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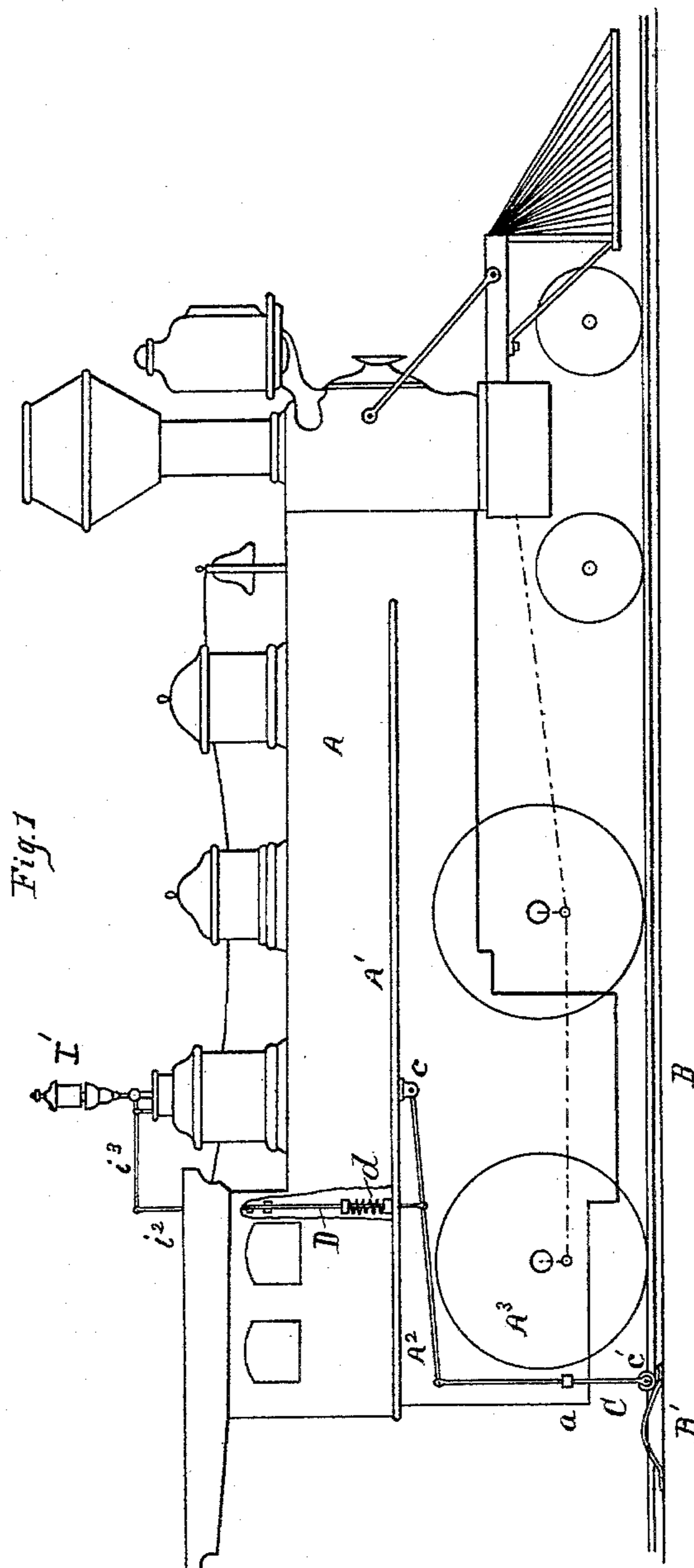
5 Sheets—Sheet 1

W. RYMER.

AUTOMATIC RAILWAY ALARM APPARATUS.

No. 401,376.

Patented Apr. 16, 1889.



Witnesses:

Alfred M. Low
George H. Higgs

Inventor:

William Rymer
By Jewell S. Wright
Attorney.

(No Model.)

