No. 848,066. PATENTED MAR. 26, 1907.

D. A., J. F. & R. C. STEWART.

STRAW CUTTER.

APPLICATION FILED MAY 10, 1904.

4 SHEETS—SHEET 1.

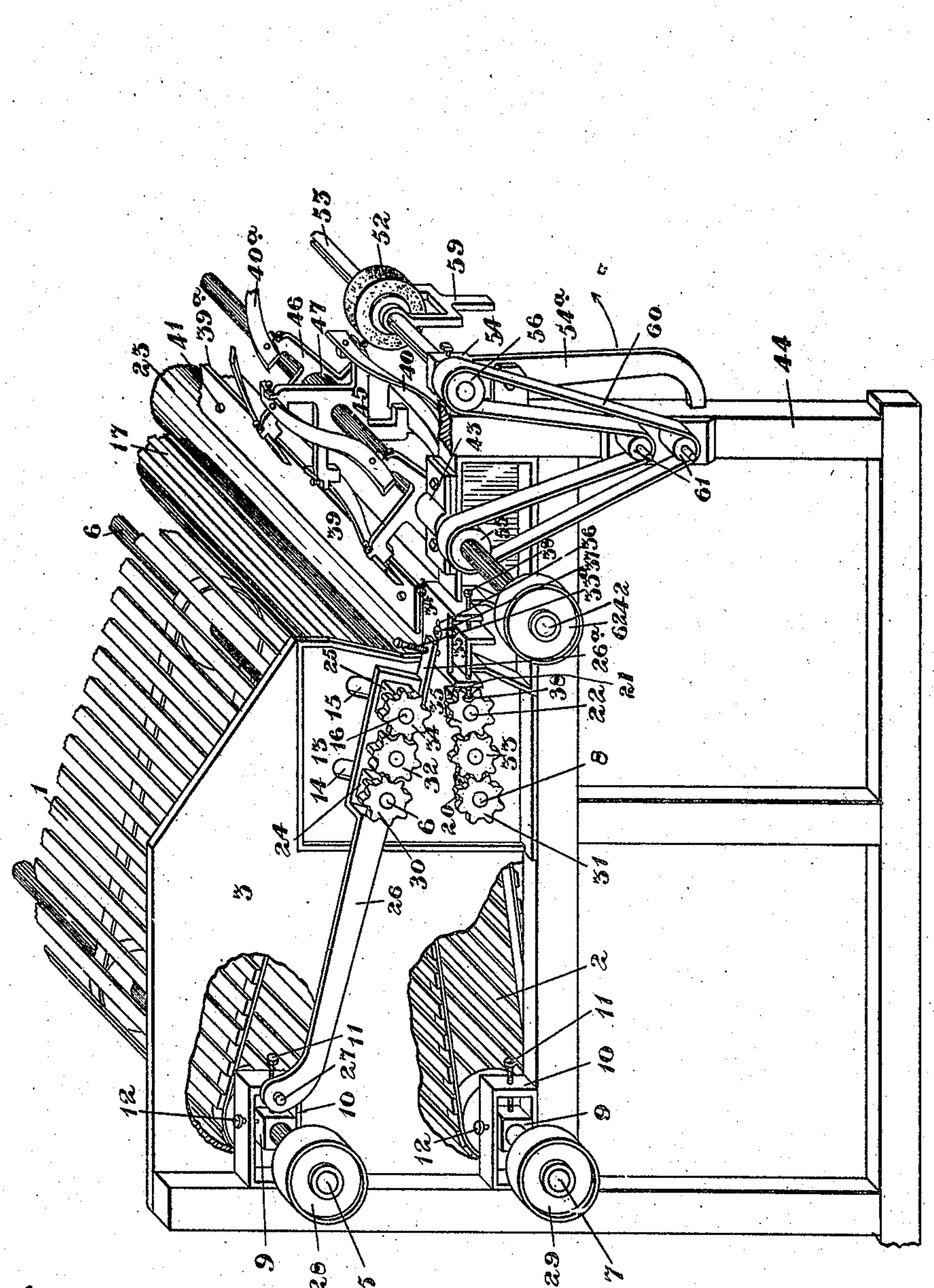

Fig. 1.

Witnesses.

H. L. Trimble.

O. B. Sheffield

Inventors.

David A. Stewart.

John F. Stewart

Robert C Stewart.

by Church & Riches

their attorney

No. 848,066. PATENTED MAR. 26, 1907.

D. A., J. F. & R. C. STEWART.

STRAW CUTTER.

APPLICATION FILED MAY 10, 1904.

