(No Model.) 4 Sheets—Sheet 1.

# A. HEINE.

## BAND CUTTER AND FEEDER.

No. 564,280. Patented July 21, 1896.

Fig. 1.

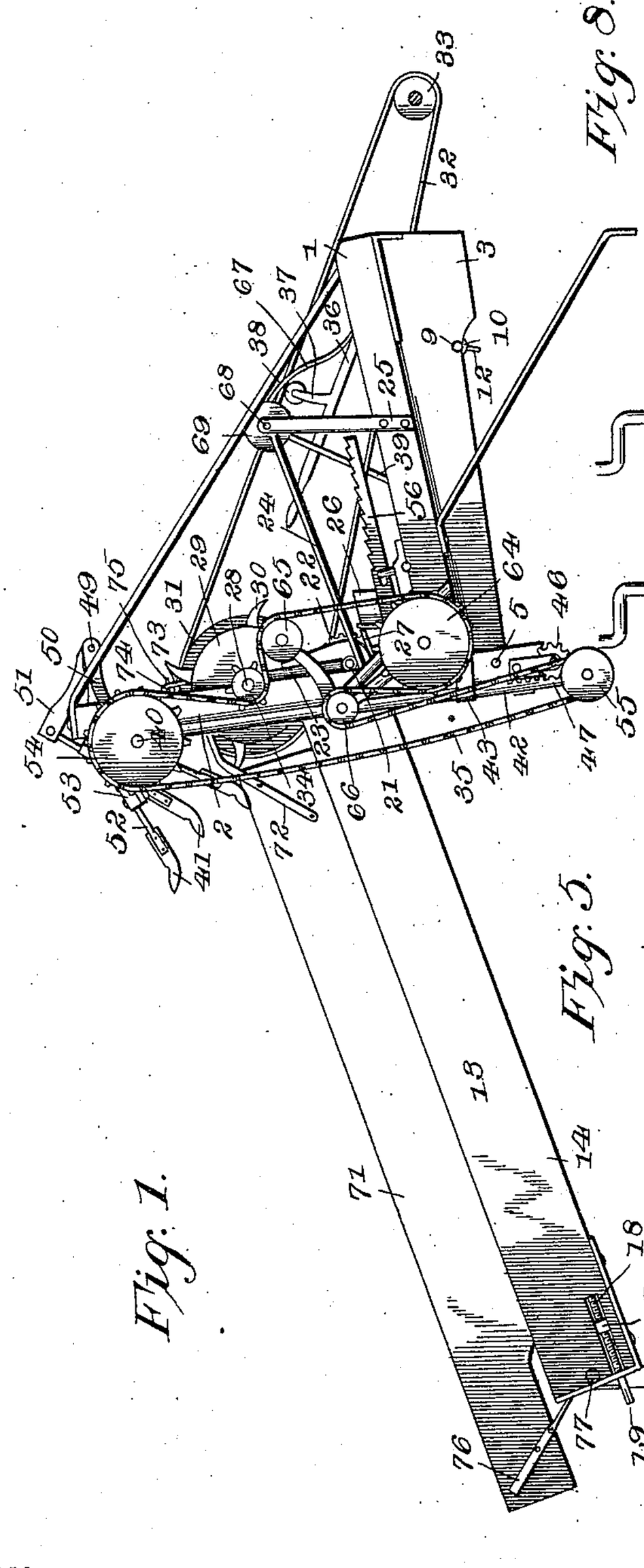



Fig. 2.

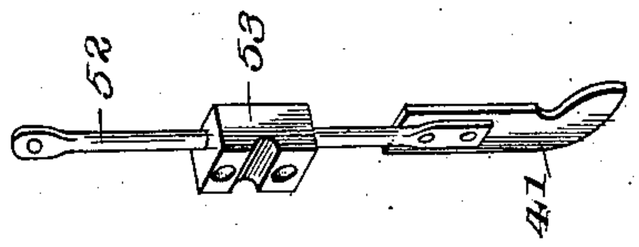
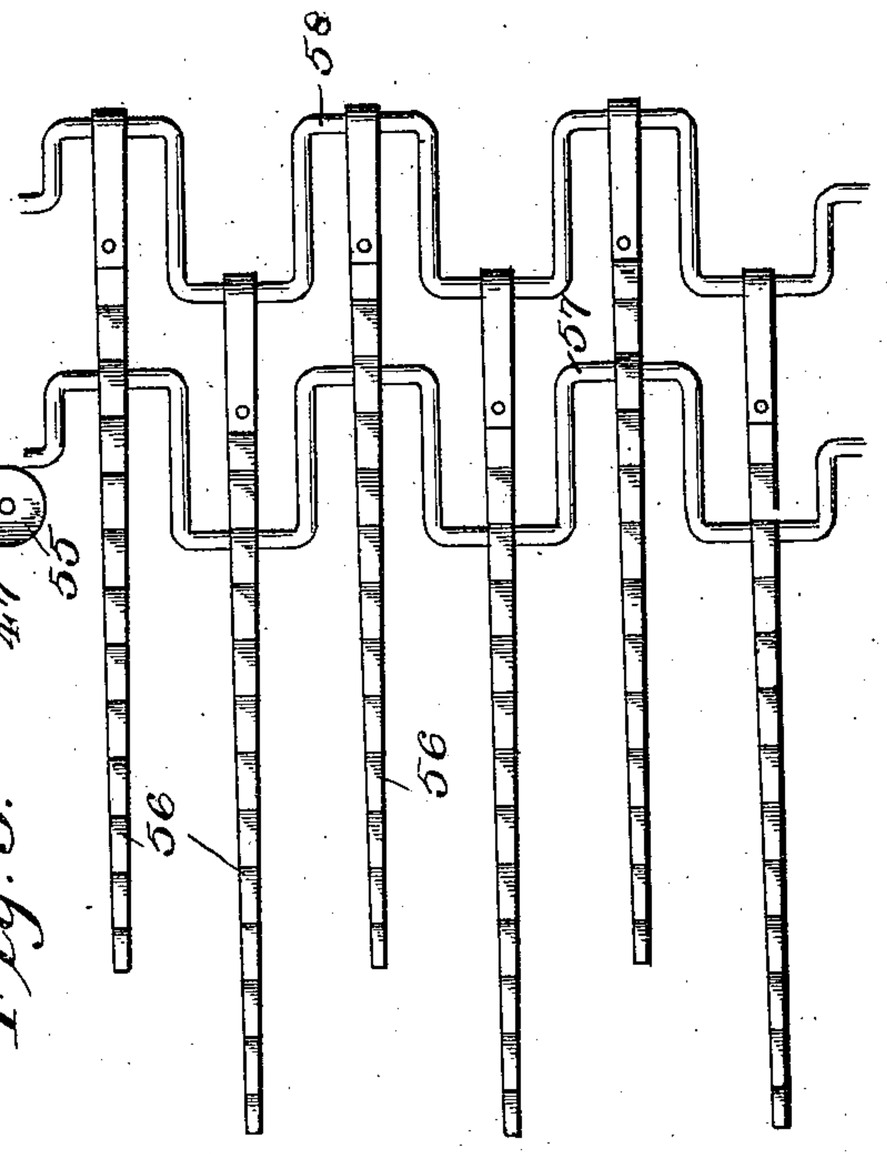



