(No Model.)

3 Sheets—Sheet 1.

J. WARRINGTON.

HOMINY MILL.

No. 427,644. Patented May 13, 1890.

Fig. 1.

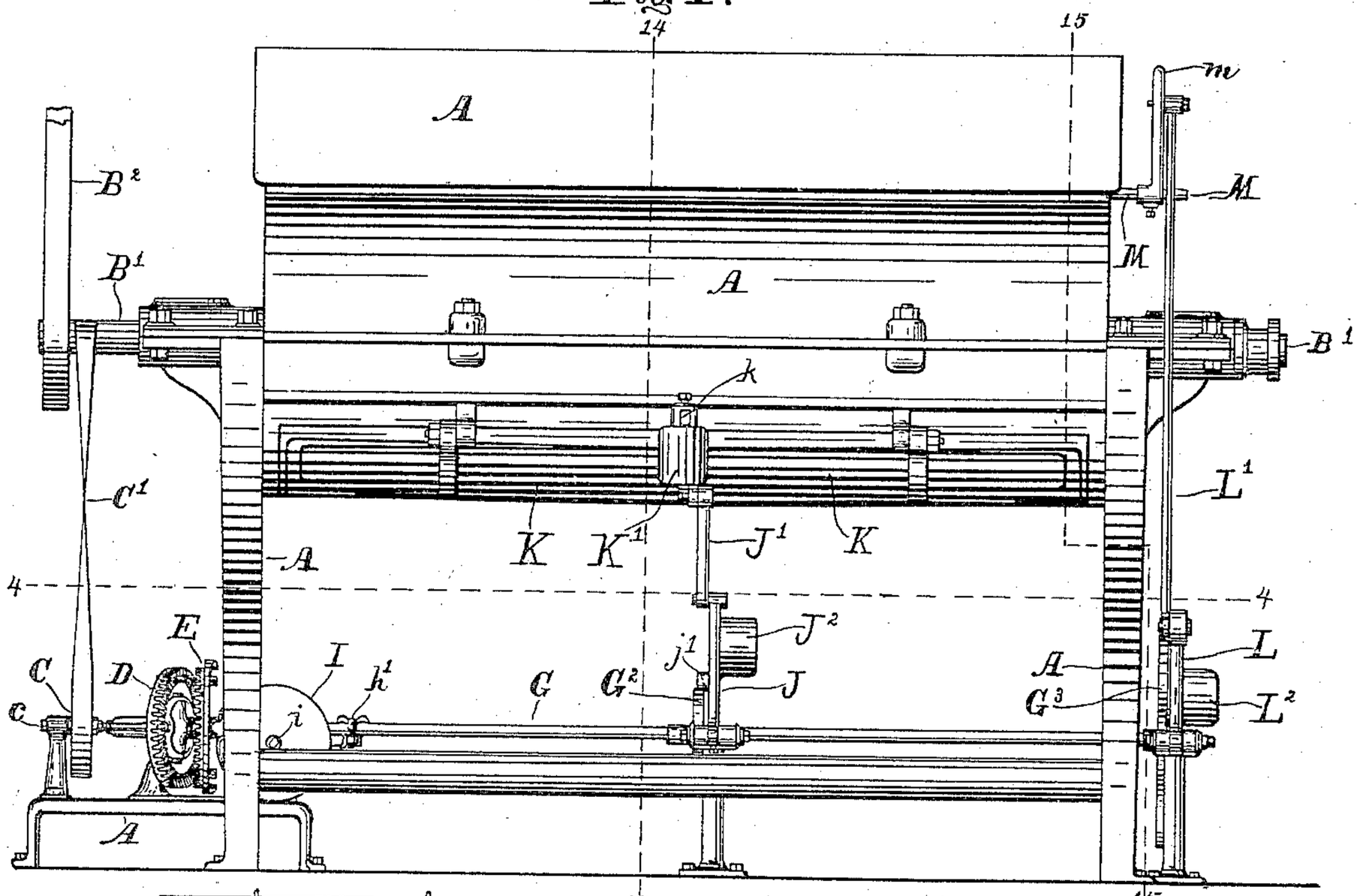


Fig. 2.

