J. B. BARTHOLOMEW.

BAND CUTTER AND FEEDER.

APPLICATION FILED NOV. 29, 1898. RENEWED OCT. 30, 1909.

**959,446.** **Patented May 31, 1910.**

4 SHEETS—SHEET 1.

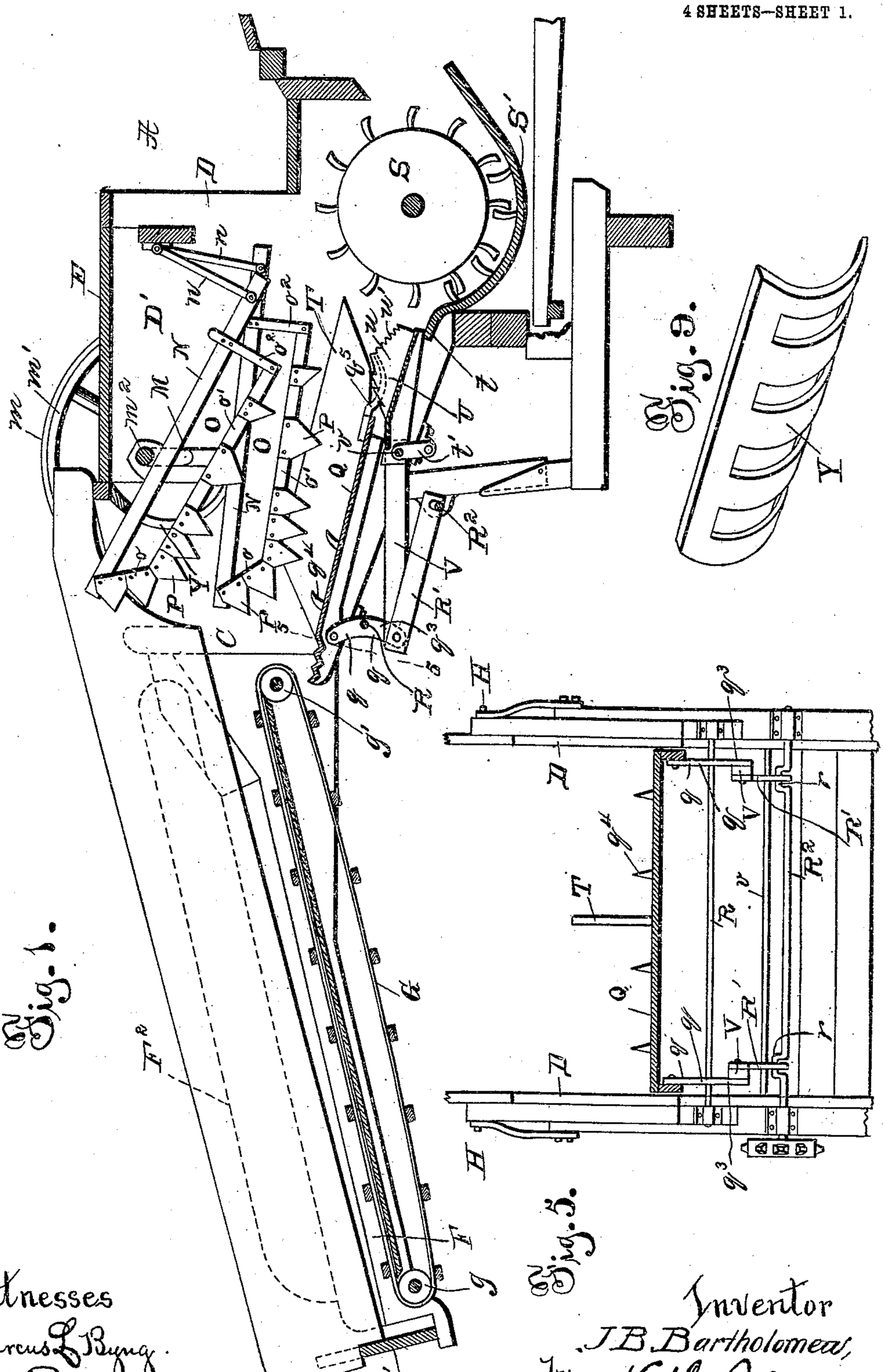

Fig. 1.



Fig. 2.



Fig. 3.