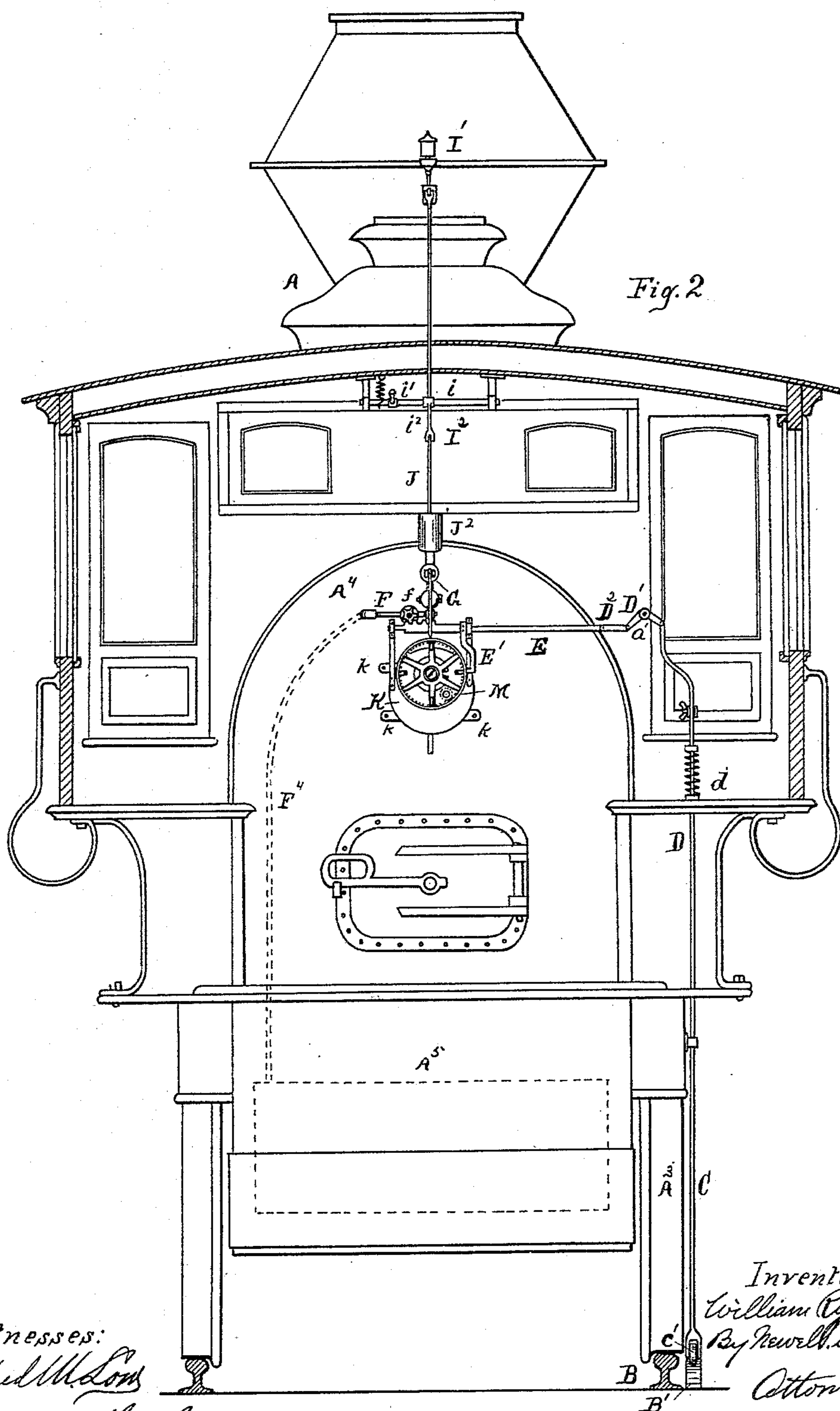
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AUTOMATIC RAILWAY ALARM APPARATUS.

No. 401,376.

Patented Apr. 16, 1889.



Witnesses:
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(No Model.)

