

(No Model.)

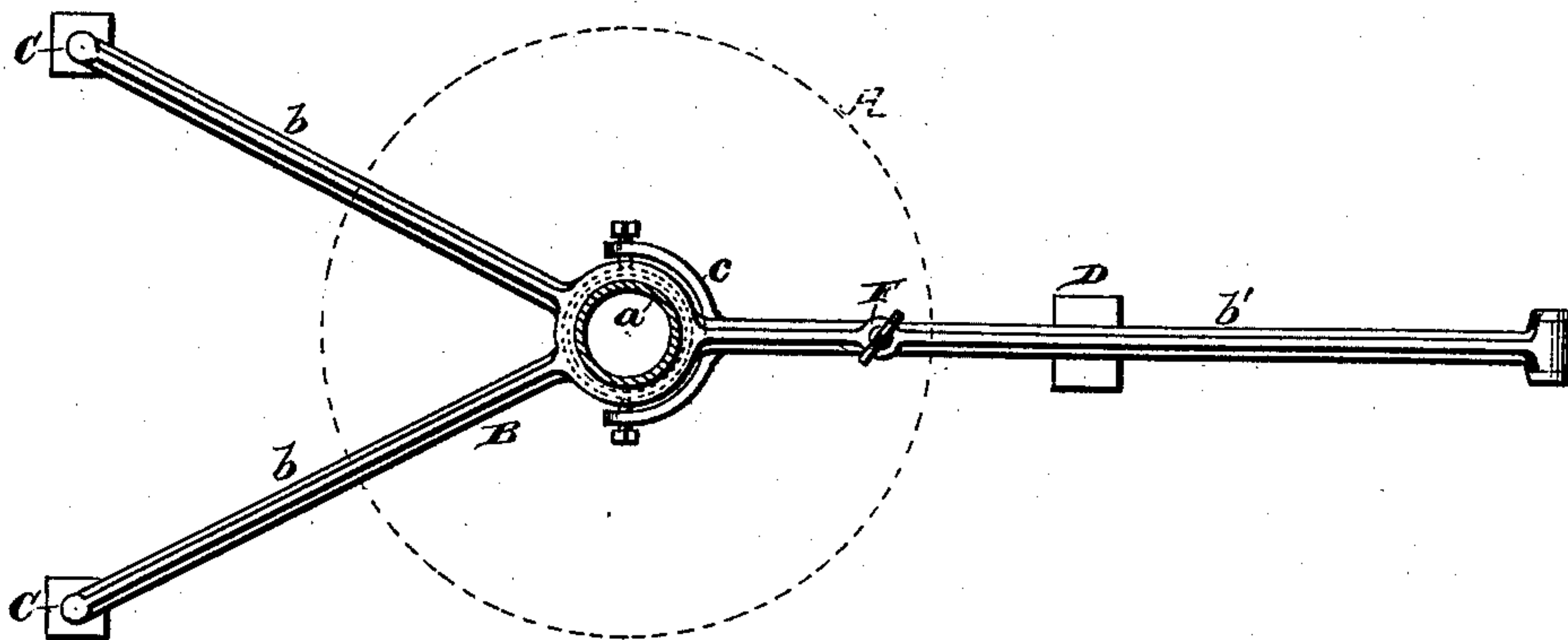
J. W. HILLIARD.

AUTOMATIC FEED REGULATOR FOR GRINDING MILLS.