Witnesses
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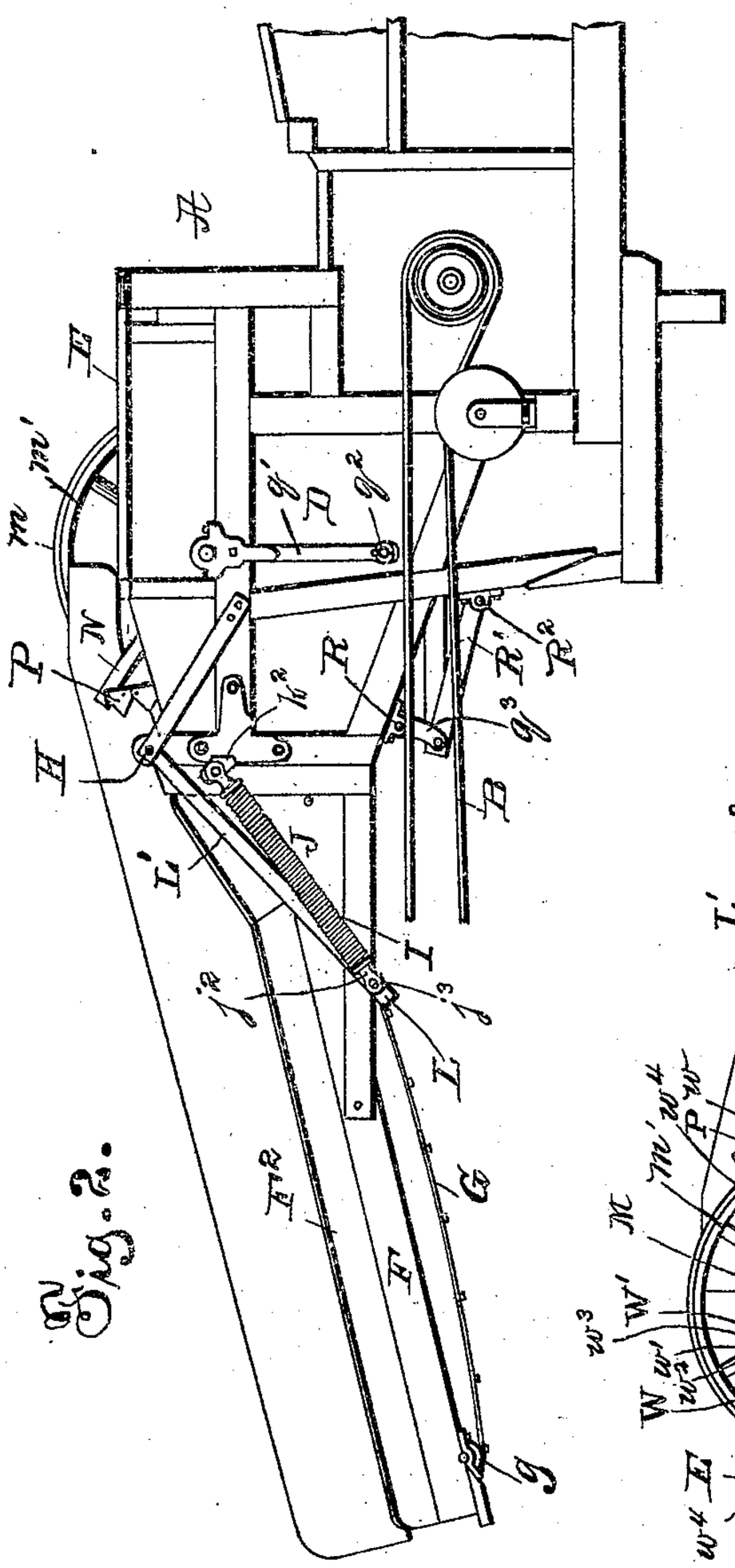

Fig. 2.

