

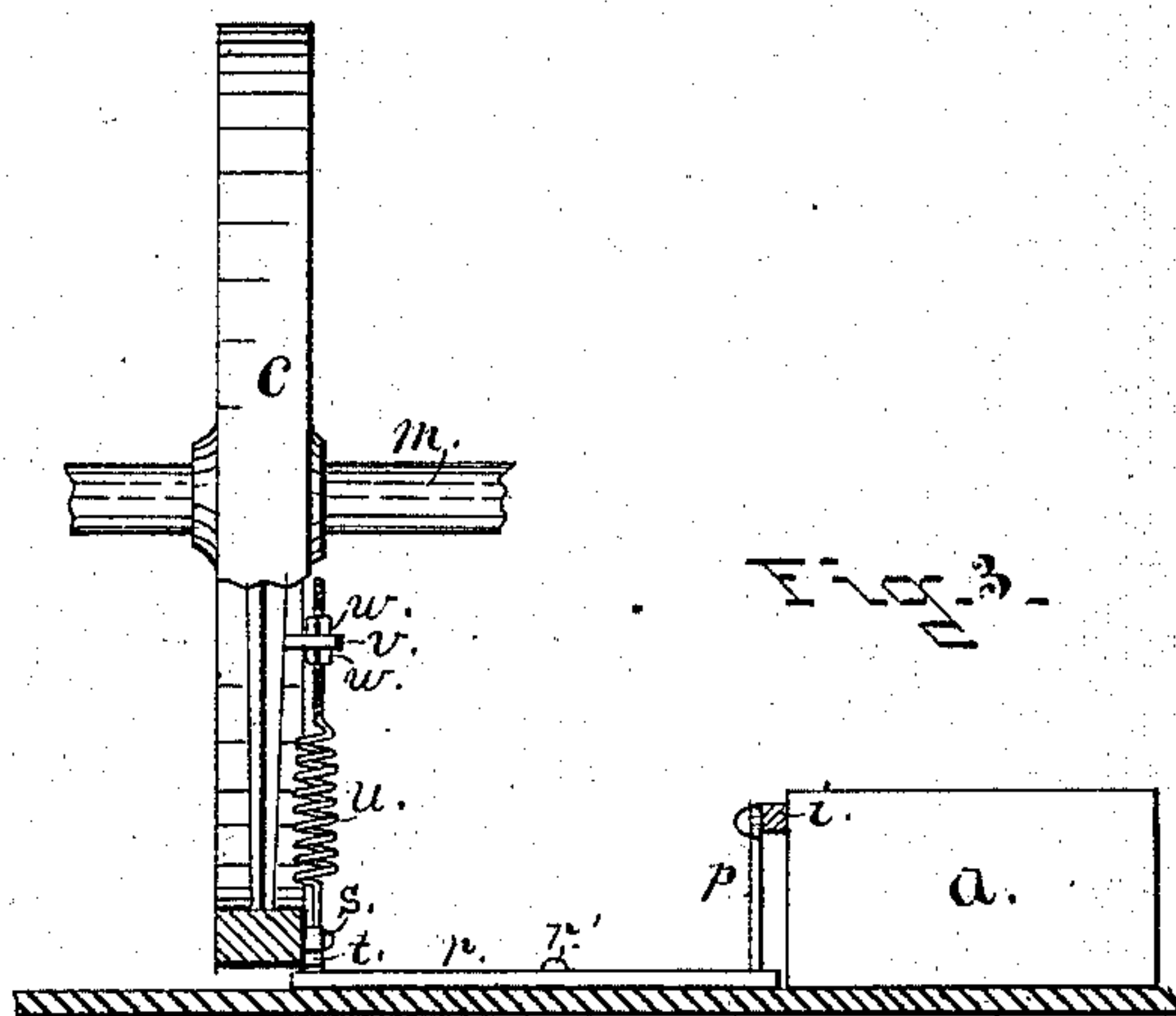
