

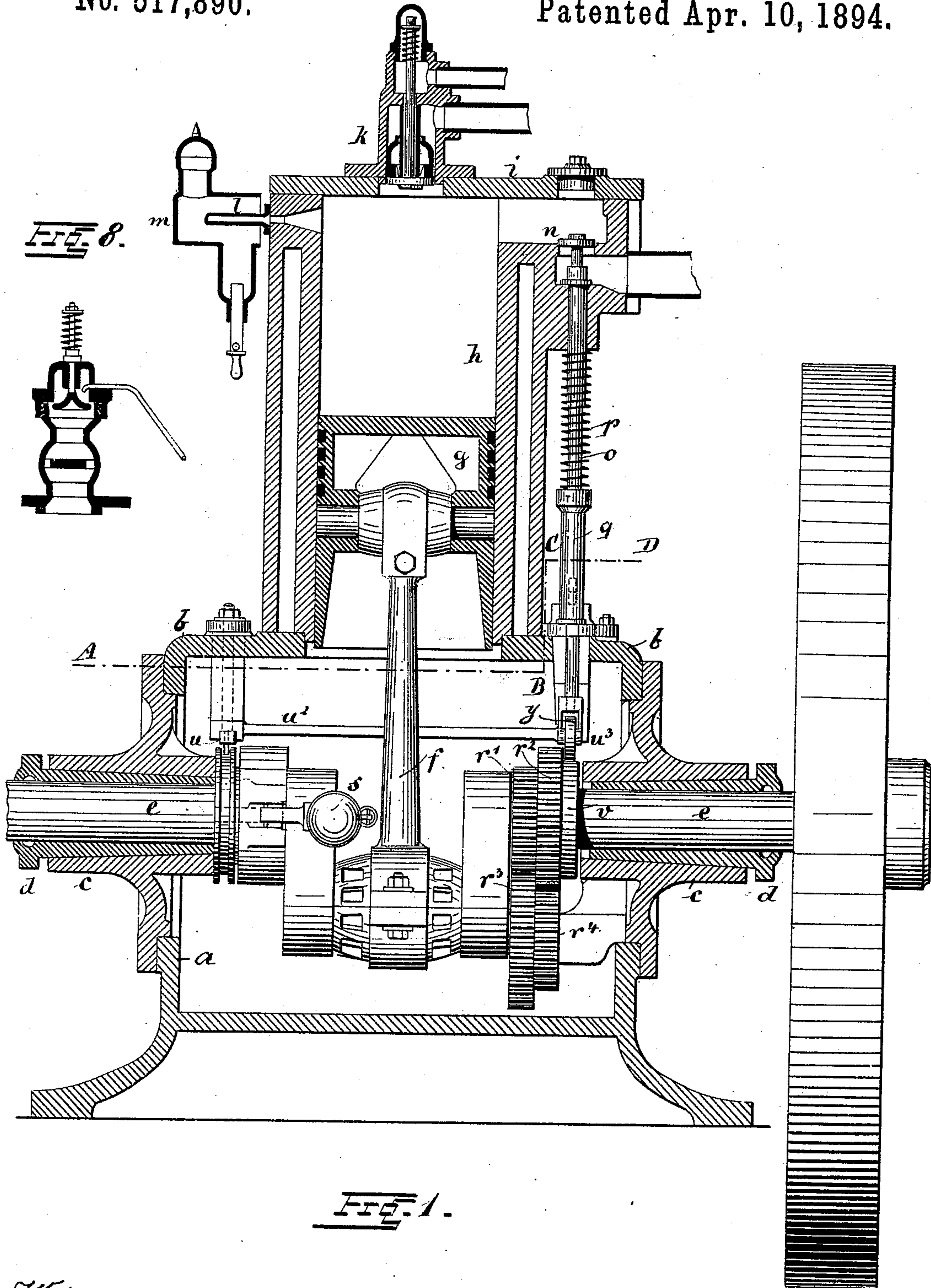
(No Model.)

3 Sheets—Sheet 1.

W. SECK.
GAS OR HYDROCARBON MOTOR.

No. 517,890.

Patented Apr. 10, 1894.