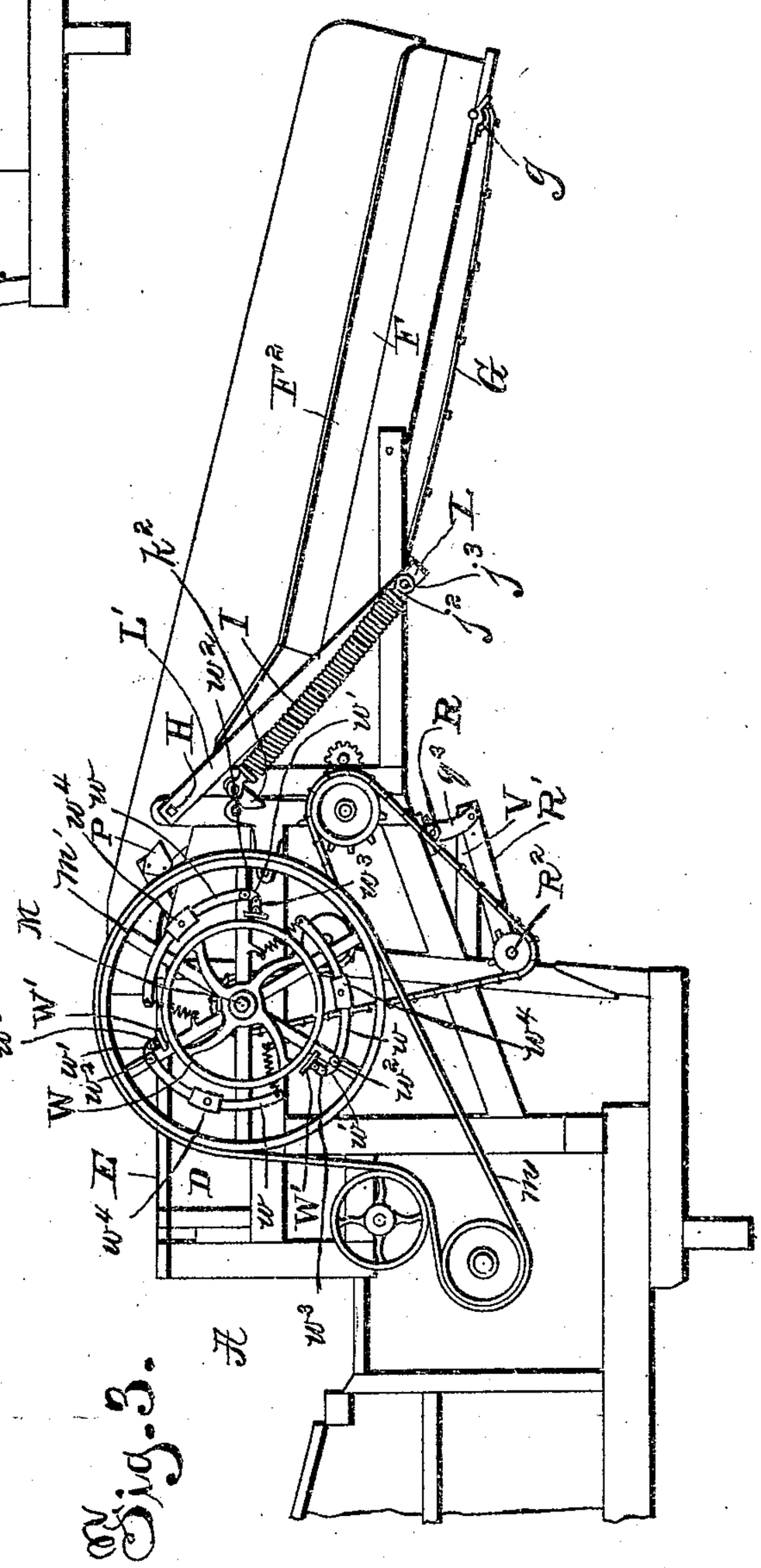

Fig. 3.

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4 SHEETS—SHEET 3.

Fig. 7.

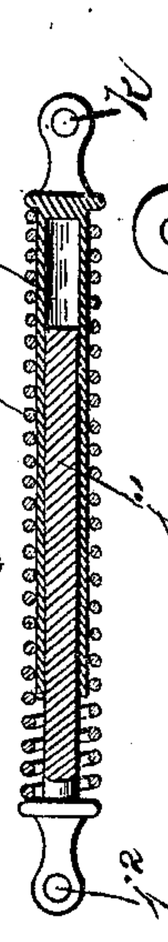


Fig. 8.

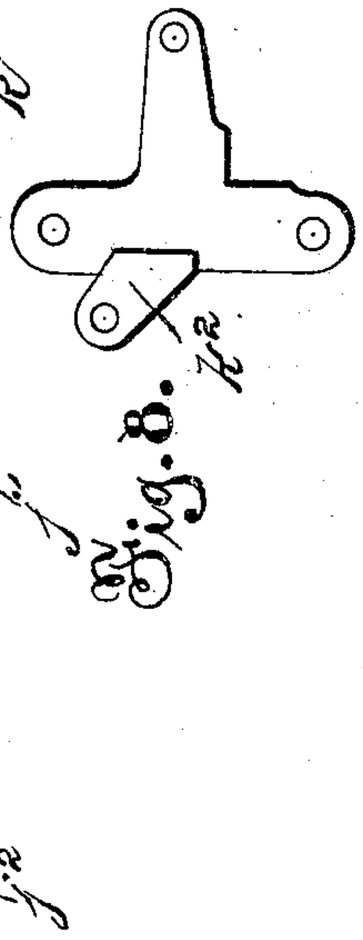


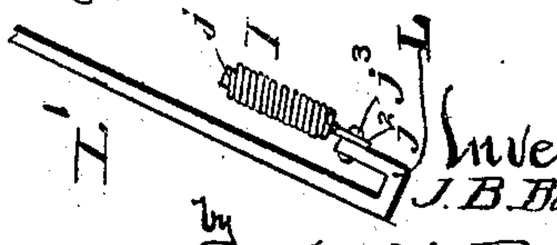
Fig. 4.



Fig. 6.



Fig. 8a.