Fig. 3.

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(No Model.) 4 Sheets—Sheet 2.

# A. HEINE.

## BAND CUTTER AND FEEDER.

No. 564,280. Patented July 21, 1896.

Fig. 7.

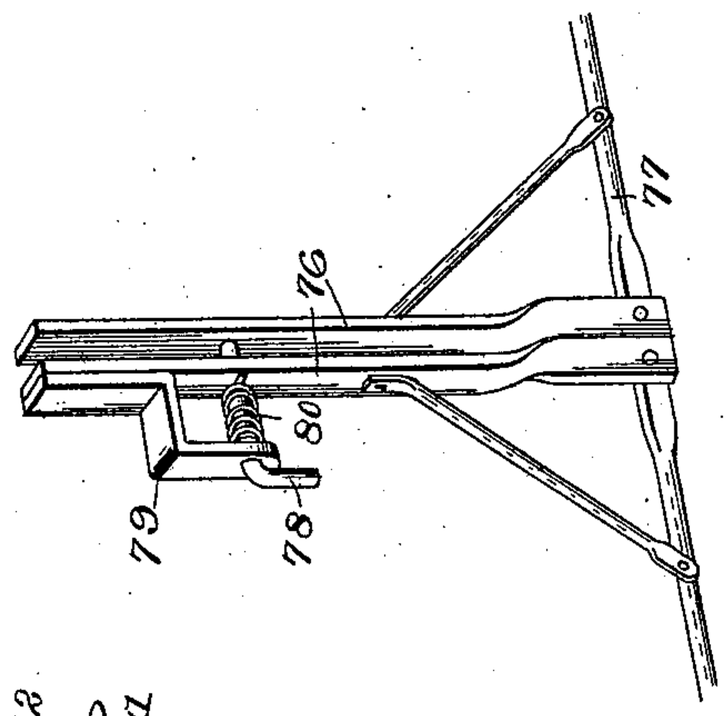



Fig. 9.

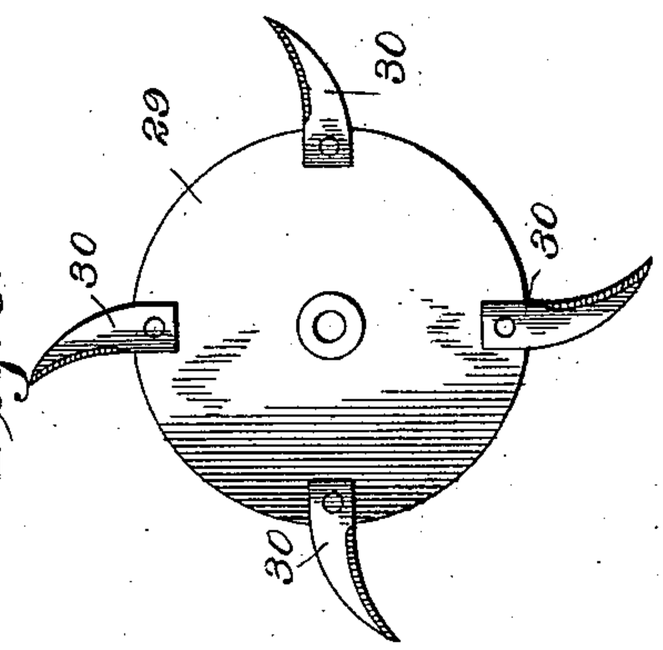



Fig. 2.

