

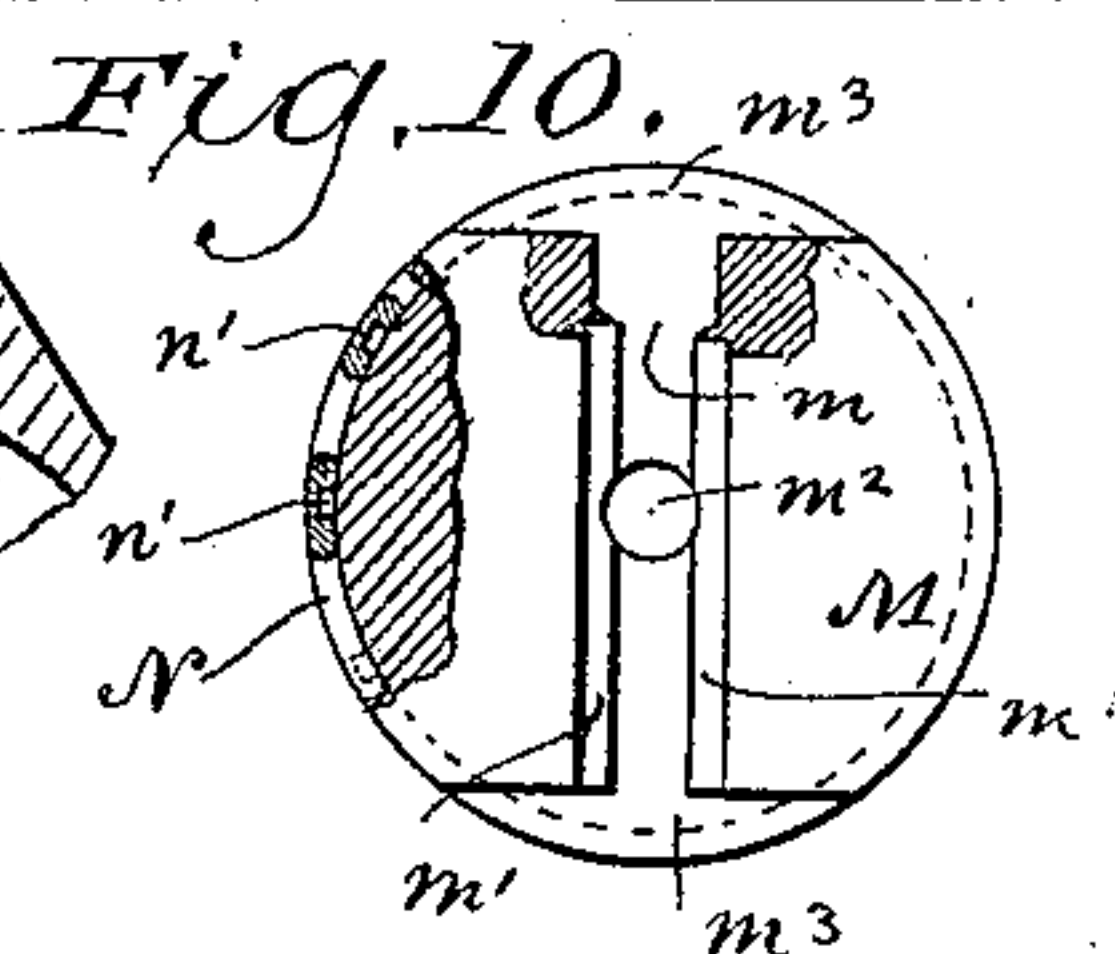
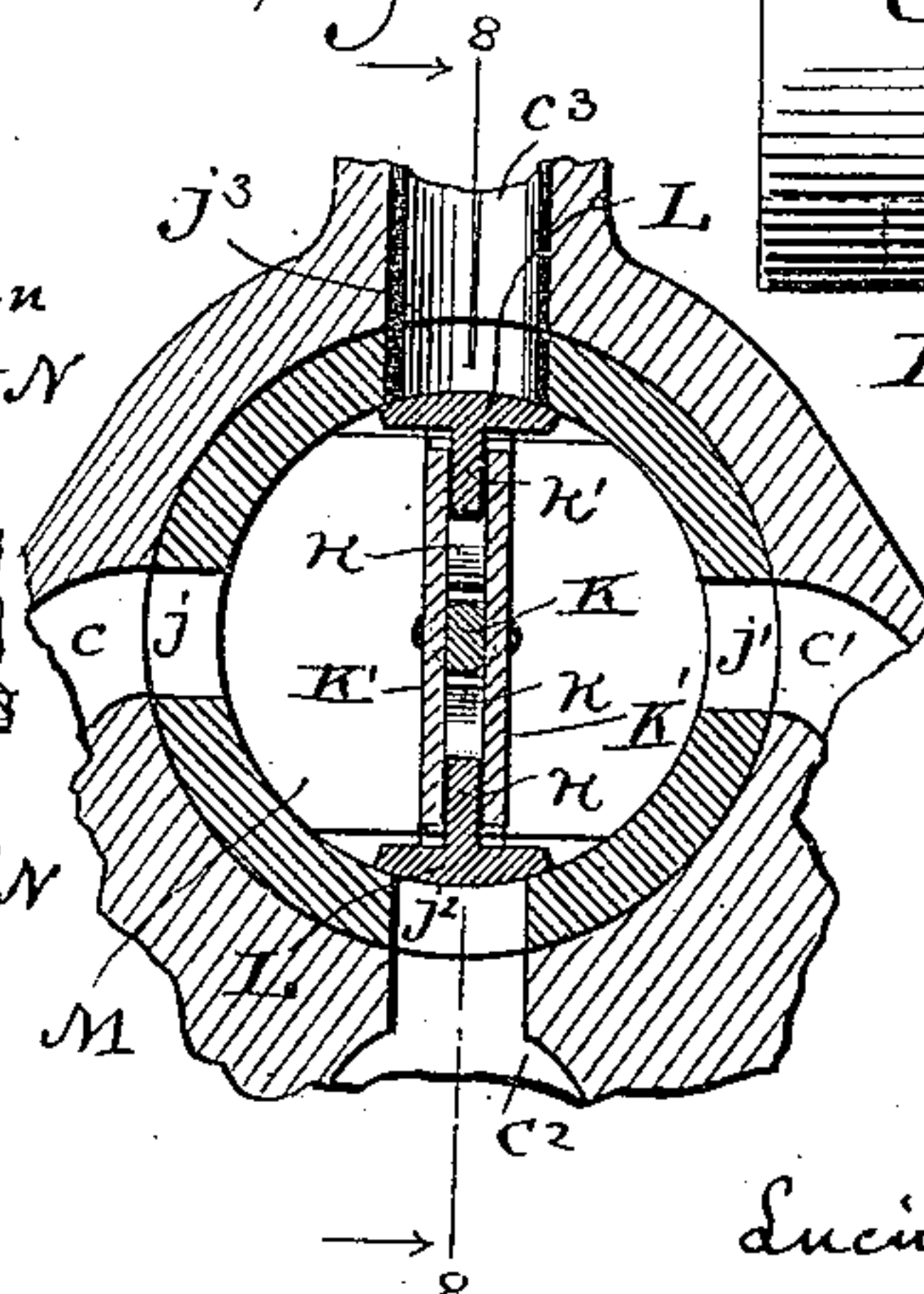
