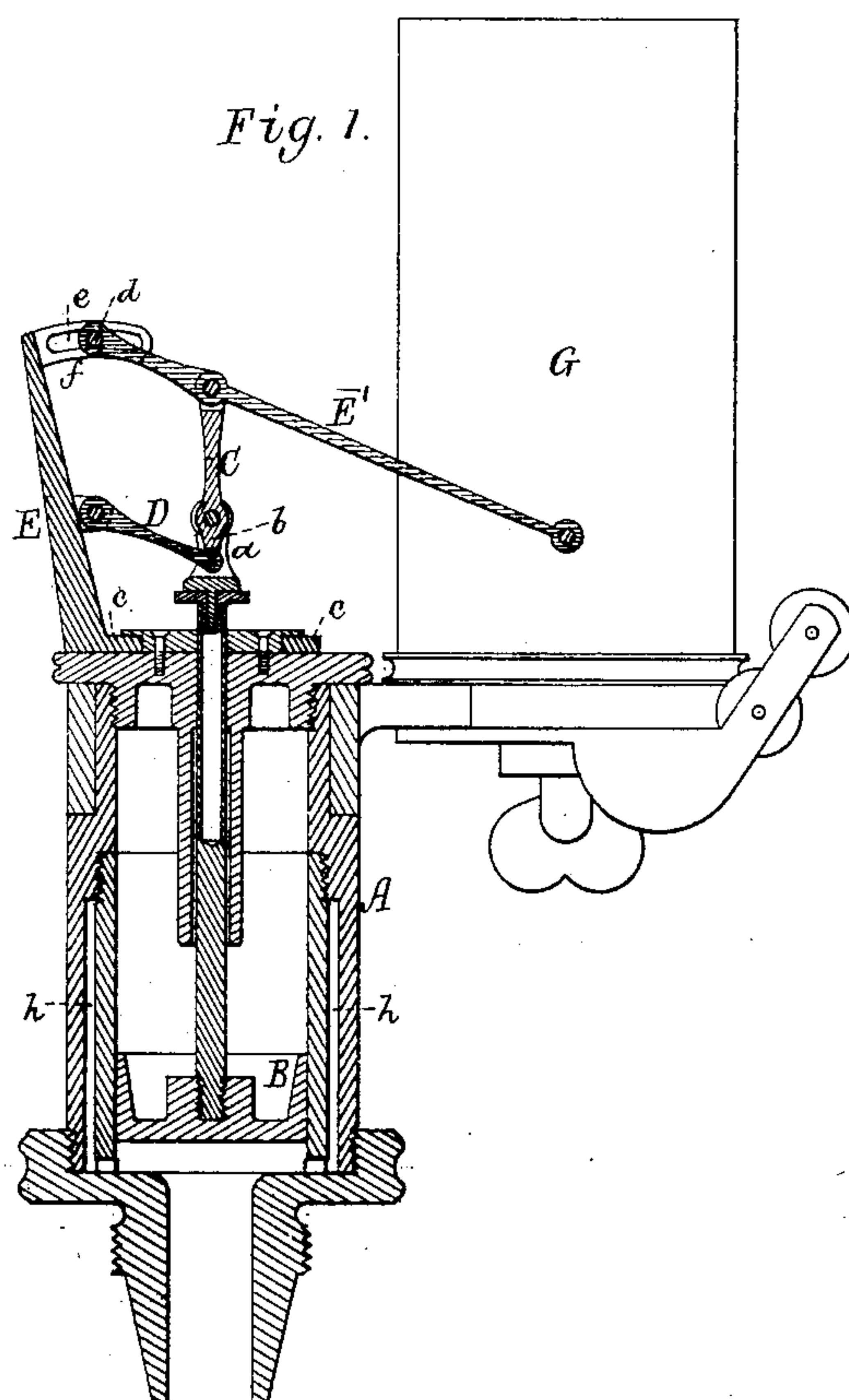


(No Model.)

G. H. CROSBY.
STEAM ENGINE RECORDER.

No. 256,294.

