(No Model.)

C. H. COOLEY.

AUTOMATIC REGULATOR FOR GRAIN SCALES.

No. 421,556. Patented Feb. 18, 1890.

Fig. 1.

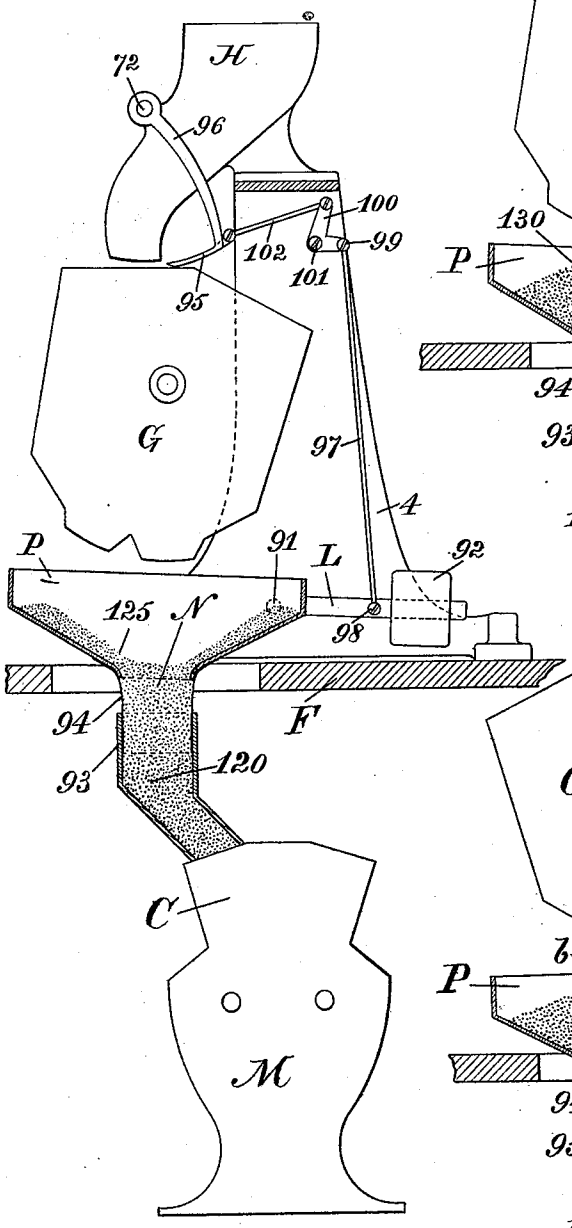


Fig. 2.

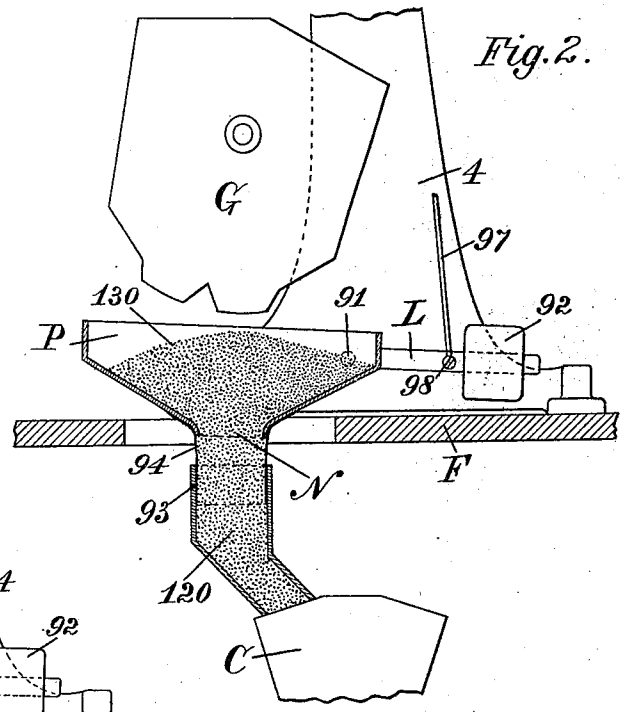
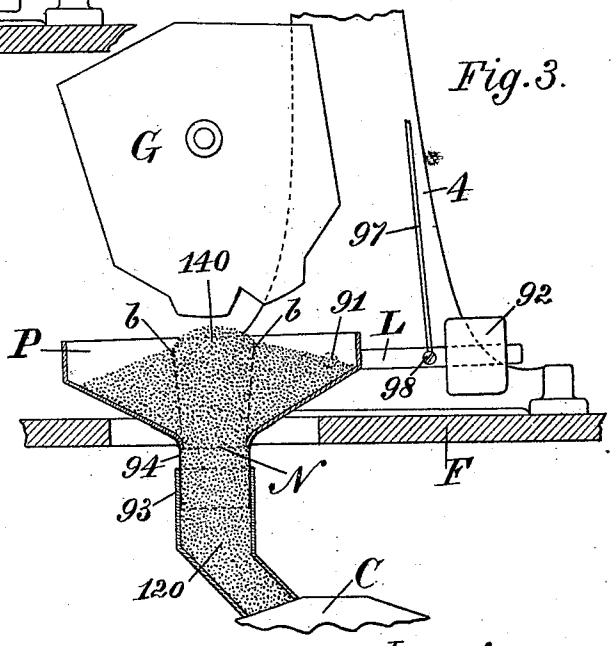