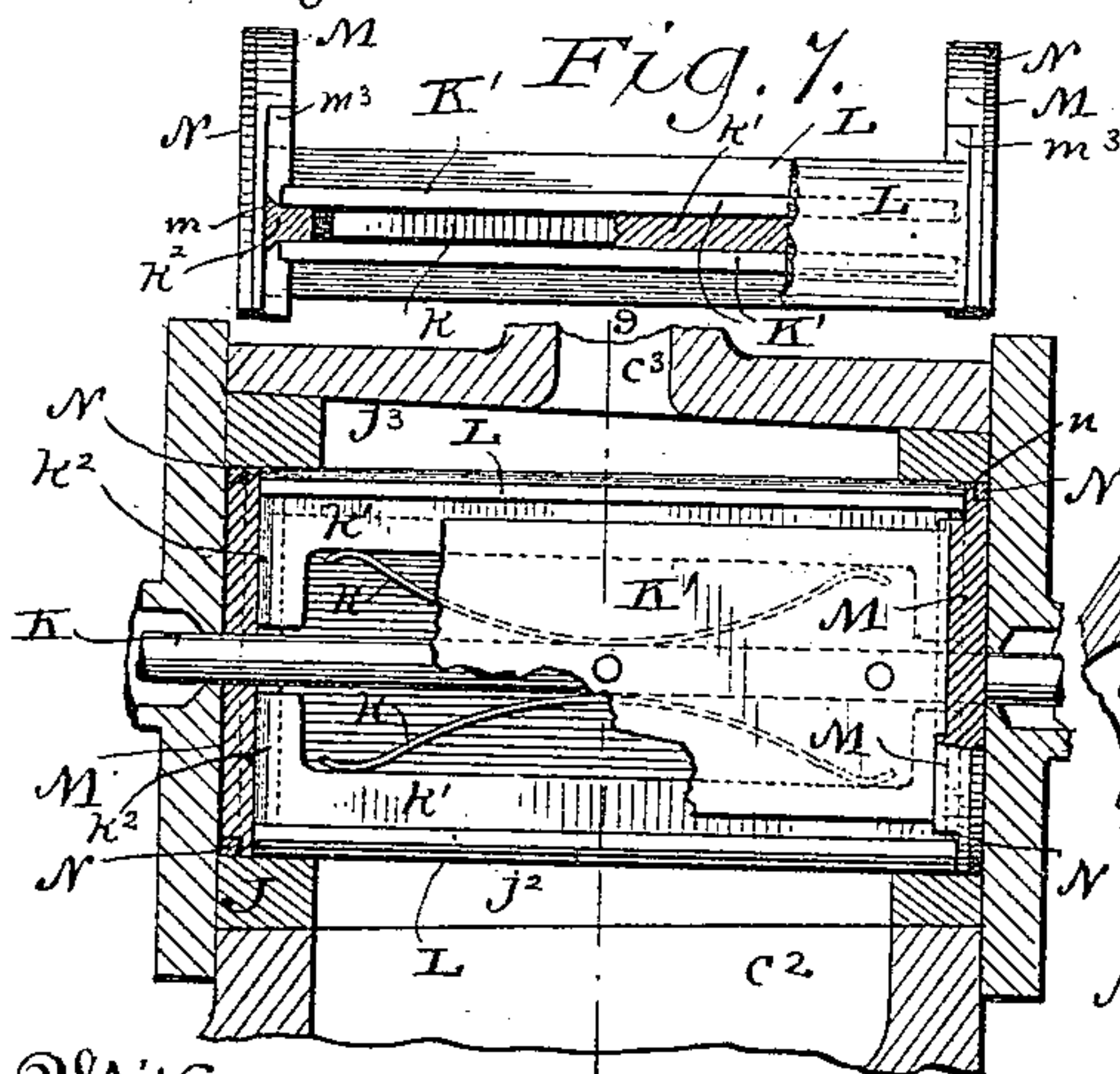
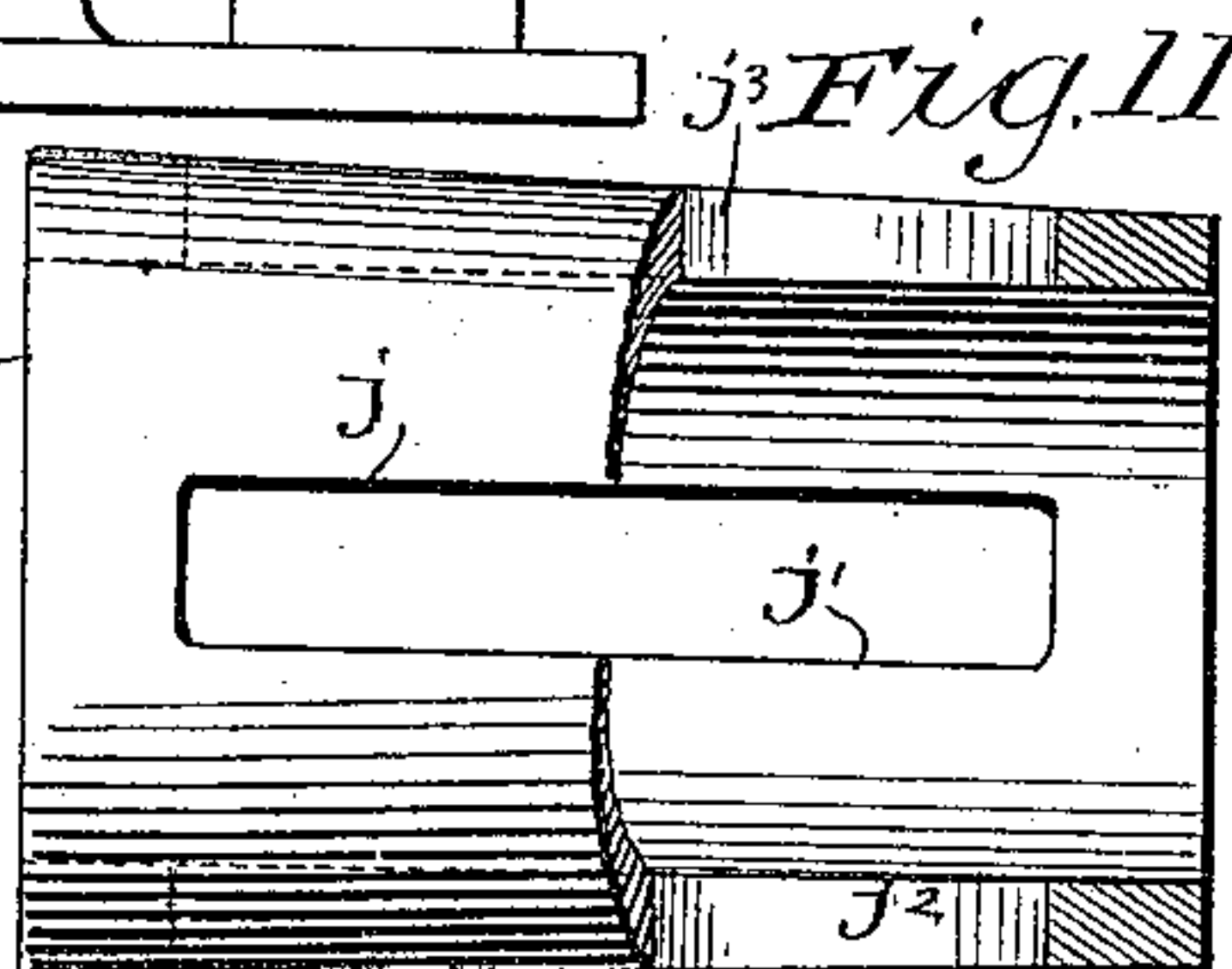
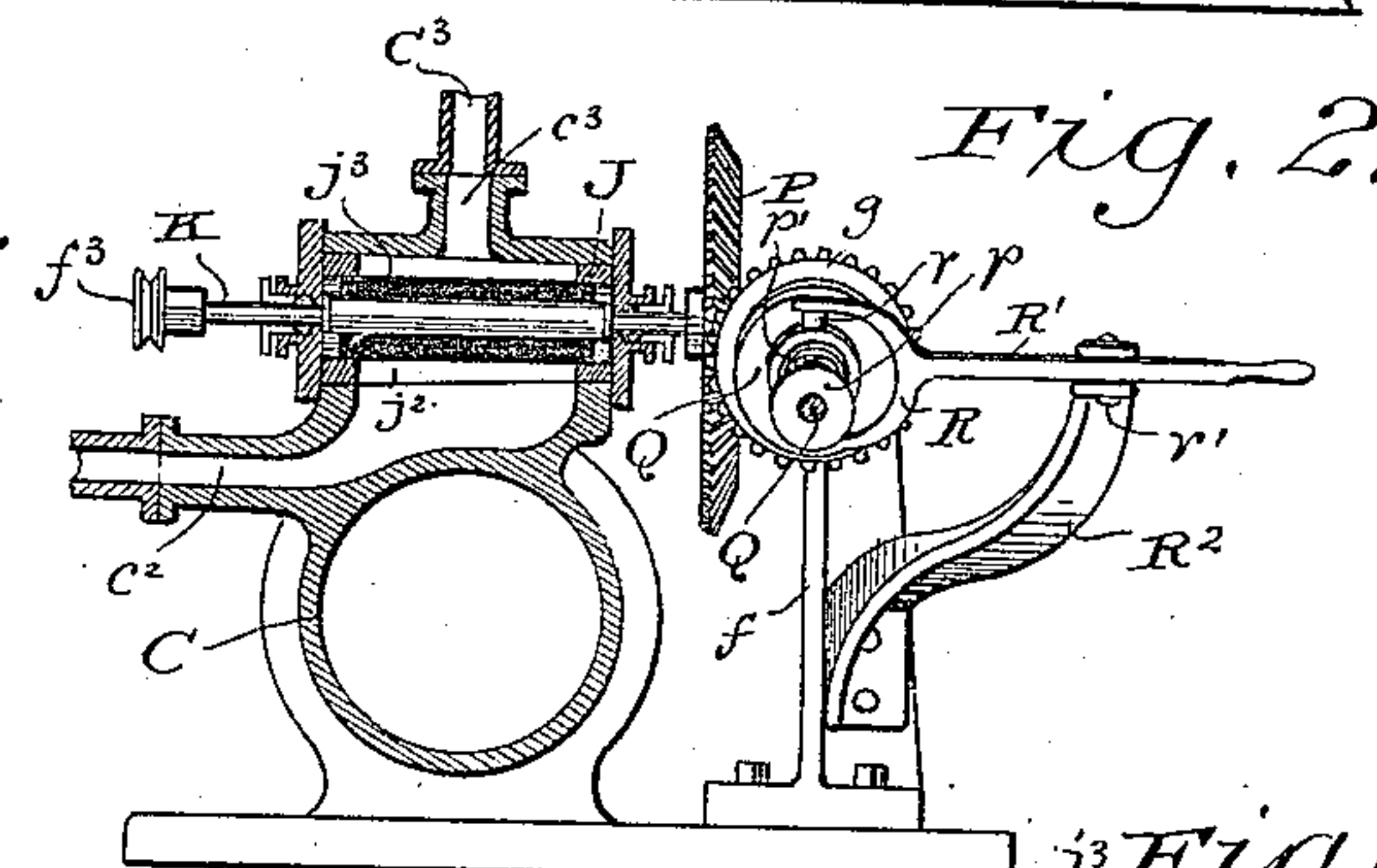
