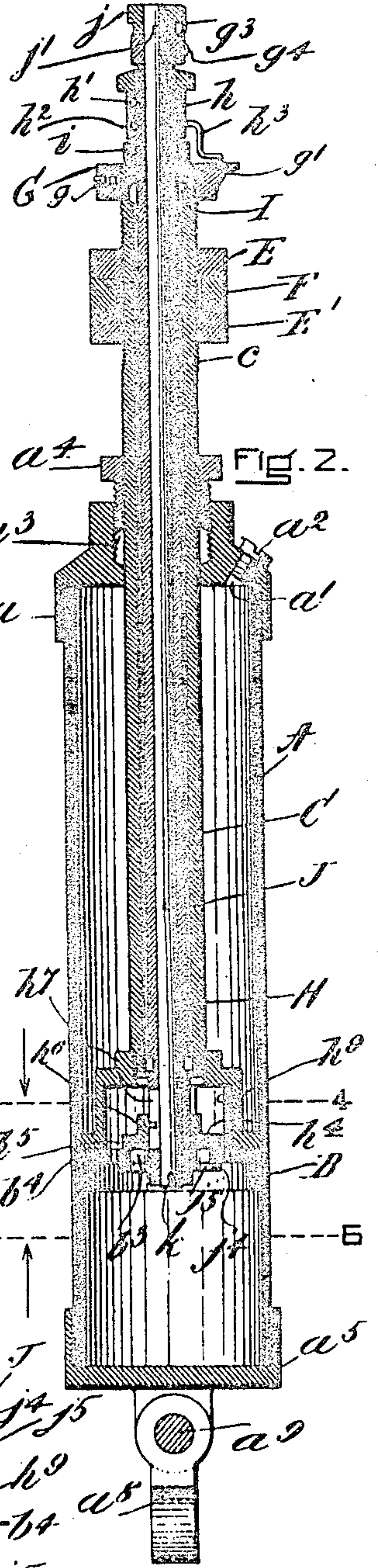
