No. 656,447. Patented Aug. 21, 1900.

J. ERICKSON & J. McC. EDMONDSON.

BAND CUTTER AND FEEDER.

(Application filed Oct. 18, 1897.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1,

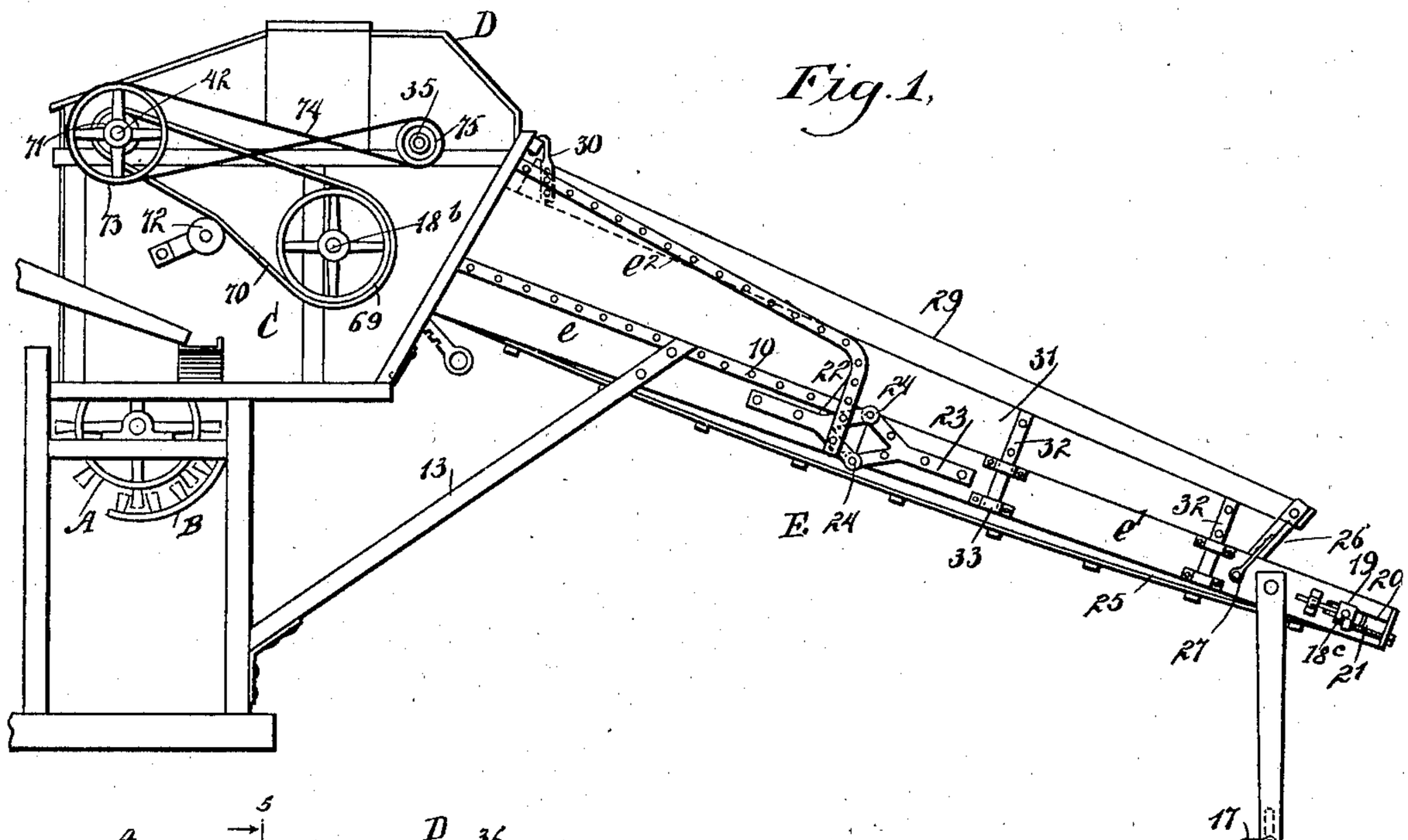