4 SHEETS—SHEET 2.

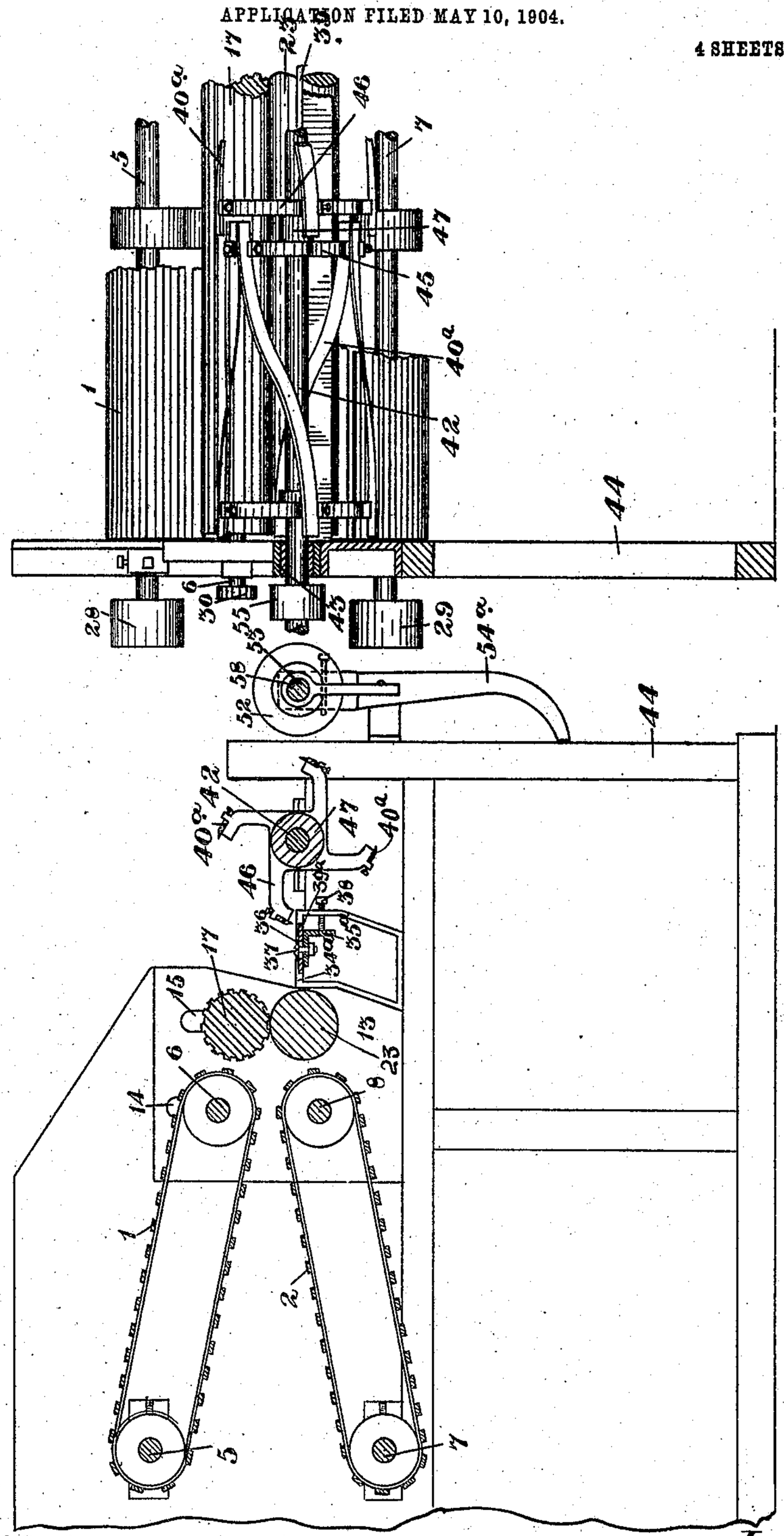

Fig. 3.

Fig. 2.

Witnesses.
H. L. Trimble.
O. B. Sheffield

Inventors
David A Stewart
John F Stewart
Robert C Stewart
by Chas. H. Peckham
Their Attorneys

No. 848,066. PATENTED MAR. 26, 1907.

D. A., J. F. & R. C. STEWART.

STRAW CUTTER.

APPLICATION FILED MAY 10, 1904.

