No. 708,848. Patented Sept. 9, 1902.

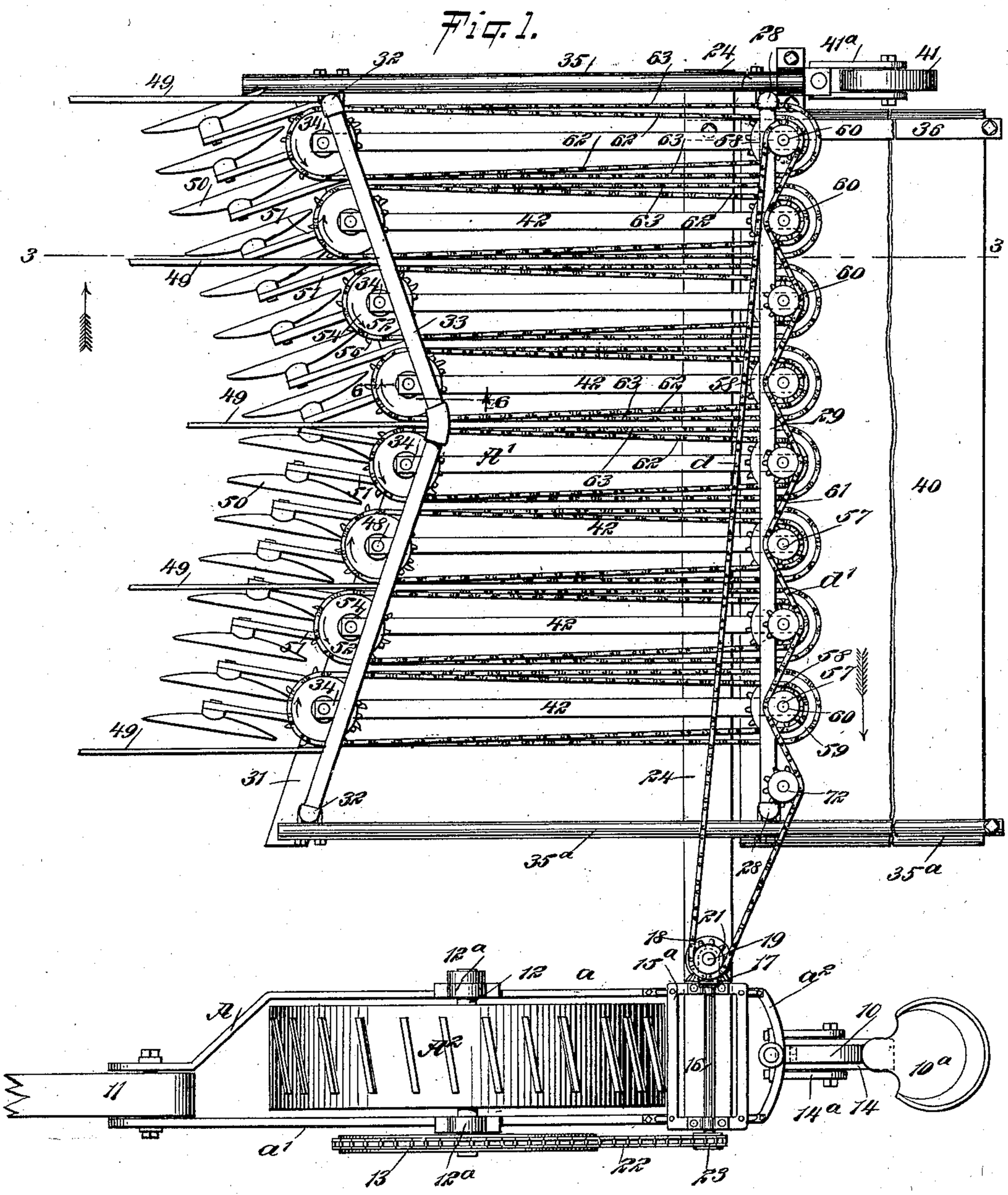
D. L. WELLMAN.

FLAX HARVESTER.

(Application filed Aug. 1, 1900.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



WITNESSES:

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Fig. 2.