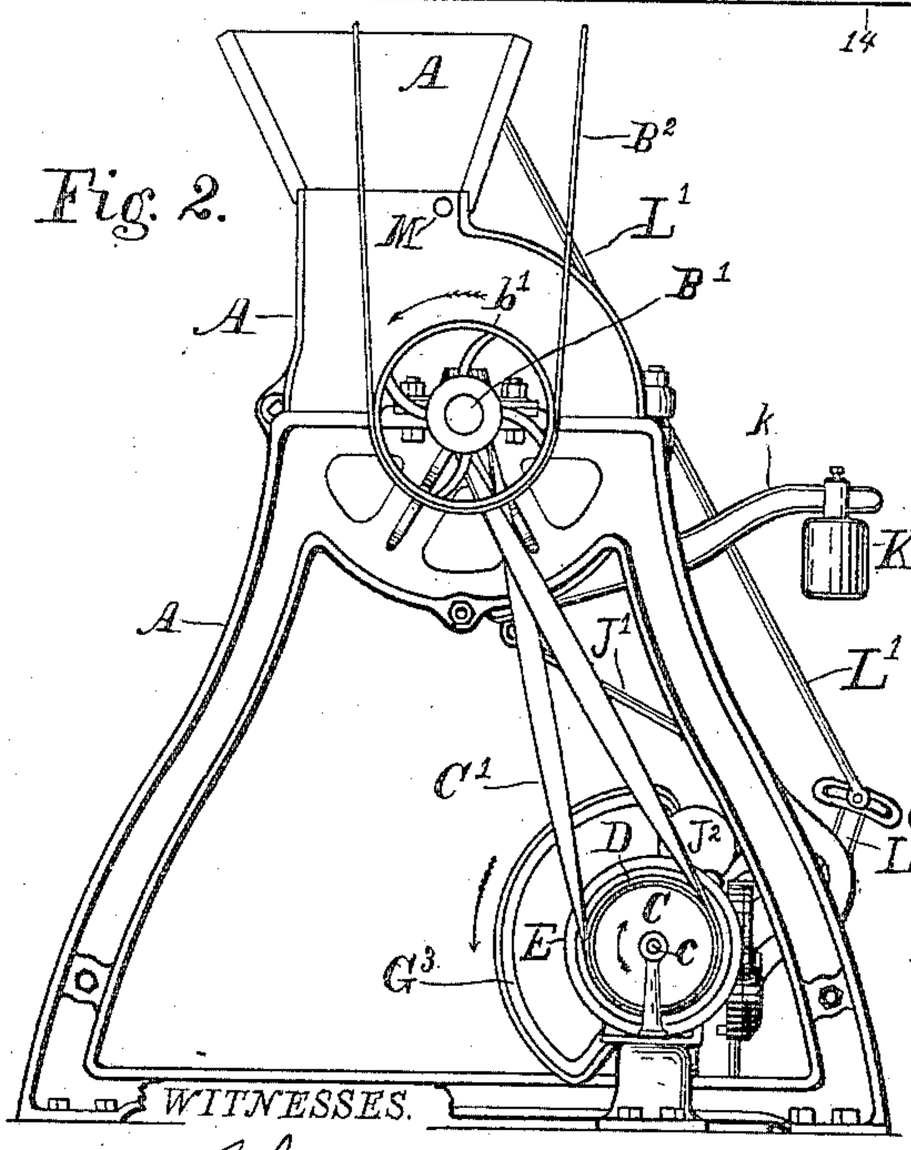
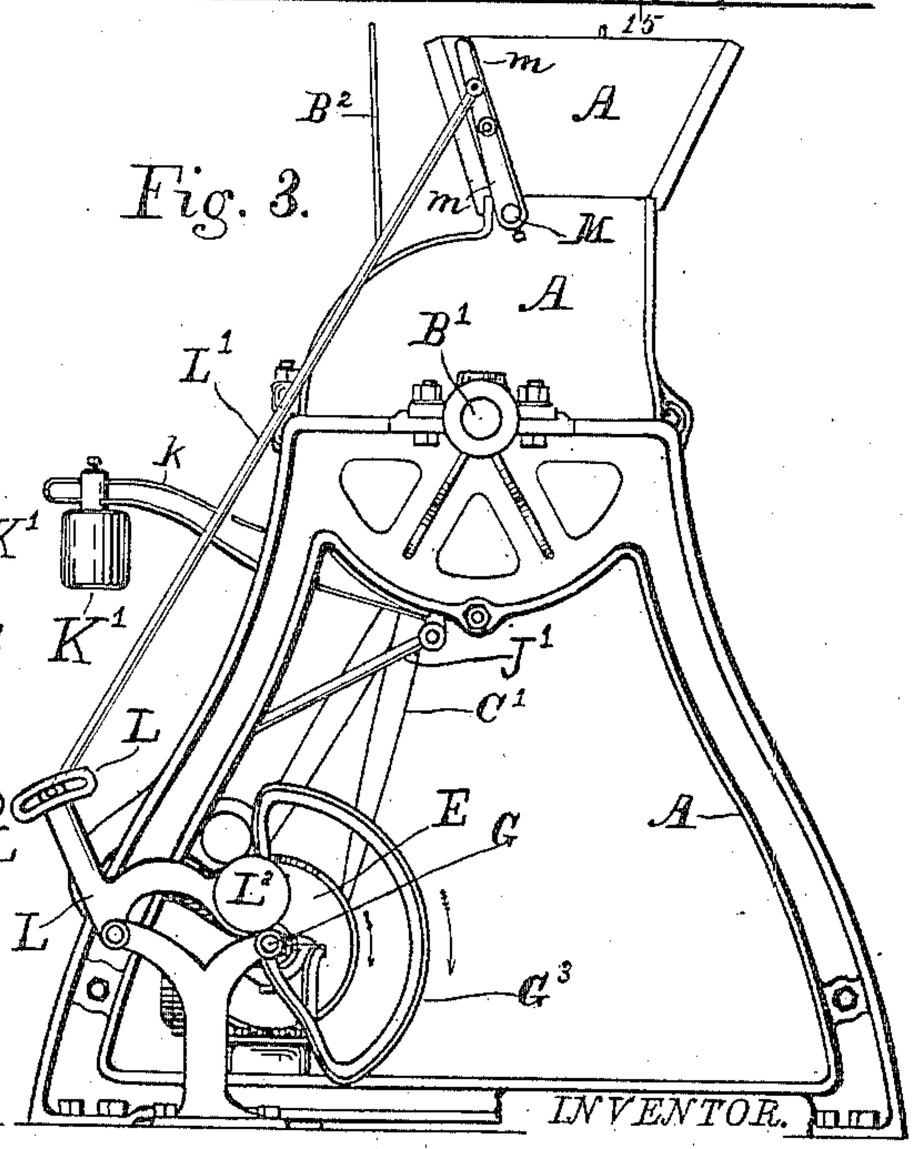


Fig. 3.



WITNESSES.

Chas. A. Suffrins,

Chas. L. Thurber.

INVENTOR.

Jesse Warrington,

PER

C. Bradford,

ATTORNEY.

(No Model.) 3 Sheets—Sheet 2.

J. WARRINGTON.

HOMINY MILL.

No. 427,644. Patented May 13, 1890.

Fig. 4.

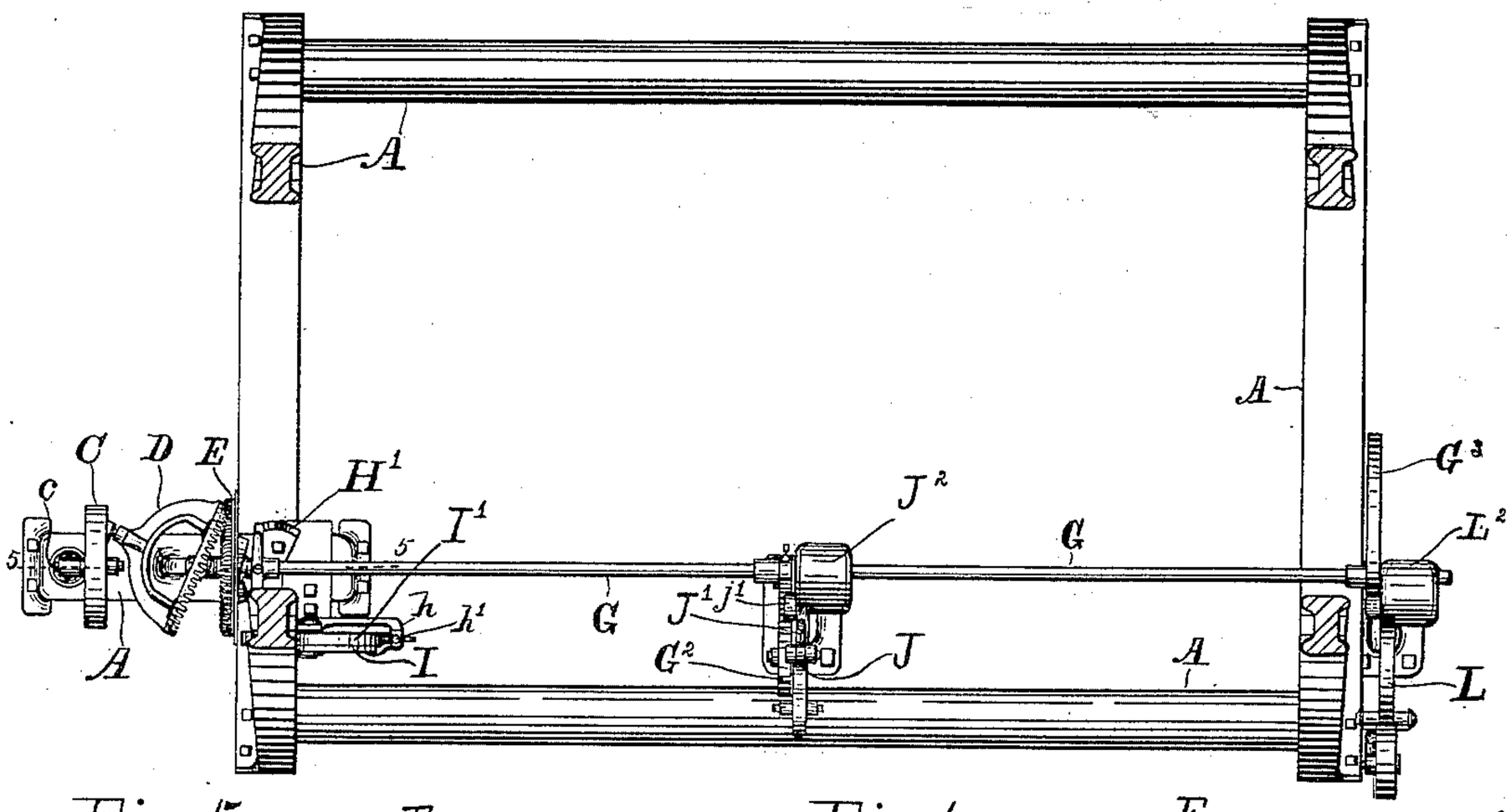


Fig. 5.

