(No Model.) 3 Sheets—Sheet 1.

C. S. WATERS.

CORN HARVESTER.

No. 563,522. Patented July 7, 1896.

FIG. 1.

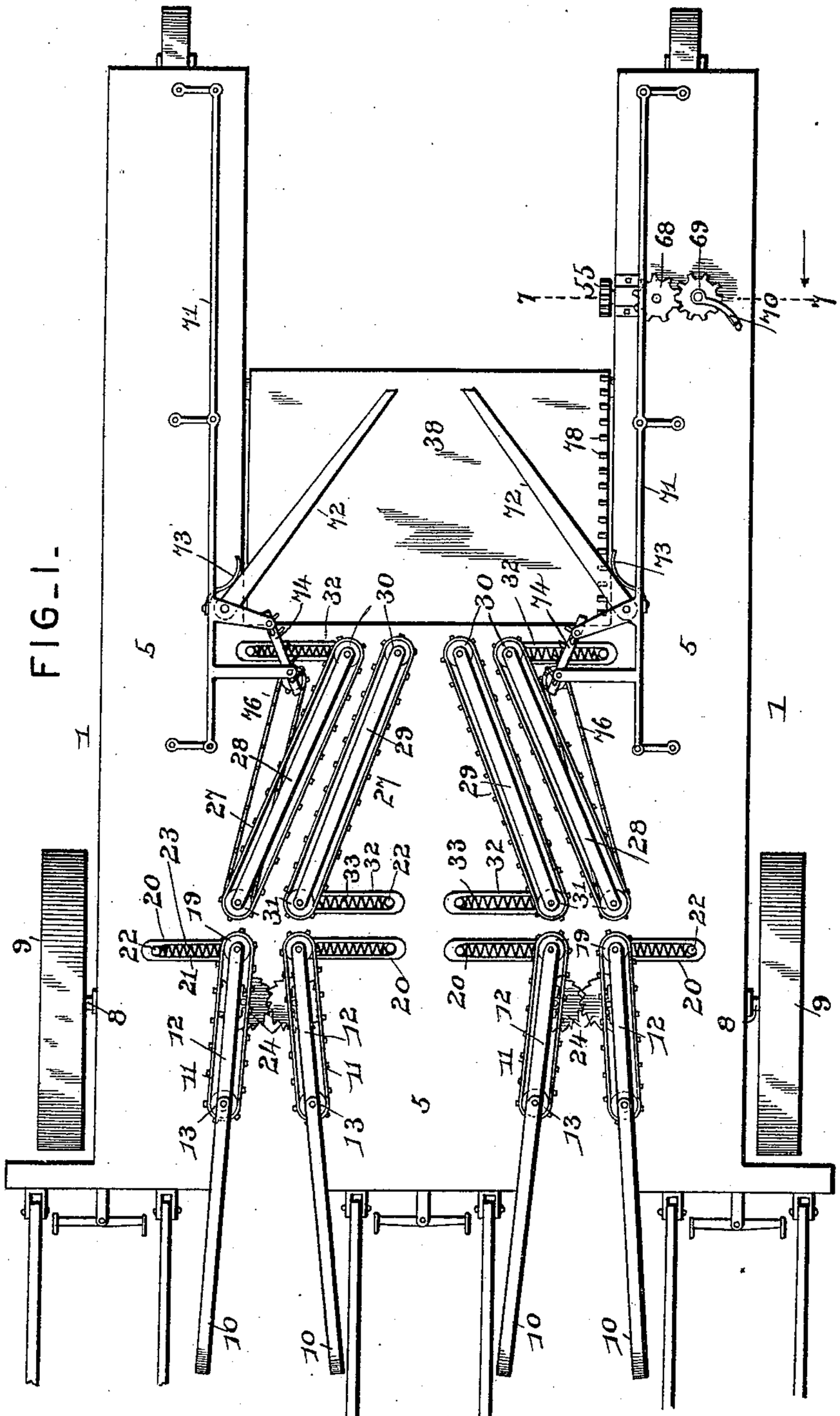
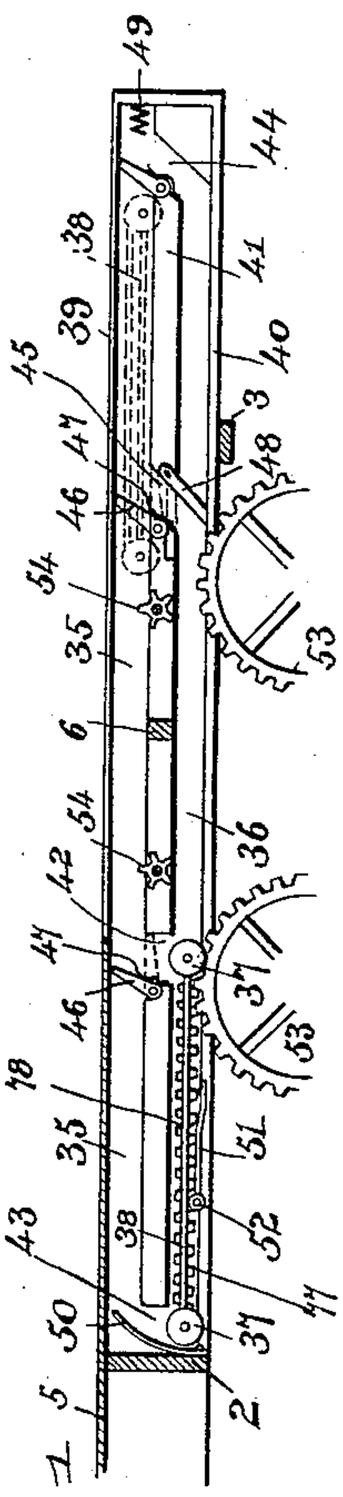