4 SHEETS—SHEET 3.

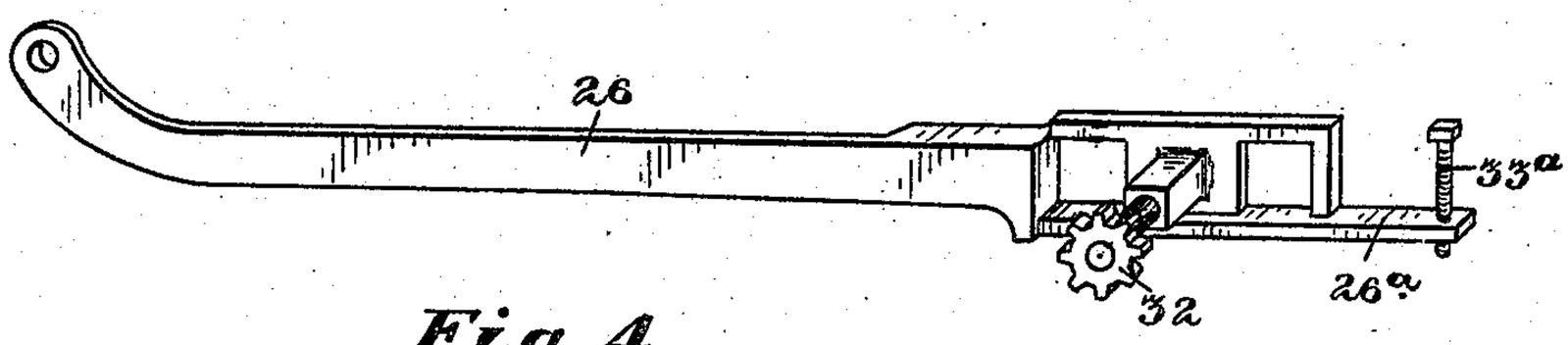

Fig. 4.

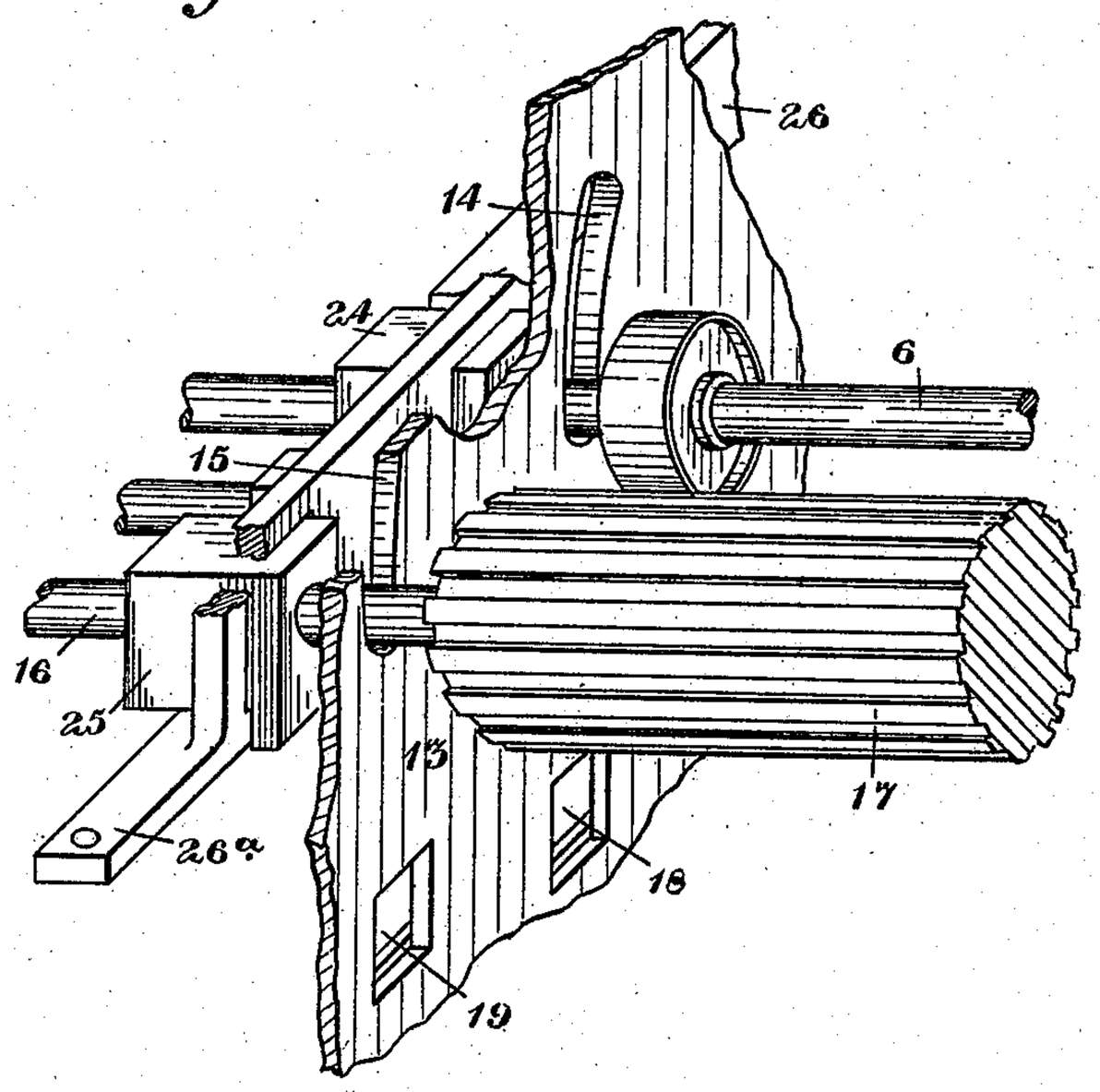

Fig. 5.

Witnesses.
H. L. Trimble.
C. B. Sheffield

Inventors.
David A Stewart
John F Stewart
Robert C Stewart
by Chas H Riches
their attorney

No. 848,066. PATENTED MAR. 26, 1907.

D. A., J. F. & R. C. STEWART.

STRAW CUTTER.

