

(No Model.)

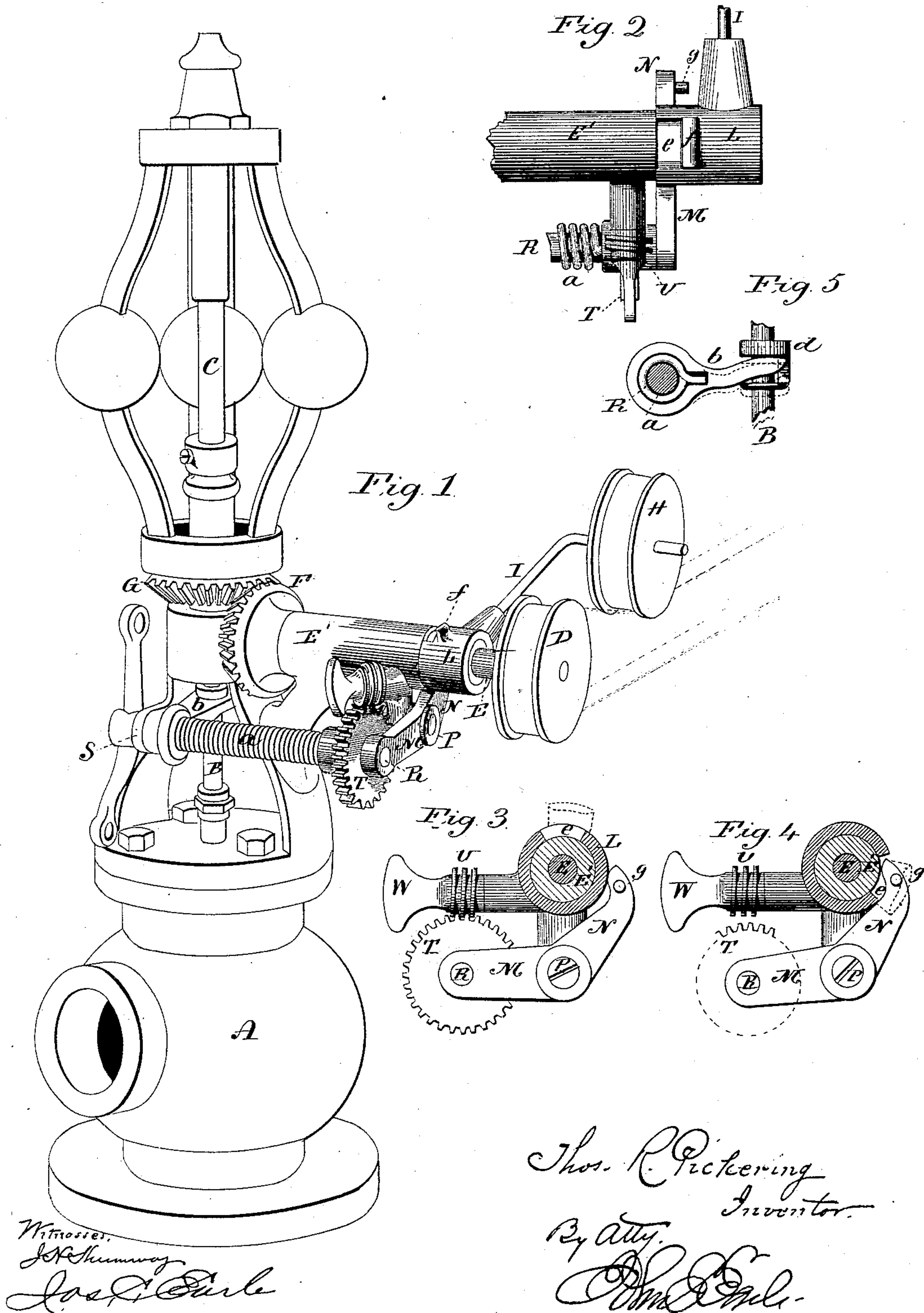
2 Sheets—Sheet 1.

T. R. PICKERING.

SAFETY ATTACHMENT FOR STEAM ENGINE GOVERNORS.

No. 318,289.

Patented May 19, 1885.



(No Model.)

