

No. 842,021.

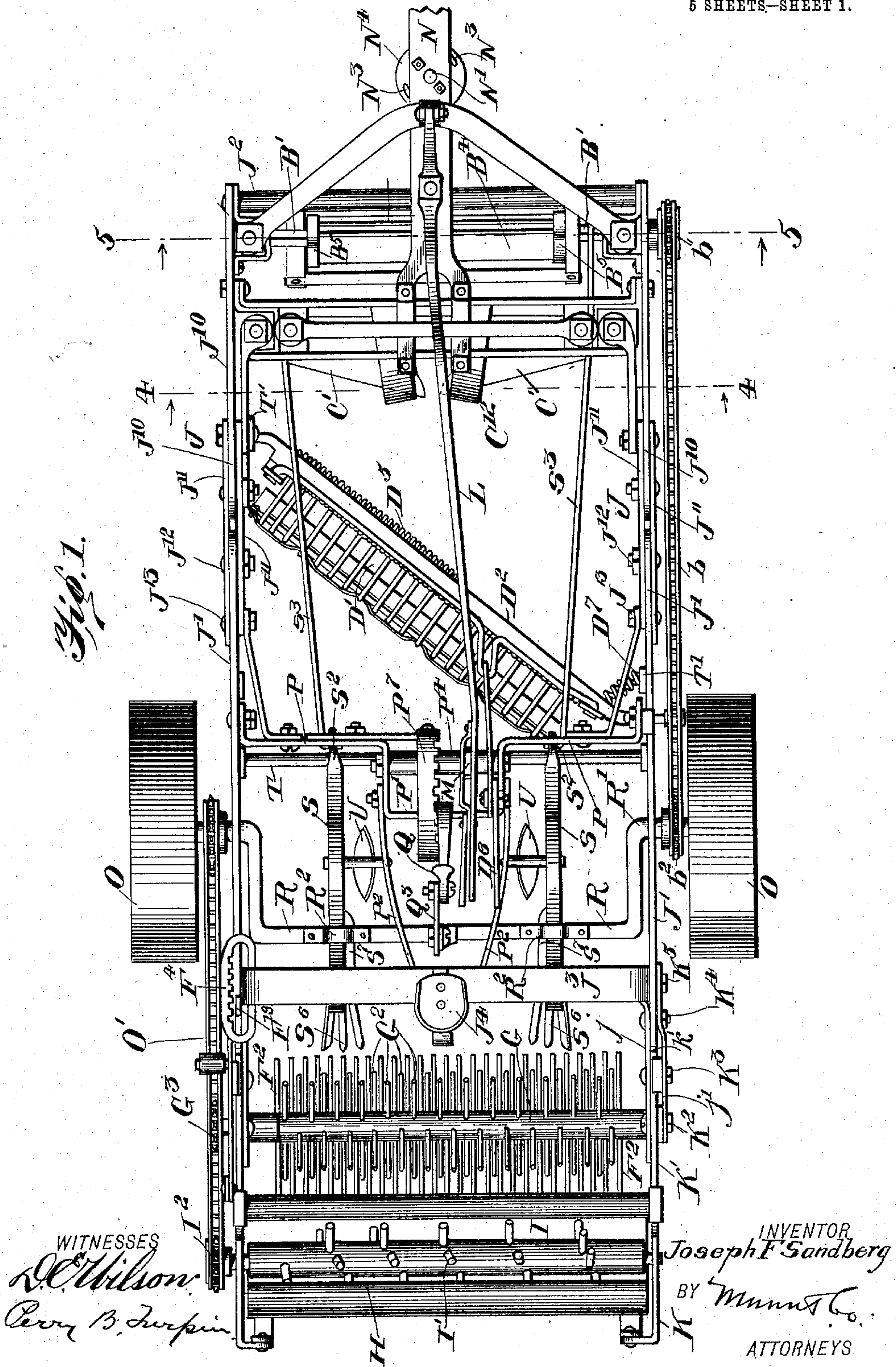
PATENTED JAN. 22, 1907.

J. F. SANDBERG.
BEET HARVESTER.

APPLICATION FILED MAY 28, 1906.

5 SHEETS—SHEET 1.

Fig. 1.