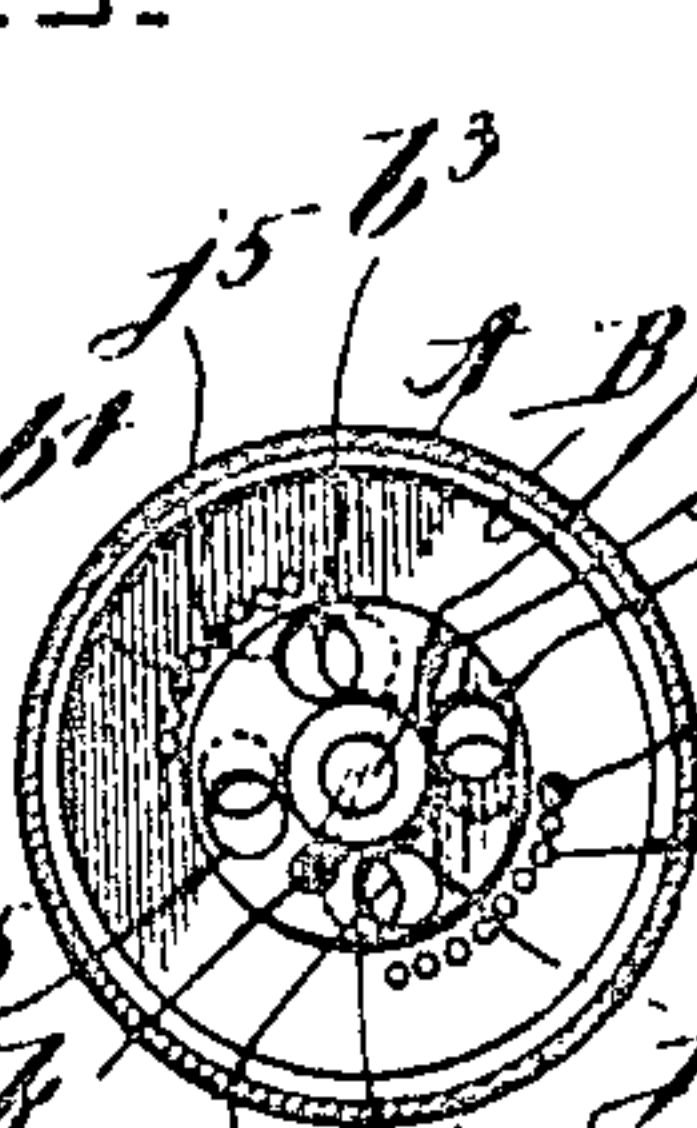
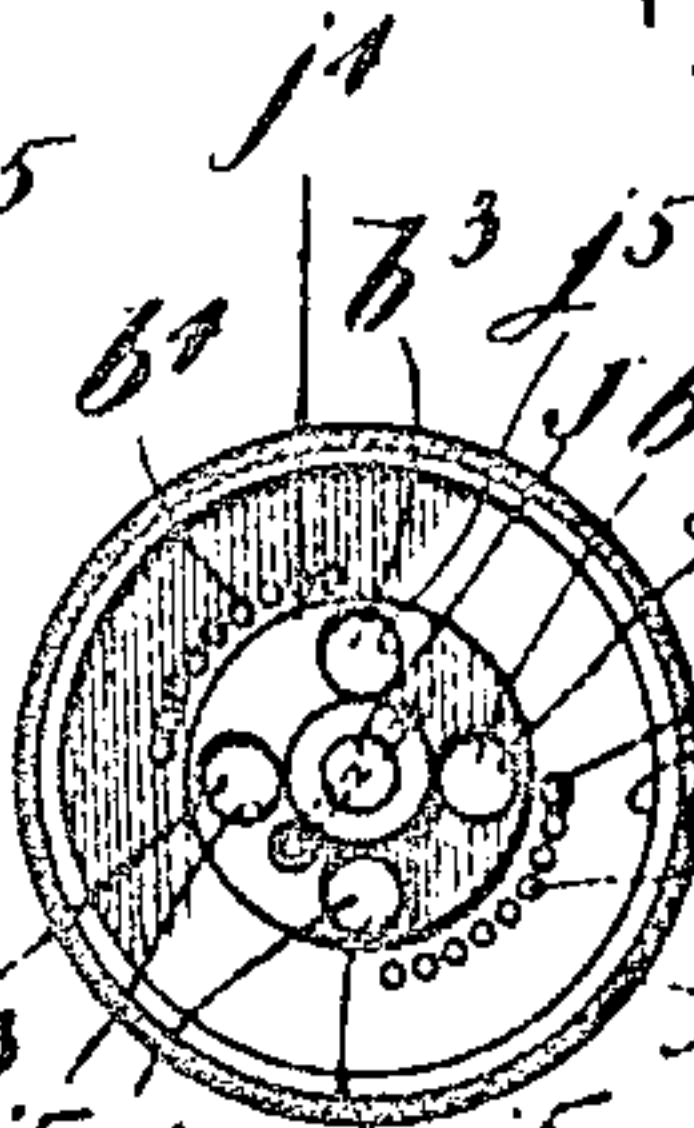
