

No. 636,271.

Patented Nov. 7, 1899.

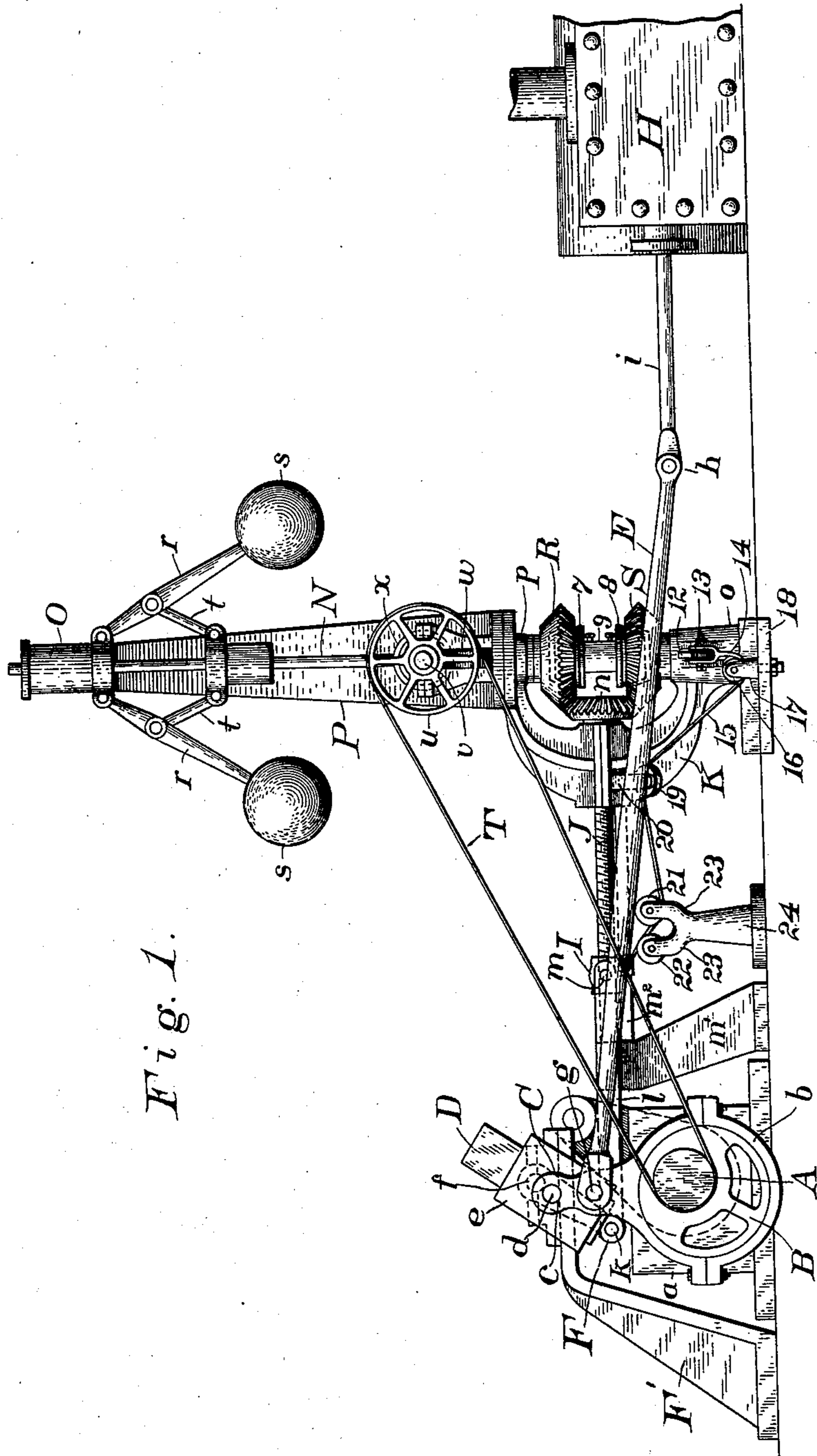
L. C. LUGMAYR.
CUT-OFF VALVE GEAR FOR ENGINES.