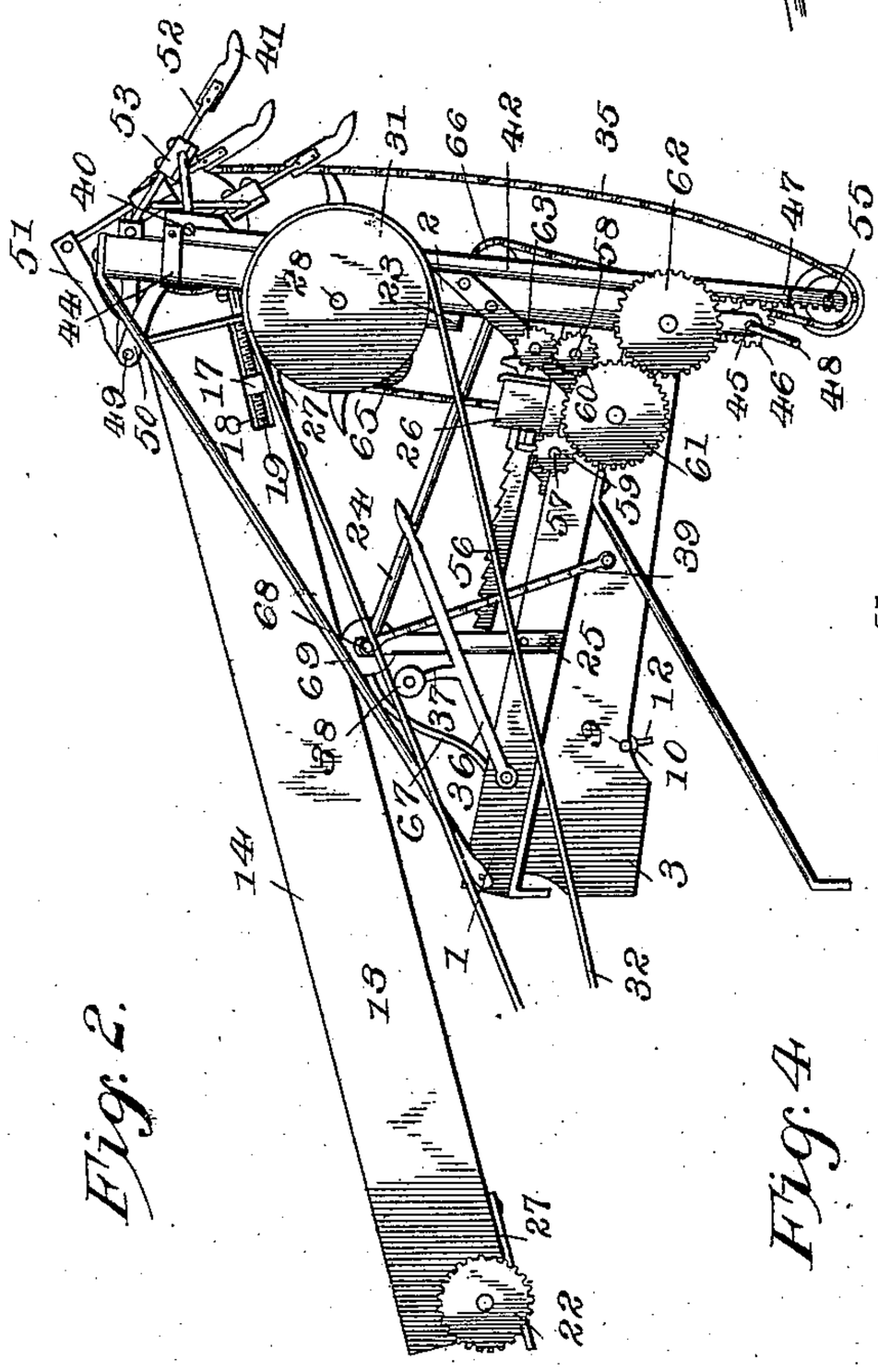
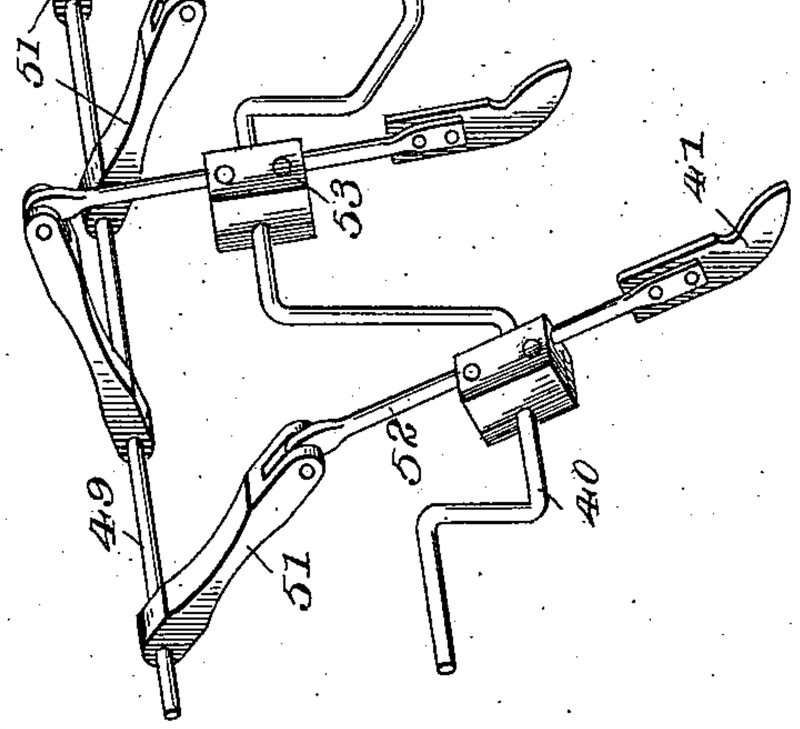



Fig. 4

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(No Model.) 4 Sheets—Sheet 3.