Fig. 2,

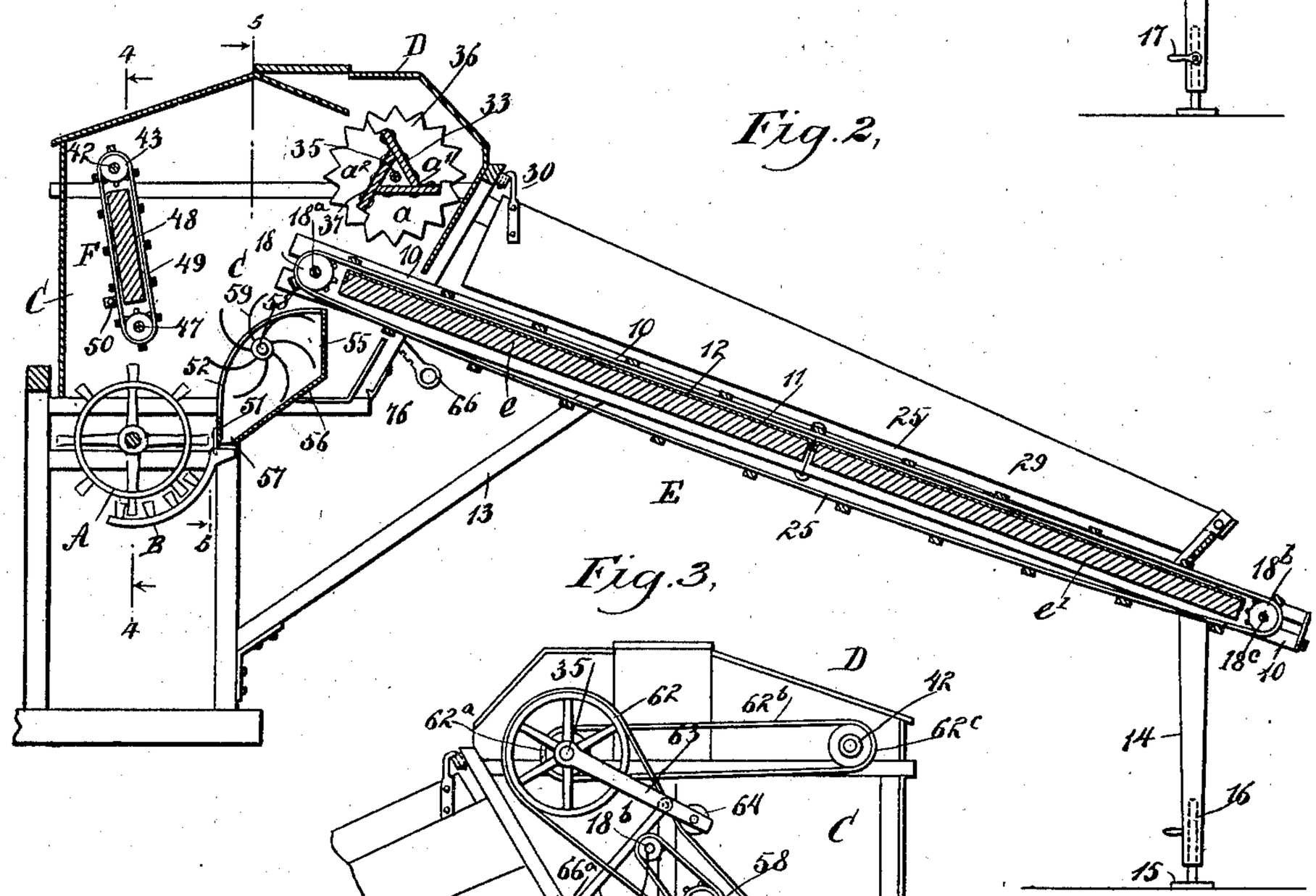
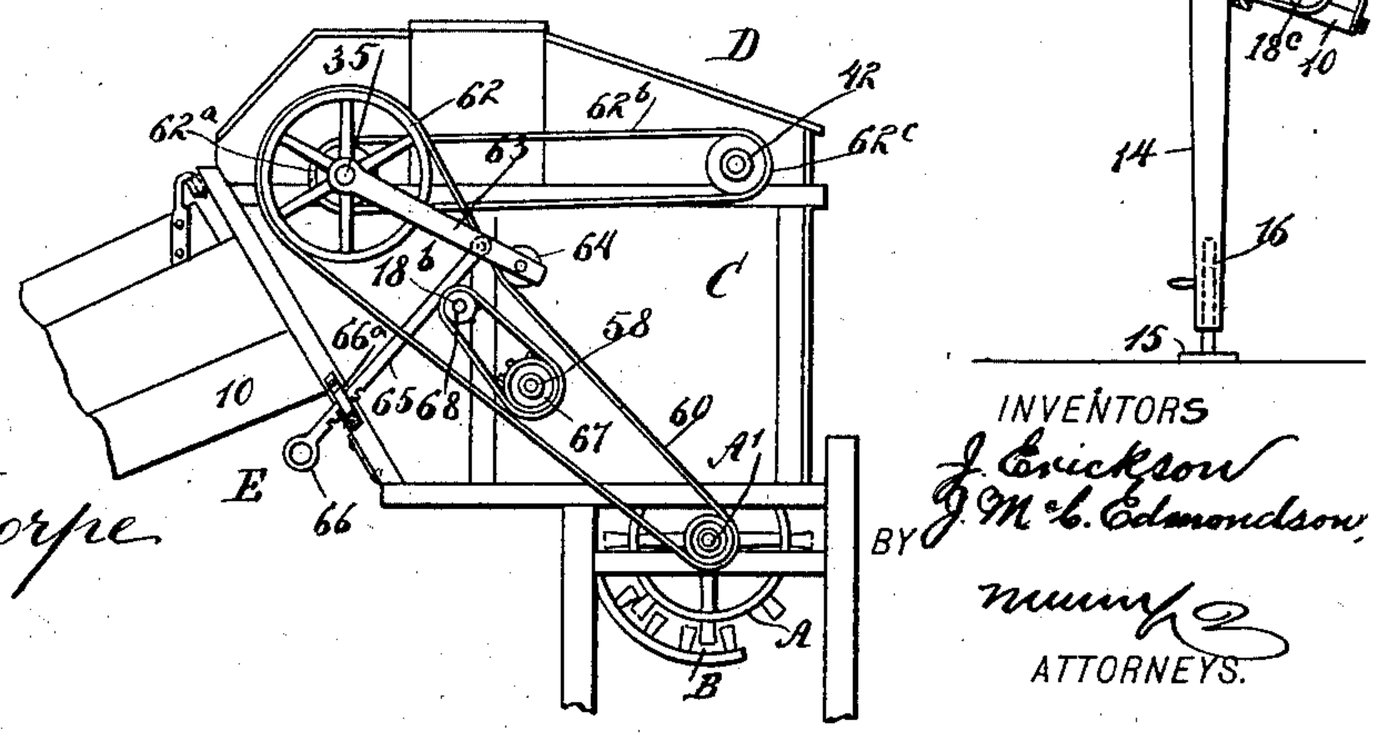


Fig. 3,



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(No Model.) 3 Sheets—Sheet 2.

Fig. 4.