FIG. 6.



Witnesses

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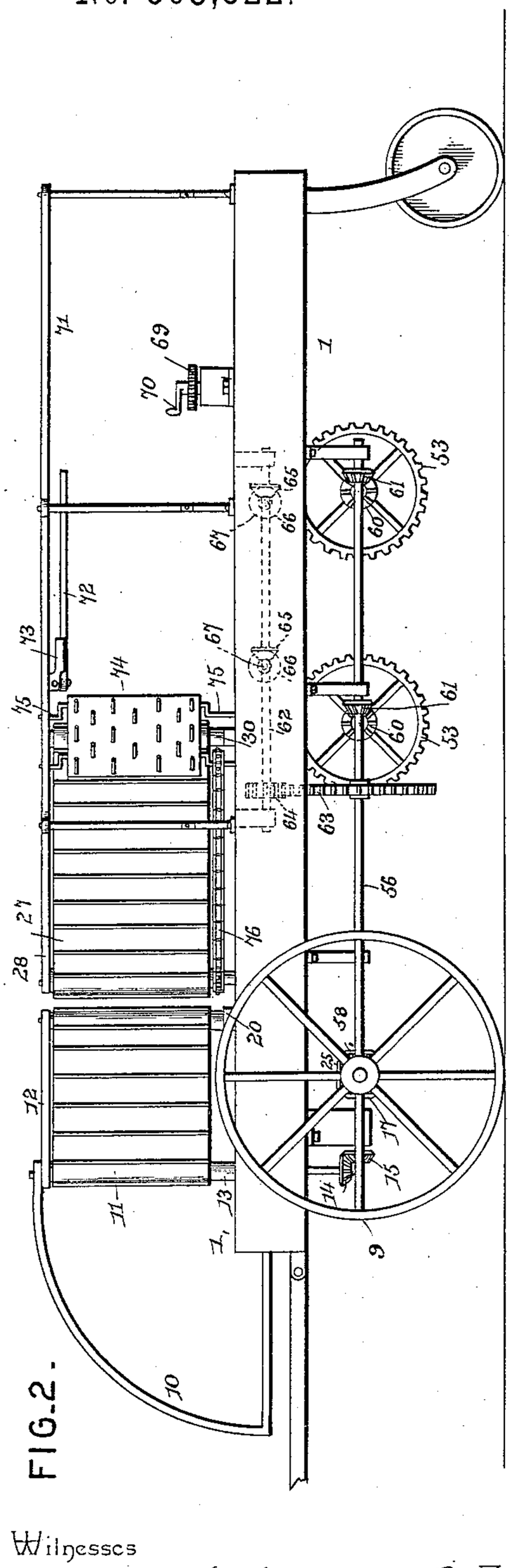

FIG. 2.