APPLICATION FILED MAY 10, 1904.

4 SHEETS—SHEET 4.

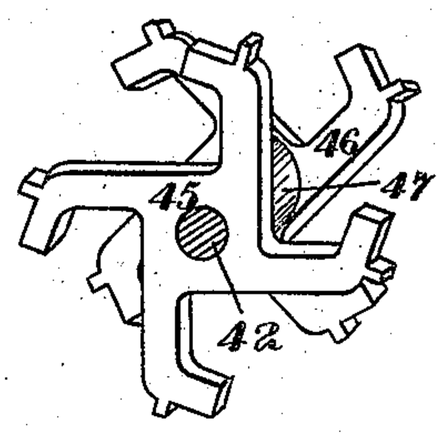

Fig. 6.

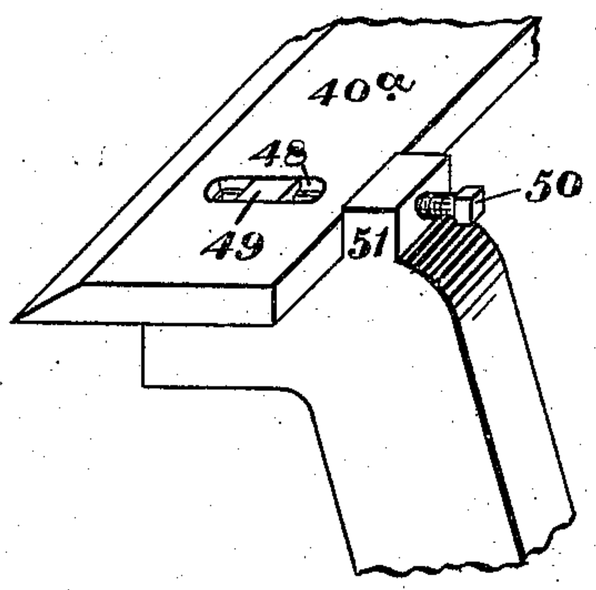

Fig. 7.

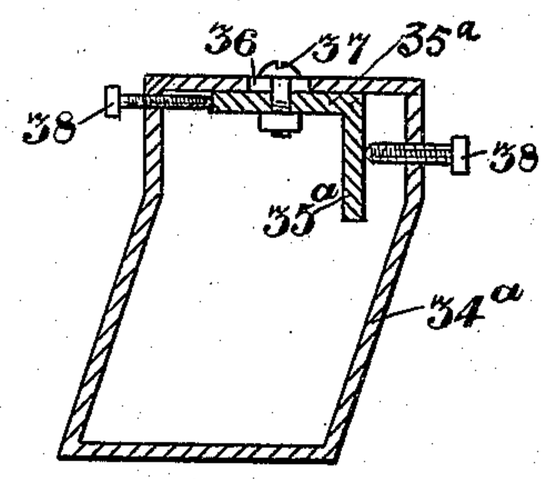

Fig. 9.

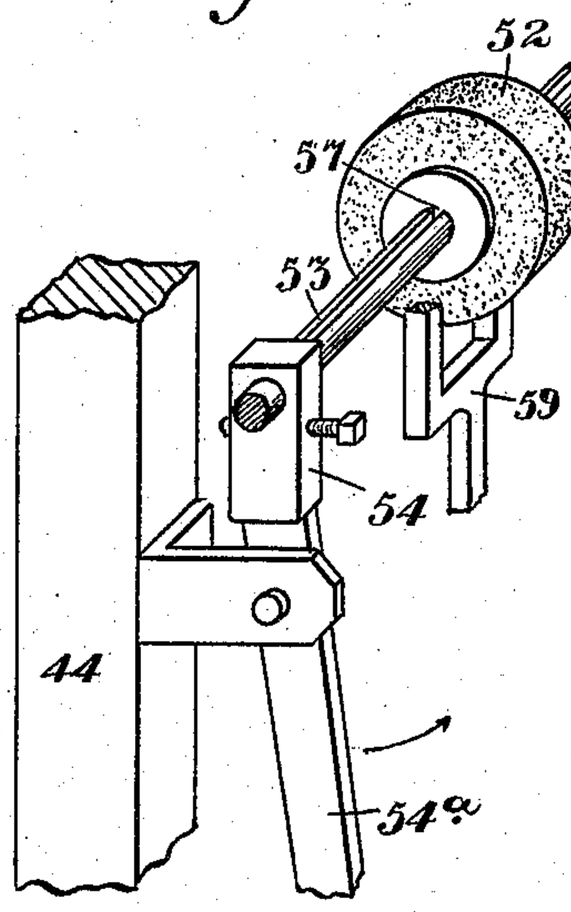

Fig. 10.

