No. 813,000. PATENTED FEB. 20, 1906.

L. N. HOLM.

BAND CUTTER AND FEEDER.

APPLICATION FILED APR. 25, 1904.

4 SHEETS—SHEET 1.

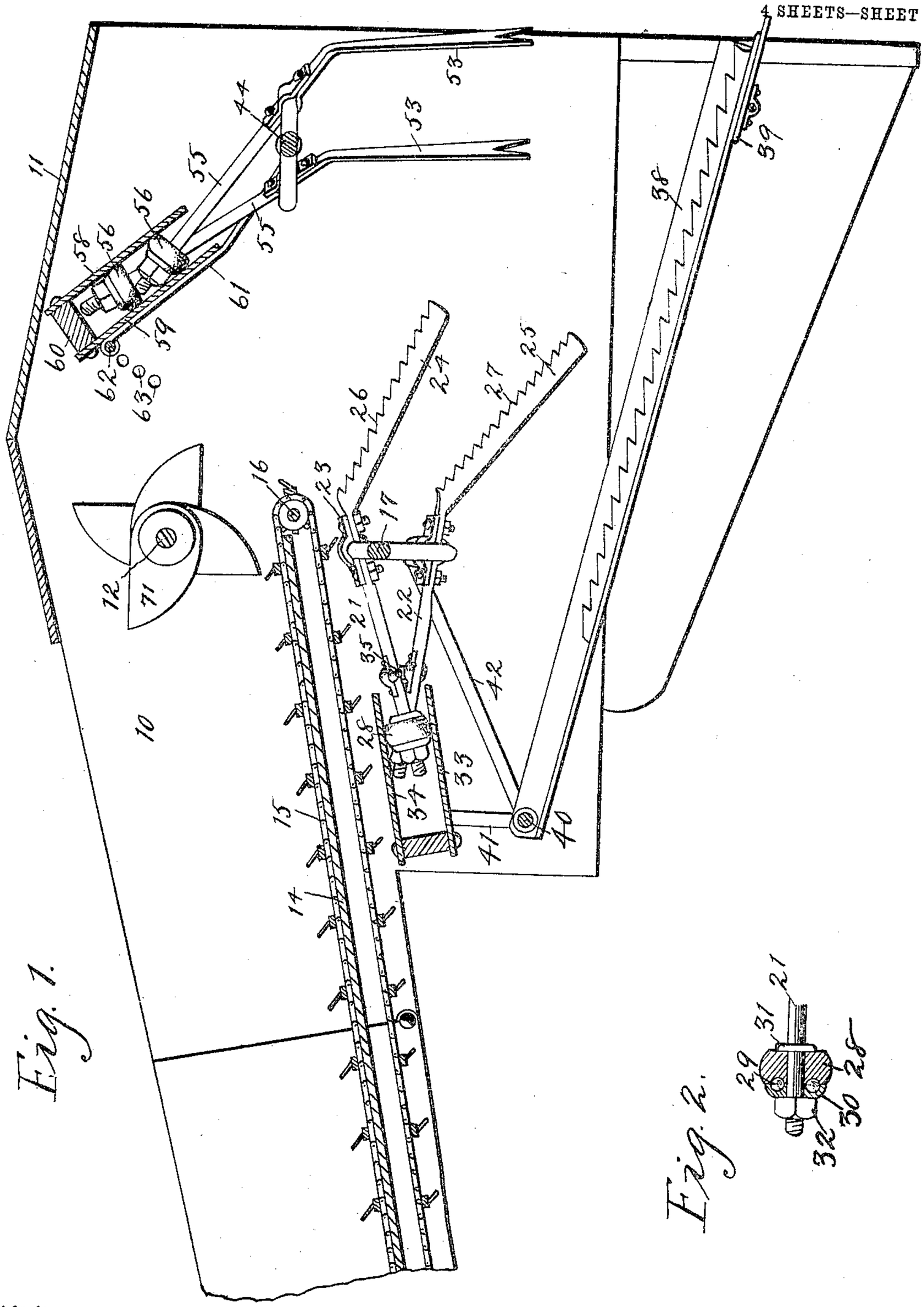

Fig. 1.

Fig. 2.

Witnesses.
K. K. Keffer.
A. G. Hagar

Inventor, L. N. Holm.
By Owing Lane Attorneys.

