No. 631,485. Patented Aug. 22, 1899.

J. B. CORNWALL.

AUTOMATIC SHAKE FEEDER.

(Application filed May 27, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

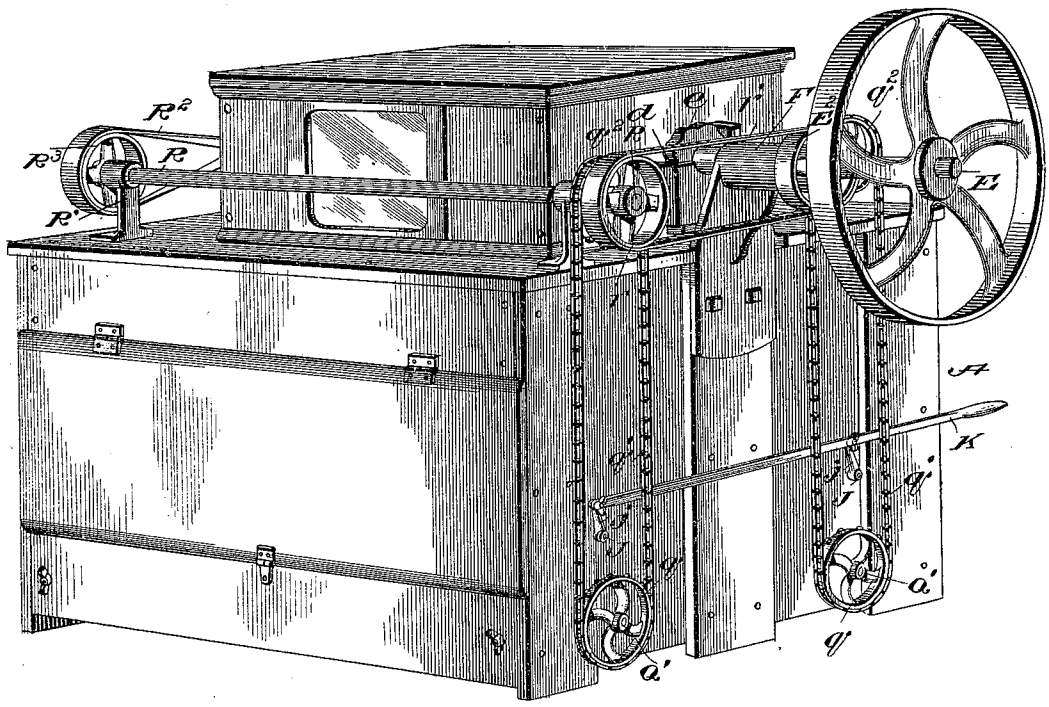
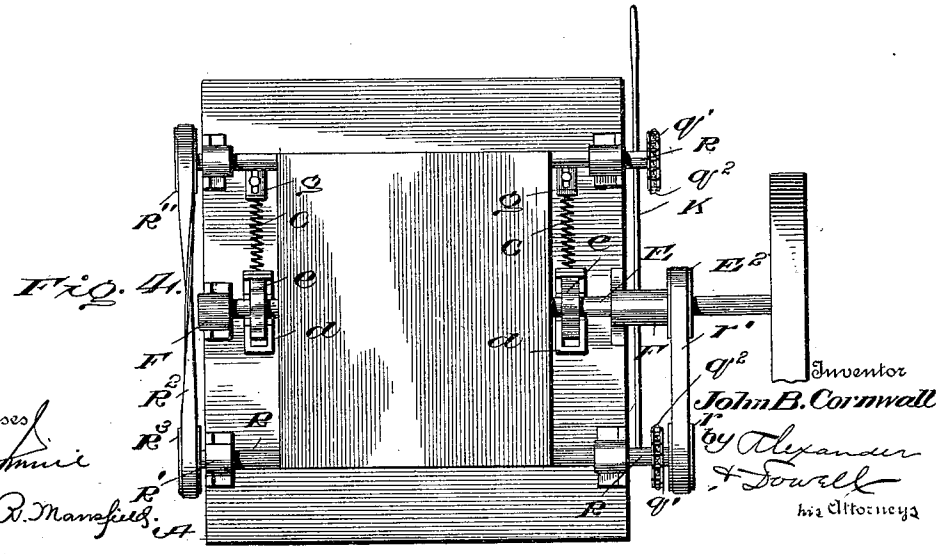


Fig. 4.