Witnesses:

G. Niemöller
E. Wolf.

Inventor:
Willy Seck
by Ottmar Lenz
Attorney

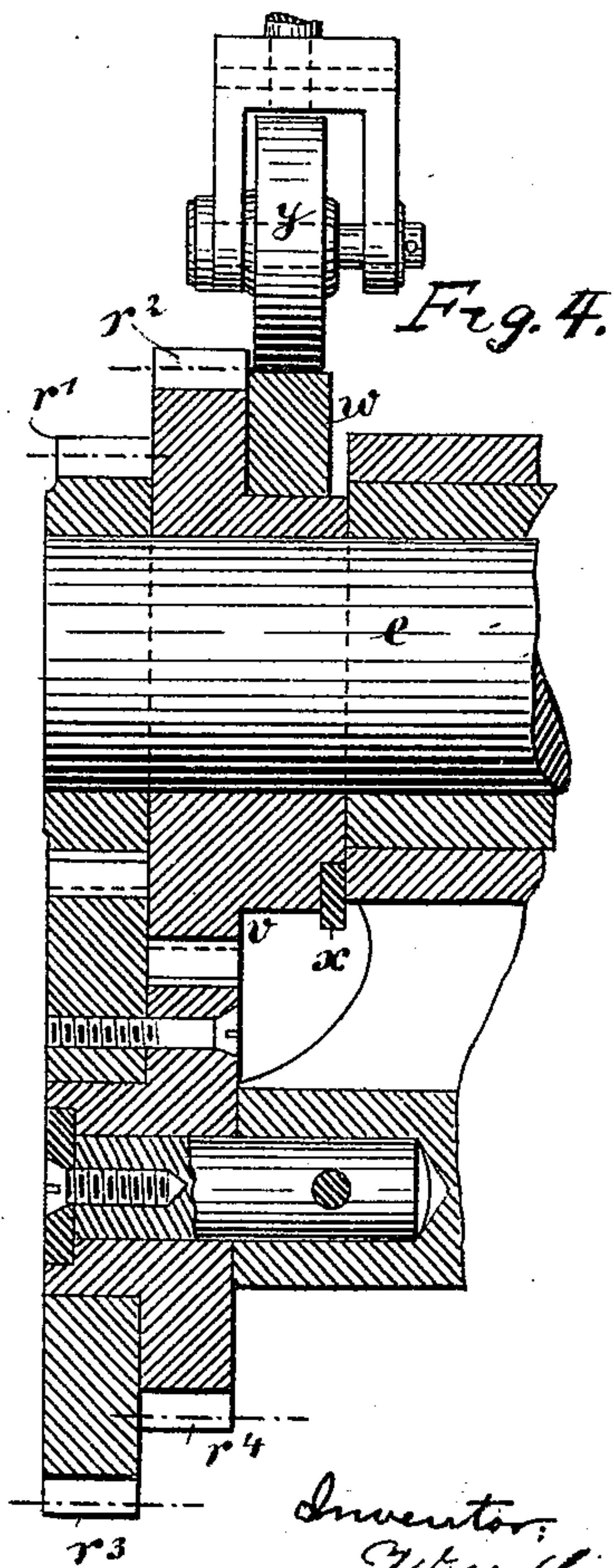
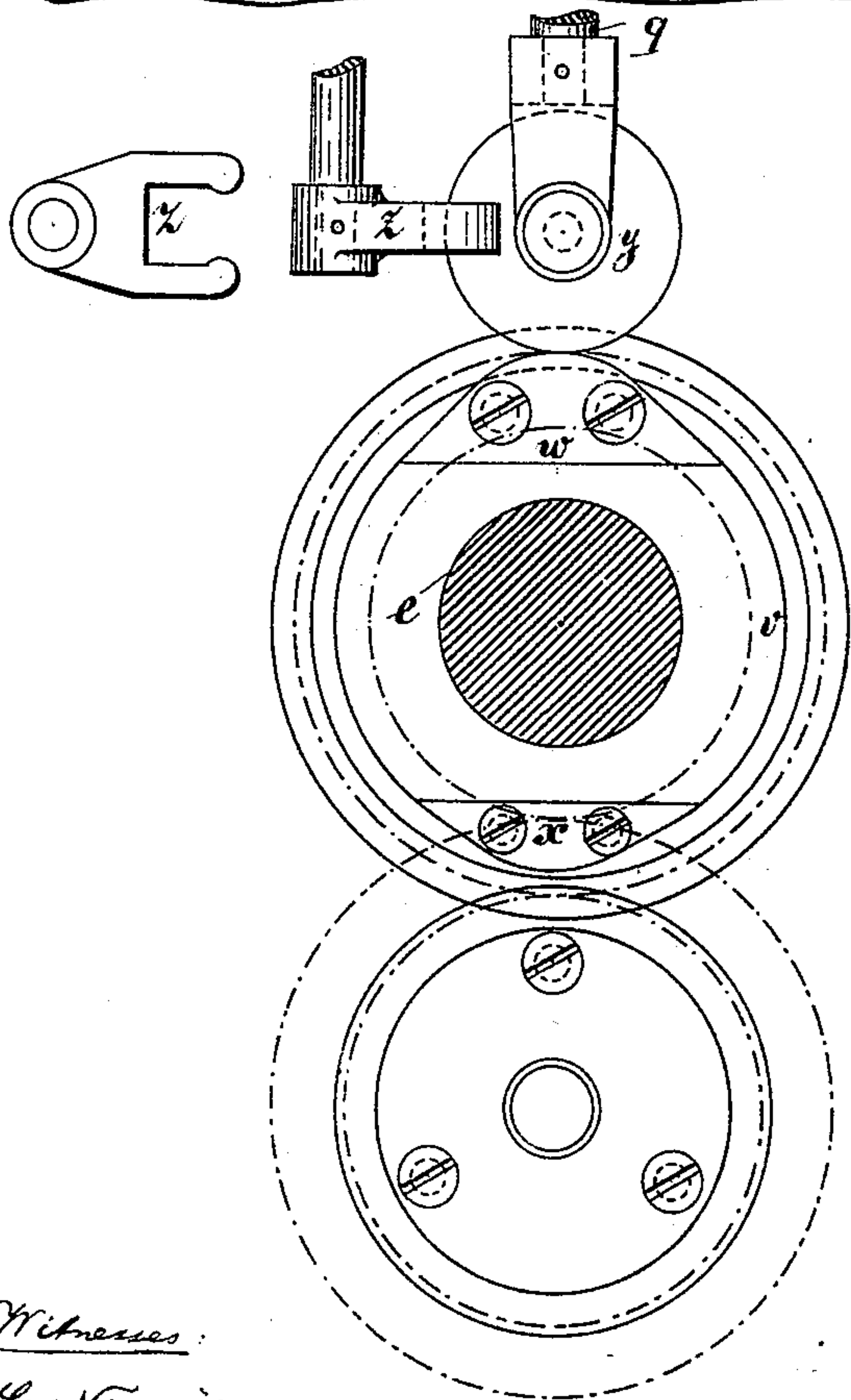