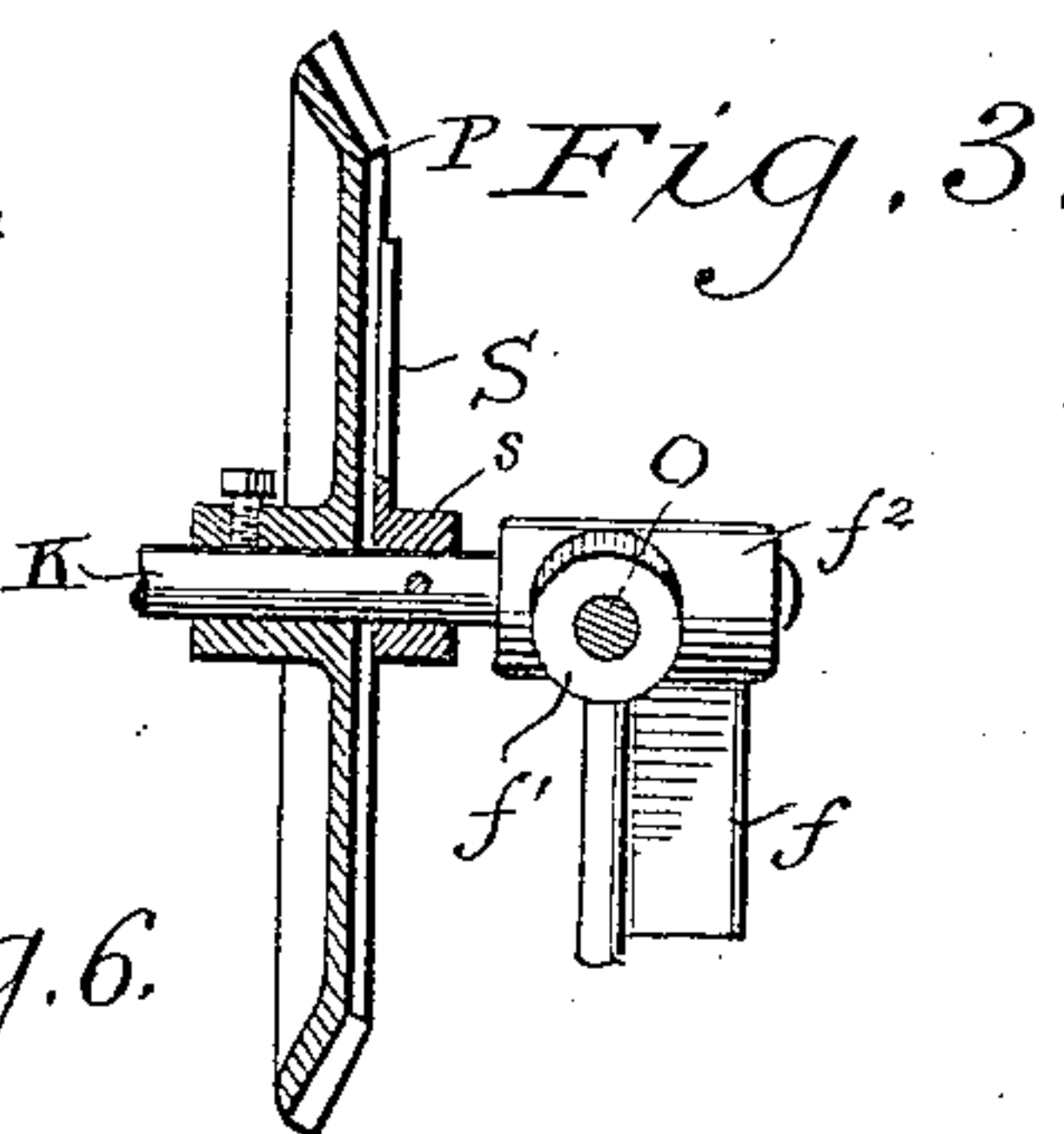
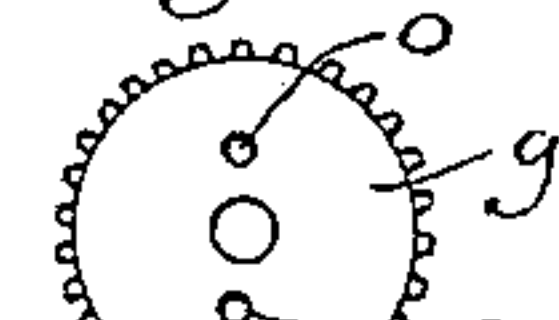