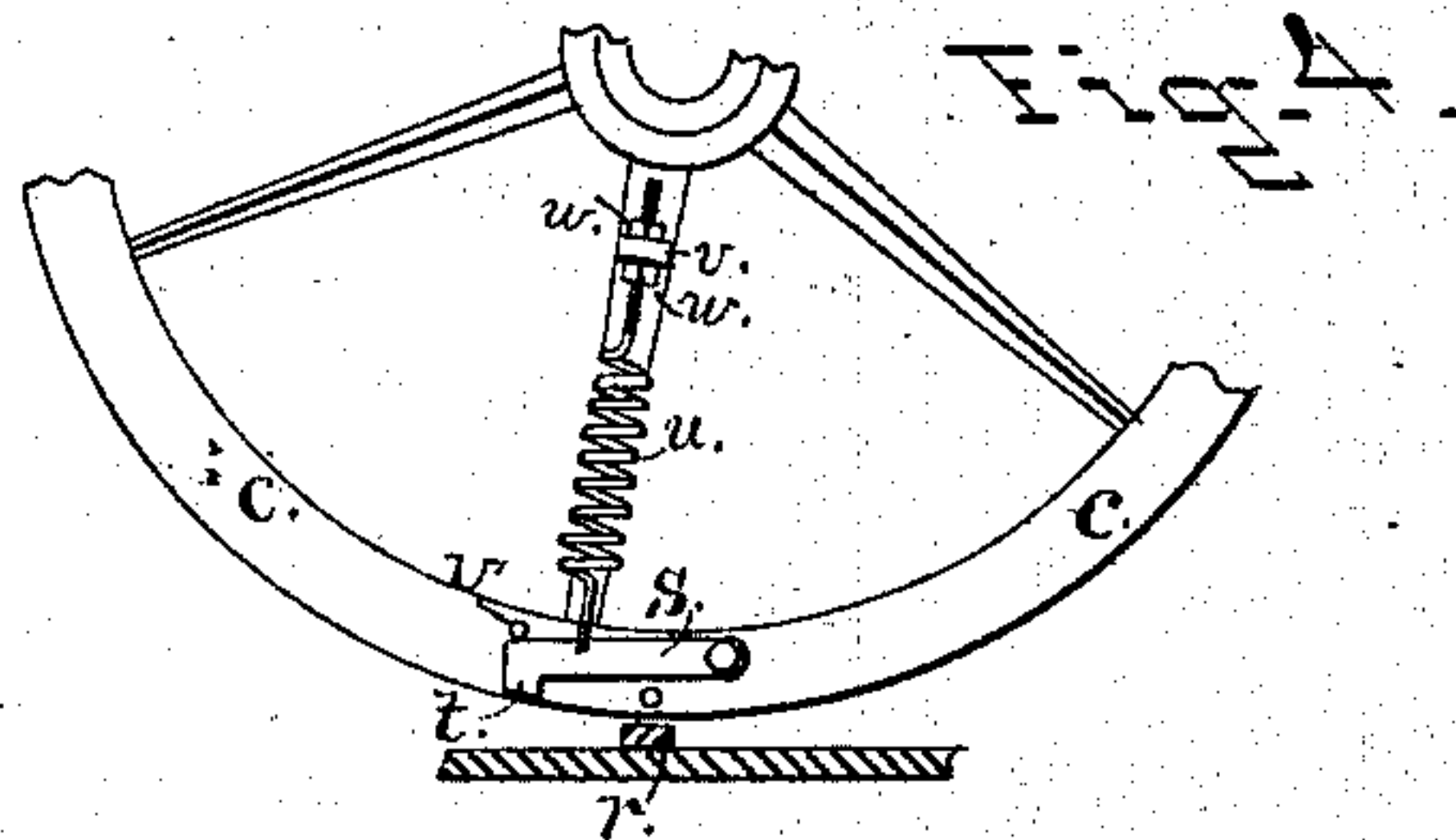