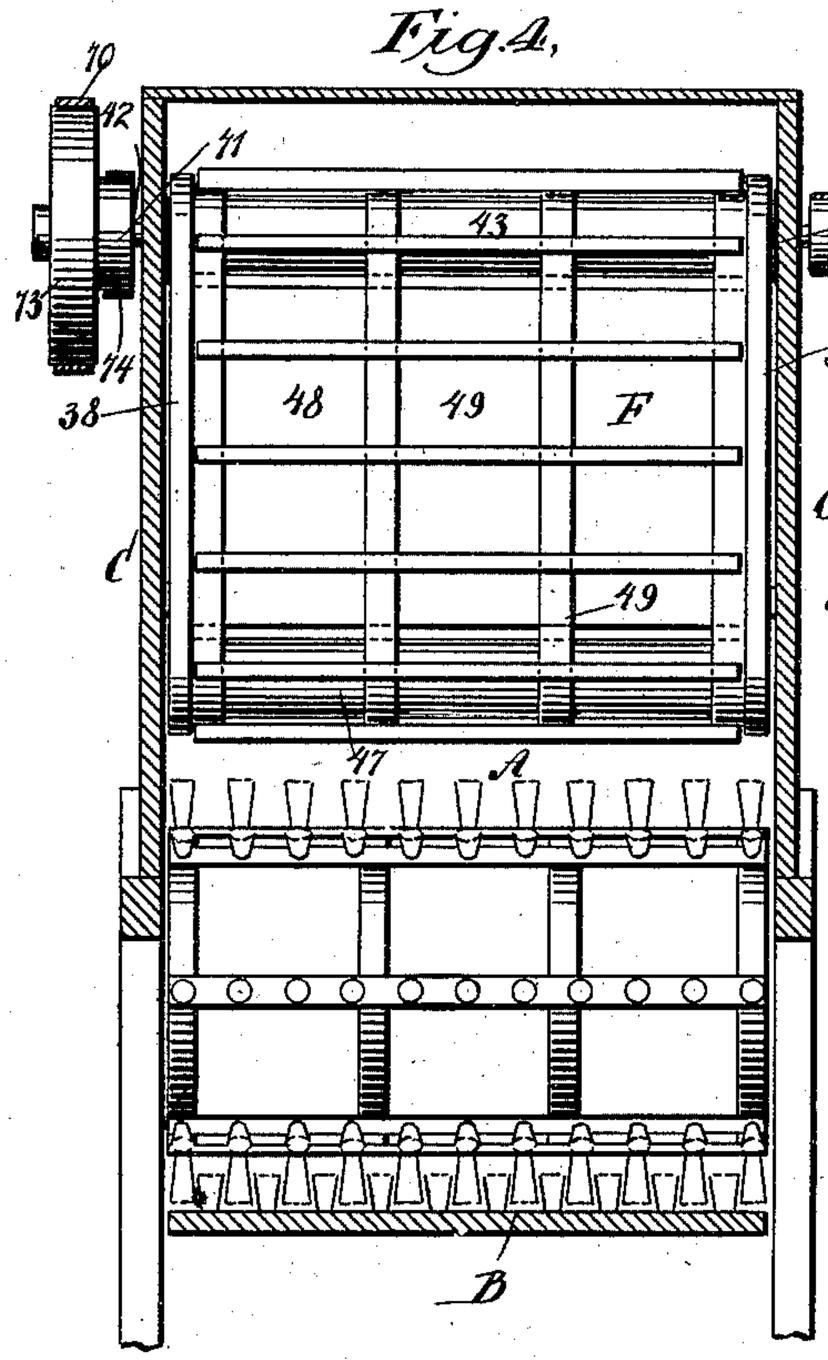

Fig. 5.