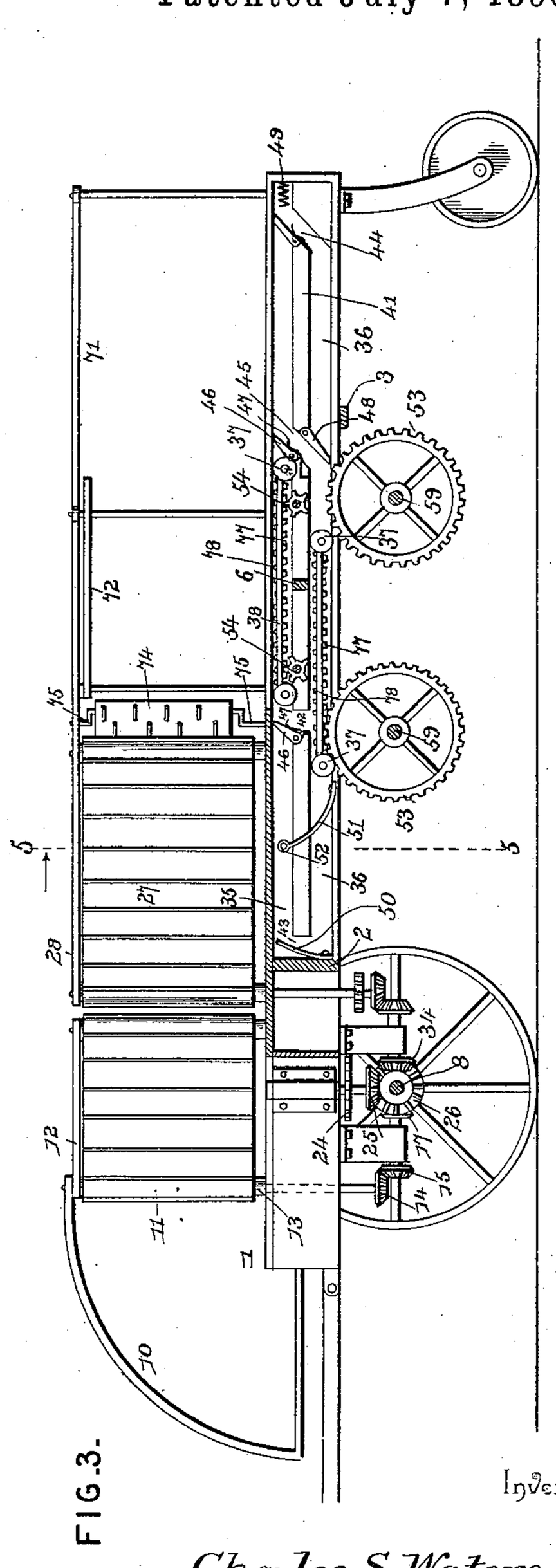

FIG. 3.

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CORN HARVESTER.

No. 563,522. Patented July 7, 1896.

FIG. 4.