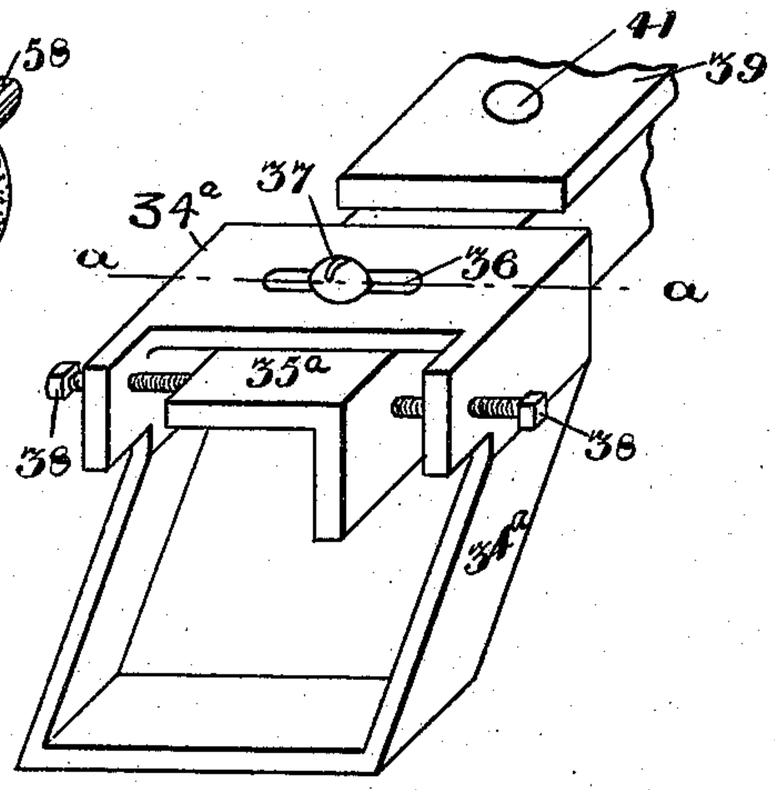

Fig. 8.

Witnesses.

H. L. Trimble.

C. B. Sheffield

Inventors.

David A. Stewart.

John F. Stewart

Robert C. Stewart

by Chas. H. Pierce

their attorney

UNITED STATES PATENT OFFICE.

DAVID ALBERT STEWART, JOHN FERGUSON STEWART, AND ROBERT CHARLES STEWART, OF MOLESWORTH, ONTARIO, CANADA.

STRAW-CUTTER.

No. 848,066. Specification of Letters Patent. Patented March 26, 1907.

Application filed May 10, 1904. Serial No. 207,230.

To all whom it may concern:

Be it known that we, DAVID ALBERT STEWART, JOHN FERGUSON STEWART, and ROBERT CHARLES STEWART, British subjects, and residents of the village of Molesworth, in the county of Huron and Province of Ontario, Canada, have invented certain new and useful Improvements in Straw-Cutters; and we hereby declare that the following is a full, clear, and exact description of the same.

On the 3d of May, 1904, Letters Patent of the United States No. 758,792 were granted to David Albert Stewart and John Ferguson Stewart for a combined threshing-machine and straw-cutter, in which the straw as it is discharged from the delivery mechanism of the threshing-machine is received between two conveyer-belts and automatically fed toward the cutting mechanism. In the above patent the conveyer-belts, owing to the bearings for their shafts being located between the sides of the inclosing frame, could only extend partially across the space between them, and it was necessary to employ straw-guards attached to the supports for the conveyer-belts to direct the straw from the straw-deck into the throat between them.

The present invention relates to a modification of the construction and operation of the apparatus described and shown in the above patent whereby the conveyer-belts will extend completely across the end of the straw-deck, so as to avoid the use of the straw-guards employed in the above-mentioned patent, and it also relates to a means for adjusting the tension of the conveyer-belts, and to the means for revolving them and the compression-rollers interposed between their delivery end and the cutting mechanism; and the invention further relates to the peculiar construction and operation of the cutting mechanism and to the operation of the means for sharpening the blades of the rotary knife; and the invention consists in the construction and combination of elements hereinafter described, and more particularly pointed out in the claims.

For a full understanding of the invention reference is to be had to the following description setting forth one means by which it may be carried into practice, and to the accompanying drawings, illustrating the same, in which—

Figure 1 is a perspective view of a part of the conveyer, cutting, and sharpening mechanisms. Fig. 2 is a longitudinal sectional view of the construction shown in Fig. 1. Fig. 3 is a partial end elevation, partly in section, showing the cutting mechanism. Fig. 4 is a perspective view of one of the supporting-arms for the rear shaft of the upper conveyer belt or apron. Fig. 5 is a perspective view of a portion of the supporting-arm shown in Fig. 4 and a portion of the rear shaft for the upper conveyer belt or apron, with its bearing mounted in the supporting-arm, and a portion of the upper compression-roll, with its shaft and bearing mounted in the same supporting-arm. Fig. 6 is a perspective view of the central one of the hubs of the rotary knife, with the radial knife-arms which carry the knife-blades. Fig. 7 is a perspective view of a section of one of the knife-blades, showing the means of attachment to the radial knife-arms. Fig. 8 is a perspective view showing the means for supporting the stationary knife. Fig. 9 is a transverse sectional view on the lines *a a*, Fig. 8; and Fig. 10 is a perspective view, partly in section, of the sharpening device.