2 Sheets—Sheet 2.

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Fig 6

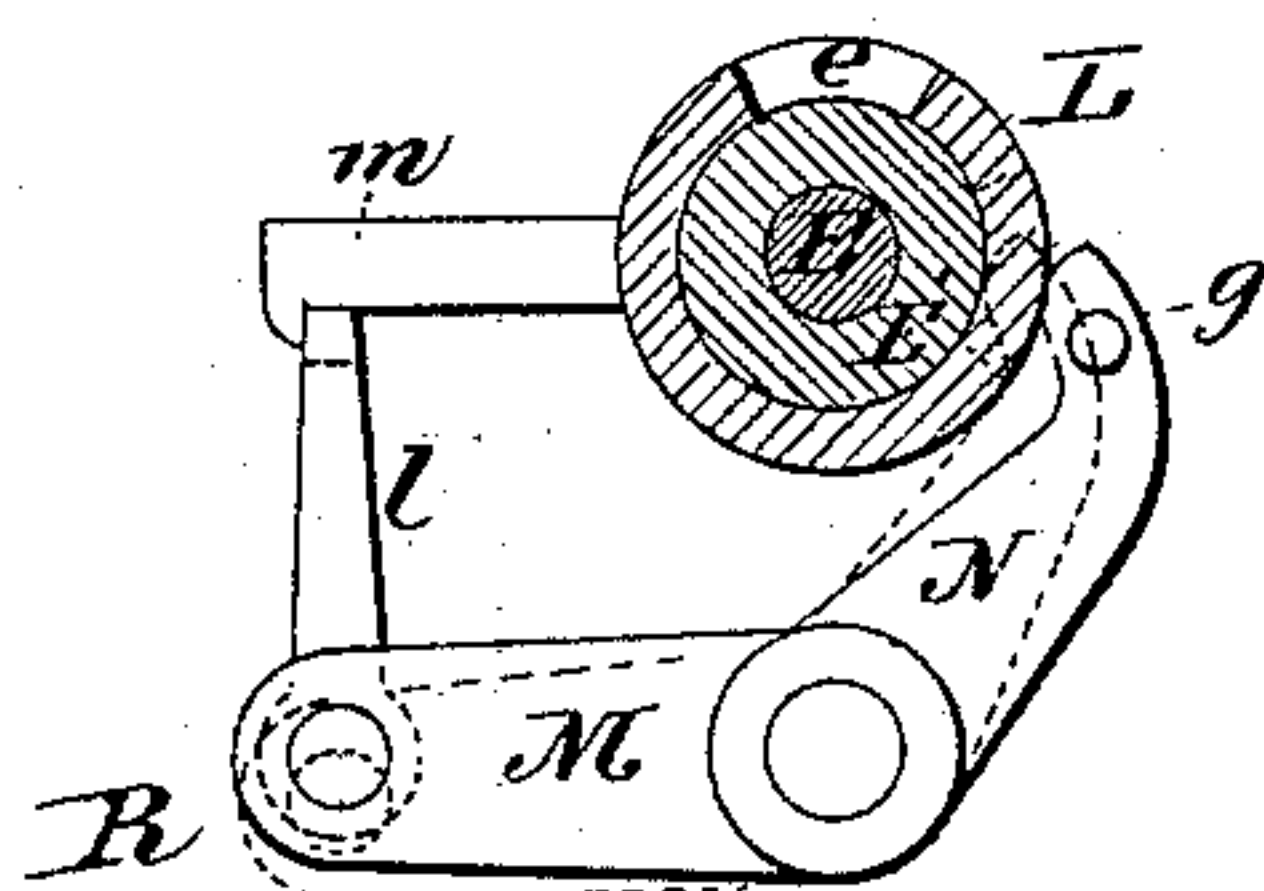


Fig 7

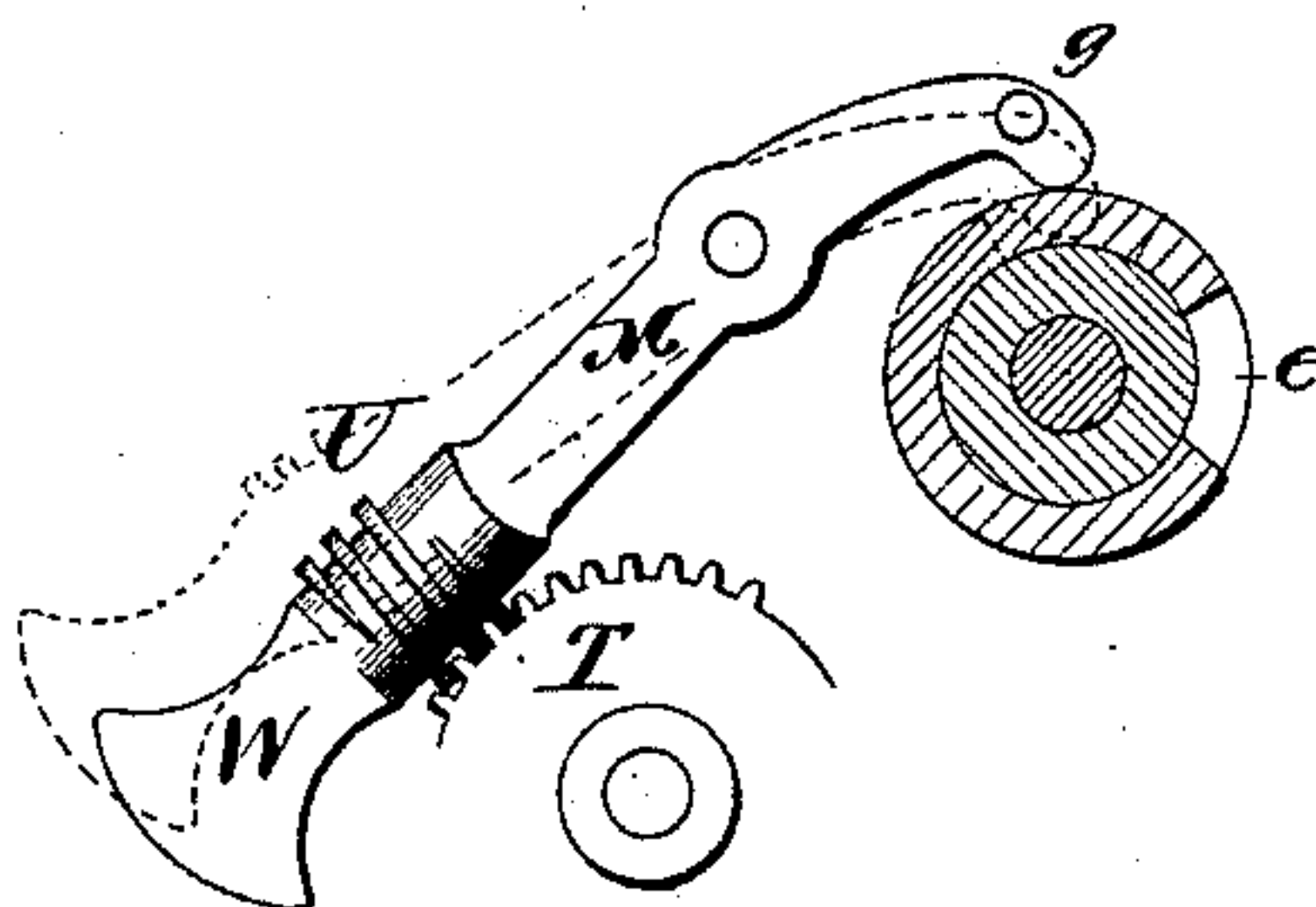


Fig 8

