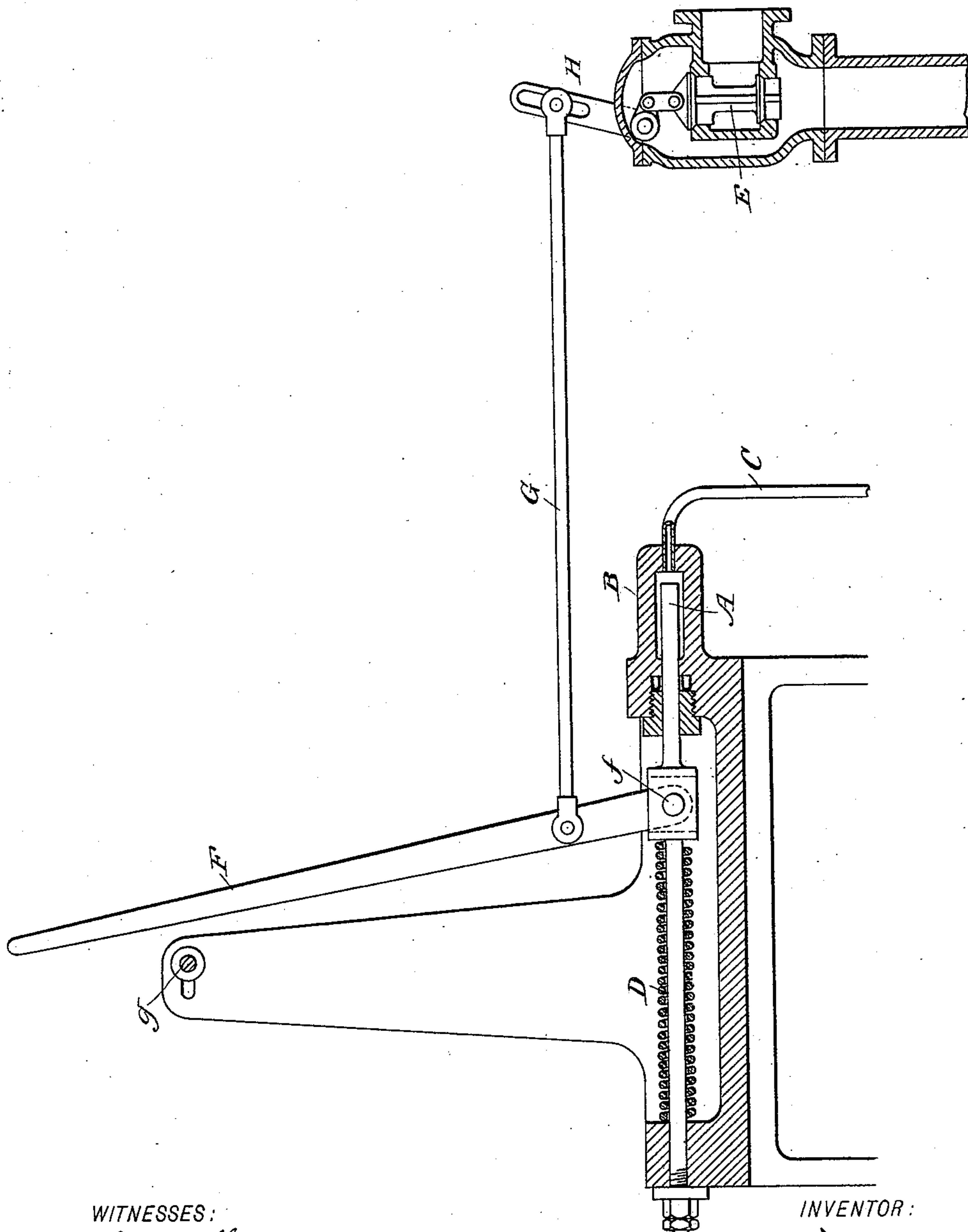


(No Model.)

C. DAVY.
GOVERNING GEAR FOR THE PUMPING ENGINES OF HYDRAULIC FORGING
OR OTHER PRESSES.

No. 447,147.

Patented Feb. 24, 1891.



WITNESSES:

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UNITED STATES PATENT OFFICE.

CHARLES DAVY, OF SHEFFIELD, ENGLAND.

GOVERNING-GEAR FOR THE PUMPING-ENGINES OF HYDRAULIC FORGING OR OTHER PRESSES.

SPECIFICATION forming part of Letters Patent No. 447,147, dated February 24, 1891.

Application filed November 22, 1890. Serial No. 372,272. (No model.) Patented in France May 2, 1890, No. 203,404; in Belgium May 2, 1890, No. 90,407, and in Italy June 30, 1890, XXIV, 27,463, and LIV, 70.