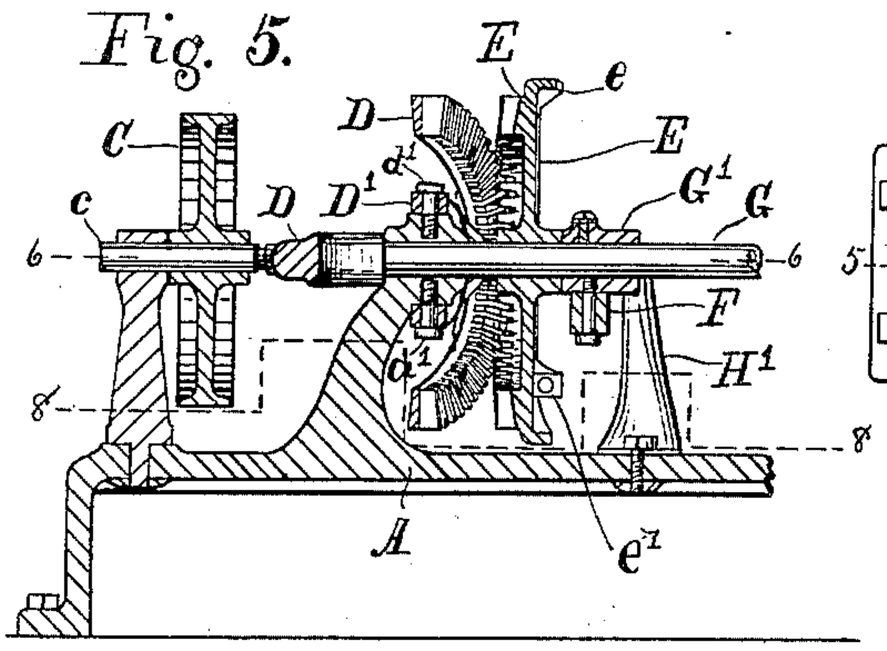


Fig. 6.

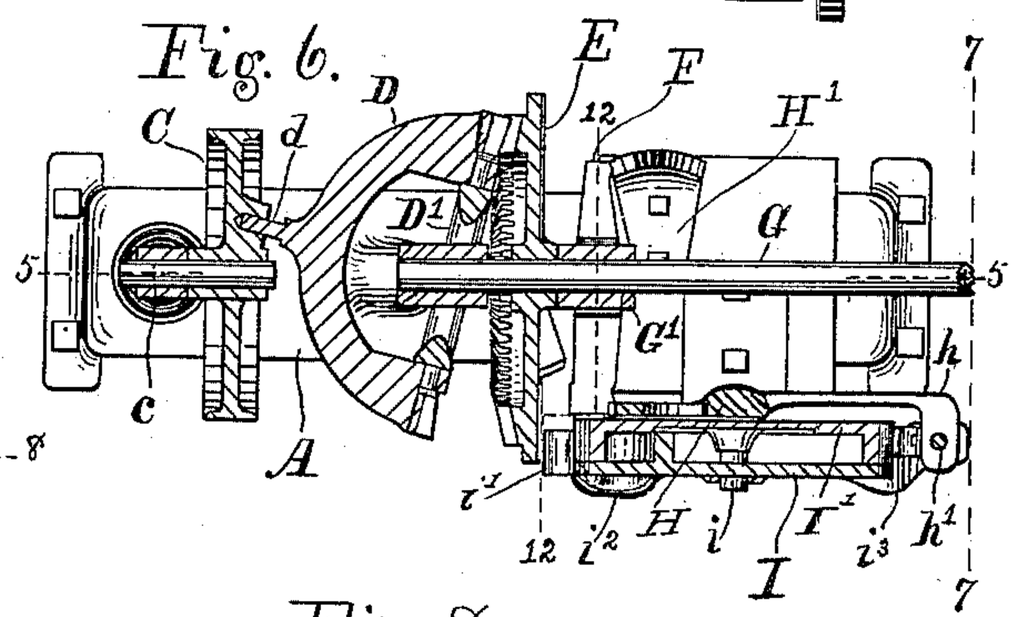


Fig. 7.

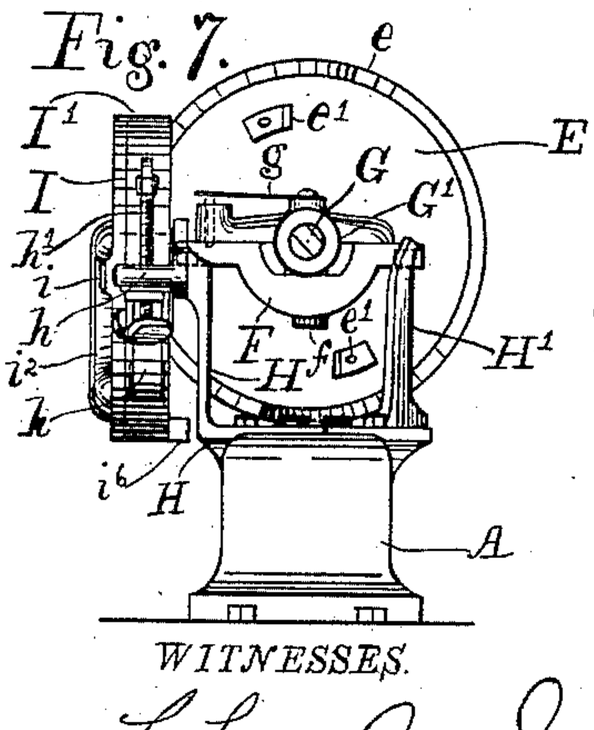
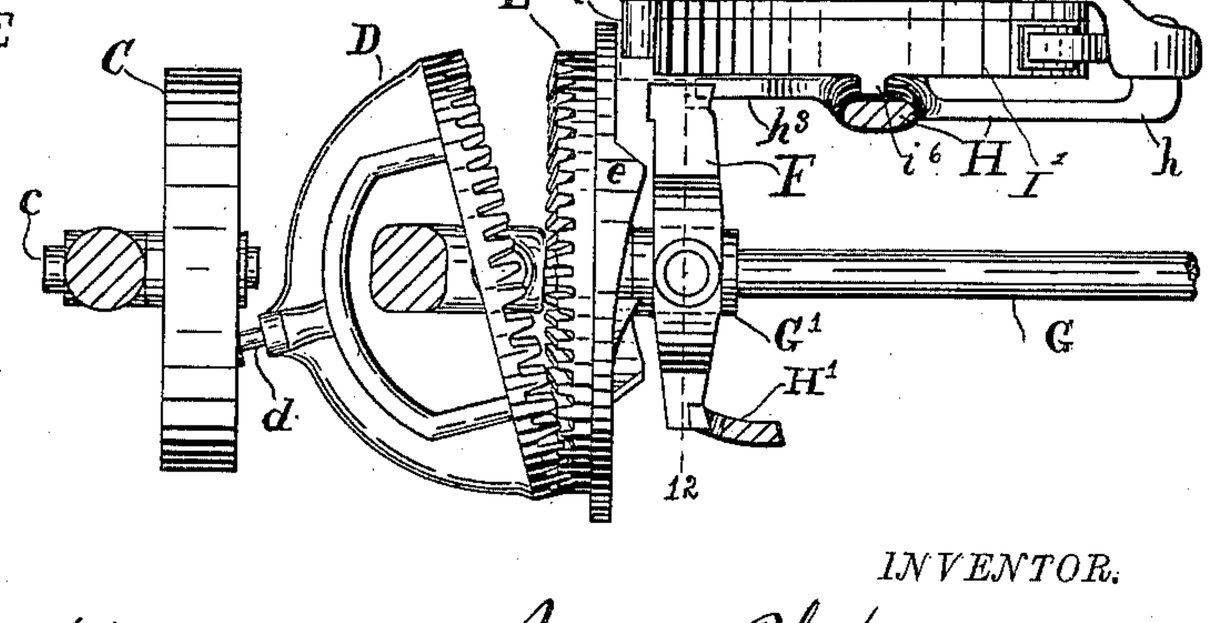


