

(No Model.)

G. C. PHILLIPS.

GOVERNOR FOR DIRECT ACTING ENGINES.

No. 257,976.

Patented May 16, 1882.

Fig. 1.

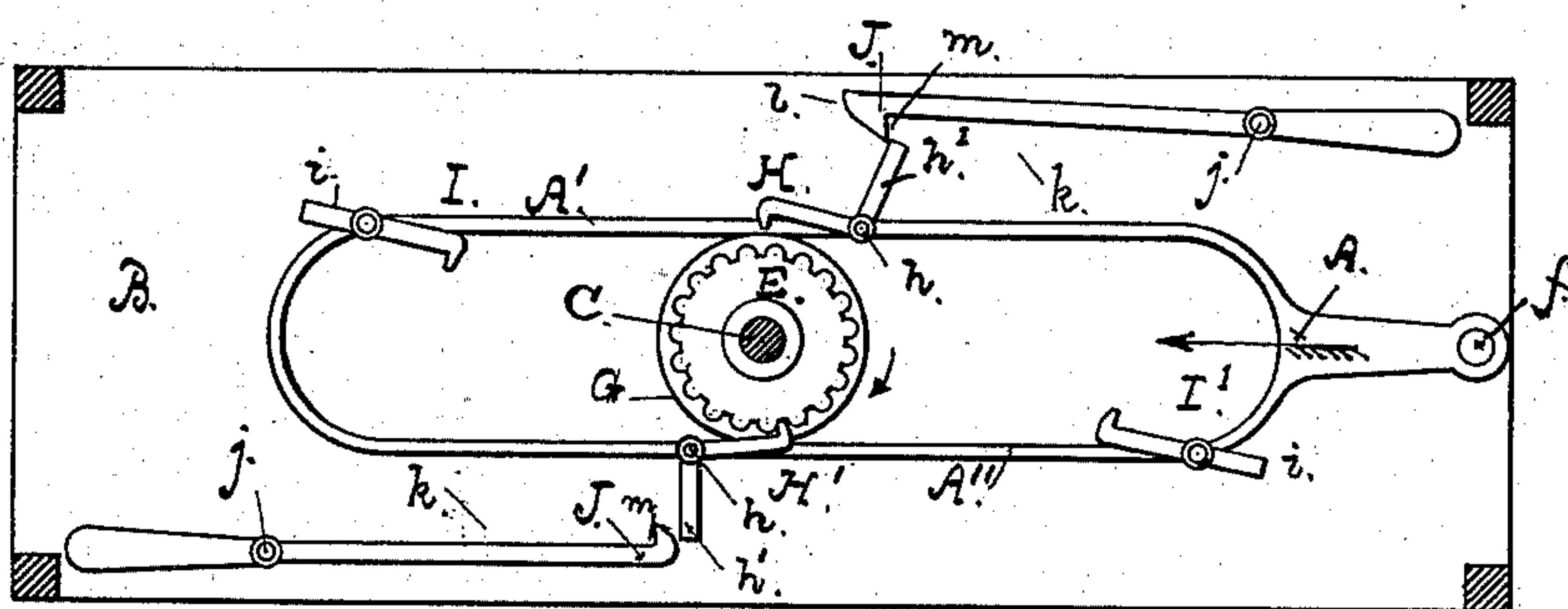


Fig. 2.

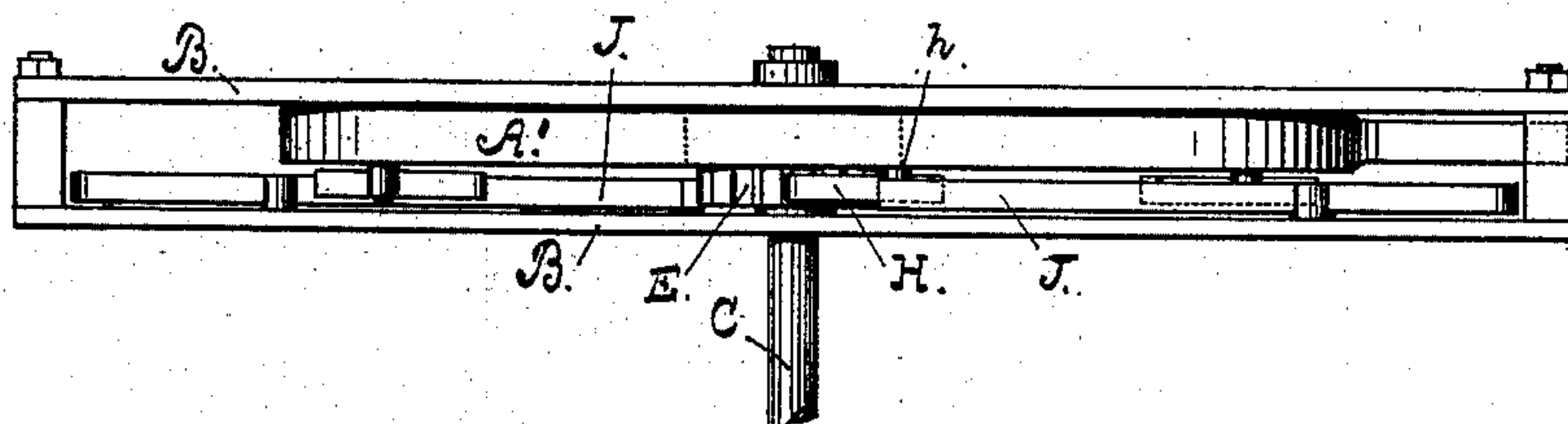
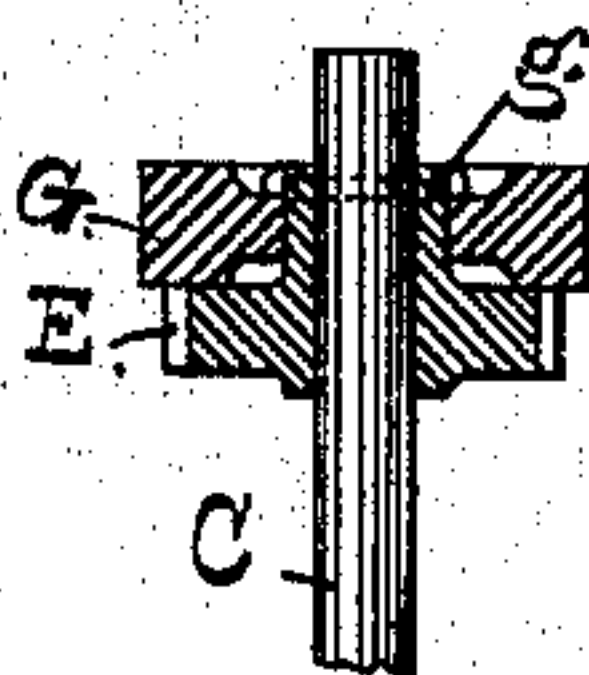


