

No. 871,176.

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E. E. MOCARGAR.

FEED GRINDER.

APPLICATION FILED AUG. 11, 1906.

Fig. 1.

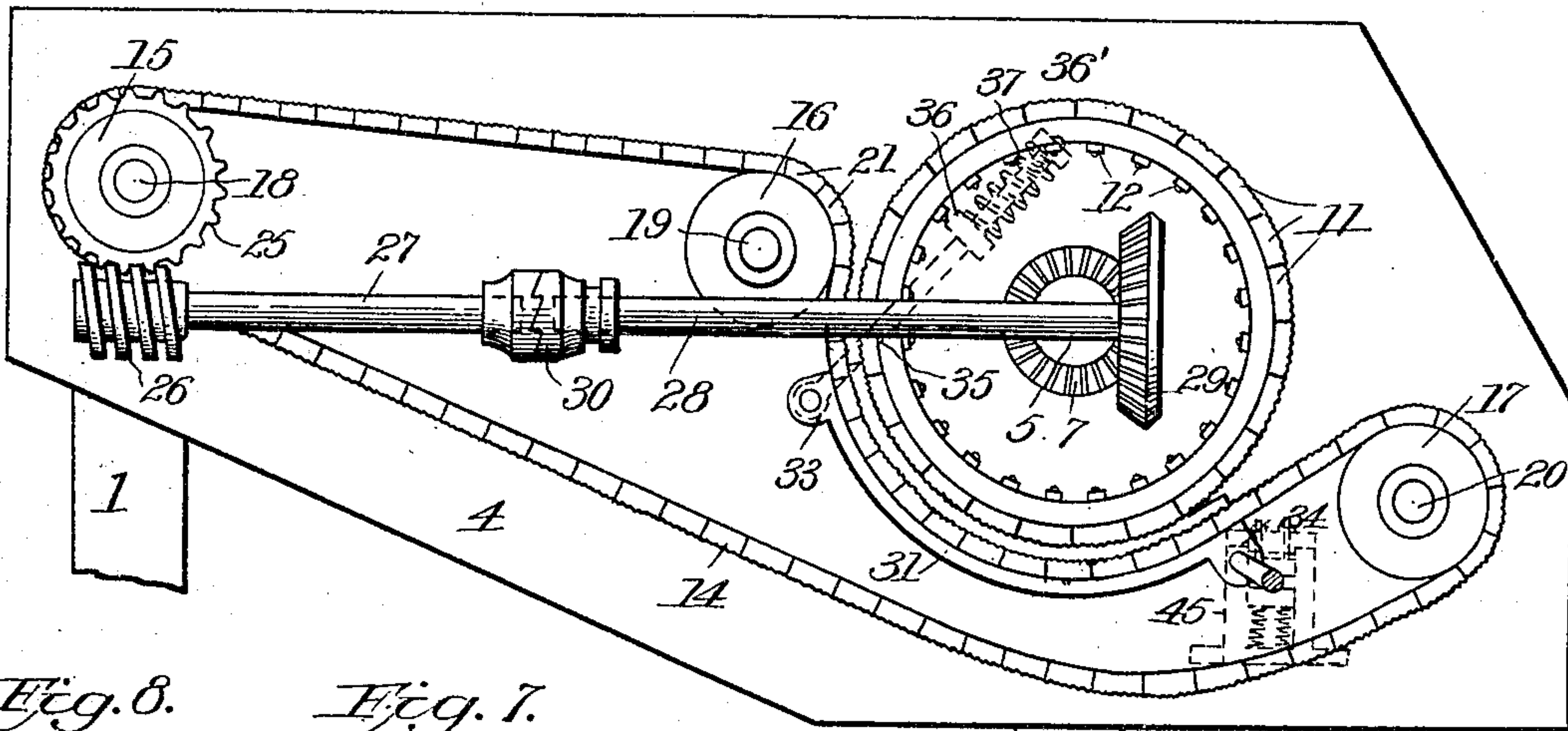


Fig. 8.

