

(No Model.)

2 Sheets—Sheet 1.

K. E. VESTERDAHL.  
CUT-OFF GEAR FOR STEAM ENGINES.

No. 459,568.

Patented Sept. 15, 1891.

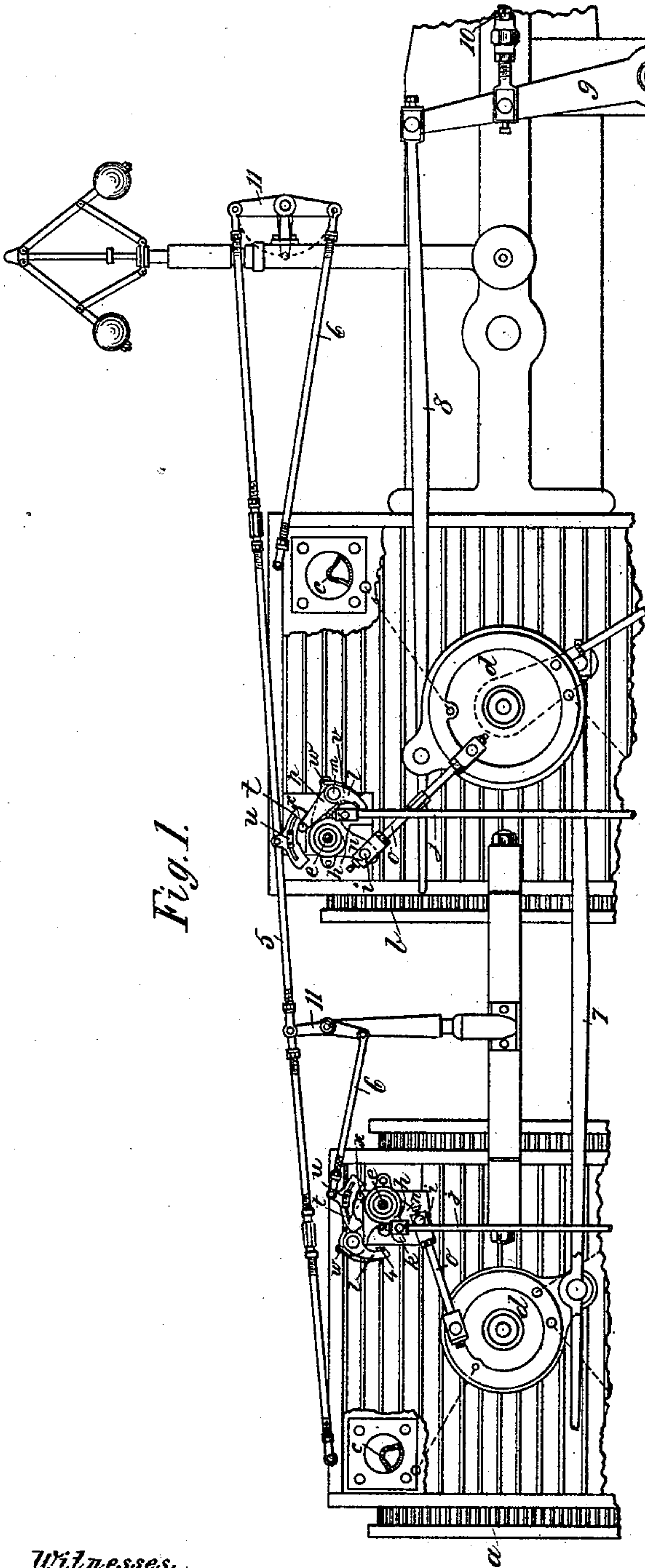


Fig. 1.