To all whom it may concern:

Be it known that I, CHARLES DAVY, engineer, of 30 Whitworth Road, Ranmoor, Sheffield, in the county of York, England, have invented new and useful Improved Governing-Gear for the Pumping-Engines of Hydraulic Forging or other Presses, (for which I have obtained Letters Patent in France, No. 203,404, dated May 2, 1890; in Belgium, No. 90,407, dated May 2, 1890, and in Italy, Nos. 27,463 and 70, Vols. XXIV and LIV, dated June 30, 1890,) of which the following is a full, clear, and exact description.

My invention relates to improved gear for controlling the speed of the pumping-engines of a hydraulic press for forging or other purposes where the water is pumped against a variable resistance—as, for instance, directly from the pumping-engines into the cylinders of the press, (as distinguished from the employment of a dead-weight accumulator,)—and such gear is particularly designed for use in substitution for the so-called “hunting-gear” described in the specification of a previous patent granted to me, dated the 15th day of December, 1885, No. 332,594.

The primary object of this improved governing-gear is to prevent the “running away” of the pumping-engines under any conditions of the load. The governing-gear is such that the quantity of steam supplied is, to a certain extent, dependent on the resistance to be overcome and the speed at which it is desired that the pumping-engines shall run under the different conditions of working, the effect of the governing-gear being that when the press-head is being depressed against a forging offering little resistance the supply of steam is limited, according to the speed at which it is then desired the pumping-engines shall run, and as the resistance increases the steam-valve of the pumping-engine can be opened wider to admit more steam, so that only enough steam can at any time be supplied to run the engines at any predetermined speed which cannot be exceeded, whatever may be the resistance (if any) to overcome. The extent to which the steam-valve can thus be opened may either be such as to cause the engines to run at an approximately uniform

speed, whether the engines be pumping against a low or a high resistance, or the extent to which the steam-valve can be opened may be in a less proportion than the increase of the resistance, so that the speed of the engines diminishes as the load increases. For example, when the resistance to be overcome is small the engines may run at one hundred revolutions per minute and at fifty revolutions per minute when the maximum hydraulic pressure is required.

The invention consists, essentially, in the combination, with the hand-lever by which the steam-valve is operated, of a plunger constantly acted on in one direction by the hydraulic pressure (if any) existing in the delivery-pipe of the pumps and in the other direction by a spring, the position of the plunger under these opposing forces determining the extent to which the steam-valve can be opened.

Reference is to be had to the accompanying drawing, forming part of this specification, wherein I have represented, in sectional elevation, an example of my improved governing-gear.

A is the plunger working in a case B in constantly open communication by a pipe C with the delivery-pipe of the steam pumping-engines.

D is the spring acting on the plunger in opposition to the hydraulic pressure in the case B, and E is the steam-valve to be controlled. The connection of the plunger with the valve is, through the medium of the hand-lever F and of a connecting-rod G, adjustably connected to the slotted arm of an L-shaped lever H, the hand-lever F being pivoted at f to the plunger A, and its motion in the direction for opening the valve being limited by an adjustable stop g, so placed as to allow valve V to be opened at starting to the proper extent for running the pumping-engine at the desired speed when working against a light load—that is to say, before the pumps have generated any hydraulic pressure. When the pumping-engine is working against the resistance of the forging, the hydraulic pressure increases in the case B, the plunger A is moved out against the pressure of the spring

D, and the position of the fulcrum *f* having been thus altered the hand-lever *F* may be again moved in the same direction for opening the steam-valve to a greater extent.

5 In practice the lever *F* would continue to be held by the attendant against the stop *g*, so that as the resistance of the forging (and consequently the hydraulic pressure) increases, the plunger *A* will move the lever *F*
10 about the stop *g* as a fulcrum and so open the valve *E* to admit more steam.

The lever *F* may at all times be freely moved in the direction for closing the valve *E*, whatever may be the position of the plunger
15 *A*, so that the steam may at any time be cut off entirely by the valve *E* acting also as a stop-valve.

It will be evident that the speed at which the engines will run may be varied by varying the effective length or range of the spring
20 *D* or by changing it for another of different strength. It will also be evident that the valve *E*, instead of being a double-beat valve, as illustrated, might be a rotary valve, corresponding parts being provided in the valve
25 and its seat, and the valve-spindle having a short lever-plunger, to which the hydraulic ram is connected as before. My invention is therefore not limited to the particular form
30 of steam-valve employed.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed I declare that what I claim is—

In hydraulic-press pumping-engines, the 35 combination, with a steam-regulating valve, of a plunger acted on in one direction by the hydraulic pressure opposed to the pumping-engines and in the other direction by a spring, a hand-lever pivoted to the plunger 40 and connected to the steam-regulating valve, and an adjustable stop limiting the motion of the hand-lever, whereby the opening of the valve beyond a certain point is dependent on the position of the plunger and on the 45 lever being moved or held by the attendant, while the valve may be closed by an opposite movement of the hand-lever, whatever may be the position of the plunger, substantially as specified. 50

The foregoing specification of my improved governing-gear for the pumping-engines of a hydraulic forging or other press signed by me this 28th day of October, 1890.

CHARLES DAVY.

Witnesses:

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