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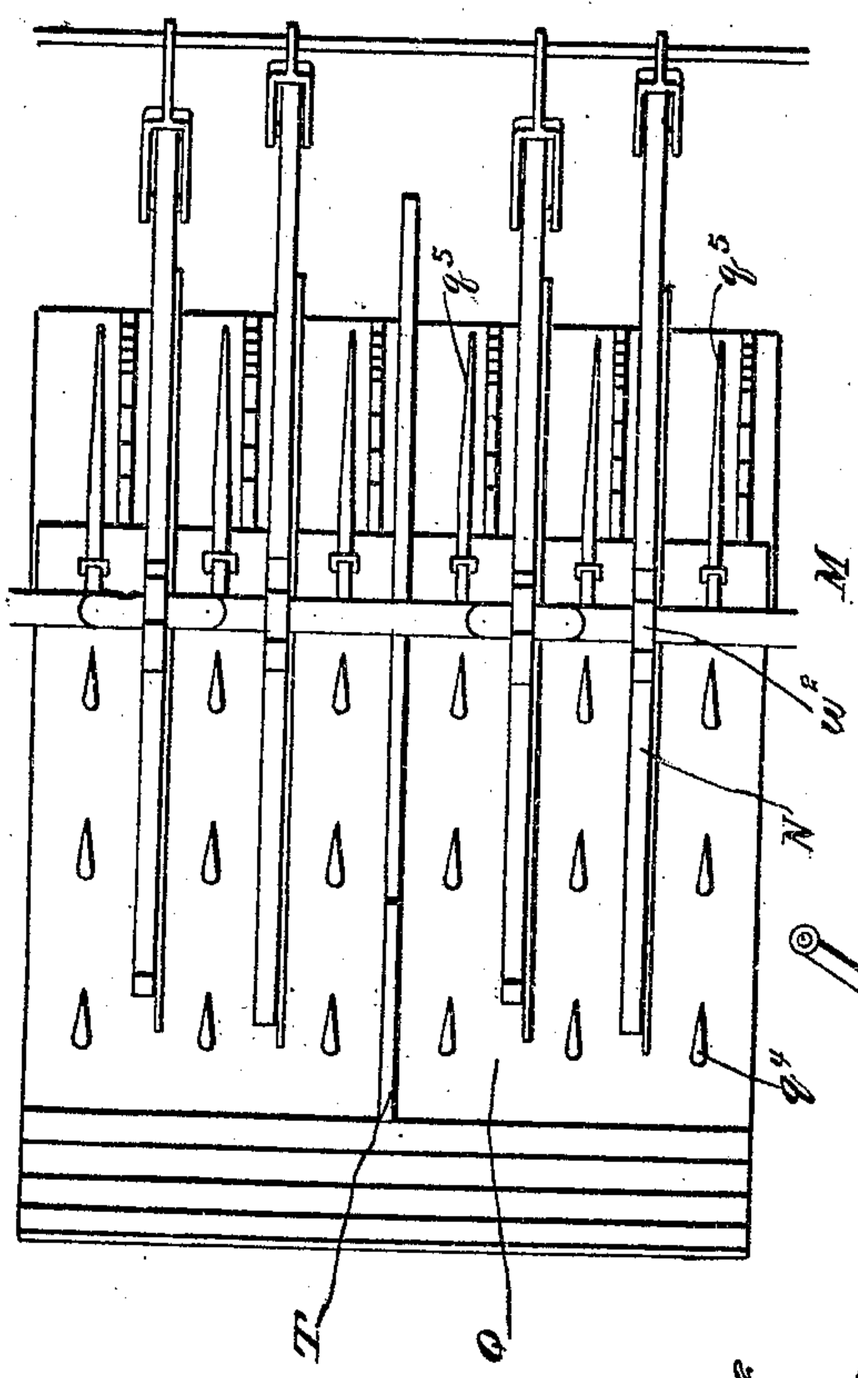


Fig. 10.

