(No Model.) 3 Sheets—Sheet 1.

J. W. EMENHISER.

GEARING FOR OPERATING STRAW CUTTERS, CHOP GRINDERS, AND CORN SHELLERS.

No. 344,363. Patented June 29, 1886.

Fig. 4.

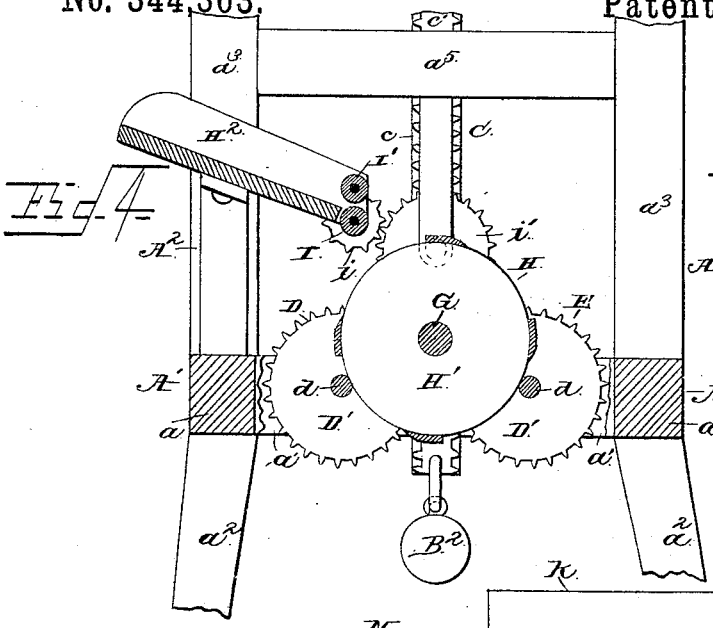
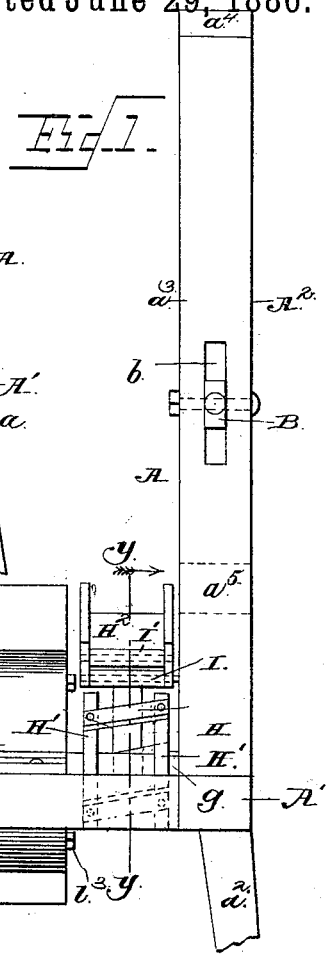


Fig. 1.



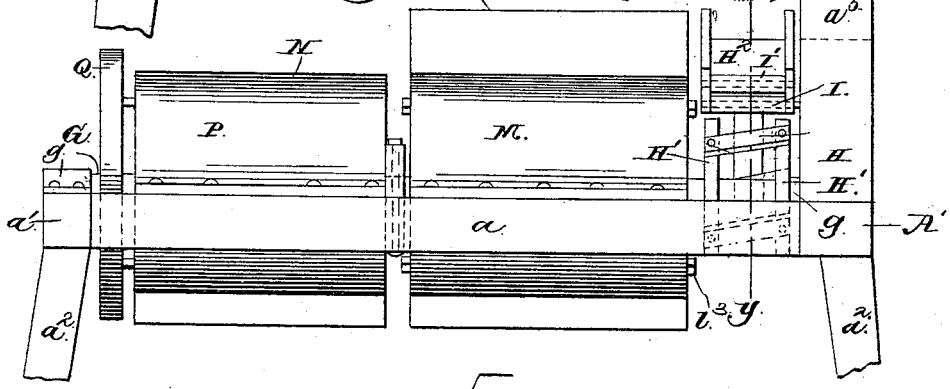
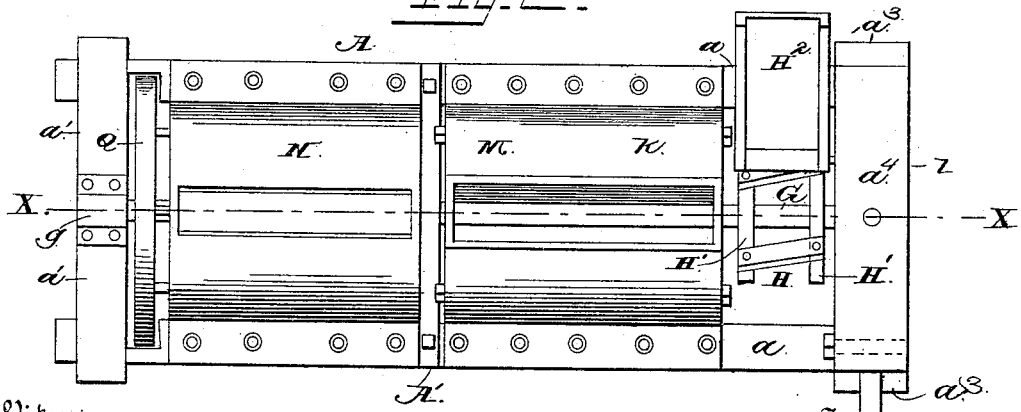


