(No Model.) 2 Sheets—Sheet 1.

A. N. WOLF.

AUTOMATIC FEED REGULATOR FOR MILLS.

No. 500,832. Patented July 4, 1893.

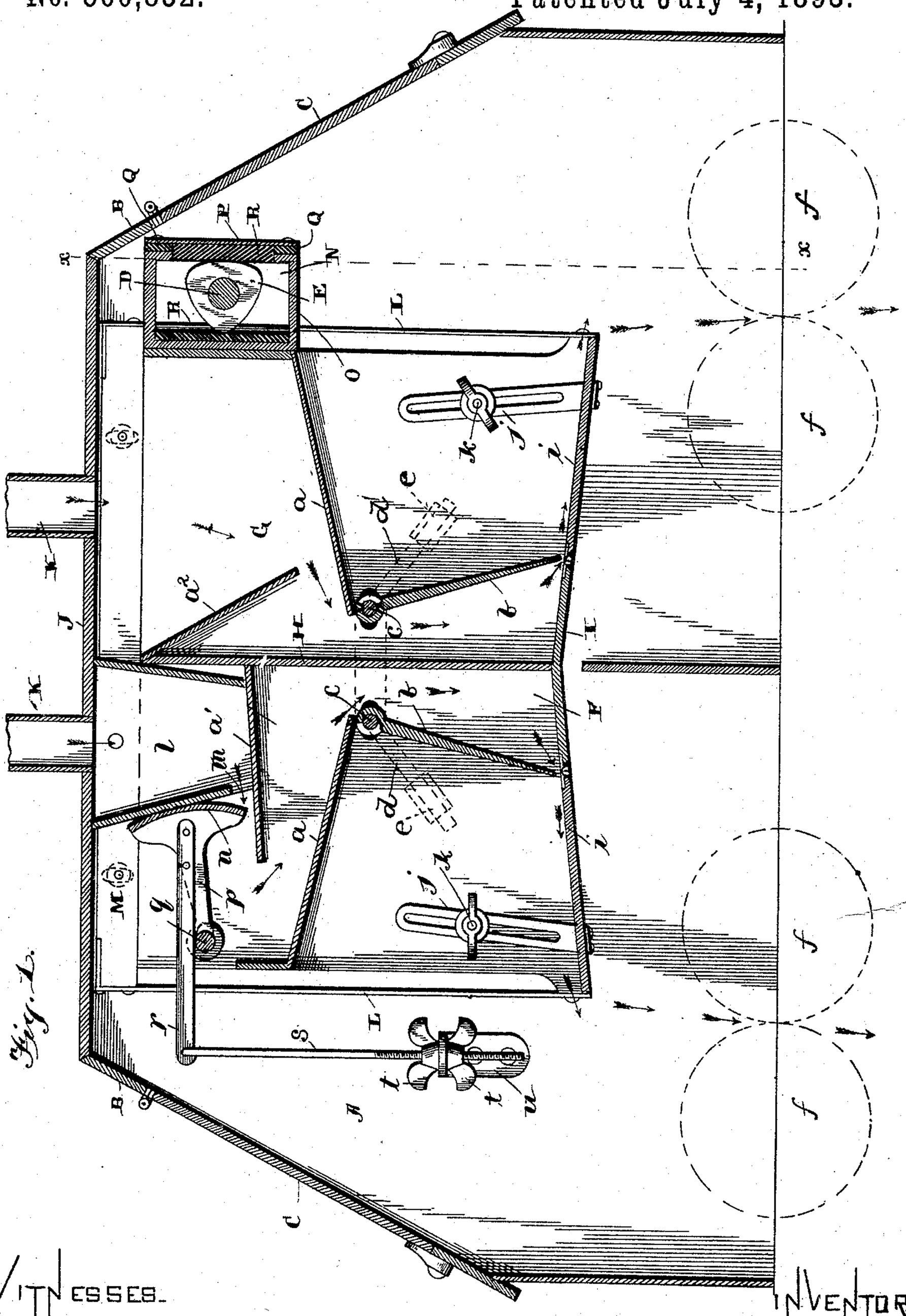

Fig. 1.