(Application filed Oct. 7, 1897.)

(No Model.)

4 Sheets—Sheet 1.

Fig. 1.



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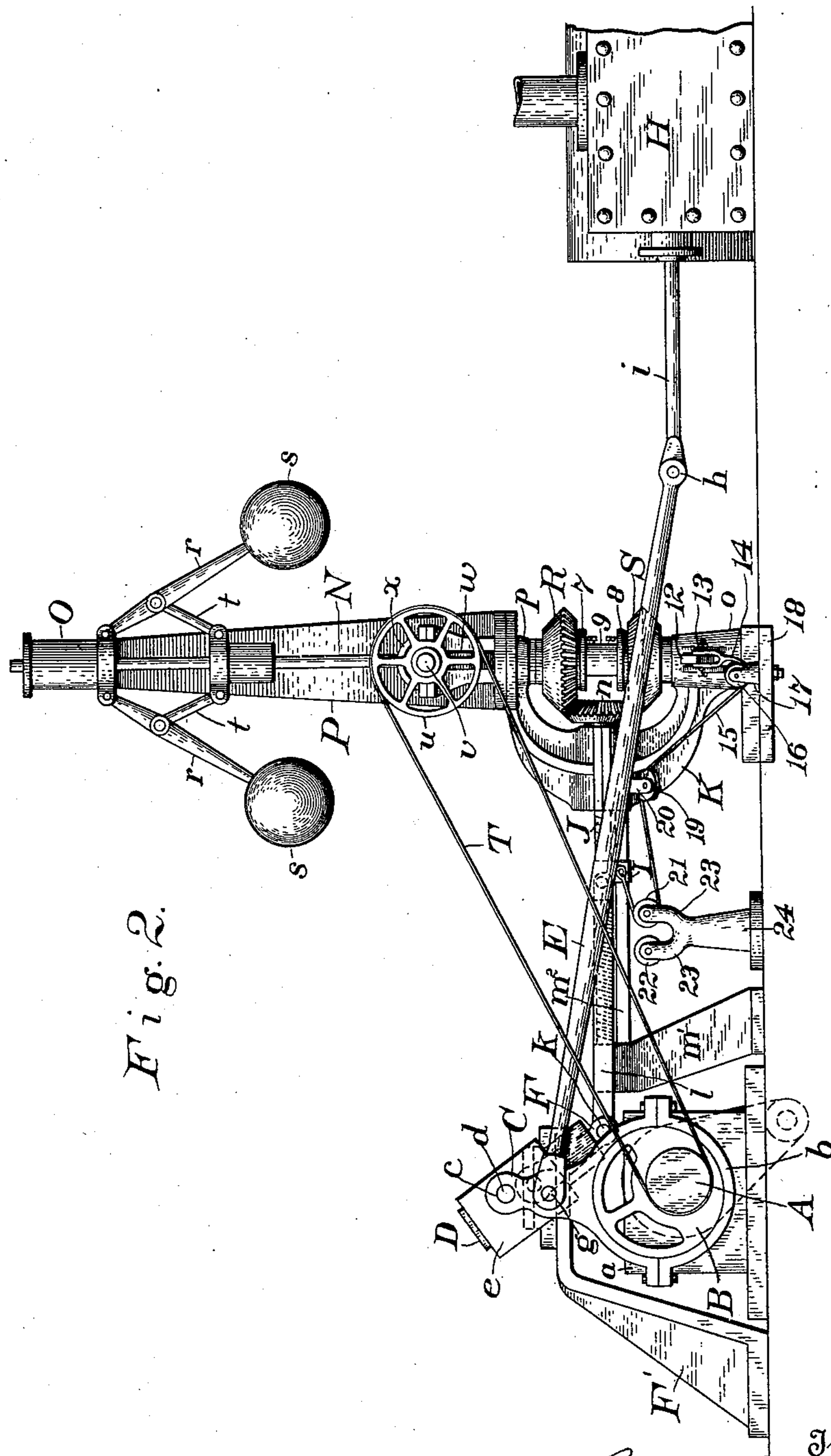


Fig. 2.