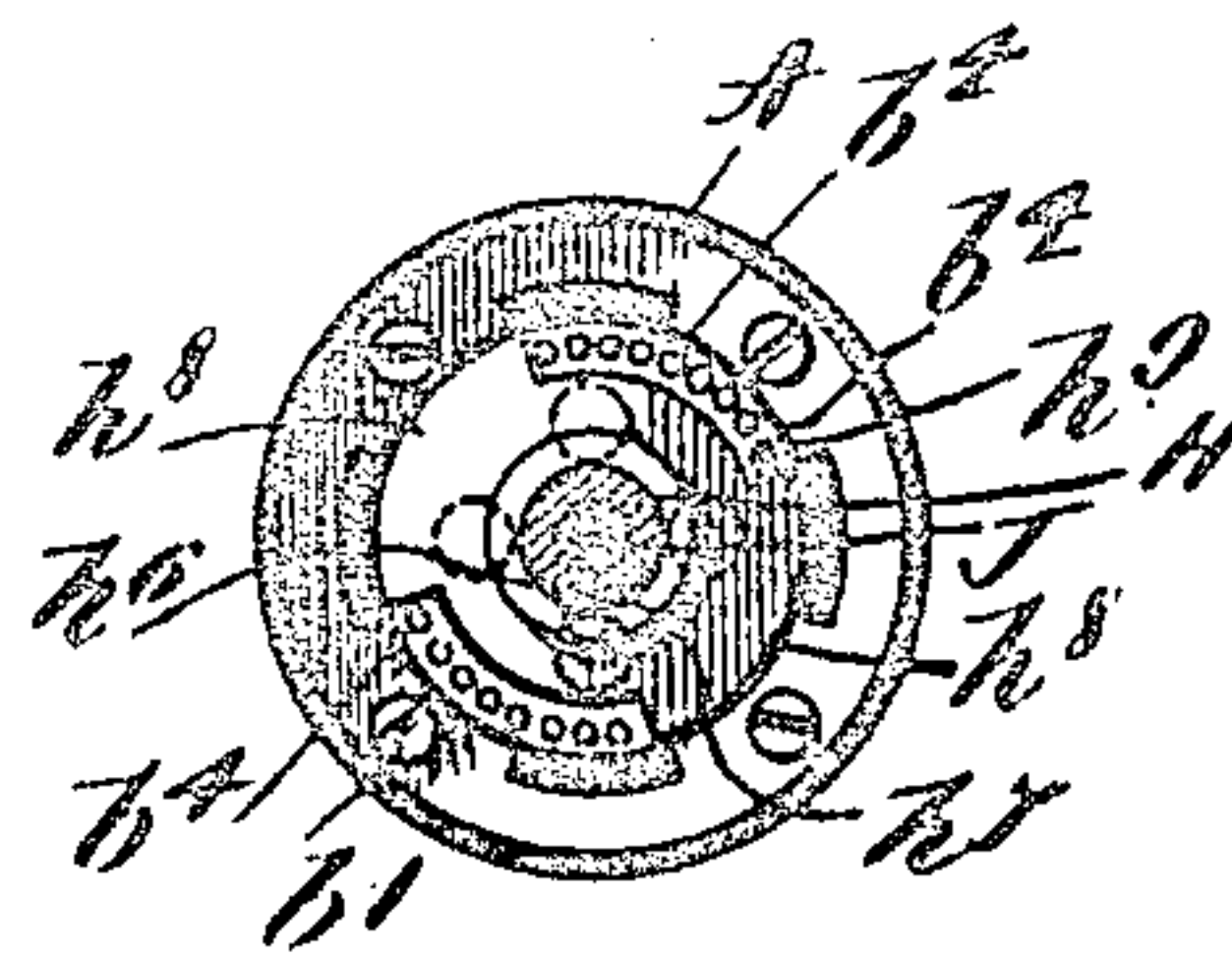