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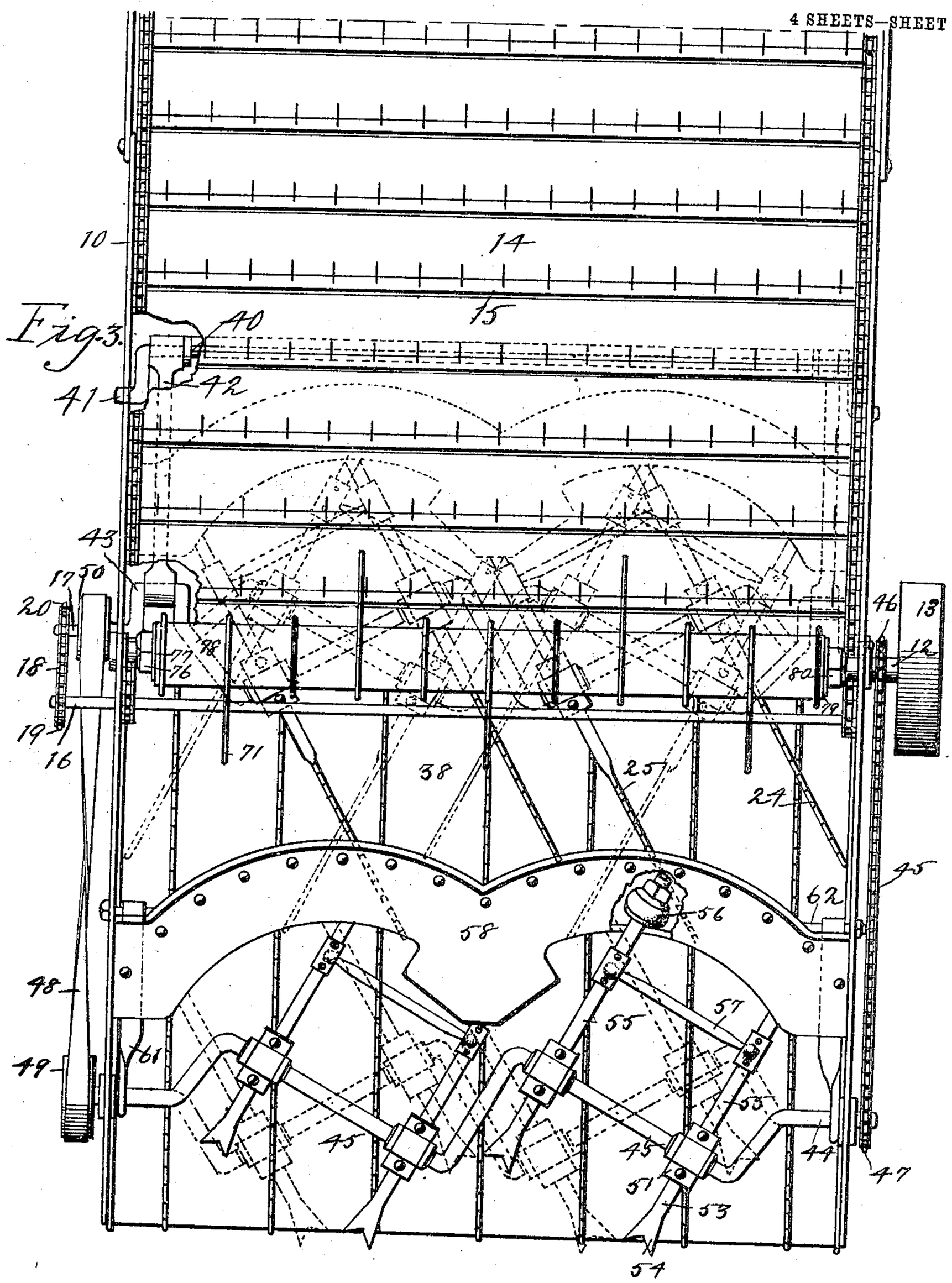
4 SHEETS—SHEET 2.

Fig. 3.



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4 SHEETS—SHEET 3.

Fig. 4.