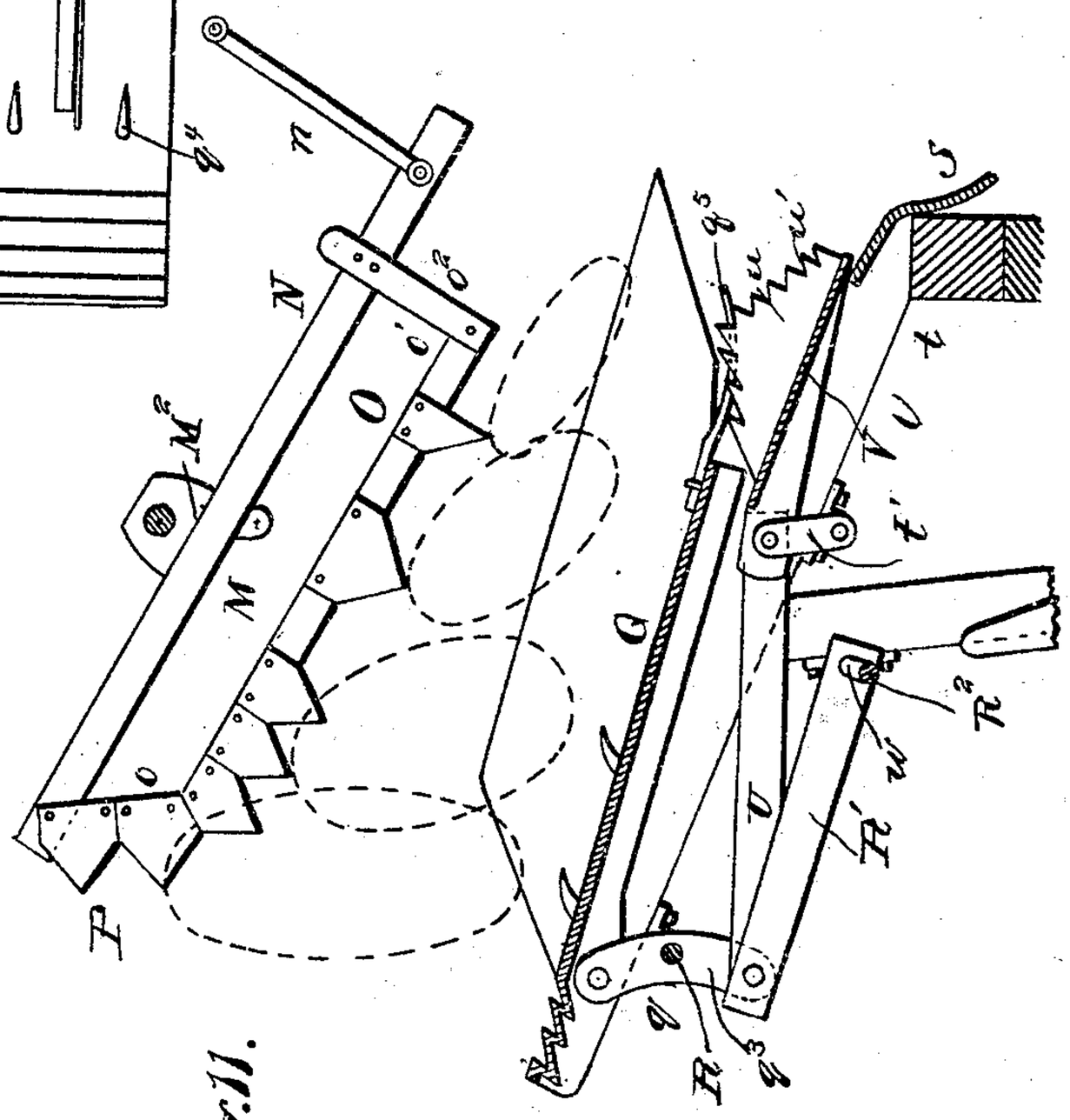


Fig. 11.

Witnesses
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Atty

# UNITED STATES PATENT OFFICE.

JOHN B. BARTHOLOMEW, OF PEORIA, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO AVERY COMPANY, A CORPORATION OF ILLINOIS.

## BAND-CUTTER AND FEEDER.

**959,446.** Specification of Letters Patent. **Patented May 31, 1910.**

Application filed November 29, 1898, Serial No. 697,782. Renewed October 30, 1909. Serial No. 525,553.

*To all whom it may concern:*

Be it known that I, JOHN B. BARTHOLOMEW, citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Band-Cutters and Feeders; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

Figure 1 is a longitudinal section of a portion of a thresher, and of a band feeding and cutting mechanism embodying my improvements. Fig. 2 is a side elevation of the same. Fig. 3 is a side elevation from the opposite side of the machine. Fig. 4 is a side elevation illustrating the manner of folding and unfolding the parts which carry the bundles to the cutters. Fig. 5 is a vertical cross section of the lower parts of the cutter and feeder. Fig. 6 is a view of the driving wheel and clutch detached. Figs. 7, 8, and $8^a$, illustrate details of the spring lifting devices for the feeder carrier. Fig. 9 shows detached the fender for the cutters. Fig. 10 is a plan view of the cutting devices and the table below them. Fig. 11 is a section of the parts on Fig. 10, illustrating diagrammatically the mode of operation of the cutters.

In the drawings A indicates a portion of a threshing mechanism, sufficient to illustrate the manner of applying my improvements thereto. In this there is mounted a threshing cylinder which together with the concave and adjacent parts may be of any common sort or of any preferred form. The cylinder is driven from the engine or motor at a distance by means of the belt B.

The mouth or passageway to the cylinder and concave is indicated by C.

The band cutter and feeder includes two parts, one comprising the mechanism for initially receiving the bundles and carrying them forward to the band cutters, together with the frame that supports them; and the other comprising the means for cutting the band, the device for properly holding the bundles while the bands are being cut, and the mechanism for opening up the bundles and loosening the straw and finally delivering it to the cylinder and concave, together with the frame work which supports them.

