

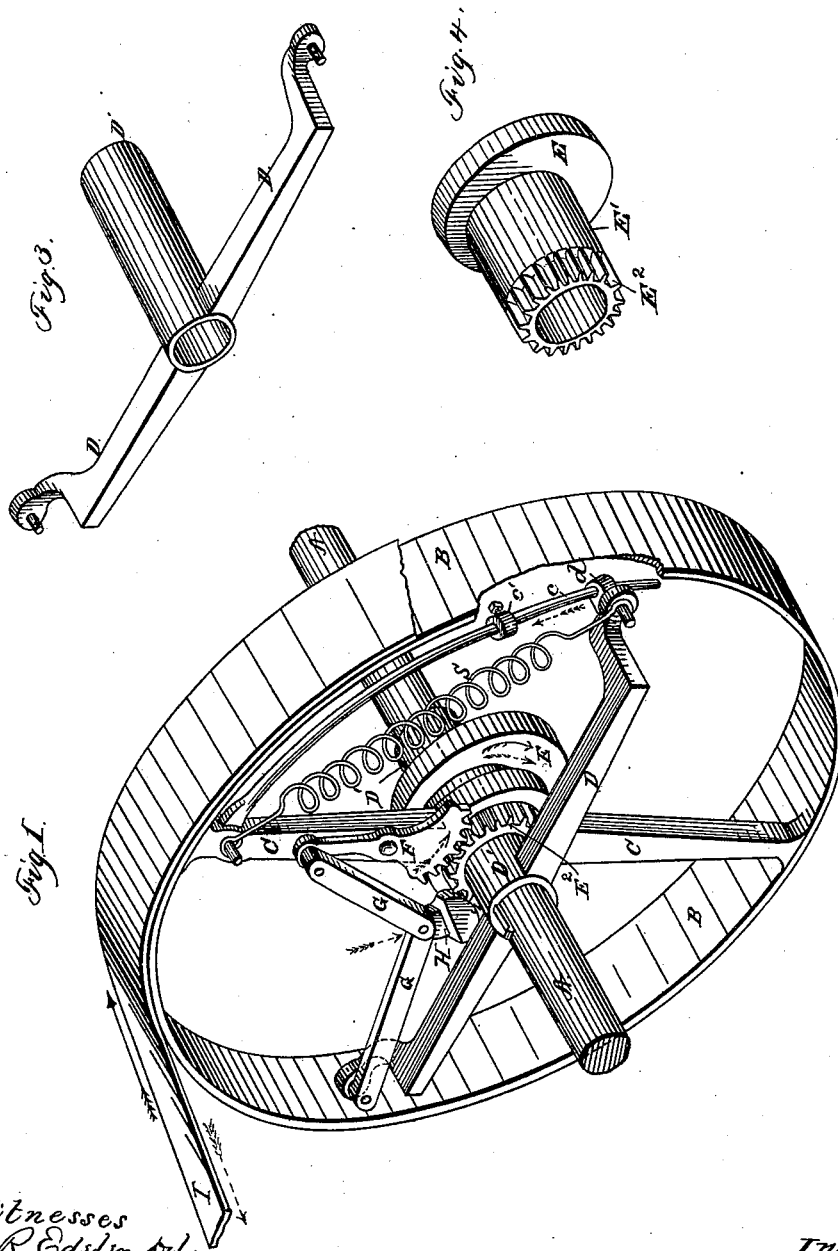
(No Model.)

2 Sheets—Sheet 1.

LE GRAND SKINNER.
ENGINE GOVERNOR.

No. 266,214.

Patented Oct. 17, 1882.