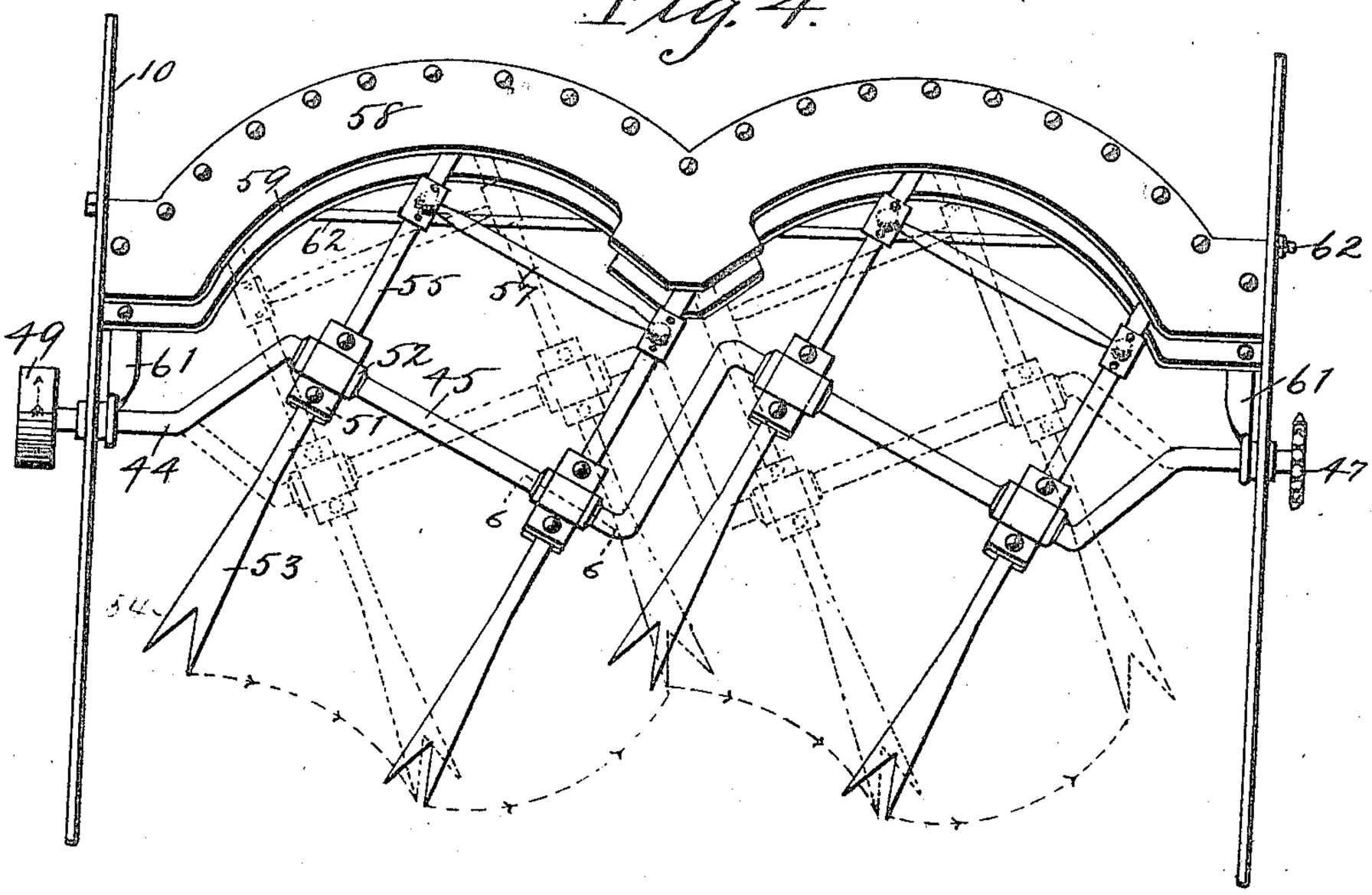


Fig. 6.

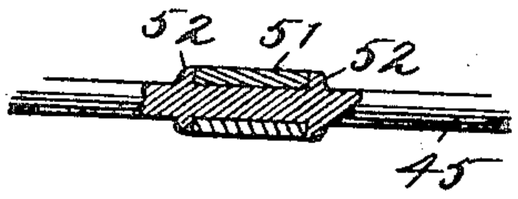
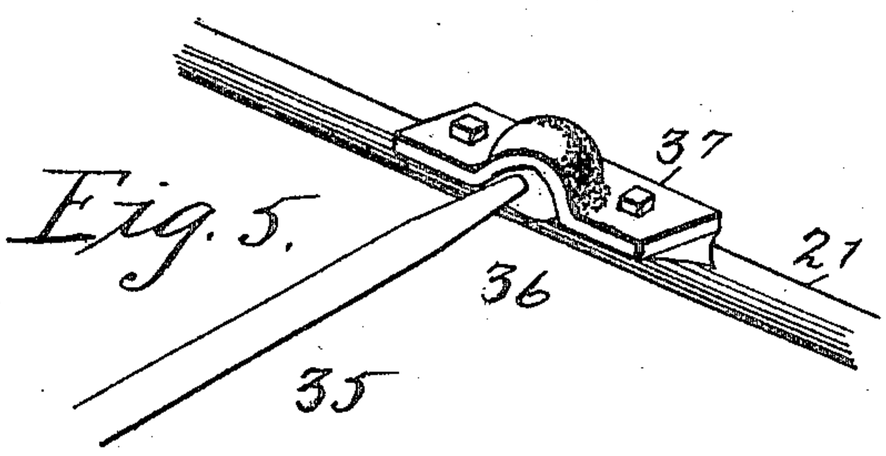


Fig. 5.



Witnesses
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4 SHEETS—SHEET 4.

Fig. 7.