The frame for the band cutter and feeder consists of suitable sills, uprights and girders to which are attached casing walls D D and a top E. This casing is arranged to inclose more or less tightly the parts which cut the bands and open up and deliver the straw, and is connected to the thresher casing so as to form a substantially tight joint. The other member of the frame consists of longitudinal sill pieces F F, with one or more cross bars $F^1$, and fender boards $F^2$, which gradually widen at their inner ends so as to register properly with the side walls D D. In this outer frame F $F^1$ there is mounted an endless carrier G, supported upon suitable rollers $g$ $g^1$. Upon it the bundles are placed and by it they are carried forward and upward to the band cutting device. When the machine is in operation this part of the frame is let down to its extended position; when the machine is out of operation and is standing idle or being transported, the carrier part and its frame F $F^1$ are turned up and over and allowed to rest above the inner frame D D. Much trouble and inconvenience has been experienced with mechanisms of this sort heretofore on account of the great strain experienced by this overhanging or extending part F $F^1$ of the feeder frame, and also from the fact that when it is being folded up or let down into its working position its great weight makes it difficult to manipulate, requiring that two or more men should climb on top of the machine for the purpose of placing it in proper position or letting it down to its working position. This I overcome by the device illustrated.

At H the frame F $F^1$ is hinged to that at D D, this hinge being as will be seen at a relatively high point so that when the frame F $F^1$ is in its folded position it will readily lie over upon the top of the other frame.

I is a spring which is interposed between the two parts D D and F $F^1$ of the frame. By preference a compression spring is used rather than a tension spring. It is held by a spring carrier J having telescoping parts $j$ $j^1$, the former being tubular and receiving the latter. The part $j$ terminates in a hinge eye $k$ which by the pivot $K^1$ is connected to

the other element $k^2$ of a hinge which is rigidly fastened to the frame work D D.

The part $j^1$ has a hinge eye $j^2$ which at $j^3$ is pivoted to the bar L secured to the swinging frame F F$^1$. The bar L may be of any suitable sort, though I prefer for attaining strength to extend the hinge bar L$^1$ which joins the two parts of the frame together downward far enough to bend outward to provide this part L.

By examining the drawings it will be seen that the spring is peculiarly related to the members of the frame in such a way that the swinging frame when in either of the positions it occupies with the greatest downward force, is more or less suspended by the spring. For instance, when it is in the lower position or position of operation, the spring is under the utmost compression because of the relative positions of the hinges H $j^3$ and K$^1$. The hinge K$^1$ is somewhat out of the line joining the hinges H and $j^3$ so that there is not a positive lock, but at the same time the force of the spring is prevented from lifting up the swinging frame F F$^1$ until the operator gives it a slight start by lifting easily at the outer end. Such lifting moves the hinge K farther away from the line H $j^3$ and the spring is then permitted to exert its expansive force and it will itself (or when properly constructed and arranged can be so made as to) continue the upward swinging motion of the frame F F$^1$ to or near to its uppermost position. But to prevent its dropping upon the other frame, such a relative position is selected for the spring as that it serves as a cushion and decreases the downward force of the frame, the latter coming to its position of rest gradually and without danger of accident. When it is in its uppermost or folded position, the frame is again approximately locked because of the nearness of the pivot K$^1$ to the line H $j^3$.

The bundles of grain after being delivered to the interior of the main frame D D are caught by the devices which sever the bands.

M indicates the main shaft, it being mounted in suitable bearings in the side walls and receiving the power from the driving device, as for instance, a pulley on the cylinder shaft, through a belt $m$ and a wheel $m^1$ to be further described. The shaft M is formed with a series of cranks $m^2$, preferably four.

N are bars connected to the cranks $m^2$ at points somewhat remote from their rear ends, and at their forward ends they are suspended by links $n$ from hinges near the top of the casing. The cranks $m^2$ project alternately in opposite directions diametrically. The bars N carry the cutter bars O each of which has a downward inclined arm $o$ and a main arm $o^1$. The cutters P are secured to this bar. The part $o^1$ extends to a point near the front end of the bar N and is carried by a short vertical arm $o^2$.

The carrier apron G is inclined upward and inward and the bottom of the chamber D$^1$ is inclined downward and inward. The general direction of the bars N and the cutter bars carried thereby, is also downward and inward and approximately parallel to that of the bottom of the chamber D$^1$. The bundles are received from the carrier G upon an advancing floor or frame Q which is reciprocated toward and from the cylinder. It is supported at its rear edge upon crank arms $q$, and at its front edge by swinging links $q^1$ on the outside of the casing, the latter having inward projecting pivot pins at $q^2$. The crank arms $q$ are pivoted upon a cross shaft R and have arms $q^3$ which are connected by pitman R$^1$ to the cranks $r$ of a shaft R$^2$. The shaft R$^2$ is driven by sprocket chain from shaft M, the same chain serving also to drive roller $q^1$ of the carrier G, as indicated in Fig. 3. When the shaft R$^2$ is rotated by the above described parts, it gives a rapid reciprocation to the floor or platform Q, and the grain is advanced from the carrier G toward the threshing cylinder S and concave S$^1$.