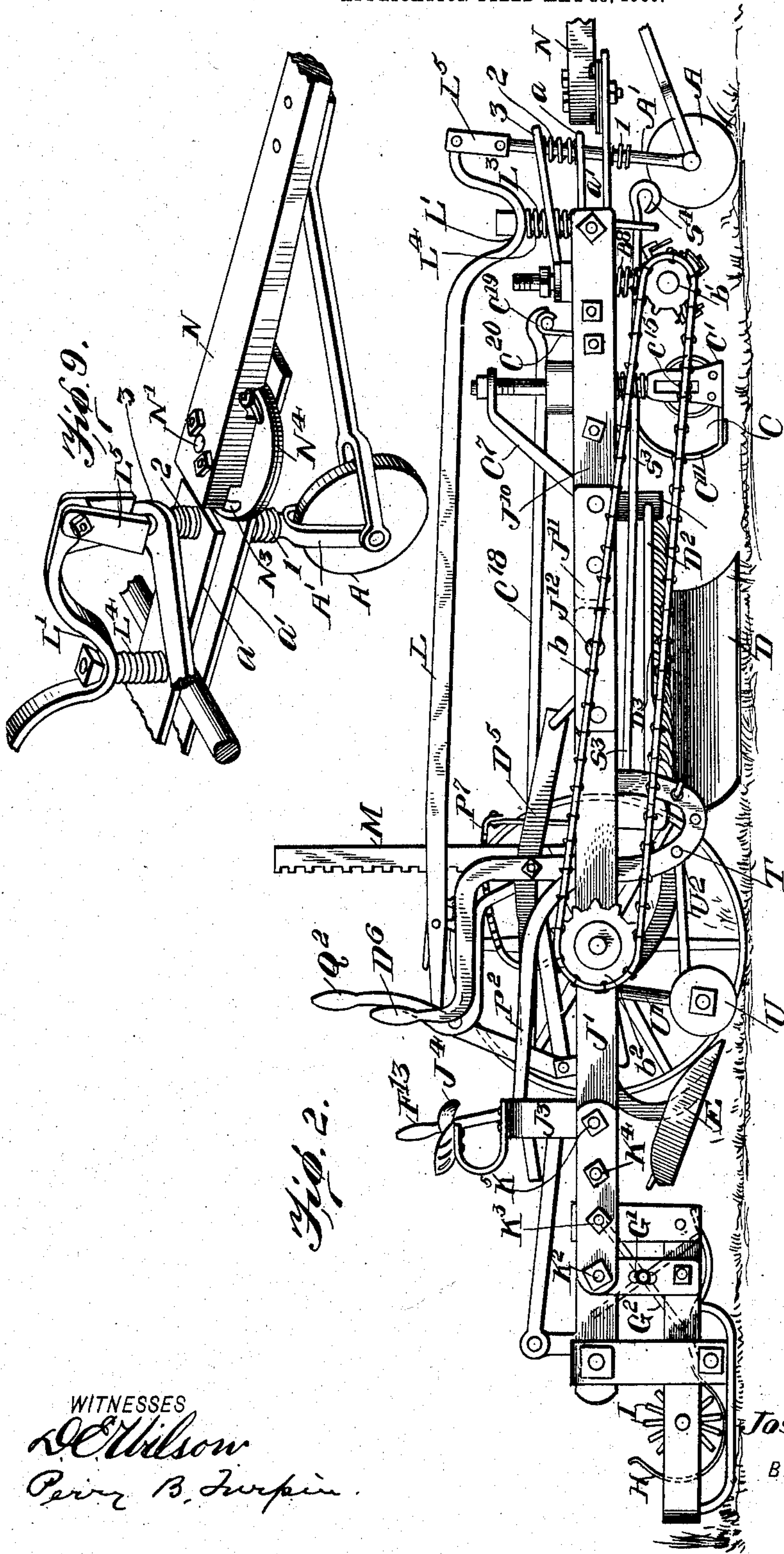
WITNESSES
R. C. Wilson
Chas. B. Surpin

INVENTOR
Joseph F. Sandberg
BY *Munn & Co.*
ATTORNEYS

J. F. SANDBERG.
BEET HARVESTER.

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5 SHEETS—SHEET 2.



WITNESSES
W. Wilson
Per B. Turpin

INVENTOR
Joseph F. Sandberg
BY *Munn & Co.*
ATTORNEYS

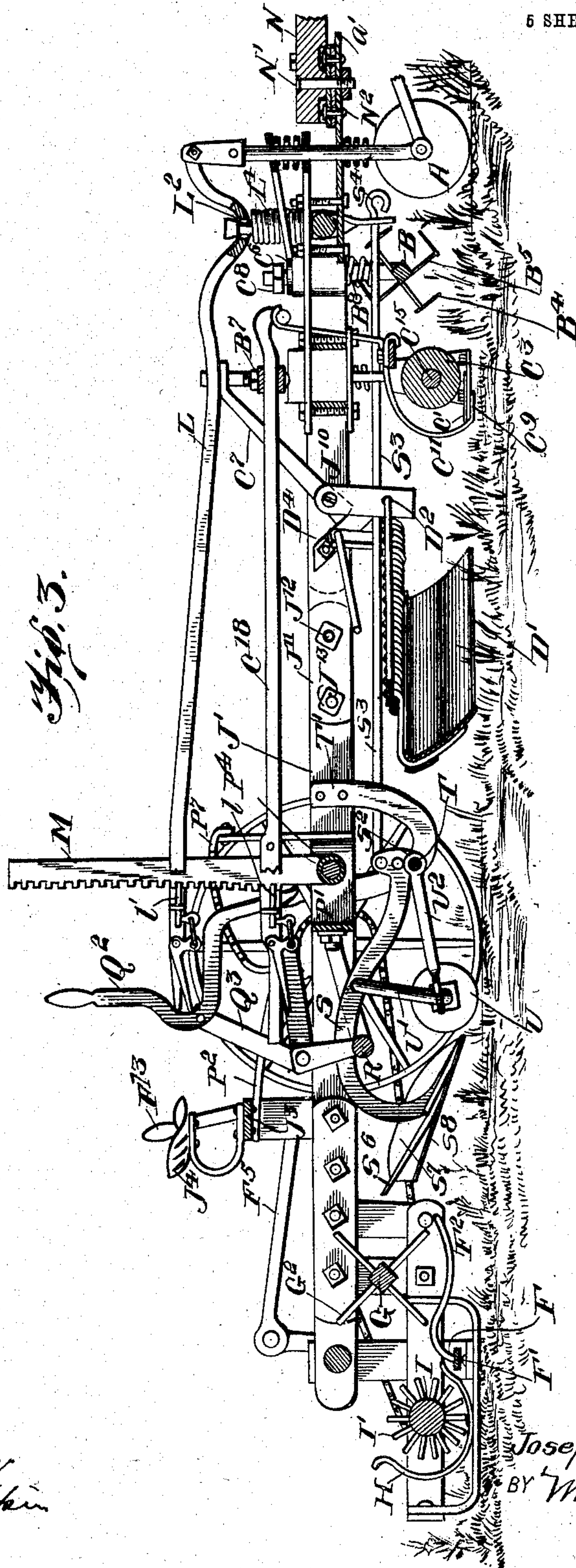
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5 SHEETS—SHEET 3.



WITNESSES
W. C. Wilson
Perry B. Surpin

INVENTOR
Joseph F. Sandberg
BY *Munn & Co.*
ATTORNEYS

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5 SHEETS—SHEET 4.

Fig. 4.