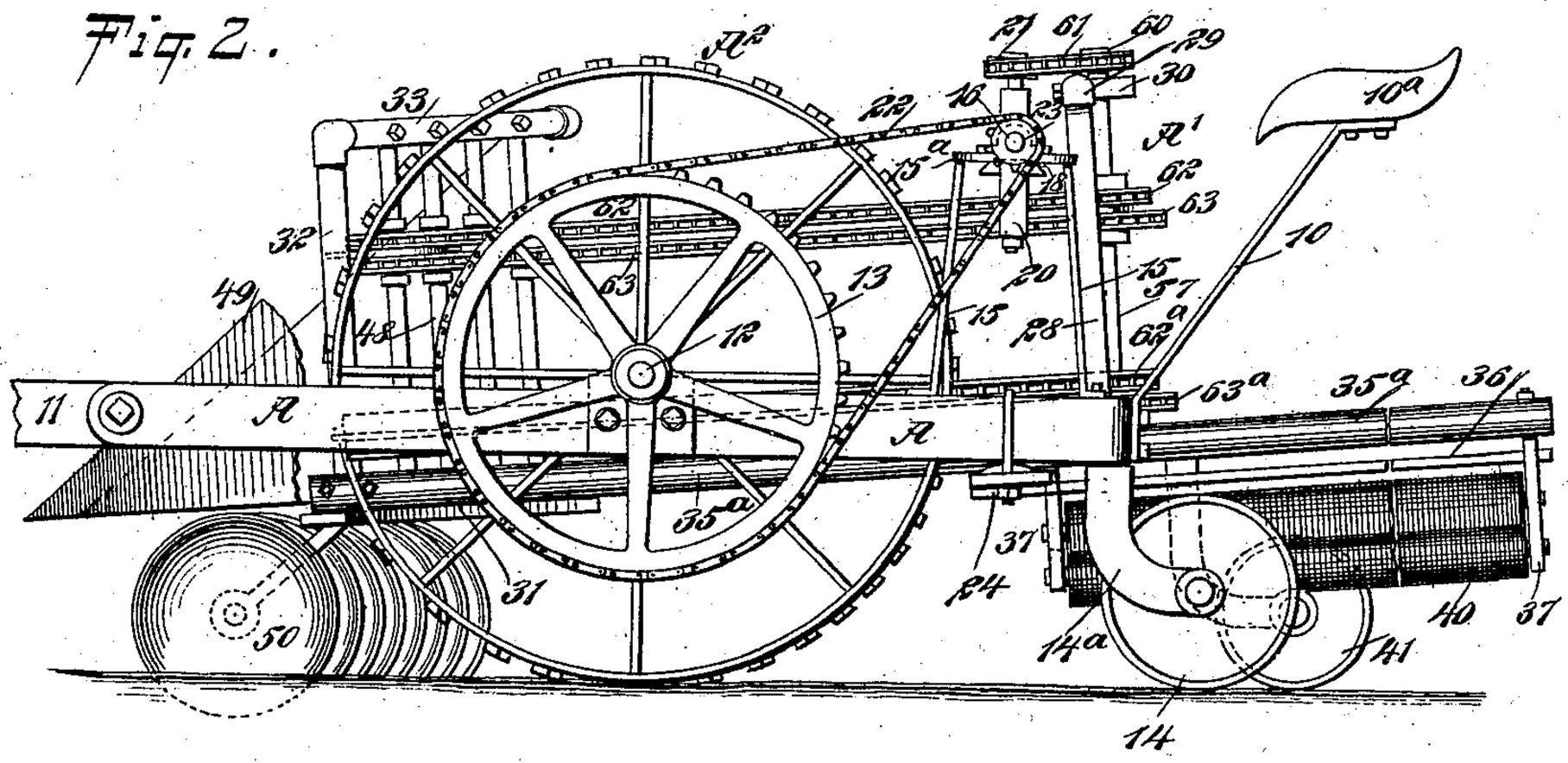

Fig. 3.