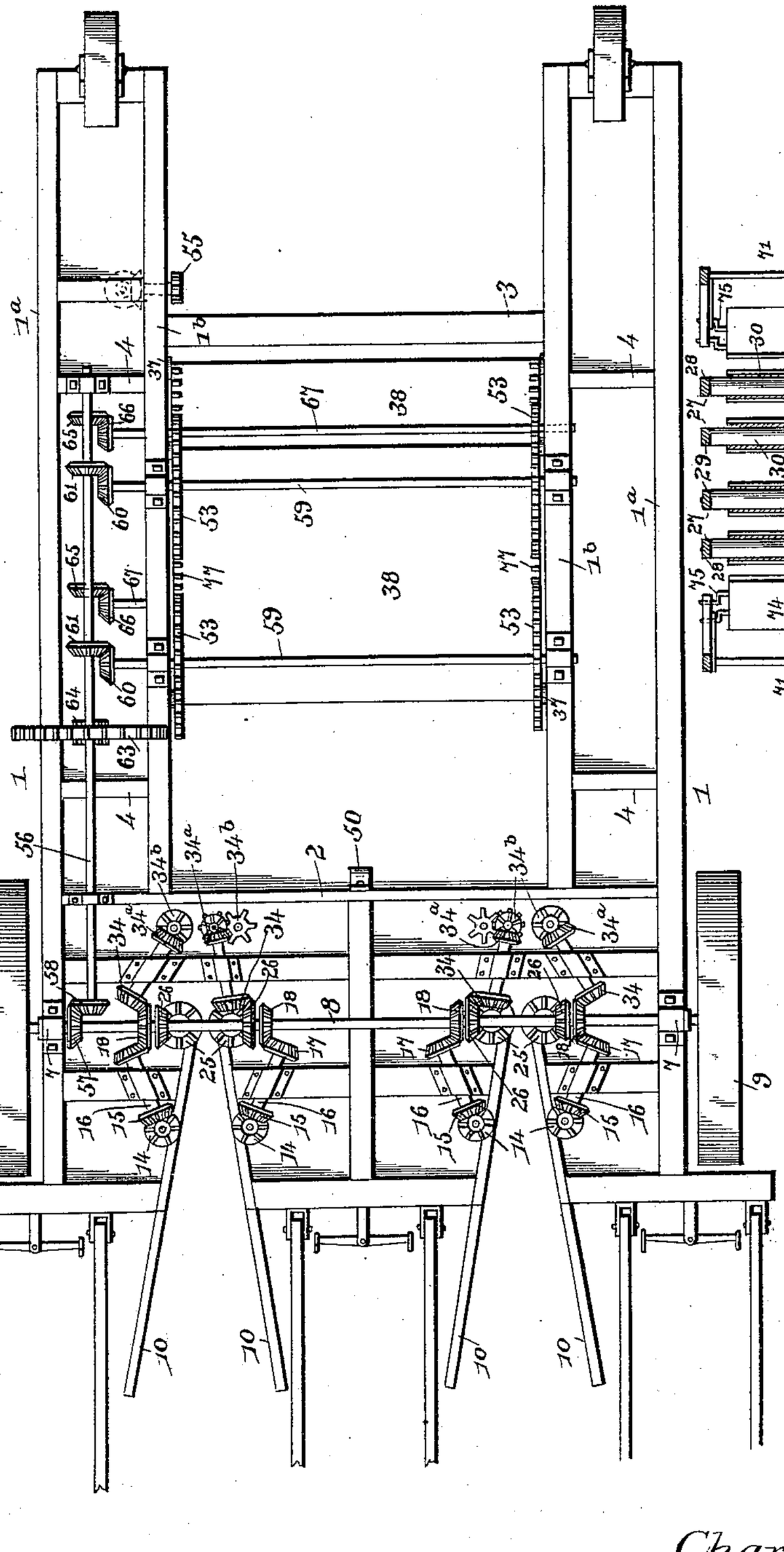


FIG. 5.