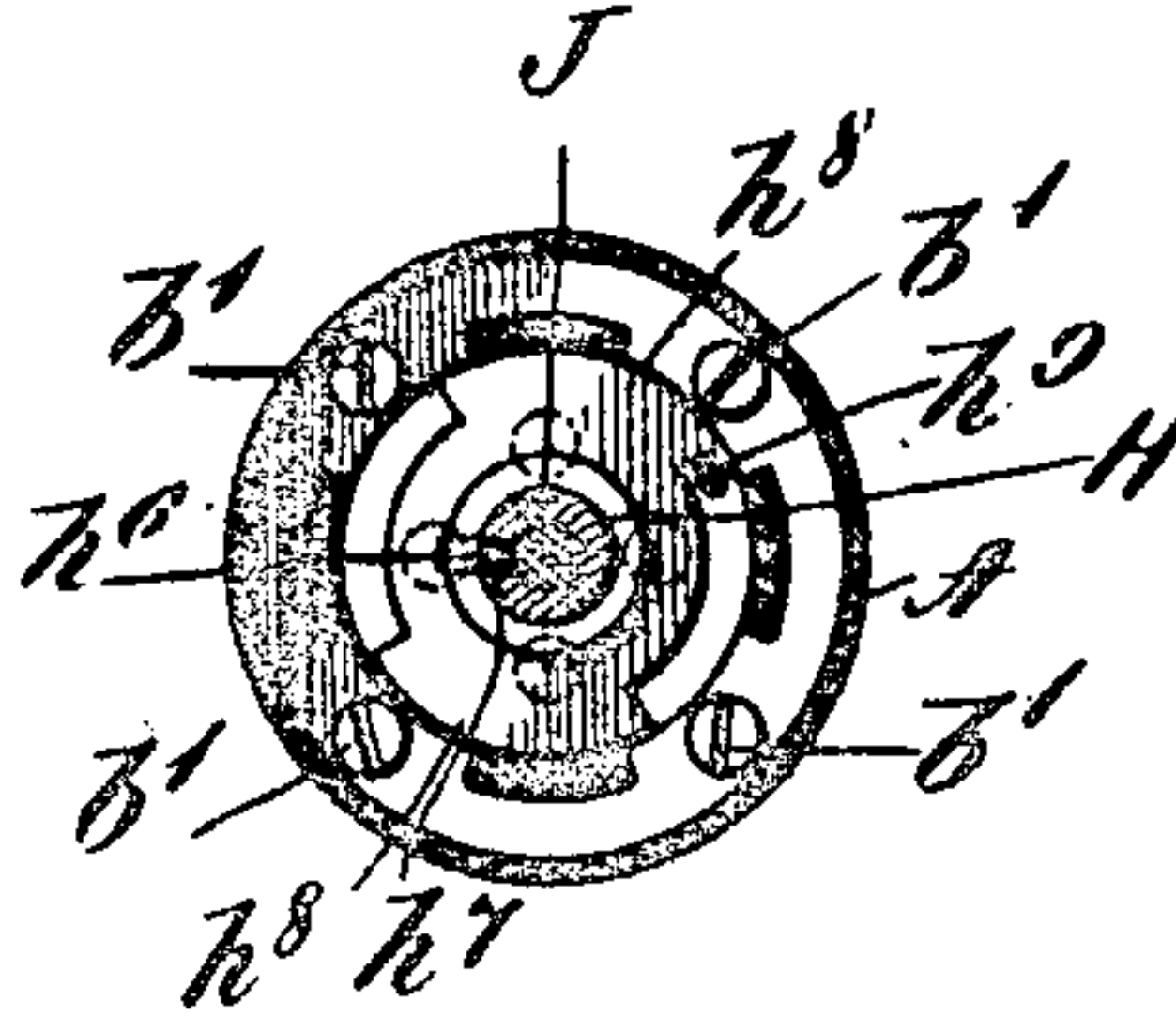
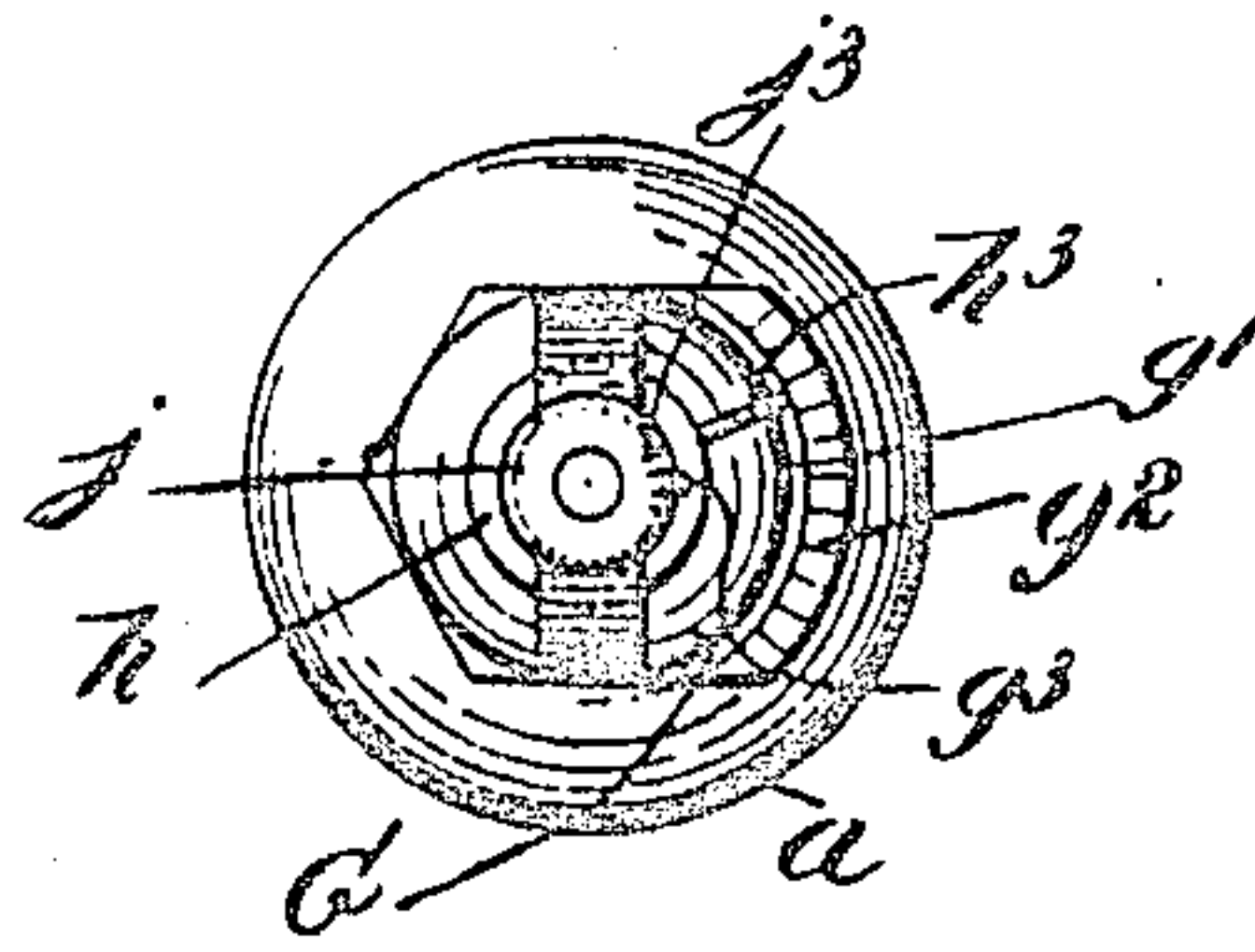