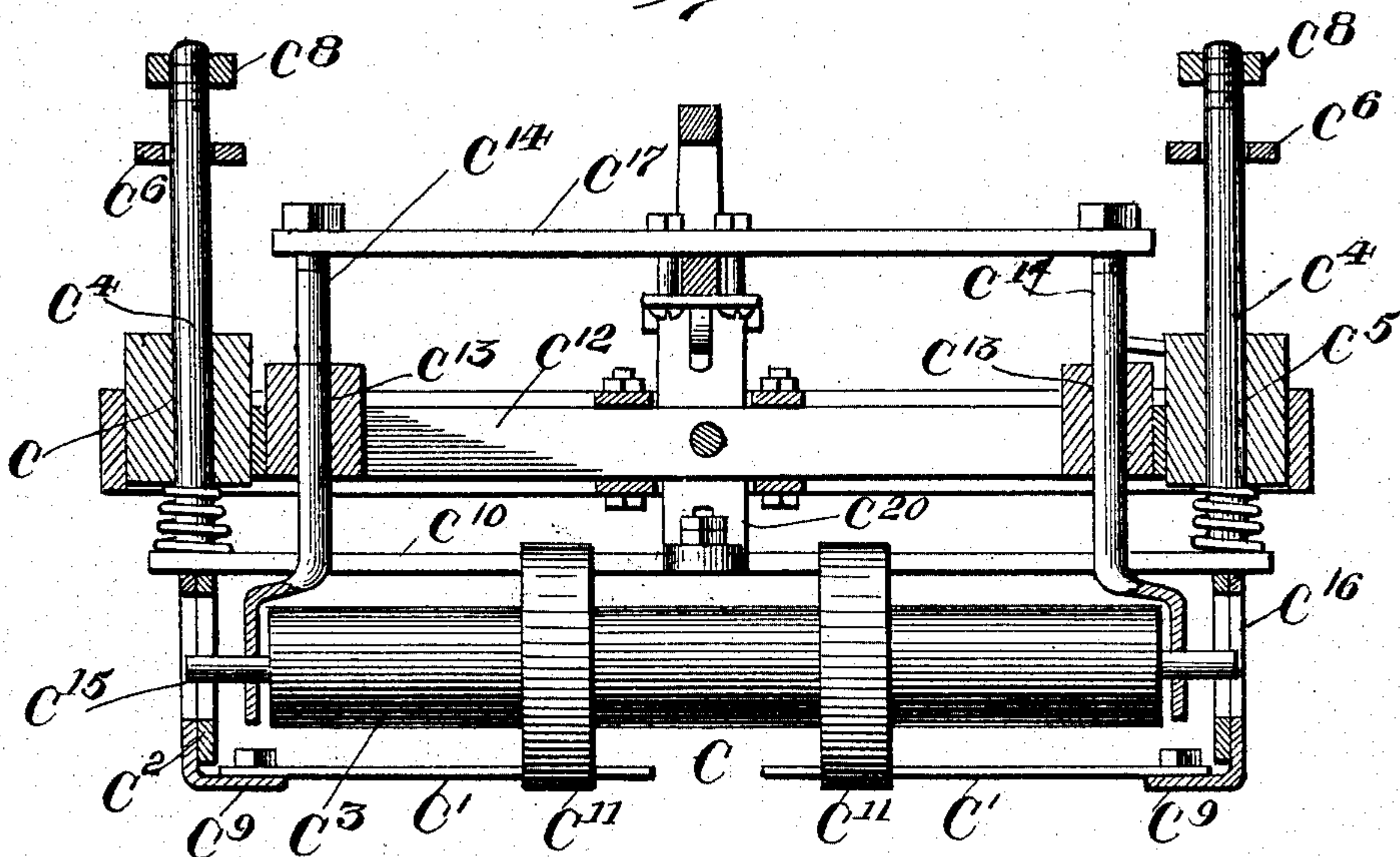


Fig. 5.