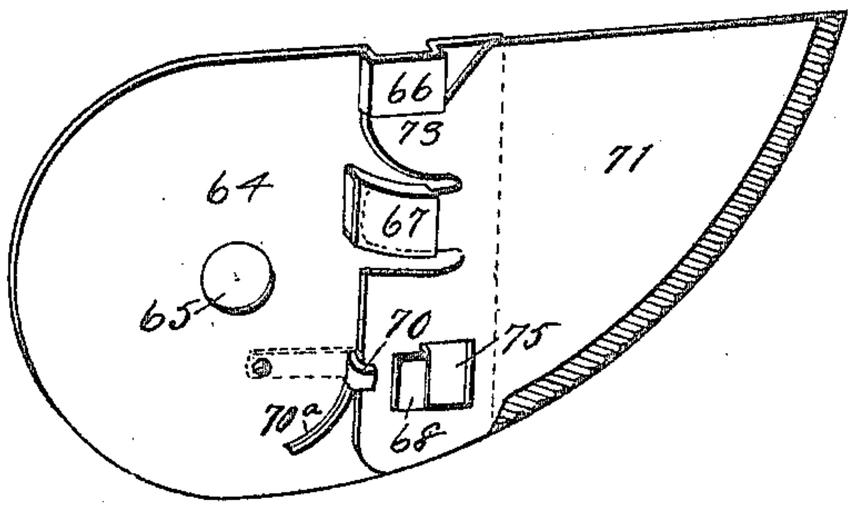


Fig. 8.

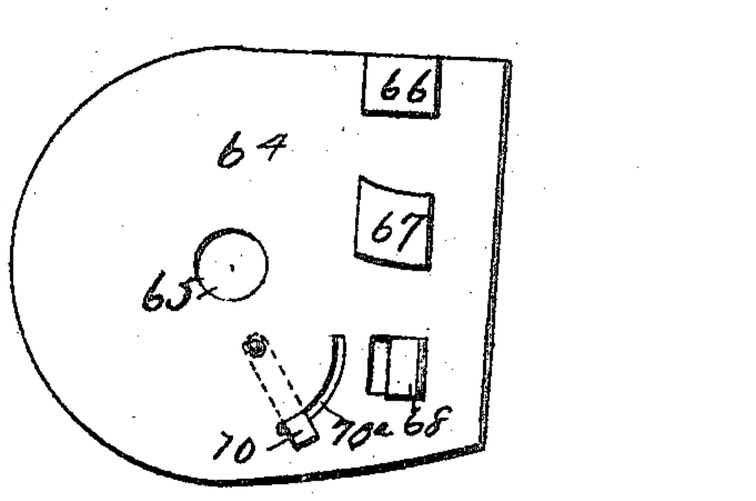
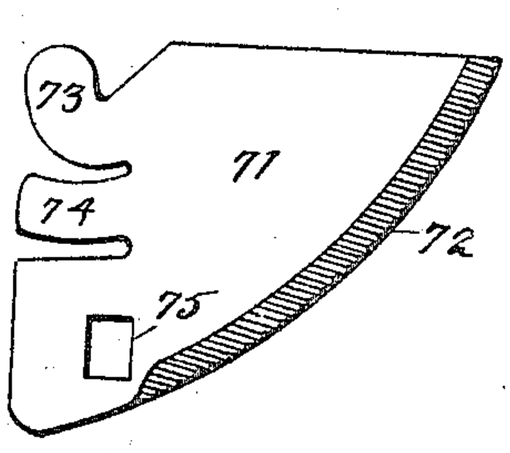


Fig. 9.



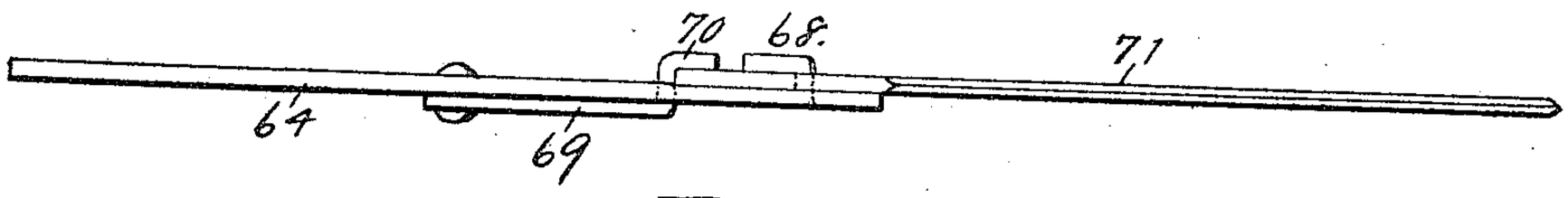


Fig. 10.

Witnesses.
K K Keffer.
A. G. Teague

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UNITED STATES PATENT OFFICE.

LARS N. HOLM, OF BRYANT, SOUTH DAKOTA.

BAND-CUTTER AND FEEDER.

No. 813,000. Specification of Letters Patent. Patented Feb. 20, 1906.

Application filed April 25, 1904. Serial No. 204,725.

To all whom it may concern:

Be it known that I, LARS N. HOLM, a citizen of the United States, residing at Bryant, in the county of Hamlin and State of South Dakota, have invented certain new and useful Improvements in Band-Cutters and Feeders, of which the following is a specification.

In delivering stock to a threshing-machine it is essential that the stock be spread evenly over the surface of the feeding-pan and that tightly-compressed or wet bundles of stock be torn apart, separated, and loosened in order that the best results in threshing may be attained.