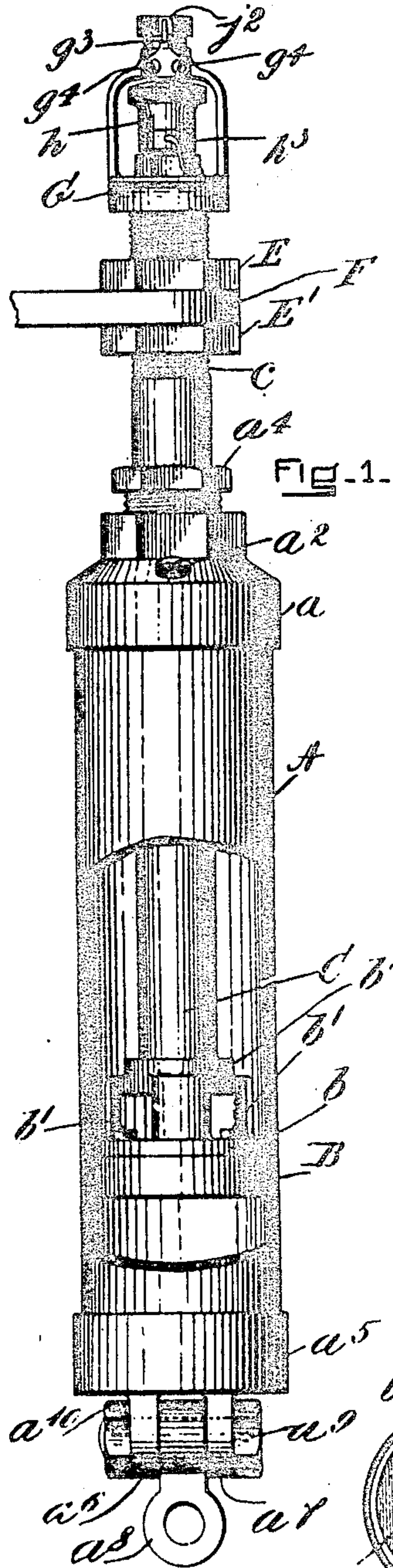