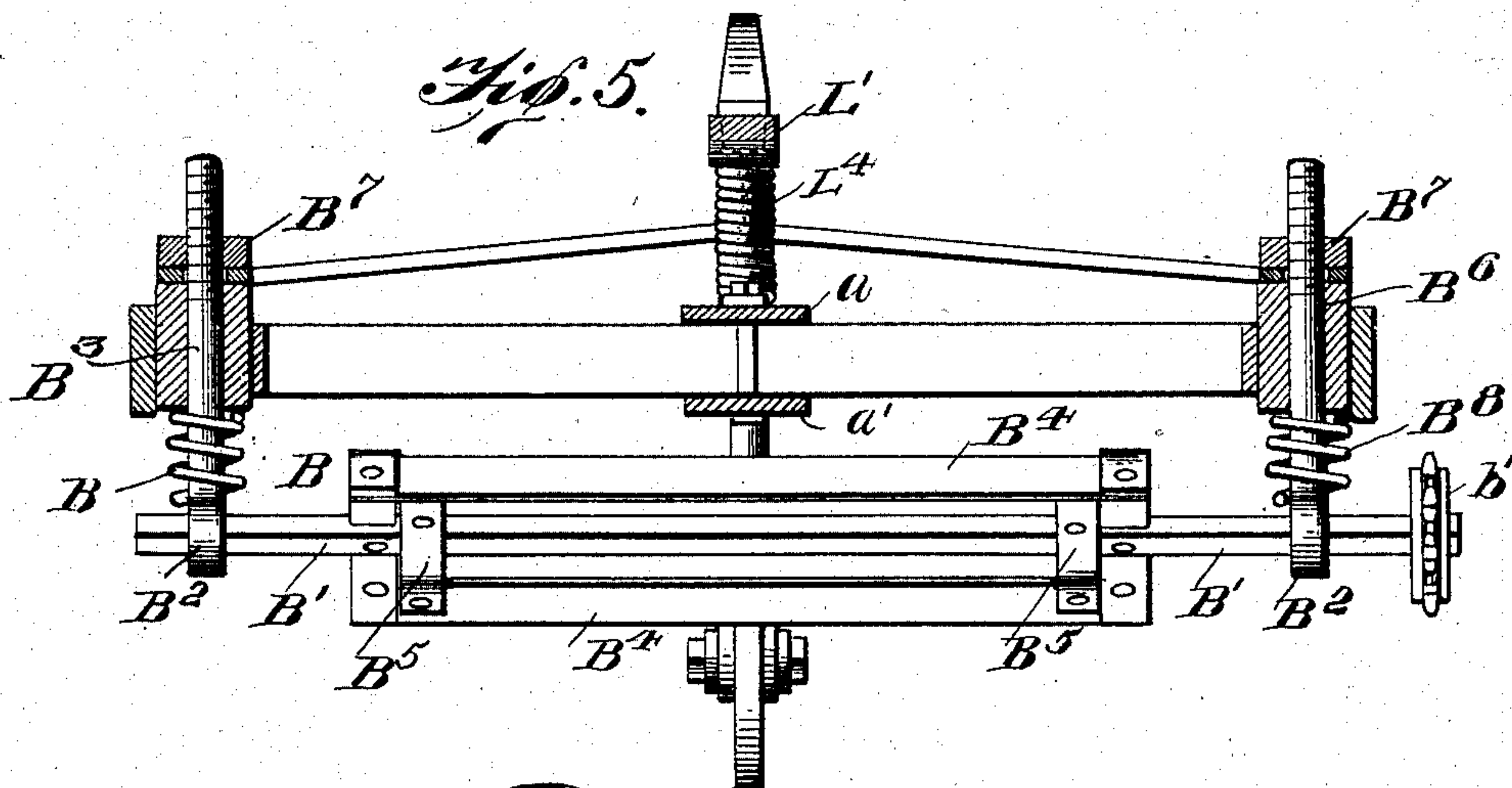
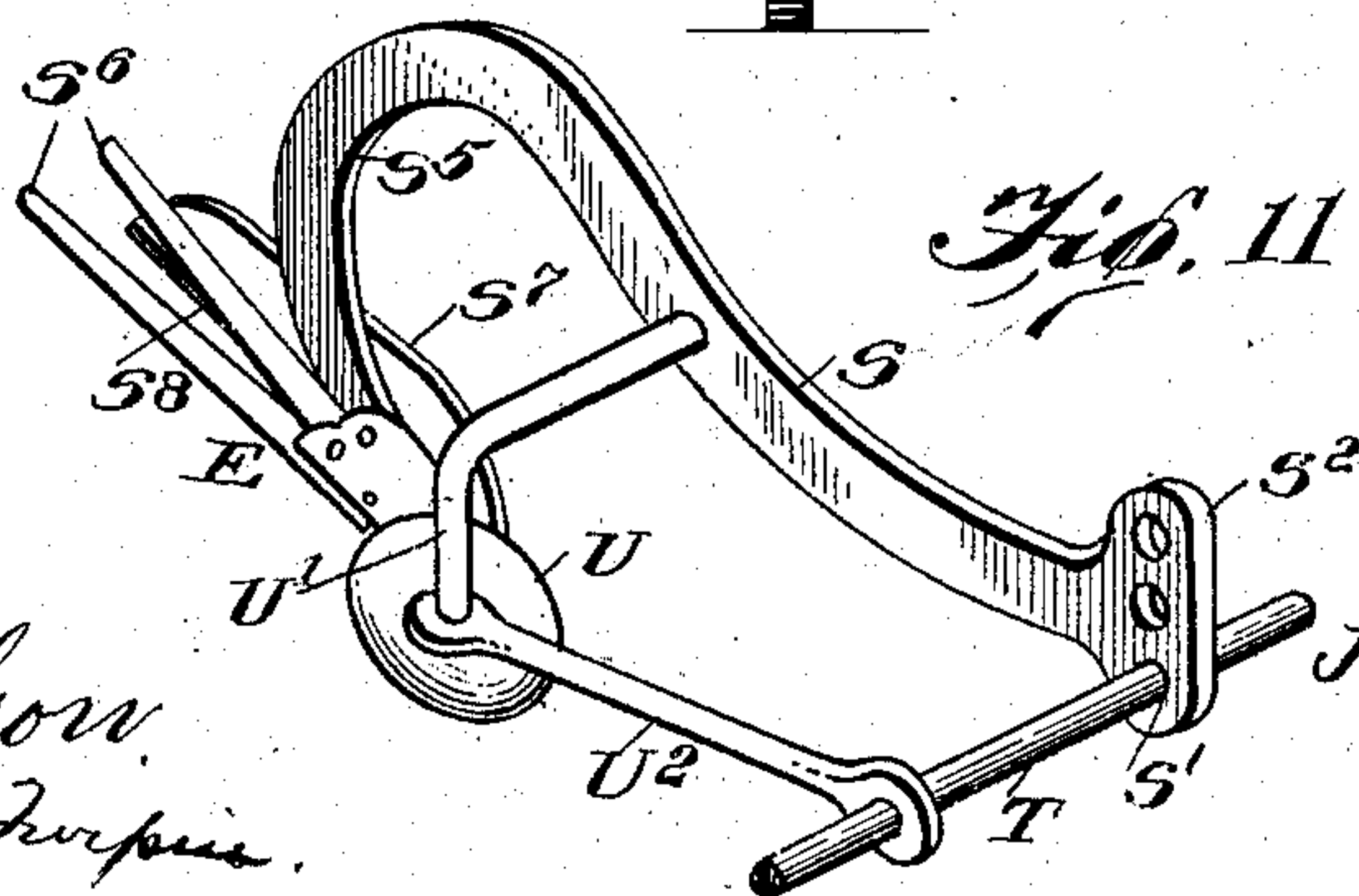


