March 9, 1937. J. WOLTER 2,073,041

ONION SET HARVESTING MACHINE

Filed June 16, 1936 3 Sheets-Sheet 1

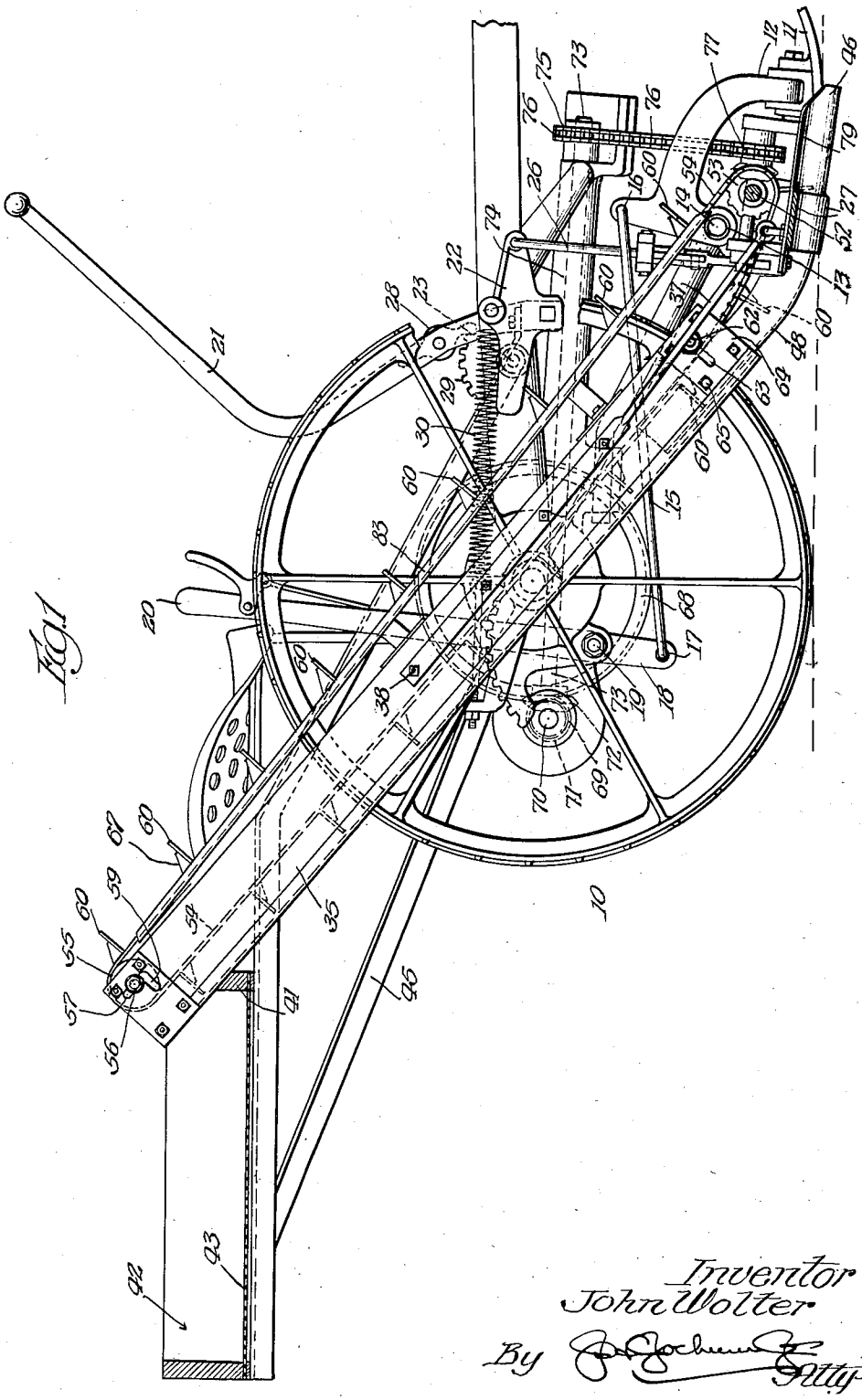