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SHOCK ABSORBER.
APPLICATION FILED OCT. 6, 1909.

967,285.

Patented Aug. 16, 1910.



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UNITED STATES PATENT OFFICE.

CHRISTIAN WILSON, OF BROOKLINE, MASSACHUSETTS.

SHOCK-ABSORBER.

967,285.

Specification of Letters Patent. Patented Aug. 16, 1910.

Application filed October 6, 1909. Serial No. 521,268.

To all whom it may concern:

Be it known that I, CHRISTIAN WILSON, a subject of the King of Denmark, residing at Brookline, in the county of Norfolk and Commonwealth of Massachusetts, have invented a new and useful Improvement in Shock-Absorbers, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to shock-absorbers for use on motor vehicles, according to the common practice, and it is the special object of my invention to provide a hydraulic shock-absorber with means to vary the resistance which may be opposed to the movement of its principal parts, in order that each shock-absorber may be readily adjustable to varying conditions of load, road, and tension of springs.

I have further sought to provide a shock-absorber with means whereby adjustability may be effected in relation to the resistance offered to the movement of its principal moving part in either direction, the means of adjustment to effect varying resistance to the movement up and down being independent of each other.

It is also an object of my invention to provide means for accurately determining the precise state of adjustment.

My invention may be best understood by reference to the drawings in which—

Figure 1 shows a side elevation of the shock-absorber with part of the cylinder casing cut away so as to display the piston therein. Fig. 2 shows a vertical cross-section of Fig. 1 viewed at a right angle thereto. Fig. 3 is a top view of the device. Fig. 4 is a cross-section of the device as it would appear if cut away on the line 4 4 of Fig. 2, looking downward. Fig. 5 represents the parts shown in Fig. 4 in a different adjustment. Fig. 6 is a cross-section view of the device as it would appear cut away on the line 6 6 of Fig. 2, looking upward. Fig. 7 represents the parts shown in Fig. 6 in a different adjustment.

Referring now more specifically to the drawings, A is a cylinder which has a cap a in which is a hole a^1 through which glycerin or some like material may be injected. The hole is closed by the screw a^2 . The cap a is provided with a cavity a^3 , which is threaded to receive the sleeve-nut a^4 which forms a stuffing-box. The bottom of the cylinder is closed by the cap a^5 which is provided with

brackets a^6 , a^7 between which is loosely mounted a link a^8 by means of the bolt a^9 and nut a^{10} . By means of this link a^8 the device may be attached to the bottom of the spring of the motor car or elsewhere in any well known manner.

B is a piston which is provided with a crown b which forms a cage, as shown. This crown b is attached to the piston by means of the screws b^1 and is screwed upon the end of the hollow piston rod C and securely fastened thereto by the screw b^2 . Upon the threaded portion c of the piston C are two nuts E, E^1 which grip the bracket F by which the device is attached to the frame of the motor car. A crown G is also screwed upon the top of the hollow piston rod C and securely fastened thereto by means of the screw G.