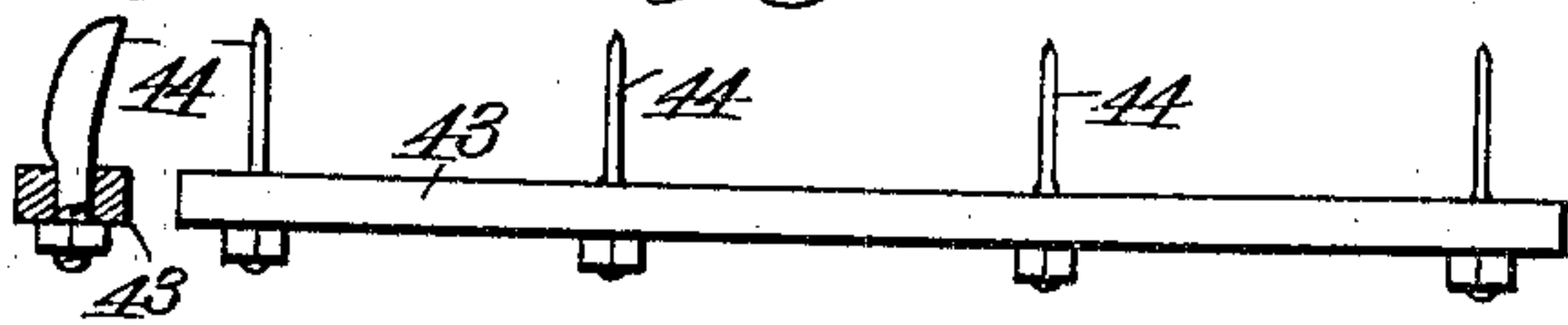


Fig. 7.

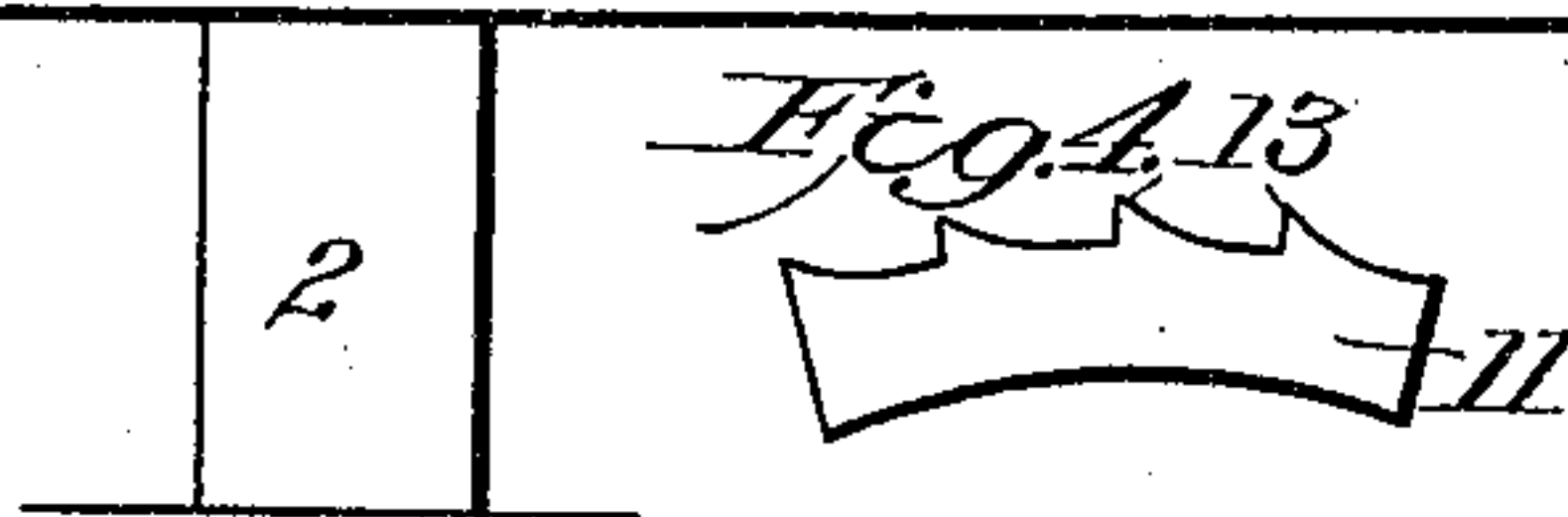


Fig. 2.