THE NORRIS PETERS CO. PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 2.

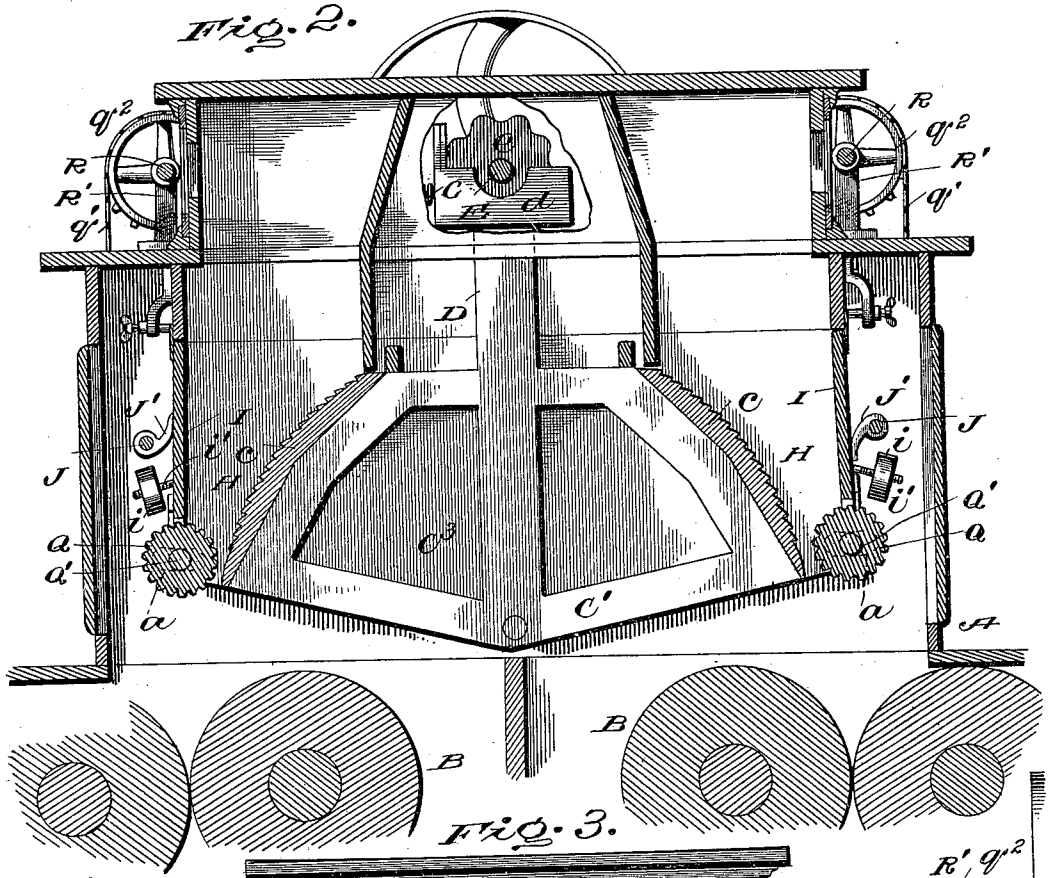
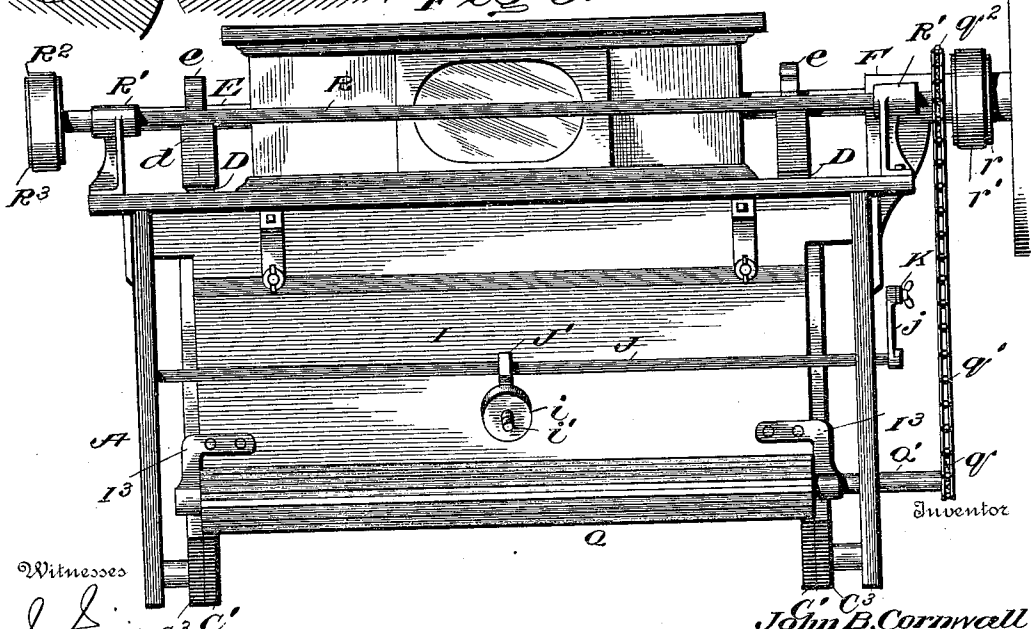