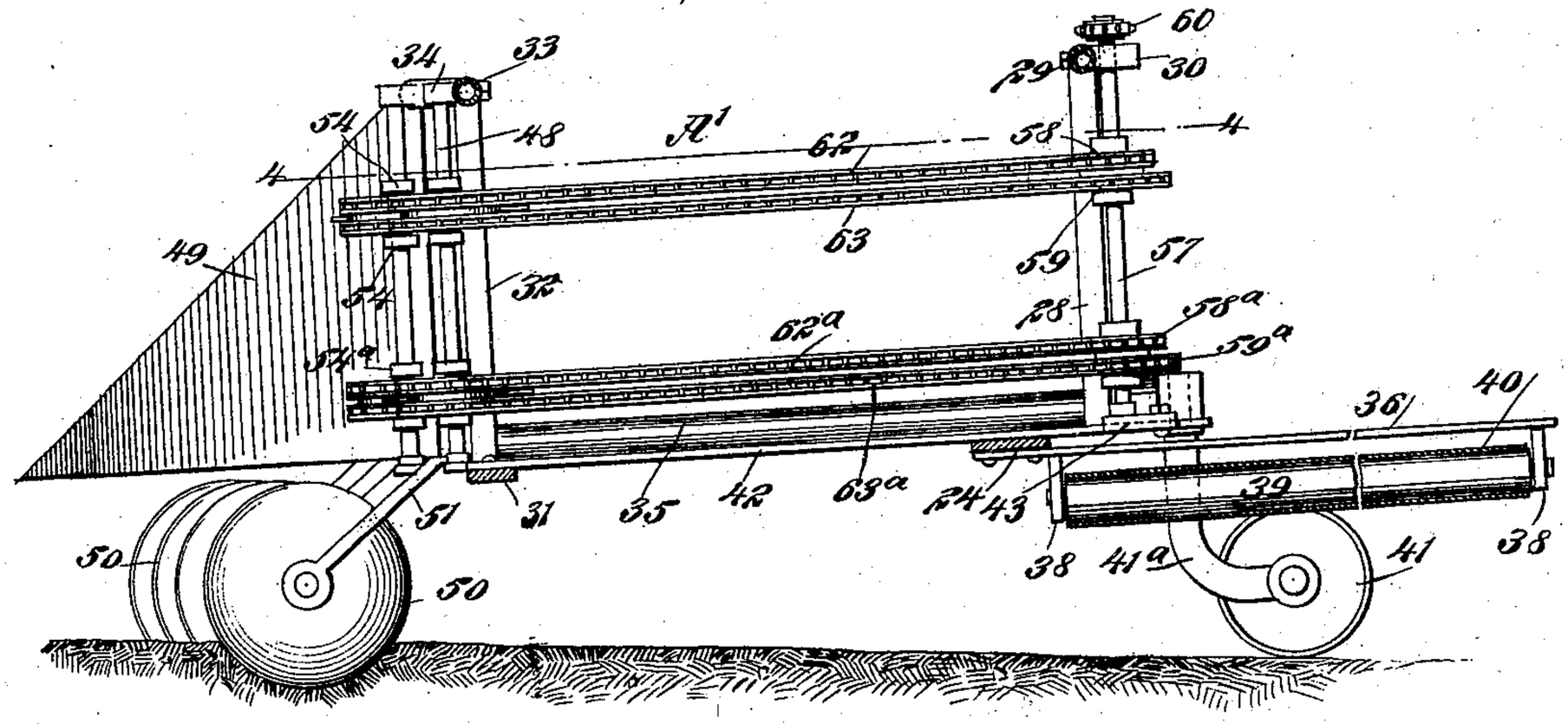

Fig. 4.

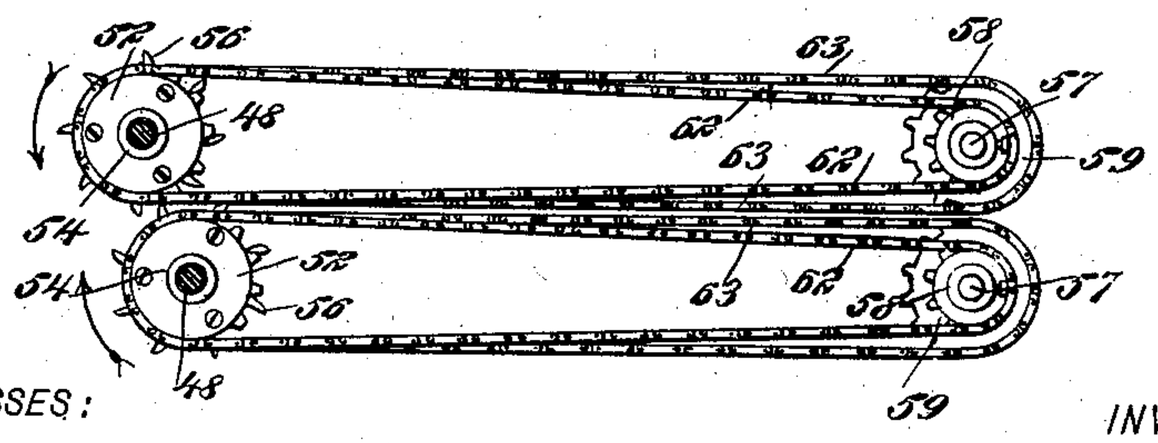

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Fig. 5.