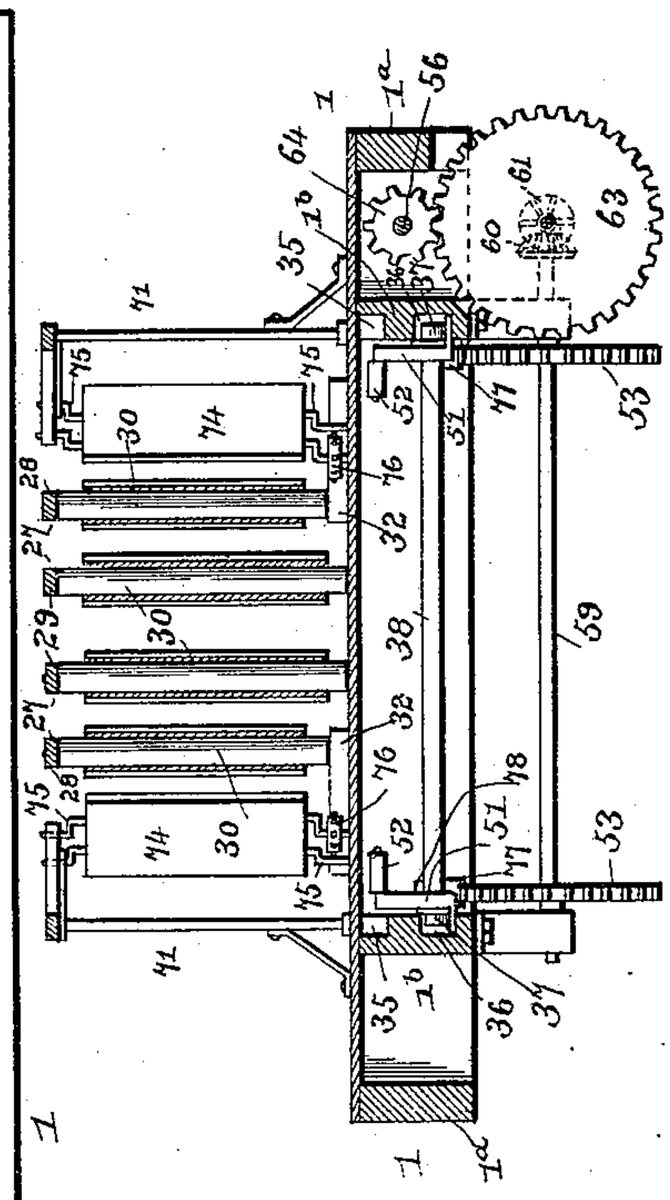
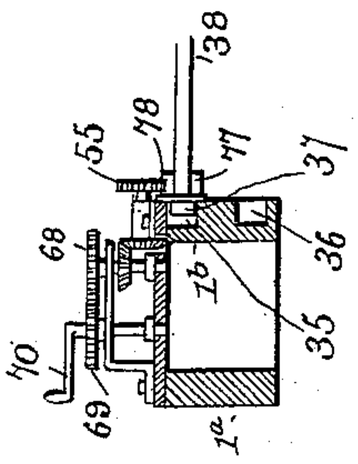


FIG. 7.



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UNITED STATES PATENT OFFICE.

CHARLES S. WATERS, OF WORSTVILLE, OHIO, ASSIGNOR OF ONE-HALF TO CHARLES E. GONSER AND JAMES O. GONSER, OF PAYNE, OHIO.

CORN-HARVESTER.

SPECIFICATION forming part of Letters Patent No. 563,522, dated July 7, 1896.

Application filed January 8, 1895. Serial No. 534,239. (No model.)

To all whom it may concern:

Be it known that I, CHARLES S. WATERS, a citizen of the United States, residing at Worstville, in the county of Paulding and State of Ohio, have invented a new and useful Corn-Harvester, of which the following is a specification.

My invention relates to corn-harvesters, and particularly to shocking apparatus for machines of that class, and the objects in view are to provide a simple and efficient shocking-table and means for operating the same, whereby as the fodder is cut and is fed rearwardly by the conveying apparatus it is received upon a table, and while being held in a vertical position suitable for forming a shock is carried rearwardly until a sufficient number of stalks have been accumulated, after which the table is dropped and drawn quickly from beneath the shock to allow the latter to fall upon the ground, where it remains standing, the table meanwhile being returned to take its position at the front of the machine to replace a second table which is being filled during the emptying and returning of the first-mentioned table.

Further objects and advantages of the invention will appear from the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a plan view of a machine constructed in accordance with my invention. Fig. 2 is a side view of the same. Fig. 3 is a longitudinal section. Fig. 4 is a bottom plan view. Fig. 5 is a transverse section on the line 5 5 of Fig. 3. Fig. 6 is a detail section of the shocking apparatus, showing one of the tables as seen just prior to being raised by the elevating-spring at the limit of its return movement. Fig. 7 is a detail section on the line 7 7 of Fig. 1.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

1 designates the side beams, connected near their front ends by a transverse beam 2 and near their rear ends by a transverse beam 3, said side beams comprising inner and outer beams 1^a and 1^b, respectively, connected by interposed spacing-blocks 4 and covered by a flooring 5. Intermediate transverse braces 6 connect the inner members of the side beams.

Mounted in bearings 7 upon the under side of the outer members of the side beams is a driving-shaft 8, to which are attached the ground-wheels 9, said driving-shaft carrying a series of bevel-gears for communicating motion to the various parts of the mechanism comprising the machine.