Fig. 3.



Witnesses
James R. Mansfield.

Inventor
John B. Cornwall
by Alexander & Dowell
his Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN B. CORNWALL, OF MOLINE, ILLINOIS, ASSIGNOR TO THE BARNARD & LEAS MANUFACTURING COMPANY, OF SAME PLACE.

AUTOMATIC SHAKE-FEEDER.

SPECIFICATION forming part of Letters Patent No. 631,485, dated August 22, 1899.

Application filed May 27, 1898. Serial No. 681,893. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. CORNWALL, of Moline, in the county of Rock Island and State of Illinois, have invented certain new and useful Improvements in Automatic Shake-Feeders; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is an improved feeder for roller-mills, &c., and is more particularly an improvement upon the feeder shown in Letters Patent granted to me January 8, 1895, No. 532,141; and the object of the present invention is to combine with the automatic shaking or vibrating feed a force-feed, the feeders being arranged to pass material between them, whereby clogging of the material being fed is effectively prevented. To this end I provide the hinged gate or valve, which is preferably weighted so as to automatically regulate the size of the feed-opening by the weight of the material in the hopper, with a revolving feed-roll attached to its lower end, such feed-roller coöperating with the shake-feeder, but being automatically adjustable, with the valve, toward or from said shake-feeder.

The invention therefore consists in the novel construction and combination of the parts in a double-action feeder, as hereinafter claimed, a preferred form being hereinafter described, and shown in the accompanying drawings, in which—

Figure 1 is a perspective view of the double-motion automatic feeder. Fig. 2 is a central longitudinal section through the upper part of a double-roller mill-casing, showing my improved double-action feeder attached thereto in vertical position. Fig. 3 is a side view of the feeder, the end of the casing being removed so as to disclose the operating parts.

Referring to the drawings, A designates the mill-casing, and B B the opposite pairs of crushing-rollers. The double-vibrating feeder is composed of two metallic substantially semicircular end frames C′, pivoted at their lower edges within the casing above and intermediate the pairs of rollers, as shown. The frames are connected by boards or plates *c*, the outer surfaces of said boards forming segments of a cylinder, whose axis is in line with the pivots of the frames C′. These boards *c* are longitudinally corrugated or serrated, the serrations all pointing downwardly in the present invention, which in this particular differs from the construction shown in my aforesaid patent. End boards C^3 are fastened to the frames C′ to prevent material escaping at the ends of boards *c*. Each frame C′ has an upright arm D, which extends through an opening in the top of the casing and is provided with a cup *d* on its upper end, which cup engages a knocker-disk *e* on the transverse shaft E, journaled in castings F on the casing parallel with and above the feeder. Obviously when shaft E is rotated the feeder is rapidly vibrated. Coiled springs G are interposed between the upper ends of the arms D and stops *g* on the top of the casing, as shown.

The lower ends of the hoppers H H are closed by the boards *c* on the vibrating feeder, and to the lower outer side of each hopper is attached a hinged feed-regulating valve I, the position of which is regulated by adjustable weights *i*, mounted on threaded rods *i′*, attached to the outer sides of the valves.