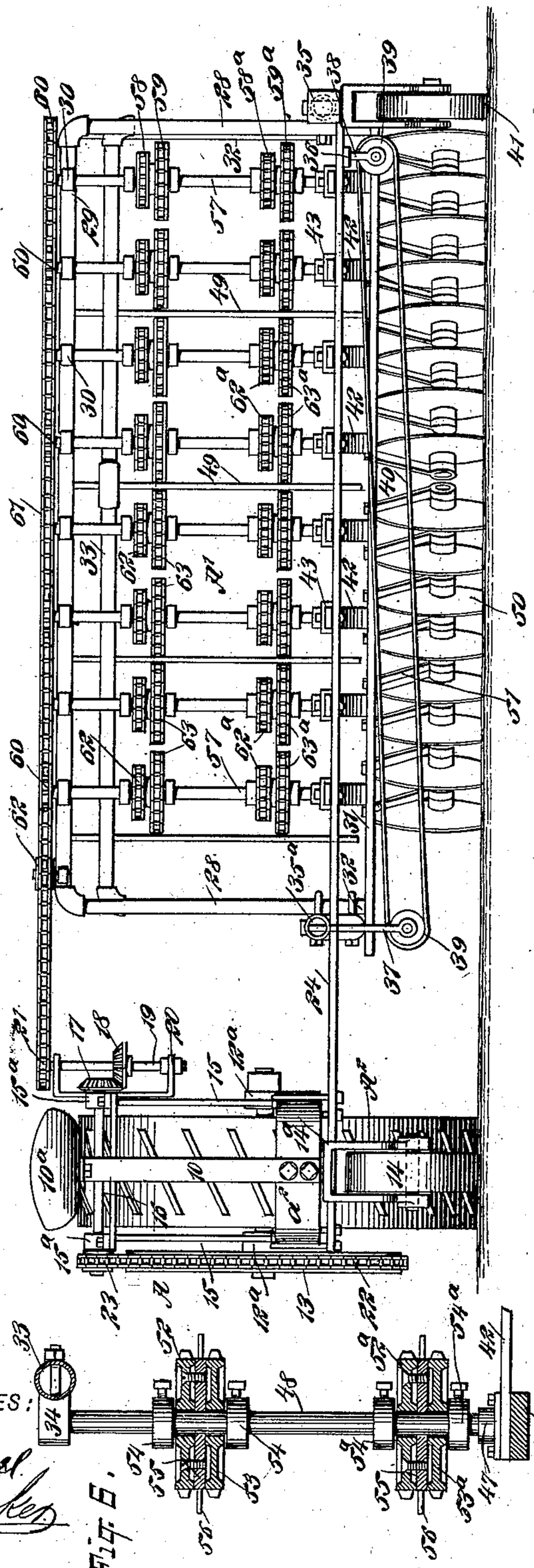

Fig. 6.

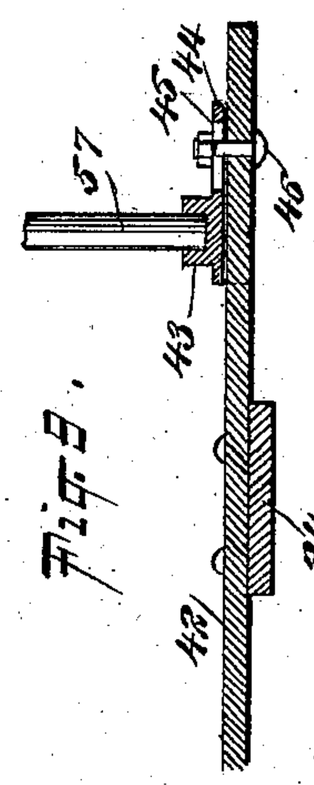

Fig. 8.

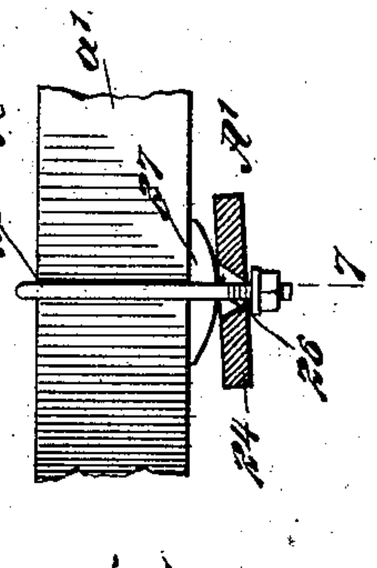

Fig. 7.

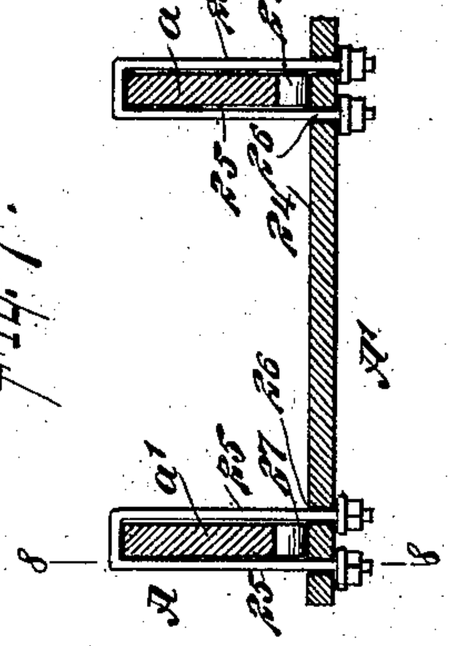

Fig. 9.

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UNITED STATES PATENT OFFICE.

DAVID LEWIS WELLMAN, OF FRAZEE, MINNESOTA.

FLAX-HARVESTER.

SPECIFICATION forming part of Letters Patent No. 708,848, dated September 9, 1902.

Application filed August 1, 1900. Serial No. 25,548. (No model.)

To all whom it may concern:

Be it known that I, DAVID LEWIS WELLMAN, a citizen of the United States, and a resident of Frazee, in the county of Becker and State of Minnesota, have invented a new and Improved Flax-Harvester, of which the following is a full, clear, and exact description.

The purpose of the invention is to provide a flax-harvester which will be light, durable, simple, and effective in operation and which will automatically cut up the ground and loosen the roots of the plant, draw them from the ground, and feed them to the rear portion of the machine, where they are received on a suitable carrier.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of the improved machine. Fig. 2 is a side elevation of the machine. Fig. 3 is a longitudinal section through the machine, taken practically on the line 3 3 of Fig. 1. Fig. 4 is a horizontal section through one portion of the machine, the section being taken practically on the line 4 4 of Fig. 3, illustrating the set of the conveyer-belts and their driving mechanism. Fig. 5 is a rear elevation of the machine. Fig. 6 is a vertical section through one portion of the frame of the machine, the section being taken on the line 6 6 of Fig. 1 and illustrates one of the forward vertical shafts and the manner in which the sprocket-wheels and feed-wheels are located on such shafts. Fig. 7 is a detail sectional view illustrating the manner in which the main and working frames are connected, the section being taken on the line 7 7 of Fig. 8. Fig. 8 is a side elevation of a portion of the main frame and a section through a portion of the working frame, the section being taken substantially on the line 8 8 of Fig. 7; and Fig. 9 is a detail sectional view through one of the lower longitudinal bars of the working frame, illustrating also in section a box adjusted upon the said bar, in which the lower end of a rear shaft is journaled.