Fig. 1

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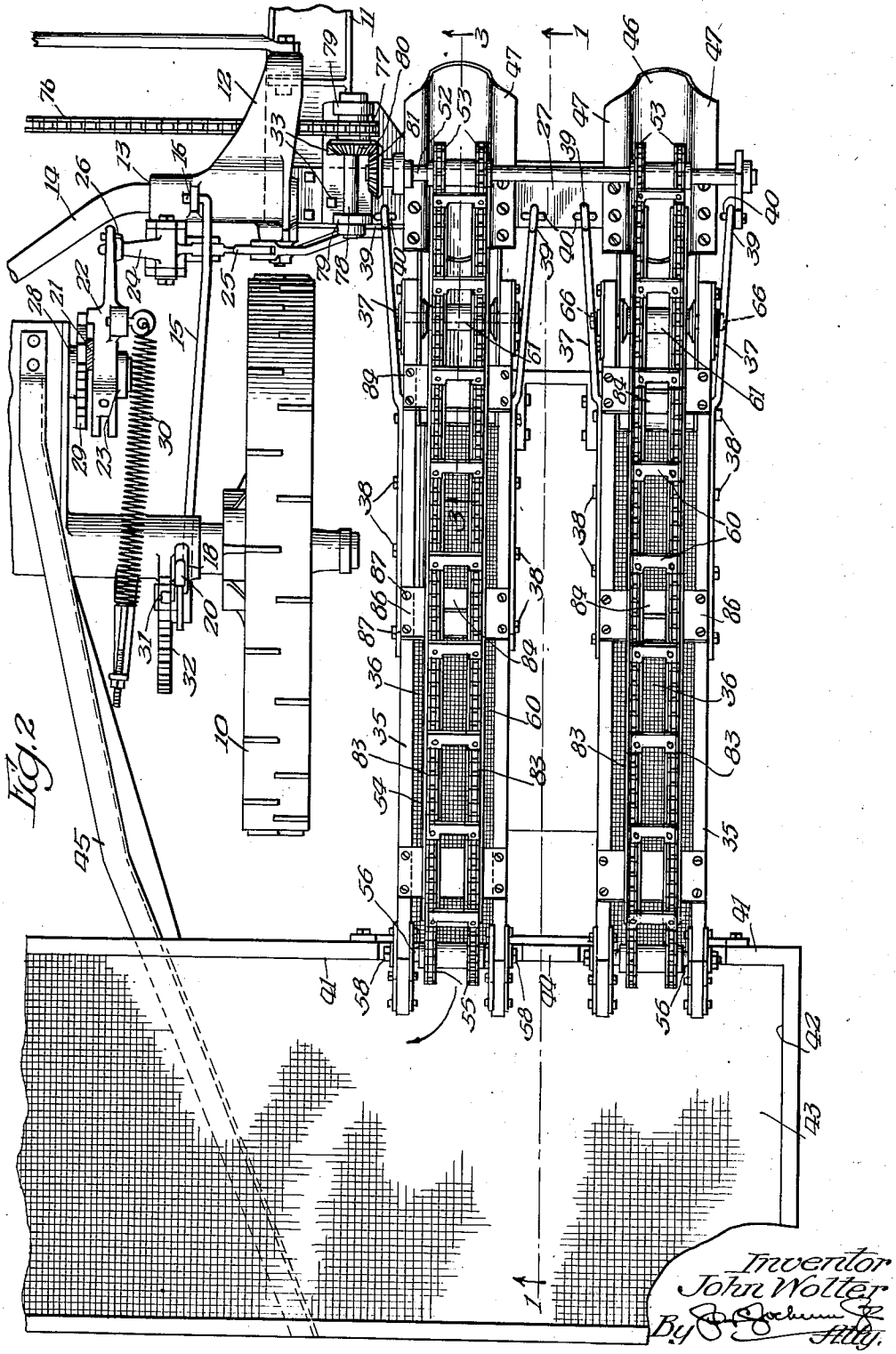