Fig. 3.



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By his Atty. F. H. Richards.

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UNITED STATES PATENT OFFICE.

CHARLES H. COOLEY, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE PRATT & WHITNEY COMPANY, OF SAME PLACE.

AUTOMATIC REGULATOR FOR GRAIN-SCALES.

SPECIFICATION forming part of Letters Patent No. 421,556, dated February 18, 1890.

Original application filed February 3, 1888, Serial No. 262,850. Divided and this application filed October 15, 1888. Serial No. 288,159. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. COOLEY, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Automatic Regulators for Grain-Scales, of which the following is a specification.

This invention relates to regulators for automatically controlling the operation of grain-meters, and more especially when these are operated in connection with some grain-working machine—as, for instance, a roller-mill—the objects being to regulate the supply of grain to a grain-receiving machine of a given capacity by retarding as required the operation of a grain scale or meter of relatively larger capacity arranged to deliver grain to said receiving-machine.

To this end the invention consists in the improvement hereinafter more fully set forth.

This application is a division of the prior application, Serial No. 262,850, filed February 3, 1888, and on which was issued Letters Patent of the United States No. 403,988, granted to me May 28, 1889.

In the drawings accompanying and forming a part of this specification, Figure 1 is a side elevation, partially in section, of an apparatus or system of mechanisms embodying my improvements. Figs. 2 and 3 are similar views of the principal parts of the apparatus shown in the preceding figure, and illustrate the mode of operation of said apparatus.

Similar characters designate like parts in all the figures.

My improved regulator apparatus is adapted to be used in connection with the improved grain-scale or grain-meter which is described in said Letters Patent; and in this present application such details and parts as are shown in both of said applications are generally designated by the same characters. Accordingly the following parts are or may be the same parts as are similarly designated in my said prior application—to wit, the grain-scale frame 4, the double-chambered grain-bucket G, the supply hopper or chute H, shaft 72, arm or arms 96, carrying the regulator-valve or valve-blade 95, which is located immediately below and contiguous to the under side of the supply-pipe H, the vertically-movable regulator-hopper P, pivotally supported at 91 by the frame-work and having the lever L, the connections between the lever L and said valve 95, consisting of rod 97, pivoted to the lever at 98 and at 99 to angle-lever 100, that is pivoted at 101 to the frame-work and connected by rod 102 to the valve, the fixed conduit 93, located below the opening N of hopper P, and the flexible connecting-pipe 94, of canvas or the like flexible material, which depends from the hopper and joins the conduit-pipe 93. Said connecting-pipe 94 is longitudinally collapsible on the downward movement of the hopper, and thus offers slight resistance to said movement.

The necessary means for carrying and operating the grain-bucket are not shown in this application.