I employ two frames, a main frame A and a working frame A′, which is mounted to rock on the main frame, so that the working frame may adjust itself to irregularities of the ground. The main frame A of the machine is of box construction, comprising an inner and an outer side bar a and a' and a connecting rear bar a^2, to which the standard 10 of the driver's seat 10^a is attached. The side members of the main frame A are brought close together at their forward ends, and at this point the tongue or pole 11 is pivoted to the main frame. The main supporting-wheel A^2 is carried by the main frame and is preferably provided with a roughened periphery, and said main supporting-wheel is secured upon a suitable axle 12, held to turn in boxes 12^a, located upon the upper edges of the side bars a and a' of the main frame, and a large driving sprocket-wheel 13 is secured to the outer end of the axle 12, as shown in Figs. 1, 2, and 5.

A caster-wheel 14 is located at the rear of the main frame, which wheel sustains the weight of the driver and facilitates turning corners, the shank 14^a of the said wheel being pivoted to the rear portion of the main frame. Standards 15 are carried up from the side members of the main frame A at its rear, and these standards are connected by a top frame 15^a, and a shaft 16 is journaled in suitable bearings on the top frame 15^a, transversely of the main frame, as is shown particularly in Fig. 1. This shaft carries a bevel-gear 17 at its inner end, which meshes with a corresponding gear 18, (shown in Fig. 5,) the latter gear being held to turn on a shaft 19, mounted in a bracket 20, usually attached to the inner standard 15, and a sprocket-wheel 21 is secured to the upper end of the shaft 19, adapted to communicate driving motion to the parts of the working frame, to be hereinafter described. The shaft 16 is revolved by a chain belt 22, which passes over the large driving sprocket-wheel 13, connected with the axle 12, and over a sprocket-wheel 23, which is secured to the outer end of the shaft 16, as is shown in Figs. 2 and 5.

In the construction of the working frame A′ a rear cross-bar 24 is employed. This cross-bar extends below the rear portion of the main frame A and as far as may be desired

beyond the right-hand side of the working frame. This rear bar 24 has a rocking connection with the main frame; but this rocking connection is but slight and does not interfere with the two driving-gears 17 and 18, since the motion at the front of the working frame to adapt said frame to the inequalities of the ground will be but slight.

The preferred manner in which the attachment is effected between the rear cross-bar 24 of the working frame and the main frame is illustrated in Figs. 7 and 8 and consists in passing staples or clips 25 over the side members *a* and *a'* of the main frame A and through openings 26 in the rear cross-bar 24 of the working frame A', the ends of the staples or clips having suitable bolts applied, and it will be observed by reference to Fig. 8 that the openings 26 are V-shaped, being wide at the top, which admits of one frame moving on the other. The movement of the two frames relatively to each other is a rocking movement and is accomplished by securing rocker-blocks 27 to the under surfaces of the side pieces of the main frame, which rocker-blocks bear upon the upper face of the rear cross-bar 24 of the working frame and are located between the members of the staples or clips 25.

Standards 28, preferably tubular, are secured to the side bars 35 and 35ª on the working frame A', as shown in Fig. 1, which bars will be hereinafter described, one standard being at the right-hand end of the said frame and the other standard near the main frame A, sufficient space being left between the left-hand standard 28 and the main frame A to comfortably accommodate an animal. These standards 28 are connected at the top by a tubular cross-bar 29, having series of rearwardly-extending bearings 30, which are preferably at equal distances apart. The front cross-bar 31 of the working frame A' is lower than the rear cross-bar 24, as shown in Fig. 5, and the length of this lower forward cross-bar 31 is slightly greater than the distance between the uprights 28. Uprights 32, also tubular and corresponding to the rear uprights 28, are secured upon the upper face of the forward cross-bar 31 of the working frame A' at or near its ends, and these uprights 32 are connected at the top by a tubular upper cross-bar 33, which from the rear of the machine appears lower than the corresponding cross-bar 30 at the rear of the said working frame. The forward upper and lower cross-bars 33 and 31 are inclined rearwardly in direction of the center of the working frame, so that these bars have a forward and outward inclination in opposite directions from a central point.