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## BAND CUTTER AND FEEDER.

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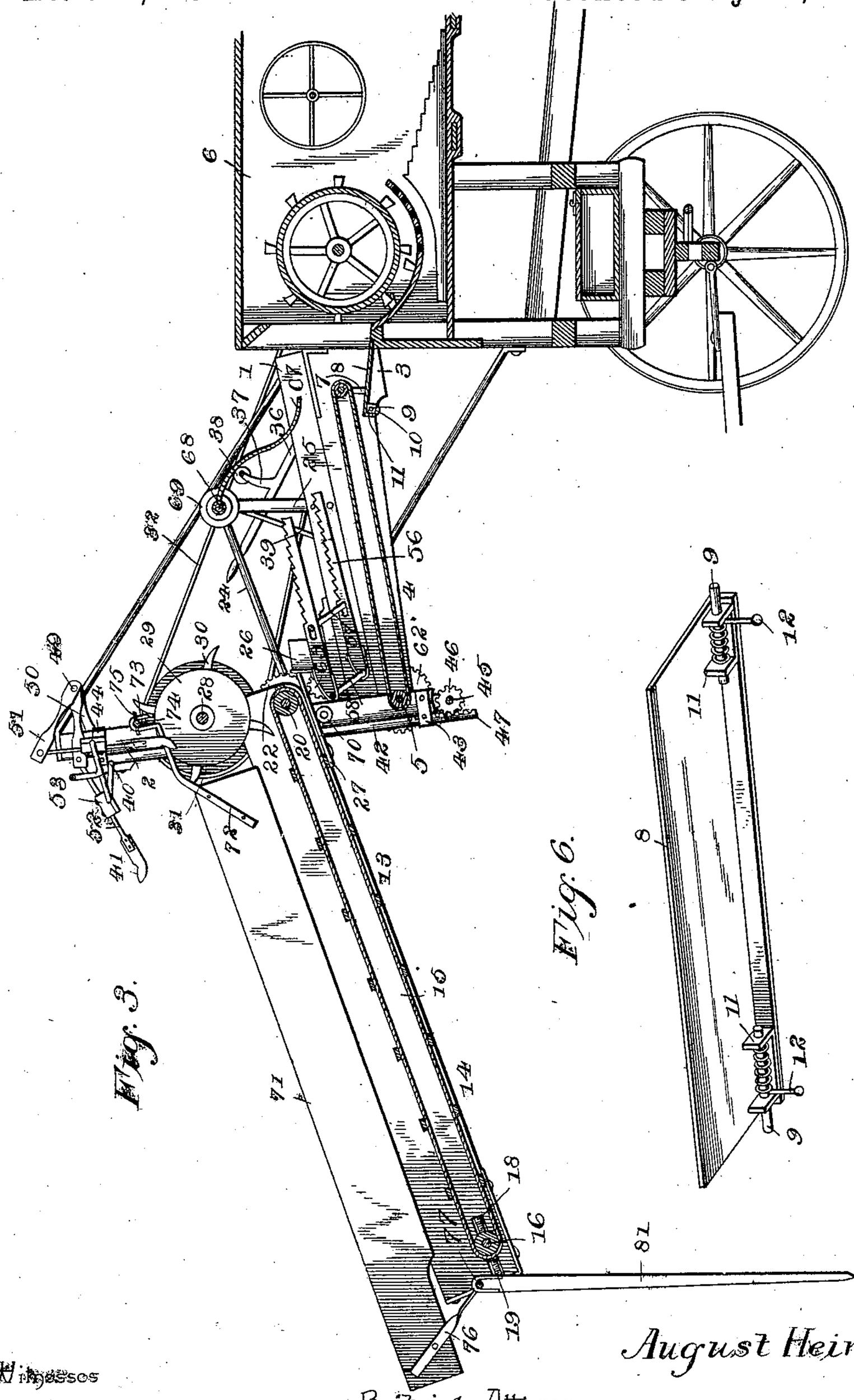

Fig. 3.



Fig. 6.

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# A. HEINE.

