

(No Model.)

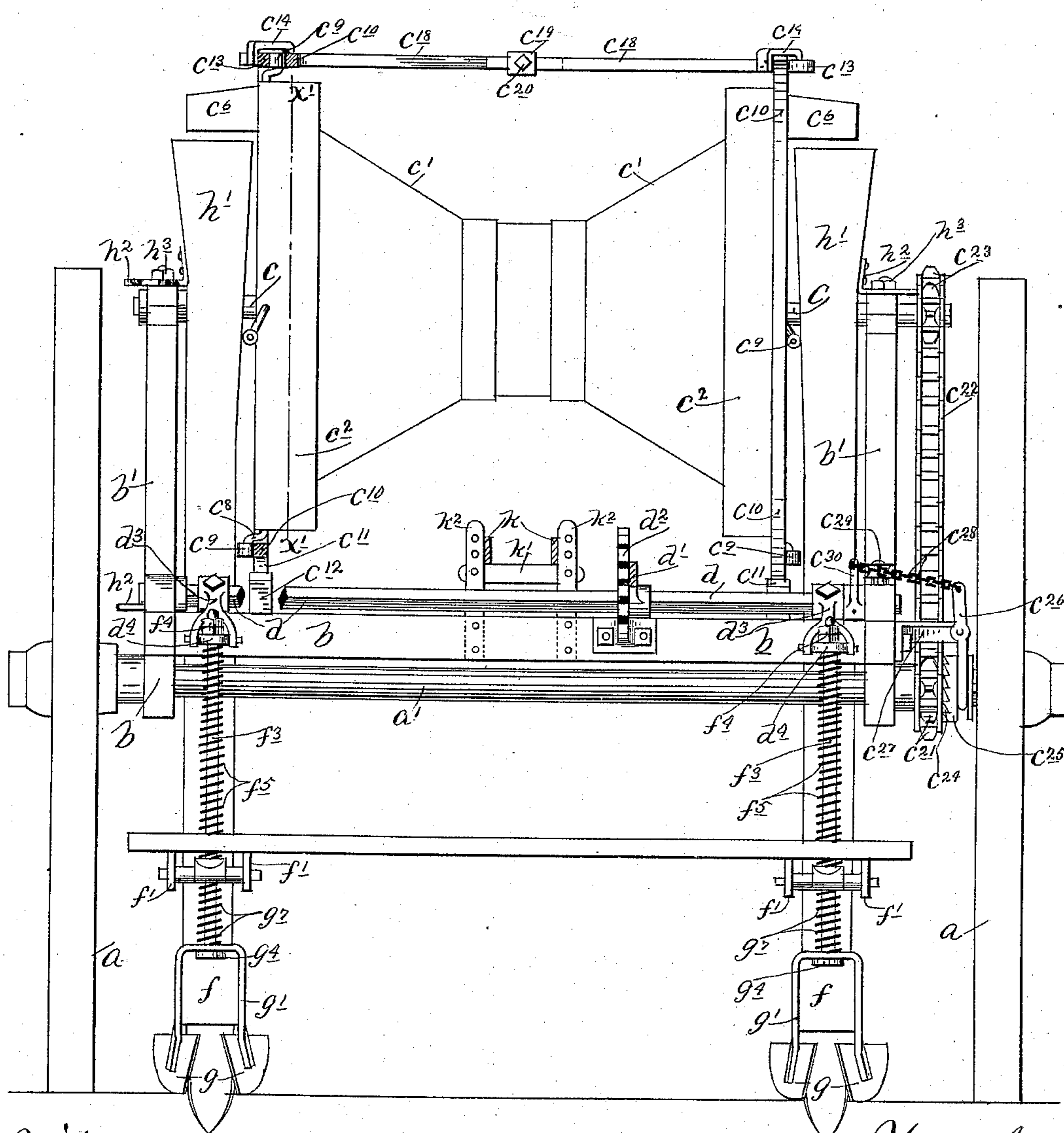
7 Sheets—Sheet 1.

J. N. WILSON.  
PLANTER.

No. 535,432.

Patented Mar. 12, 1895.

*Fig 1.*



Witnesses.