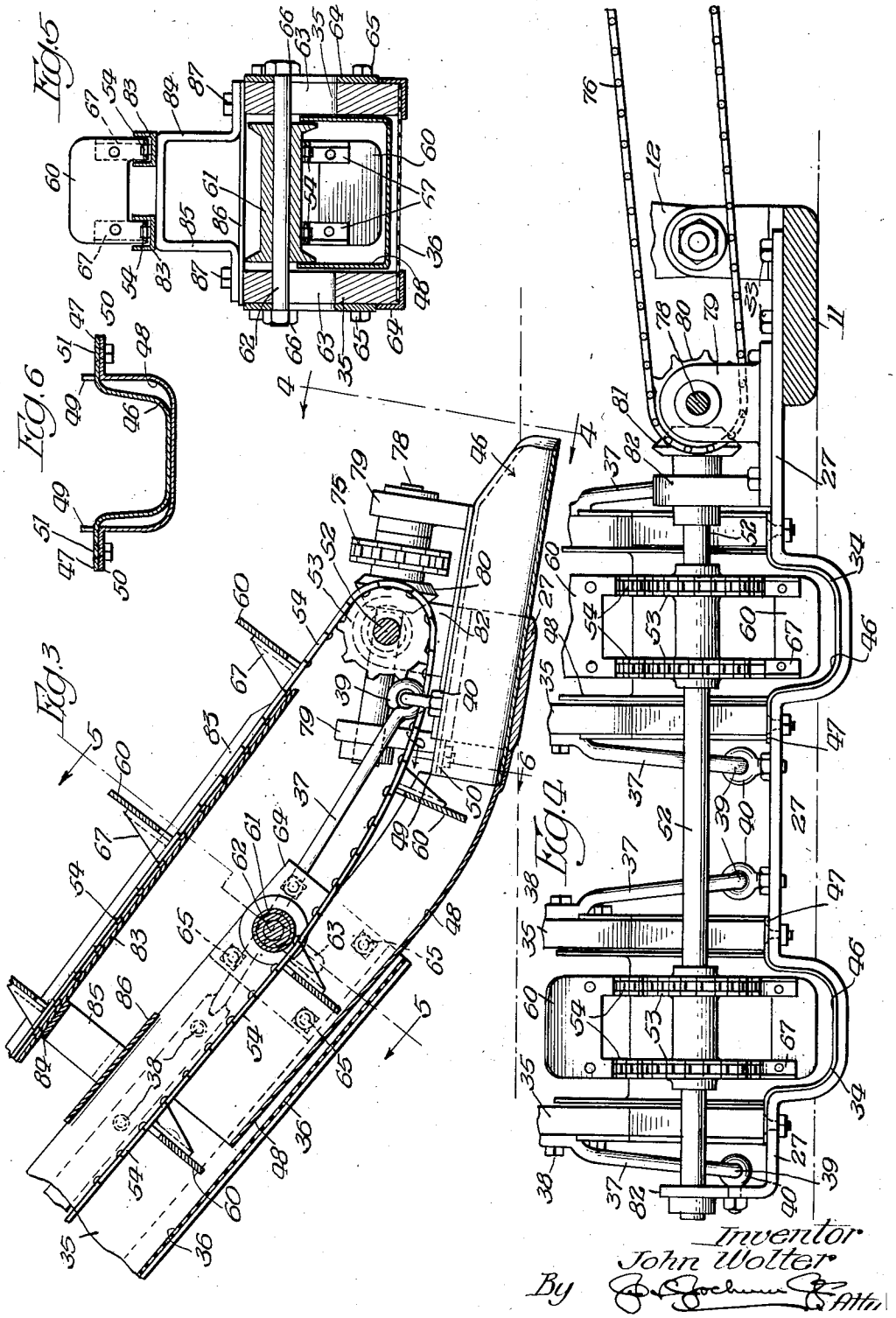
Fig. 2

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UNITED STATES PATENT OFFICE

2,073,041

ONION SET HARVESTING MACHINE

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Application June 16, 1936, Serial No. 85,547

14 Claims. (Cl. 55—138)

This invention relates to improvements in harvesting machines particularly adapted, though not necessarily limited in its use, for harvesting onion sets, and one of the objects of the invention is to provide in a machine of this character improved means for digging or removing onion sets from the ground, elevating them by means of a conveyor or elevator and depositing them into a receiver from which they may be delivered into a suitable sack or container.