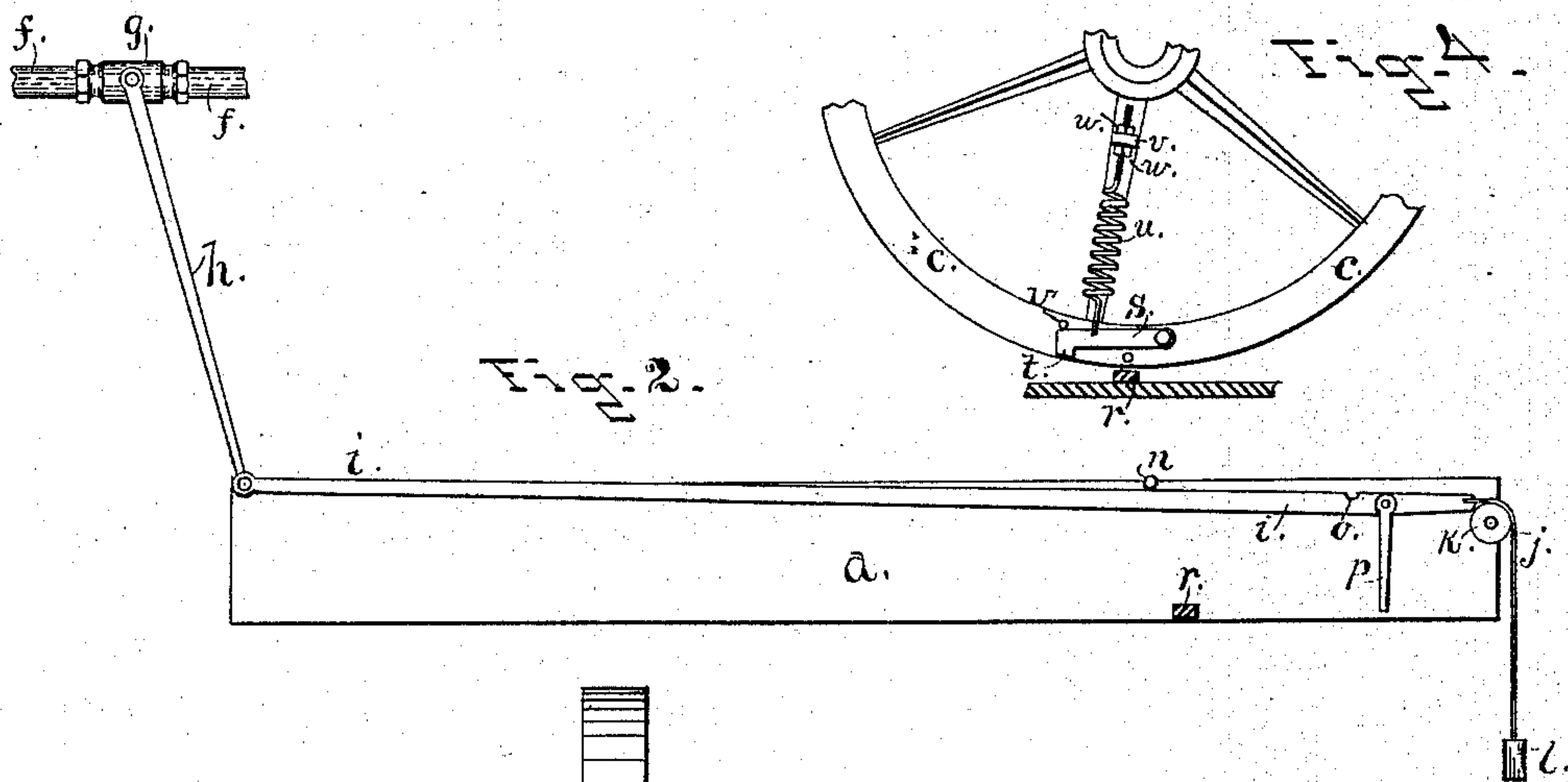