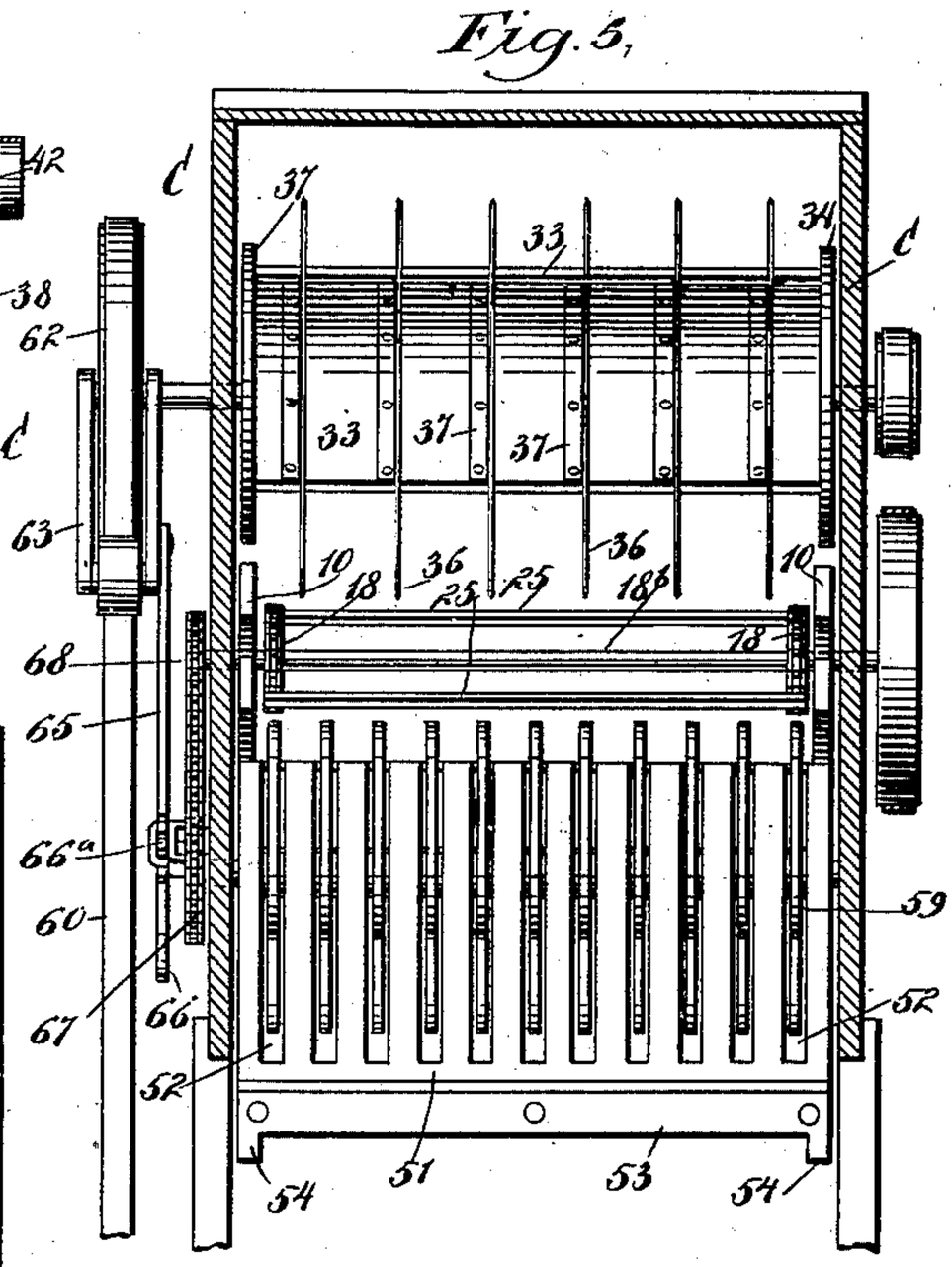

Fig. 6.

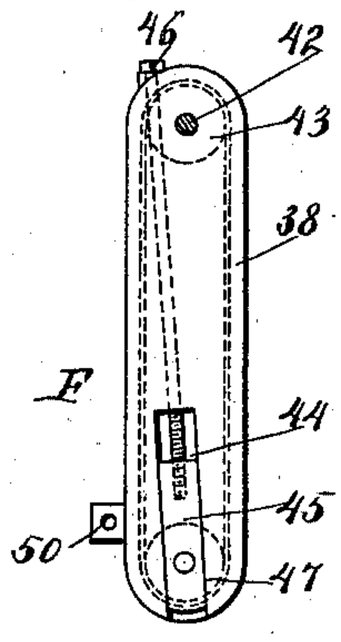

Fig. 7.

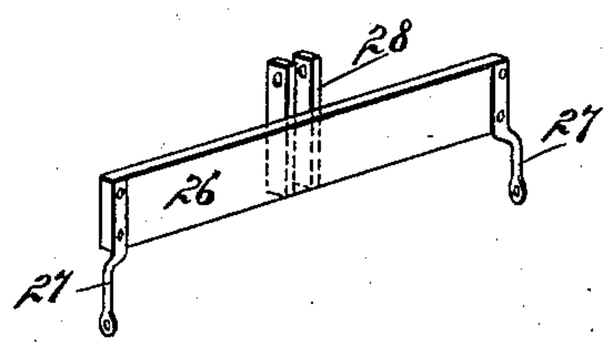

Fig. 8.