Fig. 2.



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(No Model.) 3 Sheets—Sheet 2.

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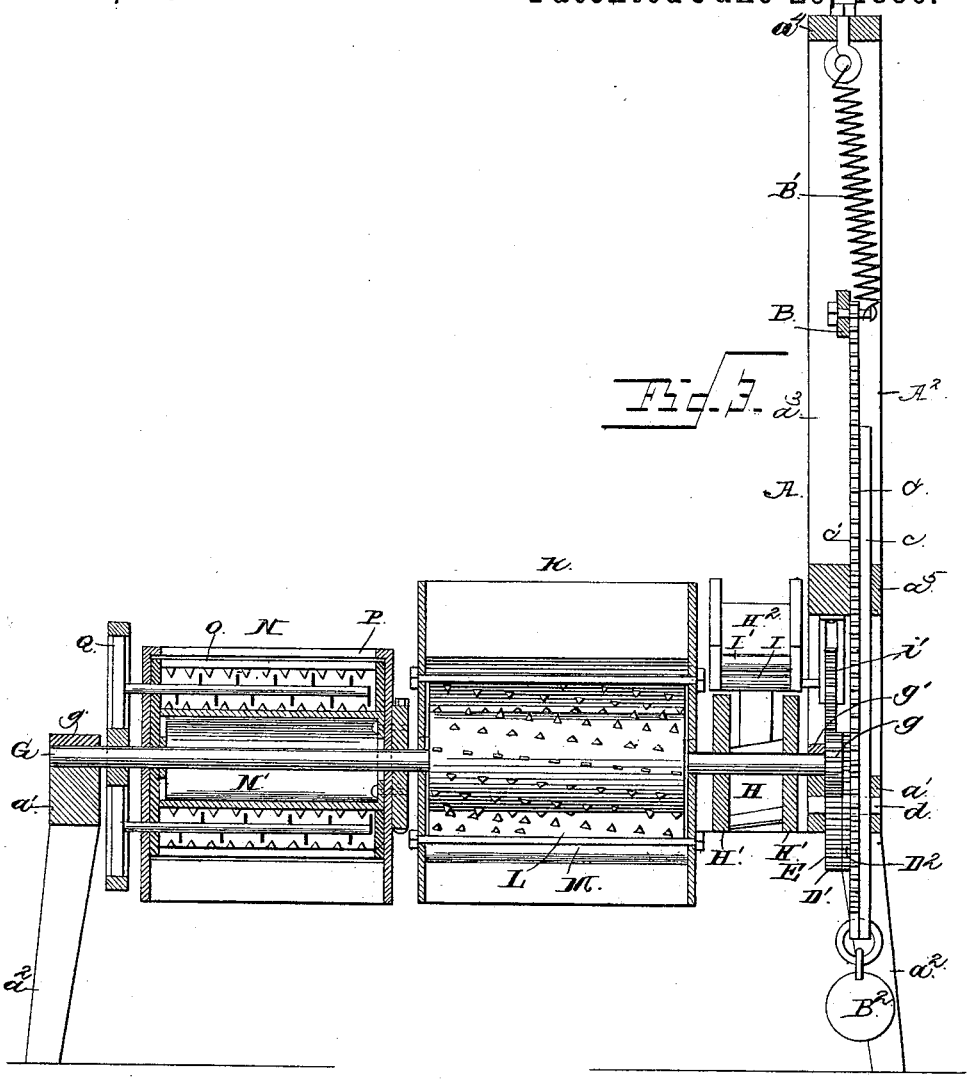

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Fig. 5.