The objects of my invention are to provide simple, durable, and inexpensive mechanism for distributing stock evenly over the surface of the feeding-pan and for tearing apart and loosening tightly-compressed or wet and tangled masses of stock.

A further object is to provide an improved detachable blade for band-cutting and feeding knives.

My invention consists in certain details in the construction, arrangement, and combination of the various parts of the device whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which—

Figure 1 shows a central longitudinal view of my improved band-cutter and feeder. Fig. 2 shows an enlarged detail sectional view of one of the guide-arms, illustrating the ball-bearings applied thereto. Fig. 3 shows a top or plan view of the complete machine with the top or cover removed. The dotted lines indicate the changed positions of the stock-distributing devices. Fig. 4 shows an end elevation illustrating the stock-distributing devices at the discharge end of the feeder. The dotted lines indicate a changed position of said parts. Fig. 5 shows an enlarged detail perspective view illustrating the means for connecting one of the guide-arms with the coupling-rod. Fig. 6 shows an enlarged detail sectional view on the line 6 6 of Fig. 4. Fig. 7 shows a detail perspective view of one of the band-cutting knives. Fig. 8 shows a plan view of the body portion of one of the band-cutting knives. Fig. 9 shows a like view of the blade portion, and Fig. 10 shows an enlarged edge view of the complete band-cutting knife.

Referring to the accompanying drawings, I have used the reference-numeral 10 to indicate the sides of the machine-frame, and 11 the top, which are of ordinary construction.

The numeral 12 indicates the shaft of the band-cutting knives, driven by the belt-wheel 13.

The numeral 14 indicates a platform extending from the receiving end of the machine to a point beneath the shaft 12, and 15 indicates a conveyer of ordinary construction passing over said platform, said conveyer being driven by a shaft 16.

The numeral 17 indicates a crank-shaft mounted in suitable bearings in the machine-frame beneath the delivery end of the conveyer, said crank-shaft provided with two crank-arms inclined at an acute angle relative to the longitudinal axis of the shaft, as clearly shown by dotted lines in Fig. 3. This shaft 17 is rotated during the operation of the machine by means of the sprocket-chain 18 traveling around the sprocket-wheels 19 and 20, fixed, respectively, to shafts 16 and 17. On each one of the crank-arms of the shaft 17 I have mounted two guide-arms 21 and 22, connected with the crank-arms by means of the bearings 23. These bearings are prevented from moving longitudinally of the crank-arm by means of annular rims formed on the crank-arm to engage the end of the bearings in the manner shown in Fig. 6.

On the delivery end of the guide-arms 21 and 22 I have formed the spreading-arms 24 and 25, which are preferably inclined downwardly and toward the delivery end of the machine, and the upper edges are serrated or toothed at 26 and 27, said arms being so arranged that stock delivered from the conveyer 15 will drop first upon said spreading-arms. At the other end of each of the guide-arms 21 and 22 I have mounted a roller 28; having an annular groove in one end to receive the balls 29. Mounted on the said arm adjacent to the roller 29 is a rim 30, also provided with an annular groove to receive the balls 29. A collar 31 is fixed to the arm 21 at one side of the roller 28, and a nut 32 is adjustably mounted on the arm to engage the rim 30 to adjustably force the rim toward the roller 28. Mounted in the machine-frame beneath the platform 14 are two guide-plates 33 and 34, fixed in position and spaced apart and designed to receive the rollers 28 between them, thus serving as guides for the rollers and holding the ends of the guide-arms so that they may travel only in a substantially hori-

zontal plane. The forward edges of the plates 33 and 34 are shaped, as shown by dotted lines in Fig. 3, in such manner that the said forward edges will not in any way interfere with the movement of the guide-arms 21 and 22. I have provided means for connecting each pair of guide-arms 21 and 22, as follows: The numeral 35 indicates a coupling-rod having a bolt 36 at each end, which bolt is inserted in a bearing 37, secured to the adjacent guide-arm. In this way the guide-arms are held spaced apart at the proper distance relative to each other, and yet they have a universal movement relative to each other. The movement imparted to the arms 24 and 25 is such that the following result is produced: During one half of the complete stroke of each arm the arm moves upwardly to engage the stock and then laterally and forwardly to advance the stock and move it laterally, and during the other half of the stroke the arm moves downwardly to free itself from the stock and then backwardly and laterally to its former position.

The reference-numeral 38 indicates a feeding-pan of ordinary construction, with its delivery end supported upon the shelf 39, which permits free sliding movement of the feeding-pan. The other end of the feeding-pan is supported upon the shaft 40, having crank-arms 41 at its ends pivotally connected to the machine-frame. I provide for reciprocating the feeding-pan 38 by means of a pitman 42, having one arm mounted on a crank-arm 43 in the shaft 17 and the other end connected to the shaft 40.