A further object is to provide improved means whereby the onion sets will be separated from the dirt while they are being advanced by the conveyor or elevator, and also while they are being handled while they are in the receiver.

A further object is to provide in a machine of this character improved means whereby the plow or scoop end of the elevator structure may be moved or set into an operative position according to the depth which it is desired to have the plow or scoop enter the ground.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in substantially the construction, combination and arrangement of the several parts hereinafter more fully described and claimed and shown in the accompanying drawings illustrating this invention and in which

Figure 1 is a longitudinal sectional view as taken on line 1—1, Figure 2, of a device of this character constructed in accordance with the principles of this invention.

Figure 2 is a top plan view of the harvester, showing the same attached to an ordinary mowing machine, the latter being partly broken away.

Figure 3 is an enlarged detail, longitudinal, sectional view of a portion of the machine as taken on line 3—3, Figure 2.

Figure 4 is a view taken on line 4—4, Figure 3.

Figure 5 is a detail sectional view taken on line 5—5, Figure 3.

Figure 6 is a detail sectional view taken on line 6—6, Figure 3, on an enlarged scale.

In the present exemplification of this invention the harvesting mechanism is shown attached to an ordinary mower, although the present invention may be operated in any desired manner or connected to any suitable machine.

In the drawings, the numeral 10 designates the land or traction wheel of the mowing machine to which this invention is applied, and 11 designates the ordinary shoe, the shoe being supported by a yoke or casting 12 which is pivotally mounted as at 13 upon a bar or support 14. The casting 12 is adapted to be rocked about its pivot to rock the shoe 11, by means of a rod 15 connected as at 16 to the shoe, and the other end of the rod is pivotally connected as at 17 to the end of a lever 18 which is pivotally mounted as at 19 and is provided with an operating handle 20 at the top thereof, by means of which the lever 18 may be swung about its pivot 19 and through the medium of the rod 15 cause the shoe 11 to be rocked.

The shoe 11 as well as the casting 12 is adapted to be bodily elevated in any suitable manner such as by means of a lever 21 to which is connected a casting 22 that is pivotally supported as at 23, and this casting is, through the medium of a pivotally mounted member 24 and links and connections 25—26, connected to a bar or member 27 in any suitable manner, so that when the lever 21 is rocked about the pivot 23, the shoe 11 as well as the bar or member 27, will be bodily raised so that they will be held out of contact with the ground when the machine is moving.

A pawl 28 and ratchet 29 may be provided for holding the parts in their adjusted position, and a counterbalancing spring 30 may also be provided.

A pawl 31 connected with the lever 18 co-operates with the rack 32 to maintain the parts in the position to which they are adjusted by means of the lever 18.

All of these parts are of the ordinary and well known construction.

The harvesting machine constituting the subject matter of this application is shown in the present exemplification of the invention as constituting two units connected together for simultaneous operation, but it is to be understood that any number of these units may be employed, and as the construction and operation of each of the units is the same, the description of one will apply equally as well to them all.

The bar or supporting member 27 may be of any desired width and of any suitable length according to the number of units employed and is supported by the shoe 11 by having one end thereof secured to the shoe by suitable fastening devices 33, such as bolts or screws, and a portion of this bar or member 27 is shaped to form a seat 34 of channel formation. In alinement with said seat is arranged an elevator frame 35 having a reticulated bottom 36 formed preferably of wire gauze, the lower end of the frame being connected to the bar or member 27 by means of bars or rods 37, one end of each of which is secured to the side members of the ele-

vator frame 35 by suitable fastening devices 38, such as bolts or screws. The forward ends of these bars or members 37 are formed into eyes or loops 39 which engage in the eyes or loops 40 on the bar or member 27, so that the elevator frame 35 will be pivotally connected at its lower end to the bar or member 27.