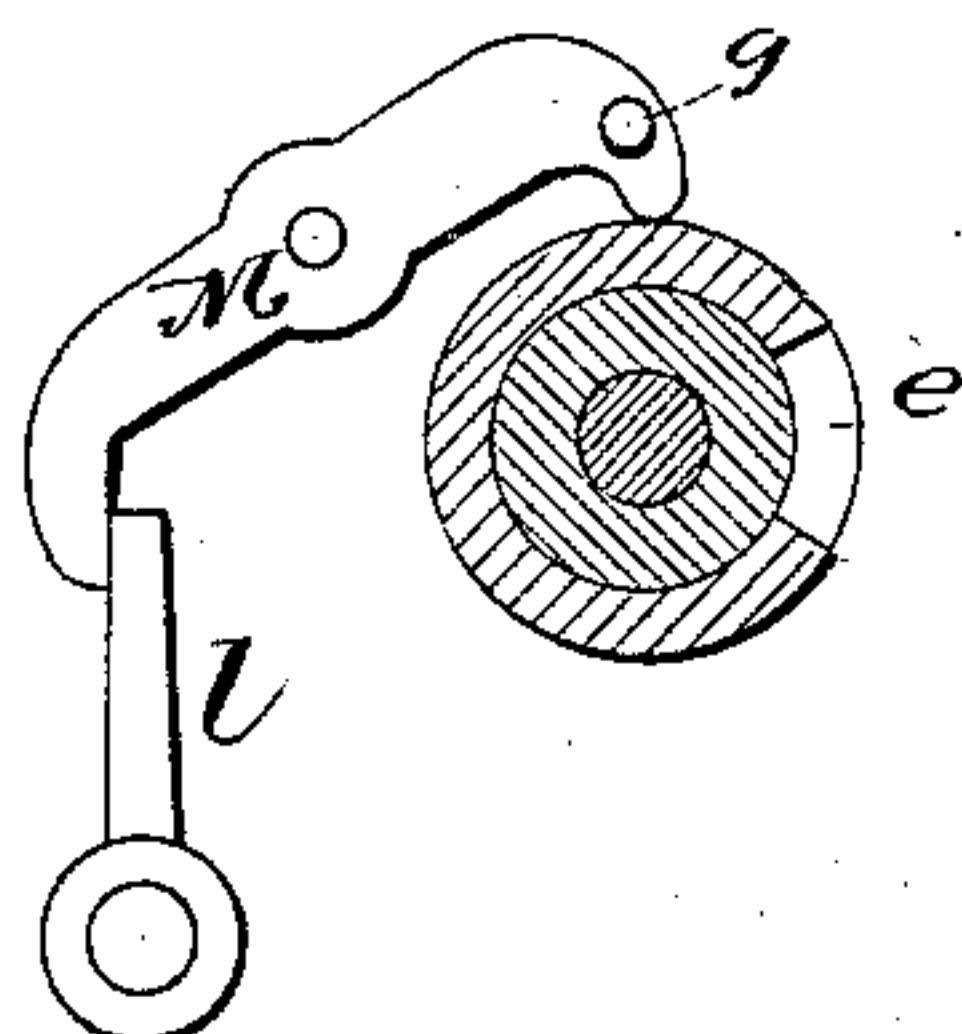
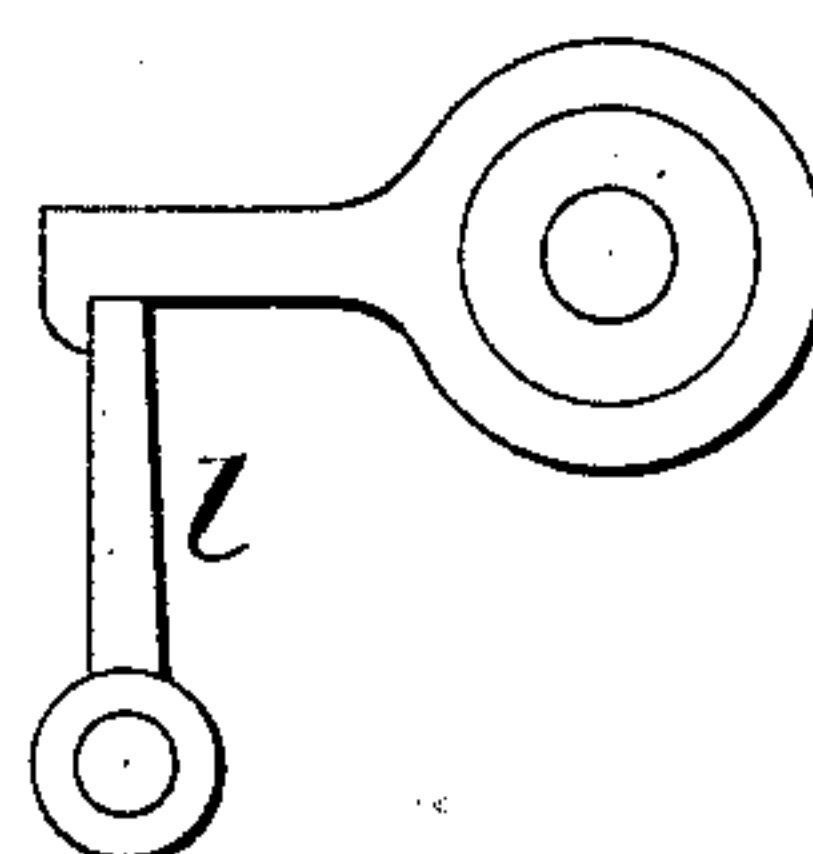


Fig 9



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UNITED STATES PATENT OFFICE.

THOMAS R. PICKERING, OF PORTLAND, CONNECTICUT.

SAFETY ATTACHMENT FOR STEAM-ENGINE GOVERNORS.

SPECIFICATION forming part of Letters Patent No. 318,289, dated May 19, 1885.

Application filed March 30, 1885. (No model.)