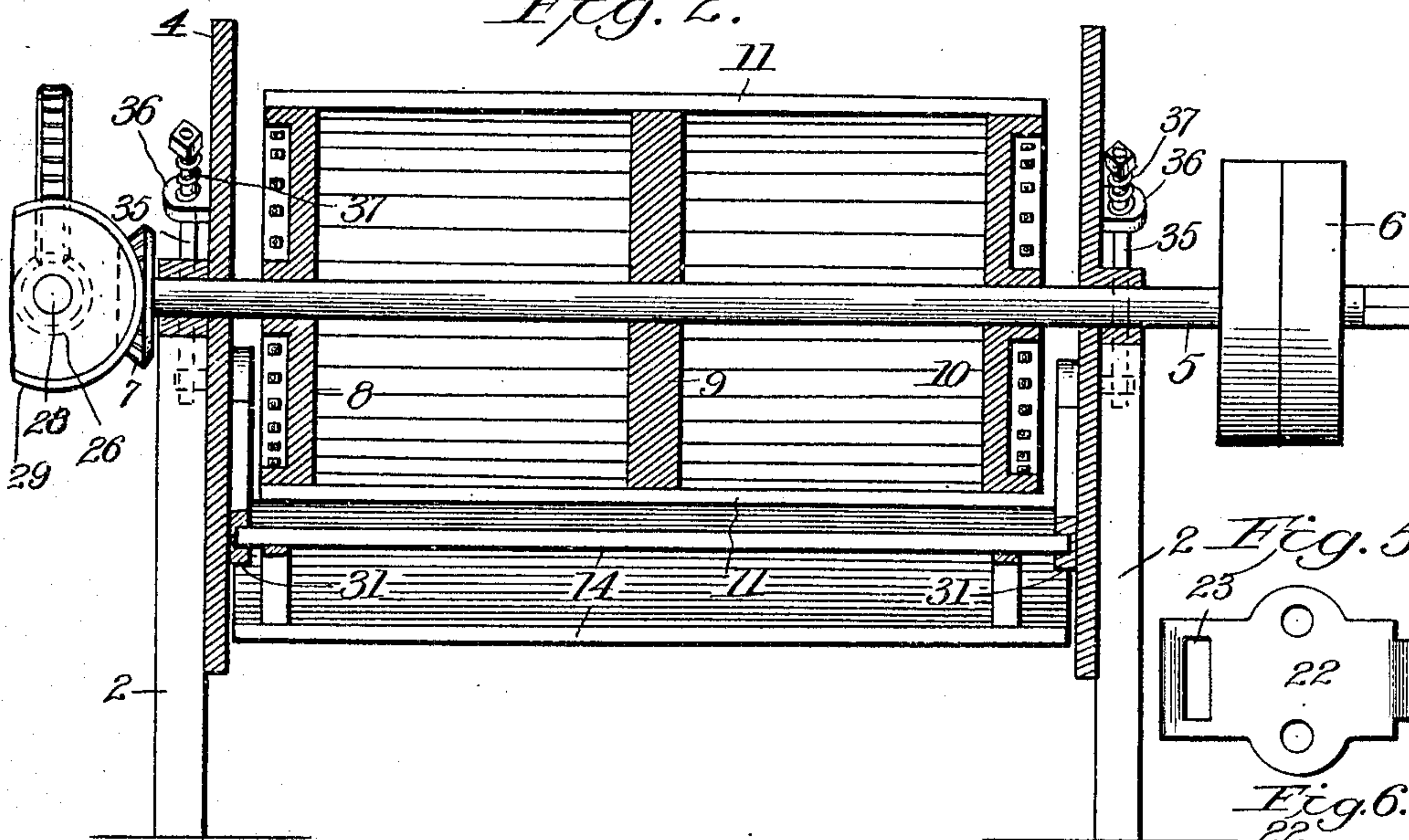


Fig. 5.