## BAND CUTTER AND FEEDER.

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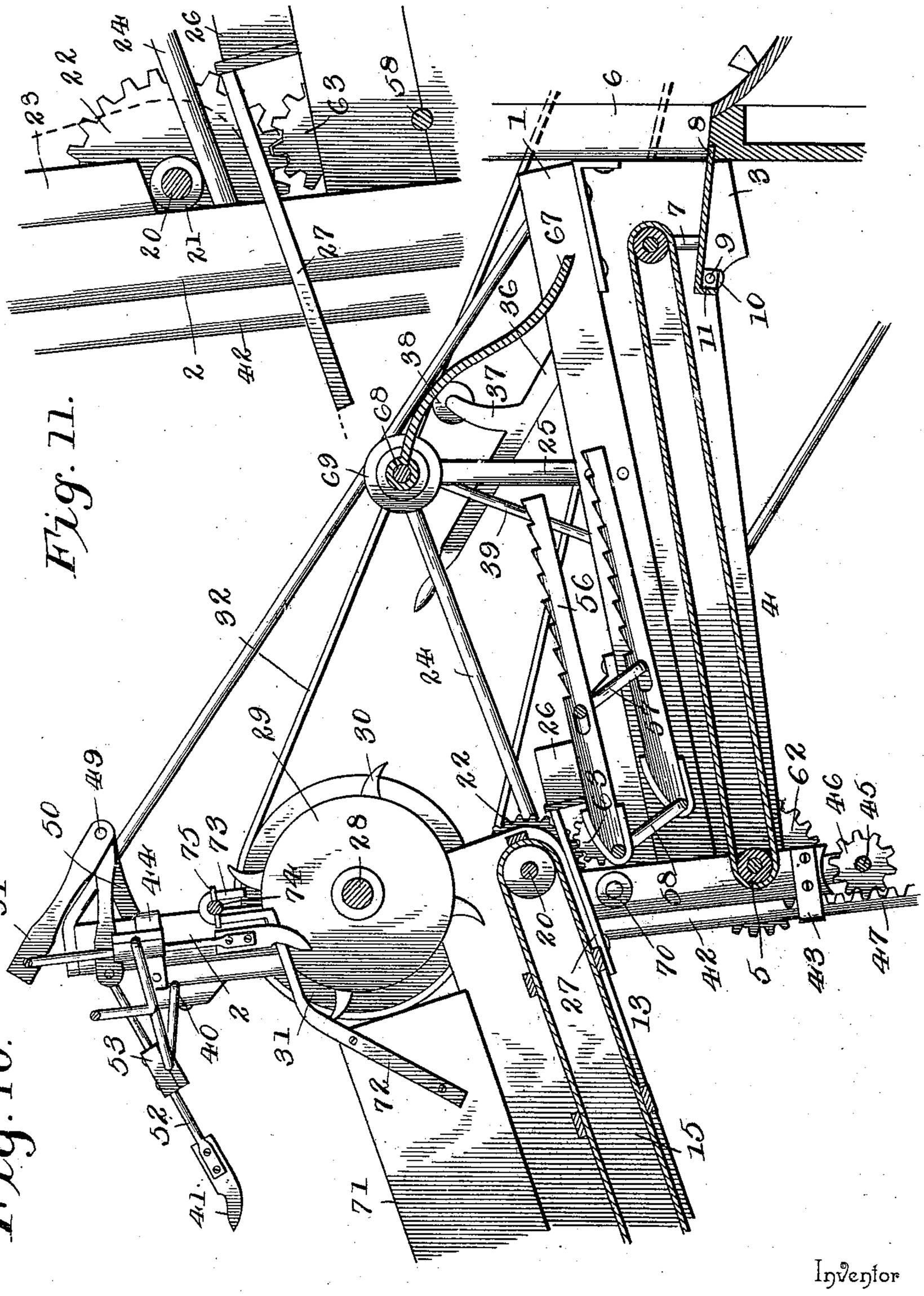

Fig. 11.



Fig. 10.

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# UNITED STATES PATENT OFFICE.

AUGUST HEINE, OF WAHPETON, NORTH DAKOTA.

## BAND-CUTTER AND FEEDER.

SPECIFICATION forming part of Letters Patent No. 564,280, dated July 21, 1896.

Application filed March 18, 1895. Serial No. 542,196. (No model.)

*To all whom it may concern:*

Be it known that I, AUGUST HEINE, a citizen of the United States, residing at Wahpeton, in the county of Richland and State of North Dakota, have invented a new and useful Band-Cutter and Feeder, of which the following is a specification.

This invention relates to an attachment to be applied to threshing-machines in general use, and is designed to automatically feed the grain to the threshing-cylinder in such a manner as to secure a uniform and steady movement of the operating parts of the thresher and at the same time sever the bands which bind the grain in sheaves or bundles.

The primary object of the improvement is to thoroughly loosen and lighten the grain and feed the latter to the thresher so as to obviate choking of the threshing-cylinder, and at the same time admit of the machine running without any jerky or unsteady movement.

A further purpose of the invention is the provision of an attachment which can be readily reduced to a compact form when it is desired to store or move the attachment from one place to another, and which will admit of the parts being quickly arranged in operative position.

With these and such other objects in view as belong to the special construction of the invention, the latter consists of the novel features and the peculiar combination and structural arrangement of the parts, which hereinafter will be more fully set forth and claimed, and which are shown in the accompanying drawings, in which—

Figure 1 is a side elevation of the invention, which is to be applied to a threshing-machine of ordinary construction. Fig. 2 is a side view of the attachment as observed from the reverse side of Fig. 1, the carrier being moved in so as to reduce the size of the attachment and the dividing-board being detached. Fig. 3 is a central longitudinal section showing the relative position of the parts when operatively disposed and the relative location of the threshing-cylinder. Fig. 4 is a detail view of the mechanism for controlling the amount of grain passing to the thresher and also serving to lighten and loosen bunches. Fig. 5 is a detail view of the notched or toothed bars for lightening the grain immediately before the entrance of the same into the threshing-machine. Fig. 6 is a detail view of the guard-plate for closing the space between the framework of the threshing-machine and the delivery end of the supplemental carrier. Fig. 7 is a detail view, on a larger scale, of the means for supporting the outer end of the divider. Fig. 8 is a detail view of one of the blades and its attachments by means of which the feed of the grain is controlled. Fig. 9 is a detail view of one of the cutters. Fig. 10 is an enlarged view similar to Fig. 3, the front portion of the main carrier being broken away and the rear part of the threshing-machine omitted. Fig. 11 is an enlarged detail view showing the instrumentalities for locking the main carrier in an operative position.