The upper end of the elevator frame rests upon a suitable support 41 preferably formed by one of the side walls of a receiver 42, into which the elevator discharges, the receiver 42 being preferably provided with a reticulated bottom 43. If desired, a portion of the side wall 41 of the receiver 42 may be cut away as at 44 for the reception of the upper end of the elevator frame. This receiver 42 is supported from the main frame of the machine by means of a brace or support 45.

Arranged at the lower end of the elevator frame and resting in the seat 34, is a plow or scoop 46 which may be of any desired configuration, but is preferably of a scoop or channel formation having laterally projecting flanges 47 at the top thereof. An extension 48 of substantially U shape formation is connected to the rear end of the scoop or plow 46 and may be of any desired length so that it will extend into the elevator or conveyor frame 35 for a substantial distance, and this extension and the scoop 46 are secured together in any suitable manner but preferably by cutting away a portion of the top of the walls of the extension 48 as at 49 (see particularly Figure 6) and deflecting the cut away portions to form laterally extending flanges 50 upon which the flanged portions 47 of the scoop or plow 46 rest. Fastening devices 51, such as screws or bolts, pass through the superposed flanges and secure these parts together and against relative movement.

The bottom of the extension 48 is spaced sufficiently above the bottom 36 of the conveyor or elevator frame 35 so as to permit the scoop 46 and the extension 48 to have a swinging movement with respect to the frame 35 to position the end of the scoop or plow 46 to enter the ground in the position desired.

With the construction thus far described, it will be manifest that by operating the lever 18 by the handle 20 after releasing a retaining pawl that holds the lever 18 in position, and which retaining pawl cooperates with the rack 32, the shoe 11 will be swung about the pivot 14, and with it the plow or scoop 46 and the extension 48 to raise or lower the forward end of the plow or scoop with respect to the conveyor or elevator frame 35.

Likewise, by operating the lever 21 the shoe 11 and the plow or scoop 48 with the bar or member 27 will be raised to lift these parts out of contact with the ground.

Arranged at the lower end of the frame 35 and on a shaft 52, are sprocket wheels 53 over which a pair of endless sprocket chains 54 pass, and at the upper end of the frame 35 are another pair of sprocket wheels 55 over which these sprocket chains also pass. The sprocket wheels 55 are mounted upon a shaft 56 journaled in suitable bearings, preferably the sides of the frame 35, the bearings being preferably formed by slots 57 so that by adjusting the shaft 56 in the slots 57, the endless flexible conveyors or elevators, here shown as sprocket chains, may be tightened or loosened, and the sprockets 55 are held in their adjusted positions preferably by means of nuts or collars 58 threaded on the ends of the shaft 56.

Slots 59 are also provided in the side of the frame 35 which communicate with the slots 57 but are arranged preferably at right angles thereto so as to receive the shaft 56 to permit the sprocket wheels 55 to be adjusted toward and away from the bottom 36 of the frame 35, according to the nature of the product being harvested.

Secured to the sprocket chains 54 and extending transversely of the frame 35 are flights 60, any desired number of which may be provided and these flights may be constructed of any suitable material.

The lower runs of the conveyor or elevator are disposed in opposing parallel relation to the bottom of the frame and overlie a portion of the scoop or plow 46.

Arranged adjacent the lower end of the frame 35 and in proximity to the point where the plow or scoop 46 discharges into the elevator or conveyor frame 35, is a pulley 61 which extends across the frame 35 and beneath which pulley the lower run of the endless flexible members 54 pass. This pulley is mounted upon a shaft 62 and the ends of the shaft are journaled in slots 63 preferably provided in bearing plates 64 that are secured by means of suitable fastening devices 65 to the end of the frame 35. The slots 63 are preferably upright slots so as to permit the pulley 61 to be moved toward and away from the bottom of the frame 35 to cause the flights of the conveyor or elevator to travel in close proximity to the bottom 36 of the frame 35. Nuts or fastening devices 66 are provided on the end of the shaft 62 for securing the pulley 61 in its adjusted position.