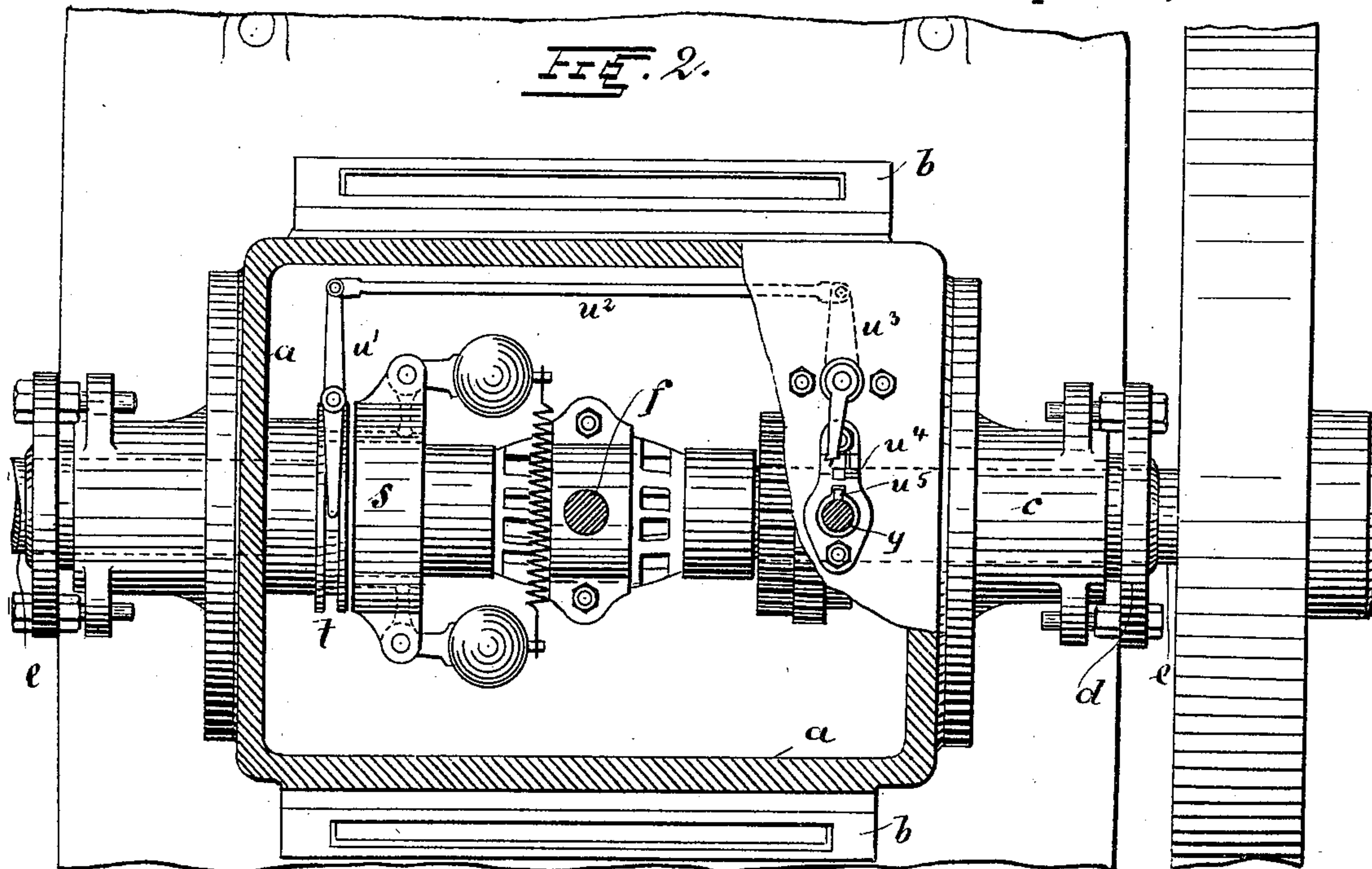
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Inventor:
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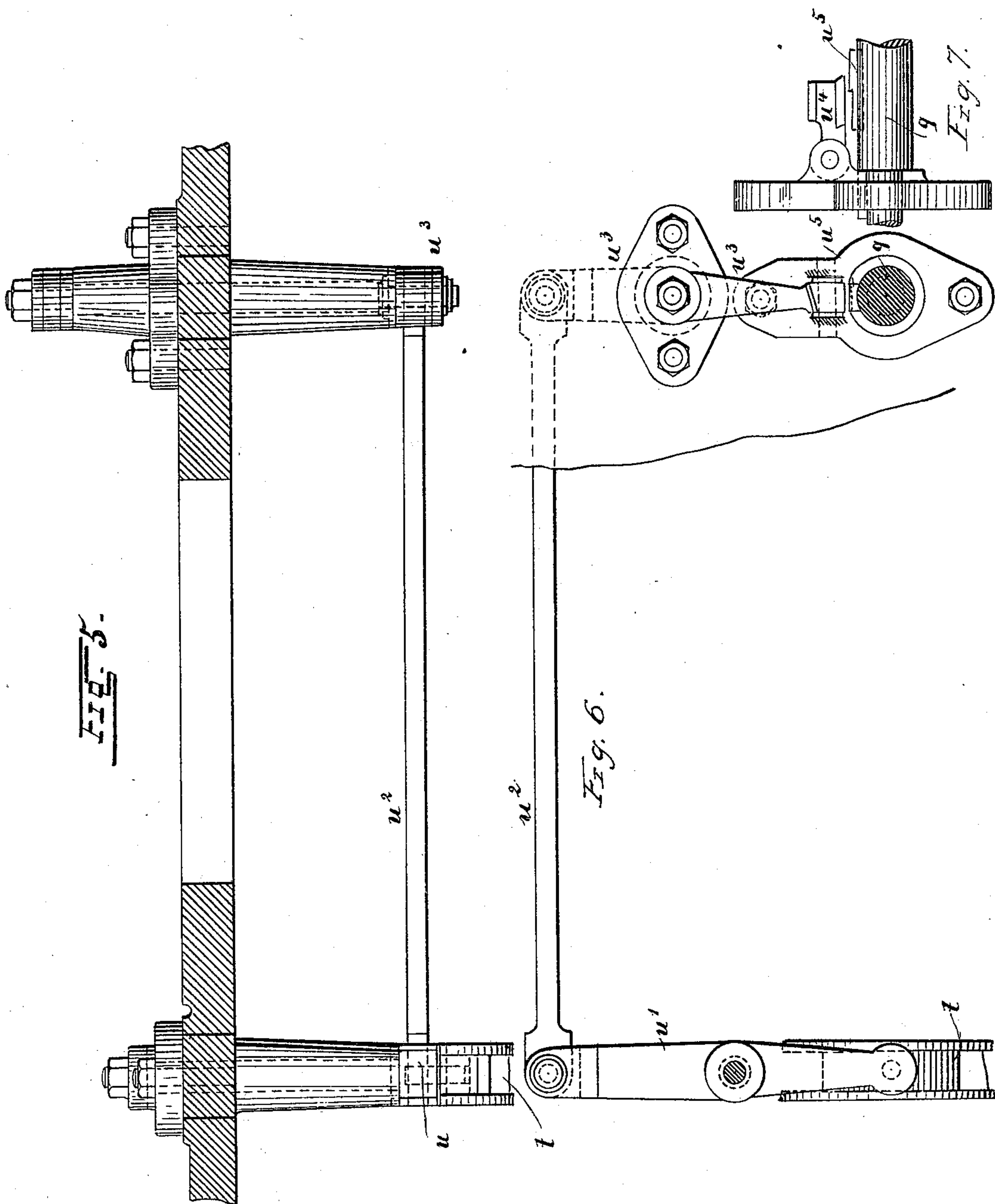
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G. Niemöller
E. Wolf.