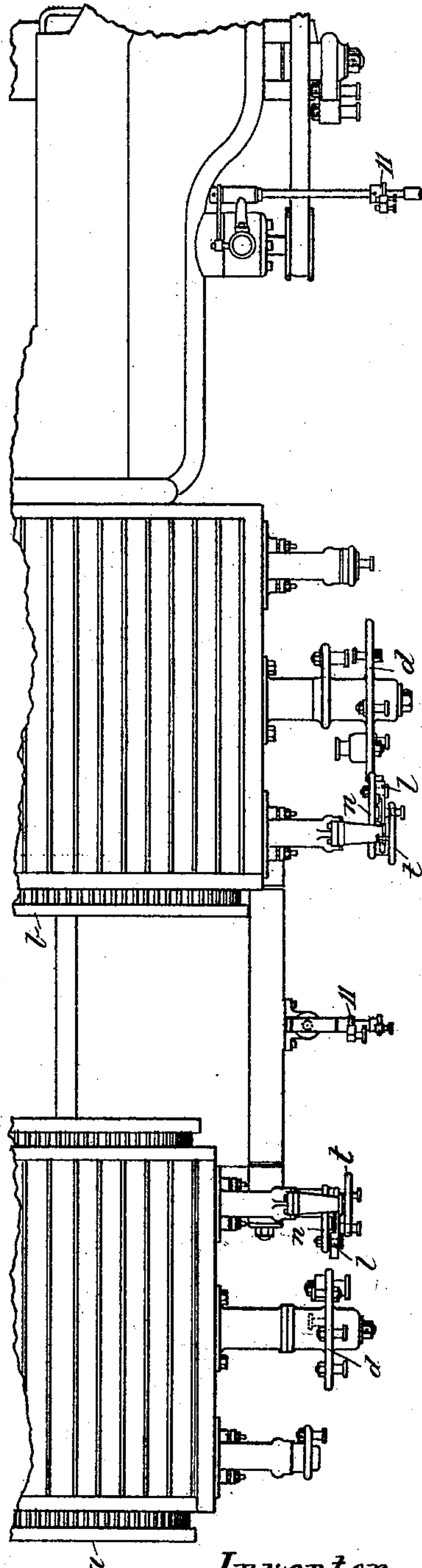


Fig. 2.

Witnesses.

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Inventor:

*K. E. Vesterdahl*  
*By A. H. Mayer*  
*Atty.*

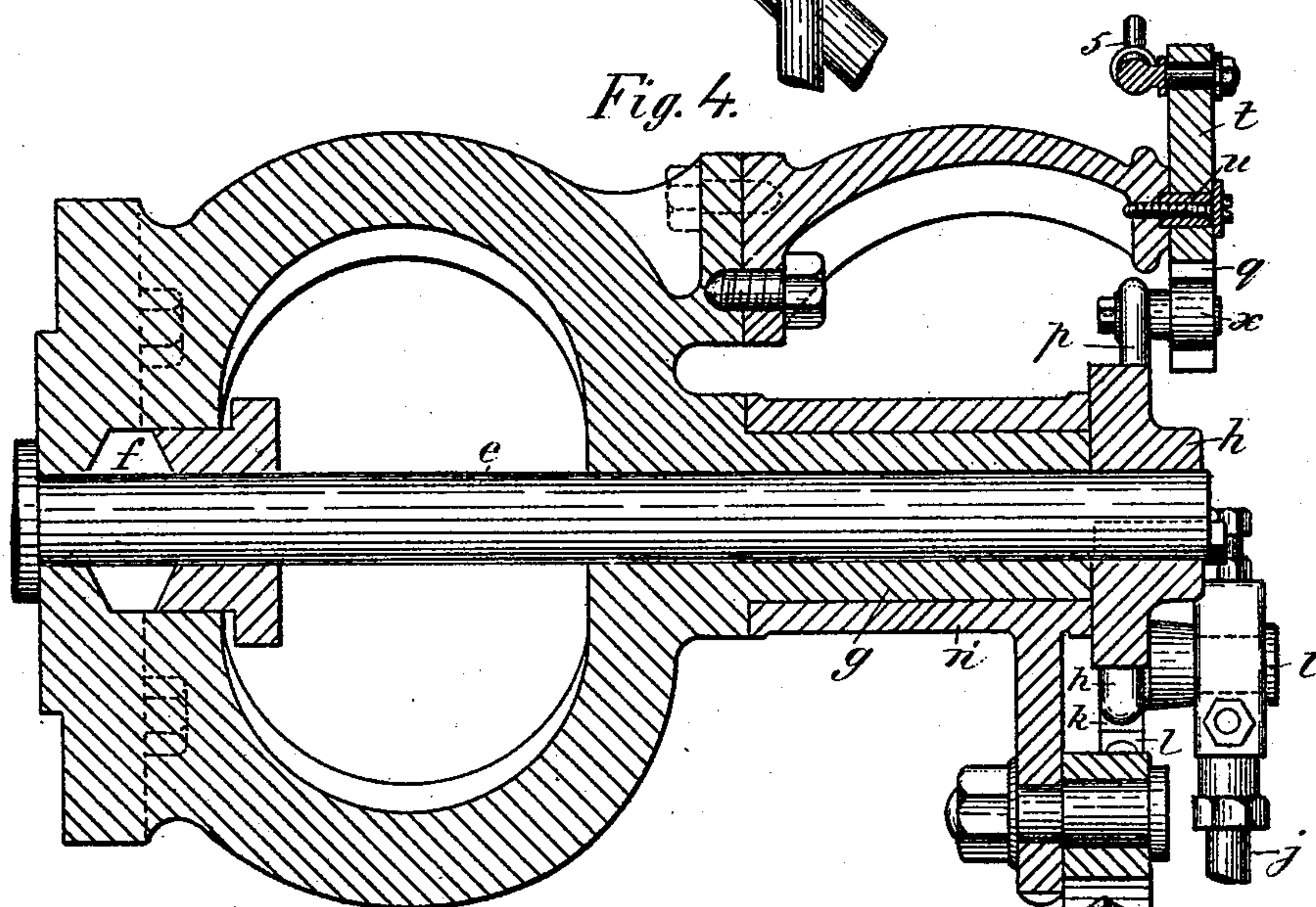
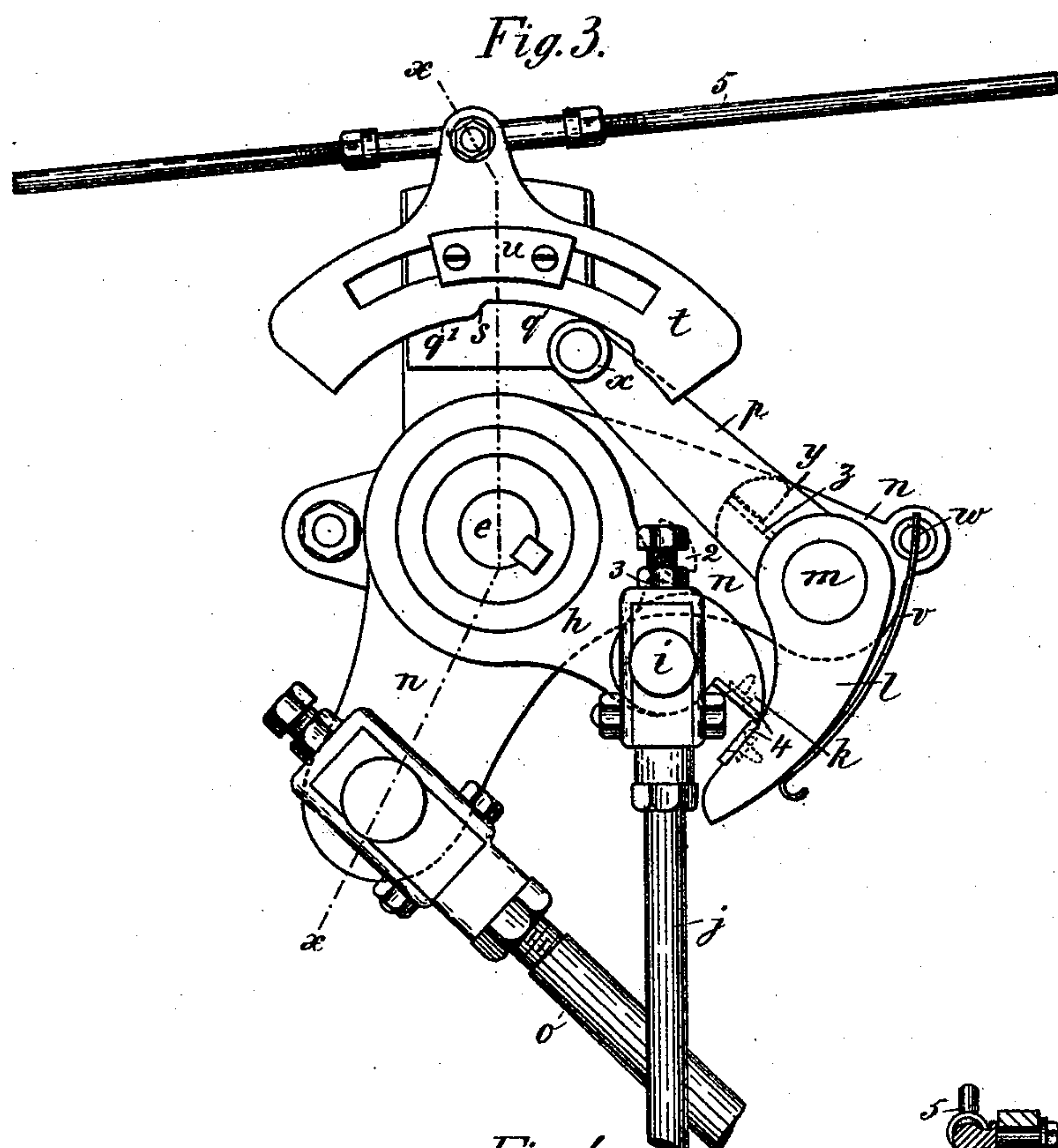
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2 Sheets—Sheet 2.