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Fig. 4.

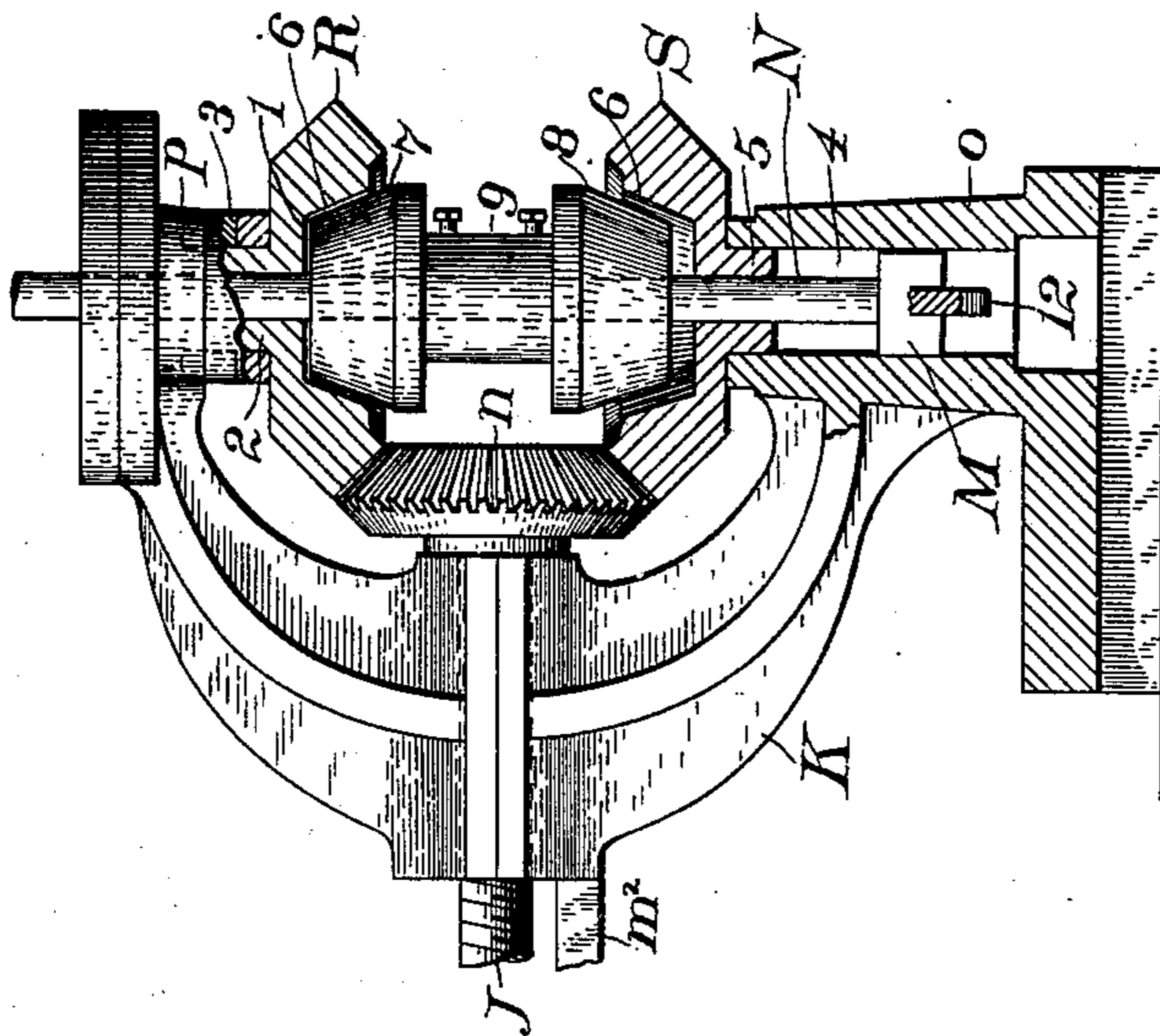
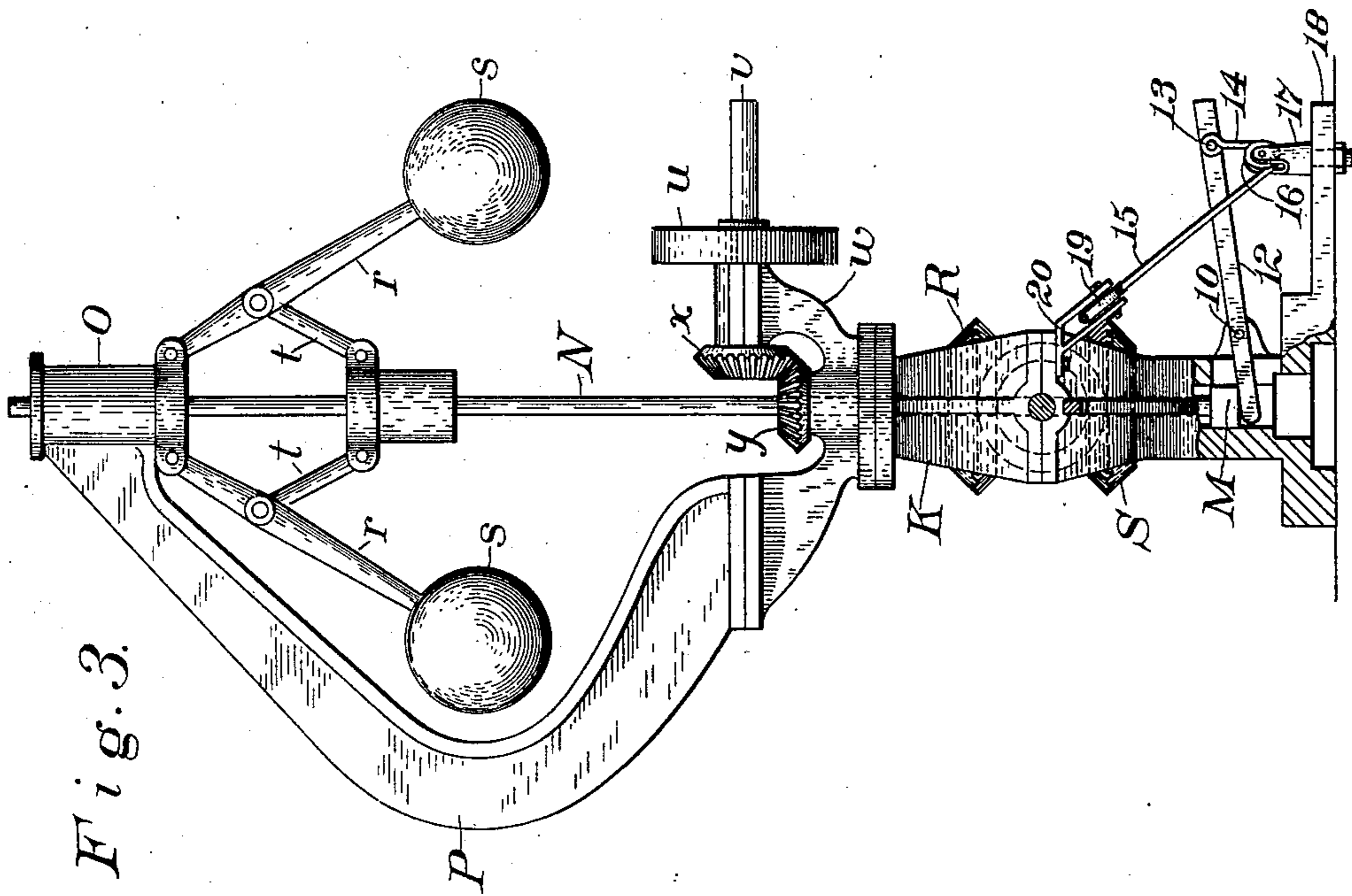


Fig. 3.