Mounted in the machine-frame above the delivery end of the feed-pan 38 is a crank-shaft 44, provided with two crank-arms 45, arranged at acute angles relative to the longitudinal axis of the shaft. The ends of the shaft are passed through bearings fixed to the sides of the machine-frame, and the shaft is driven during the operation of the machine by means of the sprocket-chain 45, connecting the sprocket-wheels 46 and 47, fixed, respectively, to shafts 12 and 44. Motion is transmitted to the shaft 44 by means of a belt 48, passing over the pulleys 49 and 50, fixed, respectively, to shafts 44 and 17. On each of the crank-arms 45 are two bearings 51, mounted on the shaft between the inner ribs 52, which limit the longitudinal movement of the bearings on the shaft. Secured to each of said bearings 51 is a distributing-arm 55, having a forked lower end 54, and formed on the upper end of each distributing-arm 53 is a guide-arm 55, having a roller 56 mounted thereon. The upper ends of each pair of guide-arms 55 are connected by means of a coupling-rod 57, having universal movement relative to the arms 55 and holding them spaced apart the proper distance. Said rod is coupled to the arms 55, the same as the rod 35 is coupled to the arm 21, as shown in Fig. 5. For guiding the upper ends of the arms 55 I have provided two plates 58 and 59, spaced apart by means of the frame 60 and supported by means of the arms 61, which are pivoted to the shaft 44 and have a rod 62 passed through both of them and through one of a series of openings 63 in each of the sides of the machine-frame. In this way the guide-plates 58 and 59 may be adjusted in such manner as to throw the distributing-arms 53 nearer to or farther from the distributing-arms 24 and 25. The forward edges of the plates 58 and 59 are shaped so that they will not interfere with the operation of the guide-arms 55 or the coupling-rods 57. In practical use with this portion of the machine and assuming that the machine is in motion and stock is being discharged from the conveyer it is obvious that the stock will be first delivered upon the distributing-arms 26 and 27, and as said distributing-arms are being oscillated from side to side of the machine-frame the said stock will be spread out over the surface of the feeding-pan 38 and tightly-compressed or wet and tangled masses of stock will be torn apart and loosened. Then the stock passes under the distributing-arms 53. The movement given to these arms is such that during one half of the movement of each arm its forked end moves downwardly into engagement with the stock and then forwardly and laterally, thus advancing the stock and moving the top layer of the stock to one side. During the other half of the movement of the arm it is elevated out of engagement with the stock and moved laterally and rearwardly to its former position. By tilting the guides 58 and 59 it is obvious that the forked ends of the distributing-arms may be made to travel in different planes—that is to say, if the forked ends are elevated a greater quantity of stock may pass over them, and if lowered they will restrict the passage of stock from the end of the feeding-pan. All of the working parts described are driven directly or indirectly from the pulley 13. I preferably arrange the shafts 44 and 17 in such relation to each other that when the distributing-arms 26 and 27 stand in position inclined toward one side of the machine-frame the arms 53 will stand in position inclined toward the opposite side of the machine-frame. In this way one set of the distributing-arms is moved toward the right, while the other set is moved toward the left, and if a bundle of stock or a wet and tangled mass is in position between the two sets of distributing-arms the under side of same will be moved to one side, while the top is moved toward the other side. In this way more perfect separation of the grain is attained. In Fig. 3 this arrangement of the two sets of distributing-arms is clearly illustrated.

I have also provided an improved band-cutting knife especially adapted for use in

connection with machines of this class and which is constructed as follows: The body portion of the knife is indicated by the reference-numeral 64 and is made of a single piece of sheet-steel provided with a central opening 65 to receive the shaft 12. Near one corner of the body portion 64 I have formed a loop 66 by bending the sheet metal outwardly. Near the central portion of the end of the body portion 64 I have formed a curved loop 67, made by bending the metal outwardly, and near the opposite corner of the end of the body portion I have formed a hook 68, made by bending the metal inwardly toward the opening 65. Adjacent to the hook 68 I have pivoted a flat bar 69, provided with a hook 70, which hook projects through a segmental slot 71, formed in the body portion. The blade of the knife is also formed complete of a single piece of metal, (indicated by the numeral 71,) and its cutting edge is sharpened and serrated at 72. At one corner of the inner end of the blade 71 is a segmental rounded projection 73, designed to enter the loop 66. Adjacent thereto is a projection 74, designed to enter the loop 67, and adjacent to the projections 74 is an angular opening 75, designed to receive the hook 68. Obviously the blade portion of the knife is of simple and inexpensive construction, because it may be stamped complete from a single piece of sheet metal. In use I connect the blade with the body portion as follows: I first insert the rounded projection 73 into the loop 66. This forms a pivot, upon which I then swing the blade to position shown in Fig. 7, and during this movement the projection 74 enters the loop 67 and the hook 68 projects through the opening 75. I then lock the blade firmly in position by forcing the hook 70 firmly into engagement with the adjacent edge of the blade 71, so that the said hooks 70 and 68 firmly clamp that portion of the blade between the edge of the opening 75 and the adjacent edge of the blade. In use the blade rotates in such direction that the sharpened edge of the blade receives all of the impact. Hence this impact will be borne by the rigid hook 68, and the blade cannot be removed from the body portion of the knife so long as the hook 68 projects through the opening 75. When it is desired to detach the blade, the hook 71 is moved on its pivot, then the edge of the blade adjacent to the hook 68 is moved over the body portion of the blade until the hook may be passed through the opening 75, whereupon the projections 74 and 73 may be in turn easily withdrawn from the loops 67 and 66.

