the compressed air may act on the oil and impel it. A pendent pipe F is on the lower side of the horizontal plate *d* and the bottom of the pump-cylinder and projects down into the oil-reservoir B, and its lower end is open. A check-valve *f'* is at the upper part of the pendent pipe to allow the oil to pass into the pump-cylinder, and closes communication in the direction from the pump-cylinder E to the oil-reservoir. By means of the pendent pipe *f* the oil will be supplied to the pump-cylinder no matter what amount of oil may be in the reservoir B. When the pump-piston G is raised, it sucks the oil up through the pipe *f*, and the check-valve *f'* opens to let the oil through and then closes to retain the oil. A passage *g* communicates from the bottom of the pump-cylinder E to the bottom of the pressure-chamber C, and a check-valve *g'* in this passage opens to allow oil to pass into the pressure-chamber, but closes to prevent the return of oil therefrom. A chamber or passage *h* for oil to pass from the pressure-chamber C to the plunger-cylinder D is formed below the horizontal plate *d* by an inclosing-wall *h'*. This small chamber *h* is thus separated from the oil-reservoir B. A valve *i* in the bottom of the pressure-chamber is opened by being raised, and has a long stem *i'*, which in the present instance passes down through the small chamber or passage *h* and through a packing or stuffing box *i²* in the bottom *c*. The lower end of the stem *i'* projects below the bottom. A foot-lever H bears against the projecting end of the valve-stem *i'*, and thereby said valve may be opened to allow the oil under pressure in the chamber C to pass to the plunger-cylinder D and raise the plunger F and chair-body. A check-valve *j* is located in the bottom of the plunger-cylinder D and has a stem *j'*, which passes down through a packing *j²* and projects below the bottom. A foot-lever Q (shown in Figs. 1 and 7) bears against the projecting end of the stem *j'* and serves as the means whereby the valve may be opened

to allow oil under pressure to pass into the plunger-cylinder to raise the plunger and chair-body, and also to allow the oil to exhaust from the plunger-cylinder back to the chamber *h* when it is desired to lower the plunger and chair-body. This lever *Q* projects through a hole *R* in the base-rim *b*, (see Fig. 7,) and said hole has a step or shoulder *z*. The lever thus may be depressed to unseat valve *j* and then moved laterally to a slight extent and thereby caught under the said step or shoulder *z*, which retains the lever and thus holds the valve *j* open.

The plunger *F* has at its lower end a packing *k* to fit tight in the cylinder *D*, and is also provided with a vertical groove *l*. A pin or screw *l'* (see Fig. 2) enters the side of the cylinder *D* and projects into this groove. The plunger is thus free to raise and lower but is hindered from rotating in the cylinder by the pin *l'*. It will be seen the lever *H* is to cause the plunger and chair-body to be raised by admitting oil under pressure to the plunger-cylinder, and the lever *Q* is to cause the plunger and chair-body to be lowered by releasing the oil from the plunger-cylinder back into the chamber *h*, when the plunger is forced down against the lifting-pressure of the oil, as described hereinafter. These two levers in the present instance are foot-levers but they may be arranged to be operated otherwise than by the foot.

The means by use of which the plunger *F* and chair-body may be lowered against the lifting force of the oil and the oil returned to the pressure-chamber *C* is clearly shown in Figs. 1 and 6. The plunger *F* is provided with ratchet-teeth *w* to make a rack. A depressing-lever *P*, pivoted by a screw *x* at the side of the base, and a spring *y*, secured to the vertical side of the base, bears against the lever *P* and raises it. As shown in Fig. 1, this lever *P* is at its middle position. The spring *y* will raise it higher than shown in this figure, and when the operator's foot is on the lever it will be depressed until it assumes an almost vertical position alongside of the base. This lever has a stud or arm, and a pawl *w'* is pivoted on the said stud or arm. This pawl engages the teeth *w* on the plunger. A spring *w²*, carried on the lever, presses the pawl, so as to keep it in contact with the teeth *w*.

