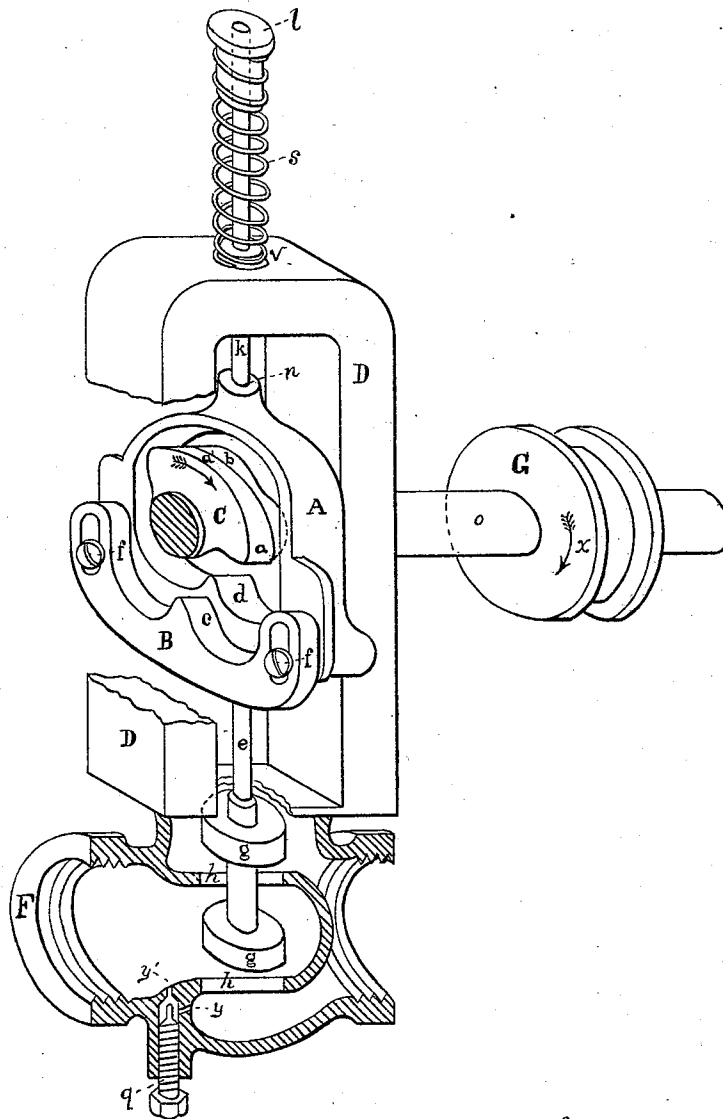


G. C. HOWARD.

Stopping and Slowing Valves for Engines.

No. 148,214.

Patented March 3, 1874.



Witnesses.

L. M. Blanton
W. W. Bell

Inventor:

G. C. Howard

UNITED STATES PATENT OFFICE.

GEORGE C. HOWARD, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN STOPPING AND SLOWING VALVES FOR ENGINES.

Specification forming part of Letters Patent No. 148,214, dated March 3, 1874; application filed October 24, 1873.

To all whom it may concern:

Be it known that I, GEORGE C. HOWARD, of the city and county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Stopping and Slowing Valves for Engines, of which the following is a specification:

In the case of engines driving rolling and saw mills, and those operating elevators, where the work to be done is intermitting it is often required at one minute to run at full speed, then the work is suddenly withdrawn, yet it is not desirable that the engine should stop altogether, allowing the cylinder to cool; nor would it do to allow the engine to run on at the same speed as when working, or at an increased speed, as it would do if the work be withdrawn and still allowed the full head of steam.

The object of my invention is to furnish a valve, which, while it will stop the engine entirely, will also by a simple adjustment slow the engine to any speed required.

This is accomplished by having attached to the stem of a valve, or connected with it by means of a cord, belt, or levers, a sliding head with an adjustable slide-piece. This head and slide are both furnished with projections, acted upon by a cam working inside of the sliding head. When the cam in its revolution strikes the outer and adjustable slide the valve is partly closed, and the steam being throttled the governor can act to regulate the further supply. When the cam in its further revolution strikes the inside projection, which is placed higher than the outer one, it forces the valve down, thus closing the valve partially or entirely, as the case may be. On being released from the pressure of the cam, the valve is opened by the action of the spring placed above the sliding head, which spring tends to resist the downward action of the cam. When the valve is entirely closed, by opening a cock in the valve a small quantity of steam is admitted into the cylinder, which keeps the engine warm and slowly rotating.

To enable others, who may wish to make or use my invention, properly to understand its construction and operation, I will proceed to explain it with reference to the annexed drawing.

To the valve-stem *e* of the valve-case *F* is attached the sliding head *A*. At the top of the head *A*, at *n*, is attached the stem *k*, passing through the frame or yoke *D*, at *v*, *v* and *n* serving as bearings for the stems *k* and *e* as the head *A* is passing up and down. When the shaft *o*, on which the cam *C* is fastened, is turned by the pulley *G* in the direction of arrow *x* the cam *C* is revolved, and the point *a* brought in contact with the projection *c* on the adjustable slide *B*. As the cam *C* continues to revolve, the projection *c*, and hence the slide *B* and head *A*, are forced down, and the valves *g g* nearly closed. The steam which enters the engine is by this means throttled, allowing the governor to act. The space left between the valve *g* and the seat *h* is regulated by raising or lowering the slide *B* by means of the screws *f f*. The lip *c* continues to slide on the curved surface *a a'* of the cam *C*, until it reaches the point *b*, which is back of *a a'*, and in the same plane as the lip *d*. The point *b* strikes the projection *d*, and forces the head *A* and the valves *g g* still further down, closing the valve entirely or partially, as the case may be. As soon as the point *b* has passed *d*, and the cam no longer presses the head down, the valves *g g* are opened by the spring *s*, which is wound around the upper stem *k*, the force of which is regulated by the nut *l*. When the valves *g g* are entirely closed the cock *q* is opened, and a small quantity of steam passes through *y* and *y'* into the cylinder, keeping the engine slowly revolving. The valve is connected to the mill-engine or elevator by cords, or other well-known means of connection, attached to the pulley *G*, and the starting-bar of elevator, or hand-wheel of engine or mill. When it is not convenient to attach the yoke *D* and sliding head *A*, and the apparatus described, directly to the valve, it may be connected to it by means of levers or cords, though acting materially the same as described.

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

1. In combination with the valve-case *F*, sliding head *A*, and adjustable slide *B*, the cam *C* working inside of the head *A*, and turned by the pulley *G* on the shaft *o*, con-

structed and operating substantially as described.

2. The spring *s* with the nut *l*, in combination with the stem *k*, and sliding head *A*, and valve-case *F*.

3. In combination, the sliding head *A*, adjustable slide *B*, cam *C*, yoke *D*, spring *s*, nut *l*, stem *k*, and shaft *o*, and pulley *G*, operat-

ing at or a distance from the valve, to which they are attached by cords or levers, and working substantially as described.

GEO. C. HOWARD.

Witnesses:

WM. W. BELL,

L. M. BLANTON.