Patented Apr. 11, 1882.



Witnesses.

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UNITED STATES PATENT OFFICE.

GEORGE H. CROSBY, OF SOMERVILLE, MASSACHUSETTS.

STEAM-ENGINE RECORDER.

SPECIFICATION forming part of Letters Patent No. 256,294, dated April 11, 1882.

Application filed September 12, 1881. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. CROSBY, of Somerville, of the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Steam-Engine Indicators; and I do hereby declare the same to be described in the following specification and represented in the accompanying drawing, which denotes a vertical section of an indicator provided with my invention.

The kind of indicator to which my invention appertains is that used to register the varying pressure of steam in the cylinder of a steam-engine during the stroke of a piston thereof, it having a rotary drum carrying a sheet of paper, which with the drum is revolved while the piston may be in movement, the paper being marked by a pencil or marker moved vertically or in a straight line by mechanism usually termed a "parallel motion," and operated by the piston of the cylinder of the indicator.

My present invention has reference to the parallel motion and to the cylinder of the indicator, the nature of such invention being defined in the claims hereinafter made.

In the drawing, A denotes the steam cylinder, and B the piston thereof, of an indicator. Fulcrumed to the piston-rod head *a*, which is forked to receive it, is a lever, C, whose lower and shorter arm, *b*, is jointed to a link, D, near one end thereof, such link, near its other end, being jointed to a post, E, extending upward from the head or rotary cap *c* of the cylinder.

The marker-lever E' is fulcrumed to the longer arm of the lever C, the shorter arm of the said marker-lever having a stud, *d*, projecting from it into a curved slot, *e*, formed in a projection, *f*, extended from the head of the post, the said slot being curved with radii whose center is in the axis of the joint of the post and the link D.

In my improved parallel motion the link D has a length equal to that of the shorter arm of the marker-lever E', and, besides, the distance between the axis of the stud *d* and the axis of the rear joint of the link D is equal to the distance between the axis of the joints of the arms of the lever C. Furthermore, the length of the shorter arm of the lever C is to

the length of the longer arm of such lever as the length of the shorter arm of the lever E' is to the length of the longer arm of such lever E'. With such a parallel motion the marker carried by the longer arm of the lever E' will during a stroke of the piston B be moved or traversed in a straight line relatively to the paper-carrying drum G of the indicator.

Within the cylinder there is a narrow annular chamber, *h*, which is concentric with and surrounds the bore of the cylinder and opens into the lower part thereof. This chamber *h* extends upward within the walls of the cylinder, in the manner as shown, as high or about as high as the piston-head moves, and when steam is let into the cylinder such steam has free access to and fills the annular chamber. The steam thus can heat the cylinder where above the piston-head at the same time it heats the latter. In this way the expansion of the cylinder and that of the head take place simultaneously, whereby the piston-head is prevented from binding in the cylinder by being suddenly expanded before expansion of the cylinder can take place.

The parallel motion herein described, though in some respects like that shown in the United States Patent No. 219,149, granted to me September 2, 1879, differs therefrom in others, as I employ in my present one a stationary post and joint thereto, the two links D and F, or use with it and the marking-lever the stud and slotted extension, whereby I am able to arrange the lever C and work it in nearly an upright position, and thus run the said lever steadier and to better advantage in several respects.

Although I have hereinafore represented the operative parts of my invention as constructed with certain proportions in respect to one another, I do not confine them to such, as in some cases they possibly may be varied to advantage without materially affecting their operations or the result to be obtained therefrom.

What I claim in the steam-engine indicator as my invention is as follows, viz:

1. The indicator-cylinder provided with the annular chamber *h* arranged therein, and to

open at its lower part into the bore of the cylinder, all being substantially and for the purpose as specified.

2. The post E and its projection *f*, slotted
5 as described, arranged and combined as set forth, with the marker-lever E', connected with the piston by the lever C, having its shorter

arm jointed to the said post by a link, D, all being substantially as specified and represented.

GEO. H. CROSBY.

Witnesses:

R. H. EDDY,
E. B. PRATT.