It will be noted that the valves I in the present application are different from those shown in my said patent in that they are extended nearly to the lower edges of the vibrator-boards *c*, as shown. The valves may be positively closed against the vibrator, so as to shut off the feed, by means of cams J′ on rock-shafts J, provided with crank-arms *j*, connected by operating-rods K. With the exceptions noted the parts thus far described are substantially identical in construction and arrangement with parts similarly lettered in my Patent No. 532,141 aforesaid.

To the lower edges of each valve I are attached brackets 1^3, in which is journaled the shaft Q′ of a force feed-roller Q. The shafts Q′ project through curved slots *a* in the casing at one end and are provided with a pulley or sprocket *q*, which is driven by sprocket-chains *q′* from sprocket q^2 on shafts R, journaled in brackets R′ on the top of the feeder and exterior to the hopper. There are two such shafts R, one at each side of the hop-

per and parallel with shaft E. One shaft R is driven by pulley r and belt r' from a pulley E^2 on shaft E. The other shaft R is driven by a pulley R′ and crossed belt R^2 from a pulley R^3 on the driven shaft R. (See Fig. 4). By this arrangement both the feed-rollers Q in a double shaker are rotated toward the vibrator and feed the grain downward. The vibrator is operated at a high rate of speed, but preferably the rollers are driven more slowly.

The operation of the device may be clearly understood from the drawings and briefly is as follows: Motion being imparted to shaft E, the feeder C is rapidly oscillated or vibrated and feeds down the material in the hoppers H. The distance between the feed-rollers Q and the shaker is regulated by the weights on the valves I and the weight of the material in the hopper, but each of these feed-rollers rotates inwardly toward the vibrator and cooperates therewith in feeding the material uniformly out of the hopper. As the roller-feed is a force-feed, clogging of the hopper is virtually impossible, and this double-motion feeder is therefore superior in feeding light materials—such as bran, &c.

By this construction I provide both a vibrating feed and a rotary force-feed, while at the same time I have preserved all the advantages of automatic regulation by the weighted gates or valves realized by the construction shown in my aforesaid patent.

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

1. In an automatic feeder, the combination of the hopper and a swinging regulating-valve; with a force-feed roller carried by said valve, and means for operating the force-feed roll, substantially as described.

2. In an automatic shake-feeder, the combination of the hopper, a vibrator, and a regulating-valve; with a force-feed roller carried by said valve and coöperating with the vibrator, and means for operating the vibrator and force-feed roll, substantially as described.

3. In a shake-feeder, the combination of the vibrator, an adjustable swinging valve for regulating the amount of feed, and a force-feed roller carried by said valve and adapted to coöperate with said vibrator and valve; for the purpose and substantially as described.

4. In an automatic shake-feeder, the combination of a vibrator, with an automatically-adjustable valve and a feed-roller on said valve beside and coöperating with said vibrator, substantially as described.

5. In an automatic shake-feeder, the combination of a vibrating feeder a swinging valve and a revolving feed-roller carried by said valve and arranged to pass the material between it and the vibrating feeder; with mechanism for imparting motion to said vibrator and feed-roller, substantially as described.

6. In a feeder, the combination of a hopper, a vibrating feeder at the lower end thereof, and a valve adjustable toward or from said vibrating feeder and a feed-roller carried by said valve, and means for driving said feed-roller, substantially as described.

7. In an automatic shake-feeder, the combination of a vibrating feeder, and a swinging valve adjustable toward or from said vibrating feeder; with a revolving feed-roller carried by said valve between which vibrating feeder and roller the material is fed, and mechanism for imparting motion to said vibrating feeder and feed-roller, substantially as described.

8. In a feed-hopper, the combination of the hopper, and an adjustable valve or gate therefor provided with weights to automatically regulate its position; with a feeding-roller mounted on said gate and adjustable therewith, and mechanism for imparting motion to said roller, substantially as described.

9. In a feeder, the combination of a hopper, a vibrating feeder at the lower end thereof, an automatically-adjustable feed-roller opposite and coacting with said vibrator, means for automatically regulating the position of said roller, and means for imparting motion to said roller, for the purpose and substantially as described.

10. In a feeder, the combination of a hopper, a vibrating feeder at the lower end thereof, an automatically-adjustable swinging valve opposite said vibrator, and a feed-roller suspended from said valve and adjustable therewith, with means for imparting motion to said roller and to said vibrator, for the purpose and substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JOHN B. CORNWALL.

In presence of—
CHAS. F. ARNBERG,
FRANK THOMPSON.