The pump-piston *G* is depressed or forced down by the lever *J*, which is arranged to give great power, and said piston is raised by the retracting-spring *n*. A suitable pivot-pin *o* is fixed horizontally at one side of the base. In this instance it is screwed thereto. The lever *J* has its eye *p* mounted on this pivot-pin. This lever extends alongside of and past the base to the opposite side. A slot *q* is in the side of the pump-cylinder *E*, and a short arm *q'* is attached to the lever-eye *p* and projects through the said slot *q* into the cylinder, and a link-bar *r* connects between the pump-piston *G* and the said short arm *q'*. This short

arm *q'* on the lever is the direct means which forces the pump-piston *G* down. The lifting-spring *n* has its lower end attached to a pin *n'* between two ears on the short arm *q'*, and its upper end attached to a cross-pin *n²*, which rests in notches at the top of the cylinder *E*. The spring *n* keeps the pump-piston *G* normally raised. When the piston is being raised, it sucks the oil up through the pendant pipe *f* and check-valve *f'* into the cylinder *E*. When the piston *G* is forced down by the lever *J*, the check-valve *f'* closes, and the oil in the cylinder *E* is forced through the passage *g* and check-valve *g'* into the pressure-chamber *C*, and the air therein is compressed. The chair-seat frame *N* rests upon the plunger *F*.

The operation of the device thus described is as follows: At the outset the chamber *C* is full of air (atmosphere) in normal condition, (no pressure.) Now by working the pump-lever *J* oil will be pumped from the reservoir and transferred to the chamber *C*. As the oil fills into the chamber, of course the air in the chamber will become compressed. This compression by the pump may be continued until the pressure stored up in the chamber *C* amounts to, say, one hundred pounds or more per square inch. This stored-up air-pressure is then ready to be utilized as the power to impel the oil and raise the plunger *F* and the chair-body. When it is desired to elevate the chair-seat frame, the foot-lever *H* is depressed by the operator, and thereby the valve *i* will be opened and the oil will flow through the passage *h* and check-valve *j* and will lift the plunger *F* and chair-body. Thus the lifting of the chair-body at the moment it is needed requires no exertion on the part of the operator. The lifting is automatic. When it is desired to lower the chair-seat frame, the lever *Q* is forced down and engaged with the shoulder *z* to hold the valve *j* open, and then the lever *P* is depressed to cause the pawl *w'* to force the plunger *F* down against the lifting force of the oil. The oil in the plunger-cylinder *D* will pass out through the open valve *j* to the chamber or passage *h* and cause a pressure in said passage, which pressure when in excess of that in the chamber *C* will lift the valve *i*, and the oil will then pass back into the chamber *C*. By repeated depressions of the lever *P* all the oil below the plunger *F* may be forced back into the chamber *C*. Provision is made to automatically seal the pressure-chamber when the oil contained therein has been nearly exhausted by raising the plunger *F*. This sealing will prevent either the entire exhaustion of the oil or the escape of the compressed air. The means employed for sealing consists of a ring-dam or upwardly-projecting tube *s* on the bottom *d* of the pressure-chamber. This dam or tube may rise from the bottom *d* to any desired height and surround the port or opening of the valve *i*, through which the oil passes to the plunger-cylinder *D*. A ball-valve *s'* seats on the top

of the ring-dam or tube *s* and closes it. A cage *t* is mounted on the said ring-dam and incloses the ball-valve and keeps it in position where it will always seat when the oil has been reduced low enough. In operation the ball-valve *s'* will float when the oil is not low and will thus remain unseated, and the ring-dam or tube *s* will be open; but when the oil is low enough to allow the ball-valve to be seated no more oil can be discharged through the valve *i*.