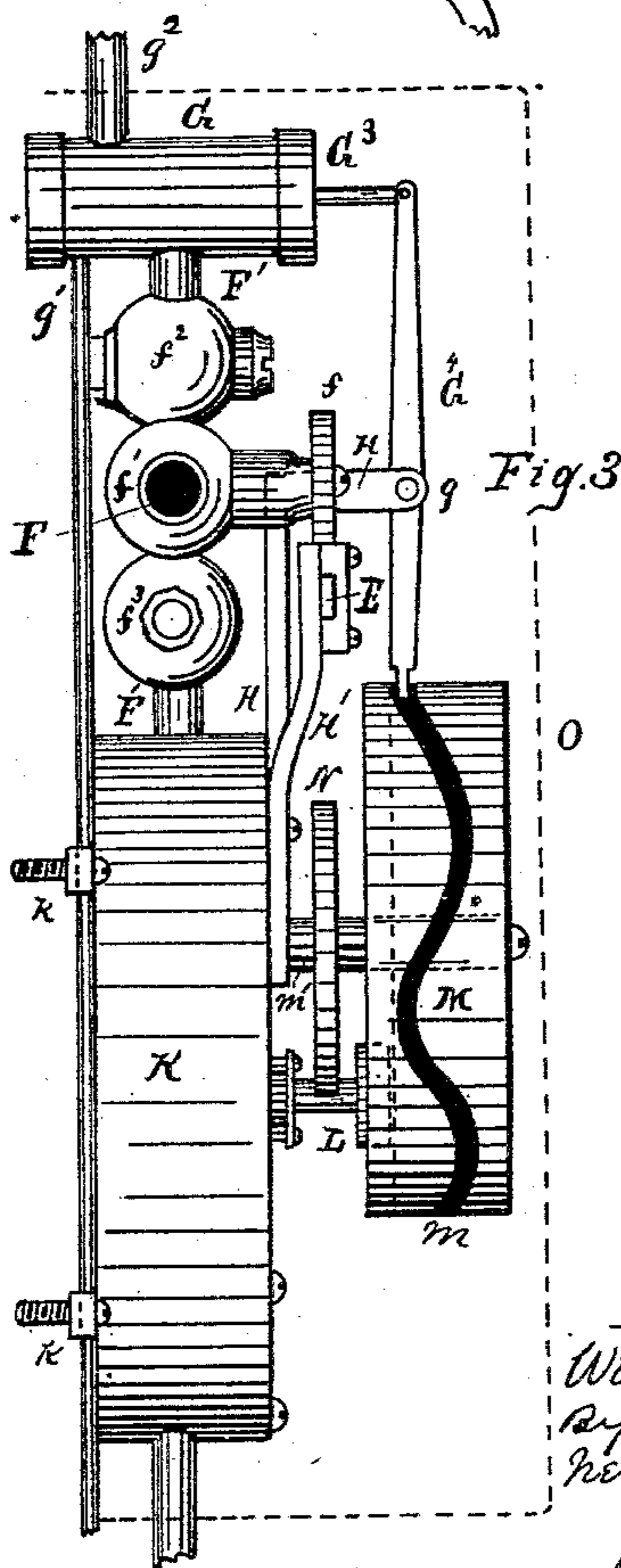
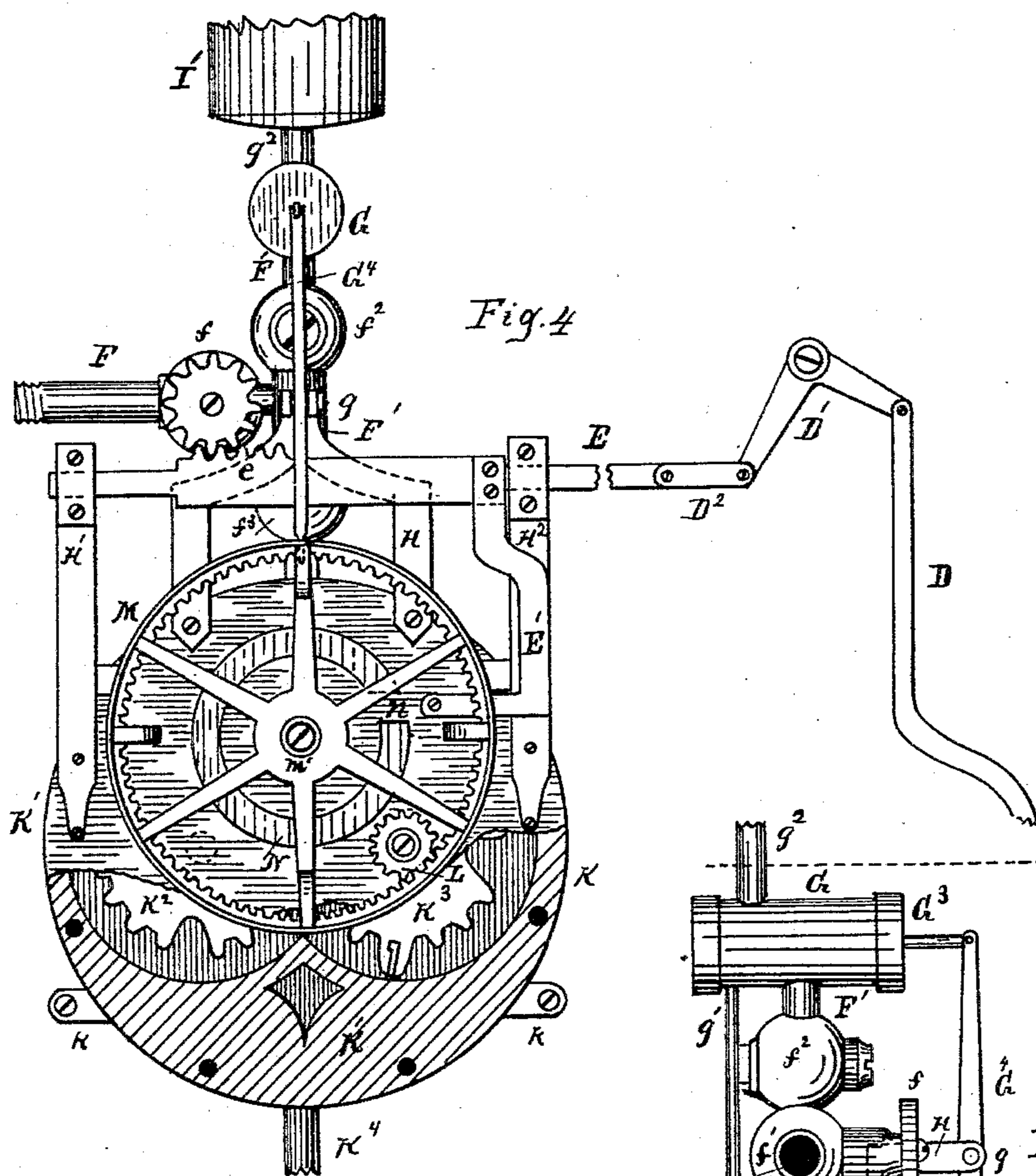
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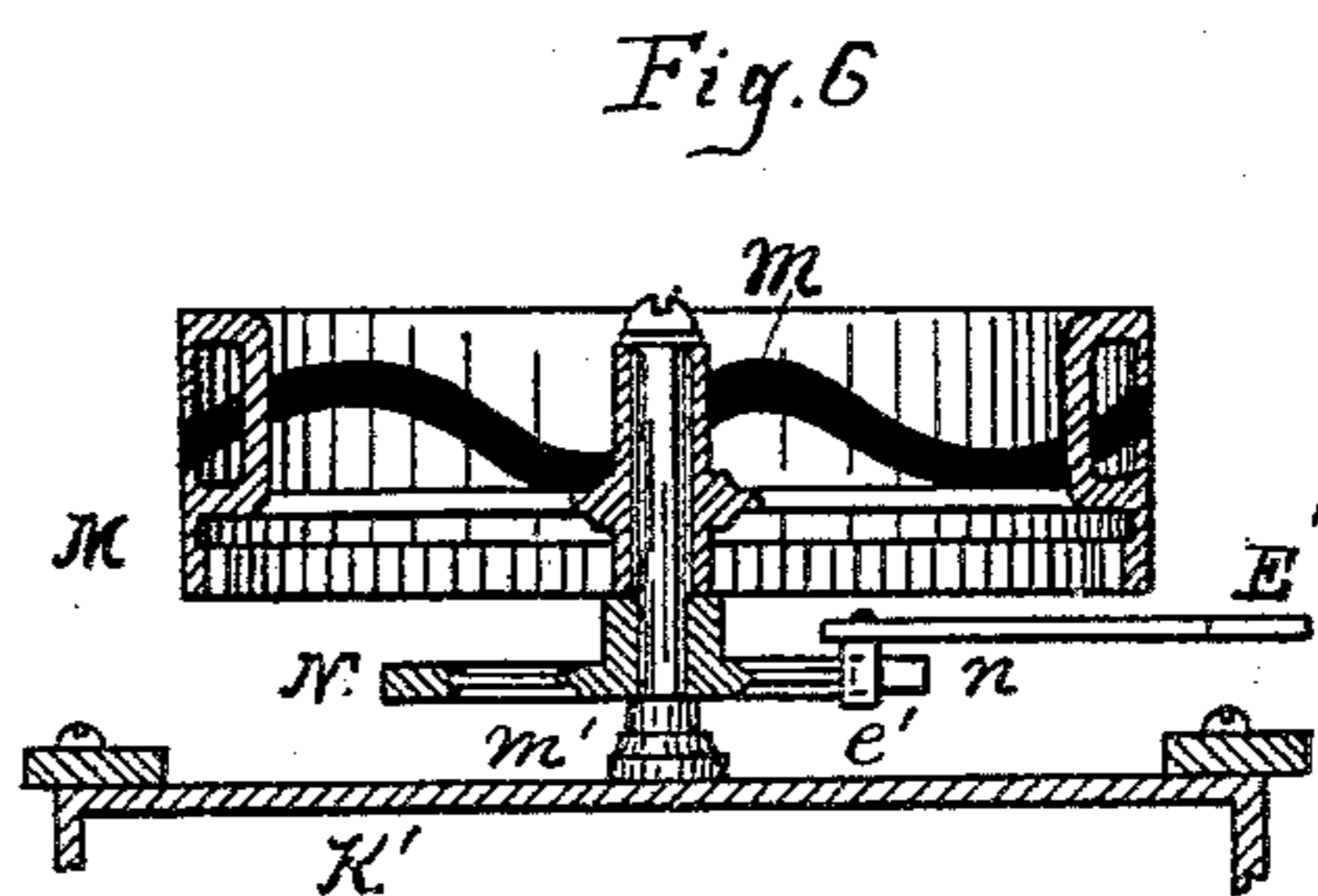