The flights 60 are preferably secured to supports 67 that are secured to and carried by the endless flexible members 54.

As the machine advances and the plow or scoop 46 enters the ground it will pass beneath the onions, and as the machine advances the onions will be moved through the plow or scoop 46 to a position that the flights 60 on the endless flexible conveyor or elevator members will engage them and move them through the frame 35 and across the reticulated bottom 36 thereof. This will permit of the separation of the dirt from the onions and the onions will be conveyed to the top of the frame 35 and there delivered into the receiver 42.

By adjusting the lever 18 the depth to which the plow or scoop 46 enters the ground may be controlled or varied and by actuating the lever 21, the plow together with the lower end of the elevator or conveyor, as well as the shoe 11 on the supporting machine may be raised and lowered.

Motion may be imparted to the endless conveyors in any desired or suitable manner either from a separate or independent motor or from one of the traction wheels of the machine to which the attachment is applied.

In the present form of the invention the conveyors or elevators are operated from one of the land or traction wheels 10 through the medium of a gear wheel 68 which is connected to one of the traction wheels for rotation therewith. This gear wheel meshes with a pinion wheel 69 that is secured to a shaft 70, and connected to the shaft 70 is a beveled gear 71 with which a beveled gear 72 meshes. This beveled gear 72 is connected to a shaft 73 journaled in a suitable bearing 74. On the end of the shaft 73 is a sprocket wheel 75 over which a sprocket

chain 76 passes, and this sprocket chain also passes over a sprocket wheel 77 secured to a shaft 78 that is journaled in suitable bearings 79 preferably carried by the bar 27.

On the shaft 78 is a beveled gear 80 which meshes with a beveled gear 81 secured to the shaft 52 for rotation therewith, this shaft 52 being journaled in suitable bearings 82.

When the machine advances, motion of the traction wheel will be imparted to the sprocket chain 76 and from the sprocket chain 76 the shaft 52 will be rotated through the medium of the intermediate gearing, and the rotation of the shaft 52 will in turn operate the endless flexible conveyor or elevator members 54.

The upper runs of the endless flexible members 55 are supported and are guided over supporting members 83 preferably in the form of channels extending lengthwise of the frame 35, and these supports or channels are themselves held in position by means of supports 84, any number of which may be provided and which in turn are supported by uprights 85 mounted upon plates 86, the latter extending across the frame 35 and being secured or anchored in position in any suitable manner, such as by means of fastening devices 87 entering the frame 35.

This will prevent the upper runs of the conveyor chains from sagging and will assist in maintaining the endless members 54 against disengagement from the sprocket wheels or pulleys over which they pass.

The harvesting units, if more than one is employed, are laterally spaced from each other a suitable distance so as to permit of the harvesting of the onion sets from a plurality of rows at a time and the units are connected together through the medium of the driving shaft 52 for operation in unison, and the plows or scoops of the elements are simultaneously adjusted with respect to the elevator or conveyor frames by the operation of a single lever.

Likewise, all of the plows and the scoops and the forward ends of the frames 35 will be simultaneously raised and lowered.

While the preferred form of the invention has been herein shown and described, it is to be understood that various changes may be made in the details of construction and in the combination and arrangement of the several parts, within the scope of the claims, without departing from the spirit of this invention.

What is claimed as new is:—

1. In an onion set harvesting machine, an upwardly inclined trough shaped elevator frame, a plow at the lower end of the frame and connected therewith for independent vertical movement with respect thereto, an endless conveyor belt journaled in said frame and having its lower run disposed in opposing parallel relation to the bottom of the frame and overlying a portion of the plow, flights on the conveyor for engaging and moving the onions over the bottom of said frame, means for actuating said conveyor, and means for moving said plow with respect to said frame.