Fig. 8.



WITNESSES.

Chas. A. Suffrus,

Chas. L. Thurber.

INVENTOR.

Jesse Warrington,

PER

C. Bradford.

ATTORNEY.

(No Model.) 3 Sheets—Sheet 3.

J. WARRINGTON.

HOMINY MILL.

No. 427,644. Patented May 13, 1890.

Fig. 9.

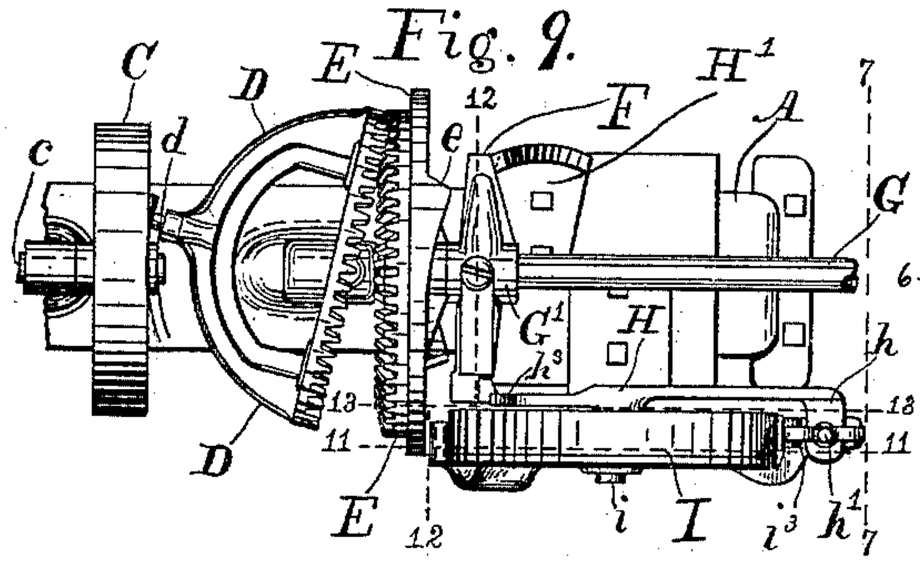


Fig. 10.

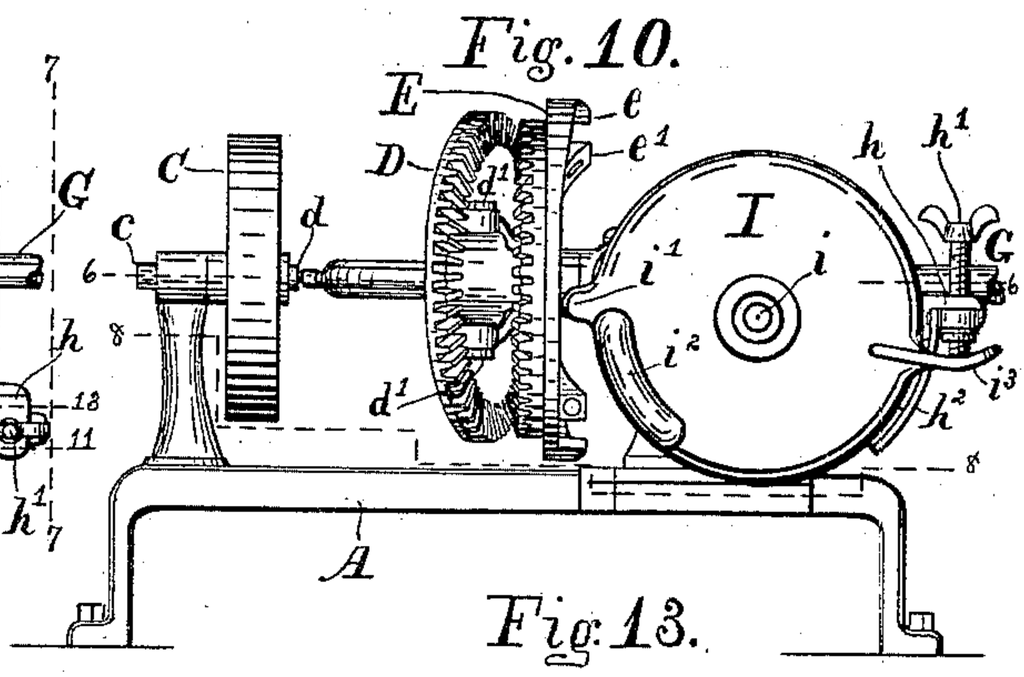


Fig. 11.

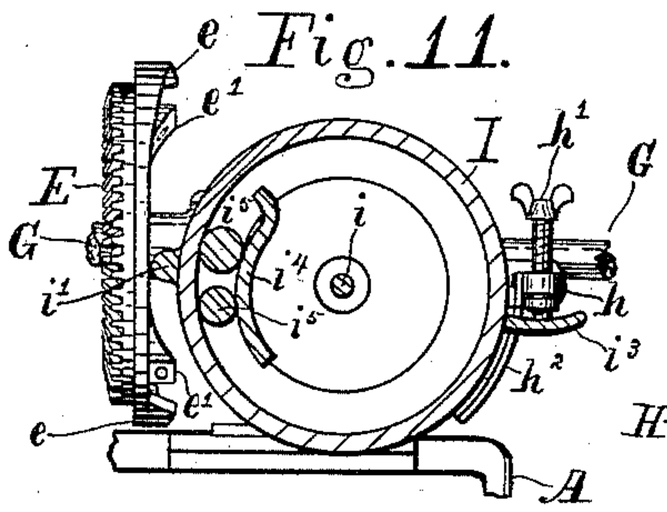


Fig. 12.