Fig. 3.



Witnesses:

Ym Voigt
D. Selleck

Inventor:

George Phillips
By his Atty., Edw. J. Osburn

UNITED STATES PATENT OFFICE.

GEORGE C. PHILLIPS, OF SILVER CITY, NEVADA.

GOVERNOR FOR DIRECT-ACTING ENGINES.

SPECIFICATION forming part of Letters Patent No. 257,976, dated May 16, 1882.

Application filed March 13, 1882. (No model.)

To all whom it may concern:

Be it known that I, GEORGE C. PHILLIPS, of Silver City, in the county of Lyon and State of Nevada, have invented a new and useful Improvement in Governors for Direct-Acting Engines, of which the following is a specification.

My invention relates to an improved device for automatically controlling the movement of the piston in direct-acting engines, by which any variation in the length of stroke is caused to change the area of the steam-inlet and bring the piston back to its normal stroke, the engine being thereby made self-regulating, and the piston made to travel uniformly under varying conditions of work.

The present invention is an improvement on a device or mechanism for use in direct-acting engines where there is no fly-wheel or gearing to equalize the movement of the piston, and which has been made by me the subject of a prior application for Letters Patent.

The following description, in connection with the accompanying drawings, will fully explain my said improvement and the manner of constructing, applying, and using it.

In the drawings referred to, Figure 1 is a side elevation of my device with one of the side plates removed to expose the working parts. Fig. 2 is a top view of the device as ready for attachment to the engine, the shaft that connects it with the throttle-valve being shown. Fig. 3 is a detail of the toothed wheel and the loose pulley G.

A may represent a frame or slotted plate forming an elongated yoke with parallel sides or bars A' A'', which are of a length somewhat greater than the longest stroke that can be made by the engine.

B B are two face-plates, between which the yoke is inclosed and guided in its movements, and they also furnish bearings for a horizontal shaft, C, that passes through them and is connected with the stem of a throttle-valve in the supply-pipe, either in a direct manner thereto or by intermediate shafts and gearing, as may be required by the character of the engine, the position of the governor, or of the supply-valve, or where other conditions prevent direct application. To this yoke a motion of reciprocation in degree equal to the stroke of the piston, and uniformly with it, is imparted

either by connecting the end *f* of the yoke directly with the piston-rod Y or by attaching or connecting the yoke to some moving part of the engine that will give to the yoke a length of stroke equal to and in unison with the movements of the engine-piston.

E is a toothed or notched wheel, placed between the face-plates B, within the slot of the yoke, and keyed to the shaft C. The bars or sides A' A'' of the yoke therefore pass respectively over and under this wheel, and by means of the reciprocation of the yoke a set of pawls or catches carried by these bars is caused to engage with the teeth or notches on the rim of the wheel E and turn the shaft C.

G is a friction-wheel held loosely upon a hub or collar, *g*, upon the side of the wheel E and designed to support the yoke, of which the top bar or part, A', bears upon the rim of this wheel. While traveling back and forth with the piston the yoke is carried upon this wheel, and the pawls or catches which are pivoted to the side of the bars A' A'' are kept in line with the toothed wheel E.