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Fig. 2.

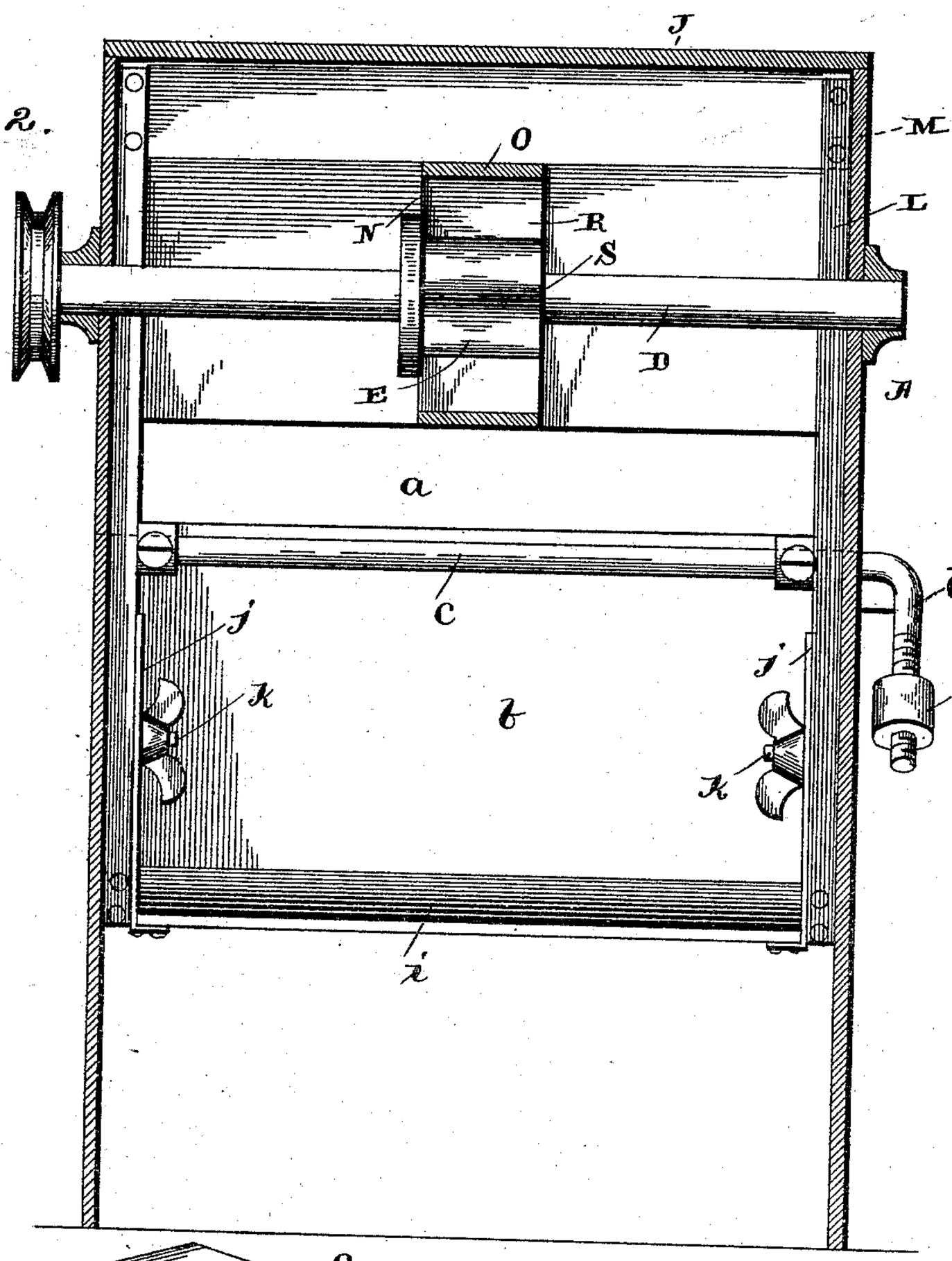


Fig. 3.