E. F. Elmoor  
Frank Merchant,

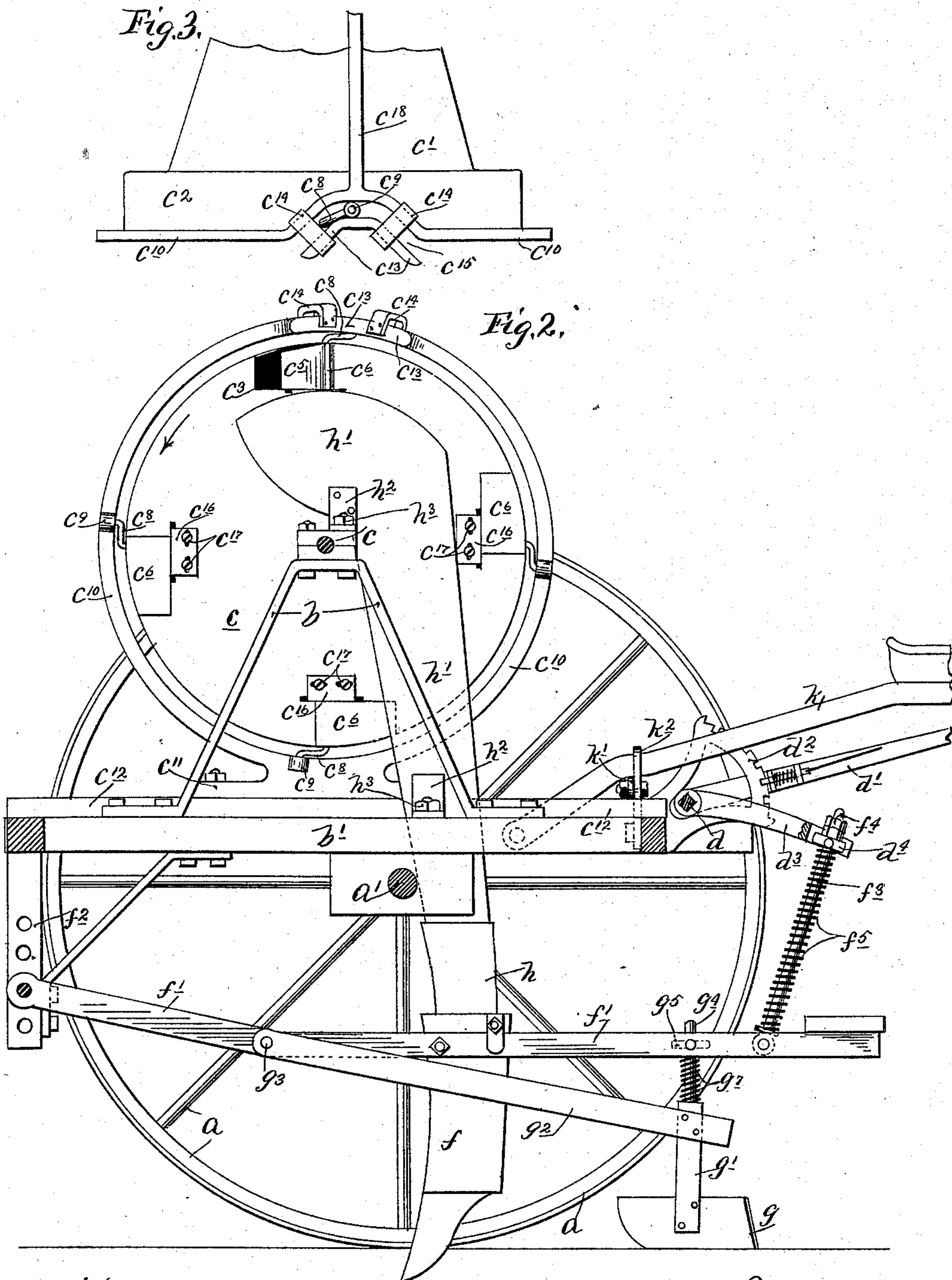
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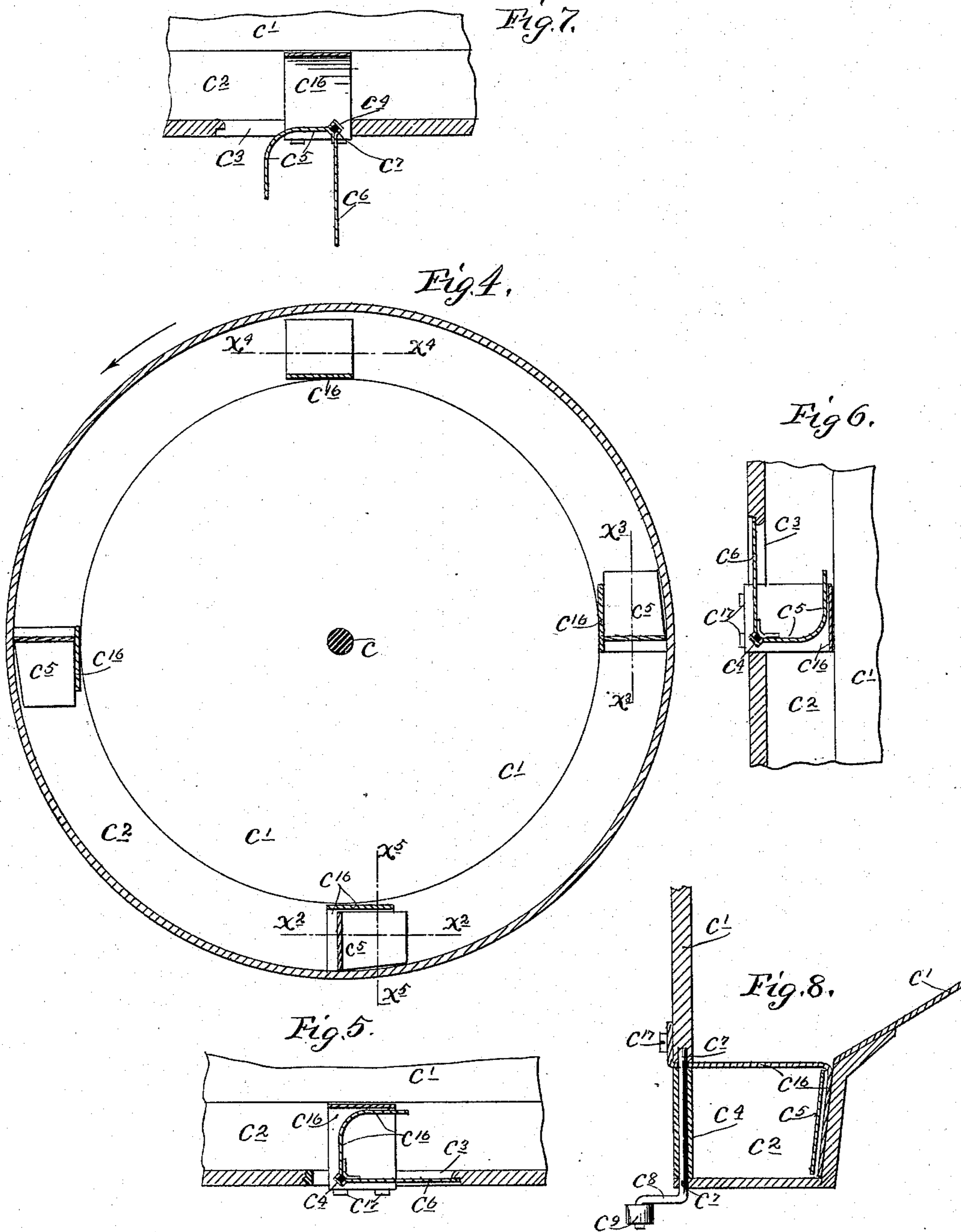
Witnesses  
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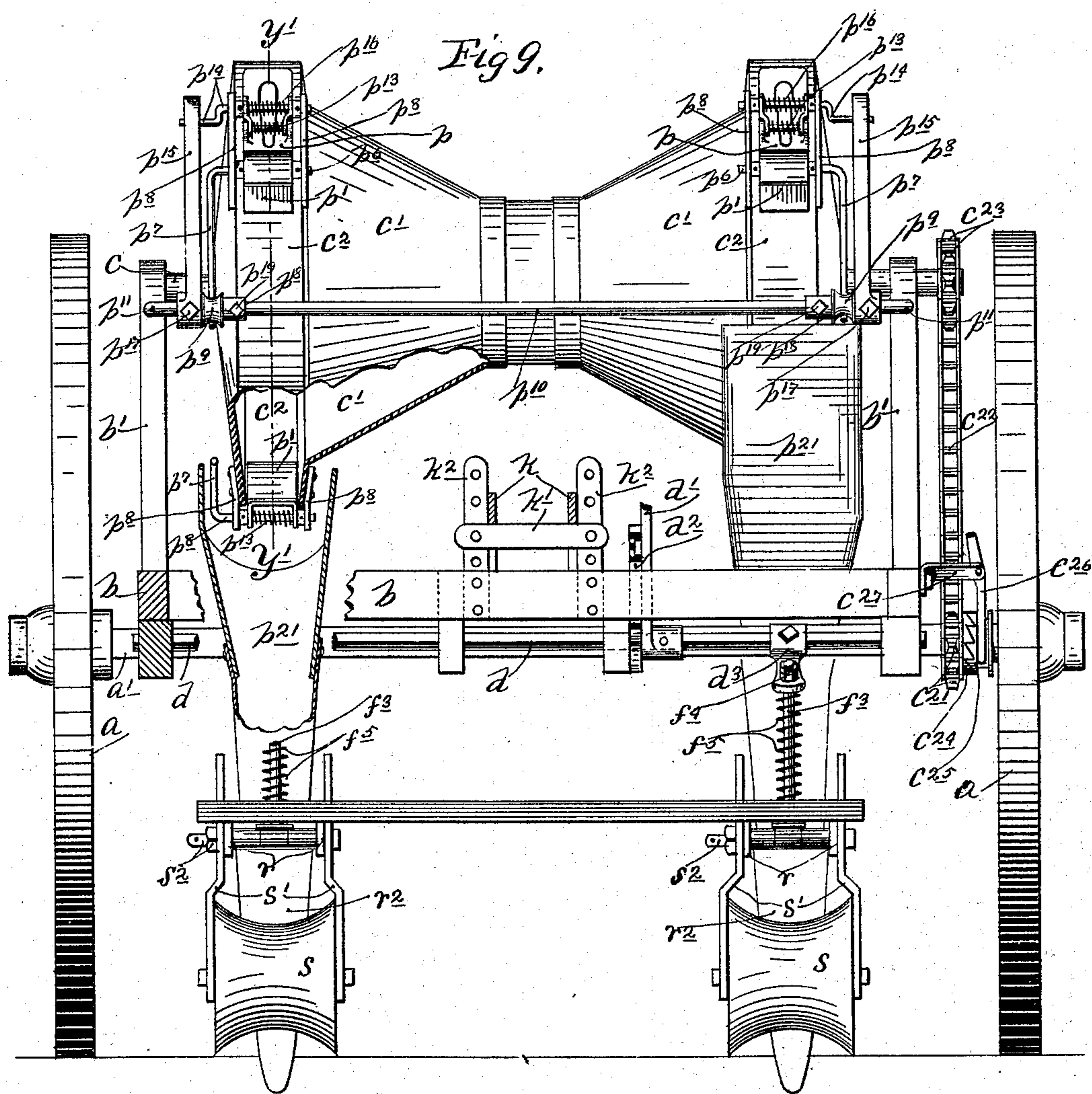
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7 Sheets—Sheet 4.