2. In an onion set harvesting machine, an upwardly inclined trough shaped elevator frame, the bottom of said frame being reticulated, a plow at the lower end of the frame and connected therewith for independent vertical movement with respect thereto, an endless conveyor belt journaled in said frame and having its lower run disposed in opposing parallel relation to the bottom of the frame and overlying a portion of the plow, flights on the conveyor for engaging and moving the onions over the bottom of said frame, means for actuating said conveyor, and means for moving said plow with respect to said frame.

3. In an onion set harvesting machine, an upwardly inclined trough shaped elevator frame, a plow at the lower end of the frame and connected therewith for independent vertical movement with respect thereto, an endless conveyor belt journaled in said frame and having its lower run disposed in opposing parallel relation to the bottom of the frame and overlying a portion of the plow, flights on the conveyor for engaging and moving the onions over the bottom of said frame, a guide extending along the frame and over which guide the upper run of said conveyor travels to be guided and supported thereby, means for actuating said conveyor, and means for moving said plow with respect to said frame.

4. In an onion set harvesting machine, an upwardly inclined elevator frame, a plow at the lower end of the frame connected therewith for independent movement with respect thereto, a pulley in the frame adjacent the upper end thereof, a pulley in the frame adjacent the plow, an endless conveyor belt passing over said pulleys and having its lower run disposed in opposing relation to the bottom of said frame and overlying a portion of the plow, flights on the conveyor for engaging and moving the onions over the bottom of said frame, means mounting said pulleys for adjustment in directions towards and away from the bottom of said frame, means for actuating said conveyor, and means for moving said plow with respect to said frame.

5. In an onion set harvesting machine, an upwardly inclined elevator frame, a plow at the lower end of the frame connected therewith for independent movement with respect thereto, a pulley in the frame adjacent the upper end thereof, a pulley in the frame adjacent the plow, an endless conveyor belt passing over said pulleys and having its lower run disposed in opposing relation to the bottom of said frame and overlying a portion of the plow, flights on the conveyor for engaging and moving the onions over the bottom of said frame, means mounting said pulleys for adjustment in directions towards and away from the bottom of said frame, means for actuating said conveyor, and means for moving said plow with respect to said frame, one of said pulleys being also mounted for adjustment in directions lengthwise of the line of travel of said conveyor for taking up slack therein.

6. In an onion set harvesting machine, an upwardly inclined trough shaped elevator frame, a plow at the lower end of the frame and connected therewith for independent vertical movement with respect thereto, an endless conveyor belt journaled in said frame and having its lower run disposed in opposing parallel relation to the bottom of the frame and overlying a portion of the plow, flights on the conveyor for engaging and moving the onions over the bottom of said frame, means for actuating said conveyor, means for moving said plow with respect to said frame, and additional means for raising and lowering the plow and the lower end of said frame with respect to the surface of the ground.

7. In an onion set harvesting machine, an upwardly inclined trough shaped elevator frame, a plow at the lower end of the frame and connected therewith for independent vertical movement with respect thereto, an endless conveyor

belt journaled in said frame and having its lower run disposed in opposing parallel relation to the bottom of the frame and overlying a portion of the plow, flights on the conveyor for engaging and moving the onions over the bottom of said frame, means for actuating said conveyor, a reticulated support at the upper end of the said frame for receiving the onions from the conveyor, and means for swinging said plow about its pivot with respect to said frame.

8. In an onion set harvesting machine, an upwardly inclined trough shaped elevator frame, a plow at the lower end of the frame and connected therewith for independent vertical movement with respect thereto, an endless conveyor belt journaled in said frame and having its lower run disposed in opposing parallel relation to the bottom of the frame and overlying a portion of the plow, flights on the conveyor for engaging and moving the onions over the bottom of said frame, means for actuating said conveyor, a support at the upper end of the said frame for receiving the onions from the conveyor, and which frame is slidably mounted upon said support, and means for raising and lowering at will the lower end of said frame and said plow, to cause the said frame to slide upon the said support.