The attachment is designed to be applied to threshing-machines of any construction, it being understood that changes in the framework will be necessary to adapt the attachment to the various styles of threshing-machines now in use. Such changes are contemplated within the scope of the present invention.

The side beams 1 of the attachment are provided at their outer ends with uprights or standards 2, and have depending side pieces 3, which close the sides of the supplemental carrier 4, the frame of the latter being mounted upon a transverse shaft 5, which is journaled at its ends in the lower portions of the standards 2. This supplemental carrier 4 is adapted to swing downward at the end contiguous to the threshing-machine 6, and is supported in an operative position by feet or irons 7, resting upon a plate 8, which is supported between the side pieces 3 by means of spring-actuated bolts or catches 9, engaging with keepers 10 in the side pieces 3. These spring-actuated bolts 9 are mounted in plates 11, secured to the end portions of the plate 8, and which have their ends bent and apertured to form supports and guides for the bolts 9, the latter having extensions 12, by means of which the said bolts are moved inward when it is required to remove the plate 8 for any desired purpose. This plate 8 forms a guard and prevents the loss of grain by closing the space between the end of the

threshing-machine and the delivery end of the supplemental carrier 4. That edge of the plate 8 contiguous to the threshing-machine is supported upon the end of the latter and forms a close joint therewith. This plate 8 inclines in an opposite direction to the supplemental carrier 4, and serves to direct any grain falling thereon into the threshing-machine.

The main carrier 13 is of ordinary construction and comprises side pieces 14 and an endless apron 15, having transverse slats at proper intervals to engage with the bundles or sheaves of grain and move the latter forward to the cutting apparatus in a positive manner. The outer roller 16, over which the endless apron 15 passes, is journaled at its ends in blocks 17, operating in slots 18 in the side pieces 14. Set-screws 19 operate in the slots 18 and pass through threaded openings in the blocks 17 and serve to move the latter in the slots 18, so as to adjust the relative position of the roller 16 to attain the required tension upon the endless apron 15. These set-screws 19 are adapted to be rotated by means of a suitable instrument applied to the projecting ends.

The inner roller 20 for the opposite end of the endless apron 15 has its journals mounted in tubular bearings 21, projecting laterally from the side pieces 14, one journal being extended and having a gear-wheel 22 secured thereon, by means of which motion is transmitted to the endless apron 15 by means of a suitable train of gearing, hereinafter to be more particularly referred to. These tubular bearings 21 form stops, in addition to their ordinary function, to limit the outward movement of the carrier when the latter is drawn out for use. Blocks 23 on the standards 2 extend over the tubular bearings 21 and prevent upward movement of the inner end of the carrier 13. Side rods 24, attached at one end to the standards 2 and supported at their opposite ends by uprights 25, are disposed to come beneath the tubular bearings 21 and support the latter and the inner end of the carrier 13 from downward displacement. These side rods 24 also serve to support and guide the inner end of the carrier 13 when the latter is moved in or out. A stop 26, consisting of a block, is attached to one of the side beams 1, and is engaged by the end of a plate 27, firmly attached to a side piece 14. By this means the carrier 13 is prevented from inward movement, and the tubular bearings 21 are held firmly against the standards 2. When it is required to move the carrier 13 inward, so as to reduce the size of the attachment, the outer end of the said carrier 13 must be lowered sufficiently to disengage the plate 27 from the stop 26, after which the carrier 13 can be shoved back, so as to occupy the position shown in Fig. 2.

The cutting apparatus comprises a shaft 28, which is journaled near its ends to the standards 2, disks of metal 29, properly spaced upon the shaft 28, so as to revolve with the latter, and blades 30, secured to the peripheral edge portions of the disks 29. These blades 30 are curved and have their cutting edges serrated to provide small cutting-teeth which engage with the bands of the bundles or sheaves of grain and insure a severance of the same. One end of the shaft 28 is provided with a band-pulley 31, around which passes a belt 32, by means of which motion is transmitted to the shaft 28 from a suitable rotating part of the threshing-machine. In the present instance the belt 32 passes around a pulley 33 on the shaft of the threshing-cylinder. A sprocket-pinion 34 is provided on the opposite end of the shaft 28 and imparts movement to a sprocket-chain 35, by means of which movement is imparted to the several mechanisms, as hereinafter will be more fully disclosed. The belt 32 is sufficiently loose to prevent movement being imparted to the band-pulley 31, and when it is desired to operate the attachment said belt must be tightened. This is accomplished by the following means: A hand-lever 36 is pivoted at one end to a side beam 1, and has a bracket extension 37, upon which is mounted an idle-pulley 38, the latter being brought forcibly in contact with the belt 32, so as to tighten the latter when the attachment is required for service. A notched bar 39 is secured at one end to a side piece 3 and at its upper end to an upright 25, and is adapted to be engaged by the free end of the lever 36 to hold the latter in the located position.