J. N. WILSON.  
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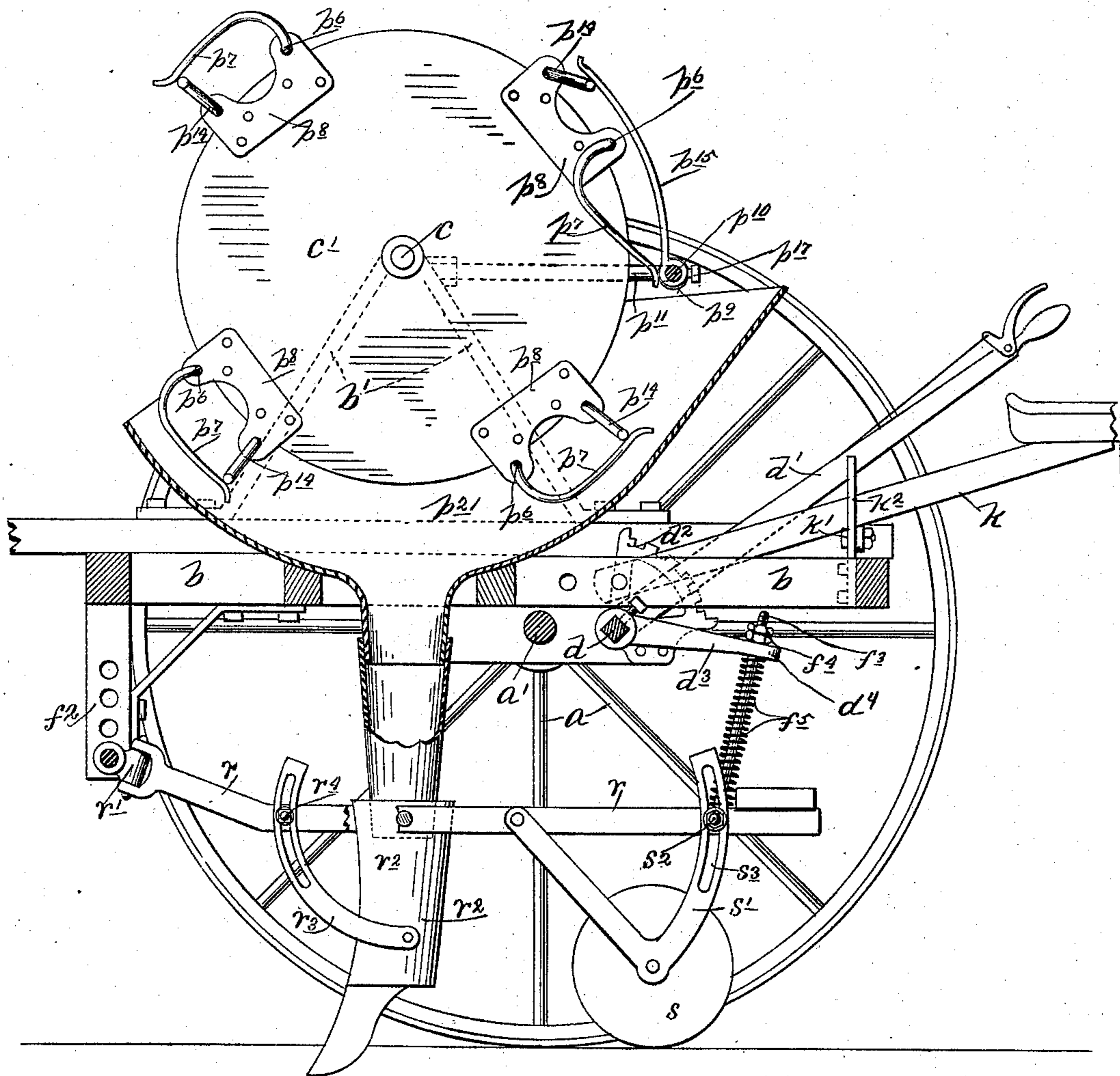
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J. N. WILSON.  
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Fig 10.