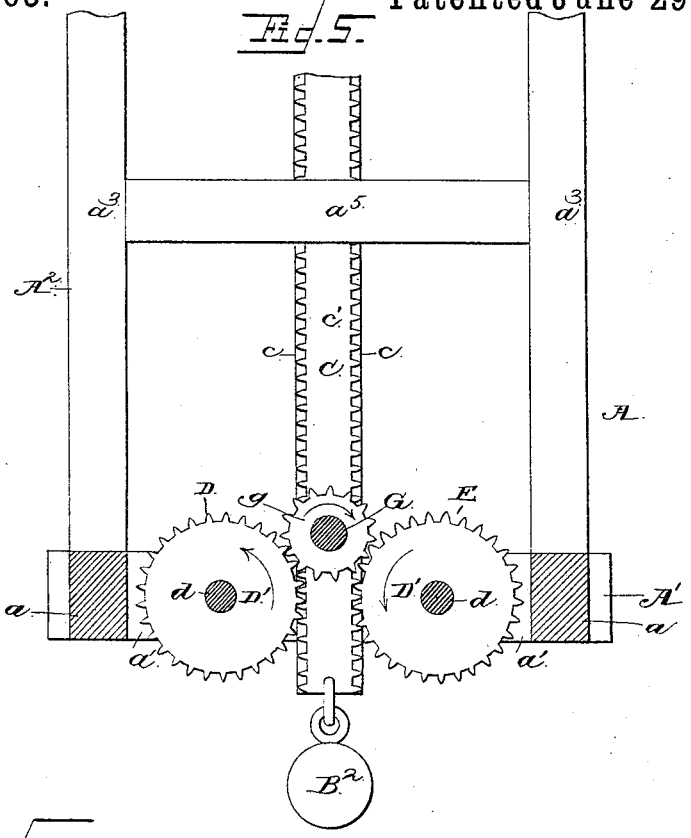


Fig. 6.

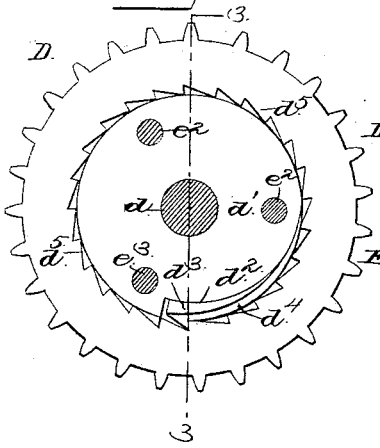
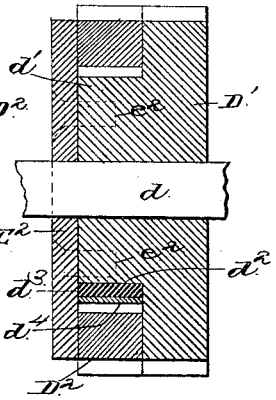


Fig. 7.



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UNITED STATES PATENT OFFICE.

JAMES W. EMENHISER, OF BERNE, INDIANA.

GEARING FOR OPERATING STRAW-CUTTERS, CHOP-GRINDERS, AND CORN-SHELLERS.

SPECIFICATION forming part of Letters Patent No. 344,363, dated June 29, 1886.

Application filed December 5, 1885. Serial No. 184,847. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. EMENHISER, a citizen of the United States, residing at Berne, in the county of Adams and State of Indiana, have invented a new and useful Improvement in Gearing for Operating Straw-Cutters and Corn-Shellers and Chop-Grinders, of which the following is a specification, reference being had to the accompanying drawings.

My invention has relation to improvements in gearing for operating combined straw-cutters, chop-grinders, and corn-shellers; and the novelty consists in the peculiar construction and combination of parts, substantially as hereinafter fully set forth, and specifically pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of my improved machine. Fig. 2 is a plan view. Fig. 3 is a vertical longitudinal section on the line *x x* of Fig. 2. Fig. 4 is a vertical cross-section on the line *y y* of Fig. 1, taken through the straw-cutting devices. Fig. 5 is an enlarged detailed view, partly in rear elevation and partly in section, of the driving-shaft-operating mechanism and the supporting-frame. Fig. 6 is a detail view of one of the gear-wheels of the driving-shaft mechanism, and Fig. 7 is a vertical sectional view thereof on the line 3 3 of Fig. 6.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts in the several figures, A designates the main frame of a combined straw-cutting, chop-grinding, and corn-shelling machine, which comprises a horizontal section, A′, and a vertical section, A^2, the latter arranged at right angles and at one end of the former and secured thereto in any suitable manner.