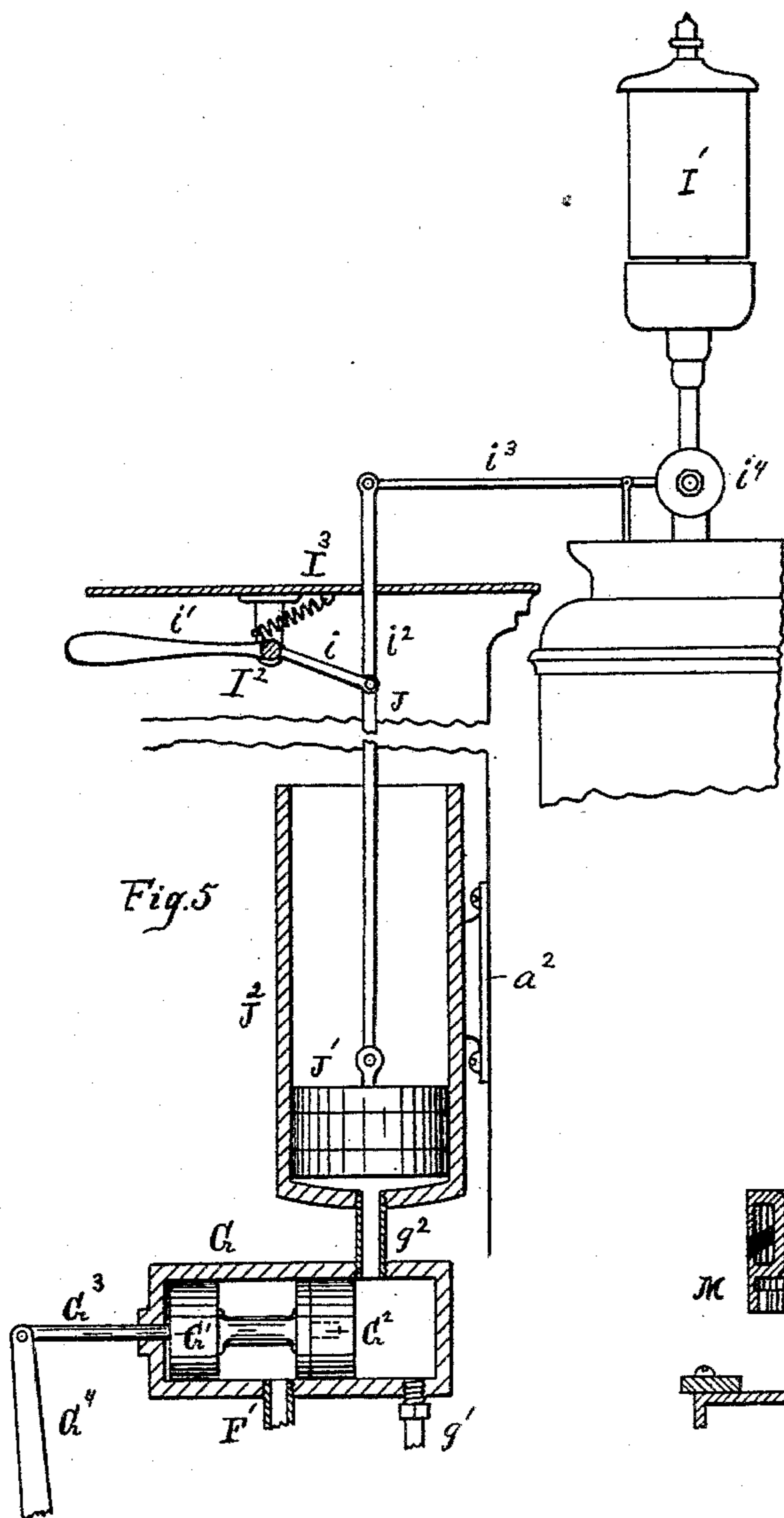
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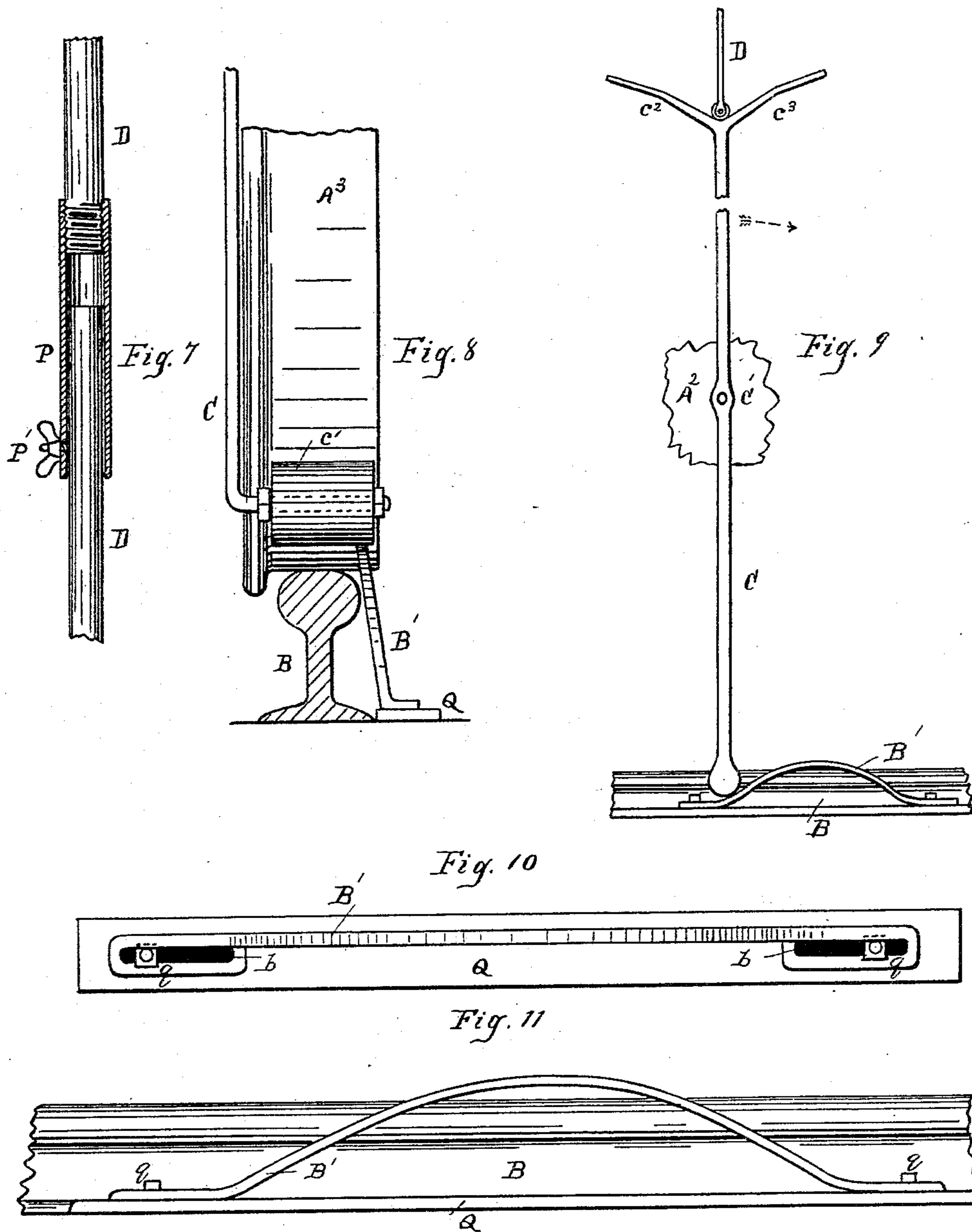
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5 Sheets—Sheet 5.