H is a hollow sleeve loosely mounted within the piston rod C which has a threaded cavity I at its top forming a stuffing-box in which is screwed the sleeve nut i . The sleeve H is provided at its top with a thumb piece h which is shown to be in two parts which are securely fastened to the hollow sleeve H by means of the screws h^1 and h^2 . The thumb piece h bears an index finger h^3 which is curved at its lower end to enter the groove g^1 in the top portion of the crown G which is provided with an index scale g^2 . Within the cage formed by the piston crown b is a valve-closing means h^4 which is faced with a leather part h^5 . This valve-closing means h^4 is loosely mounted upon the end of the hollow sleeve H, which bears upon the piston B, so that it may rise and fall within the cage formed by the crown b , being guided by the pin h^6 which slides within the groove h^7 . Because of the pin h^6 , however, the valve-means h^4 will turn upon the rotation of the hollow sleeve H. This valve-means h^4 is provided with extensions h^8 upon the periphery thereof which are adapted to be moved across the series of small openings b^4 in the piston B, while the central portion of the valve-means h^4 normally covers the four large openings b^5 in the piston B. A stop-pin h^9 carried by the crown b provides a positive check to limit the movement of the valve-means h^4 upon its rotation.

J is a rod loosely mounted within the hollow sleeve H which bears at its top a thumb piece j which is firmly fixed thereto by means of a pin j^1 . The thumb piece j has a

smooth portion j^2 with which an index finger g^3 , attached to the crown G by means of the screws g^4 , g^4 , is in firm frictional contact. On the top of the thumb piece j is an index j^3 upon which the amount of rotation of the rod J may be noted. Fastened to the bottom of the rod J by means of the pin h is a disk j^4 which is provided with holes j^5 which are adapted to register with the holes b^3 in the piston B. The disk j^4 is of such restricted diameter that it does not cover either series of small holes b^4 .

The operation of my device is as follows:—The cylinder having been filled with glycerin or any similar oily fluid it is apparent that when the springs of the vehicle are depressed the piston rod C will be thrust downward thus depressing the piston D and cause the valve-means h^4 to rise and allow the fluid freely to escape upwardly through four large holes b^3 in the piston B if the plate j^4 has been so adjusted, by moving the thumb piece j , that the index finger g^3 rests at the extreme left of the smooth portion j^2 , thus adjusting the plate j^4 so that its four holes j^5 register with the holes b^3 as in Fig. 6. If this is the case there will be little resistance to the downward movement of the piston B, but if it is desired to increase the downward resistance to the movement of the piston B, in order that the springs of the motor vehicle may be less easily depressed, then the thumb piece j , which was previously so placed that the index finger g rested at the extreme left side of the smooth space j^2 , may be rotated to the right thus turning the plate j^4 in a manner whereby the holes j^5 therein are brought out of register with the holes b^3 so that the holes b^3 are partially closed by the plate j^4 as in Fig. 7. The smooth portion j^2 of the thumb piece j may be made of such size that the thumb piece j may be turned till the index finger g^4 rests upon the right side of the smooth space j^2 without completely closing the holes b^3 .

The regulation of resistance to the upward movement of the piston B, upon the recoil of the springs, is effected by the covering of a greater or less number of the small holes b^4 which are always open upon the downward movement of the piston B, because the means for covering them, which is a part of the periphery of the valve-means h^4 , is always elevated by pressure of the fluid upon the downward movement of the piston B. This closing of the small holes b^4 is effected by turning the valve-means h^4 by the rotation of the hollow sleeve H by means of the thumb piece h so that the projection h^8 upon the periphery of the valve-means h^4 will move across the holes b^4 to close a greater or less number of them according to the amount of turning which may be determined by reference to the position of the index finger h^3 upon

the index scale g^2 . The stop-pin h^6 by contacting with the projections h^8 upon the valve-means h^4 will form a positive check to limit the movement opening or closing the series of small holes b^4 which may be seen completely closed in Fig. 4 and entirely unobstructed in Fig. 5.