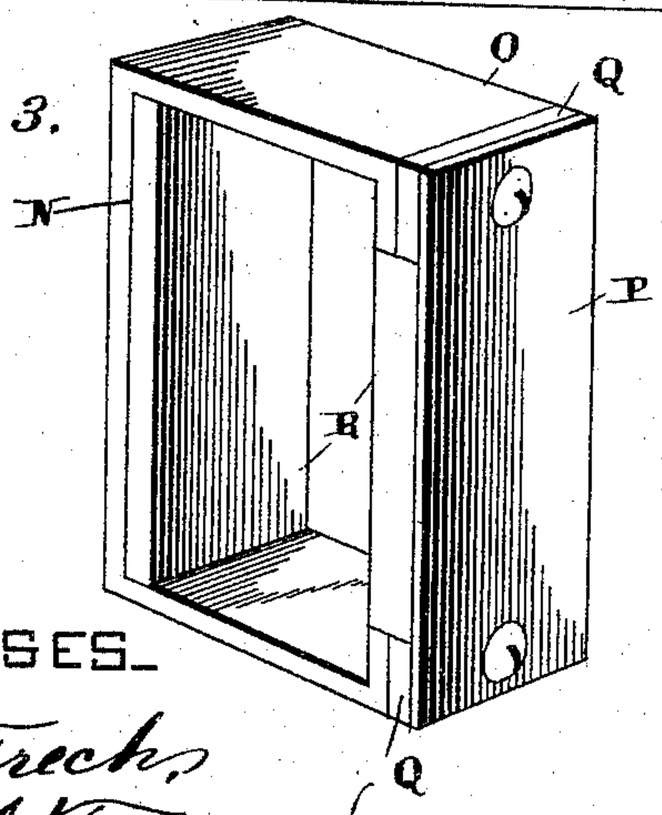
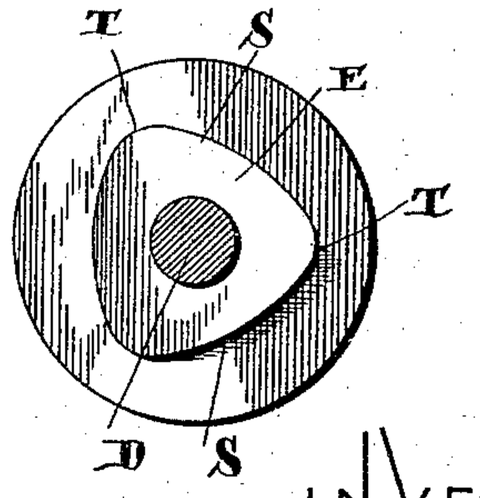


Fig. 4.



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UNITED STATES PATENT OFFICE.

ABRAHAM N. WOLF, OF ALLENTOWN, PENNSYLVANIA.

AUTOMATIC FEED-REGULATOR FOR MILLS.

SPECIFICATION forming part of Letters Patent No. 500,832, dated July 4, 1893.

Application filed December 10, 1892. Serial No. 454,783. (No model.)

To all whom it may concern:

Be it known that I, ABRAHAM N. WOLF, of Allentown, in the county of Lehigh and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Feed-Regulators for Mills; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to improvements in automatic feed regulators for grinding and crushing rolls, and it consists in the construction and combination of parts which will be fully described hereinafter and particularly pointed out in the claims.

The object of my invention is to provide a vibrating feed for roller and grinding mills, which is so constructed that the feed is given three vibrations or movements to a single revolution of the actuating shaft, and also, to have the vibrating feed box independent of regulating gates, whereby the feed box is moving while the regulating gates or valves remain quiet independently thereof, and which effects a regular and even feed of the whole wheat which is very desirable, and after the first break automatically feeds the material even in whatever quantity it may be fed to that side of the machine intended to receive it.

In the accompanying drawings:—Figure 1 is a central longitudinal vertical sectional view of a machine embodying my invention. Fig. 2 is a transverse vertical section taken on the dotted line *x*—*x* of Fig. 1. Fig. 3 is a detached view of the triple cam box. Fig. 4 is a detached view of the triple cam.