9. In an onion set harvesting machine, an upwardly inclined trough shaped conveyor frame, a plow at the lower end of the frame, arms rigidly connected to the frame and pivotally connected to the plow, said plow being spaced in advance of the frame, a trough shaped extension connected with the plow and telescoping into said frame, an endless conveyor in said frame having its lower run disposed in opposing parallel relation to the bottom of the frame and overlying a portion of the plow, flights on the conveyor, means for operating the conveyor, and means for raising and lowering the plow and said extension with relation to said frame.

10. In an onion set harvesting machine, an upwardly inclined trough shaped conveyor frame, a plow at the lower end of the frame, arms rigidly connected to the frame and pivotally connected to the plow, said plow being spaced in advance of the frame, a trough shaped extension connected with the plow and telescoping into said frame, an endless conveyor in said frame having its lower run disposed in opposing parallel relation to the bottom of the frame and overlying a portion of the plow, flights on the conveyor, means for operating the conveyor, a pulley adjacent the lower end of the said frame over which the lower run of said conveyor passes, means mounting said pulley for adjustment towards and away from the bottom of said frame, and means for raising and lowering the plow and said extension with relation to said frame.

11. In an onion set harvesting machine, an upwardly inclined trough like conveyor frame, a plow at the lower end of and spaced from the frame, said plow being of substantially U shape, laterally projecting flanges at the top of the walls of the plow, a substantially U shaped extension telescoping with the end of the plow, laterally projecting flanges on the said extension against which the flanges in the plow rest, fastening means passing through said flanges for securing the extension and plow together, said extension telescoping with said frame, means supporting the plow and extension for movement with respect to said frame, an endless conveyor belt journaled in the frame and having its lower run disposed in opposing parallel relation to the bottom of the frame and overlying said plow, and means for operating said conveyor.

12. In an onion set harvesting machine, an upwardly inclined trough like conveyor frame, a plow at the lower end of and spaced from the frame, said plow being of substantially U shape, laterally projecting flanges at the top of the walls of the plow, a substantially U shaped extension telescoping with the end of the plow, laterally projecting flanges on the said extension against which the flanges in the plow rest, fastening means passing through said flanges for securing the extension and plow together, said extension telescoping with said frame, means supporting the plow and extension for movement with respect to said frame, an endless conveyor belt journaled on the frame and having its lower run disposed in opposing parallel relation to the bottom of the frame and overlying said plow, a pulley adjacent the lower end of said frame and over which pulley the lower run of said conveyor passes, means mounting said pulley for adjustment towards and away from the bottom of the frame, and means for actuating said conveyor.

13. In an onion set harvesting machine, an upwardly inclined trough shaped conveyor frame, a plow at the lower end of the frame, arms rigidly connected to the frame and pivotally connected to the plow, said plow being spaced in advance of the frame, a trough shaped extension connected with the plow and telescoping into said frame, an endless conveyor in said frame having its lower run disposed in opposing parallel relation to the bottom of the frame and overlying a portion of the plow, flights on the conveyor, means for operating the conveyor, means for moving said plow and extension with respect to the frame in vertical directions, and means for bodily raising and lowering the plow and extension.

14. In an onion set harvesting machine, an upwardly inclined trough shaped conveyor frame, a plow at the lower end of the frame, arms rigidly connected to the frame and pivotally connected to the plow, said plow being spaced in advance of the frame, a trough shaped extension connected with the plow and telescoping into said frame, an endless conveyor in said frame having its lower run disposed in opposing parallel relation to the bottom of the frame and overlying a portion of the plow, flights on the conveyor, means for operating the conveyor, a guide extending in directions lengthwise of said frame for supporting and guiding the upper run of said conveyor, a pulley adjacent the lower end of the frame and over which the lower run of the conveyor passes, means mounting the pulley for adjustment towards and away from the bottom of said frame, and means for raising and lowering the plow with respect to said frame.

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