The plunger *F* is prevented from rotating by the groove *l* and pin *l'*, as already described; but I have made provision for turning the chair-body in a horizontal plane on the axis of the plunger, so as to permit the chair-body to be adjusted to suit the convenience of the operator. This provision is shown in Figs. 1, 3, and 4, and comprises a circular head *L*, fixed rigidly on the top of the plunger *F*. This head has notches *u* around its rim. The upper end of the plunger projects above the circular head *L*, and said end forms a pivot *v*. A chair-seat frame *N* is loosely pivoted on the end *v*, so as to revolve thereon, and is secured thereon by a screw *v'*. This seat-frame has two trunnions *v''*, on which the chair-body (not shown) is pivoted, so as to permit the chair-body to tilt. The seat-frame *N* carries a pivoted dog *u'*, which may engage any one of the notches *u* on the head *L*. It will be seen that the dog *u'* may be tilted to disengage from a notch, and then the chair-seat frame *N* may be turned in a horizontal plane on the pivot *v* to any desired position, whereupon the dog will engage another notch and thus hold the chair-body from rotation. Oil is supplied to the reservoir *B* at the hole *b'*, which may be closed by a pin or otherwise.

I do not herein claim means whereby air under compression is employed to automatically raise the chair-body without exertion on the part of the operator nor the construction of pump and float-valve *s'* shown, as these features constitute the subject-matter of and are claimed in my application for patent, filed September 29, 1894, Serial No. 524,473.

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

1. In a chair, the combination of a chair-base having a pressure-chamber; a pump to produce pressure; a cylinder inclosed in the chair-base and having its lower end in communication with the said pressure-chamber; a plunger in said cylinder and supporting the chair-body; a valve to control the flow of fluid pressure from the pressure-chamber to the said plunger-cylinder, whereby on opening the valve the fluid-pressure will raise the chair-body automatically; and means whereby the chair-body may be lowered against the lifting force of said fluid pressure.

2. In a chair, the combination of a chair-base having a pressure-chamber; a pump to produce pressure; a cylinder inclosed in the chair-base and having its lower end in com-

munication with the said pressure-chamber; a plunger in said cylinder and supporting the chair-body; a valve to control the flow of fluid pressure from the pressure-chamber to the said plunger-cylinder, whereby on opening the valve the fluid-pressure will raise the chair-body automatically; and a depressing lever by which the chair-body may be lowered and the fluid pressure under the plunger returned to the pressure-chamber.

3. In a chair, the combination of a chair-base having a pressure-chamber; a pump to produce pressure; a cylinder inclosed in the chair-base and having its lower end in communication with the said pressure-chamber; a plunger in said cylinder and supporting the chair-body; a valve to control the flow of fluid pressure from the pressure-chamber to the said plunger-cylinder, whereby on opening the valve the fluid pressure will raise the chair-body automatically; ratchet teeth on the said plunger; a pawl engaging the said ratchet teeth; and a depressing lever actuating the pawl.

4. In a chair, the combination of a chair-base having a pressure-chamber; an oil-reservoir in the chair-base; a pump to produce pressure; a cylinder inclosed in the chair-base and having its lower end in communication with the said pressure-chamber; a plunger in said cylinder and supporting the chair-body; a valve to control the flow of oil from the pressure-chamber to the plunger-cylinder; and means whereby the chair-body may be lowered against the lifting force of the said oil pressure and the latter returned to the pressure-chamber.

5. In a chair, the combination of a chair-base having a pressure-chamber; a pump to produce pressure; a cylinder inclosed in the chair-base and having its lower end in communication with the said pressure-chamber; a plunger in said cylinder and supporting the chair-body; a valve to control the flow of fluid pressure from the pressure-chamber to the said plunger-cylinder, whereby on opening the valve the fluid pressure will raise the chair-body automatically; a check-valve, *j*, in the bottom of said cylinder; a lever to open the check-valve; and means whereby the chair-body may be lowered against the lifting force of the oil pressure.

6. In a chair, the combination of a chair-base having a plunger to support and elevate the chair-body; means by which fluid pressure acting on the plunger will elevate the chair-body; and means independent of said elevating means whereby the chair-body may be lowered by overcoming the lifting force of said fluid-pressure.

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

WILLIAM B. MANN.

Witnesses:

CHARLES B. MANN, Jr.,
C. CALVERT HINES.