Like numerals of reference refer to like parts throughout the specification and drawings.

The straw as it is discharged from the straw-deck is received into the throat between the endless conveyer belts or aprons 1 and 2, the contiguous surfaces of which converge from the receiving to the delivery end of the throat and are driven in the same direction, so that they will convey the straw toward the cutting mechanism and compress it as they carry it in that direction. The conveyer belts or aprons 1 and 2 extend completely across the space between the inner faces of the frame sides 3, so that there will be no escape for the straw between their edges and the inner faces of the frame sides. To provide for this construction, it is necessary to arrange the bearings for the shafts 5 and 6 of the upper conveyer-belt and the shafts 7 and 8 for the lower conveyer-belt on the outer faces of the frame sides 3. The forward shafts 5 and 7 of the upper and lower belts, respectively, are

journaled in bearing-blocks 9, longitudinally adjustable in slideways 10, attached to or forming part of the outer faces of the frame sides 3, and are maintained in their adjusted position in the slideways 10 by adjusting-screws 11 and clamping-screws 12. In the frame sides 3 contiguous to the cutting mechanism are metal plates 13, having curved slots 14 and 15 for the movements of the shaft 6 of the upper conveyer-belt and the shaft 16 of the upper compression-roll 17, and two apertures 18 and 19 to receive the bearing-blocks 20 and 21, in which are journaled, respectively, the shaft 8 of the lower conveyer-belt 2 and the shaft 22 of the lower compression-roll 23. The shafts 6 and 16 are journaled in bearing-blocks 24 and 25, respectively mounted in the supporting-arms 26, located on the outer sides of the frame and pivotally connected to the frame sides 3 by pivot-pins 27, from the centers of which the arcs of the slots 14 and 15 are described, so that the shafts 6 and 16 can rise and fall in the slots to allow the upper conveyer-belt automatically adjusting itself to the lower conveyer-belt to correspond to the quantity of straw passing through the throat between them. Upon the shafts 5 and 7 are drive-pulleys 28 and 29, to which motion is transmitted by any suitable motion-transmitting means for the purpose of driving the conveyer-belts 1 and 2. The movement of the conveyer-belts 1 and 2 causes the rotation of their respective rear shafts 6 and 8. On these rear shafts are mounted, respectively, gear-wheels 30 and 31, meshing, respectively, with intermediate gear-wheels 32 and 33, which in turn mesh, respectively, with gear-wheels 34 and 35, mounted upon the shafts 16 and 22 of the compression-rolls 17 and 23. Through this gearing motion of rotation is transmitted from the shafts 6 and 8 to the compression-rolls during the movement of the conveyer-belts. The supporting-arms 26 are provided with extensions 26^a, fitted with adjusting-screws 33^a, resting upon the supporting-brackets 34^a for the knife-bar 35^a to position the upper compression-roll 17 relatively to the lower compression-roll 23. In the top of the brackets 34^a are longitudinally-disposed slots 36, through which extend the fastening-bolts 37, one at each end of the knife-bar, securing the knife-bar 35^a to the brackets 34^a, and fitted to the sides of the supporting-brackets 34^a are adjusting-screws 38 to effect the lateral adjustment of the knife-bar 35^a and hold it with the assistance of the fastening-bolts 37 in its adjusted position. The fastening-bolts 37 are preferably of a breakable character, so that in the event of an obstacle becoming interposed between the stationary and rotary knives, which it is not possible for them to cut, the impact of the blow of the rotary knives against such obstacle will result in the bolts 37 breaking and allowing the knife-bar 35^a and the stationary knife 39, attached to its top surface, moving out of the path of the rotary knife 40, the knife 39 being securely fastened to the top of the knife-bar 35^a by fastening-screws 41.

The continuous use of the apparatus causes the blades of the rotary and stationary knives to wear away, and to compensate for this wear it is necessary to provide for the lateral adjustment of the stationary knife relatively to the blades of the rotary knife, and this adjustment is effected by the adjusting-screws 38 and fastening-bolts 37, which permit of the stationary knife being moved nearer to or farther away from the rotary knife-blades, as required by the character of the material to be cut. The rotary knife is mounted upon a revoluble shaft 42, journaled in bearings 43, fastened to the frame 44, and may be described as consisting of a series of knife-blades 40^a, carried by radial knife-arms 45 and 46, carried by hubs 47 on the shaft 42, the adjacent sets of radial arms being so disposed that they will not lie in the same radial plane, so that the knife-blades carried by them will not lie in a plane passing through the axis of the shaft 42 throughout their length and will not be parallel with the edge of the stationary knife. By this arrangement a shearing cut between the rotary knife and stationary knife is secured.