The front upper cross-bar 33 is provided with horizontal bearings 34 at its forward surface, corresponding in number and position to the bearings 30 on the upper rear cross-bar 29. The side bars 35 and 35ª of the working frame A' are tubular and engage with the end portions of both the front and rear lower cross-bars 31 and 24, being secured to the uprights 28 and 32 by clamps of any suitable construction. The left-hand side bar 35ª of the working frame is usually carried rearward beyond the rear lower cross-bar 24, while adjacent to the opposing or right-hand side bar 35 of said frame a rearwardly-extending horizontal beam or bar 36 is attached to the rear lower cross-bar 24, as shown in Fig. 1. Hangers 37 and 38 extend downward from the rear portion of the left-hand side bar 35ª and from the beam 36, and in these hangers rollers 39 are journaled, over which rollers an endless apron 40 is passed, adapted as a carrier to receive and take off the flax-plants delivered at the rear of the machine. The right-hand side of the machine is supported by a caster-wheel 41, the shank 41ª whereof is pivoted to the rear end portion of the right-hand side bar 35 of the working frame, as illustrated in Fig. 1.

The front and the rear cross-bars 31 and 24 of the working frame are connected by longitudinal bars 42, which are placed at equal distances apart and are immediately below the front and rear upper bearings 30 and 34. These longitudinal bars 42 extend rearward beyond the lower rear cross-bar 24, and, as shown in Figs. 5 and 9, at the rear end of each of these cross-bars a bearing-box 43 is adapted to slide, the bearing-boxes having rearward extensions 44, in which slots 45 are made, and bolts 46, provided with suitable nuts, are passed through the longitudinal bars 42 and the openings 45 in the said bearing-boxes, so that these boxes may be adjusted for the purpose of tightening the conveyer belts or chains, to be hereinafter described.

A series of boxes 47 is secured to the front cross-bar 31 of the working frame. These boxes are immediately below the upper front boxes or bearings 34, and the upper ends of vertical shafts 48 are journaled in the upper bearings 34 and the said lower bearings or boxes 47, as is particularly shown in Fig. 6. These shafts are in pairs, being so divided by partitions 49, which extend from the front portion of the working frame forward beyond the shafts and parts carried thereby, and the upper edges of these partitions are inclined from the top downward and forward, as shown in Fig. 3, although they may be otherwise shaped. To loosen the soil, and thereby the roots of the plants to permit them to be easily drawn from the ground, disks 50 are mounted at the front end of the frame A'. These disks are arranged in diagonal series, a series being at each side of the central partition 49, and here it may be stated that in addition to intermediate partitions 49 similar partitions are located at the side portions of the machine. Each series of disks 50 has the same inclination as the members of the front portions of the working frame at the rear of them, as is best shown in Fig. 1, so that the series of disks incline or extend diagonally

from the outer side of the machine rearward in direction of the center of the machine, and the series of disks are practically separated by the partitions 49; but said partitions are located above said disks, as shown in Fig. 2. Usually the disks 50 are mounted upon horizontal axles carried by arms 51, which extend from the lower forward cross-bar to the working frame A′ or from any other convenient portion of the machine, the inclination of the arms being downward and forward, as shown in Figs. 2 and 3, and by this arrangement of the disks the plants can readily pass the disks and enter the spaces between the shafts 48. Each forward shaft 48 is provided with upper sprocket-wheels 52 and 53, usually of the same diameter, and lower sprocket-wheels 52ª and 53ª, the upper sprocket-wheels being adjustably held on the shaft by collars 54. The lower sprocket-wheels are held on the shaft by collars 54ª. The sprocket-wheels turn loosely upon the shafts 48, and a feed-wheel 55 is secured to the under face of the upper sprocket-wheels of the upper and lower sets, as shown in Fig. 6, the attachment being made in any approved manner. Each feed-wheel 55 consists of a suitable body and fingers 56, projected from the periphery of the body, one longitudinal edge of each finger being ordinarily straight and the opposing edge more or less curved, as shown in Figs. 1 and 4. The shafts 48 of each pair are adapted to revolve in direction of each other, as indicated by arrows in Figs. 1 and 4. Consequently the fingers 56 of the feed-wheels 55 on said shafts will take the plants from the disks and direct them into the spaces between opposing feed-wheels.

Shafts 57 are journaled in the boxes 30 upon the rear cross-bar 29 of the machine, and the lower ends of the shafts 57 are journaled in the adjustable boxes 43. (See Fig. 9.) The body portions of the shafts 57 are preferably polygonal, and at the upper portion of each shaft 57 a small sprocket-wheel 58 is secured, while below this wheel and adjacent to it a larger sprocket-wheel 59 is attached to the shaft. Corresponding lower wheels 58ª and 59ª are attached to the shafts 57 at their lower ends.

A small sprocket-wheel 60 is secured to the upper end of each shaft 57, and a chain belt 61 engages with all the sprocket-wheels 60 and with an idler 72 at the left-hand side of the machine, the said chain belt being likewise passed around the sprocket-wheel 21, adjacent to the main frame and supported therefrom, as shown in Fig. 1. The forward stretch *d* of the driving-belt 61 is straight; but the rear stretch *d′* of this belt engages alternately with the rear surface of one of the small upper sprocket-wheels 60 and the forward edge of the next sprocket-wheel 60. In this manner the shafts of a pair are made to revolve in opposite directions or in direction of each other, especially since chain belts 62 are passed over the upper smaller sprocket-wheels 58 on the rear shafts 57 and the upper sprocket-wheels 52 on the forward shafts 48, while lower belts 63 are passed over the lower sprocket-wheels 59 of the upper sets on the rear shafts 57 and over corresponding sprocket-wheels 53 on the forward shafts 48, and corresponding chain belts 62ª and 63ª connect the sprocket-wheels of the lower sets on the said forward and rear shafts 48 and 57, as shown in Figs. 4 and 5.