K. E. VESTERDAHL.  
CUT-OFF GEAR FOR STEAM ENGINES.

No. 459,568.

Patented Sept. 15, 1891.



Witnesses:

*Chas. Morgan*  
*W. B. Calk*

Inventor:

*K. E. Vesterdahl*  
*By A. P. Thayer*  
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# UNITED STATES PATENT OFFICE.

KARL E. VESTERDAHL, OF NEW YORK, N. Y.

## CUT-OFF GEAR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 459,568, dated September 15, 1891.

Application filed November 28, 1890. Serial No. 372,814. (No model.)

*To all whom it may concern:*

Be it known that I, KARL E. VESTERDAHL, a citizen of Sweden, and a resident of New York city, county and State of New York, have invented new and useful Improvements in Cut-Off Gear for Steam-Engines, of which the following is a specification.

My invention consists in an improved contrivance of variable releasing apparatus controlled by the governor for permitting the valves to be closed by any suitable appliance, as a piston subject to a vacuum on one side, the valves being of the kind that work in a rocking motion, all as hereinafter fully described, reference being made to the accompanying drawings, in which—

Figure 1 is a side elevation of some portions of a compound engine having releasing apparatus of my invention, with two of the covers detached and the valves shown in cross-section. Fig. 2 is a plan view of some portions of the same. Fig. 3 is a front elevation of the gear for one of the valves on an enlarged scale, and Fig. 4 is a section of Fig. 3 on line *x x*.

In the drawings I have represented a compound engine with valve-gear of the Corliss type for illustrating the application of my invention; but it may be applied to various types of engines and valve-gear.

*a* represents the small cylinder, and *b* the large one.

*c* represents the steam-valves, one being uncovered and shown in section and the other geared up with the working devices on each cylinder.