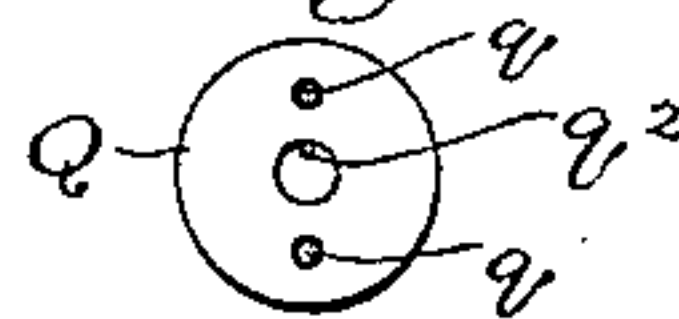
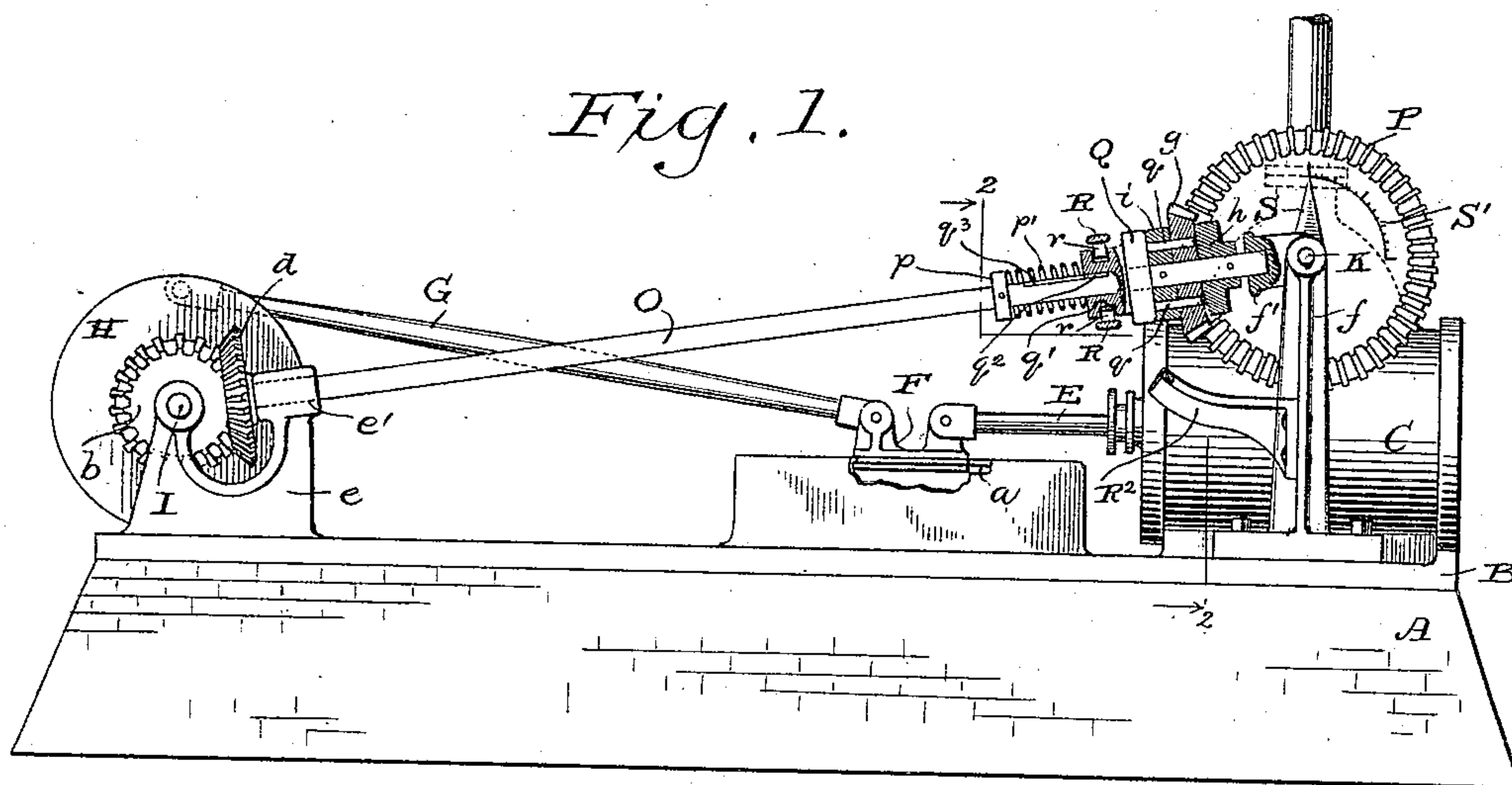
(No Model.)