To all whom it may concern:

Be it known that I, THOMAS R. PICKERING, of Portland, in the county of Middlesex and State of Connecticut, have invented a new Improvement in Safety Attachments for Steam-Engine Governors; and I do hereby declare the following, when taken in connection with accompanying drawings, and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a perspective view showing the safety attachment applied; Fig. 2, a top or plan view of the cam L, the lever M N, and their immediate connections; Fig. 3, a transverse section through the cam, showing a side view of the lever M N and parts immediately connected in the position of holding the spring; Fig. 4, the same view showing the parts in position of the spring released; Fig. 5, a transverse section through the spring-shaft, showing the arm *b* in connection with the governor-valve spindle; Fig. 6, a modification of the connection between one end of the spring and its stop; Fig. 7, a modification showing the spring-shaft arranged in a fixed bearing, the worm arranged in the arm M of the lever; Fig. 8, a modification showing the lever arranged to serve as a latch to hold the stop with the spring-shaft in fixed bearings; Fig. 9, a modification showing the arm as extending from the cam to engage the stop.

This invention relates to an improvement in a safety attachment for steam-engine governors, having for its object the automatic cutting off of the steam-engine from the machine when the governor-band shall break, and also to adjust the action of the governor, whereby the speed of the engine may be increased or diminished without changing the pulleys or gearing by which the governor is driven; and the invention consists in the combination of devices, more fully hereinafter described and particularly recited in the claims.

The governor, with which I show my invention as combined, is that known as the "Pickering Governor;" but the invention is applicable to this class of governors generally, and as here illustrated A. represents the shell of

the valve; B, the valve-stem, which is in connection with the spindle C of the governor, said valve-stem being forced downward as the balls fly outward, or raised as the balls return, in the usual manner for steam-governors, too well known to require particular description. The governor is driven by means of a pulley, D, fixed to a shaft, E, supported in a bearing, E', and carrying a bevel-gear, F, which works into a corresponding bevel-gear, G, on the governor, and so that the rotation of the shaft E is communicated to the governor proper.

The band to drive the pulley D is applied in the usual manner, and extends to the driving-pulley on the engine or other point from which the power to drive the governor is derived.

H is an idler-pulley, hung to a lever, I, the lever extending from a cam, L, arranged loosely on the shaft E or upon its bearing, or at some point so that the idler will ride upon the governor-band in the usual and proper running of the governor, the band being indicated by broken lines, but so that should the band break the idler will fall, acting as a weight to turn the cam L.

Below the cam, and upon the shaft-support, a two-armed lever, M N, is hung upon a fulcrum, P, one arm, N, extends upward, and so as to rest against the surface of the cam L when the idler is in its running condition, and, as seen in Fig. 3, the other arm, M, supports one end of a shaft, R, S being the bearing or support for the other end. On the shaft R is a gear, T, above which is a worm, U, arranged to work into the teeth of the gear T when the arm N rests against the cam, as seen in Fig. 3. The worm U is fitted with a head, W, by which it may be readily turned.

Around the shaft R is a helical spring, *a*, one end made fast to the hub of the gear T. The other end is engaged with an arm, *b*, loose on the shaft R, as seen in Fig. 5. This arm *b* is loose upon the shaft, but extends in toward the valve-stem, its inner end forked and so as to stand below the collar *d* on the valve-stem B, as seen in Fig. 5. The tendency of the spring held by the gear T is to turn the arm *b* upward, and therefore tends to raise the valve-

stem B and open the valve, it being understood that the action of the governor is to force the stem B downward to close the valve; hence the spring resists the action of the governor.

5 At one point on the cam L, in line with the arm N, a recess, *e*, is made, and so that when the cam shall be turned to such a position as to bring this recess to the end of the arm N then that end will enter that recess, as seen in
10 Fig. 4, causing the lever N M to turn and throw the gear T out of its engagement with the worm U.

Under the usual running of the governor, when the band is in the proper condition, the
15 cam stands so as to hold the recess *e* away from the lever N; but should the band break then the pulley H will drop, taking with it the lever I, which supports it, and correspondingly turning the cam L until the recess *e* arrives at
20 the arm N. Then the arm N will enter the recess, disengage the gear T from the worm, and release the power of the spring upon the arm P, so as to permit the valve to fall and cut off the supply of steam, thereby automatically
25 stopping the engine when such accident occurs.