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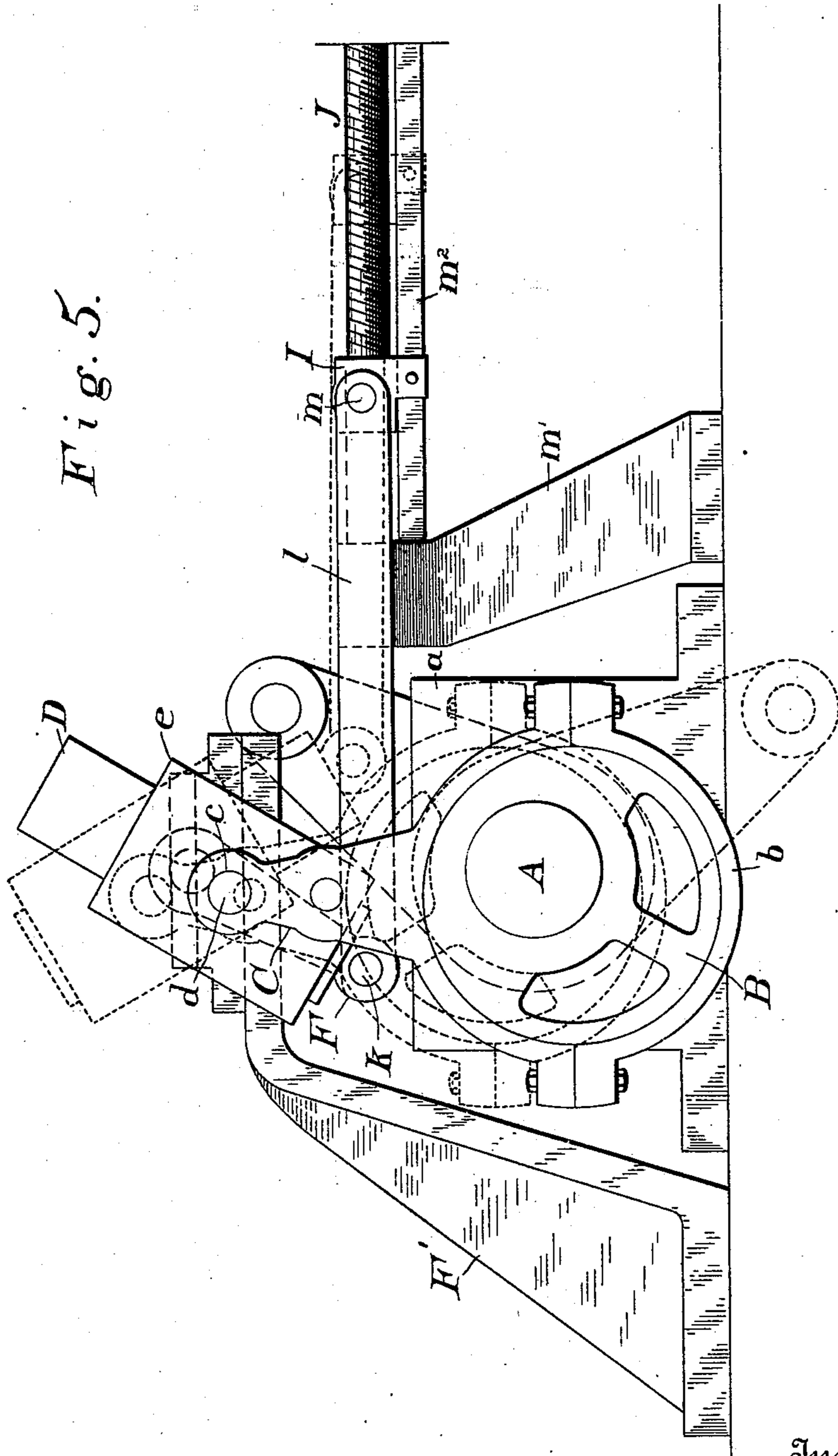
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4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

LOUIS CHARLY LUGMAYR, OF YPSILANTI, MICHIGAN.