I arrange the knives upon the shaft as follows: I first place upon the shaft a nut 76 near one end, with a washer 77 adjacent thereto. I then place one of the body portions adjacent to the washer 77 and then a cylindrical collar 78 adjacent to the knife-body. Then a second knife-body and a second cylindrical collar, and so on through the entire length of the shaft, a washer 79 and a nut 80 being placed on the opposite end of the shaft. The said cylindrical collar 78 serves the function of spacing the knife-blades apart. It is seldom necessary to remove the body portions of the knife from the shaft, as the blade portions of the knives are all that need repair or replacement in case they are broken or dulled by use.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States therefor, is—

1. In a feeder, the combination of a frame, a shaft rotatably mounted in the frame and having a crank-arm arranged at an acute angle relative to the shaft, means for rotating the shaft and a distributing-arm mounted on the crank-arm.

2. In a feeder, the combination of a machine-frame, a rotatable shaft mounted therein and having a crank-arm arranged at an acute angle relative to the shaft, means for rotating the shaft, a distributing-arm mounted on the crank-arm and an adjustable guide for the distributing-arm.

3. In a feeder, the combination of a frame, a rotatable shaft mounted in the frame and having a crank-arm arranged at an acute angle relative to the shaft, means for rotating the shaft, a distributing-arm on the crank-arm, a roller on the distributing-arm and a guide for the roller.

4. In a feeder, the combination of a frame, a rotatable shaft mounted in the frame having a crank-arm arranged at an acute angle relative to the shaft, means for rotating the shaft, a number of distributing-arms mounted on the crank-arm and a guide for said distributing-arms.

5. In a feeder, the combination of a frame, a rotatable shaft mounted in the frame having a crank-arm arranged at an acute angle relative to the shaft, means for rotating the shaft, a number of distributing-arms mounted on said crank-arm, an adjustable guide for said distributing-arms and means for connecting the distributing-arms with each other.

6. In a feeder, the combination of a frame, a rotatable shaft mounted in the frame having a crank-arm arranged at an acute angle relative to the shaft, means for rotating the shaft, two distributing-arms mounted on the crank-arm, means for holding two adjacent ends of said distributing-arms spaced apart and a guide for said arms.

7. In a feeder, the combination of a frame, a shaft rotatably mounted in the frame having a crank-arm arranged at an acute angle relative to the shaft, means for rotating the shaft, two distributing-arms mounted on the shaft and a coupling-rod pivotally connected with both distributing-arms.

8. In a feeder, the combination of a machine-frame having a crank-arm arranged at an acute angle relative to the shaft, means for rotating the shaft, two distributing-arms mounted on the shaft and a coupling-rod connected to both of said arms and capable of universal movement relative to each arm.

9. In a feeder, the combination of a frame, a shaft rotatably mounted in the frame having a crank-arm arranged at an acute angle relative to the shaft, means for rotating the shaft, a number of distributing-arms pivoted to the crank-arm, means for connecting said distributing-arms with each other and an adjustable guide for said distributing-arms.

10. In a feeder, the combination of a machine-frame, a shaft rotatably mounted in the machine-frame and having a crank-arm arranged at an acute angle relative to the shaft, means for rotating the shaft, a number of distributing-arms mounted on the crank-arm, means for connecting the adjacent ends of said distributing-arms, a roller on each distributing-arm and a guide to receive said rollers.

11. In a feeder, the combination of a frame, a shaft rotatably mounted in the frame having a crank-arm arranged at an acute angle relative to the shaft, means for rotating the shaft, two distributing-arms mounted on the crank-arm, a roller on each distributing-arm and a guide comprising two plates supported by the frame and spaced apart to receive said rollers between them.

12. In a feeder, the combination of a frame, a shaft rotatably mounted in the frame and having a crank-arm arranged at an acute angle relative to the shaft, means for rotating the shaft, two distributing-arms mounted upon the crank-arm, a ball-bearing roller on each distributing-arm and a guide comprising two plates spaced apart supported by the frame and having said ball-bearing rollers inserted between them.

13. In a feeder, the combination of a frame, means supported by the frame for advancing a layer of stock, a rotatable shaft mounted in the frame having a crank-arm arranged at an acute angle relative to the shaft, means for rotating the shaft, two distributing-arms mounted upon said crank-arm beneath the stock-advancing means one end of each distributing-arm inclined downwardly and toward the delivery end of the frame and having its top edge serrated, the other end of each arm projected in opposite directions and a guide for the latter ends of the distributing-arms.