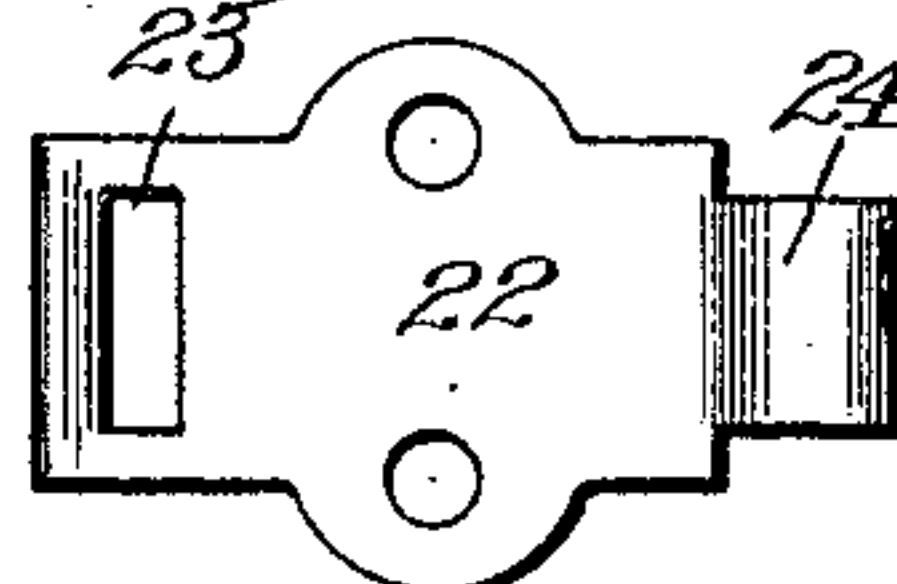


Fig. 6.

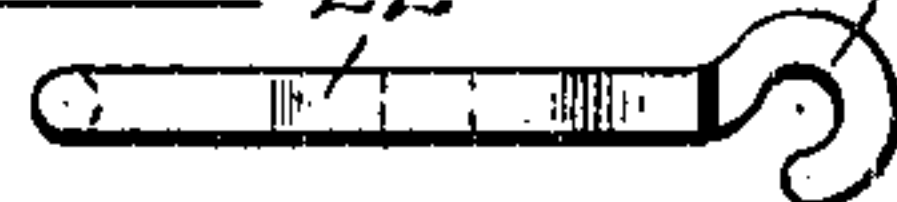
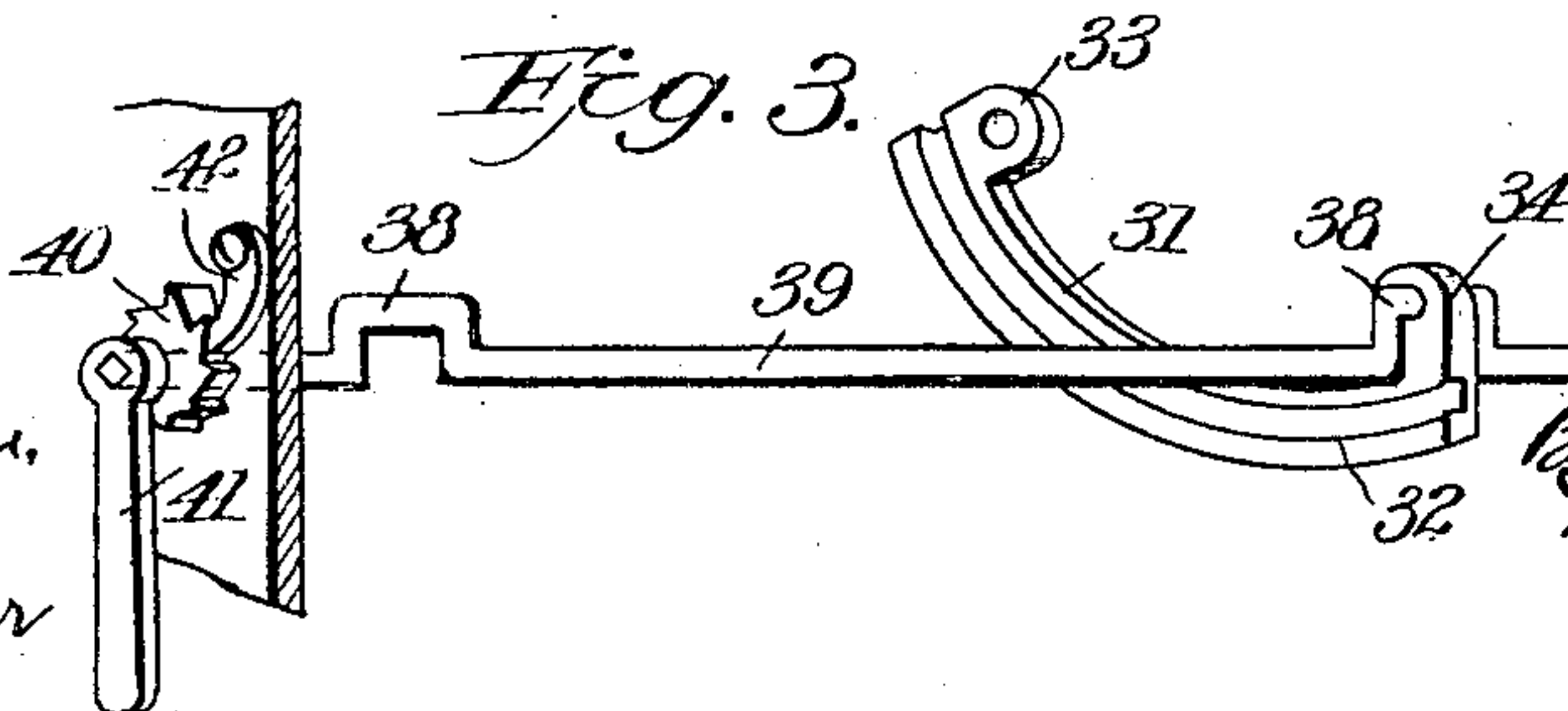