Witnesses
W. R. Edlin del.
Robt H Porter,

Inventor
I. G. Skinner,
Per Nullock Nullock
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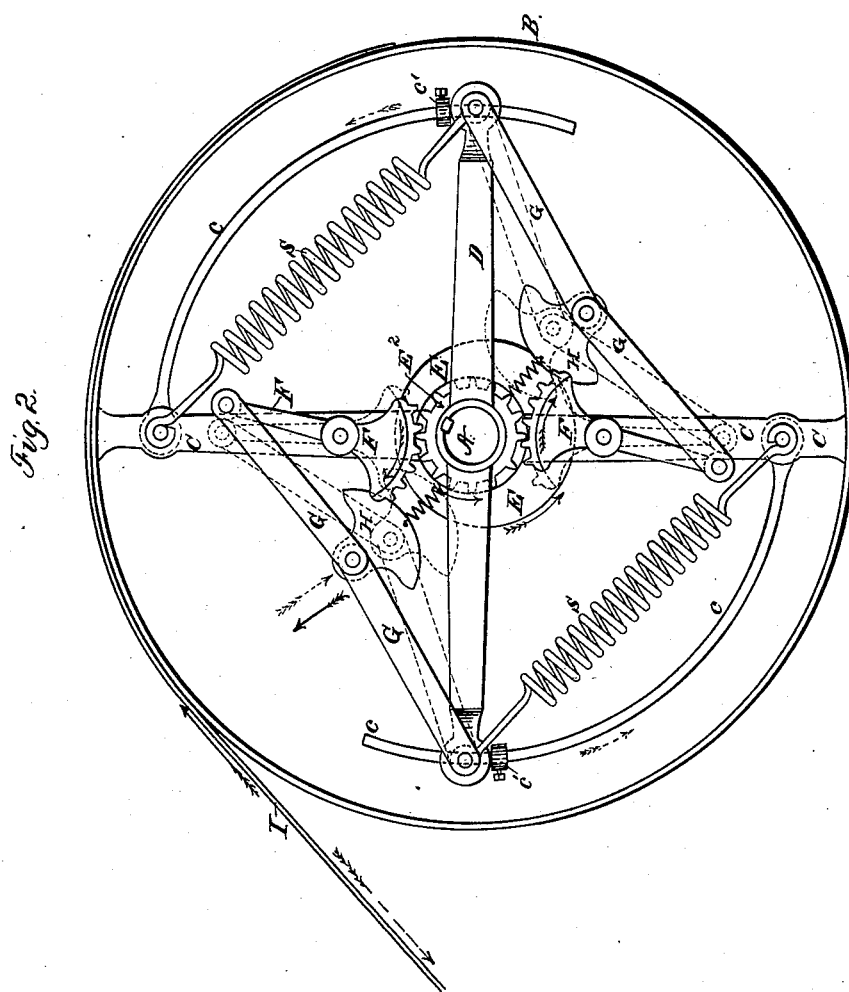
2 Sheets—Sheet 2.

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No. 266,214.

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Inventor
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UNITED STATES PATENT OFFICE.

LE GRAND SKINNER, OF ERIE, PENNSYLVANIA.

ENGINE-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 266,214, dated October 17, 1882.

Application filed March 21, 1882. (No model.)

To all whom it may concern:

Be it known that I, LE GRAND SKINNER, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented new and useful Improvements in Engine-Governors; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and the letters or figures of reference marked thereon.

My invention relates to the construction of steam-engine governors, and particularly to that class of such devices as are upon the main shaft of the engine and operate to move the eccentric, and thereby govern the movement of the valve.

The principle upon which my device operates is to regulate the position of the eccentric by the tension of the main driving-belt, which of course is regulated, or, rather, effected, by the amount of power being expended to do the work of the shop, factory, or mill. To do this the main driving-belt pulley on the main shaft of the engine must be so mounted as to be flexible and capable of yielding to the tension of the belt to a certain extent, and the movement thus obtained is utilized to operate the eccentric as necessary to govern the steam-valve by its movement. When I say "steam-valve" I mean either the main valve or an independent cut-off valve, according as the engine is constructed, for my device can be applied to either form of engine with equal facility. The essential elements of such a construction are, first, a band wheel or pulley loose upon the main shaft; second, a frame keyed to the shaft; third, a spring or other elastic device connecting the pulley to the frame; and, finally, devices for communicating the elastic movement to the eccentric.

My invention consists in providing certain useful improvements in the construction of governors having these elements.

The accompanying drawings illustrate my invention, as follows:

Figure 1 is a perspective view of the governing apparatus, the position of parts being that which they occupy when the engine has just encountered additional work. Fig. 2, Sheet 2, is a side view of the same when the engine is at rest or running on steady work. Figs. 3 and 4 are details of construction.