Inventor:
Willy Seck
by Ottomar Lenz
Attorney

UNITED STATES PATENT OFFICE.

WILLY SECK, OF OBER-URSEL, GERMANY.

GAS OR HYDROCARBON MOTOR.

SPECIFICATION forming part of Letters Patent No. 517,890, dated April 10, 1894.

Application filed November 10, 1892. Serial No. 451,587. (No model.) Patented in Switzerland December 22, 1891, No. 4,454; in England December 31, 1891, No. 22,834; in France January 21, 1892, No. 218,837; in Austria-Hungary April 25, 1892, No. 21,764 and No. 69,503; in Belgium May 20, 1892, No. 99,746; in Spain May 27, 1892, No. 13,371, and in Italy October 31, 1892, No. 32,903.

To all whom it may concern:

Be it known that I, WILLY SECK, of Ober-Ursel, in the Kingdom of Prussia, German Empire, have invented a new and useful Improvement in Gas or Hydrocarbon Motors, (for which I have obtained Letters Patent in England, No. 22,834, dated December 31, 1891; in France, No. 218,837, dated January 21, 1892; in Switzerland, (prov.) No. 4,454, dated December 22, 1891; in Austria-Hungary, No. 21,764 and No. 69,503, dated April 25, 1892; in Spain, No. 13,371, dated May 27, 1892; in Belgium, No. 99,746, dated May 20, 1892, and in Italy, No. 32,903, dated October 31, 1892,) of which the following is a specification.

My invention relates to an improved construction of a gas-motor, equally applicable to hydro-carbon motors, and the object of my invention is to provide a motor of great simplicity of construction, the working parts of which are so constructed and arranged with relation to each other as to enable their being lodged in a closed casing partially filled with oil, water or other lubricating substance.

By the improved construction hereinafter described, not only considerable economy of space, but also a complete self-lubrication of the working parts are obtained, and, further, the improved motor offers the great advantage that no injury can be done to the attendant or other persons by the working parts, which are all inclosed in the casing, and said invention consists in the novel arrangement and combination of parts hereinafter described and claimed.