The mechanism for controlling the feed of the grain consists of a compound crank-shaft 40, whose crank portions are disposed in different relative angles, so that the blades 41 mounted thereon will operate consecutively and progressively, some performing service while others are returning to an active position to engage with the grain and prevent its too rapid feed to the thresher. This crank-shaft 40 is journaled near its ends in bearings provided on bars 42, which lie against the outer side of the standards 2 and operate in guides or keepers 43, attached to the said standards 2. Clips 44, attached to the upper ends of the bars 42, embrace the upper end portions of the standards 2 and retain the bars 42 in working relation. These bars 42 have a vertical adjustment, so as to raise and lower the crank-shaft 40 and the blades 41, attached thereto, thereby making provision for regulating the feed of the grain. Any suitable mechanism may be devised for effecting the vertical adjustment of these bars 42, but that shown is preferred, because of its simplicity and successful operation, and consists of a transverse shaft 45, provided near each end with a pinion 46 to mesh with corresponding toothed portions 47 of the bars 42. This shaft 45 is journaled in plates pendent from the lower ends of the standards 2, and is provided with a crank 48, by means of which the shaft 45 is rotated, so as to raise and lower the

bars 42. A cross-bar 49 is supported in arms 50, projecting rearwardly from the upper end of the bar 42, and forms a support for one end of a series of guide-links 51, which have their outer ends pivotally attached to the upper ends of the arms 52, carrying the blades 41. These arms 52 are attached midway of their ends to bearing-blocks 53, preferably by having the latter cast thereon, and have the blades 41 secured to their lower ends. These blades 41 curve outwardly at their lower ends, and operate in an elliptical path whose major axis extends approximately in the direction of the length of the carrier 13, whereby said blades will remain in engagement with the grain for a greater length of time than if disposed to operate in any other manner. In their operation the blades 41 enter the grain at a point contiguous to the cutting apparatus and travel in an inverse direction to the movement of the carrier 13 and leave the grain at a point remote from the said cutting apparatus. When returning to an active position, the blades travel in a direction corresponding with the movement of the carrier 13. A sprocket gear-wheel 54 is mounted on one end of the crank-shaft 40, and the sprocket-chain 35 passes thereover, so as to impart movement to the crank-shaft 40. An idler 55 is located at the lower end of the bar 42 on the side of the sprocket gear-wheel 54, and the sprocket-chain 35 passes around the said idler 55.

It will be seen that the sprocket gear-wheel 54 and the idler 55 move in unison, being attached to the same bar 42. Hence a uniform tension is maintained on the sprocket-chain 35 at all adjustments of the crank-shaft 40:

Operating directly over the supplemental carrier 4 are notched bars 56, which are carried by parallel crank-shafts 57 and 58, the crank portions of which lie in parallel relation and operate in unison, so as to maintain the notched bars 56 in parallel relation to a normal or given position at all stages of their movement. The crank portions of the shafts 57 and 58 are in the same plane, but extend in alternate relation from a line passing through the axes of the said shafts. From this it will be seen that the notched bars are disposed practically in two series, which operate in reverse order, that is, while one set of notched bars are advancing and loosening the grain the other set is returning to a starting-point. These notched bars 56 operate in a plane below the delivery end of the carrier 13 and over the carrier 4, and advance the grain to the thresher by a step-by-step movement. The end of the shaft 57 is provided with the pinion 59, and the end of the shaft 58 is provided with a corresponding pinion 60, the two pinions 59 and 60 meshing with a gear-wheel 61, which in turn meshes with a gear-wheel 62 on the end of the shaft 5, whereby movement is imparted to the supplemental carrier 4. An idle-pinion 63 meshes with the pinion 60 and with the gear-wheel 22, so as to transmit movement to the endless apron 15. A sprocket-wheel 64 is secured upon the opposite end of the crank-shaft 58 and receives its motion in the operation of the attachment from the sprocket-chain 35, which passes thereover. An idle-pulley 65 is disposed over the sprocket gear-wheel 64 and below the sprocket-pinion 34, and a corresponding idle-pulley 66 is arranged opposite the space between the sprocket gear-wheel 64 and the idle-pulley 65, forming a loop in the sprocket-chain 35 at a point opposite the space between the sprocket-wheel 64 and the idle-pulley 65.

A gravity or pressure plate 67 is arranged to operate in conjunction with the notched bar 56 to attain a proper advance movement of the grain to the threshing-cylinder. This plate 67 is pivotally supported at one end, and its free portion is adapted to rise and fall to adapt itself to the movement of the notched bars 56. A cross-rod 68 connects the upper ends of the uprights 25 and forms a support for the pivoted end of the plate 67, which is mounted thereon. This plate 67 is ogee-shaped in cross-section, which form has been found to give the best results in the operation of the invention. Flanged rollers 69 are mounted upon the end portion of the cross-rod 68 and form a support for the carrier 13 when the latter is pushed in, so as to reduce the size of the machine. Corresponding pulleys 70 are provided on the inner sides of the standards 2 and subserve a like purpose as the rollers 69.

The divider 71, for separating the carrier 13 into two longitudinal compartments or passages, is supported over the apron 15 in the following manner: From one end of the divider 71 extend parallel rods 72, terminating in hooks 73, which engage with a cross-rod 74, a transverse pin 75 of the cross-rod 74 coming between the hooks 73 and holding the latter in a fixed relative position. Parallel bars 76 project from a cross-bar 77 at the outer end of the carrier 13 and receive the outer end portion of the divider 71 between their separated sides, the said divider being held in position by a latch-bolt 78, working through the parallel bars 76. A bracket 79 is secured to one of the bars 76, and the latch-bolt 78 operates through the same, a coiled spring 80 being provided and held between the bracket 79, and a stop on the latch-bolt serving normally to hold the said latch-bolt projected across the space between the bars 76. When it is desired to remove the divider 71, the latch-bolt 78 is withdrawn and the said divider 71 can be readily lifted from engagement with the cross-rod 74 and the bars 76, as will be readily understood. Braces or legs 81 have pivotal connection at their upper ends with the cross-bar 77, and are adapted to support the outer end of the carrier 13 when the latter is in an operative position.