Fig. 11



WITNESSES
W. H. Wilson
Perry B. Surpin

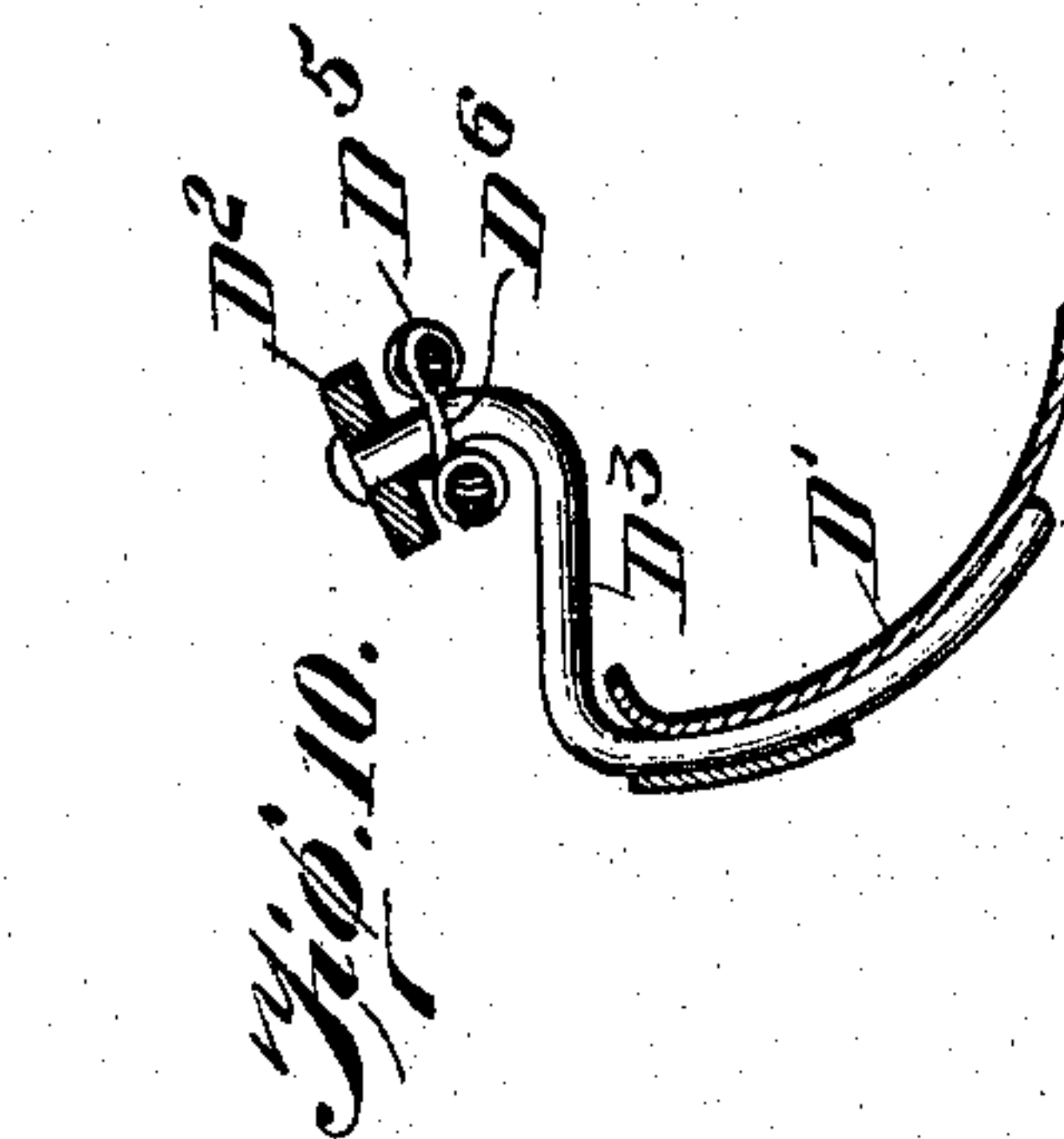
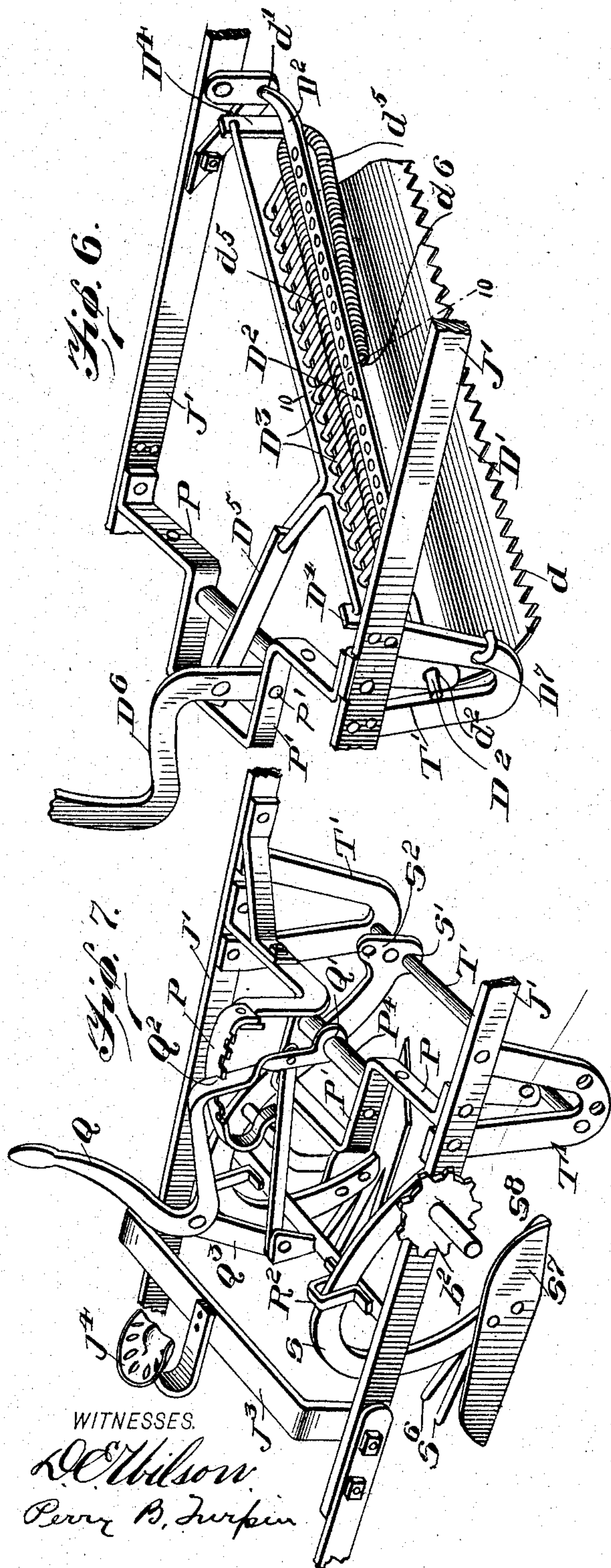
INVENTOR
Joseph F. Sandberg
BY *Wm. H. Co.*
ATTORNEYS

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BEET HARVESTER.
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5 SHEETS—SHEET 5.



UNITED STATES PATENT OFFICE.

JOSEPH F. SANDBERG, OF SMITHFIELD, UTAH.

BEET-HARVESTER.

No. 842,021.

Specification of Letters Patent.

Patented Jan. 22, 1907.

Application filed May 28, 1906. Serial No. 319,069.

To all whom it may concern:

Be it known that I, JOSEPH F. SANDBERG, a citizen of the United States, and a resident of Smithfield, in the county of Cache and State of Utah, have invented certain new and useful Improvements in Beet-Harvesters, of which the following is a specification.

My invention is an improvement in beet-harvesters; and it consists in certain novel constructions and combinations of parts, as will be hereinafter described and claimed.

In the drawings, Figure 1 is a top plan view of my machine. Fig. 2 is a side elevation thereof. Fig. 3 is a vertical longitudinal section of the machine. Fig. 4 is a detail cross-section on about the line 4 4 of Fig. 1. Fig. 5 is a detail cross-section on about line 5 5 of Fig. 1. Fig. 6 is a detail perspective view of the scraper for delivering the tops to the side of the machine and the means for supporting and operating said scraper. Fig. 7 is a detail perspective view of the devices for raising the beets out of the ground. Fig. 8 is a detail side view of the rear portion of the machine, taken from the opposite side from Fig. 2 and illustrating the rake for lifting the beets out of the ground and the means for adjusting the same. Fig. 9 is a detail perspective view of the tongue and the steering-wheel. Fig. 10 is a detail section on about line 10 10 of Fig. 6, and Fig. 11 is a detail perspective view of the digging devices.

In carrying out my invention I provide a main frame, a steering-wheel A at the front end thereof, and which may be adjusted whereby to raise the machine off the ground in moving from place to place and in turning, and in rear of this steering-wheel I provide a rotary cutter B for cutting off very rank tops and for chopping them up, so that they will not interfere with the operation of the topper C, which is arranged in rear of the rotary cutter B. In rear of the topper C, I arrange a scraper D for delivering the tops to the side of the machine. In rear of this scraper I arrange the plows E for digging the beets out of the ground, and in rear of these plows I provide the rake F to gather the beets and discharge them with the assistance of a toothed or fan-shaped roller G into the trough H at the rear of the machine, a conveyer I being supported to operate in the trough and discharge the beets at one side of the machine. For supporting the several parts I provide a frame which is preferably

made in three sections—the front section J¹⁰, the main section J, and the rear or supplemental frame-section K. The front section J¹⁰ is secured to the main section J, so the front section may when desired be raised at its front end without throwing the weight back of the wheels. This is effected by providing a hinge-joint at J¹³, on which the front section J¹⁰ may be rocked when the bolts J¹² are removed. In carrying out this construction I provide at the rear end of the side bars of the front section bars J¹¹, which are bolted to the front section J¹⁰, extend rearwardly therefrom, and lap on opposite sides of the front ends of the bars J', being secured thereto by the bolts J¹² and J¹³, so that by removing the bolts J¹² the front frame may be rocked on its hinge connection at J¹³ with the front ends of the bar J'. Except for this hinge connection at J¹³, which may be brought into play when desired, the front end of the frame cannot be raised without throwing the weight back of the wheels.