To insure the entrance of the arm N into the recess in the cam an overhanging flange, *f*, is made on the cam L, and on the side of the arm
30 N is a stud, *g*, with which the overhanging flange will engage as the cam turns, as seen in broken lines, Fig. 4, the flange forcing the arm N into the recess in the cam.

As before stated, the spring resists the action of the governor to the extent of its power
35 through the arm *b*. This power may be increased by turning the worm U so as to cause the gear T to rotate in the direction of winding or increasing the torsion of the spring, or
40 it may be diminished by the reverse operation. By increasing the resistance against the action of the governor the speed of the engine will be increased accordingly, and by diminishing the resistance of the spring the speed
45 will be decreased accordingly; hence the engineer has it in his power to increase or diminish the speed of his engine at will or as may be required, and without changing the relative proportions of the governor-pulleys, so
50 that the spring with the arm *b* serves the double purpose of closing the valve when the governor-band shall break and of adjusting the action of the governor.

While I prefer to make the spring adjustable, in order to adjust the governor, as before
55 described, the adjustment may be omitted and the spring held rigid, as indicated in Fig. 6, by extending an arm, *l*, from the shaft R, with which the spring is engaged. That arm when
60 the idler is running upon the band engages with a shoulder or hook, *m*, above and so as to hold the spring; but when the arm M drops, as before described, and as indicated in broken lines, Fig. 6, the arm *l* is relieved from its en-
65 gagement with its shoulder, and the spring is free.

Instead of hanging one end of the shaft in the lever, as described, and whereby the toothed wheel is thrown out of gear with the worm, the shaft may be arranged in stationary
70 bearings and the worm arranged in the lever, as seen in Fig. 7, and so that the movement of the lever will throw the worm out of engagement with the gear T, as indicated in broken lines; or, dispensing with the adjust-
75 ment, the arm *l* may be engaged with the lever M, as seen in Fig. 8; but as the idler falls and the cam turns the lever will be turned out of engagement with the arm *l*, and thereby re-
80 lease the valve from the action of the spring, as before described.

The lever M N may be dispensed with and the engagement of the stop made directly with the cam by extending an arm therefrom to en-
85 gage the stop, as seen in Fig. 9.

I claim—

1. The combination of a steam-governor, the valve-stem B in connection with said governor, a shaft, R, an arm, *b*, extending from
90 said shaft into engagement with the said stem, a torsion-spring, one end engaged with said arm *b*, a stop arranged to hold the other end of the spring, a cam, the idler H, hung upon an arm extending from said cam and whereby
95 as the idler falls the cam will be turned, and a stop arranged to hold the other end of said spring when the idler is running, said cam adapted to disengage said stop when the idler falls, substantially as described.

2. The combination of a steam-governor, 100 the valve-stem B, in connection with said governor, the shaft R, arm *b*, extending from said shaft, gear T, also on said shaft, a torsion-spring, *a*, one end connected with said gear T and the other with the said arm *b*, the lever
105 N M, the wheel end of said shaft hung in the said arm M, worm U, arranged to work into the teeth of the said gear, a cam, L, provided with an arm extending therefrom, and an idler-pulley on said arm, the cam constructed with
110 a recess, *e*, the arm N extending into the path of said recess, substantially as and for the purpose described.

3. The combination of a governor for steam-engines, a cam provided with an arm extend- 115 ing therefrom, an idler arranged upon said arm and so as to run upon the governor-band, but free to fall when the band breaks, a lever, M N, the one arm, N, arranged to bear upon said cam, the cam constructed with a recess
120 into which said arm may turn, a shaft, R, one end supported in the arm M of said lever, said shaft carrying an arm, *b*, extending into connection with the valve-stem, a torsion-spring, one end engaged with said arm *b*, and a stop ar-
125 ranged to hold the other end of the spring, or from which the said spring will be released, according to the position of the said lever M N, substantially as described.

4. The combination of a steam-engine gov- 130 ernor, cam L, provided with an arm, I, idler H, on said arm and arranged to run on the

governor-band, the lever M N, the arm N, arranged to bear upon said cam, the cam constructed with a recess, *e*, into which said arm N may enter, and with the flange *f*, the arm
5 N provided with a stud, *g*, to engage said flange, the shaft R, one end arranged in the said arm M, an arm, *b*, extending from said shaft into connection with the valve-spindle, a torsion-spring, one end engaged with said

arm *b*, and a stop arranged to hold the other 10 end of the spring, or from which the said spring will be released, according to the position of the said lever M N, substantially as described.

THOMAS R. PICKERING.

Witnesses:

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