W. RYMER.
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UNITED STATES PATENT OFFICE.

WILLIAM RYMER, OF DETROIT, MICHIGAN.

AUTOMATIC RAILWAY-ALARM APPARATUS.

SPECIFICATION forming part of Letters Patent No. 401,376, dated April 16, 1889.

Application filed January 10, 1888. Serial No. 260,335. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM RYMER, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have
5 invented a certain new and useful Improvement in Apparatus for Automatically Sounding a Whistle; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in
10 the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

The object of my invention is to provide
15 an apparatus for automatically sounding a whistle, the same being adapted for various uses—as, for instance, to sound a fog-whistle on a steamer or elsewhere; also to sound a locomotive-whistle at highway-crossings or
20 other desired points.

The purpose of the invention is, moreover, to automatically sound the whistle so as to give any required signal in accordance with a customary or prescribed code, as may be de-
25 sired, with or without the attention of the engineer.

I have illustrated my invention as applied to a locomotive, as such illustration answers every purpose, although I do not confine my-
30 self thereto in my present application.

It has been found desirable for many reasons to provide locomotives with a suitable and efficient device whereby the whistle will be
35 invariably sounded at highway-crossings or other points even should the ordinary signal-post be unobserved or disregarded by the engineer in attention upon other matters, and whereby he may also be entirely relieved of attention so continuously to this matter and
40 permitted to fix his undivided thought upon other duties. A device in order to provide for this end in a desirable manner must not only sound the whistle, but also cause it to sound in just the required way; and it is the
45 purpose of my present invention to accomplish these results in a satisfactory, reliable, and efficient manner. I accomplish my object as more fully hereinafter described, and more particularly pointed out in the claims.