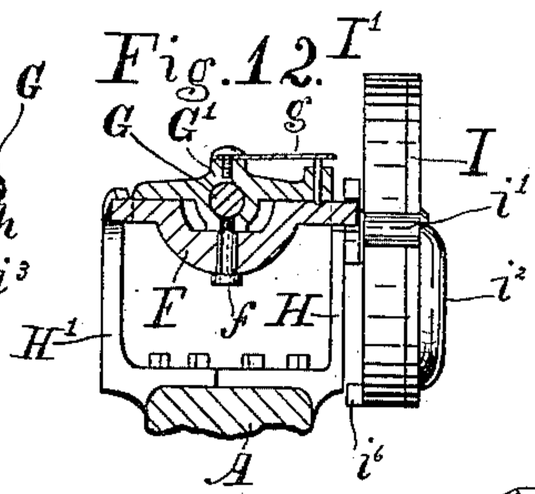


Fig. 13.

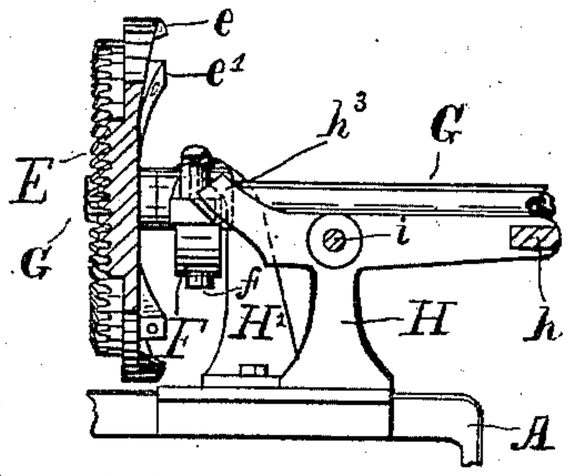


Fig. 14

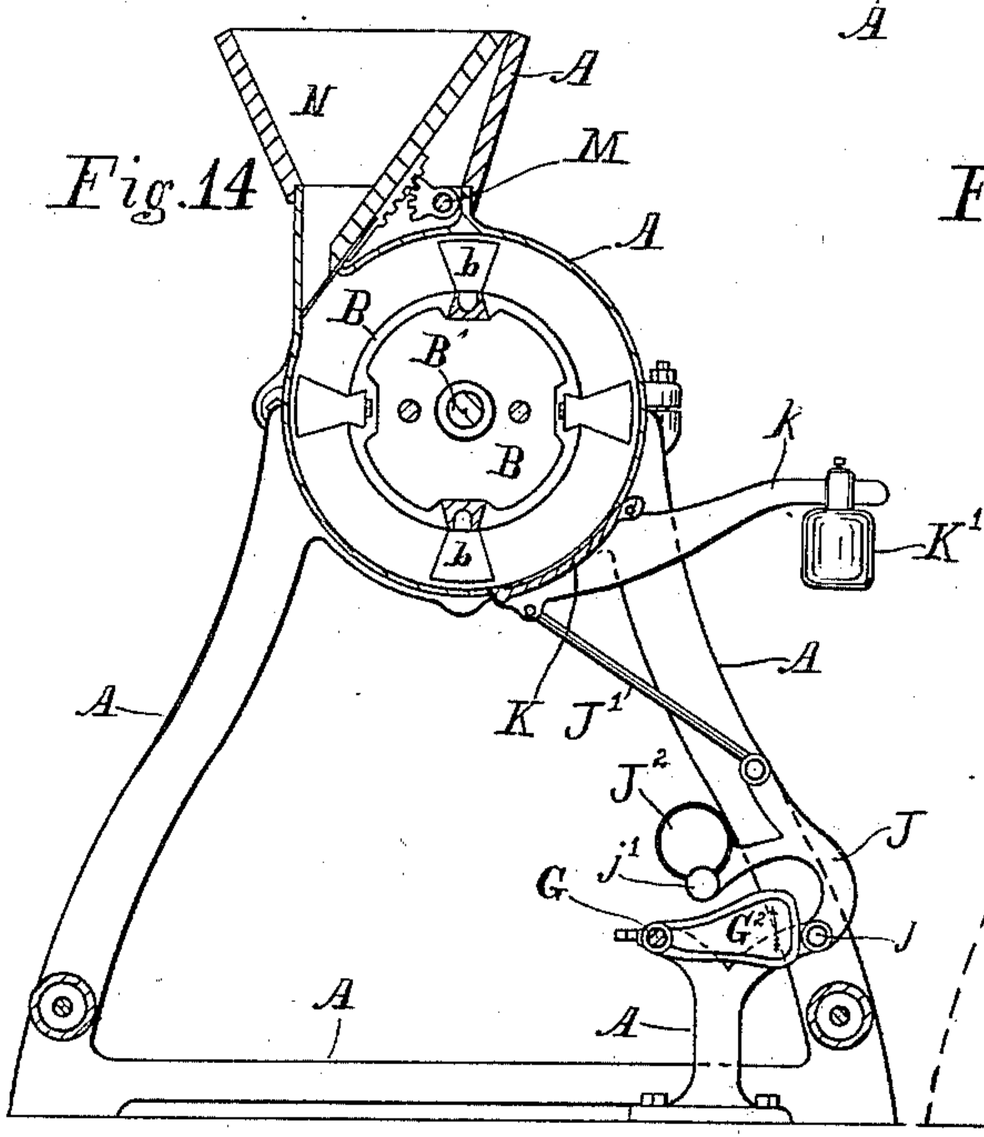
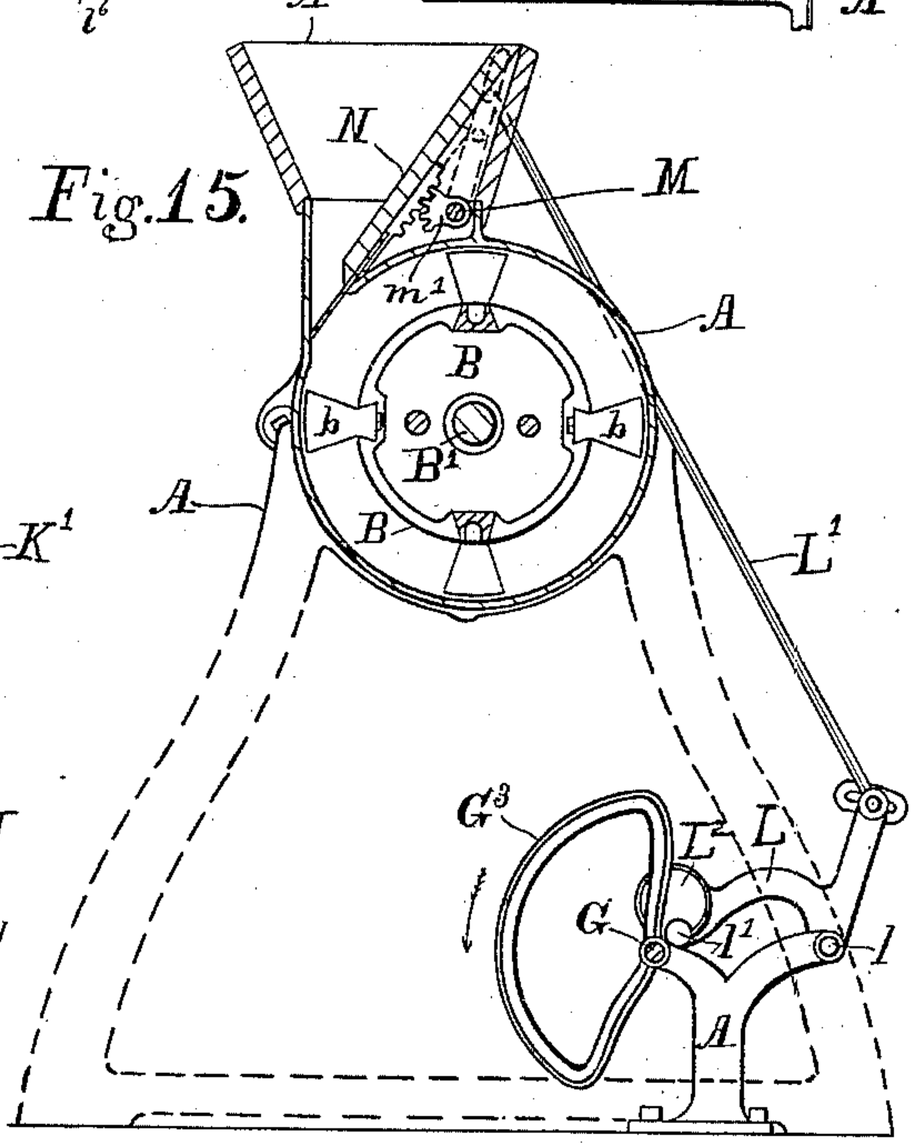