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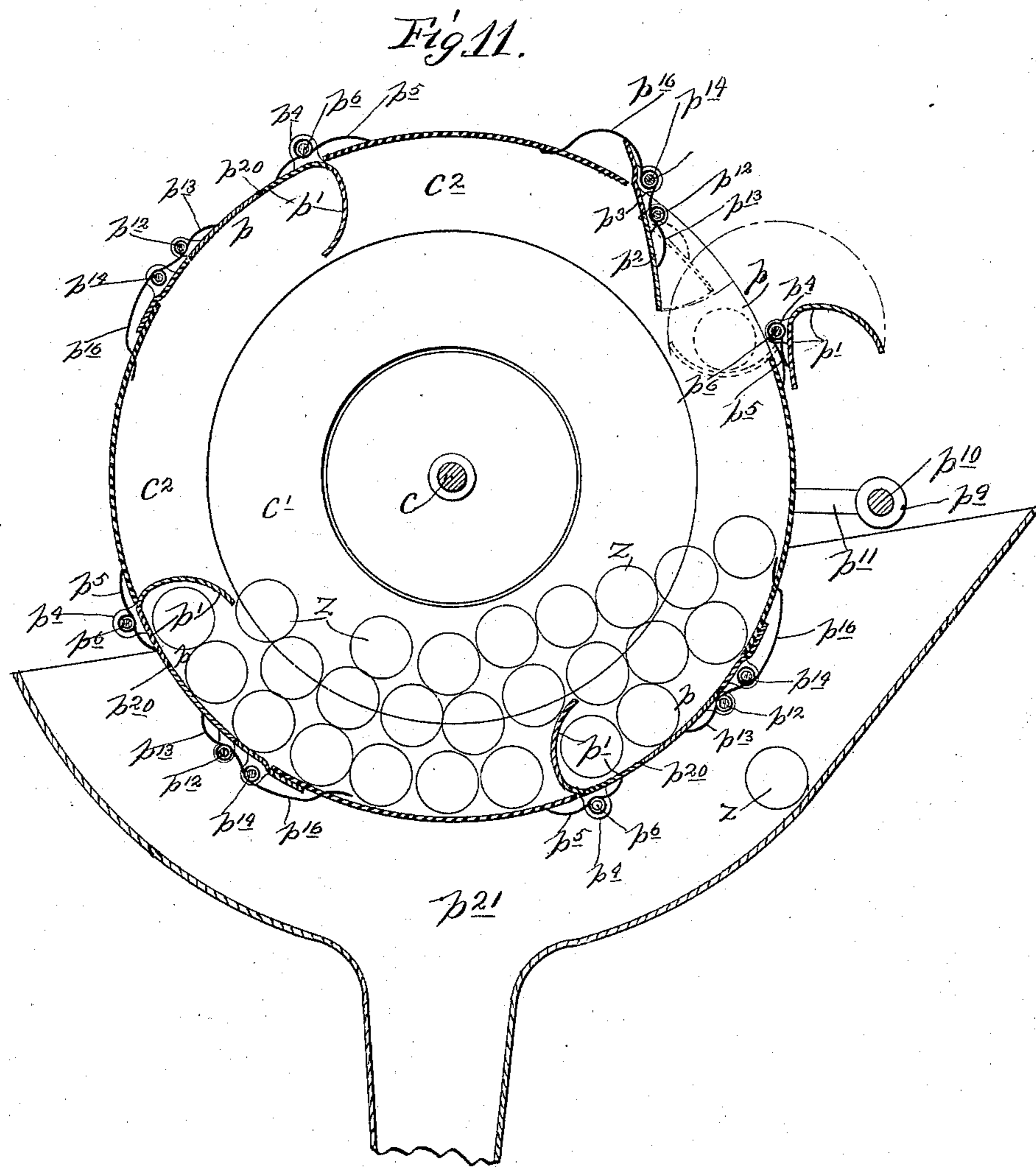
(No Model.)

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7 Sheets—Sheet 6.

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(No Model.)

J. N. WILSON.  
PLANTER.

7 Sheets—Sheet 7.

No. 535,432.

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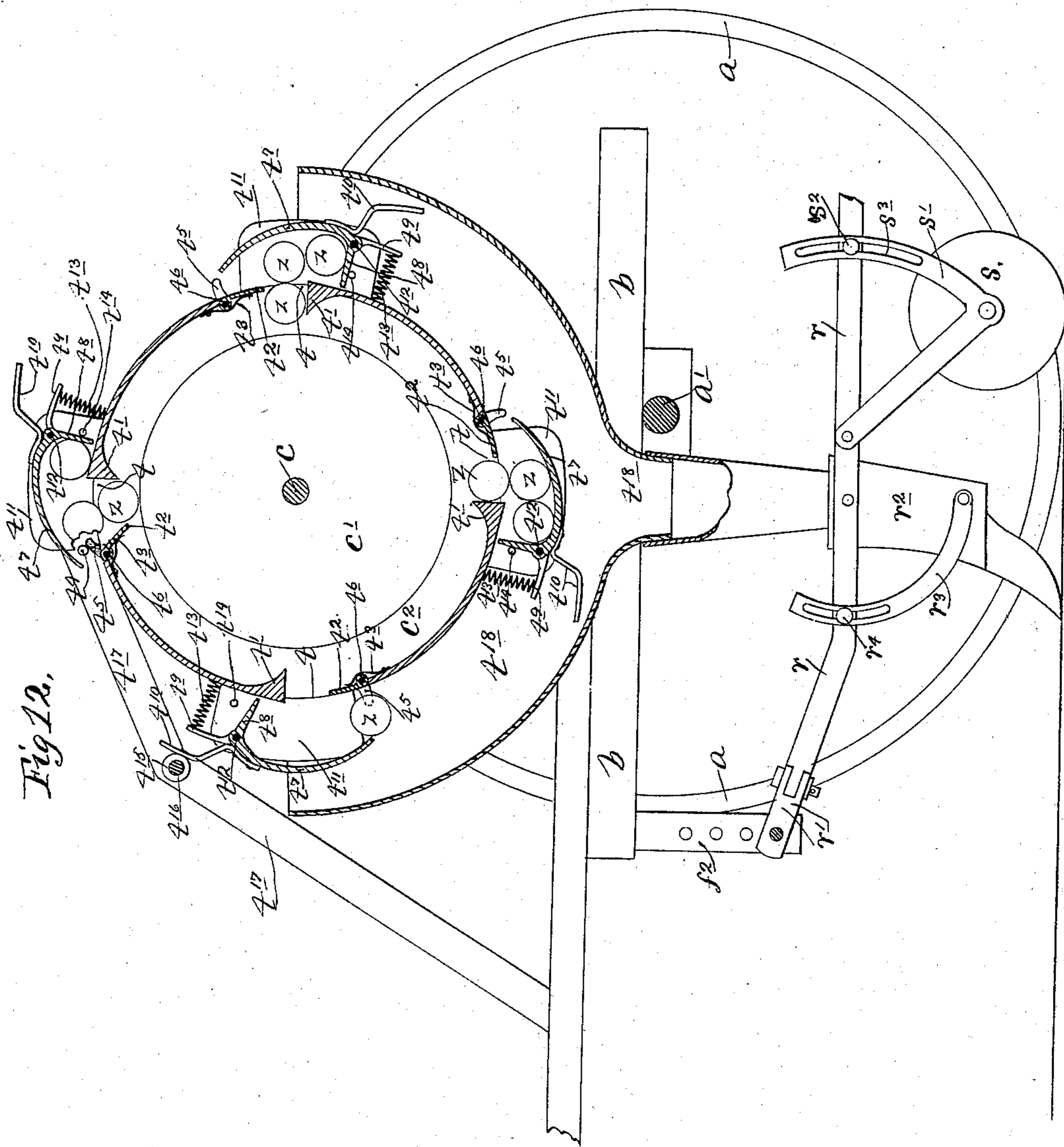