The pipe 93 leads downward to the receiving-chamber C of a roller-mill M or other grain-working machine or apparatus that is to be fully supplied with grain by the said conduit 93. Such machines or apparatuses have in practice a substantially regular capacity or rate of consumption, which is uncertain in amount, or which varies according to the variation in kind of the grain supplied thereto, or the conditions or speed under which the mechanism is operated. For instance, roller-mills of the same kind and size vary somewhat in their actual capacity or product, and the same mill may usually be adjusted to give varying results in quality of grinding, with a corresponding variation in their consumption of grain. It is found desirable in practice, and principally for the reasons set forth, to employ a grain-scale (when an automatic grain-scale is used) of a normal capacity somewhat in excess of the maximum capacity of the machine M; but to successfully operate such automatic grain-scale for said purposes I have found it necessary, in order to obtain satisfactory results, to employ a sensitive and efficient automatic regulator to properly retard and control the operation of said scale. To attain this result

by means of a simple and practicable apparatus is the principal object of my present invention.

It will be remembered that the bucket G discharges its loads of grain intermittently into the hopper P, from whence the grain passes down through the opening N and through pipe 93 into the normally oversupplied receiving-chamber C. Since the grain-discharging capacity of bucket G is greater than the grain-receiving capacity of machine M it follows that said pipe, when once filled, will be kept full of grain, as indicated at 120, so that so long as the grain-scale is operating the machine M is normally oversupplied with grain. Supposing, now, the pipe 93 and the hopper P to have been filled, if the supply is then cut off while the machine M continues in operation the grain then runs down, as indicated at 125, Fig. 1, and the said hopper rises, as there shown, being lifted by the counter-weight 92. In doing this, however, the connections hereinbefore described draw back the regulator-valve 95 from underneath the chute H, which allows the grain to fill the bucket G and thus operate the grain-scale. On receiving its complete load said grain-bucket discharges the same into the said hopper P, as indicated at 130 in Fig. 2, and by thus heavily loading that hopper carries down the same, as in Fig. 3, thereby reversely operating valve 95, and again cutting off the supply of grain to the grain-bucket. The operation of the hopper P, the pipe 93, and the flexible pipe 94 in combination and during the downward movement of said hopper is a peculiar feature of my improvement. When the loaded hopper descends, the grain in said connecting-pipe 94 and in the hopper immediately above said pipe, between lines *b b*, Fig. 3, stands substantially at rest in a column 140, while the hopper itself and the grain therein outside of said column move down together. This closes the valve 95, as hereinbefore described, and maintains the same closed until the gradual discharge of the grain, as indicated in Fig. 1, permits the counter-balance to lift the regulator-hopper and again open the regulator-valve. When the grain in the conduit is at rest, the downward movement of the hopper causes a reactionary or relatively upward movement of the grain from the said connecting-pipe into the hopper, as illustrated in Fig. 3, where the lines *b b* indicate the outlines of that portion 140 of the grain that is subject to said movement.

Under the peculiar conditions existing in this apparatus I find the flexible pipe 94, though filled as it is with grain, to permit of that comparatively free movement of the regulator-hopper P which is necessary for properly working the regulator-valve.

Having thus described my invention, I claim—

1. In regulator apparatus for grain-weighers, the combination, with the grain-weigher frame-work and with the supply-chute thereof, of the swinging regulator-valve laterally movable underneath said chute, the counter-weighted regulator-hopper at the lower part of said frame-work and having in its lower side the continuously-open outlet, said hopper being also supported and arranged in said frame-work to have a rising and falling movement and to receive its supply of grain from the grain-weigher bucket, and connections, substantially as described, operating said valve to close the same from the falling movement of the hopper and thereby to shut off the grain from the bucket, all substantially as described.

2. In regulator apparatus for grain-weighers, the combination, with the regulator-hopper supported to have rising and falling movements, of the fixed receiving-conduit below the outlet of said hopper and the flexible intermediate connecting-pipe 94, joined to and depending from the hopper around the outlet thereof and joining the upper end of said conduit, substantially as described, and for the purpose specified.

3. In regulator apparatus for grain-weighers, the combination, with the grain-weigher frame-work and with the supply-chute thereof, of the regulator-valve laterally movable to close said chute, the counterweighted regulator-hopper supported to have a rising and falling movement and connected to actuate said valve, said hopper having therein the continuously-open outlet, the fixed receiving-conduit below and substantially in vertical alignment with said outlet, and the longitudinally-collapsible connecting-pipe joined to the hopper around its said outlet and joining the upper end of said fixed conduit, all organized and coacting, when the grain is at rest in said conduit, to cause a reactionary movement of grain from the connecting-pipe into the hopper on the downward movement of the hopper, all substantially as described.

CHARLES H. COOLEY.

Witnesses:
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