CUT-OFF-VALVE GEAR FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 636,271, dated November 7, 1899.

Application filed October 7, 1897. Serial No. 654,329. (No model.)

To all whom it may concern:

Be it known that I, LOUIS CHARLY LUGMAYR, a citizen of the United States, residing at Ypsilanti, in the State of Michigan, have
5 invented certain new and useful Improvements in Automatic Cut-Off-Valve Gears for Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable
10 others skilled in the art to which it appertains to make and use the same.

This invention relates to certain new and useful improvements in automatic cut-offs for steam-engines; and it consists, substantially,
15 in such features of construction, arrangement, and combinations of parts as will hereinafter be more particularly described.

The invention is intended more particularly as an improvement on the steam cut-off
20 mechanism for which Letters Patent No. 307,128 were granted to me on the 28th day of October, 1884, and while I employ in the present instance substantially the same form of guide and slide block by which the throw of
25 the valve-rod is varied or modified the construction and operation of the parts constituting my present invention are much more reliable and effective than before and irrespective of the particular character of the engine—that is to say, whether the engine be
30 an ordinary marine engine or the common type of stationary engine.

The object of the present invention is to provide means for effecting the cut-off automatically, so that the throw of the valve-rod
35 is modified or varied in accordance with the speed of the engine rather than by hand, as heretofore required in the practice of the invention covered by my Letters Patent aforesaid.
40

A further object of the invention is to provide means for preventing the engine from "racing," as it is termed, as happens, for instance, in the case of marine engines when
45 the vessel or ship is subjected to violent tossing or pitching, with the tendency to elevate or raise the stern of the vessel out of the water.

A further object of the invention is to prevent any undue action of the engine, as results when the belt which operates the gov-
50

ernor runs off its pulleys or perchance becomes broken or disconnected in any way.

A still further object is to provide means whereby the devices which automatically effect the cut-off are also automatically thrown
55 out of action altogether on a continued slowing down of the engine or when the engine is run slow for any length of time, and whereby also said devices are again thrown into action automatically as the speed of the engine
60 increases.

The above and other objects I attain by the means illustrated in the accompanying drawings, in which—
65

Figure 1 is a side view in elevation of an automatic cut-off device or mechanism constructed, arranged, and operating in accordance with my invention. Fig. 2 is a similar
70 view representing the engine as running on a reversed motion without any change in the arrangement. Fig. 3 is a detail view, in part section, to represent more clearly the construction and arrangement of the devices
75 through the medium of which the governor is thrown out of action automatically on a continued slow down of the engine. Fig. 4 is also a detail view, in part section, representing the construction and arrangement
80 of the beveled friction or gear mechanism. Fig. 5 is a side elevation and representing the continued motions of Figs. 1 and 2 and showing a guide-arm for the removable nut.

My invention is capable of a great many different embodiments in use, and while I have
85 herein represented a certain preferred embodiment it will be understood that I am not limited thereto in detail, but that I am at liberty to make such immaterial changes in the general construction and arrangement of parts as
90 may be demanded by the exigencies of any particular case.

Thus A represents the crank-shaft mounted or supported in suitable bearings at *a*, and B is the eccentric carried by said shaft, and
95 having the strap *b*, which is provided with the arm C, having an eye *c* at its end fitting upon a lug or pin *d*, projecting from the side of the rectangular slide-block *e*, thus constituting a pivotal connection or support for
100 said block upon the end of the said arm C. This slide-block is substantially the same in

construction as the slide *c* of my former patent referred to, as is also the guide *D* herein shown, upon which the slide-block has a sliding movement, so as to vary the throw of the eccentric-arm and consequently the valve-rod *E*. The said guide *D* has a swinging bearing at *f* in the upper end of a bracket *F'*, which is made to project or extend over in proper position, and reference to Figs. 1 and 2 will show the slide-block *e* as in different positions upon the guide, such change in position being of course brought about by devices which are varied in their own movement in accordance with the speed of the engine. Connecting with a pin *g* on the side of the eccentric-arm *C* is the rear end of the valve-rod *E*, which extends forward, as shown, and is connected at its other end at *h* to the valve-stem *i*, which latter is supposed to extend from an ordinary slide-valve (not shown) working back and forth in the chest or casing *H*.