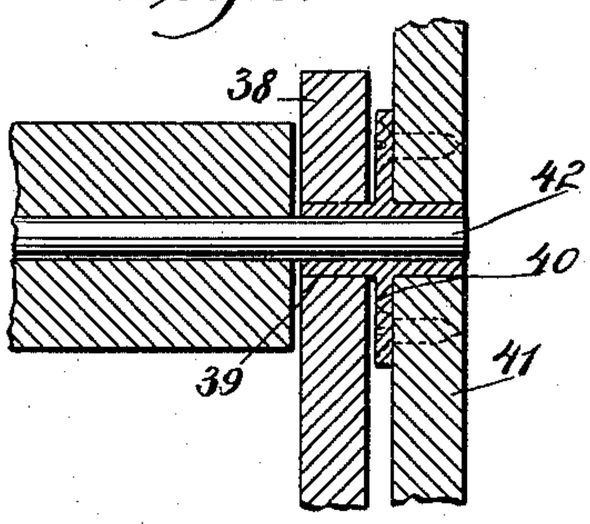

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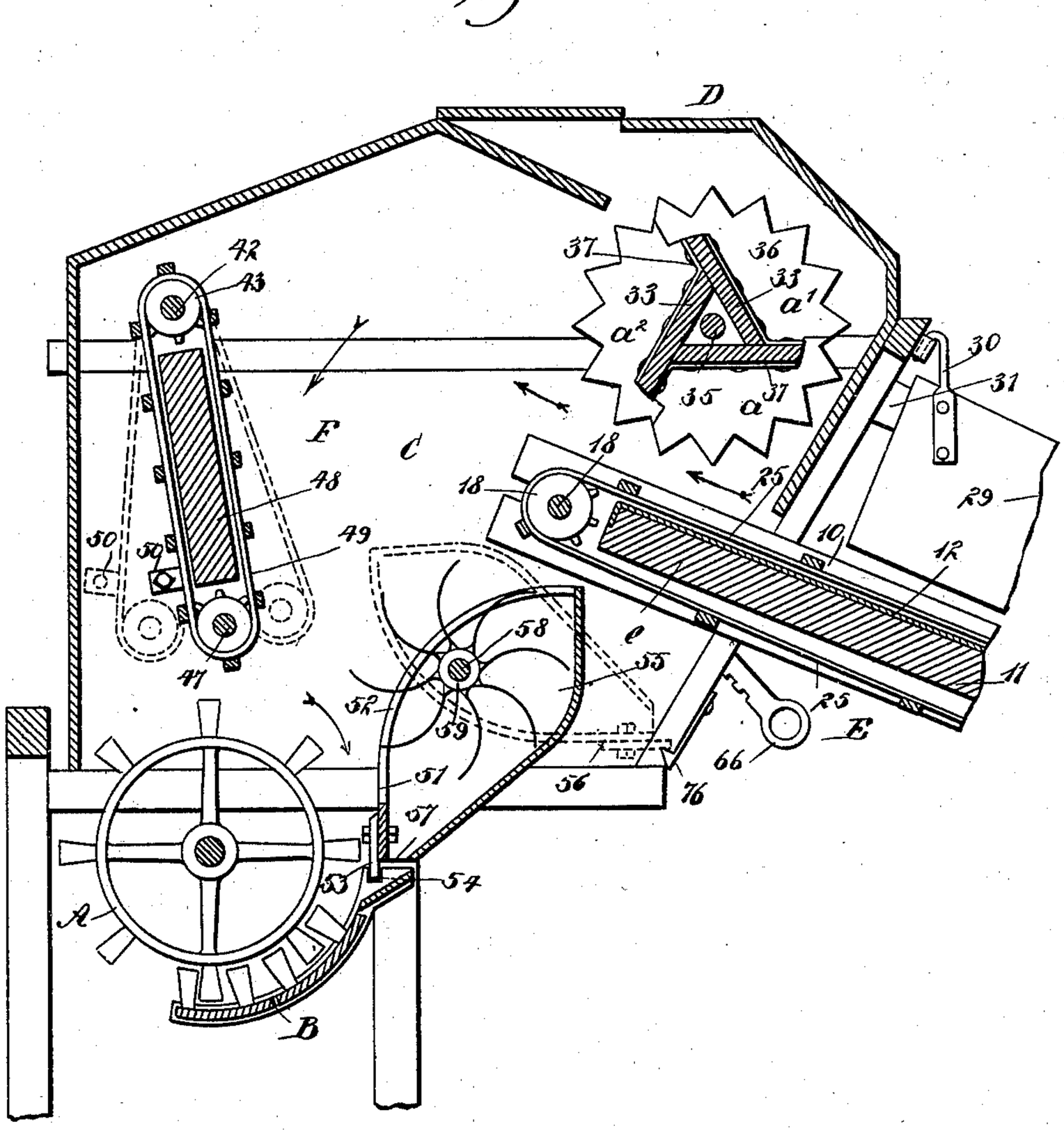
Fig. 9.



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UNITED STATES PATENT OFFICE.

JOHN ERICKSON AND JAMES McCALLENAN EDMONDSON, OF GARDNER, NORTH DAKOTA, ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, TO JOHN MARTIN, OF SAME PLACE.

BAND-CUTTER AND FEEDER.

SPECIFICATION forming part of Letters Patent No. 656,447, dated August 21, 1900.

Application filed October 18, 1897. Serial No. 655,577. (No model.)

To all whom it may concern:

Be it known that we, JOHN ERICKSON and JAMES MCCALLENAN EDMONDSON, of Gardner, in the county of Cass and State of North Dakota, have invented a new and Improved Band-Cutter and Feeder, of which the following is a full, clear, and exact description.

One object of the invention is to provide a band-cutter and feeder which will be thoroughly practical and simple and durable in its construction, and, furthermore, to provide a means whereby the grain-bearing straw will be delivered vertically to the cylinder, dropping from the carrier to the cylinder a predetermined distance, and whereby further retarding devices will be provided engaging with the straw before it reaches the cylinder, thus giving ample opportunity for all loose grain to drop out from the bundle and be conducted to a suitable point without necessarily being passed between the cylinder and the concave.

Another object of the invention is to provide a means whereby the grain-bearing straw after leaving the carrier will be properly conducted to the cylinder and likewise to so construct the carrier that it may be folded conveniently to occupy a minimum of space.

A further object of the invention is to so construct the machine that the straw will spread before it strikes the cylinder, whereby the motion of the cylinder will distribute the straw more evenly and gradually than heretofore and will also prevent the "slugging" which invariably occurs when the straw is fed from directly in front of the cylinder.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improved band-cutter and feeder applied to a threshing-machine. Fig. 2 is a longitudinal vertical section through the band-cutter and feeder. Fig. 3 is a side elevation of the body portion of the band-cutter and feeder, the side represented being the reverse of that shown in Fig. 1. Fig. 4 is a vertical transverse section taken practically on the line 4 4 of Fig. 2. Fig. 5 is a transverse vertical section taken practically on the line 5 5 of Fig. 2. Fig. 6 is a side elevation of a revolving receiver for the bundles adapted to be located over the cylinder. Fig. 7 is a detail perspective view of the tail-board for the carrier; and Fig. 8 is a detail sectional view of one portion of the revolving receiver shown in Fig. 6, Fig. 8 especially illustrating the manner in which the said receiver is hung in the frame of the attachment. Fig. 9 is a vertical section through the body portion of the band-cutter and feeder drawn upon an enlarged scale, the section being designed particularly to illustrate the adjustment of the stop above the concave and the adjustment of the shield in which the retarding-wheels are placed.

A represents the cylinder of a threshing-machine; B, the concave; C, the chambered body of the band-cutter and feeding attachment adapted to be located on the threshing-machine above the concave and cylinder, and D represents a hood or cover for the said body removed therefrom.