A indicates the casing of the machine which is preferably made of the shape here shown, that is to say with inclined ends B, and these ends B provided with hinged doors C, whereby access can be had to the interior of the machine for any desired purpose.

Passing horizontally through one end of the casing A, is an actuating shaft D, which carries a triple cam or eccentric E, which vibrates the feed box or shaker F. This shaker F, is provided with sides G, and a central division partition H, which extends from its upper open end to the bottom I thereof, thus dividing the vibrating feed box into two separate feeding compartments as will clearly appear farther on, and which compartments are separately used for feeding different material, and the top J of the casing is provided with two openings for the spouts K, which communicate respectively with the said compartments. This vibrating feed box F is suspended within the casing upon the spring suspending strips L, made of suitable spring metal, the lower ends of said spring strips being connected to the four lower corners of the feed box, and their upper ends to the opposite ends of two longitudinal strips M. These longitudinal strips M are secured to the inner side of the casing near its upper end, and in any suitable manner to be adjusted vertically so that the said feed box can be leveled within the casing when first set up.

Secured to the outside of that end of the vibrating feed box adjacent the actuating shaft is a box N in which the cam or eccentric revolves. This box consists of a metallic frame O which has its inner vertical portion attached to the vibrating feed box, and its outer portion made open to permit the passing therein of the cam and its shaft. This opening is then closed by means of a suitable metallic plate P, between which plate and the said frame O, are inserted leather liners Q. Also attached to the inner side of the plate P, and to the inner side of the frame O, are leather bearings R, against which the eccentric or cam bears. These leather bearings after the machine has run a while become worn, and then the leather liners are removed and the plate P set up, and the machine will then need no further adjustment. It will be noticed that this cam or eccentric is made substantially angular in shape, and the points of the angles connected by a slightly and gradually curved surface S, and the points themselves made rounding as shown at T. Attention is now called to the fact that the box N in which the cam revolves is made longer than the greatest diameter of the cam or eccentric, so that when the points of the cam are either up or down they do not touch any part of the box, but only engage therewith when they are in a horizontal position.

Attention is also called to the fact that while the box N is longer longitudinally than the greatest diameter of the cam, its width is equal only to the smallest diameter of the cam. Owing to this fact it will be at once understood, that when one of the rounded points T of the triple cam is in engagement with the outer plate P of the box N, and thereby the feed box moved outward, the rounding space S between the other two points T of the cam is in engagement with the inner portion of the cam box, and vice versa. In other words, the cam is formed with three portions S which are concentric with the rotation of the shaft, and the box thereby not moved when they are respectively in engagement with either side thereof, and with the eccentrically arranged points T, which move the box when in engagement with either side thereof. Thus it will be seen that I have a cam with three eccentric portions connected by three concentric portions, each eccentrical portion being diametrically opposite a concentric portion. In this way there is absolutely no lost motion of the cam in its box, for the reason that a concentric portion of the cam is in engagement with the box and not affected thereby, while at the same time an eccentric portion of the cam is in engagement with the opposite side of the box and moving it. This is also made possible from the fact that the decrease in the cam from the center of the shaft to form a concentric portion, is exactly equal to the increase of the cam from the center of the shaft to form the eccentric portion.

From the above it will be seen that the feed box is given three vibratory movements to every single revolution of the actuating shaft.

At each side of the central partition are the declined boards *a*, which extend from the ends of the feed box inward, and immediately below the inner ends of these boards are placed automatically acting valves or gates *b*. These boards *a* it will be noticed do not extend entirely inward to the central partition of box in order to leave a space between their inner ends and the said partition for the passage of the material being fed. These gates are pivotally supported upon a rod *c*, which is not in turn supported within the feed box, or in any manner by the feed box, but on the contrary is supported directly by the casing A of the machine, and inclined outward slightly as illustrated. Owing to this method of supporting the said valves or gates, the feed box is vibrated independently of the valves. The rods upon which these valves or gates are supported, (and to which they are firmly connected, while the rods rock,) have one of their ends provided with laterally extending screw threaded arms *d*, upon which are placed the weights *e*. The object of these valves is to feed the material evenly to the rolls *f*, below, and also regularly, and the amount of material fed is regulated by means of the adjustable weights *e*, as will be clearly understood.