In general, the working order of the improved gas- or hydro-carbon motor is the same as that of other known constructions; the gas is supplied by a gas feed pipe or by a generator in which hydro-carbon-oil is vaporized; the said gas or vapors are drawn into the machine by the suction of the piston, which simultaneously draws in atmospheric air; the mixture of gas and air is ignited by a flame and an exhaust valve serves to discharge the products of combustion.

In the accompanying drawings, Figure 1 is a longitudinal, vertical section of a gas-mo-

tor constructed according to my invention. Fig. 2 is a cross-section drawn to line A—B. C. D. of Fig. 1. Fig. 3 is a detail side elevation illustrating the mechanism for controlling the exhaust valve, drawn to an enlarged scale. Fig. 4 is a vertical section of the same drawn at right angles thereto. Fig. 5 is a detail side view of the mechanism by which the valve motion is controlled according to the varying positions of the regulator. Fig. 6 is a top view of the same. Fig. 7 is an enlarged detail side view of a part of the same; and Fig. 8 represents a gas generator, which however, may be of any known construction destined to replace the gas-inlet-valve, if the motor is to be worked by hydro-carbon-oil, instead of by gas.

In the drawings *a* is a closed casing, within which the principal working parts of the machine are arranged.

b are top-plates secured to the casing, which plates being removed, give admittance to the interior of the casing.

c are journal-boxes to receive the bearings *d* of the shaft-journals *e*, the bore of said boxes *c* may be slightly tapering according to the tapering shape of the bearings *d* which, being cut in the direction of their length, are forced against each other by the conical bore of the box *c*.

f is the connecting rod mounted on the crank of shaft *e*, and driving the piston *g* within the cylinder *h* of the machine.

i is the top-plate of said cylinder and *k* the valve through which gas and air are drawn into the cylinder *h* by the suction of piston *g*. In hydro-carbon-motors the said valve *k* is replaced by a suitable gas-generator, such as shown in Fig. 8, for supplying hydro-carbon vapors and air to the cylinder *h*.

l is the igniting-pipe and *m* the lamp for heating the same, *n* the valve for the exhaust of the products of combustion, *o* the valve-rod, *p* a spring tending to close the valve *n*, *q* an extension of the valve-rod *o*, serving to open the valve at suitable intervals, under the command of the regulator, as hereinafter described.

*r*¹, *r*², *r*³, *r*⁴ are four gear wheels for the com-

mand of the valve, said wheels being shown in a larger scale in Figs. 3 and 4.

s is the regulator of the machine, t a disk or wheel with a circular groove in the periphery thereof, said disk varying its position according to that of the governor s .

u' , u^2 , u^3 are a set of connecting rods which transmit motion from the disk t to the parts which command the exhaust-valve n , as more fully represented in Figs. 5, 6 and 7.

The exhaust-valve n , is under control of a cam v secured to or integral with a gear wheel r^2 loosely mounted on the shaft e at the side of another gear wheel r' , mounted fixedly thereto. Said wheel r' gears into a gear wheel r^3 loosely mounted on a fixed trunnion of the machine, and to the said wheel r^3 another wheel r^4 is cast or secured, meshing with the loose wheel r^2 on the journal e . The size of the wheels r' , r^2 , r^3 , r^4 , is so calculated that r^2 makes one revolution, while the wheel r' fast on the shaft e makes two. To the said wheel r^2 a disk or sheave v is cast or secured, carrying the main cam w , Figs. 3 and 4, and an auxiliary cam x . The main cam w serves to operate on the exhaust-valve n while the auxiliary cam x is provided to lift the said exhaust-valve only when the motor is started to permit the escape of part of the compressed gas and air. The said cams w and x revolving with the wheel r^2 have a bearing against a sheave y , carried by the extension q of the valve-rod o . The said sheave y is capable of being shifted on its stem by means of a fork z , as shown in Fig. 3, and, according to the position of said sheave y , it will be struck either by the cam w alone, or by both cams w and x during one revolution of the wheel r^2 and disk v . If both cams strike the sheave y , the exhaust-valve n will be lifted twice during one revolution of the wheel r^2 , and part of the compressed gas is permitted to escape before being exploded. The lift of the valve n is further under control of the governor s through the medium of the disk t and connecting-rods u' , u^2 , u^3 , the controlling device acting in the following manner: u' and u^3 are double-armed levers turning on suitable pivots and connected by the rod u^2 . The free end of the lever or rod u' engages by a pin or anti-friction-roller into the groove of the disk t of the governor, causing the other arm of said lever u' to swing in the direction opposite to that in which the disk t is shifted by the governor s . The rod u^2 transmits the corresponding motion to the lever u^3 , the free end of which carries an inclined surface, which, when bearing against the pawl u^4 , forces the same into engagement with a notch formed or secured to the rod q , whereby said rod is prevented from being lowered by the pressure of the spring o , and, as long as the said pawl u^4 continues in engagement with the said notch u^5 , the exhaust-valve n is kept open and the downward throw of piston g performs no drawing in of gas