As shown in Fig. 7, the knife-blades 40^a have elongated slots 48 for the screws 49, which fasten them to the knife-arm, so that the knife-blades can be laterally adjusted upon the knife-arms by the adjusting-screws 50, which pass through the lugs 51 and engage the back of the knife-blades for that purpose. As shown in Figs. 1 and 3 of the drawings, the inner ends of each set of knife-blades connected to the knife-arms 45 and 46 overlap to present a continuous cutting-surface from one end of the rotary knife to the other, and to sharpen these knife-blades during their revolution a sharpening-wheel 52 is mounted upon a revoluble shaft 53, journaled in bearings 54, carried by a pivoted lever 54^a, fulcrumed to the frame 44. Mounted upon the shafts 42 and 53 are drive-pulleys 55 and 56, respectively.

As shown in Figs. 1 and 10, the sharpening-wheel 52 is of comparatively narrow width and is laterally movable upon the shaft 53. To effect the lateral movement of the sharpening-wheel and at the same time cause its revolution with the shaft, the bore of the hub of the sharpening-wheel is provided with a spline 57, which enters the longitudinal groove 58 in the shaft 53, and encircling the shaft is a forked shifter 59, embracing the opposite sides of the sharpening-wheel 52. Motion is transmitted from the drive-pulley 55 to the drive-pulley 56 by a drive-belt 60, passing around two tension-idlers 61, journaled upon studs connected to the frame 44,

and motion is transmitted to the shaft 42 by the drive-pulley 62 and motion-transmitting means.

The operation of the apparatus is as follows: Motion is transmitted to the forward shafts 5 and 7 of the upper and lower belts through the drive-pulleys 28 and 29, respectively, and the contiguous surfaces of the conveyer-belts are caused to move in the same direction—that is, toward the compression-rolls—to carry the straw delivered from the straw-deck into the throat between them toward the cutting mechanism. The movement of the conveyer-belts causes the rotation of the shafts 6 and 8, respectively, and the gear-wheels 30 and 31, mounted upon these shafts, and the motion of the gear-wheels 30 and 31 is transmitted to the gear-wheels 34 and 35 by the intermediate gear-wheels 32 and 33, meshing with them, so that the compression-rolls 17 and 23 will be caused to rotate continuously during the movement of the conveyer-belts and at the same rate of speed to feed the straw across the top of the stationary knife 39. The straw when received from the straw-deck of the threshing-machine is in a loose and bulky condition, and it is therefore necessary to have the opening between the conveyer-belts where the straw is delivered into the throat of a size corresponding to the capacity of the threshing apparatus, and as it would be impossible for the knives to cut the straw in this loose condition it is necessary to have the conveyer-belts converge toward the cutting mechanism, so that they will compress it as they feed it toward the compressing-rolls. The compression-rolls, the upper one, 17, of which is preferably corrugated, engage the straw and feed it across the top of the stationary knife 39, so that the blades of the rotary knife as they pass the edge of the stationary knife 39[a] will cut it during their rotation, the rotary knife being driven by motion transmitted to its shaft 42 from the drive-pulleys 62. In the event of an obstacle passing onto the stationary knife 39[a] with the straw, which it is not possible for the blades of the rotary knife to cut, these blades will come into contact with such obstacle and force it against the stationary knife with sufficient pressure to break the fastening-bolts 37, which when broken will allow the stationary knife and knife-bar to be forced out of their normal position and clear the path for the continued rotation of the blades of the rotary knife. During the rotation of the shaft 42, motion is transmitted to the shaft 53 and sharpening-wheel 52 by the drive-belt 60, and when the lever 54[a] is turned in the direction indicated by the arrow in Figs. 1 and 10 the sharpening-wheel 52 is brought into engagement with the blades of the rotary knife, and by moving the sharpening-wheel 52 along the shaft 53 it will contact with the entire edges of the blades during its movement. When it is necessary to deliver the straw uncut, the knife-bar and stationary knife are removed from their supports.

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

1. In a straw-cutter, the combination of an endless apron, forward and rear shafts carrying the apron, the rear shaft being journaled in stationary bearings, a second endless apron, forward and rear shafts carrying said second apron and arranged parallel with the shafts carrying the first-mentioned apron, arms pivoted near the forward shaft of the second apron and provided near their free ends with bearings in which the rear shaft of the second apron is journaled, and means for adjusting the position of the free ends of said arms relative to the rear shaft of the first-mentioned apron.

2. In a straw-cutter, the combination of an endless apron, forward and rear shafts carrying the apron, the rear shaft being journaled in stationary bearings, and the forward shaft being carried in adjustable bearings, a second endless apron, forward and rear shafts carrying said second apron and arranged parallel with the shafts carrying the first-mentioned apron, the forward shaft of the second apron being carried in adjustable bearings, and arms pivoted near the bearings of the second apron, and provided near their free ends with bearings in which the rear shaft of the second apron is journaled.

3. In a straw-cutter, the combination of an endless apron, forward and rear shafts carrying the apron, the rear shaft being journaled in stationary bearings, and the forward shaft being carried in adjustable bearings, a second endless apron, forward and rear shafts carrying said apron, and arranged parallel with the shafts carrying the first-mentioned apron, the forward shaft of the second apron being carried in adjustable bearings, arms pivoted near the bearings of the second apron and provided near their free ends with bearings in which the rear shaft of the second apron is journaled, and means for adjusting the position of the free ends of said arms relative to the rear shaft of the first-mentioned apron.