In using the attachment the grain, in sheaves or bundles, is placed upon the apron

15 by attendants in the usual manner, and is moved forward to the cutting apparatus by the traveling motion imparted to the said apron. As the bound grain reaches the cutting apparatus the bands are severed, and the feed-controlling mechanism, operating in the manner set forth, controls the amount of grain to be fed to the threshing-machine in a given time. As the grain leaves the endless apron 15 it is taken up by the notched bars 56 and loosened and lightened thereby and at the same time advanced to the threshing-machine, any loose grain falling between the notched bars 56 being received upon the supplemental carrier 4 and advanced thereby to the threshing-cylinder. When it is required to instantly stop the feeding, the hand-lever 36 is operated so as to move the pulley 38 away from the drive-belt 32, which permits the latter to slacken sufficiently, so as to prevent movement being transmitted to the actuating mechanisms of the grain-feeding attachment.

In the successful operation of the attachment the construction herein specified is preferred. However, changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed as new is—

1. A band-cutting and feeding attachment for threshing-machines, comprising a main carrier to receive the bundles, a band-cutting mechanism to act jointly therewith, a series of notched bars located at and in a lower plane than the delivery end of the main carrier to receive the grain therefrom and advance it to the threshing-machine, a supplemental carrier located below the notched bars to receive and catch all grain escaping therefrom and deliver it to the threshing-machine, the main and supplemental carriers and the notched bars being in alinement, and a plate interposed between the threshing-machine and the delivery end of the supplemental carrier and inclining rearwardly and downwardly, substantially as set forth for the purpose described.

2. In a feeding attachment for threshing-machines, the combination with a series of notched bars to receive and advance the grain to the threshing-machine, and actuating mechanism for the said bars, of a movable pressure-plate disposed to rise and fall and follow the vertical movements of the said notched bars to coöperate therewith to secure a positive feed of the grain, substantially in the manner set forth.

3. In a grain-feeder for threshing-machines, the combination with a carrier, a series of notched bars arranged over the carrier, and actuating mechanism for the said bars, of a pressure-plate arranged over the carrier and pivoted at one end, and having its opposite end free to follow the rising and falling movements of the notched bars to coöperate therewith and with the carrier to secure a positive and proper feed of the grain to the threshing-machine, substantially as described.

4. In a feeding attachment for threshing-machines, the combination with a carrier pivotally supported at its receiving end and having pendent supporting-feet near its rear or free end, of a guard-plate closing the space between the threshing-machine and the delivery end of the said carrier and having sliding bolts by means of which it is removably held in place, and adapted to engage with the aforesaid pendent feet and support the rear or free end of the carrier a proper distance above the guard-plate, substantially as and for the purpose specified.

5. In a feeding attachment for threshing-machines, the combination with the carrier having vertical standards, and the cutting apparatus, of bars held to the said vertical standards and having toothed portions, a shaft journaled in the said standards and provided with pinions to mesh with the toothed portions of the said bars to raise and lower the latter, a compound crank-shaft journaled to the said bars, arms carrying blades to operate in advance of the cutting apparatus and mounted upon the crank portions of the said crank-shaft, guide-links having pivotal connection with the upper ends of the said arms, and a cross-rod for the said links to swing upon, substantially as set forth.

6. In a feeding attachment for threshing-machines, the combination with the frame provided with supporting-pulleys 70, stop-blocks 23 and 26, and a drive gear-wheel 63, of a carrier having a gear-wheel 22 to mesh with the gear-wheel 63, and adapted to travel upon the said supporting-pulleys, and provided with a plate to be brought into engagement with the stop-block 26, and having a lateral extension to come beneath the stop-block 23 to hold the carrier in an operative position and maintain the gear-wheels 22 and 63 in meshing relation, substantially as set forth.

7. In a feeding attachment for threshing-machines, the combination with the frame provided with blocks 23, stop 26, supporting-pulleys 70, and a driven gear-wheel 63, of a carrier adapted to move upon the said supporting-pulleys and provided with a gear-wheel 22 to mesh with the aforesaid gear-wheel 63 for actuating the carrier, and having lateral extensions to limit the outward movement of the carrier and come beneath the blocks 23 and maintain the said gear-wheels 22 and 63 in positive engagement, and having a projecting portion to engage with the said stop 26 to hold the carrier in operative position, substantially as set forth.

8. In a feeding attachment for threshing-machines, the combination with the frame provided with blocks 23, stop 26, side rods 24, rollers 69 at the rear ends of the side rods, and a driven gear-wheel 63, of a carrier pro-

vided with a gear-wheel 22 to mesh with the gear-wheel 63 for actuating the carrier and having lateral tubular extensions to travel upon the said side rods when moving the carrier in or out, and adapted to limit the outward movement of the carrier and to come beneath the blocks 23 to maintain the said gear-wheels 22 and 63 in operative relation, and forming bearings for the journals of the endless-apron-supporting roller, and said carrier having a projecting portion to engage with the stop 26 to hold the aforesaid carrier in working position, substantially as set forth.

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

AUGUST HEINE.

Witnesses:
FALSOM DOW,
S. H. SNYDER.