Fig. 15.



WITNESSES.

Chas. A. Seffens,

Chas. L. Thurber.

INVENTOR.

Jesse Warrington,

PER

C. Bradford.

ATTORNEY.

UNITED STATES PATENT OFFICE.

JESSE WARRINGTON, OF INDIANAPOLIS, INDIANA, ASSIGNOR OF ONE-HALF TO THE NORDYKE & MARMON COMPANY, OF SAME PLACE.

HOMINY-MILL.

SPECIFICATION forming part of Letters Patent No. 427,644, dated May 13, 1890.

Application filed June 26, 1886. Serial No. 206,284. (No model.)

To all whom it may concern:

Be it known that I, JESSE WARRINGTON, of the city of Indianapolis, county of Marion, and State of Indiana, have invented certain new and useful Improvements in Hominy-Mills, of which the following is a specification.

The object of my said invention is to provide mechanism by which the feed-gate and discharging-gate of a hominy-mill will be automatically opened and closed at stated periods, and the treated material thus discharged and a new supply of material let into the mill at proper times, as will be hereinafter more particularly described and claimed.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a side elevation of a hominy-mill embodying my said invention; Fig. 2, an end elevation of the same, as seen from the left of Fig. 1; Fig. 3, an end elevation as seen from the right of Fig. 1; Fig. 4, a horizontal sectional view looking downward from the dotted line 4 4 in Fig. 1; Fig. 5, a detail sectional view through the driving-gears on the dotted line 5 5 in Figs. 4 and 6; Fig. 6, a horizontal sectional view of the same on the dotted line 6 6 in Fig. 5; Fig. 7, a view looking toward the left from the dotted line 7 7 in Figs. 6 and 9; Fig. 8, an under side plan of the gears, as seen when looking upward from the dotted line 8 8 in Figs. 5 and 10; Fig. 9, a top or plan view of the driving-gear separately; Fig. 10, a side elevation of the same; Fig. 11, a vertical sectional view on the dotted line 11 11 in Fig. 9; Fig. 12, a transverse vertical section looking toward the right from the dotted line 12 12 in Figs. 6 and 7; Fig. 13, a vertical sectional view looking upward from the dotted line 13 13 in Fig. 9; Fig. 14, a transverse sectional view as seen when looking toward the right from the dotted line 14 14 in Fig. 1, showing the mechanism which operates the discharging-gate; and Fig. 15, a similar view of the mechanism which operates the feed-gate, as seen from the dotted line 15 15 in Fig. 1, the lower portion of the frame-work being shown in dotted lines.

In said drawings, the portions marked A represent the frame-work and body of the hominy-mill; B, its cylinder; C, a wheel which is the first of the series through which the mechanism for operating the gates is driven; D, the second wheel of the series, which is a vibrating gear-wheel; E, the third wheel, which is mounted loosely upon the cam-shaft; F an arm pivoted to a hub fixedly mounted on said shaft; G, said cam-shaft; H H′, two standards secured to the frame A and provided with cam-surfaces against which said pivoted arm rests; I I′, a two-part wheel mounted on a stud-shaft on the frame H, and provided with projections whereby it is periodically operated by similar projections on the wheel E, to throw the pivoted bar F into engagement with said wheel E; J, a weighted arm pivoted to a convenient portion of the permanent frame-work, or to a standard provided for that purpose, which is connected to the discharging-gate of the mill; K, said discharging-gate; L, an arm similar to the arm J, connected to the mechanism for operating the feed-gate of the mill; M, a rock-shaft carrying a gear by which said feed-gate is operated, and N said feed-gate.

The frame A includes the supporting-legs, the cylindrical body which receives the grain to be treated, fixed standards or bearings for the shaft, and the hopper. It is, as shown, of a usual and well-known character, and needs no special description.

The cylinder B is the usual revolving cylinder of a hominy-mill, armed with the operating-blades *b*. Its shaft B′ extends outside the cylinder and has a pulley *b′*, by which it is driven by a belt B^2.

The wheel C is mounted on a stud-shaft *c*, and is driven by a cross-belt C′, which runs from said wheel or pulley to the shaft B′ or a small pulley thereon. A socket or bearing is formed in said wheel, and into this socket or bearing a spindle, forming part of the vibrating gear-wheel, enters, and thus, as said wheel C revolves, said gear-wheel is given its vibrating motion.

The vibrating gear-wheel D is mounted on an arm or spoke D′, on which it may oscillate in a vertical plane, and said arm or spoke is secured by pins *d′* to the frame-work, and is adapted to rock on said pins in a horizontal plane, and thus one end of the spindle *d*

is permitted to travel through the circle described by the socket in the wheel C, into which it enters. This wheel D engages with the gear-wheel E, and its operation is as follows: The number of cogs in said wheels is different—*i. e.*, the wheel D has a greater or less number than the wheel E—and thus, notwithstanding that said wheel D does not rotate, but only vibrates, said wheel E will be rotated at a greater or less speed, according as the difference in the number of the cogs is greater or less. In practice in my machine I have made the wheel D with one more cog than the wheel E is provided with, and therefore said wheel E rotates very slowly in the opposite direction to that in which the wheel C rotates, and I thus reduce the speed much more than would be practicable by any other arrangement without a greater number of parts, the shaft B′ traveling at the rate of about eight hundred revolutions per minute, while the wheel E travels no more than about seven and one-half revolutions per minute. This is partly accomplished by means of different-sized belt-pulleys, as shown, but principally by the oscillating gear-wheel being provided with one more cog than the revolving gear-wheel with which it engages. As said oscillating wheel can thus only force said revolving wheel forward the space of a single cog at each complete movement of itself, it will take as many movements of the oscillating wheel as it has cogs to make a single complete revolution of the revolving gear-wheel, as will be readily understood.