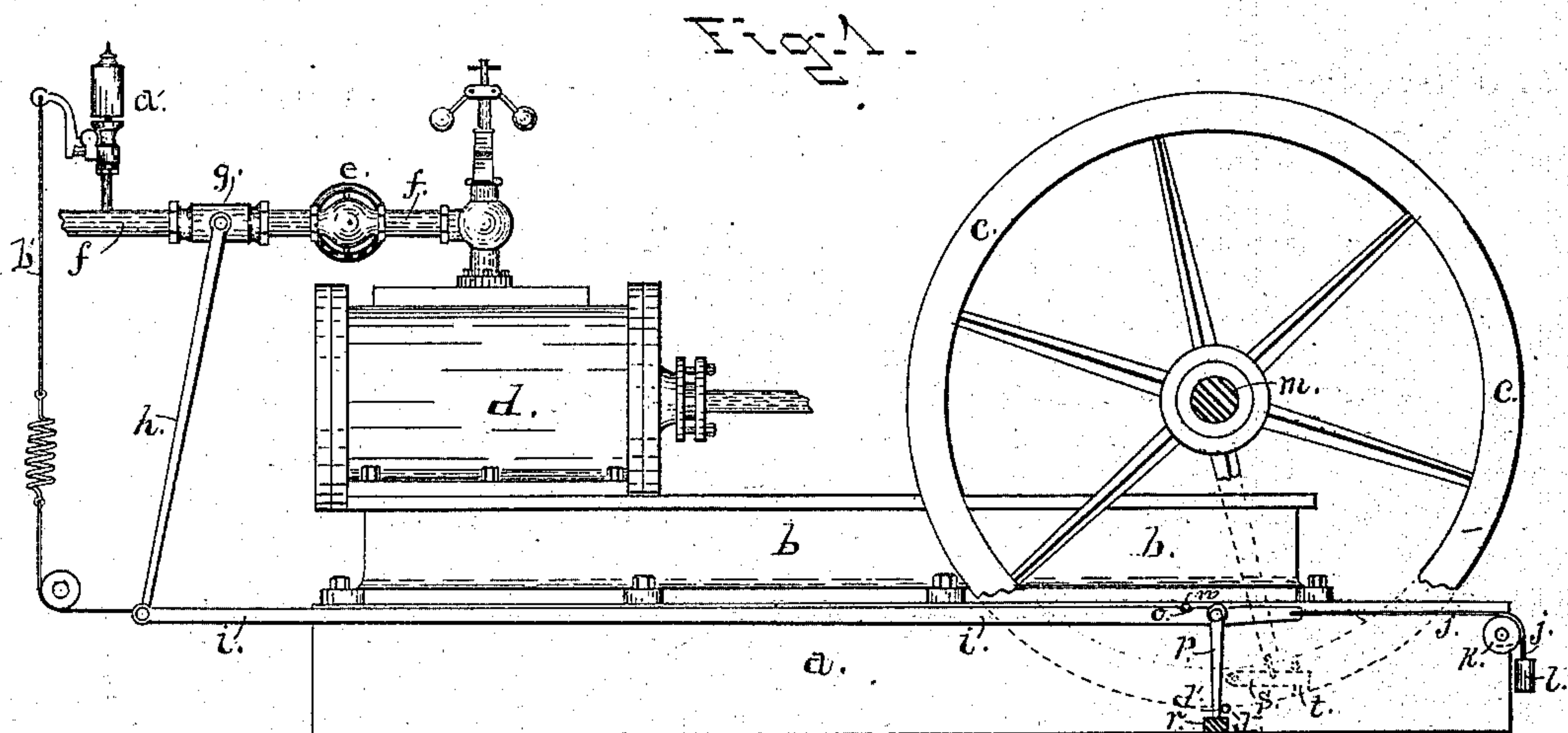
(No Model.)