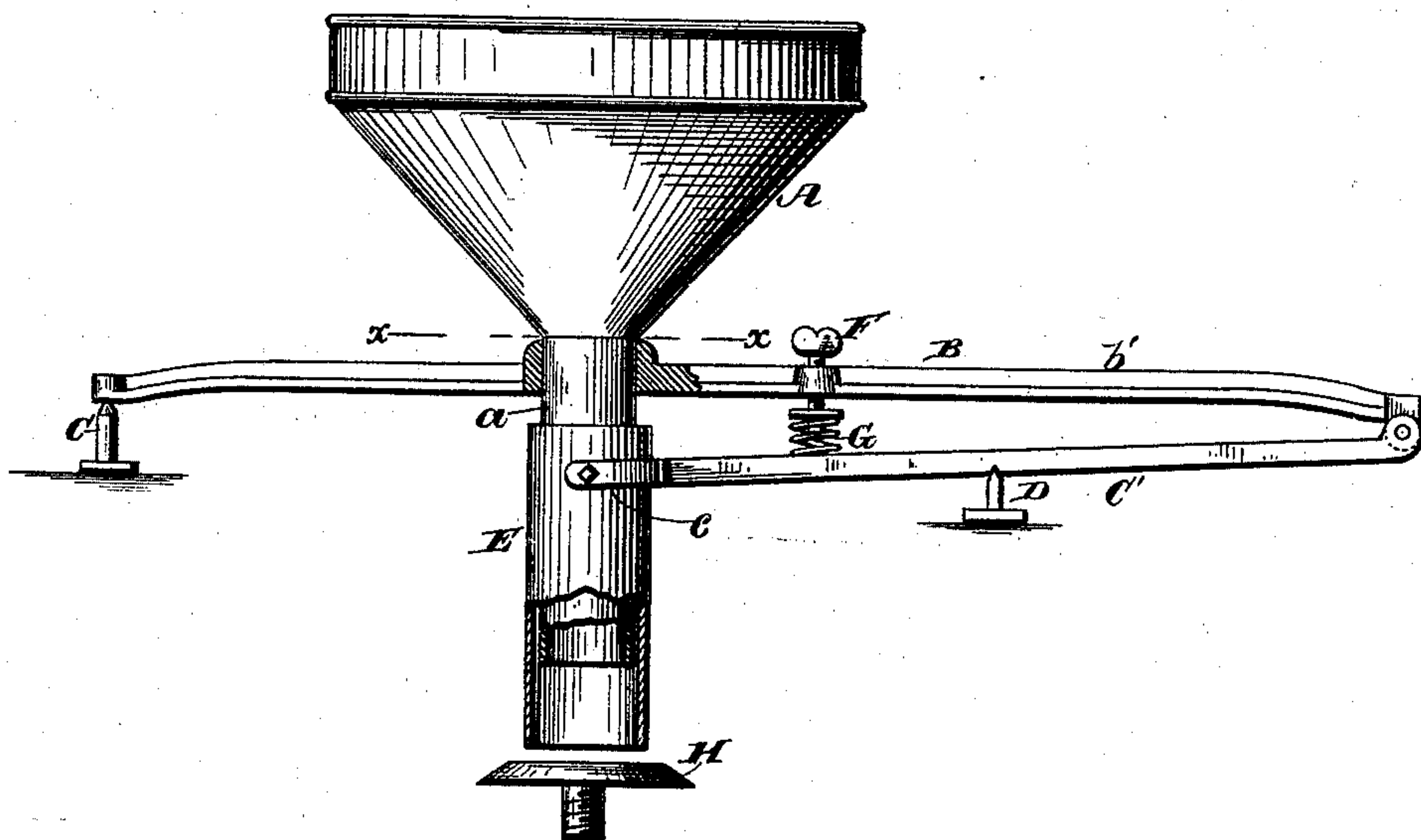
No. 286,818.

Patented Oct. 16, 1883.

*Fig. 1.*



*Fig. 2.*



*Witnesses.*

*Robert Cruett.*

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# UNITED STATES PATENT OFFICE.

JOHN WESLEY HILLIARD, OF HAWLEY, MINNESOTA.

## AUTOMATIC FEED-REGULATOR FOR GRINDING-MILLS.

SPECIFICATION forming part of Letters Patent No. 286,818, dated October 16, 1883.

Application filed March 13, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN WESLEY HILLIARD, a citizen of the United States, residing at Hawley, in the county of Clay and State of Minnesota, have invented new and useful Improvements in Automatic Feed-Regulators for Grinding-Mills, of which the following is a specification.

The object of this invention is to provide means for automatically regulating the feed of the various kinds of mill-stuff or other material from the hoppers of grinding-mills, whereby a regular feed can be obtained without requiring the constant attention of an attendant. To attain such end I utilize the weight of the material in the hopper as a means for automatically actuating mechanism for controlling the size of the discharge from the hopper, so that when the weight of material in the hopper rises or falls beyond a predetermined limit the mechanism will be actuated and the feed-space at the discharge end of the hopper adjusted accordingly.