2 Sheets—Sheet 1.

L. A. LE MIEUX.
STEAM ENGINE VALVE.

No. 441,176.

Patented Nov. 25, 1890.



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(No Model.)

2 Sheets—Sheet 2.

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Fig. 12.

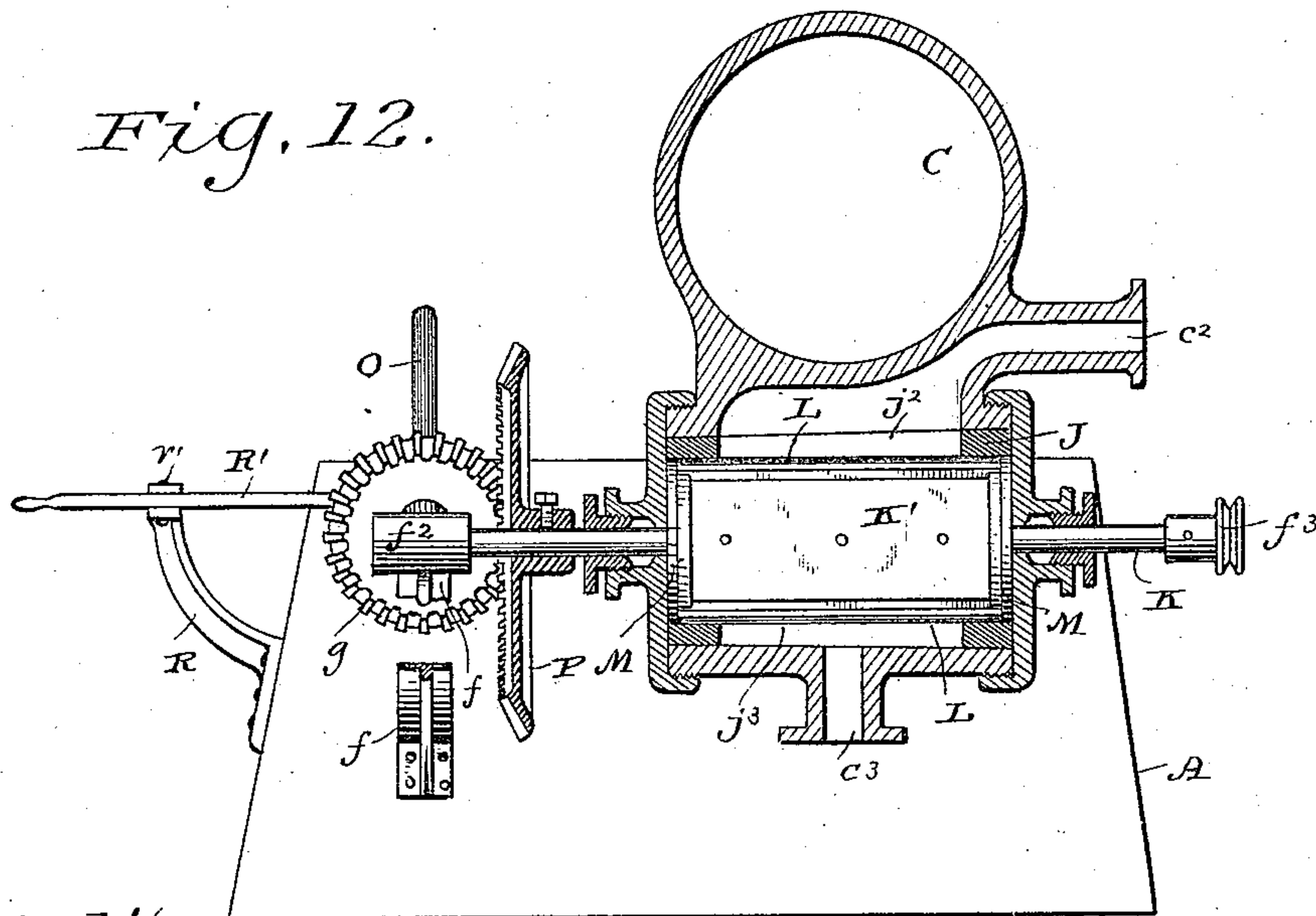


Fig. 14.

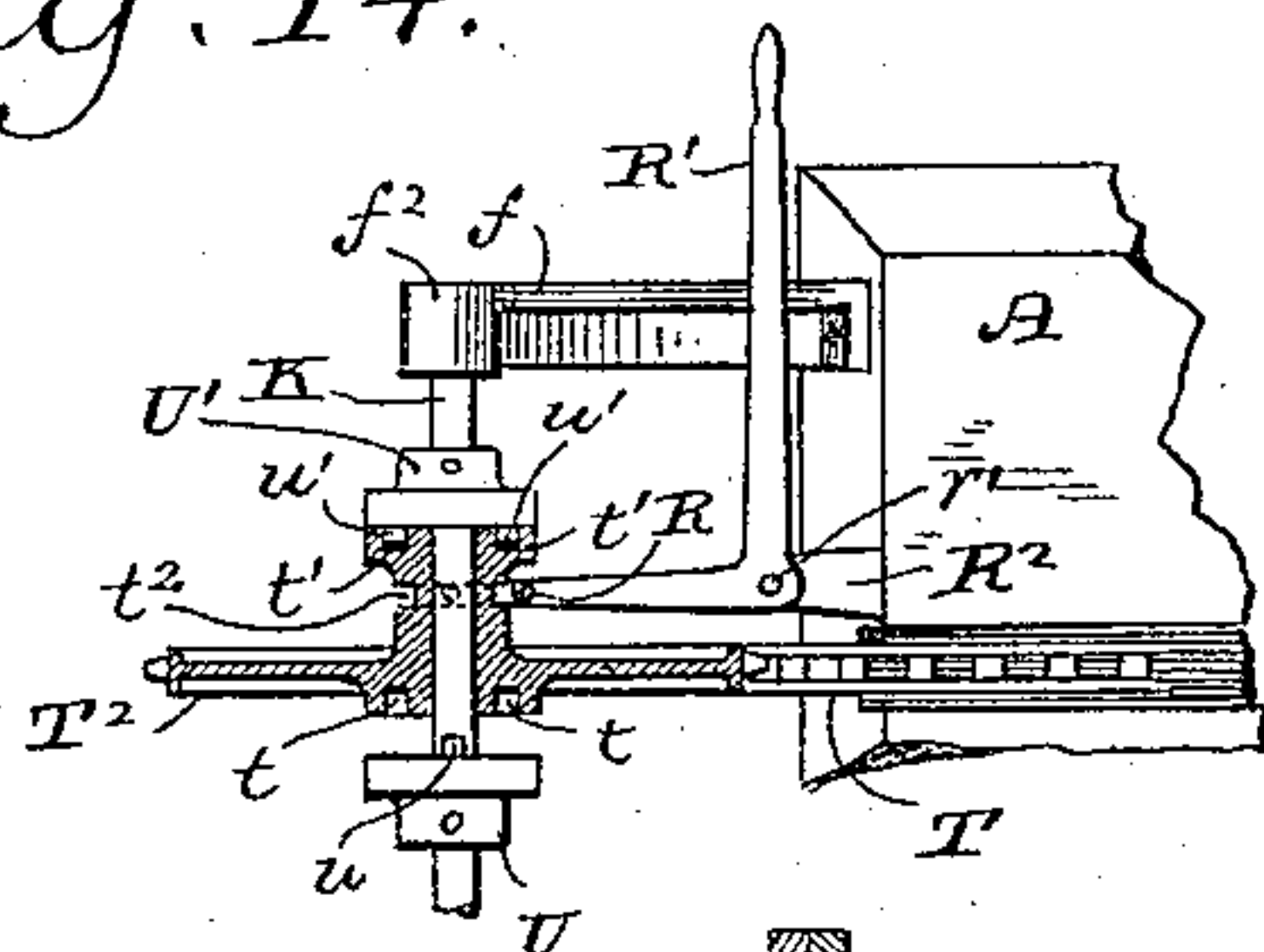
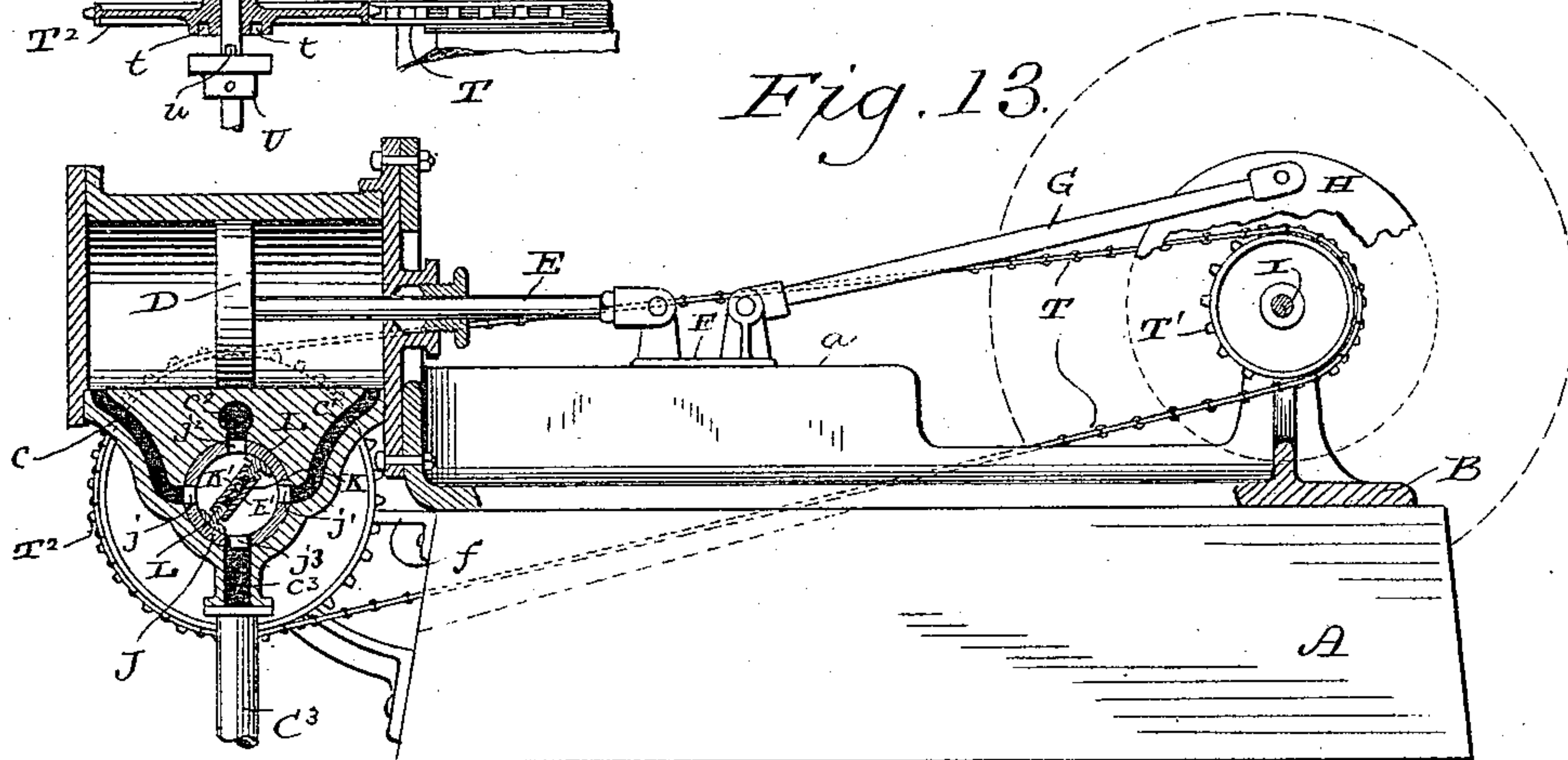