4. In a straw-cutter, the combination of an endless apron, forward and rear shafts carrying the apron, the rear shaft being journaled in stationary bearings, a compression-roll journaled in stationary bearings in rear of and parallel with the rear shaft of the apron, a second endless apron, forward and rear shafts carrying said second apron and arranged parallel with the shafts carrying the first-mentioned apron, arms pivoted near the forward shaft of the second apron, and provided near their free ends with bearings

in which the rear shaft of the second apron is journaled, and a second compression-roll in rear of and parallel with the rear shaft of the second apron, journaled in bearings carried by said arms, and means for adjusting the free ends of said arms relative to the rear shaft of the first-mentioned apron.

5. In a straw-cutter, the combination of side frames, an endless apron, forward and rear shafts carrying the apron, bearings for said shafts carried by the side frames, the bearings for the rear shaft being stationary, a second endless apron, forward and rear shafts carrying said second apron and arranged parallel with the shafts of the first-mentioned apron, bearings for the forward shaft of the second apron carried by the side frames, and arms pivoted near the bearings of the forward shaft of the second apron, and provided near their free ends with bearings in which the rear shaft of the second apron is journaled, the bearings of the forward shafts of both aprons, the bearings of the rear shaft of the first-mentioned apron and the arms carrying the bearings of the rear shaft of the second apron, being all located outside the side frames.

6. In a straw-cutter, the combination of side frames, an endless apron, forward and rear shafts carrying said apron, bearings for the shafts carried by the side frames, the bearings for the rear shaft being stationary, a second endless apron, forward and rear shafts carrying said second apron, and arranged parallel with the shafts of the first-mentioned apron, bearings for the forward shaft of said second apron carried by the side frames, and arms outside the side frames pivoted near the bearings of the forward shaft of the second apron, and provided near their free ends with bearings in which the rear shaft of the second apron is journaled, the side frames being provided with slots through which the ends of the rear shaft extend, and in which they are free to move.

7. In a straw-cutter, the combination of side frames, an endless apron, forward and rear shafts carrying said apron, bearings for the shafts carried by the side frames, the bearings for the rear shaft being stationary, a second endless apron, forward and rear shafts carrying said second apron and arranged parallel with the shafts of the first-mentioned apron, bearings for the forward shaft of said second apron carried by the side frames, and arms outside the side frames pivoted near the bearings of the forward shaft of the second apron, and provided near their free ends with bearings in which the rear shaft of the second apron is journaled, the side frames being provided with slots through which the ends of the rear shaft extend and in which they are free to move, and means for adjusting the position of the free ends of said arms relative to the rear shafts of the first-mentioned apron.

8. In a straw-cutter, the combination of an endless apron, forward and rear shafts carrying the apron, the rear shaft being journaled in stationary bearings, a compression-roll journaled in stationary bearings in rear of and parallel with the rear shaft of the apron, gearing connecting said rear shaft and the feed-roll, a second endless apron, forward and rear shafts carrying said second apron, and arranged parallel with the shafts carrying the first-mentioned apron, arms pivoted near the forward shaft of the second apron, provided near their free ends with bearings in which the rear shaft of the second apron is journaled, a second compression-roll in rear of and parallel with the rear shaft of the second apron, journaled in bearings carried by said arms, and gearing connecting the said second feed-roll and the rear shaft of said second apron.

9. In a straw-cutter, the combination of an endless apron, forward and rear shafts carrying the apron, the rear shaft being journaled in stationary bearings, a compression-roll journaled in stationary bearings in rear of and parallel with the rear shaft of the apron, gearing connecting said rear shaft and the feed-roll, a second endless apron, forward and rear shafts carrying said second apron, and arranged parallel with the shafts carrying the first-mentioned apron, arms pivoted near the forward shaft of the second apron, provided near their free ends with bearings in which the rear shaft of the second apron is journaled, a second compression-roll in rear of and parallel with the rear shaft of the second apron, journaled in bearings carried by said arms, and gearing connecting the said second feed-roll and the rear shaft of said second apron, and means for adjusting the free ends of said arms relative to the rear shaft of the first-mentioned apron.

10. In a straw-cutter, the combination of means for feeding the straw, a movable knife, a stationary knife, and means for moving the movable knife in a downward direction to coöperate with the stationary knife, a supporting-bracket for each end of the stationary knife, having its under surface adapted to receive the ends of the stationary knife, and a single bolt at each end of the knife securing it to the bracket, said bolts being adapted to permit the stationary knife to drop in case a substance which cannot be cut is presented to the knives.

DAVID ALBERT STEWART.
JOHN FERGUSON STEWART.
ROBERT CHARLES STEWART.

Witnesses:
JAMES MORDEN CARTHEW,
GEORGE BRAMHILL COOPER.