Fig. 12.

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# UNITED STATES PATENT OFFICE.

JAMES N. WILSON, OF MINNEAPOLIS, MINNESOTA.

## PLANTER.

SPECIFICATION forming part of Letters Patent No. 535,432, dated March 12, 1895.

Application filed June 25, 1894. Serial No. 515,596. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES N. WILSON, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Planters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to planters. The machine was especially designed, for use in planting potatoes and cotton-seed, but is serviceable for planting a variety of other materials, such as corn, beans, peas, &c.

The invention consists of certain novel devices and combinations of devices, which will be hereinafter fully described and be defined in the claims.

The novel features herein contained are designed for use in connection with some of the parts, shown in my prior patent, issued to me of date May 1, 1894, and numbered 518,979.

The accompanying drawings illustrate my invention. Therein like letters refer to like parts.

Figure 1 is a rear elevation of the machine, embodying my preferred construction. Fig. 2 is a view, chiefly in end elevation, but partly in section, showing the same parts as in Fig. 1, with the left side wheel removed. Fig. 3 is a plan view of one end of the drum, and one of the cams shown in Figs. 1 and 2. Fig. 4 is a vertical section, through the collecting trough section of one end of the drum, on the line X' X' of Fig. 1, looking inward. Fig. 5 is a horizontal section, on the line X<sup>2</sup> X<sup>2</sup> of Fig. 4, showing one of the pivoted droppers, at the lowermost point of the drum's travel, or in its loading position. Fig. 6 is a vertical section, on the line X<sup>3</sup> X<sup>3</sup> of Fig. 4, showing one of the pivoted droppers, when at the drum shaft level, or in its loaded or carrying position. Fig. 7 is a horizontal section, on the line X<sup>4</sup> X<sup>4</sup> of Fig. 4, showing the dropper at the highest point of the drum's travel, or when in its dropping position. Fig. 8 is a vertical or radial section, through one of the collecting troughs of the drum, on the line X<sup>5</sup> X<sup>5</sup> of Fig. 4, looking from the right toward the left. Fig. 9 is a rear elevation of a machine embodying a modified construction, with some parts broken

away and others shown in section. Fig. 10 is a view of the same parts as shown in Fig. 9, chiefly in end elevation, but partly in section, with the left hand wheel removed. Fig. 11 is a vertical section, through the collecting trough section of the drum, on the line Y' Y' of Fig. 9, with some parts broken away and others removed. Fig. 12 is a view, chiefly in section, but partly in elevation, through a machine on the same line as Fig. 11, showing a modified form of the dropping mechanism.

Considering first the preferred construction, shown in Figs. 1 to 8 inclusive, the supporting or ground wheels *a*, the axle *a'* and the main frame *b*, mounted upon said axle may be of any suitable construction. On the said frame, are mounted a pair of standards *b'*, in which is journaled a drum-shaft *c*. The drum carried by said shaft *c* is composed of a pair of bi-coniform sections *c'*, arranged large ends outward, and having internal groove-like collecting troughs *c<sup>2</sup>* formed by abrupt enlargements of the drum; which troughs serve to hold the seeds which are delivered thereinto, from the drum, from being forced back into the drum under the action of the droppers. These collecting trough sections *c<sup>2</sup>* have their inner walls set at an incline, with respect to the drum-heads, so as to make the troughs larger in cross section, at the point of their junction with the adjacent conical sections of the drum, than at the outer end or bottoms of the same, which construction prevents the lodging of potatoes or other materials on the walls of the troughs, or in other words, avoids clogging of the same. In the drum-heads or end walls of said collecting troughs *c<sup>2</sup>*, adjacent to the peripheries thereof, are a series of outlet openings *c<sup>3</sup>*; in which outlets *c<sup>3</sup>* are mounted a series of pivoted droppers, comprising pivot-shaft seats *c<sup>4</sup>* of angular form in cross section, hook-like portions *c<sup>5</sup>*, expanded flat portions *c<sup>6</sup>* and pivot shafts *c<sup>7</sup>* of corresponding shape in cross section to their seats *c<sup>4</sup>* and journaled in suitable bearing in the drum-head. The said pivot shafts *c<sup>7</sup>* have at their outer ends crank-like lever arms *c<sup>8</sup>*, provided with rollers *c<sup>9</sup>*. The said rollers *c<sup>9</sup>* engage the outer vertical base of an annular cam *c<sup>10</sup>*, having formed therewith a foot-plate *c<sup>11</sup>*, by which the said cam-casting is secured to the main frame. As shown, the said cam-casting *c<sup>10</sup>* *c<sup>11</sup>* is bolted to