Fig. 3.




Witnesses

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FEED-GRINDER.

No. 871,176.

Specification of Letters Patent.

Patented Nov. 19, 1907.

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To all whom it may concern:

Be it known that I, ELMER E. McCARGAR, a citizen of the United States, residing at Lincoln, in the county of Lancaster and State of Nebraska, have invented certain new and useful Improvements in Feed-Grinders, of which the following is a specification.

This invention relates to feed grinders.

One object is to provide a feed grinder particularly adapted to supersede the old and well known "bur grinder".

Another object resides in the provision of a feed grinder involving a rotatable cylinder and a traveling apron.

A still further object is to provide a simple, inexpensive, durable and efficient grinder embodying such characteristics that it may be adjusted to grind the feed in different courses.

It is still further designed to provide a structure of the nature stated embodying such characteristics that it may be readily thrown into and out of operation, and when in operation to overcome rigidity of the apron with respect to the cylinder to prevent undue jarring or slugging of the grinding mechanism.

With the above and other objects in view, the present invention consists in the combination and arrangement of parts hereinafter described, illustrated in the accompanying drawings and pointed out in the appended claims, it being understood that changes may be made in the form, proportion, size and minor details without departing from the spirit and scope of the invention or sacrificing any of the advantages thereof.

In the drawings: Figure 1 is a side elevation of the invention; Fig. 2 is a transverse sectional view; Fig. 3 is a detail perspective view of the eccentric shaft, one of the guide plates and the operating lever; Fig. 4 is a detail view of one of the cylinder grinding slats; Fig. 5 is a plan view of one of the slat connecting plates; Fig. 6 is an edge view of one of said plates; Fig. 7 is a front elevation of a modified form of knife-bar; and Fig. 8 is an end view of the modified form of knife-bar.

Referring now more particularly to the accompanying drawings the reference characters 1 and 2 indicate uprights, it being understood that there are such uprights upon each side of the machine. However, at the outset it is to be understood that any form of frame

may be employed and that I am illustrating and describing the present form of frame merely to disclose the operation of my invention. I also illustrate a casing 4 arranged within the frame to inclose the grinding mechanism and to prevent the feed dropping off the sides of the apron of the grinding mechanism hereinafter fully described.

Journaled through the posts 2 at one end of the frame, and also through the casing is a drive shaft 5 provided at one end with a driving pulley 6 and at its opposite end with a beveled gear 7 for a purpose presently explained.

Mounted upon the drive shaft 5 are three circular heads 8, 9 and 10 designed to form part of a grinding cylinder made into a complete cylinder thereby and the slats 11 bolted to the heads by countersunk bolts 12 or other suitable fastenings. These plates are therefore replaceable or interchangeable and each has its outer face ribbed, or otherwise formed to provide the knife edges 13 preferably of cup shape, as shown. These circular heads, just referred to, are preferably made sufficiently heavy as to preclude the necessity of a fly-wheel.

Coöperating with the grinding cylinder is an endless apron 14 supported upon the three rollers 15, 16 and 17 mounted upon the respective shafts 18, 19 and 20.