The smaller sprocket-wheels 58 are employed in order that the upper belts of each set shall move slower than the lower belts, since the lower belts of each set serve as conductors or conveyers, and the opposing lower belts at top and bottom belonging to each pair of front and rear shafts are brought so close together that they will effectually hold or retain the plant that has been passed to the space between them, as shown in Fig. 4. Under such an arrangement it will be observed that the conveyer-belts travel faster than the feed-wheels, so that the feed-wheels will have an opportunity to act in a proper manner on the plants whose roots have been loosened by the disk cutters and to feed these plants to the conveyer-belts, the latter serving to disengage the plants from the fingers 56 and to quickly carry the plants from the front of the machine to the rear and drop them upon the carrier 40. The horizontal belts may be kept at proper tension by adjusting the lower ends of the rear shafts 57, which is accomplished through the medium of the lower bearing-boxes 43 for said shafts.

The operation of the machine is automatic throughout. The disks loosen the roots of the plants and tend to lift them out of the ground, while the feed-wheels conduct the plants into the space between opposing conveyer-belts, and these latter quickly dispose of the plants at the rear of the machine.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a flax-harvester, a supporting-frame, rotary disk cutters mounted on horizontal axles in arms projecting from the frame and adapted to enter the ground and loosen the roots of plants, which cutters have concaved and convexed sides, chain conveyers adapted to receive material from the said cutters, which chain conveyers are placed in close relation, and feeding devices adapted to conduct material from the disks to the spaces between adjacent members of the conveyers, as specified.

2. In a flax-harvester, a supporting-frame, a series of rotary disks, each disk being provided with a concaved outer and a convexed inner face, the disks being mounted on horizontal axles in arms projecting forwardly from the frame and adapted to enter the ground and loosen the roots of plants, pairs of conveyer-belts located adjacent to the disks, corresponding members of horizontally-opposing belts being near together, feed-wheels located

at the forward end of each conveyer, and means for rotating the said wheels in direction of the space between corresponding members of horizontally-alining conveyer-belts.

3. In a flax-harvester, chain conveyers and feed-wheels at the forward portion of said conveyers, the feed-wheels serving to direct material to the spaces between the conveyers, said conveyers consisting of endless belts in horizontal pairs, one pair being placed above the other, the inner stretches of the belts of a pair being adapted to grip material closely between them, and rotary disk cutters mounted on horizontal axles and located adjacent to the forward lower portion of the lower conveyers, for the purpose described.

4. In a flax-harvester, chain conveyers, and feed-wheels at the forward portions of said conveyers, the feed-wheels serving to direct material to the spaces between the conveyers, the said conveyers consisting of sets of endless belts in horizontal pairs, one pair being above the other, the inner stretches of the belts of a pair being adapted to grip material between them, and means for moving the belts of one pair of belts at a lower speed than the belts of the other pair, as set forth.

5. In a flax-harvester, front and rear pairs of shafts, sprocket-wheels arranged in pairs on each shaft of the front pairs of shafts, a feed-wheel located between the wheels of each pair of sprocket-wheels of the said front shafts, sprocket-wheels of different sizes arranged in pairs on and mounted to turn with each shaft of the rear pairs of shafts, chain belts passed over corresponding sprocket-wheels on the front and rear shafts, the inner stretches of corresponding belts being sufficiently close to grip material between them, and means for revolving the shafts of the rear pairs of shafts in opposite directions, as set forth.

6. In a flax-harvester, a frame, forward and rear shafts mounted vertically on said frame, the forward shafts being in two series at angles to each other, each series having an inclination rearward to the center of the frame, sprocket-wheels of equal size mounted to turn on the forward shafts, a large and a small wheel mounted to turn on each of the rear shafts, feed-wheels located between the sprocket-wheels on the forward shaft, turning with said wheels, and conveyer-belts passed over corresponding sprocket-wheels on the forward and rear shafts, and means for driving the rear shafts, as and for the purpose specified.

7. In a flax-harvester, a frame, forward and rear shafts mounted vertically on the said frame, the forward shafts being in two series at angles to each other, each series having an inclination rearward to the center of the frame, sprocket-wheels of equal size mounted to turn on the forward shafts, a large and a small sprocket-wheel mounted to turn with each of the rear shafts, feed-wheels located between the sprocket-wheels on the forward shafts, turning with said wheels, conveyer-belts passed over corresponding sprocket-wheels on the forward and rear shafts, means for driving the rear shafts, forwardly-extending partitions dividing the series of forward shafts into pairs, and a series of disk cutters located below the said partitions and adapted to enter the ground and cut the roots of plants, which disks have concaved outer and convexed inner faces and are arranged in transverse alinement with the series of shafts at a point below and in advance of them, as described.