E represents a carrier which is used in connection with the body portion C of the attachment. This carrier extends within the body portion at its forward end such a distance that the inner end of the carrier will be over the cylinder A, occupying such a position that the material from the carrier may be dropped upon the cylinder.

In the construction of the carrier two sections *e* and *e'* are provided, and these sections may be of equal length, as illustrated, or one may be longer than the other, as found desirable. The upper section *e* enters the body of the attachment and is provided with side fenders e^2, preferably of metal, the said side fenders being usually fixed to the body C. The lower section *e'* of the carrier is pivotally connected with the upper section. Each section of the carrier comprises two side pieces 10, connected by a bottom board 11 or by strips (not shown) which will be the equivalent of the bottom board; but in any event the bottom board of each section of the carrier

is covered by a metal sheet or sheets 12, preferably of galvanized iron, and the ends of the sheets are bent downward and secured to the ends of the bottom of the sections in such manner as not to interfere with material passing over the upper face of the carrier. The upper section *e* of the carrier is securely connected with the body of the threshing-machine by means of braces 13 or the equivalents of the same, as shown in Figs. 1 and 2. The lower section of the carrier is supported by legs 14, and each of said legs is provided with an adjustable foot 15, the feet being provided with shanks which enter recesses in the legs, and when adjusted the feet are held in said adjusted position by means of set-screws 17 or their equivalents. The feet 15 are made quite broad, so as to prevent their sinking into soft ground.

A roller 18 is held to turn in the upper portion of the upper section of the carrier, being attached to a shaft 18^a, which is carried not only through the carrier but also through the body portion C of the attachment. At the lower end of the other section of the carrier a roller 18^b is adjustably journaled by a shaft 18^c, the boxes 19 of the said roller 18^b being held to slide in slots 20 in the sides of the carrier, and the said boxes may be adjusted laterally by suitable set-screws 21, as shown in Fig. 1, in order to tighten the carrier-belt 25 provided for the two sections of the carrier-frame.

Where the two sections of the carrier-frame abut, forked hinge members 22 and 23 are respectively attached to the outer faces of the side boards 10 of the upper and lower sections of the carrier-frame. The bifurcated parts of corresponding hinge members are brought together and are pivotally connected by removable pins 24 or by similar devices. Thus by removing the upper pins from the hinge members the lower section of the carrier may be folded upon the upper section at the bottom of the latter, and by removing the lower pivot-pins of the hinges the lower section of the carrier may be folded over and upon the upper face of the upper section. In this manner it is evident that the two sections of the carrier may be disposed of or their length lessened in the most convenient manner. The carrier-belt 25, above referred to, is passed over the rollers 18 and 18^a and consists, preferably, of a series of endless straps connected by suitable cross-bars; but the carrier-belt may be of any other desirable construction.

Near the lower end of the lower section *e'* of the carrier a tail-board extends across the upper face of said section, the tail-board being provided at its ends with arms 27, which are pivoted to the side portions of the carrier, the tail-board being shown in detail in Fig. 7 and as applied in Figs. 1 and 2. The tail-board is also provided at its center with one or more standards 28, extending in direction of the upper surface of the tail-board, and a central division-board 29 is attached to the standards 28 and carried above the carrier, being provided at its rear end with a hook 30, adapted to enter a suitable keeper secured to the body portion C of the attachment, as shown in Fig. 2.

At each side of the carrier a side board 31 is removably placed, the said side boards being provided between their ends with slats or standards 32, which are removably introduced into suitable sockets 33, attached to the main side boards 10 of the carrier. In this manner the carrier is rendered exceedingly strong, and there will be no possibility of the bundles whose bands are to be cut falling over the side edges of the carrier, while the center board 29 admits of the said bundles, one at each side of the center, being carried simultaneously to the cylinder or to the band-cutters.

Above the inner end of the carrier within the casing or body C of the attachment a band-cutter is mounted to revolve. This band-cutter consists of boards or plates 33, arranged in triangular form and so that a longitudinal edge of one board will extend beyond the outer face of the abutting board, as is particularly shown in Fig. 2. These triangularly-arranged boards or plates serve as beaters and are secured in heads 34, which heads are fastened upon a shaft 35, extending through the body portion C of the device from side to side. The plates or beaters 33 virtually constitute the body portion of the band-cutter, and the cutters 36 are made in the form of disks and their peripheral surfaces are provided with a series of teeth, either made integral therewith, as shown in Fig. 2, or the teeth may be attached to the disks. The toothed disks resemble somewhat a circular crosscut-saw.

Each cutting-disk is made in sections, preferably three, as shown in Fig. 2, in which the sections are designated as *a*, *a'*, and a^2. The sections fit closely together and also closely around the plates 33 of the body portion of the band-cutter, and each section of each disk is preferably provided with one or more flanges 37, adapted to be bolted, screwed, or otherwise secured to the said plates 33, as shown in Figs. 2 and 5.