It will be seen that the rollers 16 and 17 are so disposed with respect to the grinding cylinder as to cause the apron to drop and follow the lower portion of the cylinder. This apron is made up of a series of close fitting slats 21, each having its outer face provided with the knife edges similar to the knife edges of the cylinder, save that the former are finer; that is, closer together to insure proper grinding of the feed. These plates are secured together in such manner as to provide a flexible apron, one form of means being to secure a plate 22 at each end of each slat 21 and providing each plate 22 with a slot 23 and a tongue 24, the tongue of each plate engaging in the slot of the next adjacent plate. These plates form an endless chain connection upon each side of the apron to guide the latter over the rollers 15, 16 and 17 and to consequently carry the toothed slats of the apron into and out of mesh with the knife bars of the grinding cylinder. The apron is of greater width than the length of

the cylinder and the connecting plates pass not over the cylinder but outside of opposite ends of the latter.

It will now be understood that by driving the drive shaft the grinding cylinder will be revolved and in order to drive the apron I provide the shaft 18 with a gear wheel 25 designed to mesh with a worm gear 26 carried at one end of the shaft 27 whose opposite end is designed to connect with the shaft 28 carrying the beveled gear 29 in mesh with the aforesaid beveled gear 7 of the drive-shaft. By reason of the worm gear meshing with the gear 25, the apron is caused to travel at less speed than the speed attained by the cylinder. It will be seen that the shafts 27 and 28 form practically a single shaft, in that there is a clutch 30 adapted to connect them.

By operating this clutch 30 the shafts 27 and 28 may be connected together to operate the cylinder and apron simultaneously, or the clutch may be operated to disconnect said shafts whereby the cylinder may be rotated independently of the apron, the latter being thrown out of operation by such disconnection of said shafts.

There are times when the feed is to be ground or pulverized finer than at other times. I therefore provide a guide for the apron and dispose the same immediately beneath the cylinder and arranged so that it and the apron may be adjusted toward and away from the cylinder. The guide consists preferably of two curved plates 31, each having a groove 32 in one face and ears 33 and 34 at its ends. These guide plates are each supported at one end by a bolt 35 having connection at one end with the ear 33 thereof with its opposite end passed through a perforation in the lugs 36 and 36' secured to the corresponding sides of the casing, there being a spring 37 carried by each bolt 35 between the nuts 36 and 36' to place the corresponding bolt and end of guide under tension, and the tension of the guides may be adjusted by manipulation of the nuts. To support the opposite ends of the guide plates, I preferably mount the cranks 38 of the transverse shaft 39 in the corresponding ears 34. This shaft 39 is journaled through the said ears 34 the casing and the frame of the structure and provided at one end with a ratchet wheel 40 and an operating lever 41 provided with a pawl 42 to engage the ratchet and prevent backward movement of the shaft 39 and its cranks when turned to raise or lower the guide to throw the apron toward or away from the cylinder. Other forms of eccentrics and operating means for the shaft 39 may be employed, if desired.

The roller 15 is slightly higher than the roller 16 so that the feed placed upon the apron will be carried downwardly by the latter to the cylinder to be crushed between the apron and cylinder and carried by the for-

mer from therebetween and the cylinder to and over the roller 20 where it may drop in its ground or crushed state into a suitable receptacle (not shown).

It will now be understood that my invention embodies principally a rotary cylinder and an apron, both carrying knives or other means for grinding the feed, with the cylinder rotating at a higher speed than the speed attained by the apron. Such speed regulation prevents sticking of the feed between the grinding elements.

If desired, I may employ a slat 43 provided with knife blades 44 (see Figs. 7 and 8) which can be used on the grinder as an attachment for chopping beets or corn fodder, and further, if desired, I may employ a spring bearing 45 for the eccentric shaft 39, there being such a bearing, if used, at each end of said shaft.

What is claimed is:—

1. A feed grinder comprising a frame, a cylinder rotatably mounted in the frame, an endless apron mounted in the frame for cooperation with the cylinder, guides mounted in the frame beneath the cylinder to guide the apron, a spring actuated rod connecting one end of each guide, a shaft rotatably mounted in the opposite end of each guide and provided with cranks for engagement with the apron to move the latter toward and away from the cylinder upon rotation of said shaft, and means for operating the cylinder and apron.

2. A feed grinder comprising a rotatable cylinder provided with removable knife slats, a traveling apron provided with removable knife slats, and means for yieldably and adjustably supporting the apron beneath the cylinder.