Fig. 13.



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UNITED STATES PATENT OFFICE.

LUCIUS A. LE MIEUX, OF SEYMOUR, WISCONSIN.

STEAM-ENGINE VALVE.

SPECIFICATION forming part of Letters Patent No. 441,176, dated November 25, 1890.

Application filed February 11, 1889. Serial No. 299,404 (No model.)

To all whom it may concern:

Be it known that I, LUCIUS A. LE MIEUX, of Seymour, in the county of Outagamie, and in the State of Wisconsin, have invented certain new and useful Improvements in Steam-Engine Valves; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to steam-engines; and it consists in certain peculiarities of construction, as will be fully set forth hereinafter and subsequently claimed.

In the drawings, Figure 1 is a side elevation, partly in section, representing one form of my present invention, with the balance-wheel removed and parts broken away to show the construction. Fig. 2 is a section on the line 2 2 of Fig. 1. Fig. 3 is a detail view of the valve driving-wheel and connections. Figs. 4, 5, and 6 are details of the reversing mechanism shown in Fig. 1. Figs. 7 to 11, inclusive, are detail views of the valve and valve-chest. Fig. 12 represents in end elevation and transverse vertical section a modified form of my engine. Fig. 13 represents in side elevation and section, a further modification. Fig. 14 is a detail view of the reversing mechanism employed with the form of my device shown in Fig. 13.

A represents the base or bed of my engine, and B the bed-plate.

C is the steam-cylinder, D the piston, and E the piston-rod, whose outer end is connected to the cross-head F, sliding in guides *a*, the other end of the cross-head being similarly connected to the connecting-rod G, wristed to the main drive or crank wheel H on the main driving-shaft I of the engine.

J is my independent valve-chest, which is made, as shown best in Fig. 11, so that it may be removed for repair or replaced by another when worn out without displacement or injury to the other parts of my engine. In Figs. 1, 2, 8, and 9 this valve-chest is shown above the steam-cylinder while in Figs. 12 and 13 it is shown below the same, and in both arrangements I have the live-steam ports *c* and *c'* communicating with the valve-chest and cylinder, the inlet-port *c*², and the exhaust-port *c*³. The valve-chest J tapers on the outside from one end to the other, and is

provided with longitudinal openings *j j' j² j³* corresponding to the described ports *c c' c² c³*, as best shown in Fig. 9, which is a central vertical section on the line 9 9 of Fig. 8, and which openings are made true to any gage desired, thus insuring a degree of accuracy practically impossible with the ports as ordinarily cast in a valve-chest.

By reason of making my valve-chest J tapering it can be held securely in a similarly-tapered hole without the need of any fixtures.

I will next describe my preferred form of valve illustrated in the drawings.

K is a shaft, to which are secured the parallel plates *K' K'*, as shown, one on each side, or, if preferred, the shaft and plates may be all cast solidly together, making the parts *K' K'* practically a bar with opposing longitudinal recesses, whichever may be found most convenient in any case. In these recesses are located the springs *k k* and the shanks *k' k'* of the T-shaped valve-plates L, whose faces are rounded to correspond with the interior of the valve-chest J, and are wider than the port-openings in said valve-chest.