The main section J has the side bars J', which are connected at their front ends by a cross-bar J² and at their rear ends by the arch J³, the latter having the driver's seat J⁴, as shown, the side bars J' being made in sections, as before described, with the front section J¹⁰ arranged for adjustment on a hinged connection at J¹³, as best shown in Fig. 1 of the drawings. The supplemental frame-section K has the side bars K', connected detachably by bolts K², K³, and K⁴ with the rear ends of the side bars J' of the main frame-section, so that when used in small fields the frame K, carrying the gathering devices, may be disconnected from the main frame of the machine. In this connection it will be noticed that the side bars K' of the supplemental frame terminate at their front ends at k' and are secured by the bolts K² and K³ between parallel plates j and j', secured at their front ends on opposite sides of the rear ends of the side bars J' and extending thence rearwardly to secure between them the bars K', as will be understood from Fig. 1 of the drawings. These parallel plates j and j' are secured by the bolts K⁴ and K⁵ securely to the bars J', as will be understood from Figs. 1 and 2 of the drawings.

From the foregoing description and the accompanying drawings it will be noticed that I provide, in connection with a suitable main frame, means for steering the same for raising and lowering the front end of the

frame and also provide means for cutting off the rank tops, devices in rear thereof for cutting off the tops immediately above the beets, means for discharging the parts so cut to one side of the machine, and digging devices for lifting the beets out of the ground, and a rake and cooperating means for discharging the dug beets to a trough.

The steering-wheel A is mounted in bearings at the lower end of the shaft A', which shaft extends upwardly through openings in the upper and lower plates *a* and *a'*, in which the shaft A' may move longitudinally in raising and lowering the front end of the machine. Springs 1 and 2 are arranged, respectively, below the plate *a'* and above the plate *a*, the lower spring bearing between the plate *a'* and the upper end of the fork in which the wheel A journals and the upper spring 2 bearing between the plate *a* and the plate 3, which is secured at its opposite ends in connection with the framing and has an opening at its center through which the shaft A' projects. By these springs 1 and 2 the front end of the machine is cushioned in connection with the shaft A' and yet can be moved up and down to adjust the front end of the frame by means of the lever L. The lever L is pivoted at L' by fitting a comparatively large opening L² in the said lever on an upright shaft L³, mounted on the cross-bar J² of the frame and receiving the spring L⁴, upon which the lever L rests and pivots so the said lever may rock in a vertical plane to permit its front end, which is connected with the upper end of the shaft A by means of links L⁵, to operate the said shaft whereby to raise and lower the front end of the main frame. The spring L³ forms a yielding bearing for the lever L and eases any jars or shocks which might be encountered by the machine in the operation thereof. At its rear end the lever L has a detent or pawl l' engaging the teeth of the upright rack M, whereby the lever may be held in any suitable adjustment.

The plate *a'* extends in advance of the upright shaft A', and the tongue N is pivoted by a bolt N' to the said plate *a'*, so the tongue may swing to a limited extent to both sides. The swinging movement of the tongue is limited by the bolts N² passing through the plate *a'* and through the slots N³ in a plate N⁴, secured to the lower side of the tongue N, as will be understood from Figs. 1 and 3 of the drawings.

The rotary cutter B comprises a shaft B', journaled at its ends in bearings B² at the lower ends of shafts B³, and blades B⁴, carried at the ends of arms B⁵, projecting outwardly from the shaft B' and adapted when the cutter is rotated to cut off the upper portions of the rank tops of the beets. This rotary cutter is operated by a sprocket-chain *b*, connecting the sprocket-wheel *b'*, fixed on the shaft B', with the sprocket-wheel *b*², fixed to

one of the main wheels O, the opposite main wheel O having its sprocket-wheel geared with the conveyer at the rear of the machine, as presently described. By changing the sprocket-wheels B' and B² the speed at which the rotary cutter is operated may be varied, as is well known to those accustomed to the use of sprocket-chains. The shafts B³ (see Fig. 5) are movable vertically in bearings B⁶ and receive at their upper ends nuts B⁷, springs B⁸ being arranged between the bars B² of the shafts and the bearings B⁶ to cushion the said shafts and permit the rotary cutter to have a yielding action. The nuts B⁷ may also be adjusted to operate in connection with the springs B⁸ in raising and lowering the rotary cutter, as may be desired.

The topper C comprises the blades C', secured to the frame C², and a roller C³, which may be adjusted relatively to the blades C' to regulate the depth to which the latter may operate below the surface of the ground.

The frame C² has upright shafts C⁴, extending upwardly through suitable guides or bearings at C⁵ and thence through elevated bearings at C⁶ in brackets C⁷, mounted on the main frame and receiving the nuts C⁸, which may be adjusted to limit the depth to which the cutter C' may be lowered. The frame C² also has at its lower end the inwardly-projecting lugs C⁹, to which the outer ends of the cutters C' are secured, and is also provided with a top cross-plate C¹⁰, from which plates C¹¹ project downwardly to support the ends of the cutters C', as shown in Figs. 3 and 4 of the drawings. A frame C¹² extends between the side bars J' above the topper and is provided with openings C¹³, in which operate the upright shafts C¹⁴, carrying the roller C³ at their lower ends, the trunnions C¹⁵ of the roller C³ projecting through the bearings in the bolts C⁴ and thence into upright slots C¹⁶ in the frame C², whereby the roller may move up and down and will be guided in such movements by the fitting of these trunnions in the slots C¹⁶, as will be understood from Figs. 2 and 4 of the drawings. A cross-bar C¹⁷ connects the upper ends of the bolts C¹⁴ and rests upon and is secured to a lever C¹⁸, which has a detent engaging with the rack M and is pivoted at its front end at C¹⁹ to the upper end of a plate C²⁰, projecting up from the cross-bar C¹⁰ of the frame C². By operating this lever C¹⁸ the roller C³ may be moved up or down to regulate the depth of the blades C', as will be understood from the drawings and foregoing description.