The wheel E, as before stated, is mounted loosely on the shaft G, and travels upon said shaft until, by the operation of the mechanism hereinafter described, it is made to cause said shaft to travel with it. It is provided with cam-surfaces *e* upon the edge of its periphery, which come in contact with and operate the half-wheel I, as will be presently described.

The bar F is pivoted upon a hub G′ on the shaft G by a pivot *f*, (see Fig. 12,) said hub being rigidly secured to said shaft, and consequently when said bar is thrown into engagement with the wheel E said shaft and said wheel will revolve together. Said hub G′ extends out the greater part of the length of said bar F and forms bearing-surfaces for the outer portions of said bar. To said hub is secured a spring *g*, having a pin on its outer end which passes down through a hole in one end of the projecting portion of the hub G′ and enters one or the other of two notches or cavities formed to receive it in the bar F, (see particularly Figs. 7 and 12,) and thus said vibrating bar is held in the position to which it has been forced by the cam-faced standards. The end of said pin is formed with a blunt taper, and the notches or cavities are formed correspondingly flaring, so that while the bar is held in position thereby during the time desired it can be readily forced from one position to the other as it is brought in contact with the cam-faces on the standards H and H′.

The shaft G carries the above-described hub G′, and also cams G^2 and G^3, by which the arms J and L and the mechanism connected thereto are operated. It is revolved periodically by the vibrating arm F when it is forced into and out of engagement with projections *e′* on the wheel E.

The standards H and H′ are firmly secured to a portion of the frame A and extend up alongside and operate upon the vibrating bar F, as will be hereinafter described. The standard H also carries a stud-shaft *i*, (see especially Figs. 6, 8, 10, and 11,) upon which the wheel I I′ is mounted and operates, and has an arm *h*, in which is a set-screw *h′*, by which the operation of the wheel part I is regulated, as will be presently described. A spring h^2 is also secured to this arm and bears against the surface of the wheel part I′, and thus serves as a brake for said wheel part, preventing it from moving, except as it is operated by the mechanism.

The wheel I I′ is mounted, as before stated, upon a stud-shaft *i* on the standard H. It consists of two parts, one of which I has a projection *i′*, (see Figs. 10 and 11,) with which the projections *e* on the wheel E will come in contact as said wheel E revolves, thus imparting to said wheel part I a partial revolution. Said wheel part I also has the weight i^2, by which, when the projection *e* has passed the projection *i′*, it will be returned to its former position, ready to be operated upon by said projection during the next revolution of said wheel E. Said part I also has a stop i^3, (see Figs. 10 and 11,) which prevents the weight from moving it too far, and also by which, with the aid of the set-screw *h′*, the extent of the revolution of said wheel is determined. Said wheel part I has also an internal flange i^4 in the form of a segment of a circle, (struck from a different center than the center of the wheel,) between which flange and the flange forming the outer portion of the other wheel part I′ are placed one or more rollers i^5, which take the place of a ratchet and cause said other wheel part I′ to revolve in the same direction with the wheel part I and at the same time, by reason of the surfaces between which they rest being flaring, permit said wheel part I to return to position without moving said wheel part I′, as will be readily understood by an examination of the drawings, especially Figs. 6 and 11. The wheel part I′ is revolved, as just described, by the wheel part I when the latter is operated upon by the projections on the wheel E; but as it does not, because of the character of the clutch formed of rolls resting upon flaring surfaces, as before described, accompany said wheel part I on its return movement, it eventually makes a complete revolution. It is provided with a projection i^6, (see Figs. 8 and 12,) which in the course of the revolution comes against the side of the vibrating bar

F and forces it upward. At the same time, by reason of the cam-surface on the projecting portion h^3 of the standard H, (see Figs. 8 and 13,) said part F is forced toward the wheel E, and is thus thrown into engagement with one of the projections e' on said wheel E, and the result is that said vibrating bar, the hub to which it is secured, the shaft G, and the cams thereon make a complete revolution, the rotation being discontinued when the other end of said vibrating bar comes in contact with the cam-surface at the upper end of the standard H', which throws said vibrating bar out of engagement with the projection e', when, of course, its movement ceases until, by the operation hereinbefore described, the projection i^6 on the wheel part I' again operates the vibrating bar.

As before stated, the distance which the wheel part I is moved by the revolution of the wheel E may be determined by an adjustment of the set-screw h', as when said set-screw is screwed down the projection i' is consequently elevated, and thus the engagement between said projection and the projection e on the wheel E will be of shorter duration than when said set-screw is screwed up, and said projection i' consequently lowered. By this arrangement, as will be readily seen, the times at which the gates are opened may be varied and a longer or shorter period, as desired, allowed to elapse between such times of opening without varying the time occupied in opening and closing the gates themselves.

The weighted arm J (see Figs. 1 and 14) is mounted upon a pivot j on a standard which forms part of the frame A, and in which frame is preferably a bearing for the rod G. Said arm is connected to the discharging-gate K by a rod J', and is thus adapted when moved by the cam G^2 to open said gate. It has a projection or pin j', with which said cam comes in contact, and the mechanism for discharging is thus operated when the shaft G revolves. Said cam is so arranged, as before stated, that when said shaft G is revolved it will open the gate and permit it to be closed before the other cam on said shaft opens the feed-gate.

The gate K is hinged to the body of the mill and is, in effect, a part thereof. It is connected, as just described, to the weighted arm J and is operated thereby. After being opened by the operation of the cam on said weighted arm, after said cam has passed out of engagement with the projection j', said gate is again closed by the weight K' on its arm k, aided by the weight J^2 on the arm J, said weights being sufficient to hold said gate closed until forcibly opened.

The weighted arm L (see Figs. 2, 3, and 15) is similarly secured to the frame A by the pivot l, and is operated by the action of the cam G^3 upon the projection or pin l'. Said arm is connected by the rod L' to an arm m (see Fig. 3) on the rock-shaft M, and is thus adapted to operate said rock-shaft. As will be seen by an examination of Figs. 3 and 15, the connection between said rod and said arm is made adjustable, and thus the gate may be moved a greater or less distance. After the cam G^3 has passed the weight L^2 is sufficient to return the parts to their former position and close the gate.

The rock-shaft M extends through the hopper underneath the feed-gate, and has one or more cogged segments m', which engage with corresponding rack-bars on the under side of said gate, and as said shaft is rocked by the operation of the mechanism just described said gate is opened or closed.

The gate N is the ordinary feed-gate of a hominy-mill and is operated in the manner just described.

As hereinbefore stated, the mechanism is so timed that the discharging-gate will be opened and closed before the feed-gate is opened, and, as will be seen by an examination of the drawings, the cam G^3, by which said feed-gate is operated, has a considerable portion of its surface in the form of a segment of a circle struck from the center of rotation, and thus said gate is held open a time sufficient to admit the charge of corn desired.