J. M. LAING.

AUTOMATIC DEVICE FOR STOPPING STEAM ENGINES.

No. 325,941.

Patented Sept. 8, 1885.



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# UNITED STATES PATENT OFFICE.

JAMES M. LAING, OF BAY CITY, MICHIGAN.

## AUTOMATIC DEVICE FOR STOPPING STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 325,941, dated September 8, 1885.

Application filed June 25, 1885. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES M. LAING, a citizen of the United States, residing at Bay City, in the county of Bay and State of Michigan, have invented certain new and useful Improvements in Automatic Devices for Stopping Steam-Engines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

Steam-engines, from various causes, as by the lightening of a great portion of their load, or the breaking of belts and other portions of machinery, suddenly start off and run with accelerated speed and do great damage and often cause loss of life; and the object of my invention is to provide a means of automatically stopping a steam-engine when the running speed of the same shall be increased beyond a predetermined number of strokes or revolutions per minute; and it consists, chiefly, in the connection, with some rotary part of the engine, of a weighted dog, the weight of the same being counterbalanced by a suitable spring in such a manner that when the spring is properly adjusted for holding the dog in position, when the parts are being revolved at a certain speed an increase of that speed will overcome the action of the spring and allow the dog to advance beyond its regular line of travel and trip a lever properly arranged and provided with suitable means for connecting with and operating a valve placed in the steam-pipe which supplies steam to the engine and close the same and cut off the supply of steam therefrom. The mechanism I employ to accomplish this object is illustrated in the accompanying drawings, in which—

Figure 1 is a side view of a portion of a steam-engine with my invention attached thereto, showing the position of the parts when the engine is running. Fig. 2 is the same when the engine has been stopped by my improved device. Fig. 3 is an end view of the device as shown in Fig. 1. Fig. 4 is a detached portion.

Similar letters refer to similar parts throughout the several views.

*a* represents the engine-bed, *b* the frame, *c* the fly-wheel, *d* the cylinder, *e* the throttle-valve, and *f* the steam-pipe, of an ordinary engine.

In the steam-pipe *f*, and between the throttle-valve and the boiler, is placed a throttle or stop valve, *g*, and upon the stem of this valve *g* is rigidly secured the downward-extending lever *h*. To the lower end of the lever *h* is pivoted one end of the connecting-rod *i*, which extends along the engine bed *a* to nearly the opposite end of the bed *a*; and to this end of the rod *i* is attached a cord, *j*, which passes over a pulley, *k*, and is secured at its opposite end to a weight, *l*, in a suitable manner, so that when the lever *h* is in a vertical position the weight *l* will be at some distance from the floor.

At a point beneath the engine-shaft *m* and to the engine-bed *a* is secured a rigid catch or pin, *n*, and upon the upper edge of the rod *i* is arranged a recess or notch, *o*, adapted to engage with the catch *n*, and located in such a position that while the recess *o* is in engagement with the catch *n* the lever *h* will be in a vertical position.

Directly beneath the engine-shaft *m*, and with its upper end pivoted to the rod *i*, is placed the vertical trip-lever *p*, the lower end of the trip-lever resting upon one end of the horizontal lever *r*, which is pivoted near its center to the floor by the bolt *r'*, and has its opposite end extended to or beneath the fly-wheel *c*, as shown in Fig. 3.