Stalk-guides or gathering-arms 10 project in front of the framework, and contiguous to their rear ends are arranged the front ends of vertical gathering-aprons 11, mounted upon pivotal frames 12, which are pivoted at or near the rear ends of said gathering-arms and are free at their rear ends to be adjusted laterally. The front rollers 13 of these aprons are provided with bevel-gears 14, with which mesh similar bevel-gears 15 on the short countershaft 16, arranged in the framework and provided with other bevel-gears, 17, which mesh with the gears 18 on the driving-shaft 8, and the rear rollers 19 of said aprons are mounted at their lower ends in sliding blocks 20, the longitudinal slots 21 of which receive stationary guide-pins 22 on the framework, springs 23 being arranged in said slots to press the rear ends of the apron-frames inward or toward each other in pairs, whereby a yielding pressure is exerted upon opposite sides of the stalks as they are fed toward the cutting-knives 24. These cutting-knives are arranged in pairs, with their peripheries or cutting edges overlapping, and they are driven by the shaft 8 through pinions 25, which mesh with the gears 26 on said shaft.

Arranged in rear of the rear ends of the gathering-aprons are the conveying-aprons 27, mounted in frames 28 and 29, the latter or inner frames being yielding to accommodate the quantity of stalks which pass therebetween. The frames 29 are pivoted at their rear ends upon the rear rollers 30 and are provided at their front ends with the rollers 31, which are mounted in sliding blocks 32, constructed as described in connection with the blocks 20 and provided with actuating-springs 33. The frames 28 are pivoted at their front ends on the rollers 31 and having their rear rollers 30 mounted in sliding blocks 32, similar to those

above described. Motion is communicated to the conveying-belts from the gears 18 and 26 through the pinions 34 and 34ª and the pinions 34ᵇ, which are carried by the front rollers of the conveying-aprons.

The space between the inner members of the side beams 1 is open at the rear to allow the shocks, after being dropped, to maintain a vertical position, and on the inner sides of said inner members of the side beams are arranged upper and lower guides 35 and 36, adapted to receive the flanged rollers 37 of the shocking-tables 38, which operate between the side beams, said guides consisting of channels formed by upper and lower webs 39 and 40 and an intermediate web 41. These guides are connected in front of their center by vertical channels 42 and 43, the latter of which is arranged at the extreme front ends of the guides and the former at a distance in rear thereof corresponding with the interval between the rollers 37, whereby a table may be raised from the lower to the upper guide at the front end of the latter by passing its rollers through the connecting-channels 42 and 43. Said upper and lower guides are further connected in rear of their center by inclined ways 44 and 45, of which the former is arranged adjacent to the extreme rear ends of the guides, while the latter is disposed at an interval therefrom corresponding with the distance between the rollers 37 of a table, whereby when a table passes along the upper guide to the rear end thereof it may be moved downward and forward through the ways to the lower guide.

The channel 42 and the ways 44 and 45 are provided with bridging-pieces 46, which are normally held in the elevated position (shown in full lines in Fig. 6) by means of actuating-springs 47, but which may be lowered to the horizontal position (shown in dotted lines in Fig. 6) to complete the intermediate webs or bridge the openings formed therein to allow the flanged rollers 37 to pass freely thereover. Furthermore, an inclined switch 48 is arranged adjacent to the guideway 45 and normally bears at its free lower end upon the upper surface of the lower web 40, as shown in full lines in Fig. 6, but which may be elevated to open the lower guide, as shown in dotted lines in said figure. Said switch is normally held in its lowered position by gravity. A cushion-spring 49 is arranged at the rear end of each upper guide, and an impulse-spring 50 is arranged at the front end of the same, while between the channels 42 and 43 and secured to the upper surfaces of the webs 40 are the elevating-springs 51, which curve upward toward their front ends to hold the antifriction-rollers 52 at their upper extremities in the upper guides. Obviously, the elevating-springs 51 are arranged inward sufficiently to pass the inner edges of the intermediate webs 41.