H H' are two pivoted catches, one placed on the side of the top bar, A', to engage with the wheel E from above, and the other one, H', on the bottom bar, A'', to operate against the wheel from below. These two catches are held upon pintles *h h*, projecting from the sides of the bars, and they are placed to work in opposite directions—that is, one engages with the ratchet-wheel when the yoke moves in one direction and the other operates to catch into the wheel when the yoke makes the return movement. These catches are balanced so that they work without springs, for which purpose they are provided with the counter-weights *h'*, and the pivoted latches J J, fixed in between the face-plates, are also employed to throw each catch H clear of the wheel E, while moving in one direction, and to bring it down into engagement with the notches or depressions on the wheel upon the return motion. These latches are placed one to each catch H H'. They turn on pintles *j j*, and they are counter-balanced by the projecting arm or portion *j' j'*. When at rest they lie against the stops *k*, and are then in position to engage with the projecting ends *h' h'* of the catches H. The working ends of these latches J are of hook shape, with a shoulder, *m*, on the back and a bevel-

face, *l*, on the front, the action of which against the ends *h' h'* in the movement of the yoke back and forth raises the end of the catch clear of the wheel *E* when the yoke moves in one direction and throws it down into line with the notches of the wheel when the reverse movement takes place.

I I' are two similar catches, located at the ends of the yoke in position to engage with the notched wheel when an increase in the length of movement of the yoke is sufficient to bring them into contact with the rim of the wheel. These catches are each placed to work in contrary manner to the other catches, *H H'*, on the same bar, *A' A''*, and they are counter-balanced by the projection *i i* on the other side of their pivots, so that the working ends are kept in position to come in contact with the wheel *E* and engage with its notches when carried far enough along by the stroke of the yoke.

As thus constructed and put together this device will be operated as follows: Connection of the yoke *A* being made with some suitable part to give it a length of motion in unison with the engine-piston, its movements in one direction, or to the left, as in Fig. 1, will bring the catch *H'* into contact with the wheel *E* and produce rotation of the wheel to the right and turn the shaft *C* in the same direction until the catch is disengaged by the continued travel of the yoke. In like manner the return movement of the yoke will bring the other catch, *H*, into play and turn the wheel in the same direction. At each time of these movements, also, before the catch approaches the wheel *E* near enough to engage with its rim, the projecting end of the catch comes in contact with the bevel end *l* of its latch *J*, and the catches are thrown into working position with certainty at each movement. On the return of the catches, also, when they are not intended to move the wheel, the shouldered or hooked portion of the latches raises the catches clear of the wheel, so that they pass over it freely. Each complete stroke of the yoke forward and back therefore turns the wheel *E* twice a certain distance in one direction, or forward, and this rotation, acting upon the shaft *C*, increases the area of the steam-inlet a certain amount, thereby producing a regular increase of steam-pressure in the cylinder; and this forward movement takes place as long as the yoke does not travel far enough to bring the outer catches, *I I'*, into action. When from any change in the piston's stroke, however, whereby its travel exceeds the required length of stroke, the motion of the yoke is increased in proportion, and the catches *I* are brought at the end of each stroke into action to turn the wheel *E* a certain distance in the reverse direction, or backward, the effect of which is to diminish the size of the steam-inlet and reduce the pressure. Therefore

when the movement of the yoke is long enough to bring the outer catches, *I*, into action the inner end of each catch strikes against and passes over the rim of the wheel *E* as the end of the stroke is reached, and then at the reverse movement the catch drops into the notches or depressions in the wheel and produces rotation as the yoke moves backward. This takes place at the end of each stroke until the movement of the yoke no longer brings the catches *I I'* into action, and then the reduction of pressure ceases and the catches *H* only are in action.

The several views herein referred to show the application of my device to a pumping-engine of the direct-acting kind, and also the details of the catches and operating-latches, and the notched wheel, and the loose friction-wheel or disk to carry the reciprocating yoke.

This device has great simplicity of construction, is comparatively noiseless in operation for the reason that no springs or sliding bars are employed, and the parts are positive and certain in their operation at every stroke of the yoke.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with the notched or toothed wheel *E*, keyed to the shaft *C*, which is connected with a valve governing the steam-supply, of the frame or elongated yoke *A*, having catches *H H' I I'*, and connected with the engine-piston to travel uniformly therewith and with the same length of stroke, substantially as herein described, to operate as set forth.
2. The combination, with the elongated yoke *A*, adapted to be driven by or from the movements of the engine-piston and to travel with a reciprocating movement over the notched or toothed wheel *E*, of the balanced catches *H H' I I'* and the latches *J J*, substantially as herein described.
3. The combination together of the wheel *E*, keyed to the shaft *C*, the wheel *G*, turning loosely upon the shaft, the reciprocating yoke *A*, having catches *H H' I I'*, and the face-plates *B B*, substantially as herein described.
4. The herein-described stroke-governing device for direct-acting engines, consisting of the face-plates *B B*, the shaft *C*, passing through the same, the notched or toothed wheel *E*, keyed to the said shaft, the wheel *G*, held loosely upon said shaft, the elongated yoke *A*, having the pivoted catches *H H' I I'*, and the latches *J J*, combined for operation together substantially as described.

GEO. C. PHILLIPS.

Witnesses:

JOHN W. GRIER,
GEO. PHILLIPS, Jr.