The invention will be first described in detail, and afterward pointed out in the claims.

In the annexed drawings, which illustrate a mechanism constructed in accordance with my invention, Figure 1 represents a top or plan view with the hopper indicated in dotted lines. Fig. 2 is a side elevation with a portion of the frame-support for the hopper in section and a portion of the discharge-spout of the hopper broken away.

A indicates the hopper, which is supported by a spider or frame, B, having two of its arms, *b*, either hinged to or pivotally supported upon pins C, which constitute fulcral supports for this end of the frame. As shown, these pins enter sockets in the said arms; but, if preferred, said arms can rest upon any suitable knife-edge supports fixed upon the frame of the mill. The arm *b'* at the opposite end of the frame is hinged to the outer end of a lever, C', which is fulcrumed at a point between its ends on a support, D. The inner end of this lever is forked, as at *c*, and arranged to embrace a metal or other tube, E, to which the forks of said lever are pivoted. This tube is arranged to slide upon the discharge tube or support *a* of the hopper, so that in effect the hopper is provided with an adjustable neck or

spout, the length of which can be varied by raising or lowering the outer tube.

F indicates a set-screw, which passes through the hopper-supporting frame at a point between the hopper and the hinge-connection between said frame and the lever. The lower end of this set-screw connects with a coiled or other analogous spring, G, which is secured to the lever, the mode of connection between the set-screw and spring, as herein shown, being to fit the end of the set-screw in a plate secured on the spring.

H denotes the saucer or distributing-plate, that is carried by the driver or balance-rynd in the eye of the runner-stone, or otherwise, in a grinding-mill.

Now, supposing the set-screw to be adjusted so that the hopper is half-full, the parts will so balance that the tube which is supported by the lever will have its lower end maintained at the required distance above the distributing-plate as long as the parts are kept in balance by the weight of the material half filling the hopper. If, then, the supply should fill the hopper in excess of the quantity just mentioned, the extra weight will tend to cause the hopper to fall and bear down the hinged end of the frame, which connects with the lever, and hence depress the outer and raise the inner end of the lever, which will in turn lift the tube E, so as to increase the distance between said discharge and the distributing-plate. By thus shortening the two parts of discharge-spout of the hopper greater space is allowed for the feed, and hence the contents of the hopper will be emptied in proportion to the amount of material supplied thereto. As soon as the quantity in the hopper has been reduced to its normal weight, the extra pressure will be relieved from the frame and lever, and the spring will thereby be enabled to raise the frame and depress the lever, whereby the parts will assume their original relative positions. Should the supply in the hopper diminish, however, and the weight consequently be diminished, there will be less pressure on the outer end of the lever, whereby the inner end of the latter will be depressed and the frame and hopper be correspondingly raised. In this case the length of the hopper-spout will be gradually lengthened by reason of the



sliding tube being lowered, and hence there will be less space between the discharge-opening and the distributing-plate, so that the contents of the hopper will discharge more slowly through the diminished outlet. It will be seen that this shifting of the sleeve or tube so as to vary the area of the discharge-opening can take place at any predetermined condition of feed by adjusting the set-screw so as to vary the expansive power of the spring which lies between the frame and the lever.

This arrangement makes an effective and reliable automatic regulator, which is variable to the extent of the capacity of the hopper.

Having thus described my invention, what I claim is—

1. The combination, in a feed-regulator for grinding-mills, of the saucer, the movable hopper provided with an adjustable neck, and means adapting the latter to automatically rise and fall by variations in weight of the contents of the hopper, whereby the discharge-opening is varied according to the weight of the material contained in the hopper, substantially as described.

2. The combination, in a feed-regulator for grinding-mills, of a hopper, a pivoted frame supporting the hopper and permitting the latter to move, a tube capable of sliding on the discharge-tube of the hopper, and a lever pivoted to the sliding tube and to the hopper-supporting frame, substantially as and for the purpose described.

3. The combination, with the hopper and the pivoted supporting-frame B, of the lever C, hinged to said frame, a sleeve fitted to slide upon the hopper-neck, a spring located between the frame and lever, and a set-screw for varying the expansive force of the spring, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN WESLEY HILLIARD.

Witnesses:

ROBERT CRAIK,  
WALTER TANNER.