Upon the side of the fly-wheel *c*, as shown in Figs. 3 and 4, is pivoted, at one end, the dog *s*. This dog is of proper length and weight and extends along the rim of the wheel, and at its free end is provided with a catch, *t*, projecting toward the outer edge of the wheel, and to the edge opposite the projecting catch *t* is attached one end of the spring *u*, the opposite end of the spring being provided with a thread and passed through an eye, *v*, which is secured to one of the spokes near the hub of the wheel, and is therein secured and adjusted by the nuts *w*, which are placed upon opposite sides of the eye. A stop, *v'*, is placed on the rim of the wheel *c*, against which the free end of the dog *s* is held by the spring in such a position as that the projecting part *t* will, when the wheel *c* is revolved at a predetermined speed,



pass the end of the lever *r*, and the spring *u* being properly adjusted, as soon as the speed of the wheel *c* is increased the weight of the dog overcomes the tension of the spring *u*, and the free end of the dog moves outward and the projecting part *t* catches the end of the lever *r*, causing it to swing from beneath the trip-lever *p* and allow the rod *i* to drop away from the catch *n*, and the weight *l* then descends to the floor, moving the rod *i* and lever *h* to the position shown in Fig. 2. This operates the valve *g* and cuts off the steam from the cylinder and stops the engine.

Often several engines used for pumping brine, oil, &c., are located at some distance from each other and are under the charge of one engineer; and in order that the engineer shall know when one of his engines has been stopped by my device, an alarm-whistle, *a'*, is arranged in connection with the steam-pipe, and connected by the cord *b'* to the lever *h*, or other convenient moving part of the device, so that when the device operates to cut off the steam from the engine the lever of the whistle *a'* is pulled and the whistle blown until the device is again put in position for operating the valve *g*, so that the engineer may at once know that something is wrong with the machinery connected with a certain engine without waiting to make a periodical visit to find out that the engine has been stopped.

I have herein described the general construction of and a common mode of attaching my automatic device to an engine, but engines of different construction and design will require the device to be attached in a different manner and the parts to be located in different positions from that herein explained, and under different circumstances different means may be employed for working the parts, as a spring may be used for closing the valve in place of the weight, or the weight may be attached in a different place or position, or the catch *n* and recess *o* may be located differently, and the rod *i* raised up for releasing the catch, &c., and produce the same result; but

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In an automatic device for stopping a steam-engine, a dog pivoted by one end to a revolving portion of the engine, the opposite free end being provided with an extended catch, and a retaining-spring holding the free end of the said dog in one position at a predetermined speed and allowing it to move

outward at an increased speed, in combination with a throttle-valve in the steam-pipe, means, substantially as described, for closing the said throttle-valve by a weight or spring, a trip-lever holding the said throttle-valve open, and means, substantially as described, for tripping the said trip-lever by the extended free end of the said dog when the speed of the engine is increased, substantially as and for the purpose specified.

2. In an automatic device for stopping steam-engines, the combination of a throttle or stop valve placed in the steam-pipe, and a lever attached to the valve, with a connecting-rod having one end pivoted to the said lever and the opposite end provided with a weight or spring operating to move the rod and close the said valve, a recess in the rod arranged to engage with a fixed catch and hold the valve open, a trip-lever holding the said rod in engagement with the said catch, and means, substantially as described, for tripping the said trip-lever, and thereby releasing the said rod from the catch when the motion of the engine is increased beyond a predetermined speed, substantially as and for the purpose specified.

3. In an automatic device for stopping steam-engines, the dog *s*, pivoted at one end to the side of the wheel *c*, and provided at the opposite free end with the projecting catch *t*, in combination with a retaining-spring, *u*, having one end secured to the free end of the said dog and the opposite end secured to the eye *v* by the nuts *w*, substantially as and for the purpose set forth.

4. In an automatic apparatus for stopping a steam engine, the combination of a throttle-valve in the steam-pipe and a lever attached to the said valve for opening the same, and means, substantially as described, for automatically closing the said valve at an increased speed of the engine, in combination with an alarm-whistle attached to the said steam-pipe, and a cord attaching the lever of the whistle to the said valve-lever in such a manner that when the throttle-valve is closed the whistle will sound an alarm, substantially as and for the purpose set forth.

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

JAMES M. LAING.

Witnesses:

J. E. THOMAS,  
C. C. HARRIS.