*d* represents the rockers geared with eccentrics and connected with the steam-valves for opening them, and also in practice geared with the exhaust-valve (not shown) for both opening and closing them in the usual way. The steam-valves have a stem *e*, extending out through the stuffing-box *f* and the bearing-stud *g* and having the crank *h* keyed fast to the outer end. This crank is connected by the wrist-pin *i* with the rod *j*, having a piston below subject to a vacuum for pulling the rod down and closing the valve when released in the well-known arrangement of such devices, (not necessary to be shown,) or any other approved contrivance having a constant tendency to pull said rod down may

be employed as a spring. Said crank also has a toe *k* at the end, with which there is a lifting and releasing hook *l*, suitably arranged on the pivot *m* at the extremity of one of the arms of the rocker *n*, to catch and open the valve at the proper time, said rocker *n* being pivoted on the bearing-hub *g* independently of the valve-stem and connected by the rod *o* with the rocker *d*, worked by the engine and traversing synchronously therewith. The said hook has an arm *p*, which traverses a variable tripper *t*, for disengaging the hook and subject to the control of the governor, said tripper being mounted on the curved stud-piece *u* so as to slide forward and backward concentrically to the axis of the crank *h* under the influences of the governor, suitably connected to it for that purpose, and having the offset *s* between the concentric ways *q q'*, along which the said arm traverses. The spring *v*, secured at *w* to the extremity of rocker *n* and bearing against the back of the hook, tends to keep the end of arm *p* in bearing-contact with said ways of the tripper, said arm preferably having an anti-friction roll *x* for bearing on said ways. It will be seen that the radius of the way *q* is such that the hook *l* is permitted to engage the toe *k* when the hook is swung down for that purpose by the rocker *n* and to hold said toe on the return movement for opening the valve and keeping it open until the end of the arm reaches the offset *s*, which trips the hook and releases the valve, which is then closed by the said piston-spring or whatever other device may be employed for closing it. After the tripping the arm runs along the way *q'* for the rest of its travel in that direction. The time of release is determined by the position of the offset *s*, controlled by the governor, as before stated. The rocker *n* has a stud *y*, and arm *p* has a stop *z*, to limit the throw of the said arm by the spring *v* in case it happens by the breaking of the governor-belt or other cause that the tripper should be shifted out of its normal position, and they also limit the pressure of the roller *x* on the way *q* to lessen the wear on said way, and said rocker also has another stud *2*, and crank *h* has a stop *3*, to close the valve in case the vacuum or other device employed for that purpose happens to fail. Both these



studs and stops are shown in dotted lines in Fig. 3. The hook and the toe are re-enforced with hardened-steel faces 4 for durability, and they are detachably connected for renewal when required. The valves of each cylinder are geared reversely to each other in the usual manner, and the trippers *t* are therefore respectively connected to the opposite ends of the centrally-pivoted rock-levers 11, one of which is actuated by the governor and the other by the one so actuated, the two being connected by the rod 5, to which the trippers of one end of each cylinder are also connected, and the tripper of the other ends being connected to the said rock-levers respectively by rods 6. The rockers *d* are coupled by the rod 7, and one is connected to the eccentric through rod 8, rock-lever 9, and rod 10, as such parts are usually connected.

I am aware that lifting-hooks and variable trippers have been used in various arrangements for releasing the valves, and I do not claim them, broadly.

It will be seen that the large radius of the bearing of the tripper *t* and the connection of the rod 5 at a still larger radius are calculated to render the action easier and less wearing to the parts than in the case of a disk located on the hub *g* or stem *e* and employed for the like purpose, and in which the radius of the offset way is shorter than the radius of the tripping-hook pivot.

I claim—

1. In a valve opening and tripping device, the combination, with the valve-crank connected with the closing device and having the lifting-toe, the opening-rocker, and the lifting-hook and its tripping-arm pivoted on said rocker, of the tripper controlling the tripping-arm of the hook, having its offset ways on a larger radius than that of the pivot of the lifting-hook and mounted and sliding on a stationary support, also of larger radius than said pivot.

2. The combination, with the valve-crank having the lifting-toe and the rocker pivoted in the axis of the crank and working synchronously with the engine, of the lifting-hook pivoted on said rocker, the tripper having the offset ways concentric with the axis of the valve and adapted to slide on the fixed support concentrically with said axis and subject to the governor, the arm of the lifting-hook traversing the said ways of the tripper, the stud on the rocker, and the stop on the tripping-arm to limit the pressure of the said arm on the wall of guideway, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 15th day of November, 1890.

KARL E. VESTERDAHL.

Witnesses:

W. J. MORGAN,  
W. B. EARLL.