and air till the said valve n is closed again. Owing to the power stored in the fly-wheel on the shaft e , the piston g will continue to work in the cylinder h till the speed or revolution has diminished so far as to allow the governor s to return into its normal position, thereby shifting the disk t and levers u' and u^3 into the opposite direction and throwing the inclined face on the lever u^3 out of engagement with the pawl u^4 . The said pawl being free, is drawn out of engagement of the notch u^5 by a spring, and the rods q , and o are free to be forced down by the spring p whereby the valve n is closed and the piston g draws into the cylinder a fresh quantity of gas and air for being exploded.

I claim as my invention—

1. In a gas- or hydro-carbon-motor, the combination of a crank-shaft, a suitable train of gear and piston connected therewith, and a cam disk mounted loosely on the crank-shaft, said cam disk making only one revolution, while the shaft makes two, substantially as and for the purpose set forth.

2. In a gas- or hydro-carbon-motor, the combination with the crank-shaft, and piston connected therewith, of a train of gear wheels driven by the crank-shaft, a cam disk loosely mounted on the said crank-shaft and connected with said train of gear, an exhaust-valve, the rod of which is under control of said cam disk, and means for shifting the friction roller of said rod, substantially as and for the purpose set forth.

3. In a gas- or petroleum-motor, the combination with the crank-shaft e , and piston g connected therewith, of a toothed wheel r' fast on the crank-shaft, a toothed wheel r^2 in gear with r' , a toothed wheel r^4 secured to or integral with r^3 , and a toothed wheel r^2 in gear with r^4 and loose on the crank-shaft, a cam disk v secured to or integral with r^2 , a sheave or roller y under control of said cam disk, a fork z to shift said roller y , and an exhaust-valve n carrying said roller y , substantially as and for the purpose set forth.

4. In a gas- or hydro-carbon-motor, the combination with the crank-shaft e and piston g connected therewith, a cam disk v having cams w and x , wheels r' , r^2 , r^3 , r^4 , connected with said cam disk, and crank-shaft, whereby the cam disk makes only half as many revolutions as the crank-shaft, and means for shifting the roller y , against which one or both of the cams are working, as desired, substantially as and for the purpose set forth.

5. In a gas- or hydro-carbon-motor, the combination of a crank-shaft gear r' keyed thereto and gear r^2 loosely carried thereon, a cam disk secured to said gear r^2 , and gears r^3 , r^4 secured together and adapted to engage with said gears r' , r^2 , whereby the cam disk will be caused to make one revolution for every two revolutions of the crank-shaft, substantially as and for the purposes specified.

6. In a gas- or hydro-carbon-motor, the com-

5 bination of a crank-shaft, gear r' keyed there-
to and gear r^2 loosely carried thereon, a cam
disk secured to said gear r^2 , gears r^3 , r^4 se-
cured together and adapted to engage with
10 said gears r' , r^2 , whereby the cam disk will
be caused to make one revolution for every
two revolutions of the crank-shaft, an ex-
haust-valve, the rod of which is provided with
a friction-roller and is under control of said
10 cam disk, and means for shifting said fric-

tion-roller, substantially as and for the pur-
poses specified.

In testimony whereof I have signed my
name to this specification in the presence of
two subscribing witnesses.

WILLY SECK.

Witnesses:

ALVESTO S. HOGUE,
FRANK H. MASON.