The ends of the bottom I of the feed box are provided with the hinged portions *i*, which are adjustably supported by means of the slotted plates *j*, which extend upward and are clamped by means of clamping bolts *k* which extend into the sides of the feed box. The object of this adjustability of these portions *i* is to cause the material being fed to be thrown directly between the rolls.

The left side of the machine is intended to feed the whole wheat berries for the first break, and is provided at its upper end with a stationary hopper *l* that is supported by the casing. Under this hopper is placed a declined board *a'* which extends from the central partition outward over the board *a*, below it. The outer side of this stationary hopper has its lower edge cut away to form an outlet *m*, and outside of this opening is an adjustable gate or valve *n* for the said opening. This gate is provided with outwardly extending arms *p*, which are pivotally supported by a transverse rod *q*, which is supported in the casing of the machine. Extending outward from this gate is a lever *r*, to the outer end of which is connected a screw threaded rod *s*, upon which are placed the two nuts *t*. A bracket *u* extends from the casing A, and the said nuts *t* are placed respectively above and below the said bracket, and by means of which the said screw threaded rod can be moved up or down and clamped in the adjusted position. The vertical movement of the screw threaded rod causes the valve to move, and thus the distance of its lower edge from the declined board below it is regulated as desired, to govern the amount of material fed below it. This valve it will be noticed is also supported by the casing independent of the feed box, and the feed box thereby vibrated independently thereof as is the case with the automatically acting valves *b*. Owing to the fact that the valves remain quiet in relation to the vibratory movement of the feed box, it will be seen that the material is "shuffled" under the said valves in an even and regular stream.

At the opposite side of the partition there is no stationary hopper or valve *n*, such as is used in feeding the whole wheat berry for the "first break" and the material after being subjected to the first break is fed to the succeeding machines to clean the crushed material of the hulls or the berry, and then passes through the right hand side of this machine and through similar feeds until the process is completed. Therefore simply an incline a^2, is used upon which the previously treated material falls from the spout above, and is fed automatically at a given rate to the rolls below by means of the automatically acting valve *b* as before described.

Owing to the very quick movement of the feed box carrying the material fed thereto independent of the valves, the material is shaken under the said valves in an even and

regular stream equal to the width of the valve, and the depth of the stream being fed is regulated by means of the weighted valves at the right hand of the machine, and at the left hand of the machine by means of the valve at the hopper above and the valve below.

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

1. A feed regulator comprising a frame carrying a stationary hopper, a vibrating feed box beneath the hopper, the feed box carrying a slightly declined board co-acting with and forming a bottom for the said stationary hopper, a valve co-acting with said declined board and supported independently of the said vibrating feed box, and a valve supported independently of said feed box and located below the said board and co-acting with the bottom of the said feed box, substantially as shown and described.

2. A feed regulator comprising a frame carrying a stationary hopper, a vibrating feed box beneath the hopper and carrying a slightly declined outwardly extending board which co-acts with and forms a bottom for said hopper, a slightly declined inwardly extending board beneath the outwardly extending board, and a valve supported at its upper end adjacent to the inner end of said inwardly extending board and supported independently of the feed box, and the lower free end of said valve adjacent to and co-acting with the bottom of the feed box, substantially as specified.

3. A feed regulator comprising a frame carrying a stationary hopper, a horizontally vibrating feed box carrying an outwardly extending declined board beneath co-acting with and forming a bottom for said hopper, an inwardly extending declined board carried by the feed box located beneath the outwardly extending board, the walls of the feed box having horizontal slots adjacent the inner end of the inwardly extending board, a depending valve at the inner end of said board having its lower end co-acting with the bottom of the feed box, and a support for said valve extending through the said slots and supported by the frame, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

A. N. WOLF.

Witnesses:
HENRY T. KLECKNER,
W. J. CLADER.