The scraper D is arranged in rear of the topper C and is disposed diagonally from side to side of the machine, so it will gather the toppings and will deliver the same at its rear end at one side of the machine. As shown, the scraper comprises a blade D', whose front edge may be made straight, if desired, as shown in Fig. 2, or it may be

toothed, if desired, as illustrated at d in Fig. 6. This scraper is carried on a bar D^2 , which pivots at its ends at d' and d^2 in bearings depending from the main frame, the blade D' being connected, by means of a grating D^3 at its upper edge, with the bar D^2 , and the said bar D^2 having upwardly-projecting crank-arms D^4 , connected, by a pitman D^5 with the lever D^6 in convenient reach of the operator and by which the scraper may be regulated to set its edge toward or from the ground, as will be understood from Fig. 6 of the drawings. The scraper has a limited longitudinal movement afforded by the extension of the pivoted ends of the bar D^2 through the bearings d^2 , so that the scraper may give slightly in a longitudinal direction and may operate with a shearing action in readjusting to its normal position. In thus readjusting the scraper to its normal position, which is shown in Fig. 1, I may employ a spring for holding it yieldingly in place. This spring, as shown at d^5 in Figs. 1 and 6, comprises a coil-spring secured at one end d^6 to the bar D^2 and extending thence around the end of the scraper nearest the front of the machine, thence back along the rear side of the bar D^2 , and secured at its end at D^7 to the main frame adjacent to the rear end of the scraper. This construction operates to draw the scraper normally toward the right-hand side of the main frame or in the direction of the rear end of the scraper, as will be understood from Figs. 1 and 6 of the drawings.

It will be noticed that this spring not only operates to move the scraper longitudinally, as described, but also operates to tilt the scraper slightly in such manner as to force the edge of the scraper yieldingly toward the surface of the ground. This results from the bearing of the spring against the rear side of the scraper (see Fig. 6) slightly below the axis of the pivot D^2 , so that the spring performs this double function by the particular construction as shown and before described.

An intermediate cross-frame P extends between the side bars J' at a point slightly in rear of the scraper D and has at its center the rearwardly-offset portion P' , which is braced by a bar P^2 (see Figs. 1 and 2) from the arch J^3 . Within the offset portion P' is a cross-bar P^4 , on which is mounted the rack M . The lever D^6 is pivoted at p' to the offset portion P' of the intermediate frame P , (see Fig. 6,) and on the opposite side of the offset portion from the lever D^6 is mounted a rack-segment P^7 for engagement by the lever Q , which operates the crank-axle R , by which the plows may be raised and lowered in the use of the invention. The lever Q is pivoted at Q' , has a portion Q^2 for engagement with the rack-segment P^7 , and a depending portion Q^3 which connects with the crank R , which is preferably the intermediate connecting

portion of the axle R' for the wheels O . This crank R extends below the beams S of the plows and is provided on its upper side with loops R^2 , through which the beams S extend. By these box-loops R^2 , I am able to press the plows downwardly to any desired extent.

The beams S are pivoted at their front ends at S' upon a shaft T , extending from side to side of the machine and supported at its ends in brackets T' depending from the side bars J' , and at their front ends the beams are provided with portions S^2 extending above the pivots S' , and to these upward extensions are connected the drag-bars S^3 , which extend to the front end of the main frame and are provided with eyes S^4 , to which the team may be attached, so that the pulling strain will be exerted directly upon the plow-beams in the operation of the invention. By rocking the lever Q the beams may be raised and lowered to any desired extent. These beams have the standards S^5 , at the lower ends of which are secured the diggers E in the form of shovels, each having the upright landside S^7 and the base-plate S^8 , which inclines upwardly toward its rear end to lift the soil and the beets and is provided at its upper rear end with the rearwardly-projecting bars S^6 , which are spaced apart and are adapted to disintegrate the soil and in a measure separate the beets therefrom, so the beets will be delivered in condition to be collected by the rake F , which is arranged immediately in rear of the diggers, as shown in Figs. 1, 2, and 3.

Extending adjacent to the front ends of the shovels and slightly to one side of the inner edge thereof I support from the beams S disks U . These disks are inclined toward their lower edges toward their respective shovels and are supported on frames having upright rods U' , connecting with their respective beams, and forwardly-extending rods U^2 , connecting at their rear ends with the lower ends of the rods U' and at their front ends with the cross-shafts T , as will be understood from Figs. 2 and 3 of the drawings. By this construction it will be noticed the disks, being supported from the beams, are raised and lowered as the beams are raised and lowered by the operation of the lever Q before described. These disks cut the soil loose on one side, and the knife-like landsides S^7 on the shovels loosen the soil on the other side, the bottom plate S^8 raising the soil and beets and the beets operating to push each other back along the base-plate S as is desired in the operation of the machine.

The toothed roller or shaft G is journaled at its ends within vertically-elongated slots G' , (see Fig. 2,) so it can rise and fall slightly, and is provided with projecting teeth or bars G^2 , which operate directly above the teeth of the rake F . This toothed shaft G is operated from the wheel O at the left of the machine by the sprocket-chain O' , which

operates the conveyer I, said sprocket-chain O' extending over and engaging with a sprocket-wheel G³ on the shaft G. This shaft G with its projecting teeth G² aids the teeth of the rake F in sifting the soil from the beets, and also operates to discharge the beets from the teeth of the rake F into the trough H at the rear of the machine. The rake F has a bar F', journaled at its opposite ends in the framing, and the teeth F², projecting forwardly from the bar or shaft F' and adapted to be raised and lowered by the rocking of said shaft F' in the operation of the machine. For operating the rake I provide (see Fig. 8) an upwardly-projecting crank-arm F³ at one end of the shaft F' and a hand-lever F¹³, engaging a rack F⁴ (see Fig. 1) and connected by a pitman F⁵ with the crank-arm F², whereby the rake may be operated to raise and lower its teeth F², as will be understood from Fig. 8 of the drawings.

The trough H extends from side to side of the machine in rear of the rake F and in position to receive the beets discharged therefrom and is open to discharge at the right side of the machine. The conveyer I operates in this trough and is provided with conveyer-flights, such as projecting pins I', forming flights for conveying the beets to the open end of the trough at the right side of the machine when the conveyer is operated by the chain O', passing around the sprocket-wheel I² at the end of the conveyer-shaft.