The horizontal section A′ of the main frame comprises longitudinal side bars, *a*, and cross-bars *a′*, and is supported at a suitable height from the ground by legs a^2, and the vertical section A^2 of said main frame consists of vertical longitudinal side bars, a^3, connected at their upper ends by a cross-bar, a^4, and braced near their lower ends by a similar cross-bar, a^5.

B designates the operating-lever of the machine; C, the reciprocating rack-bar; D E, the train of driving-gear, and G the driving-shaft, the latter extending longitudinally of the horizontal section of the main frame, and from which the straw-cutting mechanism H, the chop-grinding mechanism K, the corn-shelling device N, and the balance-wheel Q are driven and operated, as will be hereinafter fully described.

The reciprocating rack-bar comprises a wood bar or slat, *c*, and a metallic bar, *c′*, secured thereto, and having a series of teeth on both edges thereof. The upper end of the rack-bar is pivotally connected to the inner end of the operating-lever B, which is pivoted in a slotted or cut-away portion, *b*, of one of the side bars of the vertical section A^2 of the main frame.

B′ designates a coiled retracting-spring secured at one end to the upper cross-bar of the frame A^2, and at its opposite end to the upper end of the reciprocating rack-bar C at the point, and by the same pin or bolt that pivots the operating-lever B thereto. The lower end of the reciprocating rack-bar has a weight, B^2, secured thereto or suspended therefrom, which is of sufficient ponderosity to overcome the retractile force of the spring B′, and thus maintain or hold the reciprocating rack-bar in a state of equilibrium and render its operation easy.

I attach importance to equalizing the reciprocating rack-bar and to the pivoted operating-lever, as by such construction the machine can be operated with the greatest ease and with a minimum expenditure of power, the weight and retracting-spring opposing each other to an equal degree, and holding the reciprocating rack-bar under tension and ready for immediate action at all times.

The driving gear-wheels D E are mounted on pins or bolts *d*, which bear in parallel cross-bars at one end of the horizontal frame A′, and said gear-wheels are arranged on opposite sides of the reciprocating rack-bar, and are driven thereby in opposite directions or planes, as indicated by the arrows in Fig. 7. Each of the gear-wheels comprises disks or wheels D′ D^2, the former of which is made solid and provided on its vertical face adjacent its fellow disk D^2 with an outwardly-projecting hub or disk, *d′*, of smaller diameter than the wheel D′, and the wheel D^2 is made open like a ring, the diameter of which is equal to the diameter of the disk or hub *d′* of the wheel D′, over

which it is fitted and adapted to rotate therewith, under circumstances which will be presently explained. The disk d' is cut away or notched in its periphery, as at d^2, and receives an elastic packing, d^3, and a pawl, d^4, which are loosely fitted therein and prevented from rotating with the wheel D^2, which it is designed to operate, by means of retaining-shoulders and the frictional contact of the surfaces. In lieu of the elastic packing and loose pawl, the pawl may be pivoted and normally pressed outward beyond the periphery of the disk d', in which it is seated, by a spring, as is obvious.

The inner periphery of the wheel D^2 is serrated or provided with a series of teeth, d^5, with which the pawl is adapted to engage to rotate the same, according to the direction or plane of rotation of the gear-wheel D^2. The inner vertical face of the disk d' of the wheel D′ fits flush with the inner face of the ring-wheel D^2, and a clamping-plate, E^2, is fitted against the said inner faces of the disk d' and wheel D^2 to secure them together, while permitting the wheel D^2 to rotate freely thereon under some circumstances, the plate E^2 being rigidly secured to the disk d' by screws or bolts e^2.

The drive-wheels D E have their respective wheels D′ D^2 facing each or lying in the same transverse plane in the frame A′, the wheels D^2 in engagement with the teeth of the rack-bar C, and the wheels D′ meshing with a pinion, g, on inner end of the driving-shaft G, said shaft being journaled in proper boxes or bearings g', secured to the horizontal frame A′, and extending longitudinally thereof at or near its middle. When the reciprocating rack-bar descends, the loosely-mounted wheels D′ D′ of the gear-wheels D E are rotated in opposite directions, the loose wheel of the gear-wheel D engaging the pawl of the wheel D^2, and thus drives the pinion g of the driving-shaft, the loose wheel of the drive-wheel E loosely revolving around the disk or hub d' of its wheel D^2, and the teeth d^5 thereof slipping over the end of the retaining-pawl. When the reciprocating rack-bar is drawn upward by the operating-lever, the reverse action of the drive-wheels D E takes place, the wheel D′ of the drive-wheel D revolving loosely around its hub d' and the wheel D^2 remaining idle, and the wheel D′ of the drive-wheel E engaging its retaining-pawl and operating to drive the wheel D^2 thereof, and to revolve the pinion g of the driving-shaft in the same plane of rotation that the drive-wheel D revolves it. The drive-wheels D E are thus alternately operated to rotate the driving-shaft by the downward and upward strokes of the equalized reciprocating rack-bar, and the said driving-shaft is rotated at all times in the same direction or plane.