M M represent the heads or end pieces of my valve, and I have illustrated their preferred construction in Fig. 10, wherein I have shown a central dovetailed groove *m*, bordered by shallower flat grooves *m' m'* on each side thereof, central perforation *m²* for the reception of the shaft K, and transverse offsets or shoulders *m³ m³* of the same depth as the groove *m*. The end edges of the shanks *k'* of the valve-plates L are preferably somewhat larger than the intermediate portions of the said shanks, as shown best in Fig. 8, (which is a vertical central section on the line 8 8 of Fig. 9,) and dovetailed, as best shown at *k²* in Fig. 7, to fit the dovetailed groove *m*, the heads of the plate L fitting in the offsets *m³*, and the flat grooves *m' m'* are to receive the ends of the parallel plates or recessed bar *K' K'*, the whole being firmly held together by the described dovetailed construction.

It is obvious that I may cast the heads M, recessed bar *K' K'*, and shaft K all solidly together, if desired; but I prefer the construction shown and described in ordinary cases.

The heads M are each provided with an exterior circumferential offset or shoulder to receive a split flexible metallic ring N and interposed packing-ring n of rubber or any suitable material, the inner periphery of the ring N being provided with mortises at intervals to receive pins n' n' , projecting from the recessed periphery of the said head M, all as shown in detail in Fig. 10. If found necessary, the recesses between the plates K' K' or in the bar used in place thereof may be filled with any suitable packing between the shaft K and shanks k' of the valve-plates L on both sides of the springs k , so as to guard against the escape of steam at these points.

My engine is preferably operated with the connection between the main driving-shaft I and valve-shaft K, (shown in Figs. 1, 2, 3, and 12,) although I show other means in Fig. 13. In the preferred form first named the main shaft I carries a bevel gear-wheel b , which meshes with a like wheel d on one end of a power-transmitting shaft O, supported in suitable bearings, as $e' f'$, formed in the standards $e f$, rising from the bed-plate B, or otherwise secured to the engine, and which shaft O carries near its other end a loose bevel gear-wheel g , held between two collars $h i$, which are fast on said shaft and in mesh with the bevel gear-wheel P, fast on the valve-shaft K, the wheel P being double the size of the wheel g .

Q is a clutch having two projecting pins $q q$ on one face, which normally extend through holes $o' o'$ in the collar i and corresponding holes $o o$ in the bevel gear-wheel g , as shown best in Fig. 1, the said clutch being further provided with a circumferential groove q' , and a feather q^2 , the latter projecting into the bore of the clutch, as shown in Fig. 4, and adapted to slide in the longitudinal groove q^3 in the shaft O, which latter has a collar p fast thereon, with a spring p' surrounding said shaft between said collar and clutch.

R is a spanner having teeth $r r$, which engage with the described groove q' in the clutch, the said spanner and its handle R' forming a shifting-lever for said clutch, and the said handle being pivoted at r' to a suitable arm or support r^2 .

S is a pointer, whose hub s is fast on the valve-shaft K adjacent to the valve-driving gear-wheel P, which latter is provided on said adjacent face with a graduated scale S' for indicating the position of the valve at any time, and for affording a means of accurately setting said valve to any desired position with relation to the ports in the valve-chest. One end of the valve-shaft K is supported in a suitable bearing, as f^2 , and the other end carries a pulley f^3 or other gear for connection with a governor. (Not shown.)

As shown in Figs. 12 and 13, and as previously stated, I may, if desired, construct my engine with the valve-chest below the steam-cylinder, and, in fact, I regard this as

really the most desirable construction, for the reason that in such position the exhaust-port c^3 will be at the bottom, and hence the cylinder will be self-draining, and as the exhaust-pipe C³ is always open the water of condensation is driven off automatically each time the engine exhausts, thus doing away with drainage-cocks. The exhaust-port and its opening in the valve-chest are larger than the live-steam ports c and c' and openings j and j' , to insure the rapid discharge of the exhaust-steam and prevent back-pressure, and I preferably also make the inlet-port c^2 and opening j^2 larger than the said live-steam ports and openings, to give the steam freer access to the interior of the valve-chest J.

In Figs. 13 and 14 I show a different means of connection between the main driving-shaft I and valve-shaft K—namely, a sprocket-chain and sprocket-wheels.

T represents the chain; T', the sprocket-wheel on the shaft I, and T² the sprocket-wheel on the shaft K. The other parts are exactly the same as hereinbefore described, except the clutch or reversing mechanism, which may be different, as shown.

In Fig. 14 I show the hub of the wheel T², provided with mortises $t t$ on one end and other mortises $t' t'$ on the opposite end and a circumferential groove t^2 between the two ends of the hub for the reception of the teeth of the spanner R, whose handle-lever is pivoted at r' to an arm or support R², as before described.

U U' are collars on the shaft K, one on each side of the wheel T², whose hub forms the clutch, as just described, the collar U having pins u for engagement with the mortises t , and the collar U' having pins u' for engagement with the mortises t' .

My independent valve-chest J, although tapered exteriorly, as described, has a true cylindrical bore or interior, and hence the contact of my spring-impelled valve-plates L is equal and on the same line at all points.

Although I have only shown my pointer and scale in connection with the bevel-wheel, it will be understood that the same may be applied to the sprocket-wheel shown in Figs. 13 and 14, if desired, and either the valve driving-wheel or the pointer, or both, may be adjustably secured to the valve-shaft.

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

In a steam-engine, the combination of a steam-cylinder, a valve-chest having a cylindrical interior, and openings communicating with the steam-ports of the said cylinder, of the valve-shaft, a bar or plate secured thereto with longitudinal recesses opposite each other on each side of the shaft, valve-plates having shanks fitting in said recesses, and transverse heads rounded on their outer faces to conform to the interior surface of said valve-chest and wider than the openings therein, springs located in said recesses be-

tween the shaft and the shanks of the valve-plates, and valve-heads at each end of the recessed bar or plates having grooves for the reception and guidance of the ends of the
5 valve-plates, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee,

in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

LUCIUS A. LE MIEUX.

Witnesses:

H. G. UNDERWOOD,
WILLIAM KLUG.