50 In the drawings forming a part of this application, Figure 1 is a side elevation of a locomotive, illustrating features of my inven-

tion. Fig. 2 is an elevation looking toward the front of the interior of the cab. Fig. 3 is a side elevation of certain parts of the mech- 55
anism; Fig. 4, a front elevation of the same, showing parts broken away. Fig. 5 is a view, partly in section and partly in elevation, showing a modification of the invention. Fig. 6 is a horizontal section seen from beneath, 60
illustrating features of the regulating or governing device. Fig. 7 is a separate view of the slip-sleeve; Fig. 8, a separate view, in elevation, looking toward the rear of the drive-
wheel, illustrating the spring-bar and the bar 65
C. Fig. 9 is a modification of the manner of constructing and attaching the bar C. Fig. 10 is a plan view of the spring-bar, and Fig. 11 a side elevation of the same.

I carry out my invention as follows: A rep- 70
resents a locomotive, B the rail or track, and B' a spring-bar located at the side of the track adjacent to the rail. These spring-bars may be located at desired points along the track wherever it is desired that the 75
whistle of a passing train should be sounded for highway-crossings or elsewhere. Engaged upon the locomotive is a movable or reciprocating bar, C, which may be variously shaped and engaged thereupon, its function being to 80
reciprocate a connecting-rod, D, to communicate motion to a rack-bar, E, meshing with a pinion, *f*, upon a valve, *f'*, in an inlet-pipe, F, so as to open and close said valve.

As shown in Fig. 1, the bar C is a jointed 85
bar hinged at one extremity, as at *c*, upon the under side of the foot-board A'. The lower and opposite end of said bar is extended downward along the side of the sidesheet, A², adjacent to which it may, if desired, be se- 90
cured by suitable guides, *a*, so as to have a free vertical movement. Said bar preferably terminates at its lower end in an anti-friction roller, *c'*, to facilitate the travel over the spring-bar B', which may be made arc-shaped. 95
The bar C preferably extends downward alongside the side sheet in the rear of the drive-wheel A³, as this location insures the spring-bar always being cleared, as of ice and snow in winter. The connecting-rod D is 100
engaged with the rack-bar E in any suitable manner, as by a bell-crank, D', engaged on the face of the cab, as at *a'*, and an intermediate link, D². The lower end of said rod

may extend downward through the foot-board A' and into contact with the bar C, so as to be reciprocated by the operation of said bar as its lower end travels over the spring-bar.

5 It is also provided with a retracting-spring, *d*.

The inlet-pipe F may lead from the boiler A⁴, and at its opposite end communicates with a piston-cylinder, G, through a connecting-pipe, F', the passage of steam from said pipe
10 being controlled by a shut-off valve, *f*', provided with the pinion *f*, meshing with the rack-teeth *e* on the rack-bar E. It will thus be seen that when the rack-bar is reciprocated the valve will be opened or closed accordingly,
15 so that steam may be admitted to or entirely cut off from said cylinder. The amount of steam admitted to said cylinder may be more closely governed also by a valve, *f*². The cylinder is provided, preferably, with double piston-heads G' G², the piston-rod G³ having a
20 jointed engagement with an operating-lever, G⁴, fulcrumed in a bracket or supporting arm, H, as shown at *g*. The cylinder is also provided with an exhaust-pipe, *g*', and in turn
25 may communicate with an ordinary whistle, I, through a connecting-pipe, *g*². The admission of steam from the cylinder to the whistle will thus be controlled by the movement of the piston-heads. When the piston-heads,
30 Fig. 5, are forced inwardly, steam admitted to the cylinder will have free communication with the pipe *g*² to the whistle. The opposite movement of the piston-heads will cut off the steam from entrance into pipe *g*² and permit
35 the steam to exhaust freely through the pipe *g*'. The cylinder may, if desired, communicate directly through a connecting-pipe, *g*², to an independent whistle, I, as shown in Fig. 4; but ordinarily it may be preferable to connect
40 the said cylinder with the ordinary whistle with which locomotives are already equipped by their ordinary hand-lever mechanism, whereby the engineer operates and controls at will the sounding of the desired signals.
45 My invention therefore contemplates such an attachment of my automatic mechanism with the ordinary whistle, so that the whistle may be both operated automatically, and at the same time be free for the operation of the engineer at will. Accordingly I' represents the
50 ordinary whistle, and I² its ordinary lever mechanism, which may be of any desired construction. As shown herewith, it consists of a crank-arm, *i*, and its lever-arm *i*', the crank-arm being engaged with suitable connecting-
55 rods, *i*² *i*³, to control the whistle-valve *i*⁴.

I³ is a retracting-spring of ordinary construction.

60 With the end of the crank-arm *i* or its connected rod *i*², I engage a piston-rod, J, its piston-head J' working in an auxiliary cylinder, J², the pipe *g*² in this case communicating with said cylinder, instead of with the whistle direct, as shown in Fig. 4. This auxiliary cylinder may be supported in any de-
65 sired manner, as by a bracket, *a*², engaged upon the boiler-head. Obviously the pipe *g*²

may lead to any point where it may be desired to locate the cylinder G. Steam admitted to the cylinder J² will operate the whistle
70 mechanism, while at the same time the said mechanism is also under the free control of the engineer. The admission of steam to the cylinder J² will be regulated by the piston in the cylinder G, as already described. 75