The floor or platform Q is provided with forward projecting fingers $q^4$ which act to engage with and step by step advance the bundles. As they are being advanced by it with their bands in transverse planes, the latter are struck and cut by one or another of the knives P. At its front end the platform Q carries a series of upwardly curved fingers $q^5$ that project between the plates $u$ of the table U, presently to be described, and serve both to retard the bundles somewhat and, in connection with the plates $u$, to lift and spread the straw as it is delivered to the table U. But I have found that there is considerable liability for the bundles to be thrown from the desired position, namely: one longitudinal with the machine; and when thus thrown out of this position they reach the concave and cylinder in such a way as to interfere with the proper threshing action, it being always desired to have the straws advance longitudinally and as uniformly as possible. I have succeeded in overcoming this by employing a gavel guiding or deflecting wing T. It is inclined at its rear edge so as to prevent positively engaging with and stopping the bundles, and its front edge is projected forward as closely as possible to the teeth of the cylinder. It effectually prevents the bundles from becoming twisted or thrown out of their longitudinal position.

In front of the floor or platform Q I have a supplemental feeding platform U. It consists of a plate whose front edge rests upon the stationary bottom $t$, the plate being hinged to the crank arms $t^1$ and having two

sets of the triangular feeding plates $u$, these being provided with a series of cutter-like projections $u^1$ which not only insure that any band shall be thoroughly severed but also assist in guiding or straightening out the straws so that they shall be properly delivered to the concave and cylinder. This inner or supplemental table or platform U is rapidly reciprocated by means of the cross shaft $v$ which is connected by the links V to the arms $q^3$ above described for actuating the table or platform Q, the connections of the vibrating tables Q and U with the common driving shaft $R^2$ being such that the said tables are simultaneously reciprocated in opposite directions. It will be seen that the feed plates $u$ supplement the retarding action of fingers $q^5$, the plates moving backward while the fingers move forward, and vice versa, so that the two together furnish a continuous retarding support, holding the straw up to the action of the cutting and feeding knives P. When the platform Q and table U move away from each other the fingers $q^5$ and the plates $u$ tear apart and open up the straw, thus insuring an even feed to the thresher cylinder.

The wheel $m^1$ above referred to is mounted loosely on the crank shaft M. It is driven continuously by the belt $m$ from the cylinder shaft. Adjacent to this belt wheel there is a friction pulley W which is rigidly secured to the shaft M. Connection is effected between the belt wheel and the friction wheel by means of friction shoes $W^1$. These are carried by levers $W^2$, each consisting of a long arm $w$ and a shorter arm $w^1$ and is pivoted at $w^2$ to the belt wheel. To the short arm $w'$ there is pivoted an arm $w^3$ which carries one of the aforesaid friction shoes $W^1$. $w^4$ is a centrifugally acting weight adjustably connected to the arm $w$ of the lever. The parts $w^1$ and $w^3$ are so proportioned that when the shoe $W^1$ is being pressed against the wheel W the said parts shall act as a knee joint or toggle joint, but cannot come fully to a straight line. They approach closely to such line and therefore give a powerful connection between the two wheels W and $m^1$, but the three governing points are sufficiently far from the straight line to prevent a positive lock.

I am aware that it has been heretofore proposed to connect the threshing cylinder to the main shaft of a band cutter and feeder by means of a friction clutch of such weight that the friction surface would remain disengaged until the speed of the cylinder shaft shall have reached a predetermined point, and also so that the instant the speed falls below that point the band cutter and feeder will be thrown out of action. But with all the mechanisms of this sort within my knowledge there has been difficulty owing to the fact that heavy fly weights were necessary in order to hold the friction shoes in engagement. And as these parts are driven at a high speed breakages and accidents frequently happen; and moreover the connection is not sufficiently delicate.

By having a joint such as that at $w^1$ $w^3$ between the belt wheel and the friction wheel I provide for powerful pressure from a relatively small light weight. In fact in most machines the centrifugal action of the arm $w$ is of itself sufficient to cause an immediate connection between the two parts.

Y designates a shield or guard which surrounds the cranks of the shaft M, for the purpose of preventing the straw from engaging therewith. It is secured at its upper end to the frame work. As shown in Fig. 9, this guard or fender is preferably formed from a curved sheet of metal having slots therein through which the cranks of the shaft M can freely move.

I do not claim in this application the combined cutter and feeder bars N constructed and operatively mounted as herein shown; nor do I broadly claim the construction comprising the band cutting, and straw feeding means arranged to act on the straw from above the reciprocating platform or table upon which the bundles of straw are supported while the bands are being cut, the reciprocating table between the said platform and the threshing cylinder, the retarding and spreading means carried by the said platform and table, and means for simultaneously reciprocating the said platform and table in opposite directions, as these mechanisms or parts of a band cutting and straw feeding apparatus constitute part of my application, Ser. No. 522,437, filed Sep. 8, 1894, and are claimed in that application in various operative combinations and relations.

What I claim is:

1. In a band cutting and feeding mechanism, the combination with the mechanism for receiving and advancing the bundles and the mechanism for cutting the bands, of the two-part frame supporting said mechanism, the hinge uniting the parts of said frame and the spring arranged substantially as set forth to exert pressure upon the movable part of the frame, in one direction when the said part is in its unfolded or operative position and in an approximately opposite direction when said part is in its folded position.