8. In a flax-harvester, the combination, with a main frame carrying a main driving and supporting wheel, a working frame having a rocking connection with the main frame, the forward portion of the working frame being inclined from its sides toward the center, and a series of disk cutters adapted to loosen the roots of plants, located in front of the working frame and connected with the forward portion thereof, of a series of shafts mounted at the forward portion of the working frame, following the inclination of the said part, sprocket-wheels of equal size loosely mounted on the said forward shafts, feed-wheels located between said sprocket-wheels and connected with one of them, a series of shafts corresponding to the forward shafts and mounted to turn at the rear of the working frame, a small and a large gear-wheel secured to each rear shaft and mounted to turn therewith, chain belts connecting corresponding sprocket-wheels with the forward and the rear shafts, the inner stretches of adjacent belts being sufficiently close together to grip material between them, driving-sprockets located at the upper portion of the rear shafts, a chain belt engaging alternately with the front and rear surfaces of the said driving-sprockets, and a driving connection between the belt engaging with the driving-sprockets and the main supporting-wheel in the main frame of the machine.

9. In a flax-harvester, the combination, with a main frame carrying a main driving and supporting wheel, a working frame having a rocking connection with the main frame, the forward portion of the working frame being inclined from its sides toward the center, and series of disk cutters adapted to loosen the roots of plants, located in front of the working frame and connected with the forward portion thereof, of a series of shafts mounted at the forward portion of the working frame, following the inclination of said part, sprocket-wheels of equal size loosely mounted on the said forward shafts, feed-wheels located between said sprocket-wheels and connected with one of them, a series of shafts corresponding to the forward shafts and mounted to turn at the rear of the working frame, a small and a large gear-wheel secured to each rear shaft and mounted to turn therewith, chain belts connecting corresponding sprocket-wheels with the forward and the

rear shafts, the inner stretches of adjacent belts being sufficiently close together to grip material between them, driving sprocket-wheels located at the upper portion of the rear shafts, a chain belt engaging alternately with the front and rear surfaces of the said driving sprocket-wheels, a driving connection between the belt engaging with the driving sprocket-wheels and the main supporting-wheel in the main frame of the machine, caster-wheels located at the rear of the main frame and rear outer portion of the working frame, and means, substantially as described, for adjusting the lower ends of the rear shafts.

10. In a flax-harvester, a wheel-supported frame, series of disks, said series being at angles to one another and extending from the center of the frame outward in opposite directions, each disk having a concaved outer and a convexed inner face, upper and lower belt conveyers arranged in pairs and extending from a point near the disks to the rear portion of the frame, the corresponding members of each pair of conveyer-belts being sufficiently close together to hold a plant, and feed-wheels mounted to revolve at the forward end of each belt conveyer, the feed-wheels of each pair of conveyers turning in direction of the space between corresponding members of the said belts, for the purpose set forth.

11. In a flax-harvester, the combination, with a frame, a series of shafts arranged on diagonal lines inclining outwardly and forwardly from the center of the said frame at the front, a second series of shafts located at the rear of the said frame, series of disks arranged correspondingly to the forward shafts in the said frame, the disks having concaved outer and convexed inner faces, and partitions separating the said forward shafts into pairs, which partitions extend over the said disks, of sprocket-wheels mounted on the forward and rear shafts, conveyer-belts carried by the said sprocket-wheels, feed-wheels attached to sundry of the said forward sprocket-wheels, and means for turning the feed-wheels of each pair of belts in direction of the space between corresponding members of said belts, for the purpose set forth.

12. In a flax-harvester, the combination with a main frame, a supporting-wheel mounted therein, and a working frame having a rocking connection with the main frame, of shafts arranged in pairs at the front and rear of the working frame, sprocket-wheels on the said shafts, chain belts passing around the sprocket-wheels, means for revolving the rear shafts of the several pairs of shafts in opposite directions from the supporting-wheel of the main frame, and rotary disk cutters mounted on horizontal axles at the forward part of the working frame and adapted to enter the ground and loosen the roots of the flax, substantially as described.

13. In a flax-harvester, the combination with a main frame, a supporting-wheel mounted therein, and a sprocket-wheel driven from the supporting-wheel, of a working frame having a rocking connection with the main frame, shafts arranged in pairs at the front and rear of the working frame, sprocket-wheels on the shafts, chain belts passing around the sprocket-wheels, a sprocket-wheel on the upper end of each rear shaft, and a sprocket-chain alternately engaging the front and rear surfaces of the sprocket-wheels of the rear shafts, said sprocket-chain passing around the sprocket-wheel of the main frame, substantially as described.

14. In a flax-harvester, a working frame having its front inclined rearwardly and inwardly from its sides toward the center, arms projecting forwardly from the frame, rotary disk cutters mounted on the arms, feed devices mounted on the frame in rear of the cutters, and endless conveyers mounted in the frame in rear of the feed devices, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DAVID LEWIS WELLMAN.

Witnesses:
JOHN JAPSON,
E. F. GUMMER.