In order to cause the whistle to sound the desired signal—as a succession of long or short blasts, as required—it obviously only needs
80 suitable mechanism to control the operation of the piston of the cylinder G, and this may be accomplished by regulating the movement of said piston by its operating-lever G⁴. The movement of this lever I govern in the following manner: The connecting-pipe F' not
85 only serves as a communication from the inlet-pipe F to the cylinder G, but is also extended below the union of the inlet-pipe therewith, and communicates, furthermore, with a rotary mechanism, K, of any desired
90 construction—such, for example, as that for a rotary pump shown and described in Letters Patent No. 12,350, granted to Holley February 6, 1855. In the present instance two rotatable toothed pistons, *k*² *k*³, of variable
95 diameters, are arranged to intermesh, and are driven by a supply of steam or compressed air, the same medium as that which blows the whistle. K⁴ is the exhaust-pipe from said rotary mechanism. L is a pinion driven from said
100 rotary mechanism, and meshing with a toothed cam-cylinder, M, whereby said cylinder is caused to rotate. The cam-groove *m* of said
105 cylinder may be constructed of any desired form. Into this cam-groove the lower end of the operating-lever G⁴ is extended. As the cam-cylinder revolves, it is obvious that the
110 said lever will be guided and thrown to conform to said cam-groove, and thereby the piston-heads will be accordingly thrown to and fro in the cylinder G to admit or cut off steam
and so produce the desired succession of blasts from the whistle.

m' is the shaft of the cam-cylinder. Mounted on said shaft is also located an annular locking-disk, N, recessed at *n*. 115

Engaged upon the rack-bar E is a locking-arm, E', preferably provided with an anti-friction roller, *e*', arranged to travel about the rim of the disk as the same is rotated simultaneously with the cam-cylinder when once
120 the rack-bar has been thrown to open the valve *f*'. The locking-arm will thus be guided one entire revolution of the cam-cylinder about the locking-disk, and when a single revolution has been completed the lower extremity
125 of said arm will engage in the recess *n* of the locking-disk and thus dog the mechanism. The inward movement of the locking-arm to dog the locking-disk will be simultaneous with a corresponding movement of the rack-bar,
130 by which movement the valve *f*' will be rotated to cut off steam.

The bracket H may be engaged upon the case K'. The rack-bar may be supported and

guided in suitable brackets, $H' H^2$, which may also be engaged upon said case.

The rack-bar is shown in position to open the valve in the inlet-pipe. In Fig. 6 the locking-arm is shown in position to dog the locking-disk.

Inasmuch as the connecting-pipe F' supports the cylinder G and the brackets $H' H^2$ support other features of the device from the case K' , with which said connecting-pipe is also engaged, it will be seen that the whole device may readily be located and supported in position by arms $k k$, engaged in any desired position—as, for instance, upon the boiler-head, as shown in Fig. 2—a convenient position for the ready operation of the various parts.

It will be noticed that while the cam-cylinder and locking-disk are making one revolution the bar C rides out of engagement with the spring-bar B' , and consequently the spring d will restore the connecting-rod D and rack-bar E to their normal position as soon as the locking-arm is free to move inward, stopping the movement and the signal.

The operation of the device will thus be readily understood. A portion of the steam admitted to the connecting-pipe F' passes to the cylinder G , and also to the rotary mechanism K , and thus the rotary mechanism controls the movement of the piston in said cylinder, as described, to produce the results herein set forth. When the mechanism is dogged, it will be seen the rotation of the valve f' throws off all steam entirely from the cylinder G and the rotary mechanism, so that when not in use there is no steam to be condensed in the device. The cam-groove may be shaped to conform to any signal desired.

The quantity of steam desired to be admitted to the rotary mechanism may be controlled by an auxiliary valve, f^3 , in the connecting-pipe F' .

The bar E need not necessarily be a rack-bar having a geared engagement with the valve f' , as said bar might be variously engaged with said valve to open and close it as said bar is reciprocated.

The rotary mechanism and closely-related parts may all be inclosed in a suitable case, o , as indicated in dotted lines, Fig. 3, so as to exclude dust and other obstructions from the mechanism.

I have described the pipe F as a steam-inlet pipe leading from the boiler; but it might, if preferred, lead to the compressed-air chamber of the air-brake mechanism, as indicated in dotted lines in Fig. 2 at F^4 and A^5 , respectively, and I contemplate such modification as coming within the scope of my invention.

Should it be desired to throw the automatic mechanism out of operation, the bar D might be provided with a slip-sleeve, P , as shown in Fig. 7, controlled by a set-screw, P' .

In some cases it may be preferable to make the bar C and rod D integral, as shown in Fig. 2.

The rod C may be variously constructed and arranged to reciprocate the rod D . Accordingly it may be pivotally engaged upon the side sheet of the engine, as shown at C' , Fig. 9, and instead of being lifted as it rides over the spring-bar it will be oscillated, as indicated by the direction of the arrow in said figure, whereby the lower end of the bar D will be caused to ride out upon one of the arms, $c^2 c^3$, with which the bar C may be constructed. This construction, it is evident, will afford considerable leverage for the more effective operation of the rack-bar in the rapid running of a train.

The spring-bar B' may be of any suitable construction. I prefer to construct it as more particularly shown in Figs. 8, 10, and 11, wherein it is represented as a rod or bar turned at its extremities to form an elongated orifice, b , whereby the spring is engaged upon a base-plate, Q , by means of a pin or post, q , at each end, so as to permit the spring to yield. I prefer also to locate it in an inclined position, as shown in Fig. 8, extending upward above the rail and adjacent thereto in such a manner that the driver will ride over it and so clear it, the roller c' of the bar C being also so located as to be sure of riding over it to throw open the valve f' . The tension of the spring should be such as to resist the pressure of the bar C in riding over it. It will be seen that this preferred construction provides a fixed tripping device for operating the reciprocating bar C .