A represents the main shaft of the engine; B, the main driving-wheel; I, the driving-belt. C is the web of the driving-wheel. D is the frame, which is tight upon the shaft. S is the spring, which connects the drive-wheel to the frame with an elastic connection. E is the eccentric, which has a sleeve, E', with cogs E². F is a segment-gear lever pivoted on the web C. G G are toggles connecting the frame D with the lever F. H is the centrifugal weight or ball.

The construction, as shown, is as follows:

The frame D is shown in Fig. 3 in perspective. It is provided with a sleeve, which extends along the shaft through the drive-wheel and eccentric. This sleeve is, however, not essential, and may be omitted. The frame is keyed to the shaft.

The eccentric is shown in perspective in Fig. 4. It is provided with a sleeve, E', on the end of which is a cog wheel or pinion formed from it. This eccentric is mounted loosely on the sleeve of the frame D, and the drive-wheel is mounted loosely on the sleeve of the eccentric between the cogs E² and the eccentric.

The segment-gear lever F is pivoted, as shown, on the arm C, and its cogs engage with the cogs E². If no balls are to be used, the lever F would be connected with the arm D by a rigid bar; but when balls are used, as shown, the lever F is connected with the frame D by toggles, and the weight or ball H is attached at or near the joint of the toggles.

An arc-shaped guide-arm, c, extends from the web C, and passes through a loop, d, on the frame D, and carries an adjustable stop, c', which regulates the distance to which the spring may draw the parts C and D together, and the strength of the spring limits the distance to which these two parts may be thrown apart. Thus the degree of flexible movement of the drive-wheel is limited, and this degree is adjusted by the position of the stops c', which should be placed so as to give the spring the necessary tension to keep the stop against the arm, when the power to be exerted by the engine is uniform. Any sudden call for more power will draw the stop back from the arm, because it is exerted upon the drive-wheel and tends to retard its momentum; but as soon as this variation of the position of the parts is communicated to the valve the necessary steam

for giving this additional power is supplied and the parts will resume their former position. When this call for more power occurs the arms C and D move apart, and through the lever F and the pinion E² the deviation is communicated to the eccentric, and this will be the case where the toggles G G are used or when the connection at that point is rigid. The dotted arrows in the drawings show the direction of movement of the parts when this retarding of the momentum or the extra strain occurs. The one on the belt shows the direction of the resistance which is being exerted. The black arrows show the direction of the motion of the engine and of the parts as affected by the motion of the engine.

I consider it very advantageous, but not essential, that the toggles and centrifugal balls be used, for when the work being performed by the engine is uniform the flexibly-connected parts will move evenly together, and the balls will adjust the valve according to the quality of steam furnished.

The frame D may be the fly-wheel of the engine or any other properly-formed device.

When the eccentric operated upon is connected with the main valve, in place of an independent cut-off, it will have to be moved diametrically across the shaft, which will require a change in the gearing which operates the eccentric. Any of the well-known means for moving the eccentric in this manner can be used and operated from the levers F by means easily devised by any skillful mechanic.

From the foregoing description and the arrows on the drawings the operation of the device will be as easily understood, I think, as if gone into in detail.

What I claim as new is—

1. In the governing apparatus of a steam-engine, the combination of the following elements: a frame or cross-head, D, keyed to the main shaft of the engine, a drive-wheel, B, loose upon the main shaft and connected to the cross-head D by a spring, a lever, F, pivoted on the web of said drive-wheel and connected at one end to said cross-head by toggle-levers G G, having weights H, and at the other end geared to mechanism for moving the valve-eccentric, substantially as and for the purposes mentioned.

2. In the governing apparatus of a steam-engine, the combination of the arm D, keyed to the shaft, the drive-wheel B, loose upon the shaft and flexibly connected with the arm D, the toggles G G, lever F, sleeve E', and eccentric E, substantially as and for the purposes mentioned.

3. In the governing apparatus of a steam-engine, the combination, substantially as shown, of the following elements: a frame or arm fixed upon the main shaft, a drive-wheel loose upon the shaft and connected to said arm or frame by a flexible connection, which may be limited in its degree of movement and flexibility, and, finally, valve-gearing, which is operated from the movement of the said flexibly-connected parts when they are made to change their relative positions.

In testimony that I claim the foregoing I have hereunto set my hand this 18th day of March, 1882.

LE GRAND SKINNER.

Witnesses:

JNO. K. HALLOCK,
ROBT. H. PORTER.