In the operation of the machine it will be understood that the beets being planted in rows, as usual, the rotary cutter at the front end of the machine will cut off the very rank tops and the topper C will by its blades co-operating with the roller, which is adjustable relatively to the blades, as before described, operate to cut the top portions at the desired distance below the surface of the ground, the scraper following and discharging the tops to one side of the machine, the plows E following in line with the rows and digging the beets out of the ground and disintegrating the soil and separating the same from the beets with the aid of the rearwardly-projecting bars or pins S⁶, the rake F in rear of the plows gathering the beets and discharging the same by the assistance of the toothed roller to the transverse trough at the rear of the machine, where they are discharged at one side by the action of the conveyer in the operation of the machine.

It will be noticed that in the operation of the topper the roller is adjusted relatively to the blades C', the latter being arranged to cut along the rows of beets. It will also be noticed that the plows are in alinement with the blades C' to also operate along the beet-rows, and means are provided whereby the plows may be adjusted up and down, and the topper may be adjusted, and thus I am able to adjust the plows relative to the ad-

justment of the topper, so that both said parts may be adjusted according to the depth of the beets.

I claim—

1. A beet-harvester substantially as herein described, comprising a framing, a rotary cutter at the front end thereof, a topper in rear of said cutter and having blades at its lower end, a roller above the blades, and means for adjusting the roller relatively to the blades, a scraper in rear of the topper and adapted to gather the tops and to discharge the same to one side of the machine, the plows arranged in rear of the scraper and in alinement with the blades of the topper, means whereby the plows may be adjusted relatively to the adjustment of the topper, a rake arranged in rear of the plows, a transverse trough in rear of the rake and in position to receive the beets discharged by said rake, means operating in connection with the rake for discharging the beets to the trough, and a conveyer in the trough, substantially as set forth.

2. The combination in a beet-harvester with the framing, of means for digging the beets, topping devices in advance of the digging means, and means between the topping devices and digging means for discharging the tops at one side of the machine, said discharging means comprising a scraper disposed diagonally from side to side of the machine, a bar or shaft carrying said scraper and pivoted at its ends and having a limited movement in the direction of its length, and a spring for resisting said endwise movement and for holding the scraper yieldingly in position to engage and discharge the toppings, substantially as set forth.

3. A beet-harvester comprising the framing, means supporting the framing above the ground, a topper having blades adapted to operate close to the surface of the ground, means supporting the topper from the main frame, and a cutter in advance of said topper and adapted to cut off the very rank tops, substantially as described.

4. The combination in a beet-harvester with the framing and the topping devices, of a scraper in rear of the topping devices and inclined rearwardly toward one end whereby it may discharge the tops to one side of the machine, said scraper being pivotally supported whereby it may be tilted and having a limited longitudinal movement, and spring devices for resisting said longitudinal movement of the scraper, substantially as set forth.

5. The combination in a beet-harvester with the framing and the topping devices, of a scraper in rear thereof and having a lower blade-like portion and an upper grating portion, substantially as set forth.

6. The combination with the framing and the topping devices, of a scraper pivoted at its upper end to the framing whereby it may

be adjusted at its lower edge toward and from the ground, and means for tilting the scraper on said pivot, substantially as set forth.

5 7. The combination in a beet-harvester with the framing and the topping devices, of the scraper in rear thereof and pivoted at its upper edge and movable longitudinally in the direction of said pivot whereby it may
10 operate with a shearing action, means for tilting the scraper on said pivot, and a spring for normally pressing the scraper in one direction, substantially as set forth.

15 8. In a beet-harvester, the combination with the framing and the topping devices, of the scraper in rear of the topping devices and pivoted at its upper edge and having a limited longitudinal movement in alinement with its pivot, and a spring pressing the
20 scraper longitudinally in one direction and adapted to press the edge of the scraper normally toward the ground, substantially as set forth.

25 9. The combination with the framing and the scraper pivoted at its upper end, of a coil-spring suitably secured at one end, extending thence along the rear side of the scraper below the pivot thereof, and secured at its other end in connection with the framing whereby
30 the spring may exert a tension on the scraper in the direction of its pivotal axis and also may tilt the scraper on said pivot, substantially as set forth.

35 10. The combination in a beet-harvester with devices for digging the beets from the ground and means in advance of said digging devices for topping the beets and discharging the tops to one side of the machine, of a rake
40 in rear of the digging devices, a trough in rear of the rake in position to receive the beets, and a conveyer for discharging the beets from the trough, substantially as set forth.

45 11. In a beet-harvester, the combination of the framing, the topping-blades for the beets a roller above the topping-blades for varying the operating position of the blades, means for adjusting said rollers, digging devices in rear of the topping devices, and
50 means for adjusting the digging devices, substantially as set forth.

55 12. The combination in a beet-harvester with the framing and means for topping and digging the beets, of a rake arranged in rear of the digging means, a trough in rear of the rake and in position to receive the beets therefrom, and means operating above the rake for discharging the beets into the trough, substantially as set forth.

13. The combination in a beet-harvester of the framing, topping devices supported
60 thereby, digging devices in rear of the topping devices and comprising the beams, the shovels supported thereon, disks supported from the beams and operating in connecting with the shovels and the bars projecting
65 rearwardly from the shovels and spaced apart whereby to disintegrate the soil and separate the beets therefrom, substantially as set forth.

70 14. In a beet-harvester substantially as herein described, the combination with the framing, the topping devices, and the gathering devices, of digging devices located between the topping and gathering devices and comprising the pivoted beams, means engag-
75 ing with the beams between their ends for adjusting the same vertically, the shovels and disks carried by the beams and the disintegrating-bars projecting rearwardly from the shovels and spaced apart, substantially
80 as set forth.

15. The combination substantially as herein described, of the framing, the topping devices supported at the front end of the framing, means in rear of the topping devices for
85 discharging the tops to one side of the machine, the digging devices in rear of said top-discharging means, and drag-bars connected with the digging devices and extending thence forwardly and adapted for connection
90 with the draft devices, substantially as set forth.

16. The combination in a beet-harvester with the main frame and a cross-shaft connected therewith, of the beams connected at
95 their front ends with the said shaft and provided at their rear ends with the devices for digging the beets, draft-rods connected with said beams and extending forwardly and adapted for connection with the draft de-
100 vices, substantially as set forth.

17. In a beet-harvester the combination with the main frame and means carried thereby for topping, digging and gathering the beets, of a steering-wheel having an up-
105 right shaft journaled to the main frame, spring devices for resisting the endwise movements of said shaft, a lever for moving the said shaft vertically relative to the main frame, a tongue, and means connecting the
110 tongue with the steering-wheel, substantially as set forth.

JOSEPH F. SANDBERG.

Witnesses:

GEORGE E. MILES,
GEORGE Y. SMITH.