Having thus fully described my invention, what I claim is:—

1. In a shock-absorber of the character specified the combination of a cylinder, a piston in said cylinder, a piston-rod, ports in said piston, a plurality of port controlling means and means for the manual adjustment of each of said port controlling means whereby each of said port controlling means may be manually adjusted independently of other port controlling means in a manner whereby resistance to the movement of said piston in one direction may be varied without effecting resistance to movement of said piston in the other direction.

2. In a shock-absorber of the character specified a cylinder and a piston, a port in said piston, a hollow piston rod, a rotatable member loosely mounted within said hollow piston rod, means for operating said rotatable member, an automatic valve closing means loosely mounted on said rotatable member and adapted to be rotated thereby in a manner whereby it may be moved to or from operative relation with said port.

3. In a shock-absorber of the character specified a cylinder and a piston, a hollow piston rod, a multiplicity of ports in said piston, a rotatable member loosely mounted in said hollow piston rod, means for operating said rotatable member, a valve closing means loosely mounted on said rotatable member and adapted to be rotated thereby, said valve closing means having projections upon its periphery which projections are adapted upon the rotation of said valve closing means to be moved to or from an operative relation with said ports.

4. In a shock-absorber of the character specified a cylinder and a piston, a hollow piston rod, ports in said piston, a plurality of rotatable members within said piston rod, means on said rotatable members for controlling said ports and means for the independent manual adjustment of said rotatable members in a manner whereby resistance to the movement of said piston in one direction may be varied without effecting resistance to movement of said piston in the other direction.

5. In a shock-absorber of the character specified a cylinder and a piston, a hollow piston rod, a rotatable member loosely mounted within said hollow piston rod, means whereby said rotatable member may be rotated, a valve-means loosely mounted on said rotatable member and adapted to be rotated thereby, a port so placed in said pis-

ton that upon a movement thereof in one direction said port must be closed by said valve closing means, another port in said piston so placed that upon the rotation of said rotatable member said valve closing means may be moved to or from an operative position relative to said port.

6. In a shock-absorber of the character specified, a cylinder and piston therein, a hollow piston rod, a hollow rotatable member within said hollow piston rod, a rotatable member within said hollow rotatable member, means for rotating said rotatable members, a valve closing means loosely mounted on said hollow rotatable member and adapted to be rotated thereby, a port in said piston which must be closed by any movement of said piston toward said valve closing means, another port adapted to be controlled by a like movement of said valve closing means only when said valve closing means is in proper adjustment in relation thereto, a disk fast on said rotatable member within said hollow rotatable member which disk is provided with a hole adapted to register with said port in said piston which must be closed by any movement of said piston toward said valve closing means, said disk being adapted to control said port upon the rotation thereof.

7. In a shock-absorber of the character specified a cylinder and a piston therein, a hollow piston rod, a hollow rotatable member within said hollow piston rod, a rotatable member within said hollow rotatable member, means for rotating said rotatable members, a valve controlling means loosely mounted on said hollow rotatable member

and provided with a projection upon its periphery, said valve controlling means being adapted to be rotated by said hollow rotatable member, a port in said piston which must be closed by any movement of said piston toward said valve controlling means, another port in said piston situated near the periphery thereof and adapted to be controlled by said projection on said valve controlling means upon a like movement of said piston only when said valve controlling means is in proper adjustment in relation thereto, a disk fast on said rotatable member within said hollow rotatable member which disk is provided with a hole adapted to register with said port in said piston which must be closed by any movement of said piston toward said valve closing means, said disk being adapted to control said port upon the rotation thereof.

8. In a shock-absorber of the character specified a cylinder and piston means, ports in said piston, a valve closing means, means adapted to move said valve closing means to or from an operative position in relation to said ports and a stop means adapted to contact with said valve closing means at different points thereon to indicate when said valve closing means is wholly in or wholly out of operative position in respect to said ports.

In testimony whereof I hereunto set my name in presence of two subscribing witnesses.

CHRISTIAN WILSON.

Witnesses:

DANFORTH W. COMINS,
HELEN A. AMES.