Arranged with their upper sides projecting slightly above the plane of the bottoms of the lower guides 36 are the feeding-gears 53, the rear gear 53 being arranged adjacent to the lower free ends of the switch 48, and arranged with their upper sides projecting slightly above the plane of the lower sides of the upper guides 35 are the feeding-pinions 54, a similar pinion 55 being arranged with its lower sides projecting slightly below the plane of the upper sides of the upper guides in rear of the way 45. The gears 53 are driven by the main shaft 8 through the longitudinally-disposed shaft 56, which receives motion through the intermeshing gears 57 and 58 and the transverse shafts 59, which carry said gears and are provided with bevel-pinions 60, meshing with similar pinions 61 on the longitudinal shaft, and the upper pinions 54 receive motion from the longitudinally-disposed shaft 56, through a small shaft 62, driven by intermeshing gears 63 and 64 and provided with bevel-pinions 65, meshing with similar pinions 66 on the transverse shafts 67, said transverse shafts carrying the feeding-pinions 54. The feeding-pinion 55 is adapted to be operated by hand, and for this purpose its shaft is connected by intermeshing gears 68 and 69 with the spindle of a crank 70, which is disposed above the plane of the upper surface of the side beam. The spacing-blocks by which the members of the side beams are connected form suitable supports for the bearings in which the parallel shafts 56 and 62 are mounted.

Arranged upon opposite sides of the space between the side beams, in position to form supports for a shock, are the parallel stationary guide-rods 71, and pivotally mounted at opposite sides of said space adjacent to the rear ends of the conveying-aprons are the shock-holding arms 72, which approximately meet at their rear free ends above the plane of the shocking-tables and which are held in such position by means of springs 73. Spurred packers 74 are located at the rear ends of the conveying-aprons and consist of spurred plates carried by crank-shafts 75, which receive motion from the rollers of the conveying-aprons through suitable chain-gearing, (indicated at 76.)

The tables are provided at their side edges and upon their under surfaces with racks 77 for engagement by the teeth of the feeding-gears 53 and pinions 54, and are provided at one edge on their upper sides with racks 78 for engagement by the pinion 55.

This being the construction of the improved apparatus, the operation thereof is as follows: As the fodder is cut and carried rearwardly by means provided for this purpose and is fed upon the table which is arranged in position to receive it, said table is moved slowly to the rear by means of the pinions 54, the bridging-pieces 46 being depressed by the rollers of the table to provide a continuous track. When the table has become filled sufficiently to form a shock and has passed beyond reach of the rear feeding-pinion 54, it remains at rest to give the assistant

opportunity to tie the shock, after which he turns the crank 70 to move the table to the rear sufficiently to carry its rollers over the rearmost bridging-pieces. This compresses the cushion-spring 49, whereby, when the rollers have passed beyond the extremities of the bridging-pieces, which cover the inclined connecting-ways 44 and 45, and said bridging-pieces are elevated at their rear ends to open the said ears, the cushion-spring expands and gives the table an impulse which causes it to pass quickly downward and forward. This rapid downward movement of the table, succeeded by a rapid forward movement due to the engagement of the large gears 53 with the racks on the table, draws the latter from beneath the shock and allows it to fall vertically to the ground. The table is carried forward by said large gears until its rollers 37 come opposite the channels 42 and 43, (previous to which it has depressed the free front ends of the elevating-springs 51.) It is elevated by the springs provided for that purpose to the upper guide 35. The operation of elevating the table strains the spring 50, and therefore, after the rollers 37 have reached the upper guides, said spring 50 gives a rearward impulse to the table and throws it a sufficient distance to cause the engagement of its racks with the small feeding-pinions 54, which move it rearward to receive another shock.

In order to avoid loss of time between the formation of one shock and the arrangement of the table for a second shock, I preferably employ a plurality of tables operating simultaneously. In the drawings I have shown two tables, one of which arrives at the front end of the upper guide in time to take its place as the preceding table passes from engagement with the rearmost feeding-pinions 54, this being possible by reason of the more rapid return or forward movement than advance or rearward movement. In other words, the loss of time necessitated by tying the shock is compensated for by the succeeding rapid movement of the table when it reaches the lower guide, whereby the table which has just discharged its shock returns to the initial position and is ready to receive a second shock, by the time the shock on the preceding table is completed. Thus the operation of harvesting and shocking is continuous and automatic with the exception of the tying of the shock which occupies a short time and which does not interfere with or retard the operation of harvesting and shocking, inasmuch as during the interval occupied by tying the shock a succeeding shock is being formed upon a table which has taken the place of the filled table.