I do not desire in this application to claim any of the hereinafter-described mechanisms for shelling corn, cutting straw, and grinding chop, as the invention in the present instance is confined to my peculiar gear mechanisms for rotating the driving-shaft that operates said hereinbefore-mentioned mechanisms.

The straw-cutting mechanism H comprises the disks H′, secured on the driving-shaft and carrying the knives, and a table, H^2, on which the straw is placed and fed to the cutting-disks between two rollers, I I′, one of which is geared to and rotated by motion transmitted from the driving-shaft through the gear-wheels i i', which are suitably supported.

The chop-grinding mechanism K preferably consists of a toothed cylinder, k, that is rigidly mounted on the driving-shaft G, and the concaves L are arranged around the cylinder and have the usual teeth, and they are inclosed within a case, M, that is provided with the proper ingress and discharge openings.

The corn-sheller mechanism, N, shown herein preferably consists of the toothed cylinder N′ and a series of toothed bars, O, which are suitably held in place on proper heads and arranged within an inclosing-case, P, having the usual ingress and discharge openings. A balance-wheel, Q, is rigidly secured on the driving-shaft to steady the motion thereof and of the several mechanisms operated thereby.

The operation of my invention is obvious from the foregoing description, taken in connection with the drawings.

It will thus be seen that I provide a machine which can be used for a variety of purposes, either one or more of the mechanisms being adapted for use either separately or simultaneously; that the machine can be operated with great ease and with a minimum expenditure of power, owing to the fact that the reciprocating rack-bar is equalized and held under tension, and that the machine is simple, strong, and durable in its construction, thoroughly effective in operation, and can be successfully operated by one person, the feeding-table of the straw-cutter and hoppers of chop-grinder and corn-sheller being in convenient reach of the attendant standing at the operating-lever. The lower end of the reciprocating rack-bar is provided at its ends with stop-lugs s, which limit the upward movement thereof, and the slat c of said rack-bar has plane edges, and in its reciprocating movements it bears against the smooth or plane peripheries of the disks E′ of the drive gear-wheels D E, and is thus guided in its movement and kept in its proper position to cause the teeth thereof to engage or mesh with the drive gear-wheels D E properly. The lower cross-bar of the vertical section A^2 of the main frame is slotted or cut away to provide a passage for the equalized reciprocating bar, and serves as a guide thereto to prevent lateral movement or play of the upper end when acted on by the operating-lever.

I do not desire to limit myself to the precise construction and proportions of parts shown and described, as I am aware that many changes therein may be made without departing from

the principle or sacrificing the advantages of my invention.

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

1. The combination of a frame, an operating-lever pivoted therein, a reciprocating rack-bar connected to said lever and carrying a weight at its lower end, a retracting-spring connected to the upper end of the rack-bar and the frame, a driving-shaft, and intermediate drive-gear wheels meshing with the rack-bar and drive-shaft, and successively rotated to drive the driving-shaft, substantially as described.

2. In combination with a reciprocating rack-bar and a driving-shaft, intermediate drive-wheels which are rotated in opposite planes and successively brought into operation to rotate the driving-shaft, each drive-wheel having a gear-wheel provided with a hub carrying a pawl, and a loose gear-wheel mounted on said hub and having teeth on its inner periphery to engage the pawl when the drive-wheel revolves the driving-shaft, substantially as described.

3. In combination with a driving-shaft and a reciprocating rack-bar having a plane edge, intermediate drive-wheels comprising a gear-wheel having a hub of smaller diameter and carrying a spring-pawl, a gear-wheel loosely mounted on the hub and having teeth on its inner periphery to engage the pawl, and a clamping-disk secured to the hub of one of the gear-wheels and having its periphery bearing against the plane edge of the rack-bar, substantially as described.

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

JAMES W. EMENHISER.

Witnesses:
STEPHEN EMENHISER,
NICHOLAS MEIBERG.