With the slide-block *e* and the guide *D* therefor arranged substantially as shown and described it is desirable that some means be provided by which to alter or shift the position of the said guide and block automatically as the speed of the engine rises and falls, and while this could be effected in various different ways I prefer to resort to the construction and arrangement of devices therefor substantially such as are herein shown. Thus the said guide is provided with an arm *F*, which at *k* is movably connected with a bar *l*, the opposite or forward end of which bar is in similar movable connections at *m* with a movable nut *I*, that is caused to travel back and forth upon a screw rod or shaft *J* and which screw rod or shaft has its bearing at one end in a support *m'* and is guided on a bar *m''*, while its opposite end passes through a curved frame *K*, and it is provided at such latter end with a beveled gear-wheel *n*. It is the purpose of the invention that when the engine is running slow the screw rod or shaft *J* shall be rotated in the proper direction to move the nut *I* in the direction of the support *m'*, and thus when more steam is admitted to the cylinder and the speed increases, the rotation of said shaft shall be reversed, it being of course apparent that the guide *D* is in each instance moved accordingly, and the throw of the eccentric-arm varied by reason of the slide-block *e* changing its position on said guide *D*. Different means could be employed for operating upon the screw rod or shaft in the manner and for the purpose explained; but preferably I employ such means as I have herein selected to show. Thus having its lower end resting in a block *M*, that is seated in a cavity or recess in the lower arm *o* of the frame *K*, is a governor rod or stem *N*, that passes through an opening in the upper arm or part *p* of said frame *K* and has its upper end supported in a sleeve *O*, carried at the upper end of an outwardly-curved bracket *P* of the said frame. The said rod or stem *N* is provided

with a set of governor-arms *r* and balls *s* and the usual links *t*. Motion is communicated to the governor rod or stem from the crank-shaft *A* by means of a belt *T*, connecting said shaft with a pulley *u*, carried on a short shaft *v*, that has its bearings in a branch *w* of bracket *P* and is provided with a beveled gear wheel or pinion *x*, meshing with a corresponding beveled pinion *y*, carried by the governor-rod. In order that the desired changes be effected in the rotation of the screw rod or shaft *J* accordingly as the speed of the engine increases or diminishes, I mount or locate loosely within a socket or recess 1 of the under side of the upper arm *p* of the frame *K* the stem or hub 2 of an enlarged beveled gear-wheel *R*, through which wheel the governor-rod passes, and the said stem or hub being flanged at 3, so as to maintain the wheel in the proper operative position relative to the beveled gear-wheel *n*, carried by the end of the screw-shaft *J*. Similarly supported in a like socket or recess 4 in the lower arm or standard *o* of the said frame *K* is the stem 5 of a correspondingly reversely-arranged beveled gear *S*, through which the governor-rod passes. Both this latter gear and the gear-wheel *R* are formed on their inner surfaces each with a beveled or slightly-conical circular recess or socket 6, adapted to receive the correspondingly-shaped friction-plugs 7 and 8, carried, respectively, by the upper and lower ends of a sleeve 9, that is keyed or otherwise secured in place upon the valve-rod between or intermediate the said beveled gears *R* and *S*. At the normal speed of the engine the governor will operate in the ordinary way and practically no effect will be produced on the screw-shaft, and the throw of the eccentric-arm and valve-rod will be uniform. When, however, the engine gets to running slow, the governor-balls will become lowered and the governor-stem will be correspondingly lowered until the friction-plug 8 is carried into the conical socket 6 of beveled gear *S*, whereupon the said gear will be caused to rotate by friction, and in consequence the screw-rod will be revolved and the nut *I* moved on the screw-rod in the direction of the support *m*. When more steam is admitted to the engine-cylinder, however, and the speed increases, the governor balls and stem will rise automatically, the friction-plug 8 will leave the socket in the gear *S*, and the friction-plug 7 will be carried up into the socket 6 of the upper gear *R*, and consequently a reversed motion will be imparted to the screw-rod *J* and the nut *I* will be caused to travel on said rod in the direction of the frame *K*. In this way it will fully appear how the automatic cut-off is effected. If the engine should run slow for any great length of time, the nut *I* would continue to travel on the screw-rod *J* until it reaches the end of the latter, and unless means were provided to prevent it there would be a breakdown and the engine would stop running, with probably