Opposite the inner end of the carrier E and over the cylinder A a movable and adjustable stop or receiver for the grain is located, the said stop or receiver being adapted to suitably bunch the grain and direct it to the cylinder. The receiver or stop, which is designated as F, is capable of adjustment laterally to or from the delivery end of the carrier, which is necessary when working different characters of grain. The upper end of the receiver or stop F is pivoted, the adjustment being at the lower end. As shown in Figs. 2, 4, and 6, the said receiver F consists of two side pieces 38, each provided at the top with an opening 39, extending through from one face to the other, and a tubular bearing 40 is at-

tached to a post 41 or other surface, forming a portion of the inner side face of the body C of the attachment, as shown in Fig. 8, the tubular bearings 40 extending into the openings 39 in the side pieces 38 of the receiver. A shaft 42 is passed through the body C of the receiver and through the bearings 40, and on the said shaft a roller 43 is secured. A longitudinal slot 44 is made in the lower end of each side piece 38 of the receiver, the said slots being usually inclined, as illustrated in Fig. 6, and in each slot a slide 45 is placed, the movement of the slides being controlled by the adjusting-screws 46, which are passed downward through the side pieces from the top, as is also shown in Fig. 6. The trunnions of a lower roller 47 are journaled in the slides 45, and the side pieces 38 between the rollers are connected by a back board 48. An endless, preferably slatted, belt 49 is made to pass around the two rollers 43 and 47, and the vertical stretches of the belt may enter vertical grooves in the back board 48, if necessary. Near the lower end of the receiver, at each side, an apertured lug 50 is located, so that no matter in what direction the receiver or stop may be swung it may be secured in said position by the lugs being attached to the inner faces of the body C.

Between the concave B and the delivery end of the carrier a shield and retarding-hooks are located. The shield, which is designated as 51, is provided with a convexed surface which faces the cylinder, and the said shield is provided with vertical slots 52. (Shown in Figs. 2 and 5.) At the lower end of the shield a plate 53 is adjustably secured, the said plate being capable of vertical movement, which may be accomplished by passing bolts through the plate and through slots in the lower portion of the shield. The adjustable plate 53 is provided at each of its ends with a downwardly-extending lug 54, and these lugs are arranged to enter openings in the top portion of the concave B for the purpose of removably securing the lower end of the shield to the concave. At each end of the shield a board or a plate 55 is secured, and the said shield is pivoted within the side portions of the body C of the receiver in like manner as the stop F, (shown in Fig. 8)—namely, the shield is provided with tubular pivots located in the sides of the body. The shield 51 is provided with a back 56, the lower portion whereof is inclined downward and in direction of the concave, and an outlet 57 is provided between the lower edge of the shield 51 and the lower edge of the back 56, so that any grain that may enter the chamber formed by the back and front of the shield will be delivered to the concave, as shown in Fig. 9. When it is desired to gain access to the concave or the cylinder, the plate 53 is disconnected from the concave and the shield is swung upon its pivots or upon the shaft of the retarding-wheels, to be hereinafter described, to the dotted position shown in Fig. 9.

A shaft 58 is passed through the tubular bearings or pivots for the shield above mentioned and through the side faces of the body portion C. A series of retarding-wheels 59 is secured upon the shaft 58, the retarding-wheels corresponding in number and location to the number and position of the slots in the shield. Each retarding-wheel comprises a hub and a series of curved or hook-like arms extending from the hub, the arms being all curved in the same direction. The motion of the retarding-wheels is toward the cylinder and downward, and their action is to retard the straw and regulate the flow of grain to the cylinder A.

At one side of the attachment, as shown in Fig. 3, an endless driving-belt 60 is carried around a small pulley on the cylinder-shaft A′ and likewise over a large pulley 62, which is secured upon the cutter-shaft 35. An arm 63 is pivoted on the cutter-shaft 35 at the outer face of the pulley 62, and this arm carries at its free end a roller 64, which is adapted to engage with the upper face of the rear stretch of the driving-belt 60, and an adjusting-bar 65 is pivoted to the arm 63, which adjusting-bar terminates in a handle 66, and convenient to the handle teeth are produced in the adjusting-bar adapted for engagement with a suitable keeper 66^a, secured on the outer side face of the body of the attachment. The arm 63 and roller 64, together with the adjusting-bar 65, constitute a belt-tightening device, and unless the belt 60 be brought under tension by the roller 64 motion will not be transmitted from the cylinder-shaft to the cutter-shaft, and the cutter-shaft will be driven either fast or slow, according to the tension of the belt-tightener on the belt 60. When the belt-tightener is entirely removed from the belt, the cylinder-shaft may be revolved without communicating motion to the cutter-shaft. At the same side of the attachment a pulley 67 is secured upon the shaft 58, carrying the retarding wheels or lugs, and the pulley 67 is connected by a suitable belt with usually a small pulley 68, secured upon the shaft 18^b, upon which the inner roller of the carrier is secured. At the opposite side of the body of the attachment, as illustrated in Fig. 4, the belting is as follows: A large pulley 69 is secured upon the shaft 18^a of the inner roller of the carrier. This pulley is connected by a belt 70 with a smaller pulley 71, loosely mounted upon the shaft 42, which carries the upper roller of the receiver or stop F, while upon the same end of the same shaft 42 a larger pulley 73 is loosely mounted, being attached to the pulley 71, and the pulley 73 is connected by a cross-belt 74 with a smaller pulley 75, carried by the cutter-shaft 35. The belt 70 is usually provided with a tightener 72. At the opposite side of the machine a small pulley 62^a is secured upon the cutter-shaft 35 next to the large pulley 62, and this small pulley 62^a is connected by a belt 62^b with a pulley 62^c upon

the corresponding end of the shaft 42 of the upper roller of the receiver or stop F.

By feeding the cylinder from above considerable gain in power is obtained, since the straw being delivered vertically to the cylinder has a tendency to spread, requires less power to thresh, and has less tendency to slug the cylinder than when the straw is delivered horizontally or obliquely to the cylinder. In fact, no machinery is required to force the grain to the cylinder, since it falls of its own weight. The drop of the straw containing the grain effects a considerable separation of the grain from the straw before the cylinder is reached, and the grain thus freed will drop directly down to a pan, apron, or deck placed to receive it, which latter parts may be of the ordinary construction.