a base-board  $c^{12}$ , which is laterally adjustable on the frame. Each of the cam-castings  $c^{10}$   $c^{11}$ , located one at each end of the drum, are of exactly similar form, except that they are  
 5 faced in opposite directions. At or near the highest traverse point of the drum, (see Fig. 3,) the said annular cam-plate  $c^{10}$ , is provided with jog, faced by an outside cam-plate  $c^{13}$  of similar form and supported by angle-iron  
 10 brackets  $c^{14}$ , projecting from the cam-plate  $c^{10}$ , which parts co-operate to form the offset cam-channel or passage  $c^{15}$  for the rollers  $c^9$ , at that part of their travel with the drum, which cam-channel  $c^{15}$ , becomes effective to turn the piv-  
 15 oted droppers on their bearings, as required to effect the drop and restore the same to their normal position. To the drum-heads are secured adjustable plates  $c^{16}$  of angular form, which project through the outlets  $c^3$  into the  
 20 collecting troughs  $c^2$ , with their upturned inner ends bearing against the inner walls of said troughs. The said plates  $c^{16}$  are adjustably secured to the drum-heads by slot and screw connections, as shown at  $c^{17}$ . When the  
 25 said plates  $c^{16}$  are in working position, and the said pivoted droppers are in their closed position, the said plates co-operate with the hook-like portion  $c^5$  of the droppers, to form cups, for catching and holding the potatoes or other  
 30 materials to be dropped. When one of the said plates is at the lowest traverse point of the drum, as shown in Fig. 5, it will form the top wall of the cup. When on the level with the drum-shaft, the said plate will form the  
 35 inner side wall of the cup, as shown in Fig. 6; and when at the highest traverse point of the drum, the said plate will form the bottom wall of the cup, as shown in Fig. 7. Hence, as the said plates may be adjusted, the cups, formed  
 40 by the co-operation of the same with the hook-like portions  $c^5$  of the droppers, may be varied in size, at will, to graduate the same for the quantity of material desired to be dropped. The cam-castings  $c^{10}$   $c^{11}$  are braced and prop-  
 45 erly held at their tops by a sectional cross-tie  $c^{18}$ , the meeting ends of which slide past each other, through a keeper  $c^{19}$ , and are locked together in whatever position set by a jam-bolt  $c^{20}$  tapped through the said keeper.  
 50 Rotary motion, in the direction shown by the arrows, is imparted to the drum from the right hand supporting wheel  $a$ , through a sprocket and chain drive, comprising the sprocket  $c^{21}$ , loose on the axle  $a'$ , the chain  $c^{22}$   
 55 and the sprocket  $c^{23}$ , engaged by said chain and rigidly secured to the right end of the drum-shaft  $c$ . The loose sprocket  $c^{21}$  has on its outer face a half clutch  $c^{24}$ , which is engageable by a sliding half clutch member  $c^{25}$   
 60 on the inner hub of the driving wheel  $a$  and under tension to assume its closed position from a spring not shown. The sliding half clutch  $c^{25}$  is subject to a shipper-fork  $c^{26}$ , pivoted to bracket  $c^{27}$ , projecting from the main  
 65 frame and connected by chain  $c^{28}$ , passing over guide-sheaves  $c^{29}$ , with a crank-arm  $c^{30}$  on the hand-lever rock-shaft  $d$ . The said

rock-shaft  $d$  is mounted in suitable bearings on the main frame and is provided with a spring-pawl hand-lever  $d'$ , engageable with a  
 70 notched lock segment  $d^2$  fixed to the main frame. The said lever-shaft  $d$  is also provided with rearwardly projecting crank-arms  $d^3$  having near their rear ends pivoted or rock-  
 75 ing keepers  $d^4$ .

The seed-boots or furrow-openers  $f$ , are carried by drag-bars  $f'$ , pivoted at their forward ends to the depending drag-bar brackets  $f^2$  fixed to the main frame. The boot drag-bars  $f'$  are extended rearward beyond the boots  
 80 and are provided near their rear ends with spring guide-rods  $f^3$ , pivoted to the drag-bars and extending upward to the rocking keepers  $d^4$  on the lever shaft arms  $d^3$ . The rods  $f^3$  are engaged above the keepers  $d^4$  by nuts  $f^4$ ; and  
 85 on the said rods, between the keepers  $d^4$  and the drag-bars  $f'$ , are located coiled springs  $f^5$ , through which and the lever mechanism described, the seed-boots may be yieldingly held under any desired pressure, in whatever posi-  
 90 tion they may be set, or be raised out of contact with the ground, at will.

For covering purposes, I employ a pair of vertical shovels  $g$ , set with respect to each other on upwardly and rearwardly convergent  
 95 angles, and supported by a yoke  $g'$ , attached rigidly to cover drags  $g^2$ , which embrace or straddle the seed-boot  $f$  and are pivoted to the seed-boot drag  $f'$  in front of the seed-boot, as shown at  $g^3$ . The yokes  $g'$  have upwardly  
 100 extended stems  $g^4$ , which work through pivoted or rocking keepers  $g^5$ , mounted in the rearwardly projecting parts of the seed-boot drag-bars  $f'$ . On the said stems  $g^4$ , between the seed-boot drag-bars  $f'$  and the shovel  
 105 drag-bars  $g^2$ , are located springs  $g^7$ . This construction permits the shovels  $g$  to yield independently of the drag-bars  $f'$ , while they are at the same time under the control of the common lever  $d'$ .  
 110

In the seed-boots  $f$  work the ordinary flexible seed-tubes  $h$ , which are secured to the lower ends of delivery chutes  $h'$ , having hopper-shaped mouths at their upper ends, located directly under and in position to receive  
 115 the materials delivered from the pivoted droppers, when in their dropping position, or at the highest traverse point of the drum. The said chutes  $h'$  are supported by angle iron brackets  $h^2$  and bolts  $h^3$ , working through  
 120 slots in the feet sections of the brackets into fixed parts of the frame-work, which construction permits the said chutes to be laterally adjusted, as may be required.

A suitable seat  $k$  is pivoted to the main  
 125 frame and supported in any desired adjustment on cross-bar  $k'$ , which is adjustably secured to standards  $k^2$ , rising from the frame.

The drum sections  $c'$  telescope with each other, and the seed-boots and covering devices  
 130 are laterally adjustable in substantially the same way as the corresponding parts, shown in my above identified prior patent, No. 518,979. It has already been stated, that the

cam-castings  $c^{10}$ ,  $c^{11}$ , and the chutes  $h'$  and the sectional tie-rods  $c^{18}$  are all laterally adjustable. These lateral adjustments adapt the machine to plant the rows at any desired spacing apart from each other. The drum sections  $c'$  are provided with doors, not shown.