The result which I have attained by my invention is not only an automatic operation of the discharging and feeding gates, but that such operation is timed with exact reference to the number of revolutions of the cylinder, and thus each charge or measure of corn is subject to exactly the same amount of treatment, and this without reference to the speed of the mill, a faster speed of the operating-cylinder resulting in a quicker operation of said discharging and feeding gates, which, as will be readily understood, is a desirable result.

The direction of the several revolving or rotating parts is indicated by arrows upon the drawings, and dotted lines are used where it is of advantage to show the location or configuration of hidden parts.

Having thus fully described said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in a hominy-mill, of the cylinder, the feeding-gate, the discharging-gate, an intermittingly-moving shaft, cams on said shaft, pivoted weighted arms arranged to be operated by said cams, connections between said arms and said gates, and mechanism whereby the gates are operated in a uniform time regardless of the time occupied in treating the charge of grain, substantially as set forth.

2. The combination, in a hominy-mill, of a reciprocating feeding-gate, a swinging discharging-gate, an intermittingly-moving shaft driven by the same power which drives the mill, cams upon said shaft, arms pivoted to the frame-work of the mill arranged to be

operated by said cams, and rods running from said arms, whereby said gates are opened and closed, substantially as set forth.

3. In a hominy-mill, the combination of the cylinder, mechanism for operating the same, the feed-gate, the discharging-gate, mechanism for operating said gates automatically, and a doubly-pivoted gear-wheel connecting said mechanism for operating the cylinder and said mechanism for operating the gates, substantially as set forth.

4. The combination, in a mechanism for periodically operating the gates of a hominy-mill, of a wheel having a bearing or socket on one side of its center, a doubly-pivoted gear-wheel mounted on a frame-work and having a spindle or shank entering said socket, whereby, as said first wheel is revolved, said gear-wheel is vibrated, a second gear-wheel having a different number of teeth from said vibrating gear-wheel and engaging therewith, mechanism which is operated by said second gear-wheel, connections between said mechanism and the feeding and discharging gates, and said feeding and discharging gates.

5. The combination of the main cylinder of a hominy-mill, a system of gearing, the last wheel E of said gearing having projections thereon and mounted loosely on a shaft, said shaft, a two-part wheel I I′, having internal friction-rolls, the part I having a projection which is operated upon by a projection on said last gear-wheel E, and the part I′ having a projection which, as the wheel revolves, will come into contact with and operate a vibrating bar secured to a hub on the shaft and force said bar into engagement with another projection on said gear-wheel, and fixed cam-shaped projections by which said bar can be thrown out of said engagement, and said bar and hub, whereby said gear-wheel being in continuous revolution the said shaft to which said vibrating bar is attached may be given an intermittent revolution, substantially as set forth.

6. The combination, in a hominy-mill, of the loosely-mounted wheel E, having projections *e e′*, the shaft G, the vibrating bar F, pivoted to the fixedly-mounted hub G′, said fixedly-mounted hub, the standards H H′, having cam-surfaces, and the two-part wheel I I′, operating, as described, to throw said vibrating bar into engagement with the projection *e′* on said wheel E.

7. The combination, in a hominy-mill, of the wheel E, the two-part wheel I I′, secured together by internal friction-rolls or their equivalent, and having projections i', i^3, and i^6, the shaft G, having hub G′, said hub, the vibrating bar F, pivoted to said hub, cam-surfaces with which said vibrating bar comes in contact, and an adjusting-screw h', for determining the movement of the wheel I, substantially as set forth.

8. The combination, in a hominy-mill, with the two-part wheel I I′, suitably geared together and operated one part by the other, of a projection i^3 on one, and a fixed point with which said projection may come in contact, whereby its position when at rest may be determined, and means secured to the opposite side of the wheel by which, except when forcibly moved therefrom, it will be held in its original position.

9. The combination, in a hominy-mill, of a shaft G, a hub G′, fixedly mounted thereon, a vibrating bar F, pivoted to said hub, extended portions on each side of said hub against which said bar rests, a spring *g*, secured to said hub, and having a pin thereon which extends down through one of said extended portions and engages with notches or cavities in said vibrating bar, whereby said vibrating bar may be held in or out of engagement with the operating mechanism until forcibly moved into another position, substantially as described.

10. The combination, in a hominy-mill, of the wheel E, having projections thereon and loosely mounted on a shaft, said shaft, a vibrating bar F, with which said projections may engage, pivoted to a hub fixedly mounted on said shaft, said hub, standards H and H′, having cam-surfaces which operate reversely upon said vibrating bar, and mechanism for periodically forcing said bar into engagement with one of the projections on said wheel, substantially as set forth.

11. The combination, in a hominy-mill, of a cylinder, its shaft B′, a wheel C, a belt by which said wheel is driven, a doubly-pivoted gear-wheel D, having a shank or spindle *d*, which enters a socket or bearing in said wheel C, a loosely-mounted wheel E, having projections *e* and *e′*, a vibrating bar F, pivoted to a fixedly-mounted hub on the shaft G, said shaft G, said hub, cam-faced standards H and H′, a two-part wheel I I′, means of engagement between said two parts, whereby when the part I is moved in one direction the part I′ is moved therewith, but which engagement is released when said part I moves back, a projection on said part I, with which the projections on the wheel E engage, a projection on said part I′, which engages with and operates to force said bar F into engagement with one of the projections *e′* on the wheel E, whereby said shaft G is periodically revolved from said wheel E, which itself is in continual rotation, substantially as set forth.

12. The combination, in a hominy-mill, of the intermittently-revolving shaft G, a cam G^2 thereon, a weighted arm J, pivoted to the frame-work and having a projection or pin j', with which said cam engages, a connecting-rod J′, by which said arm is connected to the gate K, and said gate K.

13. The combination, in a hominy-mill, of the shaft G, the cam G^2 thereon, the weighted arm J, pivoted to the frame-work and provided with a pin or projection, with which said cam engages, a connecting-rod J′ be-

tween said arm and the discharging-gate, said discharging-gate an arm *k*, and a weight K′ on said arm, substantially as set forth.

14. The combination, in a hominy-mill, of the shaft G, the cam G^3, a pivoted arm L, having a pin or projection *l′*, a connecting-rod L′, connecting said pivoted arm to an arm *m* on a rock-shaft, said arm *m*, said rock-shaft M, having a toothed segment, and a feed-gate N, having a corresponding rack-bar, substantially as set forth.

15. The combination, with the feed-gate of a hominy-mill having a rack-bar secured thereto, a rock-shaft having a toothed segment engaging with said rack-bar, and an arm *m*, of a pivoted arm, a connecting-rod connecting said pivoted arm to the arm on the rock-shaft, and a cam for operating said pivoted arm.

16. The combination, with the feeding and discharging-gates of a hominy-mill, of the shaft G, having cams G^2 and G^3, weighted arms pivoted to the frame-work and adapted to be operated by said cams, connections between said pivoted arms and said gates, said cams being arranged, as described, so that during a single revolution of said shaft said discharging-gate will first be opened and closed and said feeding-gate afterward be opened and closed, whereby the treated product or hominy may first be discharged from the mill and a second charge or portion of grain then introduced, substantially as set forth.

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 21st day of June, A. D. 1886.

JESSE WARRINGTON. [L. S.]

In presence of—

EDWARD T. DICKEY,

CHARLES L. THURBER.