Where it is desired to use the invention for sounding a fog-whistle or an analogous purpose, the valve f' in the inlet-pipe might be operated by hand or otherwise, the mechanism for controlling the kind of signal to be sounded being the same as herein described, for however the valve f' may be operated the rotary mechanism and its cam-cylinder may be used to control the movement of the piston in the cylinder G , and consequently the proper succession of blasts desired.

In a pending application, No. 289,375, filed by me October 29, 1888, I have shown and described, with some variations, the general construction herein set forth, and have therein broadly claimed the same.

What I claim as my invention is—

1. The combination, with a whistle and a piston-cylinder in connection with the whistle, of a piston within the cylinder to control the blast in pipes leading from a common power-supply to the piston-cylinder and to the whistle, whereby the piston is actuated by the same power that blows the whistle, the valve in the supply-pipe, and a reciprocating bar connected with the valve for operating it and having an irregular intermittent movement, substantially as set forth.

2. The combination, with a whistle and a piston-cylinder in connection with the whistle, of a piston within the cylinder to control the blast of the whistle, a rotary mechanism in connection with the piston to determine the

length of the blast, and an actuating medium common to both rotary mechanism and whistle, substantially as set forth.

3. The combination, with a whistle and a piston-cylinder in connection therewith provided with an inlet-opening, of a piston within the cylinder to control the blast, a rotary mechanism for operating the piston, and a valve to admit the whistle-actuating medium to the cylinder and to the piston-actuating mechanism, substantially as set forth.

4. The combination, with a whistle and a piston-cylinder in connection therewith provided with an inlet-opening, of a piston within the cylinder to control the blast, a rotary mechanism to operate the piston, a valve to control the admission of the whistle-actuating medium to both the cylinder and the rotary mechanism, and means for operating the valve intermittently, substantially as set forth.

5. The combination, with a whistle, of a piston-cylinder, an inlet-pipe, and connecting-pipe F', said inlet-pipe provided with a controlling-valve and said connecting-pipe with a regulating-valve, the piston-cylinder and the whistle being each connected with a common power-supply, substantially as described.

6. In combination, a piston-cylinder, a piston, a rotary mechanism to operate the piston, a pipe connecting the piston-cylinder and rotary mechanism, a supply-pipe in connection with the connecting-pipe, and a valve in the supply-pipe to control the admission of the whistle-actuating medium to both cylinder and rotary mechanism, substantially as set forth.

7. The combination of the piston-cylinder and rotary mechanism united by a connecting-pipe, an inlet-pipe communicating with said connecting-pipe, a controlling-valve located in the inlet-pipe, and valves $f^2 f^3$, located in the connecting-pipe, substantially as described.

8. The combination of a whistle, a cylinder, a power-conducting supply-pipe connecting said cylinder with the whistle, a piston within the cylinder to control the whistle, and a rotatable cam to control the movements of the piston, substantially as set forth.

9. The combination, with the piston and its cylinder, of a rotatable cam-cylinder to control said piston and a locking device to dog said cam-cylinder, substantially as described.

10. The combination of the whistle, a cylinder in connection therewith, a piston within the cylinder to control the blast, a lever to control the operation of the piston, and rotary mechanism to actuate said lever, substantially as set forth.

11. In combination, a whistle, a cylinder in connection therewith, a piston within the cylinder to control the whistle, a supply-pipe in communication with the whistle, a supply-pipe in communication with the cylinder, the

pipes from the whistle and cylinder each leading to a common power-supply, a valve in the supply-pipe, a reciprocating bar to operate the valve, and a fixed tripping device for the purpose of operating the said bar, substantially as set forth.

12. In combination, the whistle, the cylinder in connection therewith, the piston to control the whistle, the inlet-pipe in connection with the cylinder, the valve provided with a pinion, and a reciprocating rack-bar meshing with the pinion to operate the valve, substantially as set forth.

13. In combination, the cylinder, the piston, the inlet-pipe, the controlling-valve, the bar C, to operate the valve, and a fixed tripping device for the purpose of operating said bar, substantially as set forth.

14. In combination, a rotary mechanism, a pipe to admit the actuating medium to the rotary mechanism, a cylinder provided with a cam and driven by the rotary mechanism, a cylinder, and a piston in the cylinder, the said piston driven by the cam, substantially as set forth.

15. In a whistle-actuating mechanism, a rotatable cam-cylinder having in combination therewith a locking device, substantially as set forth.

16. The combination, with the rotary mechanism, of an inlet-pipe, a cam-cylinder driven by said rotary mechanism, and a locking device to regulate the movement of said cam-cylinder, substantially as set forth.

17. The combination, with the piston and its cylinder, of a rotatable cam-cylinder to operate the piston, a locking-disk, and a locking-arm to engage the disk, substantially as set forth.

18. The combination, with the piston and its cylinder, of a rotatable cam-cylinder to operate the piston, a locking-disk, a reciprocating bar, E, and a locking-arm engaged with the reciprocating bar, substantially as set forth.

19. The combination, with the piston and its cylinder and a whistle in connection with said cylinder, of the inlet-pipe, controlling-valve, reciprocating bar E, to operate the valve, reciprocating rod D and a retracting-spring, and stationary means for operating said rod D, substantially as set forth.

20. The combination, with a locomotive, of a movable bar, C, connected with a reciprocating bar, E, and valve f' , located in an inlet-pipe to control the admission of steam to a locomotive-whistle, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

WILLIAM RYMER.

Witnesses:

N. S. WRIGHT,
GEORGE H. HIGGS.