The tail-board prevents bundles carelessly thrown on the carrier from retarding the action of the carrier-belt and also serves to strengthen the carrier-frame and support the division-board. The tail-board may be folded upon a section of the carrier when the latter is folded. The band-cutting disks are light and durable and may be removed from their supports without interfering one with the other. The cutting-disks, by reason of their resemblance to a circular saw, will so cut the bundle, even if the bundle enters the carrier crosswise, that the material of the bundle will be passed to the cylinder without danger of slugging. The cutting-disks are of such diameter that they will reach well down toward the carrier and cut the bundles in small parts.

The plates 33, to which the cutters are secured, being triangularly arranged in cross-section and smaller than the cutting-disks, serve as beaters and strike the butts of the bundles after the bands are cut and remove the upper portion of a bundle, which passes on toward the cylinder, after which the lower portion of the bundles follow at the next blow of the beaters. In this manner the distribution of the grain is in a great measure regulated. The shield 51 being pivoted can be thrown up and secured in position by a hook 76, so that access can be gained to the cylinder and the concave and to the receiver or stop F by removing the rear side of the casing C. The shield 51 acts as a feed-plate and a guide for the retarding-hooks and also prevents the hooks from winding with the straw. The belt receiver or stop F receives the heads of the grain and carries said grain toward the direct position on the cylinder and, as heretofore stated, can be adjusted forward or backward, vertically or obliquely, at the will of the operator to assist in feeding different kinds of grain.

It will be understood that the grain-guide is adjustable only in the sense that it is pendent and pivoted in the side portions of the body C and mounted to be swung or turned from its normal vertical position to a horizontal position for the purpose of securing convenient access to the concave and cylinder, means being provided for locking the guide in either position, as shown in Fig. 9. The lugs 54, however, are adjustable upon the guide.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In a band-cutter, feeder, and threshing-cylinder, the combination, with the cylinder, band-cutters, and a grain-carrier located between the cylinder and band-cutters, the inner or delivery end of the carrier being arranged to deliver material at the front upper portion of the cylinder, of a retarding device for the grain, journaled between the cylinder and the delivery end of the carrier, the said retarding device consisting of a box-shield having a slotted convexed face, a shaft journaled in the shield, hubs secured to the shaft, and curved spokes secured to the shield, the spokes being arranged to extend over the openings in the shield, and a movable stop located over the cylinder, facing the retarding device and carrier, for the purpose set forth.

2. In a band-cutter, feeder, and threshing-cylinder, the combination, with the cylinder, band-cutters, and a grain-carrier between the cylinder and cutters, of a retarding device for the grain located between the cylinder and the delivery end of the carrier, the said retarding device comprising an adjustable hollow shield having a slotted convexed surface facing the cylinder, a shaft journaled in the said shield, hubs secured to the said shaft, spokes secured to the said hubs, extending through the openings in the shield, a perpendicular stop located above the cylinder in front of the shield and carrier, consisting of an endless apron mounted to rotate, means for adjusting the stop to and from the shield, a concave, and a connection between the interior of the shield and concave, as specified.

3. In a band-cutter and feeder, the combination, with a cylinder and a concave, and a straw-carrier having its delivery end above the cylinder, of a pivoted shield provided with an interior chamber and slots in its face opposite the cylinder, the chamber of the shield being provided with an outlet at its lower edge leading to the concave of the cylinder, and retarding-wheels mounted to revolve in the chamber of the shield and extending out through the slots in the shield, each of said retarding-wheels consisting of a hub and a series of hook-like spokes, a latch device carried by the shield and arranged for locking engagement with the concave, and means for locking the shield in a position which will expose the concave and cylinder, for the purpose set forth.

4. In a band-cutter and feeder, a combined cutter and beater, consisting of a shaft, three plates triangularly arranged around the shaft, one plate extending beyond the other at a longitudinal edge, and disk cutters secured to the said plates in a detachable manner, each

cutting-disk being constructed in three sections, each section being independently secured to one of the said plates, the sections of the cutting-disks also extending beyond the plates, the extending portions of the disk-sections having irregular abutting edges, as and for the purpose specified.

5. In a band-cutter, feeder, and threshing-machine cylinder, the combination, with the cylinder, band-cutters and a grain-carrier carried between the cylinder and band-cutters, the inner or delivery end of the carrier being arranged to deliver material at the front upper portion of the cylinder, of a retarding device for the grain, mounted between the cylinder and the delivery end of the carrier, the said retarding device consisting of a box-shield having a slotted convexed face presented to the cylinder, and a closed back and open lower edge, a shaft journaled in the said box-shield, hubs secured to the shaft and arranged to revolve in said box-shield and spokes attached to the hubs and extending through the openings in the box-shield, a concave for the cylinder, communition substantially as described, between the open edge of the box-shield and the concave, and a grain-stop located over the cylinder.

6. In a band-cutter and feeder and threshing-cylinder, the combination, with the threshing-cylinder the concave and band-cutters, and a grain-carrier having its delivery end located between the band-cutters and the cylinder, of an adjustable grain-stop located over the cylinder, opposite the delivery end of the grain-carrier, a pendent grain-guide mounted to swing and located between the delivery end of the grain-carrier and the concave, the delivery end of the grain-carrier extending beyond the upper end of the grain-guide, retarding devices located within the grain-guide, portions of the retarding device extending through openings in said grain-guide, a latch carried by the lower end of the grain-guide, which latch is adapted for engagement with a keeper on the concave, and a second latch device carried by the frame of the machine and adapted for engagement with the lower end of the grain-guide when said grain-guide is carried to a substantially-horizontal position between the grain-carrier and the concave and cylinder, thus enabling access to be gained to the concave and cylinder, as set forth.

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