2. In a band cutting and feeding mechanism, the combination with the devices for receiving and advancing the bundles and the mechanism for cutting the bands, of the two part supporting frame, the hinge uniting the two parts thereof, and the spring, abutting against both parts of the frame and arranged substantially as set forth to have

its line of action, when the swinging part of the frame is in its position of operation approximately coincident with a line between the hinge and one of the abutments for the spring and to exert a lifting action on the said frame when it moves away from said operative position, substantially as set forth.

3. In a band cutting and feeding mechanism, the combination with the devices which receive and advance the bundles, and the means for cutting the bands, of the two part frame, of which one part can swing from a position over the top of the other to a position at the end thereof, the hinge uniting the parts of the frame, and the spring arranged to abut against both parts of the frame and having its line of action, when the movable part of the frame is in its packed position, approximately coincident with the line from the hinge to the point of abutment on the swinging part of the frame, substantially as set forth.

4. In a band cutting and feeding mechanism, the combination with the devices which receive and advance the bundles, and the mechanism which severs the bands, of a stationary frame for a part of said devices and a swinging frame for the others, the hinge uniting the said frames, and the spring having two points of attachment, one connecting it to the stationary frame and one to the swinging frame, the line between said points of attachment being approximately coincident with the line from the hinge to the more remote point of attachment, both when the swinging frame is in its folded position and when it is in its unfolded or operating position, substantially as set forth.

5. In a band cutting and feeding mechanism, the combination with the receiving and advancing carrier G and the cutting and threshing mechanism, of the swinging frame F $F^1$, the hinge $K^1$, the spring I pivotally connected to the swinging frame at $j^3$, and pivotally connected to the stationary frame at $K^1$, the pivot at $K^1$, when the swinging frame is in its operating position, being adjacent to the line from the hinge H to the pivot at $j^3$, substantially as set forth.

6. In a band cutting and feeding mechanism, the combination with the band cutters and the devices which receive and advance the bundles, of the two-part supporting frame, one of whose parts can swing relatively to the other, the hinging devices which hold the swinging frame fixed in relation to its axis of oscillation, and a lifting spring for the swinging part of the frame supplemental to the hinging devices, having one end engaging with the swinging frame and one end engaging with the other part of the frame, and arranged to exert an upward bearing force against the swinging part of the frame and supporting the weight thereof, substantially as set forth.

7. In a band cutting and feeding mechanism, the combination with the band cutters and the devices which receive and advance the bundles, of the two part supporting frame, one of whose parts can swing relative to the other, the hinging devices which unite the swinging part of the frame to the fixed part thereof, whereby it may be moved from a folded or packed position to a working position, and a spring interposed between and connecting the two parts of the frame, the connection of the spring with the parts of the frame being such that its axial line crosses the axis of the hinge uniting the parts of the frame when the swinging frame is in a position between its working position and its packed or folded position, and the spring being arranged to exert the least force upon the swinging frame when it is in this position, and to exert an increasing degree of force as it moves in either direction from this position, substantially as set forth.

8. In a band cutting and threshing mechanism, the combination with the threshing cylinder and the concave, of the crank shaft, the reciprocating cutters carried thereby and arranged to act upon the straw from above, the reciprocating platform Q arranged to support the bundles of straw while the cutters are severing the bands thereof, and the reciprocating table U arranged between the platform Q and the threshing cylinder and below the cutters, the said reciprocating table being provided with a series of cutter-like projections $u^1$ arranged to sever any of the bands which may have escaped the cutters, and operating upon the straw from below to feed it toward the cylinder while the cutter bars are acting upon it from above,—substantially as set forth.

9. In a grain feeding and threshing mechanism, the combination of the threshing cylinder, the thresher frame, the mechanism for feeding the straw, the frame for said mechanism, the hinge interposed between the latter frame and the thresher frame around which the feeder frame can swing from a position of operation to a folded position, and a spring interposed between the swinging frame and the thresher frame and adapted to be compressed by the swinging frame as the latter approaches the position of operation.

10. In a band cutting and threshing mechanism, the combination with a threshing cylinder and concave, of a reciprocating table adjacent to the concave and having vertically arranged serrated plates, a reciprocating platform in rear of the said table, a crank shaft, and reciprocating cutters connected with and operated by said crank shaft and situated above said platform, said cutters being arranged to act upon the straw

and advance it relative to said serrated plates and toward the threshing cylinder, substantially as set forth.

11. In a band cutting and feeding mechanism the combination with the mechanism for receiving and advancing the bundles and the mechanism for cutting the bands, of the two-part frame for supporting said mechanism, one part being pivotally mounted on the other stationary part, and spring mechanism mounted on the stationary part and in operative engagement with the movable part to exert an upward turning pressure on said part both in its folded or inoperative position and in its unfolded or operating position, substantially as set forth.

In testimony whereof, I affix my signature, in presence of two witnesses.

JOHN B. BARTHOLOMEW.

Witnesses:

C. R. HOLZMAN,

O. T. BLACK.