Having regard to the action, it is of course obvious that, under the rotary motion of the drum, the potatoes or other materials will work outward into the collecting troughs  $c^2$ . The annular cams  $c^{10}$  operating on the lever arms  $c^8$  of the dropper-shafts  $c^7$ , normally hold the droppers in their innermost position, with the hook-portions  $c^5$  projecting into the said troughs and the flat expanded portions  $c^6$  closing the outlet openings  $c^3$  in the heads of the drums. Hence, when the cup formed by one of the hook-like portions of the droppers, in co-operation with one of the plates  $c^{16}$  is at its lowest point, in the traverse of the drum, as shown in Figs. 4 and 5, it will be loaded with the potatoes or other materials. On the continued movement of the drum, the cup will begin to clear itself of all excessive material, as it approaches the level of the drum shaft, and before it reaches the highest point in the traverse of the drum, all the materials, except what is retained by the plate  $c^{16}$ , will have rolled off from the cup. As the cup approaches the highest traverse point of the drum, the roller  $c^9$  on the crank-shaft  $c^7$   $c^8$  will enter and pass through the offset cam-channel  $c^{15}$ ; and thereby the said droppers will first be turned out into their dropping position, as shown in Fig. 7, and will then be restored to their normal positions, as shown in the other views. The said cam-channel  $c^{15}$  is so located with reference to the traverse of the drum, that the dropper will begin to turn before it reaches the highest point, so as to prevent the potato or other materials from rolling out of the cup, when in or near the highest point in the traverse of the drum.

From the foregoing, it will be seen that both the loading of the droppers and the dropping action, is effected in a positive manner, and that the separation of the potato, or other materials, to be dropped from the body of the materials contained in the drum, is effected in what might be called a natural manner under the rotary motion of the drum. The body of materials in the drum, under the effect of the centrifugal motion, tend to follow up with the drum until gravity overcomes the centrifugal motion, when they will roll back radially away from the cups, leaving only the graduated or desired quantity therein. The potatoes or other materials having been dropped into the chute  $h'$ , as described, will of course be directed through the seed-boot  $f$  into the open furrow, and be covered by the shovels  $g$ .

Referring next to the modification, shown in Figs. 9, 10 and 11, the general structure is similar to that shown in the parts already described, but the dropping mechanism is dif-

ferent in certain of its features, and there are also some minor differences, in respect to the drags and covering devices. The collecting trough sections  $c^2$ , have their outlet openings  $p$  in the peripheral walls thereof, instead of in the outside walls, as shown in the preferred construction. These openings  $p$  are normally closed by the co-operation of the pivoted droppers  $p'$ , and the sectional pivoted wipers  $p^2$   $p^3$ . The droppers  $p'$  are of hook-like form, as clearly shown in Fig. 11, and have their pivot-lugs  $p^4$ , located at the backs of the hooks, so as to leave a projecting part of the hook, which when the dropper is in its closed position, forms part of the peripheral wall of the collecting trough. The parts of the pivoted droppers, which project into the collecting trough  $c^2$ , when the droppers are in their closed position, work freely between the side walls of the said troughs and are normally held in their closed position, by springs  $p^5$  wrapped around their pivot-shafts, with their ends spread out and bearing one against the drum wall, and the other against the drum wall section of the drum. In the lugs  $p^4$  are fixed crank-arm pivot shafts  $p^6$   $p^7$ , which are journaled in bearing-brackets  $p^8$ , fixed to the outside surfaces of the trough walls, and the crank-arms  $p^7$  of which are of a length and project from the drum far enough to strike cam-rollers  $p^9$  on a transverse cam supporting rod  $p^{10}$ , held in proper position by radial arms  $p^{11}$ , projecting from the drum-shaft standard  $b'$ . The sectional wipers  $p^2$   $p^3$  have their parts pivotally connected by pins  $p^{12}$ , and held together, so as to yield in one direction only, by springs  $p^{13}$ . The wiper-sections  $p^3$  are rigidly secured to crank-arm pivot-shafts  $p^{14}$ , which are journaled in the bearing lugs  $p^8$  and the crank-arms of which project from the drum into position to be operated upon by segmental cams  $p^{15}$ , secured to and projecting upward from the rod  $p^{10}$ . The said sectional wipers are normally held in their closed position, so as to form a part of the drum wall, by springs  $p^{16}$ , wound about pivot shaft  $p^{14}$  and secured to the drum-section, as shown in Fig. 11. The segmental cams  $p^{15}$  are adjustable on the rod  $p^{10}$ , both lengthwise thereof and around the same, and are securable in any desired position by jam-screw bolts  $p^{17}$ . The cam rollers  $p^9$  are held in position by collars  $p^{18}$  and jam-screw bolts  $p^{19}$ , which permit the same to be adjusted when required. When the droppers  $p'$  and the sectional wipers  $p^2$   $p^3$  are both in their closed positions, they will join, as shown at  $p^{20}$ , in Fig. 11, to close the openings  $p$ . Having regard to the action, the pivoted droppers will be loaded, when at the lowest traverse point of the drum, in the same way as in the preferred construction; and, under the upward motion of the drum, the potatoes or other materials will roll away from the dropper after passing the level of the drum-shaft, leaving therein only the potatoes or other materials held by the dropper. When the wiper

crank-arms  $p^{14}$  strike the segmental cams  $p^{15}$ , they will be rocked inward into the full line position, shown in Fig. 11, and be there held for the whole length of the said cams  $p^{15}$ . While the wipers are thus held by the said cams  $p^{15}$ , the crank-arms  $p^7$  of the droppers will come in contact with the rollers  $p^9$  on the cross-rods  $p^{10}$ ; and thereby the pivoted droppers will be turned outward through the openings  $p$ . The inward motion of the wipers, when first striking the segmental cams  $p^{15}$  wipe off from the droppers all the materials, except the proper quantity to be carried out and dropped thereby. When the droppers  $p^7$  are turned outward, if the potatoes or other materials carried thereby should slightly more than fill the dropper-hooks, so as to be intercepted by the section  $p^2$  of the wiper, the said section  $p^2$  will yield outward against the spring  $p^{13}$ , so as to permit the dropper to turn, notwithstanding its excessive load into its dropping position, as shown in Fig. 11. The potatoes or other materials delivered by the droppers  $p^7$  are caught by the hopper-mouthed chute  $p^{21}$  and directed thereby through the flexible seed-tube and seed-boot to the seed-bed in the ground. The chute  $p^{21}$  is supported from the main frame in any suitable way. The boot-drag  $r$  is similar to that shown in the preferred construction, but has a swiveled connection  $r'$ , with the drag bracket  $f^2$ , and the boot  $r^3$  is pivoted to the drag and provided with a slotted segmet  $r^3$ , held by bolt  $r^4$ , in the customary way. The covering device is in the form of a concave roller  $s$ , held by a pair of sectors  $s'$ , pivoted to the boot-drag  $r$  and guided by bolt  $s^2$  working through a slot  $s^3$ , in the segmental part of the sector. The other parts of the machine are substantially the same as those shown in the preferred construction and require no further notice.