3. A feed grinder comprising a rotatable cylinder provided with knife slats, a traveling apron provided with knife slats, means for yieldably supporting the apron at one side of the cylinder, and means at the opposite side of the cylinder to adjust the apron toward and away from the cylinder.

4. A feed grinder comprising a rotatable cylinder provided with removable knife slats, a traveling apron provided with removable knife slats, oppositely disposed guide members arranged beneath the cylinder each provided with a curved groove to receive the edges of the apron, means at one end of each guide member to yieldably support it, and means at the opposite ends of the guide members to adjust them toward and away from the cylinder.

5. A feed grinder comprising a rotatable cylinder provided with removable knife slats, a traveling apron provided with removable knife slats, oppositely disposed guide members arranged beneath the cylinder each provided with a curved groove to receive the edges of the apron, means at one end of each guide member to yieldably sup-

port it, means at the opposite ends of the guide members to adjust them toward and away from the cylinder, and means for moving the cylinder at a higher speed than the apron.

6. A feed grinder comprising a frame, a rotatable drive shaft mounted in the frame and carrying a beveled gear at one end, a cylinder mounted upon the shaft, a second shaft rotatably mounted in the frame, a traveling apron cooperating with the cylinder and working around said second shaft, a two-part shaft arranged at a right angle to the aforesaid shafts, one part of the two-part shaft carrying a worm gear for mesh with the gear of said second shaft and the other of the two-part shaft carrying a beveled gear for mesh with the beveled gear of the drive shaft and a clutch member connecting the adjacent ends of the two-part shaft.

7. A feed grinder comprising a frame, a rotatable drive shaft mounted in the frame and carrying a beveled gear at one end, a cylinder mounted upon the shaft, a second shaft rotatably mounted in the frame, a traveling apron cooperating with the cylinder and working around said second shaft, a two-part shaft arranged at a right angle to the aforesaid shafts, one part of the two-part shaft carrying a worm gear for mesh with the gear of said second shaft and the other of the two-part shaft carrying a beveled gear for mesh with the beveled gear of the drive shaft, a clutch member connecting the adjacent ends of the two-part shaft, and guide members beneath the cylinder for the guidance of the apron.

8. A feed grinder comprising a frame, a rotatable drive shaft mounted in the frame and carrying a beveled gear at one end, a cylinder mounted upon the shaft, a second shaft rotatably mounted in the frame, a traveling apron cooperating with the cylinder and working around said second shaft, a two-part shaft arranged at a right angle to the aforesaid shafts, one part of the two-part shaft carrying a worm gear for mesh with the gear of said second shaft and the other of the two-part shaft carrying a beveled gear for mesh with the beveled gear of the drive shaft, a clutch member connecting the adjacent ends of the two part shaft,

guide members beneath the cylinder for the guidance of the apron, and means for yieldably supporting the guide members.

9. A feed grinder comprising a frame, a rotatable drive shaft mounted in the frame and carrying a beveled gear at one end, a cylinder mounted upon the shaft, a second shaft rotatably mounted in the frame, a traveling apron cooperating with the cylinder and working around said second shaft, a two-part shaft arranged at a right angle to the aforesaid shafts, one part of the two-part shaft carrying a worm gear for mesh with the gear of said second shaft and the other of the two-part shaft carrying a beveled gear for mesh with the beveled gear of the drive shaft, a clutch member connecting the adjacent ends of the two-part shaft, guide members beneath the cylinder for the guidance of the apron, means at one end of the guide members to yieldably support them, and means at the opposite ends of the guide members to adjustably support them.

10. A feed grinder comprising a rotatable cylinder provided with knife slats, a traveling apron provided with knife slats, means for yieldably supporting the apron at one side of the cylinder, means at the opposite side of the cylinder to adjust the apron toward and away from the cylinder, and means for moving the cylinder at a greater speed than the apron.

11. A feed grinder comprising a rotatable cylinder, a traveling apron, means for yieldably and adjustably supporting the apron beneath the cylinder, means for moving the cylinder at a higher rate of speed than the apron, and means whereby the cylinder may be rotated independently of the apron.

12. A feed grinder comprising a rotatable cylinder, a traveling apron cooperating with the cylinder, means for operating the apron and the cylinder simultaneously, and means whereby the cylinder may be operated independently of the apron.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ELMER E. McCARGAR.

Witnesses:

BERNICE BEESON,
E. F. SNAVELY.