It will be understood that in practice various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having described my invention, I claim—

1. The combination with guiding, cutting and conveying mechanism, and means for operating the same, of a shock-receiving table mounted in guideways, and means for moving the table alternately in opposite directions in the guideways, the movement in one direction being rapid to withdraw the table from beneath a completed shock and the movement in the opposite direction being slow to allow time for the accumulation of stalks to form a shock, substantially as specified.

2. The combination with harvesting mechanism, of upper and lower guideways, tables mounted to move rearwardly in one guideway and forwardly in the other, means for transferring each table at the ends of its path from one guideway to the other, gears of different diameters arranged in positions to engage racks on the tables when they are respectively in the upper and lower guideways, whereby the tables are adapted to move more rapidly in one direction than in the other, and means for imparting simultaneous rotary movement to the gears, substantially as specified.

3. The combination with guiding, cutting and conveying mechanism, of upper and lower guideways connected at their rear ends by passage-ways and at their front ends by channels, pivotal bridging-pieces arranged to close said passage-ways and the rear channels, an impulse-spring arranged at its free end in the upper guideway, at the front end of the latter contiguous to the front connecting-channels, elevating-springs arranged between said connecting-channels, a table provided with rollers to operate in said guideways and spaced apart to agree with the intervals between the passage-ways and between the channels, and means for feeding the table forward in the lower guideways and rearward in the upper guideways, substantially as specified.

4. The combination with guiding, cutting and conveying mechanism, of upper and lower guideways connected by spaced passage-ways and channels, spring-actuated bridging-pieces for closing the passage-ways and channels, a table provided with rollers to operate in said guideways and adapted to pass through said passage-ways and channels, whereby it may be transferred from one guideway to the other at the ends thereof, means for feeding the table rearward in the upper guideways, means for feeding the table forward at a high rate of speed in the lower guideways, and elevating devices to lift the table at the limit of its forward movement to transfer it from the lower to the upper guideway, substantially as specified.

5. The combination with guiding, cutting and conveying mechanism, of upper and lower guideways 35 and 36 connected at their rear ends by the rearwardly-inclined passage-ways 44 and 45 and at their front ends by the channels 42 and 43, spring-actuated bridging-pieces 46 arranged to close the passage-ways 44 and 45 and the channel 42, a guiding-pawl 48 arranged contiguous to the passage-ways

45, an impulse-spring arranged contiguous to the channel 43, a table provided with flanged rollers to operate in said guideways and adapted to pass through the passage-ways and channels when arranged in alinement therewith, large gears 53 arranged to engage racks on the table when the latter is in the lower guideway, similar gears 54 to engage the racks on the table when the latter is in the upper guideway, an elevating-spring located between the channels in position to raise the table when its rollers are alined with the channels, and means for operating said gears, substantially as specified.

6. The combination with guiding, cutting and conveying mechanism, of upper and lower guideways connected near their rear ends by passage-ways, and near their front ends by channels, impulse-springs located adjacent to the forward channels, bridging-pieces arranged to close the rearward channels and said passage-ways, a cushion-spring arranged at the rear extremity of the upper guideway, a table provided with rollers to operate in said guideways, springs for normally holding said bridging-pieces to open the passage-ways and channels, feeding mechanism for moving the table in opposite directions in the upper and lower guideways, and an elevating device to lift the table from the lower to the upper guideway at their front ends, substantially as specified.

7. The combination with guiding, cutting and conveying mechanism, of upper and lower guideways connected by front channels and rear passage-ways, tables having rollers to operate in said guideways and pass through the passage-ways and channels to transfer the tables from one guideway to the other, bridging-pieces to cover the passage-ways and the rear channels, an impulse-spring located adjacent to the front channels, an elevating-spring located between the channels and adapted to be depressed by a table during its forward movement, means for feeding the tables forward in the lower guideway, means for feeding the tables rearward in the upper guideway, hand-operated mechanism for feeding a table after disengagement from the last-named feeding mechanism, and a cushion-spring located at the rear end of the upper guideway, substantially as specified.

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

CHARLES S. WATERS.

Witnesses:
H. K. GANT,
J. L. MCCLURE.