Turning now to the modification shown in Fig. 12, the outlet openings  $t$  are in the peripheral walls of the collecting troughs, as in the modification just previously described; but the said outlet openings  $t$  have behind the same radial shelves  $t'$ , and the front walls of the same are formed by single section pivoted wipers  $t^2$ , which are normally held in their closed position by springs  $t^3$ , but which may be rocked at the proper time by a pin  $t^4$ , in the path of crank-arm projections  $t^5$  on the pivot shaft  $t^6$  of said wiper. The pivoted droppers  $t^7$   $t^8$   $t^9$   $t^{10}$  are located on the exterior of the drum, between parallel cup side-boards  $t^{11}$ , fixed to the said drum. The said droppers are pivoted to the side-boards  $t^{11}$  by pivot-pins  $t^{12}$ , and are normally held in their closed or non-dropping position, by springs  $t^{13}$ , reacting against the periphery of the drum and the projecting parts  $t^9$  of the droppers. The springs thereby hold the said droppers as shown in Fig. 12, with the parts  $t^8$  bearing against fixed stops  $t^{14}$ , projecting from the side walls  $t^{11}$ . The lever-arms  $t^{10}$ , attached to the pivoted droppers project outward from the drum, in position to be operated upon by cam-

rollers  $t^{15}$  on cross-rod  $t^{16}$ , supported by brackets  $t^{17}$ , rising from the main frame, or in any other suitable way. The said brackets  $t^{17}$  also support the pin  $t^4$ , which projects parallel with the axis of the drum into position to engage with the crank-arm  $t^5$  of the wiper-shaft  $t^6$ . The hopper mouthed chute  $t^{18}$ , for directing the dropped materials to the flexible seed-tube is substantially the same as the chute  $p^{21}$ , shown in the last previously described modification, with the exception that it is extended upward on both sides of the drum to a higher point. Having regard to the action, the pivoted droppers  $t^7$  will be loaded, when at the lowest traverse point of the drum, by the action of gravity on the potatoes or other materials in the drum, in which action the shelves  $t'$  will prevent the potatoes or other materials from rolling backward, without entering the outlets  $t$ . Loading thus by gravity, an excessive load, such for example, as two or three potatoes may pass into the pockets, on the exterior of the drum, formed by the pivoted droppers and the side-walls  $t^{11}$  of the cups, as shown in Fig. 12. If so, as the drum moves upward and the loaded pocket approaches the vertical position, the excessive part of the load will tend to roll back through the opening  $t'$  into the drum. If this unloading of the excess should not be completed before the drum reaches the highest traversed point, or nearly so, the wiper-shaft crank  $t^5$  will be struck by the pin  $t^4$  and thereby be turned inward, as shown in Fig. 12, which will insure the return of the excess of the load at that point, while the single potato or load required, will be retained between the projecting peripheral wall of the drum and the part  $t^8$  of the dropper. Hence, under the continued motion of the drum, the retained potato or other desired quantity of material, will tend to follow along the interior surface of the dropper-hook, and hence will not pass through the opening  $t$  into the drum. When the dropper reaches the cam-roller  $t^{15}$ , the lever-arm  $t^{10}$  will strike the said roller and rock the dropper on its pivotal bearings against the resistance of the spring  $t^{13}$  into its open or dropping position; and the potato will roll therefrom into the hopper-mouth chute  $t^{18}$ .

Throughout all the views wherever appearing, the potatoes are represented by circles marked  $z$ .

The form of dropper shown in Fig. 12, will do the work, as I have demonstrated by experience, but is not as positive in its action as the other constructions before described.

Analysis of all the several forms of dropping mechanism shown and described, will disclose the fact that the pivoted dropper is a common or generic feature to all of the forms; that the pivoted dropper is normally held by suitable means in its closed or non-dropping position, and is rocked into its open or dropping position, by cams, co-operating with lever-arms on the droppers. Further,

it will be noted, on this analysis, that in all the constructions, the drop occurs at some point above the level of the drum-shaft; and that the loading takes place, at or near the lowest traverse line of the drum. Otherwise stated, the dropping and loading points are so related, that the materials to be dropped may be separated from the body of materials to be retained in the drum, in what might be called the natural way, under the action of gravity and the rotation of the drum. I believe this to be a new and important principle in the construction of droppers. It will also be noted, of course, that the collecting troughs  $c^2$  are common to all the forms shown and described.

Of course, it will be understood, that still other modifications might be made, without departing from the spirit of my invention. For example, it would, be possible, to effect the dropping by cups or droppers carried on the drum and having a lateral shifting motion, on the same, for throwing the droppers from their closed or loading position into their open or dropping position.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. In a planter, a rotary coniform drum, terminating at its large end in an angular collecting trough  $c^2$  formed by an abrupt enlargement of the said drum, whereby the seeds received therein, from the body of the drum, will be held against the action of the droppers, substantially as described.

2. In a planter, the combination with the bi-coniform horizontal drum, arranged large ends outward and having adjacent to its larger ends, the annular collecting troughs  $c^2$ , formed by an abrupt enlargement of the said drum provided with discharge openings therein, of pivoted droppers mounted in the openings of said troughs and cooperating therewith, to receive the materials to be planted, when at or near the lowest traverse point of the drum, and to drop the same, at or near the highest traverse point of the drum, substantially as described.

3. In a planter the combination with a rotary drum having discharge openings, of droppers working through said openings, normally held in receiving position within said drum, and means for positively moving said droppers from their receiving position within said drum to their discharging position exterior of said drum, substantially as described.

4. In a planter, the combination with a rotary drum, of pivoted droppers carried by the drum and provided with projecting lever-arms, and a fixed endless annular cam-way for said lever-arms arranged to normally hold the droppers in their closed position and to positively rock the same on their bearings to effect the drop at the proper times, under the rotary motion of the drum, substantially as described.

5. In a planter, the combination with a conical drum, of pivoted droppers seated in outlet openings in the drum-head and having each a hook-like portion normally projecting into the drum and an expanded portion normally closing said outlet openings, and means for positively turning said droppers from their normal to their dropping position and return under the rotary motion of the drum, substantially as described.

6. In a planter, the combination with the biconiform rotary drum arranged large ends outward and having the collecting trough sections  $c^2$  with outlets  $c^3$ , of the series of pivoted droppers  $c^4$   $c^5$   $c^6$ , seated in said openings and having the pivot shaft  $c^7$  with crank lever-arms  $c^8$ , the fixed annular cam  $c^{10}$  with offset cam-channel  $c^{15}$ , and the adjustable plates  $c^{16}$ , all arranged and operating substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES N. WILSON.

Witnesses:

E. F. ELMORE,  
JAS. F. WILLIAMSON.