14. In a feeder, the combination of a frame, a rotatable shaft mounted in the frame having a crank-arm arranged at an acute angle relative to the shaft, means for rotating the shaft, two distributing-arms mounted on the crank-arm, each having one end projected downwardly and forked and each also having its other end projecting upwardly and rearwardly, and a guide for the upper end of said distributing-arms.

15. In a feeder, the combination of a frame, a shaft rotatably mounted in the frame having a crank-arm arranged at an acute angle relative to the shaft, means for rotating the shaft, a distributing-arm mounted on the crank-arm having one end extended downwardly and forked and its other end extended upwardly and rearwardly, and a guide supported by the frame arranged parallel with the shaft and receiving the upper end of the distributing-arm.

16. In a feeder, the combination of a frame, means supported by the frame for advancing a layer of stock, means for operating said stock-advancing means, a rotatable shaft supported by the frame beneath the stock-advancing means, means for rotating said shaft, a number of crank-arms formed on said shaft each arranged at an acute angle relative to the shaft, two distributing-arms mounted on each of said crank-arms, each distributing-arm having one end inclining downwardly and toward the delivery end of the machine and positioned to engage the under surface of a layer of stock discharged from the stock-advancing means and each having its other end extended in an opposite direction in a substantially horizontal plane, a guide substantially parallel with the shaft to receive the latter-mentioned ends of the distributing-arms, a second shaft rotatably mounted in the frame above the stock-advancing means and having a number of crank-arms arranged at acute angles relative thereto, means for rotating said shaft, two distributing-arms mounted on each of said crank-arms, each distributing-arm having one end inclined downwardly toward the stock-advancing means and the other end inclined upwardly and away from the delivery end of the machine, and a guide substantially parallel with said shaft for receiving the upwardly-extending ends of said distributing-arms, said latter set of arms arranged to engage the top of a layer of stock on the stock-advancing means.

17. In a feeder, the combination of a frame, means supported by the frame for advancing bundles of stock, a shaft mounted in the frame above the bundle-advancing means, means for rotating said shaft, and a knife fixed to the shaft and comprising a body portion formed with two loops arranged at divergent angles relative to each other, a blade portion formed with projections to enter said loops and a lock for securing the blade portion to the body portion.

18. In a feeder, the combination of a frame, means supported by the frame for advancing bundles of stock, a shaft mounted in the frame above the bundle-advancing means, means for rotating said shaft, a knife fixed to

said shaft comprising a body portion formed with two loops arranged nearly at right angles to each other, a blade portion having projections arranged nearly at right angles to each other to enter said loops and a lock for securing the blade to the body portion.

19. In a feeder, the combination of a frame, means supported by the frame for advancing bundles of stock, a shaft mounted in the frame above the bundle-advancing means, means for rotating said shaft, a knife fixed to said shaft and comprising, a body portion formed with two loops and a hook, a blade portion formed with two projections to enter said loops and formed with an opening to receive said hook, and a lock on the body portion to engage the blade portion and hold it against the hook.

20. In a feeder, the combination of a frame, means supported by the frame for advancing bundles of stock, a shaft mounted in the frame above the bundle-advancing means, means for rotating said shaft, a knife on the shaft comprising a body portion formed with two loops and a hook, a blade portion formed with projections to enter the loops and also formed with an opening to receive the hook, and a lock pivoted to the body portion projected through a slot in the body portion and shaped to engage a part of the blade portion and hold it against said hook.

21. In a feeder, the combination of a frame, means supported by the frame for advancing bundles of stock, a shaft mounted in the frame above the bundle-advancing means, means for rotating said shaft, a knife fixed to the shaft comprising a body portion formed complete of a single piece of sheet metal and having two loops arranged nearly at right angles to each other and also having a hook, a blade portion formed complete of a single piece of sheet metal having two projections nearly at right angles to each other to enter said loops and also having an opening to receive said hook, and a lock attached to the body portion to engage one edge of the blade portion and hold it firmly against said hook.

22. In a feeder, the combination of a frame, means supported by the frame for advancing bundles of stock, a shaft mounted in the frame above the bundle-advancing means, means for rotating said shaft, a knife fixed to the shaft comprising a body portion formed complete of a single piece of sheet metal and having one straight edge provided with a loop near one corner, a loop near the center of said straight edge nearly at right angles to the first and a hook near the other end of said straight edge extended inwardly toward the center of the body portion, a blade portion formed complete of a single piece of sheet metal having near one edge a rounded projection to enter the first loop, a second projection to enter the second of said loops, an opening to receive the said hook, and a lock pivoted to one surface of the body portion extended upwardly through a slot in the body portion and having its free end projected in a direction toward the hook.

LARS N. HOLM.

Witnesses:
HERBERT G. TEMTE,
E. S. COLE.