very serious damage. To guard against this, different means could be employed; but preferably I make the block M (supporting the lower end of the governor-rod) movable in the cavity or recess in which it is seated in the lower arm o of frame K, and to such block I attach at 10 the inner end of a lever 12, to the side of which, at or near its outer end at 13, is a hook or link 14, to which is fastened a cord or chain 15, that passes beneath a pulley 16, carried by a post 17 on the base-piece 18, then upward over a pulley 19, carried by a bracket 20 on frame K, and then beneath a pulley 21 and over a pulley 22 to the nut I, to which latter the other end of the said cord or chain is attached or fastened. The said pulleys 21 and 22 are supported by the two arms 23 of a post 24. Thus it will be seen that when the nut I has moved or traveled on the screw-rod the full limit permitted by the length of the cord or chain any farther movement of said nut will exert a downward draft or pull upon the outer end of the lever 12, the movable block M will rise, carrying with it the governor rod or stem, and the friction-plug 8 will be lifted from the socket in beveled gear S. Consequently when such disconnection is automatically effected the screw-rod J will cease to rotate and the nut I cannot move farther until the speed is reversed by the admission of more steam to the cylinder.

If my device is used in connection with a marine engine, said engine will be prevented from racing, for if the stern of the vessel on which the engine is used, embodying my device, is raised, which will lessen the load of the engine, the engine will begin to run faster and the belt T will revolve pulley X faster and the governor-ball S will be raised, thus raising the friction-plug 7, which will act to operate gear R and the gear n on the screw-shaft J, thereby moving nut m, which is connected with arm k, toward the gear n, thereby cutting off the supply of steam, which would reduce the speed of the engine. If the belt T

should slip off the pulley X or become broken in any way, pulley X will stop, the governor-balls S S will drop, and the mechanism connecting with the cut-off rod will stop, and the cut-off rod will remain in the position in which it was when the belt ran off or was broken, thereby allowing no greater or less amount of steam to enter the cylinder.

From the foregoing description, taken in connection with the accompanying drawings, it is thought the construction and operation of my invention will be fully understood, and therefore without limiting myself in any particular

I claim as my invention—

1. In an automatic cut-off for steam-engines, the combination with the crank-shaft, its eccentric and arm, of the movable guide, the slide-block thereon in movable connection with the arm, the valve-rod, a screw rod or shaft, movable traveling connections between said screw-rod, and the guides and means for changing the direction of rotation of the screw rod or shaft accordingly as the speed of the engine increases or diminishes, substantially as described.

2. In an automatic cut-off for steam-engines, the combination of the shifting guide and its slide-block of the screw-rod having a beveled pinion at one end, a traveling nut on said rod, connection between the nut and guide, a pair of reversely-arranged beveled gear-wheels adapted to independently engage said pinion and friction devices alternately engaging said wheels to rotate the rod in one direction or the other accordingly as the speed of the engine increases or diminishes, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

LOUIS CHARLY LUGMAYR.

Witnesses:

PHIL. W. JOHNSON,
JESSE H. JOHNSON.